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*A Sign in Space* is an interdisciplinary project by media artist Daniela de Paulis, in collaboration with the SETI Institute, the European Space Agency, the Green Bank Observatory and INAF, the Istituto Nazionale di Astrofisica.

The project consists in transmitting a simulated extraterrestrial message as part of a live performance, using the Trace Gas Orbiter ESA spacecraft as celestial source. The objective of the project is to involve the world-wide Search for Extraterrestrial Intelligence community, professionals from different fields and the broader public, in the reception, decoding and interpretation of the message.

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# A Sign in Space: an Essay by Thomas Moynihan

**Thomas Moynihan**

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# 1. INTRODUCTION

Humans are curious creatures, and curious creatures search for answers. This is why our kind has always searched for signs — signs of sagacity or of solution to our woes — everywhere we look in this universe.

Given that most of the universe is not to be found on Earth, but instead lies up in the voluminous heavens — though, for the longest time, people did not have the technical means to become certain of this — we have long looked for signs, for signs of an answer, in the sky. For most of humankind's existence, we had only our retinas to conduct our search; these days, however, we also have radio antennae.

As curious creatures, of the type for whom the world must be approached as a riddle, we must suppose that there *is* an answer. We must act *as if* there is one answer, one best and single solution to the world-riddle, as this is what prompts creatures like us to inquire in the first place. This is so because the supposition of a best answer is what *motivates* and *compels* us to let go of elder answers, when they are later proven inadequate, through intercourse with things: through their collision with the world's recalcitrance, its obstinate independence from our hopes and our hunches.

This way, approaching the world as a riddle — as creatures of our questioning kind do — presupposes our *assumption* that there is some singular and satisfactory solution, some answer, to all our local inquiry and action. We operate under the expectation that there *is* some reply, out there, to our query.

But this does not necessarily mean that there *is* such an answer, out there — dwelling apart, remote and serene — merely waiting to be intercepted by our searches and our

petitions for existence to reply.

It is our guiding hope, our lodestar; it is what makes us search for signs; but it is not a promised inheritance; it is not anything which existence independently owes us.

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This, to me, is what is endlessly intriguing about Daniela de Paulis's ongoing interdisciplinary project, *A Sign in Space*. It is a performance: of the arrival of an extraterrestrial sign from space, sweeping a global audience into committing themselves to decrypting the message. This way, it gets to heart of what we are, as creatures who ask questions and search for answers.

In miniature, the project poses the question: what would happen if we got a reply from the skies? The very decryption of the message alludes to the fact, however, that none of our conversations with this universe are easy or conducted on our terms. By absconding and occluding the message, *A Sign in Space* brings attention to the fact that — in our longing to decrypt this universe and its messages — we each project our own anticipations and desires onto the sign. This, however, has a surprisingly long history. That is to say, people have, for many generations, looked to the skies for signs of other minds. In the process, they have often revealed their own wishes and worldviews.

Given that, as a performance, *A Sign in Space* will, in our responses to it, reveal much about our own moment's wishes, it may well become an episode of much interest for future historians. For now, however, the following piece explores some of the past history of peoples' expectations when it comes to the search for the sign in space, and, in particular, the recurrence of two particular — and, originally, religious — moods when it comes to conjecture upon this. That is, one that embodies the longing for an answer from minds superior to our own; and another that accepts that minds other than our own may, in their sheer alienness, challenge all such hopes for a singular solution.

## 2. PART I

Human creatures have always been in messy dialogue with their world, through both the materials they manipulate — the things they build — and the attitudes they hold, along with the affordances these bring.

These days, however, we realise this can be called a “conversation” only in an intensely oblique sense. That is, though Francis Bacon once described investigation as the act of putting questions to nature, we now recognise that nature does not reply to our probing in any anthropomorphic tongue, but only through the ways it *defeats* our desires and *thwarts* our theories.

Where once, generations ago, every creature in creation taught its resonant lesson in the form of fables, whilst myth way readily read from nature’s visage, and even the heavenly spheres themselves sung, modern science has nonetheless since revealed a cosmos more silent than could have been expected before.

The world has always been a riddle, of course, and people have always been alert to this. However, many of our ancestors would perhaps have been surprised by how much it is the case that, in learning so much more concerning existence, existence itself has steadily swollen into more of an enigma.

It’s a well-worn oddity of knowledge: knowing more is merely gaining greater grasp of the greater dimensions of what you don’t know. That is to say, there is a difference between unstructured ignorance and structured ignorance. Posing the puzzle of why there are heavier elements than helium within the universe, and recognising that this is a conundrum at all, could not have taken place *prior* to the discovery of myriad other

phenomena such as atomic mass and stellar spectra. Ignorance, as much as knowledge, has its own history — its own developments and diversifications.

So, the scientific stance to the cosmos rests in the desire for an answer, coupled with the patience of knowing that none may immediately be immediately forthcoming, alongside the hope that continued trial and tinkering may reveal more than we know now. Here lies the reason why the scientific cosmos — the modern cosmos — is an inherently *silent one*, in the sense that it has been revealed to be more silent precisely to the degree that humans pose better questions to it, by forcing their ignorance to become more structured in relation to it.

What is silence, after all, but a frustration of desired or expected reply? Such frustration, however, is fruitful insofar as it compels the search for better questions. The stance of searching, the stance of science, is therefore one of undefeatable disquiet in the face of the universe's quietness. But, though it ceaselessly probes, it is an admirably patient disquietude, one that dwells comfortably with silence. It is this very patience — this willingness to be frustrated in inquiry, to be mindful that the first answers will not be best, combined with the hope for more adequate successors — which has created this modern world: this modern world, where we have radio antennae, and not only our retinas, with which to conduct our scouring and searching.

