

## The Convergence of Science and Spirituality

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### Abstract

Science is recovering its basic mission of making sense of the world. As a search for meaning it is similar to spirituality. The difference between science and spirituality is not in the end they seek, but in the way they seek it. Science uses rational thinking in analyzing and interpreting what experience and experiment discloses, while combines experience with the immediacy of an intuition that speaks to a reality that underlies the world conveyed by the senses. In our day science and spirituality, the great streams of human endeavor are on a converging course. They share the realization that the cosmos is not a domain of unconscious matter moving about in passive space; that it is a dynamic, self-evolving whole, integral at all scales and in all domains. This convergence is important in itself, and it is also important in regard to its consequences. On the one hand it tells us that our intuitive insights about the nature of life and reality are not illusory: they are confirmed in their essence by cutting-edge science. And on the other it offers motivation for entering on a positive path to our common future, since wholeness is a defining characteristic of the kind of civilization that could overcome the problems created by the mechanistic manipulative rationality of today's dominant civilization.

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It used to be said that there is no meeting ground between science and spirituality. Science is just observation and the measurement and computation of the observations, and spirituality is either religion, which means devoutly following a holy scripture, or irrational fascination with a new-age esoteric doctrine.

Ideas such as these no longer apply to the world today. Science may have been narrowly "reductionist" (attempting to reduce everything to observations), but it is far broader than that today. And the contemporary forms of spirituality go entirely beyond institutional and dogmatic religion, and are not limited to particular esoteric doctrines either. Science is recovering its basic mission, as part of the perennial human quest for making sense of the

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world. It is a search for meaning, and in that regard it is similar to the emerging forms of spirituality. The difference between contemporary science and spirituality is not in the end they seek, but in the way they seek it. Science uses rational thinking in analyzing and interpreting what experience and experiment discloses, while combines experience with the immediacy of an intuition that speaks to a reality that underlies, and is essentially different from, the world conveyed by the senses.

Contemporary society needs both science and spirituality, the former for a credible view of the world, and the latter for finding deeper meaning in life and experience. Yet modern Logos-civilization has created a seemingly insuperable gulf between science and spirituality, obliging people to choose one to the exclusion of the other. This was not always so. In the history of civilization, the common roots of science and spirituality were recognized by humanists, philosophers, and philosophically inclined scientists. The Hellenic thinkers, precursors of the modern scientist-philosophers, were at home with rational discourse about the world as well as with a deeper reality that would underlie it; they spoke of the “primary substance” of the universe just as readily as of beauty, the good, and the soul. There was no gap in their thinking between everyday observation and deep intuition, no gulf between “science” and “spirituality.”

The gulf separating science and spirituality arose at the dawn of the modern age. Scientific inquiry had legitimacy in the eyes of the late medieval Church only if it limited itself to “natural philosophy,” leaving “moral philosophy”—all things to do with values and ethics, and mind and soul—to Christian theology. Giordano Bruno was burned at the stake for transgressing this divide, while Galileo managed to escape. He made a careful distinction between “primary qualities” such as the solidity of bodies, their extension, figure, number, and motion, and secondary qualities such as color, taste, beauty, or ugliness. He claimed freedom for science only for the investigation of the former. This distinction was reinforced when Descartes separated “thinking substance” (*res cogitans*) from “extended substance” (*res extensa*) and identified the one with human consciousness and the other with everything else in the world. Clearly, a thinking substance capable of perceiving secondary qualities can be spiritual, but

there is no way that an extended substance that only has solidity, extension, number and motion can be that...

The growing gulf between the material world and the world of mind and spirit did not prevent great scientists from seeking a meeting-ground between them. The founders of modern science were integral thinkers. Bruno, Galileo, Copernicus, Kepler, and Newton himself, had deep spiritual, even mystical streaks. Nor did spirituality lack in the giants of 20th century science. As their writings testify, it was present in Einstein, Schrödinger and Bohr, and in Pauli and Jung, to mention but a few.

A breaching of the gulf is attempted also from the side of spirituality. There is a veritable renaissance of spirituality in industrial societies, with more and more people having a personal experience of the spiritual aspects of existence. They are asking how their spiritual insights and experience would relate to the scientific view of the world. The question is increasingly pressing, for science continues to enjoy credibility in the eyes of most people, while the reality of spiritual experience is becoming more and more evident. How to reconcile them? The dilemma is evident in the evident hunger for the more serious kind of spiritual literature, and also for popular science-literature. The quantum physics-inspired film, *What the Bleep Do We Know?*, scheduled initially for art cinemas, made the multiplexes throughout the United States and has moved to Europe and the rest of the world. A recent survey of the thinking of Americans found that 57 percent of people believe that a "global awakening to higher consciousness" is taking place.

