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Elihu continued and said:

“Bear with me a little, and I will show you, for I have yet something to say on God’s behalf.”
—Job 36:1-2 (NRSV)

Advanced “Earth Conditions”

Corrections to Miller’s 1953 Hypothesis and Its *Likely* Indications

Greg Stafford**

In a very important but brief scientific article published in 1953, Stanley L. Miller (1930 – 2007), with the assistance of Nobel Prize winner, chemist, and physicist Harold C. Urey, showed how an already existing, intentionally intelligent (human) being under simple yet highly controlled and managed conditions could generate what have been called the basic building blocks of life (though not “life” itself), namely, amino acids.¹

Note, however, the latter part of the title of Miller’s article with my emphasis, “... *Under Possible Primitive Earth Conditions*.” In this paper I will argue based on the best available reasons that Miller’s hypothesis is not simply “possible,” but *likely*. Further, I will argue that the conditions under which such a production of amino acids *likely* occurred were not at all “primitive” but *advanced*, in that we would have to presently conclude, though without claiming to know for a certainty, that the conditions for the production of amino acids was similar to the very experiment which Miller conducted.

This can be shown both by Miller’s own experiment and by a comparative consideration of other types of what can also only be presently considered similarly designed, created, and maintained production “apparatus(es).” Therefore, throughout this paper I intend to show that neither Miller nor the scientific community which has followed his experiment appears to fully recognize the most important consequences of Miller’s experiment, in as much as this same scientific community (which included Miller) did not embrace Miller’s experiment as evidence of what Miller had truly demonstrated.

Due to the brevity of Miller’s article, it is practical here for me to quote extensively from it in discussing its content and conclusions. As I do so, I will explain how Miller and others who may cite him as a basis for concluding that anything other than an intentionally intelligent (and, thus,

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¹ See Stanley L. Miller, “A Production of Amino Acids Under Possible Primitive Earth Conditions,” *Science* 117 (May 15, 1953), pages 528-529 (available here: <http://www.sciencemag.org/content/117/3046/528.full.pdf>). For my discussion of what is considered by regular practice to be “intelligence” in contrast to “*intentional* intelligence,” see my article, “The Intelligence in Life: Intent and “Time,”” *Watching the Ministry* (February 8, 2010 [link: <http://elihubooks.blogspot.com/2010/02/intelligence-in-life-intent-and-time.html>]), beginning with the paragraph starting with, “Consider further the question of *intent*”; see also my subsequent article, “Intentional Intelligence in Non-Human Life: The Division of Human Language,” *Watching the Ministry* (April 5, 2010 [link: <http://elihubooks.blogspot.com/2010/04/intentional-intelligence-in-non-human.html>]).

already existing or) living being similarly put together the necessary controls and the required “apparatus(es),” likely not only for the basic “building blocks” of life but also for “life” itself to exist and to be maintained, are not basing their conclusions on the best available evidence. This evidence includes, as I intend to show in this paper, Miller’s own 1953 experiment.

You can consider Miller’s 1953 study and conclusions here in this paper, or by reading Miller’s article separately yourself followed by a consideration of my response. I recommend keeping both Miller’s 1953 article and this review and response to the same together for convenience and for the most effective use in any related studies, presentations, or discussions with others over any of these and other, related subjects.

The opening paragraph in Miller’s 1953 article reads:

The idea that the organic compounds that serve as the basis of life were formed when the earth had an atmosphere of methane, ammonia, water, and hydrogen instead of carbon dioxide, nitrogen, oxygen, and water was suggested by Oparin and has been given emphasis recently by Urey and Bernal.

The “idea” expressed here by Miller begins with and is, thus, only possible because of already existing (and, hence, existentially unexplained) beliefs concerning 1) the earth, 2) the earth’s atmosphere, 3) the gases methane, ammonia, water, and hydrogen, but 4) not the existence (or, rather, presence in earth’s atmosphere) of carbon dioxide, nitrogen, oxygen, and water, the presence or absence of which is subsequently and further 5) controlled by a living (and, hence, already existing), intentionally intelligent being (in this case, Miller). *These conditions* are the foundation for what follows in Miller’s experiment, to which Miller then proceeds:

In order to test this hypothesis, an apparatus was built to circulate CH₄, NH₃, H₂O, and H₂ past an electric discharge. The resulting mixture has been tested for amino acids by paper chromatography. Electrical discharge was used to form free radicals instead of ultraviolet light, because quartz absorbs wavelengths short enough to cause photo-dissociation of the gases. Electrical discharge may have played a significant role in the formation of compounds in the primitive atmosphere.

