

“Two Faces of Reality”

Robert Jastrow and Norman Podhoretz

Robert Jastrow:

Recently there has been a great deal of discussion about whether Darwin’s ideas conflict with accepted religion, and, in a related question, whether his theory is valid. In a powerful essay in the Wall Street Journal, “Science hasn’t killed God,” Norman Podhoretz cites the Nazi slaughter of the Jews as Hitler’s genetic experiment in purifying the human race. He mentions other cases: Stalin’s Soviet “experiments” (so-called), and a proposal by Watson and Crick, the discoverers of the double helix, to administer genetic tests to infants – and if they fail, to put them to death. Similarly, a recently appointed professor of bioethics at Princeton University, Peter Singer, has proposed a program of infanticide for babies who fail the test of vulnerability through their predisposition to certain diseases.

There is a feeling that this view of the human being, which is certainly repellent, draws impetus from Darwin’s ideas about the evolution of a gene pool. Such an association makes Darwinian ideas seem intrinsically immoral and to be rejected – particularly if they turn out to be invalid in comparison with the history of life.

So the first question is whether there is a valid association between this highly immoral behavior and the Darwinian view of humans as a collection of genes, controlled by the force of natural selection. This leads to another question: whether the evidence for Darwinian evolution, and for Darwin’s view of the world of life (and humankind in particular) is valid. Today, I hope only to clarify a few misunderstandings regarding Darwin’s theories and their implications for these larger issues of existence.

A general remark. By small increments of knowledge, accumulating over the last five hundred years or so, scientists have pushed the frontiers of the material universe farther and farther back into the world that used to be considered the spiritual. Their efforts have yielded a chronicle of events by which atoms in the parent cloud of the universe gradually evolved into intelligent life. Through the work of these scientists, the material substances of the earth and its inhabitants have been traced back in time to a beginning – a distinct moment when the universe we know came into being. In a material sense, the seed of everything that has since happened was planted in that moment: every star, every planet, every living thing, can trace its physical origin to that moment. It was, literally, the moment of creation.

Now, what forces brought the universe into being, and in a form congenial to the support of life – science cannot answer *that* question. Yet, while science cannot explain what came before the beginning, it can offer a good account of the events that came after; and that is what I would like to summarize briefly for you:

- ◆ About three minutes after the beginning of the universe – the Big Bang – the temperature had dropped to a billion degrees. Protons and neutrons began to stick together to form helium nuclei.
- ◆ After a million years, the first atoms appeared.

- ◆ After a billion years, the cloud of atoms and nuclei was cool enough so that knots of condensed matter appeared. These were the first stars, galaxies and planets.
- ◆ In another ten billion years – and now this brings us to a time four or five billion years ago – the sun and earth appeared.
- ◆ After another billion years, life appeared on the earth. The evidence is one-celled organisms – bacteria and algae that appear in rocks about four billion years old.

Was this life created out of the inanimate matter that preceded it? And if so, how? The answers are not known. It is not as big a mystery as the beginning of the universe, but it is one that is under intense research and still evolving. Once across the threshold of life, however, we pick up the trail as a scientific narrative:

- ◆ About three and a half billion years ago, the remains of simple one-celled organisms, algae and bacteria appear.
- ◆ Next, we see what appear to be worm burrows – evidence of many-celled animals – preserved in rocks about seven hundred million years old. So we are coming up to the present.

Note that in this narrative, there is no hint as to why the universe exists; why it is congenial to life; why, in the language of the Roman philosopher Lucretius, “there is something rather than nothing.” On this, there is no illumination whatsoever. But there is a narrative chain of cause and effect that stretches from the beginning of the universe across the threshold of life on the earth and then onward:

