# Re: "The Scarcity of Life Bearing Planets"

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On Feb 9, 8:26 am, "Ynam" <y...@xxxxxxx> wrote:

> "The Scarcity of Life Bearing Planets"
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> There is considerable interest in the possibility that there may be a large number of planets in our galaxy that are suitable for life. In the hope that there may be intelligent life on planets lying within a reasonable distance, a project named SETI (Search for Extraterrestrial Intelligence) has been set up to search for evidence of that life. The idea behind the project is that intelligent life may be generating signals which can be received on Earth that are either a by−product of their civilization (such as our own radio broadcasts) or a deliberate attempt to communicate. Unfortunately, the probability of success of those programs is far lower than currently believed. If an Earth sized planet existed 93,000,000 miles from a star that was virtually identical to the Sun, it is extremely unlikely that it would be capable of supporting life. To see why this should be so, an examination of our own Solar System is order.
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> With the exception of Mercury, the Earth, Mars, and Pluto, all of the planets have enormous atmospheres (relative to the Earth). One can draw no conclusions about the original conditions on Mercury or Pluto. Mercury is too small and too close to the Sun to have prevented its atmosphere, regardless of its original quantity, from boiling away to space. (There may be a remnant of an atmosphere frozen at the poles.) At the other extreme, due to its distance from the Sun, any atmosphere that Pluto may have had at its beginning and which has not been lost by evaporation to space is of necessity frozen solid and is therefore unobservable. Observations have shown that Mars once had a significant atmosphere that supported running water (and, by implication, oceans) but has lost both. Apparently, its low gravitational mass has made it too easy for the Sun's radiation to cause Mar's atmosphere to evaporate to space. Of all the planets, it is Earth that is the anomaly.
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> Due to its location, Venus receives about twice the heat input from the Sun as does the Earth. Its gravitational mass is slightly less than that of the Earth and yet it has an atmosphere about 70 times as dense as the Earth. In addition, the atmosphere of Venus is alleged to consist of mostly carbon dioxide. Since, under the evaporation process, the other normal atmospheric gases, having a lower molecular weight, will evaporate before carbon dioxide

does, the initial Venusian atmosphere must have been significantly denser than it is now.

The Earth, on the other hand, has an atmosphere that contains a negligible quantity of carbon dioxide but is relatively rich in the lighter gases. In addition, it is estimated that about 3 billion years ago the atmospheric pressure on the Earth was about 20 PSI and has been reduced to its current level of 14.7 psi. This means that, for the Earth, 25% of the atmosphere has been lost in 3 billion years, probably by a net evaporation to space. (Any gas or vapor subject to a vacuum will evaporate, an atmosphere is no exception.)

It seems reasonable to accept that the early history of the Solar System approximated the following stages:

A:− The planets were formed by the collision of smaller objects circling the Sun in eccentric orbits. The collision process continued until the Solar System was virtually cleared of objects in non−circular orbits.

B:− During the planetary formation stage, the planets could not acquire atmospheres because the bombardment that was forming them made their surfaces extremely hot. Atmospheric gases which impacted the planet from interplanetary space or from the accreting object might be expected to boil away quite rapidly, particularly since they were being added to the surface of the planets.

C:− Once the rate of bombardment forming the planets reduced to the point where the planets could cool sufficiently, they were capable of collecting atmospheres from gases that remained in the Solar System. (There are arguments that planetary atmospheres were formed by outgassing. The writer doubts this was a major source of atmosphere, but whether it was or not does not affect the conclusions.

D:− For Venus and the gas giants to have their present atmospheric density, all of the planets, including the Earth, must have initially acquired enormous (by Earth standards) atmospheres. They gained their atmospheres by sweeping up gases from the surrounding interplanetary space (and possibly by outgassing) and lost some of that atmosphere by evaporation to that same space from the uppermost layer of the atmosphere.

In order for a molecule of gas to be lost to the planet, it must acquire a thermal velocity greater than the planet's escape velocity. This must occur at an altitude at which the atmosphere is sufficiently thin so that it does not strike other molecules while escaping. (This occurs above the altitude where the effects of diffusion are significant.) The rate at which atmospheric gases are lost to space is determined almost entirely by the rate of energy input from the Sun and by the escape velocity of the planet at the top of its atmosphere The rate of atmosphere loss is virtually independent of the amount of atmosphere the planet owns at any instant of time.

