

Happy Birthday Charles Darwin
By Greta West

This year marks the 200th anniversary of Charles Darwin's birth. Born on February 12th 1809, he grew up to be an unassuming upper-class young man of no great prospects. His father sent him to the University of Edinburgh in order to study medicine, but young Charles found the lectures dull. He neglected his studies in favor of an interest in natural history. Darwin's neglect of his medical studies annoyed his father, who sent him to Christ's College, Cambridge, as the first step towards becoming an Anglican parson. But Darwin preferred riding and shooting to studying.

Not an auspicious beginning for a man who would rattle the foundations of the scientific world, and much else besides.

Though collecting beetles surely would have made for a satisfying hobby for a country parson, it provided no means of financial support. Yet Darwin's interest in natural history grew into a consuming passion. His amateur pursuits in the field began to earn him a reputation; one of his papers was published in a respectable British scientific journal. So when he was offered a position on the Beagle, he jumped at the chance. Captain Robert FitzRoy wished him aboard more as a gentleman companion than as naturalist. In those days it was considered unseemly for the captain of a ship to mingle too intimately with the lower classes of the crew. Thus, Charles Darwin won his berth due to the captain's desire for suitable company.

And the rest, as they say, is history. Indeed, Darwin's serendipitous inclusion on the voyage of the HMS Beagle stands as one of those rare turning points at which the history of ideas took a radical turn. Though it seems certain that someone else would have formulated the theory of natural selection (the idea of evolution was "in the air" so to speak) it seems unlikely that anyone else would have been able to make as convincing a case in its favor. When Darwin was an old man, and still procrastinating over publishing his theory, he was approached by a young man named Alfred Russell Wallace, just back from the Amazon. Wallace, too, was a naturalist, and had approached the great Darwin for an endorsement of the very same theory! Is it understandable if Darwin was profoundly shaken, for even respectable old gentleman naturalists have egos.

Charles Darwin was an exacting researcher. He had been thinking about evolution and gathering evidence for the previous twenty years of his life. He was well aware of the philosophical and religious implications. He knew it would upset people, including his pious wife, whom he adored. Also, he had spent that twenty-year interval building a reputation as one of Europe's most respected naturalists, publishing papers on everything from snails to the geology of South America. No one else could have written the book he was rushed to complete by 1859. What's interesting is that the *The Origin of Species* was a mere synopsis of the book he had wanted to write. Had Darwin had his way it would have been the size of the *Encyclopedia Britannica*, for he had wanted no stone left unturned.

As I said above, the idea of evolution had been in the air for quite some time. What made Darwin's work so powerful was this: he had come up with a mechanism that would explain how and why evolution occurs. That mechanism is natural selection; or as he put it, descent with modification. Others had proposed that creatures evolve, but only Darwin (and Wallace) had proposed a mechanism that would put evolution on the scientific map. It is that mechanism that places the theory in the realm of science. You often hear people say, It's only a theory. But so is the germ theory of disease, and physicists still refer to Newton's theory of gravity, the equations of which guide rockets to Mars. To the pedestrian

mind, a theory is little more than a wild idea that floats unsupported like castles in the air. But in scientific circles a theory is something quite different. A theory is a description of the natural workings of a particular phenomenon.

In its essence, science is a lot like auto mechanics. Your mechanic hears a noise in the engine. He says, I think that noise is made by part A rubbing against part B. Now in possession of a theory, he must test it. So he opens the hood and looks. If part A is not rubbing against part B, then he casts that theory aside. If part A is indeed rubbing against part B, his theory is confirmed. Whether the theory is right or wrong, it is still a theory. In auto mechanics, as in science, ideas don't graduate from theory to fact. Either a theory is confirmable (or falsifiable), or it's not, and even bad or incomplete theories are still theories. If a theory cannot be tested, it's not a very useful theory. If your mechanic tells you there's a demon in your carburetor, he's obviously blowing smoke up your skirt, for there is no test for demons in carburetors. This theory is neither confirmable nor falsifiable. You get a different mechanic. It's really that simple.

