

Christian Engineers and Scientists in Technology Newsletter

Winter 2011-12 Issue 21

American Scientific Affiliation/Canadian Scientific & Christian Affiliation

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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, Paul Carr, and Dennis Feucht. BY ■

Correct Answer Received! Physics Problem Challenge

Here is the race car flywheel problem I posed in Issue 19 and, for lack of a response, repeated in Issue 20:

A rear wheel drive race car's engine (including flywheel) rotates clockwise as

seen from the front of the car. It is racing counterclockwise around the semicircular end of an oval racetrack. What is the effect on the car of turning the axis of the rotating flywheel?

Another car has front wheel drive with a transverse mounted engine that rotates clockwise as seen from the right hand side of the car. What is the effect in this case?

I received this response Dave Kramer of Chelmsford, MA:

Hi Bill,

Since you had no responders, I guess I have to answer.

We are dealing with the principal of conservation of angular momentum.

In the case of the race car with the engine rotating clockwise as seen from the front, by the right hand rule, the angular momentum vector points to the rear of the car. To turn the car around the track counterclockwise, the change in angular momentum points outward, away from the center of the track. This requires a torque toward the rear of the car. This is supplied by a weight shift from the back to the front of the car. Not such a good idea for a rear wheel drive vehicle.

In the case of the transverse engine, the angular momentum vector points toward the center of the track, and the delta angular momentum points to the rear of the car. The momentum change thus requires a clockwise torque as seen from the front of the car. This is provided by a weight shift from the inside to the outside wheels of the car.

I must confess that I had to fool around with a bicycle wheel to convince myself that I had the sign of the torque correct.

Dave

BY comment:

Great job, Dave! I was pretty bummed that no one solved this. Now I feel better. I received a response from another person, too. She had the right approach, but had the signs reversed in both cases.

It appears to me that the best result would occur with a transverse engine rotating in the opposite direction. Then the weight shift would be from the outside wheels to the inside wheels, thus counteracting the roll tendency of a car going around a corner. But I also note that the effect of

the car's wheels may be more important than the flywheel's. Although they don't rotate as fast, they probably have larger moments of inertia and there are four of them. BY ■

Geometry Challenge

Here's a geometry problem to challenge skills you learned in 10th grade or thereabouts. It was suggested by Dave Kramer.

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

Send your proof to LWYoder@ieee.org and I will acknowledge in the next issue.

BY ■

Energy Technology: A Big Battery

Summarized from an article on page 45 of the *IEEE Spectrum*, January 2012.

An unprecedented energy storage facility planned for Mexicali, in Baja California, Mexico, will be able to feed a gigawatt into the power grid for 4 to 6 hours. That would be 4 to 6 million KWH! It will be used to smooth out the distribution of wind/solar energy.

Rubenius, a Dubai based company, is behind the project. They say they haven't yet decided what type of batteries to use, but two smaller facilities they have built in Abu Dhabi use sodium-sulfur batteries.

The article mentions a large battery installation at a wind farm near Elkins, W. Va. that uses lithium ion batteries. It also says that currently, "the world's biggest grid-scale battery is a bank of nickel cadmium cells in Fairbanks, Alaska, which can produce up to 52 MW of emergency backup power for about 15 minutes."

Find the article online at:

<http://spectrum.ieee.org/energy/the-smarter-grid/a-battery-as-big-as-the-grid> BY ■

**Energy Technology:
Suntrap**

Summarized from an article on page 64 in *The Economist*, December 31, 2011

A research team at MIT led by Peter Bermel claims that they have found a way to convert more energy from sunlight into electricity than the best photovoltaic cells can. They expect a conversion efficiency of 37 percent. To do this they will have the sunlight impinge on a specially prepared thin sheet of tungsten. The side illuminated by the sun will be pitted with pits 0.75 microns in diameter and 3 microns deep. They will be arranged in a grid 0.8 microns apart. This surface is expected to absorb much more of the sunlight's energy than a smooth surface would. The tungsten will become very hot, and will radiate infrared radiation. The other surface of the tungsten, which faces an indium gallium arsenide photocell, will have a pattern etched on it that will favor radiation at frequencies favored by the photocell.

