

About the search for extraterrestrials - ow, where are you here?

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Annotation (Abstract)

There are at least two strategies: 1 - to look for reasonable ones, such as us, and 2 - to look for strangers who are sharply different from us in the type and speed of communication.

"... ow, where are you here? " ... and here we are!"

Mikhail Zadornov, the seeker of meaning

Introduction

The activity and fearlessness of Russians in the situation with the pandemic and amendments to the constitution amazes. What the Western world takes for the danger of self-destruction is for Russia just incentives to perform planetary functions. It seems that Vladimir Vernadsky was right - "... the billion-year evolutionary process of cephalization cannot be stopped by events of a historical scale" - everything that is against - stops in the shortest possible time. This is evident, for example, in the brevity of the period of nuclear tests - from 1945 to 1998, only 53 years - even less than the retirement age. It resembles a splash, the duration of which was determined not only by people - it stopped almost instantly, as if on command.

For many Russians, the pandemic vacation smoothly turned into a working one - it's time to talk about the search for extraterrestrials, because the idea of the uniqueness of earthly intelligent life does not correspond to the principle of maximum geochemical activity. It seems that quiet loneliness in the universe is a dream incompatible with the life of Russians.

Problem state

The problem of contact with extraterrestrial civilizations is still too tough for us. It would seem that there should be a lot of them, for example, according to Drake's formula, but we don't see them, "says Enrico Fermi," ... and they shouldn't, "smiles a politician like Vladimir Putin. However, remaining within the framework of a scientific discussion, we have to state that Drake's formula, the Fermi paradox and similar attempts to estimate the probability of contact within the framework of the diffusion model are untenable. I will not theorize, I will offer experience - bring two adjacent fingers on your hand into constant contact for a week - according to Drake's formula, they should grow together with a high probability. And about the Fermi paradox, I will note - ... a skin cell on your right heel can meet a related cell on the left only if for some reason you want to scratch heel on heel. I'm ready to bet - none of us just scratch ourselves - only if, for example, it becomes hungry, cold, and finally bored. Of course, we can assume that the cage will somehow make you want to scratch, but in any case, this is an external reason in relation to both the cage and us. What can be done with probability here? - there are at least three ways: the first is to guess, the second is to try to make an assessment in the context of something more than a search, and the third is to influence the probability in the desired direction by ourselves.

It seems that when searching for extraterrestrial civilizations, one should not forget about the living rule of thumb: the more complex the system, the more difficult self-defense, including camouflage, from outsiders - otherwise the system will not survive. In addition, the search is complicated by pareidolia - an illusion that lies in wait for any scout outside his world. Pareidolia can be visual, auditory, tactile, mental ... No amount of pattern recognition will save him from pareidolia. Only extreme suspicious

attentiveness and constant learning from their own and others' mistakes will save. These are the usual professional qualities of an engineer and scientist by vocation in any field - physical and mental, humanitarian. Let me point out that the engineer is no less important to society than the scientist, because he materializes scientific thought. However, there are very rare people in whose personality an engineer and a scientist are united. And what is interesting - among the most different professions: a master of rare repairs at an oil field, this is such a strange profession, - several businessmen, several academicians, one professional intelligence officer who became the president of the country.

And more about pareidolia - look at the X-ray photo-mystery of the Sun - in the intricacies of magnetic field lines, for example, I saw a funny face. Therefore, there is nothing left but to support any empirical attempts creatively, by any means, to look for manifestations of the life of extraterrestrial civilizations, otherwise you will have to wave your fists after a fight ...

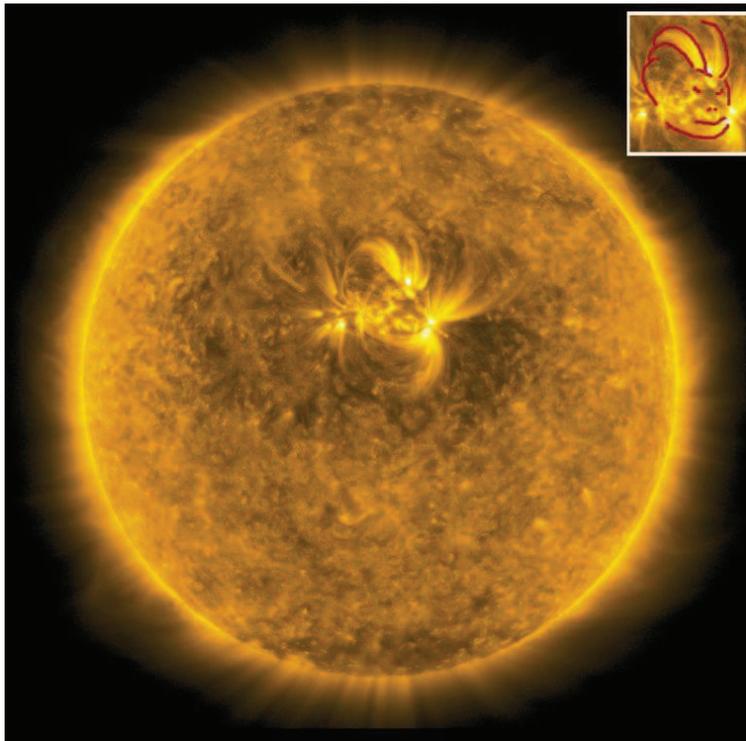


Fig. 1. A photograph of the Sun's corona was obtained on April 14, 2019 at 20:56 UT in the FeIX 171 A iron line by the AIA instrument on board the SDO satellite.