Alas, nature isn't as simple as a car's engine. She beguiles her mechanics with complexity within complexity. Given how little Darwin understood about the mechanics of life, and given nature's subtle, multi-layered complexity, it is a wonder Darwin got so much correct. For instance, no one knew a thing about genetics in the nineteenth century. Gregor Mendel's work with pea plants was done, yet his discoveries about inheritance gathered dust until the turn of the twentieth century. In fact, prevalent misconceptions concerning the way inheritance works troubled Darwin deeply. Ironically, though the notion that organisms evolve took hold in the halls of science, the mechanism of natural selection was considered unworkable for several decades. It wasn't until genetics had matured into a legitimate science that natural selection was reinstated, and Darwin was vindicated. This, I think, is the most remarkable thing about Darwin's work. The more we learn about biology, the more prescient Darwin seems. This is backwards from the way things usually work out.

Today Darwin's theory is considered the central organizing principal of all the biological sciences. Many researchers claim that nothing in biology makes sense without it. It has often been said that the mark of a great theory is that it presents as many questions as it answers. In other words, a good theory opens up new avenues of research. Like a jack-in-the-box, it yields surprises. As Timothy Ferris writes in *Coming of Age in the Milkyway*, "It is the grand, mystical systems of thought, couched in terminologies too vague to be wrong, that explain everything and seldom err and do not grow."

The theory of evolution, by contrast, though it is a hundred and fifty years old, is a thriving field of study that continues to grow with the enthusiasm a puppy Saint Bernard. But you wouldn't know this by gauging the attitudes of the American public. Over the past twenty years polls have consistently shown that from 42 to 47 percent of the American people believe God created human beings in their present form sometime in the last ten thousand years. Specifically, a 2005 NBC News poll showed that 44% of respondents believed God created the world in six days, as presented in Genesis. On the other hand, a Gallop poll of 2004 showed that 38% believe God guided the process of evolution, compared to 63% from a 2005 poll by the Pew Research Center. A lot depends on how the questions are worded. (For a detailed analysis see: <http://people-press.org/commentary/?analysisid=118>)

More disturbing is a Gallup poll showing that religion has a strong negative affect on one's comfort with evolution. Among weekly churchgoers, only 24 percent said they believe in evolution, while 41 percent do not. Inversely, 55 percent of those who seldom or never attend church expressed belief in evolution, while 11 percent do not.

Given poll numbers like these, and given that evolutionary science is a thriving field of study, you have to ask yourself: What has gone wrong with all those church-goers?

There has to be a deep cultural element to our rejection of a purely scientific idea. After all, when is the last time someone has stepped up to you and asked if you “believe in” string theory? How often have preachers made a religious issue of the theory of relativity? Given that so many ordinary people have managed to reconcile faith and evolution, the real wonder is that more aren’t up to the task. It should be an easy thing to do, yet even now, a hundred and fifty years after the publication of *The Origin of Species*, evolution is still a passionate and divisive religious issue; and given the current so-called “culture wars” it is an issue that erupts into the political arena with sickening regularity.

I feel that my own experience has granted me a certain insight into the problem, if only in a limited way. Though my parents were not strict overt fundamentalists, I did grow up in a culture in which fundamentalist assumptions were the norm. Everyone knew the Book of Genesis was the literal and inerrant word of God. Given my childhood interest in dinosaurs, astronomy, and all things scientific, I soon found myself in conflict. I remember conversations with pious relatives in which the message came across loud and clear that one could not “believe in” evolution and also believe in the Christian god. Looking back now, I feel sympathy for my young self, for a child is unable to step outside her little cultural bubble and see things in a wider context. I had no other intellectual or religious influences, aside from the books I read. Biblical literalism, as far as I could see, was the only way to be religious. Yet the stars were so fascinating to me, and the history of life so invigorating a topic that I came to feel in my bones that evolution had to be true. I was therefore faced with a choice; and when you give a child such a choice, you run the risk that she will choose differently than you. Throughout my childhood I resisted making that choice, but when I did, I chose the more interesting scientific worldview over the stifling religious one.

