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For though we walk in the flesh, we do not war according to the flesh, for the weapons of our warfare [are] not fleshly but mighty in God for pulling down strongholds, casting down arguments and every high thing that exalts itself against the knowledge of God, bringing every thought into captivity to the obedience of Christ. And they will be ready to punish all disobedience, when your obedience is fulfilled.

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The Sagan of Science

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Had Dr. Carl Sagan been born in any other century, he would have been known as a teller of stories, a spinner of yarns, a maker of myths. Some of his listeners would have been skeptical; most would have hung on his every word, believing them all to be true, just as they do today. He is a talented storyteller.

But Dr. Sagan wasn't born a thousand years ago or in a primitive culture. He was born in this century, during the great depression, and he has become perhaps the most popular and the most effective propagandist for science in the twentieth century. His function is, of course, to make myths and tell tall tales, but to do it with such a flourish of scientific legerdemain and eloquence that the credulous are easily and thoroughly convinced of the truth of his scientific sagas. Of course, he doesn't start from scratch with his readers. They have been prepared for a hundred years by other storytellers: The Huxleys, Charles Darwin, Ernst Haeckel, Jacob Bronowski, and Isaac Asimov, to mention just a few.

According to *the Oxford English Dictionary*, a Sagan is a deputy of the Jewish High Priest; he is the second highest functionary of the Temple. In this century, since our religion is science and our temples are laboratories, Dr. Sagan's name is, appropriately and ironically enough, an accurate description of his function. He is a prominent member of the new scientific priesthood, as anyone can see by looking at his credentials. Dr. Sagan's

name is as fitting for his work as Cardinal Jaime Sin's name is for his, and Larry Speakes' name is for his. One can be amused by God's sense of humor in causing these men to bear the names they do.

Carl Sagan is David Duncan Professor of Astronomy and Space Sciences and director of the Laboratory for Planetary Studies at Cornell University. According to his biography, he has played a leading role in the Mariner, Viking, and Voyager expeditions to the planets, for which he received the NASA medal for exceptional scientific achievement; the International Astronautics Prize, the *Prix Galabert*; the NASA medal for distinguished public service (twice); and the John F. Kennedy Astronautics Award. Sagan's Peabody and Emmy Award-winning thirteen-part government television series, *Cosmos*, has been seen by more than 250 million people in sixty countries. The book that Sagan wrote to accompany the television series is the best selling science book ever published in the English language. Dr. Sagan has won the Pulitzer Prize for another book, *The Dragons of Eden*; the Joseph Priestly Award "For Distinguished Contributions to the Welfare of Mankind"; and the Leo Szilard Award for Physics in the public interest for his contribution to the discovery of nuclear winter. He is past chairman of the division for Planetary Sciences of the American Astronomical Society, past president of the Planetology Section of the American Geophysical Union, and was editor in chief of *Icarus* (the leading professional journal

devoted to planetary research) for twelve years. Sagan is the author of more than four hundred scientific and popular articles, and the author, editor, and co-author of more than a dozen books: *The Cosmic Connection: An Extraterrestrial Perspective*; *Cosmos*; *Comet*; *The Dragons of Eden*; *Broca's Brain*; *Contact*; *Murmurs of Earth*; *Intelligent Life in the Universe*; *UFO'S: A Scientific Debate*; *Communication with Extraterrestrial Intelligence*; *The Cold and the Dark: The World After Nuclear War*; *Other Worlds*; and *Mars and the Mind of Man*.

Isaac Asimov, another writer of science fiction and a popularizer of science (Asimov has written hundreds of books and produces half a dozen or so new books each year), surpasses Sagan in quantity of output; but Sagan, in academic and scientific respectability, surpasses Asimov and all other contenders for the title of Chief Propagandist for Science. Only one other contemporary propagandist for science comes close, Stephen Jay Gould of Harvard, but Dr. Gould has yet to host a government television series and spend millions of dollars in tax revenues spinning scientific sagas for worldwide consumption.

In discussing Sagan's views, we are not speaking of a man on the fringes of science or academia, but the views of a man who holds a full professorship at one of the nation's leading universities; who has worked closely with the government scientific establishment, including NASA and the National Science Foundation; and who has won the praise of the scientific establishment and the fervid following of millions of readers and television viewers. Simply because Sagan is so praised and so popular, it is necessary to examine his views. He is, if not the high priest of modern science, then the deputy high priest, just as his name implies.

Dogmatism

Like a priest, Dr. Sagan is given to making dogmatic statements. The first line of his best-selling book *Cosmos* is an ipse dixitism: "The Cosmos is all that is or ever was or ever will be."

The statement is not argued; no evidence is presented for our consideration; no hint is given that this statement is open to revision of even the mildest sort. The Sagan has spoken; so let it be written; so let it be done. This tone of dogmatic finality appears in all his books, and while it contradicts what he has to say about science, it is fundamental to his duties as a high priest of science.

