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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 the Miller/Urey 1953 Hypothesis and Its *Likely* Indications

Greg Stafford**

In a brief yet important, 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 but 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

While I do not believe amino acids are, in fact, the building blocks of “life,” but rather only the building blocks of protein (which is a part of physical, living things) not *life*, since when a person dies the protein/amino acids remain for a time. Yet, at death something which kept the person or living creature alive is gone, even though the amino acids and protein remain for a time as the person’s body decomposes. Therefore, it seems clear where there are amino acids or proteins there is not always life, and so amino acids are not in any real sense the “building blocks of life,” as is commonly taught.

Apart from this, note the latter part of the title of the Miller/Urey article with my emphasis, “... *Under Possible Primitive Earth Conditions.*” In this paper I will argue based on the best available reasons the Miller/Urey hypothesis is not simply “possible,” but *likely*. Yet, it is often the possibility that is chosen rather than the conclusion which is most likely (think of the odds involved in the biological evolution of life by random chance versus the creation of life intentionally).

In this paper I will argue the conditions under which such a production of amino acids *likely* occurred were not, in fact, “primitive,” but advanced. Further, I will argue Miller/Urey did not account for the primary agents in the production of amino acids: themselves. Finally, from this I will show the conclusion adopted by Miller/Urey is not the most likely conclusion which follows from their experiment.

* This article was most recently revised on February 8, 2013.

** Greg Stafford owns and operates Elihu Books, a book publishing, video and audio production company related to the educational and ministerial activities of Christian Witnesses of Jah around the world. For more on Stafford’s writings and theological interests see the Topical Index at http://www.elihubooks.com/content/topical_index.php.

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> [last accessed: February 5, 2013]). For my discussion of what is considered by our regular practice to be “intelligence,” and 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>]).

Ultimately, I believe what Miller/Urey showed was we must presently conclude without claiming to know for a certainty the conditions for the production of amino acids were similar to the Miller/Urey experiment, namely, advanced conditions which were designed, set up, and maintained from the start through to the end. This can be shown both by a careful evaluation of the Miller/Urey experiment and by a comparative consideration with other types of similarly designed, created, and maintained production “apparatus(es).”

Due to the brevity of the Miller/Urey 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/Urey and others who may cite their experiment as a basis for concluding anything other than an intentionally intelligent (and, thus, an already existing or) living being similarly put together the necessary controls and the required “apparatus(es)” for the production of amino acids are not basing their conclusions on the best available evidence. I will show this in the balance of this paper, using in large part as my evidence the Miller/Urey 1953 experiment.

The opening paragraph in this Miller/Urey 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/Urey begins with and is 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/Urey).

It is *these conditions* which are the foundation for what follows in the Miller/Urey experiment, which experiment then proceeds according to Miller/Urey (with underlining added):

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, we can say the Miller/Urey hypothesis implicitly *requires* an intentionally intelligent, already existing being must 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 discharge must also have been intentionally generated or put in place by the same already existing human beings (Miller/Urey).

Only after all these things are completed is there a “resulting mixture” which (with my underlining) the “electrical discharge was used to form.” Note again the language used by Miller/Urey, “... *was used to form.*” But how was it “used”? If the ‘use’ comes from within the intentionally designed, built, and maintained apparatus (which it does) then the resulting mixture and any ‘use’ within the apparatus is also, ultimately, the product of the same intentional intelligences who designed, built, and maintained the same apparatus (again, Miller/Urey).

However, note the Miller/Urey 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/Urey attribute more causation to the presence of the “electrical discharge” than they do their own actual, intentionally intelligent planning and design, which is what led to the electrical discharge in the first place.

Based on the Miller/Urey 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 “may have” (= Miller/Urey) and say more, namely, ‘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 intentionally intelligent beings capable of arranging for and maintaining these same or similar-type components and conditions in early earth’s atmosphere for, in fact, this is what Miller/Urey showed by their created “apparatus” and subsequent experiment.

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

Based on the Miller/Urey experiment, it is *likely* the atmosphere in which such formations (amino acids) occurred was not at all “primitive,” if by this Miller/Urey mean in any way it was not as sophisticated as one might consider the same or similar conditions which were designed, created, and used in the Miller/Urey experiment. In fact, there is no basis in the Miller/Urey experiment for concluding anything other than under the very same or similar conditions an already existing, intentionally intelligent being (in this case, Miller/Urey) designed, built, and then used a controlled and conditioned “apparatus” for the production of compounds such as amino acids, which still does not explain what is “life” or how “life” came to be part of physical systems comprised of (among other things) amino acids.