Not until much later did I realize that greater intellects than mine had struggled with these same issues and had come to radical and wonderfully different conclusions. I realized I had been lied to and given a false choice. To be sure, fundamentalism provides plenty of its own thorny theological problems to contend with, and I feel I would have rejected it soon enough on its own merits. But the issue of God versus evolution is surely utterly artificial, the product of a provincial and narrow-minded view of the Divine.

These days, however, and much to my ongoing dismay, it is not just ignorant country preachers who rail against Darwin’s theory. The false dichotomy of God-versus-evolution has somehow trickled up, so to speak, to more intellectual circles. Politicians and political pundits, former presidential speech writers, doctors, lawyers, and the baker-man have all boarded the anti-evolution bandwagon, many of whom have ivy league educations. Even Michael Behe, a professor of biochemistry at Lehigh University in Pennsylvania, joined the fray in 1996 with the publication of *Darwin’s Black Box*, a book that advocates Intelligent Design (of which I will say more below). But when you look closely at what these people have to say, you find they are motivated more by religious conviction than honest science. It is a strange thing indeed that after all these years the ghost of Darwin still haunts the pious.

I suppose it is possible that somewhere on Earth there lives an atheist or agnostic who rejects evolution with a passion equal to that of pundit Ann Coulter — but somehow I doubt it. The link between anti-evolution sentiment and religion appears self-evident, especially given the above poll numbers. Americans care because, like myself, they are taught in their churches that evolution is antithetical to belief in God. From the churches it leaks out to become a generalized cultural phenomenon. Even people who aren’t church-goers absorb it from the cultural ambience — that evolution is anti-religious.

When you peek behind the curtain and beyond the pseudoscientific rationalizations you find that critics of evolution often reject it for moral reasons. For instance, they claim that it engenders racism and genocide, as if those evils never existed before 1859. But even as Darwin was writing the Origin, European colonialism was in full bloody swing. Ideas about white superiority had long been entrenched in the European mind. Likewise, the arena of western civilization is drenched in the blood of the victims of genocide, often for religious reasons. Ask any Jew or Christian heretic. They didn't need evolution as an excuse. The same can be said of Social Darwinism. Those who most adamantly preached this mean-spirited distortion were greedy capitalist, not those who studied and understood evolutionary theory. Darwin himself was far ahead of his time in terms of racial attitudes.

Critics also worry that if we teach our children that they "came from monkeys", they will behave like monkeys. This, it seems to me, may well be an insult to monkeys, for they seem to get along with one another much better than we do. Bonobos, it is said, routinely forestall violence with sexual behavior — a less injurious solution than pistols at dawn, I would think. Recent studies have shown the Great Apes to be a shy and gentle species, by and large. Yes, they commit episodic violence on one another, but never on the scale that humans do. We figured it out all on our own.

Another troubling aspect of evolution appears to be the brutish picture it paints of nature, "red in tooth and claw", as Alfred Lord Tennyson put it. He coined that phrase, by the way, years before the publication of the Origin. It appeared in a poem in which Tennyson "posed questions about the apparent conflict between love as the basis of the Christian religion and the callousness of nature." (See: <http://www.phrases.org.uk/meanings/red-in-tooth-and-claw.html>.) It was not inspired by the implication of evolution, but simply by being honest about the world.

Ask yourself this: Does evolution reveal anything about nature we didn't already know? I was recently watching a scene from the BBC documentary Planet Earth in which a crocodile emerges from hiding at the waters edge and grabs an antelope by the leg. The antelope's death was anything but quick and merciful; it resisted for many long minutes as the croc gradually pulled its reluctant victim into the water. The antelope was alive and fully aware to the last violent moment. We have always known that nature was often cruel and wasteful, as when a mother frog lays hundreds of eggs only to have a mere handful of tadpoles live to adulthood. We don't need a theory to show us this; we need only to open our eyes.

