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A CONTRARIAN PERSPECTIVE ON ALTRUISM: THE DANGERS OF FIRST CONTACT

1. *Altruism in the Natural World: Advantage and Satiation*

The title of this conference - Encoding Altruism - conveys certain assumptions. The first of these is that altruism -- a selfless imperative to assist others without expectation of reward -- is likely to be a valued attribute among advanced technological civilizations.

Moreover, it implies that humanity should strive to display this attribute in communicating with extraterrestrial life forms that may be 1E8 to1E9 years ahead of us in development.

Finally, the overall topic under discussion in this series of workshops -- how to craft and send a deliberate message from Earth into space -- is based on the supposition that we can dismiss any substantial likelihood that transmitting will exposed humanity and our world to danger.

Are all of these assumptions warranted? Or do they reflect the personal inclinations and wishes of a narrow group, arising from a particular culture and era? Given the potentially overwhelming implications of Contact, we may be wise to reflect upon the full range of possible outcomes, not only those we yearn for. I, for one, would feel more confident in the inevitability of alien altruism if that beneficent trait appeared more often in nature.

John Alcock, in his textbook, Animal Behavior: An Evolutionary Approach[1], shows that reciprocal altruism between related individuals occurs in many species; the real question concerns altruism between unrelated individuals and groups. It helps to divide generous behavior into two categories: “pragmatic cooperation” and “pure altruism”.

Biologists consider reproductive fitness to be the coin of the evolutionary realm. They study how this coin is spent in games like The Prisoner's Dilemma, which many animal species seem fully

[1] Animal Behavior: An Evolutionary Approach by John Alcock Hardcover: 560 pages Publisher: Sinauer Assoc; ISBN: 0878930116; 7th edition (August 2001)

capable of playing. In simulations involving various kinds of rewards, you quickly get clear examples of cooperation and/or competition, depending on a pre-set payoff matrix. Emergent strategies like cheating, stealing, and trust-building honesty also appear. A basic concept of quid-pro-quo seems to manifest even among 'lower' animal species.

In contrast to pragmatic cooperation, the purest form of altruism -- in which individuals sacrifice advantage to benefit others without hope of recompense -- does not at first appear to have anything to do with a cost/benefits game matrix. That is, until you include the 'payoff' of genetic reproductive success. Then we see that the greatest and most prevalent forms of personal sacrifice -- e.g. a mother for her child -- fall elegantly into place. An uncle who risks his life to save a nephew benefits by helping his close gene pool to thrive. Biologists have documented extensively a basic fact: that selfless generosity occurs less often, and with decreasing intensity, as individuals grow more distantly related.

This may seem a cold-blooded way to view something that we idealize as a noble quality. But shall we ignore scientific results? Especially results that shine revealing light on the very thing we desire?

Moreover, science acknowledges important exceptions to this curve (relating generosity to genetic payoff). We have all seen well-publicized examples in which mothers of one species have seemed impelled to adopt and nurse surrogate offspring from another. Dolphins have pushed human castaways toward boats or islands. And today, upon hearing word that sea creatures are stranded on some shore, modern people are frequently known to drop everything and race down to the beach... with the same alacrity and eagerness that their ancestors would have shown, upon hearing the same news.

Pause for a moment and consider that final example -- human beings racing toward stranded whales. The vigor and speed of that response has remained constant. Today, their aim is to gently rescue rare, precious creatures. During most of our past, people hearing the same news would have hurried to the shore with a different purpose in mind... lunch.

The difference is clearly based on two transformations -- education and satiation. We now know more about cetaceans and can thus identify with them far better. But above all, we no longer need their flesh to feed our hungry young. Satiation appears to be a critical element in the rising environmental movement, in the drive to include others within the protection of law, and in elevating altruism above other ideals that our ancestors considered paramount -- like tribal patriotism and glory-at-arms.

Satiation seems important, as does a strong cultural drive toward valuing altruism as an admired goal. There are also aspects to altruism about which an idealist may not want to know. It has long been known that groups and animals and humans will – under certain circumstances – find ways to ensure that generosity is a widely exhibited trait, by either overtly or subtly reproving or disciplining those who behave selfishly. Ernst Fehr and Simon Gachter have carefully examined "altruistic punishment". Simple and clearly realistic game rules result in players ganging up - en masse - on defectors who play selfishly or fail to meet minimal standards of cooperation or beneficence. This occurs even when the act of punishing the defector adds costs and no benefits to the other players, and when any resulting altered behavior will help some other, later team, not themselves. [2] We can all recognize the emotional drive that appears under certain circumstances, when we resent discourteous or selfish public behavior. The impulse to punish such behavior appears to have roots that go deeper than human nature.

Is this 'true' alruism? Is it possible that we need to divide up this word and recognize that it represents a wide range of possible definitions and variants? Some of these variants may be crucially different in their effects during a contact situation.

They may also merit quite different styles of representation in any message or interstellar art that is meant to convey our hopes and wishes to the stars.

Let us summarize up to this point.

1) Nature indicates that both pragmatic cooperation and selfless altruism occur in largely predictable ways, having to do with either quid-pro-quo payoff or reproductive success.

2) Interestingly, the fall-off curve for altruism appears quite similar to the curve of likelihood that two groups can cross-infect each other with disease. Both events happen in direct proportion to the degree of shared genetic heritage. The less-related that two groups are, the less frequently they appear to be mutually generous or mutually infectious.

3) This fall-off curve bodes ill for the likelihood of interplanetary altruism, even as it bodes well for our likelihood to survive interplanetary disease.

4) Even what we recognize as altruistic behavior can have certain callous or game-based aspects that we should not ignore simply out of aesthetic puritanism.

