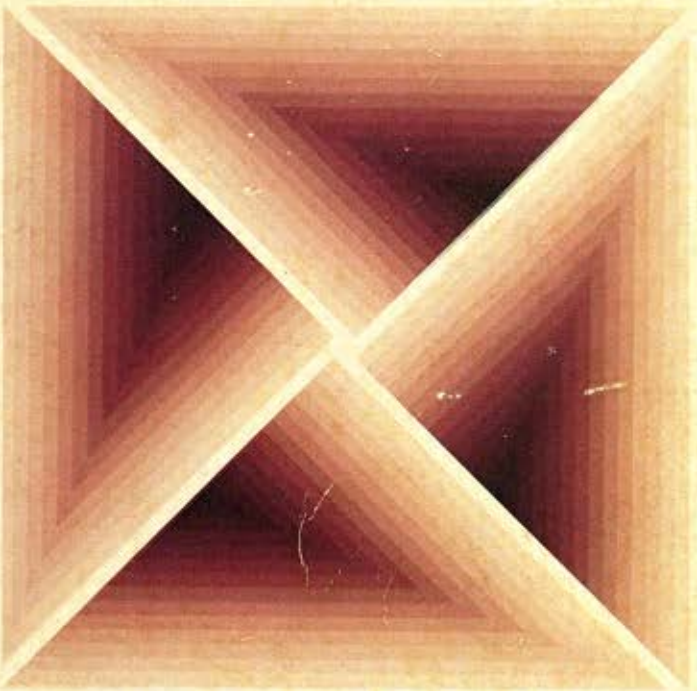

The Holographic Paradigm

and other paradoxes

EXPLORING THE LEADING EDGE OF SCIENCE

Edited by Ken Wilber

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A NEW PERSPECTIVE ON REALITY

The Special Updated Issue of The Brain/Mind Bulletin

NEUROSCIENTIST KARL PRIBRAM of Stanford and physicist David Bohm of the University of London have proposed theories that, in tandem, appear to account for all transcendental experience, paranormal events and even "normal" perceptual oddities. The implications for every aspect of human life, as well as for science, are so profound that we have dedicated an issue to the subject.

This breakthrough fulfills predictions that the long-awaited theory would (1) draw on theoretical mathematics; (2) establish the "supernatural" as part of nature.

The theory, in a nutshell: *Our brains mathematically construct "concrete" reality by interpreting frequencies from another dimension, a realm of meaningful, patterned primary reality that transcends time and space. The brain is a hologram, interpreting a holographic universe.*

Phenomena of altered states of consciousness (which reflect altered brain states) may be due to a literal attunement to the invisible matrix that generates "concrete" reality. This may enable interaction with reality at a primary level, thereby accounting for precognition, psychokinesis, healing, time distortion, rapid learning . . . and experience of "oneness with the universe," the conviction that ordinary reality is an illusion, descriptions of a void that is paradoxically full, as in the Taoist saying, "The real is empty and the empty is real."

For several years those interested in human consciousness have been speaking wistfully of the "emerging paradigm," an integral theory that would catch all the wonderful wildlife of science and spirit. Here, at last, is a theory that marries biology to physics

in an open system: the paradoxical borderless paradigm that our schizophrenic science has been crying for.

In the 1963 book *You and Your Brain*, Judith Groch observed that paranormal events could be ignored just because they were inconvenient to the framework of our knowledge. Einstein, unable to reconcile inconsistencies within Newton's physics, "unlocked a theoretical door through which scientists then poured in pursuit of the knowledge that lay on the other side." Groch suggested that the brain awaited its Einstein.

It is appropriate that this radical, satisfying paradigm has emerged from Pribram, a brain researcher-neurosurgeon who was a friend of the Western Zen teacher Alan Watts . . . and Bohm, a theoretical physicist, close friend of Krishnamurti and former associate of Einstein.

WHAT IS HOLOGRAPHY

Holography is a method of lensless photography in which the wave field of light scattered by an object is recorded on a plate as an interference pattern. When the photographic record—the hologram—is placed in a coherent light beam like a laser, the original wave pattern is regenerated. A three-dimensional image appears.

