Book Review

Concerning **Carl Sagan**'s ***The Varieties of Scientific Experience: A Personal View of the Search for God***, edited by Ann Druyan (New York: Penguin Press, 2006 [originally "The Search for Who We Are," unpublished, 1985]): **A descriptive, evaluative, and constructive review**

By Theodore Walker Jr.

> **Carl Sagan (1934-1996)** is well remembered for his enormously popular Emmy and Peabody Award-winning thirteen-part public television series called "Cosmos" and his bestselling book—*Cosmos* (New York: Ballantine Books, 1985). Also, many of us recall some of his other books, including his Pulitzer Prize-winning *The Dragons of Eden: Speculations on the Evolution of Human Intelligence* (New York: Random House, 1977) and *The Demon-Haunted World: Science as a Candle in the Dark* (Random House, c1995). Plus, we probably remember his involvement with the *Mariner*, *Viking*, *Voyager*, and *Galileo* space missions. Sagan was editor of *Icarus*, a professional journal on planetary research, cofounder and president of the Planetary Society, chairman of the Division of Planetary Sciences of the American Astronomical Society, president of the Planetology Section of the American Geophysical Union, chairman of the Astronomy Section of the American Association for the Advancement of Science, and the David Duncan Professor of Astronomy and Space Sciences and Director of the Laboratory for Planetary Studies at Cornell University.

In mark of the tenth anniversary of Sagan's death, his 1985 Gifford Lectures on natural theology at Glasgow University in Scotland were published as a book by the Penguin Press in 2006. Originally, these unpublished lectures were collectively titled "The Search for Who We Are."

Sagan's Gifford Lectures were transcribed from audio tapes by his executive assistant Shirley Arden. Under the inspiration of Penguin Press editor Ann Godoff, the transcriptions were edited by Sagan's widow and two-decade collaborator Ann Druyan, then beautifully illustrated (37 illustrations, including NASA, Cassini, Hubble and other images far superior to those available in 1985) and updated with post-1985 scientific data by Illustrations Editor and Scientific Consultant Steven Soter, and printed in an exceptionally well-crafted hardback book superbly designed by Amanda Dewey, and fitted with an appropriate jacket designed by Barbara de Wilde. Sagan's transcribed-edited-illustrated-updated-printed-jacketed collection now enjoys a new title—*The Varieties of Scientific Experience: A Personal View of the Search for God*.

This new title is similar to the title of the published collection of William James's 1901-02 Gifford Lectures at Edinburgh—*The Varieties of Religious Experience: A Study in Human Nature*. Druyan offers the new title as "a tip of the hat to the illustrious tradition of the Gifford Lectures" (xv).

In the editor's introduction, Druyan reports that the "more Carl learned about nature, about the vastness of the universe and the awesome timescales of cosmic evolution, the more he was [religiously] uplifted" (ix). Druyan notes that Sagan the scientist had qualities associated with Old Testament religion, that as a child in Brooklyn he recited "the Hebrew V'Ahavta prayer from Deuteronomy at temple services: 'And you shall love the Lord your God with all your heart, with all your soul, with all your might'" (ix), and that "like some latter-day Joshua" Sagan sought to bring down walls, including

"the wall of jargon that mystifies science" (ix), "the wall around our souls that keeps us from taking the revelations of science to heart" (ix), and the "wall separating science and religion" (xi). Instead of allowing religion to sustain "a protective wall around itself" (xii) by holding that "religious beliefs should be off-limits to scientific scrutiny" (xi), Sagan, says Druyan, "took the idea of God so seriously that it had to pass the most rigorous standards of [scientific] scrutiny" (x).

