Too Damned Quiet?

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Abstract

It is often suggested that extraterrestrial life sufficiently advanced to be capable of interstellar travel or communication must be rare, since otherwise we would have seen evidence of it by now. This in turn is sometimes taken as indirect evidence for the improbability of life evolving at all in our universe.

A couple of other possibilities seem worth considering. One is that life capable of evidencing itself on interstellar scales has evolved in many places but that evolutionary selection, *acting on a cosmic scale*, tends to extinguish species which conspicuously advertise themselves and their habitats. The other is that – whatever the true situation – intelligent species might reasonably worry about the possible dangers of self-advertisement and hence incline towards discretion.

These possibilities are discussed here, and some counter-arguments and complicating factors are also considered.

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I. COMMENTS: APRIL 2011

This article was written in early 2005, and submitted then to Science. Perhaps predictably enough, it was rejected. Since then it has languished in my filespace, while I occasionally wondered whether to try to make it more publishable in a peer-reviewed science journal (and indeed whether that was possible).

Having recently noticed 2003 and 2005 arxiv papers by Beatriz Gato-Rivera expressing some very similar ideas [1, 2], I decided now to bite the bullet and distribute it as is. Sometimes, one should have the courage to communicate hypotheses even when they are difficult or impossible to test any time soon or argue rigorously for. (As Prof Gato-Rivera did: credit to her.) Gato-Rivera focusses on the possibility that all advanced civilisations would deliberately and consciously choose to remain inconspicuous, which she calls the Undetectability Conjecture. While the ideas in this paper obviously can fit with this premise, it seems to me that the case for undetectability (such as it is) is made a little stronger by considering the evolutionary mechanism for selecting inconspicuity discussed below, and its possible applicability regardless of the conscious exercise of intelligent choice.

To arxiv readers who feel that speculating about possible explanations for the lack of visible alien life goes beyond the boundaries of current science, I would say (a) you clearly have an arguable point, and part of me salutes your scientific rigour and notes that reading the article isn’t obligatory, yet (b) on the other hand, the borderline between the scientific and extra-scientific isn’t necessarily forever sharply fixed on this topic – after all, the ideas are ultimately testable in principle by searching the cosmos and seeing what is out there, and even now one could make some sort of test of the arguments’ (im)plausibility, however inconclusive, with suitable models, and also (c) sometimes it is intellectually legitimate for scientists to engage in reasoning about subjects that go beyond the current boundaries of experimental or observational science: we just need to be clear that’s what we’re doing when we do that (and clear too about the limitations of our arguments).

In any case, whatever scientific status it merits, the article gives arguments for a point of view and hypotheses that I still think deserve more attention. So here it is.

Apart from the addition of the references to Gato-Rivera’s work, and a disclaimer added to the acknowledgements, the article below is unchanged from its April 2005 version.
II. INTRODUCTION

Fermi’s famous question — “where is everybody?” — frames, in the plaintive cry of neglected hosts through the ages, a real intellectual puzzle. It is, on the face of it, surprising that aliens appear to display such little interest in the Earth and its inhabitants. Are the scientific, artistic and technological glories of our planet’s civilisations not worthy of at least cursory attention? Is there really no exobiotic need — aesthetic, intellectual, comedic, psychotherapeutic, gastronomic — that we terrestrials could satisfy? And even if extraterrestrial life isn’t interested in visiting us, why do we see no evidence of it elsewhere?

It is difficult to discuss this topic intelligently, given that we know almost nothing about the existence of bio-friendly environments other than Earth, the existence or otherwise of extraterrestrial life, the forms it might take, or the ways in which it might behave. Most of our ideas about extraterrestrials — whether set out in science fiction or (I would guess) in the policy documents of space exploration agencies — are just figments of our psyches. We do, though, have one source of conjectures that may at least plausibly be useful: extrapolation from the Earth’s evolutionary history.

III. EVOLUTION ON A COSMIC SCALE?

The aim here is to consider how life might evolve, or choose to behave, when it is or could be conspicuous on a cosmic scale. Here “conspicuous” means “conspicuous to some independent lifeform on a reasonable fraction of other cosmic habitats”. The discussion doesn’t require assuming that life originally evolved or currently exists only on planets, but I shall make the assumption anyway for succinctness, using “planet” as shorthand for “cosmic habitat”, and taking “independent lifeform” as shorthand for “lifeform having an evolutionary history which begins on a different planet”.