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Nevertheless, people have been speculating concerning which signs there may be in space far before radio antennae could hone the search.

Like any other epoch, the Medieval world looked for such signs, and conjectured upon an intercourse between worlds. Back then, however, "worlds" weren't yet so much physical bodies dispersed through the void of outer space, as they were ideas — concerning possible world-plans other than our own — held in the mind of God.

Moreover, such interchange of signs was, first and foremost, *a salvific affair.*

For, though monotheistic religions, in general, spread the idea of a universe with a beginning and end, it was Christianity, specifically, that introduced the notion of a *singular event* — a sacrifice, taking place within *this* world, breaking time in half — which thus introduces a "before" and an "after" to history, in a universal sense. But such a notion interacts uncomfortably with the idea of other worlds: each with their own affairs, developments, and tribulations.

Accordingly, in the 15th century, French theologian Guillermus Vorrilong inquired whether a "whole world is able to be made more perfect than this universe", before answering that multitudes of such worlds "lie hid in the mind of God". Immediately, the troublesome question of intercourse — of signs shared — arose for Vorrilong.
He wrote:

> *"As to the question whether Christ by dying on this Earth could redeem the inhabitants of another world, I answer that he is able to do this even if the worlds were infinite, but it would not be fitting for Him, to go into another world that he must die again."*[1]

Mercifully for Christ, Vorrilong deemed that it is the sign alone that diffuses between worlds, not the physical sacrifice itself. The word need only be made flesh once, at one world.

But what motivated Abrahamic theologians to assent to this belief in other worlds, and to explore the potential for intercourse of signs between them, when it readily produced such dilemmas for soteriology? The motivation rested in their stronger commitment to the notion of *omnipotence.* That is, against the Aristotelian notion that this universe is thoroughgoingly *rational,* in the sense that everything is the way it is for a demonstrable and necessary reason — such that it cannot be *any* other way — Islamic and Christian theologians instead desired to protect God's freedom to choose. As such, they

[1] G. Vorrilong, Quattuor librorum Sententiarum Compendium venerabilis patris fratris Guillermi Vorrillonis Lib. (Basel: Langerdorf, 1510), folio.105.

foregrounded the notion that God could, and perhaps had, created many other worlds and creations.

Given, however, that a liveable world is an ordered one, and in order to police ours from the irruption of alien orders and possibilities — the intercourse which might threaten our own — the theologians were careful to introduce a distinction between God's "*potentia ordinata*" (ordained power) and "*potentia absoluta*" (absolute power). The former being divinity's governance of order and regularity within this, our world; the latter, divinity's overriding, sometimes threatening, ability to arbitrarily, and even capriciously, produce things radically otherwise from the world-order we are familiar with.

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Around the same time as Vorrilong's musings, Nicholas of Cusa — a German cardinal — produced a more recognisable version of the plurality of worlds. He supposed actual worlds, distributed through stellar regions.

Supposing all such regions inhabited (to stave off the issue of the cosmic designer having forged gratuitously barren, wasted worlds), Cusa admitted we can learn little about their denizens, given our lack of "standards by which to appraise them".

Here is another echo of omnipotence: that is, the blank potency for things to be radically otherwise — to be alien — beyond all our appraisal and anticipation. However, following the Medieval interpretation of the cosmos's physical architecture — of concentrically nested spheres — as one inherently imbued with moral meaning and hierarchy, Cusa nonetheless immediately produced a system of cosmic ranking. He wrote, that is, of creatures existing "in the area of the sun", supposing such "solar beings" to be "bright and enlightened", far more so than those populating our sublunary regions, who are "gross and material". [2]

[2] N. Cusa, *Of Learned Ignorance*, trans. G. Heron (London: Routledge & Kegan Paul, 1954), 116.

In subtle tension with his earlier admission of the difficulty in appraising and anticipating alien orders, this other conceptual inclination — toward appraisal and ranking, an assumption of differential moral standing — instead seems inspired by a belief in *omniscience*. This being the monotheist conviction that there is *one* single standpoint, one best and decisive view: a "perspective of the universe" — a cosmical supreme judge and arbiter — whether this be thought of as arising from divinity or, in more modern parlance, impartiality.

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Following the 16th century's inauguration of our Copernican world, which eventually ushered in unanimous acceptance that there are other planetary bodies gyrating around distant stars, thinkers and speculators of the Early Modern period became very fond of the conviction that all these will, also, be inhabited.

However, given heightening sensitivity to the gargantuan distances involved — which built momentum during the Enlightenment era — the suggestion of physical interchange across sidereal expanses did not yet gain prominence. Nonetheless, the suggestion of an interchange of signs remained important. Indeed, it had become a problem increasingly necessary to address.

That is, by the 18th century, the acknowledged universe had become massive enough for the notion of a singular event — of universal import — to begin seeming shaky. Under the light of swirling star systems, seen through optic glass, each now recognised as congeries of worlds, the notion that Earth was the one recipient of the Word became increasingly strained.

Why, some asked, should our planetary sphere — one amongst multitudes, an iota within the cosmic concourse — be the one that received, witnessed, and enjoyed the most important message of all time and space? How can one, local word be of

significance to all?

Politician and revolutionary, Thomas Paine, pursued just such a line of assault in 1794. “The inhabitants of each of the worlds of which our system is composed”, he supposed, “enjoy the same opportunities of knowledge as we do”.
They look on us as we look on them, he continued:

> *“They behold the revolutionary motions of our earth, as we behold theirs. All the planets revolve in sight of each other, and, therefore, the same universal school of science presents itself to all.”* [3]

Here, we see the continuing trace of ideas deriving from omniscience: that is, the assumption that there is *one* best perspective upon the cosmic riddle. But, moving from the domain of objective affairs to that of moral belief, Paine shifted gears, instead raising the spectre of omnipotence, or, in more modern parlance, of contingency, diversity, and heterogeneity.