Because there is no focusing lens, the plate appears as a meaningless pattern of swirls. *Any piece of the hologram will reconstruct the entire image.*

THE HOLOGRAM AS A MODEL FOR A NEW DESCRIPTION OF REALITY

Physicist David Bohm says that the hologram is a starting point for a new description of reality: the *enfolded* order. Classical reality has focused on secondary manifestations—the *unfolded* aspect of things, not their source. These appearances are abstracted from an intangible, invisible flux that is not comprised of parts; it is an inseparable interconnectedness.

Bohm says that primary physical laws cannot be discovered by a science that attempts to break the world into its parts.

There are intriguing implications in a paradigm that says the brain employs a holographic process to abstract from a holographic domain. Parapsychologists have searched in vain for the energy that might transmit telepathy, psychokinesis, healing, etc. If these events emerge from frequencies transcending time and space, they don't

have to be transmitted. They are potentially simultaneous and everywhere.

Changes in magnetic, electromagnetic or gravitational fields and changes in the brain's electrical patterns would be only surface manifestations of seemingly unmeasurable underlying factors. J.B. Rhine, who pioneered modern parapsychology, was skeptical that an energy would be found. Psychologist Lawrence LeShan, author of *Alternate Reality*, believes that energy is a less useful concept in psychic healing than a certain merger of identity, perhaps a resonance.

PRIMARY REALITY MAY BE A FREQUENCY REALM

Is reality the product of an invisible matrix?

"I believe we're in the middle of a paradigm shift that encompasses all of science," Karl Pribram said at a recent Houston conference, *New Dimensions in Health Care*. He went on to spell out a powerful multifaceted theory that could account for sensory reality as a "special case" constructed by the brain's mathematics but drawn from a domain beyond time and space, where only frequencies exist.

The theory could account for all the phenomena that seem to contravene existing scientific "law" by demonstrating that such restrictions are themselves products of our perceptual constructs. Theoretical physics has already demonstrated that events cannot be described in mechanical terms at subatomic levels.

Pribram, a renowned brain researcher, has accumulated evidence for a decade that the brain's "deep structure" is essentially holographic—analogous to the lensless photographic process for which Dennis Gabor received a Nobel Prize.

Pribram's theory has gained increasing support and has not been seriously challenged. An impressive body of research in many laboratories has demonstrated that the brain structures see, hear, taste, smell and touch by sophisticated mathematical analysis of temporal and/or spatial frequencies. An eerie property of both hologram and brain is the distribution of information throughout the system, each fragment encoded to produce the information of the whole.

Although the holographic model generated fruitful answers, it raised a question that came to haunt Pribram. Who was looking at the hologram? Who was the "little man inside the little man," what Arthur Koestler called "the ghost in the machine"?

After agonizing over this problem for some time, Pribram said, he

decided that if the question had stymied everybody since Aristotle, perhaps it was the wrong question. "So I asked, 'What if the real world isn't made up of objects at all. What if *it's* a hologram?' "

Pribram's conversation with his son, a physicist, led him to the recent theories of David Bohm. To his great excitement he found that Bohm speculated that the nature of the universe might be more like a hologram, a realm of frequencies and potentialities underlying an illusion of concreteness. Bohm pointed out that ever since Galileo, science has objectified nature by looking at it through lenses.

Pribram was struck with the thought that the brain's mathematics might be "a cruder form of a lens. Maybe reality isn't what we see with our eyes. If we didn't have that lens, we might know a world organized in the frequency domain. No space, no time—just events. Can that reality be 'read out of' that domain?" Transcendental experience suggested that there is access to the frequency domain, the primary reality.

"What if there is a matrix that doesn't objectify unless we do something to it?" The brain's own representations—its abstraction—may be identical with one state of the universe.

Pribram pointed out the extraordinary insights of mystics and early philosophers that preceded scientific verification by centuries. One example is the metaphysical description of the pineal gland as the "third eye." Recently it was found that the pineal may be something of a super master gland, since its secretion of melatonin regulates the activities of the pituitary, long considered the brain's master gland.

The eighteenth-century philosopher Leibniz described a system of "monads" that coincided strikingly with the new paradigm, Pribram observed. His discovery of integral calculus enabled Gabor to invent the hologram two hundred years later.