- ◆ About six hundred million years ago appear the remains of the first hard-bodied animals, animals with external skeletons.
- ◆ Five hundred million years ago, the fishes – the first animals with internal skeletons – appear.
- ◆ About four hundred million years ago, in a time of drought, a kind of fish with lungs as well as gills, and stumpy fins articulated for walking, dragged itself out of the water and across the land – probably in search of a pond with more water. This, over the course of time, evolved into the first amphibian.
- ◆ Two hundred and fifty million years ago, the amphibians had evolved into an animal completely emancipated from the water: the first reptile. These were the ancestors, according to the fossil record, of every backboned animal: snakes, lizards, dinosaurs, crocodiles, turtles, birds, and mammals.
- ◆ About a hundred and fifty million years ago, the climate grew colder and drier. An offshoot of the reptiles appeared: mammal-like reptiles that were warm-blooded or partly warm-blooded. Then the world entered a period of mild climate, the Mesozoic, and for some hundred million years, reptiles flourished and ruled the earth.
- ◆ About a hundred million years ago, the climate turned cool again as we began the descent into the present Pleistocene Ice Age. Reptiles declined in size and numbers, and an animal that had remained inconspicuous and minor in the population up to that time, the ancestral mammal, now inherited the earth. In a short time, it radiated into the forms with which we are familiar today: lions, tigers, elephants, apes and the rest. From this point on, the history of life is fairly complete, until finally, in rocks about a quarter of a million years old, the first creature with a human level or quasi-human level of intelligence is found.

Note that *all* the large trends in the history are clearly exhibited in the fossil record. The “missing links” are not missing. There are some gaps, but they are being filled in from year to year. Just in the last ten years, two important finds stitch together the transition from the first fishes, to the amphibians, to the ancestral reptiles. The continuity of this fossil record, even with the gaps it presently possesses, offers convincing evidence that by a succession of improvements over millions of years, humans did in fact arise from simpler and less intelligent animals.

It is interesting, for instance, that nearly every important bone in the human body can be traced back to the skeletons of the first fishes. You can trace the evolution of the 28 bones that form the dome of the skull, bone by bone, from the first fishes that left the water, through the amphibians, the reptiles, the tree-apes, and finally humans. It is an impressive demonstration of the continuity of the record.

The proof of man’s animal origins is circumstantial but its cumulative impact is overwhelming. All of the evolutionary changes are associated with changes in the environment – mostly climate – and they are clearly adaptive; that is, the changes that appeared made populations better able to survive under the new conditions.

It was Darwin’s genius to figure out how this works, through the mechanism of differences in reproductive success. However, Darwin’s theories are not, in my opinion, an important issue in the dialogue between the scientist and the theologian. The significant question is whether the long chain of events that culminated in the appearance of humans on the earth is part of a larger plan or purpose in the universe. My own views on this question are close to those of Darwin, who said: “My theology is a muddle. I cannot look at the universe as the result of blind chance, yet I see no evidence of beneficent design in the details.”

Most scientists today don’t share his doubts. They have a materialist philosophy; they are convinced that the demonstrated fact of evolution removes the need for a guiding hand in the universe. The great evolutionist George Gaylord Simpson expressed a view widely held among scientists when he wrote that evolution “achieves the aspect of a purpose without the intervention of a purposer, and a plan without the action of a planner.”

Yet, when you study the history of life from the perspective of hundreds of millions of years, you see a flow and a direction – from simplicity to complexity, and always towards higher intelligence in the most advanced forms. And you wonder, can this history of events, this chronicle of life, with its clear direction, yet be undirected?

For me, this is the central issue, and I believe that science cannot answer it. Scientists have an interesting story to tell that connects the birth of the universe to the appearance of mankind, but to the larger questions of plan and purpose, science has no answer.

But let me make a comment on the very strong feeling among our friends and colleagues that Darwin is wrong, and that it is just as well that he is wrong. I think it is important to straighten out the fact that the fossil record supports evolution and evolution by Darwin’s mechanism extremely well. That is something that one must live with. The chain of cause and effect revealed by the fossil record that stretches up to the appearance of mankind is completely convincing and satisfactory.

One reason why there is so much interest in the validity of Darwin’s theory in the last couple of years has been the work of a biochemist named Michael Behe. In his book, *Darwin’s Black Box*, Behe suggests the record cannot be explained by Darwin’s ideas. He argues, for in-

stance, that if you take a complex system like the human eye – with its zoom lens and color adaptation and retina and variable aperture – and take away any single element, the rest doesn't work; it is like taking the spring out of a mousetrap. Therefore, he argues, the eye cannot be the product of gradual, incremental improvements over the history of the species, as Darwin's ideas would suggest.