There are nine chapters: Chapter 1—"Nature and Wonder: A Reconnaissance of Heaven," Chapter 2—"Retreat From Copernicus: Modern Loss of Nerve," Chapter 3—"The Organic Universe," Chapter 4—"Extraterrestrial Intelligence," Chapter 5—"Extraterrestrial Folklore: Implications for the Evolution of Religion," Chapter 6—"The God Hypothesis," Chapter 7—"The Religious Experience," Chapter 8—"Crimes Against Creation," and Chapter 9—"The Search." Sagan's "search for who we are" included searching for others, including terrestrial others, extraterrestrial others, intelligent extraterrestrials with radio transmitters, and searching for God.

Extraterrestrial Life

Though scientific searches continue to yield only inconclusive evidence of extraterrestrial life, Sagan suspected "life and intelligence are a cosmic commonplace" (195). In Chapter 3 "The Organic Universe" (where 'organic' refers to the presence of complex carbon-based molecules), Sagan argued that because the universe is rich in complex carbon-based molecules prerequisite for life as we know it, explaining the origin

of life requires no appeal to miraculous/divine activity. Instead, "the origin of life was in some sense easy, in some sense sitting in the laws of physics and chemistry" (99). For Sagan, the history of science shows that "as science advances" (filling in explanatory gaps), there is "less and less" for a "God of the Gaps" to do (64). Sagan reasoned that life is probably commonplace in an organic universe. Also, in "The Search for Extraterrestrial Life" in *Scientific American* (October 1994) Sagan said that "carbon- and water- based life-forms are the only kinds we know or can even imagine" (93), that life "seems to need liquid water, which in turn seems to require planets," and that "planetary systems are common" (99).

Extraterrestrial Intelligence

Sagan saw no evidence that there are intelligent extraterrestrials (evidence from UFO reports and theories about ancient astronauts were rejected as "folklore"), but he found the idea is plausible, and he advocated scientific searches for electromagnetic signals from intelligent extraterrestrials. Sagan noted that this mainstream scientific approach was suggested by the Drake equation—$<N = R \times f_p \times n_p \times f_l \times f_i \times f_c \times L>$, that is N [number of technical civilizations in our galaxy capable of interstellar contact] = R [galactic star formation rate] x f_p [stars with planets] x n_p [number of planets] x f_l [planets with life] x f_i [planets with intelligent life] x f_c [civilization with communications technology] x L [lifetimes of technical civilizations] (109). According to the Drake equation, the product of various individual probabilities yields a collective probability of a number—"N"—of extraterrestrial technical civilizations capable of interstellar

communications. Depending upon the probabilities, there may be a million such civilizations in our galaxy (114-115).

Because the idea of such technological extraterrestrial civilizations implies equal-to-human or more probably superior-to-human intelligence, Sagan saw favoring this idea as a Copernicus-like threat to valuing humans as central, privileged, and superior. Sagan argued that the history of science shows that we tend to retreat from Copernican insights, from Darwinian insights, and from other scientific insights (including special relativity and big bang cosmology) that deny us cosmic centrality and privilege. Recent manifestations of this tendency include creation science, arguments from design and anthropic principles, and some arguments against the possibility of extraterrestrial intelligence. Instead of continually retreating from Copernicus-like threats to human centrality, Sagan prescribed that we adopt a "cosmic perspective" (30), that we "embrace our lack of centrality" and "face the vastness" (Druyan, xii).

God and Extraterrestrials

Sagan scrutinized the cosmological argument, arguments from the Second Law of Thermodynamics, the argument from design, the moral argument, the ontological argument, the argument from consciousness, and arguments from religious experiences (154-163), and he concluded that these "alleged natural theological arguments" are "not very compelling" (165).