A few pages later (8), Sagan tells us that "the laws of nature are the same throughout the cosmos." He repeats the assertion several times throughout his books. He does not tell us how he knows that. It too is an unsupported assertion, and like a mythmaker and priest, Sagan offers no evidence for the assertion. What evidence could he offer? He had already told us (*Cosmos*, 4) that "the size and age of the cosmos are beyond ordinary human understanding ... [the cosmos] is the greatest of mysteries." Perhaps the Sagan is claiming greater than ordinary human understanding.

A few more pages into *Cosmos* we read: "there must be many such worlds [where the matter of the cosmos has become alive and aware] scattered through space" (12). The Sagan does not offer any evidence for this oracular assertion. It is easy to understand why: There isn't any. But the lack of evidence has never stopped priests, and Sagan continues. He is convinced that evolution occurred not only on Earth, but on billions of other planets as well. "The initial chemical constituents for the origin of life are the most abundant molecules in the universe. Something like the processes that on Earth led to man must have happened billions of other times in the history of our galaxy. There must be other starfolk.... There must be, I think, many places in the galaxy where there are beings far more advanced than we in science and technology, in politics, ethics, poetry, and music" (*The Cosmic Connection*, 257-258). He asserts that "evolution is a fact, not a theory" (*Cosmos*, 27). The mechanism of evolution, natural selection, is a "great discovery" made by Charles Darwin and Alfred Russell Wallace. "We are," he writes, presumably not in tending to speak only of himself and his co-author, "the products of a long series of biological accidents.... We know that the atoms that make us up were synthesized in the interiors of previous

generations of dying stars" (*The Cosmic Connection*, 52). The Earth itself "condensed out of interstellar gas and dust some 4.6 billion years ago" (*Cosmos*, 30). The early history of Earth is equally open to the penetrating gaze of Sagan: "In the early history of our planet, however, ... enormous amounts of organic molecules were being produced by sunlight in a hydrogen rich atmosphere, ... some similar chemistry must have occurred on a billion other worlds in the Milky Way Galaxy. The molecules of life fill the cosmos" (*Cosmos*, 40).

Assertions such as these are not true; they are not even good science. They are the stuff that legends and myths are made of, and one cannot understand the importance of Sagan's work unless one realizes its function as a new scientific mythology.

His dogmatism extends from discourses about what "must" have happened on billions of planets and what "must" have happened on Earth billions of years ago to the details of evolution and the remote future. "We have five fingers," writes Dr. Sagan, "because we have descended from a Devonian fish that had five phalanges or bones in its fins" (*Cosmos*, 282). Not only does Dr. Sagan know where fingers came from, he knows toes as well: "They are clearly evolved from fingerlike appendages for grasping and swinging, like those of arboreal apes and monkeys" (*The Dragons of Eden*, 4). Nothing could be clearer than the origin of fingers and toes, unless, of course, it is the evolution of the neocortex: "Finally, surmounting the rest of the brain, and clearly the most recent evolutionary accretion, is the neocortex" (*Dragons*, 58). Even the pain of childbirth is transparent to the remarkable intelligence of Dr. Sagan: "So far as I know, childbirth is generally painful in only one of the millions of species on Earth: human beings. This must be a consequence of the recent and continuing increase in cranial volume" (*Dragons*, 97). Not to let a swelled head get in the way of science (in fact, Sagan would argue that a swelled head is the cause of science), Sagan tells us that "the fear of falling seems clearly connected with our arboreal origins..." (*Dragons*, 158). "Clearly," he says.

Dr. Sagan makes science clear for the masses by making false statements about its theories. This can

be seen not only in the area of biology, but in physics as well. He declares, for example, that light is a wave (*Cosmos*, 253). He offers no qualification for the statement, no hint that there is conflicting scientific evidence on the nature of light, no suggestion that scientists have different opinions on the issue, no admission that science is hopelessly contradictory on the definition of light. In many such cases Sagan writes clearly because he writes inaccurately.

Not only is there a paucity of empirical evidence for his dogmatic claims, they are sometimes based upon logical fallacies as well as an overheated imagination. For example, in *The Cosmic Connection* (3) Sagan writes: "The early atmospheres were composed of the most abundant atoms and were rich in hydrogen. Sunlight, falling on the molecules of the early atmosphere, excited them, induced molecular collisions, and produced larger molecules ... These molecules, remarkably enough, are the ones of which we are made: The building blocks of the nucleic acids, which are our hereditary material, and the building blocks of the proteins, the molecular journeymen that perform the work of the cell, were produced from the atmosphere and oceans of the early Earth. We know this because we can make these molecules today by duplicating primitive conditions." This argument, that certain organic molecules must have arisen in a certain way billions of years ago because we can make these molecules today by "duplicating" primitive conditions in modern laboratories, is a logical mess. The only thing remarkable about the situation is that a professor at a respected university can make such blunders and retain his chair.

