

## WHAT ROLE WILL EXTRATERRESTRIALS PLAY IN HUMANITY'S FUTURE?

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Because their capacities are probably highly advanced, some extraterrestrial species may be using unobtrusive methods of observing humankind and other fledgling civilisations in this Galaxy. The amount of help they want to give to such civilisations is probably quite significant. Their help could be of three types: instant intervention to avoid a nuclear holocaust or other imminent catastrophe; long-term help in reducing grave dangers; and help in improving nondangerous spheres of life.

Sooner or later, unless we extinguish ourselves first, advanced extraterrestrials will have an enormous impact on humankind. Even during the next 30 years, the probability of contact or interaction may be one in four.

Given these conclusions, what should we do next? Thirteen possible strategies are outlined. The likelihood and benefits of success are estimated for each strategy; then its overall priority is rated. At present, seven of the eight highest priority strategies remain neglected and unfunded.

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### 1. INTRODUCTION

What role will highly advanced extraterrestrials play in our future? In particular, what forms of contact will occur, when, and with what impact on us?

We cannot answer these questions with complete confidence, nor with a wealth of accurate detail. We can, however, gain major insights through thoughtful, disciplined inquiry into such questions. Such insights can, in turn, alter our current priorities.

Indeed, the final section of this paper points out a strange imbalance among our current priorities: a single strategy is reasonably well funded while five higher priority strategies (and two that are equal) receive virtually no attention and funding. The study of advanced life in our Galaxy is an incredibly important field for a variety of reasons, such as the significant context it provides for understanding humanity's meaning and purpose, the practical benefits from contact or interaction with an advanced civilisation, and the major role that such contact will probably play in the unfolding of humanity's future. At present, much of the literature and funding in this field is devoted to a single strategy (searching the electromagnetic spectrum for distant messages). At this early stage in the development of the field, it seems strange to plunge ahead with only one form of data collection, even though it is an attractive and potentially beneficial approach. Sending radio messages may not be an alien civilisation's first choice of method for interacting with us. Examining the likely behaviour and capacities of extraterrestrials can lead us to add seven other reasonably high priority strategies to our efforts, as we will see in the final section.

We begin this paper with the assumption that there are some advanced extraterrestrial beings in this Galaxy. That is, at least one nonhuman species has evolved into one or more advanced civilisations and perhaps even beyond into some post-civilisation form. We will return to this assumption in Section 6.

Our central question is the role that these advanced extraterrestrials will likely play in humanity's future. Before we can tackle that question, however, we must first tackle two other questions that provide a necessary foundation. First, what *capacities* are advanced extraterrestrial beings likely to possess? Second, what is their likely *behaviour* toward us?

### 2. EXTRATERRESTRIAL CAPACITIES

Most extraterrestrial civilisations in our Galaxy today have advanced at least 10,000 years beyond humanity's current level of development. A thorough search of recent literature did not discover any claim that many extraterrestrial civilisations are less advanced than that. In fact, the specific numbers in most

calculations of the number ("N") of technological civilisations in the Galaxy indicate that *some* civilisations are 100,000 or even millions of years more advanced than we are. This should not surprise us, since several species (though not civilisations) on our own planet are 300,000,000 years older than we are [1]. Some civilisations presumably fail to survive once they discover nuclear weapons or other means of extinction, but surely others learn to cope successfully with this problem and then survive for a very long time.

We cannot at present be certain about the particular capacities of highly advanced civilisations in the Galaxy. We can, however, make some thoughtful guesses based on established human knowledge (such as history and futures studies) combined with intelligent speculation.

Our own progress in several areas of life has been very dramatic over the past 10,000 years. If we survive another 10,000 years, it is highly likely that we will again make dramatic progress in several areas. When we turn our attention to other civilisations that are 10,000 or perhaps even a million years older than we are, there can be little doubt that some of them will be far beyond us in their biological, mental, technological, psychic, communication, or travel capacities. Also, because they originated in bodies, physical environments, and social environments that are highly different from ours, their patterns of perceiving, thinking, and relating may be vastly different from ours.

It is highly likely, therefore, that many of the capacities in the following list have already been developed by one advanced civilisation or another in our Galaxy. It is unlikely that any one civilisation will have all of the listed capacities: it is quite probable, though, that each of these capacities (with one or two exceptions) now exists somewhere in our Galaxy. We ourselves will probably possess many of these capacities someday if we continue to develop for another 10,000 or 1,000,000 years. Indeed, the list is based partly on the thoughtful writing of various authors about the long-term future of humankind, which has been one of the author's professional interests for the past ten years.

