

If life's a gamble, then the odds aren't great

A review of
Rare Earth
By Peter D. Ward and Donald Brownlee
Copernicus, Springer-Verlag New York, 2000

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This is not a book about rare earth elements, but one that has a much grander scope. It is boldly sub-titled '*Why Complex Life is Uncommon in the Universe*'. The subtitle flies in the face of the hopes of the much funded and much lauded SETI¹ project and infers that we know enough about the universe to make statements about the incidence of life within it.

One could imagine that the authors make their claim because no intelligent life has contacted us, or we have not detected it. Of course, 'complex' life might be:

1. less 'advanced' than we are so that it has no means of communicating,
2. so different that we could not communicate even if we had the means, or
3. so advanced that it could not be bothered.

Whichever way, we might not know even if it was there.

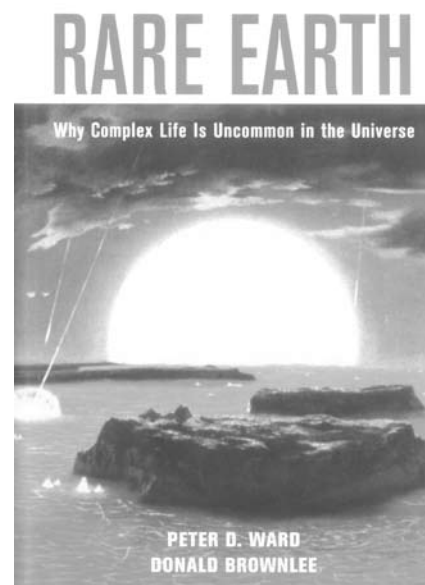
In his concise recitation of the anthropic universe concept, Peter Williams² makes the point that the universe (and Earth) appears to be surprisingly suited to human life, which, by inference, suggests that the God who could make such a universe does exist. Ward and Brownlee in *Rare Earth* go further and say that not only is Earth surprisingly suited to animal life, but that the events which would have brought this about are so rare in themselves, and more so in conjunc-

tion, that it is unlikely that similar life would exist elsewhere.

One who rejects the materialist view would take issue with the way the authors assemble their evidence. They rely on the improbabilities of biological evolution (but don't question the 'fact' of evolution), and the supporting inter-calibrated geological dating systems in current favour and, of course, they accept that materialism is capable of thorough explanation of the universe. However, the reader will agree with the authors' conclusion, i.e. that Earth has such a highly improbable conjunction of characteristics that its life support capability would be a rarity in the galaxy, if not the universe.

The book's position makes a refreshing change from the zeal of people such as Frank Drake, and the late Carl Sagan, who supposed that the universe must be teeming with life because, well, just because. Sagan and Drake presented a highly uncritical calculation which suggested that life is so dense in the universe that we could expect inter-planetary visitors at any moment; even hordes of them.

The authors re-assess the formula assembled by Sagan and Drake (the Drake formula) adding factors, as they see them, that must be influential for a planet to support life. The Drake formula considers number of stars, the fraction with planets, the fraction of planets in the habitable zone (for life as we know it), and so on. Ward and Brownlee go on to factor in a planet's metal richness, a planet's being in a galactic habitable zone (where star density is 'right'), the presence of a large moon, Jupiter-sized planets, and the planet having a low number of mass extinction events. They could well add the specific related factors they also discussed: plate tectonic effects, planet obliquity (tilt), magnetic field, atmospheric history, presence of liquid water and so on.



On the basis of their formula, the probability of there being animal life elsewhere in the galaxy is vanishingly small. That is, on the supposition that the factors they have listed were causative in the formation of life on Earth and not co-incidental by intelligent intention.

There is an 'out', though, in their proposition. While they put the view that **animal** life may be very rare in the universe, because it requires Earth-like characteristics that, as a set, occur rarely, they suggest that **microbiotic** life may be less rare, if not plentiful. This is based on the discovery of life forms in what were regarded as inhospitable ecological niches on Earth: places of high water temperature, high pressure, no light, chemical environments inimical to common life forms, and so on. Such places, in the authors' view, abound in the universe and so they should have produced life. This amounts however to the genetic code, or a genetic code of some sort popping into existence willy nilly. They fall into the same basic trap that Sagan *et al.* fell into. Forget about the basic improbabilities of life occurring materialistically. Forget the high information content and coding system it relies upon. If it happened once, in a perverse rejection of probability, it can happen a zillion times. On the other hand, in the real

world, how often is lotto won by the same person time after time?

The beginning chapters of the book are devoted to discussion of these creatures (extremophiles), the implications of their existence for the origin of life and the possibility of similar extremophilic life being in comparative abundance throughout the galaxy. The authors contend that the existence of life here on Earth in conditions 'previously thought too hot, cold, acidic, basic, or saline shows that ... life can exist in a much wider range of habitats than previously thought'. They claim this as the strongest evidence that life may be widespread in the universe. As this quote suggests, the procedure used by the authors in discussion of life's origin and putative evolution wavers between question-begging in the grandest style and *post hoc ergo propter hoc*³ 'brilliance'. The tissue of supposition that lies behind conventional consideration of the origin of life leaves the critical reader unimpressed.

The authors' handling of evolutionary ideas is 'traditional', and

their presentation is as conventional and unquestioning as could be expected in a popular publication supportive of the broad views of the scientific establishment. One reference in this line is mention of the discovery that amino acids could be formed *in vitro*. So what! Repetition is another irritant that crops up throughout the book. The authors also have the habit of amplifying speculation into discovery, labelling Darwin's speculation as a 'discovery', for instance.

While the book is refreshing in some ways, putting more substantial thought to the idea of extra-terrestrial life than Sagan and others have done, it features a 'messianic' view of science. That is, of human capability. The book seems to be directed towards a popular audience and therefore serves as a useful corrective to the wild speculations that have assumed that 'evolution once, evolution twice, evolution everywhere' in the universe. Hopefully it will also strengthen Christian apologetic along the lines of the 'anthropic teleological' argument. However, in a world that

mounts human capabilities on a white charger, either in materialism or fake spirituality, the common mind will persist in finding humanity at the centre of the universe, despite Copernicus, despite our manifest failure to run this planet, and despite the incarnation of our Creator in Jesus of Nazareth.

References

1. Search for Extra-Terrestrial Intelligence.
2. Williams, P., The anthropic teleological argument, in: *The Case for God*, Monarch, 1999.
3. The logical fallacy that something occurring after a phenomenon indicates that it is caused by the phenomenon.



Geysers in the geothermal area at Rotorua, New Zealand. Even though microscopic life can survive in the hostile environment around volcanic vents and geothermal areas, it does not explain how the complexity of life arose in the first place.