Sagan does not know what primitive conditions obtained; he has chosen the conditions most conducive to the results he wants. He has assumed what he should prove. His argument is: organic molecules must have formed spontaneously under Earth's primitive conditions; organic molecules today can form only under certain conditions; therefore, those conditions must be Earth's primitive conditions; there fore, given those conditions, organic molecules could and did form spontaneously.

To argue that x must have happened in the past because x can be made to happen now is an elementary logical blunder. It is like arguing that because we now get to Pikes Peak by cog railway and car, that that is how the pioneers must have done it. Sagan must first demonstrate that there is only one way for organic molecules to be formed. Then he must demonstrate that they formed spontaneously on Earth billions of years ago. He has done neither, he can do neither, and his argument is worthless. It is as much science fiction as H. G. Wells' *The War of the Worlds*. It is, however, no worse than other scientific arguments which regularly violate the rules of logic.

Sagan's dogmatism about the past knows no bounds. He asserts, "there is no doubt that our instinctual apparatus has changed little from the hunter-gatherer days of several hundred thousands years ago" (*The Cosmic Connection*, 7). "No doubt," Dr. Sagan says. Certainty is quite worthless in the quest for knowledge. Many people are certain that vinegar cures warts, that reincarnation is true, and that science furnishes truth. Dr. Sagan is certain about a large number of things that he cannot demonstrate and of which he cannot possibly know. Far from knowing what the "instinctual apparatus" of the hunter-gatherers was, Sagan does not even know what the instinctual apparatus of the Cornell University faculty is, nor how it differs from that of the hunter-gatherers, whoever they may be.

His dogmatism does not extend only to the remote past and the far reaches of the universe, but to the remote future as well. He believes that the phonograph record which he and one of his wives were responsible for producing for NASA and which was sent into space in two Voyager spacecraft, will "last for a billion years" (*Cosmos*, 289). So, he says, will the equipment left on the moon by the Apollo astronauts. Fortunately, Carl Sagan's books will not.

Science

One of the strange things about Sagan's arrogance is that it is in conflict with his remarks about

science. One can conclude from this that either he is confused and does not see the conflict, or that he is well aware that he is not making scientific statements, but is constructing an elaborate scientific mythology for the sophisticates of the twentieth century who could never believe in angels, demons, or God, but who will believe in ET.

"Science," Sagan writes in *Broca's Brain* (15), "is a way of thinking much more than it is a body of knowledge." Science "has emerged in the popular mind as the primary means of penetrating the secrets of the universe" (*Broca's Brain*, 54). "Scientists have been known to change their minds completely and publicly when presented with new evidence and new arguments" (*Broca's Brain*, 74). "Science is also self-correcting. The most fundamental axioms and conclusions may be challenged—the history of science is full of cases where previously accepted theories and hypotheses have been entirely overthrown, to be replaced by new ideas that more adequately explain the data" (*Broca's Brain*, 96). "Science is a self-correcting enterprise. To be accepted, all new ideas must survive rigorous standards of evidence" (*Cosmos*, 91).

But where are the rigorous standards of evidence that apply to Sagan's ipsedixitisms about the evolution of human brains, fingers, and toes? Or to the instincts of ancient men? Or the natural laws that apply a trillion light years from Earth? Dr. Sagan does not meet the standards that he says distinguish science from superstition. Nor does he seem to be willing to subject all his most cherished beliefs—such as evolution—to the scrutiny that science demands.

Still less does Dr. Sagan seem to realize that science is a self-correcting and ever-changing discipline precisely because it is never correct. If a scientist ever discovered a truth, it would not and could not change. Two plus two is four is now, has always been, and always will be true because it was not discovered by the scientific method. Christian theology has always taught and will always teach the doctrine of the Trinity because the Trinity was not discovered by the scientific method, but revealed by God, who is truth himself. All scientific

laws are false. All the laws of physics and astronomy are false. Why just a month ago the astronomers admitted that—oops!—they had made a mistake in calculating the distances between stars, a mistake of only 25 percent. Who knows, perhaps next month they will acknowledge another mistake. Or perhaps it will be the chemists, or the physicists, or the biologists who make the announcement next month. All the physics and biology textbooks written in 1910 are now regarded as completely wrong. Fifty years from now scientists will consider our present texts completely wrong. Scientists never discover the truth because the scientific method, which Dr. Sagan esteems so highly, is a tissue of logical fallacies. Science does not and cannot give us truth. Scientists, to use the phraseology of the King James Bible, are ever learning and never able to come to the knowledge of the truth. Science is a tentative technological enterprise. It is incompetent as a source of knowledge. Dr. Sagan, however, is far from tentative in his oracular pronouncements about man and the universe.