Find the article online at <http://www.economist.com/node/21542157>.

BY ■

**Energy Technology:
Drive a Flybrid?**

From <http://www.flybridsystems.com/Roadcar.html>.

Flybrid Systems have been working with a number of OEM car makers including Jaguar Cars to develop flywheel hybrid systems for road cars. Based on the original Flybrid Formula One Kinetic Energy Recovery System device these systems feature a fully mechanical drive using a continuously variable transmission (CVT) but have evolved to better meet road car requirements and now feature:

- A design life of 250,000 kms
- Low cost in volume manufacture
- Optimized CVT design for high efficiency at low power levels
- Bespoke™ Flybrid developed vacuum, oil and hydraulic pumps to reduce parasitic losses
- Powerful clutches to allow launch of the vehicle from rest under flywheel power alone with the engine turned off

- Fully automatic control systems that react to normal vehicle control pedal movements and require no additional inputs from the driver

These are full hybrid systems capable of kinetic energy recovery but also able to store energy when the vehicle is not braking in order to optimize the engine operating efficiency. Using optimized strategies CO2 and fuel consumption savings of over 20% are possible on the NEDC cycle and more than 30% is possible in real world conditions. These CVT based systems are the most developed Flybrid products and the closest to realizing volume production. Flybrid expect to start supply of these systems in volume during 2013. ■

**Anthropogenic Global Warming:
A Debate**

ASA member and IEEE Life Fellow Paul H. Carr, Ph. D., debated with Prof Laurence I. Gould on Saturday, Nov. 19, 2011 at the New England Section of the American Physical Society Meeting at the University of Massachusetts at Amherst. Dr. Carr's PowerPoint talk was entitled, *Data Supporting Anthropogenic Global Warming: Balancing Economics and Ecology*. Prof Laurence I. Gould' talk was *Anthropogenic "Global Warming" — Illuminating some of its Scientific and Methodological Flaws*.

Paul Carr sent me files or links to files containing the charts used in the presentations. Presented in the box (next page) are summaries of the technical points presented to support the two sides – that greenhouse gases produced by human activity is an important cause of global warming on the one hand and that this conclusion is not supported by the science on the other. Of course, since I don't have the verbiage used in discussing the charts, I may have missed some points. I did not include their points about the predicted disastrous consequences of AGW on the one hand or the folly of crying the sky is falling based on inconclusive data on the other.

Their presentations can be found on their respective web sites – Carr's at <http://mirrorofnature.org/GlobalWarmingDebateNESAPS.pdf> and Gould's at http://uhaweb.hartford.edu/lgould/Rotary%20Club_SouthWindsor_13May2009.ppt.

BY ■

Paul H. Carr B.S. , M.S. MIT; Ph.D. Brandeis, led the Component Technology Branch, of the Air Force Research Laboratory (AFRL), Bedford, MA, where he is emeritus. His research on surface acoustic waves (SAW) resulted in signal processing filters used in radar, cellular phones, and TV. He has written numerous editorials on global warming and energy as co-editor with Larry Gould of the APSNES Newsletter. He has given invited talks on this subject at the MIT Lincoln Laboratory, U Mass Lowell, the NH IEEE Awards Banquet, the Sigma Xi Chapter and the Academy of Senior professionals at Eckerd College, FL. He has published over 80 technical papers, has 10 patents, and is a Fellow of the IEEE. From 1998 – 2000, he taught philosophy courses at U Mass Lowell, which inspired his book *Beauty in Science and Spirit*.

Laurence I. Gould is Professor of Physics at the University of Hartford and Past Chair (2004) of the New England Section of the American Physical Society. Dr. Gould earned his doctoral and master's degrees in physics from Temple University and his bachelor's degree in physics from Carnegie-Mellon University. He has a wide range of interests and has published many scholarly articles in several areas of his discipline. He became interested in the "climate change" debate and has been studying the subject for over seven years. He has given many presentations on the topic, including a recent campus-wide talk at Princeton University (sponsored by the university's Physics Department). In addition, Dr. Gould has given a number of talks overseas and in the United States on a variety of subjects, including: the application of symmetry principles in teaching science, the life and work of Albert Einstein, symbolic methods in computational physics, and foundations of quantum theory.