5) Nevertheless, it is worth noting special anomalies, such as dolphin and human compassion for the strange and unrelated. These exceptions, and a few others, seem to leap right off the genetic

[2] Altruistic Punishment in Humans, Ernst Fehr and Simon Gachter NATURE vo.415, January 2002, p 137-140.

relatedness curve, having no apparent 'game' benefit. Here the driving force appears to be abstract sympathy, unleashed by full bellies and brains that are capable of seeing enlightened self interest in the long term survival of an entire world.

Clearly, while remaining painfully aware of facts 1-4, we must invest in the hope offered by #5.

What can we then conclude about extraterrestrial altruism?

Why, nothing, of course. We are exploring new territory. Any conclusions that we draw -- either from nature or our inner wishes -- should be taken as tentative, in a spirit of willing uncertainty.

Nevertheless, it is wise to bear nature in mind, as a de facto ground state for our discussions. [3]

What biologists seem to be telling us, is that evolution does not predispose living creatures toward truly selfless altruism any more than it does toward esthetics. True, these are properties that humans have recently come to cherish. We may be doing so because that is what advanced creatures always and automatically do at this point in their rise. This idea – that sophistication and beneficence go hand-in-hand -- appears to be the assumption of many SETI optimists.

On the other hand, our bent for altruism may instead be a quirky outcome -- an 'emergent property' -- of our background as a species of already gregarious, exogamous and cooperative apes.

For contrast, consider what kind of moral systems you might expect to arise if lions independently developed sapience. Or solitary and suspicious tigers? Bears are omnivores, like ourselves, and yet their consistent habit of male-perpetrated infanticide seems deeply rooted. Meta-ursine moralists might later view this inherited tendency as an unsavory sin and attempt to cure it by preaching restraint. Or else, perhaps they would rationalize and sacralize it, writing great literature to portray and justify the beauty of their way, just as we romanticize many of our own most emotion-laden traits.[4]

Is our present fixation on 'altruism' -- in a strange twist -- somewhat chauvinistic and humano-centric? That ironic possibility is something to bear in mind.

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[3] Are biologists too cynical to see something that seems obvious to SETI researchers? Is this why the SETI community (as opposed to the quite separate field of exobiology) appears largely made up of physical scientists? Perhaps they know something we do not. We might be wise to invite more of them into the tent.

[4] Anyone who doubts that intolerant or even murderous habits can be romanticized should study the religious rites of the ancient Aztecs and Carthaginians. If we are capable of rationalizing and even exalting brutally un-altruistic behaviors, might advanced extraterrestrials also be capable also of such feats of mental legerdermain? Especially if their evolutionary backgrounds predispose them?

Please do not misconstrue. I heartily approve of altruism and try to live my life guided by this rising standard. I certainly have no intention to denigrate an enthusiasm for self-improvement. To the contrary, I have often demonstrated my own idealistic yearnings for 'otherness'. As a stage in our development, this admirable trend may save us all.

Nevertheless, scientific honesty warns against extrapolating any trend into a natural law. That is teleology -- perceiving a plan, or cause-and-effect, where there may only be coincidence and happenstance.

And yet, even if it is largely absent from the natural world, that fact alone does not render pure altruism irrelevant. I just mentioned emergent properties. Complexity theory teaches that new forms of order arise as systems gain intricacy. It may be no accident that the most complex society created by the most complex species on Earth has elevated altruism from a rare phenomenon to an ideal -- something to be striven toward across the present and into future years. Furthermore, in another ironic twist, it is entirely by these recent, higher standards that we now project a higher level of altruism upon those we hope to find more advanced than ourselves.

2. The Power of Thought Experimentation

In a strange kind of conservatism, SETI researchers have long striven to sever all links to the long tradition of science fiction, with its vast variety of contemplations about First Contact, ranging from high-end gedankeneksperiments to B-movie drivel. One can understand that this reflex has some basis in self-preservation, during an era when ridicule can be used to undermine your grant proposal. Above all, any talk of 'danger' from first contact tends to be dismissed as sensationalism, conjuring up lurid images of pop-eyed invaders with jaws dripping formic acid. Hardly the stuff of serious science in the 70s, 80s and 90s.

And yet, doesn't this aversion give Hollywood entirely too much power over our thought processes? To draw premature conclusions, and exclude a huge trove of plausible scenarios, seems inordinately unwise, especially when the asymmetry is so great between positive and negative consequences.

For this reason -- in a spirit of cordial, contrarian questioning -- let me offer to play devil's advocate. I intend to suggest that it may be foolish for us to beam any messages from this planet until we know a lot more. To do so will be like ignorant children, screaming "Hello!" at the top of their lungs, in the middle of a dark, unknown jungle.

3. Fools Rush in...

Interstellar space may hold only the wise, grandfather types predicted by Cornell-based SETI founders Frank Drake and Carl Sagan. Kindly ancient ones may welcome us into their advanced, pacific civilization. On the other hand, consider our own practical experience over the last 6,000 years, when various human cultures have collided with each other here on Earth. In history, "first contact" has seldom been gentle and benign. At best, cultural values were shaken, requiring painful readjustments. At worst, the outcome was often genocide.

In other words, altruism appears to have been as rare for intra-human first-contact experiences as it is between animal species. Yes, that may change. We may yet become a civilization that lives and works under codes such as the famous "Prime Directive". Even if this is not now in our nature, we may choose to change that nature, turning ourselves into truly noble beings. This is our ambition and hope for the future. Still, it is wise to remember our context and our past.

Bearing this history in mind, SETI pioneer Phil Morrison said: "I share the idea of caution before any reply."

