MAN'S LONGING FOR IMMORTALITY SHALL ACHIEVE ITS REALIZATION

Mr. BYRD. Mr. President, I ask unanimous consent that an article from the July 20, 1998, edition of U.S. News & World Report and an article from the July 20, 1998, edition of Newsweek be printed in the RECORD. The two articles are relevant to the speech that I delivered on Tuesday this week entitled ''Man's Longing for Immortality Shall Achieve Its Realization.''

I understand the Government Printing Office estimates it will cost approximately $1,283 to have these articles printed in the RECORD.

There being no objection, the articles were ordered to be printed in the RECORD, as follows:

[From U.S. News & World Report, July 20, 1998]

SCIENTISTS AND THEOLOGIANS DISCOVER A COMMON GROUND

Darwin, Freud, relativity, the mechanics of the big bang—rightly or wrongly, all have been taken as supporting the modernistic conception of a change-based world in which forces devoid of meaning account for all outcomes. Some thinkers have maintained that the big-bang theory shows that no god was necessary at the creation. Intellectuals have wrung their hands in angst about how bang-caused cosmic expansion will result in an inescapable running down of the stars, proving existence to be pointless. A depressing inevitable death of the universe figures prominently in the works of post-modern novelist Thomas Pynchon; while in the movie *Annie Hall,* Woody Allen's character is psychologically paralyzed by his dread of the galaxies expanding until they die.

By contrast new developments in big-bang science are almost supernaturally upbeat: The universe wants us, and the stars will shine forever!

This remarkable change in perspectives is helping inspire a warming trend between scientific and spiritual disciplines. A conference last month in Berkeley, Calif., at which cosmologists discussed the theological implications of their work, is representative. Allan Sandage, one of the world's leading astronomers, told the gathering that contemplating the majesty of the big bang helped make him a believer in God, willing to accept that creation could only be explained as a ''miracle.''

HERESIES

Not that long ago, such a comment from an establishment scientist would have been shocking. The mere existence of the organization that sponsored the Berkeley event, a well-regarded academic group called the Center for Theology and the Natural Sciences, might have been snickered at. Today, ''intellectuals are beginning to find it respectable'' to talk about how physical law seems to favor life, notes Ian Barbour, a professor of both religion and physics at Carleton College, in Northfield, Minn.

In this vein, the recent book *Consilience* by Harvard biologist E.O. Wilson argues that there is no need to wall off scientific from moral thought; rather, people should once again pursue the Enlightenment vision of reconciling the technical and the spiritual. A boomlet of serious books with titles such as *A Case Against Accident and Self-Organization* and *God: The Evidence* goes further, suggesting the unknowns of the big bang eventually will be seen as divine latency.

If nothing else, the theological idea of creation ex nihilo—out of nothing—is looking better all the time as ''inflation'' theories (main story) increasingly suggest the universe emerged from no tangible source. The word ''design,'' rejected by most 20th-century scientists as a theological taboo in the context of cosmology or evolution, is even creeping back into the big-bang debate. Physicist Ernest Sternglass, among Einstein's last living acolytes, recently argued that the propitious circumstances of the big bang show that the universe is ''apparently designed for the development of life and destined to live forever, neither to fly apart into dying cinders nor collapse.''

Parallels between cosmology and spirituality may be coincidence. Some fine it significant that the Book of Genesis describes God creating existence out of the ''waters,'' because big-bang science asserts the early universe was mostly hydrogen, the chief component of H_2O. Maybe that tells us something; probably it's just a word choice.

But on more telling issues, the trend line of cosmology unquestionably favors a sense of purpose. Existence may be eternal, prewired somehow for life; consciousness may expand forever, never running out of room or resources; there may be a larger cosmic enterprise waiting for us to join its purpose, if we can just learn wisdom and justice.

Because the cosmos is ancient by our measure, people assume they are latecomers, gazing out into a universe worn down and faltering. But if the firmament will expand for an enormous span of time, or even for an eternity, then our universe glistens with morning dew. Homo sapiens may represent a youth movement, arriving at a time when almost everything is still to come. Dreary projections about ultimate fates may be supplanted by the belief that, like the cosmos itself, the human prospect is, as the physicist Freeman Dyson once wrote, ''infinite in all directions.''