"How did these ideas arise for millenia before we had the mathematics to understand them?" Pribram asked. "Maybe in the holographic state—in the frequency domain—4,000 years ago is tomorrow.

"Eastern philosophy has come into Western thought in the past. Every once in a while we have these insights that bring us back to the infinite," he told his audience. "Whether it will stick this time or we'll have to go around once more will depend on you. The spirit of the infinite could become part of our culture and not 'a little far out.' "

PRIBRAM'S PARADOXES: HOW DOES THE BRAIN KNOW?

Karl Pribram's research and theory encompass the whole spectrum of human consciousness: learning and learning disorders, imagination, meaning, perception, intention, paradoxes of brain function. Following are current key concepts:

- The brain's intricate mathematical devices may depend on interactions at the junctions between cells (synapses) via a network of fine fibers on the branching axons. Nerve impulses in this fine-fiber network manifest in **slow waves** with the potential to carry out the mathematics. (Other researchers have speculated that the **alpha brainwave rhythm** may be a timing device necessary for this computation.)

- Information in the brain may be distributed as a **hologram**. The brain apparently has a parallel-processing capability that suggests a model-like optics, wherein connections are formed by paths traversed by light, in addition to its more limited digital or linear computer-type connections. A distribution pattern similar to that of a hologram also would explain how a specific memory does not have a location but is scattered throughout the brain.

- A kind of **stereo effect** of sensory input—auditory, kinesthetic, etc.—causes point perception to leap out into space, as when two stereo speakers are so balanced that sound seems to project from a point midway between them. Such phenomena involve alternation of frequency and phase relationships.

- Pribram speculated that **transcendental experience** might also involve projection of some sort. He said his observations of transcendental experience suggest a possible role for circuits centering on the amygdala that control the joining of feedback and feedforward mechanisms in the brain. These circuits have been the site of pathological disturbances, he noted, as well as *deja vu* and the "consciousness without a content" of mystical states.

- He believes that the **neuropeptides** (*see BIMB, June 20, 1978*), the recently discovered large molecules, will prove to regulate the brain transmitters and represent a breakthrough in understanding brain function.

- Pribram finds mystical experience no stranger than other phenomena, such as the selective derepression of DNA to form first one

organ, then another. The most productive scientists, he said, "are as ready and as capable to defend spirit as data. This is science as it was originally conceived: the pursuit of understanding. The days of the cold-hearted, hard-headed technocrat appear to be numbered."

• He suggested that there is no such thing as metaphor—or, in a sense, that all metaphor is true. "Everything is isomorphic." (In Eastern philosophy, "As above, so below.") We may now be experiencing the effects of a social hologram, a pattern of interconnectedness of individuals. **Synchronicity,** meaningful coincidence, makes sense in a meaningful, holographic universe. Pribram proposed that even random distribution is based on holographic principles and is therefore determined. "The uncertainty of occurrence of events is only superficial . . ." There are **underlying symmetries,** not just haphazard occurrences. He cited recent observations of "spin" in physics and Einstein's insistence that "God doesn't play dice with the universe."

THE THEORY'S IMPLICATIONS TOUCH ALL ASPECTS OF HUMAN LIFE

The new theory has awesome implications in terms of the individual's potential to affect his life—his "reality"—and impressive power to unify disparate discoveries in consciousness research.

Learning: Educators have known for decades that anxiety undermines the ability to learn. Judging from brainwave activity, anxiety is like static—a noisier, arrhythmic state. Teaching methods can attempt to foster harmonious, relaxed states in students by centering or meditative techniques, biofeedback, Suggestology-type blends of music and breath exercises. A deeper understanding of the brain as a complex frequency analyzer might engender greater respect for individual differences in learning style.

Health: Individual responsibility for health is underscored once it becomes fully apparent that there is access to the primary realm of reality that creates illness or wellness. This does not mean that environmental factors are unimportant: nutrients, light, ionization and sound affect health at the level of frequencies.

Healing approaches that combine imagery with altered states of consciousness—autogenic training, meditation, hypnosis, psychosynthesis—make a lot of sense if the image interacts with a simultaneous-everywhere state of all possibility. This could reassure skeptical patients—and save the cost of placebos!