Reductionist-materialistic science cannot furnish meaningful answers to people's queries about the way science would relate to spirituality. It finds no human meaning in the laws and processes of nature; it ascribes life and mind to an accidental configuration of genes and the universe itself to a serendipitous "Big Bang" that produced the seemingly improbable physical conditions under which life and mind could evolve. But reductionist-materialist science is on the way out. The emerging world concept at science's leading edge offers a promising ground for a meeting with spirituality. It is not reductionist, but holistic. It merits deeper acquaintance.

*The holism of the new physics*

Classical physics was mechanistic and reductionist. It reposed on Newton's uncontested laws of nature, published in his *Philosophiae Naturalis Principia Mathematica* in 1687. These laws and the system in which they are stated became the foundation of modern-age Logos, the mechanistic worldview that achieved its fullest expression in the industrial civilization of the twentieth century. They demonstrated with geometrical certainty that material bodies are made up of mass points and that they move according to mathematically expressible rules on Earth, while planets rotate in accordance with Kepler's laws in the heavens. They showed that the motion of all masses is fully determined by the conditions under which motion is initiated, just as the motion of a pendulum is determined by its length and its initial displacement and the motion of a projectile is determined by its launch angle and acceleration.

But classical physics is not the physics of our day. Although Newtonian laws apply to objects moving at modest speeds on the surface of the Earth, the conceptual framework by which these motions, as all observed phenomena, are embedded has shifted radically. Today "quanta," the fundamental units of the physical world, are known to be intrinsically and instantly "entangled" with each other, creating subtle strands of connection that span the cosmos. The idea of instant and intrinsic connection goes back to a concept advanced by Erwin Schrödinger in the 1930s. It is "entanglement." Its reality has been demonstrated over and over again in numerous repeated experiments. Physicists have accepted the strange fact that all quanta in the universe, in particular those that share, or have ever shared, the same quantum state, are intrinsically entangled with each other. This means that in its totality the physical universe is an intrinsically and instantaneously interconnected whole—a far cry from the Newtonian universe of mechanically interacting independent mass points.

The Newtonian mechanical view of nature had begun to crumble at the end of the nineteenth century. The supposedly indivisible atom proved fissionable to a bewildering variety of components that, decades later, dissolved in a swirl of energy. Max Planck discovered that light, like all energy, comes not in a continuous stream but in discrete packets called quanta.

Faraday and Maxwell came up with theories of nonmaterial phenomena such as electromagnetic fields, and Einstein advanced the special and the general theories of relativity.

The death-knell of the classical concepts was sounded in the 1920s with the advent of quantum mechanics, the physics of the ultra-small domains of reality. The quanta of light and energy that surfaced in ever more sophisticated experiments refused to behave like commonsense macroscale objects. Their behavior proved to be more and more weird. Einstein, who received the Nobel prize for his work on the photoelectric effect (where streams of light quanta are generated on irradiated plates), did not suspect, and was never ready to accept, the weirdness of the quantum world. But physicists investigating the behavior of these packets of light and energy found that, until registered by an instrument of detection or another act of observation, quanta have no specific position, nor do they occupy a unique state. It appears that the ultimate units of physical reality have no uniquely determinable location, and they exist in a superposition of several potential states at the same time.

Perhaps the most remarkable feature of particles is their mutual entanglement. Particles turn out to be highly sociable: once they are in the same quantum state, they remain linked no matter how far they may be from each other. This strange space- and time-transcending connection became apparent when a thought experiment proposed by Einstein with colleagues Boris Podolski and Nathan Rosen (the so-called "EPR experiment") was tested by physical instrumentation. The experiment was first performed by French physicist Alain Aspect in the 1980s and has since been replicated in laboratories all over the world. It is important enough to merit deeper acquaintance.

Einstein proposed the experiment in the expectation that it would overcome the limitation on measuring the various states of a particle simultaneously. The idea is to take two particles in a so-called singlet state, where their spins cancel out each other to yield a total spin of zero. We then allow the particles to separate and travel a finite distance apart. If the spin states of both particles are measured, we would know both of the spin states at the same time.

