Earthkeeping Technologies for Afghanistan

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The terrorist attack on the U.S. and the military action being taken in Afghanistan have exposed the U.S. population and our students to the desperate conditions in Afghanistan and the hopelessness that is prevalent there. After much prayer and contemplation, I am proposing that our department take the following action to help the poor of Afghanistan. All the earthkeeping technologies that are described below have been tested and proven at various places, including the appropriate technology program of the Bishop Heber College in South India. I have been a consultant for this program for several years. Some of the proven technologies can be useful in Afghanistan’s cities, as well as rural areas. In this article, I propose a few of them, and hopefully, Messiah College can transfer them as a part of our earthkeeping missionary endeavor.

What Are “Earthkeeping Technologies?”
Earthkeeping technologies are those which not only consider human beings’ needs, but also the impact these technologies have on God’s creation. These earthkeeping technologies are based on Genesis 2:15 where God commands Adam to “…TILL the Garden and KEEP it.” Engineers come up with great ideas for creative tilling of God’s earth but many times do not faithfully keep it.

A plastered straw shed built in replica to what may be built in Afghanistan.

Some Examples of Earthkeeping Technologies

Food Production
We see on TV the arid and barren land that dominates Afghanistan. Instead of sending tons and tons of food, we must use container gardens to grow fruits and vegetables. I successfully established many urban gardens on the roofs of buildings and in vacant lots in many cities in the U.S. and in a few places in India and Central America. You can visit the web site that explains the techniques at www.ringoall.com/elca/. We can also follow what Heifer Project International has done and increase the small animal farms. I have successfully raised tilapia (a type of fish) in Chicago apartments, as well as in Milwaukee. You can also visit a web site that describes this technique at www.webof-creation.istc.org/congregations/.

Building Technologies
Last spring, Messiah College’s engineering and business department students constructed a plastered straw shed in Harrisburg using pre-fabricated panels. Last summer, John Paul Peterson ’03,
A bicycle is used to grind soy beans.

built a solar greenhouse/shed at a Lutheran Camp in Elizabethtown. I helped Bishop Heber College to construct two such buildings using rice straw and locally available materials. In India, we have shown that we can build a plastered straw building for one-fourth of the price of a cement block building. We can introduce this technique in Afghanistan.

Transportation and Energy Technologies

Use of bicycles and modified bicycles (pedal cars) seem to be an appropriate transportation system for cities. At Messiah College, we will be testing a pedal car and modifying it to suit the needs of developing countries. We can very easily find millions of unused bikes stored in our garages and put them to use in Afghanistan. These bicycles, besides being used for transportation, can also be converted to produce a small power supply. For over two decades I have developed dozens of uses for bicycles which can be used to power rice threshers, peanut shellers, corn shellers, grinders, circular saws, wood working lathes, water pumps, and many other implements. We can introduce these technologies in Afghanistan without spending thousands of dollars to install wind-powered devices and photovoltaics. We can introduce solar and wind energy systems later, but for the near future, pedal power seems to be most appropriate.

Water Development

Many parts of Afghanistan are very arid and dry. We can use a solar distiller to get one or two gallons per day using brackish or salt water. Again, a small solar distiller using electrical conduits and clear plastic can be built easily, so that each family can get one or two gallons of drinking water. We can also use a passive solar water heater to pasteurize contaminated water. Building cisterns to catch rainwater is yet another way to develop water resources in Afghanistan.

The technologies I described not only take care of human needs but are also harmless to God’s creation. These are the “earthkeeping technologies” that Messiah College students and faculty can present to not only Afghanistan but to many other developing countries. Please send your comments and recommendations to me and come up with your innovative ideas for “earthkeeping technologies.”

Solar distillers are used by families to get drinking water each day.

Facts About Water

- 25% of the world’s population lacks access to safe drinking water.
- Some 80% of all human disease is linked to unsafe water, poor sanitation, and a lack of basic knowledge of hygiene and disease mechanisms.
- Waterborne diseases claim at least 25 million lives each year in the Third World.