[From Newsweek, July 20, 1998]

SCIENCE FINDS GOD

(By Sharon Begley)

The more deeply scientists see into the secrets of the universe, you'd expect, the more God would fade away from their hearts and minds. But that's not how it went for Allan Sandage. Now slightly stooped and white-haired at 72, Sandage has spent a professional lifetime coaxing secrets out of the stars, peering through telescopes from Chile to California in the hope of spying nothing less than the origins and destiny of the universe. As much as any other 20th-century astronomer, Sandage actually figured it out: his observations of distance stars showed how fast the universe is expanding and how old it is (15 billion years or so). But through it all Sandage, who says he was ''almost a practicing atheist as a boy,'' was nagged by mysteries whose answers were not to be found in the glittering panoply of supernovas. Among them: why is there something rather than nothing? Sandage began to despair of answering such questions through reason alone, and so, at 50, he willed himself to accept God. ''It was my science that drove me to the conclusion that the world is much more complicated than can be explained by science,'' he says. ''It is only through the supernatural that I can understand the mystery of existence.''

Something surprising is happening between those two old warhorses science and religion.

Historically, they have alternated between mutual support and bitter enmity. Although religious doctrine midwifed the birth of the experimental method centuries ago (following story), faith and reason soon parted ways. Galileo, Darwin and others whose research challenged church dogma were branded heretics, and the polite way to reconcile science and theology was to simply agree that each would keep to its own realm: science would ask, and answer, empirical questions like ''what'' and ''how''; religion would confront the spiritual, wondering ''why.'' But as science grew in authority and power beginning with the Enlightenment, this détente broke down. Some of its greatest minds dismissed God as an unnecessary hypothesis, one they didn't need to explain how galaxies came to shine or how life grew so complex. Since the birth of the universe could now be explained by the laws of physics alone, the late astronomer and atheist Carl Sagan concluded, there was ''nothing for a Creator to do,'' and every thinking person was therefore forced to admit ''the absence of God.'' Today the scientific community so scorns faith, says Sandage, that ''there is a reluctance to reveal yourself as a believer, the opporobrium is so severe.''

Some clergy are no more tolerant of scientists. A fellow researcher and friend of Sandage's was told by a pastor, ''Unless you accept and believe that the Earth and universe are only 6,000 years old [as a literal reading of the Bible implies], you cannot be a Christian.'' It is little wonder that people of faith resent science: by reducing the miracle of life to a series of biochemical reactions, by explaining Creation as a hiccup in space-time, science seems to undermine belief, render existence meaningless and rob the world of spiritual wonder.

But now ''theology and science are entering into a new relationship,'' says physicist turned theologian Robert John Russell, who in 1981 founded the Center for Theology and the Natural Sciences at the Graduate Theological Union in Berkeley. Rather than undercutting faith and a sense of the spiritual, scientific discoveries are offering support for them, at least in the minds of people of faith. Big-bang cosmology, for instance, once read as leaving no room for a Creator, now implies to some scientists that there is a design and purpose behind the universe. Evolution, say some scientist-theologians, provides clues to the very nature of God. And chaos theory, which describes such mundane processes as the patterns of weather and the dripping of faucets, is being interpreted as opening a door for God to act in the world.

From Georgetown to Berkeley, theologians who embrace science, and scientists who cannot abide the spiritual emptiness of empiricism, are establishing institutes integrating the two. Books like ''Science and Theology: The New Consonance'' and ''Belief in God in an Age of Science'' are streaming off the presses. A June symposium on ''Science and the Spiritual Quest,'' organized by Russell's CTNS, drew more than 320 paying attendees and 33 speakers, and a PBS documentary on science and faith will air this fall.

In 1977 Nobel physicist Steven Weinberg of the University of Texas sounded a famous note of despair: the more the universe has become comprehensible through cosmology, he wrote, the more it seems pointless. But now the very science that ''killed'' God is, in the eyes of believers, restoring faith. Physicists have stumbled on signs that the cosmos is custom-made for life and consciousness. It turns out that if the constants of nature—unchanging numbers like the strength of gravity, the charge of an electron and the mass of a proton—were the tiniest bit different, then atoms would not hold together, stars would not burn and life would never have made an appearance. ''When you realize that the laws of nature must be incredibly finely tuned to produce the universe we see,'' says John Polkinghorne, who had a distinguished career as a physicist at Cambridge University before becoming an Anglican priest in 1982, ''that conspires to plant the

idea that the universe did not just happen, but that there must be a purpose behind it.'' Charles Townes, who shared the 1964 Nobel Prize in Physics for discovering the principles of the laser, goes further: ''Many have a feeling that somehow intelligence must have been involved in the law of the universe.''