Elsewhere I have discussed the "Great Silence" -- also called the Fermi Paradox -- the mystery of why the nearby regions of our galaxy appear to be rather quiet -- emptier of living voices than many of us expected when the SETI era began. I will readily concede that half a century without a clear signal proves nothing about absence. What it does imply is either some degree of scarcity or else a reticence on the part of aliens to broadcast at the maximum levels achievable by highly-advanced technological cultures. This reticence to broadcast at full strength -- a lack of the Giant Beacons once predicted by Drake et. al. -- should be at least somewhat worrisome. Especially to those among us who feel an urge to shout.

In the Great Silence paper I listed a wide range of possible explanations for this strange state of quiet (in more detail than I have room for here). Not all of these reasons are pessimistic. Some may be benign, raising the possibility that patience and perseverance will eventually bring success. On the other hand, there seem to be numerous plausible ways that our galaxy may be hazardous. These begin with natural phenomena. Supernovas, comet swarms and giant molecular clouds are among just a few of the natural threats that 'life-worlds' like Earth have to survive before they can bring forth technological civilizations.

One explanation: we may be among the few survivors to reach this phase.

There are also unnatural ways the universe could turn unfriendly. For example, suppose some earlier species unleashed a wave of irresponsible colonization across the galaxy, sweeping like a prairie fire, leaving over-exploited worlds and ravaged ecospheres in its wake. Malevolence is not required, only shortsightedness and unsustainable appetites across many millennia, (a trait that is completely consistent with the behavior of the one sapient species currently known.) If such an unfortunate interstellar ecological disaster happened, our Earth might be among the few life-worlds to have escaped. That, too, could explain why we don't hear anybody.

Again let me emphasize, no single explanation has any great weight of evidence for being true. All merit study.

In this article, I want to narrow the focus onto Contact itself -- the day we actually learn we aren't alone. What dangers should we consider during the following days and months? What possibilities should we keep in mind while seeking neighbors among the stars?

4. Physical and Biological Contact

The first question has to be, will First Contact be made in person? Or will it be a mere exchange of greetings and information by radio? It is the latter scenario most SETI scholars predict. But let's start by briefly considering dangers that might arise if we met alien beings face to face.

For starters, we can almost certainly eliminate the obvious -- direct conquest by some interstellar empire. While many scientists believe various forms of interstellar travel will someday be possible, nearly all spurn the idea of armadas filled with enslaving conquerors, swooping down from the sky.

For one thing, why invade us now, when we can fight back? Why not come during the several billion years that Earth was prime real estate, but had no technological civilization to defend it?" The temporal coincidence implicit in most sci fi invasion films makes them absurd on that basis alone.

Then there are the economics of interstellar travel. Even if star flight proves plausible, it is likely to remain an expensive proposition. Bulk natural resources won't be worth the shipping costs. Information-based commodities, such as inventions, cultural works and genetic codes are far more transportable. Such commodities might be given away, traded or stolen. But even in the last category, the thieves will most likely us subtle or surreptitious means rather than brute force.

Of course invaders might not come for plunder but to colonize. Even here though, most

physicists and science fiction writers agree the prospect is farfetched. “Just how do you maintain an invading army at the end of a supply line several light-years long?" one might ask. Conquerors would have to live off the land, at least until they altered Earth's biosphere to suit their needs -- a difficult undertaking while they're being harried by determined guerrillas. Despite its prevalence in cheap movie melodramas, invasion may seem the least likely of dangers from outer space.

But other, more plausible hazards might arise from physical contact. Suppose a single alien starship decelerates into our Solar System, say on the folding wings of a great light-sail or behind a super-efficient antimatter engine. Presumably we would send welcomers to say hello. Or their emissaries may come down to meet us. Let's further suppose they show no signs of weaponry and appear to be on a genuine mission of peace.

In that case, one of the most fearsome possibilities for us to worry about would be disease.

Until our recent AIDS epidemic, the concept of plague had grown strange to modern westerners. Yet, history shows that infection was a major element in countless first-contacts between human cultures. Often, it played a crucial role. Anthropologist Alfred W. Crosby points out that the European conquest of the Americas and Oceanea was facilitated by such Eurasian diseases as measles and smallpox -- sometimes introduced intentionally, but more often quite inadvertently and, ironically often, quite soon after both sides shook hands over treaties of friendship!

Some claim alien physiologies would be too incompatible ... that extraterrestrial parasites would be unable to prey upon human organisms and our organisms would certainly fail against our guests. But there is wide disagreement about this among biologists.

Stanley Miller, one of the premier experts on the origins of life, has a different opinion. Miller now believes that biological chemistry throughout the universe involves the same small set of amino acids and nucleic bases Earth lifeforms use. Those chemicals happen to be the most stable, the best at forming the complex structures of enzymes and proteins.

On the other hand, arguing from earthly experience, it seems that cross-infection follows a curve not too dissimilar to that of interspecies altruism! The more genetically remote a given species is from us, the less likely it is to transmit a lethal agent to us. A lot of the most lethal agents (e.g., HIV, monkey B virus) seem to have started off in other primates, albeit in modified form. But as you move away on the genetic continuum, these events are fewer. Once you leave mammals, you have parrot fever and various flu viruses from birds, little or nothing from amphibians, reptiles or fish. Insects, which make up most of the eukaryotic biomass of the planet, serve as or carriers for a few things like malaria, but these are more incidental vectors than hosts. If you assume that ET is

very far from us genetically, the likelihood of cross-infection seems pretty low.

In other words, there is no clear consensus about the danger from Space Bugs. Nevertheless, even dismissing scenarios such as H.G. Wells's War of the Worlds, we would be fools not to at least bear human history in mind, before some handsome alien steps down the ramp and offers his hand.

