

COVALENCE

The Bulletin of the Evangelical Lutheran Church in America Alliance for Faith, Science and Technology

VOLUME IV, Number 2

“Summer Reading” Issue

Second Quarter, 2002

IT'S BEGINNING TO LOOK A LOT LIKE ... HOME? On Discovering the Closest Analog to Our Solar System Yet.

George Koch, D.Min.

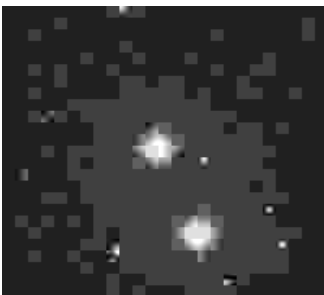
On the one hand, it's not much to look at. A yellow-

orange dwarf star with a mass 95% that of our sun, and a diameter 1.1 times



larger, 55 Cancri (55 Cnc) is nondescript as stars go. Its luminosity is only 60% as luminous as the sun (shown above). Scientists describe it as either a “super metal-rich dwarf or a slightly metal-poor K0 subgiant” (Baliunas et al, 1997). It is abundant with metals, especially iron. It is thought to be between two and eight billion years old, a middle-aged star, much like our Sun, existing at a distance of 41 light years from us in the

constellation Cancer. At 5.9 magnitude, it is just barely visible to the naked eye.



Although 55 Cancri may look like a typical, ordinary,

middle aged star, it is, in fact, as star of great

(See *Cancri*, Page Three)

ONE SCIENTIST'S THOUGHTS ON THE THEOLOGICAL IMPLICATIONS OF THE EXISTENCE OF EXTRA-TERRESTRIAL LIFE

Grace Wolf-Chase, Ph.D.

Throughout human history, people have gazed at the stars and wondered if Earth is the sole abode of life in the Universe. For many years, this question has been explored in stories, science fiction, philosophy, and in religion, but until recently, hopes of answering this question with observational evidence seemed remote, at best. In the 1950's, Cornell Professor of Astronomy Frank Drake used a simple statistical argument to estimate the number of intelligent civilizations that may have arisen in our Galaxy. Though an interesting intellectual exercise, unfortunately most of the values of the parameters in the so-called "Drake Equation" - such as the number of stars in our Galaxy that have habitable planets orbiting them - have been ill-known, to say the least!

Thanks to the advent of new astronomical technologies over the past few decades, we can now begin to explore the question of life elsewhere through direct observations. We know from observational surveys that at least 50% of the stars in "nearby" star-forming regions are surrounded by vast disks of gas and dust, the probable precursors of planetary systems; and the number of actual planets discovered orbiting distant stars has been steadily increasing.

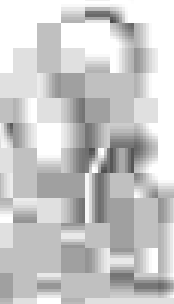
(See *Extraterrestrial Life*, Page Five)

INTELLIGENT DESIGN AS A THEOLOGICAL PROBLEM

George L. Murphy, Ph.D.

The ID Movement

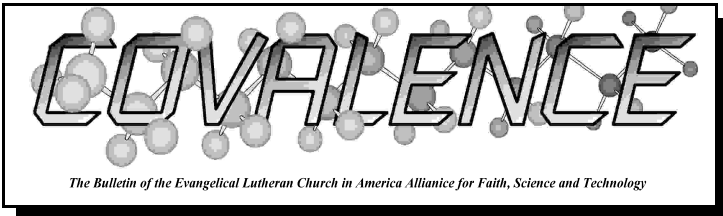
Intelligent Design (henceforth ID) is the latest American cultural and religious challenge to evolution.¹ Its immediate prehistory is the attack of Berkeley law professor Phillip Johnson on Darwinism and “naturalism” in general which began with his *Darwin on Trial*.² The emphasis on ID came from two lines of argument having to do with the complexity of biological systems. Biochemist Michael Behe claims that some aspects of living things, such as the blood clotting mechanism, are “irreducibly complex” and cannot have arisen by means of natural selection alone.³ Mathematician and philosopher William Dembski, on the other hand, presents theoretical arguments to the effect that “complex specified information” in living systems could not have been generated by natural processes.⁴



Darwin Contemplates the Worm

processes.⁴

These arguments attempt to show that important features of biological systems and life itself can't be explained by neo-Darwinian evolutionary theory but require the action of an Intelligent Designer. ID has played a major role in what Johnson calls the “Wedge” strategy directed against naturalism throughout contemporary culture.⁵ While some ID proponents accept evolutionary (See *Intelligent Design*, Page Seven)



COVALENCE: the chemical bond formed by the sharing of one or more electrons between atoms which is the basis for organic chemistry and, therefore, life itself. This bulletin pursues the bonds formed between science and theology that gives greater meaning to life than science or theology taken separately.

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Successor to Works, The Newsletter of the Evangelical Lutheran Church in America Work Group on Science and Technology.

"The ELCA Alliance for Faith, Science and Technology will help the church carry out its mission in a world profoundly influenced by science and technology. In pursuit of this the alliance will
*expand awareness,
*encourage conversation, and
*promote action
pertaining to the relationships between science and technology and the faith and life of Christians."

Volume IV, Number 2

Second Quarter, 2002

Editorials

Enhanced Web Presence.

As this bulletin is being written our web presence is being updated. While it may be yet "under construction" when you log in, we are having a major upgrade thanks to David Scott who works with publications for the Division for Church in Society (his work now includes Web Publishing). Thanks for the Division for allowing David to add this to his portfolio, and thanks to David for his good work. You can find us at <http://www.elca.org/dm/faithandscience/> You will find this publication there, and (and in color, to boot!!!). Please visit often.



If there are Little Green People, who will their savior be?

T.S. Elliot, on visiting the prehistoric art found in a cave in France is said to have remarked, "Art never changes, only the form of art changes." Similarly, one can also say that the "big" questions of life (questions of meaning, purpose and value) never change; only the answer to them changes. Five years ago, our predecessor newsletter, WORKS, wrestled with the question, "If there is life on other planets how will this affect our theology, and, perhaps more importantly, our Christology?" (cf. George Murphy, "Mars Needs Theologians", Works, Volume VI, Nos 1,2 July-October 1997.)

In this bulletin, Grace Wolf-Chase, works through the theological implications of extraterrestrials for her, as a scientist. Her issues hinge on a how we understand both creation and incarnation. Also in this issue, George Murphy ends up in a similar place, although he is dealing with Intelligent Design. For him, science means living in a world which can be known through natural processes (no "fingerprints of the creator," thank you) and faith informs him of a loving God who can be known through the cross.