In fact, Miller’s hypothesis *requires* that an intentionally intelligent, already existing being first design and then build “an apparatus” which can “circulate” the already existing (but, again, existentially unexplained or unaccounted for) gases through “an electric discharge” which also had to be put in place or generated intentionally by the same already existing human being, in this case, by Miller.

Only then comes the “resulting mixture” which (with my underlining) the “electrical discharge was used to form.” Note here again the language used by Miller, “... *was used to form.*” But, who ‘used’ it? It would have to be the same one who by means of intentional intelligence also designed, created, controlled, and maintained the very same apparatus involved in the experiment, namely (again), Miller.

However, note Miller’s conclusion, “Electrical discharge may have played a significant role in the formation of compounds in the primitive atmosphere,” which misses all of the earlier described, surrounding and, in fact, foundational elements which gave rise to the “electrical discharge” in the first place! Indeed, Miller attributes more to the presence of the “electrical discharge” than he credits his own actual, intentionally intelligent planning out and so also *Miller’s own causing* of the discharge.

Based on Miller’s experiment and in view of the lack of any other type of non-intentional, or “un-intelligent” experiment which could produce any similar results, the evidence indicates we must conclude differently from Miller’s “may have” and say more than this, namely, that ‘electrical discharge likely played a significant role in the formation of compounds in the [earth’s] primitive atmosphere.’ However, demonstrably related to and even foundational to this same conclusion is the acceptance of the existence of an intentionally intelligent being capable of arranging for and maintaining these same or similar-type components and conditions in early earth’s atmosphere because this is, in fact, what Miller did show by means of his own “apparatus” and experiment.

I will here repeat my earlier contention: Miller’s 1953 experiment can only be used to show that *an already existing, intentionally intelligent being likely* “played a significant role in the formation of compounds in the primitive” or, rather, the “*earlier* atmosphere.” I believe this because it is both 1) precisely what Miller demonstrated and 2) it is consistent with everything else which can be repeatedly demonstrated using similarly intelligent and intentionally designed apparatuses filled with measured components and with other components intentionally excluded, along with intelligently set temperatures and other controlled apparatus conditions (for example, “an aspirator arrangement to promote circulation” [from Miller’s page 528, quoted below]).

Based on Miller’s experiment, it is *likely* that the atmosphere in which such formations (amino acids) occurred was not at all “primitive,” if by this Miller means in any way *not as advanced* as Miller would consider the same or similar conditions in his own intentionally intelligent experiment. In fact, there is no basis in Miller’s experiment for concluding anything but that under the very same or similar conditions an already existing, intentionally intelligent being (in this case, Miller) designed, built, and then used a controlled and conditioned “apparatus” for the production of compounds such as amino acids (and this still does not explain what is “life” or how “life” came to be part of systems comprised of [among other things] amino acids).

Returning to Miller’s 1953 article, page 528, paragraph 3:

The apparatus used is shown in Figure 1 [shown on page 6 of this paper (GS)]. Water is boiled in the flask, mixes with the gases in the 5-l flask, circulates past the electrodes, condenses and empties back into the boiling flask. The U-tube prevents circulation in the opposite direction. The acids and amino acids formed in the discharge, not being volatile, accumulate in the water phase. The circulation of the gases is quite slow, but this seems to be an asset, because production was less in a different apparatus with an aspirator arrangement to promote circulation. The discharge, a small corona, was provided by an induction coil designed for detection of leaks in vacuum apparatus.

The intentionally designed and intelligently built apparatus (shown on page 6, followed by other, similar apparatuses) is then used by an already existing being (Miller) to ‘boil water.’ The boiled water is then intentionally ‘mixed with gases’ and ‘circulated past electrodes’ before the intelligently built apparatus by intentional design “empties” the mixture “back into the boiling flask.” Once again, intentional intelligence is shown in the apparatus’ designed *prevention* of ‘circulation in the opposite direction,’ this so the “amino acids formed in the discharge ... accumulate in the water phase.”