When this experiment is carried out, a strange thing takes place: no matter how far the twin-particles are separated, when one measures one of them, the measurement on the other corresponds precisely to the results of the measurement on the first—even though this result was not, and could not have been, known in advance. It is as if the second particle “knew” what is happening to the first. The information that underlies this strange knowledge appears to be conveyed over any finite distance, and to be conveyed nearly instantly. In Aspect’s experiments the speed of its transmission was estimated at less than one billionth of a second, about twenty times faster than the velocity of light in empty space. In a subsequent experiment performed by Nicolas Gisin, it proved to be 20,000 times faster than the speed of light.

Widely reported “teleportation experiments” have shown that such “nonlocal connections” exist not only between individual particles, but also between entire atoms. In the spring of 2004 two teams of physicists, one at the National Institute of Standards in Colorado and the other at the University of Innsbruck in Austria, demonstrated that the quantum state of entire atoms can be teleported by transporting the quantum bits (“qubits”) that define the atoms. In the Colorado experiment led by M.D. Barrett, the ground state of beryllium ions was successfully teleported, and in the Innsbruck experiment headed by M. Riebe, the ground and metastable states of magnetically trapped calcium ions were teleported.

The physical world is strange beyond description, but it is not incomprehensible. Its relevant feature is time- and space-transcending entanglement, known as *nonlocality*. Nonlocality is both a microphysical and a cosmological phenomenon, it involves the very smallest as well as the very largest structures of the universe. Cosmologists Menas Kafatos and Robert Nadeau entitled their study of the cosmos *The Nonlocal Universe*, and English physicist Chris Clarke did not hesitate affirm that the whole universe is an entangled quantum system—it always has been, and always will be, fully coherent. For U.S. quantum theorist Henry Stapp, the finding of nonlocality is the most profound discovery in all of science.

*The holism of the new biology*

For the better part of the past two centuries holism in biology was considered idealistic or metaphysical. It was associated with vitalism (the concept that life is infused with a vital force or energy), or teleology (the notion that life and evolution tend toward a predetermined goal or "telos"). Reacting to these nineteenth-century ideas, twentieth-century biologists turned to the contrary approach, which was to emulate classical physics in viewing the organism as a complex mechanism. Investigators claimed that the organism can be understood as a collection of independent if interacting parts, such as cells, organs, or organ systems. These can be analyzed individually, and the analysis can show how their interaction produces the functions and manifestations of life in the organism. The analytic approach gave rise to molecular biology and modern genetics and encouraged the current trend toward genetic engineering. The initial success of these methods and technologies seemed to have provided sufficient proof of the correctness of the approach from which they sprang.

However, in the late twentieth century the mechanistic conception of life came to be increasingly questioned. Innovative biologists noted that the alternative to mechanism is not a return to vitalism and teleology but adopting an organismic approach. This has been explored as a philosophy by the great process thinkers of the late nineteenth and early twentieth century, such as Henri Bergson, Samuel Alexander, Lloyd Morgan, and Alfred North Whitehead. The latter's concept of the organism as a fundamental metaphor for all entities of the physical and the living world served as the rallying point for the post-Darwinian developmental schools of the new biology.

The developmental approach maintains that organisms have a level and form of integrity that cannot be fully understood merely by studying their parts and their interaction. The concept "the whole is more than the sum of its parts" holds, for when the parts are integrated within the living organism, properties emerge and processes take place that are not the simple sum of the properties or aggregate of the processes of the parts. The living organism cannot be reduced to the interaction of its parts without losing its "emergent properties"—the very characteristics that make it living.

"Coherence" is the concept that best expresses the wholeness now discovered in the domains of life. An organically coherent system is not decomposable to its component parts and levels of organization. In the words of biophysicist Mae Wan Ho, such a system is dynamic and fluid, its myriad activities self-motivated, self-organizing, and spontaneous, engaging all levels simultaneously from the microscopic and molecular all the way to the macroscopic. There are no controlling parts or levels, and no parts or levels controlled. The applicable concept is not control but *communication*. Thanks to the constant communication of the parts in the organism, adjustments, responses, and changes required for the maintenance of the whole can propagate in all directions at once.

For the understanding of the nature of organic coherence, Ho suggests that a great dance group or a good jazz band is a useful example. Here all performers are perfectly in tune with each other and with the performance, and even the audience becomes one with the dance and the music. The "song and dance" within the living organism ranges over more than seventy octaves, with localized chemical bonds vibrating, molecular wheels turning, microcilia beating, fluxes of electrons and protons propagating, and metabolites and ionic currents within and among cells flowing through ten orders of spatial magnitude.