Summary of a debate at the November 2011 meeting of the New England Section of the American Physical Society

<p style="text-align: center;">Paul Carr Arguments For AGW</p>	<p style="text-align: center;">Laurence J. Gould Arguments Against AGW</p>
<p>The average land surface temperature increased 0.6 °C between 1800 and 1940 and 0.8 °C between 1960 and 2010.</p> <p>Historical data from various sources shows that there is a correlation between carbon dioxide and temperature increases since the beginning of the industrial era.</p> <p>The carbon dioxide increase is from burning fossil fuels. Carbon isotope ratios indicate the CO₂ increase since 1850 is from burning ~300 million year old fossil fuels.</p> <p>Increased greenhouse gases (CO₂) blanket and <i>warm</i> the earth's surface, allowing less heat to reach the stratosphere, which is <i>cooling</i>.</p> <p>Solar irradiance has not increased since 1940. Although solar irradiance does vary over the eleven year sunspot cycle, this does not explain the surface warming observed in the latter part of the 20th century.</p> <p>The temperature of the stratosphere has been falling while the surface temperature has been rising. This is consistent with the increasing greenhouse effect which is trapping more and more heat within the troposphere and at the surface so that less heat reaches the stratosphere.</p> <p>The present CO₂ level of 390 ppm is 31 percent higher than in the last 800,000 years. This extrapolates to 900 ppm by 2100. When CO₂ was 900 ppm, 51 million years ago, earth was ice-free, sea levels 100 to 200 feet higher.</p> <p>Present sea levels are projected to increase 2.5 – 6 ft by 2100.</p> <p>Greenhouse gases are essential; without the radiative forcing of noncondensing CO₂, etc., the terrestrial greenhouse would collapse, plunging the global climate into an icebound earth state. However, climatological models cannot explain the temperature increases seen between 1960 and 2011 by using natural forcings only. Manmade forcings must be included to get results to match observed temperature increase.</p>	<p>The famous Hockey Stick graph was featured in the summary of the crucial report by the United Nations climate panel from 2001. Based on tree ring studies, it denies that the Medieval Warm Period (A.D 700 – 1300) and Little Ice Age (A.D. 1560 – 1839) were global events. It considers them to be European only. But scientific studies of marine organisms in sea bed sediments, oxygen isotopes in coral skeletons, mineral and biological proxies in ocean bed sediments, ice cores from glaciers, etc., confirm their worldwide character. These studies show that temperatures in the Medieval Warm Period were in reality warmer than those in the late 20th century.</p> <p>The sun is more likely than CO₂ to be the cause of the increased 20th century warmth. The Little Ice Age correlates well with a period of no/low sunspot activity. The Medieval Warm Period is not considered to have been caused by CO₂, so the warming in the 20th century may also be due to other causes.</p> <p>Data indicate strongly that peak values in CO₂ concentrations follow peak temperature values, not the other way around as the “Global Warming Alarmists” hope for. This is apparently because the warming ocean reduces the solubility of CO₂ in water, thus increasing its level in the atmosphere.</p> <p>CO₂ absorbs infrared radiation in only two very narrow bands of wavelength. In addition, infrared light in those narrow bands is almost totally absorbed by carbon dioxide at current levels. The additional heat-trapping effect of any CO₂ increase (such as that from human activities) is sharply reduced as the concentration increases.</p> <p>That portion of atmospheric CO₂ contributed by human activities is only a few percent of the total atmospheric CO₂ present. Human activity puts about 6 billion tons of CO₂ into the atmosphere each year while nature adds about 180 billion tons. Therefore, believing that even a major reduction in this tiny fraction of CO₂ in the atmosphere will have a measurable effect on global temperatures makes no sense.</p> <p>Increased CO₂ in the atmosphere causes plants to grow faster and take more CO₂ out. After water, CO₂ is the main source for plant growth. This is a significant negative feedback for CO₂ growth in the atmosphere.</p> <p>“In climate research and modeling, we should recognize that we are dealing with a coupled non-linear chaotic system, and therefore that long-term prediction of future climate states is not possible.” —IPCC Third Assessment Report (TAR; 2001), Section 14.2.2.2, page 774.</p>