— from the “The Global Ecology Handbook”

Water Purification Project Begins

A new initiative of the Collaboratory was approved in November. Mr. Ray Diener of the Elizabethtown Crystal Pure Water Company suggested an interesting water purification project to the Engineering Department earlier in the year and gave an initial gift to help start the project. Professor Carl Erickson is heading the multi-disciplinary project. Students, faculty, and staff from three departments (natural sciences, engineering, and business) are involved in the project. The basic goals of the project are to:

- Investigate various disinfecting processes to include chlorine, ozone, and ultraviolet light. The Natural Sciences Department will take the lead in this objective.
- Develop a prototype device based on Mr. Diener’s patent. The Engineering Department will head this objective.
- Consider entrepreneurial aspects of such a device. The Business Department will take the lead in this objective.
- Develop a plan for an ongoing water purification program to help promote the concepts and/or devices developed through the results of this specific project.

Three separate teams are meeting weekly while the project team as a whole meets twice a month. By the end of the summer of 2002, a prototype device should be completed.
A LIFE WORTHY OF THE LORD

Ephesians 4:1 and Colossians 1:9–12
by Dr. David T. Vader

Who are you? We are, of course, children of God, and after that daughters and sons, husbands and wives, parents, friends, and neighbors. When asked about our identity, however, we are as likely to answer by saying where we work and what we do there, as we are to describe our relationships. The way that we link our very identity to work shows how important work is to us. In this culture, we give the best hours of the day five or more days a week to work, and over the course of our lives we may dedicate to work a larger portion of the time, talent, and even gifts given to us by God than to any other purpose or cause. It is no wonder that Christians sometimes use words like vocation to describe their work, seeking to imbue daily activities with eternal significance. This article explores how God’s call on our life both encompasses economic activity and frees us from bondage to the market.

Hearing God — The word vocation is derived from a root, which is Latin for “voice” or “to call.” Language about God’s divine call on our lives is common in the Bible. The Hebrew verb “to call” appears frequently in the Old Testament in reference to a personal or collective summons by God. For example, God calls upon his people, Israel, to repent (Jeremiah 31:12) and individuals such as Isaiah (Isaiah 42:6) and Samuel (1 Samuel 3:4) to personal office. In the New Testament, the Greek verb “to call” is used by Jesus to call all persons to repentance and discipleship (Mark 2:17). Discipleship in the Gospels results exclusively from Jesus’ personal call (Mark 1:19–20); there is no case of anyone successfully volunteering to become a disciple.1 Clearly, vocation does not begin with human will; the true call on my life is neither my willing to do as I please nor the willing of others who presume to know what I ought to do. It is most fundamentally the call of Jesus to “follow me” and his instruction to love the Lord our God with all my heart, soul, mind and strength; and the other instruction like it, to love my neighbor as myself. In the broadest sense, one’s vocation is to do the will of God.2

Prior to Martin Luther and the Reformation, the concept of vocation was used exclusively to denote religious life, as exemplified by the monastic system. Luther argued that since God calls individuals to a particular way of life in and among the world, one’s call had to be fulfilled within and among the world. He painted the monastic system as selfish and indulgent compared to the lives of believers who served neighbors by working out their calling in the world. The concept of calling took on an even more urgent meaning for the followers of John Calvin and his reformed doctrine of predestination. Individuals longing for assurance that they were among God’s elect were urged to consider their worldly conduct. Trusting that God would work in the lives of his elect to bring glory to himself, individuals sought conviction of their salvation according to their success in fulfilling their calling. Although in principle the early Calvinists understood that God’s call encompassed all of life, success in the marketplace became especially significant to them as the most readily measured or quantified aspect of calling.3 These origins of the protestant work ethic, then, are also the origins of today’s narrow understanding of vocation as whatever a person does to earn a living. Today, “in the secular world one’s vocation or ‘calling’ has come to mean simply ‘occupation,’ particularly in the professions.”4

Fruit that Lasts — The call of Jesus to “follow me” is neither strictly for religion’s professionals, nor is it to be trivialized as merely one’s career. His is a claim over all of our being, the whole person. Even so, it is the call of Christ to discipleship in our work that I wish to address here. I want to propose six potential sources of lasting significance to our work, a typology that I hope will enable us to think more deeply, pray more effectively, recognize with greater clarity, and act more joyfully in response to the Lordship of Christ over our work. These categories are:

1. Share with God in the joy of creation. (Genesis 1:31)
2. Provide for the needs of my family and myself. (Ecclesiastes 2:24–25, 2 Thessalonians 3:11–13)
3. Work for income to support myself in ministry outside of the marketplace. (Acts 18:1–4)
4. Live on less than what I earn to provide for ministry to social, economic and spiritual outcasts. (Matthew 25:34–40, Luke 16:9)
5. Gain access and influence for God’s Kingdom over individuals, communities, and institutions. (Esther 4, Acts 17:16–34)