Behaviorism

One of Dr. Sagan's certainties concerns the nature of thought. He does not believe that he has a mind, and some times this writer is inclined to agree. He maintains that "mind" is the term we use to describe the workings of the brain. He is a behaviorist. To define the term, I quote Ernest Nagel's Presidential Address to the American Philosophical Association in 1954:

The occurrence of events, qualities, and processes, and the characteristic behavior of various individuals, are contingent on the organization of spatio-temporally located bodies, whose internal and external relations determine and limit the appearance and disappearance of everything that happens. That this is so, is one of the best-tested conclusions of experience.... There is no place for the operation of disembodied forces, no place for an immaterial spirit directing the course of events, no place for the survival

of personality after the corruption of the body which exhibits it.

This notion, that mind is merely the behavior of matter, has been advocated by many leading philosophers and scientists, among them John Dewey, John Watson, and B.F. Skinner. Skinner is justly famous for his attack on political freedom and human dignity and his advocacy of a totalitarian society controlled by scientists. Watson was an experimental psychologist of the early twentieth century who exerted enormous influence in both psychology and philosophy. Dewey, of course, is notorious for his influence on American government schools. He is the prime reason why Johnny can't think, for Dewey did not believe in thinking: according to Dewey, one learns by doing. Dewey wrote: "Habits formed in the process of exercising biological aptitudes are the sole agents of observation, recollection, fore sight and judgment: a mind or consciousness or soul in general which performs these operations is a myth.... Knowledge lives in the muscles, not in consciousness."

Carl Sagan accepts this behaviorism. In *The Dragons of Eden*, subtitled *Speculations on the Evolution of Human Intelligence*, he writes (7): "My fundamental premise about the brain is that its workings—what we sometimes call 'mind'—are a consequence of its anatomy and physiology, and nothing more. 'Mind' may be a consequence of the action of the components of the brain severally or collectively.... We are, to a remarkable degree, the results of the interactions of an extremely complex array of molecules.... Because there is not a shred of evidence to support [*sic*] it, I will not in these pages entertain any hypotheses on what used to be called the mind-body dualism, the idea that inhabiting the matter of the body is something made of quite different stuff, called mind."

Notice that Sagan presents this behaviorism as a premise, not as a conclusion. He does not argue for it, but assumes it, because, as he says, there is not a shred of evidence for the existence of mind. Obviously, if science can investigate only what can be sensed or quantified, then there is no evidence for mind, which can be neither sensed nor quantified. But this means merely that Sagan is also

making assumptions, of which he does not inform us, about the nature of evidence.

Sagan's phrase about man being an extremely complex array of molecules reminds me of another philosopher, Bertrand Russell, who wrote one of the most powerful passages in English literature defending the same view:

That man is the product of causes that had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and beliefs, are but the out come of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling can preserve an individual life beyond the grave, that all the labors of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius are destined to extinction in the vast death of the solar system, and the whole temple of man's achievement inevitably be buried beneath the debris of a universe in ruins—all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built....

Brief and powerless is man's life; on him and all his race the slow, sure doom falls pitiless and dark. Blind to good and evil, reckless of destruction, omnipotent matter rolls on its relentless way; for man, condemned today to lose his dearest, tomorrow himself to pass through the gate of darkness, it remains only to cherish, ere yet the blow falls, the lofty thoughts that ennoble his little day.... Proudly defiant of the irresistible forces that tolerate, for a moment, his knowledge and his condemnation, to sustain alone, a weary but unyielding atlas, the world that his own ideals have fashioned despite the trampling march of unconscious power (*Mysticism and Logic*, 47-48, 56-57).

Russell's prose is magnificent—I have come across nothing nearly so good in Sagan—but the "truths" he believes are not true at all.

Neither is Sagan's behaviorism. For the triune God, Sagan has substituted what he calls "The Triune Brain" consisting of the reptilian complex, the limbic system, and the neocortex. Sagan believes the old mythology of Ernst Haeckel, the popularizer of evolutionary thought in Germany during the late nineteenth and early twentieth centuries, and whose books were bestsellers and laid the foundation for Nazism. One of Haeckel's myths was that ontogeny recapitulates phylogeny. Sagan believes that "in human intrauterine development we run through stages very much like fish, reptiles and nonprimate mammals before we become recognizably human. The fish stage even has gill slits, which are absolutely useless for the embryo who is nourished via the umbilical cord, but a necessity for human embryology: since gills were vital to our ancestors, we run through a gill stage in becoming human" (*The Dragons of Eden*, 59-60).

But we are getting somewhat afield from Sagan's behaviorism. Dr. Sagan believes that "consciousness and intelligence are the result of 'mere' matter sufficiently complexly arranged" (*The Dragons of Eden*, 221). "Each human being is a superbly constructed, astonishingly compact, self-ambulatory computer" (*Broca's Brain*, 281). Speaking of himself, Sagan writes: "I am a collection of water, calcium and organic molecules called Carl Sagan. You are a collection of almost identical molecules with a different collective label. But is that all? Is there nothing in here but molecules? Some people find this idea somewhat demeaning to human dignity, for myself, I find it elevating that our universe permits the evolution of molecular machines as intricate and subtle as we" (*Cosmos*, 127). "A thought," Dr. Sagan thinks, "is made of hundreds of electrochemical impulses" (*Cosmos*, 277).