One can consider the possible ways in which extraterrestrial life might generally interact or avoid interaction without making any assumption about where we fit into the picture. If the aim of the discussion is to give a possible explanation for why we haven’t seen any evidence of extraterrestrial life, though, we need to assume that we are, by virtue of our senses and acquired science and technology, reasonably competent cosmic observers, so that if cosmically conspicuous life was prevalent, we would expect to see a fair fraction of it.
Obviously, if we are just not equipped to look for the right things, then our incompetence is sufficient to explain why we don’t see extraterrestrial life. Even if that were very likely true, though – say, if our planet were surrounded by a dense nebula, allowing us to observe the universe only by a very restricted frequency band — it would still be interesting and useful to consider how more favourably situated and more competent extraterrestrials might interact. Knowing the answer might not, in this case, help explain why we don’t see extraterrestrial life, but it might be a useful guide to our future actions (should we attempt to communicate or travel outside the nebula?).

Note that in principle one could imagine one lifeform being conspicuous to another one, living on a different planet, without assuming that either is intelligent or technologically advanced.

Now, it could be that cosmically conspicuous life, or life capable of interstellar travel, or even just life, has evolved nowhere but on Earth. It could also be that, although cosmically conspicuous life has evolved independently at many locations in the cosmos, its evolution is relatively rare, and it generally survives for relatively short periods, so that creatures originating in different cosmic habitats should expect rarely, if ever, to encounter evidence of one another. This has often been suggested, on the grounds that lifeforms are unlikely to become cosmically conspicuous until they develop radio technology, and that our own example suggests that once intelligent lifeforms reach this level they are likely very soon to acquire massively destructive weapons and (it is argued) will proceed quickly to bring about their own extinction. Another possibility, often considered in science fiction, is that the cosmos is teeming with intelligent species, who roam far and wide, but are careful to ensure that we are unable to infer their existence, perhaps because they have decided not to interfere with our development.

Though each of these scenarios may perhaps be plausible, I do not want to discuss them further here.

The point of this paper is to introduce and consider some other explanations. Consider, for instance, the following hypotheses. First, life has evolved relatively frequently in the cosmos. Second, interactions between species originating on different planets have not been so uncommon. Third, these interactions have often led to species becoming extinct (or at least to previously conspicuous species becoming inconspicuous, either because their numbers and/or technological development have been greatly reduced, or because their behaviour has
been permanently altered). Fourth, as a consequence, evolutionary selection, operating on galactic or even larger scales, has ensured that typical surviving species are not conspicuous to typical observers who are based in another cosmic habitat and capable of interstellar travel.

Perhaps the most obvious version of these hypotheses involves “wars of the worlds” — deliberately waged struggles between rival intelligent and technologically advanced civilisations. One could, indeed, restrict discussion only to this case, assuming that only intelligent species are able to travel from one planet to another. It is worth noting in passing, though, that the hypotheses do not necessarily require such struggles to be the dominant selection mechanism. One could, for instance, imagine (though I am not sure whether it is really plausible) predatory species which have somehow evolved to propagate over interstellar distances, perhaps somehow guided by being somehow attuned to signs of distant life or promising-looking habitats, although they have nothing that we would recognise as advanced intelligence.

Similarly, it is important to note that cosmic inconspicuity need not necessarily arise as the result of a deliberate decision by an advanced civilisation. Some intelligent species might indeed prudently make themselves as inconspicuous, and their habitat as desolate-looking and useless, as possible, either because they are concerned about the possibility of interstellar predation, or perhaps even because they have observed it in operation from afar. But others might perhaps simply lack the wit, gumption, or interest to advertise their coming of age or to venture beyond their native environment — and have rather greater chances of survival because of their lack of initiative. (No one said that life is fair.) And some species might avoid predation through the good fortune of happening to take such an unfamiliar form that most other inhabitants of the cosmos would not recognise them as living, or by using such exotic resources that their habitats are not generally seen as valuable, and so surviving unnoticed.

IV. WHY CONSPICUITY?

Suppose now that there is indeed some sort of competition for resources on a cosmic scale and that some sort of evolutionary selection ensues. Is it at all plausible that conspicuity should be an important criterion in this selection process? After all, on Earth, though
many species do indeed successfully employ camouflage and concealment, it is not generally true that the most successful species live in habitats completely hidden from other competitor species. Terrestrial ecosystems are generally characterised by complex symbioses and interactions amongst their component species.