Psychotherapy and religion: Figurative descriptions of a sense of flow—as in love, joy, confidence and the creative process—may actually reflect states of consciousness in resonance with the holistic "wave" aspect of reality. Anxiety, anger and "stuckness" would represent fragmented states.

Personal transformation: Are profound, transforming personal experiences coincident with attunement to underlying universal symmetries? Consciousness research already has tied activity in the brain's limbic system to such experiences. The term "transcendence" may prove a literal description—some sort of phase relationship between two brain processes usually considered mutually exclusive: the analytical and the holistic (like particles and waves), the intellectual and the intuitive.

Attention: Does truly focused awareness correlate with a state of universal harmony? Attention is little understood. Some biofeedback patients cure their migraines by raising their hand temperature, some by lowering it. Researchers are coming to believe that the quality of attention may be more important than the actual learning of physiological self-control.

Philosophy and evolution: Pierre Teilhard de Chardin's idea of a noosphere—an invisible planetary web of evolving consciousness—is interesting in light of the new theory. So is the age-old esoteric notion that other dimensions of reality exist at frequencies normally not perceptible to us. And consider the alchemists, who believed that they could transmute earth's elements if they could reach a point of utmost harmony in themselves.

The arts: Apparent universals in aesthetic quality could reflect underlying symmetry, frequencies, phase relationships to which our brains respond. Classical music is used increasingly to alter consciousness. One physicist has speculated that Beethoven's great chords activate the chakras.

IS CHANGE DUE TO RESONANCE, NOT TECHNIQUE?

A New York psychoanalyst has proposed that the hologram is a valuable model for the phenomenon of insight or sudden change in psychotherapy.

Edgar A. Levenson pointed out that such changes take place across the spectrum of psychoanalytic methods and must therefore be due to something other than a specific approach. Technique, he said, is nothing more than a series of ceremonial preparations for change.

"Sudden or insidious, dramatic or by default, change does not come at the behest of any technique or procedure. If his life depended upon it, no therapist could produce a therapeutic result on command. . . . Like the mystical or the aesthetic, the psychoanalytic experience is capricious and unreliable."

But there is a strong feeling when therapy is going well that an elusive pattern is emerging, a powerful central theme evident on all levels at once. The therapist is not saying anything *new* to the patient "but resonates with something the patient already knows and brings it into clearer focus. The change results as a consequence of the expansion of configurational patterns over time."

The therapist's interpretation in itself would not make for change "any more than one point in space makes a line. It is not so much that a therapist is correct in his formulations but that he is in harmony or resonance with what is occurring in a patient.

"It is as though a huge, three-dimensional, spatially coded representation of the patient's experience develops in the therapy, running through every aspect of his life, his history and his participation with the therapist. At some point there is a kind of 'overload' and everything falls into place."

The pattern, or theme, had emerged dramatically for the patient.

In an article in *Contemporary Psychoanalysis* (12: 1-20), Levenson cited Karl Pribram's holographic model of brain function and physicist David Bohm's concept of a holographic, "enfolded" level of reality.

The therapist does not succeed because he explains, Levenson said. He expands awareness of *patterning*. This activity of expansion and resonance hits closest to the real neuropsychological substrate of revelation.

"The holographic model suggests a radically new paradigm that might give us a fresh way of perceiving and connecting clinical phenomena that have always been known to be important but were relegated to the 'art' of psychotherapy. The error has been our model for communication: the transportation of a message across interpersonal space."

THE QUANTUM BRAIN-ACTION APPROACH COMPLEMENTS THE HOLOGRAPHIC MODEL

A torrent of comments, books, papers and leads continues to pour in, responding to the July 4 issue of *Brain/Mind Bulletin* devoted to the

emerging holographic model of reality based on the theories of brain scientist Karl Pribram and physicist David Bohm.

Parapsychologists Stanley Krippner, Charles Tart and Douglas Dean commented that the holographic model is consistent with their experimental data, particularly as it postulates access to a domain transcending time and space; but Jule Eisenbud finds the theory too mechanistic.