This is not new theology. Christianity has always proclaimed two things about God: God is unbelievably far off, unapproachable and unknowable (cf. Isaiah 45:15) and, at the same time, God is knowable through the incarnation and the cross (1 Cor. 1:21- 2:2).

From the very first, Christian theology has said that the incarnation and the cross change things - for all of creation. "(Jesus) is the image of the invisible God, the firstborn of all creation, for in him all things in heaven and on earth were created, things visible and invisible... all things have been created through him and for him...for in him the fullness of God was pleased to dwell and through him God was pleased to reconcile to himself all things, whether on earth or in heaven, by making peace through the blood of his cross (Colossians 1:15-20)." While no "contact" with extraterrestrial life is likely in the very near future, it is not just an intellectual enterprise to consider the implications of the incarnation and atonement for all of creation. Does the whole creation bear the marks of separation from the creator? Are the "memes" (to use Dawkin's term) of civilization as universal as the laws of nature are? Are all civilizations in the cosmos "fallen" and in need of a savior? If so, it is not just an intellectual exercise to ask who will be their savior, or how we will relate to them as children of God.



In the Next Issue: It has been a while since we have updated our database, and now with hospital chaplains added to our newsletter mailing list, it made sense to update our database. A database update form will be included in the next issue. Please fill out the form when it arrives; your response helps us find speakers and knowledgeable experts on issues to which the ELCA wishes to speak.

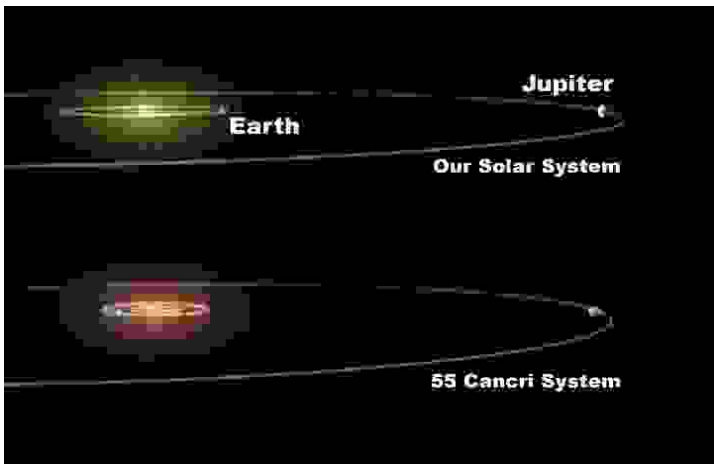


Errata

On page 4 of Volume IV, Number 1, William Dembski was incorrectly named "William Dembowski." We apologize for the error.

Cancri, Cont.

historical significance – twice over. On April 12, 1996 Geoffrey W. Marcy, a professor of astronomy at the University of California at Berkeley, and colleague R. Paul Butler of the Carnegie Institution of Washington, announced that they had discovered a 3/4 Jupiter-sized planet orbiting 55 Cancri (*55 Cancri b*) in an orbit closer to its sun than Mercury’s. A second, planet (*55 Cancri d*), was announced on June 16th of the same year. Both were discovered by measuring subtle shifts in



55 Cancri System compared to the Solar System

(Note the two giant planets orbiting closer to 55 Cancri than Earth is to Sun) [courtesy of NASA/JPL]

the wavelengths of visible light [see “Doppler for Dummies,” Page Five]. Since the mid-1990s, scientists have found more than 90 planets orbiting distant stars. Astronomers call them extra-solar planets, or “exoplanets” for short.

At a news conference on June 13th of this year, 55 Cancri again made history. At that conference, Marcy and Butler announced the finding of a total of 15 new planets, including the smallest found thus far, a planet half the size of Saturn (or about 15% that of Jupiter). But perhaps the most important news *55 Cancri’s*. 55 Cnc is now known to have a trio of planets, including one similar in size and orbit to Jupiter. "For the first time, we've found a family of planets that has some similarity to our own solar system," said Marcy.

Previously discovered extra-solar planetary systems have seemed strange because the planets announced have been giants in tight orbits, often in orbits closer to their stars than Earth does to the Sun. Prior to this June’s announcement, *55 Cancri* could have been thought of in just this way, as one of its planets, a gas giant slightly smaller than the mass of Jupiter, whips around the star in 14.6 days at a distance only one-tenth that from Earth to the Sun (and three times closer to the sun than sun-scorching Mercury!), and its second gas giant (1/4 the size of Jupiter) orbits at one-quarter the distance of Earth to the Sun.

The newly-discovered third planet orbits *55 Cancri* at a distance of 5.9 AU’s (for “Astronomical Units”, the distance of the earth to the sun), comparable to Jupiter’s distance from our Sun of 5.2 AU (about 824 million kilometers or 512 million miles). *55 Cancri d’s* slightly elongated orbit takes it around the star in about 13 years, comparable to Jupiter’s orbital period of 11.86 years.

This new find is exciting says David N. Spergel, a professor of astrophysics at Princeton University, as "suddenly our solar system is not special." "The existence of analogs to our solar system adds urgency to missions capable of detecting Earth-sized planets," says Charles Beichman, of NASA.

Previously discovered exoplanetary systems seemed strange - gas giants so close to their suns that they almost brushed them, orbiting in highly elliptical orbits, with surface temperatures often exceeding 1,000 degrees Fahrenheit.

A Table of the 55 Cancri (55 Cnc) Planets to Date

Name of Planet	Planet’s Period of Revolution (in days) around 55 Cnc	Size (M), as compared to Jupiter M(sin I, M _{jup})	Astronomical Units (AU’s) from 55 Cnc
55 Cnc “b”	14.653 days	.84	0.115
55 Cnc “c”	44.28 days	0.22	0.24
55 Cnc “d”	5360 days	4.26	5.9

"The vast majority of [exoplanets] orbit in these elongated elliptical orbits," says Dr. Marcy. "And that, frankly, is the most profound result in planetary science, maybe ever."