Probable capacities in one civilisation or another include the following:

- virtually unlimited energy (solar, nuclear, etc.)
- technology and know-how that are so advanced that they would appear to us as miraculous
- enormously evolved individual brainpower linked with an implanted twentieth-generation computer
- the capacity to live and travel anywhere in space, probably approaching and perhaps surpassing the speed of light

- elimination of individual and collective behaviour that is violent, destructive, or harmful
- loving cooperation, altruism, and compassion combined with sensible public decision-making
- individual self-understanding, self-acceptance, and mental health that are very high, along with the skill of relating effectively and harmoniously with members of one's own species
- excellent skill (at least among the members of specially trained intercultural teams) at interacting with vastly different species and cultures
- knowledge and wisdom unimaginable to us
- excellent control over biological reproduction and evolution, including very healthy long-lived bodies and super-capacity brains
- the technological and/or psychic ability to send information, receive information, detect, and observe across vast distances at the speed of light or even faster
- the technological/psychic ability to covertly influence an individual's thoughts, images, motives, and experiences
- the technological/psychic ability to influence virtually any object, and to transfer one's body or consciousness instantly from one place to another
- organic or psychic connections to other members of the species, or to a central organism or brain
- extremely rapid, accurate, versatile, and powerful weapons.

Such a list may strike us as unbelievable when we first read it. Would a human being 10,000 years ago, though, have reacted any differently to a list of our present capacities? Airplanes, astronauts, Moon-walks, telescopes, selective breeding, television, electricity, microbes, hospitals, DNA, computers, universities, skyscrapers, cordless telephones, nuclear weapons, the United Nations, taxes, and many other aspects of today's world would have been dismissed 10,000 years ago as ridiculous or impossible. That was the time when the Ice Age ended, humanity's main crops became domesticated, and the world's first town arose. Pigs, cattle, and horses had not yet been tamed 10,000 years ago. Weaving, wagon wheels, and writing had not yet been invented. The Bronze Age and Iron Age had not yet begun. Stone buildings, philosophy, and science still lay in the future [1]. No wonder the people of 10,000 years ago could not have anticipated today's capacities. For us, in turn, the actual capacities of a civilisation 10,000 or a million years beyond us will probably make my list seem unimaginative.

Will surveillance, communication, or travel ever be faster than the speed of light? As our understanding of the laws of physics is expanded, we may discover physical principles far beyond what we now imagine. James Trefil has declared, "It is presumptuous of us to suppose, on the basis of three hundred years of experience with science, that barriers that appear insurmountable to us will remain insurmountable 30 million years from now" [2]. Peter Sturrock, too, has said, "The laws of gravitation and motion have been known for only about 300 years, electromagnetism for about 100 years, and quantum theory and relativity for only about 50 years. Why should we believe that, if scientists were to continue working for another million years, there would not be comparable revolutions or revelations?" [3].

In 2010 Arthur C. Clarke gives us a glimpse of the transformations that may occur in a highly advanced civilisation (or whatever succeeds a civilisation as its next stage). One species in that novel, beginning as flesh and blood, eventually learned

to transfer their brains and then their thoughts into shiny new homes of metal and plastic. Then they learned "to store knowledge in the structure of space itself, and to preserve their thoughts for eternity in frozen lattices of light. They could become creatures of radiation, free at last from the tyranny of matter. Into pure energy, therefore, they presently transformed themselves... They could rove at will among the stars and sink like a subtle mist through the very interstices of space" [4].

### 3. SOME EXTRATERRESTRIALS KNOW ABOUT US

It is highly likely that some advanced extraterrestrials know about us. In addition to basic knowledge about us, they may also have highly detailed information.

This conclusion is based on two factors: capacity and motivation. We saw in the previous section how highly advanced the *capacities* of some extraterrestrials are, compared to our present level of development. It seems highly likely that they are capable of observing, monitoring, or studying us if they wish to do so. Believing that we "vastly underrate the abilities of ETI," John Ball has stated that "we'll certainly start studying and cataloguing biosystems in the Galaxy as soon as we're able; why should ETI do less?" [5].

Their *motivations* to do so might include their own protection and security, and their desire to help us develop. In addition, they could be motivated by curiosity and scientific study; for example, within the field of comparative civilisations, some scholars may study the similarities and differences among various civilisations and planets in our Galaxy. On their equivalent of videocassettes, some extraterrestrials may want to record certain aspects of our music, art, games, recreation, loving deeds, thoughts, laws, customs, insights, appearance, dwelling places, technology, culture, and landscape.

Let us turn now to *how* they might gain information about us. After a further 10,000 or even one million years of development, how will we gain information about the Universe? At present we can only guess at the answer. It is even harder to guess how a species quite different from us to begin with, and now advanced far beyond us, has gained information about us. We can list some potential methods, however, such as the following:

- monitoring our radio and television broadcasts from within the Solar System or from a great distance
- incredibly advanced imaging techniques (far beyond our spy satellites and space telescope)
- observation spacecraft with a living crew of intelligent beings, clones, slaves, servants, or biologically manufactured beings
- spacecraft controlled by twentieth-generation computers and robots
- an automated probe or sonde parked in our asteroid belt
- self-replicating probe machines (Von Neumann or "Santa Claus" machines) strictly programmed to self-destruct if they ever become dangerous
- tuning into our thoughts or taking over someone's brain
- invisible or unobtrusive techniques of observation that we have not even imagined

With some of these methods of monitoring or observing us, a highly advanced species could probably escape detection. At least with our present capacities, we simply have no way of disproving the hypothesis that some extraterrestrials have knowledge of us and our planet. We can make an effort to detect

their methods, though, in hopes that some extraterrestrials lack the motivation or capacity to disguise and hide their observation efforts.

