

an astrophysicist believer
in extraterrestrial life
describes the portents and complexities
of confrontation with
nonhuman sentient beings

WHEN EARTHMAN AND ALIEN MEET

article By ARTHUR C. CLARKE THE FIRST ENCOUNTER between Earthman and alien is one of the oldest and most hackneyed themes of science fiction. Indeed, it has now become such a cliché that "Take me to your leader" jokes are perfectly familiar even to those benighted souls who have never read a word of science fiction in their lives.

How odd, therefore, that there seem to be so few serious *factual* discussions of this subject. True, there have been essays without number on the possibilities of extraterrestrial life and the ways we might communicate with it, but most of them stop abruptly at the really interesting point. The astronomers and biologists, and even the philosophers and theologians, have all had their say in the past few years. But the sociologists and the politicians have left it to the science-fiction writers—and this at the very time when the subject is moving out of the realm of fantasy.

All war departments, it is said (though one sometimes doubts this), have plans worked out for every conceivable eventuality. Presumably, somewhere in the Pentagon are the orders for such lamentable necessities as the invasion of Canada or the bombing of London—or even New York, *vide Fail-Safe*. If there are any plans for the defense of Earth, no one has ever mentioned them.

Probably, the Department of Defense would argue, if pressed, that the matter was under the jurisdiction of the State Department—and you may be quite surprised to learn that State *does* have an Office of Space and Environmental Science Affairs. On March 15, 1967, its director, Robert F. Packard, presented a paper on "Voyage to the Planets—the Role of the Diplomat" to the Fifth Goddard Memorial Symposium in Washington. It was concerned, however, exclusively with terrestrial diplomats and did not even hint that there might be any other kind. In the absence of any official guidance, therefore, let us attempt to construct some scenarios (I believe this is the approved term among the nuclear doomsday planners) of our own.

The first problem we have to face is our total ignorance of the nature of extraterrestrials (E.T.s)—we do not even know if they exist! If they don't, of course, that is the end of the matter—but even if this is true, *we can never be sure*. And the idea that *we* are the only intelligent creatures in a cosmos of a hundred thousand million galaxies is so preposterous that there are very few astronomers today who would take it seriously.

It is safest to assume, therefore, that They *are* out there and to consider the manner in which this fact may impinge upon human society. It could come in ways as undramatic as the deciphering of an ancient papyrus or as shattering as a crash landing, with ray guns ablaze, on the White House lawn.

The most probable scenario, at least during the foreseeable future, might be called "Discovery Without Contact." By this I mean that we obtain unequivocal proof that intelligent E.T.s exist (or have existed) but in a manner that excludes communication.

Such a proof might be obtained from archaeology or geology. The discovery of a fossilized transistor radio in an undisturbed coal bed, preferably accompanied by skeletons that did not fit into any evolutionary tree, would be convincing evidence that our planet was once visited from space. Ancient legends, wall paintings or other works of art might also record such visits in historic times; unfortunately, this type of evidence can only be circumstantial—it can never be conclusive.

Shklovskii and Sagan's fascinating book *Intelligent Life in the Universe* reproduces some 3000-year-old Babylonian seals that, together with their associated legends, can very easily be taken to depict encounters between men and nonmen; parts of the Bible have been interpreted in the same manner. However, the mythmaking abilities of the human mind are so unlimited that it would be very foolish to accept these items as proofs of anything. After all, what would intelligent aliens make of a *Superman* comic strip?

No; in a matter as important as this, the only acceptable evidence would be hardware. About 20 years ago, in the short story *The Sentinel* (which Stanley Kubrick later used as the basis of *2001: A Space Odyssey*), I suggested that the best place to look for such evidence would be on a relatively stable and changeless world such as

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the Moon. On Earth, with its incessant weather and geological upheavals, no extraterrestrial artifact would survive for very long—though this is no excuse for not keeping our eyes open. The reason space hardware has never been discovered may simply be that no archaeologist ever dreamed of looking for it.

Although the philosophical—and sensational—impact of such a discovery would be enormous, after the initial excitement had ebbed, the world would probably continue on its way much as before. Once he had read a few Sunday supplements and watched a few TV specials, the proverbial man in the street would say: “This is all very interesting, but it happened a long time ago and hasn’t anything to do with me. Sure, they could come back one day—but there are plenty of more important things to worry about.” And he would be quite right.

