The Galapagos Islands: The Bohlins' Visit

The Galapagos Islands, off the coast of Ecuador, are where Charles Darwin received the inspiration for the theory of evolution. In observing the islands' ecosystem and how its bird and reptile inhabitants compared to similar South American cousins, Darwin assembled what has become the driving philosophy of science.

In May 2003, Dr. Ray and Sue Bohlin visited the Galapagos Islands with a different perspective, focusing on intelligent design and the natural limits to biological change. Here is their report.

1 – Why Visit the Galapagos Islands?

2 – Thursday PM: Bartolome

3 – Friday AM: Punta Espinosa

4 – Friday PM: Tagus Cove

5 – Saturday AM: Punta Moreno

6 – Saturday PM: Urbina Bay

7 – Sunday AM: Darwin Research Station

8 – Sunday PM: Santa Cruz Highlands

9 – Monday AM: Beach Visit

10 – Galapagos Wrap Up: ICR Lecture, What It All Means

The Galapagos Islands: Evolution’s Sacred Ground

Dr. Bohlin helps us understand the significance of the Galapagos Islands in the birth of the evolutionary theory of Charles Darwin. Based on personal observation on these unique isolated islands, he explains why he is not convinced that the animals of these islands make a case for the evolution of all living things.

What’s So Important About the Galapagos Islands?

The Galapagos Islands are located in the Pacific Ocean, 650 miles off the coast of Ecuador in South America. They are isolated from any other island group or land form.

What’s so important about the Galapagos Islands? Here are four reasons:

First, because they are extremely isolated, the Galapagos Islands are home for dozens of species of both plants and animals found nowhere else in the world. The Galapagos Tortoise, for example, is the largest reptile found anywhere on the planet, and it lives longer than any animal known to man. The oldest is currently over 170 years old and lives in a zoo in Australia. Other unique animals include the Flightless Cormorant, the Marine Iguana, the Galapagos Penguin, and Darwin’s Finches.

There are even unique forms of plants including numerous forms of cacti and at least thirteen species of sunflower or daisy-like plants, one of which is a “sunflower” tree with bark and no tree rings.

Second, Darwin’s visit to the Galapagos for five weeks in 1835

on the HMS Beagle provided the starting point for the development of his theory of natural selection. Darwin had believed that God individually created each species. However, when he saw and studied variations between similar species from island to island, he correctly reasoned that a natural process made more sense. However, he eventually threw the baby out with the bathwater by reasoning that all species arose by a natural process through natural selection. Darwin's Finches continue to be used as a textbook example of evolution today.

Third, similar to the Hawaiian Islands, the Galapagos Islands are volcanic. There is a geological hotspot deep in the earth's crust underneath the Pacific tectonic plate where magma flows to the surface. The hotspot remains stationary. However, as the Pacific plate moves from west to east, new volcanic islands begin to appear beneath the sea until they eventually poke above the surface to create a new Galapagos island. The youngest of the islands is the island of Fernandina which is the westernmost island. It is estimated geologically to be 800,000 years old. The oldest islands off to the east are estimated to be 3 million years old.

Fourth, two major ocean currents affect the climate of the Galapagos. First, from the south comes the Humboldt Current from Antarctica. Second, a deep-water current comes from the west. Upon reaching the islands, this cold deep water current brings with it a large supply of nutrients that feed the bottom of the food chain. Consequently the western waters of the Galapagos are colder and richer in marine life. These cold-water currents keep the temperature of the islands rather moderate for islands on the equator. In the Galapagos, the waters usually range from the 60s to the 70s F (15-22 degrees Centigrade), creating a more temperate climate for these equatorial islands.

All these factors combine for a most unique experience. The Galapagos have been a "poster child" for evolution ever since Darwin. We'll see how well that holds up.

What Evidence of Evolution Do Darwin's Finches Provide?



Click to see Ray's picture report of his trip to the Galapagos Islands

In May 2003 I had my first opportunity to visit the Galapagos Islands with a group led by several scientists from the Institute of Creation Research. Our goal was simply to see for ourselves many of the unusual animals and plants which so heavily influenced Darwin in the development of his theory of natural selection.

Look in almost any high school biology textbook and you will find some mention, if not a whole section, on what are now known as *Darwin's finches*. Darwin's finches are comprised of thirteen different species of small finches that arose from a single species that colonized the islands. The finches have adapted to differing food sources ranging from different size seeds, to insects, to cactus flowers, to even blood. The major feature of these finches that has changed is the size and shape of their beaks, but the differences are very subtle.

When we got our first glimpse of the finches we found out just how subtle the differences in beak size and shape really are. Without being able to compare two or three birds right next to each other, we found it virtually impossible to identify them. This observation confirms recent research by Princeton researchers Peter and Rosemary Grant. The Grants have come to the Galapagos Islands every year since the mid-1970s. They have banded, measured, and weighed literally thousands of

finches of nearly all species.

Of the thirteen species, six are called ground finches, and they feed on different size seeds and cactus flowers. These finches particularly differ almost exclusively in their beak size or shape. The Grants have found that these finches will "evolve" to larger and smaller beaks depending on the seed availability based on a wet or dry rainy season.

They also learned that most of these six ground finches will interbreed, and the hybrids are fertile, meaning they can also breed among themselves. This information is quite startling because it means that these six species may actually be one species. And the actual degree of change is quite miniscule. The average beak size may change by only a half a millimeter from dry to wet season. These six finches are also indistinguishable in their mtDNA.

These species are so similar in the field that some of the workers and guides from the Darwin Research Station on the Galapagos have a saying: "Only God and Peter Grant can identify Darwin's finches."

As an icon of evolution, the finches are far less than hoped for.{1} Yes, they do document the reality of natural selection. But the degree of selection is quite small and seemingly insignificant. They are a wonderful example of the ability God has given His creatures to be fruitful and multiply in a fallen world.

Why Save the Galapagos Tortoise?

The word Galapagos is Spanish for *saddle*. The islands were named for a particular variety of Galapagos tortoise known as the saddleback. These tortoises inhabit the drier islands and feed primarily on many varieties of prickly pear cactus. The saddle refers to a striking feature of their shell that forms a large space just above the neck that allows the tortoise to

reach high to grab a succulent piece of cactus.

Since the islands were named for the saddleback tortoise they are a symbol of the islands. As I mentioned earlier, these tortoises are the largest living reptiles. They are also the longest living animals in the world. There is a female Galapagos tortoise in a zoo in Australia by the name of Harriet. Harriet was reportedly taken from the Galapagos Islands by Charles Darwin himself. She eventually was taken to Australia and is reported to be 173 years old, born around 1830. This would make her the oldest living creature on earth.

Harriet is a dome tortoise as opposed to the saddleback variety. Dome tortoises eat low-lying grasses, vegetation and fruits. When Darwin came to the Galapagos Islands in 1835, there were approximately 300,000 tortoises on eleven islands. There are five different varieties on the largest island, Isabella. The five varieties are found associated with the five large volcanic craters where water accumulates and grass is abundant. The other ten varieties inhabited a specific island, one variety of tortoise per island.

The islands were a favorite stopping place for whaling ships and ships crossing the Pacific. Sailors would come on shore and round up twenty to thirty tortoises to be used as food on the long voyage. A tortoise could remain alive with little or no food or water for months, providing fresh meat for the long voyage.

In addition, as people began colonizing the islands, they brought with them rats and mice that would eat the tortoise eggs. Introduced goats and pigs competed with the tortoises for food. Consequently, the tortoise population has been reduced to around 20,000. Some of the specific island varieties have gone extinct. Lonesome George has become the symbol of the plight of the giant tortoise. He is the only remaining member of the tortoises from Pinta Island, and he seems to be refusing to breed.

The Darwin Research Station on Santa Cruz Island in the Galapagos is involved in an extensive captive breeding program, trying to reestablish the tortoises in areas where they have disappeared. But why? If evolution is true, then let natural selection take its course. If they survive, fine. If not, that's just life in an evolutionary world. In Genesis, however, we are commanded to have rule and dominion over God's creatures. Wherever practicable, we have a biblical mandate to preserve the creatures He has made in the environment He provided for them (Psalm 104). So the Darwin Research Station is unwittingly acting on a Biblical worldview.

Strange Creatures of the Galapagos

Though the Galapagos Islands are world famous, they didn't particularly impress Darwin when he first arrived. In his book, *Voyage of the Beagle*, he wrote, "Nothing could be less inviting than the first appearance. A broken field of basaltic lava, thrown into the most rugged waves, and crossed by great fissures, is everywhere covered by stunted, sunburnt brushwood, which shows little signs of life."{2}

Though we may disagree with Darwin on many of the conclusions he drew from his observations of the Galapagos wildlife, he was nonetheless an excellent observer and rather humorous reporter. For instance, one of the well-known inhabitants of the Galapagos is the marine iguana, the only lizard in the world to feed in the sea. Darwin described it this way,

> *"It is extremely common on all the islands throughout the group, and lives exclusively on the rocky sea-beaches, being never found, at least I never saw one, even ten yards from shore. It is a hideous-looking creature, of a dirty black colour, stupid, and sluggish in its movements."{3}*

Darwin aside, these creatures are fascinating. They feed on algae and seaweed close in to shore. They swim easily with a

serpentine movement with their limbs tucked close to their body. Since the water is so cool, they need several hours to sun themselves before entering the water for breakfast. They will only stay in the sea for about twenty minutes and never longer than an hour. When warming themselves, they lie perpendicular to the sun so their body is fully exposed to the sun. When maintaining their temperature they will face the sun directly and lift their chests off the ground to allow the sea breeze to provide ventilation.

The marine iguana's cousin, the land iguana eats cactus pads and leafy vegetation and never ventures toward the sea. They also didn't impress Darwin terribly much. He described them this way.

