

Intelligent Life in the Universe?

Catholic belief and the search for
extraterrestrial intelligent life



by Br. Guy Consolmagno SJ



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for extraterrestrial intelligent life**

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THE HUNCH

I have a hunch... I can't prove it, I can't be sure I'm right, indeed I could well be wrong, but still... I have a hunch that, sooner or later, the human race will discover that there are other intelligent creatures out there in the universe.

Part of my reason for that hunch is scientific: there are already hundreds of nearby stars that we know have planets, and there are so many billions of other stars waiting to be explored in our galaxy, and so many billions of other galaxies (each with billions of stars) in the visible universe... surely, somewhere in that number, there must be other civilized, rational beings.

Part of my reason for that hunch is not scientific at all, but just a comfortable familiarity with the idea of "aliens" from a lifetime of reading science fiction. (Perhaps too much science fiction, some might say.)

And part of my reason is simply aesthetic: I am not the first astronomer, nor the first religious believer, to see the amazing panoply of the stars in the sky at night and intuit that God's fecund creativity couldn't possibly just stop with us.

It's a hunch.

But the first and most important fact we have to confront in the whole question of "extraterrestrial intelligence" is this: *we don't know*. Of all the planets

we've found orbiting other stars, it's not clear if any of them are suitable places for life as we know it. On none of them, nor indeed anywhere closer to us in our own Sun's system of planets, have we ever found evidence that completely, uncontrovertibly, proves life originated in some place other than just here on Earth. As far as we know for sure, we could be alone.

And so that means that everything else we can say about extraterrestrial life, indeed almost everything in this booklet, is speculation and guess-work. Certainly, some of it will turn out to be wrong. Possibly, all of it is wrong. *We don't know.*

So why do we even bother speculating about such a topic?

Well, for the same reason that you've picked up this booklet in the first place.

Because human beings have always found the topic somehow fascinating.

Indeed, stories and speculations about races and beings other than human are as old as story-telling. Ancient Greek and Roman myths were populated not only by gods, heroes, and demons, but by any number of strange and monstrous beings. Lucian of Samosata in AD 160 wrote perhaps the first tale of travel to the planets, and he imagined various alien races living and warring there. As we will see, even the Bible talks about non-human intelligent beings, created by God.

But there's more value to this pondering than just indulging our fantasies by thinking about extraterrestrial life. Imagine you were born and raised on a desert island that had only one tree. You'd be hard pressed to appreciate just what a "tree" was. Would you think that all trees had palm leaves and coconuts? If you were then transported to Britain, would you be able to recognize that firs or oaks were trees as well? Most of us have experienced how traveling to another city, or another country, can make us recognize and appreciate the things we take for granted at home. In the same way, thinking about "aliens" is a good way to understand, and appreciate, what it means to be human.

I have to recognize that there is another reason why a lot of people are hungry to be visited by alien beings. Seeing a world full of pain, full of disease and warfare, injustice and poverty, they hope that somehow any race advanced enough to cross the vast distances between the stars and visit us must also be advanced enough to know how to overcome all those human problems. They look to The Aliens to be the saviours of humankind.

On that score... well, again I have only my hunches to play. But my hunch is not too sanguine. Consider the fate of the alien in the classic science fiction movie *The Day the Earth Stood Still*, who came to Earth exactly to help humankind. (It's not a happy ending.)

And after all, haven't we already had a Saviour visit Earth? And look what happened to Him.

(The makers of that movie appreciated the parallel; to make the connection with Jesus all the more obvious, they even had the alien call himself "Mr Carpenter".)

But this also highlights perhaps the deepest value of contemplating, and speculating, about life elsewhere in the universe. Looking at this topic from a religious perspective adds a new dimension to our own understanding what it means to be in a relationship with God.

Appreciating God as the Creator of a universe big enough to contain those billions and billions of galaxies and stars makes us realize just how immense God's infinity must be. Asking what it would take for an "alien" to have something like a "soul" forces us to confront just what we mean when we use that word. Speculating on how Christ's salvation could apply to other beings is a wonderful way to appreciate anew what that salvation means to us humans.

But we must never forget that what we are doing is indeed appreciation, contemplation, and speculation. It isn't science; not yet. Maybe, not ever. It isn't theology, either. It's science fiction, or fantasy, or poetry. It's great fun... precisely because, in fact, *we don't know*.

“TRUTH DOES NOT CONTRADICT TRUTH”

If we don't know for sure just yet if extra-terrestrial beings exist, when will we know?

What are the odds that we will ever find out? To understand the likelihood that there might be “aliens” elsewhere in the universe, we will want to examine just what astronomy does tell us about this universe. But before we go there, we should remind ourselves of just how the Church feels about spending so much time and effort studying the physical universe.

Is science dangerous to our faith? Doesn't a preoccupation with things off the Earth merely distract us from problems closer to home or from our own spiritual journey?

Some people may be surprised to learn that, in fact, the Catholic Church not only encourages the scientific study of universe, but it even supports its own astronomical observatory. The Vatican Observatory's telescopes sit on the roof of the Pope's summer home in Castel Gandolfo, Italy, and more recently it's also built a new advanced technology telescope on a mountain top in the dry, dark skies of Arizona.

I know the Vatican Observatory intimately. I work there. I study comets and asteroids through these telescopes, and I do experiments with the Vatican's

collection of meteorites - rocks from space - which is one of the world's largest collections. I'm a religious Brother, a member of the Society of Jesus, but I also have advanced degrees in planetary science from MIT and the University of Arizona. And I am just one of a dozen Jesuit astronomers doing this work. Indeed, Jesuits have been engaged in astronomy since before Galileo.

About Galileo... well, like any group of scientists, we haven't always gotten it right.

