

Perspectives on Science and Christian Faith

special issue on

Responsible Technology and Issues of Faith

Perspectives on Science and Christian Faith announces a forthcoming special issue on “Responsible Technology and Issues of Faith” to be co-edited by Arie Leegwater and Jack C. Swearingen. We favor having a balance of theoretical-reflective articles, weighing normative principles which should guide sustainable technological development, with a number of case studies in which responsible technology is practiced.

Manuscripts that address the following topics are especially welcome:

- Broad themes: Responsibility and sustainability in technological practice
- Case Studies (for example)
 - Biotechnology
 - computer and communications technologies (e.g. video games, networking, Internet impacts)
 - Development technologies, disruptive technology
 - Sustainability, including green design and manufacturing
 - Transportation and land use

Both original research reports and relevant literature reviews will be included.

Manuscripts should be 20 to 30, doubled-spaced typewritten pages and comply with the reference style of the 16th edition of the Chicago Manual of Style. Style requirements can be found in a recent copy of the journal, on the web at www.asa3.org, or can be obtained via direct communication with any of the journal’s editors. Submissions are due by **September 30, 2011**.

To expedite processing, submit the manuscripts electronically. Authors should use e-mail attachments, with the manuscripts readable in Window-based MS Word or WordPerfect formats. If using postal mail, submit manuscripts in triplicate, with two copies prepared for blind review, to either of the special issue editors.

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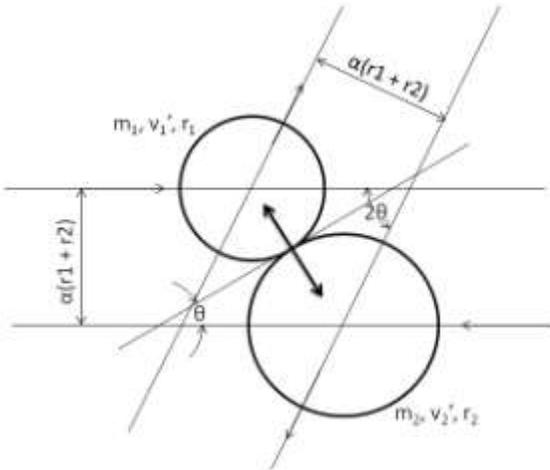
Please copy and post on notice boards and forward to anyone who might be interested.

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From the editor

You've probably already seen the announcement of an upcoming special issue of PSCF on *Responsible Technology and Issues of Faith* in the March 2011 issue of PSCF. I hope some of you will participate in this project. Most of you received copies of the last newsletter with the figure for the **Solution to A 6th Dynamics Problem** missing.



Here it is. I received a **reader response** from Harold Reed about my assertion that it takes energy to dissolve salt in water. He at first objected, stating that a small amount of energy is released in this process. But later he realized he had read the enthalpy of solution (1.164 kcal/mol or .0291 kcal/g) with the wrong sense. So he agreed with me, stating, "But since any separation process involves inefficiencies, and the heat change is so small, I don't

think [it] is realistically possible [to recover this energy in the desalination process.]" I received no responses about **Mitochondrial Eve** and how many generations it would take for a constrained population to eliminate all but one line of mitochondrial DNA. I think it's an interesting problem, but I haven't had time to address it either. I have a few more comments about **desalination** and **ice melting**. See below. There are brief updates about **One Laptop Per Child** and **Cape Wind**. There is a news note about **another wind-farm project**, this one in Rhode Island. There is a new **math problem** for you to solve.

Dennis Feucht responded to my request for reader input and **Another One of My Activities** by sending a letter about their **Life in Belize**.