Although the very rationality of science often feels like an enemy of the spiritual, here, too, a new reading can sustain rather than snuff out belief. Ever since Isaac Newton, science has blared a clear message: the world follows rules, rules that are fundamentally mathematical, rules that humans can figure out. Humans invent abstract mathematics, basically making it up out of their imaginations, yet math magically turns out to describe the world. Greek mathematicians divided the circumference of a circle by its diameter, for example, and got the number pi, 3.14159 . . . . Pi turns up in equations that describe subatomic particles, light and other quantities that have no obvious connections to circles. This points, says Polkinghorn, ''to a very deep fact about the nature of the universe,'' namely, that our minds, which invent mathematics, conform to the reality of the cosmos. We are somehow tuned in to its truths. Since pure thought can penetrate the universe's mysteries, ''this seems to be telling us that something about human consciousness is harmonious with the mind of God,'' says Carl Feit, a cancer biologist at yeshiva University in New York and Talmudic scholar.

To most worshipers, a sense of the divine as an unseen presence behind the visible world is all well and good, but what they really yearn for is a God who acts in the world. Some scientists see an opening for this sort of god at the level of quantum or subatomic events. In this spooky realm, the behavior of particles is unpredictable. In perhaps the most famous example, a radioactive element might have a half-life of, say, one hour. Half-life means that half of the atoms in a sample will decay in that time; half will not. but what if you have only a single atom? Then, in an hour, it has a 50–50 chance of decaying. And what if the experiment is arranged so that if the atom does decay, it releases poison gas? If you have a cat in the lab, will the cat be alive or dead after the hour is up? Physicists have discovered that there is no way to determine, even in principle, what the atom would do. Some theologian-scientists see that decision point—will the atom decay or not? will the cat live or die?—as one where God can act. ''Quantum mechanics allows us to think of special divine action,'' says Russell. Even better, since few scientists abide miracles, God can act without violating the law of physics.

An even newer science, chaos theory, describes phenomena like the weather and some chemical reactions whose exact outcomes cannot be predicted. It could be, says Polkinghorne, that God selects which possibility becomes reality. This divine action would not violate physical laws either.

Most scientists still park their faith, if they have it, at the laboratory door. But just as belief can find inspiration in science, so scientists can find inspiration in belief. Physicist Mehdi Golshani of Sharif University of Technology in Tehran, drawing from the Koran, believes that natural phenomena are ''God's signs in the universe,'' and that studying them is almost a religious obligation. The Koran asks humans to ''travel in the earth, then see how He initiated the creation.'' Research, Golshani says, ''is a worship act, in that it reveals more of the wonders of God's creation.'' The same strain runs through Judaism. Carl Feit cites Maimonides, ''who said that the only pathway to achieve a love of God is by understanding the works of his hand, which is the natural universe. Knowing how the universe functions is crucial to a religious person because this is the world He created.'' Feit is hardly alone. According to a study released last year, 40 percent of American scientists believe in a personal God—not merely an ineffable power and presence in the world, but a deity to whom they can pray.

To Joel Primack, an astrophysicist at the University of California, Santa Cruz, ''practicing science [even] has a spiritual goal''—namely, providing inspiration. It turns out, explains Primack, that the largest size imaginable, the entire universe, is 10 with 29 zeros after it (in centimeters). The smallest size describes the subatomic world, and is 10 with 24 zeros (and a decimal) in front of it. Humans are right in the middle. Does this return us to a privileged place? Primack doesn't know, but he describes this as a ''soul-satisfying cosmology.''