Upon discovering the brain of Paul Broca, the nineteenth-century French surgeon, in a bottle in the Musée de L'Homme in Paris, Sagan wondered "whether in some sense Broca was still in there—his wit, his skeptical mien, his abrupt gesticulations

when he talked, his quiet and sentimental moments. Might there be preserved in the configuration of neurons before me a recollection of the triumphant moment when he argued before the combined medical faculties ... on the origins of aphasia? A dinner with his friend Victor Hugo? A stroll on a moonlit autumn evening? ... Where do we go when we die? Is Paul Broca still there in his formalin-filled bottle?" (*Broca's Brain*, 10-11).

These thoughts remind one of the delusions of savages who think that by eating the flesh of their enemies they will become like them. Scientists have performed innumerable experiments testing the cannibalistic theory of learning: since memory inheres in the chemistry of the brain, one can, by ingesting that chemistry, learn what others have known. Scientists use rats and planaria in their experiments; cannibals, of course, use people. Of course, this is not a refutation of behaviorism, merely an illustration of how primitive the modern scientist (or perhaps how advanced the unjustly maligned cannibal) is.

A refutation of behaviorism can be derived from either the Bible or from logic. God, angels, and demons all think. None of them has brains or body. Christ and the thief on the cross went to paradise at death; their brains were lying in the ground in Palestine. Moses, whose brains had been buried somewhere in the Middle East more than a thousand years earlier, held a theological conversation with Christ at the transfiguration. These scriptural references ought to be sufficient to convince Christians that brains are not necessary for thinking. Unfortunately, Dr. Sagan does not believe that the Bible is true, so we will have to offer a more extended argument from logic. If he does not believe that logic is true, then there is no point in arguing with him at all; one ought rather to confine him to a soft room.

Let's assume that Dr. Sagan's beliefs about mind and thought are true. Thoughts are, he thinks, "hundreds of electrochemical impulses" in the brain. What follows from this? First, error is impossible. One electrochemical impulse is as good as another. The chemistry in the brain of someone who thinks that behaviorism is false is as perfect as

the chemistry in the brain of someone who thinks that behaviorism is true. If thoughts are electrochemical, then one thought, one chemical reaction, is as good as another. Why Sagan insists that his chemical reactions are right and mine are wrong is a complete mystery. "Wrong" has no meaning on behaviorist premises.

It follows from the meaninglessness of error that behaviorists, in this case Dr. Sagan, cannot claim their assertions are true. Behaviorism makes truth equally meaningless. Truth is not a quality of electrochemical impulses. My rejection of behaviorism, that is, in Dr. Sagan's terms, the electrochemical impulses in my brain, are chemically as good as his. Chemicals never err. Both his reactions and mine are solid chemistry. Both obey the inviolable laws of chemistry, which, Dr. Sagan has told us, are the same every where in the universe. Now if anyone, no matter how highly respected and decorated, proposes a theory that precludes the truth of the theory he proposes, he is involved in a hopeless contradiction and needs no further refutation. If he persists in asserting what cannot be true, he needs close and compassionate attention, rather than disputation.

The situation is, however, somewhat worse than this initial consideration indicates. Not only does behaviorism eliminate truth, it eliminates memory and communication as well. If thoughts are electrochemical impulses, then they are specific datable events in the brain. They cannot be repeated. They occur and then they stop. Memory is impossible. A behaviorist might reply that we can have a similar thought later, that is, a similar electrochemical impulse can occur. But the behaviorist forgets (and hopes that we will forget as well) that according to behaviorism the thought of similarity is still another and still later electrochemical impulse, another dated event separated by time (and perhaps by space) from the first two chemical reactions. How can still a third electrochemical reaction connect the first two, which have already occurred and ended? How can a behaviorist tell whether two ideas are similar, if ideas are electrochemical impulses? Behaviorism makes comparison and memory impossible.

It also makes communication impossible. Carl Sagan's mind is a bundle of electrochemical impulses and reactions; and so is mine, according to Carl Sagan. Dr. Sagan has a thought, that is, his intracranial chemicals react in a certain way. But his brain's electrochemical impulses cannot be my brain's electrochemical impulses, any more than his toothache can be mine or my toothache his. Therefore, I can never know his thought. It is therefore impossible to tell what Dr. Sagan means by any of the thousands of propositions that he has written in his books and articles. And since behaviorism also destroys memory, Dr. Sagan himself has no idea what he wrote either. Perhaps his books mean nothing at all. Perhaps they are simply the debris left by a powerful and sudden electrochemical brainstorm.