> *"We will now turn to the terrestrial species, . . . Like their brothers the sea-kind, they are ugly animals, of a yellowish orange beneath, and of a brownish red colour above: from their low facial angle they have a singularly stupid appearance. . . . In their movements they are lazy and half-torpid."*{4}

Evolutionists suggest that these two species derived from a common ancestor over ten to twenty million years ago (although the oldest island is only 3 million years old!). But we learned that these two species would interbreed on occasion. The hybrids live for only seven to eight of the usual forty years, and their eating habits are strangely intermediate. The hybrids will eat cactus but not leafy vegetation, and will eat seaweed and algae but only at low tide when they can scramble over the rocks to get it. They won't enter the water. This level of hybridization makes it unlikely they are as old as evolutionists suggest.

Evidence for Evolution on the Galapagos

Islands?

Thus far we have reviewed some of the amazing animals and plants found on the Galapagos Islands in the Pacific Ocean. The mockingbirds, tortoises, and finches played a role in the formulation of Darwin's theory of natural selection. The Galapagos Islands and their varied and diverse wildlife continue to serve as examples of evolutionary change.

In my brief five-day visit to the Islands, I made a number of observations that cast doubt on the evolutionary significance of these islands.

Earlier this week we talked about Darwin's finches. These thirteen finches most likely are descended from a flock of more than thirty finches that colonized the islands about 2 million years ago according to evolutionists. They vary considerably in their beak size and shape as they have adapted to different food sources. As much as these finches have been studied, there is still a great deal we don't know.

For instance, we know nothing of the genetics of beak size and shape. It's certain that beak size is a heritable trait, but just what the genetic cause of the variation is, we don't know. As we said earlier, there may be as few as six actual species of finches on the islands, not thirteen. The changes in beak size and shape may simply have been due to genetic variation the original flock carried with them to the islands in the first place.

The changes between species are very small as we found out trying to identify them. The selection that has been documented varies only from dry to wet years and no overall trend has been observed. So Darwin's finches are not much of an example of evolution after all.

Another strange creature on the Galapagos Islands is the flightless cormorant. Cormorants are birds that inhabit the

shores of lakes, rivers, and oceans. They usually feed by diving into the water for fish. Cormorants will then perch above the waters surface and dry their feathers by holding their wings out for maximum air exposure. Flying requires dry wings.

The flightless cormorants of the Galapagos have wings so reduced that they are unable to fly at all. They catch fish by swimming in the water much as a penguin does using their large powerful feet for propulsion. The reduced wing size is probably due to a single mutation that short-circuits wing development in the cormorant chick. The change is indeed quite dramatic, but the change involves a loss of a feature, not the gain of a new adaptation. This is often the case in the origin of new adaptations. Something is lost, not gained. Evolution must be able to explain the gain of new features, not simply explain how an organism managed to survive when it lost an important structure. So even the dramatic case of the flightless cormorant is not real evidence for evolution.

The Galapagos are a naturalist's wonderland. They guard their mysteries in a shroud of isolation and time. They are a good example of the fact that there is much to learn about the world God created.

Notes

1. Jonathan Wells, *Icons of Evolution* (Washington, DC: Regnery Publishing 2000), p. 159-175.

2. Charles Darwin, *The Voyage of the Beagle*, Harvard Classics (Cambridge: Harvard University Press), p. 377-378.

3. Ibid, p. 390.

4. Ibid, p. 392.

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PBS Evolution Series

Darwin’s Dangerous Idea

Some evolutionists are definitely worried. Creation, intelligent design and a general dissent concerning Darwinian evolution continue to gain ground—so much so that a deliberate counterattack has been launched. Using scientists from around the world, professional defenders of evolution, beautiful nature photography, computer graphics and simulations, the prestige of the PBS NOVA series and the financial backing of Microsoft billionaire Paul Allen, a monumental defense and celebration of evolution has been produced.

The new PBS Evolution Series is a seven part, eight hour documentary originally aired on PBS stations around the country in late September of 2001 and rebroadcast in May and June of 2002. Accompanying the video series is an interactive Web site, 360-page companion book, coordinated teacher training and education, and a determined publicity campaign aimed at getting the series into the nation’s high schools.

The explicit goals of the series are to help students understand the critical importance of evolutionary theory in understanding so many scientific and health issues of today—from AIDS to antibiotic resistance to fighting agricultural pests to even how we choose a sexual partner. The producers set out to establish the overwhelming evidence behind evolution and the soundness of the science behind it. They specifically sought to pursue solid science journalism and forego the religious realm.

Essentially, the series has failed on all counts. This beautiful documentary is loaded with speculation, exaggerated

evidence and claims, glossing over of legitimate controversy, and a persistent hostility towards any religious perspective deemed incompatible with evolution.

Episode One begins with a dramatization of a conversation between Charles Darwin and Captain Robert Fitzroy of the HMS Beagle in South America as Darwin is purchasing a fossil. The fictitious conversation clearly pokes fun at the Biblical account of the flood. Darwin was nowhere near as skeptical as portrayed, and Fitzroy was nowhere near as literal either. This opening scene lays the groundwork for a continual assault on history and the evidence to make evolution look as positive as possible and opponents of evolution as silly as possible.

This two-hour opening episode crosses paths with religion several more times in discussions of the philosophical meaning of evolution in an interview of Kenneth Miller, a Darwin defender who finds no incompatibility between his Christian faith and Darwinian evolution. In this opening episode the producers present a confusing contradiction. On the one hand Darwin's dangerous idea precludes any true meaning to life and on the other hand, Darwinian evolution is completely compatible with an informed Christian faith. For more detailed analysis of this episode consult the Discovery Institute's free Viewer's guide available on the Internet at www.reviewevolution.com.

"Great Transformations" and "Extinction"

Perhaps the most foundational episode is Episode Two: The Great Transformations. One's expectation would be the presentation of numerous persuasive transitional forms demonstrating without doubt, the common ancestry of all life. Instead we are treated to a certainty based on the usual arguments from authority, selective fragmentary fossil evidence, and speculative molecular mechanisms.

The opening segment presents the mounting evidence for the

amazing transition from a terrestrial wolf-like vertebrate to modern aquatic whales. Lots of fossils and reconstructions are paraded before us, unfolding the supposed story of whale evolution. Complete skeletons are pictured with no indication that they are based on very partial fossil finds. The overall transitional series is discussed with certainty despite the fact that evolutionists themselves admit that the known members of the transitional series are not thought to be the actual members of the transitional series but just representative of what the actual transitional species may have looked like.{1} Also missing is the admission that, by the very nature of fossils, it can never really be known if any one fossil was ancestral to another.

Also featured in this episode is the stunning Cambrian explosion of animal life forms featuring Simon Conway Morris. Morris freely admits that "this sudden appearance of the fossils led to this term, the Cambrian explosion. Darwin, as ever, was extremely candid, he said, Look, this is a problem for my theory. How is it that suddenly animals seem to come out of nowhere? And to a certain extent that is still something of a mystery." As the segment develops, no attempt is made to explore or resolve this mystery. The experts make only vague references to evolution tinkering with what already exists. But even tinkering is a design activity, design with a purpose. Natural selection would be better described as a blindfolded man trying to navigate a minefield.

Episode 3 explores the evolutionary significance of extinction. Both the great Permian extinction of 250 million years ago and the KT extinction of dinosaur fame of 65 million years ago are explored and make fascinating stories. Their relation to evolution is obscure, however. Mass extinctions supposedly open up the playing field for new and diverse species to evolve due to less competition. But Darwinian natural selection supposedly thrives on competition. The segments on biological invaders, while important in and of

themselves, have little to add to the evolutionary debate. Biological control has been practiced for centuries with no knowledge of evolution.{2} Once again, we witness lots of authoritative posturing but little evidence for evolution.

"The Evolutionary Arms Race" and "Why Sex?"

For many years medical authorities have been warning of the dangers of infectious bacteria becoming resistant to antibiotics. The overuse and misuse of antibiotics in western society has led to an increase in the number of strains of bacteria that are resistant to our primary defense against infection. In Episode Four of PBS's Evolution Series titled "The Evolutionary Arms Race," we are told this is evolution in action.

First, this statement leads to the conclusion that knowledge of evolution is essential to designing adequate health care. And second, labeling antibiotic resistance as evolution in action implicitly states that evolution is a fact, since antibiotic resistance is a fact. This is another case of a selective use of evidence. What the producers of *Evolution* don't say is that the mechanisms for antibiotic resistance have been known for years. Usually the capacity to resist antibiotics has always been in the bacterial population and does not result from mutation. Even when a mutation is responsible, a new function is never evolved, just the damaging of an existing function. Sometimes the mutation results in the antibiotic being expelled from the cell faster or taken in more slowly. This doesn't create a new species and doesn't fundamentally change the organism.

Another factor left out of the discussion is that antibiotic resistance always comes with a cost of its own. Antibiotic resistant bacteria are always inferior to the original wild-type bacteria. Their growth is stunted. Sometimes these costs

can be compensated for but also at additional costs. Resistant bacteria are not better bacteria. Remove the antibiotic and they quickly lose out to the original wild-type bacteria. Therefore, to suggest that in the case of resistant tuberculosis that the bacteria evolved right inside the human host is highly misleading. The bacterial resistant forms were already present, the bacterium has not changed or evolved at all.

While the episode gives numerous examples of natural selection on a micro scale, the evidence discussed tells us nothing of how antibiotic resistance arose in the first place or how ants, molds, fungi, and bacteria first became intricately associated.

The fifth episode contains perhaps the least science and relevance to evolution, but will certainly be the most entertaining and even titillating for high school students. The episode "Why Sex" tries to ascertain the purpose and even evolution of sexual reproduction. While containing some helpful information and case studies, the program is full of speculative storytelling and an overload of sexual displays and sexual acts from fish to lizards, to birds, to chimpanzees and even a highly unnecessary and suggestive encounter between humans.