But the painful, and well-acknowledged, mistake that the Church made in trying to silence Galileo is all the more stark when contrasted with the many more numerous times and places where Church-supported astronomers did get it right. Pope Gregory XIII used astronomy to reform the calendar in 1582. Seventeenth-century Jesuits invented the reflecting telescope and the wave theory of light. In the 18th century they ran a quarter of all the astronomical observatories in Europe, and their missionaries ran most of the observatories outside Europe: their measurements helped determine the size of the solar system. In the 19th century, the Jesuit priest Angelo Secchi was the first to classify stars and planets by their color spectra, turning "astronomy" into "astrophysics." And it was the 20th-century priest (though *not* a Jesuit, he was quick to point out!) Georges Lemaître who suggested that the universe began in a kind of cosmic explosion that came to be called the "Big

Bang" theory. Modern astronomy is fundamentally based on Church-supported astronomy.

Why would the Church be interested in astronomy? Certainly, one reason is that the study of Creation is a way of knowing the Creator God. In the very first chapter of the *Letter to the Romans* St Paul insists that God is revealed to us in the things He has created (*Romans* 1:20). In this he was echoing a long Jewish tradition that "The heavens proclaim the greatness of God" (*Psalms* 8).

But Christianity, says St Paul, was adding something new: "For God was in Christ, reconciling the world to himself." (2 *Cor* 5:19) St Athanasius emphasized that because of the Incarnation, this physical universe which Jesus adopted as His own has as a result become sacred, "cleansed and quickened." St Augustine argued against the heresies of the Manicheans by insisting that a Good God could only create a Good Universe.

The Irish monk Johannes Scotus Eriugena in the early middle ages included a lengthy description of the solar system based on Greek astronomy as part of his theological treatise *Periphyseon, on the Division of Nature*. He wrote: "Divine Authority not only does not prohibit the investigation of the reasons of things visible and invisible, but even encourages it... it is no small step, but a great and indeed profitable one, from the knowledge of the things we can touch to the understanding of the things we understand in our mind. For just as through our

senses we arrive at understanding, so through what has been created do we return to God.”

The emphasis in all these examples is on the importance of the physical universe. Rather than insisting that people should “reject” the world of the body and concentrate only on “spiritual” matters, Christianity explicitly embraces the body.

This has had a crucial effect on the whole of Western culture. As the historian of science (and Benedictine priest) Stanley Jaki has pointed out, worshipping a Creator God gave the followers of Judaism, Christianity and Islam the motivation, and the justification, for studying creation itself. Thus in these cultures (in contrast to the equally advanced cultures of India and China, for example) the study of the physical sciences - including engineering and medicine - flourished. As G. K. Chesterton put it (in *A Short History of England*), “a mystical materialism marked Christianity from its birth; the very soul of it was a body. Among the stoical philosophers and oriental negations that were its first foes it fought fiercely and particularly for a supernatural freedom to cure concrete maladies by concrete substances.”

By the time of the late middle ages, when the Church organized the first universities, astronomy was one of the subjects taken as a part of the *quadrivium*, a three-year course of study (comprising music, arithmetic, geometry

and astronomy) to be mastered before one was admitted to the study of theology or philosophy. Following the lead of Aristotle, who considered physics and metaphysics as part of a unified whole, astronomy and the other subjects that we now consider to be physical sciences were classified as a part of natural philosophy.

If the Church made a terrible mistake in censoring Galileo, it was only because it recognized that knowing the way the universe was organized does indeed affect the way that we think about God. The trouble in the Galileo case was that the Church (or at least, certain elements in the Church) were afraid of where these new ideas could lead.

It was a failure of nerve. A faith that is afraid of truth, has no faith. St Thomas Aquinas would have blushed; the whole point of his work, four hundred years before Galileo, was that the then-newly rediscovered ideas of Aristotle and the other Greek scholars posed no threat to Christian dogma, and indeed the truth to be found in these secular philosophies could only affirm a God who was himself “the Way, the Truth, and the Life.” He particularly rejected the assertion of the Islamic scholars who suggested there might be one sort of truth for science, another sort for religion.

St Thomas Aquinas’ insight has been brought forth to the present day. Pope John Paul II, speaking in 1996 before the Pontifical Academy of Sciences (a group of

120 distinguished scientists gathered by the Vatican from around the world, including both believers and non-believers), put it most succinctly in the title of his talk: *Truth Cannot Contradict Truth*.

On the occasion of another Pontifical Academy of Science study week, sponsored by the Holy See and held at the Vatican Observatory in 1987, John Paul II provided another insight into why the Church should be interested in science... and vice-versa. He wrote, "Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes."

It is in this spirit that we explore the heavens, asking our speculative questions about other Creations of God that might, or might not, be found there. What we find in our science should never be mistaken for a false absolute. But we should be free to embrace what we find, as a way of deepening and sharpening our own reflections on the One who created the things we study. We can only find the shape of the things we don't know by trusting in what we do know, thanks to both our science and our faith.

THE SCIENTIFIC SEARCH FOR LIFE OUTSIDE EARTH

What, if anything, can science tell us about the existence of alien life in the universe? We can speculate about many possibilities, but it is important first to make clear what we do know, what is not speculation.

Intelligence exists in at least one place: here on Earth. And it exists in at least one form: in the human animal. So, if we could find any other places where life like human life could grow and survive, those would be likely places to look for intelligence. (Maybe they won't be the only places to look; but surely, such planets should be the first places to try.)

What do we need for life? At a bare minimum, we need food and shelter: the fuel to provide the energy for life, and protection from all the different things that could interfere and kill that life.

The energy of life as we know it, is chemical energy, specifically the energy available in some very complicated chemicals based on the element carbon but also including water and nitrogen as essential ingredients. Everything that animals on Earth consume are carbon-based "organic" chemicals (plus water, and a little salt). Liquid water, in particular the salty water of the oceans, provides an ideal medium for all this chemistry to take place.