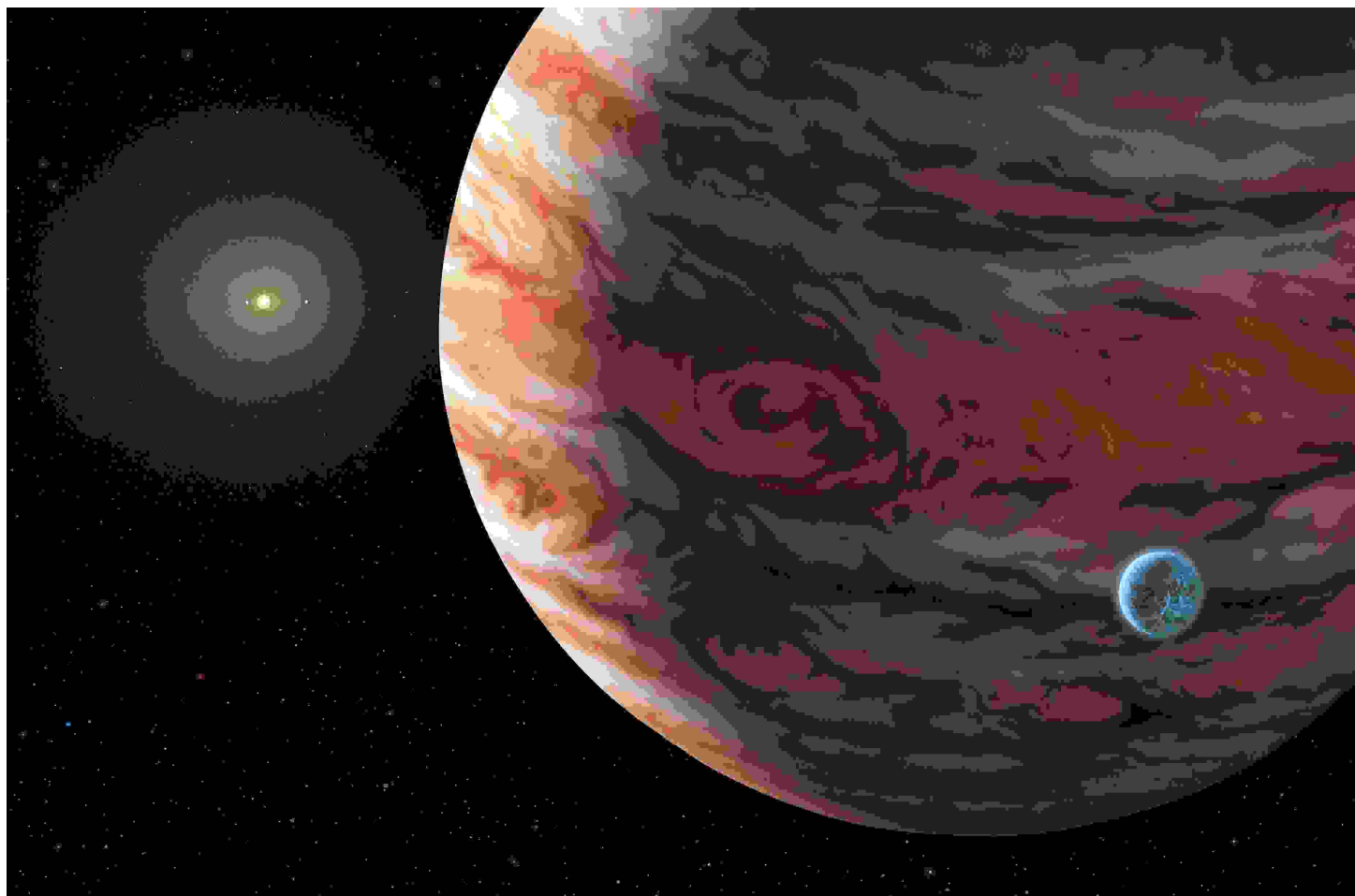
Given planetary systems like those previously discovered, earth-sized planets would not have a chance. "Those systems are inhospitable to having an Earth in the habitable zone, because [in these systems, a] giant 18-wheeler planet is careening around the inner solar system knocking all these little planets around like Volkswagen Beetles," said Beichman.

However, the findings at 55 Cancri give hope that other earth-sized planets can be found, and the possibility that planets may be found capable of sustaining life.

With the huge gap between *55 Cancri c* and *55 Cancri d* [a gap which is greater than the gap between Mercury and Jupiter], there is a possibility that smaller, earth sized planets exist in that gap, planets which are currently undetectable given today’s technology. For example, Dr. Greg Laughlin, assistant professor of astronomy and astrophysics at the University of California, Santa Cruz has shown that an Earth-sized planet could survive in a stable orbit between the two gas giants. For the foreseeable future, however, existence of any such planet around *55 Cancri* will remain speculative.

If such planets exist, they might be in the so-called “goldilocks zone” (neither too cold nor too hot) which is capable of sustaining life. And if they do exist in that zone, *55 Cancri d* will play a crucial role in sustaining life on them. Spergel and others believe that Jupiter and the other gas giants in our solar system play an important role in allowing life to evolve on Earth. With their massive gravitational pull, these gas giants (Jupiter, Saturn, Neptune and Uranus) sweep comets (like comet Shoemaker-Levy 9, which crashed into Jupiter

(Continued on Next Page)



Artist's Rendering of *55 Cancri d* orbiting *55 Cancri*
 (note planets b & c in close orbits to the star)
 ©2002 Lynette R. Cook, Astronomical/Scientific Illustrator
<http://extrasolar.spaceart.org/> email: lynette@spaceart.org
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Cancri, Continued.

in 1994) away from the inner solar system where at least some would have collided with Earth, perhaps sterilizing the planet. *55 Cnc "d"* could play a similarly protective role for any earth-sized planets in *55 Cancri's* "goldilocks zone."

In a little more than a decade, in launches planned between now and 2015, even more sensitive instruments will be placed in orbit which will be able to detect earth-sized planets. These instruments will consist of systems of telescopes, known as interferometers, such as the planned Space Interferometry Mission (SIM) and the planned Terrestrial Planet Finder

"The existence of analogs to our solar system adds urgency to missions capable of detecting Earth-sized planets - first the Space Interferometry Mission and then the Terrestrial Planet Finder," said Dr. Charles Beichman, NASA's Origins Program chief scientist at the agency's Jet Propulsion Laboratory, Pasadena, CA.

For those on the cutting edge of the exoplanet search, the sense of wonder at what is possible within our lifetime is no less than that of the awe of the least informed amateur star gazer. "You think of what we humans have to show for ourselves," Geoffrey Marcy says, "and a lot of times, flipping through the newspaper, you don't see things that make us proud as a species. But finding other abodes that have some kinship to Earth, that would be an awesome accomplishment by we poor Homo sapiens."