We need to begin by remembering that there is something even more important about work than its necessity or usefulness; work is valuable purely for the joy that it can bring to the worker. Receiving this first blessing of work is to share in the deep and boundless joy that was God’s when he created the universe and every living thing, declaring all of it good. It is to share in the eternal joy that is God’s as he contemplates “towering clouds of gasses billions of miles high, backed by nuclear fires in newly forming stars, galaxies cartwheeling into collision and sending explosive shock waves boiling through millions of light-years of time and space.”5 “These things are all before him, along with numberless unfolding rosebuds, souls, and songs — and immeasurably more of which we know nothing.”6 Before sin came into the world, God called us to join our own intelligence and efforts to his work. He called us to be fruitful, increase in number, fill the earth, and subdue it (Genesis 1:26–28). At the dawn of creation, everything was good and pregnant with unimaginable riches and possibilities. God gave to Adam and Eve the task of bringing these treasures to fruition. Now each new generation is also charged with helping all things come into their own. Building on the work

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of prior generations, we are to bring out ever more intricate features and increase beauty in the creation. What began in a garden will end in a city, the new Jerusalem.'

The second meaning of work is perhaps the most obvious sometimes the primary significance of work is to satisfy the basic needs of self and family for food, clothing, and shelter. Indeed, this and the first meaning may be the only ones that many Christian brothers and sisters in the world will ever know. Career decisions are an unknown luxury to persons whose lives are governed by the questions "What will I eat today?" and "Where shall I sleep tonight?".

No one, however, is excluded from this second blessing of work. God knows about and cares for our material needs; he deserves our thanksgiving for his provision. Those who do not receive their wages with a grateful heart and an attitude of thanksgiving, who believe that by their own will they have earned a just reward in the marketplace over which they are now sovereign, are indeed proud and in jeopardy of securing for themselves only wealth that will not last.

The third and fourth meanings for work recognize the possibility that in a prosperous society one's individual market potential may well exceed the needs of self and family. Of course there is tremendous social pressure to both optimize our financial resources and grow my "needs" to equal if not exceed those resources. Christian financial counselors exhaust their best efforts to merely keep us out of debt. We are so busy dealing with the problem of over-consumption that little time or attention remains to nurture generosity. Living on what one earns, all of it minus a tithe, is thought to be particularly virtuous today. The limits of generosity give way pretty quickly to what is called foolishness, both in our culture and in the church. Those found to be living much below their means are as likely to be chided for "poor stewardship" by another believer as by anyone. Even so, it is quite possible for many believers in America to live comfortably and with greater joy on a fraction of their income, and there are many great works to which a brother or sister might be called in the Kingdom of God that have little or no market value, works by no means limited to missions and evangelism.

The world is filled with persons who do not exist to the market, but who need the love of Jesus. These market non-entities are people with financial resources so small that the forces of supply and demand are entirely unmotivated to meet even their most basic needs. Christians, however, are free to meet them: teachers might provide an education, attorneys might seek justice, physicians might provide health care, and counselors might bring emotional and relational healing. We must also direct our attention to the many problems that remain almost entirely unattended by the market because they are problems that belong only to the poor. Not all of us, for example, need to devote ourselves to creating economics that provide meaningful work in the world's poorest communities, devising technologies to remove unexploded landmines from the fields of civilian farmers, and curing diseases like malaria. It would not be unreasonable in God's economy for some of us to provide significant financial support to a brother, sister, or organization on just such a mission for God. It is also entirely possible for some of us to follow the example of Paul the tentmaker and do less work for pay, using the balance of our time and what we earn to pursue some other work that matters more to God. The security and provision of the Lord and his Kingdom frees each of us from any obligation to optimize our own market potential.

Other Christian disciples are called to a fifth kind of work, to gain access to individuals, communities, and institutions, and to influence them as ambassador for Christ. Under the tutelage of God's Spirit, the career path of this brother or sister is shaped by a desire to represent Christ to others and in influential places more than for promotion. Such persons might know the joy of loving many into the Kingdom, and the joy of righting injustices that have become worked deep into the fabric of culture. Could yours be the high calling of Christian service in government, the World Bank, the United Nations, education, or the corporation? A special opportunity for those called to minister from within the business world, one beyond a witness to individuals or the transformation of structures for Christ, is the ministry of job creation. Be an owner rather than an employee! Every man and woman is an image bearer of God and ought to be so honored by work that is satisfying, a healthy work place, and a fair wage.