Also, as usual, there is an article by Dennis. And last, I am mentioning **More of My Activities**. Please help make this a community newsletter by sending in your input. BY ■

Desalination

In the last issue I mentioned a web site where claims were made for a system that could desalinate seawater for an energy expenditure of 1.58 kilowatt-hours per cubic meter. The system described pushes seawater in a high pressure chamber through a membrane. As water in the chamber is pushed through the membrane, the water in the chamber becomes more salty, so there is a bypass outlet that lets some of the too salty water out in favor of more seawater. The typical desalination membrane requires pressure on the order of 400 psi to push the water through the membrane. It requires a lot of energy to move water at that pressure, and if the bypass water were simply discharged a significant amount of energy would be lost. To avoid that loss, the system uses a "PX energy recovery device" to transfer the pressure of the bypass flow to incoming seawater. This device is described at <http://www.energyrecovery.com/index.cfm/0/0/32-How-It-Works.html>.

Just as a check on the numbers I calculated how much energy it takes to pump a cubic meter of water at 400 psi. I got 2,034,125 ft-lb, which converts to 0.766 KWH. BY ■

Ice Melting Systems

We have had a lot of snow-clogged streets here in New England, and some municipalities have resorted to using snow melting systems. With these, the snow can be melted and disposed of through the storm drains rather than being trucked away. A typical system can melt 100 tons of snow per hour using 150 gallons of no. 2 fuel oil. In many cases this is evidently a cheaper way to dispose of snow. However, it does create a lot of CO₂. BY ■

One Laptop Per Child—Update

January 8, 2011. OLPC Project claims to have shipped about 2 million units. Current cost per unit is \$199, but a new version to ship in the fall will cost around \$165. New unit to use 2 watts vs. 4 in current unit. Project now looking to build tablet computer that will use 1 watt and cost \$100. Find out more at <http://www.bbc.co.uk/news/technology-12144651> and at <http://one.laptop.org>. BY ■

Cape Wind—Permits In Hand

From a news release at capewind.org: BOSTON, MA, January 7, 2011 – Cape Wind completed its Federal permitting process today with the receipt of a final permit from the Environmental Protection Agency (EPA). With the permitting process complete, and with the Massachusetts Department of Public Utilities recent approval of Cape Wind's power purchase contract with National Grid, Cape Wind's focus turns to securing project finance. Cape Wind is America's first fully permitted offshore wind farm and it has also secured the nation's first offshore wind lease. The project will locate 130 offshore wind turbines on Horseshoe Shoal in Nantucket Sound that will provide most of the electricity used on Cape Cod and the Islands from clean, renewable energy - reducing this region's need to import oil, coal and gas. Read the full article at: <http://www.capewind.org/news1174.htm>. BY ■

Block Island—Wind farm Blocked

From *The Sun* [Lowell MA] Sept 30, 2010

R.I. AG challenges wind-farm deal

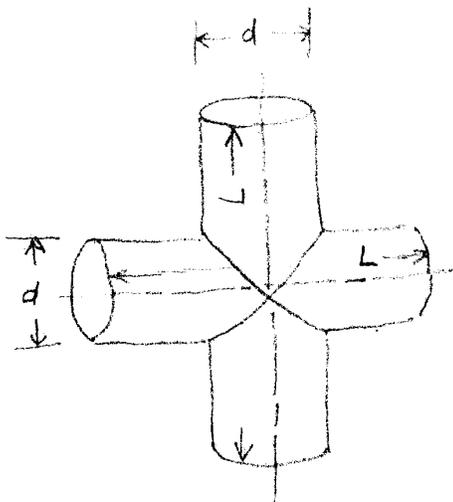
PROVIDENCE, R.I. Rhode Island's Attorney General Patrick Lynch has joined an environmental group and others challenging a power purchase agreement for a proposed wind farm off the coast of Block Island. The *Providence Journal* reports that Lynch filed an appeal with the state Supreme Court against a deal approved on Aug. 11 by the Rhode Island Public Utilities Commission. Under the arrangement, utility National Grid PLC will pay 24.4 cents per kilowatt hour for energy generated by developer Deepwater Wind's eight-turbine wind farm planned off Block Island's coast. Lynch says the deal will force Rhode Island's residents "to buy overpriced electricity for the next 20 years in order to subsidize one company."

BY ■

Math Problem Challenge

Here is a challenge for the reader.