Also included is a highly controversial, yet factually presented discussion of evolutionary psychology and one researchers ideas that all forms of human artistic endeavors are little more than sexual displays. Some of their own previously used evolutionary experts would find most of this episode an incredible waste of time and money.

"The Mind's Big Bang" and "What About God?"

The uniqueness of human beings presents a difficult evolutionary puzzle. So much of who and what we are is

categorically different from other animal species that trying to account for it by mutation and natural selection presents a tough challenge. In Episode Six, “The Mind’s Big Bang,” we unfortunately don’t get much of an answer.

The episode begins by documenting the amazing human capacity for art in the caves of France. This launches a long series of segments that document the early appearance of artistic expression that has its roots in the development of tool making. Eventually this explosion of capacities rooted in the brain is traced to the remarkable development of human language. As in other episodes there is lots of speculation about the selective advantages of language, but this tells us nothing of how language evolved. The discussion gives the impression that if we can just discover what language is used for, we will know how it evolved. This is typical evolutionary story-telling masquerading as science.

The Cambridge Encyclopedia of Language candidly admits that “For centuries, people have speculated over the origins of human language. . . . [but] the quest is a fruitless one. . . . We have no direct knowledge of the origins and early development of language, nor is it easy to imagine how such knowledge might ever be obtained.”{3} The Discovery Institute’s Viewers Guide also notes that we are told that language was the key to our becoming human. In Episode Two, however, we were told it was the ability to walk on two legs and in Episode Five it was using our brains to choose sexual partners. This confusion of “key events” exposes them for the speculation they truly are.{4}

The final episode “What About God?” reveals the entire series as the propaganda it is meant to be. Here we meet the old science vs. religion argument in all its glory. The Evolution producers go to great lengths to distort the controversy to their own ends. The Scopes trial and the Sputnik-induced revolution in science education are neatly packaged and distorted as science vs. religion. The inquiring and

passionate science students and professors who have no quarrel with evolution are favorably portrayed against uneducated parents and naïve Bible literalists. Theistic evolutionist Keith Miller is pictured as a liberator to Wheaton College students who don't want to be perceived as unintelligent.

What becomes unmistakably clear in this episode is that the reigning naturalistic stranglehold on science education is to be maintained at all costs. Those who oppose it, risk being branded as dangerous or stupid or ignorant or all three. Censorship of facts contrary to evolution is justified in the name of science. The bottom line is that "It's OK for people to believe in God, as long as their beliefs don't conflict with Darwinian evolution. A religion that fully accepts Darwin's theory is good. All others are bad."{5}

The PBS Evolution Web Site

Located at www.pbs.org/wgbh/evolution, the PBS Evolution Web site is a goldmine of information and teaching suggestions along with interactive games and exercises aimed at sharpening one's evolutionary skills. But visitors should also expect that much of the information contained here employs the same sleight of hand that the video series uses in relating evidence for evolution. With such a great volume of information available at the *Evolution* Web site, I will direct my attention to one article as an example. Under the main heading of "Change," an essay is offered critiquing Intelligent Design. The essay is authored by Kenneth Miller, a Brown University biology professor, featured in the first episode as a Roman Catholic who sees no problem with evolution.

The essay is titled "Life's Grand Design" and purports to explain how evolution accounts for the design of nature far better than an intelligent designer would. His entire discussion revolves around the design of the human eye.{6} On page one Miller presents the problem. The eye is exquisite in

its design, accomplishing the wondrous effect of color vision with a very complicated design. How could it possibly have evolved one step at a time? On page two, Miller begins his response with the standard blind watchmaker explanation from Richard Dawkins. Miller emphasizes the gradual slight improvements and that all those that are positive will be selected. This is not necessarily true. It is well known that some genetic changes will be so slight that they do not offer a significant enough selective advantage and therefore, will be lost. Miller ignores the uncomfortable details.

Miller then describes how easy it would be to build an eye from just a few light-sensitive cells. But he starts with "light- sensitive cells." Where did these come from? How did they become light sensitive? The molecular mechanism of light sensitivity is quite complex and one of Michael Behe's examples of irreducible complexity. But once again Miller ignores the uncomfortable details. Miller states, "it is possible to draw a series of incremental changes that would lead directly to the lens and retina eye." But you know, I'm not interested in whether it can be drawn. I want to know how it would evolve biologically.

Finally Miller delivers the *coup de grace*; the eye exhibits design flaws that any engineer would never employ. You see, the human eye seems to have things a little backwards. The light- sensitive cells face the back of the eye or the retina, instead of the front of the eye where the light comes from. Therefore, the incoming light must pass through the nerve cells and blood vessels first, potentially distorting the image. Not only that, but the nerve cells eventually bunch together before punching through the retina en route to the brain, therefore creating a dangerous blind spot. Surely an intelligent designer wouldn't do it that way. The eye is therefore a great example of evolution at work. Evolution simply arrives at the best available solution.

But again, Miller ignores the details. He doesn't reveal that

the layer of cells behind the nerve cells, behind the blood vessels and behind the photoreceptor cells, is an immensely important group of cells we will abbreviate as the RPE (Retinal Pigmented Epithelium). The RPE is necessarily in close proximity to the photoreceptor cells, the rods and cones, because the RPE replenishes the necessary molecules for vision. With the RPE at the very back of the retina, these cells act as an absorptive layer to get rid of excess light. Without the RPE we would be blinded by ordinary sunlight. Also the absorption of excess light sharpens our vision. So the designer has a dilemma. Both the nerves and blood vessels must be in front of the rods and cones or the RPE must be in front because both must be in direct contact with the photoreceptor cells and they all won't fit and function together. Something will get between the light and the light sensitive cells. Putting the blood vessels and nerves in front of the rods and cones creates a very mild light filter, but does create a blind spot where the nerves bundle together. However, putting the RPE between the light and the rods and cones would create a much more detrimental filter and diffusing agent. The vertebrate eye is structured properly when all factors are considered.

"The vertebrate eye provides an excellent example of functional– though non-intuitive design. The design of the retina is responsible for its high acuity and sensitivity. It is simply untrue that the retina is demonstrably suboptimal, nor is it easy to conceive how it might be modified without significantly decreasing function."{7}

As we have seen in this essay, evolution can offer some impressive evidences on first glance. But time and time again, the intricacies of design are in the details.

Notes

1. The story of whale evolution has indeed grown more

sophisticated over the last 10-15 years. Indeed, this was one transition that many creationists had a great deal of fun with. How could a land mammal evolve into a whale? How could the transitional forms possibly be functional on land or in water? If one were to scan the presumed transitional series (found on page 138 of *Evolution* by Carl Zimmer, Harper Collins, 2001) it is quite impressive evidence for evolution. The transitional series, while a little jerky with certain gaps remaining, appears gradual enough and the fossils seem to appear in the expected order and strata. But as always, the truth is in the details. Two recent articles investigate the evidence with some detail and rigor. Ashby Camp has written a fine summary (last modified March 11, 2002) and critique of the fossil evidence for whale evolution that is available from the TrueOrigins website at www.trueorigins.org/whales.asp. Also, John Woodmorappe has analyzed the mixture of characters in some of the whale-like fossils in his article "Walking whales, nested hierarchies, and chimeras: do they exist?" in *TJ* 16(1) 2002: 111-119. *TJ* was formerly *Creation Ex Nihilo: Technical Journal.*

What we learn from these articles is that the true land mammal ancestor of whales is still in dispute. The pakicetids, the first "intermediate," are true land mammals with a few potential aquatic features in their inner ears. The next group known as ambulocetids show some aquatic features but other features distance them from actual whale ancestors. Many of these are not in the proper stratigraphic position. The pakicetids and ambulocetids are all less than 10 feet long; the fully marine Basilosaurus are all over 50 feet in length. Even by evolutionary standards there isn't enough time between these species to evolve even this simple increase in length. None of the species depicted on page 138 of Evolution are thought to be actual ancestors of modern whales. The diagram is actually drawn to indicate this fact but most people looking at it won't come away with that impression. Each species is diagrammed as an offshoot of the lineage but not an actual transitional form. How come we always find just "types"

of ancestors and never the ancestors themselves? Some character or another always disqualifies the intermediate in question. There seems to be a deeper lesson here that most evolutionists are unwilling to face.

2. The documentation of human interference in the ecosystems of Hawaii and Thailand are summed up with a plea to slow down the rate of human induced extinction and allow nature to take its own more natural and easy-paced course. This implies, however, that humans are somehow outside the loop of nature. If we are just another biological species, then we are only acting according to our own biological nature. How or why should this be suppressed? As in past mass extinctions, the strong, opportunistic and lucky will survive. Perhaps that includes us, perhaps not. In the naturalistic worldview of the series, what's the difference? This is another example of stealthily applying a Christian worldview that gives intrinsic value to nature while maintaining the guise of naturalism. In a naturalistic worldview, nature just is. Choosing to interfere on nature's behalf indicates intrinsic value and worth that can only come from outside nature itself. In the Christian worldview, this comes from God.

3. David Crystal, *The Cambridge Encyclopedia of Language,* Second Edition, Cambridge: Cambridge University Press, 1997, p. 6,290.

4. www.reviewevolution.com, p. 92.

5. Ibid, p. 107.

6. www.pbs.org/wgbh/evolution/change/grand/, p. 1-6.

7. George Ayoub, On the design of the vertebrate retina, *Origins and Design,* Vol. 17(1): 19-22. This article can also be found on the web at www.arn.org/docs/odesign/od171/retina171.htm.

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Response to News Of First Human Clone

Today, December 27, 2002, it was announced that the first human clone was born at an undisclosed location. The announcement came from Brigitte Boisselier, the director of Clonaid, the research branch of the Raelian cult. Dr. Boisselier revealed that four other clones are expected by the end of January. The Raelians have been hinting for months that a successful cloned birth was expected. Two other independent researchers, Severino Antinori (an Italian working in an undisclosed Muslim country) and Panos Zavos (from Lexington, Kentucky) have also been hinting at human cloning success and suggesting that a birth will be announced soon.