Subsequently, Miller noted varying degrees of success in the resulting “production” as it relates to “a different apparatus” which was also designed and built by an intentionally intelligent, already existing and living being (Miller). Indeed, the “small corona” discharge “was provided

by an induction coil” which was (with my underlining) “designed for detection of leaks in vacuum apparatus.” Miller then writes:

The experimental procedure was to seal off the opening in the boiling flask after adding 200 ml of water, evacuate the air, add 10 cm pressure of H₂, 20 cm of CH₄, and 20 cm of MH₃. The water in the flask was boiled, and the discharge was run continuously for a week.

The “procedure” described already to this point by Miller shows clearly that an already existing, intentionally intelligent being (Miller) ‘sealed off the opening in the boiling flask.’ This was done *after* the same already existing, intentionally intelligent being added water, removed the air, and then added measured quantities of specific gases exclusive of other gases. After all this, then the “water in the flask was boiled” and the discharge “run continuously for a week.”

However, to this point in his article it should be kept in mind that Miller has failed to note *the necessity of himself* or of a similarly existing, intentionally intelligent being as part of Miller’s “experimental procedure.” Miller continues:

During the run the water in the flask became noticeably pink after the first day, and by the end of the week the solution was deep red and turbid. Most of the turbidity was due to colloidal silica from the glass. The red color is due to organic compounds adsorbed [adsorbed involves one substance sticking to another substance (GS)] on the silica. Also present are yellow organic compounds of which only a small fraction can be extracted with ether, and which form a continuous streak tapering off at the bottom of a one-dimensional chromatogram run in butanol-acetic acid. These substances are being investigated further.

Here Miller describes what took place *after* Miller arranged for the earlier described and controlled conditions. Yet, from the apparatus to the boiling water, to the measured and included gases to any gases intentionally excluded, from the air present to the vacated air, without Miller none of this would have been possible.

It is Miller who intentionally created the above described conditions, and it was Miller who set in motion the circulation of a mixture past electrodes. It is Miller who is also responsible for the following parts of his experiment:

At the end of the run the solution in the boiling flask was removed and 1 ml of saturated HgCl₂ was added to prevent the growth of living organisms. The ampholytes were separated from the rest of the constituents by adding Ba(OH)₂ and evaporating *in vacuo* to remove amines, adding H₂SO₄ and evaporating to remove the acids, neutralizing with Ba(OH)₂, filtering and concentrating *in vacuo*.

Again, without Miller none of this would have been possible. Therefore, Miller’s 1953 subject experiment shows that in order for even amino acids to be formed there likely were extensive conditions in the early earth’s atmosphere intelligently designed and intentionally created or arranged and thereafter also maintained by the same living, intelligent being under highly controlled conditions. The obvious conclusion which results from a complete consideration of the involved person(s), the designed and built equipment, included and excluded gases, and other intentionally controlled conditions is what makes Miller’s first full paragraph-sentence on his page 529 so surprising (with my underlining added):

The amino acids are not due to living organisms because their growth would be prevented by the boiling water during the run, and by the HgCl₂, Ba(OH)₂, H₂SO₄ during the analysis.

And yet there is no question that, ultimately, and rather immediately in Miller’s experiment, in fact, the amino acids *are* ‘due to a living organism,’ for at the very least (though it can and does go farther²) *they are due to Miller*.

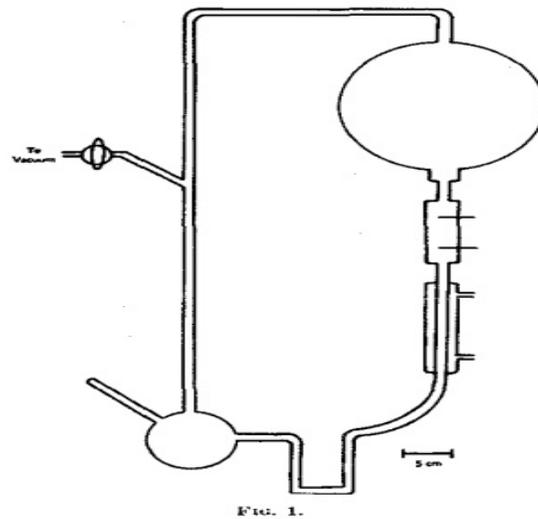
Just as Miller was present and arranged for the conditions of his experiment, so also there must have been one or more who similarly existed during earth’s “primitive” or earlier condition, one or more who like Miller should also be credited for the productions which have likely occurred through similarly ordered, constructed, controlled, and maintained ‘experiments.’