Although skeptical scientists grumble that science has no need of religion, forward-looking theologians think religion needs science. Religion ''is incapable of making its moral claims persuasive or its spiritual comfort effective [unless] its cognitive claims'' are credible, argues physicist-theologian Russell. Although upwards of 90 percent of Americans believe in a personal God, fewer believe in a God who parts seas, or creates species one by one. To make religions forged millenniums ago relevant in an age of atoms and DNA, some theologians are ''incorporat[ing] knowledge gained from natural science into the formation of doctrinal beliefs,'' says Ted Peters of Pacific Lutheran Seminary. Otherwise, says astronomer and Jesuit priest William Stoeger, religion is in danger of being seen, by people even minimally acquainted with science, ''as an anachronism.''

Science cannot prove the existence of God, let alone spy him at the end of a telescope. But to some believers, learning about the universe offers clues about what God might be like. As W. Mark Richardson of the Center for Theology and the Natural Sciences says, ''Science may not serve as an eyewitness of God the Creator, but it can serve as a character witness.'' One place to get a glimpse of God's character, ironically, is in the workings of evolution. Arthur Peacocke, a biochemist who became a priest in the Church of England in 1971, has no quarrel with evolution. To the contrary: he finds in it signs of God's nature. He infers, from evolution, that God has chosen to limit this omnipotence and omniscience. In other words, it is the appearance of chance mutations, and the Darwinian laws of natural selection acting on this ''variation,'' that bring about the diversity of life on Earth. This process suggests a divine humility, a God who acts selflessly for the good of creation, says theologian John Haught, who founded the Georgetown (University) Center for the Study of Science and Religion. He calls this a ''humble retreat on God's part'': much as a loving parent lets a child be, and become, freely and without interference, so does God let creation make itself.

It would be an exaggeration to say that such sophisticated theological thinking is remaking religion at the level of the local parish, mosque or synagogue. But some of these ideas do resonate with ordinary worshipers and clergy. For Billy Crockett, president of Walking Angel Records in Dallas, the discoveries of quantum mechanics that he reads about in the paper reinforces his faith that ''there is a lot of mystery in the nature of things.'' For other believers, an appreciation of science deepens faith. ''Science produces in me a tremendous awe,'' says Sister Mary White of the Benedictine Meditation Center in St. Paul, Minn. ''Science and spirituality have a common quest, which is a quest for truth.'' And if science has not yet influenced religious thought and practice at the grass-roots level very much, just wait, says Ted Peters of CTNS. Much as feminism sneaked up on churches and is now shaping the liturgy, he predicts, ''in 10 years science will be a major factor in how many ordinary religious people think.''

Not everyone believes that's such a hot idea. ''Science is a method, not a body of knowledge,'' says Michael Shermer, a director of the Skeptics Society, which debunks claims of the paranormal. ''It can have nothing to say either way about whether there is a God. These are two such different things, it would be like using baseball stats to prove a point in football.'' Another red flag is that adherents of different faiths—like the Orthodox Jews, Anglicans, Quakers, Catholics and Muslims who spoke at the June conference in Berkeley—tend to find, in science, confirmation of what their particular religion has already taught them.

Take the difficult Christian concept of Jesus as both fully divine and fully human. It turns out that this duality has a parallel in quantum physics. In the early years of this century, physicists discovered that entities thought of as particles, like electrons, can also act as waves. And light, considered a wave, can in some experiments act like a barrage of particles. The orthodox interpretation of this strange situation is that light is, simultaneously, wave and particle. Electrons are, simultaneously, waves and particles. Which aspect of light one sees, which face an electron turns to a human observer, varies with the circumstances. So, too, with Jesus, suggests physicist F. Russell Stannard of England's Open University. Jesus is not to be seen as really God in human guise, or as really human but acting divine, says Stannard: ''He was fully both.'' Finding these parallels may make some people feel, says Polkinghorne, ''that this is not just some deeply weird Christian idea.''

Jews aren't likely to make the same leap. And someone who is not already a believer will not join the faithful because of quantum mechanics; conversely, someone in whom science raises no doubts about faith probably isn't even listening. But to people in the middle, for whom science raises questions about religion, these new concordances can deepen a faith already present. As Feit says, ''I don't think that by studying science you will be forced to conclude that there must be a God. But if you have already found God, then you can say, from understanding science, 'Ah, I see what God has done in the world'.''