Well, I did a little reading on this matter and would like to share with you what I found. The eye has appeared independently approximately forty times in the history of life on the earth. Some of those are indeed eyes with a lens like ours. But some eyes – for example, those of the nautilus – are like pin-hole cameras; they have no lens, just a very small aperture for focus. Other eyes are built like an astronomer's telescope, using not a lens for their curvature but a curved mirror. Others are compound eyes. The point is that *anything* that enables you to detect what is going on in the environment will be valuable to you and to your descendents. It can be an eye without a lens; it can be a simple light-sensitive spot. It needn't be that near-perfect eye that we possess. So it is not correct to say that the eye of the human must come into being all in one piece, so to speak, or else it will not work at all.

Again, the big questions are not answered: Why is there something, rather than nothing? And as Einstein said once, didn't God have a choice when he or she made the universe? Could the universe have been different with a different velocity of light, different conditions, perhaps a different form of life? Or was there, in fact, no other option?

If that is the case, then beneath our present knowledge of physics as well as of natural theology, there must lie something deeper to which we have not yet penetrated, and which remains for future generations to discover.

For when we step back, all of us must admit that the emergence of this variety and tapestry of life forms on the earth (not to mention the possibility of life on other planets in other solar systems) must have some meaning deeper than our present understanding of the fossil record.

With these remarks, I would like to turn the podium over to Norman.

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Norman Podhoretz:

Bob Jastrow and I have been having lunch together for years now, discussing this very question and the more we talked, the more I listened to him and the more he listened to me, the less we seem to have to disagree about. I was only reminded, with all this hundred billion year stuff, that the Book of Job, as you may recall, ends with God appearing in the whirlwind after Job and his so-called comforters had been arguing about whether Job must have been guilty of some heinous sin to have been punished as he was punished. And instead of answering that question, God answers with the logically irrelevant demand, "Where wert thou when I created the universe?" I now know the answer to that question: the scientists were there, with the Big Bang and they have been there ever since, although it says in the Bible that a thousand years are as the blink of an eye to God, apparently a hundred million years is closer to the right number, as we are going to talk about in a minute, in the eye of God. I want to – well, I don't know.... I am neither a theologian nor the son of a theologian, to paraphrase the prophet Amos, who said he was neither a prophet nor the son of a prophet, and I certainly don't wish to play the role of the apologist for religion in one of those classical disputations in the war between science and religion. But the article to which Bob Jastrow referred says pretty well what I have to say on this

matter. I was hoping to be able more or less to read it, since it was published a year ago and since most of you either never read it or don't remember it if you did. I wonder if that would be in violation of every rule in the book. Would it? Good God -- will you pardon me as God may or may not? All right, let me run through it anyway, possibly cutting it, because frankly what I have to say on this subject is said more precisely in this article than I would be able to say now. This article was written, incidentally, as the last in a year-long series that the Wall Street Journal had commissioned about the most significant events of the millennium just ending.

The title is not mine, "Science hasn't killed God," but in any event, I began by saying that the single most important event or phenomenon of the millennium just ending was "the dog that didn't bark." But the second most important was the dog that did. As for the dog that barked, it was surely the development of modern science. This process started not at the beginning of the millennium but halfway through it. It got seriously under way with Copernicus in the middle of the 16th century and picked up steam in the early 17th. But in the four centuries since Copernicus proved that the Earth revolves around the sun rather than the other way around, more has been learned about the natural world than was known in all the ages of human existence that came before him, as Bob Jastrow has just vividly demonstrated, at least in one area.

Now this seems, when you pause to reflect on it, very odd indeed. After all, there can't be any doubt that some of the greatest intellects ever to appear on earth were active two thousand years ago and earlier. Among the ancient Hebrews and the ancient Greeks alone, there were thinkers who have never been surpassed in profundity, originality, vision and wisdom.