The sixth and final meaning of work is found in the product of the work itself. A few years ago, during a national meeting of the American Society for Engineering Education, I posted an invitation to a Christian engineering education conference that was to be hosted by my department. A day later, I discovered that someone had penned into the margin of my flyer a question: "What is Christian engineering?" Beneath this in another hand was a response: "The engineer is Christian, not the engineering." I disagree with that brother or sister. Both the object of our work and how we achieve it matter. Not everything that can be done for pay should be done; not every product that can be sold should be sold. If my work is only about paying my bills then it is convenient for me to believe that whether or not something should be done or purchased is other people's business. It is your business! We are each responsible to ask if the fruit of our labor honors and cooperates with God's work in the world. Is it an instrument of justice and mercy? Does my work build up joy, peace, and kindness, or does it serve our high-paced culture of fractured relationships and endless consumption? The market is able to value only that which can be assigned a dollar value and is therefore unable to value the joy and lasting reward of doing something worthy of the Lord.

There are many great works that we know should be done. Some of us are called to create great music, literature, or films; others will be called to lead in industry; and God will ask of us to care first for the special needs that belong only to persons without material resources in the world. Let no one believe that the eternal worth of any of these tasks is merely equal to your pay. In fact, some of the most important works may not pay well at all.

Why Don't We? Why is it that faith seems to have such limited influence over the workplace objectives of many Christians? Historian and futurist Tom Sine has observed a dualistic approach to discipleship in the larger American church. "In spite of all the talk about Christ's lordship," says Sine, "everyone knows that the expectations of modern culture come first. Everyone knows that getting ahead in the job comes first. Getting ahead in the suburbs comes first. Getting the kids off to their activities comes first. And we tend to make decisions in these areas pretty much like everyone else does, based on our income, our professions and our social status."

Western Christians allow modern culture to
arrange the furniture of our lives, while fol-
lowing Christ is trivialized "to little more
than a devotional lubricant to keep us from
stripping our gears as we charge up the
mountain."

"Desires for security, the desire to
belong to a healthy community, and desires
for joy in our work are right and good.
Aiming to secure them by means of our
own industry and as captains of our own
life choices, rather than as daily bread from
a present and loving God, is idolatry and a
sure way to receive only the world's disappoin-
ting imitations. Material wealth and some-
times power take the place of real secu-
ritv. Casual relationships with people we find
useful take the place of community. Happi-
ness and entertainment take the place of joy
and contentment. A reputation in the world
takes the place of glory and eternal signif-
cance.

The career objectives of many Messiah
College graduates and employees also mimic
those of our culture. Too many of us have
permitted the decrepitude of wealth and the
worries of life to choke our lives, making
them unfruitful (Matthew 13:22). Dreams
shared confidently by first-year students can
be diminished, not enhanced, by four years
at Messiah College when student loans and
the expectations of family and friends appear
to loom larger even than graduation. We
find it difficult to follow Christ before we
have achieved for ourselves a certain feeling
of security in the world by way of a market-
competitive salary and benefits package; a
home, furniture, and a car about like those
we grew up with; a safe neighborhood for
family life; entertaining area attractions; and
if possible, work that is fun or entertaining.
Faced with the hard realities of our world,
what Jesus asks for seems unreasonable.

Systems of reason, however, are always
constructed on an accepted set of basic irre-
ducible truths upon which all other truth is
built. Philosophers call these basic truths
axioms; in the church we might call them
faith assumptions. In a very real sense, then,
all human beings live by their beliefs, and
God's irrefutable truths are not those of the
world. The logic of popular culture is not
Kingdom logic. The most fundamental faith
assumption in the secular world is that God
does not exist, leaving human beings to sat-
sify their own fundamental needs for securi-
ty, acceptance, and significance. When one
begins from this premise, God's ways are
indeed irrational, even ridiculous. If Christ
was not raised from the dead, Paul argues,
his followers are to be pitied above all
humanity. But he did rise, and within his
Kingdom system of truth God is perfectly
reasonable. We Christians would do well to
remember that "there is no independently
available 'real world' against which we must
test our Christian convictions, because these
convictions are the most final, and at the
same time, the most basic, seeing of what
the world is."

