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RELUCTANCE TO ADMIT WE ARE NOT ALONE AS AN INTELLIGENT LIFEFORM IN THE COSMOS

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With an ever-increasing body of evidence from diverse scientific disciplines all pointing to the existence of alien life and alien intelligence on a cosmic scale, there has developed a growing tendency to maintain that we might still be alone as intelligent beings in the universe. This a stubborn resistance to admit facts may well signal the end of our civilization.

Keywords: Exobiology, SETI, panspermia

1. Introduction

Yuri Milner, Russian billionaire who announced recently that he has relinquished his Russian citizenship, may have revived an ailing SETI (Search for Extraterrestrial Intelligence) programme with the injection of a 100 million dollars a few years ago. We are still waiting now for over a century for news of the first detection of an intelligent message from a cosmic neighbour. After such a long period even the genuine desire of humanity to discover an alien intelligence in all probability more advanced than us could be called to question.

It has recently been pointed out that such a message or messages may already have reached us, taking the form of microbial genetic codes that have already slipped into terrestrial biology (Slijepcevic, P. and Wickramasinghe, C., 2021). Temple and Wickramasinghe (2019) have also discussed a more specific model involving clouds of charged spinning dust grains that serve as conveyors of intelligent messages across the galaxy (see also: Temple, 2022). However, the more familiar expectation from SETI-type projects is the emergence of evidence for radio/microwave signals which has thus far been searched for over half a century with null, or at best dubious results.

2. Positive Evidence?

The SETI program (Search for Extra-Terrestrial Intelligence) began in 1960, supported first by NASA, and later by a few private or semi-private entrepreneurs. It is fair to say that any signs of success in this venture have been slow to come, and this

was, of course, to have been expected. With the exception of the famous “Wow!” signal discovered in August 1977, there has been a deathly silence across all of the prospective sources and electromagnetic wavelengths that have been scanned.

In 1977, the “sound” of extra-terrestrials may have been heard for the first time – or so it was thought at the time. The famous Wow! Signal was detected by radio astronomer Jerry Ehman using Ohio State University’s Big Ear Telescope. The telescope was a radio signal detector which, at the time, was pointed at a group of stars called Chi Sagittarii in the constellation Sagittarius. Whilst scanning the skies around the stars, Ehman recorded a 72 second burst of radio waves which he circled on his paper output with the word "Wow!” This record shown in Fig.1 is the source of the now famous “Wow!” signal – one that was never repeated. Over the following half a century the Wow! signal has tentatively been cited as possible evidence for the claim that we are not alone in the galaxy.

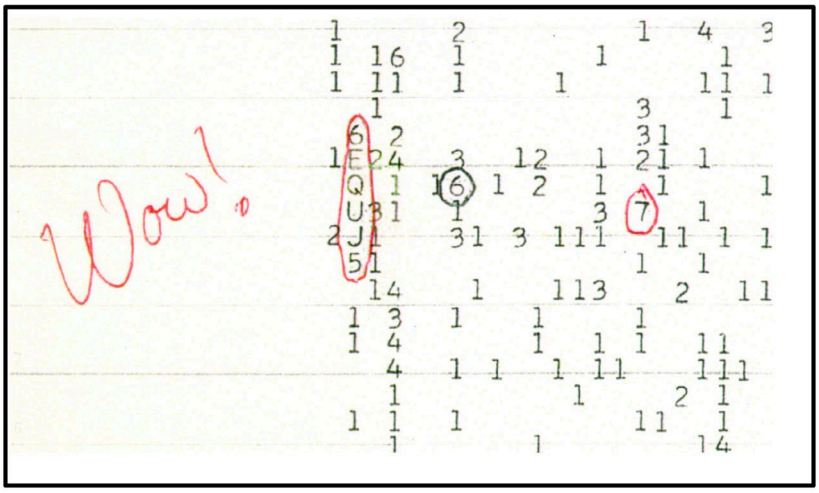

Fig.1. Ehman’s Wow! signal

Recently, however, Antonio Paris (2017) attributed the Wow! signal to a pair of comets. The comets 266P/Christensen and 335P/Gibbs, which possessed extended comas of neutral hydrogen millions of kilometres in diameter, appear to coincide with the direction from which the signal came. This explanation may have some credibility because the Wow! signal, which was detected at 1420MHz, matches the radio frequency at which hydrogen naturally emits. Furthermore, Paris verified that these comets were in the “vicinity” at the time, and that the radio signals from 266/P Christensen matched those from the Wow! signal.

