



Search for Intelligent Worlds

To find extraterrestrial intelligence we should look for engineered exoplanets.

HUMANS HAVE CERTAIN qualities that distinguish us from other life: levels of abstract reasoning, awareness of past and future, and the ability to intentionally alter environments. This inventiveness enabled our species to weather the last ice age and populate nearly the entire planet. But do we have enough of these skills, on the necessary scale, to continue to thrive?

We have global influence but lack global control. We now dominate many of Earth's "natural" systems, and scientists have identified many accelerating global changes that may threaten the future of our civilization. Unlike most challenges our race has faced, these new self-imposed hurdles are inherently planetary in nature and will require globally coordinated responses. Our future survival hangs on the need to perceive and act on this scale.

Just in the nick of time, we may be starting to develop a kind of "planetary intelligence" that would enable us to anticipate, perceive, and respond to survival threats on a global level. The rapidly coalescing, technologically interconnected global *noosphere* (pronounced "new-oh-sphere," a term coined in 1922 by Pierre Teilhard de Chardin to mean "sphere of human thought") of trade and communication has some properties of an emerging consciousness. As in a primitive nervous system, information is sensed

and exchanged through complex networks, and the global system reacts in various ways. Through us and our technology, the biosphere is arguably developing a global mind that may soon be able to fend off asteroid strikes and climate catastrophes.

Our survival may depend on refining and amplifying these tendencies. Britain's Astronomer Royal Sir Martin Rees, in his book *Our Final Hour*, gives civilization a 50% chance of surviving the next century. Others have described a kind of 21st-century bottleneck whereby our exponentially increasing technological prowess will either destroy our civilization or insure its long-term survival. This bifurcation may be a feature of technological civilizations in the galaxy. Many may be short lived but some could be nearly immortal. If so, our search for other intelligences is a search for survivors of the same kinds of challenges we currently face.

Over the long run planets are changing, unreliable homes, so some long-lived civilizations might not be confined to a single world. Others may engineer their planets. We're beginning to observe exoplanet atmospheres, so when our abilities improve, we should be on the lookout for signs of deliberately altered environments. How would we recognize these "noosignatures"?

We can imagine how we would terraform worlds or fix climate problems on a future Earth. If our descendants are still here and want to maintain their civilization, let alone a thriving biosphere, they will intervene to prevent future ice ages and, eventually, the Venus-style runaway greenhouse that will despoil Earth if left to its own devices. If an exoplanet has a strange climate that is being controlled by seemingly unnatural atmospheric compounds such as chlorofluorocarbons, that should grab our attention. Or if we find a world with a suspiciously unusual day-night pattern of brightness, we might suspect planetary engineering with mirrors or surface alteration. Of course, we can't really predict the actions of super-advanced intelligent aliens, so we can at best make reasonable guesses and be prepared for surprises. ♦

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