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WITH COVERAGE FROM nature

Steven J. Dick is the former NASA chief historian and the former Baruch S. Blumberg NASA/Library of Congress Chair in Astrobiology. He is the author or editor of 20 books, including, most recently, *Astrobiology*, *Discovery*, and *Societal Impact* (Cambridge, 2018). In 2006 Dick received the LeRoy E. Doggett Prize from the American Astronomical Society for a career that has significantly influenced the field of the history of astronomy. Minor planet 6544 Stevendick is named in his honor.

SPACE

Astroethics and Cosmocentrism

As astronomers forge ahead in their search for alien life, the ethical questions a discovery would raise are becoming more urgent

ANYUR ZAKIROV PIXABAY

WITH THE RECENT ANNOUNCEMENT of a large subsurface lake on Mars, ongoing investigations of the oceans of Europa and Enceladus (complete with shooting geysers!), the discovery of exoplanets numbering in the thousands and the $100-million Breakthrough Listen SETI program well underway, the paradigm-shattering discovery of life beyond Earth could be made any day. NASA is showing renewed interest in SETI (it is sponsoring a meeting on technosignatures in September), and a few intrepid organizations such as METI International are actually sending messages to the stars (METI stands for "messaging extraterrestrial intelligence").

In recent months both Breakthrough Listen and the SETI Institute have sponsored both real and virtual meetings to examine the societal impact should their programs prove successful. Anthropologists, historians, ethicists, philosophers and others are joining the interdisciplinary conversation in a serious way, impelled by the increasing possibility of discovery.

All of this activity gives new urgency to a whole series of ethical questions. Does Mars belong to the Martians, even if the Martians are only microbes? What do we say in response to an alien message, and who speaks for Earth? How do we treat aliens, either remotely or in a "close encounter of the third kind"? In short, whether we discover alien microbes or advanced alien life, we will immediately be faced with the problem of how to interact. Welcome to the world of astroethics—the contemplation and development of ethical standards for a variety of outer space issues, including terraforming the planets, resource utilization, near-Earth asteroid threats, space exploration, planetary protection—and the discovery of extraterrestrial life.

The problems involving E.T. life are particularly fraught, especially if it talks back to us. Before we can act in any situation that involves life, it is first important to assess the moral status of the organisms involved. This is no easy task, since we are ambigu-

ous about relations with animals on Earth, on the one hand sheltering them as beloved pets, on the other hand and rather arbitrarily hunting, eating and exterminating them. But a good deal of thought has been given to the subject of the moral status of Earth organisms and the idea of intrinsic value on which it is often based. Contemplating encounters with alien life tremendously expands our ethical horizons.

The case of intelligent aliens also encompasses not just the problem of how we might treat them but also how they might act or react. In other words, it is not just a question of our ethics. What about their ethics? Is there any basis for inferring whether alien intelligence might be good or bad? On Earth we exhibit a mix of altruism and evil, but is there any reason to believe altruism has triumphed among extraterrestrials? Might there be such a thing as a universal ethics in the form of a universal Golden Rule or a reverence for life? Or is *Star Trek*'s "Prime Directive" of nonintervention a naive one-way street, a recipe for our own extinction? Does the arc of the moral universe indeed bend toward justice?

There are obviously many more questions than answers. Nonetheless, answers to these questions will inform our actions in real-world contacts with alien life under different scenarios. As I argue in my new book *Astrobiology, Discovery and Societal Impact,* by contemplating these issues, and certainly by putting them into practice in the event of the discovery of life beyond Earth, we will not only address what the World Economic Forum has called one of the "X-factors" in our near or far future but also transform our thinking by moving from an anthropocentric ethic toward a "cosmocentric" one that establishes the universe and all or part of its life as a priority rather than just humans or even terrestrial life in general.

Let's look at some specific issues, beginning with microbes, which many consider most likely to be the first discovery of life beyond the Earth. Microbes have always been a focus of attention in the context of Mars exploration, but now the focus is expanded to other water worlds of our solar system, such as Jupiter's moon Europa or Saturn's Enceladus. At first the issues might seem straightforward: NASA has a robust planetary protection program whose goal is to protect all of the planets all of the time from contamination or back contamination.