The Earth−Moon system has two characteristics that are anomalous compared to the other planets. The first is that it has far too much angular momentum (orbital angular momentum, rotational angular momentum of the Earth and the Moon, and orbital angular momentum of the Moon around the Earth). As pointed out in a text by Dr. Urey, an exponential plot of angular momentum vs. total mass for all of the other planets yields a straight line. The total angular momentum of the Earth−Moon system lies far above that line. The second anomaly is that it contains far too little atmosphere and, unlike Mars, the density of that atmosphere has remained almost unchanged. A satisfactory explanation for both of these anomalies seems to have been provided in the 80's
by a computer simulation of a glancing impact on the Earth by an object having a mass about one sixth of its mass and which yields a conclusion for the formation of the Earth−Moon system which seems to be currently accepted. The simulation predicted the formation of a binary system with a Moon sized object orbiting the Earth an altitude of about 12,000 miles, with the Earth having a 4 hour day, and with the Earth having captured the iron cores of both objects. Since the length
of the Earth's day was, is, and will remain less than the Moon's orbital period until the Sun enters its red giant stage, tidal effects on the Earth will perpetually transfer angular momentum from the Earth to the Moon. This transfer has lengthened the Earth's day to 24 hours and has caused the Moon's orbit to increase to 238,000 miles. More important, such an impact would have blasted away most if not all of the atmosphere the Earth had at the time and, if the collision occurred late enough in the formation period of the Solar System, most of the interplanetary gases would have already been absorbed by the other planets and/or lost to interstellar space and not be available to reform much of an atmosphere on the Earth. This scenario could easily allow the Earth to have the comparatively puny but stable atmosphere required to support the evolution of intelligent life.

In order for a planet to support life, not only must it be in the "life zone" about a suitable star, it must possess an atmosphere of a suitable density for a sufficient period of time for life to evolve. On the Earth, life does not seem to prosper above an altitude where the density is half an atmosphere. At the other end of the scale, the atmosphere must not be too thick or the wavelengths of radiation needed for photosynthesis not only will not reach the atmosphere−water interface where life begins, that interface is likely to be too hot due to the temperature rise of adiabatic compression. (This temperature rise is the reason the surface of Venus is so hot). Making the optimistic assumption that four and a half atmospheres is the highest suitable atmospheric pressure requires that a life supporting planet not lose more than four atmospheres of density in the period required for intelligent life to evolve. For a planet starting with the atmospheric density of Venus to lose 60 PSI of surface atmospheric pressure in 3 billion years (the time required for intelligent life to have evolved on Earth), the existence of such life would require an age of 50 billion years for the planetary system. Such a conclusion
presents problems. A star similar to our Sun will become a red giant about 10 billion years after its formation and the apparent age of the Universe is only 15 billion years. On the other hand, if a planet such as Mars lost its

atmosphere at a sufficient rate to reach compatibility with the requirements of life before its star became a red giant, it would pass though the "life range" so quickly that intelligent life would probably not have had time to evolve. It is the author's belief that, without the addition of the 'wild card' implicit in the postulated Earth−Moon collision, a planet capable of supporting life cannot exist. (It is hoped that this question would be examined further.) It is the author's belief that intelligent life is much rarer in the Universe than Dr. Sagan suggested.

The asteroid belt exists as a ring of stony and iron rocks in orbit about the Sun between the orbits of Mars and Jupiter. The radius of that orbit coincides with the anticipated location of a planet under the conventional theory of planetary formation. If one examines the objects in the asteroid belt, the moons of Mars, and the meteorites that strike the Earth, one finds that, unlike comets, many if not most of them composed of stone or of iron. Unlike the flimsy comets, such objects cannot form by accretion, they can only be formed within a planet−sized object that has already accreted. One must conclude, therefore, that initially a planet did form at the radius of the asteroid belt and was later shattered by a collision. Such a collision would drive away most of the planetary material and leave a residue of rocks from the planet's upper layers and iron objects from the planet's core. That collision is a reasonable candidate as the source for the object that impacted the early Earth to form the Earth−Moon system, the meteorites which strike the Earth, and the moons of Mars.