In one sense, science and religion will never be truly reconciled. Perhaps they shouldn't be. The default setting of science is eternal doubt; the core of religion is faith. Yet profoundly religious people and great scientists are both driven to understand the world. Once, science and religion were viewed as two fundamentally different, even antagonistic, ways of pursuing that quest, and science stood accused of smothering faith and killing God. Now, it may strengthen belief. And although it cannot prove God's existence, science might whisper to believers where to seek the divine.

HOW THE HEAVENS GO

(By Kenneth L. Woodward)

That many contemporary scientists make room for god in their understanding of the cosmos should hardly be surprising. For most of history, religion and science have been siblings—feeding off and sparring with each other—rather than outright adversaries in the common human quest for understanding. Only in the West, and only after the

French Enlightenment in the 18th century, did the votaries of science and religion drift into separate ideological camps. And only in the 19th century, after Darwin, was the supposed irreconcilability between ''God'' and ''science'' elevated to the status of cultural myth. History tells a different, more complicated story.

In the ancient world, religious myth invested nature and the cosmos with divine emanations and powers. But this celestial pantheism did not prevent sober observation of the heavens and sophisticated mathematical calculations. By 1400 B.C. the Chinese had established a solar year of 365 days. Ancient India formulated the decimal system. Ancient Greece bequeathed Euclidean geometry, Ptolemy's map of the solar system and Aristotle's classification of living organisms, which served biologists until Darwin.

But none of these advances seriously disrupted religions's more comprehensive worldviews. Buddhists, for example, showed no interest in investigating nature since it was both impermanent and, at bottom, an illusion. Islam made great advances in algebra, geometry and optics, as well as philosophy. But Muslim scholars left the mysteries of physics—motion, causality, etc.—to the power of Allah and to the aphorisms of Aristotle, whose works they recovered and transmitted to the Christian West.

The Bible, of course, has its own creation myth, and it is that very story that eventually led scientists to realize that nature had to be discovered empirically and so fostered the development of science in the Christian West. The universe created by a rational God had to be rational and consistent—that much the Creeks already knew. But a universe created out of nothing, as Genesis described, also had to be contingent. In other words, it could have turned out other than it did. It was only one of an infinite number of possibilities open to a wholly transcendent deity. Gradually, scientists realized that the laws governing such a universe could not be deduced from pure thought—as Aristotle supposed—but instead needed to be discovered through experiment. Thus was experimental science nurtured by religious doctrine.

When the scientific revolution did occur, in Europe early in the 17th century, and researchers for the first time began to regard the world as a mechanism whose workings they could probe through the scientific method, it wasn't God's existence that was thrown in doubt. Rather, it was Aristotle's ''sacred geography,'' in which Earth and the heavenly bodies were fixed and eternal. Relying on Aristotle, medieval Christianity had imagined a tidy geocentric universe in which nature served man and mankind served God. ''In a certain sense, religion got burned for locking itself too deeply into a particular scientific view which was then discarded,'' says Owen Gingerich, a professor of astronomy and the history of science at Harvard.

First Copernicus, then Galileo (aided by one of the first telescopes) and Kepler demonstrated with ever greater precision that the earth and other planets circled the sun. Humankind, it seemed, was peripheral to God and the universe. All three scientists, however, were devout Christians who defended their new worldview as most worthy of the Creator. But Copernicus and Kepler were denounced by Martin Luther for views he thought contradicted the bible, and Galileo was tried and condemned to house arrest by the Roman Inquisition. Although Pope John Paul II declared in 1992 that the church had erred in condemning Galileo, the incident was never a simple conflict between science and religion. Galileo overstated the proof he could provide for a heliocentric (suncentered) cosmos and incautiously caricatured the pope in a published tract. Yet he could also quote one of the pope's own cardinals in his defense: ''The intention of [the Bible] is to teach us how one goes to heaven, not how the heavens go.''

In subsequent centuries, however, scientific theories of ''how the heavens go'' increasingly determined the place and power of God. The ''celestial mechanics'' of Isaac Newton produced a god who designed a world machine and somehow sustained it in motion. Theologians readily accepted whatever proofs for God's existence the new science chose to give. The result was a diminished ''god of the gaps'' inhabiting whatever dark corners science had not yet brought to rational light. In this way, says Jesuit theologian Michael Buckley of Boston College, theologians themselves cooperated in the advent of modern atheism by relying on science to explain God and ignoring ''the traditional sources of religious insight and experience that make belief in God intelligible,'' By the 18th century, astronomer Pierre Laplace could explain nature as a self-sufficient mechanism. As for God, he told Emperor Napoleon, ''I have no need of that hypothesis,'' Nor, a century later, did Darwin in his theory of evolution.