3. Case for Oumuamua being an alien craft

In 2017 another comet-like object Oumuamua some 200m long came into the solar system from interstellar space in a hyperbolic orbit and crossed the ecliptic plane on September 6th 2017. The object intercepted the ecliptic (solar system’s orbital plane) from the direction of Vega, a massive bright star, some 25 light years away in the constellation of Lyra. After reaching perihelion (closest point to the Sun) the object evidently began leaving the solar system at a high relative speed, escaping the Sun’s gravity.

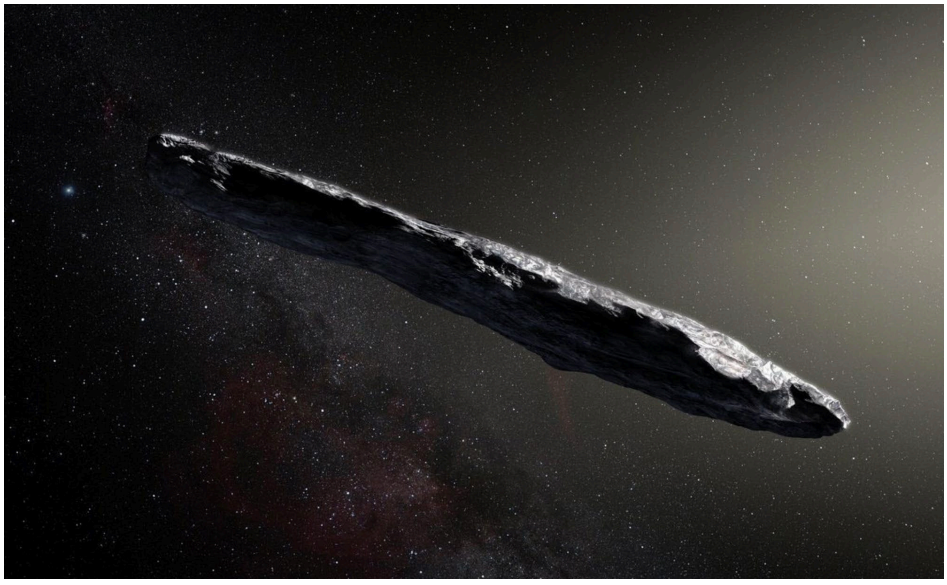

Fig.2. Artist's impression of Comet Oumuamua that reached perihelion in a hyperbolic orbit in 2017. The aspect ratio of up to 10:1 is unlike that of any object seen in our own solar system. (Image Credit: European Southern Observatory / M. Kornmesser)

Since the surprise arrival of Comet Oumuamua in the solar system in 2017, some aspects of this object's behaviour have puzzled astronomers to the extent that a few have proposed it may be a product of alien intelligence (Loeb, 2022). One of us (NCW) and a few colleagues have, however, challenged these claims arguing the case for a natural cometary origin of the most secure data that relates to this object (Wickramasinghe, et al, 2018. 2019). However, Loeb and his colleagues have pointed out many aspects of the data relating to Oumuamua that may indeed be consistent with an "alien spaceship" hypothesis (Ginsburg et al 2018, Loeb, 2019, 2022).

4. Black Cloud hypothesis

Fred Hoyle's 1959 classic science fiction novel "Black Cloud" anticipated many of the future developments in science and astronomy regarding the persistence of organic molecules and even living entities throughout the galaxy (Hoyle, 1959). The novel tracks the progress of a giant black cloud that comes towards Earth and positions itself in front of the sun, thus causing widespread panic. The cloud is revealed to be an alien gaseous superorganism many times more intelligent than humans, one which is perhaps surprised to find intelligent life-forms on a solid planet like the Earth. The cloud suddenly removes itself from our solar system because it detects a signal from another black cloud in another part of the Galaxy and it rushes off to make a new friend. This allows sunlight to return to the Earth and thus humanity is saved. It is important to stress that Hoyle's novel was written before dusty complex plasmas were known, and so his black cloud has no plasma aspects in the way that we now know it must have.