To make the chemical reactions “go”, to put the energy back into the chemicals once they’ve been eaten (and turned into... well, fertilizer), you ultimately need an outside source of energy. On Earth, there are two known sources of this energy. Sunlight powers plant life on the surface of the Earth and thus, indirectly, provides the energy as well for everything that eats those plants, or eats the plant-eaters. In the deep oceans, we also find various odd life forms that take some of their energy from the chemicals emitted by undersea hot springs boiling off volcanoes on the ocean’s floor. (Even there, though, it may be that an essential part of the chemical chain is free oxygen carried down to the depths from the surface of the ocean, where it was produced by plant life exposed to sunlight.)

The things that kill life are many and varied. Extremes in temperature, too hot or too cold, can disrupt the chemistry of life. (That’s another reason why liquid water is a good tracer for life. Boiling water is generally too hot for life, and frozen water too cold.) Extreme radiation, like the cosmic rays and ultraviolet radiation emitted by energetic stars, will also disrupt living cells.

Breaking the energy chain can starve life to death. For instance, if an impacting comet (or a nuclear war) covers the Earth with a thick layer of dust, this would cut off sunlight to the surface, stopping the plant life, and starving the animals that feed on those plants, or feed on

those animals. (And, of course, once you have plants and animals on a planet, they do tend to feed off each other... sometimes, to the point of extinction.)

Thus, a convenient place in the universe to grow life is on the surface of a planet, orbiting a star. The planet should have an atmosphere (and maybe, a magnetic field) to deflect the worst of the cosmic and ultraviolet radiation from space. It should have liquid water on its surface, which means that it must be in a situation that provides for a relatively constant temperature. This means that its star should be stable, not varying in brightness or given to emitting irregular bright flares, as some stars do. And the planet's orbit around the star should be at a relatively constant distance, at just the right distance so that the starlight hitting the planet and the atmosphere capturing that light interact (in a very complicated way) to allow most of the surface of that planet, most of the time, to be a place where liquid water can exist.

Obviously, Earth is such a place. Obviously, there is life on Earth. And obviously, we can't draw any strong conclusions from this coincidence: if life were not here, we wouldn't be here to comment upon the fact!

So the real question is, are there many other places like Earth in the universe? And how many of them have life? This, at least, would let us know if life is common and inevitable, or rare and unlikely.

The first obvious place to look are the other planets in our own solar system, the planets orbiting that star we call The Sun.

The Moon would seem to be a likely candidate. It follows the Earth around the Sun, orbiting at the same distance, so presumably if it had a similar atmosphere then it too could have similar conditions for life. Alas, it is clear from looking at the Moon through a telescope that it has no atmosphere or water. Indeed, the Moon rocks brought back by the Apollo astronauts confirm that the Moon's chemistry is significantly different from Earth in at least one important respect: not only is there no water there today, but apparently the Moon rocks never saw any water. (Why is the Earth wet but the Moon dry? We're still arguing about that one.) So the Moon is not a likely place to look for life as we know it.

The next most likely places to look for life are our neighbor planets, Venus and Mars. Venus, covered with thick clouds, seemed like a good possibility until our telescopes and space probes were able to explore the planet more closely. It turns out, the atmosphere is thick with carbon dioxide which traps the heat from the Sun and turns the surface temperature to an unlivable 700 degrees. And those clouds are made of droplets of deadly sulfuric acid. It is hard to see how life could survive in those conditions; indeed, our best space probes can't survive for even an hour on the surface.

(And yet, at least one scientist has speculated that up in those acidic clouds - which are high enough above the surface of Venus to be as cool as Earth - perhaps some strange form of acid-eating microbes might be found. *We don't know.*)

Mars, on the other hand, has an atmosphere that seems to be too thin and too cold for life. Any water on its surface must be frozen today. And if it did heat up, the air is so thin that any ice there would all evaporate before it had a chance to melt into a puddle. Its thin air, and lack of magnetic field, also mean that the surface of Mars is not well protected against ultraviolet or cosmic rays.

But, again, that may not be the whole story. Certainly, looking at the surface of Mars from our orbiting spacecraft, we see features that look like dried-up river channels. The surface apparently was once wetter and warmer than it is today. Could it have had life in the past? The most recent probes to Mars indicate that there is a lot of water frozen just below the dusty surface, and indeed there are traces of chemicals in its atmosphere that suggest the possibility that microbes of some sort could be living underground, protected from the harsh surface conditions, even today. It is possible. *We don't know.* Stay tuned!

With even our closest neighbors being either, like Venus, too hot, or like Mars, too cold, you would expect any other planet in our solar system to be even less hospitable for life. But the other planets can't be ruled out

quite so quickly. Jupiter is a huge ball of gas, so big that it generates heat inside just from the compression of that gas under its own weight. It also is covered with colorful clouds, whose temperature and pressure (thanks to that compression) are within the range of liquid water. Conceivably, microbes could be hiding in those clouds - maybe even providing their colors.

Even a better hiding place for life, however, might be inside the moons that orbit Jupiter. We've known for a long time that three of the biggest Jovian moons - Europa, Ganymede, and Callisto - are balls of rock and ice. The surfaces of these moons are airless and frozen, hundreds of degrees below zero. But a number of different mechanisms can heat up the insides of these moons, apparently enough to melt the ice some tens to hundreds of kilometers below the frozen surface. Deep below the ice, the melted water may well be in contact with hot springs and lava from a hot rocky core. Remember the life forms I mentioned, deep in Earth's oceans, that live off volcanic chemicals coming out of hot springs? What's to say that there could not also be similar creatures deep inside Europa or the other moons?

(Pardon me while I brag: life in the melted interiors of these icy moons is an idea that I was the first to suggest in print, in my thesis at MIT back in 1975. Of course, since then the details have been worked out by other scientists in far greater detail than I could do at that time.)

And none of this even touches on the more exotic possibilities, for instance that some strange life could flourish in the liquid-methane rivers and lakes of Saturn's moon Titan, seen by the space probe that landed there in early 2005. We know so little about life anywhere that it would be premature to rule anything out.

But, remember, though life may be possible in all of these places, actually finding that life will be very difficult, given our current technology. Even though there are several places in our own solar system where life *might be* found, only on one place, planet Earth, has it actually been found so far. We can't tell yet if life is common, or rare. We don't know.