Two circular cylinders, each with diameter d and length L , have center lines that intersect at right angles (see figure). What is the volume inside this structure?



Send solutions to lwiyoder@ieee.org. I will acknowledge correct answers in a future issue.

BY ■

Life In Belize

A letter from Dennis Feucht

Sauerkraut Bill,

First, I appreciate your descriptions of what you are doing in the CEST Newsletter. I would hope that your invitation to other readers to give the rest

of us some insight into what they are doing would be taken up. I would like to see some expanded sense of community to the Newsletter in this way. My wife and I do not grow cabbage, though we appreciate the substantial nutritional benefits of it. A neighboring village began a few decades ago by El Salvadoran refugees. Some youth from it come to our "colony" and work for my wife. She has restored our garden plot by having them wheelbarrow (to verbize a noun) black topsoil from the bottom of our hill to the garden. It appears that my dreams of growing okra again have been supplanted by more cassava, a root like yucca or sweet potato that becomes rather large and can keep people from starving in an emergency. My wife makes cassava chips (like potato chips) out of some of it and commercial potato chips have nothing over cassava chips!

We are turning our 24 acres, along with our fellow colonists - German refugees who came to Belize to avoid punishment for the crime in Germany of homeschooling - into a proverbial tropical paradise, with numerous fruit trees. This year, the five-year-old avocado tree growing near our house has supplied us with abundant and delicious fruit. Two wild guava trees down the hill are developing guavas. The coconut palms near them are rising. We have banana bushes here and there of various kinds, from ordinary to apple and red bananas, to blogos, palapitos, and plantains. Dottie and my favorite fruit here is soursop (guanabana in Spanish), so intensely good that we have three young trees growing well, along with a mamee tree - kind of a tropical pear. This year we also were blessed with an abundant crop of craboo from two large, wild trees at the base of our hill. These are yellow fruit about the size of grapes that have a flavor better combined into something than eaten alone (though many of the natives do). The Germans have planted several mangos and a relenio, or "Chinese soursop". They also are growing some macal, another root-based plant that tastes like buttered potato. Our second favorite fruit is a cactus relative, the pitaya. It tastes like a cross between strawberry and prickly pear (if you have ever gone to the Southwest and, with gloves, harvested any, in California or Nevada). It is smashingly delicious too, and the fruit is the size of a baseball, and flaming red, with growths coming off the main ball that look like

flames. Cut it in half with a knife and spoon out the fruit. The casing is even smooth, for a clean removal. This is in contrast to another excellent fruit, mangos, which are much harder to "extract". And I cannot stop this run-on monologue without mentioning papaya. We have a wild papaya tree that was nearly destroyed by a virus but is now reviving zealously. We are hoping for papaya. They are about the size of footballs down here and too big (fragile) to export.

This gardening activity we do might be more important in the larger picture than as the hobby to which most Americans have relegated its status. It was at one time the kind of activity that kept the American rural population independent and free from dependency upon evil strangers. After WW II, 44 % of the US population was still rural. Earlier, in Sherman's March to the Sea, he destroyed much of the rural South in the 19th-century American War (which did not seem "Civil" at all), and it is not well known that he destroyed the small family farms and forced Southern farm families into the cities.

Second, I have attached yet another CEST Newsletter submission for your consideration. As usual, it is outside the box of normal thinking, and I hope it generates some deeper thought (and action) about how as engineers we relate to the larger social order, and how our engineering mental habits can help us in applying scripture in our thinking about that order. If you get any rebuttals of anything in my articles, I would be interested to take up dialog with anyone disagreeing though thinking through the issues. I suspect that some of this material from me is so far out to most readers that it is like the skyscrapers were to the Manhattan Indians when some of them were brought back to modern-day New York City. Yet it is generally recognized that we live in a transition between ages, and to understand the changing world around us, we must do as they teach at MIT and Caltech: go back to basics, discover our hidden assumptions, and achieve clarity of thought and action based on the Logos revealed to us in Christ.