As of yet there has been no independent verification that the baby girl, named Eve, is truly a clone. Eve was delivered by Caesarian section from her twin sister (the woman who donated the nuclear genetic material from which she was cloned also served as the surrogate mother). There is some reasonable doubt about either the information given the public at this time or the legitimacy of the claim. Dr. Boisselier claimed at the press conference this morning that ten clones were implanted (no information if the ten clones were of the same individual or clones from ten different people). Five of the clones spontaneously aborted within three weeks while the other five have continued without complication. This is a 50% success rate. Normal success rates in other mammals are 2% at best. Even then, many of the clones which survive to birth develop complications in their first months of life, as high as 10% in cattle. This incredibly high 50% success rate for human cloning leaves most researchers believing that either this isn’t really a clone or they simply aren’t revealing all

the other failures.

This announcement is no cause for rejoicing. This baby and the others to follow are human experiments with high odds to develop life-threatening complications. Not only that, but poor Eve, who I believe is a full human being with a soul, will be a research subject all her life, however long that is. Human cloning ought to be banned, both reproductive cloning and so-called therapeutic cloning—or as Stanford University recently referred to it, "human nuclear transplantation." Boisselier, Antinori, and Zavos are forging ahead at breakneck speed with only a thin veneer of compassion for childless couples. They are deliberately putting innocent human life at risk both medically and psychologically for personal fame and notoriety. This needs to be condemned before others follow suit, and stopped if at all possible. The Senate needs to act now to join the House in banning all human cloning within U.S. borders.

Other articles of interest from the Probe Web site:

Can Humans Be Cloned Like Sheep?

Cloning and Genetics: The Brave New World Closes In

Stem Cells and the Controversy Over Therapeutic Cloning

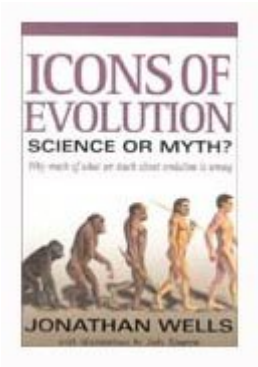
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Icons of Evolution

Dr. Ray Bohlin reviews Jonathan Wells' book Icons of Evolution, *which exposes the lies and distortions that constitute evolution's best textbook "evidence."*

 *This article is also available in Spanish.*

Lies and Distortions Masquerading as Truth in the Halls of Science



Most everyone was required to take biology in high school, and many who went on to college likely took an introductory biology course as an elective, if not as a beginning course for a biology major. Required in most of these courses, mainly because of its inclusion in the textbook, was a section on evolution. Therefore, most people with a secondary education or above are familiar with the more popular evidences and examples of evolution nearly all textbooks have been using for decades. These include the peppered moth story of natural selection, Darwin's finches as an example of adaptive speciation, and the ubiquitous tree of life with its implied common ancestor to all life forms.

These familiar evidences of the creation story of our early 21st century culture are what Jonathan Wells (Ph.D., UC Berkeley, molecular and cell biology; Ph.D., Yale University, religious studies) refers to as the *Icons of Evolution* in his book by the same name (Regnery Publishing, 2000). Wells focuses on ten of these icons and meticulously exposes them to be false, fraudulent or at best, misleading. Many of these difficulties have been pointed out before and are known to a few, but Wells adds a level of sophistication and packages them in a form certain to get the attention of everyone in the educational establishment. This book is not a plea for creation in the schools or a selective and picky rant against trivial details. It is a frontal assault against some of the most cherished and revered "proofs" of the evolution story. There will be no shortage of controversy around this extensively researched and well-written exposé. If these "Icons" are the best evidence for evolution, or at least the

easiest evidence to explain, then one is left wondering what the future of evolutionary instruction could be. Even further, what future might there be for evolution itself?

Wells begins with an icon that itself starts at the beginning, the Miller-Urey experiment. This purports to show that molecules necessary for life could have arisen by simple chemical reactions on an early earth. The Miller-Urey experiment uses an atmosphere of reduced gases: ammonia, methane, water vapor, and hydrogen. Then it adds some energy in the form of sparks, and produces as Carl Sagan said, "the stuff of life." Dating back to 1953, this experiment has been around for nearly fifty years. The problem is that for at least the last twenty-five years origin of life researchers realized that this atmosphere does not reflect that of the early earth. Many textbooks will begrudgingly admit this, but include the experiment anyway. One can only guess the reason: no other simulated atmosphere works. I suppose that textbook writers would suggest that since we "know" some form of chemical evolution happened, they are justified in not representing the facts accurately!

Tree of Life, Homology, and Haeckel's Embryos

The tree of life is ubiquitous in evolutionary literature. The notion that all of life is descended from a single common ancestor billions of years ago is how many would define evolution. But the actual evidence argues strongly against any such single common ancestor, and most animal life forms appear suddenly without ancestors in what is known as the Cambrian explosion of nearly 543 million years ago in evolutionary time. The Cambrian documents life forms so divergent that one would predict a fossil record covering hundreds of millions of years just to document the many transitions required from the first multicellular animal ancestor. Current estimates suggest this change took place in less than 5-10 million years. Yet

the tree of life, documenting slow gradual changes, persists.

Another critical evidence for evolution over the years has been homologous structures. The forelimbs of all mammals, indeed all vertebrates, from bats to whales to horses to humans, possess the same basic bone structure. This is routinely held up as evidence of having descended from a common ancestor. The different forms simply tell of different adaptive stories, resulting in their unique functions relying on the same basic foundation. What becomes puzzling is, first, a confusion of definitions. *Homology* is **defined** as structures having arisen from a common ancestor.{1} But then homology cannot be used as an evidence of evolution. Something is very wrong, yet textbook orthodoxy concerning homology continues to perpetuate a myth that has been exposed for decades. Second, supposed homologous structures do not necessarily arise through common developmental pathways or similar genes.

Next, Wells turns his attention to perhaps the most inexcusable icon of all: similarities in vertebrate embryos originally pointed out by Ernst Haeckel in the 19th century and used by Darwin in *The Origin of Species* as a powerful evidence for common descent. Haeckel's vertebrate embryos are shown passing through a remarkably similar stage early in development and only later diverging to the specific form. This passage through a common form early in development was seen as obvious evidence for a "community of descent." Yet, once again, the evidence gets in the way.

Since before the dawn of the 20th century, embryologists have known that Haeckel misrepresented the evidence. Vertebrate embryos never pass through a similar stage. What's more, Haeckel left out the fact that the earlier stages of embryonic development between classes of vertebrates pass through remarkably different pathways to arrive at this supposedly similar intermediate stage. The fraud was recently "rediscovered," though most embryologists have been aware of the inaccuracy all along. This shows the longevity of even

falsified evidence, due to its persuasive appeal even in the hallowed halls of science. Perhaps scientists are human after all, seduced by a fraud simply because it makes such a good case for a treasured theory.

The Peppered Moth

Probably the granddaddy of all the icons of evolution is the peppered moth story. In pre-industrial England, the peppered moth was common in entomologists' collections. By the 1840s a dark or melanic form was increasing in frequency in populations across England. By 1900 the melanic form comprised as much as ninety percent of some populations. In the 1950s experiments by Bernard Kettlewell clearly established that this change in frequency from a peppered variety to a dark variety was due to two factors.

First, the surface of tree trunks had changed from splotchy, lichen-covered patchwork, to a uniform, dark complexion, due to increased levels of pollution. The pollution killed the lichens and covered the tree trunks with soot. Second, the peppered variety was camouflaged from predation by birds on the lichen-covered tree trunks, and the melanic variety was camouflaged on the dark tree trunk. Therefore, the switch from peppered variety to melanic variety was due to natural selection, acting through selective bird predation as the trees changed from lichen-covered bark to soot-covered bark. Then with stricter air quality standards, the lichens are returning and the peppered variety is predictably coming back strong.

The peppered moth story became legendary as a classic example of Darwinian natural selection. But within 20 years of Kettlewell's work, cracks began to appear. It was soon noted that the characteristic switch from the peppered form to the dark form happened in areas where the lichens still grew on tree trunks. In other areas, the dark form began to decrease before the lichens began returning on trees. A similar pattern

of a switch from a light form to a dark form was observed in ladybird beetles. Birds don't like ladybird beetles. Therefore, predation is ruled out as the selector. It all began to unravel when it was observed that peppered moths of both varieties **never** rest on tree trunks!

Essentially all photographs of moths on the trunks of trees were staged using dead or sluggish moths. They are not active during daylight. If that were the case, how could birds find them on tree trunks at all? Kettlewell released his moths in his mark-recapture-predation experiments in daylight hours, when the moths are naturally inactive. They simply found the nearest resting place (tree trunks in their sluggish state), and the birds gobbled up the non-camouflaged moths. We still don't know exactly where moths rest or whether lichens play any significant role in the story. Yet many biologists insist that the traditional story makes a good example of evolution in action. "To communicate the complexities would only confuse students," they say. Once again, flawed, yet cherished, examples persist because they are just too good **not** to be true!

Birds, Dinosaurs, Fruit Flies, and Human Evolution

The reptile-like bird, Archaeopteryx, has long been heralded as a classic example of a true ancestral transitional form. The improbable change from reptile to bird has been preserved in snapshot form in this remarkable fossil from Germany. Possessing a beautifully preserved reptilian skeleton with wings and feathers, Archaeopteryx was a paleontologist's dream. This would certainly explain why Archaeopteryx has found its way into just about every textbook. But Archaeopteryx has fallen on hard times. As happens with so many perceived transitions, it is universally viewed now as just an extinct bird, an early offshoot of the real ancestor.