Beyond our own solar system, in the past ten years we have finally begun to discover evidence of planets orbiting other stars. For the most part, this evidence is indirect: we see the stars wiggling back and forth as if they were being pulled by orbiting planets, or we see their light dimming slightly, on a regular basis, implying a planet orbiting between it and us. The limits on how we search, impose limits on the kinds of planets we can find. We have not found any Earth-like planets yet; but our detection tools to date are so crude that we would not expect to be able to see them even if they were there.

The fact that we see any planets at all, given the crudeness of these tools, is significant, however. Over a hundred such planetary systems have already been

detected. At the very least, some ten percent of the stars where we've looked have shown us that they have the kinds of giant planets that we are capable of seeing.

Could those giants have cloud-dwelling microbes, or their own icy moons with sub-crustal oceans teeming with life? Who's to say? Again, it all depends on the one crucial question: given the right conditions, how likely is it that life will arise? And so far, science does not have an answer to that question.

Indeed, one of the great questions of astrobiology is, how did life arise out of non-living chemicals? Again, the only scientific answer we have to date is: we don't know. (To say merely "God did it" is no help. Science wants to know: *how* did God do it?)

Given these uncertainties, some people argue life is inevitable; others, that it is quite rare. We don't know.

But even if it turns out to be rare, how rare would it have to be, to not exist anywhere else but on Earth? We've already found planets around plenty of stars. And we've only looked at stars nearby, within 50 light-years of Earth. But our galaxy is a hundred thousand light years across; there are a billion stars in it, most of them out beyond where we can search with our present techniques. And our galaxy is not the only galaxy in the universe. Even just counting the galaxies close enough to us to be seeable in our telescopes, it is estimated that there are more than a hundred billion galaxies in the visible

universe! That means there could be something like 100,000,000,000,000,000,000 stars with planets out there. Life would have to be very rare indeed, if it turns out that we're really all alone.

Note a couple of things about this calculation, however.

By expanding the search for life to places far beyond our own solar system, we can greatly increase the odds that life might be present; but at the same time, we also increase the odds that such life will be physically so distant from us that we'll never know about it, much less be able to communicate with it. When we say that a star is five, or fifty, or five thousand light years away, we are saying that any signal we send there will take five, or fifty, or five thousand years to arrive. And the response would take just as long to get back to us. That kind of time lag makes it hard to get a good conversation going.

These time lags apparently aren't the fault of limits in today's technology, or even a comment about the limits on our current understanding of physics. It appears to be a fundamental characteristic of how the universe works. Without going into the details (it'd take another book!), if there were some way - "worm-holes" or "warp speed" or any other science fiction gizmo - that allowed one to communicate at faster than the speed of light, then we can show that eventually it would be possible to violate one of the most basic, common-sense laws of the universe:

causality. In such a universe, it would be possible for an effect to occur *before* the cause.

That would imply that everything we have deduced about how the universe works, is wrong... always a possibility, but not all that likely. Will our understanding of quantum simultaneity change enough in the future to overcome the contradiction? And how much faster might communication become? We don't know. But in the meanwhile, don't hold your breath; I don't expect it to happen soon. Until it does, we are stuck with the fact that it is impossible to converse with most of the universe, over a human time scale.

Another thing to note is that up to now all we've talked about is "life as we know it."

We can speculate about life as we *don't* know it, but we can't talk scientifically about it because, by definition, we don't know what we'd be talking about.

Indeed, once you go beyond the well documented case of terrestrial organic chemistry, you even have a hard time defining what exactly you mean by life. There are probably more definitions of life out there than there are scientists doing the defining. It is ultimately a philosophical, not a scientific question... but it's one with serious scientific implications. Once you have found something suggestive, what evidence will be sufficient to convince the rest of us that indeed it is life?

That's already come up, several times, as people have announced very suggestive findings of interesting traces in meteorites... those rocks that occasionally fall from space onto the surface of the Earth.

One of the most interesting cases was a meteorite discovered in Antarctica in 1984, believed to have come from Mars, that twelve years later was discovered to have microscopic forms, trace chemistry, and even tiny crystals all consistent with the presence of fossilized life. Any one of these bits of data would have been accepted as the result of life, if they had been found in a terrestrial rock. But hardly anyone in the field thinks that they came from life on Mars. Why not? Well, there are certainly non-life processes that could produce all these effects. And they are sufficiently different from what you'd see in an Earth rock to create a reasonable doubt.

But mostly, I suspect, it is because finding life on another planet would be such an important discovery that you really want to be sure you've got it right, before you believe it. And that "really sure" criterion is not scientific at all. It's aesthetic, intuitive, a "gut feeling." A hunch. And it's a hunch I have to trust. Given our experience, trusting such intuitions is probably right. But it's not certain. *We don't know.*

THE NATURE OF KNOWLEDGE

In understanding or interpreting what we know, be it in Science or in the Bible, it is important to recognize that, in the final analysis, all language and all explanation, whether Biblical or scientific, is by analogy.

Certainly science explains and describes by analogy. When we lack good metaphors, we are lacking an essential tool for doing science. That's one reason why we speak here of "life as we know it"; it is difficult to talk about "life as we *don't* know it" since, by definition, we don't have the words to describe it.

Even a scientific equation is a metaphor for the behavior of an entity in nature. No equation is ever a perfect description, but rather an approximation of reality that is always simplified and incomplete. This means that science never gives us absolute, complete knowledge of the truth. That's not a criticism of science, but rather a recognition of what it really is, and what it is supposed to do.

