

# Christian Engineers and Scientists in Technology Newsletter

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## From the Editor

This newsletter is intended to facilitate camaraderie and exchange of information among CEST members. Reader responses and other inputs are welcomed. Please send me **your** input for this newsletter.

My thanks to those who contributed to this issue, i.e., Dave Kramer, John Osepchuk, Bruce Nelson, Paul Carr, and Dennis Feucht. BY ■

## Geometry Challenge – Reader submits Proof of Van Aubel’s Quadrilateral Theorem

We received a proof of Van Aubel’s Quadrilateral theorem from Bruce Nelson of Abiquiu, NM. This problem was posed in the Winter issue and a clue added in the Spring issue, as follows:

*Van Aubel's Quadrilateral Theorem states that the lines connecting the midpoints of squares constructed on opposites sides of any (arbitrary) quadrilateral are equal in length and mutually perpendicular. Prove this theorem.*

*Clue: As a hint you could first prove the Triangle-Squares theorem: The lines joining the midpoints of squares constructed on two sides of a triangle to the midpoint of the third side are equal in length and mutually perpendicular. Then find a way to apply this to Van Aubel.*

Bruce also solved the Triangle-Squares theorem suggested as a first step, but he didn’t need that theorem to prove Van Aubel. So I’ll not include that proof here.

**Continued on page 4.**

## An Engineering Challenge - Miner Lifeline—Explained

I received two responses regarding this note in the Spring 2012 issue:

*On page 37 of the May 2012 issue of National Geographic magazine there is a note about an explosion proof transceiver that’s being tested in a West Virginia coal mine. It is claimed that it will allow trapped miners to communicate to the surface above, via magnetic fields. “Voice or text can move more than 1500 feet up or down ... arriving in less than a minute.” I find their explanation of how this works inadequate and wonder if one of our readers could explain how it must work. Here is the explanation NG gives:*

- 1. Voice, text, or SOS beacon gets wrapped in magnetic waves.*
- 2. The now magnetic message moves through the earth.*
- 3. Magnetic bubble pops when receiver recognizes source.*

*Can you help us understand how this scheme must work?*

Dave Kramer wrote: “The magnetic transmitter must be a very low frequency system low data rate radio. As you know, you can’t have H without E. A low frequency system would probably penetrate the earth fairly well.”

John Osepchuk wrote: “The technical explanation is by a journalist and doesn’t pass a test by engineers. Firstly, there is no such thing as “magnetic waves” at least in homogeneous media. Maxwell’s equations hold for all EM phenomena, and thus with EM waves there always is an E field along with a B field. The

communication apparently is through the excitation of magnetic fields at low frequency – i.e. 0 to 300 Hz with sophisticated digital modulation as was used in the radiating ELF systems by the Navy to communicate with underwater subs. – in which case there were waves albeit with wavelengths of thousands of meters. In this case the transmission distance is only ~1500 feet. This is well within the “near field” of any ELF EM source. The magnetic field most certainly is being generated by multi-turn coils with large current for short periods of time.

The time variation of this field embodies the information etc. This time variation is essentially transmitted with no time delay, i.e. ~at the speed of light The transceiver senses the field at the earth’s surface and demodulates the signal into information. I have no idea what the magazine writer means by “Magnetic bubble pops” – maybe he means that after the message is acknowledged then the field is shut off. Also it is not clear if the system works only one-way – e.g. up – or both up and down. A complete technical description, no doubt, will include many sophisticated details like the spectra dependence on modulation, precursors etc. But in the end, the basic phenomenon seems to be the production of a quasi-static magnetic field that is little affected by the earth.”

By searching the web I found more clues, but I still have questions.

The in-the-mine unit is described as being refrigerator size, weighing 1250 pounds. To me this implies a high price tag, but I found no pricing information.

Both units – in-the-mine and surface – use identical antennas. The transmit antenna is a 400 foot loop that is wrapped around a coal pillar in the mine. I assume the surface one is similarly oriented. The receive antenna is enclosed within a plastic box that’s roughly a 0.5 meter cube. I do not understand why two antennas are needed as I don’t believe there are intended to be simultaneous transmission and reception.

Principal research engineer David LeVan described the process in a video on Lockheed Martin’s website.