Similarly to the entanglement of quanta in the physical world, in organic coherence there are intrinsic and instant correlations, enabling changes to propagate throughout the living organism, making even distant sites neighboring. This is incompatible with the mechanistic concept of the organism, where the parts are separate from one another, having definite boundaries and simple location in homogeneous space and time.

Coherence in the living realm ranges from the smallest element in an organism to the full range of life on the planet. It encompasses multi-enzyme complexes inside cells, the organization of cells into tissues and organs, the polymorphism of living species within ecological communities, and the web of local and continental ecologies in the biosphere. It ensures the coordination of the biosphere's myriad organic and ecological systems and their co-evolution.

The new concept of the evolution of life is considerably different from the classical concept. The latter maintains that biological evolution results from the interplay of two mutually independent factors: the genetic information encoded within the organism (the genome) and the physical organism in which that information is expressed (the phenome). The genome mutates randomly, and the phenome it codes is exposed to a succession of independently evolving environments. There, natural selection weeds out the unfit species and allows the fit to survive and reproduce.

The embracing concept of coherence in the living realm contradicts the mechanistic assumption of chance processes occurring among independent elements. The new concept is more than a philosophical or metaphysical tenet: there is increasing evidence that pure chance, which requires the complete absence of causal links, is not a significant factor in the evolution of life.

The evidence against the role of chance processes in evolution is wide-ranging. Random mutations are unable to explain even the earliest phases of biological evolution—complex structures have appeared within astonishingly brief periods of time. The oldest rocks date from about 4 billion years, and the earliest and already highly complex forms of life (blue-green algae and bacteria) are more than 3.5 billion years old. The classical theory cannot explain how this level of complexity could have emerged within the relatively short period of about 500 million years: a random mixing of the molecular soup would have taken incomparably longer to produce it.

The chance-based process of mutation and natural selection likewise cannot account for the increasingly complex multicellular organisms that emerged in the course of time. The assembly even of a primitive self-replicating prokaryote (primitive non-nucleated cell) involves building a double helix of DNA consisting of some 100,000 nucleotides, with each nucleotide containing an exact arrangement of thirty to fifty atoms, together with a bi-layered skin and the proteins that enable the cell to take in food. This construction requires an entire series of reactions finely coordinated with each other.

Random mutations and natural selection may account for variations within a given species, but the roughly four billion years available on this planet for the evolution of biological complexity could not have been sufficient for these processes to generate today's complex and ordered organisms from their protozoic ancestors. This is because it is not enough for genetic mutations to produce one or a few positive changes in a species; they must produce the full set. The evolution of feathers, for example, does not make for a reptile that can fly; radical changes in musculature and bone structure are also required, along with a faster metabolism to power sustained flight. Each innovation by itself is not likely to offer evolutionary advantage; on the contrary, it is likely to make an organism less fit than the standard form from which it departed. And if so, it would soon be eliminated by natural selection. As a result, a random stepwise elaboration of the genetic code of a species is astronomically unlikely to produce viable results. Mathematical physicist Fred Hoyle pointed out that evolution occurring purely by chance is about as likely as a hurricane blowing through a scrap yard assembling a working airplane.

Life, it appears, comes about by massive and highly coordinated innovations in the genome, rather than by piecemeal variations dictated by chance. If there is no hidden program guiding evolution—a now abandoned teleological thesis—then in some way the environment in which the organism finds itself must be creating a "selection pressure" that limits and orients the genome's mutations.

There is growing evidence for this hypothesis. Experiments in Japan and the United States have shown that rats that developed diabetes when the insulin-producing cells of their pancreas were damaged by a drug administered in the laboratory had offspring in which diabetes arose spontaneously. It appears that the alteration of the rats' somatic cells produced corresponding alterations in the DNA of their germline. In some cases mutations are specifically correlated with the fields or chemicals that affect the organism. When some plants and insects are subjected to toxic substances, they mutate their genome in precisely such a way as to detoxify the toxins and create resistance to them. This is the phenomenon of pesticide resistance—a classic case of feedback regulation in the complex network (or

"ecology") of genes that governs the organism. Because of this feedback, when bacteria or plants are exposed to sub-lethal levels of toxic substances, they need not wait for random mutations to occur. The genetic changes that come about are part and parcel of the physiological responses common to all cells challenged with toxic substances, including pesticides in plants, antibiotics in bacteria, and anticancer drugs in mammalian cells.

