

MAKING SENSE OF GOD: HOW I GOT TO THE BRAIN

by James B. Ashbrook

Abstract. I describe the development of my work in relating brain research and religion from my personal roots in my family of origin through my professional responsibilities as a pastor, a clinician, and a theological educator to my developing what I call “a neurotheological approach” to faith and ministry. My early correlations gave simplistic attention to bimodal consciousness as an interpretive tool for understanding religion. Subsequently came a more sophisticated exploration of whole-brain functioning and suggested cultural correlates. Currently, I am explicating the humanizing brain as reflective of our living in an open system, a universe that is unfolding and evolving, a universe in the hands of the whole-making, integrating, emerging God whose reality far exceeds the insights of cultural construction. As we humans relate to this God, attachment and aspiration are reciprocal.

Keywords: attachment theory; bimodal consciousness; brain-mind; emergent evolution; neurotheology; religion.

Looking back almost half a century, I am aware that I have invested my personal and professional energies in trying to make sense of God. In the early period of my evolving self, “making sense” carried more of an experiential than a conceptual meaning. During the last twenty years, my scholarship has related to the working brain. “Making sense” has come to mean a convergence of an experiential understanding of religious faith and practice with an empirical explanatory approach. The result is a more explicit and comprehensive coherence of what matters to our human life together.

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In the making of meaning, even the single excitable nerve cell contributes, finally, to essential human centeredness. Information processing, sifting and selecting, organizing and reorganizing, learning and remembering are both experiential and biological. The conscious brain and working memory serve as indispensable features of what makes information "make sense" and "full of meaning."

SOURCES OF MY SCHOLARSHIP

Besides brain research, many varied sources have contributed to my evolving scholarship. These range from dynamics in my family of origin to theological influences, to pastoral responsibility, to clinical pastoral education, to dynamic psychiatry and academic psychology.

Personal Influences. I am aware of personal sources for my scholarly work, most particularly my family of origin. Mother was an imaginative, seemingly chaotic maverick; my father was a structured, orderly executive. Apparently, I struggled to hold these two powerful forces together in some sort of balance. I have never learned to be in the middle of contending forces easily or constructively. Yet both my parents were models of commitment to social justice, peace, and shared humanity. For that I am ever grateful.

My cognitive style shifts back and forth between stories and statements, experience and explanation, metaphors and models. I do so here. A Sufi story about a folk character named Nasrudin, who reputedly lived in Persia in the thirteenth century, carries the impact of my predicament with irreconcilable opposites—in my growing years between my parents and in my later years with dichotomies and dualisms.

One night Nasrudin found himself in a tea house, caught between two men arguing over a basic fact of the universe. One claimed, "The sun is more important than the moon." The other countered, "The moon is more important than the sun."

Neither was making headway against the other. Finally, they turned to Nasrudin. "Which is more important?" they beseeched him. "The sun or the moon?" "It's quite simple," he announced. "The moon is more important than the sun."

With that the moon man stopped thinking. But the sun man continued arguing. "How can you say the moon is more important than the sun?" "It's quite simple, as I said," Nasrudin replied. "The moon is more important than the sun . . . because . . . at night we need the light more." (Shah [1964, 1969] 1971, 76)

His response, of course, is absurd. There is no way we can choose between the sun and moon, day and night, noontime and twilight. These are distinguishable, yes; but they are not divisible. They belong to each other; they are part of a system, a greater whole; they are ever and always variations within a single reality.

I use this story to suggest the integrity of complexity. Whether we

divide the world into good and bad, female and male, the West and the East, sacred and secular, spirit and matter, or body and soul, we are arguing about a product of our human imagining. Reality itself is whole, an integrity. No matter how suggestive our imaginings, they are variations on the simple fact of a functioning system, one that is both differentiating and cohering, emerging and evolving, ever-surprising and ever-present. We are part of a universe in which everything affects everything else. I could no more say, "Who is more important—mother or father?" than I could separate sun and moon or God and humanity.

Religious and Theological Influences. Because I have been seeking to make sense of God most of my life, I can identify specific convictions and orientations. The optimistic piety of Walter Rauschenbusch and the social gospel movement has always been at the forefront of my thinking. This orientation also has included commitment to a devotional life and regular Bible study—devotions to cultivate the interior dimension, and the Bible to learn from over a thousand years of people's experiences in trying to understand God. Optimism, piety, and social change reinforced by a devotional life and Bible study—these are threads from my Protestant heritage.

Except for Karl Barth's explosive *Epistle to the Romans*, neo-orthodoxy left me cold. Emil Brunner was right—the image of God in humanity has been damaged but not obliterated, as Barth contended. Søren Kierkegaard and the existentialists quickened my imagination. Alfred North Whitehead's *Adventure of Ideas* and *Science and the Modern World* provided both poetic vision and an organismic model, a precursor of psychology's gestalt approach and general systems theory. Charles Hartshorne's *Man's Vision of God* and *The Divine Relativity* added rigorous logic to assumptions about belief.