“When a miner sends a message with MagneLink, the transmit antenna is energized and a bubble of magnetic

energy is generated around it," he said. "As the message is sent, the bubble essentially bubbles up through the earth and creates a dome of magnetic energy at the surface. If another MagneLink system is anywhere within that magnetic dome, whether within the mine or up on the surface, it can receive the message."

Here's a quote from Warren Gross, the Lockheed Martin project manager: "Unlike most other radios we use magnetic waves instead of radio-waves. We generate a signal and send it through a loop that's wrapped around a pillar in the mine. When you send the signal through a loop of wires it creates a magnetic moment or a magnetic field. That magnetic field essentially creates a bubble of magnetic energy which rises to the surface."

"On the surface we have another antenna, called inductor. The magnetic waves induce a current into that device and that current is detected by our radio software on our surface computer, which then decodes the messages which were encoded in magnetic waves. It's fairly well-developed system."

"We can send text and voice communications. Text is near real-time - it's nearly the same as sending text messages on a cell phone. Our voice messages are just like satellite phones: you talk, the data is recorded and when you're finished talking it is transmitted up through the earth."

I conclude that the system is an extremely low frequency system that generates a magnetic field that is modulated to convey digital information, be it text or voice. The receiver is in the near field.

BY ■

### A New Challenge A Straightforward Math Problem

This problem was posed by Dominic Halsmer during his talk at the 2012 ASA annual meeting. The challenge is to find the sum of the following infinite series and show how you got it.

$$\sum_{n=1}^{\infty} \left(\frac{1}{4}\right)^n = ?$$

Send your solution to [LWYoder@ieee.org](mailto:LWYoder@ieee.org) and I will acknowledge in the next issue.

BY ■

### Smartphones That Use Other People's Wi-Fi?

*From an article in Bloomberg Businessweek, July 23, 2012*

Cell phone companies have spent billions of dollars upgrading their networks to carry internet traffic. But a company called Devicescape has developed a capability that allows smartphones to automatically connect through nearby Wi-Fi hotspots rather than use up capacity on cell phone networks.

The company has compiled a database of millions of hotspots, and is able to prevent use of some hotspots, such as those in residences, that they consider off-limits. However, probably none of the ones they do use were intended for such use. They were put there for the convenience of coffee shop patrons so they would sit there using their laptops and drinking more coffee. Or enjoying the city park, etc. Devicescape claims that their carrier clients see more than 40 percent of their mobile data traffic run over hotspots in their database.

Read more at

<http://www.businessweek.com/articles/2012-07-26/hon-weng-chong-paging-dr-dot-smartphone>

BY ■

### LIFE in the UNIVERSE? FOR WHAT PURPOSE?

*This is a summary of a paper by Paul H. Carr delivered by Rev. Gregory Davis at a meeting of the European Society of the Study of Science and Theology at Tartu, Estonia on April 25, 2012.*

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#### What is Life?

Life is hard to define, but we know it when we see it. Physicist Erwin Schrodinger's little book "What is Life?" (1944) helped inspire the biomolecular revolution (Margulis 1995). His definition was "an aperiodic crystal...an elaborate, coherent, meaningful design traced by the great master." Metabolism and reproduction characterize life.

New complexity science can help us to define life and relate it to contemporary theology. Life exists on the polar liquid boundary between order and chaos (Lewin 2000). Solids have forms such as the beautifully symmetric order of carbon atoms in diamonds. However, a "diamond is forever." Such static perfection or form is not conducive to life processes. The opposite pole is the molecules dancing about in the air we breathe. They are too dynamic and chaotic to get life started. Complex adaptive life exists "on the edge of chaos" (Levin 2000). For existential theologian Paul Tillich (1963), the self-creation of life occurred when "form was held in a polar interdependence with dynamics." The polar relation of form and function characterizes life's beauty (Carr 2006).

#### How did the life emerge?

Contrary to natural processes, the intelligent design movement does not believe that Darwinian evolution can account for the origin of life, although variations and natural selection could be a mechanism for small changes. Biochemistry Professor Michael Behe, Lehigh University, PA, in his best-selling book, Darwin's Black Box: The Biochemical Challenge to Evolution (1998), claimed that the first cell was so irreducibly complex that it required an "intelligent designer."