What are we, Paine implored, to make of the “Christian system of faith”: which “forms itself” on “only one world”; and, within that one world, holds sway only upon a portion of its surface? Religious convictions, he seemed to imply, are beliefs secreted by the believing organs of organisms affected, in their inclinations to believe, by their local climes and climates.
If diversity arises within one planet, why not across planets?

Pushing further, Paine intensified his attack, asking whether we are to suppose the “Almighty” should “quit the care of all the rest, and come to die in our world”. Or, elsewise, he goaded, are we to believe “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 deaths, with scarcely a momentary interval of life”? [4]

Once more, believing that there is one word — one supreme sign — comes into inherent

[3] T. Pain, The Age of Reason (Paris, 1794), 45.

[4] Ibid., 46.

conflict with the pluralising notion of many worlds, and of many possibilities — and other signs — beyond what's become actual here.

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Two decades afterward, the Scottish minister Thomas Chalmers answered Paine's challenge. Chalmers foregrounded the intensely speculative nature of attributing or prohibiting qualities to life on other planets. One cannot know, he insisted, about the "natural history" of other planets, nor make attempts at "the botany of other worlds", let alone conjecture upon the "character" and "moral temperament" of their inhabitants. Satisfied with this shift of evidential burden, Chalmers forcefully inquired:

> *"How do infidels know that Christianity is set up for the single benefit of this earth and its inhabitants? How are they able to tell us, that if you go to other planets, the person and the religion of Jesus, are there unknown to them?"*

For Chalmers, the infidel's is an "assertion" the "truth or falsehood" of which could only be verified through receiving some "message". Otherwise, such matters, he inveighed, lie "completely beyond the range of human observation". (Unsurprisingly, and in a kind of circular reasoning, Chalmers supposed such a message could only ever arrive through "supernatural" means.)

Again, there is here, in disagreements like these, a recapitulation of elder themes when it comes to intercourse with other worlds. There is, again, the spectre of omnipotence: or, the acceptance that the sign from space could be signal that things can be radically otherwise, in ways which throw light upon the parochiality and contingency of *our own* local convictions. There is also the way in which this conflicts with the comforts and promises of omniscience: that is, the longing that the sign from space will be something affirming — something we both recognise and welcome — whether as an example to follow, or, as the solution to our perennial woes. People have, for a very long time, been

wrestling with the question of whether the word from other worlds will be in the spirit of the former or the latter.

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By the 1850s, more naturalistic knowledge could be brought to bear on the question of what signs might be found in space. This, after all, was the moment which allowed Darwin's theory of evolution by natural selection — having dwelt decades in dormancy — to finally enjoy germination. It was, similarly, the period when large reflecting telescopes started to be constructed, and the Milky Way's structure and size began to be mapped, instilling renewed sense of space's unthinkable scope.

Nonetheless, it remained commonplace for writers not only to assume, but to confidently state, that our Solar System's other planets must be populated with "races very closely resembling, if not absolutely identical, with those with which the Earth is peopled".[5]

Responding to these developments, the English philosopher-historian William Whewell penned his *Of the Plurality of Worlds* in 1853.[6] It proved controversial, becoming something of a sensation. In it, Whewell attempted to protect Christian doctrine from the threat of signs from elsewhere — of other words from other worlds — by taking a new tack. He argued for the uniqueness of life to Earth.
Again, at the time, this was a novel position, so much so that critics called referred to it as an "extraordinary doctrine".[7] Whewell used innovative arguments, concerning the stringency of physical conditions requisite for life, to argue for the inhabitability of other planets.

In part, his argument rested in the supposition that, *had* intelligent beings existed in sister worlds, then we would surely see ready signs of this. A staunch Kantian, Whewell, again, rested this in the omniscience-echoing assumption that, in his words, wherever

[5] D. Brewster, More Worlds Than One: The Creed of the Philosopher & the Hope of the Christian (London, 1854), 83.

[6] W. Whewell, *Of the Plurality of Worlds* (London, 1853).

[7] Ibid., vii.

“intellect” exists “its results and conclusions are the same”. Honing in on the example of geometry, he wrote that the Earth can be “no more the special basis of geometry”, than “Jupiter”, “Saturn”, “Sirius”, or “Arcturus”. [8]

“If there be intelligent inhabitants of the Moon”, Whewell continued, then they may have discovered “four thousand years ago” the laws of “geometry”, just like us. After accepting this, Whewell proceeded to speculate what it would be like, for us tellurians, to receive a sign from the lunar geometers:

> *“If we were to see, on the face of the full moon, a figure gradually becoming visible, representing a right-angled triangle with a square constructed on each of its three sides as a base; we should regard it as the work of intelligent creatures there, who might be thus making a signal to the inhabitants of the earth, that they possessed such knowledge, and were desirous of making known to their nearest neighbours in the solar system, their existence and their speculations.”* [9]

It must be noted that, even though he believed they didn’t exist, Whewell — just like his pluralist peers — continued to maintain that, *if they did*, they would essentially be “men”. Even the most elaborate attempt, to picture alien beings as unlike us as our imagination allows, remain, Whewell revealingly stated, “merely combinations, slightly varied, of the elements of human being”.

This proves, he concluded, that “man cannot conceive any moral creature who is not man". [10] Though it is almost certain our imagined aliens, today, are still mere melanges of mankind, it pays not to make proclamations like this: even if the expansion in imagination is paltry, the limits have undeniably widened since Whewell’s day.