Others of us might accept in our minds
the reality of Kingdom logic, but we are
embarrassed that it does not "work" very
well in the world. We have difficulty getting
past the practical need for success in the
marketplace as a bulwark against the terrors
of the world and an affirmation of our worth.
Heaven is going to be great, but when it
comes to getting along in the world Jesus
seems nice but not very smart. This is, Dallas
Willard observes, the death knell of disci-
plership. "It locates (Jesus) outside the company
of those who have knowledge and therefore
deprives us of the practical power of his
teachings." But can we seriously imagine
that Jesus could be Lord if he were not
smart? "If he were divine, would he be
dumb? Or uninformed?" Yet rarely do we
hear the words well informed, brilliant, or
smart used to describe Jesus. "Jesus is Lord,"
however, can mean little in practice for any-
one who has to hesitate before saying, "Jesus
is smart." "If we are to be effective ambassa-
dors for Christ and his Kingdom, God's pro-
visions of wisdom and knowledge about how
the world actually works must be real and
present to us now."

Embracement over the "impracticality"
of the Kingdom may in the end mean only
that we have failed to count the cost of dis-
cipleship. Living by Kingdom logic, we are
promised, is both foolish and costly within
the kingdom of this world. An appeal to
the reason of the world is thus "helpful" in that
the cost of discipleship is circumvented
merely by possessing two sets of beliefs: one
called faith and the other reason. Faith pro-
vides assurance that God will at some future
time credit us with the righteousness of
Christ, while reason becomes the trusted
instrument of worldly wisdom by which we
govern the messy business of life today.
This approach to faith, however, leads us to nur-
ture a persona of disinterest in wealth, fame,
and power even as we carry on in secret with
all of them. It is too bad that we are so shy
about our desires for significance and securi-
ty. God provides for these needs abundantly.

What are called worldly passions and desires
are only the misshapen reflections of our
deep longing for what God has promised:
satisfaction of those desires in the world only
parodies God's eternal provision. He promis-
es and even encourages passion in his
Kingdom for what looks a lot like wealth,
fame, and power. Apparently there is no
problem with the human impulse to take
care of our interests; the problem lies in
where we decide our interests reside.

On the point of wealth and security the
Kingdom logic of Jesus is clear: we are to
store up treasure in heaven, the only place
where it can be secure. Those tempted to
diversify their investments, to serve God
and money, are warned about the likelihood of
total loss. These instructions by Jesus to
secure real wealth for ourselves are followed
immediately with assurances that he can be
trusted to provide for our earthly needs
(Matthew 6:19-34). In another place, Jesus
goes so far as to encourage the use of worldly
wealth to make friends, the kind of friends
who will welcome us into heaven. This he
holds out as an example of good stewardship
(Luke 16:1-12). In place of worldly fame,
reputation, or our desire for the approval of
fellow creatures, God offers something called
glory. C. S. Lewis argues powerfully and
wonderfully in his essay "The Weight of
Glory" that glory with Christ is something
very much like fame and good repute with
God. What disciple does not long to hear
Jesus say, "Well done thou good and faithful
servant?" In the end, reputation with God is
all that matters. Being known by God is of
ininitely greater importance than our know-
ling God (Matthew 7:21-23, 1 Corinthians
8:3). Lewis helps us "to remember that the
dullest and most uninteresting person you can
talk to may one day be a creature which,
if you saw it now, you would be strongly
tempted to worship, or else a horror and a
corruption such as you now meet, if at all,
only in a nightmare. All day long we are, in
some degree, helping each other to one or
other of these destinations."

Seek First — Frederick Buechner has
called vocation that "place where your deep
goodness and the world's deep hunger
meet." The choice to follow God is never a
choice between his will and what you need.
Vocation originates neither with your own
willfulness nor with a will exerted by others
when they say what you ought to do. It
comes from listening to the heart of your
own identity in Christ. A vocation that
does not fit with who you are, no matter how externally valued, does violence to you and those given by God into your care. If a work is really yours, it will make you glad over the long haul, despite the difficult days."