Surprisingly, bird-like dinosaurs from much later geologic periods are hailed as the real ancestors. This is based on structural similarities despite their existence after Archaeopteryx. Never mind that the child exists before the parent. So enamored are some, that birds are just today's feathered dinosaurs. *National Geographic* was recently caught red-faced by perpetrating a fraudulent dinosaur/bird fossil as the real thing in its pages. Scientists have even accepted molecular evidence indicating an *identical* match between turkey DNA and Triceratops DNA. Never mind that the identical DNA match is more likely the result of contamination from a turkey sandwich in the lab and that Triceratops is in the wrong dinosaur family for bird evolution. Such is the power of *wanting* to believe your theory is true.

In the next four chapters, Wells visits the familiar icons of Darwin's finches, fossil horses, mutant four-winged fruit flies, and the ultimate icon, diagrams of the progressive change from ape-like creatures to full human beings. Like the others above, these icons turn out to be far less than what the textbooks suggest. In each case, as in the six discussed above, there are plenty of experts willing to expose the lack of evidence for each icon. But they remain staples in the arsenal of evidences of the evolutionary process. Fossil horses and human evolution turn out also to be indicators of the difficulty evolution has in separating philosophical preferences from conclusions drawn from the evidence.

Textbook writers are either ignorant of current data, which prompts one to be skeptical of the accuracy of the rest of the textbook, or they are willfully misrepresenting the evidence in order to present a united front on the factualness of evolution. Unfortunately for our children, Wells is able to provide direct quotes indicating that at least some see no problem with including misleading or false data in order to make a point. After all, we know evolution is true, so just

because we don’t have easy simple stories to tell, doesn’t mean they aren’t out there waiting to be discovered.

The Scientific Academia Reacts

The reasoning behind these *Icons of Evolution* exposes much of the standard story of evolutionary theory to be mythology rather than science. And if these ten icons have been viewed as the best evidence for evolution, the entire theory needs to be questioned and made accountable to the evidence. It will be interesting to watch the evolutionary community react to these revelations. Evolutionary propagandist Eugenie Scott has already reportedly predicted that the book will be a “royal pain in the fanny” for biology teachers. Will the scientific community be able to respond with an appropriate *mea culpa,* or will there be a battery of excuses and obfuscations? I predict the latter. In the last ten years, the evolutionary establishment has been exerting a great deal of effort to demonstrate that evolution is confirmed to such a degree as to be beyond rational dissent. Organizations such as the National Academy of Sciences, the National Association of Biology Teachers, and the National Center for Science Education have lobbied long and hard for the scientific integrity of the standard evolutionary story. They have held up most, if not all, of these ten icons as the principal pillars of the unassailable evidence for evolution.

Evolution is the principal foundation of the naturalistic world view, presented by many in academia as the only scientific, and therefore, objective, view of reality. Without evolution, metaphysical naturalism cannot stand. As Richard Dawkins has said, Darwin made it possible to be an intellectually fulfilled atheist.{2} Without evolution, the naturalistic worldview is in serious trouble. Therefore, the scientific community can be expected to rally fiercely behind the evolution story. Just how they do it will prove interesting indeed. *Icons of Evolution* will help draw the

evolutionary establishment out from behind the protective bulwark of its authority and force it to defend its theory on the basis of the evidence. This is a fight I believe it must eventually lose in the court of scientific and public opinion.

There are two minor, yet unfortunate, problems with the text. The first, actually a book design problem, regards the difficulty finding the legends for some figures and distinguishing them from the regular text. The second involves an unnecessarily inflammatory discussion of the monetary support evolution receives from the U.S. tax-supported National Institutes of Health and National Science Foundation. While Wells' discussion is accurate, it comes across as sour grapes and may provide a convenient target for evolutionary propagandists to dismiss the book without dealing with the evidence.

These problems aside, *Icons of Evolution* is a landmark work and deserves to be read and studied by all who have an interest in the controversy surrounding not only the teaching of evolution, but also the very theory of evolution itself.

Notes

1. "The term 'explosion' should not be taken too literally, but in terms of evolution it is still very dramatic. What it means is rapid diversification of animal life. 'Rapid' in this case means a few million years, rather than the tens or even hundreds of millions of years that are more typical. . ." Simon Conway Morris, *Crucible of Creation*, (Oxford: Oxford University Press) 1998, p. 31.

2. Richard Dawkins, *The Blind Watchmaker*, New York, NY: W. W. Norton, 1986, p. 6.

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Global Warming

Fossil fuel emissions are unfairly being blamed for global warming. The Kyoto Protocol is based on questionable science, and will cause unnecesssary economic hardship.

What is Global Warming?

Over the last few months, dating back to the 2000 election, we have been bombarded with the news of global warming. Unfortunately, this issue has become highly polarized politically. Some scientists and politicians believe the warming has been fully documented as being caused by human interference and drastic measures are necessary to bring it under control, while others just as strenuously maintain that nothing has been proven and drastic measures will only ruin our economy for no reason. What are we to think?

First, let me say at the start of this article that I have been what some would call an environmentalist since high school. I cooperate fully with the recycling program offered by my city: collecting all newspaper, glass, aluminum cans, and certain plastics for pick-up every other week. I don’t buy Styrofoam plates or cups since it is not reusable or biodegradable.

I have long been a nature enthusiast, previously as an avid bird-watcher and feeder. Zoos have always been an attraction for me, but even better are opportunities to see God’s creatures in their natural habitat. A jog in the woods is more preferable to a run down the street, even with no traffic.

I drive a small fuel-efficient car and as soon as it is practicable for my family financially, I intend to purchase one of those new cars run by both battery and gasoline, which

gets close to 60 miles to the gallon.

I think stewardship of God's creation is a good thing and I think we (meaning humans) have often sought our own needs to the unnecessary detriment of the rest of creation. So with this as a background, what do I think of global warming? I'm afraid that my position will not totally satisfy either of the extremes mentioned earlier. For I don't think global warming requires the drastic action being required by the United Nations' Intergovernmental Panel on Climate Change (IPCC). But neither do I believe that the signs of global warming can be totally ignored, as some economists and political conservatives would have us think.

For instance, it does seem that there is credible evidence that both Arctic and Antarctic ice is receding, most glaciers worldwide appear to be in retreat, and sea levels are rising. The important question, however, is whether global warming is responsible for these events. And perhaps even more importantly, what can we realistically do about it even if rising global temperatures are even partly responsible for these disturbing trends?

In this article I will be examining the evidence for a human component to the increasing temperatures and whether the proposed remedies offered by the IPCC are the best means of effecting real change for the future.

Global Warming and the Kyoto Protocol

The issue of global warming has become a lightning rod issue the world over. When President Bush recently indicated that he would hold back on setting carbon dioxide limits for U.S. power plants, environmentalist groups around the world immediately demonized him. A campaign was put in motion to flood the White House with e-mails condemning his action.

To help understand this issue let's investigate the basics of

the greenhouse effect on our planet and see what the fuss is all about. The greenhouse effect simply refers to the ability of some gases in our atmosphere to absorb and hold heat better than others. This creates a warming blanket around the earth without which life would be much more difficult for all life forms on earth.

It’s similar to the effect produced by actual greenhouses with walls and ceilings of glass. Glass allows certain wavelengths of light and radiation in, but traps certain others from getting out. Leave your car in the full sun, even on a pleasant day, and you can later enter the car to blast furnace temperatures. That’s a greenhouse effect.

Of great concern today is the fact that some greenhouse gases, such as carbon dioxide, are increasing in the atmosphere and the average temperature of the earth at ground level has increased by about a full degree Fahrenheit since 1900 (0.5 degrees Celsius). Many have become convinced that the increase in carbon dioxide and the increase in temperature are cause and effect respectively.

Further, many believe that the increased carbon dioxide is due to the burning of fossil fuels. Some global climate computer models predict that this is only the beginning of the rise of global temperatures and that by the end of the 21st century, average global temperatures could rise by as much as seven degrees Fahrenheit (3.5 degrees Celsius). As a result, the United Nations Framework Convention on Climate Change, based on the work of the Intergovernmental Panel on Climate Change, issued the Kyoto Protocol in December of 1997.

Simply put, the Kyoto protocol calls on all agreeing nations to reduce their fossil fuel emission by at least five percent below their estimated 1990 levels by around 2010. Most nations were actually assigned reductions of 7-8 percent, including the United States. Now that doesn’t sound like much at first glance. However, it is widely recognized, that with the growth

in the U.S. economy since 1990, this would amount to as much as a 30 percent actual reduction in fossil fuel use by 2010. To achieve such a drastic reduction would require major shifts in U.S. energy policy and the economy. We'd better make sure it's worth it.

Next we'll look at the science of global warming.

Scientific Problems with Global Warming

Now I want to discuss some of the problems with the scientific evidence that purports to show that human produced carbon dioxide is responsible for global warming.{1} As I mentioned earlier, levels of carbon dioxide are increasing in the atmosphere and ground stations have reported a slight warming in this century. Many believe that the increase in carbon dioxide has caused the slight rise in temperature, and they fear this is only the modest beginning of more significant temperature increases in the 21st century. I think there are several reasons to strongly doubt this conclusion.

First, we need to consider the influence of long-term trends. The last ice age ended about 11,000 years ago by most estimates, and the planet has been warming ever since. Sea levels have been rising at the rate of 7-8 inches every 100 years. Therefore, the fact that sea levels are rising is not necessarily due to humanly caused global warming. There was a significant warming trend from around 900 A.D. to 1300 A.D. Greenland was actually green on its coasts at one time. This was followed by what is referred to as the "Little Ice Age" from about 1450 to 1850. Both of these trends occurred without human influence and the current warming trend could just be stabilization from this last Little Ice Age.

I have mentioned that the warming trend has been measured from ground stations. This distinction has been added because there is conflicting data from weather balloon and satellite data. The most significant warming has been measured in the last two

decades. However the temperature of the atmosphere has remained constant over the last twenty years.