Scientists find that no gene works in isolation: the function of each gene is dependent on the context provided by all the others. The whole ecology of genes exhibits layers and layers of feedback regulation, originating both with the physiology of the organism and with its relationship to its environment. These regulations can change the function of the genes, rearrange them, make them move around, or even mutate them. Thus major mutations are not due to a haphazard recombination of genes but are flexible responses on the part of the genetic network of a living species to the chemical, climatic, and other changes successive generations of organisms experience in their milieu.

The emerging insight combines a long-discredited thesis of Jean Baptiste Lamarck (that the changes the organism experiences can be inherited) with a main pillar of the theory of Charles Darwin (that inheritance must always be mediated by the genetic structure of the organism). The influences an organism experiences in its milieu are indeed affecting subsequent generations—not because changes in the parent organism would be directly communicated to the offspring, but because some effects experienced by the parent organism leave their mark on its "ecology of genes" and are thus handed down from one generation to the next.

The discovery of subtle links between the genome and the organism, and between the whole organism and its environment, means that the living world is not the harsh domain of classical Darwinism, where each struggles against all, with every species, every organism, and every gene competing for advantage against every other. Rather, life evolves through what biologist Brian Goodwin calls the "sacred dance" of the living organism with its milieu. Subtle strains of that dance extend to all the species and ecologies in the biosphere.

In the emerging concept of the new biology, the web of life is just as intrinsically and thoroughly whole as the living organism—and as the world of the quantized particles that underlies them.

### *The holism of the new psychology*

In their latest development also some branches of psychology recognize wholeness in the human psyche, their domain of investigation. This goes considerably beyond the concept entertained by the classical empiricists, behaviorists, and behavioral experimentalists.

In the classical view the external world is perceived only through the senses: it is said that everything that is in the must have been first in the eye. But leading-edge psychologists, psychiatrists, and consciousness researchers are rediscovering what behaviorists have ignored although ancient cultures have always known: that the mind is capable of more subtle and spontaneous intuitions as well. These seemingly paranormal perceptions are called "transpersonal." They furnish the evidence for holism in the sphere of mind and consciousness.

Experimental parapsychology laboratories produce impressive evidence of transpersonal forms of perception and interaction. Controlled tests on extrasensory perception (ESP) date from the 1930s, when J. B. Rhine conducted his pioneering card- and dice-guessing experiments at Duke University. Today's experimental designs are sophisticated and the experimental controls rigorous; physicists often join parapsychologists in carrying out the tests. A whole range of experimental protocols has been developed, from the noise-reduction technique known as the Ganzfeld technique to the highly respected DILS (Direct Interaction with Living Systems) method. Explanations in terms of hidden sensory cues, machine bias, cheating by subjects, and experimenter incompetence or error have all been considered, but they were found unable to account for a number of statistically significant paranormal results. There appears to be an extremely subtle yet profound interconnection among living systems. In particular, human "senders" and "receivers" seem able to interact in ways that go beyond ordinary sense perception.

In the early 1970s two physicists, Russell Targ and Harold Puthoff, undertook a series of tests on thought and image transference. They placed the "receiver" in a sealed, opaque, and electrically shielded chamber, and the "sender" in another room where he or she was subjected to bright flashes of light at regular intervals. The brain-wave patterns of both sender and receiver were registered on electro-encephalograph (EEG) machines. As expected, the sender exhibited the rhythmic brain waves that normally accompany exposure to bright flashes of light. However, after a brief interval the receiver also began to produce the same patterns, although he or she was not being directly exposed to the flashes and was not receiving ordinary sense-perceivable signals from the sender.

A variety of physiological effects also can be transmitted in the transpersonal mode. Transmissions of this kind came to be known as "telesomatic": they consist of physiological changes triggered in a targeted person by the mental processes of another. Some effects recall the quasi-mythical processes anthropologists call "sympathetic magic." Shamans, witch doctors, and other practitioners of sympathetic magic act not on the person they target but on an effigy of that person, such as a doll. This practice is widespread among traditional peoples; the rituals of Native Americans make use of it as well. In his famous study *The Golden Bough*, Sir James Frazer noted that Native American shamans would draw the figure of a person in sand, ashes, or clay and then prick it with a sharp stick or do it some other injury. The corresponding injury was believed to be inflicted on the person the figure represented. Observers found that the targeted person often fell ill, became lethargic, and would sometimes die. Dean Radin and his collaborators at the University of Nevada decided to test the positive variant of this effect under controlled laboratory conditions.