Even as we wait for newer and more subtle instruments to find earth-sized planets, there is plenty to explore with *55 Cnc "d"*. At a distance of 41 light-years from Earth, *55 Cancri d* is close enough that astronomers could try to obtain a direct image of it, said Dr. Spiegel. "This may well be the first planetary system we image beyond our own."



For more information, see:

Newfound Planetary System has 'Hometown' Look, June 13, 2002 NASA/JPL News Release

Web Links:

<http://www.exoplaneten.de/55Cancrib/english.html>

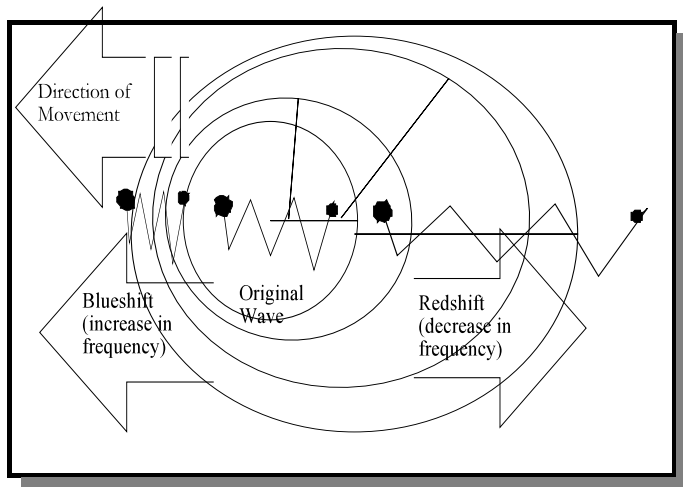
<http://exoplanets.org/>

Doppler for Dummies

You knew about the "Doppler Effect" even before you knew what it was called. You heard a train whistle coming across the farm fields or the ambulance as it streaked down your city street. The pitch of the sound rose as it came toward you and fell as it receded in the distance.

Initially described by the Austrian scientist, Christian Doppler (1803-1853), the Doppler Effect describes the property of waves in which the frequency ("pitch") increases as waves are compressed and decreases as they are stretched. Inversely, wave length is decreased upon compression, and increased upon expansion. The table below illustrates this phenomenon:

The Doppler Effect pertains to all waves: sound, microwave and visible light, just to name a few. Because it is now associated with weather



forecasting, many equate the "Doppler Effect" with "Doppler Radar", which, by measuring with radar the change in rotational speed of winds within storm cells, can warn local populations of severe thunderstorms and tornados.

A less well known use of the Doppler Effect, but perhaps of greater long-term importance, is the detection of planets orbiting stars. Planets, through their own gravitational pull, cause their star to "wobble" in reference to the observer. When a star wobbles toward us, the star's light appears to be shifted toward the blue and the frequency of the visible light spectrum increases (i.e., the wavelength is shorter) compared to if the star had not moved. This is known as Blueshift. When the star wobbles away from us, the frequency decreases. Light from the star appears to be shifted toward the red, or longer wavelength, end of the spectrum in a phenomenon known as Redshift.

While the variation in light wavelength (frequency) is quite small (a Jupiter-sized planet changes the frequency in only 1 part in 10 million), it is – none-the-less – detectable. With precision Doppler-based instruments, stellar wobbles within a plus or minus 3 m/sec (10 ft/sec or 7 mph), can be detected. Using our own solar system as a reference for calculating the Doppler effects caused by planets, scientists have been able to describe the exoplanets' sizes and distances from their stars. Accuracies of 1 part in 100 million have been described.

Extraterrestrial Life, Cont.

Although the methods currently employed are not sensitive enough to detect planets as small as our Earth orbiting stars like our Sun, during the next few decades, NASA plans to launch large systems of telescopes into space that will be capable of not only identifying planets like our Earth, but studying the atmospheres of these planets for potential signs of life, such as the presence of significant amounts of water and oxygen. Getting an actual "photo" of such a planet is still decades down the road, but might occur within the lifetime of some who are reading this article!

There are, of course, no guarantees that extraterrestrial life of any kind, intelligent or otherwise, will ever be discovered. Surveys over the next few decades will only be able to examine nearby planetary systems, so a negative result will not be evidence that life doesn't exist elsewhere; however, if life were to be discovered in a nearby planetary system, it would surely be a powerful indication that life is common in the Universe, and would, in any case, render the theoretical consideration moot!

What effects might such a discovery have on our Christian understanding of God? To explore this question, let us ask what is theology, and how has the Christian concept of God been formed? I think it may be helpful to use an analogy from science here. In science we use experiments, or, in the case of astronomy, primarily observations, to help construct models of nature that attempt to make sense of the observations or experiments.

**What effects might
[a discovery of
extraterrestrial life]
have on our
Christian
understanding of
God?**

The "big theories" of science are those that present a unified view of nature, by helping us to understand and make sense of a wide array of observations, and are consistent with what we know from other areas of science. The development of a model or a theory in science is so not

different from the process employed by theologians to help develop a "model of God" - that is, a model of the nature of God, and how God relates to Creation. In this case, the "observations" may be identified with Scripture and other historic texts, as well as religious experiences. Theology, then, aims to make sense of these observations and formulate a model of God that is consistent with the available observations.

(Continued on Next Page)

Now, what happens to a theory when scientists acquire new observations? The theory may be supported by the new observations, or the new observations may not support the theory. There is a general misconception that a scientific theory is falsified by one observation that doesn't fit the mold and the theory is subsequently discarded; however, this is a gross misrepresentation of the actual process of science. A theory may indeed be falsified - potential falsification is one characteristic of a scientific theory - but in practice, the "big theories" of science - those that unite and make sense of a wide array of observations - are far more likely to need tweaking, rather than discarding, as better observations become available.

True revolutions are rare in science. Even such different ways of looking at nature that came about with the development of General Relativity and Quantum Theory in the early twentieth century did not "overthrow" the applicability of Newton's Laws in the regime of our everyday experiences!

It is difficult to see how the discovery of "ET" could not affect our view of God, but I don't think we should fear this as Christians; rather, such a discovery could serve as an important reminder not to confuse our models of God with the real God, for to do so would be a form of idolatry - it is not the model of God, created by fallible human beings, that is worthy of praise and worship! Similarly, the wise scientist never confuses a model with the underlying reality. This is beautifully expressed by astrophysicist Sir Martin Rees in his contribution to the book "Many Worlds" (2000, ed. Steven Dick): "Theorists may, some day, be able to write down fundamental equations governing physical reality. But no physicist will ever tell us what breathes fire into the equations and actualizes them in a real cosmos." Indeed. The Christian perspective on this elegant mystery is that the orderliness and rationality of Creation - characteristics that form the basis for scientific investigation as well as for our theological understanding of God - reflect the rationality and constancy of God the Creator and Sustainer of all-that-is.

