

By Jennifer Boeth

They've seemed hellbent on divorce for years. But, just because science and religion have been pleading irreconcilable differences, that doesn't necessarily mean they're a bad match. They actually may have more in common than either party likes to believe.

At least that's the message four Nobel prize-winning scientists and two theologians brought to a lecture series in Dallas on "The Convergences of Science and Religion."

Both science and religion are, after all, modes of inquiry, processes of seeking truth. And, said Schubert Ogden, a theology professor at Southern Methodist University's Perkins School of Theology and speaker at the first of four Isthmus Institute lectures* last November, "the questioning process is more fundamental than any byproduct of it."

The Isthmus Institute is a nonprofit organization devoted to promoting dialogue between science and religion on issues such as the nature of reality and truth, the difference between the personal and the cosmic, the balancing of freedom and responsibility, the independent existence of self and mind.

If, as Ogden suggested, the questions are more important than the answers, why have science and religion been the best of enemies for centuries?

The Isthmus Institute's first Nobel laureate presenter, Ilya Prigogine, hinted at conspiracy. Classical scientists and theologians agreed—very nearly conspired—to maintain the gulf between science and religion, between the study of nature and the study of man, Prigogine said. But today, "the distinction between the sacred and the profane is becoming more difficult. Today, nature is becoming transcendent."

In what he called "the greatest scientific revolution since the Renaissance," Prigogine, a Nobel prize-winning chemist and professor at The University of Texas at Austin, said "a new dialogue between science and philosophy is becoming possible."

Prigogine won his Nobel laureate in 1977 for his work on "dissipative structures," structures that move from disorder to order by dissipating energy, forms that arise spontaneously in states of chemical nonequilibrium. He sees, in that scientific investigation, a metaphor for the origin of life itself. Complex structures, such as life, demand special conditions, one of which is nonequilibrium, the chemist said. "Nonequilibrium, but not too much," he added with a gentle smile. "Some nonequilibrium creates structure; too much creates chaos."

"In the classical view of physics, of science," said Prigogine, "structure formation is an exception, life is an exception. Classical physics takes a mechanical world view, seeing matter as essentially passive and life as an accident, an accident compatible with the laws of physics but outside nature."

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SCIENCE and RELIGION

Strange Bedfellows But Soulmates Nonetheless

"Classical physics believes that molecules do not communicate with each other. How then do you explain how molecules in the brain know what molecules in the feet are doing?

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The concept of time as a humanizing factor also has captured Prigogine's imagination. Science saw itself as "a liberation from the temporal," an escape into the security of a sense of timelessness. Even Albert Einstein called time "an illusion."

In classical physics, Prigogine said, time separated man from nature. The chemist now believes that "time has its roots in nature, in the very laws of complex systems. To negate the role of time is to negate Hiroshima, to negate history, to negate science itself."

He called the coming years "the century of the rediscovery of time," admitting that few scientists would agree with him—"yet."

Prigogine had sharp words for scientific educators who teach our children that science is a rational, closed, deterministic system. "Science is a flow," he said, "as problematic as history or any other body of knowledge."

In his response to Prigogine, theologian Schubert Ogden spoke of

the need for science in any fruitful examination of religious questions. "Only through science can I come to a disciplined knowledge of the complexities, limits, consequences, risks and opportunities of any of my actions," he said.

However, 19th century science was dualistic, mechanistic in the extreme, and that kind of science has little to say to the monistic Judeo-Christian tradition. But, like Prigogine, Ogden sees science changing.

Beginning with Darwin, Ogden suggested, science has become more and more problematic. "Dualism is being overcome by a new, nondualistic paradigm of understanding nature and history."

The theologian finds that encouraging, for although science and religion pose essentially different questions—science ponders the structure of ultimate reality while religion asks the meaning of that ultimate reality—they overlap in the realm of metaphysics, where the question, Ogden said, is "what is the ultimate reality common and necessary to all conceivable worlds?" In the answer to that question, moral implications arise.

In the second of three Isthmus lectures, Nobel laureates Roger Sperry and Brian Josephson both embraced science's need for a religious dimension but locked intellectual horns over how to get there.

Sperry, a zoologist who received the 1981 Nobel Prize in medicine and physiology for his work on right brain/left brain function, called for "a new, science-based theology, equating

God with the natural forces of the universe." But he drew the line at what he termed "angels, myths of heaven and hell, other-worldly deities, devils and dualist spirits of all kinds." He also rejected the individual, experiential knowing of the mystics, a path to religious awareness followed by many of the Eastern religions.