It is its very simplifications that makes science useful. For example, to describe the motion a falling rock, science determines that it can neglect many specific things about a given falling rock - its shape, the time of day, the eye colour of the person watching it fall, and so

forth - if all we want is a “good enough” description of how long it will take before it lands. For that, all we need to know are its velocity and position and the forces acting on it. Of course, what our description needs to include, depends deeply on how good is “good enough.” That can change a lot, depending on what you’re wanting to do with the description. Some times those other things actually aren’t negligible: for example, the shape of a falling pebble in a strong wind may produce non-negligible frictional forces that affect its path. Indeed, in quantum mechanics the nature of the observers (if not the colours of their eyes!) can in fact affect the outcome of the experiment. In such cases, the scientific description then needs a more complicated, but less generally applicable, set of equations.

Our inability to describe anything except by analogy is especially evident in any bit of writing trying to express something as ineffable as love, or beauty, or joy. To really be able to communicate these concepts, we must write poetry. A love poem is far better way to tell my beloved how I feel than a clinical description of my pulse rate and skin temperature.

The ancients knew this. The oldest recorded pieces of literature are poems... the *Iliad* and the *Odyssey*, the *Psalms*.

Even technical, non-poetic writing is subject to these limitations. The Greek historian Herodotus pointed out

that the essence of history was not the dry recording of events but rather the selection of which events actually mattered (just as the science selects the important characteristics of a falling rock) and the interpretation of why those events were important. A videotape is not science, nor history. Only the human interpretation of the events (whether recorded or not by a video tape!) constitutes human intelligent understanding of those events. And different historians can, and will, have different interpretations. Thus in the Old Testament itself you find the same bits of the history of the Jewish people recorded more than once, with different interpretations. And in the New Testament you find a different selection of what events in the life of Jesus are recorded by John compared to those recorded by Luke or Mark.

It should be no surprise that our finite human words taken literally must always be inadequate to describe God. Instead we use not one but many different metaphors to try to sketch out a representation of who He is and how He has interacted with us. Even in the first few chapters of *Genesis* we see many such metaphors: God as a wind blowing across the waters, God who speaks and moves and separates things, God as someone who walks in a garden with us. Elsewhere, the Bible describes God as a burning bush and a small, still voice.

And each metaphor, while conveying some important insight about God, colours that insight with unintended

connotations. Indeed, to refer to God with a gender-specific pronoun, either “He” or “She” as English forces us to do, is an example of how the limits of human language unintentionally color the metaphors we use to express God’s personhood.

That is why the earliest Church fathers emphasized over and over that the Scriptures must be interpreted, not taken as simple descriptions. The very first Christian theologians, people like Origen and St Gregory of Nyssa writing in the third and fourth centuries, saw Biblical narratives as metaphors that expressed theological principles, not a substitute for a textbook.

We must recognize that the Bible is divine science, a work about God. It does not intend to be physical science. Eight hundred years after St Augustine, St Thomas Aquinas reiterated that Scripture passages referring to God as having a hand or a breath must be taken metaphorically, noting that without such metaphors we would have no way of speaking about God. But then he goes on to say: “... the philosopher and the faithful Christian consider different points about created things: the philosopher considers what attaches to them in their proper nature: the faithful Christian considers about created things only what attaches to them in their relation to God, as that they are created by God, subject to God, and the like... Hence it is not to be put down as an imperfection in the doctrine of faith, if it

passes unnoticed many properties of things, as the configuration of the heavens, or the laws of motion.” (*Contra Gentiles*, Book 2)

In other words, the Bible tells us nothing about the “configuration of the heavens” nor should it be faulted for not doing so, any more than you should expect to find instructions in the Bible for how to program your video machine.

Our Catholic faith teaches us that the Bible is written by human authors with human limitations. It is not “dictated word for word” by God unlike what the Muslims believe, for instance. That’s why we’re free to translate the Greek or Hebrew or Aramaic original texts into different languages (while Muslims read the Koran in Arabic).

In *Genesis* we find two different cosmology stories, presumably written by two different human authors in different times and places. Whoever wrote *Genesis* Chapter 1 apparently took the best science of the day, the cosmology of the Babylonians, but added something new. Taking for granted that the world was made in the way those Babylonian scientists described it, the author insists that was done *by a deliberate loving action of God*. It is this new point, the role and attitude of God, which is important to the author of *Genesis*.

The second creation account, the story of Adam and Eve in the Garden found in Chapter 2, focuses not on the

“how” of how animals and people arose, but on the relationship of those creatures with respect to God. It is a relationship, says the author, based on God’s love, which is so strong that it is not broken even by the doubts and misdeeds of his creatures.

However you picture the universe being created, says *Genesis*, the essential point is that ultimately it was a deliberate loving act of a God who exists outside of space and time.

In *Genesis* 1:6 to 1:10 the world is described as earth and ocean sitting under a dome, with waters above the dome and below the earth. By the time of Christ, the understanding of the universe was that the Earth was a sphere surrounded by other spheres (see C. S. Lewis’s book *The Discarded Image*). That these are very different pictures of the universe didn’t seem to bother anybody at that time. Both Jewish and Christian believers understood that the Bible was talking about God and the history of salvation, not about planets.

St Augustine, writing around the year 400, was taken by how *Genesis* sees life arising out of the waters and the Earth. In *De Genesi ad Litteram* (“On the Literal Meaning of Genesis”) he argued, 1400 years before Darwin, that in the universe “there was invisibly present all that would later develop... not only sun, moon, and stars... but also the beings which water and earth produced, in potency and in their causes before they came

forth in the course of time.” And all of this, including time itself, was the creation of God. Note that, to St Augustine, “literal meaning” meant the meaning that the author intended, not the meaning read into the words by someone encountering them, out of their cultural context, thousands of years after they were written.

Even Cardinal Bellarmine, writing in 1615 against Galileo’s opinion that the Earth goes around the Sun, admits, “if there were a true demonstration that the sun was in the center of the universe and the earth in the third sphere, and that the sun did not travel around the earth but the earth circled the sun, then it would be necessary to proceed with great caution in explaining the passages of Scripture which seemed contrary, and we would rather have to say that we did not understand them than to say that something was false which has been demonstrated.”