How can the ground temperatures increase and the atmospheric temperatures stay the same? To be honest, nobody really knows for sure, but there is evidence that the ground based temperatures are in error. This could be due to what is called the heat island effect. It has been noticed that urban measured temperatures have increased faster than rural temperatures. The concrete, asphalt, factories, motor vehicles, and population density of large cities may be biasing these readings and giving a false warming trend.

If the warming trend is real, there may be another significant factor involved that has nothing to do with human interference: the sun. A measurement of solar activity in terms of the sunspot cycle length shows a strong correlation with global temperatures over the last 100 years: including the rise from 1920-1940, the dip from 1940 to 1980, and the rise over the last twenty years.

All these data seem to indicate that global warming, if it exists, is not likely to be due to human action.

The Economic Effects of the Kyoto Protocol

Knowing that the science is highly questionable raises severe concerns about the Kyoto Protocol, which calls for at least a 30 percent reduction in U.S. fossil fuel use by 2010. Not only is this drastic reduction unnecessary to combat global warming, but also its effects on the U.S. economy could be catastrophic.

First, let me point out that some warming is not such a bad thing. It is widely recognized that increased carbon dioxide is good for plants. They grow faster and require less water. A slightly longer growing season is not a negative either. It is

simply not factual to suggest that global warming is responsible for increases in severe weather, including hurricanes, tornados, floods, and droughts. Storms, in particular, have not shown any real increase in frequency or intensity.

John Christy, professor of atmospheric science at the University of Alabama and one of the lead authors of the IPCC report, said, "Hurricanes are not increasing. Tornados are not increasing. Storms and droughts do not show any pattern of increasing or decreasing . . . . Variations of climate have always occurred, even when humans could not have had any impact."{2}

Beyond these observations is the realization that the implementation of the Kyoto Protocol would have severe economic consequences. Our own U.S. Energy Information Administration (EIA) says Kyoto could drain more than $340 billion a year from the U.S. economy ($1,500 per person), double electricity prices, and cause the price per gallon to soar 65 cents for gasoline, 88 cents for diesel, and 90 cents for home heating oil. What is most significant about these rises in energy prices is that they would affect low-income families most severely. Upper and middle-income families can better shift resources to meet rising energy costs than the poor or the elderly on fixed incomes. Yet no one has talked about this.

The EIA also calculates that the Kyoto treaty could cost 3.2 million American jobs. An exhaustive study commissioned by a coalition of minority business groups concluded that 1.4 million of those lost jobs would be in our Black and Hispanic communities. And average annual family incomes in those communities would decline by between $2,000 and $3,000 under Kyoto.{3}

What is most disconcerting is that all this economic impact would be essentially for nothing, because not only is the

science of human caused global warming suspect, but even if the Kyoto Protocol is followed, it would result in less than one-half of one degree reduction in global temperature by 2050. It hardly seems worth it.

So What Do We Do?

After exploring the question of global warming, we've found the science behind it to be questionable at best and the economic impact unnecessarily severe, particularly for minority families and businesses. This may raise a question in some people's minds as to why this is being pushed so uncritically by other world governments and by the media.

Well, the first clue comes from a quick perusal down the list of nations from the Kyoto Protocol itself. Some countries like the Russian Federation are simply asked to hold their emissions at 1990 levels with no reduction. Countries from Latin America, Asia, Africa, and Polynesia, including China and India aren't even on the list (except Japan)! The reason is that these countries are still developing their economies and will need unrestricted energy use. However, as these populous nations grow economically, they may well exceed the emissions output of western nations altogether.

Implicitly, this affirms the necessity of fossil fuel energy for healthy economies. This treaty may be little more than a tax on western nations, not a policy for climate change. The late Aaron Wildavsky, professor of political science at UC Berkeley, wrote, "Warming (and warming alone), through its primary antidote of withdrawing carbon from production and consumption, is capable of realizing the environmentalist's dream of an egalitarian society based on the rejection of economic growth in favor of smaller population's eating lower on the food chain, consuming a lot less, and sharing a much lower level of resources much more equally."{4}

Now I don't think all those things are bad in and of

themselves. But I don't like the idea of being forced into it in the name of avoiding climate change. A recent *Time* cover story, apart from a wholly typical and irresponsible scare article promoting the myth of human induced global warming, actually provided some common sense activities for responsible environmental activities that save resources and money.{5}

Among them were: running your dishwasher only when it's full, replacing air-conditioning and furnace air filters regularly, and adjusting your thermostat to a little warmer in summer and a little cooler in winter. You can also set your water heater to no higher than 120 degrees (F); it saves money and is safer. Try low-flow showerheads to use less hot water and wash clothes in warm or cold water. Most detergents today clean just as well in cooler temperatures. Use energy efficient light bulbs. Improve your home insulation. And seal up all the cracks.

Since all of these save electricity, they save not only resources, but also money for you. It just makes sense.

Increased energy prices, which should occur as demand for oil and gas increases and supply remains steady temporarily but begins to drop in 20 to 40 years, will spur development for more renewal energy sources such as solar, wind, and geothermal power. Also, research is progressing in stimulating the ocean to be more biologically productive through seeding with iron to act as a sink for carbon dioxide, if levels are shown to be affecting the general climate.

But where is the voice of the church? For too long we have been silent on environmental issues. As Christians we should lead the way in care for the environment, since we claim to be rightly related to its Creator in the first place.

Notes

1. S. Fred Singer, 1997, 1999, "The Scientific Case Against

the Global Climate Treaty," http://www.sepp.org/GWbooklet/withfigures.html. All of the scientific evidences in this section can be found in this fair and reasoned report. Singer is a retired climatologist from the University of
Virginia and has formed The Science and Environmental Policy Project (SEPP) to help educate the public on global warming. This website is a great resource for up-to-date information on the global warming controversy. The report above is available with and without figures, but I reference and recommend the version with the figures copied with permission from peer-reviewed science journals for the full effect.
2. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal.*
3. Paul Driessen, 2000, "Navigating the Treacherous 'Seven Cees' of Climate Care," The Issue Archive of CFACT (Committee for a Constructive Tomorrow) at http://www.cfact.org/Issues.htm.
4. Quoted by James K. Glassman, in "Administration in the Balance," March 8, 2001, *Wall Street Journal.*
5. "What Can You Do?" *Time*, April 9, 2001, p. 39.

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The Controversy Over Stem Cell Research

What Are Stem Cells and Why Are They Important?

President Bush recently decided to allow the use of federal

funds to research the therapeutic properties of privately produced human embryonic stem cells (ES). President Bush clearly maintained the prohibited use of federal monies to produce human ES cells, since the procedure requires the destruction of the embryo to obtain them, which is currently prohibited by federal law. To fully understand the ramifications of this decision, I will discuss the nature of stem cells and their potential to treat disease.

Most of the more than one trillion cells that form the tissues of our bodies possess a limited potential to reproduce. If you remove some live human skin cells, they may divide in culture (laboratory conditions) five or six times and then die. Special cells in the underlying skin layers are what produce new skin cells. These cells' sole function is to churn out replacement cells. These are known as stem cells. Most tissues of our bodies possess stem cells that can reproduce the different cells required in that tissue. Bone marrow stem cells can produce the many different cells of the blood. They are called stem cells, since they are seen as the stem of a plant that produces all the "branches and leaves" of that tissue.

What I've described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.{1}

In addition to the advantages of previously unknown adult stem cells and their unexpected ability to produce numerous types of cells, adult stem cells carry the added potential of not causing any immune complications. Conceivably adult stem cells could be harvested from the individual needing the therapy, grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient's own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

Human Embryonic Stem Cells

The advances in adult stem cell research has only come about in the last three years. Traditionally it was thought that ES cells carried the greatest potential to treat wide-ranging degenerative diseases such as diabetes, Parkinson's, multiple sclerosis, spinal chord injuries, and Alzheimer's. Since ES cells derive from the inner cell mass of the early embryo (5-7 day old blastocyst), they are capable of forming all the tissues of the body. Therefore, researchers have long felt that human ES cells hold the greatest potential for treatment of degenerative diseases.

While the potential has always existed, the problem has been that in order to obtain these human ES cells, the embryo is destroyed during the harvesting procedure. In addition, while ES cells had been obtained and grown successfully in culture from several mammals, including mice, efforts at producing ES cells from other mammals had failed. Nobody was sure human ES cells could even be successfully produced until November 1998 when James Thomson from the University of Wisconsin announced the establishment of five independent human ES cell lines.{2} (A cell line is a population of cells grown from a single cell that has been manipulated to continue growing indefinitely in

culture, while maintaining its cellular integrity.) Geron Corporation funded Thomson's work, so it did not violate the federal ban on government funds being used for such purposes. But his announcement immediately opened up a desire by federally funded researchers to use his already established human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty years away from developing commercially available treatments using ES cells.{3} Clinical trials using adult stem cells in humans are already under way.

In August of 2000, NIH announced new guidelines allowing federally funded researchers access to human ES cell lines produced through private funding. The Clinton administration hailed the new guidelines, but Congressional pro-life advocates vowed a legal confrontation claiming the new guidelines were illegal.

The Options for President Bush

This was the situation facing President Bush when he took office. The pressure to open up federally funded human ES cell research mounted from patient advocacy groups for diabetes, spinal chord injuries, Parkinson's disease, and Alzheimer's. Additional pressure to reject federal funding of human ES cell research came from traditional pro-life groups including

National Right to Life and the Catholic Church, with personal lobbying from Pope John Paul II.

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Notes

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Stem Cells and the Controversy Over Therapeutic Cloning

Dr. Ray Bohlin explains stem cells and where they come from, insisting the potential of stem cell therapy must be weighed against the personhood of the embryo.

What Are Stem Cells and Why Are They Important?