Besides the power struggles that ensue between competing institutions and groups of scientists and astronomers who are challenged with the task of dealing with the situation, some aspects of the science involved chime with recent scientific discussions in science. In particular, recent arguments by two of us (Chandra Wickramasinghe and Robert Temple) relating to the so-called Kordylewski Clouds are worthy of note (Temple and Wickramasinghe, 2019). They first point out that

recent astronomical observations combined with dynamical simulations have led to a confirmation of the existence of stable dust clouds (Kordylewski Dust Clouds) at the Lagrange libration points of the Earth-Moon system. The diameter of a Kordylewski Cloud is estimated to be about 9 times the Earth's diameter, and the radius of the average grain is estimated at ~ $3x10^{-5}$cm, consistent with bacterial-type cells, with a mean separation of less than 1 cm. We have argued that such grains are most likely elongated and similar to rod-like bacteria, photoelectrically charged to a few eV, and would acquire a spin through collisions with neutral gas atoms, and thus could act as emitters and absorbers of longwave electromagnetic radiation. The entire Kordylewski Dust Cloud comprised of such particles would then have the potential to possess electromagnetic connectivity combined with an information storage/processing capacity akin to a form of intelligence – a gigantic superbrain, not unlike Fred Hoyle's fictional Black Cloud. In addition to these calculations, it should be noted that the clouds must be dusty complex plasma clouds, which have additional characteristics of their own which would further enhance the inevitability of self-organisation and emergence of intelligence, presumably a kind of 'super-AI' intelligence of such vast computing power that the human imagination is simply incapable of even imagining it.

5. Spontaneous Generation of Life or Panspermia?

A prerequisite for success of any form of SETI is the presence of technologically advanced lifeforms on a galactic scale. On the basis of the reigning dogma of spontaneous generation, life on Earth emerged as the result of an exceedingly improbable accident whereby the chemical building blocks of life (nucleotides/amino acids) assembled themselves in primitive oceans to form an "evolvable" microbial living system. Hoyle and one of us (Hoyle and Wickramasinghe, 1982) have argued that this would inevitably involve probability factors of the order of 1 in $10^{40,000}$ that cannot be easily grasped or understood within the context of a finite universe. (See also more recent arguments discussed by one of us (Wickramasinghe, 2013). If we argue that a "miracle" transcending these improbabilities *must* have happened on the Earth for the sole reason that we are here, then a similar miracle will not be repeated elsewhere. If, furthermore, we assume that the evolutionary progression from microbes to intelligent humans arose in a natural sequence of the most exceedingly improbable events, then it stands to reason that this entire process will not be repeated elsewhere, and we certainly would remain hopelessly alone in the cosmos.

This position of isolation ultimately stems from a philosophy that dates back to the 3rd century BCE. The Greek philosopher Aristotle proposed that life can emerge *spontaneously* from non-life on a planet like the Earth whenever the "right conditions" prevail. This basic concept, stretched beyond Aristotle's own intentions, forms the basis of the modern theory of spontaneous generation to which we have already referred and which involves improbabilities on a scale that cannot be bridged no matter how vast or how old a finite universe might be.

Let's now turn to evidence as it continues to unfold at the present time. How did life *really* arise in the first place? Not just on the Earth, or in our Milky Way galaxy, but anywhere in the Universe? Conventional science has steadfastly maintained that the Universe itself had a definite origin in time 13.8 billion years ago, a little in excess of 3 times the age of the Earth. With new data recently emerging from observations made with the James Webb telescope, serious potential flaws are emerging in this

"standard" cosmology, possibly pointing to cosmologies which have an open timescale (Penrose, 2022). In such a cosmology one might well imagine a scheme that involves the "information" of life also to have an open timescale (Wickramasinghe *et al*., 2023). The idea of life emerging spontaneously on planet Earth, whether by unknown physical processes or even by means of miraculous intervention, then becomes irrelevant.