Almost every field of scientific inquiry, however, would be profoundly affected. If it appeared that the visitors had come from one of the other worlds of our own Solar System—Mars, for example—this would obviously be a great stimulus to planetary exploration; but it would also start us searching much farther afield.

Two intelligent races in the same Solar System, even if they were separated by millions of years of time, would provide virtually conclusive proof that higher civilizations were very common throughout the Universe. This would immediately stimulate really determined attempts to detect signals from other star systems.

Little more than a decade ago, the astronomers suddenly realized, to their considerable surprise, that our radio technology has advanced to the point where we can start talking seriously about interstellar communication. And if, after only 50 years, *we* have reached such a level of development, what might older civilizations have achieved?

Scattered among the stars there may be radio beacons and transmitters of unimaginable power; the British cosmologist Fred Hoyle has expressed the view that there may be a kind of galactic communications network, linking thousands or millions of worlds. Indeed, a group of mysterious radio signals from space first discovered by Massachusetts Institute of Technology scientists in 1963 and monitored continuously since then do, in fact, exhibit many of the properties that we believe would characterize messages from other worlds. “These properties,” MIT astronomer Alan H. Barrett wrote in an August 1967 issue of *Science*, “are strong intensity, narrow band width, origin from regions of extremely small angular size, strong polarization and, perhaps, variation with time.” Expanding on the last characteristic, Barrett noted, “The apparent time variations of the amplitude of the signals seem to have a period of days, or weeks—somewhat longer than would be expected for interstellar communications, but not so much longer as to be unreasonable.” While declining to claim that the signals do indicate a vast interstellar communications network, Barrett insists that “such speculations have passed well beyond the domain of science fiction in our times.”

The possibilities opened up even by one-way communication (passive eavesdropping) are almost unlimited. The signals would certainly contain visual material—not necessarily real-time TV—that would be rather easy to reconstruct. And then, across the light-years, we would be able to look at other worlds and other races. . . .

Now, this is a situation far more exciting than the discovery of fossil artifacts. We would be dealing not with prehistory but with *news*—though news that had been slightly delayed in transit. If the signals came from the very closest stars, they would have left their transmitters only five or ten years ago; a more likely time lag would be a few centuries. In any event, we would be listening to civilizations still in existence, not studying the relics of vanished cultures.

The things we could learn might change our own society beyond recognition. It would be as if the America of Lincoln’s time could tune into the TV programs of today; though there would be much that could not be understood, there would also be clues that could leapfrog whole technologies into the future. (Ironically enough, the commercials would contain some of the most valuable information!) Nineteenth Century viewers would see that heavier-than-air machines were possible, and simple observation would reveal the principles of their design. The still-unguessed uses of electricity would be demonstrated (the telephone, the

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electric light) and this would be enough to set scientists on the right track. For knowing that a thing *can* be done is more than half the battle.

As signals from the stars could be received only by nations possessing very large radio telescopes, there would be the opportunity—and the temptation—to keep them secret. Knowledge is the most precious of all commodities, and it is a strange thought that the balance of power may one day be shifted by a few micromicrowatts collected from the depths of space. Yet it should no longer surprise us; for who dreamed, 50 years ago, that the faint flicker of dying atoms in a physics lab would change the course of history?

Glimpses of supercivilizations could have either stimulating or stultifying effects on our society. If the technological gulf was not too great to be bridged and the programs we intercepted contained hints and clues that we could understand, we would probably rise to the challenge. But if we found ourselves in the position of Neanderthals confronted by New York City, the psychological shock could be so great that we might give up the struggle. This appears to have happened on our own world from time to time, when primitive races have come into contact with more advanced ones. We will have a good chance of studying this phenomenon in a very few years—when communications satellites start beaming our TV programs into such places as the Amazon jungle. This is the last century during which widely disparate cultures will exist on Earth; would-be students of astrosociology should make the most of their opportunity before it vanishes forever. And no one will be surprised to hear that Margaret Mead is intensely interested in space flight. . . .