Some of these ancient peoples even applied themselves to mathematics and the sciences, and up through the Middle Ages their work continued to exert a mighty influence on Jewish, Christian and Muslim philosophers and theologians alike. Scholasticism, the school of thought rejected by modern science (it was called the "new philosophy," in the parlance of the time) was almost as deeply rooted in the Greeks, especially Aristotle, as in it was the Bible. Indeed, the most formidable of the Scholastics, St. Thomas Aquinas, dedicated himself to reconciling reason, which he equated with Aristotle, and revelation, which of course he equated with the Scriptures). In the course of pursuing this enterprise, Aquinas had much to say about the physical nature of the universe, as indeed, had Aristotle before him.

What, then, can explain why most, if not all, of what these great minds thought they knew about the nature of the material world was wrong? Conversely, how did it happen that Copernicus, and then Kepler and Galileo, the two giants who came right after him, and those who followed in their footsteps all the way to Bob Jastrow, got most, if not all, of it right?

One might imagine that so huge and consequential a question would be hard to answer. But I don't think it is hard to answer at all. Galileo himself, as a matter of fact, answered it. The Scholastics, he clearly recognized, were interested only in explaining *why* things were as they were, and their explanations took the form of logical deduction from the truths they already possessed through revelation. Galileo's revolutionary aim, by contrast, was to discover *how* things were by observing and measuring them.

Galileo never claimed that these new experimental procedures could uncover anything about the cause or the origin of the forces being measured and observed. But through such procedures, he could and did find evidence that the Scholastics, and Aristotle before them, were

wildly mistaken about the physical universe. Speaking of phenomena that he had spotted through the telescope he built -- phenomena that were ruled out by the prevailing Scholastic theory -- Galileo declared (and I am quoting him): "We have in our new age accidents and observations, and such, that I question not in the least, that if Aristotle were now alive, they would make him change his opinion."

Well, Aristotle might have changed his opinion, but the professor of mathematics and philosophy at the University of Padua was no Aristotle. He declined even to look through the telescope Galileo had built. Why bother? So far as he was concerned, nothing he might see through that telescope could shed light on the human purposes it served. So he wouldn't look.

Now Galileo took the opposite tack. It was, he argued, beyond the power of the human mind unaided by revelation to penetrate those purposes. Therefore, it would be better for people (and I am quoting him again) "to pronounce that wise, ingenious, and modest sentence, 'I know it not,' ", rather than, like the Scholastics, "suffer to escape from their mouths and pens all manner of extravagance." Even though Galileo, while famously forced by the church to recant his belief in the heliocentric cosmology of Copernicus, held on privately to that belief, but he did not reject Christianity. He also contended that science did not contradict the Bible, as properly understood. But he did, willy-nilly, whether he wanted to or not, sever the connection forged most fully by Aquinas between reason and revelation.

To the great English poet John Donne, who lived in the early days of this intellectual revolution, it was a disaster:

And new philosophy calls all in doubt.

The element of fire is quite put out;

The Sun is lost, and the earth, and no man's wit

Can well direct him where to look for it. ... ,

'Tis all in pieces, all coherence gone. ...

However, Donne's fellow countryman and near- contemporary, Sir Francis Bacon, saw it all very differently. In Bacon's view, the new philosophy was no threat at all, not to religious faith, not to the wit of man and not to the social order. By separating out "the absurd mixture of matters divine and human" that the Scholastics had concocted, all the new philosophy did was "to render unto faith the things that are faith's." To understand the word of God, we now had to "quit the small vessel of human reason, and put ourselves on board the ship of the Church, which alone possesses the divine needle for justly shaping the course." Furthermore, "in submitting to the limits of human reason, we would lay bare the true wonders of God's creation, and we would thereby ultimately be led to worship him all the more."

This prediction may have been sincere or, more likely, it was a clever piece of apologetics to get Bacon out of trouble with the church, but in any case it turned out to be wrong about the effect of the new philosophy on religious belief. As science progressed, faith in the old sense grew correspondingly weaker, and by the 18th century, which was not dubbed the Age of Reason for nothing, it had been diluted into the depersonalized generalities of Deism.

In the meantime, the human mind unaided by revelation was showing such enormous power that even a poet like Alexander Pope (who was a Roman Catholic) fell into a state of veneration as before a saint in contemplating the figure of the preeminent scientist of his day, Sir Isaac Newton:

Nature and Nature's law lay hid in night.