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Proponents of a plurality of populated worlds, took umbrage with Whewell’s reasoning,

[8] Whewell, Plurality of Worlds, 31.

[9] Ibid., 32.

[10] Ibid., 42.

taking aim at his assumption that he had exhausted all possible permutations of life and mind in his premise that all such worlds must produce their own "Platos", be compelled to become geometers, and come to communicate through Euclidean glyphs. One reviewer, to mark their disagreement, declared contrarily:

> *"We beg to assure our readers that we do not extend the slightest degree of identity or sameness in our endeavour to prove [...] life in other planets besides our own. We do not conceive that the pure intellect of the Creator has been employed according to our Author's ideas or that 'its results and conclusions have been always the same'. We believe those ways to be past finding out and as infinite in variety as design."* [11]

These critics believed a pluralism of populous planets — setting the stage for an abundance of diversity and heterogeneity beyond comprehension — provided better proof of the capability of the Almighty, particularly when opposed to a position forcing the Almighty to be found guilty of arbitrary terrestrial favouritism.
They admired plenitude more than exceptionalism, such that they sought signs of it in the skies.

But, because of this, Whewell's critics were led toward fortifying and strengthening arguments as to why — even if they all house life — the "other spheres" might not necessarily nourish "IDENTICAL animals", nor their homegrown "moulds" be mere replications of our tellurian types. [12]

Such argumentation, however, could, of course, not yet be Darwinist in flavour. Instead, appeals were made to Richard Owen's idea of "*ideal archetypes*". Owen, the preeminent biologist of the pre-Darwinian generation, had sought to explain life's diversity as so many variations and divergences from a collection of transcendent, archetypal plans. He based this upon observations of analogy and of homology across highly distinct branches of life: for example, the fact that the wing of an eagle can be considered a contortion of the bones of a human arm.

[11] W.S. Symonds, Geology as It Affects a Plurality of Worlds: An Essay (London, 1856), 50.

[12] Ibid., 50.

Sensitive to the variability on Earth — both present and past — Owen's transcendental morphology, however, was capacious enough to allow, for example, that the "conceivable modifications of the vertebrate archetype are very far from being exhausted by any of the forms that now inhabit the Earth, or that are known to have existed here at any period". That is, "though they may never be developed as such in this planet", the archetypes permit of more possibilities than can unfold upon one celestial body alone. [13]

Of course, where unrealised possibility enters the picture — along with the attendant recognition that all we know and recognise may be merely one subregion within a much wider space of alternates — so too does contingency. And, in turn, with contingency comes the apprehension that our way of going about may not be the only — *nor the optimal* — way of achieving life's goals.

Indeed, in a remarkable passage, Owen thus reflected upon Earth's "insect forms" — which, he remarked, have been endowed with "instincts that simulate closely our boasted reason" — but are "so inconceivably different from our own or any vertebrate organisation", as to:

> *"...lead any one conscious of the extremely narrow field to which his observation of life-phenomena is here restricted, to deem it highly probable that the forms of organisation endowed with physical powers akin to our on in other planets, may nevertheless be very different from ours, and be as admirably adapted to the media of existence in those planets."* [14]

When it comes to anatomical plans, Owen concluded that the "riches of creative resources" are far "from having been exhausted" in our "*one* planet". Inspired by such reflections, one of Whewell's critics — desirous, as so many before, to find some salvific sign in the stars — used Owen's reasoning to argue the following:

> *"...may we not equally expect, in the upper spheres, modifications of mind which have not been exhibited in the terrestrial races? If the rudimentary*

[13] R. Owen, On the Nature of Limbs (London, 1849), 83.

[14] Cited in Brewster, More Worlds Than One, 87.

> *wing of man be expanded into the soaring pinion of the eagle, may not those mental powers which are only rudimentary here, and which fail in grasping the infinite and the eternal, expand themselves in another planet, and approximate to that divine intelligence of which they are here but a feeble emanation?"* [15]

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In order to argue against his depopulation of space, Whewell's critics produced new and stronger arguments as to why the denizens of other places may be drastically different in ways *escaping* our anatomies and appraisals. Nonetheless, the scope of difference remained comparatively restricted: for though Owen's theory allowed wide divergence within the vertebrate plan on other worlds, this was still divergence *within a vertebrate plan*.

Even in entirely secular contexts, we still inherit conceptual inclinations and dispositions from unsecular origins. Once again, here, we detect a kind of tension between a respect for the omnipotent and a desire for the omniscient. That is, in the spirit of the former, a steady expansion of the acknowledged scope of contingence, of the possibility for things to be otherwise, and for other lifeways — forged by divergent histories and happenstances — to be radically alien in ways that fall beyond our hunches and hopes, and thus also challenge our search for their signs.

But such musings were not therefore unalloyed successors of omnipotence, in this pure form, insofar as this argument from diversity was only pursued as means to celebrate the one, true optimum mind. Diversity, that is, was sought only insofar as it was taken as the evidence, and exaltation, of the universe's supreme intelligence. And this was sought, at least in part, because only this assumption of one impartial view can ground the notion that things are better or worse — higher or lower — in a *cosmic* sense. One needs to suppose such a view in order to provide the touchstone against which all other minds can be ranked in likeness and worth, and, without which, such absolute ordering

[15] Cited in Brewster, More Worlds Than One, 90.

becomes groundless. Contrarily, omnipotence — in its pure form — challenges all such hierarchical inclinations, because it is merely the capacity for things to go otherwise in ways which can fall beyond, and challenge, all our categorisations and cravings.