President Bush recently decided to allow the use of federal funds to research the therapeutic properties of privately produced human embryonic stem cells (ES). President Bush clearly maintained the prohibited use of federal monies to produce human ES cells, since the procedure requires the destruction of the embryo to obtain them, which is currently prohibited by federal law. To fully understand the ramifications of this decision, I will discuss the nature of stem cells and their potential to treat disease.

Most of the more than one trillion cells that form the tissues of our bodies possess a limited potential to reproduce. If you remove some live human skin cells, they may divide in culture (laboratory conditions) five or six times and then die. Special cells in the underlying skin layers are what produce new skin cells. These cells' sole function is to churn out replacement cells. These are known as stem cells. Most tissues of our bodies possess stem cells that can reproduce the different cells required in that tissue. Bone marrow stem cells can produce the many different cells of the blood. They are called stem cells, since they are seen as the stem of a plant that produces all the "branches and leaves" of that tissue.

What I've described is referred to as adult stem cells. There is no controversy revolving around the use of human adult stem cells in research, since they can be retrieved from the individual requiring the therapy. The promise of adult stem cells has increased dramatically in recent years. Stem cells have even been found in tissues previously thought to be devoid of them, such as neural tissue. It has recently been shown that certain types of stem cells are not limited to producing cells for the tissue in which they reside. For instance, bone marrow stem cells can produce skeletal muscle, neural, cardiac muscle, and liver cells. Bone marrow stem cells can even migrate to these tissues via the circulatory system in response to tissue damage and begin producing cells of the appropriate tissue type.{1}

In addition to the advantages of previously unknown adult stem cells and their unexpected ability to produce numerous types of cells, adult stem cells carry the added potential of not causing any immune complications. Conceivably adult stem cells could be harvested from the individual needing the therapy, grown in culture to increase their number, and then be reinserted back into the same individual. This means the treatment could be carried out with the patient's own cells, virtually eliminating any rejection problems. Adult stem cells may also be easier to control since they already possess the ability to produce the needed cells simply by being placed in the vicinity of the damaged tissue.

Human Embryonic Stem Cells

The advances in adult stem cell research has only come about in the last three years. Traditionally it was thought that ES cells carried the greatest potential to treat wide-ranging degenerative diseases such as diabetes, Parkinson's, multiple sclerosis, spinal chord injuries, and Alzheimer's. Since ES cells derive from the inner cell mass of the early embryo (5-7 day old blastocyst), they are capable of forming all the

tissues of the body. Therefore, researchers have long felt that human ES cells hold the greatest potential for treatment of degenerative diseases.

While the potential has always existed, the problem has been that in order to obtain these human ES cells, the embryo is destroyed during the harvesting procedure. In addition, while ES cells had been obtained and grown successfully in culture from several mammals, including mice, efforts at producing ES cells from other mammals had failed. Nobody was sure human ES cells could even be successfully produced until November 1998 when James Thomson from the University of Wisconsin announced the establishment of five independent human ES cell lines.{2} (A cell line is a population of cells grown from a single cell that has been manipulated to continue growing indefinitely in culture, while maintaining its cellular integrity.) Geron Corporation funded Thomson's work, so it did not violate the federal ban on government funds being used for such purposes. But his announcement immediately opened up a desire by federally funded researchers to use his already established human ES cells.

But there are potential problems and uncertainties in both adult and ES cells. While the ethical difficulties are non-existent for adult stem cells, they may not prove as helpful as ES cells. ES cells have the potential for universal application, but this may not be realized. As stated earlier, establishing ES cell lines requires destruction of human embryos. An ethical quagmire is unavoidable.

Whereas adult stem cells can be coaxed into producing the needed cells by proximity to the right tissue, the cues needed to get ES cells to produce the desired cells is not known yet. Some in the biotech industry estimate that we may be twenty years away from developing commercially available treatments using ES cells.{3} Clinical trials using adult stem cells in humans are already under way.

In August of 2000, NIH announced new guidelines allowing federally funded researchers access to human ES cell lines produced through private funding. The Clinton administration hailed the new guidelines, but Congressional pro-life advocates vowed a legal confrontation claiming the new guidelines were illegal.

The Options for President Bush

This was the situation facing President Bush when he took office. The pressure to open up federally funded human ES cell research mounted from patient advocacy groups for diabetes, spinal chord injuries, Parkinson's disease, and Alzheimer's. Additional pressure to reject federal funding of human ES cell research came from traditional pro-life groups including National Right to Life and the Catholic Church, with personal lobbying from Pope John Paul II.

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Human Genome Project

Dr. Ray Bohlin takes a brief look at the accomplishment, purpose and consequence of the Human Genome Project.

 *This article is also available in Spanish.*

What’s All the Fuss About the Human Genome Project?

In February of 2001, virtually every media outlet, whether TV news, newspapers, radio, Internet news services, or news magazines, was all worked up about the announcement of the completion of the Human Genome Project. In this article we will explore this monumental achievement and what it means for the future of medicine and our understanding of ourselves.

To appreciate this important accomplishment, we need to review a little basic genetics. It may actually astonish most adults just how much genetics the National Institutes of Health assumes we know about our genetic heritage. The educational video from the HGP includes a three-minute review of basic genetic processes like DNA packaging, transcription of DNA into message RNA, and the translation of message RNA into protein. It’s no exaggeration to say that when I played this

short piece during a lecture for high school students and their parents, mom and dad were left in the dust.

Honestly, I did that intentionally; because we are only in the beginning stages of a genetic revolution that will transform the way we diagnose and treat disease and how we may even alter our genetic structure. These new technologies bring with them numerous ethical and moral dilemmas we have only begun to address and for which there may not be simple answers. If we don't take the time to familiarize ourselves with genetic research and its implications, we risk responding out of fear and ignorance and potentially throwing away crucial medical advances.

I have contended for a long time that we can no longer afford to remain ignorant of genetic technologies. They simply harbor far too great a power for both tremendous good and tremendous evil. We must work hard to take every thought captive to Christ and see what there is of benefit and what avenues of research and application we need to avoid to preserve human freedom and dignity.

Well let's talk about our genome, the sum total of all our genes. In most of the 100 trillion cells of our body are 46 chromosomes. These chromosomes are tightly coiled and packed strings of a remarkable molecule called DNA (Deoxyribonucleic Acid). DNA is a polymer, a repetitive sequence of four molecules, which I will only refer to by their one-letter abbreviations, A, G, C, and T. The human genome sequence is simply the sequence of these four molecules in DNA from all our chromosomes. If you laid out the DNA from all our chromosomes in each of our cells end to end, it would stretch six feet long.

A gene is a segment of DNA that contains the precise coding sequence for a protein. And proteins do all the real work in our cells. By looking at our completed sequence, it is predicted that our genome consists of 30,000 to 45,000 genes

in each of our cells. So, now that we have the sequence, what does it mean? We'll begin answering that question in the next section.

What Does the Human Genome Project Hope to Accomplish?

The National Institutes of Health in cooperation with several international research organizations began the HGP in 1990 in the U.S. There were four primary objectives among the many goals of the HGP{1}.

The first and primary goal of the HGP was to map and sequence the entire human genome. There is a critical and significant difference between a map and the sequence. There are over three billion letters, or base pairs, in the human genome, spread out over 23 pairs of chromosomes. Trying to locate a sequence of say 1,000 letters, the code for a large protein, is a one in a million task. Therefore, researchers needed a refined roadmap to the genome. The map entails particular sequences that can be used like signs on a road map. If the trait a scientist is studying always seems to be present with this marker, the gene involved is probably nearby. In 1995, a detailed map was published with over 15,000 markers, one for every 200,000 base pairs. This will aid greatly in associating genes with particular diseases. And now with the sequence nearly complete, with over 99% accuracy, determining the precise effect of this gene on disease will be even easier.

A second critical goal was to map and sequence the genomes of several important model organisms: specifically, the bacterium E. coli, yeast, the roundworm, fruit fly, and mouse. This information is helpful, because each of these organisms have been used for laboratory studies for decades. Being able to coordinate knowledge of their genomes with cellular and biological processes will certainly inform our study of the human genome and its various functions.

The third important objective of the HGP was to systemize and distribute the information it gathered. Any sequence over 2,000 base pairs is released within 24 hours. The sequence and map data is contained in publicly accessible databases on the Internet. The HGP has also been creating software and other tools for large-scale DNA analysis.

The fourth and final primary goal of the HGP was to study the ethical, legal, and social implications of genetic research. A full 5% of all funds appropriated for the HGP have been earmarked for these kinds of considerations. There are many concerns revolving around the use of genetic sequence data. Not the least of which are worries about ownership, patenting, access to personal sequence data by insurance companies, potential for job discrimination based on personal sequence data, and the prospects for genetic screening, therapy, and engineering. In the next section we'll begin investigating how the HGP thinks this information can be used.

What are the Long Term Hopes for the HGP?

The completion of the sequence was announced jointly in February 2001 in the journals *Nature*{2} and *Science*{3}. Both *Science* and *Nature* have made these landmark issues available, without subscription, on their websites.

The importance of recognizing the sequence of a particular gene has three important ramifications.{4} The first is diagnosis. Over the last few years, single genes have been found leading to deafness and epilepsy. Numerous genes, however, will influence most diseases in complex ways. Recently, genetic influences have been found in many forms of hypertension, diabetes, obesity, heart disease, and arteriosclerosis{5}. Genetic analysis of cancer tumors may someday help determine the most effective drug therapy with the fewest side effects. Genetic diagnosis has the potential to more precisely prescribe treatments for many medical conditions.

Second, diagnosing ailments with more precision with genetics will also lead to more reliable predictions about the course of a disease. Genetic information about an individual's cholesterol chemistry will aid in predicting the course of potential heart disease. Obtaining a genetic fingerprint of a cancerous tumor will provide information concerning its degree of malignancy. Third, more precise genetic information will also lead to the development of better strategies for prevention of disease.