God said: 'Let Newton be.' and all was light

The paradox was that this apparently unlimited power had been unleashed precisely by the willingness of reason to become (in Galileo's term) more "modest." In restricting itself to what it was capable of discovering, instead of presuming to answer the ultimate questions that were beyond its ken, and, as Bob tells us, are still its ken, the human mind had rapidly acquired a vaster store of knowledge about the physical universe than it had managed to gather in all the thousands of years gone by.

By the 19th century, with the advent of Charles Darwin, and here I turn to the main subject of Bob's talk – I am not an anti-Darwinist, I don't know enough about Darwin to take an issue. But I do know that with his advent, the new philosophy had descended, you might say, from the planets to the apes. (Confused laughter) Don't you people go to the movies? And with this shift, the so-called war between religion and science, which Bacon, had denied would ever occur, heated up to a veritable frenzy. 'Like so many of the scientists who had come before him, Darwin protested that he was not a nonbeliever and he insisted that his discovery of the descent of man from the apes did not refute the essential truths of religion. Perhaps I got that wrong, because his theology was muddled, but he did on other occasions deny being a non-believer.

But still, that was to little avail. There were (and still are) desperate efforts by many Christians either to refute Darwin or to find a way of maintaining their faith in the biblical account of creation in the teeth of his work, such as through "creation science," in which the world was created in 4004 B.C.. Great outpourings of religious enthusiasm even occurred here and there in the resistance to Darwinism. And yet when the German philosopher Friedrich Nietzsche proclaimed toward the end of the 19th century that God was dead, he was expressing a very widespread feeling, often secretly held, that few others had the nerve to articulate so boldly. Few people had the nerve to articulate anything so boldly as Nietzsche did.

Nietzsche welcomed the death of God as a necessary precondition for the fruition of human greatness. But his older Russian contemporary, the great novelist Feodor Dostoevsky, like John Donne before him, was appalled by the consequences that the victory of science over religion were likely to bring with it. If God was dead, he said (through the mouth of one of his characters, Ivan Karamazov), then everything was permitted.

At this point in the story, we run into another fascinating paradox. While it was in becoming "modest" to refer again to that word of Galileo, that the human mind seemed to have grown to superhuman proportions, it soon forgot, in the headiness of its accomplishments, the respect for its own limits that had made the gigantic accomplishments of reason possible in the first place. Now the idea spread that reason, in the form of science, scientific method had shown that *IT*, not God, was omnipotent and was on its way to usurping the divine attribute of omniscience as well.

And so it came about that modesty was replaced by the puffed-up pride the Greeks called hubris. The likes of the Marquis de Condorcet in the 18th century and then Auguste Comte in the 19th asserted that science need not even be restricted to the physical world; it could be adapted to the social world just as successfully. "Social science" could design plans for an ideal society, and in implementing them, it could at the same time-- or so the most utopian of these social engineers expected--- reshape and perfect human nature itself.

If, according to Dostoevsky, the death of God meant that everything, by which he meant everything evil, was now permitted, the new worshippers of reason believed that everything, by which they meant everything good, was now possible. But Dostoevsky was a better prophet than the utopian rationalists on the other side of this argument, as the grisly horrors perpetrated by the two main totalitarian systems that sprang up in the 20th century would demonstrate. Bob has already alluded to this point. The point I want to make here is that both communism and Nazism were forms of social engineering and they both based themselves or claimed to base themselves on scientific foundations. The communists who took over in Russia in 1917 explicitly saw themselves as "scientific Socialists," as against the infantile leftists and utopians who came before them, carrying out the hitherto hidden laws of History as unearthed by the mind of Karl Marx and they would create, by following those laws, a "new Soviet man," a new breed of creature. As for the Nazis, they justified the genocide of Jews and others as part of a program of putatively scientific eugenics that would purify the human race and create the higher breed foreseen by Nietzsche in his vision of the superman.