In other words, the essential conceit of hierarchy — a framing flowing from the idea that there is some single omniscient view providing the measure for such cosmometry — continued to be forceful. This way, hope of a sign from space continued, well into the 1800s, to be an essentially *salvific* hope.

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Darwin, of course, explained why it was that island species are not found beyond their islands of origin. Though it took further generations to spell it out, this also applies to planets. Identical creatures do not and cannot simply appear shorn from connection to parents and ancestors, and this limits where they can appear in space and time. Moreover, it makes them contingent in the sense that they are forged by local histories, which stretch back through long-winding chains of chancy couplings, and are, in principle, impossible to repeat or replay elsewhere. This way, the logic of Darwinism implies not only that species are unique to their planetary birthplaces, but also that different planets — like isolated islands — will create wondrously variant forms.

It is perhaps no surprise, then, that it is in the closing decade of the 1800s that the first genuine suggestions for actively searching for signs in space took hold. Because a signal is more informative, and more interesting, the more the listener cannot easily predict and anticipate its contents; so, aliens had to become sufficiently alien, before it could become sufficiently clear that we could learn something genuinely novel from them, and thus clamour to find their signs.

In other words, people had to recognise the potential alienness of aliens before they could become truly curious concerning communications with them.

In England, Victorian polymaths, citing Whewell's conjecture upon lunarian geometers, wrote letters to newspapers suggesting that, with "funds" and "good will", Earthlings may reflect bursts of sunlight so as to communicate with the "inhabitants of Mars"; who, "if they have eyes, wits, and fairly good telescopes", may "wish to answer", with "scintillations" of their own. [16]

Such proposals of interplanetary "telegraphing" were taken seriously: for example, by the editor of *Nature*, who suggested electric-powered lights might provide a better solution. Codes and ciphers were discussed; the plausibility of "inter-stellar language" was widely entertained. Similar notions — concerning suggestions for arithmetical systems for signalling Mars — had already been explored by the Finnish mathematician E.E. Neovius back in the 1870s. [17] In France, one Anne Emile Clara Gouget-Guzman offered a prize, of one hundred thousand francs, for the person who finds a way to communicate with another planet. [18]

In another echo of elder ideas surrounding omnipotence, sceptics, of course, stressed the potency for aliens to be radically otherwise: pointing out that Martian civilisation may "depend on sense of which we have absolutely no trace, so that communication between us and them would be a great deal less possible than communication between a fish and a mole". Others suggested that such endeavours may "be as much use as an oration to an ash-heap", deeming it "wiser to wait until our planetary neighbours" initiate the dialogue. [19]

Scientists accordingly speculated as to what the reaction would be, on Earth, to the reception of light-signals from Mars. Curiously, being heralded by the "Marsfolk" was pictured as being merely one of mainly academic interest, with the public relatively nonplussed, even to the point of some dismissing Martian signs as nothing more than the results of the "caprice of a mad millionaire in Mars". [20]

[16] F. Galton, 'Sun Signals to Mars', in The Times (August 6, 1892), 7.

[17] See R. Lehti, 'Edvard Engelbert Neovius, an early proponent of interplanetary communication', Act Astronautica, 42 (1998), 727-738.

[18] 'Prix Pierre Guzman', in Comptes Rendus (December 17, 1900), 1147.

[19] 'Telegraphing to Mars', in The Spectator (August 13, 1892), 218.

[20] F. Galton, 'Intelligible Signals Between Neighbouring Stars', in *Fortnightly Review* (November 1, 1896), 657-664.

The aliens, it seems, had still not yet become alien enough for contact to become the existential episode — the revolution in worldview — we now recognise it would be.

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Clearly, anthropomorphism was still rife. Nonetheless, the further lessons of Darwinism were seeping — albeit unevenly and often distortedly — into the minds of many. In 1896, writing for a newspaper, H.G. Wells had proclaimed that "creatures whose evolution" has "proceeded on different lines" will have different "shapes" and "structures" in ways "impossible to imagine". Concluding, he declared:

> *"No phase of anthropomorphism is more naïve than the supposition of men on Mars. The place of such a conception in the world of thought is with the anthropomorphic cosmogonies and religions invented by the childish conceit of primitive man."* [21]

Perhaps suiting, then, that it was Wells who also ushered the search for a sign into its paranoid phase with his narration of inverse colonisation from Mars. That aside, the direction of travel toward the more alien had been set. However, in the face of inertial anthropocentrism, it proceeded slowly and laboriously. Nonetheless, with benefit of hindsight, little could stop Darwinism's acidic challenge — to the cosmical universality of human form and mind — from eventually reaching explicitness.

By the 1920s, some naturalists were arriving at just this lesson, insisting that "man is actually unique both in time and space". Having acknowledged that the unlikelihood that another planet has experienced "a geologic history sufficiently similar to that of our earth to have developed lifer along similar channel", Kirtley F. Mather announced the following in 1924:

> *"The law of probabilities almost excludes the possibility that anywhere else or at any other time vital energy has manifested itself in protoplasm and*

[21] H.G. Wells, 'Intelligence on Mars', in The Saturday Review (April 4, 1896), 346.

*that protoplasm has been led through the long chain of upward progress to a creature which would be even an approximate duplicate of mankind."*[22]

Implicit in this is growing admission — and awareness — that aliens may be truly alien. That is, there was gradually increasing sensitivity to the sheer scope of contingence in life's manifestations here on Earth, which cannot but also sensitise to the realisation that analogy, with terrestrial forms, cannot be the only guide when it comes to speculating upon forms and adaptations hailing from elsewhere. This speculative domain of possible forms, entirely unrealised upon Earth, has, ever since, steadily grown.