Miller’s second and third full paragraphs on his page 529 describe further the results of his own experiment, which experiment did end up producing a small amount of amino acids. In his fourth paragraph Miller references the “apparatus” which he designed and created for use in his experiment, namely:

² See my article, “The Origin of Life Is Life (or Something or Someone Already Alive),” *Watching the Ministry* (January 13, 2010 [link: <http://elihubooks.blogspot.com/2010/01/origin-of-life-is-life-or-something-or.html>]), in which I provide an argument such as the following for the origin of “life” as life itself, or rather something or someone already (and so, ultimately, eternally) alive:

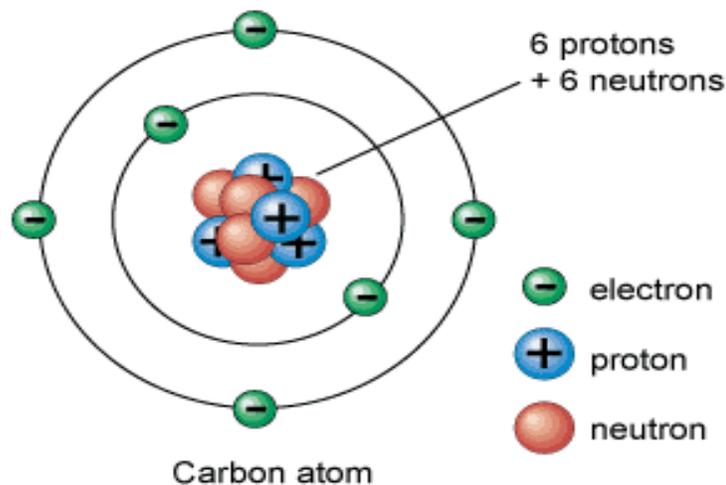
- 1) “Life” exists. (Examples include: You, me, and ‘living’ things which have some active “system” of production which can be considered “dead” when completely non-functional in contrast to its/our definable, ‘living’ quality or functioning-as-it-normally-does-and-is-expected-to-do “system.”)
- 2) Based on all known, shared, and/or otherwise available scientific study and information “life” can only come from something or from someone already alive or living. (In other words, there is no example which can be demonstrated or produced and so considered “scientific” in which “life” is produced apart from anything or apart from anyone who is already alive.
- 3) Therefore, since based on all known, shared, and/or otherwise available scientific study and information life can only come from something or from someone already alive or living, the origin of life must be life or something or someone who is already alive.
- 4) Further, based on the above “life” must also be considered “eternal,” or “life” must always have been in existence in some sense since life is, in fact, *here* now and the present life can only have come from preceding life, and so on all the way back until the cause of each life is the same by repeated demonstration and observation: Life.

The above argument demonstrates scientifically that “life” is eternal or that it (that is, “life,” or something or someone already alive) must always have been in existence in order for life to be here now or at any time in the past or even in the future (since the same argument would then also apply, as above). If this eternal life is also intentionally intelligent as we consider humans (like Miller) to be intentionally intelligent, then this would account for what Miller has shown “likely” took place in early earth’s “primitive” atmosphere: An intentionally intelligent, already existing being designed, set-up, controlled, and then produced the compounds (amino acids) needed as “building blocks” or proteins in order for physical “life.” However, since Miller failed to account for the necessity of such already existing, intentionally intelligent life, Miller correspondingly failed to make the connection which was not only “likely” based on Miller’s own experiment but even *foundational to it*, namely, that what is needed first of all is the existence of intentionally intelligent life, like Miller, but on a scale matching the “apparatus” and matching also the intelligent design and the greater (quantitative) choices needed to produce compounds in earth’s early atmosphere.

Miller’s “Apparatus”³

In this same second-to-last paragraph of his article, Miller opens in closing summary of his experiment by writing, “In this apparatus [the one above, which Miller designed and created] an attempt was made [by Miller, an already existing, intentionally intelligent being] to duplicate a primitive atmosphere of the earth.” Yet, what resulted was the production of amino acids which, though a small “yield,” according to Miller “with a more efficient apparatus ... this type of process would be a way of commercially producing amino acids.”