To be sure, few worshippers of reason detected in the horrors of totalitarianism the fingerprints of their triumph in the war between science and religion. Quite the contrary. Many scientists and other devotees of what has aptly been described as "the religion of science" even supported what they called the Soviet "experiment" (the use of this word was itself significant) or they apologized for or denied the crimes it entailed. Conversely, they placed the blame for Nazism not on anything connected with reason or science but on the atavistic influence of religion and the forces of irrationality and superstition that allegedly always accompanied it.

Hence totalitarianism failed to make a dent in the hubris of the religion of science. But the atom bomb did manage to trigger a recoil among the physicists who had invented it. In yet another of the paradoxes that keep cropping up here, this most vivid demonstration of the seemingly limitless power of science brought about something of a return to Galileo's modesty. Scientists like J. Robert Oppenheimer, who had supervised the project, took to agonizing over what science had wrought and were beset by doubts about its role in the total scheme of things.

In yielding to these doubts, Oppenheimer and others had been preceded by several scientist-philosophers, of whom the most eminent was probably Alfred North Whitehead. In "Science and the Modern World" (1925), Whitehead, from within a generally scientific worldview, raised deep questions about the idea that science provided an exhaustive account of reality. "Religion," he wrote approvingly, "is the vision of something which stands beyond, behind, and within, the passing flux of immediate things."

During this same period, there were also literary figures like

T. S. Eliot who carried forward and modernized the tradition of resistance to the imperialistic claims of reason and science as against those of imagination and religion. There were others within the precincts of religion itself. But within the realm of science itself, new discoveries were made, particularly in cosmology, where the whole thing had started, that further encouraged

a return to Galileo's modesty. In 1992, the very Robert Jastrow with whom I have the honor to share this discussion, while describing himself as an agnostic, wrote a book entitled "God and the Astronomers" concluding that "it is not a matter of another year, another decade of work, another measurement, or another theory; at this moment it seems as though science will never be able to raise the curtain on the mystery of creation."

But the very last sentence of Mr. Jastrow's book was even more astonishing: "For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak and as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries." Poor Bob. (Laughter) Evidently, as with the death of Mark Twain, reports of the death of God have been greatly exaggerated. Against all expectation, that dog did not in the end bark. I am not here referring to the fact that in the polls, approximately 95% of the population professes to believe in God. I'm not sure what that figure means. But what strikes me as more impressive is the almost complete disappearance in recent years of any talk about the war between science and religion. We do talk of a "culture war," but that battle has been raging on an entirely different front. As for science and religion, these two formerly passionate enemies have for the moment reached an accommodation on the ground. It is an unwritten armistice, based, perhaps unconsciously, on the conception of the relations between the two that was advanced by Galileo and Bacon, who rendered unto each its own sphere of truth: "to science the *how* of material things, and to religion the *why* of them."

As Bob Jastrow sees it, this is where the story ends. But as he indicated earlier, alas, the story ends only for the older breed of natural scientists. We have now a new breed, which did not yet exist in the 17th century, and that breed has come along in the latter part of the 20th century and is still with us today and it seems likely to re-ignite the war between science and religion. This new breed is made up of geneticists, molecular biologists and biotechnologists and it is in only the early stages of its work. Like their predecessors in other scientific fields, they have gone very far very fast. But they have neither begun with nor yet acquired any sense of the limits of what they can do. Not for them Galileo's modesty. I can skip these illustrations, which Bob already mentioned, the frightening proposals by Crick and Watson about genetic tests followed by infanticide for those who fail, and Peter Singer, who is more humane than Crick and Watson. They give the newborn infant five days; Singer gives them thirty days in which to pass, so they presumably can bone up. Mr. Singer has been rewarded, as Bob mentioned, by an appointment as professor of bioethics at Princeton University for his noble work.