When I watch a silverback gorilla murder the babies of a troupe so that the female gorillas will become sexually receptive again, I don't deny that it happens because it is brutal, and I certainly don't derive a moral lesson from it. I am told my English ancestors were horse thieves, yet I have never felt the urge to steal a horse! So why should ancestors from five million years ago have a greater influence? To the contrary, a deeper, more mature understanding of evolution reveals a world full of surprising wonders. We now understand that there is more to evolution than "nature red in tooth and claw." It also gives rise to cooperative behavior, and even examples of altruism. Had natural history been nothing but a bloody free-for-all, none of us would have survived. Nurturing is also a requisite for survival. Deriving moral lessons from nature has always been a risky business. Saying that evolution teaches us to be brutal is as absurd as saying the theory of gravity teaches us to fall and break our backs. We reject falling as we reject brutality — for reasons that are all too human. Morality (as far as we know) is a uniquely human business.

Anti-evolutionist worries about racism are equally disingenuous, mainly for the simple reason that racist thought was a feature of European culture centuries before Darwin. It is not limited to Europe, of

course; historically, all human cultures have claimed superiority over all others. In cultures like those of Europe and India in which social class is a given, such ranking will extend naturally to other groups, especially those who don't look or speak the way we do. Darwin himself, by contrast, "opposed the idea of rigid racial differences in *The Descent of Man* (1871) in which he argued that humans were all of one species, sharing common descent. He recognized racial differences as varieties of humanity, and emphasized the close similarities between people of all races in mental faculties, tastes, dispositions and habits, while still contrasting the culture of the 'lowest savages' with European civilization." (See: http://en.wikipedia.org/wiki/Racism#As_part_of_colonialism_in_the_19th_century.)

Though Darwin, by today's standards, would be regarded as racist for using terms like "lowest savages", his own ideas about evolution led him to think beyond his own ethnocentric European worldview. Indeed, his study of human facial expressions in *The Expression of the Emotions in Man and Animals* (1872) led him to believe that all human beings are basically the same under the skin. (See: http://en.wikipedia.org/wiki/The_Expression_of_the_Emotions_in_Man_and_Animals.) Since Darwin's time, with our growing understanding of genetics, many researchers have come to question the very idea of "race," for it has little meaning in the context of biology. In fact, given homo sapiens' immigrations around the world during prehistoric times, the real wonder is that we are so much alike, either genetically or anatomically. For instance, geneticist tell us that there is only about 2% difference between the genomes of chimpanzees and human beings; if this is so, how little can there be between the so-called races? Too little to measure, I think. And imagine if human beings came in as wide a variety of anatomical forms as dogs! The fact that we are so much alike in stature, facial features and the like gives scientific credence to the old religious notion that all men are brothers.

No, I'm afraid racism was never a result of evolutionary thinking, but of the universal human propensity toward feelings of superiority, and the fear of "The Other". There is no basis for it in evolutionary theory. We should look for its roots in our own flawed hearts. Evolution forces us all to take responsibility for it.

Darwin's revelations also forces us to take responsibility for the meaning of our lives. Ben Stein, former speech writer for Nixon, recently made a movie called *Expelled*, in which he presents evolution as an ideology of existential nihilism that robs life of all its meaning. With his characteristic dead-pan humor, he adopts the role of the rebel out to expose the dogmatism of a stuffy, narrow-minded scientific establishment, all against the soundtrack of "Bad to the Bone" by George Thorogood and the Destroyers. "At stake," he says "are two very consequential views of existence: Is life purposeful, and intelligently designed? Or is it random and purposeless?" He frets that our origins in "primordial goo" and the mindless processes of evolution make our existence meaningless. As a result, the only way to redeem ourselves is to insert God into science, and he does this by way of Intelligent Design. Unlike others before him, however, he does not try to deny or disguise the fact that God is the designer (preferably the Christian one, obviously). Stein should be commended for being honest about it. He is a funny guy on a number of levels.