Returning to Miller/Urey, page 528, paragraph 3:

The apparatus used is shown in Figure 1. 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 (Figure 1 is shown on page 6) is then used by an already existing being (Miller/Urey) 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/Urey 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/Urey). 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/Urey then write:

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/Urey shows clearly an already existing, intentionally intelligent being had to “seal 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 Miller/Urey it should be kept in mind Miller/Urey failed to note *the necessity of themselves* or of a similarly existing, intentionally intelligent being as part of the Miller/Urey “experimental procedure.” Miller/Urey 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/Urey describes what took place *after* they 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/Urey none of this would have happened according to any known scientific study.

This is because it is Miller/Urey who intentionally created the above described conditions; it is Miller/Urey who set in motion the circulation of a mixture past electrodes; and it is Miller/Urey who is also responsible for the following parts of this 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/Urey none of this would have been possible. Therefore, the Miller/Urey 1953 subject experiment shows in order for even amino acids to be formed there likely were extensive conditions in the early earth’s atmosphere which were 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, the included and excluded gases, and the other intentionally controlled conditions is what makes the first full paragraph-sentence on page 529 of Miller/Urey 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, ultimately, and rather immediately in the Miller/Urey experiment, the amino acids *are* ‘due to a living organism,’ for at the very least (though it can and it does go farther²) *they are due to Miller/Urey*.

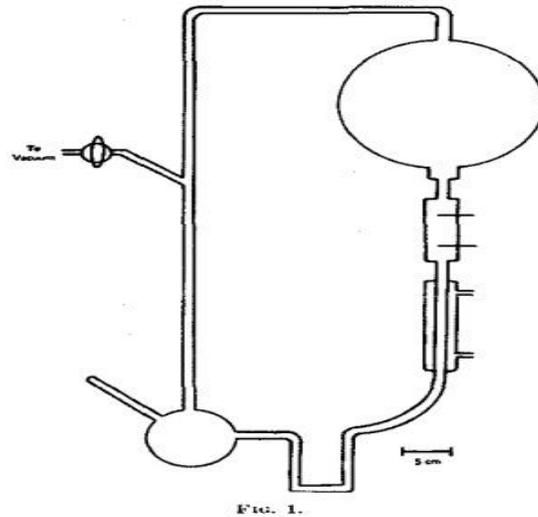
Just as Miller/Urey was present and arranged for the conditions of his experiment, so also there must have been one or more intentionally intelligent and powerful beings who similarly existed during earth’s “primitive” or earlier condition, one or more beings who like Miller/Urey should be credited for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

The second and third full paragraphs on Miller/Urey page 529 further describe the results of their experiment, which experiment did end up producing a small amount of amino acids. In their fourth paragraph Miller/Urey reference the “apparatus” which was designed and created for use in this 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*, or rather as something or as someone already (and so, ultimately, *eternally*) alive:

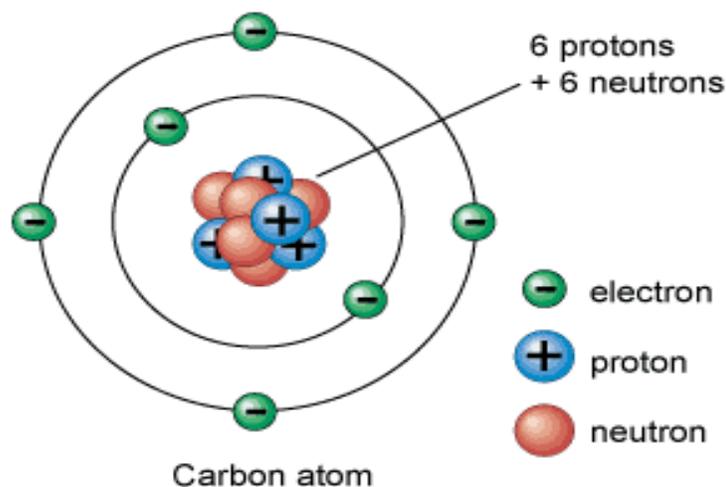
- 1) “Life” exists. Examples include: You, me, and ‘living’ things which have some active “system” of production which can be considered “dead” when completely non-functional in contrast to its/our definable, ‘living’ quality or functioning-as-it-normally-does-and-is-expected-to-do “system.”
- 2) Based 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, the origin of life must be life or something or someone who is already alive or living.
- 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 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 arguments show scientifically “life” is eternal or “life” or something or someone already alive must always have been in existence in order for life to be here now, or for life to have been here at any time in the past or even in the future, based on what we know or can show now. Indeed, if this eternal life is also intentionally intelligent as we consider humans such as Miller/Urey to be intentionally intelligent, then this would account for what Miller/Urey have shown “likely” occurred 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” of proteins which are part of what allow “life” to have substance. However, since Miller/Urey failed to account for the necessity of *already existing*, intentionally intelligent life in order for even amino acids to be produced, Miller/Urey correspondingly failed to reach the connection which was not only “likely” based on their experiment but *foundational to it*, since what is needed first of all is the existence of intentionally intelligent life, but on a scale or quality capable of designing and then making and maintaining a similar type of “apparatus” necessary in order to intentionally produce such compounds in earth’s early atmosphere.

Miller/Urey “Apparatus”³

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

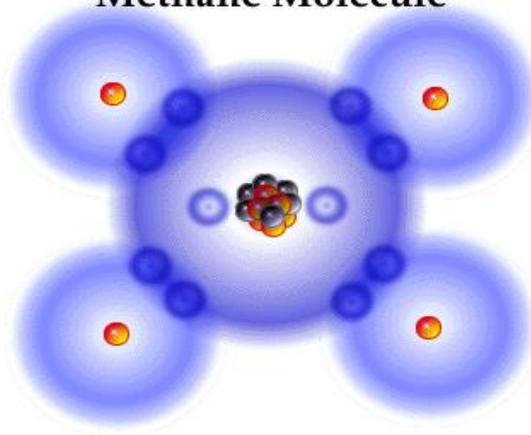
However, even if a small yield of amino acids took this much existing and intelligent life and materials to produce, in the light of the Miller/Urey experiment it must have taken an incredible amount of intelligence and control to design, to create, and also to maintain “apparatus(es)” and “building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



[Image link: http://www.phy.cuhk.edu.hk/phyworld/articles/laser/c-atom_e.gif (last accessed February 8, 2013).]

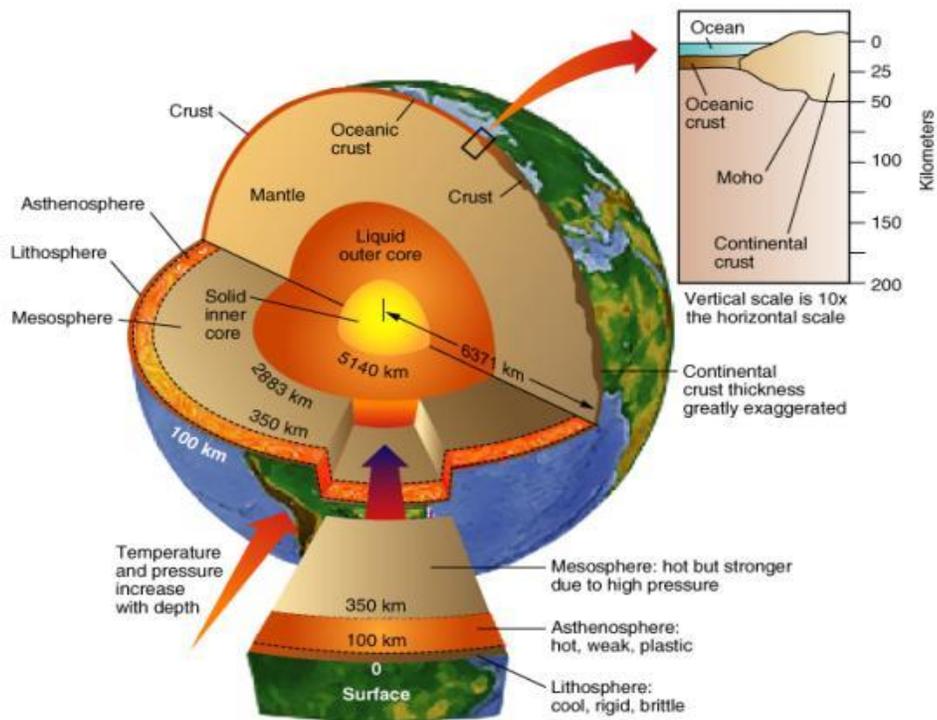
³ See Miller, “A Production of Amino Acids Under Possible Primitive Earth Conditions,” page 528.