#### 4. EXTRATERRESTRIAL BEHAVIOUR TOWARDS US

Two key conclusions emerged in the previous sections of this paper. One, it is highly likely that at least one group of advanced extraterrestrials knows about our civilisation. Two, it is highly likely that they have the capacity to interact or intervene in a variety of ways if they choose to do so.

They *can* interact or intervene, but *will* they? We must now turn our attention to their likely behaviour toward humanity. What basic goals and policies guide their behaviour toward humanity and other fledgling civilisations? How much help will they donate to us? What sorts of help? How? When?

In order to wrestle with these questions, I have used a combination of four methods.

- (1) One method was an extensive search of potentially relevant literature, located through abstracts in three fields (astronomy and astrophysics, aerospace, and physics) and through nine other bibliographic tools.
- (2) As any writer does, I spent many days thinking about the various issues and possibilities.
- (3) When alone in my home, I held two lengthy tape-recorded mock meetings in which a variety of advanced extraterrestrials expressed their views on how to relate to fledgling civilisations, particularly humankind. The purpose of these two mental exercises was to empathically generate ideas about extraterrestrial behaviour. In these two meetings, I spontaneously created the various voices and views myself. Because each view arose in response to the previous one, a surprising diversity of views emerged on some of the issues.
- (4) At the University of Toronto, I also conducted two tape-recorded meetings in which all the people present took the part of advanced extraterrestrials with remarkable ease. A printed agenda for "The Galaxy-Wide Association of Advanced Civilizations: Special Meeting to Discuss Fledgling Civilizations" focused the discussion on several major decisions about helping humankind. About 40 undergraduate students at the final session of a science-oriented course on "Life on Other Worlds" participated for one hour at one of these meetings. About ten mature graduate students at the final session of a course on "Potential Futures" participated for two hours at the other meeting.

##### 4.1 They Avoid Harming Fledgling Civilisations

Probably the cardinal principle guiding extraterrestrial behaviour toward all other civilisations is this: avoid unnecessary harm and interference. Do not hurt any other civilisation, nor hinder their development. Avoid exploitation and other interactions in which their losses outweigh their benefits.

If another civilisation is clearly about to break the cardinal rule (through a powerful attack or through spreading a plague, for example), and if this poses a definite and immediate threat to the survival or further development of an advanced species, then it is permissible to intervene powerfully and even harmfully in order to prevent this. Under any other circumstances, how-

ever, an advanced civilisation will not interfere harmfully in the development of any other civilisation.

There are several reasons for concluding that advanced beings are helpful or at least benign, and are unlikely to harm humankind and other fledgling civilisations. Here are the main reasons:

- They still recall their own early history, including their primitive stages, their dark periods, and their follies; therefore, they may feel sympathetic toward us.
- Anyone bent on capturing our planet would have done so long ago, before we despoiled it so much.
- Any hostile civilisation with advanced technology would have programmed its robot Replicator probes to eliminate any potential civilisation long before reaching the stage at which it could attack the Replicator; that is, long before our present stage [6].
- Extraterrestrials are probably letting us develop freely, without interference, in order to maximise the amount of information they gain; if they interfere and control us, they will learn less [7].
- Intelligent life forms that are destructively aggressive and irresponsible will usually eliminate themselves or revert back to primitive conditions before they achieve interstellar travel. If an aggressive species does manage to avoid the usual consequences of natural selection at the planetary level, and then prepares for an interstellar voyage, it may well be terminated by the more advanced beings in the Galaxy. ("How this is done is a matter of more than academic interest to the human race in the next few centuries" [8]).
- If most extraterrestrials agree on the cardinal principle, their advanced capacities will enable them to detect and deal with any would-be outlaws, pirates, plunderers, or mavericks who are tempted to interfere with life on Earth.
- Carl Sagan and William Newman [9] have concluded that most or all advanced civilisations are likely to have benign intentions, to live with other groups in mutual respect, and to be sensitive to a civilisation as young as ours.
- Michael Papagiannis [10] has concluded that civilisations older than ours are likely to choose intellectual values over materialism, to achieve a high level of ethical and moral development, and to be highly evolved spiritually.

##### 4.2 How Much Help Will They Give Us?

Extraterrestrials may hold somewhat divergent views concerning the amount of effort and resources they will donate to helping fledgling and early-stage civilisations. Their views may well range along a continuum, with zero at one end, low-budget efforts somewhere in the middle, and high-budget efforts at the other end.

Let us discuss the zero-help approach first. Perhaps some civilisations simply have no desire to help anyone else, nor even interact with them. They may have plenty of other things to attend to, both positive and negative. Proponents of zero effort and resources may well say, as one person did in the mock meetings of extraterrestrials: "Leave fledgling civilizations

alone. Don't try to influence or help them. Live and let live. Let them develop freely, autonomously, naturally, in their own ways, even to the point of making an enormous or fatal error. The development of fledgling civilisations is not a high or even medium priority for us; we have nothing to gain. Instead we must devote our efforts and resources to the survival and development of the most *advanced* features in the Galaxy. Let's follow an isolationist policy for our sake and for theirs. Let our anthropologists unobtrusively study their arts and knowledge and customs for us, and let it go at that." Another "extraterrestrial," who had recently been on an anthropological expedition to Earth, said at one of the meetings: "Our main aim and enthusiasm is to study human culture: we want to understand them better and thus understand ourselves better. Occasionally, when we encounter ordinary people who seem willing to listen to a message from us, we give them basic advice about what their species should do. But we'd never think of seeking informed consent and offering major sorts of help, let alone approaching one of their governments!"