The discovery of an active communications network in our region of space (and I would make a small bet that such a thing exists) would at once raise a very difficult problem: Should we announce our presence by joining in the conversation or should we maintain a discreet silence? If anyone thinks that this is an easy question to answer, let him put himself in the place of a cultured and sensitive extraterrestrial whose knowledge of human civilization is based largely on *The Man from U.N.C.L.E.*, *Dragnet* and *The Late, Late Show*.

Probably everyone would agree that the wisest plan would be to listen carefully until we had learned as much as possible, before attempting to signal our presence. However, such caution may already be much too late; as far as Earth is concerned, the electronic cat was let out of the bag a couple of decades ago. Although it is unlikely that our first radio programs have ever been monitored (they were too low-powered and at unfavor-

able frequencies), the megawatt radar developed during World War Two may have been detected tens of light-years away. We have been making such a din that the neighbors can hardly have overlooked us, and I sometimes wonder when they will start banging on the walls.

Of course, if intelligent civilizations are so far apart that no *physical* transport between them is possible (as most scientists believe), then there would seem no objection to announcing our presence. As the old jingle puts it, "Sticks and stones can break my bones, but words will never hurt me." Some writers have argued that we should be thankful for the immense distances of interstellar space. Cosmic communities can talk to one another for their mutual benefit—but they can never do one another any harm.

However, this is a naïve and unrealistic view. Even if star travel is impossible (later we will give reasons for believing that, on the contrary, it is rather easy), "mere" communications could do a lot of damage. After all, this is the basis on which all censors act. A really malevolent society could destroy another one quite effectively by a few items of well-chosen information. ("Now, kiddies, after you've prepared your uranium hexafluoride. . .")

In any case, after a certain level of technical sophistication, it is meaningless to distinguish between the transfer of material objects and the transfer of information. Fred Hoyle, in his novel *A for Andromeda*, has suggested that a sufficiently complex signal from space might serve as the genetic blueprint for constructing an extraterrestrial entity. An invasion by radio sounds a little far-fetched—but it does not involve any scientific impossibilities.

I suspect that, once we had heard voices echoing between the stars, it would not be long before curiosity—or egotism—made us join the conversation. However, the task of framing suitable replies might be difficult. Naturally, we would present ourselves in the best possible light, and the temptation to gloss over unflattering aspects of human history and behavior would be considerable. Also—who would speak for man? It is easy to imagine our current ideologies proclaiming their rival merits to the heavens, and even a supercivilization might well be baffled by propaganda blasts based on the teachings of Comrade Mao.

Perhaps fortunately, the power and the resources needed to beam a profile of *Homo sapiens* across interstellar space are so great that a global, cooperative effort would be needed. Then, for the first time, mankind might speak with a single voice; and the problem of compiling the program might induce a certain humility.

After that, there would come the long wait for the answer. In the unlikely event that there is a civilization circling the very nearest star—Alpha Centauri—we could not receive a reply in less than eight years. It is more probable that the delay would be measured in decades, so any two-way conversations would be distinctly tedious. They would, in fact, be long-term research projects, with scientists receiving in their old age answers to questions they had asked in their youth.

Despite its unavoidable slowness, such conversation without contact would, over the centuries, have enormous and perhaps decisive effects upon human society. Quite apart from the technological leapfrogging already mentioned, it could produce knowledge of different races, patterns of thought and political systems that would completely change our philosophical and religious views. Are good and evil man-made concepts? Do other races have gods, and of what nature? Is death universal? These are a few of the questions we might ask of the stars, and some of the answers might not be to our liking.

Yet perhaps the most important result of such contacts might be the simple proof that other intelligent races do exist. Even if our cosmic conversations never rise above the "Me Tarzan—you Jane" level, we would no longer feel so alone in an apparently hostile Universe. And, above all, knowledge that other beings had safely passed their nuclear crises would give us renewed hope for our own future. It would help dispel present nagging doubts about the survival value of intelligence. We have, as yet, no definite proof that too much brain, like too much armor, is not one of those unfortunate evolutionary accidents that lead to the annihilation of its possessors.

If, however, this dangerous gift can be turned to advantage, then all over the Universe there must be races who have been gathering knowledge, and perfecting their technologies, for periods of time that may be measured in millions of years. Anything that is theoretically possible and is worth doing will have been achieved. Among those achievements will be the crossing of interstellar space.