I am probably running over my time but I can't resist telling you, I know Jim Watson. No doubt he is a great scientist and has a higher I.Q. than I do but he is a very strange bird. I was once sitting next to him at a conference and we got into an argument and we discovered that we knew one another at Cambridge University in the early 50s, when we were in neighboring staircases. Anyway, he was telling me about his idea of D.N.A. testing. It wasn't his idea, it was Crick's idea, but he endorsed it. When I looked at him, I thought to myself, "I don't know. You sure are lucky to be alive because God knows what you looked like when you were a newborn infant, given what you look like today." So that is just a little digression. Well, Crick, Watson, Singer and others . . . (inaudible)

So if you're not six feet tall or beautiful like Walter Bird(?), off with your head! Well. Even with this terrible question hanging in the air, what can we do? I foresee, as I said earlier, opening up a new round, the opening up of a new front in the ancient war between science and

religion and I don't look forward to such a war. Still, thanks to the progress of genetic engineering, which assures us it can rectify defects in advance, (and that's the good news) infanticide may prove unnecessary. Maybe they can do genetic surgery and these things can be cured in advance. It sounds wonderful, but wait again. As the political theorist Francis Fukuyama has written, biotechnological revolution is "on the brink" of being able to custom-design creatures who will resemble humans but will not be governed by human nature as we have always known it.

Unlike his namesake Francis Bacon, who greeted the first stage of modern science with hope and enthusiasm, Mr. Fukuyama looks forward with fear and trembling to this next stage. "To the extent that nature is not something given to us by God or by our evolutionary inheritance, but by human artifice, then we enter into God's own realm with all of the frightening powers for good and evil that such an entry implies." I confess to you that I tremble even more violently than Mr. Fukuyama, but I can't bring myself to believe that the new scientists *will* succeed in replacing God any more than their predecessors managed to kill God off. The dog didn't bark in the millennium just ending, and my guess -- or perhaps I should say, more appropriately, in the context of this discussion, my prayer -- is that it will also fail to bark in the one just ahead.

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Question and Answer Session

Questioner: It would seem that the arrogance of religion has caused far more conflict and harm than science ever has – would you comment on that?

Norman Podhoretz: The word I would use is not arrogance, but rather, a form of certainty on the part of some people: a belief in the possession of truth and a duty to impose that truth, even by the sword, on others. But I don't think most contemporary conflicts – nor, I predict, the murderous conflicts of the future – are actually based on religion in that sense.

For example, the Protestant-Catholic wars in Northern Ireland do not seem to me to be theologically based; they seem to me to be based on politics and on sociological and economic factors, rather than disputes over who has the truth. And certainly, on the Jewish side, the conflict in the Middle East is not overwhelmingly based on the Bible. There are religious Jews who believe that theirs is the Promised Land and they are entitled to it. But they are a rather small minority in Israel. Most of the people there are fighting because of quite different considerations dictated by their history as a minority in the Diaspora.

So, while not denying that crimes have been committed in the name of religion, I don't think that they are at the center of the stage. Whereas I do believe that for obvious reasons, for the last several hundred years, science has been at the center of the stage – the shaping ethos of our epoch. Science has been far more influential in the last few hundred years than religion has been, just as religion was far more influential than "reason" in the several hundred years that preceded the rise of modern science.

Questioner: It seems logical, maybe only with hindsight, that science can't displace religion in answering questions that science doesn't claim to answer. It is not equally obvious why science can't do what Peter Singer and James Watson want it to do; which is the possibility of applying eugenics in a rather gruesome fashion. So why are you as optimistic as you are about the next millennium?

Norman Podhoretz: It's blind faith, as faith almost by definition is.

But to answer: the complexity of the human organism is such that it makes the ecology of the physical universe sound simple. Given that fantastic complexity, it is hard for me to imagine how you can mess around with the human organism at will and with predictable results. Just as the law of unintended consequences applies in social engineering, I feel reasonably sure it would apply in genetic engineering as well. And I think that once people start thinking their way through, or maybe a few mistakes are made or something, there would be a re-thinking, a recoil from this entire tendency.

Questioner: A question for the materialist, Dr. Jastrow.

Norman Podhoretz: He only thinks he's a materialist.

Robert Jastrow: No, I really am.

Questioner: It has been suggested by some thinkers that the material world has qualities that are ephemeral and transient and much more like consciousness. Do you concur?

Robert Jastrow: I think that consciousness is nothing more or less than a brain and a mind that are large enough to model the world and see oneself in that model. I don't find the subtleties in the concept of consciousness that one finds in some of the literature. In other words, I don't think there is much there except self-awareness.