In view of God's promises, I think it is fair to say that our dreams are usually too small. Too many of us have become satisfied with working God in around the edges of our economic and social lives. It is time to begin trusting in the real and present provisions of God over and above the work of our own hands, mind, and will. This is not to deny that work is one means by which God meets our physical needs and provides material blessing; refusing to work can be refusing God's provision. The marketplace, however, teaches some things about work that cannot be reconciled to the teachings of Jesus. In the marketplace, material wealth is merely the just reward of one's labor. But markets undervalue a great many important tasks, perhaps beginning with parenting, while grossly overvaluing the contributions of fame, sales, and entire industries that increase profits only by cultivating self-destructive behavior. To believe that I have earned and deserve my pay is to deny that God is my provider. This is idolatry, trusting in something or someone other than God for what only God can provide. It is not possible to possess sufficient wealth to buy freedom from fear, or to be valued as God made us to be valued. For many believers, it is not Paul's admonition to work (2 Thessalonians 3:10) that we must heed, but Jesus' warnings about the deceitfulness of wealth and how it can make us unfruitful in God's Kingdom (Matthew 13:22, 22:23-3, 5).

God's desire to provide for and bless his children far exceeds the meager compensations of a market economy. As we enter deeper into the security of relationship with him we are freed from the need to optimize our market potential for earning and prestige, freed to serve his eternal purposes. For those who are listening, it is likely that you will experience in different times and situations God's call to many different expressions of love and devotion to him through your work. We need not be concerned that his call will separate us from people, situations, and needs in the world for which we care deeply. Jesus did not say to seek only the Kingdom of God; he said to seek it first, so that all other kingdoms might be contained and transformed by his Kingdom (Matthew 6:33). The decision to answer God's call on our lives must become a fundamental decision, one that binds our daily decisions for many days to come. The student who makes a fundamental decision to learn Shakespeare decides every day whether to read Shakespeare on that particular day. She enrolls in related college courses, clears her calendar for the appropriate times, buys the books, pays the tuition, commits to appearing in class and completing assignments. In the same way, if following Christ is to reign over and above the task of merely making our lives work in the world, then we will listen for and commit to God's specific call on our life; and by that larger purpose we (and God) will govern the daily choices and patterns of our lives, especially in the realms of work and other economic activity.

As a footnote to this discussion, I wish to point out that those readers who have not yet begun careers, those who are still in college, are indeed fortunate. Your future commitments are still relatively unshaped by past economic decisions. Not yet (and hopefully never) owned by the bank, you are perhaps more free than other readers to ponder to what great work God is calling you, and to permit that fundamental purpose to guide your daily decisions about when to purchase a home, cars, and furniture; how much to spend on them; and how much debt to take on. Some of you may already feel that you are in bondage to student loans. Persons who make a conscious decision to live simply and make the retirement of those debts a priority, however, can pay off their loans in much less than the allotted time. For all of us, isn't it time to stop being governed by the minutia of life, the small daily decisions? Let us ponder again the larger purpose of our lives in Christ, and permit those larger commitments to govern what each one of us does with this day. Our future life in this world is hidden in the seemingly small decisions of today; we ask God for faith and courage to commit them all to Christ.

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2 Ibid., pp. 14-16.
6 Dallas Willard, The Divine Conspiracy, p. 63-64.
9 Ibid.
Facts About Solar Energy

- The sun is responsible for nearly all the energy on earth, except for moon tides, radioactive material, and the earth's internal heat.
- The sun is a fusion reactor (unlike nuclear power which creates energy from splitting atoms — fusion) delivering $1.52 \times 10^{18}$ to the 18th power kWH/year to earth.
- Enough sunlight falls on the earth's surface each minute to meet world energy demands for an entire year.

Elizabeth Barr '04 and Joseph Blake '04 stand with the solar display during the presentation.

Solar Energy Educational Display at Whitaker Center

As part of the Genesis "Chasing the Sun" Exhibit at Whitaker Center for Science and the Arts held from January 14th to February 2nd, eight engineering students gave presentations about the Genesis solar car and solar energy which included photovoltaic cells (solar cells) demonstrations and solar heating to hundreds of school students and adults who stopped by throughout the 2½ weeks. The student educators were Peter Allen, Elizabeth Barr, Joseph Blake, Stephen Frank, Anne Manek, Collins Mwangi, Matt Roske, and David Sundberg. Professor Carl Erikson developed the materials and coordinated the schedules. Handouts were given to the attendees on how to build solar ovens from pizza boxes, information on the Genesis car, and 6" plastic rulers. Colorful posters, a continuously playing video about Genesis in the American Solar Challenge race, and other hands-on examples of solar products were available for attendees to review.