In Radin's experiments the subjects created a small doll in their own image and provided various objects (pictures, jewelry, an autobiography, and personally meaningful tokens) to "represent" them. They also gave a list of what makes them feel nurtured and comfortable. These and the accompanying information were used by the "healer" (who functioned analogously to the "sender" in thought- and image-transfer experiments) to create a sympathetic connection to the subject (the "patient"). The latter was wired up to monitor the

activity of his or her autonomous nervous system—electrodermal activity, heart rate, blood pulse volume—and the healer was in an acoustically and electromagnetically shielded room in an adjacent building. The healer placed the doll and other small objects on the table in front of him and concentrated on them while sending randomly sequenced "nurturing" (active healing) and "rest" messages.

It turned out that the electrodermal activity of the patients, together with their heart rate, were significantly different during the active nurturing periods than during the rest periods, and blood pulse volume was significant for a few seconds during the nurturing period. Both heart rate and blood flow indicated a "relaxation response," which makes sense because the healer was attempting to "nurture" the subject via the doll. On the other hand, a higher rate of electrodermal activity showed that the patients' autonomic nervous system was becoming aroused. Why this should be so was puzzling until the experimenters realized that the healers nurtured the patients by rubbing the shoulders of the dolls that represented them or stroked their hair and face. This, apparently, had the effect of a "remote massage" on the patients.

Radin and colleagues concluded that the local actions and thoughts of the healer are mimicked in the remote patient almost as if healer and patient were next to each other. Distance between sender and receiver seems to make little difference. This was confirmed in a large number of trials by experimental parapsychologists William Braud and Marilyn Schlitz regarding the impact of the mental imagery of senders on the physiology of receivers. Braud and Schlitz found that the mental images of the sender could reach out over space to cause changes in the distant receiver. The effects are comparable to those that one's own mental processes produce on one's body. "Telesomatic" action by a distant person is similar to and nearly as effective as "psychosomatic" action by the subject on him- or herself.

This writer's decade long experience with natural healer Dr. Mária Sági and with physician Gordon Flint of the Psionic Medical Society confirms a basic fact: some forms of transpersonal healing, from near or from far away, can effectively replace traditional medical treatment. An impressive number of rigorous studies on spiritual as well as distant healing at medical schools, experimental laboratories, and hospitals support this conclusion. At the request of patients, some healers have been allowed into British National Health Service

hospitals since 1970, paid by the NHS itself. Psychiatrist Daniel Benor, founder of the UK's Doctor-Healer Network, examined more than 200 controlled trials of "spiritual healing," mainly of humans, but some directed at animals, plants, bacteria, yeasts, laboratory cell cultures, and enzymes. Nearly half had clearly documented therapeutic effects.

U.S. physician Larry Dossey spoke of a new era in medical practice. He called it Era III, nonlocal medicine. It follows Era II, mind-body medicine, and Era I, standard biochemical medicine.

Although pockets of skepticism remain, on the whole the debate among leading psychologists is shifting from whether transpersonal phenomena occur to *how* they occur. The experience of scores of psychiatrists, consciousness researchers, and alternative medical practitioners furnishes evidence that such phenomena are real and not imaginary.

The paradigm of the new psychology is consistent with the paradigm of the new physics and the new biology. It testifies that the mind is a whole, the same as the body—and the cosmos. It tells us that we are not complex sophisticated machines, and are not separate from each other and from our environment. We are intrinsic elements of the biosphere and the universe.

### *Conclusions*

The paradigm of the new sciences indicates that the great streams of human endeavor, the stream of science and the stream of spirituality, are on a converging course. They share the realization that the cosmos is not a domain of unconscious matter moving about in passive space; that it is a dynamic, self-evolving whole, integral at all scales and in all domains. This realization informs the mind of a growing number of people in society: more specifically the segment called "alternative cultures" including the "cultural creatives." The search for the wholeness of life, of mind, and of nature is spreading and deepening from year to year.

The convergence of science and spirituality is important in itself, and it is also important in regard to its consequences. On the one hand it tells us that our intuitive insights about the nature of life and reality are not illusory: they are confirmed in their essence by cutting-edge

science. And on the other it offers motivation for entering on a positive path to our common future. For wholeness is a defining characteristic of the kind of planetary civilization that could overcome the problems created by the mechanistic manipulative rationality of the civilization that is still dominant today.

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