Some people are intimidated by what science has revealed about the evolving nature and sheer vastness of the Universe, and see our scientific understanding of the Universe as a threat to human significance. Our fears may be verbalized with the question, "How can we approach God if we 'let' God get 'too big'?" But if we, through faith inspired by the Holy Spirit, truly accept that God has approached us in the Incarnation, how can this be an issue?

Apparently, the approachability of God has little to do with the physical size of the Universe! And we would do well to remember that the question of human significance has been around a lot longer than our scientific understanding of the Universe!

The wonder of experiencing the love of God, while humbly acknowledging the awesomeness of Creation, is beautifully expressed in Psalms 8:3-4: "When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is man that you are mindful of him, the son of man that you care for him?"

As we continue with our quests to better understand God and nature, we should never forget that the historic Jesus was hardly what the religious authorities of the time were expecting! Should it come as any big surprise that God may have yet-a-few-more-mysteries to reveal to us? The discovery of "ET" might add yet another level of significance to Jesus' parable of the Good Samaritan - who, indeed, is our neighbor?

Grace Wolf-Chase is a research scientist in the Department of Astronomy and Astrophysics at the University of Chicago, and Research Astronomer and at the Adler Planetarium (Chicago, IL), specializing in how stars are formed, and how young "proto-stars" affect their environments.

The January Consultation: An Update

In January 2002, twenty-two scientists and twelve observers gathered in Chicago for a consultation on Faith and Science. From that meeting and a resolution by the South Carolina Synod regarding Faith and Science, a report was drafted to the Board of the Division for Church in Society, in consultation with the Division for Ministry and the Division for Higher Education and Schools. These events are chronicled in the last issue of *Covalence* (Volume IV, Number 1 - First Quarter, 2002).

As part of the report, the Executive Director for the Division for Church in Society (DCS) was called to "explore with the directors of other churchwide units the implementation of a full-time churchwide staff position on faith and science; and to request a report on this exploration at the next board meeting." Full-time equivalency, for the time being, "would be comprised of partial portfolios of current staff."

In a number of meetings at the Churchwide office, ideas have been shared as to how to do this. One idea has been to create a staff equivalency, a position shared by several people across several churchwide divisions but equivalent in time to one full time staff person. Several meetings have been held in April and May to discuss this and other options, and the topic is now being studied by James Wylie, interim Executive Director of DCS, with input from executive directors of other divisions and DCS staff.

The consultation has also helped to formalize and strengthen an existing interest group in the Churchwide office, which is now known as the Lutheran Center's Workgroup on Faith, Science and Technology. A number of projects have come out of our regular meetings in the building: a Listserv for consultation participants, a communication vehicle for the Churchwide office work group, a new web developer who will improve and maintain our current web site, and a series of "brown bag" lunches dealing with topics on faith and science.

The final update consists of an action not directly related to the January Consultation, though it is based on the Consultation's findings. In assembly this spring, the Southeast Iowa Synod, acting on the recommendation of Alliance Steering Committee member,

The Reverend Gregory Davis, has forwarded the following resolution to the 2003 Churchwide Assembly (which will be held in Milwaukee, WI) which seeks to add a full-time faith and science desk at the ELCA churchwide office:

A Resolution from the 2002 Southeastern Iowa Synod Assembly
WHEREAS, the world in which the ELCA strives to make disciples of all nations is one shaped profoundly by scientific and technological developments; and,

WHEREAS, the South Carolina Synod, ELCA, in its 2001 Assembly, memorialized the ELCA to “initiate, encourage, and support discussion on the role of science within the church’s mission in the areas of education (both secular and religious), applications of technology, and moral obligations of scientists, engineers, and technicians”; and,

WHEREAS, the ELCA is recognized widely as possessed of gifted thinkers and leaders who have been at the forefront of the faith and science conversation; and,

WHEREAS, a consultation hosted by the ELCA in Chicago, January 25-26, 2002, which, “gathered 22 faithful Christians working out their vocation as scientists from a full array of natural and social science disciples,” expressed hope that we shall do a much better job of engaging faith and science in dialogue so that faith, daily work, and our participation in God’s mission to the world will be enriched; and,

WHEREAS, a report to the Division for Church in Society (DCS) from the Department for Studies, in consultation with the Division for Higher Education and Schools (DHES) and the Division for Mission (DM) noted the need for a full-time churchwide staff position—a faith and science desk—to provide, “a locus of continuity and accountability, vigor and visibility, for faith and science concerns within the ELCA’s life,” although current practice pieces together a full-time equivalent by taking some time from staff members in each department; and,

THEREFORE, BE IT RESOLVED, that the 2002 Southeastern Iowa Synod Assembly memorialize the 2003 ELCA Churchwide Assembly to establish and fund a full-time churchwide staff position, housed at the ELCA Church Center, that will develop faith and science resources, especially for congregational use, and represent faith and science concerns throughout the breadth of the ELCA

Intelligent Design, Cont.

theory as valid but incomplete, others reject it. Not surprisingly, there have been attempts to get ID introduced into public school science curricula as an alternative to standard presentations of evolution. One is taking place in Ohio as I write. These attempts provoke debate having to do largely with whether or not ID is science (or perhaps whether it’s good science) and questions about church-state separation.

The Religious Element

ID claims are scientifically questionable, but our concern here is with theology. Advocates of ID have often been less than straightforward about their religious agenda. In some settings they play the “Nobody here but us scientists” card, arguing that their claims should be investigated like those of any scientific theory. This tactic is necessary if there is to be any chance of getting their ideas into public science education. On the other hand, the fact that religious beliefs are central to ID is clear from statements by major figures in the movement and is inherent in the attack on naturalism. There are no protests by ID proponents when some Evangelicals use their claims to try to prove the existence of God and creation.

The existence of an Intelligent Designer is supposed to be a conclusion of scientific argument. But who is this Designer? The statement is

sometimes made that it could be a natural agency - e.g., some process of “directed panspermia” in which extraterrestrial life seeded the earth with life.⁶

This would

not, however, solve the scientific problem of the origin of life but would only push it back a step. It would also be of no use in the attack on naturalism. If the argument is to be worth anything, the Intelligent Designer must be God. We are then faced with a choice. We might be prepared to subject God to study with the techniques of the natural sciences. But if it is realized that such study is inappropriate, the ID conclusion becomes a STOP sign for further scientific research. God did it and that’s that.