At all four meetings, various low-budget approaches were proposed. One suggestion was to donate one team of ten extraterrestrials to each fledgling civilisation, at least during certain crucial periods in their development.

Another low-budget view emphasised selectivity: only the most promising civilisations should receive help. Occasionally a fledgling civilisation will show exceptional promise of someday attaining and contributing to the extraordinarily advanced level of development achieved in the Galaxy at that time. Or, at least, it may have a 5 or 10 per cent probability of developing into a wise, compassionate, advanced civilisation. Extraterrestrials might well limit their help to such civilisations.

Another "extraterrestrial" proposed that they donate one-sixteenth of their public resources to *all* charitable causes outside their own species ("thus leaving the rest for ourselves; that should be plenty!"). That total amount would then be divided among Earth and all other competing possibilities according to their needs.

The most generous voice at the four mock meetings of extraterrestrials took the following stance: "We ought to do everything we can to foster and help good, delightful, intelligent, wise, compassionate, fascinating life develop in great diversity throughout this Galaxy. We should help it *wherever* it shows signs of positive potential. We can do this without hindering our own development, which I agree is an even higher priority."

Even this generous view indicates that our progress and well-being are not the central goals for an extraterrestrial civilisation. Their efforts to foster our development are only one small sphere of activity within their total societal activity. They may have some caring and altruism, yes, but their own concerns and well-being are probably far more salient to them. They probably have two fundamental priorities [11]. One is biological and cultural survival. They want to retain the knowledge, wisdom, culture, compassion, and beauty that they have already achieved. Their second fundamental priority is further development of their knowledge and culture. No doubt they are vigorously pursuing certain projects or directions that they hope will lead them to an even more advanced level. (The comparative study of civilisations in the Galaxy could be one of those projects.) In addition, as long as it does not jeopardise their first two priorities, they may have a third major priority: the survival, evolution, and flourishing of other advanced species throughout the Galaxy. The further development of knowledge, wisdom, insight, love, harmony, effectiveness, goodness, and beauty in our Galaxy may be very important to some highly advanced beings. Fostering a rich diversity of life and cultures throughout the Galaxy and Universe may be one of their highest aims. Consequently, they may devote *some* effort and resources to our welfare, although this will not overshadow their first two priorities. If humanity blunders, deteriorates, fails, or even extinguishes itself, however, no extraterrestrial civilisation will mourn this as the worst possible tragedy. They

might be about as upset as humanity would be if all whales became extinct or if an earthquake sent Toronto to the bottom of Lake Ontario.

## 5. THREE POTENTIAL TYPES OF HELP

It is useful to distinguish three potential types of extraterrestrial help: (1) instant protection from some ultimate catastrophe, (2) helping us reduce major dangers over time, and (3) help in various other spheres of human life.

### 5.1 Instant Protection

In this section we will discuss instant protection, which is often an early-stage type of help. If a human toddler is about to run on to a busy street or fall into a campfire, we instantly grab the child. Explanations and education can wait for a moment! Similarly, if a promising civilisation is about to trigger a nuclear holocaust or collide with a giant asteroid, a team of extraterrestrials may take instant action to avoid the catastrophe. Such extraterrestrials would unobtrusively monitor the civilisation and act only if needed, probably extremely rarely. They would continue providing instant protection until it is no longer needed, either because severe dangers no longer exist or because the civilisation becomes able to cope on its own.

Putting into place the means for instant protection will often be the first and most common type of help provided to fledgling and promising civilisations. If an all-out nuclear war were suddenly about to begin here, for instance, the team of extraterrestrial engineers assigned to Earth would take instant action. Having been monitoring each nation's code signal for beginning a nuclear attack, they might jam those signals or immediately issue the countermand ("I changed my mind") code. World leaders would thus find themselves unable to launch their missiles. Alternatively, extraterrestrials with highly developed psychic capacities could probably avoid the launch by monitoring the mental processes of the key world leaders and then directly influencing their minds just before they would otherwise order the missiles launched. A third possible method is to defuse the missiles in flight or have their navigation systems send them far away from the planet. If all of this sounds too far-fetched for you to accept, ask yourself how your great-grandparents (when they were your age) would have reacted to today's actual nuclear, navigational, espionage, and space capabilities!

If measures for instant protection were in place, they would certainly be used to prevent the *extinction* of a promising fledgling civilisation. The data concerning a "nuclear winter" on Earth indicate that even one-fifth of our present nuclear weapons could possibly eliminate humankind completely within a year after detonation. The extraterrestrial team might, or might not, take action if they predicted that at least a handful of human beings and some basic knowledge would survive. "Our compassion is very long-term," said one extraterrestrial at the mock meetings. "We care about the ultimate destination of humanity, but we do not want to interfere with their present journey unless they are about to eliminate *all* human life and culture."