"I would rather be governed by principles and values which have been proved at least a little," he remarked.

Brian Josephson places no such restrictions on his spiritual quest. Josephson, a British physicist who won his Nobel laureate in 1973 for pioneering research into superconductivity, uses meditation as his method of inquiry into the nature and meaning of life and seems to have no qualms about trusting his internal discoveries. None of which, he stressed, has stopped him from doing rigorous science. Josephson sees no essential conflict between the scientist and the mystic.

"We must work to stop this contraction which stops one from being a human being when one is being a scientist," he remarked. "Mysticism deals with the roots of reality. Science deals with its branches. If scientists were to examine the nature of God, what would come out is a confirmation and clarification of what the mystics have already said. They would find they were documenting known, not new, territory."

Science already is heading in that direction, Josephson suggested. Fritjof Capra started it all with his book, *The Tao of Physics*, drawing connections between discoveries on the frontiers of quantum physics—where particles act in ways that can't be explained mechanistically, sometimes acting differently under the same conditions, where entirely separate regions of space appear to be connected in ways science doesn't understand—and the very nature of existence.

"Quantum physics, with its paradoxes, raises some philosophical problems," Josephson said. "As classical physics deals with ordinary reality, the sensory world, quantum physics deals with celestial realities, the astral world. It presents us with a different kind of reality, a new set of possibilities." It suggests that there is "an unobserved order, an intelligence behind the scenes," he said. And it offers "a new paradigm, in which God plays a role in science."

"What kind of science might it be that would take God into account?" Josephson asked.

Our concept of "intelligence" might be the metaphor that makes it clear.

"The closest aspect of God to science is intelligence," the physicist said. "Intelligence manifests itself by making certain unlikely things occur." And intelligence has limits. It must obey natural laws. It appears that there are limits to God's "intelligence" too, Josephson said. Why else do we have suffering, injustice, cruelty? A synthesis of science and religion might view God as "a scaled-up

human intelligence, not different, just bigger and more universal," he suggested.

As Josephson spoke, Roger Sperry was gazing at him in thinly veiled horror. To Sperry, the inner realms to which Josephson has traveled in meditation and mystical inquiry are little more than "witchery, astrology, the occult, the paranormal, and everything else that modern science rejects." The theology Sperry called for instead is a "naturalistic pantheism, equating God with the laws and forces of the universe."

Sperry's brand of "scientific theology" retains firm roots in modern scientific practice. "No one yet has described another realm of existence that even remotely compares in its

vastness, in complexity, in diversity, interest—and yes, wonder, beauty and meaning—with the real world described by modern science," he said.

During the 1970s, hope for such scientific theology was reinforced by "a broad shift in scientific paradigm," from mechanistic and materialistic to what Sperry—who has devoted his life and work to brain research—called "mentalism," focus on consciousness, free will and the inner self. Although he feels that scientists who work with the brain, mind and human behavior have progressed the farthest with "mentalism," Sperry said he sees "revisionist principles" affecting all sciences as our understanding of the very nature of physical reality changes.

"Never before have such anti-mechanistic, anti-reductionist interpretations become established as the dominant working doctrine for an entire scientific discipline with signs of rapid spread to neighboring sciences," he said. "As a result, science comes out today with a very different world view, a very different picture of total reality."

Sperry sees two scientific principles that have particularly affected our world view: what he calls "downward causation" and a revitalized theory of "vitalism."

Vitalism, which hypothesized certain "vital forces" that distinguish life from inanimate objects, was debunked in the early part of the century because no such forces could be found in the physics or chemistry of living things.

"What happened is that we biologists had been searching in the wrong places," Sperry said. "You don't look for vital forces among atoms and molecules; you look instead among living things."

"The special vital forces that distinguish living things from the non-living are emergent, holistic properties for the living entities themselves," the zoologist said. In other words, horses gallop, fish swim, birds fly, not simply because of their molecular or atomic structure, but because they are horses, fish or birds.

"Downward causation," the other major scientific metamorphosis described by Sperry, says that higher laws and forces exert downward control over lower forces. "The lower-level forces in any entity are enveloped, overwhelmed and overpowered by the higher," the zoologist said.

So, when science teaches that the forces and laws of the universe are blind, uncaring and purposeless, that human beings and everything else in the world are nothing but aggregates of electrons, protons and other sub-atomic elements, it's a classical case of missing the forest for the trees. The scientists are right, but they're overlooking the fact that, as Sperry put it, "the molecules and atoms of our world are pushed around, not so much by atomic and molecular forces, but rather by higher-level mental and vital forces such as those manifest in politics, psychology, religion."