The natural processes are evidence of the creative logos (Gregersen 2002). "In the beginning was the Word (Greek logos) the Word was God" (John 1: 1). Science is committed to finding evidence that the first living cell emerged by natural processes. Primitive cells emerged with novel properties that were greater than the sum of their interacting parts. For anthropologist Terrence Deacon (2011), this happened in three steps:

1. THERMODYNAMICS, CHAOS: atoms and molecules of water, methane, ammonia, carbon dioxide, etc. moving randomly from thermal fluctuations in a primordial soup.
2. MORPHODYNAMICS or FORM (morphology = structure). Self-organizing order for free, and the absence of dynamical variety. Example: diamond crystals found in the earth whose carbon atoms have a orderly cubic structure. With the right temperatures and pressures, diamonds emerge from the self organization of clusters of carbon atoms in the earth. Man-made diamonds are

made by using the same high temperatures and pressures.

Similarly, the Miller (1953) and Urey experiment showed how amino acids, which are the building blocks of life-forming proteins, could have emerged. They subjected a mixture of water, hydrogen, methane, and ammonia that were present shortly after the earth was formed, to an electrical spark, which simulated lightning. They observed organic compounds, including amino acids, which are the building blocks of life-forming proteins.

3. TELEODYNAMICS: (telos = purpose, goal) Similar to the formation of diamonds in the earth's crust, living cells emerged under the right conditions from amino acids and proteins. The vital purpose of a cell is to eat and to avoid being eaten. The behavior and development of cells is constrained by absence. To survive, a cell must move away from areas where food is absent to those where it is present.

Sidney Fox (1980) demonstrated how protocells emerged from hunks of lava placed over amino acids derived from methane, ammonia and water. With everything sterilized, he baked the lava over the amino acids for a few hours in a glass oven. (This could have occurred naturally in the craters of volcanoes.) The amino acids combined to form proteinoids, and the proteinoids had combined to form small, cell-like spheres, called protocells. Research at Harvard University (Alonzo 2009) on how the first living organisms arose from inanimate matter indicates that the first replicating molecule was RNA

Even though improbable, once life got started, its population expanded rapidly by cell division, doubling in each generation. In 20 generations the population is 1 Million; in 30 generations, a billion; in 40 generations, a trillion, etc. (For humans, we have two parents, four grandparents, etc. A generation is about 25 years. In 30 generations or 30 x 25 years = 750 years, we would have had 1 billion ancestors, assuming no intermarriage.)

### What light can the discovery of exoplanets shed on the origin of life?

In 1995, the Swiss astronomers Michel Mayor and Didier Queloz announced the discovery of a planet orbiting a star similar to our sun (51 Pegasi). On Feb 2,

2011, NASA announced that the Kepler space telescope had identified 1200 planet candidates. Most of the planets are gas giants like our Jupiter and Saturn.

On Dec 5, 2011, NASA announced the discovery of Kepler 22b. which is the best candidate for life. Its temperature is 72 F and has a period of 273 days, both similar to our earth. Its parent sun-like star is 600 light years away. Kepler 22b has a diameter about twice that of our earth. Astronomers are determining if it is rocky or gas-like.

The molecular building blocks of life are found in meteorites, cosmic dust, and comets. Evolutionary biologist, Ernst Mayr (1904 - 2005) believed single cell life in the universe is very likely, but **intelligent** life very rare. The history of life on earth is the basis of Ernst Mayr's belief. The oldest ancient fossil prokaryote cells (lacking a nucleus) are dated to be 3.5 Ga (billion years old), approximately one billion years after the formation of the Earth itself. By 2.4 Ga, molecular biomarkers indicate eukaryote cells and photosynthesis demonstrating that life on Earth was widespread by this time. The Cambrian explosion of multicelled life occurred 0.6 Ga. The first humans emerged 6 million years ago and our first home sapiens ancestors only 200,000 years ago.

### Is there direction and purpose in life's evolution?

Theologian Paul Tillich (1963) viewed religion as part of the vertical dimension of depth, ultimate concern, meaning, and purpose. He regarded science as part of the horizontal dimension of relations between finite objects in chronological time. Religion is concerned with eternity, as the other of time, and narrated time. We cannot experience the absence of time. (Jackelen 2005).

Prof. Simon Conway Morris' book, "Life's Solution: Inevitable Humans in a Lonely Universe," (2003) on the broad topic of evolutionary convergence, emphasizes the parallel evolution of sensory systems. Different evolutionary paths converge on common solutions: the insect eye and the camera eye. Theologian Niels H. Gregersen (2002) believes, "There is some directionality to evolution - propelled by universal chemical constraints on selection and the likewise universal tendency for collective behavior."