Aside from its accusation that legitimate scientists have been "expelled" from their positions for questioning evolutionary dogma (and, presumably, for believing in God) the film is interesting for the way it portrays evolution as an atheist ideology. He does this in part by way of an interview with evolutionary biologist Richard Dawkins, who happily professes an atheism which he admits is a result of his studies in evolution. Given Stein's thesis, then, he necessarily gives short shrift to those biologists who do believe in God, and those who did not believe in God before the Origin was written. In other

words, atheism existed long before Darwin. Philosophical arguments can be made against religious belief without ever resorting to the science of evolution.

Admittedly, Intelligent Design goes about its task in a more sophisticated way than did its direct ancestor, so-called “scientific creationism.” Advocates of ID seek out examples of what Michael Behe calls “irreducible complexity”; that is, particular features of organisms that could not have evolved via a step-by-step process of natural selection. But even if such a feature is found, ID takes upon itself a heavy burden of proof, for how does one empirically demonstrate that something could not have happened? They must prove a negative. I dare say nature is far more clever than any scientist, and so our current ignorance of how a feature evolved is not, in itself, proof of anything — except our own ignorance. This reasoning points to the central flaw of ID as a scientific project, for it seeks out things that could not have evolved. Let’s say our auto-mechanic cannot figure out what made your car stall. Let’s further say that our mechanic is a renegade who has rejected the standard theory of auto-mechanics in favor of a more meaningful, spiritual theory. When all else fails he declares that there is a demon in the carburetor. But how does he prove it? When he looks into the carburetor he sees nothing there, but this proves nothing because demons are invisible. More to the point, if our auto-mechanic cannot figure out why your car stalled, he is not justified in claiming there is a demon in the carburetor. No matter how much meaning such a belief gives his life, his claim is simply a cover-up for his failure to diagnose the problem.

It may well be true that there are certain features of living things that God simply made from scratch without resort to natural process. But if such features exist, how would we recognize them? Unless they come stamped with the creator’s very own signature, identifying them would prove a tricky business, because our lack of understanding of that feature demonstrates nothing but our lack of understanding. Intelligent Design wants to replace that lack with belief, and (as I explain below) dogmatic belief can get in the way of true understanding.

This does not mean believers in God cannot do science. It simply means that our hapless auto-mechanic is not allowed to invoke God every time he fails to diagnose a mechanical problem. Doing so is a cop-out, or an implicit admission of failure as a mechanic. A scientist’s job is even more difficult, for her job is to elucidate the subtle mechanics of nature. Cartoonist Gary Larson once illustrated this principal in a cartoon. A lab-coated scientist has filled a chalkboard with complex equations; but when he reaches the bottom of the board he writes in, “And then a miracle happened.” Larson’s scientist’s insertion of a miracle is misguided not because he believes in miracles, but because he has ceased to do science. My grandfather was a faithful, God-fearing man, but seemed to lack a certain curiosity about the world. According to family lore, my Uncle John asked, “Daddy, why is grass green?” To which my grandfather replied, “Because God made it green, ye danged idgit!”

My grandfather may well have been right; all people of faith believe God made grass green. But if we look closely at grass it turns out there are other ways of answering the question. Grass is green because this is the color of chlorophyll. But this leads to another question: Why did God make chlorophyll green? Look at chlorophyll closely and we discover that it plays a part in the way grass makes a living. We call it photosynthesis. When we look closely at photosynthesis we find ourselves in the midst of chemical processes so complex as to be overwhelming. Such investigations challenge us to think hard, and to look more deeply, but at no point did we discover that God does not exist. If anything, it might grant us a greater appreciation of the complexity of God’s creation. Though my grandfather may have been right in a certain sense, the way he answered the question served only to stifle curiosity. Simply saying God did it puts an end to further questioning.