Comments from a Student Educator
by Joseph Blake, class of 2004

From January 14th to February 2nd, Messiah College worked with Whitaker Center in Harrisburg to set up a solar energy educational display. The main attraction was Genesis, the Messiah College solar car. Genesis brought attention to a wide spectrum of inquisitive minds. From first graders to senior citizens, visitors drilled Messiah College engineering students and faculty with questions like "Where is the gas pedal?" and "How fast does it go?" In addition to the solar car, displays of photovoltaic and solar thermal energy techniques were presented. Many of the students going through the educational display were impressed with a solar-powered fan. Their adult chaperones were happy to see a practical application of solar energy: a solar powered radio. The radio uses solar panels stored in its handle to catch the energy from the sun and recharge the batteries.

After many hours of preparation and work done by Messiah College engineering students and faculty, the educational display at Whitaker Center was a success. Hundreds of visitors walked away seeing the power of alternative energy, and some even realized its importance.

Engineers' Day 2002
by Dr. Timothy Whitnoyer

On January 18th and 19th, twenty-five prospective engineering students visited the Grantham campus to get a sample of Messiah’s engineering program. Friday evening began with few hours of get-acquainted games and problem-solving exercises facilitated by the staff of Issachar’s Loft. Several of the engineering faculty stopped by to participate in the exercises and to interact with the visitors.

Next, the visitors began to work on a design challenge. After being organized into six groups, each group was given the task of building a mechanism using Legos to compete with other group’s designs. The object of each contest was to either gather three of five ping-pong balls on a playing field or score by placing a ball in the opponents’ goal.

After a good night’s rest, the students heard Dr. David Vader share some of his thoughts about integration of faith and engineering. Later in the morning, current Messiah engineering students presented samples of curricular and extra-curricular projects. The visitors then resumed work on the design challenge.

As the snow began to fall, the families of the attendees arrived to see the design playoffs. While the students put the finishing touches on their designs, the families were treated to refreshments and a tour of the engineering lab facilities. After an exciting double-elimination tournament, “Random Task,” designed by Brian Christensen—Ben Johnson, Stephen Osborne, and Austin Steffy emerged as the champion. The winners were given gift certificates to the College Bookstore.

Overall, Engineers’ Day 2002 was a great success. The prospective students not only participated in the design project, but also learned about life at Messiah College and the importance of having faith affect life decisions.
The mission of Messiah College is to educate men and women toward maturity of intellect, character, and Christian faith in preparation for lives of service, leadership, and reconciliation in church and society. Graduates of the Engineering Program will therefore be technically competent and broadly educated, prepared for interdisciplinary work in the global workplace. The character and conduct of Messiah Engineering graduates will be consistent with Christian faith commitments. We accomplish this mission through Engineering instruction and experiences, an education in the liberal arts tradition, and mentoring relationships with students.

Introducing the Sahara Forest Project

by Robert Clancy, adjunct instructor

The Sahara Forest Project is an initiative to reintroduce appropriate species of trees and shrubs at strategic locations in the Sahara region. Helping only enough to get them started, the project encourages self-propagation and always identifies the tree owner. Its impact on the nearby area will be spontaneous and self-sustaining. Once an informal arboretum or wind belt is established and growing, the goal is satisfied at that location. Efforts are then directed toward a new site.

The vision is rather straightforward and simple but challenging since Africa’s Sahara region is as large as the continental U.S. and its bleak status is well established. Many good people have long been investing their time, efforts and money doing broad variations of essentially this same task and in a sense, we are joining in their effort.

This effort has been ongoing for more than two decades. During years of development, the Sahara Forest Project has refined its goals, methods, and environmental understanding. The goal is that this effort become an externally funded activity, possibly through Messiah College’s Collaboratory, and be largely a student service-learning activity closely related to Messiah’s Engineering Department.

We are learning about soils, climate (including the related El Niño phenomena), hydrology, plant species, sociological impacts, drip irrigation, water lifting using renewable energy, strategic locations at which to start, arboreta, seed orchards, wind belts, and agro-forestry (growing trees and crops together).

While magnificent forests abound throughout the earth, no forest has ever been planted by humans. It has been our long-standing belief that God is out ahead and leading us in this venture. The delay has been somewhat frustrating, yet we continue to work diligently and await God’s timing.