Upwards,

Dennis Feucht

Engineering Gone Bad: Wolves in the Sheepfold

Three recent developments illustrate that the assumption that engineering improves the world is not unquestionably true. Historically, both science and engineering grew up in a Christian milieu and it has been argued that the biblical outlook shaped, and even made possible, these blessings to humanity. The dominant emphasis in the engineering tradition has been the improvement of the human situation by the exercise of the growing powers of humanity equipped with an enlarging base of technical knowledge. The images elicited by science-fiction have often been those of a morally or spiritually restored humanity accomplishing dramatic things with advanced technology. However, as the developed world decays, sci-tech is no longer largely an enterprise conducted within the sheepfold of redeemed humanity. Institutionally, wolves have come in and are reorganizing the sheepfold into a wolf den. The consequences are becoming substantial.

In the ancient world, technology was also a significant factor in life. The biblical history includes but does not place great emphasis on the role of technology in culture. Along with the accomplishments of the ancients is the Greek myth of Prometheus, who stole fire from the gods. Myths tend to have some basis in fact, however obscured. If indeed extraterrestrials (ETs), referred to in scripture as angels, have played a role in human history, then the hints given in biblical history (and even Greek mythology), which in a skeptical age have been relegated to the margins of consideration, take on new possibilities. Could it be that an ancient human inappropriately acquired technology from these ET gods and was made to pay the price of futility for it? We lack data to know. Yet the point behind the myth was technological in nature. Perhaps mankind did not have the wisdom to use this technology, and Prometheus was an earlier case of the sorcerer's apprentice. Then there is the box of Pandora, hinting of another case of ancient technology let out too widely and with undesirable consequences. Before the recent advances in genetics and biotechnology, the half-animal, half-human creatures of Greek mythology, from centaurs to dryads, mermaids and cyclops, were easily

dismissible. Now they are beginning to become possibilities, suggesting that biotech experiments might have occurred in the past.

Now we come back to our own time and see this kind of history (or intimations of it) repeating itself. The first instance is in the mainstream news of 2010, of the accident at the deep-sea oil platform of British Petroleum off the Caribbean coast near New Orleans. Deep sea oil wells are not highly controllable technology and when a plumbing fault occurs, the means of stopping the leak are limited and costly. This incident is not the first or the largest oil spill in the Caribbean Sea. The Mexican state-owned oil company, PEMEX, receives that appellation. The damage done by the failure is ecological and financial for coastline businesses in the Gulf. In time, the Cajun swamps and Texas beaches will become clear again with the work of bacteria on the oil, but one might wonder how many of these big spills the coastal estuaries and wildlife in the sea, on land, and in the air can absorb without permanent damage.

Of potentially greater impact are disintegrating radioisotope thermoelectric generators, or RTGs. These compact electricity sources use a significant mass of plutonium to generate heat. It is converted to electricity using thermoelectric modules: thermocouples placed electrically in series to provide a workable voltage. They operate by the Seebeck effect whereby the junction of two dissimilar metals produces a voltage driven by a temperature difference. This difference causes thermal diffusion of electrons which also causes charge diffusion and separation. It is not an efficient process (5 % max) but is capable of providing long-term power to spacecraft at relatively low weight.

The toxicity of ^{238}Pu is much higher than weapons-grade ^{239}Pu and it is more fissionable (though unable to sustain a chain reaction). ^{238}Pu emits relatively mild radiation - no gamma rays or neutrons - and does not need a thick shield. Both the USA and former Soviet Union have used RTGs in spacecraft but both the USA and especially the USSR have used hundreds of them to power remote sites such as Alaskan and Arctic Ocean lighthouses. Some of these units have fallen into the hands of vandals and salvagers. In Georgia, three hunters slept near one for its warmth and were subsequently treated

for radiation sickness. Spacecraft RTGs include the one in the lunar excursion module of the failed Apollo 13 mission, now presumably intact in the Tonga Trench of the Pacific Ocean. Others have been recovered. For decades, their design has included heat shielding that would allow the iridium and graphite-encased plutonium to remain intact through re-entry and not be corroded by sea water. One Russian spacecraft that did not remain intact spewed pepper-sized flakes of plutonium 238 across an area of northern Canada, costing the Canadian people many millions of dollars in its clean-up. An earlier RTG design of the USA broke up over Madagascar, scattering plutonium into the atmosphere and polluting the southern hemisphere with it.

