

GENESIS OF LIFE ON EARTH: DIFFERENT PRESENTATION JUNE 18 2021

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It looks increasingly clearer to me that my scientific theory of abiogenesis is right, and so I want to just listen to how it sounds, as a story perhaps for children even. There was a discovery that water was part of Earth's formation in 2020, and before that it was known to have existed 4.28 billion years ago. I think we can assume that water was central already around 4.4 billion years ago around 154 million years of cooling later.

Now we have water and we can tell the story of how life arose from a non-living world.

Our story is holistic in that we consider (a) carbon density in water, (b) plenty of ocean, (c) plenty of sunlight.

There are a class of organic molecules of moderate sizes that are 'animate' by themselves. They replicate themselves in the wild without much assistance of a complex infrastructure. Other organic molecules, even those that are biologically active in living organisms, are not alive. Our abiogenesis story begins around 154 million years after Earth is formed when the oceans already take shape. Our story is not a story of living things but how the sun indiscriminately bombarded the oceans with a huge amount of photons day after day after day in a cold lifeless planet and filled the oceans with all sorts of organic molecules that were inert, dead, lifeless.

Life arose when particular chemical configurations were reached by sheer inefficiency and abundance of millions of years of bombarding the oceans producing covalent bonds between a reasonably large density of atoms in the waters of the world.

We will pause here.

Damyata: The boat responded Gaily, to the hand expert with sail
and oar The sea was calm, your heart would have responded
Gaily, when invited, beating obedient To controlling hands
I sat upon the shore Fishing, with the arid plain behind me Shall
I at least set my lands in order? London Bridge is falling
down falling down falling down Poi s'ascose nel foco che gli af-
fina Quando fiam uti chelidon—O swallow swallow Le Prince
d'Aquitaine à la tour abolie These fragments I have shored
against my ruins Why then Ile fit you. Hieronymo's mad againe.
Datta. Dayadhvam. Damyata. Shantih shantih shantih

You see you can't waste time and have to quote Eliot's The Waste Land before the United States or Russia or England or whoever decides that it is they who will bomb you and extort all seas. We were in a lifeless Earth just now, and I could

easily proclaim the entire oceans of the world as mine, lifeless, but the sea was calm you see?

1. THE DENSITY OF CARBON IN EARTH'S OCEANS

The volume of water in Earth's oceans is

$$V = 1.335 \times 10^{18} m^3$$

The total amount of carbon in the oceans is

$$M = 38100 Gtons = 3.81 \times 10^{16} kg$$

Therefore the density of carbons in a cubic meter of water on Earth is

$$\delta = 3.81/133.5 kg/m^3 = 3810/133.5 g/m^3 = 28.53933 g/m^3$$

This is one of the keys to why sunlight actually produces covalent bonds. This density is equivalent to 2.378 moles of carbon in every single cubic meter of ocean. This density is just high enough so that the mechanism that we propose will actually fill up the sea with organic molecules over millions of years. If the density were far lower then the probability that sun's rays ionise enough carbons to promote covalent bonds would be lower and the Earth might not have produced any living things at all.

Note that the situation here, relatively high density of carbons in oceans and sunlight bombarding the oceans is a generic situation and our mechanism will work on any planet in the universe with sufficient water and sufficiently high carbon density and sufficient energy with high frequency photons to ionise the carbon atoms. Abiogenesis there will have the same sort of quality that after large amounts of dead organic molecules being created indiscriminately, there will be a probability of particular RNA being produced that are animate, and then the story of life will begin there as well. This situation is extremely general, and we are proud of our scientific theory of abiogenesis for the beautiful parsimony of assumptions and clear understanding of the elements that lead to living molecules.

2. SUN'S RADIATION THAT CAN IONISE CARBON ATOMS

The sun acts as a thermal blackbody of temperature $T = 6000K$. Let's consider the frequency version of Planck's law.

$$(1) \quad I(\nu, T) = \frac{2h\nu^3}{c^2} \frac{1}{e^{h\nu/kT} - 1}$$

This is so nice, but you see we don't care about most of the frequencies. We care about only those frequencies that will ionise carbon; that's ionisation energy $e_0 = 11.2603eV$. Solar radiation does have a bit of charging for these energies, but it's delicate. It's the *left tail* of the blackbody spectrum. We want to get probability from the Planck Law.

We will calculate the probability and the result will be crucial to *why there is any life on Earth*. We want to keep emphasizing that it was the sunlight that really was responsible for genesis of all life on Earth. In the beginning was the sun, and sun did not say a goddam word. The sun just sputtered and groaned and indiscriminately bombarded Earth's ocean with absolutely no care about little carbons in the bottom of the ocean, and eventually life formed on Earth and the

sun was still oblivious to life. Eventually Life produces the Temple of the Sun God in Egypt and sun was oblivious and still sputtering.