6. Psychological Impediments?

Let us next ask the deeper question: do we, *Homo sapiens* in the year 2023, really want to come face to face with a superior extraterrestrial intelligence if such exists? Or would we rather turn away from even contemplating such a possibility? Coming to grips with the prospect of AI, which might possibly trump human intelligence in the very near future, is already sending shivers down our spines, so there may well be a deep psychological impediment to facing any prospect of encountering, or even admitting the fact of any extraterrestrial intelligence higher than our own prevailing in our midst, or entering our space of cosy comfort. At a more basic level, there may also be a subliminal resistance to entertaining the prospect that the Earth continues to be connected to a vast cosmic "ocean" of informationally rich extraterrestrial microorganisms and viruses, and this may well be one reason for holding back a paradigm shift that is long overdue (Wickramasinghe, 2023). Our autonomy as a species and our absolute independence and self-determination will then be called into serious question. The ongoing antagonism to the concept of cometary panspermia might thus have deeper roots than we are willing to accept.

7. An Ancestral Psychological Driving Force?

There may, however, be a redeeming feature in our behaviour over the past few decades. All the space missions undertaken in recent times spell out a single unavoidable cosmic truth: *Homo Sapiens,* in whatever way we emerged, appears to be hard-wired to seek out its cosmic origins, perhaps *intuitively* sensing that *we* cannot be alone and, more importantly, that we could not claim to be the most intelligent or the most technologically advanced life form in our cosmic neighbourhood. An inkling of the same realisation seems to show up even in the cave paintings of our stone-age ancestors perhaps as distant in time as 20,000 years ago, for instance in the famous Lascaux caves in the Dordogne region of southern France (See Fig.1).

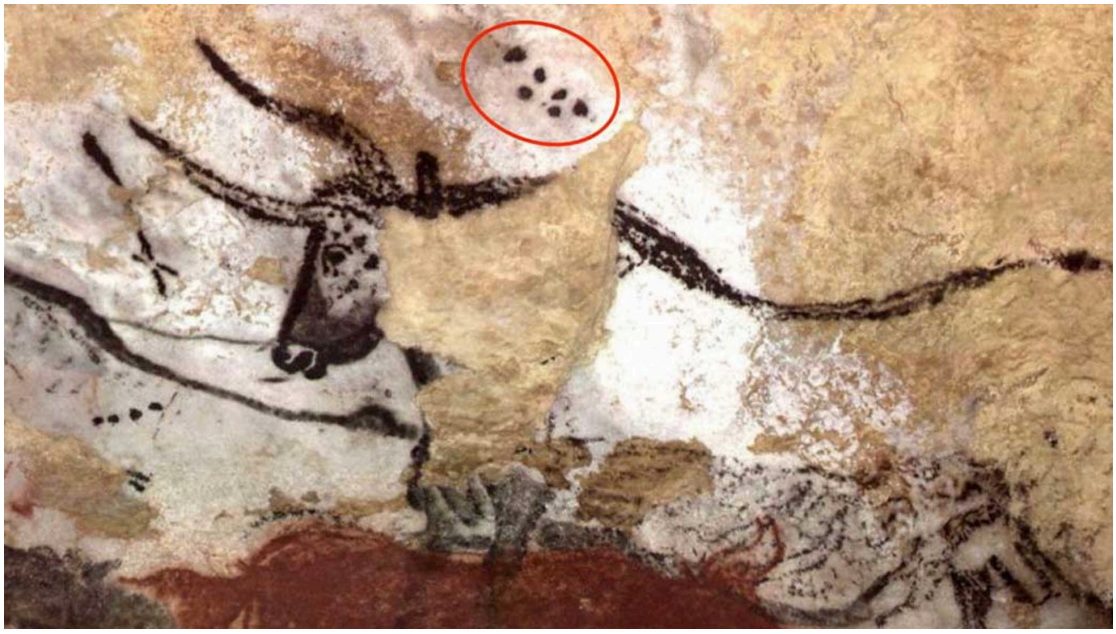

Fig.3. Ancient cave painting showing constellation of Taurus and Pleiades in the Lascaux caves.