Engineering Amid Ominous Social Trends

An article by Dennis Feucht

Scientific and engineering theories are much like civilizations. They begin in a creative milieu driven by facts in need

of explanation or as a basis for living. As time passes, theories are refined until they take on the status of established truth. New facts that would tend to undercut them are disbelieved or minimized in their significance, and they become the basis for a paradigm shift. Civilizations who

have outlived their time similarly resist the stubborn facts that would collapse their social institutions were they widely accepted. A fantasy view becomes entrenched because the normal constraints that keep society on the road of truth are removed through subterfuge and deceit.

Inclinations rooted in fantasy are encouraged. For instance, the fantasy of Wall Street financial structures is now becoming evident. Consequences of financial and other ongoing trends were quite visible ten years (or even decades) ago to those heeding Christ's advice: to watch. Some who saw them proclaimed gloom and doom early, when the good times preoccupying the masses seemed to have no end. The good times are now suddenly waning. It is as though a wild party has ended and the host is sending the drunks out to their cars.

At the introductory session of a recently-held World Economic Forum in Davos, Switzerland, Russian leader Vladimir Putin used what has become a favored choice of metaphor to describe the major converging trends of the last decade, having their origins in the last two centuries, if not in Eden. He said a "perfect storm" is now beginning to overtake us. Its three converging trends are

- Global economic collapse caused by currency fraud,
- Emergence of the police state as a military dictatorship,
- World War Three.

These trends tend to interact and reinforce. As economic depression sets in, social unrest bursts forth (starting in Europe) to the anticipated extent that the military will be required to suppress it. A mega-9/11 event which the ruling class has been signaling in their speeches – most recently, as a nuclear or biological event – would be sufficiently traumatizing to allow for the imposition of the combined presidential executive orders awaiting nothing more than enactment. These orders, under conditions of presumed necessity, would sweep away America as we have known it by placing under government control all vital aspects of life. In addition, reports of 800 or more civilian detention camps - many of them military bases converted by KBR (a subsidiary of Richard Cheney's Halliburton) - are staffed and fully operational though empty, ready to start filling with destitute, pensionless people and dissidents. The event of mass destruction triggering the takeover will be blamed on hobgoblins, now domestic as well as foreign, and provide a pretext for WW III to expand to its full proportions – all conducted by an aspiring empire which

has required over two billion dollars a day from foreign interests to operate.

I go to town with Ralf, a Christian who left Germany because his son would have been forced to attend the state school, and we talk. Ralf lives, by middle-class American estimation, a relatively impoverished though content life with his wife in the jungle in a 16 × 30 foot cottage. He has been watching. His observation is that in earlier times, work was not such a central preoccupation as it has become today, and people would spend more time relating to God in various ways. Life was oriented around God and his guidance and instruction. Now, work dominates and the voice and guidance of the Lord are secondary. Perhaps God is about to get the attention of most of us, and a strategic review of the place of engineering in our lives will be a factor to consider.

With what can we compare our era to gain some context in which to inventory and assess the components comprising our lives? Germany in the 1930s is the default historical example of recent bad times. Despite the intellectual demands of leading-edge physics, Werner Heisenberg and other German scientists were alert to more than physics and aware of the growing dangers. Einstein barely left in time and had to sneak out of Germany on a half-true pretext. Heisenberg recounts these days in his book, *Physics and Beyond: Encounters and Conversations* (Harper Torchbooks, 1972). His father, whose political views Heisenberg respected, did not think Hitler could win the war, "For the technical and military potential of the British and Americans is incomparably greater than ours." (p. 175) His expectation bore out so that by our time, the Anglo-American financial and military power is unrivalled. Yet this time around, the third and final world war (final according to early 20th-century writings of those devising a global order) is being driven by the same circle of people who brought Hitler (and also the Bolsheviks) to power. It is as though the Devil knows his time is short and the *telos* of world re-ordering is breaking into history. The Mayan long-count calendar for this age rolls over at the winter solstice of 2012. The Mayans had the most accurate calendar of the various groups in the Americas. Might the Mayans have learned something more that is interesting from the Toltecs, who were described by the Aztecs as "tall, white,

and bearded"? Someone left the Ten Commandments in a paleo-Hebrew script used by Spanish Jews between 400 and 100 BC on a rock near an ancient Mideast-style mound near Los Lunas, NM. The name *Toltec* in Hebrew means "hill encampment", sometimes translated "mound builders".