Search strategies

The basic principle of the search is that the closer a form of life is to us, the more similar it is to ours. This is a general empirical pattern for complex hierarchical systems - from nucleons to galaxies. Of course, adjusted for organizational anisotropy, which makes contact between dissimilar elements within the framework of general expediency. For example, two adjacent skin cells of the same type need each other and are in contact quite differently from, say, one of them with a neighboring cell of a different specialization. Hence, at least two search strategies: 1 - their own kind and 2 - sharply different from us in the type and speed of communication. The like look for each other in the same way and commute in the same way, so strategy-1 seems to be more productive than strategy-2. It is possible that the size of the galactic region for a life form like us is an astrosphere, a stellar wind bubble.

Strategy-2 and the possibilities of its technogenic development are no less interesting. Evolutionarily, we started in the hydrosphere with communication at the speed of sound. Then we moved into the atmosphere - a less dense environment and added electromagnetic communication with the speed of light to sound communication - made a jump in speed by 6 orders of magnitude. I will add another consideration - the dimension of the square of the speed of communication is the maximum specific energy available to a form of life that communicates at this speed.

Two examples: $(\text{speed_sound})^2 = (343\text{m/s})^2 = 1.176 \cdot 10^5 \text{ J/kg}$ is the typical specific energy of chemical reactions and $(\text{speed_light})^2 = 8.988 \cdot 10^{16} \text{ J/kg}$ is the specific energy of thermonuclear reactions - theoretically the continuation of the sequence is admissible.

In principle, there is no prohibition on the next jump - for the next 5 or 6 orders of magnitude, - says Sergey Sukhonos. There are incentives - on Earth we are getting cramped, as it once became cramped in water. We have ears and eyes - sensors for sound and electromagnetic waves or bosons and, possibly, a sensor for signals of the next level of communication. This is most likely the youngest, developing paired structure of the brain and spinal cord. The daytime range of our audibility in the radial direction is the thickness of the atmosphere to an altitude of about 50 km, visibility to the nearest star, the Sun. The ratio of the ranges of daytime visibility and audibility is approximately equal to the ratio of the speeds of light and sound communications - we use them during the day. It seems that at night we actively use only the third-generation communication sensor, the most long-range, - unlikely when we sleep, an intensively working brain is engaged only in the processing of daytime information, protection and rehabilitation of the body tired during the day. Otherwise, earthly life would be too autonomous, calm - without entangled quantum states.

It is permissible to consider the problem of contact with extraterrestrials as part of a more general problem of the Exodus - the inevitable evolutionary leap of the social person outside the Earth.

The idea of the Exodus is sometimes illustrated by analogy with the pioneers-navigators. It seems that it is not enough and Gödel's theorem requires going beyond human limits - otherwise the problem of contact cannot be solved. Gödel's theorem is surprisingly optimistic - it allows you to hope for the solution of any problems and not too much trust in today's axioms:

If you want to solve the problem -

then jump out of your pants.

And look at her wider -

as a word in a line of verse.

I am more impressed by the analogy with our ancestors from another habitat that is now alien to us. A visual picture - the ancient amphibians discuss the urgent problems of their native reservoir - pollution, overpopulation, erosion of social landmarks ... and come to an uncontested inspiring conclusion - they need to move to another reservoir. Details of the Exodus are reflected in the scientific, philosophical, religious literature, as well as in the genetic code and history of the development of the embryo. If the trend continues, then it looks like our stage of the Exodus relay will be overcome faster than the previous one by about 10^5 times. If the previous one lasted, say, 18 galactic years, then 40 thousand earth years will be enough for us, of which some have already passed.

Another biomorphic analogy model - universal spermatogenesis - is used as a plot by Arthur Clarke in the novel "Childhood's End". A numerical estimate of the Exodus period from considerations of the similarity "man ~ spermatozoon" leads to the same 40 thousand Earth years. But the analogy performed by Arthur Clarke looks very gloomy. He feels it and in advance disowns the authorship of the idea of the plot in the epigraph - "...the opinions expressed in this book are not those of the author". Konstantin Tsiolkovsky and Sergey Sukhonos have created much more optimistic and attractive scenarios for a social person to enter the next habitat.

Conclusion

In general, it seems that the transition period will be short even by historical standards, and, possibly, with conflicts of interest, which are an attribute of the life of open hierarchical systems. Most likely, outwardly, the life of a planetary society will resemble the dream of the communists and, oddly enough, those who want to see the ultimate form of social, genetically fixed caste - as in the current living organism. However, the future "race of beings who independently design and improve themselves" is hardly compatible with our current dreams and notions of intelligent life striving for understandable goals.

In general, here we are faced with a situation that Stanislaw Jerzy Lec managed to express with one amazing phrase - "... In reality, everything is not as it really is." On my own I would add - ... if the road to hell is paved with good intentions, then to heaven, it seems, with sharp jokes.