Travel to the stars requires no more energy—demands no more of propulsion systems—than flight to the nearest planets. There are rockets in existence today that could launch tonnage pay loads to Alpha Centauri; however, it would take them about a quarter of a million years to get there—and Alpha, remember, is the very closest of our stellar neighbors. We will have to move a little faster.

But even at the speed of light (about 20,000 times greater than that of any space probe yet built), Alpha is still four light-years away—and it would take over

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100,000 years to cross the width of the galaxy.

Yet this does not prove, as many scientists have rashly argued, that interstellar flight is impossible. There are several ways in which it might be achieved, by technologies that even we can imagine and that might be within our grasp a few centuries from today.

It is highly probable—though not absolutely certain—that the velocity of light can never be exceeded by any material object. Star travel will thus be very time consuming; the duration of voyages will be measured in decades at the very least—more likely, in millennia. For such short-lived creatures as human beings, this would require multigeneration trips in totally enclosed, self-contained mobile worldlets (little Earths)—or, perhaps less technically demanding, some form of suspended animation.

There is another factor that is almost invariably overlooked in discussions of star travel. Our understandable doubts about the practicability and desirability of such ventures would not be shared by really advanced creatures, who might have unlimited life spans. If we were immortal, the stars would not seem very far away.

It is, therefore, quite unrealistic *not* to expect visitors from deep space, sooner or later. And, of course, a great many people—not all of them cranks—think that they are arriving right now.

UFOlogy is a can of worms into which I refuse to probe. Let us take the line of least resistance and assume that the strange apparitions whizzing through our skies are, indeed, of extraterrestrial origin, and that this is finally proved beyond all reasonable doubt.

The first result would be a drastic lowering of the international temperature; any current wars would rapidly liquidate themselves. This point has been made by numerous writers—starting with the late André Maurois, whose *War Against the Moon* suggested almost half a century ago that the only way to secure peace on Earth would be to manufacture a fake menace from space. A genuine one would be even more effective.

If, however, the E.T.s did nothing, but merely studied us like detached anthropologists, eventually we would resume our pastimes—including minor wars—though with a certain tendency to keep looking over our shoulders. Anyone who has observed the neat farms on the slopes of a volcano will agree that the human race has an astonishing ability to continue life as if nothing has happened, even when something very obviously has. We can be sure, though, that under the cover of normalcy, there would be heroic attempts by all the secret services and intelligence agencies to establish

contact with the aliens—for the exclusive benefit of their respective countries. Every astronomical observatory in the free world would be pelted with largess from the CIA.

Such a situation, though it might endure for a decade or so, could not be stable. Sooner or later, there would be a communications breakthrough—or else the human race would become so exasperated by the spectacle of Olympian indifference that an "Aliens Go Home!" movement would develop. Rude radio noises would eventually escalate to nuclear bombs, at which point the aliens either *would* go home or would take steps to abate the nuisance.

It has often been suggested that the arrival of visitors from space would cause widespread panic; for this reason, some UFO enthusiasts believe that the U.S. Government is keeping the "facts" concealed. (Actually, the reverse is nearer the truth: As one Pentagonian once remarked sourly, "If there really *were* flying saucers, all us majors would be colonels.") The world has become much more sophisticated since the far-off days of Orson Welles' famed radio broadcast. It is unlikely that a friendly or neutral contact—except in primitive communities or by creatures of outrageous appearance—would produce an outburst of hysteria like that which afflicted New Jersey in 1938. Thousands of people would probably rush to their cars—but they would be in a hurry to get to the scene of such a historic event, not to escape from it.

And yet—having written those words, I begin to wonder. It is easy to be calm and collected when discussing a theoretical possibility; in the actual event, one's behavior may be very different. Like any reasonably observant person who lives under clear skies, I have seen a good many objects that could have been taken for UFOs—and on just one occasion, it seemed as if it might be the "real thing." (No one will ever believe this, but I was with Stanley Kubrick, the very night we decided to make our movie.) I shall never forget the feelings of awe and wonder—yes, and fear—that chased one another through my mind before I discovered that the object was only Echo I, seen under somewhat unusual conditions.