Today, realizing that St Bellarmine’s understanding of astronomy was wrong, we nonetheless appreciate that his understanding of theology was correct. And the most important thing to realize is that our own understanding is always incomplete. It is crazy to underestimate God’s ability to create in depths of ways that we will never completely understand. It is equally dangerous to think that we understand God completely.

Whenever I find any new knowledge that seems to contradict what I thought I knew before, whether in the field of religion or the field of science, what I usually

discover is that both bits of knowledge are true, but the real truth encompassing both is deeper and richer and more complex than either one alone would indicate. To cite again Pope John Paul II: truth does not contradict truth. What *Genesis* says about creation is true. God did it; God willed it; and God loves it. When science fills in the details of how God did it, science helps us get a flavor of how rich and beautiful and inventive God really is, more than even the writer of *Genesis* could ever have imagined.

It might even include other planets with other beings created by that same loving God.

OTHER INTELLIGENCES IN THE BIBLE

Nothing in our science tells us that life elsewhere in the universe, even intelligent life, is impossible. But is this consistent with what we know of God's creation, as described to us in Holy Scripture?

It's surprising how many people who think they know what the Bible says, seem to have never actually read that book! While it is true that the Bible is specifically the history of God's interactions with us humans, it by no means rules out the existence of other intelligent creatures besides humans. This can be found both explicitly, and implicitly: both in what the Bible says directly about other creatures, and what it implies in the way it talks about creation.

First, and most importantly, the Bible makes clear the God is the God and Creator of the entire universe, not just of Earth. And God is outside the universe, beyond space and time. From the opening words of *Genesis*, "In the beginning," God is already there. This is emphasized in the *Psalms* and other hymns that praise God as the Lord of the heavens. It is also emphasized in a special way in the opening of John's Gospel: In the Beginning, the Word was already present.

God created us, humans. But we are not the only creatures that God created.

There are, unquestionably, non-human intelligent beings described in the Bible. At least one famous group of such creatures are familiar to us all. They are in a relationship with God; they are capable of Good and Evil; and they are most certainly not human. They're called angels.

Other heavenly beings come up several times in the Psalms. For example, look at the beautiful passage in *Psalms* 89 that calls out, "Let the *heavens* praise your wonders, O Lord, your faithfulness *in the assembly of the holy ones*. For *who in the skies* can be compared to the Lord? *Who among the heavenly beings* is like the Lord? ... The *heavens* are yours, the earth also is yours; the world and all that is in it - you have founded them." Likewise, God asks Job (38:7) if any human can claim to have been around at the creation, "when *the morning stars* sang together and *all the heavenly beings* shouted for joy."

Are these "heavens," "holy ones," those "in the sky," the "morning stars... and heavenly beings" more references to angels? Or do they refer to some other kind of life beyond our knowledge? It doesn't really matter. The point is, in the Bible there are more than just humans who worship God.

And these are not the only non-human intelligent creatures mentioned in the Bible. There's that odd, and mysterious, passage at the beginning of *Genesis*, Chapter 6, that describes the "sons of God" taking

human wives. With it is a frustratingly oblique reference to “The Nephilim... the heroes that were of old, warriors of renown.”

Most Biblical scholars suggest that the Nephelim and the Sons of God in *Genesis* can be explained away as a left-over reference to the creation stories of the pagans who surrounded ancient Israel, that they were written by the kind of people whose culture saw anyone Not Of My Tribe as being unspeakably alien. Likewise, the references to heavens and stars singing and praising the Lord can be seen simply for the beautiful poetry that it is.

But whether you interpret these creatures as angels or aliens doesn't really matter for the sake of our argument here. The point is that the ancient writers of the Bible, like all ancient peoples, were perfectly happy with the possibility that other intelligent beings could exist. They knew how limited their knowledge was. The world was a big place, most of it unknown and probably hostile. This attitude was reflected in epics like *The Odyssey*, or the tales of Hercules or Jason and the Argonauts.

The existence of other creatures could easily be accommodated in the Hebrew world-view, as long as you recognized two things: First, that they were also the creation of God, not independent of Him (hence their attribution in *Genesis* as “sons of God”). And second, nothing about them denies the fact that this God, who created all these other creatures, is nonetheless in a

special loving relationship with His people: the people of Israel, and by the extension all of humanity, whom Jesus has made (in the words of St Paul) “co-heirs” of his Kingdom.

Indeed, it wasn’t until the “Enlightenment” of the 18th century that a skepticism for the existence of other creatures took hold. Even today, the scientific study of life in the universe has to fight hard to overcome the prejudice in our modern culture that extraterrestrial beings are nothing but “crazy Buck Rogers” stuff. (Actually, there aren’t any aliens in the original Buck Rogers stories...)

This is not to insist that the descriptions of “angels” and “heavenly beings” must be taken literally, and certainly not as proof positive that such creatures are extra-terrestrials. The skepticism of the Enlightenment was based on a hard-earned experience. Many of the tall tales returned by sailors exploring the world in those days may have been based on truth, but many more were mere wild inventions. Science does have to correct the superstitions of its time. But, as Pope John Paul’s statement affirms, religion must also remind us of the limits of our scientific knowledge.

The point of all this discussion is simple. There is nothing in Holy Scripture that could confirm, or contradict, the possibility of intelligent life elsewhere in the universe. *We don’t know*. We’re free to speculate.

But that speculation is bounded by two facts which we accept as crucial tenets of our faith. First, whatever is out there, it is the creation of a loving God. And second, regardless of what God may or may not do with the rest of creation, nothing out there can contradict what we know He has done here for us.

EXTRATERRESTRIAL INTELLIGENCE AND CATHOLIC THEOLOGY

Of course, if you are really eager to find a reference to extraterrestrials in the Bible, you can't do better than look at John 10:14-16, the famous Good Shepherd passage: "I am the Good Shepherd. I know My own and My own know me, just as the Father knows Me and I know the Father. And I lay down My life for the sheep. I have other sheep that do not belong to this fold. I must bring them also, and they will listen to My voice. So there will be one flock, one shepherd." Perhaps it's not so far-fetched to see the Second Person of the Trinity, the Word, Who was present "In the beginning" (*John* 1:1), coming to lay down His life and take it up again (*John* 10:18) not only as the Son of Man but also as a Child of other races?