What is the risk-benefit ratio of RTGs? It would not take much plutonium 238 dust to kill the entire human race. Yet accidents have happened that have released it into the environment. Perhaps we are paying, or will pay, the price for these mishaps. Or perhaps not. The risk seems dire, yet is not easy to quantify. It is reminiscent of the arguments against nuclear power plants: the high risk of nuclear contamination outweighs the benefit of cheap electricity. In the assessment of that risk, some "deep greens" argued against any release of radioactivity whatsoever from the Trojan nuclear plant in Oregon, though the naturally-occurring level of radiation in the Columbia River was quite measurable. I would think that most engineers would find this kind of risk tradeoff absurd and be willing to accept at the least the natural level. (The "greens" were not urging anyone to clean up nature.) The emission level from the plant was already lower than the naturally-occurring level. (ASA past president David Willis of Oregon State University was called as an expert radiobiology witness to testify at the Trojan trial. He did not enjoy the experience!) Similar risk argumentation is heard among other "greens" who consider the loss of any species unacceptable, despite the natural evolutionary mechanism of non-survival of the less fit. The concern about species preservation has a compelling side when the benefits of biodiversity are enumerated. Yet who would fault the World Health Organization for eliminating from the environment the smallpox virus? (Bioweapons labs have it, recovered from

a man who died of smallpox in Alaska and subsequently froze, thus preserving the microbe.)

To conclude that RTGs are engineering gone bad might be excessive. Perhaps their misuse and neglect reflect inadequate attention during design to the environment in and range of uses to which they would be applied. Yet there is a compelling aspect to them. Pu 238 has a half life of 87.7 years meaning that its thermal power output falls off by

$$\dot{W}(t) = \dot{W}(0) \cdot e^{-t/87.7 \text{ yr}}$$

For a 25 year product life, initial power would have decreased by about 25 %. If plutonium could be handled responsibly by a redeemed humanity, one might consider the RTG as an alternative energy source: a household power generator, tucked in a closet or basement, maintenance-free and long-lasting. Yet the doomsday scenario of a few kilograms of plutonium dust in the air or water can give engineers plenty to weigh in achieving a compromise optimum among conflicting criteria.

Morgellons Disease is the final example, that of bioengineering gone bad. It has appeared mainly in urban areas of California, Texas, and Florida. Those who have it develop skin rashes and lesions and have the sensation of bugs crawling in them. They usually go to a doctor when fibers begin to grow out of the lesions. Doctors unfamiliar with the disease chalk it up to delusional parasitosis. Three categories of fibers occur. The first are like cotton balls, white and fluffy. The second are tiny pink or blue threads that spectroscopically match with polyethylene, shown below (as found in the article on the subject at www.ViewZone.com).



The third are clear with a golden bulb at the end, the shape of a hair follicle. The FBI lab could not match these filaments to any in their extensive catalog of manufactured fibers. The Center for

Disease Control has paid little attention to the disease.

Biochemical analysis of the fibers revealed proteins not synthesized by the human body, one or more fluorescent, and also cellulose. One of the proteins that was fluorescent was identified as belonging to *Chromobacterium Violaceum*, found in the water and soil of subtropical regions. It produces the antioxidant *violacein*. The Helmholtz Center for Infection Research in Braunschweig, Germany identified violacein as used by bacteria in biofilms to protect themselves against the attacking phagocytes of the human body. The genome of *Chromobacterium Violaceum* was published in 2003.