### 5.2 Helping Us Reduce Dangers Over Time

Helping us reduce (over time) our worst risks and dangers is a second type of potential help. In the childhood analogy, we might build a fence or gate so that the child cannot reach the busy street or we might teach the child to stay off the road. Extraterrestrials are very likely to provide this type of help when they cannot handle a future danger cheaply and easily through instant protection. They also may provide it when the civilisation becomes mature enough to accept and implement extraterrestrial suggestions. As human youngsters mature, for example, we gradually help them gain more and more of the knowledge, skill, and responsibility necessary for independent

safety. There is less and less need for our constant monitoring, our alert readiness to intervene, and our efforts to safely "child-proof" their home.

Three sorts of approaches might be used to help us, over time, reduce our worst risks and dangers:

(1) Advanced extraterrestrials may perform some *invisible* actions behind the scenes in order to eliminate certain risks. Human beings might be unaware that extraterrestrials were influencing certain events, phenomena, miracles, objects, widespread beliefs and feelings, or key decisions of world leaders. We might not notice if they rendered inoperable the detonation or navigation system of every nuclear weapon at the time of its installation. We might not realise why our experiments to develop one particularly deadly agent for biological warfare always seemed to fail. We might not know that a giant asteroid or comet abruptly changed course long before astronomers realised that it was on a collision course with Earth. Highly advanced beings could produce these various sorts of influence in several ways: electronically from a great distance, directly through their presence here in our Solar System, or indirectly by changing the minds or behaviour of certain key individuals.

(2) A second approach emphasises *informed consent*. Extraterrestrials following this light-handed approach would obtain informed consent from humanity (or at least from its international associations or leaders) before intervening. After hearing about the help we were being offered, we would be free to accept or reject it, or to try to negotiate certain modifications.

This second approach requires a reasonably rapid method of two-way communication. They have to outline their potential contributions and their consequences, we have to choose our preferences and give consent, and they then have to deliver our choices. Such two-way communication can probably occur best if they come to Earth physically. An individual or team could come in a spacecraft or through some other sort of physical travel. An extraordinarily intelligent computer capable of sophisticated interaction with aliens might perform as well as a team. Their communication might be kept a secret among a few key government or international leaders, or might be publicly known.

Their actual presence here on Earth would have enormous advantages for diagnosis, rapid two-way communication, and action. Their actions might include giving advice and information, physically fixing or changing something for us, building or demonstrating a better way of doing things, or eliminating nuclear warheads or making them inoperable.

(3) A much more heavy-handed approach would *force* humankind (and other early-stage civilisations on other planets) to correct our worst risks, dangers, flaws, errors, and follies. For instance, extraterrestrials might force us to eliminate all risks (or reduce them to a probability of 1% per century) that could irretrievably wipe out 90 per cent of our culture, knowledge, arts, values, environment, and so on. Such risks could include humanity's arsenal of nuclear bombs, rapid population growth, wars and violence, biological warfare or accident, and rapid degradation of the environment. We would be threatened with severe punishment if we did not cooperate, or we might simply find that many things

were dramatically changed regardless of our wishes and choices.

This approach, too, would probably require extraterrestrials to actually come to Earth (or to have some other way of communicating and acting rapidly with us). In order to diagnose, negotiate, command, coerce, threaten, or make direct powerful interventions, they themselves or at least their awareness and power would have to reach our planet.

### 5.3 Help in Nondangerous Spheres

In a third type of help, extraterrestrials may help another civilisation develop or improve certain nondangerous spheres of their culture. Presumably this sort of help is not offered or provided until serious dangers and risks are already eliminated or clearly being reduced. This third type of help is most likely offered when the civilisation is stuck or stagnant far short of its potential, at least in certain important spheres, or is choosing a nonproductive path within certain major spheres.

Help with the positive, nondangerous aspects of a civilisation would probably be given only after informed consent. During a mock meeting, one extraterrestrial's view was this: "We should not influence or help any other civilisation without their informed consent. If certain of our individuals, missionary groups, charitable organisations, benevolent societies, governments, or federations want to voluntarily help a fledgling civilisation, they're free to do so. Such projects are free to offer aid with the positive aspects of their culture, such as further development of fundamental knowledge, deep wisdom, philosophy, compassion, thoughtful aims and values, arts, and conflict resolution techniques. They are free to *offer* diagnoses, suggestions, priorities, principles, knowledge, effective procedures, skills, information, beliefs, music, rituals, social organisation, laws, and so on. But such projects must not use threats, coercion, punishment, or misleading information in order to influence whether their offer is accepted. In order to obtain *informed* consent, the project must accurately spell out the possible consequences, both positive and negative, and their probabilities."

In certain spheres of activity, a fledgling civilisation might show some promise of developing something useful and fresh, something different from all other civilisations in the Galaxy. In such a sphere, intervention would be inappropriate. However, if a civilisation is on a wrong or useless path in some sphere, unlikely ever to develop anything of use to other civilisations or even to itself, the advanced civilisation might make available their total store of knowledge and techniques in that sphere. Alternatively, in order to encourage diversity, they might simply point out certain errors or dead ends, inspire people to try certain fresh paths, or generally provide a hopeful vision of potential development and a highly positive future. Sensitive advanced species will presumably be careful not to squelch the portions of our culture that are positive and effective; they will not want our culture to become a carbon copy of theirs.