Methane Molecule



[Image link:
<http://www.brooklyn.cuny.edu/bc/ahp/SDgraphics/PSgraphics/Methane.GIF>
(last accessed February 8, 2013).]

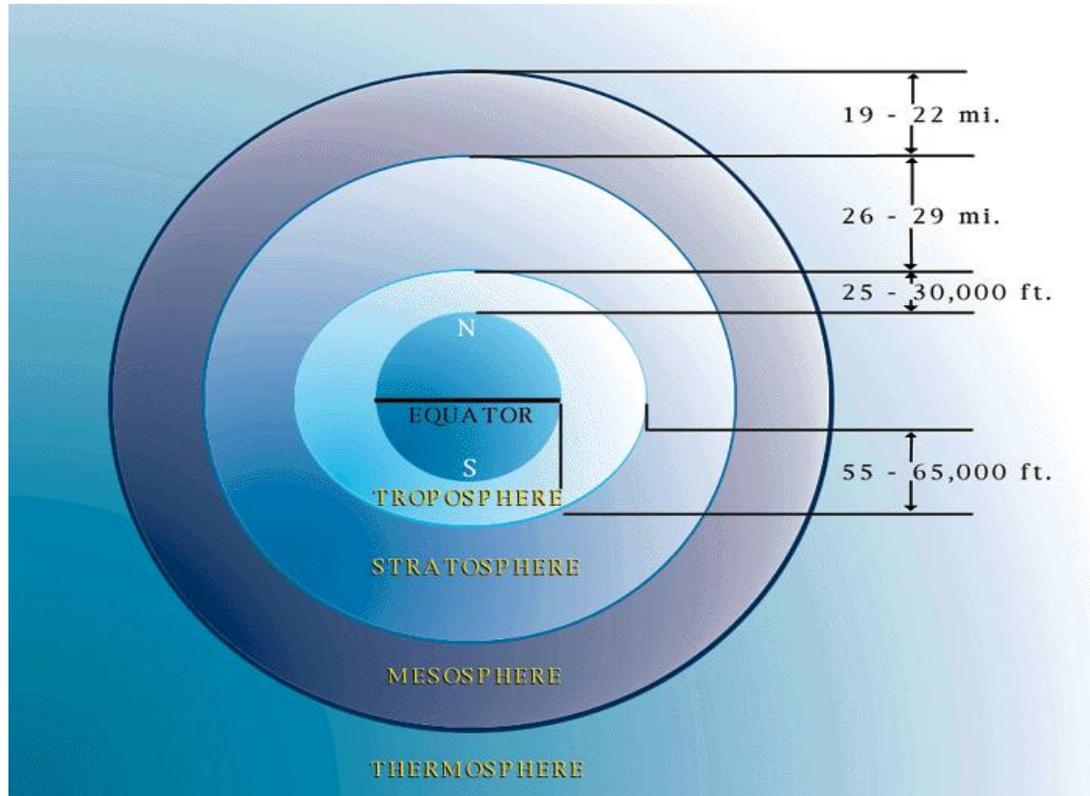
The Layers of the Earth



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

The Layers of Earth’s Atmosphere