Behaviorism has been around for centuries, but the modern revival of some forms of Greek paganism has made it into one of the major superstitions of the twentieth century. Ernest Nagel, in his presidential address that I quoted above, said that it is one of the best-tested conclusions of experience. Gordon Clark has suggested that behaviorism be subjected to the same sort of test that other theories claiming to be scientific undergo. Einstein's general theory of relativity predicted several events, such as the precession of the perihelion of Mercury and the deflection of starlight in the presence of large masses. Scientists could observe whether those events occurred as implied by Einstein's theory. Let Dr. Sagan specify which electrochemical impulses in the brain are the thought "the Earth is 4.6 billion years old." Let him tell us what the specific chemistry of astronomy, as distinguished from astrology, is. Let him specify how the surge of electrochemical impulses meaning "The opening chapters of the book of Genesis are mythological" differs from the spurt of electrochemical impulses meaning "The Bible alone, and the Bible in its entirety, is the word of God written and therefore inerrant in the autographs." Let us see what empirical basis there is for the claim that thoughts are electrochemical impulses. I certainly hope Dr. Sagan's brain is up to the task.

Scientific Mythology

Dr. Sagan's role as deputy high priest of the new religion of science involves creating a new scientific mythology for the twenty-first century. He recognizes both the power and the importance of myth in creating and maintaining a scientific culture. In the introduction to *The Dragons of Eden*, he quotes Henry David Thoreau's *Journal*: "I do not know where to find in any literature, whether ancient or modern, any adequate account of that nature with which I am acquainted. Mythology comes nearest to it of any." In the same book Sagan offers what he calls scientific myths to the reader: "these conjectures on the origins of the mammals constitute a kind of scientific myth: they may have some germ of truth in them, but they are unlikely to be the whole story. That scientific myths make contact with more ancient myths may or may not be a coincidence" (147). In *Cosmos* he writes, "As the ancient mythmakers knew, we are the children equally of the sky and the Earth" (318). And in *The Cosmic Connection*, Sagan spins one of his own myths, which he labels as such by beginning it, "Once upon a time" (249). The fable is the theory of evolution, both cosmic and biological. It is the gist of his book compressed into a few pages. It is a scientific fairy tale.

ET

Now the myth of evolution, both cosmic and biological, is nothing new. Sagan's contribution to the myth, apart from the fascinating way in which he presents it for the general reader, is an emphasis on extraterrestrial intelligent life. The titles of some of his books betray this interest, this obsession of his: *The Cosmic Connection: An Extraterrestrial Perspective*; *Other Worlds*; *Intelligent Life in the Universe*; *Communication with Extraterrestrial Intelligence*; and *UFO'S: A Scientific Debate*.

This obsession has been a lifelong characteristic of Sagan. In *Broca's Brain* he tells us that "by the time I was ten I had decided—in almost total ignorance of the difficulty of the problem—that the universe was full up. There were too many places for this to

be the only inhabited planet" (162). He has never wavered from that opinion. In *The Cosmic Connection* he writes: "The initial chemical constituents for the origin of life are the most abundant molecules in the universe. Something like the processes that on the Earth led to man must have happened billions of other times in the history of our galaxy. There must be other starfolk.... There must be, I think, many places in the galaxy where there are beings far more advanced than we in science and technology, in politics, ethics, poetry, and music" (258-259).

When he first learned of pulsars, Sagan thought "that they were perfect interstellar navigation beacons, the sorts of markers that an interstellar spacefaring society would want to place throughout the galaxy for time- and space- fixes for their voyages. There is now little doubt that pulsars are neutron stars. But I would not exclude the possibility that if there are interstellar spacefaring societies, the naturally formed pulsars are used as navigation beacons and for communications purposes" (*The Cosmic Connection*, 260).

In his most popular book, *Cosmos*, Sagan argues that "The universe is brimming over with life" (7). He even offers us a calculation of the number of inhabited planets: there are one million advanced technical civilizations in our galaxy alone, and "there appears to be a fair chance that advanced extraterrestrial civilizations are sending radio signals our way ..." (*The Cosmic Connection*, 211). The notion of extraterrestrial intelligent life is, to quote one of Sagan's chapter titles in *The Cosmic Connection*, "An idea whose time has come" (191).

Because he is convinced that ET is out there, Sagan has convinced the government to spend millions of tax dollars on the search for intelligent life in the stars. Over the past twenty-five years, messages from Earth have been placed on spacecraft and sent into space. Radio telescopes have been tuned to distant stars in the hope of picking up messages beamed at us by ET. The National Aeronautics and Space Administration presently operates a program called Search for Extraterrestrial Intelligence. NASA is now in the middle of a five-year program of research and planning to design the largest and

most intensive search for extraterrestrial intelligence ever undertaken. Once started, NASA's search will last for decades.