Martin Sweatman and Alistair Coombs studied the chemical makeup of the paint used in cave drawings and dated the art back 12,000 to 40,000 years. Next, they calculated the positions of stars were positioned at the times the art was created and concluded that many of the cave paintings mark the dates of significant comet sightings, and that the relative placements of stars correlated with stellar constellations that were visible at those times.

8. Scope of Panspermia

Given an access to the basic genetic units of life which we have argued are contained and carried in comets, and throughout interstellar space, the requirement for the emergence of creatures like ourselves (carbon-based bipeds) would be for the existence of rocky planets with water and an atmosphere generally similar to Earth (Wickramasinghe et al, 2019). This is of course to exclude higher levels of "Black Cloud"- type intelligence that may also be lurking around in our vicinity and seeking to communicate with us. Sticking to creatures modelled on ourselves, how many such planetary homes exist in the Galaxy, and beyond?

In 2009 NASA launched its orbiting Kepler telescope, which was specifically designed to discover planets which are the size of Earth. The detection process involved tracking down minute blinks (dimming) in the star's light when a planet transited periodically in front of it during its orbit. Extrapolating from the sample of present detections, the estimated total number of habitable planets in the galaxy is reckoned to be in excess of a billion and with a mean separation of only 10 parsecs (Kopparapu, 2013). Most of these habitable planets orbit very long-lived red-dwarf stars that are nearly twice as old as the sun. On the vast majority of these planets, it is possible that life may have begun, evolved to advanced levels of intelligence, and perhaps long since disappeared, their homes being engulfed in the expansion of their parent stars in the red giant phase.

Apart from the additional prospect of microbial SETI that we have discussed, radio, microwave and laser detections of potential ET signals are still the priorities being pursued. It is in such ventures that financial support from individuals like Yuri Milner are still relevant and, of course, welcome. Such support could help to "buy" more telescope time, increase the range of wavelengths, enhance detector sensitivity and extend sky coverage. These new future developments have often been argued as necessary prerequisites if a SETI breakthrough within the foreseeable future is to be achieved. But it is worth stressing that a positive result from SETI would be contingent on the validity of the ideas of panspermia that we have developed for over four decades (Wickramasinghe *et al*., 2019). It is only the operation of panspermia, with the consequent widespread dispersal of information-carrying primitive life, that would lead to the emergence of intelligent lifeforms such as ourselves. How often does this happen?

The discovery of microorganisms occupying the harshest environments on Earth continues to provide indirect support for panspermia. Transfers of microbial life from one cosmic habitat to another requires endurance to space conditions for millions of years. The closest terrestrial analogue to this latter situation exists for microbes exposed to the natural radioactivity of the Earth. Quite remarkably, microbial survival under such conditions is now well documented. Dormant microorganisms in the guts of insects trapped in amber have been revived after 25-40 million years. All this goes to show that arguments used in the past to 'disprove' panspermia – an idea that had its beginnings in antiquity – independently in classical Greece, India and Egypt (Temple, 2007) - on the grounds of survivability during interstellar transport are seriously flawed. Another aspect of the circulation and transport of microbiota in space and the organisation of microbiota within cosmic clouds concerns the neglected aspect of *charge.* A paper is in preparation by two of us (Temple and Wickramasinghe) concerning the importance of charged microbiota, whether negative or positive. Just as there are two kinds of charged rain, positively charged at higher altitudes and negatively charged at lower altitudes, so there are two kinds of charged microbiota, positive and negative. Not only has this question not yet been discussed, but it appears that virologists have not even considered the effects if any which charge might have on the behaviour of viruses. (For instance, could some viruses be denatured or rendered less potent if subjected to charge reversals or repeated charge oscillations?)