It is also conceivable, though unlikely, that some extraterrestrials take a heavy-handed approach to helping and influencing others, even within spheres that are neither dangerous nor urgent. Because they see their technology, knowledge, beliefs, and morals as highly advanced, they may see no need to seek consent from us in order to spread their superior culture. Some may even advocate the use of force or coercion: "For their own good, let's go in there and straighten them out. Intervene forcefully to improve their goals, strategies, morals, arts, and sciences." One speaker at the tape-recorded meetings went so far as to point out that the low level of consciousness on one planet, manifesting itself in violence and hatred and evil, can disturb or lower the level of consciousness in other parts of the Galaxy: "Immediate and massive change is clearly necessary."

A heavy-handed approach is highly unlikely within nondan-

gerous spheres. Because advanced aliens are probably peaceful and well intentioned, as we saw in Section 4.1, they are unlikely to use a distasteful, intrusive, coercive, heavy-handed approach. It also seems highly likely that advanced extraterrestrials would at least *begin* with informed consent or some other light-handed approach, and then perhaps move on to use power and coercion if necessary. A combination is also possible, of course: heavy-handed coercion to force us to eliminate our worst dangers, combined with informed consent (or no help at all) in all other spheres.

#### 5.4 Methods of Communication and Help

For the first type of help (instant protection), it is obvious that detailed ongoing monitoring is essential, along with the power to act swiftly. The second type of help (reducing dangers over time) requires these same capacities and/or rapid two-way communication. For these two types of help, then, it is unlikely that extraterrestrials will choose a method that provides only one-way communication or extremely slow two-way communication. Radio messages from a distant source, for instance, would be ineffective for providing these two types of help. A highly advanced civilisation, with a repertoire of rapid and powerful techniques for interacting with beings on other planets, is unlikely to choose the incredibly slow interaction provided by radio. Diagnosis, informed consent, two-way communication, and action are not feasible by radio messages over vast distances. Extraterrestrials *could* use radio messages (just as we could still use smoke signals or bonfires for communication from one hilltop to another) but surely they are unlikely to choose such a cumbersome form of communication and interaction. The same reasoning rules out the use of an automated probe parked in the Solar System's asteroid belt, preprogrammed to release a long, significant, detailed message when we approach the probe or direct certain radio waves or laser beams at it.

Radio messages are, however, a possible method for extraterrestrials to choose for providing the *third* type of help (nondangerous spheres). Advice, information, know-how, techniques, principles, knowledge, values, ethics, social and political organisation, and even religious beliefs could be conveyed by radio messages from a distant planet. Radio could even communicate instructions for building a machine to travel millions of times faster than the speed of light through black holes or wormholes, as fantasized in Carl Sagan's recent novel [12]. At least at one stage of its development, a civilisation may choose radio as a cheap broad-gauge way to disseminate whatever it considers valuable and useful. As the civilisation's capacities increase, though, and as it clarifies the three potential types of help, it will probably move on to more rapid and effective methods. Searching the sky for automated probes and far distant messages within the electromagnetic spectrum is definitely a worthwhile endeavour for us, but it should not overshadow several other higher priority strategies presented in the final section.

### 6. THE GREAT SILENCE

We began this paper with the assumption that at least one nonhuman species that has evolved to an advanced level is present in our Galaxy today. Among some scientists in recent years, a phenomenon called the Fermi Question or the Great Silence has been a stumbling block to accepting this assumption. These scientists reason that if we have never seen nor heard from any other civilisations, despite their capacity to send us radio messages and to colonise our Solar System with spacecraft or self-replicating probes, then they probably do not exist.

Various counter-arguments have been presented [13]. Some of the ideas in this paper support the counter-arguments. One reason we have not seen them nor heard from them, for example,

is that they may be using unobtrusive methods to observe us. They may not want to colonise our Solar System nor intrude upon our fledgling civilisation. Although they may offer help or interact with us in other overt ways in the future, perhaps they are choosing not to do so at present because we are not in desperate need of help (except perhaps they have put in place invisible measures for instant protection in case they are suddenly needed).

### 7. THE NEXT 30 YEARS

During the next 30 years, what are the chances of significant contact or interaction with advanced extraterrestrials? What are the chances that at least one type of help will be provided or offered?

All in all, taking into account a wide range of factors, the chance of some sort of significant extraterrestrial impact or help during the next 30 years is probably about one in four. Clearly we must strive wholeheartedly to solve our global problems ourselves since the chances of outside help are not reassuringly high. At the same time, odds of one in four are sufficiently high to make most of the strategies in the final section definitely worth betting on. Compared to our total human resources and efforts, only a tiny fraction devoted to several strategies could pay off with stunningly high benefits to humanity.

### 8. EVENTUAL IMPACT

We have seen that advanced extraterrestrials probably are monitoring us, willing and able to help us, and waiting for the appropriate time to do so. It seems highly likely, then, that they will eventually have an enormous, significant, central impact on humanity's future developments. Whether this impact occurs this year or 100 years from now, it will likely affect our civilisation profoundly at that time and for many centuries afterwards. The general picture presented in this paper indicates that extraterrestrial impact will likely be highly positive rather than harmful, and will foster or speed our development in beneficial ways. (I am assuming in this paragraph that we do not extinguish ourselves in the next few decades through our extraordinarily risky gamble with nuclear weapons.)