Sagan realizes the public's fascination with the idea of intelligent life in space, and he sees the search for such life as the key to continued public and government financial support for his ideas. A recent public opinion poll, published in *The Washington Post* on June 2, 1986, indicated that "Seven of 10 participants agreed with the theory that 'in the entire universe, it is likely that there are thousands of planets like our own on which life could have developed.'" Sagan believes it is far more than likely, of course. He says it must have happened billions of times. But he does not believe that the Earth has already been visited by such advanced beings. He argues that the Earth has been a technological civilization for too brief a time to have attracted the attention of the intelligences who must be out there, and that the distances to their planets are so vast that sufficient time has not elapsed to allow them to explore all the worlds between here and there, let alone to get here. Perhaps he also realizes that a belief in UFOs at the present time would destroy both his credibility and the reason for government funding for his projects. After all, if ET has already been here, we should be looking for evidence on Earth, not listening to the heavens and sending messages to the stars. Johannes Kepler once commented that the creator has given every animal the means of sustaining its life, and to the astronomer he gave astrology. In the twentieth century, astronomers grow fat by feeding the imaginations of people and bureaucrats who want to believe that ET lives.

The Religion of Science

One cannot help but notice the religious undertone in all of this scientific mythology. Sagan tells us, "Thousands of years ago, the idea that the planets were populated by intelligent beings was uncommon. The idea was that the planets themselves were intelligent beings. Mars was the god of war, Venus was the goddess of beauty, Jupiter was the king of the gods" (*The Cosmic*

Connection, 191). In the eighteenth century the idea that the planets, while not gods, were inhabited by godlike beings, began to grow. Emanuel Swedenborg and Immanuel Kant, two false messiahs of the Enlightenment, claimed that the planets were populated. Sagan believes, "out there in the depths of space, it seems very likely that, sooner or later, we will find other intelligent beings. Some of them will be less advanced than we; some, probably most, will be more.... The beings more advanced than we will have capabilities far beyond our understanding. In some very real sense they will appear to us as godlike" (*Broca's Brain*, 368).

If I were a betting man, I might wager that sometime in the not too distant future, these godlike beings will contact Earth. Of course, they will not be what Dr. Sagan apparently believes them to be, the evolutionary products of time, chance, and death; but evil angels who have transformed themselves into messengers of light. It seems to me that the scientific mythology that Sagan develops in his books, together with the influence of movies like *ET* and *Close Encounters of the Third Kind*, and the new age movement generally are setting the world up for a massive deception. The contact, when it comes, will permit both secular and religious people to accept the extraterrestrial beings as gods. Scientists, especially behaviorists like Sagan, who do not believe in the God of the Bible or angels or demons, easily believe in some sort of superior intelligence that has evolved by natural processes just as man has. Sagan already believes in such beings, and he is doing his best to convince the world.

The religious nature of Sagan's scientific mythology may also be seen in his affinity for non-Christian religions, Hinduism in particular. Sagan uses quotes from religious writings generously in the mottoes to his chapters. *Cosmos*, the best selling science book ever published in the English language, has thirteen chapters, twelve of which are introduced by quotations from non-Christian religions and cultures, including the Aztecs, Incas, Mayans, Eskimos, Assyrians, Indians, Chinese, Egyptians, Sumerians, the Bhagavad Gita, the Zoroastrians, and the Koran. He reproduces in full color a statue of the Hindu god Shiva dancing the

dance of creation, and quotes, on the facing page, these lines from *The Mahapurana (The Great Legend)*, a ninth-century Indian document:

Some foolish men declare that a creator made the world. The doctrine that the world was created is ill-advised, and should be rejected. If God created the world, where was he before creation? ... How could God have made the world without any raw material? If you say he made this first, and then the world, you are faced with an endless regression.... Know that the world is uncreated, as time itself is, without beginning and end. (245).

Obviously, modern science finds much more in common with such doctrines of devils than it does with Christianity. Sagan finds Hinduism particularly attractive, for, "The Hindu religion is the only one of the world's great faiths dedicated to the idea that the cosmos itself undergoes an immense, indeed an infinite, number of deaths and rebirths. It is the only religion in which the time scales correspond, no doubt by accident, to those of modern scientific cosmology.... There is the deep and appealing notion that the universe is but the dream of the god who, after a hundred brahma years [each 8.6 billion ordinary years long], dissolves himself into a dreamless sleep. The universe dissolves with him—until, after another brahma century, he stirs, recomposes himself and begins again to dream the great cosmic dream. These great ideas are tempered by another, perhaps still greater. It is said that men may not be the dreams of the gods, but rather the gods are the dreams of men" (*Cosmos*, 258).

Sagan finds Jainism, another religion of India, attractive, because it is one of the few religions of planet Earth that implements a reverence for all life (*The Cosmic Connection*, 8). The reverence leads Sagan to assert that dolphins and whales may be other forms of intelligent life on Earth, and to ask the profound and moving question, "Why, exactly, all over the civilized world, in virtually every major city, are apes in prison?" (*The Dragons of Eden*, 127). I thought of describing Sagan's question as asinine, but then a person who believes in the

"connectedness" of all life would miss the meaning of the word and my intention.

Sagan's philosophy leads him into all the chic and crackpottish causes of the left: ape liberation, the salvation of the whales, fornication as a form of war prevention, the belief in evolution and extraterrestrial intelligences, and a more just redistribution of the world's wealth. Despite all the clamor he makes about science being self-correcting, it has not kept him from making a fool of himself. But then science never has, and it never will. Only the word of God can stop men from making fools of themselves, and Dr. Sagan refuses to listen. He prefers cunningly devised fables to revealed truth.