"The humanities and common sense were right all along," the Nobel laureate went on to say. "Science was wrong."

For Sperry, it all points to a pressing need for science and religion, the technologist and the humanist, to get together to create what he called "a new moral code based on ecological principles."

"Society is on the wrong track when it continues to try to treat global ills through further advancements in science and technology," he said. "The problems are much too urgent to wait and much too complex to expect solutions from any single mind."

If we are to avert "global disaster," science and religion must join forces to create a naturalistic moral code that is ecologically sound, Sperry said. "It would go a long way to help improve current global conditions if

mankind generally were to acquire a deep and powerful religious conviction that it is not just unwise or inexpedient, but actually sacrilegious to pollute the world, to overpopulate, to deplete irreplaceable resources, eradicate or demean other species, or in any way despoil, degrade or desecrate for coming generations the quality of our biosphere."

Albert Outler, professor emeritus at SMU's Perkins School of Theology, applauded Sperry's call for a commitment to a code of global ethics. "In the face of worsening world conditions, the modern sciences and the living religions need each other as never before," he said. Religion no longer can be regarded as "a stopgap until the sciences figure things out." Together they must find a way to get "from brain consciousness to conscience."

Describing his journey and that of science as "a shared quest for truth," Outler nonetheless was frank about their differences. "Science is a way of looking at data, of framing hypotheses and testing them," he said. "Religion is the way human beings together share their spiritual insights and moral concerns, the way people celebrate and endure together."

"Science springs from human curiosity and an urge to control," the theologian said. "Religion springs from human wonder and an urge to reverence."

While dogmatists still survive in both science and religion, more and more physical scientists have come around to an awareness that they are "islands in a sea of unknowns," Outler said. At the same time, many theologians are becoming increasingly concerned with "order, design and causality."

"Look at this meeting," he said. "A distinguished scientist pleading for human values. A distinguished physicist pleading for meditation. Talk of values as causal forces, of wholeness."

Sir John Eccles, an Australian neurophysiologist who won a Nobel prize in 1963 for his discovery of the chemical ways that nerve cells transmit information one to another, wrapped up the series of Isthmus Institute lectures with a frankly theistic look into what 60 years of brain research has taught him—in essence, this: Humankind does indeed have free will and therefore, moral responsibility. We can and do choose our actions and so are responsible for the consequences of our choices.

How has his work on the human brain led Eccles to that conclusion?

It all begins with a finger, he explained, one that you want to move. When you move your finger, that apparently simple action is the culmination of millions of unutterably complex chemical and electrical interactions, occurring within milliseconds in a neatly ordered sequence in your brain.

Recent research has shown that the entire process of moving that finger—what Eccles calls "the firing mechanism"—starts in a region at the top of the brain called the supplementary motor area.

"But," said the neurophysiologist, "that still doesn't answer the primary

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question: How is the firing mechanism initiated?"

Further research provided a clue. If the subject of an experiment did not actually move his finger at all, but merely thought about moving it, detectors indicated that his supplementary motor area was firing, although the motor cortex of the brain—which controls the movement of the muscles themselves—was not.

In another study, of people with Parkinson's disease, in which movement becomes shaky and uncontrolled, thinking about a movement caused the supplementary motor area to fire even though the movement itself might not follow because the SMA's "path of talking" to the motor cortex has been destroyed by the disease.

"So," said Eccles triumphantly, "the supplementary motor area is fired by intention. The mind is working on the brain. Thought does cause brain cells to fire."

The physiology of movement proves conclusively to Eccles that we have freedom of will, that something outside a purely mechanical process is involved in our actions.

"You have the mental ability to decide to act," he said. "If you can do it on an elementary level—moving a finger—it follows that you can do it on more complex levels of human action and interaction."

The neurophysiologist likened the brain to "an enormous computer," and "we are the programmers, using it to get into the world and to receive from the world."

Eccles has little time and less patience for scientists who say "Just wait. It can all be explained."

"These are not scientists," he snapped. "These are scientific people, scientists gone berserk. This is an age which is beset by superstition more than any other age. 'And the worst superstition' is that 'materialistic science' soon will be able to explain and diagram exactly how the brain works."

"I accept all their scientific theories," the Nobel laureate said, "but it doesn't explain at all how I as a thinking being exist and can do things. It is completely mysterious, this human existence. There are many questions that can never be answered but should always be asked."