Biophysicist Harold Morowitz wrote, "Convergence is a sign of the inevitability of emergence." Life is converging towards its spiritual consummation in an Omega Point according to paleontologist Teilhard de Cardin, S.J. (1965): "The end of the world: the overthrow of equilibrium (heat death), will detach the mind, fulfilled at last, from its material matrix, so that it will henceforth rest with all its weight on God-Omega."

### Conclusion

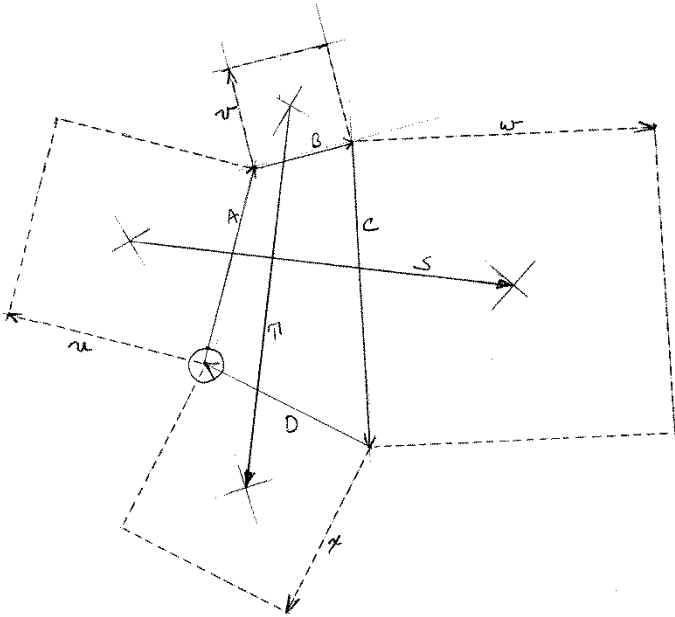
The 1995 discovery of stars with planets like our own was the first step towards discovering life in the universe. Science is committed to finding evidence that the first cells emerged by natural means. Biologist Ernst Mayr granted that cellular life in the universe may be common, but intelligent life is rare. Our religious traditions give life meaning and purpose with symbol, story, and liturgy. Alfred N Whitehead (1933), founder of process philosophy/theology wrote, "The teleology (purpose) of the Universe is the production of beauty."

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From page 1 — Continuation of Bruce Nelson's proof of Van Aubel's Quadrilateral theorem.

Refer to the figure below.



Write vector algebra expressions that will allow one to solve for S and T:

$$\frac{1}{2}u + \frac{1}{2}A + S + \frac{1}{2}C - \frac{1}{2}w + D = 0$$

$$-2S = u + A + C - w + 2D$$

$$A + B + C + D = 0$$

$$\boxed{-2S = u - B + D - w}$$

$$A + \frac{1}{2}u + \frac{1}{2}B + T + \frac{1}{2}D - \frac{1}{2}x = 0$$

$$-2T = 2A + u + B + D - x$$

$$\boxed{-2T = A - C + v - x}$$

Then, using the equalities  $u \cdot A = 0, v \cdot B = 0, w \cdot C = 0, x \cdot D = 0, u \cdot v = A \cdot B, u \cdot x = A \cdot D, w \cdot v = C \cdot B, w \cdot x = C \cdot D, u \cdot w = A \cdot C, v \cdot x = B \cdot D, |u| = |A|, |v| = |B|, |w| = |C|, |x| = |D|$ , expand the dot product of S and T, cancel equal and opposite terms, collect terms, and show that their dot product is zero, so they are perpendicular. Note: all vector products are dot products, even if the dot is missing.