Moreover, Sagan held that, except for slight "details," the question of "convincing evidence" for the existence of God is "not significantly different" from the question of convincing evidence for the existence of intelligent extraterrestrials (108), and that "a reasonably competent god" could have provided "absolutely clear-cut evidence of His existence" (165). For examples, "God could have engraved the Ten Commandments on the Moon," or God could have placed "a hundred-kilometer crucifix in Earth orbit" (167). The lack of such clearly visible evidence brought Sagan to conclude that Protagoras was correct when (in his fifth century B.C *Essay on the Gods*) he wrote that he had "'no means of knowing'" if the gods exist because "'they are never seen'" (168). Though Sagan imagined that someday soon we may discover convincing evidence for the existence of intelligent extraterrestrials [For instance, see *Intelligent Life in the Universe* (San Francisco: Holden-Day, 1966, translated by Paula Fern) by I. S. Shklovskii and Carl Sagan, and Sagan's novel (now a motion picture) about receiving the first radio signals from extraterrestrials—*Contact: A Novel* (New York: Simon & Schuster, 1985).], Sagan did not imagine there will ever be convincing evidence for the existence of God.

"What we mean by God"

Sagan noted that the outcome of scientific inquiry into the existence of God hinges upon "what we mean by God," and that the word "'god' is used to cover a vast multitude of mutually exclusive ideas" (224). According to Sagan, ideas of God range from at one pole "the view of, say, Spinoza or Einstein, which is more or less God as the sum total of the laws of physics" (and "If that's what we mean by God, then surely God

exists") to the "opposite pole" where God is imaged as a man with "a long white beard, sitting in a throne in the sky" (and "for that kind of god I maintain there is no evidence") (224).

Sagan rejected the idea of "an exhortatory god" (191) or "a personal god" who gives us purpose because "purpose is not imposed from the outside" and not found "in some book written thousands of years ago" (227). Sagan held that we create our purposes, and "survival" is one purpose "that we have to work out for ourselves" (227). The scientific evidence shows that survival is far from guaranteed. We are now fully able and increasingly likely to destroy ourselves with nuclear war or by destroying our environment. Sagan drew upon religious language to describe accumulating weapons of mass destruction and increasing ecological destructions as "crimes against creation" (title of chapter eight). And he prescribed that religious teachings about creation, stewardship, hope, and love (including love of enemies) should be employed to assist scientists in encouraging peace and ecological responsibility (205-209). [Similarly, in *Billions and Billions: Thoughts on Life and Death at the Brink of the Millennium* (New York: Random House, 1997) Sagan prescribed a science-religion alliance aimed at protecting the Earth (172).] He rejected the idea that God (or extraterrestrials) will determine human destiny because this idea discourages us from taking immediate and full responsibility for our future survival (Ibid, also 59, 129).

Deity as "too small"

As an astronomer, Sagan adopted a to-scale perspective on our size, age, and non-centrality relative to our solar system, our Milky Way galaxy, and the universe. From this "cosmic perspective," Sagan found that "the God portrayed" in "Earth-centered" theology is "too small"—"a god of a tiny world and not a god of a galaxy, much less of a universe" (30). Sagan judged that portraying God as "too small" is "a general problem with much of Western theology"—a problem "that theologians have not adequately addressed" (30).

Sagan rightly identified 'smallness' (conceiving of a deity "too small" for universal influence) as a "general problem" for classical Western theology (30). Despite having identified 'smallness' as the problem, Sagan failed to explore the implied solution—'largeness' (conceiving of a God *not* "too small" for universal influence). Sagan failed to consider the neoclassical notion that 'God is great' means [among other meanings (including 'God is good')] 'God is large' beyond possible equal or surpassing by any other(s). God is large enough to encompass all that is real, however large that may be. In contrast to the Earth-centered classical theology scrutinized by Sagan, the neoclassical theology of Charles Hartshorne holds that God is "the one universal individual" (*Reality as Social Process* 1953, 176). Schubert M. Ogden's formulation of this panentheist-Hartshornean-neoclassical doctrine is that God is "the one all-inclusive whole of reality" (*Perkins Journal*, Spring 1984, 21). According to neoclassical theology, any non-all-inclusive reality is "too small" to be God. Here is the definitive solution to the problem of a god "too small" for universal influence.