Ambiguity about claims for a Designer allow the ID argument appeal to many religious believers.⁷ Theists certainly have no objection to the idea that there is a Designer, for that seems to be

(Continued on Next Page)

Traditional doctrines of providence have held that God acts in and through natural processes in the world, cooperating with creatures as instruments.

Apparently, It's Not Just "an American Thing"

Despite Arthur Peacocke's dismissive remark that "Design is an American thing" (quoted in *Covalece*, Vol IV, Number 1, page 4), the teaching of evolution at the Emanuel City Technical College in Gateshead, England has stirred up a great debate. As reported by the British Broadcasting Company (BBC) on its website BBCiH2G2 [<http://www.bbc.co.uk/dna/h2g2/A734302>], Emanuel City Technical College allows for the teaching of evolution, but earlier this year sent out a document giving specific written instruction to those teaching the classes. For example the written instruction states that when dealing with the suggestion that the age of the earth is "billions of years old" they should teach the "always preferable Biblical version" of the events.

Although Emanuel City Technical College has been given high marks by British accreditation agencies up to this point, many prominent scientists and theologians have called for a special inquiry into the science department. In an open letter to Prime Minister Tony Blair, dated March 22nd, prominent scientists and theologians said, in part:

We write as a group of scientists and Bishops to express our concern about the teaching of science in the Emmanuel City Technology College in Gateshead.

Evolution is a scientific theory of great explanatory power, able to account for a wide range of phenomena in a number of disciplines. It can be refined, confirmed and even radically altered by attention to evidence.

It is not, as spokesmen for the college maintain, a "faith position" in the same category as the biblical account of creation which has a different function and purpose.

The issue goes wider than what is currently being taught in one college. There is a growing anxiety about what will be taught and how it will be taught in the new generation of proposed faith schools.

We believe that the curricula in such schools, as well as that of Emmanuel City Technical College, need to be strictly monitored in order that the respective disciplines of science and religious studies are properly respected.

Yours sincerely,

The Rt Revd Richard Harries, Bishop of Oxford
Sir David Attenborough FRS
The Rt Revd Christopher Herbert, Bishop of St Albans
Lord May of Oxford, President of the Royal Society
Professor John Enderby FRS, Physical Secretary, Royal Society
The Rt Revd John Oliver, Bishop of Hereford
The Rt Revd Mark Santer, Bishop of Birmingham
Sir Neil Chalmers, Director, Natural History Museum
The Rt Revd Thomas Butler, Bishop of Southwark
Sir Martin Rees FRS, Astronomer Royal
The Rt Revd Kenneth Stevenson, Bishop of Portsmouth
Professor Patrick Bateson FRS, Biological Secretary, Royal Society
The Rt Revd Crispian Hollis, Roman Catholic Bishop of Portsmouth
Sir Richard Southwood FRS, Past Biological Secretary, Royal Society
Sir Francis Graham-Smith FRS, Past Physical Secretary, Royal Society
Professor Richard Dawkins FRS

For further information, you may also compare *The Guardian* at:
<http://politics.guardian.co.uk/publicservices/story/0,11032,680219,00.html>

Intelligent Design, Continued.

just an expression of the belief that God is the creator of the universe and life and has purposes for creation. The ID claim, however, is that the activity of a Designer is not only a religious belief but a science result, and can, in principle, be observed by scientific methods.

Religious believers agree that God was the creator of the first life on earth. God is also the creator of each life that arises in the womb, and the one who makes the grain grow to provide us with food, but God is not a kind of Intelligent Embryologist or Farmer whose actions are part of a scientific explanation of these phenomena. Traditional doctrines of providence have held that God acts in and through natural processes in the world, cooperating with creatures as instruments.⁸ Our observations of the world see these instruments but not the one who works with them.

The ID movement has not followed this tradition by addressing the relationship between the actions of its Designer and natural processes, and there are good reasons for its failure to do so. A theological attempt to understand how God acts through natural processes to introduce information into biological systems would seem to mean surrender to the naturalism that ID is fighting against.

One may ask, for example, whether or not the carbon-12 nucleus is "intelligently designed." The question is important because the element carbon is, as far as we know, essential for the existence of physical life. The carbon nucleus can be formed by fusion reactions in the interiors of stars only because the strengths of the electromagnetic and nuclear interactions have just the values that they do have. This is, in fact, one of the "anthropic coincidences" that seems to make our universe precisely adjusted for the development of intelligent life.⁹

ID proponents are in a bind here. Clearly they don't want to deny that carbon-12 is intelligently designed. But if they say that it is then they concede that such design can be accomplished through natural processes - for we understand in detail the nuclear reactions that give rise to this nucleus. And in that case the normal reaction of scientifically minded believers to other systems whose formation we don't completely understand will be to look for better scientific theories, not to fall back on the God of the Gaps.

The True Creator

Our religious discussion to this point has been limited to a general theism. Johnson makes his belief more explicit by distinguishing between "theistic naturalism," which he rejects, and his own "theistic realism."¹⁰ The distinction is made clear in his oft-quoted statement:

God is our true Creator. I am not speaking of a God who is known only to faith and is invisible to reason, or who acted undetectably behind some naturalistic evolutionary process that was to all appearances mindless and purposeless. That kind of talk is about the human imagination, not the reality

(Continued on Next Page)

Intelligent Design, Continued)

of God. I speak of a God who acted openly and left his fingerprints all over the evidence.

We have to ask, however, if such a God is the one revealed in the cross and resurrection of Christ.

Contrast Johnson's last sentence with a thought of Pascal: "What meets our eyes denotes neither a total absence nor a manifest presence of the divine, but the presence of a God who conceals Himself. Everything bears this stamp."¹¹ Pascal had Isaiah 45:15 in mind, and Luther refers to the same verse in arguments for the Heidelberg Theses which set out his theology of the cross.

That person does not deserve to be called a theologian who looks upon the invisible things of God as though they were clearly perceptible in those things which have actually happened.

He deserves to be called a theologian, however, who comprehends the visible and manifest things of God seen through suffering and the cross.¹²

According to Luther, "true theology and recognition of God are in the crucified Christ."¹³ Conversely, one who wants to discover God from

some clues in creation "does not deserve to be called a theologian."

God's actions in the world bear the mark of the cross.