As for the ephemeral nature of matter: well, there is a respectable body of opinion that looks on quantum theory as a means of recapturing free will, because of the uncertainty. You are invited to hold to that opinion; you are in good company. What I find interesting is that what can be explained on a completely material basis – namely, the record of the history of life on this planet and perhaps other planets – when looked at in its entirety, calls for a greater explanation, and I don't know what it is. Those of you have religious faith do know what it is. I am genetically wired so it is very difficult for me to get out of my materialist box.

Questioner: The scientific record, beginning with the Big Bang, is compelling. I just wondered, where do you go beyond the Big Bang?

Norman Podhoretz: Nowhere.

Robert Jastrow:: Nowhere. Norman and I agree, nowhere. I don't know, and nor does anyone else. Any astronomer or cosmologist who thinks he knows what came before the Big Bang is foolish, I would say. This is one of the remaining mysteries.

Norman Podhoretz: When I first heard about the Big Bang, roughly fifty years ago, it was a controversial theory. Then it swept away all the opposition to it. Of course, if you talked to any scientist in those days, as I did at Cambridge, they would ridicule the idea that it had any implications beyond itself. It did seem very much like the Biblical account of creation. And there are mystical theories of the Biblical account of creation that are quite eerily similar to what the layman understands about the Big Bang.

Robert Jastrow:: Well there is more going on there; it could be physics and it could be God.

Questioner: Isn't a belief in God necessary for a people to have a functioning ethical system?

Norman Podhoretz: I certainly have friends who get extremely angry at the idea that you have to believe in God to be ethical or moral. And there have been philosophers – G.E. Moore,

for example, at the turn of the century – who made a point of trying to develop ethical systems that do not depend on religious faith. My reading of those works has left me unconvinced. I tend to agree with Dostoevsky on this one: If there is no God, anything goes. Again, I am using “God” in the most general sense: natural law; some system according to which the moral universe is subject to law, including the law of cause and effect, rather as the physical universe is described by scientists.

For most ordinary people, it is intolerable not to have some sort of moral system by which to be guided. And all the major moral systems I am aware of have their roots in religion.

Questioner: Suppose through the policies of some future Hitler or Stalin, humanity ceases to exist. Most of us would want to say that would be bad. But within a scientific framework, would it not simply mean that the future fossil record would be different. And, according to that scientific view, so what?

Norman Podhoretz: I wouldn’t use the word “bad” when talking about Hitler and Stalin, I would use the word “evil.” But I agree with you entirely about the inability of science to make such moral judgments.

For ordinary people, there is something utterly intolerable in the idea that there should be nothing rather than something, or that we might disappear and life would go merrily on compiling new fossil records. Most of us can’t live with the idea that our lives have no meaning or purpose of any kind.

My guess is that Hitler and Stalin led to more people gaining faith than losing faith. That’s another paradox. Many survivors of the death camps, who had every reason to lose their faith in a God who seemed to abandon them, became more religious. We know from the Soviet Union and its satellites, that despite all its efforts to crush religion, people continued to practice it underground; there was a big religious revival in several of those countries when communism fell.

Questioner: David Berlinsky seemed to poke holes in Darwinian theory. His work seemed authoritative enough to arouse doubts as to how coherent the theory is, whether it answered all the questions that it raises, and you seem to be saying that those criticisms are of no particular validity.

Robert Jastrow: That is my understanding from my study of the situation. I do think that it is clear that the fossil record demonstrates the validity of Darwin’s explanation of evolution. If one is relying on the attack on the Darwinian paradigm for some assistance in making progress on these deeper questions, one can’t find it in that direction. We will have to look elsewhere, and that is an interesting result whose consequences remain to be seen.

Norman Podhoretz: A concluding remark: over the last four hundred years, the “arrogance” of religion that a questioner mentioned has been dealt very grievous blows by scientists, and not just from Darwin. At least in the West, the pretensions of religion to being able to answer certain types of questions have long since been dropped. Religions have learned to render unto the scientists what belongs to the scientists and not pretend that such answers can be found in, or need to be sought from, revelation.

The human mind is capable of going all the way – except when it asks the question, why.

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