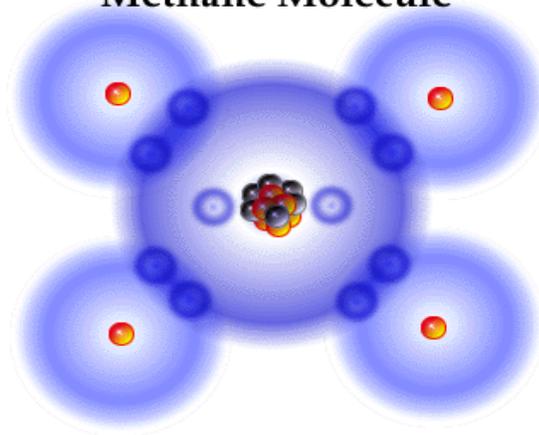
However, even if a small yield of amino acids took this much existing and intelligent life and materials to produce, in light of Miller’s experiment it must have taken an incredible amount of intelligence and control to design, to create, and also to maintain “apparatus(es)” and “building blocks” such as the following:



[Image source link: http://www.phy.cuhk.edu.hk/phyworld/articles/laser/c-atom_e.gif (last accessed on January 10, 2011).]

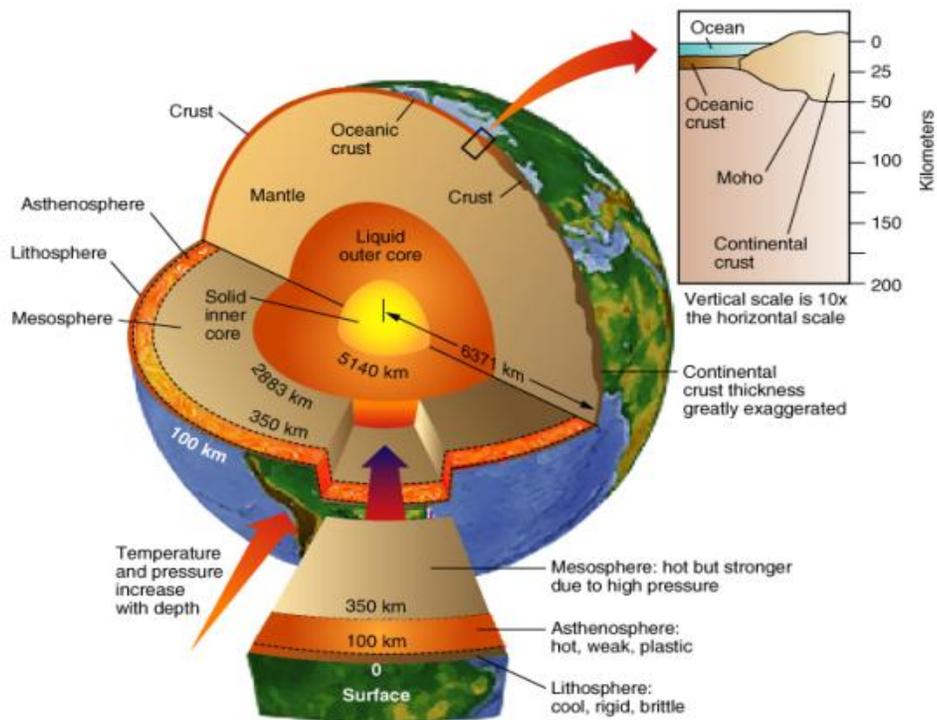
³ See Miller, “A Production of Amino Acids Under Possible Primitive Earth Conditions,” page 528.

Methane Molecule



[Image source link:
<http://www.brooklyn.cuny.edu/bc/ahp/SDgraphics/PSgraphics/Methane.GIF>
(last accessed on January 10, 2011).]