One might imagine that, if any cosmic scale ecosystems actually exist, they would be similarly complex. But there are some reasons to think that the situation might be very different. If cosmic habitats can indeed largely be equated with habitable planets, they are discrete and (on our current best guesses) very widely separated, unlike most terrestrial habitats. And if inhabited planets are very widely separated, there may well be no easy way for an inhabitant of planet A to identify inhabited planet B, unless the inhabitants of B succeed in some way or other (perhaps inadvertently) in advertising their existence. One imagines that an inhabited planet, together with the ecosystem it supports, constitutes a resource that would be valuable to (some significant subset of the) species originating on other planets. For instance, a sufficiently technologically advanced species might find it worthwhile to use (the exobiotic analogue of) genetic engineering to adapt the planet’s entire ecosystem to their purposes. Of course, these purposes may not be entirely compatible with the purposes of its original inhabitants. In fact, the stakes may be still larger, and the competition correspondingly fiercer, than this suggests, if the inhabitants of planets A and B are also potential or actual competitors for resources elsewhere (whether other inhabited planets or some other type of resource).

In summary, there is a potential competition for resources, and a potential evolutionary mechanism for selecting against those who tend to lose such competitions. If cosmic habitats are widely enough separated that they are very hard to find, by far the best strategy for a typical species to avoid defeat in such competitions may be to avoid entering them, by being inconspicuous enough that no potential adversary identifies its habitat as valuable.

V. COMPLICATIONS

But not so fast. A little reflection suggests that, even if conspicuity is indeed liable to provoke some sort of predation from competitors, the selection dynamic must be rather more complicated than the preceding discussion allows. In the first place, it is difficult to predate on a conspicuous habitat without making oneself conspicuous. Even granted an exemplarily
stealthy attack and takeover, the mere fact that the previously conspicuous species B is no longer so gives a clue to observers elsewhere that some other species A, with its own potentially interesting resources, may now be in occupation — and hence that it may also perhaps be worth exploring the neighbourhood for other habitats that species A occupies.

If species A manages to take over while leaving in place whatever made the habitat conspicuous in the first place, they might manage to make their conquest imperceptible. But then, of course, the habitat would remain conspicuous: this would not contribute to an evolutionary selection against conspicuous habitats, and so would not support our attempt to explain the lack of conspicuous extraterrestrials.

A really cautious predator might perhaps try to take over species B’s habitat while giving the impression that species B had self-destructed. This might or might not be believed: however good the cover story, it would presumably lose credibility if a number of independent species on different habitats in a given region appeared to self-destruct within a statistically implausibly short time interval.

If B’s takeover is detected or inferred by species C, they might be tempted to jump in. But so might species D, E, and so on. Considering this possibility might thus deter not only species C, but also species B. (Or evolution might have selected against this behaviour.) But then, if species B, C and so on are all deterred, species A is after all left alone, happily broadcasting its existence to the cosmos.

Our original scenario appears to be in danger of self-contradiction. But the inconsistency arises only if one contemplates an absolute law stating that any form of self-advertisement is certain to provoke attack from competitors which leads to extinction. A more reasonable picture is of a cosmos with species which behave with varying degrees of caginess: some predate on any conspicuous habitat, some attempt to observe predators before perhaps predating on them, some look for evidence of second (or third, or higher) level predation and observe for a long time before deciding whether to become involved, and some just sit tight and remain as inconspicuous as possible, hoping to avoid predation. In such a world, all species are playing a game with very imperfect information. It would be very difficult to produce a model that convincingly predicts the likelihoods and spatial distributions of the various strategies, since the answer surely depends on many unknowns (for example: what is the distribution in time and space of the evolution of cosmically conspicuous species? what is the distribution of their capacities to predate and defend? and what is the distribution
of the strategies they are initially predisposed to adopt?). The correct formulation of the hypothesis is simply that evolution has very significantly suppressed cosmic conspicuity.

Obviously, this hypothesis may simply be wrong. It is not, I must admit, evident that, even if life did indeed originate on many different widely separated planets, the suppression of cosmic conspicuity would be the likeliest outcome of an evolutionary competition, assuming one did indeed ensue. But the hypothesis is certainly not logically inconsistent and it seems to me not entirely implausible, especially in comparison to other proposed solutions to the Fermi problem.