Some of the hidden mysteries of ancient times are coming out at a time when it seems that God is ready to press the reset button on the world. We are at the end of the age. While the Babylonian interpretation of the heavens through what we know as astrology manifests itself in the New Age message of the dawning of the age of Aquarius, an older reading of "the gospel in the stars" (the title of a book by Bullinger, a Lutheran theologian of a few centuries hence) is that the age of the water-bearer - the one who brings the water of life - is the age of the reign of him who during the age that is now passing - that of Pisces - laid the soteriological foundation for the eschatological age to follow. And the sun at the spring equinox is now rising in the new constellation. The old order is ending.

What can we as engineering pawns in this large chess game do? The answer is clear in principle: seek the Lord while he may yet be found and follow his leading. Much of the text of the OT prophets was written near the end of the Israelite nations of Israel and Judah. Jeremiah in Judea and Isaiah in Israel (northern kingdom) were giving the populace advance warnings of the invasions of both Assyria, and later, Babylon. It was another historical parallel of nations about to collapse into bad times. Jeremiah was even taken by the ruling Judeans as a propagandist for Babylon, and was treated accordingly as an Israelite dissident though he was related to the ruling family, the last family of the unending dynasty of David to rule in Judea. Jeremiah's advice, which was taken seriously by many Israelites, was to get out and go west. (This article will not recount the growing revelation since the days of Austin Henry Layard and his unearthing of the royal library of Ninevah of the biblical mystery of the nations ("gentiles") - where Israel is and who they are today. Those called "Jews" today are merely the tip of the iceberg, are also not all Israelites, and are hardly the promised number of the sands of the sea or stars of the heavens.)

The early Christians and the Soviet-era dissidents, under duress, both recognized that they had three choices:

- Overthrow the existing order (whether by military force or overwhelming social and-or gospel influence)
- Hunker down, go underground (as in Rome)
- Leave

In the case of Rome, most Christians left. They went to the tribes of barbarians (barbed, or bearded, Aryans – a major factor in the mystery of the nations) who were ripe and ready for the Good News. The Israelites of the OT who stayed did not have the opportunity to lay low and weather out the attacks of Assyria or Babylon. The invading forces were too powerful and swept the land clean of its population, as the prophets predicted. The survivalist option in the Trilateral world is also meager. While millions of guns are in the hands of American patriots, a semi-organized civilian effort to confront and beat the U.S. military is unlikely, even as a guerilla war. The wilderness-project plans of sweeping free of human habitation many regions of land in the U.S. will make it harder to head for the “marches”, the places at the margins of political jurisdiction. Even remote areas of Idaho or Wyoming or Coast Salish can be monitored for activity by existing surveillance technology from satellites. That leaves the confines of the cities and detention camps.

A recent meeting of central bankers in Europe, including Benjamin Shalom Bernanke, have addressed replacement of the failing global default currency – the Federal Reserve dollar – with either a single global fiat currency or three (trilateral) currencies. Those watchers who are thinking proactively recognize that the grasp of the Money Power on society is tightening and that monetary economic exchange as a private event is quickly disappearing. Only those who revert to honest money – precious-metal coins or other durable commodities – will be able to buy and sell outside the emerging system of fiscal control. Money is the cornerstone of economic activity which is a major factor in the stability of the social order.