The plot now thickens. As Dan Eden reports in his article at www.viewzone.com:

Vitaly Citovsky is a professor of molecular and cell biology at Stony Brook University in New York (SUNY). He is a world authority on the genetic modification of cells by *Agrobacterium*, a soil bacterium widely used in creating genetically modified (GM) plants since the 1980s. *Agrobacterium* has the ability to invade a plant and then insert a large amount of its own DNA sequence [into] growing cells in the plant...

Citovsky commented on lab testing of Morgellons patient skin samples:

Skin biopsy samples from Morgellons patients were subjected to high-stringency polymerase chain reaction (PCR) tests for genes encoded by the *Agrobacterium* chromosome and also for *Agrobacterium* virulence (*vir*) genes and T-DNA on its Ti plasmid. They found that "all Morgellons patients screened to date have tested positive for the presence of *Agrobacterium*, whereas this microorganism has not been detected in any of the samples derived from the control, healthy individuals." Their preliminary conclusion is that "Agrobacterium may be involved in the etiology and/or progression" of Morgellons Disease.

Eden then proposes that

In short, *Agrobacterium* was found to transfer T-DNA into the chromosomes of human cells. The association of Morgellons Disease with dirt and soil where *Agrobacterium* lives, the

widespread use of *Agrobacterium* in genetic engineering of plants, and the ability of *Agrobacterium* to infect human cells, all point towards a possible role of genetic engineering in the aetiology of Morgellons disease via *Agrobacterium*.

The laboratory findings can be summarized:

- Some fibers fluoresce. Fluorescent properties are spliced into certain genes to tag them in genetic research. Fluorescence does not naturally occur in humans and how it got into Morgellons victims is a mystery.
- Fibers consisted of human serum albumin (the liquid part of human blood that contains proteins) and cytoskeletal keratin (hair and fingernail material).
- The fluorescent substances contain no human proteins. These proteins were traced to non-human organisms, all of which had been sequenced and their complete genomes published in the last decade. This would be needed for transgenic manipulation and tagging in the laboratory.
- The proteins come from organisms that make biofilms and violacein, both of which are effective against the human immune system and can insert genes into human cells.
- Morgellons victims test positive for *Agrobacterium*, a unique bacteria that is widely used to genetically modify plants and which can genetically modify human cells.

These facts support the hypothesis that the origin of Morgellon's Disease, whether by design or accident, was bioengineering. If government or a politically powerful transnational corporation were involved, this would explain the reluctance of the CDC to take an active role in investigating what is becoming a pandemic disease.

Like the nuclear risk, bioengineering places a new power in the hands of humanity and some of its consequences are reminiscent of the opening of Pandora's box. As engineers following Christ, how might we respond? One of the factors to consider in response is the relative weighting placed upon criteria. The developed world is in decay, and what has increasingly been depreciated in

value are the virtues promoted by God's Law. This departure from scriptural instruction can cause decisions to be made out of fear or pleasure at the expense of rational caution. Prudence indicates that we should go patiently and carefully into these new habitations of dragons, and learn the territory well before attempting to advance the technology and apply it for good.

It also means that we should contemplate the evils that can be brought upon humanity by those from the wolf den. We should try to anticipate where a world of technology of this kind gone awry might put us, and be proactive instead of reactive. Perhaps the "meek" - the powerless and cautious - who will inherit the earth will be like the Barton Creek Mennonites who live a few miles from me, who have chosen to largely shun modern technology, processed food, vaccinations, and floridated city water because of the unwanted side-effects.

Perhaps the least some readers can do is to become more aware that engineering has an increasing dark side to it as civilization itself decays. This awareness might motivate an inventory of the various interfaces of yourselves and your people in Christ to the world we live in, and as engineers, establish biblically consistent criteria with which to analyze the influences of modern life. Then assess them and proceed to manage their effects upon you and your people. If pursued with sufficient diligence, you might conclude that it is not optimal to live the lifestyle of the decaying world. When the unwanted side-effects of technology defeat its putative advantages, alternatives of some kind are sought. Some move to the developing world, where chickens still run free, crops are grown without too many chemicals, truck engines have no electronic controls to fail in high humidity, and food is picked off bush or tree and eaten fresh. New, developing colonies of people who have analyzed their inventory of interactions might even appear - in Wyoming, NE Oregon, or New Hampshire.