A further complication, which incidentally lends at least slight support to the plausibility of the hypothesis, is that species may be induced to predate on conspicuous near neighbours even if their general strategy is to remain inconspicuous and avoid predation. Noisy neighbours are liable to attract unwelcome attention to the neighbourhood. One could perhaps run as far away as possible, but this requires finding another unoccupied and inconspicuous habitat. Not only may this be hard, and thus dangerous in itself, but there is the added danger that one risks becoming conspicuous to predators during the search. Eliminating noisy neighbours is, at least arguably, less dangerous than leaving them alone: they might not yet have been noticed by some potentially dangerous predators, and one might presume that they are only going to become more conspicuous, and hence more dangerous to have around, unless one intervenes. And even if they have already been noticed, eliminating them does not necessarily add to the danger: the overall risk of more powerful predators arriving in the neighbourhood, and noticing you, may not be increased.

VI. DELIBERATE INCONSPICUITY

Intelligent species do not have to follow their instincts blindly. Reflecting on these possibilities, and awareness of the uncertainties involved, might deter many intelligent species from interstellar exploration, and persuade them to remain as inconspicuous as possible on their home planet. A typical rational species should conclude that, if life in the cosmos is common, the chances are that there are species elsewhere that are more highly developed and likelier to prevail in any struggle that might develop. If the cosmos is, in fact, a competitive and dangerous place, a typical species thus ought, rationally, to be pessimistic about its own chance at prevailing, if it enters into the cosmic fray.
The relevant probabilities are unknowable, but even if they are pretty small, the cost (likely extinction) is so high that the possible gain of new habitats and new knowledge may not seem adequate compensation, unless perhaps one’s situation is already truly desperate.

A thoughtful species might, at the very least, decide to wait and observe for a long while, in the hope of getting some evidence about the state of life elsewhere, before taking steps that would advertise its own existence.

VII. POSSIBLE SCENARIOS

Where does this all leave us? What could the situation be in, say, our own galaxy? Maybe, of course, we are the only species in the galaxy (resident or visitor) capable of space travel, and nothing we do in the foreseeable future is going to affect our conspicuity to any potentially dangerous species. But the possibilities considered here also suggest less stable scenarios. We ought at least to consider them seriously and be convinced that they really are negligible before neglecting them.

One could imagine, for instance, a mixed population of cautious predators and cautious stay-at-homes. Assuming there is currently no dominant predator, any predators which attempted dominance in the past must have come to grief. (Perhaps this seems unlikely: if it was defeated by another predator, why would that predator not have come to dominate? And is it really plausible that a very powerful but reticent stay-at-home could, when threatened, have taken out a predator with galactic ambitions?) Advertising our existence in such an environment would be risky: a predator species might decide it could afford to predate on us, and even a reticent neighbour species might decide it could not afford to leave us attracting the attention of predators to the neighbourhood.

One could also imagine a situation in which one predator species dominates (perhaps co-existing with successfully inconspicuous stay-at-homes) but remains as stealthy as possible. A rational predator species might well do just that, adopting a predatory strategy which as far as possible eliminates unnecessary risk. Advertising our existence in this environment would most likely be suicidal.

A third possibility is that most or all species are cautious stay-at-homes, fearful of interaction. It is unclear what result advertising one’s existence would have in such an environment, but one should probably not expect a welcoming response.
VIII. SOME COUNTER-ARGUMENTS

A. Aliens are civilised

One common counter-argument arises from scepticism that species will wish to carry on competing by the time they have become sufficiently advanced to attempt interstellar travel. Would the wisdom of co-operation not be clear, and would respect for exobiotic cultures not be a universally accepted value, by that point in a species’ evolution? Could any advanced species really destroy the unique and irreplaceable culture of another, in the process gravely altering an ecosystem that was millions or billions of years in the making? Morality aside, would enlightened self-interest not militate against such vandalistic aggression?

These are nice and optimistic presumptions, and one would like to believe they are right, but the evidence of the last few millennia on Earth does rather give pause for thought. Perhaps there really are cosmic civilisations worthy of the name. But everything alive in the cosmos has, presumably, evolved to compete for resources in environments where they are not always plentiful, to reproduce successfully, and to give its offspring the best chances in life. Almost every aspect of the psychological makeup of aliens may be utterly unrecognisable to us: indeed the term itself may not apply in any recognisable sense. But the best guess we can make, extrapolating from life on Earth, is that any species which controls significant resources is likely to have maintained a powerful urge to live and to multiply.

