

SEARCH Scientists Who Serve God

TEXAS PROFESSOR PROBES LIFE'S MYSTERY



Walter Bradley is an energetic young engineer whose academic career has not stood in the way of his Christian witness. It has even thrust him into a scientific squabble that may affect the way we read the Bible.

As a professor of mechanical engineering at Texas A & M University, Bradley studies various materials to find out why they sometimes fail. His work helps make sure that huge rotors will not fly apart at high speeds. He has done "failure assessment" studies of plastic connectors in San Antonio's municipal water system—which uses 70,000 of them.

Bradley was born in Dallas, grew up in Corpus Christi, and majored in engineering science at the U. of Texas in Austin. Born into a Christian home, Walt made a youthful commitment to Christ. His faith "stayed on the shelf," he says, until as a student he came in contact with "serious Christians" of his own generation through Campus Crusade for Christ. On graduation, Walt married his sweetheart, Ann.

Awarded a three-year graduate traineeship from the National Science Foundation, Walt stayed on at Texas to do basic research in the College of Engineering. With his new Ph.D. in 1968, he joined the metallurgical engineering faculty of the Colorado School of Mines. At Golden he studied metals and taught engineering until his move to Texas A & M in 1976 with Ann and their two children, Sharon and Steven.

His Energy Calculations Pose a Problem

In the early 1970s Christian groups began inviting Walt to lecture on faith and science. In 1974 he connected with other Christian scholars through the American Scientific Affiliation and through Probe Ministries. In Probe-sponsored visits to university campuses, Walt presented the Christian message and fielded student questions.

Tough questions about evolution and creation forced him to broaden his own background. A discipleship group in his home brought him into contact with a Ph.D. student in geochemistry, Roger Olsen. They began writing a book about the origin of life, eventually collaborating with chemist Charles Thaxton, a Probe staffer at the time. In 1984 it was published by Philosophical Library, titled *The Mystery of Life's Origin*.

What could an engineer and "materials scientist" contribute to such a book? "Well," says Professor Bradley, "if life began on its own from nonliving stuff, those materials had to obey the same laws as the materials I study." Many "scenarios" have been invented to explain how life began on the early earth or in its atmosphere. Some have been tested in "simulation experiments." Bradley's contribution was to analyze the energy required for any such scenario to "work."

His conclusions? "At the very least," he says, "the origin of life has to be considered an extremely improbable event. I think Christians would call it a miraculous event, even if we knew how God did it. But the fact is that no scenario proposed so far comes even close to satisfying the energy requirements of my calculations. The origin of life is still a mystery."

Publication of *The Mystery of Life's Origins* has led to many speaking engagements in an already busy life. But Walter Bradley thinks Christian faculty should have greater visibility and influence on university campuses. He wants students to see that a vibrant Christian faith and an active Christian witness are fully compatible with serious intellectual pursuits.

Scientific Investigation

SCIENTISTS CONTINUE TO EXPLORE LIFE'S ORIGIN

MORE ON THE ORIGIN OF LIFE

1. Teaching Science in a Climate of Controversy (American Scientific Affiliation, 1986). A readable 48-page booklet with a good section on the origin of life, produced by evangelical Christians in science to help teachers cope with the creation/evolution controversy. Order from your Christian bookstore or from ASA, P.O. Box 668, Ipswich, MA 01938. \$4.00, postpaid. Quantity discounts.

2. The Mystery of Life's Origin: Reassessing Current Theories (Philosophical Library, New York, 1984) by Charles B. Thaxton, Walter L. Bradley, and Roger L. Olsen. This is a technical discussion of origin-of-life studies, with a challenging philosophical conclusion. By three evangelical Christians who are scientists.

3. Origins: A Skeptic's Guide to the Creation of Life on Earth (Bantam Books, New York, 1987) by Robert Shapiro. If you think only Christians are skeptical about claims that we know how life began, read this amusing (but serious) nontechnical book by an agnostic chemist who works in the field himself.

Until the middle of the 19th century it was easy to believe in "spontaneous generation." People saw mold begin to grow on old bread and mice suddenly appear in grain bins. Then a French scientist, Louis Pasteur, showed that life *never* appeared when already living organisms (or their microscopic spores) had been totally excluded.

But how did life ever get started in the first place? That problem grew when 20th-century "molecular biology" showed that even a bacterial cell contains thousands of intricately arranged chemical structures. Reasoning that the first stages of life may have been much simpler, in the 1950s some scientists tried setting up experiments to simulate the chemistry of the early earth.