Many more ailments in newborns can eventually be screened more specifically to avoid disorders later in life. Currently, babies in the U.S. and other countries are routinely screened for PKU, a metabolic disorder that prevents the breakdown of a specific amino acid found in proteins. This condition becomes toxic to the nervous system, but can be prevented and managed with appropriate diet. Without dietary changes, affected babies face extreme mental retardation. Hopefully, the number of conditions this type of screening applies to can be expanded.

Screening can also be done for adults, to see if they may be carriers of potential genetic conditions. Certain Jewish and Canadian populations regularly obtain voluntary screening for Tay-Sachs disease, a known child-killer. This information has been used to help make decisions about future marriage partners.

Perhaps the greatest benefit will come from what is called gene-based therapy. Understanding the molecular workings of genes and the proteins they encode will lead to more precise drug treatments. The more precise the drug treatment, the fewer and milder will be the side effects.

Actual gene therapy, replacing a defective gene with its normal counterpart, is still very experimental. There are still many hurdles to overcome involving how to deliver the gene to the proper cells, controlling where that gene is

inserted into a chromosome, and how it is activated.

Not surprisingly, some have seen the human genome sequence as a vindication of Darwin. We'll examine that contention next.

Did the Human Genome Sequence Vindicate Darwin?

Amid the controversy and exultation over the release of the near complete human genome sequence has been a not so quiet triumphal howling from evolutionary biologists. The similarity of many genes across boundaries of species, the seemingly messy patchwork nature of the genome, and the presence of numerous apparently useless repetitive and copied sequences all have been laid out for us as clear validations of evolution. Really!

If Darwin were alive today, he would be astounded and humbled by what we now understand about the human genome and the genomes of other organisms.

Let's take a closer look at the claims of one bioethicist, Arthur Caplan{6}, who thought the major news story was missed. So let's just pick a few of the more glaring statements to help us understand that little in his comments should be trusted.

First, Caplan says, "Eric Lander of the Whitehead Institute in Cambridge, Mass., said that if you look at our genome it is clear that evolution must make new genes from old parts."

While it may be true that we can see some examples of shared sequences between genes, it is by no means true that we see wholesale evidence of gene duplication throughout the genome. According to one group of researchers,{7} less than 4,000 genes share even 30% of their sequences with other genes.

Over 25,000 genes, as much as 62% of the human genes mapped by the Human Genome Project, were unique, i.e., not likely the

result of copying.

Second, Caplan says, “The core recipe of humanity carries clumps of genes that show we are descended from bacteria. There is no other way to explain the jerry-rigged nature of the genes that control key aspects of our development.”

Not everyone agrees. The complexity of the genome does not mean, necessarily, that it has been jerry-rigged by evolution. There is still so much we do not know. Caplan is speaking more out of ignorance and assumption than data. Listen to this comment from Gene Meyers, one of the principal geneticists from Celera Genomics, from a story in the *San Francisco Chronicle*:

> *‘What really astounds me is the architecture of life,’ he said. ‘The system is extremely complex. It’s like it was designed.’*
>
> *My ears perked up. ‘Designed? Doesn’t that imply a designer, an intelligence, something more than the fortuitous bumping together of chemicals in the primordial slime?’*
>
> *Myers thought before he replied. ‘There’s a huge intelligence there. I don’t see that as being unscientific. Others may, but not me.’{8}*

Jerry-rigged? Hardly! Confusing at the moment? Certainly! But more likely to reveal hidden levels of complexity, rather than messy jerry-rigging.

It will take more than bluster to convince me that our genome is solely the result of evolution. The earmarks of design are clear, that is, if you have eyes to see.

What are the Challenges of the Human

Genome Project?

In closing, I would like to address what are many people's concerns about the potential for abuse of this information. While there is great potential for numerous positive uses of the human genome, many fear unintended consequences for human freedom and dignity.

Some are justifiably worried about the rush to patent human genes. The public consortium, through the National Institutes of Health, has made all its information freely available and intends to patent nothing. However, there are several patent requests pending on human genes from the time before the HGP was completed.

It is important to realize that these patents are not necessarily for the genes themselves. What the patent does protect is the holder's right to priority to any products derived from using the sequence in research. With the full sequence fully published, this difficult question becomes even more muddled. No one is anxious for the courts to try its hand at settling the issue. Somehow companies will need some level of protection to provide new therapies based on genetic information without hindering the public confidence and health.

Another concern is the availability of information about individual genetic conditions. There are legitimate worries about employers using genetic information to discriminate over whom they will hire or when current employees will be laid off or forced into retirement. Upwards of 80-90% of Americans believe their genetic information should be private and obtained or accessed only with their permission. The same fears arise as to the legality of insurance companies using private genetic information to assess coverage and rates. A recent bill (June 29,2000) before Congress to address these very concerns was amended to the Health and Human Services appropriations bill, but was removed in committee. The bill

will be reintroduced this session.{9} I would be very surprised if some level of privacy protection is not firmly in place by 2002.

Moreover, many are apprehensive about the general speed of discovery and the very real possibilities of genetic engineering creating a new class, the genetically enhanced. Certainly, there is cause for vigilance and a watchful eye. I have said many times that we can no longer afford to be ignorant of genetic technologies. And while I agree that the pace of progress could afford to slow down a little, let's be careful not to throw the baby out with the bathwater.

After a series of lectures on genetic engineering and human cloning at a Christian high school, one student wrote me to say:

> *I am a senior, in an AP Biology class, and I find genetics absolutely fascinating. It's both fascinating and scary at the same time. . . . [You have inspired me] to not be afraid of the world and science in particular, but to take on its challenge and trust God.*

Amen to that!

Notes

1. "Genetics: The Future of Medicine," *NIH*, Publication No. 00-4873, 2.
2. *Nature*, 409 (15 February, 2001), www.nature.com.
3. *Science*, 291 (16 February, 2001), www.sciencemag.org.
4. Genetics: The Future of Medicine, 9-11.
5. Kevin Davies, "After the genome: DNA and human disease," *Cell*, 104 (Feb. 23, 2001), 465-467.
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A War of Words in Bioethics

Political battles are often won or lost with definitions. Proponents of abortion learned this lesson well. They didn’t want to be described as those who were willing to kill innocent life. So they changed the focus from the baby to the woman and emphasized her personal choice. Those who are pro-abortion called themselves “pro-choice” and supported “a woman’s right to choose.” Changing the words and modifying the definitions allowed them to be more successful and more socially acceptable.

Homosexuals learned the same lesson. If the focus was on their sexual activity, the public would not be on their side. So they began to talk about sexual orientation and alternate lifestyles. Then they began to focus on attacks on homosexuals and argue that teaching tolerance of homosexuality was important to the safety of homosexuals. Again, changing the words and the debate made the issue more socially acceptable.

Now this same war of words is being waged over cloning and stem cell research. The recent debate in Congress about cloning introduced a new term: therapeutic cloning. Those who

want to use cloning argued that there are really two kinds of cloning. One is reproductive cloning which involves the creation of a child. The other is called therapeutic cloning which involves cloning human embryos which are eventually destroyed rather than implanted in a mother's womb.

Representative Jim Greenwood (R-PA) sponsored a bill that would permit this second form of human cloning for embryonic stem cell research while outlawing the first form of cloning to produce children. Although it was put forward as a compromise, pro-life advocates rightly called his legislation a "clone and kill bill." Fortunately, the Greenwood bill was defeated, and a bill banning all cloning sponsored by Representative Dave Weldon (R-FL) passed the House and was sent to the Senate.

Another example of this war of words can be seen in the floor debate over these two bills. The opponents of the "clone and kill bill" were subjected to harsh criticism and stereotypes. Both the debate on cloning and the debate on stem cells has often been presented as a battle between compassion and conservatives or between science and religion. Here are just a few of the statements made during the House debate on cloning:

Anna Eshoo (D-CA): "As we stand on the brink of finding the cures to diseases that have plagued so many millions of Americans, unfortunately, the Congress today in my view is on the brink of prohibiting this critical research."

Zoe Lofgren (D-CA): "If your religious beliefs will not let you accept a cure for your child's cancer, so be it. But do not expect the rest of America to let their loved ones suffer without cure."

Jerold Nadler (D-NY): "We must not say to millions of sick or injured human beings, 'go ahead and die, stay paralyzed, because we believe the blastocyst, the clump of cells, is more important than you are.' . . . It is a sentence of death to

millions of Americans."

Notice too how a human embryo is merely called a blastocyst. Though a correct biological term, it is used to diminish the humanity of the unborn. In the stem cell debate, it was disturbing to see how much attention was given to those who might potentially benefit from the research and how little attention was given to the reality that human beings would be destroyed to pursue the research.

Moreover, the claims of immediate success were mostly hype and hyperbole. Columnist Charles Krauthammer called it "The Great Stem Cell Hoax." He believes that any significant cures are decades away.

He also points out how it has become politically correct to "sugarcoat the news." The most notorious case was the article in the prestigious scientific journal *Science*. The authors' research showed that embryonic stem cells of mice were genetically unstable. Their article concluded by saying that this research might put into question the clinical applicability of stem cell research.

Well, such a critical statement just couldn't be allowed to be stated publicly. So in a highly unusual move, the authors withdrew the phrase that the genetic instability of stem cells "might limit their use in clinical applications" just days before publication.

Charles Krauthammer says, "This change in text represents a corruption of science that mirrors the corruption of language in the congressional debate. It is corrupting because this study might have helped to undermine the extravagant claims made by stem cell advocates that a cure for Parkinson's or spinal cord injury or Alzheimer's is in the laboratory and just around the corner, if only those right-wing, antiabortion nuts would let it go forward."

So the current debate in bioethics not only brings in Huxley's

Brave New World, but also George Orwell's newspeak. The debate about cloning and stem cells is not only a debate about the issues but a war of words where words and concepts are redefined.

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