$$\begin{aligned} (-2S) \cdot (-2T) &= (u - w - B + D) \cdot (v - x + A - C) \\ &= u \cdot v - u \cdot x + u \cdot A - u \cdot C \\ &\quad - w \cdot v + w \cdot x - w \cdot A + w \cdot C \\ &\quad - B \cdot v + B \cdot x - B \cdot A + B \cdot C \\ &\quad + D \cdot v - D \cdot x + D \cdot A - D \cdot C \end{aligned}$$

$$\begin{aligned} &= u \cdot v - u \cdot x - u \cdot C \\ &\quad - w \cdot v - w \cdot x - w \cdot A \\ &\quad + B \cdot x - B \cdot A + B \cdot C \\ &\quad + D \cdot v + D \cdot A - D \cdot C \\ (-2S) \cdot (-2T) &= -u \cdot C - w \cdot A + B \cdot x + D \cdot v \\ &= -w \cdot A - u \cdot C + x \cdot B + v \cdot D \\ &= -|C||A|(\cos \theta_{uA} + \cos \theta_{wC}) + |B||D|(\cos \theta_{xB} + \cos \theta_{vD}) \end{aligned}$$

$$\boxed{\theta_{uA} = \theta_{wC} + 180, \theta_{vD} = \theta_{xB} + 180}$$

$(-2S) \cdot (-2T) = 0$  ... They're  $\perp$

Now to show that they are equal in length, start with the expressions for S and T developed above and show that their squared magnitudes are the same. Use  $u^2 = A^2, w^2 = C^2$ , and  $uw = AC$ .

$$\begin{aligned} (-2S)^2 &= u \cdot u - 2u \cdot w - u \cdot B + u \cdot D \\ &\quad - u \cdot w + w^2 + w \cdot B - w \cdot D \\ &\quad - 2u \cdot B + 2w \cdot B + B^2 - BD \\ &\quad + 2u \cdot D - w \cdot D - BD + D^2 \\ &= A^2 - 2uw + C^2 - 2uB + 2uD + 2wB + B^2 - 2wD - 2BD + D^2 \\ &= A^2 + B^2 + C^2 + D^2 - 2uw - 2uB + 2uD + 2wB - 2wD - 2BD \\ &= A^2 + B^2 + C^2 + D^2 - 2AC - 2uB + 2uD + 2wB - 2wD - 2BD \\ &= [A^2 + B^2 + C^2 + D^2 - 2AC - 2BD] \end{aligned}$$

$$\begin{aligned} (-2S)^2 &= [ \dots ] \\ &\quad - 2uB + 2uD + 2wB - 2wD \\ &+ 2|A||B| \sin \theta_{AB} + 2|A||D| \sin \theta_{AD} + 2|B||C| \sin \theta_{BC} + 2|C||D| \sin \theta_{CD} \end{aligned}$$

To compute the squared magnitude of T use  $v^2 = B^2, x^2 = D^2$ , and  $vx = BD$

(go to next page).

$$\begin{aligned}
 -2\pi &= v - x + A - C \\
 (-2\pi)^2 &= v^2 - vx + vA - vC \\
 &\quad - vx + x^2 - xA + xC \\
 &\quad + vA - xA + A^2 - AC \\
 &\quad - vC + xC - AC + C^2 \\
 &= B^2 - 2BD + D^2 + 2vA - 2vC - 2xA + A^2 + 2xC - 2AC + C^2 \\
 &= A^2 + B^2 + C^2 + D^2 - 2BD + 2vA - 2vC - 2xA + 2xC - 2AC \\
 &= [A^2 + B^2 + C^2 + D^2 - 2AC - 2BD] \\
 &\quad + 2vA - 2vC - 2xA + 2xC \\
 (-2\pi)^2 &= [ \dots ] \\
 &\quad + 2|A|B|\sin\theta_{AB} + 2|B|C|\sin\theta_{BC} + 2|A|D|\sin\theta_{AD} + 2|C|D|\sin\theta_{CD} \\
 \therefore (-2S)^2 &= (-2\pi)^2
 \end{aligned}$$

Q.E.D.

**CEST at the ASA Annual Meeting at Point Loma**

About a dozen persons—CEST members and others interested in CEST—met for a meal at the ASA annual meeting at Point Loma Nazarene University. Here are Jack Swearingen’s minutes of the meeting.