Now, at the end of the millennium, religion and science are beginning to talk, though neither answers to the other's authority. John Paul II consults with his Pontifical Academy of Science—most of whom are not Catholic. Philosophers of science examine the often-hidden assumptions on which scientific theories rest. Confronted by dimensions of the world no scripture has encoded, theologians are discovering a God who resists domestication into any single theory of how the world works. And at the center—still—are flawed and fragile human beings trying to understand a universe that has the uncomfortable feel of a home away from home.

AUGUSTUS ENGLEKEN STEVENS

Mr. BYRD. Mr. President, August is from the Latin Augustus, the eighth month of our calendar year, a time of harvest and of plenty, named after Augustus Caesar. Augustus Caesar, or, more formally, Gaius Julius Caesar Octavianus. He was the grandnephew of Julius Caesar, and he was the first emperor of Rome, from 27 B.C. through 14 A.D. August is also an adjective, derived from the Latin verb meaning to increase, and in English meaning: to inspire awe and reverence, impose, something that is imposing and magnificent, or dignified and majestic. The adjective augustan refers also to the age of Augustus Caesar and his reign and suggests that anything so described is classical and elegant. The term Augustan age specifically refers to a period of Latin literature during the reign of Augustus Caesar, when elegance and correctness were highly valued. Oh, that we might return to that age at least in one sense, when elegance and correctness—not political correctness, but correctness—were highly valued.

Augustine, a diminutive form of Augustus, was the name of two saints, Saint Augustine of Hippo (354–430 A.D.), a Latin church father and bishop of Hippo, in northern Africa, known for his ''Confessions'' and his work ''The City of God.'' The second Saint Augustine—the dates we are not sure of but we can believe that he lived until about 604 A.D. He was a Roman monk who went to spread Christianity among the English and who was the first Archbishop of Canterbury.

We can see from this that the name Augustus is fraught with significance and with portent. It is a name to be lived up to with great deeds and great learning. It is also the name conferred upon the newest member of Senator TED STEVENS' growing family, Augustus Engleken Stevens. My guess would be the middle name is Anglo-Saxon. And this is the third child of Senator STEVENS' third son, Ben.

It is also the tenth grandchild to join the impressive Stevens clan. This newest Caesar to rule with his chubby and imperious fist, and to issue edicts in a piercing wail, was born on Monday, July 27, at 3:20 p.m., weighing in at a healthy 7 pounds, 10 ounces.

I congratulate Senator STEVENS and his wife, Catherine, on this blessed addition to their family. As they well know, there is no greater joy than to gather into one's arms a tiny, peaceful bundle, and to gaze down upon that small, sleeping face, to gently stroke the soft, velvety down of hair and rounded cheek, and to listen closely for the faint murmurs and coos that slip almost unnoticed from that perfect cupid's bow of a mouth. What happier moment could there be, than to see that little mouth open in a sleepy, toothless yawn, or to catch a glimpse of a little foot—not much longer than a peanut, with toes so small that they could not possibly have working bones inside them—kicking out on bowed leg from within the folded blanket?

In choosing a name as ancient and as illustrious as Augustus, his parents—I surmise—have high hopes and grand ambitions for their infant son. I am sure that grandfather TED has great, grandiloquent schemes afoot as well, to bounce him on a hobbyhorse knee, or to take him salmon fishing in pristine Alaskan waters. I suspect that those who see TED on the Senate floor, shepherding appropriations bills through contentious debate to final passage—fists pounding and voice booming—might not recognize Senator STEVENS in his happier and more serene role as grandfather. But to be a grandfather is to be a happy man.

And what feelings of immortality, to be a grandfather. Holding this youngest member of his family, born in the waning days of this second millennium, the namesake of one whose life spanned the opening days of the first millennium, and poised to come into his own birthright in the third millennium, Senator STEVENS can see history unfold into the coming ages. Through children and grandchildren, one has a glimpse of the glorious future, the immortality of the human race, tinged with the bittersweet sorrow of time passing too swiftly and of children who grow up much too quickly.