But I owe my appreciation for both historical and systematic theology to Paul Tillich. In his work I found acceptance of my struggles and answers for my longings. His emphases upon the Protestant Principle, which calls all structures into account, upon Catholic Substance, which opens up the sacredness of all life, upon the demonic, which identifies what is aggressively destructive within us and around us, upon the limited fears of fate and condemnation and emptiness and the existential anxiety of death and guilt and meaninglessness, upon faith *in spite of* doubt, upon the polarities of freedom and destiny, potentiality and actuality, and upon the God above God continue to inform my living and thinking.

Tillich opened for me experiential origins of the theological past. The main tributary of Christianity has been Antiochean incarnationalism, Jesus divine and human. I have resonated more with Alexandrian Logos Christology, Christ as the universal ordering of existence. This more

cosmic view reduces the impulse to exclusiveness among the world religions. I prefer to think of religion as wholistic or whole-making, or, better yet, the dynamic integrity of Reality. For me, Jesus is the archetypal prototype of what it means to be human rather than a perfect essence emanating from some Platonic realm.

In the mid-1950s I was a candidate for applied psychiatry for the ministry at the William Alanson White Institute of Psychiatry in New York City. Rollo May acted as my official advisor. His own work on anxiety, combined with his concern to go beyond the Cartesian split between body and soul, helped me merge my theological inclination with my interest in dynamic psychiatry. This more didactic work was matched with my being the first pastoral counselor intern at the then American Foundation of Religion and Psychiatry, now known as the Institutes of Religion and Health in New York. I began to learn to use myself by putting myself at the service of others even as I ventured deeper into the interpersonal and intrapsychic dimensions of the psyche.

Since the mid-1960s I have been chastened, enlarged, and challenged by the plethora of people seeking their particular destinies. This includes black, liberation, feminist, and third-world theologies. I also taught at a divinity school that was the focal point for "death of God" theology. What I have taken from that bruising period is this: The death of God means the collapse of our cultural assumptions and the anxiousness of searching for a more basic grounding than any we can capture with our conceptualizations. This view is a more secular perspective on the crucifixion of Jesus, the best of humanity being put to death by the best of civilized culture.

Pastorates. Ten years as pastor of two churches—one in an inner-city rooming-house area and the other in a small-town university setting—immersed me in the everyday struggles of people and communities. I moved back and forth between the brokenness of life—a sense of the tragic condition to which neo-orthodoxy pointed—and the hopefulness of life—a sense of being able to use whatever came in some constructive way.

Parish life seemed to call forth all of me. Yet God seemed to have another agenda, namely, seminary teaching. I moved from the fullness of community involvement to the restrictedness of seminary life. Not easily, I must say. It felt as though I were tearing my blood vessels out. Perhaps that investment explains why I have always been concerned about applying theoretical understanding. My scholarship on the brain has continued that motivation to bridge theory and practice.

Seminary. My initial investment in seminary teaching focused on small-group process and the cultivating of awareness, relatedness, and

wholeness (the name of a course I developed). Behind these foci lay my experience with Fritz Perls in gestalt therapy and extensive work with groups.

My first years of teaching included my enrolling in a graduate program in psychology at Ohio State University. While majoring in counseling and minoring in clinical psychology, I found myself accommodating to, and then assimilating, a scientific orientation to human life. Physiological psychology bored me, as did a course in motivational psychology. But as a conforming student I learned the difference between experimental evidence and experiential knowledge, between causality and meaning. That program has served me in ways I never imagined in the midst of the struggle. Years later, biopsychologist Jerre Levy observed—mistakenly, I believe—that I seemed more geared to being a scientist than a theologian.

However, myths and dreams began to capture my attention as meaning-making processes. I found myself exploring meditation in both Western and Zen practices in the United States and briefly in Japan. I found myself returning to F.S.C. Northrup's *The Meeting of East and West*, which in college had initiated me into the wider world of comparative religion. At the same time I spent some five years in the public school system of Rochester, New York, demonstrating and advocating William Glasser's Schools without Failure program. The issues were how to keep options open and how to facilitate learning. Involvement in community psychology and psychodynamic case conferences added to my background in the clinical dimensions of human experience.