Sagan was correct in observing that the question of "convincing evidence" for the existence of a small god is "not significantly different" from the question of convincing evidence for the existence of intelligent extraterrestrials (108). The two questions are "not significantly different" insofar as both are about the existence of putative *parts* of reality. By contrast, where God is understood to be "the one all-inclusive *whole* of reality" (Ogden, italic added), the theological question is significantly different, and mere factual observations—such as seeing commandments on the Moon or a crucifix in Earth orbit—cannot qualify as "absolutely clear-cut evidence" (165). More deeply empirical, logical, and metaphysical evidence is required. Though Sagan rightly identified the fact that the gods are "never seen" as an epistemological problem for affirming the existence of any small god (168), he did not consider the significantly different question of seeing the one reality large enough to be fully divine—the all-inclusive whole of reality.

For creatures that see, where anything real is seen, the all-inclusive whole of reality (God) is always seen in part, and "never seen" in whole. Though seldom recognized, God is always seen in part where anything real is seen. No creature (no part of reality) can ever see the comprehensive whole of reality. (Analogously, if single cells could see, no cell could see the whole body from inside the body of which it is a cellular part. At best, such a cellular part could see only some parts of that bodily whole.) At best, creaturely seeing is seeing only some parts of the divine whole of reality.

Sagan's scientific search for God was seriously limited by his failure to search for data concerning the all-inclusive whole of reality—the universal individual. Without

attention to the living (and inspiring) whole of reality, Sagan's search for God was limited to searching for the "never seen" and "too small" gods of classical Western theology (putative parts of reality). In his search for God, Sagan was searching for life too small for universal influence.

ET as "too small"

Sagan's search for extraterrestrial life was also limited to searching for small life, that is, to searching for living individuals or communities of individuals that are small enough to live on a planet or moon. Nonetheless, the idea of searching for vastly larger individuals is suggested by Sagan's critical questions concerning the suspicious notion that the continuum of life stops at humans. Sagan said: "If there is … a continuum from self-reproducing molecules, such as DNA, to microbes, and an evolutionary sequence continuum from microbes to humans, why should we imagine that continuum to stop at humans? Why should there be an open-ended gap in the spectrum of beings? And isn't it a little suspicious that the gap would begin with us? (103)" Given a non-suspicious reading of the small-to-large-to-larger continuum, the familiar pattern (many small individuals living within a large individual that lives within an even larger living individual) probably continues. Between earthly individuals and the one all-inclusive-universal individual, there is plenty space for multiple nestings of individuals that are both vastly more inclusive than earthly individuals and vastly less inclusive than the all-inclusive individual. (For example, a galaxy might be a living individual or part of a larger non-universal living individual, or both. Certainly a galaxy is a very small part of

the one universal/all-inclusive living individual.) Though Sagan did not advocate or even imagine searching for life-forms that are vastly larger than us, his questions suggest the need for such searching. [Sir Fred Hoyle did conceive of astronomically larger-than-human intelligences, and he presented this conception in his science fiction book—*The Black Cloud* (1957).]

Science as Religious Experience

Sagan's "search for who we are" did not reveal that we are parts of an all-inclusive divine whole. Still, it did reveal much about who we are. We are at home on only one small planet. If we continue to commit "crimes against creation," we will become extinct much sooner than otherwise. We should repent of such crimes immediately. We are explorers searching beyond our planet. Looking back at our "pale blue dot" (title of Sagan's 1994 book) from outer space inspires greater appreciation for our Earthly home and increased moral responsibility.

As indicated in the first chapter—"Nature and Wonder: A Reconnaissance of Heaven," exploring the cosmos inspires a sense of awe and "wonder" that Sagan recognized as a deeply religious sentiment. Sagan experienced scientific exploration of the cosmos as a form of worship. He held that "If a Creator God exists," surely such a God prefers "His votaries to admire the real universe," and that "science is, at least in part, informed worship" (31). Even without recognizing God, Sagan and Druyan

recognized this wonderful variety of scientific experience as a variety of religious experience.