Bonhoeffer's reflections on God's action in the world during his imprisonment were in this tradition. In one letter he says that reading a book on modern physics "has again brought home to me quite clearly how wrong it is to use God as a stop-gap for the incompleteness of our knowledge. ... We are to find God in what we know, not in what we don't know."¹⁴ This is not simply a concession to the successes of

science, for his belief that "we have to live in the world *etsi deus non daretur* [though God were not given]" is christologically grounded: "God lets himself be pushed out of the world on to the cross. He is weak and powerless in the world, and that is precisely the way, the only way, in which he is with us and helps us."¹⁵

If Luther is right, if the cross is where we really see what God is like, then we should expect that God's actions in the world bear the mark of the cross.¹⁶ To say "God lets himself be pushed out of the world on to the cross" means that God acts in such a way as to be considered unnecessary from the standpoint of the natural sciences. A number of participants in science-theology dialogue have pursued this logic by developing kenotic theologies of divine action.¹⁷ The name is taken the Christ hymn of Philippians which speaks of how the one who "was in the form of God ... emptied [ekenōsen] himself, taking the form of a slave" (Philippians 2:6-7 NRSV). Just as the Son of God limited himself by taking human form and dying on a cross, God limits divine action in

the world to be in accord with rational laws which God has chosen. This enables us to understand the world on its own terms, but it also means that natural processes hide God from scientific observation.

A theology of the cross then suggests that, contrary to the belief of ID advocates, methodological naturalism is appropriate for natural science, which is not to invoke God as an explanation for phenomena. This is not to be equated with a metaphysical naturalism which assumes that the natural world is all there is, for the triune God revealed in the cross and resurrection of Christ is the true creator of nature. But this God does not compel the belief of skeptics by leaving puzzles in creation which science can't solve. The mark God has placed on creation is both more stark and more subtle. "An evil and adulterous generation asks for a sign, but no sign will be given to it except the sign of Jonah" (Matthew 16:4 NRSV).

George Murphy, has been a Lutheran Pastor since 1983 and currently serves at St. Paul's Episcopal Church, Akron OH. He has a Ph.D. in physics from Johns Hopkins University and has written extensively on issues of Science and Religion.

Endnotes

1. Robert T. Pennock (ed.), *Intelligent Design Creationism and its Critics* (MIT Press, Cambridge MA, 2001) contains essays debating philosophical, theological, and scientific issues related to ID.
2. Phillip E. Johnson, *Darwin on Trial* (InterVarsity, Downers Grove IL, 1991).
3. Michael Behe, *Darwin's Black Box* (Free Press, New York, 1996).
4. William A. Dembski, *Intelligent Design* (InterVarsity, Downers Grove IL, 1999).
5. E.g., Barbara Forest, "The Wedge at Work" in Pennock, *Intelligent Design Creationism*, pp.5-53.
- 6.E.g., Francis Crick, *Life Itself* (Simon and Schuster, New York, 1981).
7. The Plain Dealer of Cleveland, Ohio reported on June 9, 2002 on a poll indicating that 59% of Ohioans favored teaching evolution together with ID in science classes in public schools.
8. Benjamin Wirt Farley, *The Providence of God* (Baker, Grand Rapids, 1988). Ian G. Barbour, *Religion and Science* (HarperSanFrancisco, 1997), Chapter 12, provides a survey of models of divine action.
9. John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford, New York, 1986), pp.251-253.
10. Phillip E. Johnson, *Reason in the Balance* (InterVarsity, Downers Grove IL, 1995), Ch.5.
11. Phillip E. Johnson, *Defeating Darwinism by Opening Minds* (InterVarsity, Downers Grove IL, 1997), p.23.
12. Blaise Pascal, *The Pensées* (Penguin, Baltimore, 1961), #602, p.222.
13. Luther's Works, Volume 31 (Fortress, Philadelphia, 1957), pp.52. Isaiah is cited in support of the latter thesis on p.53.
14. *Ibid.*, p.53.
15. Dietrich Bonhoeffer, *Letters and Papers from Prison*, enlarged edition (Macmillan, New York, 1972), p.311.
16. *Ibid.*, pp.360-361.
17. George L. Murphy, *The Trademark of God* (Morehouse-Barlow, Wilton CT, 1986).
18. For a survey of such ideas see Barbour, *Religion and Science*, pp.315-318. More detailed treatments are Nancey Murphy and G.F.R. Ellis, *On the Moral Nature of the Universe* (Fortress, Minneapolis, 1996) and George L. Murphy, "The Theology of the Cross and God's Work in the World", *Zygon* 33 1998, 221



News from The Presbyterians: Science and Technology Luncheon Features ... Technology

Nancy Rodman (presbynews)

"Technology pervades every part of our lives and we've begun deciphering the book of life." So began James B. Miller's address, "At the Banks of the River Jordan: The Promise and Peril of the Future for the PC(USA)" to members and friends of the Presbyterian Association on Science, Technology and the Christian Faith (PASTCF) at the association's annual General Assembly luncheon June 20, 2002 in Columbus, OH.

In his address, Miller referred to "two books," the book of Scripture and the book of nature. He said that there is a cultural effort to keep the two separate, and is often presented as conflict, "sort of the Robert Frost theory of science and religion - good walls make good neighbors." There is an interactive alternative, developed over the last 25 years, he continued, where science describes nature which informs religion which in turn offers meaning to the culture. In a power point presentation that used power point which drew on Scripture, St. Augustine, and contemporary humor, Miller offered reflections on worship, education, and mission in the Presbyterian Church. Among his observations:

* "There is a paucity of hymns that reflect the creation God is bringing into being." He asked whether we are really singing to the Lord a new song when we sing hymns that refer to the earth standing still and the sun in its orbit.

* "What we need to do in our talk in the church is to talk in a way that is consonant with the world in which we find ourselves."

* "In evangelism, do we have a message that is both compelling and credible?"

Miller reviewed PASTCF's long-range plan that includes increased individual and institutional membership, resource development, and full time staffing. He closed with these words from Copernicus: "To know the mighty works of God, comprehend His wisdom and majesty and power, to appreciate in degree the wonderful working of His laws, surely all this must be a pleasing and acceptable mode of worship to the Most High to whom ignorance can not be more grateful than knowledge."

The following presentations were made at the luncheon:

* The Rocky Mountain Chapter of PASTCF, the organization's first local chapter was presented with its charter.

* The Dan Martin Science As Christian Vocation Recognition was presented to James Bidlack for exemplifying the practice of science as Christian vocation, and Aubrey C. Briggs for exemplifying the practice of engineering as Christian vocation.

* Miller was presented with a certificate of appreciation for his service to the church in the area of science, technology, and the Christian faith by Joseph Small on behalf of the Office of Theology and Worship and the Congregational Ministries Division.