The writer is of the strong opinion that, unless a planet that is located around its star and sized to be suitable for the retention of an atmosphere, undergoes such a history at the appropriate time in the planetary system process a planet suitable for the evolution of intelligent life cannot evolve. It would seem, therefore, that in addition to the probability factors now considered for the existence of life bearing planets that yield the possibility of perhaps 100 civilizations within our galaxy, an additional factor must be considered for each candidate planetary system. This factor is the probability of AN EVENT occurring at the right time in the planetary formation process to drive off the excess atmosphere from a planet that is large enough to retain a stable atmosphere. When added to the already tabulated probabilities assumed for the SETI observations, it seems quite probable that instead of a civilization occurring about 100 times in a galaxy as is currently hoped, civilization would occur once in a hundred or a thousand galaxies. If this were the case, the SETI project would seem to be doomed to failure.

The source material for this posting may be found inhttp://einsteinhoax.com/hoax.htm(1997);http://einsteinhoax.com/gravity.htm (1987); andhttp://einsteinhoax.com/relcor.htm(1997). EVERYTHING WHICH WE ACCEPT AS TRUE MUST BE CONSISTENT WITH EVERYTHING ELSE WE HAVE ACCEPTED AS TRUE, IT MUST BE CONSISTENT WITH ALL OBSERVATIONS, AND IT MUST BE MATHEMATICALLY VIABLE. PRESENT TEACHINGS DO NOT ALWAYS MEET THIS REQUIREMENT. THE WORLD IS ENTITLED TO A HIGHER STANDARD OF

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E−mail:− einsteinh...@xxxxxxxx If you wish a reply, be sure that your mail reception is not blocked.

The material at the Website has been posted continuously for over 8 years. In that time THERE HAVE BEEN NO OBJECTIVE REBUTTALS OF ANY OF THE MATERIAL PRESENTED. There have only been hand waving arguments by individuals who have mindlessly accepted the prevailing wisdom without questioning it. If anyone provides a significant rebuttal that cannot be objectively answered, the material at the Website will be withdrawn. Challenges to date have revealed only the responder's inadequacy with one exception for which a correction was provided.

Howdy,

I'm not sure how a discussion of extra−terristrial life got listed under the heading of sci.physics.particle, but it's an interesting topic and one that I've thought about quite a bit.

In my view, we don't really have enough data to accurately predict the number of "M−type" planets (to use a StarTrek reference for planets that can sustain human life). The StarTrek number is 1 in every 72,000 planets.

I've heard many arguments in favor of a "unique earth" proposition −− that the conditions required to create and sustain life on earth are so specific, and so delicately balanced that the chances of this same eco−system being reproduced elsewhere are unlikely. (some argue that the planet must have a moon that drives the tides which enabled aquatic mammals to progress to a terrestrial habitat −− others argue that there must be an extinction event like the asteriod that many belive wiped out the dinosaurs 65 million years ago to enable primates to prosper −− etc. )

My thinking on the matter is guided by a few principals extrapolated from what we know about the Universe now.

The first is that we are all made up of the same stuff −− we are all "star dust" made up of the same elements from the same periodic table (allbeit in different combinations) everywhere we look in our Universe −− the chemistry and the laws of physics are the same on Alpha Centauri as they are here.

The second is that life is a persistent bugger. Everywhere we look on our planet (and possible others if you believe that foscilized microbes were discovered in a meteroite from Mars) life has taken hold. From the frozen arctics wastes to the deepest under−sea "black smokers", from boiling hot thermal pools to just under the surface of permafrost, life forces itself upon the world. One commentator stated that it's as if life is a logical consequence of nature.

The third is that in addition to being persistant, life is also hugely adaptable and thus a planet need only have the basic ingredients to get going. Some commentators have proposed that the only requirement is liquid water, which is why we can continue our search for life on Mars and on the moons of Saturn and Jupiter.

The fourth is that there are so many stars, most of which we now believe to have planets surrounding them, that the sheer odds of finding other "M type" planets have got to be pretty good.

From all of this I conclude that there are many M−type planets available to support life, and that life is a logical and inevitable consequence of the evolutionary processes on these planets, that life need not be "life as we know it" but rather, will be a varied in its form and content as the environments which created it.

I do agree with you on the poor chances of finding intellegent life via the SETI project −− not because there is no one to talk to, but rather because we are still to primative to bother with.

Our world may be an object of study for some advanced civilizations, but not yet ready to formalize relations with.

Thanks for posting your views and providing space for me to reply.

−− Deck

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