Beyond that, however, the scary fact is that no guidance exists on what to do if microbial life is actually discovered. In the context of microbes, it matters whether we adopt an anthropocentric or ratiocentric ethic that confers intrinisic value only on reasoning beings, or a biocentric ethic that values all living things. It matters whether we consider microbes only of scientific value or whether they are considered to have intrinsic value, in which case microbes have rights too—rights that we do not give their counterparts on Earth. Planetary contamination policies seem to confer rights on any microbes we may find on other worlds; the central goal of those policies, after all, is to protect from contamination any planets that might harbor life. That is a kind of biocentric ethic.

But it is an unstable and inconsistent one, since by necessity on Earth we stamp out pathogenic microbes while at the same time realizing the microbiome is essential to human health. Thus, the status of microbes is one of many ethical dilemmas we will face if and when extraterrestrial microbes are discovered. One has the feeling that even if a biocentric ethic is adopted in principle, human health will always take priority.

While the policy issues involved with the discovery of microbes are serious enough, the issues become even more daunting for extraterrestrial intelligence. Once again they depend on the discovery scenario, most urgently in connection with current programs for indirect contact via SETI or METI, and most spectacularly in terms of impact if we ever make direct contact with aliens on Earth or in our solar system, even in the form of alien artifacts. The question of what to do in the event of success in SETI has received considerable attention in the form of SETI protocols adopted three decades ago, which basically boil down to "confirm and then tell everybody."

In other words, no false positives and no secrets. While these protocols have been adopted by a number of international organizations such as the International Astronomical Union, they have not been adopted by the United Nations and are not legally enforceable. Moreover, they have already been broken. When a reporter calls an astronomer to ask about a rumored detection, astronomers admirably tend not to lie, even before confirmation. Beyond that, there are no principles for dealing with a successful SETI detection.

And despite attempts, there are no protocols for the messaging in METI, although there has been a great deal of heated discussion about the ethics of initiating messages, both in terms of consultation and message content. Opponents have gone so far as to suggest METI should be banned, and readers of Cixin Liu's disturbing *Three-Body Problem* trilogy might

tend to agree as they witness the Trisolaran fleet heading to Earth from the Alpha Centauri system. In contrast, I argue that when it comes to METI—and all of astrobiology—we are a part of the universe and cannot isolate ourselves from it. We will have to deal with microbes and aliens for good or ill in the same way we have had to deal with terrestrials for good and ill. Certainly, we can have consultations about message construction, content and other burning issues bound to arise.

But it is good to recall that METI is just one step ahead of SETI. If SETI is successful, we will reply, and all the questions METI practitioners are now dealing with will immediately come to the fore. In my view, not only is it unrealistic to think we will restrain ourselves from replying, it is also undesirable. An Earth where we have to limit our curiosity is not the kind of place I want to live. We should take all necessary precautions, feel at home in the universe and deal with the problems and the promise as they come.

The questions we have been asking go to the very core of the concepts of intrinsic value, moral status and their meaning for practical ethics. They raise the issue of whether an anthropocentric ethic is enough for an astroethics dealing with alien life, even when extended to environmental ethics and deep ecology, or whether we need something even broader: a "cosmocentric ethic," as NASA engineer, biologist and philosopher Mark Lupisella and space policy analyst John Logsdon suggested two decades ago.

I would argue that we do, in the sense that at a minimum we should apply a *basic cosmocentric ethic* stipulating that our increasing cosmic consciousness requires us to consider our place in the biological universe when we make ethical judgments. We are, after all, part of the cosmos and perhaps not the most important part when it comes to life—the central question of astrobiology. In this view, when we ask about the rights of Martian life or how to treat alien intelligence, we should certainly avoid an anthropocentric stance that only humans have moral status.

Perhaps you think this is all rather esoteric, a subject for elites to contemplate while most people deal with the more pressing problems of daily life. In my view, you would be wrong. Yes, we have plenty of problems on Earth to deal with, but extraterrestrial contact may soon be one of them. Preparing for discovery is important to maximize the chances for a beneficial outcome. And we should never forget that Earth is part of the universe, and the cosmic view of astroethics and an accompanying cosmocentric ethic might just give us a perspective on our problems that will help solve them. In addition, astroethics has the potential to influence multitudes with the rise of the related discipline of astrotheology, the study of alien behavior, now also a hot topic and the subject of many books. But that is another question.