Perhaps, nonetheless, enlightened self-interest prevails. Perhaps co-operation is, and is almost universally recognised as, a better survival strategy than predation; perhaps a combination of consensus and enforcement has brought about some sort of modus vivendi. If there is intelligent life out there then we had better hope so, and hope also that other civilisations are tolerant of our naïveté. It doesn’t seem a good advertisement for our value as recruits to cosmic society that we have not yet even seriously contemplated the alternative scenarios.

B. Self-advertisement signals peaceful intention

It is sometimes suggested, when our own attempts to contact extraterrestrials are discussed, that the sort of trusting openness we have displayed to date is the best policy. Since we must realise that aliens are likely to be more advanced than us, we anyway could not
hope to prevail in competition with them. By displaying our trust, we show that our own intentions are peaceful and our desire is to learn and collaborate, and hence that they have nothing to fear from us either now or at any point in the future, and that we deserve their help and respect. Should we be persuaded by this argument? More to the point, might another species who receives our signals be?

I rather doubt it, unless extraterrestrial civilisations share our capacity for spasmodic outbreaks of truly epic self-delusion. In the first place, as our own history sadly illustrates very well, aggressors may not care much whether a weaker group (or species) has peaceful intentions or not: they tend rather to latch on to the point that their relative strength allows them to capture and exploit its resources regardless. Secondly, our superficially trusting openness does not actually credibly signal that our intentions are necessarily peaceful. The most cursory inspection of present day Earth would show the discerning alien that our intentions are, at best, mixed and fickle. If we happened to come upon a weaker species inhabiting a resource-rich planet similar to Earth somewhere in our vicinity, our leaders would no doubt make the right noises about our peaceful and noble intentions, and a sizeable number of us would sincerely agree — but history suggests it would be rash to bet against our colonising and exploiting the planet in the long run.

Our openness to date in advertising ourselves to hypothetical extraterrestrials seems to me to demonstrate only our lack of thought and self-knowledge, not to mention a decidedly tactless lack of consideration for our cosmic neighbours who, if they exist, may not share our insouciance about attracting possible predators to the region.

C. Interstellar conquest isn’t worth it

Another common counter-argument is that it hardly matters whether aliens are malevolent or benevolent, since any species which is technologically advanced enough to constitute a threat to us will also surely — since technology develops quickly, and the chances of two independent species being at similar levels of development is very small — be so advanced that it has no use for the pitiful resources we and our fellow terrestrials have to offer. Possibly — but again, terrestrial history gives one pause for thought. Great empires do take an interest even in rather small and unprepossessing territories. They can do so, often, precisely because they are technologically advanced: conquest thus requires few personnel
and small resources, relative to their capacity. It may indeed not be worthwhile for the hyper-advanced Sirians to send a large fraction of their interstellar battle fleet to conquer Earth and rearrange its ecosystem into a productive Sirian-friendly habitat. But might the rewards not justify the effort for three bored undergraduate Sirians armed with borrowed lab equipment and looking for a mildly remunerative holiday project?

IX. CONCLUSION

The Fermi problem is a real puzzle, and it seems to me that none of the proposed solutions (including the one suggested here) is so compelling as to inspire confidence that it is clearly right. Yet there must be a solution, of course. The relevant question, thus, it seems to me, when considering any proposed solution is not whether it is completely convincing, but whether there is another solution which is clearly more compelling. In other words, does the proposed solution belong on the list of contenders? If it does, then we had better take it seriously as a possibility when considering policy.

We do not seem, as a species, to be particularly good at thinking realistically either about small risks of large disasters or about our situation in the cosmos. These are seen as not quite respectable topics in the academic world. Almost no one is employed to worry about them, and the prevailing mood of postmodern irony makes it hard for us to take them quite seriously. But they deserve to be taken seriously nonetheless.

We have, famously, taken a few steps actively to advertise our existence: the 1974 Arecibo message beamed towards the Hercules globular cluster, the golden records and plaques carried aboard the Voyager and Pioneer spacecraft, carrying information about us and star maps directing any interested aliens to our solar system, and, more recently, the Team Encounter “Cosmic Call” messages sent to a number of nearby (30−75 light years away) stars.

What was the point of these efforts? Were they well justified? Distinguished scientists and others have argued on several occasions that, on the contrary, they were dangerously, and potentially suicidally, irresponsible. These arguments appear to have largely fallen on deaf ears, but they deserve repeating, and perhaps can even be amplified a little in the light of the above discussion.