Suppose our extraterrestrial guests pass successfully through quarantine. There are still reasons to be nervous. For example, how are we to guarantee their safety? Would you risk letting alien tourists walk unguarded down our city streets? Ninety nine percent of the population may welcome them gladly. But most people also liked John Lennon. Human diversity is one of our treasures. Alas, it also means our mad fringe will be a persistent danger to visitors from space. This may be hard for guests to understand if they come from a homogeneous, uniform society.[5]

In the past, several human societies found themselves plunged into calamitous wars against European powers, precipitated by the actions of a few local hot-heads, acting against the wishes of wise and cautious local chiefs. This will be a source of danger in any future contact situation, as well. Of that you can be sure.

5. Non Biological Probes

Some scientists, such as the late Stanford University SETI scholar Bernard Oliver, long held that interstellar travel by living organisms is too uneconomical ever to be practical. While I disagree, it hardly matters. Even if we eliminate that entire set of possibilities, it turns out that there are plenty of dangerous scenarios that do not involve direct physical contact between organic beings.

What about space probes? Following the lead of the British Planetary Society, NASA has already commissioned preliminary studies of a survey device which might be sent toward Alpha Centauri within our lifetimes, carrying sophisticated cybernetic systems that (it is hoped) will border on human intelligence. If such probes seem possible for us to dispatch within decades, some

[5] What about diversity among the extraterrestrials themselves? In both SETI and science fiction, we tend to envision each type as uniform in characteristics, with little variation -- a bad habit that is related to the evils of racism, sexism and stereotyping others by class. It is, in fact, quite possible that the first exemplars of communicating aliens that we meet may be atypical. Moreover, they may have reasons not to convey this fact to us. How do you know whether you're dealing with a council of elders that have high tolerance and a low fear level, or an "alienated alien teenager"… or for that matter an autonomous "PDA" buried in the tracking software for an advanced radio or optical telescope. Keep in mind our SETI program, which gives "first crack" at looking for signals to thousands of unvetted amateurs. Another reason for caution.

advanced civilization would surely come up with even better plans. Perhaps machine emissaries capable of making copies of themselves at each new arrival point, using local materials to multiply and then speed many duplicates onward, unhampered by the weight of onboard life-support systems.

Simple propagation algorithms show that - based on reasonable assumptions for ship speed and rebuild times - a single self-reproducing probe might create enough progeny to visit every star in the galaxy within less than five million years. A mere heartbeat in the life of our cosmos.

It's generally thought that such “Von Neumann Self-Replicating Probes" would be programmed to be friendly. But this is only an assumption. Might such probes turn out to be dangerous? Physicist and Nebula Award winning novelist Gregory Benford points out that all “self-replicating" systems -- such as living things -- are controlled by programs of internal information containing their design, and plans for the fabrication of new copies. These plans inevitably suffer changes in time -- called mutations. Life relies on mutation to drive variation and evolution. But mutation also means no species will adhere forever to its original program. The same would hold for any probe emissaries sent forth by curious aliens.

If such a probe arrived in our solar system, in what condition would its programming be?

Some of Benford's fiction, along with those of Fred Saberhagen and others, portrays the dread possibility of “deadly probes" -- either deliberately or accidently programmed to destructively home-in on new civilizations soon after they become detectable by their radio transmissions. Such horrible “berserker" machines may seem garish, even sensational, and nobody claims they are particularly likely. Still, they are in no way inconsistent with natural law. Indeed, they are quite consistent with the observed state of silence.

They remind us to consider just how unwise it may be to shout in a jungle, before we have any idea what’s out there.

6. Propagation as Information

We have only touched lightly on the range of possible outcomes and drawbacks from direct physical contact between ourselves and extraterrestrials. But let us move on, putting aside that category for now (it is highly unpopular among SETI enthusiasts) and concentrating instead on what most scholars consider the more likely eventuality -- communication with other worlds solely via radio or light waves, exchanging only information.

Only information? Surely no harm can come to either side from such an encounter!

Well, actually, we shouldn't be too blithely certain about that. One has only to look again at the history of first contact between human cultures to see how much pain sometimes came about not from conquest or disease, but when one civilization encountered another's' ideas.

What are some of the mistakes we might make, if ever we encounter someone out there with something to say?

What if a government manages to slap a TOP SECRET classification on the discovery, sequestering knowledge of contact for the benefit of some group or nation here on Earth. We cannot know for certain that this hasn't already happened! Just because an idea has been worked to death in bad dramas doesn't mean that it's completely impossible. America's NSA (National Security Agency) is just one group already possessing far more sophisticated listening apparatus than all of the world's SETI teams put together. If SETI discovers a point source in some portion of the sky next week, can we know for certain that the NSA did not pick it up first, perhaps many years ago?

A chief argument against this paranoid scenario is that the intelligence community seems neutral -- even mildly supportive -- toward SETI, implying they're not worried about secrets being uncovered by those civilian astronomers. Still, it's worth considering what the consequences might be, if extraterrestrial life were first discovered not by independent searchers, but by one of the security agencies, or by the intelligence service of a hostile power.

One could imagine how information from the stars might be used in unfortunate ways if access were restricted to a narrow group. At the minimum, it would deprive the rest of us of a startling and wonderful experience which we, as taxpayers, paid for. Clearly, from the success of many popular science fiction "contact" films, people in our civilization feel positively toward the search for otherworldly life, and would resent being coddled, or cut off from full participation in such a momentous event.

Many SETI scholars do worry about this possibility, and a consensus has spread among them that information about alien life is nobody's "property" -- save, perhaps, all of mankind. An unofficial but influential "SETI Protocol" has been signed or initialed by most of the first-rank workers in this field, accepting general principles of accountability and openness.