As the old age passes, our very lives and their foundations are now entering into examination. Those reading this

article are likely to have two advantages in coping with the emerging time of testing. As Christians we have an advantage as we avail ourselves of Gods’ grace. We are willing to believe - to accept as having serious informational content - the scriptural revelation as a key to our understanding of the social order and the times. In recent times, those parts of scripture that do not readily fit into the prevailing theories of theology are downplayed, ignored, or treated as Rorschach inkblots. A study of ancient history, which is necessary for understanding scripture, can overcome this operational obstacle, for scripture only gives us a strangely selective account local to the promised land of Israel in ancient times. Their “wanderings” far from Palestine and their substantial colonization in Europe are mysteriously missing in the biblical account, yet are a key factors in understanding the relevance of scriptural history in our time. With an enlarged understanding of the Bible in a historical context - and not only the approved historical theories commonly offered us - it is possible to better understand how God is bringing his plan for history to fulfillment.

While scriptural eschatology has weak (though not negligible) predictive powers, it has strong post-dictive power. Daniel nearly went berserk trying to understand the revelation given him, yet for us in retrospect it is not difficult to identify the world powers represented in the statue, eventually to be brought down by the unhewn stone striking the last humanly-built empire at its feet, a mixture of iron and clay – a hybrid empire having characteristics of the Roman empire but alloyed with the weakness of that from which Adam was made. When the technical strengths of humanity have never been stronger, the social and spiritual aspects continue to show their weakness. With a renewed relevance to historical reality, the Bible can provide us not merely psychological support but facts needed to see how mysteries that God has kept hidden for centuries are being revealed in these last times. (One place to start in an expanded biblical study tied to neglected history are books available from www.artisanpublishers.com.)

Second, as engineers we also have some advantages. We are supposed to be able to think clearly. We are trained to think and if we cannot, we cannot excel in engineering. Engineering and science

function as truth’s filter, for the tangible results that demonstrate engineering competence depend on a clear understanding of the structure of the creation itself and its behavioral characteristics. If one’s mind is uncluttered by spurious rationalizations and prejudices, it is possible to see that, despite the voices of prominent “experts”, “professionals”, and those with social influence, certain stubborn facts expose the fantasies upon which contemporary American life is based. Scripture aids in reinforcing this sense of truth.

As a prime example, consider the bedrock of present-day social fantasy. The OT prophets thunder against it in the context of false weights and measures. It appears repeatedly in their writings, yet how is it related to today, if at all? In ancient Israel, as is occasionally suspected in Belize, the gas pumps were rigged to provide less gas than indicated (if you will allow an anachronistic illustration). In our time, such fraud has been taken to its ultimate limit: the currency used in economic exchange is rigged to have no market value in itself. In 1971, the Federal Reserve Accounting Unit Dollar (or FRAUD for short) was cut loose from its last bond to reality when Washington (during the presidency of Nixon) opted out of the Bretton Woods agreement of international exchange and closed the gold trading window for the green paper. This was in large part the result of the imposition of bluff-calling upon the dollar by Charles DeGaulle of France, who was cashing in the green paper for gold worth far more than the market value of the paper.

As Christians and engineers who can read and understand the *money issue*, it becomes clear that we are participants in the world’s largest fraud in recorded history, a confidence game that has overtaken the whole world. When we consider that the necessities of our lives depend on playing this money game of musical chairs, it is sobering to contemplate how we might extract ourselves from it as citizens of a different kingdom, grounded in truth and righteousness. If everyone were to quit playing, the giant edifice built by Satan and operated through his middle management, the “banksters” (following FDR’s use of the expression), would collapse. Yet who can resist this “animal”, this “beast” of a money system?

The money issue is a central though singular example. When one inventories other aspects of life, it becomes evident that almost every Christian in developed-world engineering has become well-integrated into a set of relationships to social institutions controlled by strangers, many of whom are also hostile to Christ, his people, and his government. In earlier years of this decade, it was still possible to become set apart from many of these worldly entanglements by an identification and inventory of them followed by a plan to disentangle from them in engineering fashion. Now we are in the twelfth hour for the option of living as strangers and aliens in the world-system because our very lives depend on essential relationships with it.

There are, at present, attempts to restart an honest money system as an alternative to the printing and political declaration of the value of fiat money. The Liberty Dollar was one example not tolerated by the Money Power. Gold and silver traded electronically through the Internet are others, as exemplified by www.goldmoney.com, www.e-bullion.com, www.pecunix.com, www.e-gold.com and others. Some of these efforts have been attacked by the Money Power using the strong arm of Washington agencies such as the SEC and FBI.