Eventually, when decay triggers the thresholds of more Christians to action, the people of God will form groups in America that are more close-knit and interdependent than in the present pattern of meeting two or three times a week at the temple. They will pull together for survival, share a common life, and

rediscover and recover true Christian community. In this setting, where the intransigence of change in the past way of life has by necessity given way to the vicissitudes of a different world, the church will start over. Some will be engineers and in that new and humble beginning, the opportunity to do it right the second time will present itself. We should be ready ...

Dennis Feucht,
17JUL10

More of My Activities

At our church (Grace Chapel in Lexington MA) a team of five of us have developed a course that we are using in the adult Sunday School this semester. It is based on the widely known 3 semester hour college level course *Perspectives on the World Christian Movement*. You could think of it as a *Perspectives Sampler* because we can only hit some of the high points in our 15 one-hour classes. We call the course *Glocal Outreach*, and have a website where it is described: <http://glocaloutreachgrace.org/> I will be teaching the two abbreviated lessons on the history of the world Christian movement.

* * *

Last summer about a dozen of us at GC began a science-faith book reading and discussion group. So far we have read and discussed *Saving Darwin* by Karl Giberson, *I Believe in Jesus and I Accept Evolution* by Dennis Lameroux, and *Creation as Science* by Hugh Ross. We are currently reading *The Faith of a Physicist* by John Polkinghorne.

GC has January short-term SS classes, and we were asked to present a four-week class on *Are My Children Safe in Science Class?* About half the time was used in presentations on The Framework Hypothesis, A Concordist Old-Earth View, and a Theistic Evolution View. The other half was used for testimonies of science-faith experiences of several of the discussion group members. I was allocated 10 minutes to speak of my experience, and to keep to the time limit, I decided to use a script. Here is what I said.

My Science-Faith Experience

My purpose in these few minutes is to relate some of my science-faith experience. My comments are about me,

our five children and our fifteen grandchildren.

I was raised in a Christian home and accepted Christ as a child six years of age in first grade. That happened in a revival meeting in a one-room schoolhouse in southwestern Virginia—the same school where I was a student—six grades in one room with only one teacher. We moved back to PA and I completed 12 years in the public schools. Then, after working 15 months in a weaving mill to earn money for college, I enrolled at Penn State, where my major was engineering science. I stayed to earn my MSEE there and later earned my PhD EE at the University of Pennsylvania.

I avoided any major crisis of faith regarding science, and I would like to mention four factors that seem to be important in this regard.

1. **My parents' faith.** I said I went forward in a revival meeting, but I what I understood being a Christian meant, I learned from my parents. Their lived-out testimonies and their decisions to follow God's call on their lives helped to impress on me and my siblings that our faith was real. I may have questioned some peripheral matters that our church taught, but the heart of the faith I took as my own. I wish I had time to tell you about my parents ... , but let me tell you just this story. In 1944, when I was 4, my parents accepted a call from our church's mission board for Daddy to become pastor of a small mission church in southwestern Virginia. They left their comfortable home in Lancaster County, Pennsylvania, and with 5 children, ages 1 to 7, moved to the middle of Appalachia. Our home there had no electricity, no telephone, no indoor plumbing, and we got our drinking water from a well with a bucket on a rope. My sisters and I walked 1½ miles to school each day. We had several cows, pigs, and chickens, and Mother had two pet geese.