Those first experiments were quite exciting. They produced some of the amino acid building blocks of proteins and some small components of nucleic acids. Many scientists expected to keep going, hoping to produce some form of "proto-life" in the test tube. They formed an International Society for the Study of the Origin of Life (ISSOL) to exchange fast-breaking information.

But when ISSOL investigators met in Berkeley in 1986, they were still unable to report such a breakthrough. Some think life began with RNA, a simpler form of nucleic acid than the DNA now carrying the "genetic code" in living cells. Others bet on protein molecules called enzymes, folded into shapes that could speed up chemical reactions.

ISSOL Scientists Have a Problem

Today all life depends on *both* nucleic acids and proteins. It's a cyclic "chicken vs. egg" situation. Nucleic acids carry the coded information to make the right proteins, but enzyme proteins are necessary for nucleic acids to replicate. The chemistry of RNA makes it a good "information carrier" but not a very good enzyme molecule; protein chemistry is just the other way around.

Now the "thermodynamic approach" is making the origin-of-life problem seem even more difficult. Walter Bradley has calculated the amount of "configurational entropy work" required to select the right amino acids out of a "prebiotic soup" and line them up in the correct order before zipping them into a simple protein. Even if plenty of thermal zip-up energy is available, he argues, no one has any idea of how energy could be harnessed to do the necessary organizing work.

Is it possible to use ordinary heat energy, seen in the random motion of molecules, to produce a stable molecular arrangement? That depends. Bradley illustrates it this way: Suppose you want all the balls on a pool table to group together and stay that way. Easy. Make a shallow depression in the center of the table, put the balls on the table anywhere and gently jiggle it. The balls move naturally from their positions and organize themselves into a low-energy, stable formation. But what if your shallow depression is in a "hill" in the center of the table? Now, to get each ball up that high-energy hill you have to jiggle the table somewhat harder. But as you try to get the next one in, your high-energy jiggling will make some of the others roll out again.

To Bradley, that's the kind of problem facing investigators of the origin of life (or *abiogenesis*). At present, there's no theoretical way around it. Of course, some new discovery may bring a fresh perspective. For example, the newly discovered "smoke holes" (*fumaroles*) of undersea volcanoes provide a new environmental model for the origin of life, a place where "primitive" gases, high thermal energy, and a watery environment all exist together.

ISSOL '86 participants were eager to study the chemistry now going on around such fumaroles. But Walter Bradley, who gave two papers at the meeting, sees nothing in that new environment to solve the "configurational entropy" problem. Scientists *still* do not know how life on earth began.

After three decades of theoretical and experimental work, scientists cannot agree on the chemical steps that brought life into existence. Most scientists, some of them Christians, think this gap in our knowledge will eventually be bridged with a plausible series of steps obeying laws of physics and chemistry. Many Christians, including some scientists like Walter Bradley, doubt that scientists will ever bridge that gap.

Some scientists are convinced that the origin of life was a divine *miracle* beyond the power of science to explain. Their theological stance is referred to (by those who object to it) as a "God-of-the-gaps" position. To many devout believers in the Bible, it is a risky kind of theology. They warn that some gaps once claimed as evidence of a "special creation" were later filled by a scientific explanation. When that happens, science comes off looking very powerful but God's creative power seems diminished.

Papering Over the Cracks

Rushing in to glorify God by posing creation as an alternative to natural processes is like trying to "paper over the cracks" with a *supernaturalistic* assumption. Some Christians have tried to set up a *creationist* alternative to regular science. In the 1980s courts in Arkansas and Louisiana, and now the U.S. Supreme Court, have ruled that "creation science" is really a religious position merely masquerading as science.

But Christians are not the only "believers" tempted to claim too much. Atheists and humanists often claim support from science for their own "secular religiosity." (If that phrase seems odd, substitute *ideology*, a term that can include both religious and non-religious "faith positions.") Their "scientisms masquerading as science" go under such names as positivism, materialism, naturalism, and evolutionism. Anyone insisting that life *must* have arisen by natural processes (but unable to specify them) is also a believer in papering over a crack—with a *naturalistic* assumption.