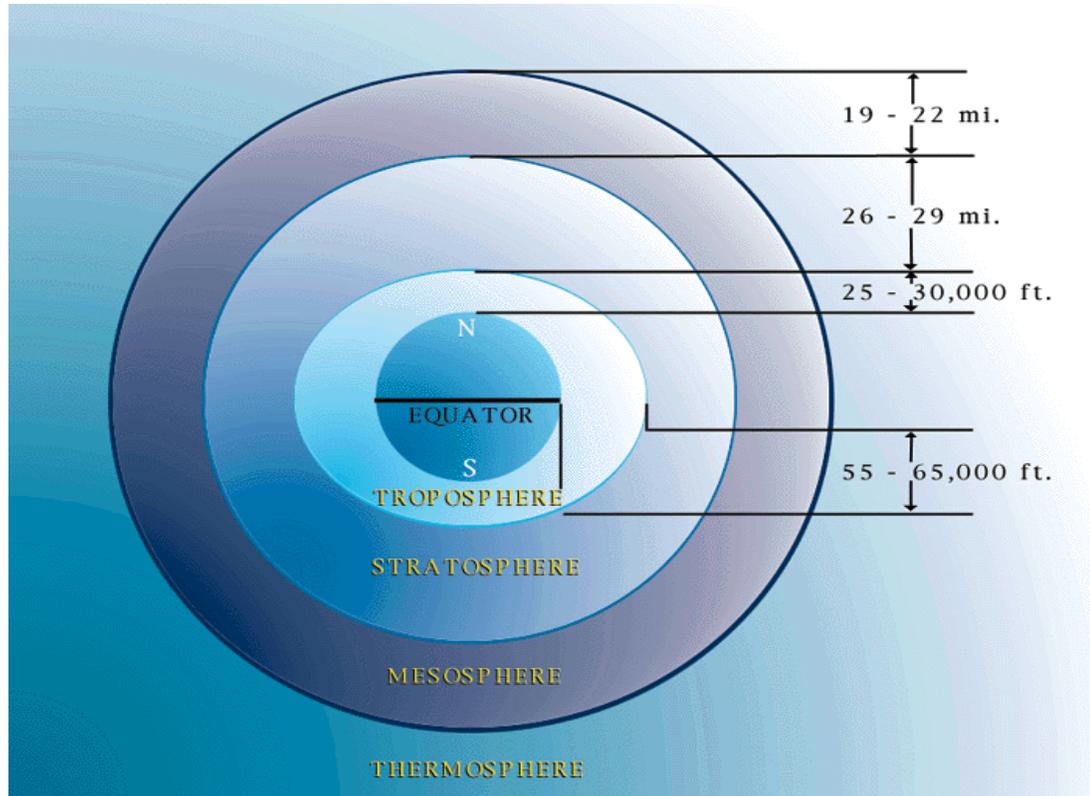
The Layers of the Earth



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[Image source link:
http://www.oso.tamucc.edu/labs/lab4/Lab4_files/image004.jpg
(last accessed on January 10, 2011).]

The Layers of Earth’s Atmosphere

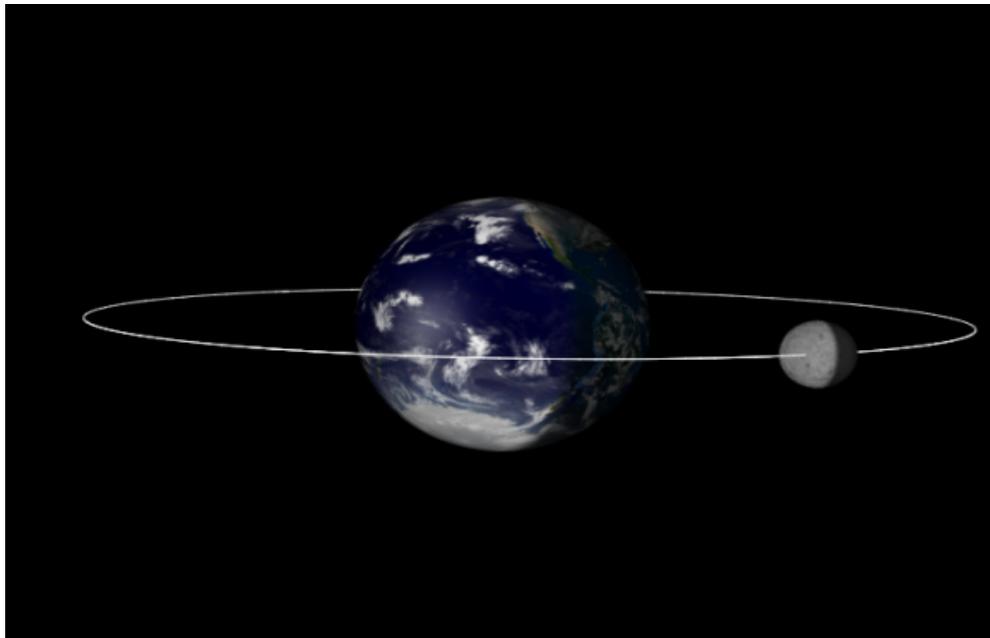


[Image source link:

