

Implications of the Copernican principle for the existence of extraterrestrial intelligence

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Strictly applying the Copernican principle to the formation of intelligent life implies that it may be quite rare, and the factor in the Drake equation may be many orders of magnitude less than one.

It has puzzled me for a long time why astronomers tend to be more optimistic regarding the possibility of extraterrestrial intelligence than biologists. Starting from considerations made in an article in *Nature* from several years back (Gott III, J. Richard **Nature** **363**:315-319, Implications of the Copernican principle for our future prospects.) I would like to follow through with the implications for other forms of intelligent life in the Universe. We do not occupy a privileged position in the Universe and we are not privileged above other species, as Gott rightly states in the opening paragraph of his article, but in considering the probability that an intelligent species may form on a habitable planet his estimate is probably several orders of magnitude too high.

The Copernican principle means discarding explanations for observed phenomena that assume a privileged position when alternatives. Paradoxically abandoning a privileged point of view implies that the formation of intelligent life forms may be quite a rare occurrence and human-like intelligence may be (almost) unique however much this goes counter to what many of us would like or hope. To see why we must consider (as S. J. Gould points out in *Full House*), that evolution is not a process towards a higher complexity, but a random process in which most forms of life continue to occupy the simpler portion of the spectrum of complexity. There is a lower limit on complexity (living beings smaller than a molecule are highly unlikely!) so some species increase in complexity as an incidental consequence of random changes. Thus the general trend towards ever more intelligent creatures is an illusion from our own particular perspective. Viewed from this privileged position we find it hard to see that there is really no trend towards us. This means that the assumption made that intelligent species are being formed at a uniform rate must be taken cautiously. When we talk of planet formation, or of the formation of stars we are dealing with a physical processes that obey certain laws given a set of circumstances. This is not at all the case when we talk about evolution. Randomness is a major factor in evolution, however much we may dislike to admit it (cf. for example: Leakey, Richard *The Sixth Extinction*).

Though the recent discoveries of other planetary systems has greatly increased the hope of finding other forms of life it is probably more than compensated by the extremely small factor of the possibility of it being intelligent, and in any case we cannot assume that intelligence must be similar to ours. (cf.

for example Marino, Lori *Brain-behavior relations in primates and cetaceans* in **Astronomical and Biochemical Origins** ed. C.B. Cosmovici)

I now think that the answer to my opening question may be that astronomers tend to deal with phenomena that are “repeatable” and thus foreseeable, whereas biologists study a (so far) unique event.

yours truly,

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As a concluding remark: I do not, despite these considerations, wish to imply that I believe that SETI, or similar projects, should be reduced.