Creation's Deeper Meaning

For most Christians, the biblical doctrine of *creation* states the overall terms of God's relationship to everything in the natural world, including all living things. The Bible asserts that God has brought everything into being and sustains it moment by moment. The doctrine of creation is not based on Genesis 1 and 2 alone. It is emphasized in many of the Psalms (such as Psalms 19, 102, and 104) and elsewhere in the Old Testament. Three New Testament passages (in John 1, Colossians 1, and Hebrews 1) extol the Creator, extending praise to Jesus Christ as "the living Word" at the center of God's creative activity.

All Christians praise God as the creator of physical life. Some believe he did it in an instantaneous supernatural miracle, which science can never "break down" into a sequence of steps. Others think of all events as natural processes with a supernatural (or "trans-empirical") aspect, since everything ultimately belongs to God and "proceeds according to his Word." They would say that even the highly compressed story in Genesis 1 pictures God doing things in sequential steps. To believe that God has the power to create life instantaneously does not mean that he did it that way. The Bible calls some events miracles but seems unashamed to implicate natural processes in God's purposeful activity.

At present the origin of life is one gap in human knowledge. Christians can surely assert that God created life, while humbly admitting that neither the Bible nor modern science tells us exactly how it was done.

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Theological Reflection

WAS THE CREATION OF LIFE A MIRACLE?

SOME EVANGELICAL EVALUATIONS OF CREATION

1. God Did It. But How? (Zondervan, Grand Rapids, 1981) by Robert B. Fischer. A small paperback showing how a chemist distinguished as a Christian educator puts science and the Bible together.

2. In the Beginning: The Opening Chapters of Genesis (InterVarsity Press, Downers Grove, 1984) by Henri Blocher. A thoughtful reader's guide to the Genesis creation narratives, with an appendix on what science has to say, translated into English by David G. Preston. Blocher is professor of systematic theology at the Faculté Libre de Théologie Évangélique, Vaux-sur-Seine, France.

3. The Fourth Day: What the Bible and the Heavens Are Telling Us About the Creation (Eerdmans, Grand Rapids, 1986) by Howard J. Van Till. An astronomer and physicist at Calvin College in Michigan argues that neither the biblical nor the scientific view of the cosmos is complete in itself. Van Till is currently on the executive council of the American Scientific Affiliation.

In the beginning God created the heavens and the earth" (Gen 1:1). After some time had passed, God said, "Let the earth put forth vegetation..." (1:11), and later, "Let the waters bring forth swarms of living creatures..." (1:20), then, "Let the earth bring forth living creatures..." (1:24).

To some Christians the creation narrative in Genesis 1 reads much like an outline of the current scientific picture of progressive development of life on earth. To others the narrative is a more-or-less literal account of a series of discrete, instantaneous formative acts. Some think our present inability to solve the riddle of life's origin points to the latter interpretation. Theologians still argue about views of the Bible represented by the two interpretations.

Honoring Life's Creator

Christians are united when we focus on *Who* rather than *How* or *When*. It is ultimately God who created life, those Genesis passages proclaim—not Nature or Chance or Evolution or Science. After he created life, "God saw that it was good." We praise God for *all* his mighty works, whether we can understand them or not, whether we can imitate them or not.

"In the beginning was the Word, and the Word was with God, and the Word was God. He was in the beginning with God; all things were made through him, and without him was not anything made that was made. In him was life, and the life was the light of men..." (John 1:1-5) "And the Word became flesh and dwelt among us, full of grace and truth; we have beheld his glory, glory as of the only Son from the Father" (John 1:14).

To Christians, a concept even greater than God's gift of physical life is his gift of spiritual life—the kind not quenchable by death. In the Old Testament, the Creator calls physical life into existence—perhaps by designing the universe to produce it. Throughout the Old Testament he is also creating his own people, both by declaring his intent and by patiently molding the raw material into what he wants them to become. In the New Testament God is seen as a heavenly Father who, like a human parent, is a "giver of life" in a more personal sense.

Some Christians rejoice in being "born again." Others cherish the image of being "adopted into the Lord's family." Some emphasize the moment or day or year in which they first experienced the newness of spiritual life. Others tell how patiently God worked, first to draw them to himself, then to mold their lives after they learned to love him as their heavenly Father.

We meet God as Father by following Jesus as Lord. That enables us to pray joyfully, to experience forgiveness, and to find guidance and strength for our daily work—including scientific work. We can be grateful that we don't have to settle all the scientific or theological problems first. We can be thankful right now for the gift of eternal life.

It is worthwhile to study life. It's even better to live it, abundantly.

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Thoughtful Worship

LIFE IS GOD'S GOOD GIFT

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