http://wings.avkids.com/Book/Atmosphere/Images/atmos_layers.gif

(last accessed on January 10, 2011).]

The Earth and Its Moon in Orbit

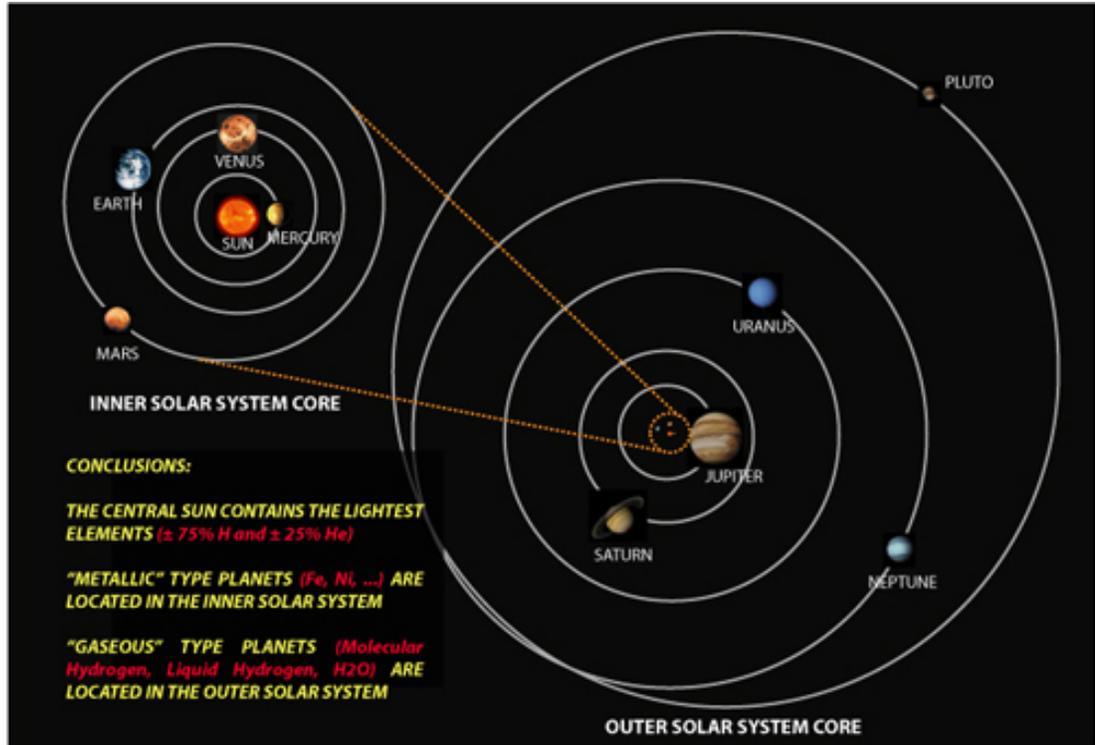


[Image from Neptune, late 2003, with each body magnified by 20; source link:

http://xplanet.sourceforge.net/Gallery/20031202_earth/earth.png

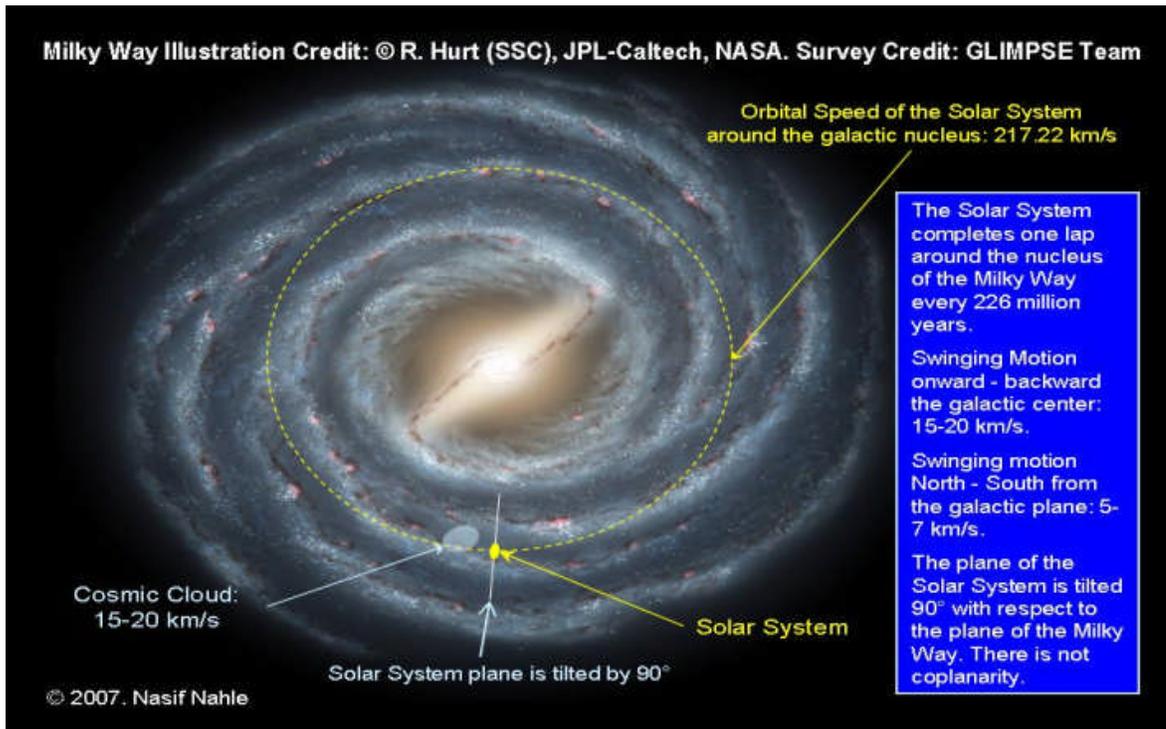
(last accessed on January 10, 2011).]

Our Solar System



[Image source link:
http://www.keshetechnologies.com/image/solar_system/Solar-system_500.jpg
 (last accessed on January 10, 2011).]

Our Milky Way Galaxy



[Image source link:
http://biocab.org/Cosmic_Cloud-Solar_System-Milky_Way.jpg
 (last accessed on January 10, 2011).]

Like Miller’s “apparatus,” the above-type systems or structures show intentional intelligence, but in ways that include and that also go far beyond Miller’s own 1953 experiment. Yet, rather than support the belief that intentional intelligence was *not* needed in order to produce amino acids under early earth’s conditions, Miller’s experiment shows clearly that there likely was an intentionally intelligent, already living being capable and desirous of designing, building, and then putting into place and into operation the right apparatuses with controlled conditions necessary to maintain, as was true with Miller and with his experiment.

At its beginning, in the middle, and at its end Miller’s 1953 experiment shows that even for the formation of very basic compounds (such as amino acids) there likely was an already existing, intentionally intelligent being who designed and who then set up controlled conditions within which further creative results or productions took place. This is precisely the conclusion which I, too, believe results from the best available evidence. Miller’s 1953 study is simply a part of that large body of evidence which supports the belief that a living, intentional intelligence was behind the production of amino acids and other compounds in the early earth’s atmosphere, which were then used to create the physical forms into which “life” came to be through what was likely also a further indication of intentional intelligence, that is, in so far as we can conclude was “likely” based on the best available evidence.

What remains unclear is 1) why Miller took himself out of the sequence of causes and other intentionally intelligent contributions involved in and throughout his own experiment, and 2) why anyone else since Miller would similarly fail to promote or to highlight the *necessity* of intentional intelligence behind the production of amino acids in early earth’s conditions. Indeed, Miller and his intelligently designed and arranged for experiment are not simply “possible” conditions for the early earth’s production of such basic compounds. The conditions demonstrated by and inclusive of Miller’s 1953 experiment are *likely* to have existed in view of the great production experienced originally in our early earth.