2. **Our church's moderate position on scripture** (and our family's) said "The holy scriptures ... constitute a basis for faith and the supreme guide for life and conduct." This is similar to Grace Chapel's "... the Bible was given by divine inspiration [and] constitutes the only perfect rule and final authority in all matters pertaining to Christian faith and practice." We did not feel a need to defend the accuracy of every statement in the Bible—especially on matters of

history and science. When around age 11 I asked my father about the dates given in the center column in my Bible, he explained that they were not really part of the Bible, but were study aids inserted by the publisher. I think it said the earth was created in 4004 BC and Noah's flood was around 2350 BC. But he told me the earth is millions of years old. If children are being taught that the Bible is literally true, and that that means humans have no common ancestor with the Chimpanzees, that Eve was literally created from Adam's rib, that the earth is 6,000 to 10,000 years old, that Noah's flood was universal, etc., then I think they are being set up for a crisis of faith when they find out that these things are not true, and that the Bible is evidently not reliable.

3. **Not a biology student.** As an engineering science student, I did not have the pressures a student in the life sciences would have had. A biology student must come to terms with evolutionary theory on a more or less immediate basis if he is to have any integrity in his professional life. Other students can put that on the shelf for a while.

As a junior I took a zoology course as an elective. I learned the material on evolution for exam purposes, but personally took it as tentative information to be revisited later. I was sure God did it, but I wasn't sure how. Now, nearly 50 years later, information obtained from the fully decoded human genome has convinced me that much of what the biologists seemed to have known years ago, is true,

4. **IVCF and ASA.** Throughout my 5 years at Penn State I was active in IVCF, and I found others there who were committed to the idea that God's Word and God's Works were both valid sources of truth and that any apparent conflicts would eventually be resolved. When a friend from IV who was a PhD student in zoology gave a talk on evolution and faith to the IV group, it was reported in the student newspaper. He was then called in by his advisor and told that he should keep quiet about these things or he would put his status as a PhD candidate at risk.

I joined the ASA in March, 1965, the month I graduated with my M.S.E.E. Here several thousand Christian men and women trained in the sciences grapple with all sorts of issues where Christian faith and science intersect. Their

commitment to the idea that the findings of science and scripture do not ultimately contradict each other has been an encouragement to me over the years. The quarterly journal, annual meetings, and website are important sources for current science-faith information. The quarterly journal of the ASA, called Perspectives on Science and the Christian Faith, can be found on the web at asa3.org with about a one year delay.

I recently went up into our attic and dug out the first issue of the ASA Journal I received—the March 1965 issue. The first article is *DNA, RNA and Protein Biosynthesis and Implications for Evolutionary Theory*, by Duane T. Gish. Has anyone here ever heard of him? Yes! He became a major spokesman for the young-earth creationist movement and a leader of the Institute for Creation Research. He is no longer a member of the ASA, but there may still be a few young-earth creationists who are members.

Our experience with our children. Our five children all attended 12 years in the public schools of Chelmsford. Here are some principles we used in raising them:

1. We tried to show our children by our lives that God is real.
2. The Bible is an authoritative source of information about what we should believe for salvation and how we should live.
3. The Bible does not teach science. Generally if a teacher, or more likely, a fellow student says something negative about how science relates to God, it will be to identify one or more contradictions between science and what they have been told the Bible says.
4. Science does not study God. We taught our children that their science teachers have no special information about God. Any comments they make about God are only their personal opinions.

What about our grandchildren? (Ages 4 to 15.)

This is mostly up to our children and their spouses. Here are some questions that have come up:

1. Did God create us or did we come about by undirected evolution?
2. Are humans just another animal species?
3. Are we to worship Mother Earth?

4. Did God make some people homosexual?
5. Why is sexual purity important?
6. If we are just another animal species, abortion isn't wrong, is it?
7. How do we know that God is really real and not just a big fairy tale?
8. If a baby dies without understanding the Word, will it go to heaven? (The Fall)
9. Where is heaven?

BY ■

The YahooGroup

asa_cest@yahoogroups.com
was established to provide a mechanism for CEST members to keep their entries in the CEST email address list up to date. For CEST members not in this Yahoo group, we use email addresses from the ASA's new online membership directory. However, past issues of our newsletter will continue to be archived at the Yahoo group's web site, where they are accessible to group members. To join our group, go to:
groups.yahoo.com/group/asa_cest/join
and follow the instructions.

Bill Yoder, ed. ■

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