*Thanks to everyone who participated in the impromptu meeting of Christian Engineers and Scientists in Technology (CEST) at PLNU. It was a pleasure to see old (sic) friends and meet new ones. As Chairman Bill said at the meeting, engineers and applied scientists represent one of the largest—if not the largest—subgroups group within ASA. Many of us would like to see more emphasis on E.&A.S. at ASA meetings and on the web site. I for one think ASA would benefit by increased membership and participation from this group.*

*In the meantime, Bill soldiers on as Editor and Producer of the CEST Newsletter. He would be pleased to receive articles from a broader base. So: please send him news notes about yourself, your work, or your institution. And we will look for opportunity in a year or two to assemble a technology feature for the Annual Meeting. Energy, ethics, nanotech, drones and robotic soldiers, bioengineering, social networking and computer games, resource exhaustion, recycling and recovery—these and many other hot topics of modern technology present themselves as possibilities. (Come to think of it, Bill—why not solicit ideas from CEST via the Newsletter?)*

*Warmly, Jack Swearingen, Secretary, CEST*

**On the Frontiers of Human Destiny**

An article by Dennis Feucht

*For a change of pace,  
The human race,  
Is seeking a place,  
On the frontiers of space.*

We are privileged to live in the time of the first early exploration of the universe beyond the earth. This began in earnest with the invention of the telescope a few centuries ago, and now has emerged to a new phase involving exploratory spacecraft sent to nearby planets. The “canali” observed on Mars by an Italian and popularly mistranslated as “canals” has fed an ongoing folklore about civilization on Mars. In his classic *War of the Worlds* by British New World Order Fabian socialist H.G. Wells, in which the Martians invade earth and are unfriendly, life on Mars was promoted, especially when an early twentieth-century radio broadcast presented it realistically as news. This caused a momentary stir when many listeners mistook the fictional presentation as actual news, showing that Americans were at least ready to entertain the notion of actual Martians.

In more recent years, a somewhat respectably-credentialed Richard Hoagland has been making the case that certain features in the Mars photos sent back by spacecraft are products of intelligent design (another possible test

case for the Intelligent Design filter of Bill Dembski). Looking at these photos and attempting to see in them a face or pyramids seems to be like staring at Rorschach inkblots. Are the pyramids or the face really there or not? There is no other way to know that I know of except by visual recognition.

The habitation of Mars theme was perpetuated in the final Tom Baker phase of the long-running BBC television series, *Doctor Who*. Fans of the show will remember the episode, *The Pyramids of Mars* in which the opponent of the Doctor is none other than the Devil himself, intent upon breaking free from his bondage within a pyramid on Mars to wreak destruction upon Earth (as though this has not been going on all along!). To get to the Devil, the Doctor must overcome several obstacles, the most noteworthy being an exercise in logic. The Doctor is faced with two buttons; one opens the door to the next inner chamber and the other destroys him. Two sentinels accompany the buttons; one always tells the truth while the other only states falsehoods. The Doctor is given one question to ask either sentinel in his effort to push the right button. What does he ask? He arbitrarily asks one of them: If I ask the other which button to push to open the door, which will he say? If the sentinel he asks always tells the truth, he will truthfully give the answer of the other which, being false, indicates to the Doctor

to push the other button than that of the answer. If he has chosen instead the liar, then he will give the opposite answer to that of the truth-teller and in this case the right answer is again the other button. The Doctor manages to successfully traverse this obstacle only to be placed under the power of the Devil himself - for a while, at least.

The entertaining bit of logic also makes its unintended appearance in the writings of the apostle Paul, who points out to an understudy that “Cretans are always liars, evil beasts, lazy gluttons”, a quotation taken from a Cretan poet, probably Epimenides. If Epimenides, being himself a Cretan, is included in the statement (which was apparently not the intention of Paul in quoting him), then it is false that Cretans are liars in which case Epimenides did indeed speak the truth. But if true, then Epimenides is a liar and the statement is false. The truth value of the statement, in an engineering sense, oscillates between being true and false and is pronounced by logicians to be logically “indeterminate”, not entirely unlike the “don’t care” entries in the state tables of digital logic designers. This example of self-referencing logic leads to higher-order or increasingly “self-aware” logic that is critical in understanding (if you follow the argument of Donald MacKay) how to reconcile divine determinism with human freedom of will

or moral responsibility. But that is a topic for another time.