[22] K.F. Mather, 'Geologic Factors in Organic Evolution', Ohio Journal of Science, 26:3 (1924), 141.

## 3. PART II

In tandem with such anticipations, there, of course, came steadily increasing interest in the sign from space and conducting a concerted search for it. By the first decades of the 1900s, of course, credulity that planets like Mars and Venus are populated — almost unanimous only a couple of generations before — had begun to dissipate. Accordingly, the search was increasingly aimed toward sidereal space and other star systems. In light of this, at a discussion on cosmic evolution, conducted by the British Association in 1931, the mathematician-bishop Ernest William Barnes conjectured the following:

> *"As I have already indicated, I have no doubt that there are many other inhabited worlds, and that on some of them beings exist who are immeasurably beyond our mental level. We should be rash to deny that they can use radiation so penetrating as to convey messages to the earth. Probably such messages now come. When they are first made intelligible, a new era in the history of humanity will begin. At the beginning of the era the opposition between those who welcome the new knowledge and those who deem it dangerously subversive will doubtless lead to a world war. But the survivors, when they extricate themselves from the economic consequences of the peace treaty, will begin what we may correctly term a strenuous correspondence course. I should like to be living then. We might get a true understanding of the evolution of the universe."*[23]

Statements reflect their times, and this was made in a period sandwiched between global conflicts. But what's striking here is that, within only a generation, contact — the arrival of the sign from space — had gone from an academic curio to a universal paroxysm, breaking history in two.

Barnes's comments proved influential, being cited often in years to follow. For example, a few years afterward, in 1934, the Indian astrophysicist Meghnad Saha assented to

[23] E.W. Barnes, 'The Evolution of the Universe, Nature Supplement, 3234 (1931), 721-722.

Barnes's declaration of the importance of searching for signs in space. Citing Barnes, Saha wrote that the "present-day world requires a Prince Henry the Navigator who can conceive, organise, and finance an enterprise for large-scale experiment on these lines". Continuing, he remarked that "[m]oney spent on such experiments would be better spent than money spent on armaments". [24]

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Some readers were less keen on Barnes's proposal, and responded by pointing out that the Bishop had "overlooked the fact" of "the velocity of light". So wrote H.V. Gill, the same year as Saha's reflections:

> *"The correspondence course he looks forward to would need an interval of at least two hundred years for each question and answer! Dr. Barnes can avoid the absurd consequences of his oversight only by assuming that by that time man's life would be proportionally prolonged, so that 100 years would correspond to a single day in our time; but that would be to explain one absurdity by another."* [25]

Others, despite longing for such intercourse, found themselves agreeing with the fundaments of Gill's dispute. Hiram Percy Maxim, in 1933, despaired about the "magnitude of cosmic distances" — and delays — involved in any attempt to communicate across the stars. Before we excite ourselves, he warned, with the idea of "sending post cards of radiograms" to "other intelligences", we must "consider the sad limitations that cosmic distances place upon communication". Continuing, he allowed that, though a radio message from Mars would only take half a minute, a message from Rigel would take half a millennium.

Maxim, with sadness, thus concluded:

> *"Communication between living creatures across the cosmos seems not to be a part of the Great Plan."*

[24] M.N. Saha, 'Fundamental Cosmological Problems', in The Shaping of Indian Science: 1914-1947 (Hyderabad: Universities Press, 2003), 337.

[25] H.V. Gill, 'Scientists at Sea', in The Month (January, 1932), 39.

He did allow, however, that it is a possibility that "we are being signalled at the present time but that we are not mentally competent to comprehend it". [26]

⁂

Nonetheless, despite scepticism, Barnes's suggestion seemed to have seeped into the scientific subconscious. In 1936, the American geneticist H.J. Muller echoed Barnes's desire for a sign, and answer, from the aliens:

> *"In the star-bespattered abysses of the cosmos, there must surely dwell a myriad exotic forms of sapient beings, more or less analogous, more or less incommensurable, with ourselves. [...] How much we may someday be able to learn of this life, through super-telescopes and other scientific telesenses, without coming into more direct contact with it, is at present an unanswerable question; but any knowledge of it — not to speak of contact with it, whether direct or indirect — would introduce an incalculable element into our reckonings of the future, charged with unlimited potentialities for progress as well as for danger."* [27]

Again, the aliens had become sufficiently alien — and our ignorance sufficiently structured — for the question and potential of contact to come to be recognised as one of unprecedented import and consequence. A singular event, that is, which breaks history in half; albeit now understand to not be necessarily salvific, and potentially dangerous, in nature.

Nonetheless, in both Barnes and Muller, one detects the then-growing conviction that the communicating extraterrestrials, insofar as they are potentially much older than us, are plausibly also far superior. Hence, the strong longing for a final answer — a communication with omniscience — came to be transposed onto the interstellar aliens, and they came fully to *reoccupy* the role once played by divinity's all-knowing.

[26] H.P. Maxim, Life's Place in the Cosmos (New York: D. Appleton, 1933), 148-160.

[27] H.J. Muller, Out of the Night: A Biologist's View of the Future (London: V. Gollancz, 1936), 75-76.

Of course, such longing rests, once again, on the conceit that there are “superior” beings, and that there is thus a natural hierarchy, along with the idea that technological aptitude and moral wisdom are correlated. No surprise that the above thinkers gravitated towards the dubious conceit of some sort of moral ranking being inherent within nature: both Barnes and Muller were themselves ardent eugenicists. No wonder, then, that they assumed there could be something like a cosmic caste system, hoping we could clutch at the coattails of the “superior” species.