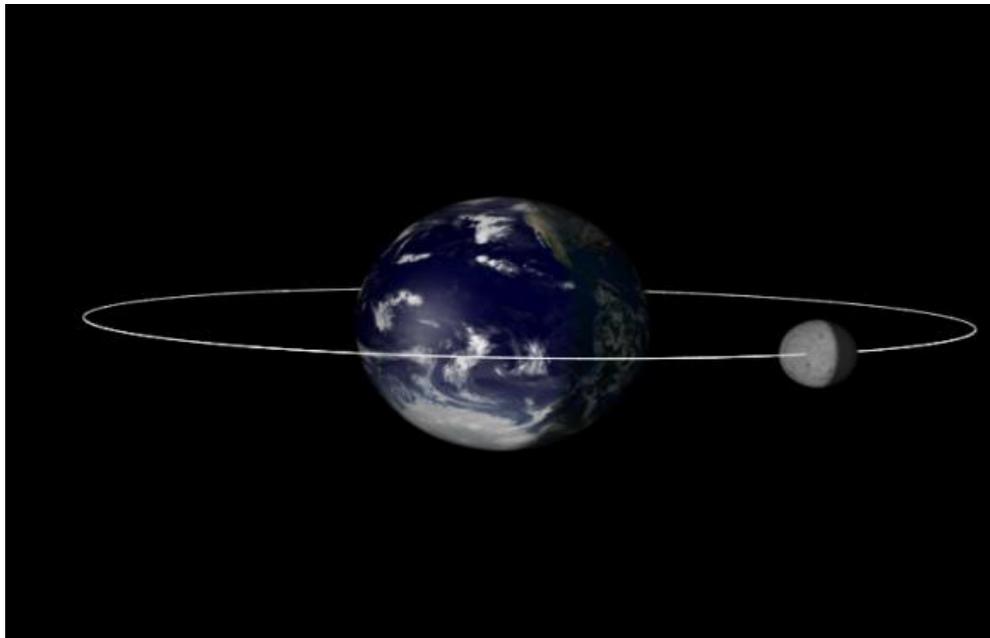


[Image link:

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

(last accessed January 10, 2011).]

The Earth and Its Moon in Orbit

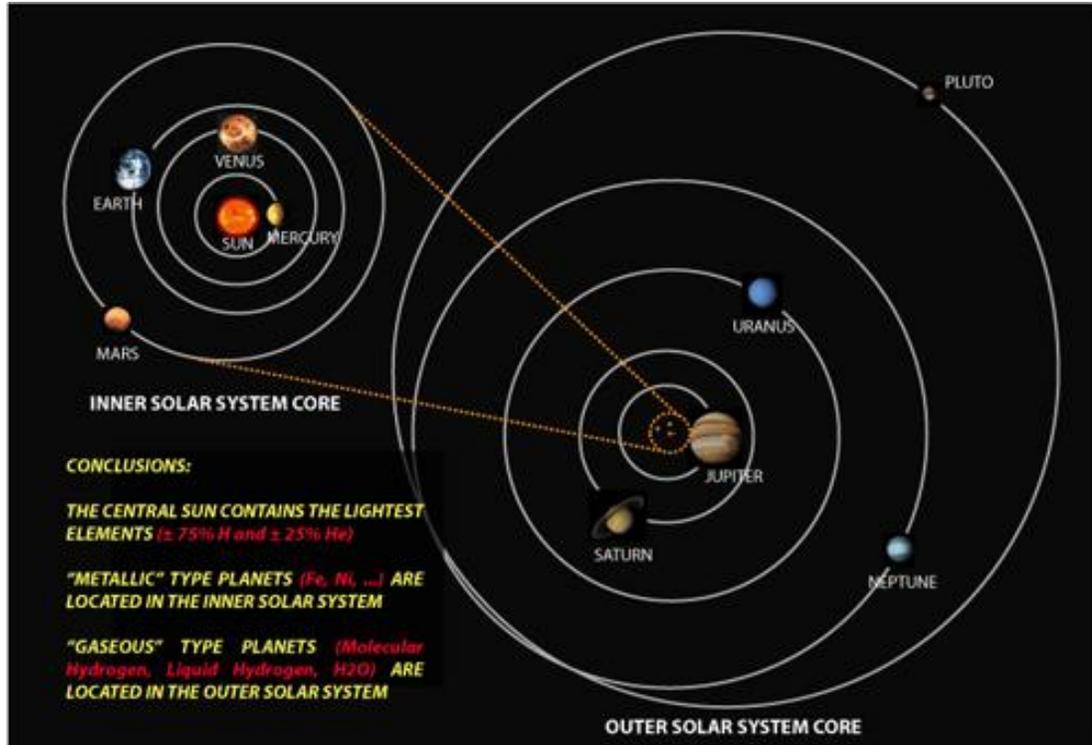


[Image from Neptune, late 2003, with each body magnified by 20; source link:

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

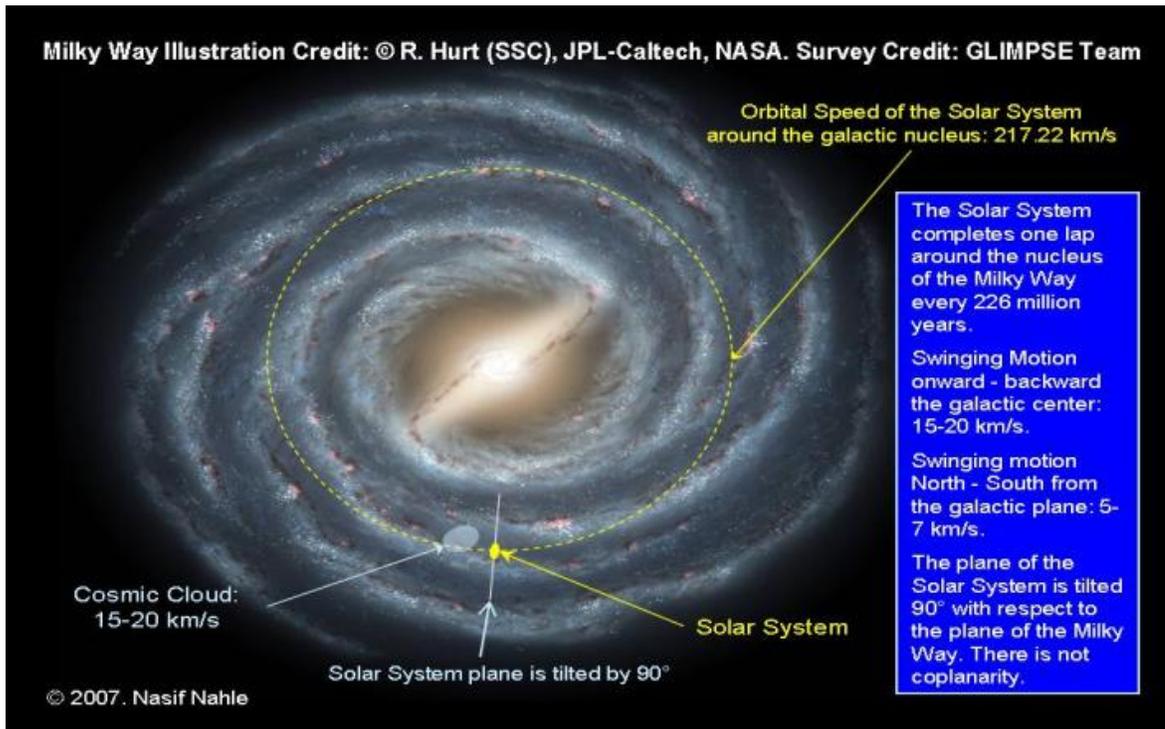
(last accessed February 8, 2013).]

Our Solar System



[Image link: http://www.keshetechnologies.com/image/solar_system/Solar-system_500.jpg (last accessed February 8, 2013).]

Our Milky Way Galaxy



[Image link: http://biocab.org/Cosmic_Cloud-Solar_System-Milky_Way.jpg (last accessed February 8, 2013).]

Like the Miller/Urey “apparatus,” these systems or structures show intentional intelligence, but in ways which reflect and which go beyond what Miller/Urey saw as the primary implications of their 1953 experiment. Rather than support the belief intentional intelligence was *not* needed in order to produce amino acids under early earth’s conditions, the Miller/Urey experiment shows 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, maintained conditions.

At its beginning, in its middle, and at its end the Miller/Urey 1953 experiment shows 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, which evidence includes the Miller/Urey 1953 experiment.

What remains unclear is 1) why Miller/Urey took themselves out of the sequence of causes involved in and throughout their own experiment, and 2) why anyone else since Miller/Urey would similarly fail to promote or to highlight the *necessity* of intentional intelligence behind the production of amino acids in early earth’s atmosphere.

Indeed, Miller/Urey and their intelligently designed and arranged and maintained experiment are not simply “possible” conditions for the early earth’s production of basic compounds. The conditions demonstrated by and inclusive of the Miller/Urey 1953 experiment are *likely* to have existed and occurred in light of the obvious, early production of compounds like amino acids in our early earth, when compared to what Miller/Urey demonstrated in 1953.