The moral paradox of humanity diffusing into the rest of the universe is that despite the aspiration for truth and goodness as historically manifested in the motivations underlying science and technology, the fallenness of our species in our present state would be taken with us, and humanity would be like a moral contagion, spreading corruption throughout the universe (and providing a fitting topic for a hypothetical *Doctor Who* episode). In his *Perelandra* trilogy, C.S. Lewis makes an attempt at science fiction which presumes that off the earth, the rest of the universe is morally upright. This is a view that was shared earlier by other medieval thinkers, though scripture clearly indicates the existence of fallen angels, beginning with the Devil, and talks of war in heaven. "Heaven" is triply ambiguous in scripture. It could mean the troposphere, the sky of earth. Or it could mean the rest of the universe - outer space. Or it might mean the reality beyond the creation and beyond space-time - eternity. Too often, I suspect, Christians have opted for the most mysterious third heaven when the sufficiently mysterious second might have been intended in scriptural references to "heaven". Angels are, like ourselves, creatures and thus a part of the created universe. Some are on earth, but they do not seem to be solely restrained to earth. Jesus said he saw Lucifer fall like lightning from heaven. Which heaven? Perhaps the sky, but another possibility is that he was "grounded" on the very planet of our human existence. (Why here, of all worlds, is left for a speculative discussion.)

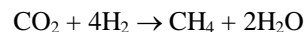
The UFO phenomenon of our time is but a part of the larger view of the heavens which includes notions about life on Mars. The many reports of encounters with extraterrestrials (ETs) - or at least some other species of intelligent life - include some that are hard to merely brush off, especially in view of the many accounts in scripture of them. In the 1950s and before, the U.S. government was openly investigating UFOs. This ended around the time of issuance of the report on Project Blue Book (*The Report on Unidentified Flying Objects*, by Edward J. Ruppelt, former head of USAF Project Blue Book, Ace Books, Doubleday & Co., 1956) and the subject then went deep under cover. Some

indications are that a close official encounter "of the third kind" - a direct encounter of humans and aliens - first occurred during the Truman administration. Decades later, in one of his State of the Union addresses, President Jimmy Carter (1978 - 82) announced that later in the year an announcement would be made about the subject. I waited in anticipation, and it was finally in December of that year that PBS aired a program on UFOs that revealed nothing new. If the U.S. government secretly knows of the existence and perhaps presence on earth of ETs, it is indeed a well-guarded exception to the major secrets that in U.S. history have been unable to be contained. Information on the existence of ETs might not be in a form within U.S. covert channels that offers any concrete outlook on them, and thus there is nothing definitive to leak. On the other hand, people such as Ted Gunderson, former Los Angeles FBI station chief, have claimed that they saw ETs in a visit to the outskirts of Area 51, the secretive area near Fallon Air Force base in the desert of Nevada where new flying technology is tested - and who knows what else goes on there. While the mainstream of evangelical Christians are dubious of ETs (despite the many accounts of angels in scripture), some, like Hugh Ross, are thinking outside the box.

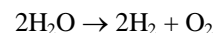
Returning to the topic of a human destiny in the stars - a topic that is familiar to those of us who grew up reading mid-20th-century "hard" (meaning realistic, as opposed to fantastic) sci-fi such as that of Robert A. Heinlein, Andre Norton (Andrew North), Poul Anderson, Robert Silverberg, or Arthur C. Clarke (who held the patent on the communications satellite), and for starters, Tom Swift, Tom Corbett - Space Cadet, or the earlier Jules Verne or Konstantin Tsiolovsky - we are now on the threshold of human ascent beyond the bounds of earth. Human presence on the moon has been attained, though ironically not repeated for over a half century. Perhaps it is not yet time - time in the sense of the biblically-used Greek word *kairos* instead of *kronos*. The conditions are not right for it, though the technology for lunar or martian habitation might now be possible.

Robert Zubrin worked out a nifty scheme, called "Mars Direct" for going to Mars. In his talks on the subject, he

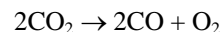
recounts the history of two attempts to find the Northwest Passage for ships across northern Canada. The first failed while the second, in which the exploration team learned to live off the land, succeeded. Zubrin's plan is to use the methanation (Sabatier) reaction to make return-flight fuel from CO<sub>2</sub> on Mars, from additional hydrogen taken on the flight:



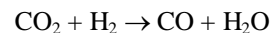
This reaction is exothermic (outputs heat) and thus needs no input of energy to drive it to produce methane (CH<sub>4</sub>) fuel for the return trip. The water is input to an electrolysis cell,