(I should also point out that at no point did we discover “why” grass is green. Japanese maples are red, so couldn’t grass have been red too? Maybe blue or black chlorophyll would have been just as good at photosynthesis. If there is a mechanistic reason chlorophyll had to be green, I don’t know what it is. Maybe God just likes green. Or maybe grass is purple or yellow on other planets.)

Simply saying God did it is precisely what Intelligent Design does. When a miracle is inserted at any point in our investigations it puts an end to further questioning, and therefore to deeper understanding. If God did it, science comes to a screeching halt. If there does exist a mechanistic answer to the question being asked, we will never discover it.

People like Ben Stein frame the issue in terms of opposing views of existence: a religious one versus an atheistic one. But the science of evolution is no more atheistic than auto-mechanics or the biochemistry of grass. Instead we are faced with two different ways of framing our questions. Christians, Hindus and Buddhists have all done legitimate science, as have atheists and agnostics. And this, I think, is one of the remarkable things about the scientific enterprise. Science is not atheistic, but secular — secular in the sense that people of any faith can participate. It does not care what our religion is as long as we are honest about the mechanics in question. For science seeks out mechanistic answers to mechanistic questions. It asks, How does it work? not, Why do I exist?

So perhaps Ben Stein and his ilk are upset about the secular nature of science; in other words, it points in no particular religious direction. It does not necessarily lead us to God. If Ben Stein needs to know why he exists he is asking the wrong people. If he is in search of the meaning of his existence he would be ill advised to ask an auto-mechanic or an evolutionary biologist. Of course, practitioners of both professions are allowed to reach beyond their fields of expertise for the answer, but neither can answer it within the exacting, mechanistic contexts of those professions. He will not find the meaning of existence in the workings of an automobile engine.

It seems to me that science often draws criticism for its inability to do things it was not designed to do. This is like cursing a hammer for making a lousy screwdriver. So if science does not lead us directly to a particular set of religious beliefs, it makes no sense to rail against it, reject it, or to accuse it of atheism. No matter how passionately one curses a hammer, it will never become a screwdriver — or a burning bush. The secular and mechanistic nature of the scientific enterprise allows us, even encourages us, to seek God via other avenues. As I said above, science forces us to take responsibility for the meaning of our own lives. If we are unable to find meaning in photosynthesis, or in the inner workings of a living cell, or in evolutionary biology, then perhaps this is due simply to a massive failure of imagination. If I were to recommend a single book to those who reject evolution on religious grounds it would be *Finding Darwin's God: A Scientist's Search for Common Ground Between God and Evolution*. Its author, Kenneth R. Miller, is a professor of biology at Brown University and a devout Christian. Miller writes: "As more than one scientist has said, the truly remarkable thing about the world is that it actually does make sense. The parts fit, the molecules interact, the darn thing works. To people of faith, what evolution says is that nature is complete. God fashioned a material world in which truly free, truly independent beings could evolve."

Miller makes the argument that creationists, in trying to salvage God, actually diminish the deity by insisting that nature is not complete. He feels that the self-sufficiency of nature — that it works all by itself without need of miracles — is necessary if we are to believe that God made us free moral agents. A universe in which God pulls all the strings limits our freedom to decide for ourselves. Below I quote Miller at length, for he makes his argument far better than I could:

This sad specter of a weakened and marginalized God drives the continuing opposition to evolution. This is why the God of the creationists requires, above all, that evolution be shown not to have functioned in the past and not to be working now. To free religion from the tyranny of Darwinism, creationists need a science that shows nature to be incomplete; they need a history of life whose events can only be explained as the result of supernatural processes. Put bluntly, the creationists are committed to finding permanent, intractable mystery in nature. To such minds, even the most perfect being we can imagine would not have been perfect enough to fashion a creation in which life would originate and evolve on its own. Nature must be flawed, static, and forever inadequate.

. . . evolutionary science . . . suggests a world in which our material existence is not an impossible illusion propped up by magic, but the genuine article, a world in which things are exactly what they seem. A world in which we were formed, as the Creator once told us, from the dust of the earth itself.