Maybe. Or, maybe not. There are a lot of questions hidden in this assertion.

What do we mean by "intelligent" life in terms of the classic definition of a "soul"? Would we know it if we saw it? Could we communicate with it if we knew it was there? Should we even try?

Is original sin something that affected all intelligent beings? Is there a sort of "cosmic Adam" predating even life on Earth? Is Jesus Christ's redemptive sacrifice

sufficient for the whole Universe? Would there be a parallel history of salvation on other planets?

Would ET planets be seen as mission territories? Would you baptize an alien? For that matter... would you *ordain* an alien?

These questions are not new. In the middle ages it was widely believed that there was a world-wide strip of impenetrability (just think of the Sahara Desert) separating the northern half of the Earth from what they called the “antipodes,” and some theologians raised the issue of whether people living on the other side of the divide had need of Christ’s redemption. In response, St Zachary (who was Pope from 741 to 752) essentially sidestepped the issue. Pope Zachary simply refused to speculate on any beings that were not actual descendants of Adam.

What was important to him (and remains important to us) is that we avoid introducing any “novelties” to those Church dogmas that insist on the unity of all human beings. From the Biblical story of Adam, and as confirmed by both modern genetic analysis of human DNA and the observable fact that people from all over the world can have children together, comes the essential truth that all human beings are related and share a common ancestry. No person is superior to another by virtue of race or heritage.

This issue arose in a very practical sense in the sixteenth century as the explorers from Europe first

encountered different-looking people in Africa, Asia, and the Americas. Enterprising slave-traders, supported by the scholar and humanist Juan Ginés de Sepúlveda, argued before the Spanish King Charles V in 1550 that the people found in the Americas were fair game for enslavement, since the limitations of their “barbaric” culture demonstrated that they were less than fully human. The Dominican priest (and later bishop) Bartolomé de Las Casas argued in defense of the natives, insisting that they had souls and deserved to become Christian. The Church agreed, supporting a massive missionary effort that very often came in conflict with the European colonists.

Besides sharing a common ancestry, all humans also share a common failing called original sin. That we are subject to temptation, that we live in a world contaminated by evil, and that we are in need of salvation, is not merely a theological construct; it is a fact that you can observe by the most superficial reading of the daily newspaper (or by an honest examination of your own conscience). The cruelty and barbarism that the colonists observed among the native peoples if anything proved their common ancestry with the Europeans, who were themselves no strangers to cruelty and barbarism. We are all sinners, and all in need of salvation.

But all such cases in human history have dealt with creatures that were demonstrably human. Would other

intelligences not related to human beings, not arising on our Earth, still have souls? Would they need redemption? And was the death of Jesus necessary, or sufficient, for them?

We learned in *Genesis* that as God's creation we were made in His image and likeness. Obviously this has nothing to do with the shapes of our noses or the colors of our eyes. Classical Catholic theology has identified this likeness as representing the essential aspects of the soul, namely intellect and free will.

Intellect and free will are the essential ingredients for being in a loving relationship with anyone, whether you are loving a fellow creature or loving God. We have to be capable of being aware of our own existence, and the existence of the other with whom we would be in love. And we must be free to choose to accept, or reject, the possibility of loving.

Thus having a soul has nothing to do with how smart you are. Anyone who has worked with the mentally handicapped knows that they can be some of the most loving, and lovable, of people. They can also be real pains: they are human, and so they are capable of choice, including making choices that we might not like.

And having a soul has nothing to do with how many arms or legs, or tentacles, you have. Any creature capable of being self-aware, and aware of others, and free to make choices to love or not love based on that awareness,

fills the criteria of having a soul. Or at least, that's what it looks like to me.

Would that include little green men from Arcturus? Or self-aware computers?

Let's bring this question closer to home. Would this include dolphins? Or dogs and cats? Farm animals? Snakes and spiders? Bacteria? Viruses? Trees? Rocks? How can we tell, for sure?

My point is not to suggest that rocks have feelings. Rather, it is to remind ourselves of just how hard it would be to communicate with a different species. Heck, we have a hard enough time getting our family and friends to understand us at times. If dolphins or caterpillars were actually sentient beings, in a self-aware, loving relationship with God, odds are pretty strong we'd never know about it. So how can we expect to be able to communicate with creatures that don't even share a planetary origin with us?

We don't know.

For that matter, we don't know that it is impossible, either. If there are other planets suitable for life, if there is life on those planets, if that life is intelligent, if that life is in a free, self-aware, loving relationship with the Creator, if that life can communicate to us about their experience of that relationship... well, that's a lot of "ifs." If it's so, then certainly we could have a lot to talk to each other about. It might be a lot of fun. But if any of that chain of "ifs" turns out wrong, we'll never know.

And right now, we don't know. So we are left, not with science or theology, but speculation. That's all right, as long as we recognize it as speculation. Because, even though we realize that the issue of really communicating with such creatures is not likely to come up in our lifetimes, the possibility of other God-fearing intelligences being out there someplace is certainly real, and certainly worth thinking about.

In times past, thinkers on both sides of the religious issue have used the possibility of extraterrestrial life to support their preconceptions. Dozens of authors weighed in with their opinions in the 18th and 19th century. For example, the German theologian Joseph Pohle argued that the Glory of God *demand*ed that the universe be filled with intelligent beings, and not just us. Similar opinions were expressed by John Herschel, son of the astronomer who had discovered Uranus, and himself a founder of the Royal Astronomical Society.

But the American radical Thomas Paine used the inevitability of life on other worlds to mock Christianity. He argued, in *The Age of Reason*, that Christianity demanded either the unlikely proposition that of all the worlds in the Universe, God chose to be incarnated only in ours, because "one man and one woman had eaten an apple"; or else, there were many incarnations, such that "the person who is irreverently called the Son of God... would have nothing else to do than to travel from world

to world, in an endless succession of death, with scarcely a momentary interval of life.”