What will the specific effects of extraterrestrial messages, interaction, or intervention turn out to be? This is a common theme in the scientific literature about ETI (as well as science fiction, of course). Few nonfiction writers treat the question with much thought or depth, unfortunately, nor even go beyond one paragraph. There are stimulating and useful exceptions, however, such as Michaud [14], Prytz [15], Regis [16] and Thatcher [17].

If we accept the knowledge and other help that will someday probably be offered to us, here are some major sorts of impact that might occur:

- Enormous advances in technology, know-how, medicine, levels of consciousness, spiritual growth, social organisation, decision-making, and governing may occur.
- We may eliminate nuclear weapons and other threats to humanity's survival.
- Our understanding of the Cosmos, its creation and ultimate fate, and even its meaning or purpose may increase.
- Our view of ourselves, our place in the Universe, and our ultimate destination may shift dramatically.

- We may receive a definitive answer to our questions about the existence and nature of a supreme supernatural being (God).
- Various academic and scientific fields of knowledge may be outmoded or transformed.
- Fresh goals, priorities, and projects may supersede our present ones.
- Our values, taboos, motivations, and emotional patterns may be deeply influenced or even shattered.
- Our cultural norms may be turned upside down as we interact with highly intelligent gigantic snails or other beings even stranger in appearance and manner than the creatures in various science fiction films.
- We may thoughtfully choose to have our genes and/or our culture mixed (partially or completely) with those of one or more nonhuman species.
- Without losing our identity as human beings, we may join a galactic information network, a political or trade federation, or a Galaxy-wide pool of consciousness.
- Individually and collectively, many human beings may join galactic projects to solve fundamental mysteries of the Universe, to help other species and civilisations develop and flourish, and to spread harmony and wisdom throughout the Universe.

Compared to the various sorts of impact in this list, the impact of a brief message that simply reveals the existence and location of one nonhuman civilisation might be fairly minor. After all, millions of people already believe that extraterrestrials exist, or have at least become used to the idea through films, television, and novels.

Before leaving the topic of eventual impact, we should note one particular galactic or intergalactic project that may eventually be the most significant project of all. If advanced beings do not prevent it, probably this physical Universe will either expand and cool down until there are no temperature differences (heat death) or else collapse inward in a "Big Crunch." In either case, an enormous project will be needed to avoid the extermination of all life, knowledge, wisdom, and genetic information. Perhaps this project will find a way to avoid the end of life in this Universe, possibly by altering the physical Universe (or one portion of it) in some powerful and massive way, thus avoiding its physical death. Alternatively, some way may be found to break out of this Universe into another one, either existing parallel to it or arising subsequent to it. That is, perhaps the best of our knowledge, consciousness, and genes can somehow be transferred to this other universe. As the time approaches when such a project is needed, intelligent life may have reached such an advanced stage that this project no longer seems absurd or impossible. Indeed, Freeman Dyson [18] has already explored some possible ways of achieving it.

### 9. WHAT WE CAN DO NOW

What should our responses be to all of this? During the next few years, what strategies and projects will most likely prove highly beneficial to us? If the general picture presented in this paper is correct, major implications arise for humanity's immediate priorities.

Our overall approach should take into account our level of uncertainty about the number, characteristics, capacities, and

motives of advanced life forms in our Galaxy. At this stage, we clearly need to pursue a variety of directions, a mixed strategy, a multi-path approach. We certainly have not reached the stage at which it makes sense to focus all our efforts on only one or two strategies while neglecting the rest.

Thirteen possible strategies, directions, and projects are listed in Table 1. Three assessments are provided for each of these.

First, what is the probability of success if the project is funded at a reasonably adequate level? The judgements in this column are based largely on the conclusions in this paper.

Second, if the given project is successful, how great will the benefits be for humankind's future? The judgements in this column are based on the extensive literature on potential human

TABLE 1. What We Can Do Now.

Some Possible Strategies and Projects	Likelihood of Success	Benefit to Humanity if Successful	Overall Priority
Study the likely capacities, aims, projects, help and methods of advanced extraterrestrials	MEDIUM-HIGH	HIGH	HIGH
Develop a broad interdisciplinary field of study re advanced life in the Galaxy	HIGH	HIGH	HIGH
Try to detect intentional detailed messages (radio, etc.) from outside our Solar System	MEDIUM-LOW	MEDIUM-HIGH	MEDIUM-HIGH
Try to detect astroengineering projects, high energy consumption, byproducts, or other distant evidence of technological civilisations	MEDIUM	LOW	LOW
Try to detect in our Solar System a probe that can be triggered to release a message to us	MEDIUM-LOW	MEDIUM-HIGH	MEDIUM-HIGH
Try to detect a staffed spacecraft parked in our Solar System	LOW	MEDIUM	MEDIUM-LOW
Try to detect other signs of extraterrestrial artifacts in our Solar System [19]	LOW	LOW	LOW
Study claims of experiences with extraterrestrial spacecraft, visitors, and messages since 1940	MEDIUM	HIGH	HIGH
Try to detect on Earth any other evidence of their current monitoring, presence, or instant protection	MEDIUM	HIGH	HIGH
Study possible evidence of extraterrestrial visits to Earth (or other influence) before 1940	LOW	LOW	LOW
Prepare for successful interaction with extraterrestrials	MEDIUM	HIGH	HIGH
Improve our technology for sending distant messages that give and request information and intentions [20]	LOW	MEDIUM	LOW
Consider other human actions that might encourage extraterrestrials to interact with us	MEDIUM	HIGH	MEDIUM-HIGH

futures as well as on this paper.