Ecclles offered this alternative: "Let us believe that we are mysterious beings with all these wonderful abilities, all this richness, immense resources of creativity. Let us accept what is given."

"You say that is against science? It isn't against science. Science is created by imaginative thinking." In fact, he said, "science and religion are very much alike. Both are imaginative and creative aspects of the human mind."

"If science and religion cannot be reconciled, we're for the dark and deserve to be so," Eccles went on to say. "We will end as victims of technology—the usual fruit of science—and superstition—the bad fruit of religion."

If science took its licks from Eccles, philosophy didn't come out wearing

any halos. In fact, the neurophysiologist said he decided to devote his life to studying the human brain precisely because of the low-grade answers he'd received to some fundamental philosophical questions he'd been asking since age 17.

"I wanted to know what I was, what was the meaning of life, what was thought. I looked to the philosophers and I found that the philosophers were extremely ignorant of the brain and the mind. And with what arrogance these people put out their useless explanations."

If there were better answers anywhere, thought Eccles, they would come from deeper understanding of how the brain works. So he decided to make neurophysiology—the study of the nervous system—his life's work.

"I still have great difficulty with the philosophers," Eccles remarked. "They want to reject all the mechanics. They say 'I will my arm to move and the arm moves.' You can't argue about that. You just hope they get a disease, so they will realize that there are all these complexities of machinery involved."

Despite a tendency to short-sightedness on both sides, Eccles sees hope for a synthesis, where the material and the spiritual—joined together by the interaction of mind and brain—are equally honored and inextricably linked.

"The materialists have had their long innings of arrogance," Eccles said. "Their beliefs have worn out. They lead us nowhere. Materialism gives you a hopeless, empty life, one without values. Values are spiritual things, giving primacy to love, courage, compassion."

Albert Outler, who said he has been "arguing with the mechanists for years," expressed relief and delight at the "alternative to monism and dualism" that Eccles offered, at his apparent proof that "matter and spirit both exist and interact." Science now seems to be proving "that ancient wisdom that our thoughts affect our actions and that our lives are not at the blind mercy of chance and necessity," the theologian said. "We're neither puppets of nature nor little gods. I think this is not simply wishful thinking, but is and always has been the basis of being human."

"I find it extremely reassuring to learn that there is empirical evidence that human freedom comes as standard equipment on the human chassis," Outler said. "Now the question is, how is it to be socialized, humanized, moralized, spiritualized? This cannot be done by hedonism or utilitarianism. No enlightened self-interest is enough. And certainly not by authoritarianism or dogmatism."

"The human condition is and always has been dismal and glorious, sodden and creative, miserable and heroic," Outler observed. "We have a tragic propensity to misuse our freedom."

He turned toward Eccles. "How do we get from free will and moral responsibility in simple physiological acts to the most complex global issues?"

If there's an answer to that one, it will come from a recognition that the brain and something outside it, beyond it—something called the mind—are in constant interaction with one another, Eccles suggested. And that the motive force for that mind is a spiritual one.

"Each of us is a unique, conscious being, a divine creation," Eccles concluded. "It is the religious view. It is the only view consistent with all the evidence."

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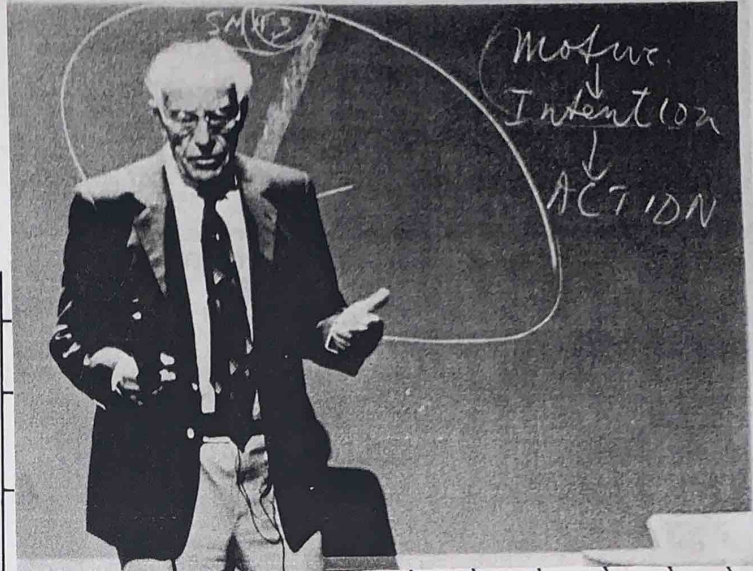


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