If he so chose, God . . . could have fashioned anything, ourselves included, *ex nihilo*, from his wish alone. In our childhood as a species, that might have been the only way in which we could imagine the fulfillment of a divine will. But we've grown up, and something remarkable has happened: we have begun to understand the physical basis of life itself. If a string of constant miracles were needed for each turn of the cell cycle or each flicker of a cilium, the hand of God would be written directly into every living thing — his presence at the edge of the human sandbox would be unmistakable. Such findings might confirm our faith, but they would also undermine our independence. How could we fairly choose between God and man when the presence and the power of the divine so obviously and so literally controlled our every breath? Our freedom as his creatures requires a little space and integrity. In the material world, it requires self-sufficiency and consistency with the laws of nature.

Those who ask from science a final argument, an ultimate proof, an unassailable position from which the issue of God may be decided will always be disappointed. As a scientist I claim no new proofs, no revolutionary data, no stunning insight into nature that can tip the balance in one direction or another. But I do claim that to a believer, even in the most traditional sense, evolutionary biology is not at all the obstacle we often believe it to be. In many respects, evolution is the key to understanding our relationship with God.

Believing in Darwin's God as Miller does requires an act of imagination far in excess of that available to Ben Stein and Michael Behe, author of *Darwin's Black Box* in which he argues that nature is not self-sufficient but requires ad-hoc miracles to make it work. If I were a believer, I would not wish to believe in a creation so flawed and incomplete that it needed constant tinkering to make it function. This is exactly the kind of world Stein and Behe wants us to believe in, and therefore in a Creator who is not quite competent. Such incompetence makes a poor argument in favor of God's existence. That people like Kenneth Miller and atheist Richard Dawkins can each see the world in such starkly different lights bespeaks a universe of such richness, subtlety, and complexity that it challenges our imagination to its limits. With each new discovery we are forced, often against our will, to re-imagine God and our place in the natural world. If the world does not turn out to be as simple as we once hoped, then we can either reject the entire idea of God, or we can allow our God to expand to encompass the

new reality. As beings possessed of free will, the choice is up to each of us. But given the apparent self-sufficiency of nature, and given that science has shown itself capable of explicating the subtle mechanics of nature, what is not an option is the intellectual dishonesty of creation science. Intelligent Design attempts to redeem God by stripping mechanism from science, and therefore is not a science at all. Nor is it, as Kenneth Miller argues, honest faith.

When critics reject the “mindless processes of evolution” they reject science itself, for science is by its very nature an investigation into process. Therefore science is unable to say anything about miracles, for miracles offer no process to investigate; and if a miracle can be understood in scientific terms, it is no longer a miracle. Characterizing those processes as purposeless is more a matter of opinion (or faith) than science. In Ben Stein’s movie he gets a lot of comedic mileage out of biology’s failure to understand how life began. Various hypotheses have been advanced, each of which Mr. Stein, in his infinite wisdom, finds laughable. But if biologists don’t yet have the answer, shouldn’t they be lauded for saying so? An admission of ignorance is far more honest than a creationist’s desire to put an end to the question by inserting a miracle. You can be sure that if an answer is ever found it will not be found by a creationist — nor by a comedian and former speech writer.

For a fuller examination of 19th century “scientific” racism see *The Mismeasure of Man* by Steven Jay Gould.

The Wikipedia article on racism also offers an extensive reading list at <http://en.wikipedia.org/wiki/Racism>

For an excellent explanation of how natural selection works see *The Blind Watchmaker* by Richard Dawkins.

There are many books on the creationism/evolution debacle. The two I would recommend are older and don’t include discussion of Intelligent Design, but given that Intelligent Design is just Scientific Creationism with a makeover, they are still relevant. *The Monkey Business: A Scientist Looks at Creationism* by Niles Eldredge, and *Scientists Confront Creationism* edited by Laurie R. Godfrey.

I would also recommend a more recent publication I have not yet read: *Scientists Confront Creationism: Intelligent Design and Beyond* edited.