No one can be sure how *he* would react in the presence of a visitor from another world. When the time comes to announce that mankind is no longer alone, those who prepare and issue the statement will have a truly terrifying responsibility. Though they will certainly try to sound reassuring, they will know that they are whistling in the dark.

It is impossible to guess at all the motivations that might drive E.T.s to visit our planet. Human societies have an almost unbelievable range of behavior, and totally alien cultures might act in ways quite incomprehensible to us. Any-



"Well, at least he's got them agreeing on something!"

one who doubts this should attempt to look at our own society from outside and imagine himself in the role of an intelligent Martian trying to understand what was really going on at a political rally, a chess tournament, the floor of the Stock Exchange, a religious revival, a symphony concert, a baseball game, a sit-in, a TV quiz program—the list is endless.

In a witty essay on "Extraterrestrial Linguistics," Professor Solomon Golomb of the University of Southern California has tried to make order out of chaos by suggesting that our neighbors might wish to deal with us under one or another of these headings: 1. Help! 2. Buy! 3. Convert! 4. Vacate! 5. Negotiate! 6. Work! 7. Discuss! And a famous short story of Damon Knight's has added 8. Serve! (Baked or fried.)

Yet even this rather comprehensive list assumes that "they" possess psychologies similar to ours and that we can make mental or at least physical contact. Some ingenious science-fiction writers have

argued that this may not necessarily be the case. In Olaf Stapledon's tremendous history of the future, *Last and First Men*, the Earth was invaded by microscopic creatures from Mars who formed a rational entity only when they coalesced into a kind of intelligent cloud. (If this seems farfetched, consider how many independently viable living cells go to form the entity you are pleased to call You.) Because Stapledon's Martians found it very exhausting to assume the solid state, they worshiped hard, rigid bodies and thus avidly collected diamonds and other gems, while ignoring the soft, semiliquid creatures who transported these sacred objects. They were aware of automobiles but not of human beings. Indeed, it has been suggested that any dispassionate observer of the United States would conclude that the automobile was its dominant life form.

It would be difficult to bridge such a psychophysical gulf; a similar one may already exist right here on Earth. 211

between man and such social insects as ants, termites or bees. Here the individual is nothing: The State is all, beyond the wildest dreams of any totalitarian dictator.

In extreme cases, we might not even be able to *detect* an alien species, except by rather sophisticated instruments. It could be gaseous, or electronic, or could operate on time scales hundreds of times faster or slower than ours. Even human beings live at different rates, judging by speeds of conversation, and there seems little doubt that dolphins think and speak much more rapidly than we do, though they are courteous enough to use slow-speed baby talk when we attempt to communicate with them.

I mention these rather far-out speculations not because I take them very seriously (I don't) but because they show the utter lack of imagination of those who think that intelligent aliens must be humanoid. Now, there may well be millions of intelligent humanoid races in the Universe, since ours appears to be a successful and practical design. But even if all the ingredients are exactly the same, and in approximately the same places, it would be exceedingly rare to find a humanoid alien who resembled a man as closely as does, say, a chimpanzee.

I would even go so far as to say that, from the cosmic viewpoint, *all* terrestrial mammals are "humanoid." They all have four limbs, two eyes, two ears, one mouth, arranged symmetrically about a single axis. Could a visitor from Sirius really tell the difference between a man and, for example, a bear? ("I'm terribly sorry, Mr. Prime Minister, but *all* humanoids look the same to me. . . .")

Even if we restrict ourselves to the sense organs, and manipulators, with which we are familiar on Earth, they could be arranged—and, equally important, used—in an enormous variety of ways, to produce effects of astonishing strangeness. The late Nobel laureate Dr. Hermann Muller expressed this very well in his phrase: "The Bizarreness of the Right and Proper." An alien, he pointed out, "would find it most remarkable that we had an organ combining the requirements of breathing, ingesting, chewing, biting and, on occasion, fighting, helping to thread needles, yelling, whistling, lecturing and grimacing. He might well have separate organs for all these purposes, located in diverse parts of his body, and would consider awkward and primitive our imperfect separation of these functions."

Even judging by the examples on our own world, where all life is based on the same biochemical system, the ingenuity of nature seems almost unlimited. Consider the nightmare shapes of the deep sea, the armored gargoyles of the insect world; we may one day encounter rational creatures in forms analogous to all of these. And, conversely, we should not

be misled by superficial resemblances; think of the abyss that separates the sharks from their almost-duplicates, the dolphins. Or, nearer home, that which tragically divides the sundered children of Abraham today. . . .