Science and the Spiritual Quest II Announces
a Spain Symposium:

Science and the Three Monotheisms in the 21st
Century:

A New Partnership?

August 23-25, 2002

Hotel Alhambra Palace, Granada, Andalusia, Spain

At the Science and the Spiritual Quest Spain Symposium in Granada, Spain, August 23 - 25, 2002, scientific leaders from the Islamic, Christian, and Jewish traditions will hold a public forum to address recent world events in the light of contemporary science and living religions. Seeking common ground as scientists, 17 distinguished researchers will call for cultural dialogue and inter-religious understanding as they grapple with the challenging question: "Science and the Three Monotheisms: A New Partnership?"



Drawing in other eminent scientists and religious scholars, the international summit meeting-set in an historic meeting ground of Jews, Christians, and Muslims near the landmark Alhambra Palace-will be open to the public. For information and registration, visit www.ssq.net or call (510) 848-2355.

"If we are to respond to the religious and political conflicts that beset our world, we must understand the complex connections among religion, culture, and modern science," said W. Mark Richardson, Co-Investigator of the Science and the Spiritual Quest (SSQ) program and organizer of the summit. "At the SSQ Spain Symposium we are urgently asking what these connections mean for a humanity so divided by cultural struggles. We must wrestle with the challenges that new scientific insights pose for our spiritual traditions, but we must also look for ways that science can support religious visions of peace, justice, and reconciliation."

The eight topical sessions, detailed below, address themes ranging from cosmology to biotechnology in a variety of formats including presentations, panel discussions, and breakout discussion groups for attendees.

Session 1: Monotheisms and Modern Science: Three Traditions, One Cosmos?

What are the key issues to be faced in the relationship between monotheism and science, and what are the distinctive features of this relationship for Judaism, Christianity, and Islam? A British mathematical physicist and Anglican Christian theologian, an Israeli Jewish historian of science and religion, and a French-Italian astrophysicist and Sufi Muslim scholar offer views from their respective religious traditions.

* John Polkinghorne, Cambridge University

* Noah Efron, Bar-Ilan University

* Bruno Abd-al-Haqq Guiderdoni, Institut d'Astrophysique de Paris

Session 2: Natural Law and Divine Creation: Monotheistic Perspectives on Complexity and Emergence

How might the Abrahamic faiths respond to the increasingly influential scientific portrait of nature as self-organizing and emergent-and how, if at all, might they resist assimilation of this picture? An American Jewish philosopher and theologian, a Pakistani-American Muslim neuroscientist, and a South African Quaker Christian cosmologist reflect on one of the most intriguing paradigms of contemporary science.

- * Norbert Samuelson, Arizona State University
- * Ayub Ommaya, George Washington University
- * George F. R. Ellis, University of Capetown

Session 3: Neuroscience and the Person in the Religious Traditions

In what ways can current research in the neurosciences inform our understanding of the human person-especially religious notions regarding the human capacities for consciousness, moral agency, and sociality? Three neuroscientists-an American Jewish expert on vision and mental imagery, an Iranian-British Baha'i specialist in cognitive and behavioral neuropathology in children, and an American Jewish researcher in brain function and

mystical experience-speak to "the subject."

- * Stephen Kosslyn, Harvard University
- * Faraneh Vargha-Khadem, University College London
- * Andrew Newberg, University of Pennsylvania

Session 4: Breakout Discussion Groups on Sessions 1-3

How do we-whether as scientists, scholars, religious leaders, public policymakers, or interested laypeople-encounter the questions raised at this symposium? Attendees are invited to participate in the moderated discussion session of their choice.

- * Historical Perspectives on Science and the Monotheistic Traditions
- * Physics and Cosmology
- * Biology
- * Neuroscience

Session 5: Biotechnology, Ethics, and the Spiritual Traditions

What problems and possibilities does the biotechnology revolution present for the Abrahamic faiths-and how might these ethical traditions contribute to policy development in biotechnology and medicine? An American cancer researcher and Talmudic Jewish scholar, a Pakistani biologist and Muslim social critic, and an American physician and Protestant Christian biomedical ethicist wrestle with critical issues.

- * Carl Feit, Yeshiva University
- * Munawar Anees, Universite Interdisciplinaire de Paris
- * William Hurlbut, Stanford University

Session 6: The Cloning and Stem Cell Controversies: Scientific, Theological, and Ethical Issues.

What beliefs and values are at stake in two of today's most publicized biotechnology debates-and how do they play out in the media, corporate, and public policy arenas? Two American Christian theologians and leaders in science-religion education cut through the hype to examine the issues that underlie our decisions.

- * Ted Peters, Center for Theology and the Natural Sciences
- * Gaymon L. Bennett, Center for Theology and the Natural Sciences

Session 7: Modern Science, Contemporary Politics, and Living Religions: Is There Hope for Peace?

How do modern science and living religions interact with the cultural and national conflicts so poignantly pervasive in our world today? In what ways does each of these profoundly human quests-each with its own complex internal dynamics of innovation and tradition, inquiry and criticism, dialogue and domination-shape our political debates and economic struggles? How can science and religion, separately or together, contribute to the equally



profound humane quest for peace, justice, and understanding across our differences? An Israeli astrophysicist and Orthodox Jewish peace activist, a British astrophysicist and Quaker Christian leader, and an Iranian physicist and Muslim scholar address the prospects for our shared future.

- * Tsevi Mazeh, Tel Aviv University
- * S. Jocelyn Bell Burnell, Bath University
- * Mehdi Golshani, Sharif University of Technology

Session 8: Discussion of Sessions 5-7 and Closing Reflections

What, then, should we make of science and the three Monotheisms in the twenty-first century: is there, or can there be, a new partnership? The conference organizers invite further audience discussion on the preceding three sessions and offer a summation of the SSQ Spain Symposium.

- * Philip Clayton, Science and the Spiritual Quest
- * Mark Richardson, Science and the Spiritual Quest
- * William Grassie, Metanexus Institute on Religion and Science

For more information and registration, visit www.ssq.net or call (510) 848-2355. Science and the Spiritual Quest (www.ssq.net) is a program of the Center for Theology and the Natural Sciences (www.ctns.org) in Berkeley, California. The Spain Symposium is presented in partnership with the Metanexus Institute on Religion and Science (www.metanexus.net) and the CTNS Science and Religion Course Program (<http://srcourse.ctns.org>) with the generous support of the John Templeton Foundation (www.templeton.org)