Sequestration of information is a clear danger to be guarded against. But now -- in the spirit of contrarian criticism -- I want to turn around and warn about the opposite trend, the growing assumption that absolutely everything about First Contact should automatically and unquestionably be released right away, into the direct spotlight of mass media.

This extreme, too, could cause severe problems.

Take, for instance, the way the press turns some events into “media circuses". During the early phases of a discovery -- while scientists are still trying to verify that it's “contact", and not some fluke or natural phenomenon -- premature media attention could do great harm. What if a mistake was made?

I am reminded of the events surrounding detection of the first pulsar, which was initially thought to be an interstellar beacon because of its uncannily regular radio pulsation. If there had been an Internet back then, perhaps that false alarm might have aborted the entire SETI enterprise! How many false alarms can a program survive before it turns into a laughing stock? For this reason, we must expect some caution while responsible researchers triple check their data and discreetly seek verification from colleagues around the world.

Also, we must remember, researchers are people, with families and obligations. Their employers -- for instance, NASA -- may have operational rules and internal procedures that scientists are expected to follow, before any public announcement is made. It would be unfair to shout “coverup!" just because a little bureaucratic paperwork delays the big press conference by a few days.

This may mean the first announcement won't be made by responsible, careful scientists, but by a person on the periphery, perhaps a lurker in the rumor loop, someone with an appetite for headlines. Those who grab the front pages may not be the ones most qualified or deserving to represent us during the critical stages of First Contact.

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TOXIC IDEAS: *Choose which statement comes close to your belief.*

Many ideas are inherently dangerous or toxic. People are easily misled. An elite should protect or guide gullible masses toward correct thinking. *(Memic Frailty.)*

Children can be raised with openness and skepticism to evaluate concepts on their merits. Citizens can pluck useful bits even from bad images or ideologies, discarding the rest on their own. *(Memic Maturity.)*

If you believe in the second proposition, how do you explain the fact that nearly every other human culture held to the first? Were they all wrong? Can you prove it?

Let's take the matter further. Say contact has been verified, to the best of our scientists' abilities. Miraculously, nobody leaked prematurely or tried to steal their thunder. They've cross checked, fulfilled their institutional requirements, and are now ready to release the good news.

Might there be some justification for delaying the announcement for just a little longer? Or to limit the amount of knowledge released? (Perhaps excluding specific location and frequency information.) Yes, I am about to question one of the core tenets of the "SETI Protocol". But do hear me out.

We should recall that it is only very recently that a few cultures began ascribing to the notion of freely exchanging ideas. Throughout history, nearly every tribe or nation held instead to the more traditional notion -- that some concepts are too dangerous (or valuable) to be let loose among common folk. Were all those cultures entirely wrong to believe this? (See box.)

I happen to believe they were! I hold to my own culture's central tenet that openness is good. The best way to protect people from bad ideas is to let them experience the entire range of human concepts, so they can learn for themselves to judge wheat from chaff. Clearly, the SETI Protocol is based entirely on this premise. Indeed, the Protocol is clearly a wager that we have the toxicity question figured correctly, and others did not.

Let me state again that I agree with the maturity worldview. My life revolves around it and I approved back when a few of us were deliberating the SETI Protocol, line by line. But then, honesty compels me also to admit I might be wrong. My culture's central assumption could be mistaken. Every other human culture may have been right instead, when they posited that ideas in are inherently dangerous.

It is the height of arrogance not to at least ponder this possibility, instead of simply assuming that a very recent set of upstart principles are automatically and obviously true.

In his famous book, THE SELFISH GENE, Oxford scientist Richard Dawkins made this idea of toxic or infectious information look startlingly plausible. He coined a word, "meme", to stand for an idea which catches the attention of a person hearing or reading it... and intrigues that person enough to make him want to tell someone else about it. And then she passes it on to someone else. And so on. It sounds like what goes on every day, as people talk to other people about what interests them, spreading everything from useful knowledge to acrid rumors.

It also sounds a lot like the way we catch and pass on the common cold, passing it from host to host with our sneezes!

Dawkins made the interesting case that “memes" behave very much like our “genes". In other words, successful information replicates (makes copies of itself) whether via the coding mechanisms in a cell's DNA or via the connected words communicating an idea. Dawkins pointed to how eager we sometimes are to persuade others to share our opinions, and to the tenacity with which some people fight for their beliefs.

This is not the place to go into Dawkins's fascinating idea in detail. (Though, you'll notice I've already “infected" you with the concept of “memes". In some of you it will take root, you'll go look it up, and tell others. So it is with all interesting ideas, whether they're true or not.)

Still, we are led to speculate about several rather chilling and dangerous scenarios that could come about, the day after information about First Contact is finally announced.

For instance, what will the news of contact do to people?

Some suggest it will inevitably lead to mass hysteria and alienation -- even riots and suicide -- as paranoia and xenophobia (fear of outsiders) takes hold. This hoary sci fi cliché – which drives a story plot by assuming the worst -- has even appeared even in some high quality speculations, like *2001 a Space Odyssey*.

SETI scholars take the opposite view, conveyed aptly in another film, *Contact*, in which humanity is portrayed accepting the news from outer space with commendable reflection, awe and humility, eager to put our petty Earthly struggles into perspective.

(Should contact be made by the natives of my homeland -- California -- the first question asked of any visitors would probably be -- *“Say, groovy gentlebeings, have you got any new cuisine?")*

In truth, we’ll most likely see every possible reaction. Panic and calm, mysticism and reason, hope and despair. Each combination will mirror the heart of different human being, or a different segment of the population. This may or may not be dangerous, but it certainly does promise interesting times, soon after the announcement is made.