Physicist Evan Harris Walker has framed a complementary quantum-mechanical theory of psychic phenomena. Recently he dealt specifically with subatomic events in the brain: "Quantum Mechanical Tunneling in Synaptic and Ephaptic Transmission" (*International Journal of Quantum Chemistry* 11: 102-127).

Terence and Dennis McKenna formulated a related theory in their book, *The Invisible Landscape* (Seabury, 1975), in an excellent section titled "Toward a Holographic Theory of Mind." They expanded holographic brain theory to the possibility that DNA and even subatomic particles operate on holographic principles.

Holographer Eugene Dolgoff told *B/MB* that his unsuccessful attempts to detect energy transfer in psi in the late 1960s led him to conclude that no transfer was necessary. "Nothing needed to go from here to there, because in that realm there isn't any 'there.' "

Melvin Werbach, psychiatrist and biofeedback clinician, believes that the hologram may not be our ultimate model, "but it can serve a most important purpose by providing those of us who are comfortable in thinking in holistic terms the possibility of a scientific base." William McGarey, director of the A.R.E. Clinic in Phoenix, and George Baker of Graduate Theological Union in Berkeley suggested metaphysical implications of a resonance model.

CHRONOLOGY OF AN IDEA

1714—Gottfried Wilhelm von Leibniz, discoverer of integral and differential calculus, said that a metaphysical reality underlies and generates the material universe. Space-time, mass and motion of physics and transfer of energies are intellectual constructs.

1902—William James proposed that the brain normally filters out a larger reality.

1905—Albert Einstein published his theories.

1907—Henri Bergson said that the ultimate reality is a vital impulse comprehensible only by intuition. The brain screens out the larger reality.

1929—Alfred Whitehead, mathematician and philosopher, described nature as a great expanding nexus of occurrences not terminating in sense perception. Dualism such as mind/matter are false; reality is inclusive and interlocking . . . and Karl Lashley published his great body of research demonstrating that specific memory is not to be found in any particular site in the brain but is distributed throughout.

1947—Dennis Gabor employed Leibniz's calculus to describe a potential three-dimensional photography: holography.

1965—Emmett Leith and Juris Upatnicks announced their successful construction of holograms with the newly invented laser beam.

1969—Karl Pribram, who had worked with Lashley as a neurosurgeon, proposed that the hologram was a powerful model for brain processes.

1971—Physicist David Bohm, who had worked with Einstein, proposed that the organization of the universe may be holographic.

1975—Pribram synthesized his theories and Bohm's in a German publication on Gestalt psychology.

1977—Pribram speculated on the unifying metaphysical implications of the synthesis.

References

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David Bohm's theories appear in *Quantum Theory and Beyond*, edited by Ted Bastin (Cambridge U., 1971); *Foundations of Physics* 1 (4), 3 (2), and 5 (1); and in *Mind in Nature* (University Press of America, Washington, D.C.).

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KARL PRIBRAM'S CHANGING REALITY

Marilyn Ferguson

IF YOU WANT TO KNOW where the next revolution in brain research will take place, find out what currently interests Karl Pribram. In the course of his career, the 58-year-old Stanford neuroscientist has been close at hand, if not a primary incendiary, at nearly all the major upheavals of prevailing thought about how the brain works.

Currently he is proposing a startling, all-encompassing model that is generating considerable excitement among those intrigued by the mysteries of human consciousness. His "holographic model" marries brain research to theoretical physics; it accounts for normal perception and simultaneously takes the paranormal and transcendental experiences out of the supernatural by explaining them as part of nature.

Like certain dicoveries of quantum physics, the radical reorientation of this theory suddenly makes sense of paradoxical sayings of mystics throughout the ages. Not that Pribram was the least bit interested in giving credence to mystical insights. The diminutive brain surgeon, researcher and professor was only trying to make sense of the data generated from his laboratory at Stanford where brain processes in higher mammals—primates, especially—have been rigorously studied.

This latest development in the thinking of Karl Pribram makes his own transition complete from (in his own term) a "staunch behaviorist" in the 1940s to a pioneer in cognitive psychology in the 1950s to an occasional ally of humanistic psychologists in the 1960s and early '70s to a radical defender of spiritual experience in the late '70s.

Biologist T.H. Huxley once wrote, "Sit down before fact like a little child, and be prepared to give up every preconceived notion,