The Materialistic Mystic

Does it not seem strange to you that a man who insists upon "rigorous standards of evidence," and who even rejects the idea of mind because "there is not a shred of evidence to support it," should endorse the mysticism of eastern religions? Isn't it odd that Sagan, who does not believe that he himself has a mind, finds "deep and appealing" the mystical Hindu notion of gods dreaming universes without end? How are materialism and mysticism combined in one mind?

In his book *The Screwtape Letters*, C. S. Lewis has the senior demon, Screwtape, advise the apprentice demon, Wormwood, on how he is to deceive the man over whom he has control:

My dear Wormwood, I wonder you should ask me whether it is essential to keep the patient in ignorance of your own existence. That question, at least for the present phase of the struggle, has been answered for us by the high command. Our policy, for the moment, is to conceal our selves. Of course this has not always been so. We are really faced with a cruel dilemma. When the humans disbelieve in our existence we lose all the pleasing results of direct terrorism, and we make no magicians. On the other hand, when they

believe in us, we cannot make them materialists and skeptics. At least, not yet. I have great hopes that we shall learn in due time how to emotionalize and mythologize their science to such an extent that what is, in effect, a belief in us (though not under that name) will creep in while the human mind remains closed to belief in the enemy [God]. The "Life Force," the worship of sex, and some aspects of psychoanalysis may here prove useful. If once we can produce our perfect work—the materialist magician, the man, not using, but veritably worshipping, what he vaguely calls "forces" while denying the existence of "spirits"—then the end of the war will be in sight (32-33).

Sagan is Lewis' materialist-magician. He is the believer in scientific mythology. In *The Cosmic Connection* he writes:

In a very real sense human beings are machines constructed by the nucleic acids to arrange for the efficient replication of more nucleic acids. In a sense our strongest urges, noblest enterprises, most compelling necessities, and apparent free wills are all an expression of the information coded in the genetic material: we are, in a way, temporary ambulatory repositories for our nucleic acids. This does not deny our humanity; it does not prevent us from pursuing the good, the true and the beautiful. But it would be a great mistake to ignore where we have come from in our attempt to determine where we are going.... We are the product of 4.5 billion years of fortuitous, slow, biological evolution. There is no reason to think that the evolutionary process has stopped. Man is a transitional animal; he is not the climax of creation.... The time has come for a respect, a reverence, not just for all human beings, but for all life forms.... It is important that we extend our identification horizons, not just down to the simplest and most humble forms of life on our own planet, but also up to the

exotic and advanced forms of life that may inhabit, with us, our vast galaxy of stars (*The Cosmic Connection*, 4-8).

There you have it, the materialism (man is a machine) and the mysticism (a reverence for all life forms, including the extraterrestrial) in a few paragraphs taken from an essay entitled "A Transitional Animal." If Lewis is to be believed, Sagan, and the men like him, who seem to number in the millions, are the perfect work of the demons, and the end of the struggle is near. Sagan, by rejecting the doctrines of the Bible, is zealously and eloquently propagating what the Bible calls doctrines of demons.

In another of his books, *Perelandra*, Lewis has his villain, who is a professor of physics named Weston, explain his philosophy to the hero, Ransom. Any resemblance between Weston's philosophy and Carl Sagan's is probably not coincidental:

All my life I had been making a wholly unscientific dichotomy or antithesis between man and nature—[I] had conceived myself fighting for man and against his non-human environment. During my illness I plunged into biology, and particularly into what may be called biological philosophy. Hitherto, as a physicist, I had been content to regard life as a subject outside my scope. The conflicting views of those who drew a sharp line between the organic and the inorganic and those who held that what we call life was inherent in matter from the very beginning had not interested me. Now it did. I saw almost at once that I could admit no break, no discontinuity, in the unfolding of the cosmic process. I became a convinced believer in emergent evolution. All is one. The stuff of mind, the unconsciously purposive dynamism, is present from the very beginning.... The majestic spectacle of this blind, inarticulate purposiveness thrusting its way upward and ever upward ... swept away all my old conception of a duty to

man as such. Man in himself is nothing. The forward movement of life ... is everything. (90-91).

It is everything to Dr. Sagan as well. Man is a transitional animal, and out there, in the vast reaches of space, there are beings so advanced that they will appear like gods to us when they finally make contact with us. The materialist-mystic, the perfect work of the devil, is complete. He does not believe in God, but in demons, "though not under that name."

The coming of the lawless one is according to the working of Satan, with all power, signs, and lying wonders, and with all unrighteous deception among those who perish, because they did not receive the love of the truth, that they might be saved. And for this reason God will send them strong delusion, that they should believe the lie, that they all may be condemned who did not believe the truth but had pleasure in unrighteousness (2 *Thessalonians* 2:9-12).