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Widening Perspectives: The Intellectual and Social Benefits of Astrobiology (Regardless of Whether Extraterrestrial Life is Discovered or Not)

I.A. Crawford (1,2)
(1) Department of Earth and Planetary Sciences, Birkbeck College, University of London, Malet Street, London, WC1E 7HX, UK; (2) Centre for Planetary Science at UCL/Birkbeck, Gower Street, London, WC1E 6BT, UK (i.crawford@bbk.ac.uk).

Abstract

Astrobiology is usually defined as the study of the origin, evolution, distribution, and future of life in the universe. As such it is inherently interdisciplinary and cannot help but engender a world view infused by a cosmic perspective. Both these attributes of the study of astrobiology are, and will increasingly prove, beneficial to society regardless of whether extraterrestrial life is actually discovered or not.

1. Introduction

The principal objective of astrobiology as a scientific discipline is to understand the origin, evolution, distribution, and future of life in the universe. There is no doubt that the 'holy grail' (or at least one of the holy grails, because there are actually several) of astrobiology would be the discovery of life elsewhere in the universe. Such a discovery would have profound scientific, and very likely also philosophical and societal, implications, although the nature of these implications will depend on the nature and location of the extraterrestrial life discovered. However, as these implications will presumably be covered elsewhere in this meeting, here I wish to address the intellectual and social benefits of the *study* of astrobiology, regardless of whether the search for extraterrestrial life is ultimately successful or not.

2. Intellectual benefits of the study of astrobiology

The principal scientific and intellectual benefits of astrobiology arise from its inherently inter-disciplinary nature. The study of astrobiology requires a grasp of, at least, astronomy, biology, biochemistry, geology, and planetary science. All undergraduate courses in astrobiology (including the one the author has taught at Birkbeck College London for the last nine years) have to cover elements of all these different disciplines, and postgraduate and postdoctoral astrobiology researchers likewise need to be familiar with most or all of them. For most of the nineteenth and twentieth centuries these subjects were taught as separate academic disciplines, with the result that the practice of science ceased to reflect the underlying continuum of Nature. By forcing these different disciplines to interact, the study of astrobiology is helping to move the practice of at least some aspects of twenty-first century science towards the more interdisciplinary outlook that prevailed in the sixteenth and seventeenth centuries. By producing broad-minded scientists, familiar with multiple aspects of Nature, astrobiology is enriching the whole scientific enterprise. It is from this cross-fertilization of ideas that future discoveries may be expected, and such discoveries will comprise a permanent legacy of astrobiology even if they do not include the discovery of alien life.

In addition to the (partial) re-unification of the sciences, the study of astrobiology clearly stimulates much intellectual and philosophical activity that would not otherwise take place (of which this Session at EPSC is a small example). The discovery of extraterrestrial life will of course stimulate much scientific and philosophical debate, but in some ways the implications of the *non-discovery* of extraterrestrial life may be equally profound. The intellectual life of humanity will be enriched by considering the results of *searching* for life in the universe, regardless of what those results turn out to be.

3. The ‘cosmic perspective’ and resulting societal benefits of astrobiology

To my mind, the principal societal benefits arising from the study of astrobiology, and from its popularization to a wider public, are a consequence of the ‘cosmic perspective’ that it naturally engenders. It is impossible to consider searching for life on Mars, or on a planet around another star, without moving away from the narrow Earth-centric perspectives that dominate the social and political lives of most people on this planet most of the time. At a time when the Earth is faced with global challenges that can only be met by increased international cooperation (and arguably by developing institutions of global *governance*), yet tribal nationalistic and religious ideologies are acting to fragment humanity, the promulgation of a cosmic perspective on human affairs is potentially of enormous importance.

Although the cosmic perspective might be expected to intrude most forcibly into the public consciousness in the event of an actual discovery of extraterrestrial life, the search itself can still contribute. Indeed it is only by sending spacecraft out to explore the Solar System, in part for astrobiological purposes, that we can obtain images of our own planet that show it in its true cosmic setting (Fig. 1).

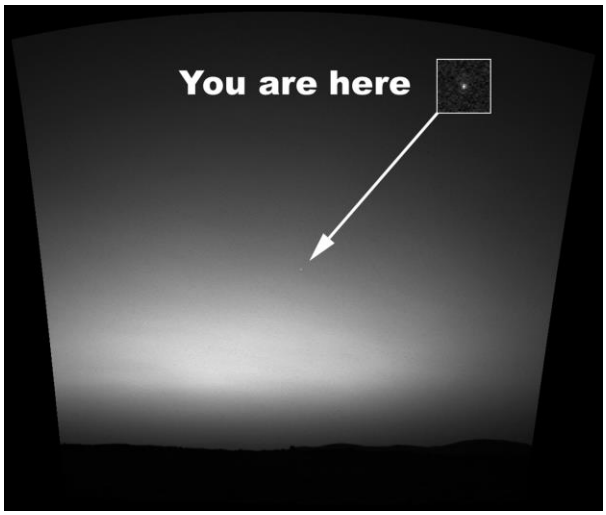

Fig. 1. The Earth photographed from the surface of Mars by the Mars Exploration Rover *Spirit* in March 2004. Such images imply a ‘cosmic perspective’ that can have a unifying influence on human affairs (image courtesy of NASA).

Moreover, opportunities for developing this cosmic perspective on human affairs may increase in the future, especially as a result of human space missions beyond low Earth orbit (which are likely to be, at least in part, motivated by astrobiological considerations [1,2]).

4. Conclusions

I have argued that the study of astrobiology yields, and will continue to yield, significant scientific, intellectual, and social benefits, even if extraterrestrial life is not discovered. The (partial) re-unification of the sciences under the influence of astrobiology has already resulted in much intellectual enrichment, and this trend is set to continue. Moreover, the ‘cosmic perspective’ entailed by the *search* for extraterrestrial life, regardless of whether such life is ultimately discovered, may be expected to have a unifying effect on humanity. Astrobiology is by no means a panacea in either respect, but both the intellectual world, and the ‘real’ world, would be poorer places without it.

References

[1] The Global Exploration Strategy: Framework for Coordination, http://esamultimedia.esa.int/docs/GES_Framework_final.pdf

[2] Crawford, I.A., 2010. Astrobiological benefits of human space exploration, *Astrobiology*, 10, 577-587.