Paine’s argument, though crude, deserves an answer. In fact, it has received many answers, not all of them compatible with each other. It is not outside the realm of possibility that we are, indeed, in a unique position in the universe. Nor is it impossible that the Second Person of the Trinity, who was indeed present (as St John tells us at the start of his Gospel) in the Beginning, as The Word, should be expressed in more than one place, “spoken” in more than one “language”. The multiple lives and deaths of that Second Person which Paine so glibly mocked are in fact a fundamental Catholic truth expressed in our understanding of the Holy Eucharist. Christ is truly, physically present in a million places, and sacrificed a million times, every day at every sacrifice of the Mass.

Ernan McMullin, a priest and philosophy professor at Notre Dame (with a background in physics), has discussed the possible impact on Christian theology of discovering extraterrestrials, and he concludes only that it would certainly inspire theologians to develop new ways of thinking about topics like original sin, the immortality of the soul, and the meaning of Christ’s redemptive act. But, as he points out, there is already a voluminous literature, and hardly a consensus, on these points among theologians even today, without ETs!

Giuseppe Tanzella-Nitti, an astronomer and Opus Dei priest who teaches theology at the Pontifical University of the Holy Cross in Rome, comes to the same conclusion. He has written a lengthy entry on Extraterrestrial Life in the *Dizionario Interdisciplinare di Scienza e Fede* (*The Interdisciplinary Dictionary of Science and Faith*, of which he was an editor). But at the end, he concludes by saying (in my translation of his Italian), “the last word on the question of extraterrestrial life will not come from theology, but science. The existence of intelligent life on planets other than the Earth neither rules in nor rules out any theological principle. Theologians, like the rest of the human race, will just have to wait and see.”

WHAT DOES IT ALL MEAN?

The American cartoonist Walt Kelly perhaps had the clearest insight into the whole extraterrestrial intelligence debate. In the early 1970s, a character in his comic strip Pogo mused, “There’s only two possibilities: there is life out there in the universe which is smarter than we are; or we’re the most intelligent life in the universe. Either way, it’s a mighty sobering thought.”

The mere possibility of intelligent life elsewhere puts a human (or at least, human-like) face on the far better established astronomical observation of the enormity of our universe. For Catholics, the sobering thoughts that come from contemplating this question, in the absence of any firm answers, should lead us to focus on realizing God’s greatness and His special love for us.

For most of us, most of the time, our lives are centered on our immediate needs and fears, our own personal joys and sorrows. But it is important to remember that God, and the meaning of our life that comes from loving God, is greater than the daily traffic, the pile of dirty laundry, the question of “what’s for lunch.”

God is bigger than our family problems, our city, our sports teams, our nation. Bigger than bombs; bigger than history. Bigger than the whole world and all its past and future. Bigger than our sky or our Sun or our solar

system. Bigger than the galaxy we see spread out above us at night, as far as we can see. Bigger than all the galaxies, seen and unseen. Bigger than whatever parallel universes may or may not exist beyond our own.

Indeed, God is so big that, even in all this immenseness, He is able to concentrate His entire effort, energy, and love on each one of us tiny individuals on this tiny planet. And, I have confidence, on any other individuals on any other planet, as well.

Contemplating what it would mean for humans to encounter aliens also forces us to ask in a new what just what it means to be “human.” The natural next question to arise is, “human as compared to what?” The literature of science fiction is filled with alien creatures, or sentient computers, or half human/half machine constructs. Fantasy stories add the whole spectrum of mythical elves and ghosts. But the central character of any such story, regardless of how many tentacles it has, is recognizably human: self aware, free to choose, to love or to hate. Free to do good; or to sin. And in need of redemption. It’s no surprise that so many of these stories have been written by Catholics, like R. A. Lafferty or J. R. R. Tolkein or Gene Wolfe.

Indeed, a common insight of these stories is that any creature of this universe, created and loved by the same God who created and loves us, would be subject to not only the same laws of physics and chemistry as us, but also the same rules of right and wrong. What else is there,

except the superficial accidents of the gas they breathe or the number of genders they have, that makes them essentially any different from us? Is there any important way at all that they would deserve to be called alien or that we would be alien to them?

We have commented, over and over again, how the search for life outside the Earth is an exercise of the imagination, a speculation better served by science fiction or poetry than by the definitions of science or theology. With that in mind, what better way to close this contemplation than to read a poem on the topic. It was written nearly a hundred years ago by an Englishwoman and Roman Catholic convert, Alice Meynell (1847 - 1922). (She was also the mother of eight children, and a prominent Suffragette.)

The following poem was published in her collected works in 1917... ten years before the first pulp science fiction story about travel to another solar system!

Christ in the Universe

With this ambiguous Earth
His dealings have been told us. These abide:
The signal to a maid, the human birth,
The lesson, and the young Man crucified.

But not a star of all
The innumerable host of stars has heard

How He administered this terrestrial ball.
Our race have kept their Lord's entrusted Word.

Of His earth-visiting feet
None knows the secret, cherished, perilous,
The terrible, shamefast, frightened, whispered, sweet,
Heart-shattering secret of His way with us.

No planet knows that this
Our wayside planet, carrying land and wave,
Love and life multiplied, and pain and bliss,
Bears, as chief treasure, one forsaken grave.

Nor, in our little day,
May His devices with the heavens be guessed,
His pilgrimage to thread the Milky Way,
Or His bestowals there be manifest.

But, in the eternities,
Doubtless we shall compare together, hear
A million alien Gospels, in what guise
He trod the Pleiades, the Lyre, the Bear.

O be prepared, my soul!
To read the inconceivable, to scan
The million forms of God those stars unroll
When, in our turn, we show to them a Man.

(Alice Meynell 1847 - 1922)

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