Whilst Francis Crick and Leslie Orgel's idea of directed panspermia transfers the problem of the origin of life to another cosmic site, possibly invoking intelligent intervention (Crick and Orgel, 1973), modern advocates of panspermia have attempted to expand the domain in which cosmological abiogenesis *may* have occurred (Wickramasinghe *et al*., 2023). Once life has got started in the universe and evolved on an alien planet or planets the transference of the products of local evolution to other planets within reach becomes inevitable. Transference to other habitable planets or moons in the same system (eg between sites in our solar system) becomes more or less guaranteed over long enough periods of time. The same process can be repeated (via comet or asteroid collisions) to transfer genetic material carrying local evolutionary 'experience' to other distant molecular clouds containing nascent planetary systems. If every life-bearing planet transfers genes in this way to more than one other planetary system (say 1.1 on the average) with a characteristic time of 40My then the number of seeded planets after 9 billion years (lifetime of the

galaxy) is $(1.1)^{9000/40} \sim 2x10^9$ (Wallis and Wickramasinghe, 2004) Such a large number of 'infected' planets illustrates that Darwinian evolution, involving horizontal gene transfers, must operate not only on the Earth or within the confines of the solar system but on a truly galactic scale. Life throughout the galaxy on this picture would constitute a single connected biosphere.

9.Societal Resistance to Panspermia

The compelling spectroscopic evidence for panspermia, and consequently the widespread existence of biological dust in interstellar space and in comets, have been discussed for well over a decade and will not be repeated here (Hoyle and Wickramasinghe, 2000; Wickramasinghe, 2010). The existence of PAH's (polyaromatic hydrocarbons) both in interstellar clouds within our galaxy and in extragalactic sources have also been known for over 3 decades, and in our view, this has been incorrectly attributed to a non-biological origin. Biological aromatic molecules in the form of PAH's would be a natural result of the degradation of biological dust (bacteria and viruses) which we have argued makes up over 10 percent of carbon in interstellar space (Wickramasinghe, 2010).

Another phenomenon that is linked to PAH's and biological dust is the extended red emission (ERE) that has been observed in many extended astronomical sources (Witt & Schild 1988; Furton & Witt 1992; Perrin et al. 1995). These sources, including the Red Rectangle, emit radiation at red wavelengths that is readily explained on the basis of biological pigments. The biological aromatic model for ERE discussed by Hoyle & Wickramasinghe (1996) still remains the most reasonable explanation for this data. The competing at present in vogue, involving inorganically generated PAH's, are not easily justifiable in our view.

In addition to the growing body of astronomical evidence supporting panspermia over a broad front, there is also strong evidence for the continuing entry of bacterial material into the stratosphere of the Earth, amounting to some 20-200 million bacteria per square metre per day, a flux that will normally go unnoticed, but one that we cannot afford to ignore (Harris et al, 2001; Reche et al, 2018; Wickramasinghe et al, 2020).

In conclusion we stress that the prevailing societal resistance to panspermia is one that has to be overcome, for otherwise there will be a dangerous outcome for humanity. We have argued from 1979 onwards that pandemics of new viruses arriving from space pose a continuing threat to our planet. Many historic pandemics, including the 1918-1919 influenza pandemic that claimed 30 million lives, show all the signs of a space origin (Hoyle and Wickramasinghe, 1979). Similarly, other pandemics all the way down to the recent Covid-19 pandemic have signs of a cosmic content. In a recent paper we issued a "warning" as to how we might predict, and possibly prepare for, future eventualities of a similar kind (Qu and Wickramasinghe, 2020). Such warnings are ignored and when facts are rejected in favour of fashion and ideology there can be little doubt that the end is nigh.

What then of life outside Earth including SETI? Collisional ejection of life bearing rocks from a life-laden Earth to other nearby habitable sites in the solar system and beyond would appear to be more-or-less guaranteed. However, a reluctance to accepting available data including evidence for past and recent life on Mars and other

habitable planets and moons in the solar system appears to be deep rooted in prejudice (Joseph *et al*., 2023).

Another related matter concerns the objective and impartial assessment of the so-called UFO sighting reports. Here, perhaps understandably, prejudice runs at an even deeper level, and it is amply clear that such matters must be faced with honesty and courage. Humanity is perhaps not yet ready to admit that we are not alone – let alone invaded by alien life (Wickramasinghe and Tokoro, 2014; Grebennikova *et al*., 2018; Harris *et al.*, 2002). Let us hope that it will not take another devastating pandemic, an H.G. Wells-type War of the Worlds, or even a Fred Hoyle-type Black Cloud to visit before reality and sanity dawns on *Homo Sapiens*.

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