Conclusion: The Morals of Macroevolution

In the film *Contact* (1997), based on a novel by Carl Sagan, SETI researcher Dr. Ellie Arroway, played brilliantly by Jodie Foster, is whisked off by an alien-designed transporter device on an eighteen-hour journey through the galaxy. At one poignant moment, Arroway emerges from a wormhole to witness a remarkable stellar event that she attempts to describe scientifically, in third-person terms, only to be overcome by the subjective aesthetic of the experience. "They should have sent a poet," she famously exclaims.

The story of macroevolution is just as poetic and profound as any journey through the physical universe. This remains true whether bodies and minds as we know them are contingent accidents of history or robustly replicable outcomes written into the laws of life. Either way, the picture painted by macroevolutionary science provides us with a deep source of self-knowledge, placing humanity in an unbroken chain of reproduction that extends all the way back to the origin of life on Earth, and forging connections, through laws or through chance, to life as it may exist elsewhere in the cosmos.

At the same time that natural history enriches our self-understanding, it also enables us to transcend our selves. During transcendent experiences, the self fades from view, allowing one to feel "connected" to some hidden grandeur that had been there all along but had remained out of sight. Psychologist Jonathan Haidt argues that transcendence is an adaptive mechanism that promoted the evolution of human cooperation by modulating group identity. In my view, transcendence is not so much a relic of human evolution as it is a primitive feature of consciousness itself. If the awareness of the body in space and time is a critical component of consciousness, then there is an important sense in which richer forms of conscious experience flow from a better understanding of one's place in the cosmos. This understanding can be simple—relating, for example, to an animal's position relative to its nest or other meaningful objects in its immediate microcosmos—or it can involve a more abstract representa-

tion of the broader enveloping world, even one of open-ended spatiotemporal depth that reposes on the theoretical knowledge of scaffolded science.

Transcendence is not the sole province of mystics and shamans. It is an important part of many people's lives, and it is central to the value of science. The iconic "Earthrise" image, taken on Christmas Eve 1968 by the crew of Apollo 8, shows the bright blue Earth, churning with oceans and clouds, rising over the barren gray surface of the moon. Logically, of course, there was nothing surprising about the view; and yet, like Sagan's Arroway, words failed the astronauts of Apollo 8 as they were faced with nature's transformative grandeur. For at that moment, they not only *knew* their place in the universe, but they *experienced* it in a different and deeper way. The event was more revelation than confirmation.

As the frontiers of scientific knowledge shrink, either renewed confidence or increasing doubt will swirl around the conclusions of this book. Convergence, if it proves to be a potent force in evolution, could provide a cosmic connectedness—for it is a story about the immense chasms that life will cross to reach the same place. If convergence is an ode to similarity and destiny, contingency is a celebration of the diversity and uniqueness that results from an evolutionary process that performs more like improvisational jazz or a Jerry Garcia guitar riff than it does like the highly structured composures of classical form. Radical contingency, should *it* prevail, would compel us to confront the infinite isolation of a desolate universe, drawing us closer to the only cosmic companions we will ever have: the meaningful minds with whom we share this pale blue dot.

Contingency and Convergence

Toward a Cosmic Biology of Body and Mind

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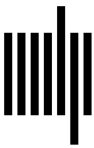

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