In fact, our society will probably not choose to fund all 13 projects at an adequate level. Consequently, the right-hand column sets priorities among the various possibilities; it is based on the other two columns, on costs compared to benefits, and on an overall comprehensive comparison. If we cannot do all 13 projects, which ones are highest priority for our efforts and resources? The eight strategies rated HIGH and MEDIUM-HIGH should be fully supported and funded at an adequate and reasonable level. The lower priority projects should also receive some funding, if possible.

Five strategies in the table are particularly high priority ("HIGH"). All five are incredibly neglected and underfunded at present. We will now look briefly at each of these high priority strategies in turn.

The first high-priority project in Table 1 involves thoughtful study and discussion of the likely capacities, aims, principles, projects, help, and methods of advanced extraterrestrials. I hope the current literature (including this paper) will stimulate a great deal of further individual study and critical dialogue. Paying some of the brightest people on Earth to spend several years thinking about this area would be a wise use of public resources. Futurists, historians, psychologists, anthropologists, and other social scientists should be involved, as well as astronomers, biologists, etc.

Second, the highest priority strategy of all may be to develop a broad interdisciplinary field of study focusing on advanced extraterrestrials. If research, thoughtful writing, symposia, graduate programmes, academic associations, high-level research teams, an ongoing research centre, a clearinghouse, journals, and integrative books in this field were all funded adequately, the benefits to humanity's future could be enormous. Such a field should examine data, thoughts, and suggestions from a wide variety of sources and disciplines; being unduly narrow in our questions and data sources is a far greater danger at this stage than being too broad-minded. We need fresh views and approaches.

Third, many people over the past 40 years have claimed that they have seen and even interacted with extraterrestrial spacecraft and occupants. A few people have claimed that they have received messages from these visitors (directly or while in a psychic trance). Most sightings turn out to be the result of erroneous perception or interpretation [21]. A few reports, however, remain unexplained. It could be very useful, therefore, to study the most promising claims with an open-minded scientific approach. Until we do so, carefully and thoughtfully, we cannot be sure that *all* the claims are erroneous. It is highly likely that some advanced extraterrestrials are observing us one way or another, as we have already noted in Section 3; perhaps someone occasionally manages to perceive them or receive a message from them.

Efforts to detect any other evidence on Earth of recent extraterrestrial monitoring, presence, or measures for instant protection are also rated "HIGH" in the priorities list. Earlier in this paper we saw that it is quite likely that we are being observed or monitored somehow and quite possible that measures for instant protection are already in place or soon will be. Consequently, it definitely seems important to create and try several methods of detecting these. If one of these methods succeeds, we would then know for sure about one actual form of highly relevant contact.

Preparing for successful interaction with extraterrestrials is the other high priority project in the table. This should be a public world-wide effort, involving a wide range of people. We should become clear on our goals and requests. For example, one priority for us might be the maintenance of our own unique culture and gene pool unless we thoughtfully choose to merge with another species. We might want to prepare a group of people to be a flexible, effective, trusting, caring, comfortable, non-military welcoming party or negotiating team. We need to develop a genuinely peaceful, ethical, cooperative approach

(and a set of clear principles and laws) in which our overriding motivation is harmonious interaction for mutual benefit. We need to study the "Deadly Probes" scenario [13], but we also need world-wide agreement that we will not wage war with any extraterrestrial group unless truly necessary for self-defence. Some thinking about metalaw and effective interaction with alien cultures has already occurred [22], but much remains to be done. As Michael Michaud [14] has pointed out, "We are not ready for contact. We have not yet created the philosophical context for a calm and rational relationship with aliens. That relationship will require a broad view of life in the Universe... It will require a long perspective on our own history, and a sure knowledge of our own purposes... We may not have much more time to put our house in order before contact occurs." Our further thinking and preparation should be done soon, instead of waiting until contact occurs. After all, as we noted in Section 7, there is a reasonably good chance that contact will occur within 30 years (or is already occurring).

All three of the MEDIUM-HIGH projects, too, should certainly be funded adequately. Searching appropriate portions of the electromagnetic spectrum for distant messages has already begun and will no doubt continue with vigorous effort. Although its funding is not overwhelmingly generous, it is at least receiving far more funds than any other strategy on the list.

Very small efforts are already underway with some of the other strategies on the list. Compared to the potential payoffs for humanity, however, at least seven of the strategies are grossly neglected and underfunded. Because of the enormous benefits that might well result, humankind should certainly devote one per cent of its total effort and resources to these strategies. Few other investments in the future of humanity provide better prospects for a dramatically significant payoff.

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