So, beyond doubt, physical shape is unimportant compared with motivation. Once again, because of our blinkered human viewpoint, we cannot extend our ideas much beyond Dr. Golomb's not-altogether-facetious list of directives. Now, although everything that is conceivable will occur at least once in our galaxy of a hundred billion suns, some of these categories seem more likely than others. The insanely malevolent invaders beloved by the horror comics have, perhaps, the least plausibility—if only because they would have destroyed themselves long before they got to us. Any race intelligent enough to conquer interstellar space must first have conquered its own inner demons.

Moreover, there seem few grounds for cosmic conflict—even if it were technically possible. It is hard to see what attractions our world could offer visitors from space; since their physical forms and requirements would be totally different from ours, it is very unlikely that they would be able to live here.

There are no material objects—no conceivable treasures or spices or jewels or exotic drugs—valuable enough to justify the conquest of a world. Anything we possess, *they* could manufacture easily enough at home. For imagine what *our* chemists will have done a thousand years from now.

There may, of course, be entities who collect solar systems as a child may collect stamps. If this happened to us, we might never be aware of it. What do the inhabitants of a beehive know of their keeper?

That may be an analogy worth pursuing. Men do not interfere with bees—or wasps—unless they have very good reasons: As far as possible, they prefer to leave them alone. Though we possess no better weapons than 100-megaton bombs, we are not entirely defenseless, and even an advanced supercivilization might think twice about tangling with us.

If *they* were desperate—if, for example, they were the last survivors of an ancient race whose mobile worldlet had almost exhausted its supplies after eons of voyaging—they might be tempted to make a fresh home in our Solar System. But even in that case, cooperation would be to their advantage—and to ours. Since they would probably be able to transmute any element into any other, there is no reason they should covet Earth. The barren Moon and the drifting slag heaps of the asteroid belt would provide all the raw materials they needed—and the Sun, all the energy. Our planet intercepts only one part in two billion of the radiation pouring from

the Sun, and we actually utilize only a minute fraction of that. There is matter and energy enough in the Solar System for many civilizations, for ages to come.

Unfortunately, our past record does not give too much hope for peaceful coexistence. As such writers as Robert Ardrey have stressed, much of human (and animal) behavior is determined by the concept of "territoriality." The landowner who places a sign on a piece of private wilderness announcing that *TRESPASSERS WILL BE PROSECUTED* speaks for his entire species. If some inoffensive visitors began to colonize the frozen outer moon of Jupiter, there would be angry voices proclaiming it sacred soil, and retired generals would warn us to keep our lasers dry and not to fire until we could see the greens of their eyes.

All of which leads to a conclusion that may not be very original but whose importance cannot be overstressed. Everyone recognizes that our present racial, political and international troubles are symptoms of a sickness that must be cured before we can survive on our own planet—but the stakes may be even greater than that.

Though it is impossible to guard against all the eventualities that the future may bring, if we can learn to live with ourselves, we will at least improve our chances of living with aliens. And the word "ourselves" should be interpreted in the widest possible context—to embrace, as far as practical, *all* intelligent creatures on this planet. At the moment, in a paroxysm of greed and folly, we are exterminating the last survivors of the largest animal this world has ever seen. Only a few eccentrics have felt any twinges of conscience over the fact that the brain of a blue whale is larger than a man's, so that we do not know what kind of entity we are really destroying.

It is true that our aggressive instincts, inherited from the predatory apes who were our ancestors, have made us masters of this planet and have already propelled us into space. Without those instincts, we might have perished long ago; they have served us well. But, to quote King Arthur, "The old order changeth, yielding place to new. . . . Lest one good custom should corrupt the world."

We have the intelligence to change, or at least to control, the atavistic urges programed into our genes. Though it may seem a paradox and a denial of all past history, gentleness and tolerance may yet prove to have the greatest survival value when we move out into the cosmic stage.

If this is true, let us hope that we have time to cultivate these virtues. For the hour is very late and no one can guess how many strange eyes and minds are already turned upon the planet Earth.