The oxygen is stored while the hydrogen is recycled back into the previous reaction. Each kilogram of hydrogen brought to Mars results in 12 kg of return methane fuel and oxygen oxidizer with a fuel-oxidizer ratio of 2 and having a specific impulse of 340 seconds, a propulsion performance parameter. The optimum mixture ratio is 3.5 (for 380 seconds of specific impulse) and a gain for carried hydrogen of 18 to one, the performance level needed for Mars Direct. This requires more oxygen, and a source is from the reduction of Mars carbon dioxide. The dissociation reaction is



and requires a zirconia catalyst. Zirconia tubes are brittle and many would be needed. An alternative is to run another Gaslight Era reaction, the water-gas shift reaction, in reverse using some of the hydrogen gas from the electrolysis unit:



The reaction is mildly endothermic and can be driven by heat from the Sabatier reaction. Another possibility is to combine the first and last of the above reactions into



and could accomplish the Mars Direct objective. Details are found in Zubrin's book, *The Case for Mars: The Plan to Settle the Planet and Why We Must*, (with forward by Arthur C. Clarke), Touchstone (Simon & Schuster), 1996. The level of technical difficulty in a Mars mission would nowadays, with the advancements in technology since the 1960s, be comparable to what the moon mission was in the 1960s. NASA has spent far more money as facility curators than a

decisive plan to go to Mars would have cost long ago. (As Jim Davidson says, NASA delenda est.)

The jump to other planets was well expected by the visionaries writing sci-fi and painting space art a half century ago, and by the leading rocket engineer of the Apollo program, Werner von Braun. The outlook for space colonization in the 1960s was so hopeful that Arthur C. Clarke sent man as far as Jupiter by 2001 (movie version). The reality is that humanity has yet to colonize any of the heavenly bodies. This situation is counter-intuitive, yet the social conditions have not led to it.

Perhaps it is the prerogative of a redeemed humanity to inhabit the stars. In view of non-technical events of the social order, the human race is floundering on the threshold of a new age, an age that could well be ripe with eschatological offerings, including “going to heaven”. Technology has now advanced to the point where weapons of mass destruction could essentially destroy civilization as we know it. Perhaps we are living through a pause before the conquest of space that awaits the completion of other conditions on humanity for us to be fit to pass through the gateway into the rest of the universe. From a scriptural perspective, we know that this evolution of humanity to a new phase will be precipitated by the return of the prototype New Man to lead the rest of those redeemed from the curse of fallenness into a new age. The world is certainly undergoing major trends toward discontinuity with the past, as is being observed by geopolitical analysts from widely differing perspectives. A new age is dawning; even the New Agers (somehow) sense it. Before we go to the heavens, we can expect the one who has already gone there ahead of us (to prepare a place for us, but in which star system?) to return here to earth.

And how will Jesus return? The children’s illustrated Bible-story books show the ascension of Christ as though he were levitating upward like some Eastern guru. No physical means of ascent is apparent, as though the laws of the universe were suspended for the event. Earlier ascents, like that of Enoch or Elijah, were achieved by “fiery chariots”, a description that sounds like vehicles of fire, or what we identify as rockets of some kind. I offer the conjecture that the ascent of Jesus was vehicular,

accompanied by the ETs (angels) attending to his resurrection, in some kind of vehicle(s). Of the gospel accounts, only Luke (24:50, 51) describes in brief the ascent (ESV): “Then he led them out as far as Bethany, and lifting up his hands he blessed them. While he blessed them, he parted from them and was carried up into heaven.” Note that he was first separated from them as in boarding a vehicle, then “was carried up”.

The vehicle was unimportant to the scriptural accounts and is not included in them. If a vehicle were involved, then the return of Jesus, which he said would be similar to his leaving, would also be via some kind of ET ship. (Perhaps the Raelians had some seed of a right idea.) And the apostle John wrote that there would be signs of his coming in the heavens, and that those wielding worldly power on earth would know about it, to their chagrin. One does not need biblical faith to observe an H.G. Wells-like scenario. Could the return of Christ be in the form of an armada of spaceships, accompanied by the “heavenly angels”? I leave these seeds of ideas for you to consider in your biblical study. God is not inconsistent in how he upholds the universe, and though we have much to learn yet about the “customs of the Creator”, we can expect him to remain faithful in his character and creationary behavior. Even more advanced beings such as ETs cannot disregard Newton’s laws if the universe is to have some definitive character to it. I place my expectations on sightings of spacecraft when he returns.

*Dennis L. Feucht, MAR12* ■

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*Bill Yoder, ed. ■*

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