One can summarise the essential point simply enough. If there are no aliens out there,
any efforts at communication were obviously wasted. Thus we can assume for the sake of
discussion that there are aliens out there likely to receive the messages at some point. The
relevant parameter, then, is not the probability of our messages being received by aliens who
might potentially do us harm: it is the conditional probability of the aliens who receive the
messages doing us harm, given that the messages are indeed received (and understood to be
messages). Can we really say that this probability is so negligible, bearing in mind that any
such aliens appear to have made no reciprocal attempts to advertise their existence? The
arguments considered above suggest that we cannot.

The Pioneer and Voyager spacecraft are travelling sufficiently slowly that they will pose
essentially no additional risk for a very long while. We could, though, take steps to enforce
a ban on any further attempts along the lines of the Arecibo and Team Encounter messages.
We might also want to take steps to intercept and return the Pioneer and Voyager craft
some time in the next few millennia. These might, at this point, only be gestures. But if
we believe in the merits of gestures at all, they seem more worthwhile than most. They
would, at least, be small signals that we have begun contemplating the possible realities of
our cosmic existence, and might just possibly be coming to realise that it would be wise to
tread carefully and politic to take care not to jeopardise the interests of our neighbours. If
anyone happens already to be listening, that really would be a message worth sending.

One final point: it often seems to be implicitly assumed, and sometimes is explicitly
argued, that colonising or otherwise exploiting the resources of other planets and other
solar systems will solve our problems when the Earth’s resources can no longer sustain our
consumption. It might perhaps be worth contemplating more seriously the possibility that
there may be limits to the territory we can safely colonise and to the resources we can safely
exploit, and to consider whether and how it might be possible to evolve towards a way of
living that can be sustained (almost) indefinitely on the resources of (say) our solar system
alone.

Acknowledgments

I would like to thank Rob Spekkens for a particularly helpful discussion, while stressing
that responsibility for the ideas expressed here is of course mine alone.
For example, it seems to me that even the most thoughtful science fiction tends to skate over the likely social realities of alien contact. An obvious point which is most often neglected is that encountering intelligent extraterrestrial life, even if it were benign, would likely be enormously traumatic for us all. What would we do, and how would our societies reorganise, on encountering a civilisation that may well be far more competent than us at essentially everything we value?

See e.g. [http://en.wikipedia.org/wiki/Arecibo_message](http://en.wikipedia.org/wiki/Arecibo_message)

See e.g. [http://en.wikipedia.org/wiki/Voyager_Golden_Record](http://en.wikipedia.org/wiki/Voyager_Golden_Record)

See e.g. [http://en.wikipedia.org/wiki/Pioneer_plaque](http://en.wikipedia.org/wiki/Pioneer_plaque)

See e.g. [http://en.wikipedia.org/wiki/Communication_with_Extraterrestrial_Intelligence#Cosmic_Call_Messages](http://en.wikipedia.org/wiki/Communication_with_Extraterrestrial_Intelligence#Cosmic_Call_Messages) and [http://www.matessa.org/~mike/dutil-dumas.html](http://www.matessa.org/~mike/dutil-dumas.html)

The British astronomer and Nobel laureate Martin Ryle, protested forcefully against the Arecibo message, and lobbied the International Astronomical Union (of which he was a past president) to pass a resolution in condemnation. The distinguished Australian palaeontologist and evolutionary biologist Michael Archer has advanced similar arguments and warnings. The American diplomat Michael Michaud also queried the wisdom of sending the Arecibo message, arguing (correctly in my opinion) that the message was fundamentally a political act rather than a scientific experiment, and required political consideration.

Potted summaries of these objections, and of some responses, can be found, for example, at [http://www.planetary.org/html/UPDATES/seti/Contact/RespondingToAliens.html](http://www.planetary.org/html/UPDATES/seti/Contact/RespondingToAliens.html), and in *Sharing the Universe: Perspectives on Extraterrestrial Life*, S. Shostak and F. Drake, (Berkeley Hills Books, 1998).

In qualified support one might also cite Jared Diamond’s discussions in the article *Alone in a Crowded Universe* in *Extraterrestrials: Where Are They?* (B. Zuckerman and M. Hart, eds, Cambridge University Press, (2nd edition, 1995) and in *The Rise and Fall of the Third Chimpanzee: Evolution and Human Life* (Vintage, 2004). Diamond agrees that communicating with intelligent aliens would indeed be highly dangerous, but suggests that the point is probably moot, as we are quite likely the only examples of intelligent life in the cosmos.