By analogy with our situation, the five foolish virgins of Jesus's parable actually were headed in the right direction - that of replenishing the oil in their lamps - but their timing was fatally flawed. They were simply behind in their response to the critical event. They were reactive, not proactive. The option of leaving the developed world, which is the focus of control by the worldly powers, is also closing quickly. It is still possible to liquidate assets, buy a truck with camper top, load the essential items into it, containerize and ship what has not been divested of the rest, and with family (and preferably a caravan of likeminded friends) head into Mexico and beyond. However, the lesser-known and more formidable obstacle is not that of

emigrating but of immigrating elsewhere, for this takes, time, resources, and adaptation. Those who have no intention of leaving face the challenge of how to live in the margins of the System. The early Christians did this by forming small (house-church) groups, networked through identification by personal knowledge. Watchful Christians who intend to stay already need to be building an underground economy and culture, as the seeds of a new civilization to emerge from the collapse of the existing one. As the apostle Paul wrote (1 Thes. 4:1, 11-12), "Finally, then, brothers, ... aspire to live quietly, and to mind your own affairs ... so that you may live properly before outsiders and be dependent on no one." Christians should seek to establish an independence for their essential needs while the worldly powers are systematically gaining a monopoly on the control of vital resources. This means for most engineers a regression to more basic engineering functions that are not characterized by adding a specialized piece to a larger technical system outside the control of all but those in power. It is a reversion to what might be called "homestead engineering" with the technical goal of finding ways of achieving basic living conditions from what is at hand. And that can include lifetime supplies of advanced-technology components too.

Thus, a second advantage for engineers at the end of an age is that we are the builders of the physical infrastructure of civilization. The alternative culture will need engineers to accomplish the various tasks required to live outside the System, if this is even going to be possible. The Five Wise Engineers already have acquired homestead engineering capabilities and are putting them to good use. While so many other topics in American (and European) society distract (and to some significant extent are intended to) from rock-bottom basics, some in the ASA have been thinking about this for some time - and not all are engineers. Walter Hearn's odyssey in Berkeley has been

based largely on starting from square one to do a rethink of what it means to be a Christian in the developed world. Walt's urban form of scrounging dumpsters does not address dependency on the System but it does begin the needed rethink by starting with basics. Homesteading goes the added step beyond to also apply as a constraint that of maximizing independence from the System. Those in ASA who have been involved in infrastructure aid projects to the developing world are thinking in this direction too, though not for Americans.

I do not consider it necessary to try to convince those who do not find it wise to elevate this homesteading mentality to a high priority in their lives, though this article is intended to raise an awareness of it. If I am grossly misled and America and the world continue on happily with the American Dream, then nothing is lost by not listening to me. If, however, the signs of the times are read right by those of us watching them, then ominous trends will lead to dire circumstances which will necessitate a homesteading mentality without any convincing from others. If "the end is near" then the sooner one develops an outlook based on the apostle Paul's advice, so much the better for preserving options for decisions. In Belize, I consider one of my missions here to be a bridge to the Christian remnant who decide to leave, to assist in overcoming the obstacles of leaving. I did not find them very formidable when I left because I had already formed a developed outlook on living outside the System. Other likeminded Christians - one or two Christian engineers, even - live in my locale, and more are welcomed. In the most important ways, life in the jungle is not much different than in suburban America. Engineering principles all continue to apply, as do scriptural principles. Ideally, a "colony" of Christian engineers can accomplish much, and with some contiguous land holdings, the benefits of being relatively close can synergistically multiply the effort to "live properly before outsiders and be dependent on no one."

**ASA/CEST Newsletter
Distribution**

The primary distribution of this newsletter is via email to ASA/CEST members as indicated in the ASA's online directory. Members are expected to keep their email address up to date there. No paper copies are mailed. Recent past issues are located at <http://www.asa3.org/ASA/cest> All issues are archived at the YahooGroup asa_cest@yahoogroups.com web site, where they are accessible to group members. To join the group, go to: groups.yahoo.com/group/asa_cest/join and follow the instructions.

Bill Yoder, ed. ■

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