What if an ambiguous message from the stars seems to verify or validate the cherished belief-meme of some group on Earth? For instance, imagine that, after transcription of the messages, a star-and-crescent symbol appears repeatedly on our alien correspondents' interstellar letterhead, and this is taken by some to mean that the aliens are Muslims? Or that some E.T. name happens to translate similar to a central myth figure of an obscure Christian sect? Or that hive-like beings express uncomprehending contempt for democracy? If two-way communication takes decades, even centuries, it may be hard to ask our new friends to clarify their meaning in time to make a difference in the resulting confusion.

This is serious. Once upon a time, wars were fought over differing interpretations of a single line or word of scripture. Or even a smudge, as in the row over homo ousias. We like to think such pettiness lies behind us. But then, we also thought that epidemic was an obsolete word, for a brief innocent while. We ought to be prepared for the inevitable likelihood that individuals and groups on Earth will seek any advantage they can from the first messages from the stars, whatever form those messages take.

How much worse might these problems be, if the extraterrestrials are responding to an ill considered message of our own? Whether they do so inadvertently, or out of deliberate malice, it will be within the power of alien communicators to use words and symbols in unhelpful ways. History suggests caution.

Which brings up the inevitable question -- “How do we decide who will speak for us?"

Will every nation, sect, and religious group begin casting its own pleadings, threats, and dogmas skyward, almost the instant that contact is announced? Probably. One thing our alien friends are certain to learn about us right away is just how undisciplined a species we are.

That's only the truth, after all.

But let's return again to the topic of dangerous ideas. Is it possible that we may be the infectious ones? Before dismissing the idea out of hand, consider that the apparent silence out there could have any number of possible reasons. We who are so new to understanding the depth and potential of syntactical information flow -- are we the best judges of what is possible, let alone dangerous to others?

Would it really hurt to spend a little while advancing our knowledge in those areas, before ecstatically and impulsively shouting (or ‘sneezing’) in all directions?

How about those wonders of technology we hope to acquire, once we begin learning under the remote tutelage of our wise, beneficent predecessors? There has been talk about solving many of the problems that dog us -- e.g. energy crises, disease and unsafe transportation -- by sharing solutions that were discovered long ago by others out there. They might even know answers to biological and sociological quandaries which today threaten our very survival.

For now, let’s put aside the interesting philosophical question of whether we’d be better off earning our rightful place, instead of becoming dependent on technological crumbs, like beggars at a banquet. That is a serious question, but I don’t expect it to receive a congenial hearing here.

Suppose we do start receiving a wad of generous schematics for all sorts of wonders. What if

they are technologies we're not ready for? Like a simple way to make antimatter, using common household materials and wall current? Ninety nine point nine percent of the population may behave responsibly and refrain from blowing us up. The remaining 0.1% would kill us all.

A SETI manager who would take great care to quarantine actual visitors may feel uncomfortable with the proposition that data need also to be checked. But can a case be made for putting a buffer between the main SETI receiving facility and the rest of the world, so both time and geography will give us a chance to pause and evaluate each part of the message before committing ourselves irrevocably?

Many westerners believe in the free competition of ideas -- letting the fittest survive in open argument. We tend -- quite rightly -- to see any attempt to restrict that openness as a direct threat. And yet, there may be ways, quite conceivable ways, in which information from the stars could prove harmful, as in “virus" computer codes which infect a mainframe or microcomputer, proceeding to gobble up memory space, ruin data, and then spread to other hosts. So far, most inimical programs have proved fairly primitive -- nothing compared to the voracious, computer-eating monsters depicted in some science fiction stories. And yet, those stories were correct in predicting computer viruses in the first place. And they are getting more sophisticated, all the time.

A software “invader" needn't be intentional. On Earth there are endless stories of programs interfering destructively with other programs. What, then, of sophisticated code from an alien culture, taken in through our antennas and suddenly introduced into a data-handling system for which it wasn't designed? Any message from the stars is likely to include error correction modules, designed to repair damage done to the message during transit through the dust and plasma of interstellar space. Once the code is embedded in an active computing medium, such modules would “wake up" -- much like a hibernating animal aroused from sleep -- and would then begin using available computing resources to restore the integrity and function of the message.

As bizarre as this concept may sound at first, it isn't science fiction. Far from it. This is how the world's best information specialists say they would design any complex code meant to beam at the stars! (Consider how each of these dangers should be considered in the opposite direction, as we prepare potential messages to transmit. Our own coding assumptions may have unexpected side effects when they enter the medium of an alien information system.)

Under normal circumstances, an extraterrestrial message may be completely harmless. But what is “normal" for alien software? There is no guarantee such a program won't inadvertently take over more of an unfamiliar host system than anyone ever imagined. This accident might be made even worse if the program suffered “mutation" in transit.

7. Giving It All Away

Today, SETI scientists worry far more about lurid headlines ("...SCHOLARS THINK E.T. PROGRAMS MIGHT EAT US!!...) than about warding off infection by self-replicating alien software. And they are right. After all, nobody believes virus codes really represent a high probability hazard to us or our civilization. But the wrong type of publicity, even misquoted, is a sure way to see your grant slashed. With that, far more imminent danger always looming nearby, it's no wonder that talk of potential hazards from First Contact rates far down most researchers' list of priorities.

And yet, is it wise to go into this enterprise simply assuming there's no danger at all? That's called “success-oriented planning", and it was used extensively by the U.S. Space Shuttle Program. Need I say more? [6]

Consider the Intermediate Contact Scenario -- in which those we encounter by radio are too far away to meet physically, but near enough that two-way communication is a practical possibility. (By this I mean that you might cast forth a question and expect that you, or your grandchild, may hear a reply.) Let's further assume the scholars are right, and First Contact will be made with an older, utterly benign civilization, completely uninterested in harming us. Furthermore, say they loose no dreaded plagues upon us, either physical or informational -- either genes or memes -- and none of the ideas or technology we receive are beyond our ability or wisdom to handle.