⁂

By 1943, in the midst of World War (though it was not precipitated by contact), a sense of the otherness of aliens had grown enough that one theologian reflected “scientific men were at one time inclined to think that most of the other planets of our solar system were inhabited by intelligent beings”, but now — due to growing understanding of the ramifications of evolutionary theory — this “view has been very largely abandoned”. [28]

The extent of significance, when it comes to intercepting a sign, hinges upon the degree to which you find your surroundings silent. In other words, we had to first truly recognise our cosmic loneliness before we came to recognise how consequential it would be receive the sign from space.

However, though alien life was, in the expectations and minds of scientists, becoming rarer and more alien, it still was often assumed, throughout the 1900s, that inhabited worlds — should they exist — would eventually produce intelligences of some easily recognisable sort. Accordingly, the hope that they might be elder — and thus wiser and sager — could only grow and strengthen; particularly so in the fertile soil produced by the events which concluded the Second World War, ushering in our atomic age of planetary precarity.

In 1955, Arthur Koestler captured this mood by noting that, ever since the first

[28] W.R. Thompson, ‘Providence’, The Thomist, 5 (1943), 229.

"hydrogen bomb tests", there has been "sudden interest in life on other stars".[29] This was borne out with an increasing tone of desperation surrounding hope for some salvific sign from space. Writing for *The Humanist*, Gordan H. Evans published a telling article entitled 'The Other Worlds Revolution'. By this point, the singular, irruptive, and revolutionary nature of a sign from space was taken for granted. In the context of the first genuine attempts to scour the skies for radio signals, conducted by Frank Drake and others at Greenbank in the early 1960s, Evans wrote the following:

> *"A great revolution with the profoundest ramifications for our lives is preparing. It will be the third general moral and intellectual revolution of post-medieval times. The first, the Copernican revolution placed mankind in the inanimate universe. The second, Darwin's revolution, placed him in organic nature. The third will reveal to us the other higher species of the cosmos. It may well be the most profound of the three, the most destructive-creative of them all. Man's very feelings toward the heavens will change; instead of a cold, empty vault, they will come alive — probably friendly, possibly indifferent, conceivably hostile."*

Continuing, he marvelled at the depth of ramification:

> *"How should we greet the event? What problems will it bring? What solutions? Who may gain, who may lose? What will be the impact on society? On the community of nations? On the consciousness of man?"*

Given this, Evans reflected this is an issue of equal importance to "nuclear war". Hoping that Barnes's "prophecy of a world war is unlikely", he arrived at his desire for a lesson in sagacity from the alien sign, should it come:

> *"...the point is that the discovery of advanced communities beyond the earth may lead to an absolutely un-paralleled expansion of human knowledge. So far we have lifted ourselves by self-help, by our boot-straps. But what if we could draw upon the accumulated wisdom of races millions, even hundreds of millions, of years ahead of us? Progress in all branches of practical and speculative knowledge may accelerate to an astonishing extent, limited only by our capacity to comprehend, assimilate, and use it!"*

[29] A. Koestler, 'The Boredom of Fantasy', in Harper's Bazaar (August, 1953), 121.

By turns both apocalyptic and expectantly hopeful, in equal degree, Evans concluded that searching for the sign "may act as an antidote to the gloom of the times":

> *"We may discover that our isolation is an illusion, and that we are not abandoned to self-destruction. We may be able to gather comfort from other species — perhaps millions of them — who have made the same passage we are making now."*[30]

This "passage", in his eyes, was that of that from reckless and precarious adolescence to sage and stable maturity. As ever, we project our own local and salient hopes and fears onto the sign. Naturally and inevitably, the longing for omniscience — for the "superior" solution to all worldly conundrums — could only rise again in the age when everything, even humanity's existence itself, comes into question.

⁂

Before closing, one final example of people's expectations regarding the sign in space, this time from the progenitor of S.E.T.I himself. In 1976, Frank Drake published an article in the *MIT Technology Review* revealingly titled 'On Hands and Knees in Search of Elysium'. In it, he modelled contact — intercepting the sign from space — as "a short-cut to wisdom", a way to leapfrog the way we plan our civilisation and skip our current "trial-and-error approach which has been until now our only available avenue to progress".

He continued, writing that:

> *"We would learn ways to improve the quality of life on earth at an unprecedented rate. We would learn what ultimate social systems are arrived at through evolution in other civilizations. Perhaps there are alternatives to choose from, some alternatives being better suited to certain biological forms and planetary chemistries and geologies. From this we*

[30] G.H. Evans, 'The Other Worlds Revolution', in The Humanist (August, 1964), 239-241.

*could understand the way of life most likely to be best for us in the long run."*

Nonetheless, he did admit the following:

> *"To be sure, there will be many forms of intelligent life unimaginably different from ours. They will behave differently, and what is reasonable to them will be greatly different from our concepts of rationality. It could be that we cannot communicate with such creatures at all, even if we are able to detect them. There is no strategy we can now construct to cope with this plausible situation."*

Drake then soared into speculation. He reasoned that, given that most civilisations capable of conversing across sidereal distances are also ones of technical sophistication, then most of them will be "immortal". That is, through advanced medicine and technology, their individuals never naturally die except through accident and physical destruction. He then imagined what such a civilisation would be like, conjecturing that they would have "a fantastic obsession with safety":

> *"...every device and vehicle must be so constructed as to present no lethal hazard under any circumstance."*

Because of this, Drake reasoned, they would not use high-speed transport.
"But then," he added, "who would be in a hurry anyway?" Continuing, he claimed that war would "probably no longer occur because no one would take the risk of fighting".
At which point, he came to a crux of his conjecture:

> *"A civilization of immortals would probably be extremely active in detecting and communicating with other intelligent civilizations for several reasons. First, such a civilization would soon use up the resources for amusement and adventure in its own limited planetary system and would want to share vicariously in the adventures of other civilizations.*
> *More importantly, the reverence they would attach to the preservation of individual lives would drive these immortals to avoid physical threat from*

> *another planet, even over the cosmic time scale. This may seem a remote possibility, but they would have to be certain."*

Finally, Drake revealed his motivating ambition for the search for a sign:

> *"An immortal civilization's best assurance of safety would be to make other societies immortal like themselves, rather than risk hazardous military adventures. Thus, we could expect them to spread actively the secrets of their immortality among the young, technically developing civilizations. This hypothesis suggests that the numbers of their signals may well be much greater than we imagine."* [31]

This way, Drake made the search for signs in space not only a "short-cut to wisdom" — one of pressing importance for the era marked by humanity's invention of the means to extinguish itself — but, in addition to this, also the *search for immortality.* Hence, his characterisation of S.E.T.I as a scouring, on our hands and knees, for "Elysium".

[31] F. Drake, 'On Hands and Knees in Search of Elysium', in MIT Technology Review (June, 1974), 22-29.

# 3. CONCLUSIONS

The alien — along with the reply it might give — has come to occupy two distinct roles in our modern minds. Firstly, the alien has become an avatar filling the gap left by the recession of conviction that there is one omniscient agent, one cosmic being with all the answers, which speaks to our perennial hope for a solution, our longing for an end to our questioning. Second, the alien has also become a kind of successor to the old idea of omnipotence: fulfilling the role that this notion used to play, as a recognition of reality's potency and potential to challenge all our systems, hopes, desires, and wishes, by simply being independent and otherwise.

Drake's religious tones were overt, and thus probably intentional. Nonetheless, such tones pervade all of our searches for signs — in space and elsewhere — and do so in subtle and profound ways. This is because, once they are engendered, psychological and conceptual needs do not disappear immediately on their first frustration, but can only fade with time. When it comes to the needs instilled by religions, this applies in a very strong way: the needs they engender remain, inertially, long after the surrounding doctrines and orthodoxies recede. Hence, we look for other concepts to reoccupy these positions and thus fulfil the desires left behind by religion's legacies. This is inevitable, and not inherently a dishonest thing, though it pays to be aware of the ways in which our search may be shaped by our local traditions and inherited worldviews.

One of the beauties of Daniela de Paulis's *A Sign in Space*, then, is the way it opens a space for pure speculation and questioning, rather than providing an answer. It acknowledges that the sign may never be decoded, that our frustration may be perennial. It doesn't provide an answer or a prescription so much as an invitation to speculate and suggest. Neither does it overpromise, appealing to our cultural longings

for immortality, Elysium, or an answer from beings that are somehow “superior” in some cosmic sense.

Perhaps, instead, and in the spirit of recognising the potency of things to be otherwise, there can be no cosmic ranking, no sense in which any beings are “better” or “worse”, because there is no view-from-nowhere that could make this decision, nor any voice-from-nowhere that will tell it to us. Perhaps, instead, we should regard the alien — and the sign it may send — as an invitation to explore the ways things can be different without being better or worse.

This way, I believe, *A Sign in Space* appeals more to that old stance of living with, and even celebrating, cosmical omnipotence, which is just the acknowledgement that things can be otherwise in ways that challenge all our hopes and hunches. It is essentially open-minded. It appeals less so to the desire for omniscience — for the search for the sign to provide one final answer — which has so often influenced peoples’ thinking when it comes to searching for signs in space. It allows the alien to be truly alien, in its independence and otherness. Neither does it rely on the pernicious, yet recurrent, assumption that the aliens will have all the answers nor that, in being elder, they will inherently be “superior” in some cosmic and impartial sense.

This way, *A Sign in Space* accords far more with the more modern, and humbling, acceptance that the terrestrial solutions to life’s challenges, and to the world-riddle, will not come anywhere near to exhausting the entire space of life’s cosmic possibilities. That is, that all Earth’s organisms and societies occupy only the tiniest island within the vast ocean of creatures and creations cosmically possible. And, moreover, that there perhaps is no inherent “better” or “worse”, and no cosmic ranking system.

Whatever the sign turns out to be, in reality and in performance, perhaps the above — a celebration of our own contingency and the ways our own mental habits do not exhaust all those possible — may not be the answer some want. But perhaps it might be a more interesting one. After all, isn’t it true that arriving at one monolithically irresistible conclusion, easily and effortlessly, doesn’t really make an interesting conversation? Perhaps, that is, wisdom is always earned — through learning from one's own history, through attending to and reckoning with it in all its incommensurable peculiarity and

unrankable particularity — and there can be short-cut, from outside and beyond, to sagacity.

# ABOUT THE AUTHORS

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Thomas Moynihan is a UK-based researcher and author. He holds a DPhil from Oriel College, Oxford, and is currently a Visiting Researcher at Cambridge University's Centre for the Study of Existential Risk.

He studies the history of ideas: primarily the ways changing theories about the wider universe have transformed human self-conceptions and practical priorities throughout the past, as a building sense of our placement within wider ranges of space and time has been pieced together.

## The Project Founder & Artistic Director - Daniela de Paulis

Daniela de Paulis is a former contemporary dancer and a media artist exhibiting internationally. She is also a member of the IAA SETI (Search for Extraterrestrial Intelligence) Permanent Committee and a licensed radio operator. Her artistic practice is informed by Space in its widest meaning. Since 2009 she has been implementing radio technologies and philosophies in her art projects.

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