At this point, we begin to sing.

At first flash of Eden We race down to the sea Standing there on
 freedom's shore
 Waiting for the sun Waiting for the sun Waiting for the sun
 Can you feel it Now that Spring has come That it's time to live in
 the scattered sun
 Waiting for the sun Waiting for the sun Waiting for the sun Waiting
 for the sun Waiting, waiting, waiting, waiting, waiting, waiting,
 waiting, waiting
 Waiting for you to come along Waiting for you to hear my song
 Waiting for you to come along Waiting for you to tell me what
 went wrong
 This is the strangest life I've ever known

Waiting for you to tell me what went wrong. This is a beautiful song of Jim Morrison and The Doors. My dear readers might not truly appreciate this song without realising that indeed this is the strangest life you have ever known. But it's okay if you don't like talking about that.

There is a small probability for sunlight to contain photons that ionise carbon. There is a divine balance here, for our account says that those photons were crucial for emergence of life at all on Earth. Simultaneously, if this probability was just a bit uncomfortably high, then life would not live long either, as all biological molecules would be in danger of being destroyed by sunlight.

I want my dear reader to appreciate that I have on my desk a book of articles called *The Axial Age and Its Consequences*. When we scan over the blackbody radiation spectrum of the sun, we ought to be moved by awe at the beauty of the situation where sun leaked just sufficient photons that could ionise carbons to produce life on Earth, and not so much as to destroy it altogether. We are quite far today from the Axial Age, when all parts of the world gave rise to Transcendental considerations. I don't see why we should not have veneration and awe for the balance between sunlight that ionises carbon and the rest of the nourishing rays of sunlight that caress life without threatening every biomolecule in our bodies with disruption.

So what is the frequency of light that will ionise carbon?

$$\nu_0 = 11.26\text{eV}/h = 2.723 \times 10^{15}\text{Hz}$$

Now we have to be quite delicate, because that's just the sort of ultraviolet frequency where we are quite sure sun will not produce in abundance. It's not that sun is particularly caring of all his children and so on; it's that life did develop, and I might not be the healthiest specimen in the world but miraculously I am still alive, and still causing great scientific revolutions on Earth and writing all manner of great pronouncements to my Beloved people the Human Race. Fine, it is true that I do love my people the Human Race much more than the sun. Look how uncaring the sun is compared to me! But unfortunately I don't go around bombarding oceans with my own blood and spawn entire living ecosystems. In another life, I might do that. In this life, I want to do these other sorts of things.

3. ESTIMATE OF PROBABILITY OF HIGH ENERGY PHOTONS IN SUNLIGHT

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> sum(I(rt[2:270]*1e14,6000)/(2.77*3e10))
[1] 9.306256
> sum(I(rt[271:301]*1e14,6000)/(2.77*3e10))
[1] 4.284325e-15
> sum(I(rt[271:301]*1e14,6000)/(2.77*3e10))/9.3
[1] 4.606801e-16
```

Our estimate at the moment for probability of photons from sun able to ionise carbon atoms is $p_{carbondisrupt} = 4.6 \times 10^{-16}$. This looks reasonable to me.

Now let's see how much of these photons will actually show up in a cubic meter of water in a day.

The total amount of Joules that will pass through the cubic meter is

$$e_{tc} = 2734082J$$

Of these how much are these high energy photons?

$$e_{thc} = e_{tc} \times 4.6 \times 10^{-16} = 1.2577 \times 10^{-9}J$$

This looks reasonable. Let's convert this to electron volts.

$$e_{thc} = 1.2577 \times 10^{-9} \times 6.2415 \times 10^{18} = 7.85 \times 10^9 eV$$

In other words, in a meter cubed of ocean water, we expect $e_{thc} = 7.85 \times 10^9 eV$ of high energy photons to pass through this region. They will have a chance to ionise some of the 2.5 moles of carbon matter in the cubic meter.

4. PROBABILITY OF FINDING A CARBON ATOM IN A 91 PM GRID

Carbon radius is 91 picometers, and the density of carbon is roughly 2.5 moles per cubic meter, so the probability of finding a carbon element in a cubic grid within a cubic meter of length 91 pm is this:

$$p_{loc} = 2.5 \times A_0 \times (91pm)^3 = 1.131 \times 10^{-6}$$

Now we can estimate the expected number of carbon atoms ionised by sun rays at

$$p_{loc} \times (4.6 \times 10^9 eV) / 11.26 eV = 463$$

This is a possibility and certainly would guarantee abiogenesis but somehow seems too high.