Assume further that competing powers on Earth don't conspire to withhold bits of the message for their own advantage, nor vie with each other to influence our faraway friends. Let's say we manage to appoint a proper committee to speak for Earth while, at the same time, allowance is made for the melange of other human voices that will inevitably cast forth, outside all official channels.

(“It's often that way with bright, impatient young species," the Ancient Ones might say. “We'll negotiate with your committee, and happily set up cosmic pen pals for the rest of you.")

Finally, let's assume the news that we aren't alone affects us in all the right ways. That it causes us to reflect on our lives and to grow closer, deeper in our understanding of ourselves and the

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[6] Success-oriented planning is actually the most reasonable thing to do in many cases, where there isn't a large asymmetry or irreversibility in the payoff matrix. First Contact with an unknown life form does not meet the criterion, however. Potential downsides of failure are immense and irreversible. This makes success-oriented planning truly irresponsible.

universe. That we do not wind up feeling cowed or intimidated or shamed by having to be saved, instead of managing it ourselves.

This is the classical Contact Scenario, a glowing prospect which many consider the most likely result of verified discovery of extraterrestrials.

Actually, I agree. It is the most likely result... one of many reasons why I enthusiastically support SETI.

But now, even after making every one of those blithe assumptions, can we relax at last? Are we ready to enjoy and celebrate First Contact in complete safety?

We are not!

For even in a civilized setting, life can still be dangerous if you don't know the rules. (Don't believe me? Try investing in Wall Street without any experience!)[7]

What, after all, is the most common peaceful enterprise of human beings? Commerce, of course. And what is likely to be the main commodity -- perhaps the only commodity -- of commerce on an interstellar scale?

Again, it will almost certainly be information.

Not the malign, dangerous information we spoke of earlier, but useful information -- neat inventions and brilliant innovations and even -- especially -- art and literature. Anything novel and original. Whatever's fresh and new.

How will most of you respond if the first thing we're asked by aliens is, “Send us your music and your art!" The Voyager spacecraft carry disk recordings of samples of Earth culture, along with graphic instructions how to read the information. In the spirit of the United Nations, it simply never occurred to any of the people planning this gesture that the album should have carried a price tag, as well.

It's all very well to speak of altruism, and of the joys of free exchange. But we should always remember that is a very recent concept in human affairs. Quid pro quo is a more venerable theme. Throughout human history, in most of our daily lives, and even among the higher animals, the real rule for civilized relations is not “be generous".

It is “be fair".

And make no mistake, there is a difference!

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[7] The most effective con artists are the least rapacious-seeming folks you will probably ever have the misfortune to meet. Kenneth Galbraith once said that we experience big financial cons about every 20 years, because we let our guard down. We can afford several-year setbacks every 20 years. What we can't afford is a millennia-scale setback, simply because we didn't argue about something for while before responding.

Nice as they may be, our extraterrestrials will almost certainly engage in trade. And their stock in trade will be information. We may seek from them the answers to our ultimate questions. They, in turn, may reply, “Great. We've got some answers. But surely you have something to offer in exchange?"

What can we offer? All we may have is ourselves -- our art, our music, our books and drama. Forget physical resources. The true wealth of humanity lies in our culture. That is what we have to trade. It is our treasure.

And it is also the very first thing we are likely to beam to the stars, in gigabytes, within days after First Contact! Given the spirit of the times, and our ecstatic enthusiasm for contact, it's what would seem only natural as we eagerly seek to “share with" (or impress) our newfound neighbors.

And that very admirable rush to share -- proving our altruism in an orgy of transmission -- might turn out to be the worst mistake of all time.

They may be nice. They may operate under rules we would call fair. But nobody expects to pay for a free gift! It could be that history will speak of no worse traitors to humanity than those who, with all the best intentions, cast out to the skies our very heritage, asking nothing in return, thereby impoverishing us all.

Let me reiterate this point.

Nature is mostly tooth-and-claw.

At the opposite end are some glimmers of genuine altruism, exhibited by dolphins now and then, an occasional dog, plus a large number of recent human beings who want to be much better than they are. Our great opportunity for improvement shines at this end of the spectrum. I hope we make it. But as yet there is no guarantee. There is hardly even a trend.

What is more firmly based in both nature and human experience is something that lies midway along the spectrum -- our concept of fairness in dealing with each other on a basis of quid pro quo. Many animals seem to understand the basic notion of exchanging favors, tit-for-tat, making a deal.

Unlike pure altruism, pragmatic cooperation stands on much firmer ground , rooted firmly in observed nature, halfway between predation and total beneficence. Moreover, one can easily imagine how to portray fair trade in a message. There is every chance that intelligent aliens will understand this concept, even if they find ‘altruism’ incomprehensible.

Because of this, let me humbly suggest that a fair and open approach based on cautious quid pro quo should be our central theme as we take measured steps toward Contact, while all the time remembering that we are new and small and weak in a vast universe.

If aliens truly are benignly altruistic, they will forgive us this precaution, this vestige of pragmatic self-interest. Noble beings will bear in mind our recent difficult experience. They will understand.

8. Already Too Late?

Is it already too late?

A long-held truism maintains that the Earth has been extremely noisy in the radio spectrum, especially since the end of World War II, with the advent of television broadcasting and continental missile-detection radars. So noisy that any thought of reticence or patient listening is already moot. If the Galaxy really is a dangerous 'jungle', predators have already picked up "I Love Lucy" – so we might as well shout as loudly as possible, in hope of also meeting the best people out there.

This supposition – which always reeked of rationalization -- has lately been questioned by experts such as Seth Shostak, who calculate that it would take a very large and carefully-aimed antenna receiver to pick out signs of technology in our solar system's emanation-spectrum, from more than a dozen or two light years away. The modulated portions probably stand out from the background far less than we thought. The sole exception would be deliberately-beamed messages, which pack a lot of signal energy into a narrow beam area.

Until recently, the one well-known intentional 'message' was cast forth from Arecibo many years ago by one of the teams affiliated with Frank Drake, in the direction of the Great Nebula of Andromeda (the Andromeda galaxy). With that target an innocuous distance away – several hundred thousand light years – the act was more a symbol of faith in the SETI enterprise (or else a 'stunt', depending on your view) than a serious attempt to attract attention. Drake's group, despite their enthusiasm, had the maturity to refrain from doing anything more, or taking upon themselves a decision that belonged properly to all humankind.

This wise reticence has been broken in recent years. Russian astronomer Alexander Zaitsev claims to have beamed forth a handful of interstellar messages, including pictorial and musical transmissions, from the Evpatoria radio telescope in the Ukraine. Another group in Brazil claims to have sent forth some narrow-casts. We can certainly expect more such unilateral spasms in future years, as radio equipment becomes cheaper and available to pseudo-scientists – with or without

academic credentials – who lack the patience or scientific courtesy to respect the wishes of others. History shows that people can rationalize anything, when it offers their only hope for self-importance.

The consensus of all major SETI research groups, however, as reported by American space lawyer Patricia Sterns, is to follow policy guidelines developed by the SETI Committee of the International Academy of Astronautics and the International Institute of Space Law. These protocols discourage intentional transmissions targeted at extraterrestrials unless preceded by broad-based international discussion.

Falling under a completely separate category are endeavors that do not try to unilaterally impose a point of view upon the rest of humanity. Conferences such as this one, which engage in discussions of the scientific and esthetic aspects of interstellar communication, aim to explore things that we have always taken for granted, using the imagined viewpoint of alien outsiders to gain fresh perspective on fundamentals that may be shared across the cosmos. This is a valuable undertaking that falls under the general rubric that Albert Einstein called gedankenexperiment, or thought-experimentation, and can help broaden our thinking even in the absence of First Contact. Indeed, this overlaps strongly with the venerable tradition of high-end science fiction, which contains a plethora of deeply-related scenarios.

Nor is it improper or impatient to create exemplars of contact art while we wait. The best example of such art, which served the purpose of exciting human imaginations without taking untoward risk, was the 'calling card" placed aboard each of the Voyager spacecraft, back in the 1970s.[8] These symbolic gestures did not appreciably increase our detectability cross-section. Moreover, no one can deny that the salutary and inspirational value of the Voyager exercise far exceeded its modest cost.

Just thinking ahead can have benefits that pay wonderful dividends. The conceptual foundations that are laid down at conferences such as this one may someday prove invaluable, should Contact come – as it probably will – by complete surprise.

[8] C. Sagan, ed., *Murmurs of Earth: The Voyager Interstellar Record* (New York: Random House, 1978).

9. Gambling Our Posterity

This essay has been, I freely admit, a lot of fun to write. Despite many years spent professionally contemplating the notion of alien life, in a myriad variations, I personally don't expect Contact to happen in my lifetime. When it does, I hope and predict that our grandchildren will be a whole lot wiser and far better able to deal with it than you or I. Our top priority should not be rushing toward Contact, but to preparing our heirs to be ready for it.

A parallel might be the way we sometimes screen our calls, listening to messages instead of answering right away. What we almost never do (past the age of twelve), is just punch random numbers into the phone, jabbering at anyone who happens to be out there, telling them our names and where we live. We certainly don't go roaming about, shouting, in the darkest part of an unknown town.

Optimistic scholars may be right that we have nothing to fear from that eventual encounter with wise beings from the stars. Still, we cannot be reminded often enough to look back on our own history of contact among humans here on Earth, a litany of dire cautionary tales. We are, all of us, descended -- only a few generations back -- from folk who suffered horribly because they weren't ready for the challenges brought on by new vices, new technologies, new diseases, new ideas, new opportunities, new people. And those ancestors were the lucky survivors! Many peoples and cultures – including every species of hominids other than our own – left no descendants at all. How ironic that this reminder should come from someone who is a dedicated believer in the new!

Ironic, and yet somehow apropos. For I would rather bet on a horse that I know -- human improvability and progress -- than on salvation from some hypothetical super-beings high above. We have tried that route, countless times before, and the lesson has always been that we should rely (mostly) on ourselves.

In this article I've only touched on just a few of the dangers conceived by various gloomy thinkers and writers over the years. I could go on, but a complete listing isn't necessary. What matters is the lesson, one of circumspection and caution. The worst mistake of first contact, made throughout history by individuals on both sides of every new encounter, has been the unfortunate habit of making assumptions.

It often proved fatal.

Lets hope it is a habit that we, or our grandchildren, manage to break. If so, we may pass a crucial test when the time comes to meet and greet beings from the stars.

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David Brin is a scientist and author whose novels, including *Earth, The Postman*, and *Otherness* have been translated into more than 20 languages. His scientific papers cover a wide range of topics from astronautics, astronomy, and optics to alternative dispute resolution and selection for neoteny in human evolution. Brin's non-fiction book -- *The Transparent Society* -- deals with issues of openness and liberty in the new wired-age. His classic paper on SETI appeared in the Quarterly Journal of Royal Astronomical Society, fall1983, v.24, pp283-309

George Dyson: "All intelligence we know of is collective, distributed intelligence. An advanced alien intelligence might have as much interest in communicating with you, me, or a radio astronomer as we would have in carrying on a millisecond of conversation with a single neuron of a rat."

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