Those twenty-some years culminated in three books: *become Community* (1971), a theological study book on the dynamics of community experience; *In Human Presence—Hope* (1971), a volume on the pastor dealing with individual and social change, and *Humanitas: Human Becoming and Being Human* (1973), a synthesizing work for the searching person on the meaning of "self" and one's existence. In the next to the last footnote of *Humanitas* I make reference to the convergence of the empirical-experimental approach of the West and the empirical-experiential approach of the East as sketched by psychiatrist Claudio Naranjo and psychologist Robert E. Ornstein in *On the Psychology of Meditation* (1971). For the first time I was introduced to bimodal consciousness and the intriguing data on split-brain research.

Thus began the second half of my scholarly search to make sense of God.

THE EXCITEMENT OF BRAIN RESEARCH

I was invited, as the first faculty person, to give the 1975 Ayer Lecture on the history and interpretation of Christianity at Colgate Rochester/Bexley

Hall/Crozer Theological Schools, where I then taught. The committee believed I would have something to say about ministry in a postcritical—meaning postrationalistic—age. I was able to deal with meaning without getting lost in psychic imagination or becoming locked into analytic rationalism. I worked with dreams, myths, and metaphors. In addition, I had begun exploring the richness of mysticism.

Having just read Ornstein's *The Psychology of Consciousness* ([1972, 1977] 1986), I found the idea of two kinds of consciousness—the analytic and the holistic—a paradigm with which to organize ways of using the Bible, speaking of God, praying for the Spirit, and living for Christ. In speaking to God, for instance, it seemed consistent with bimodal consciousness that our God talk be based on what we first experience in the full subjectivity of the right brain's in-touch awareness and then express in the intentional consciousness of the left brain's descriptive language. Subsequently, these ideas appeared in a co-authored book on *Christianity for Pious Skeptics* (1977). I also found the bimodal orientation useful in *Responding to Human Pain* (1975) as a way of organizing relational and rational aspects of helping.

While well received, the presentation left me uneasy. Was I saying anything that had validity? Were my interpretations—extrapolations—related to the way the brain actually works? Or, was bimodal consciousness simply a metaphor without analogical possibilities? Did the brain really offer a way out of the conflicted dualism of Creator and creation, of spirit and matter, of faith and finitude, of God and humanity?

I had never accepted such splits. They always seemed to distort a deeper reality. The mythic process of the coincidence of opposites, the complementarity principle in physics, the integrity of "alpha" in the beginning, and the wholeness of "omega" in fulfillment each seemed to assume nonduality—in the universe, in ourselves, in God. The evidence of bimodal consciousness seemed to offer a way to understand a religious view of reality empirically as well as experientially. The finite and the infinite could be one, whole, inseparable, and nonpolarized. The locus of the holy could lie within, even as the reaches of the holy opened outward.

I needed to know more about the brain—what it was, how it worked, what could be made of it in understanding ourselves and God. This sounds pretentious, but that is where I was and where I am.

Biofeedback. I turned first to the Biofeedback Center of the University of Rochester. Working with its director, Robert Nideffer, from 1975 to 1977, I learned about stress and stress reduction. After auditing his seminar I became a clinical consultant in the clinic. Nideffer educated me about biofeedback and supported my interest in linking faith with empirical data.

I had been skeptical of a strictly behavioral approach to pain. I saw such an approach as either too rationalistic—being all cognitive, as in positive thinking—or too mechanistic—being all physiological as in progressive relaxation procedures. I felt a behavioristic approach turned people into objects—things—to be manipulated from the outside. This feeling paralleled my rejection of a supernaturalistic view of God manipulating the world from the outside in order to save it from itself. Managing the body by manipulating either the mind or the body seemed like conscious magic, hocus-pocus, the worse expression of the Cartesian split between mind and body.

Refocusing Theology. For years, as I indicated, I struggled, as did others, with an unsatisfactory view which split the physical from the spiritual, matter from meaning, transcendence from immanence. The Western world—shaped by patriarchy and a philosophical perspective—has labored under a view of God that separated humanity from divinity. Because of that dualistic worldview, the issue has been how to reconcile spirit and matter.

In classical thought, natural theology assumed a continuity between the physical domain and the spiritual realm even as it conceived of reality as substantial, permanent, and eternal. What people knew in the physical realm represented a mathematical “proportion” of what was true of eternal essence. “Natural” meant rational, self-evident structures and principles of existence. These provided the basis for communicating the “wholly incommunicable.” In Reformation thought, theology assumed a discontinuity between the physical and the spiritual. Only by faith alone—*sole fide*—could the creature and the Creator be united. In our day, an empirical theology has meant discovering suggestive facts, which the religious imagination then actively shapes. While process thought recognizes that empirical arguments finally rest on the belief of the believer, it assumes God as the universal, least exhaustible, individual concretion, as comprehended by means of philosophical ideals.

My thinking begins in a different way. I assume a new natural theology in an empirical mode. It is “natural” because it takes cognitive processes (both cortical and subcortical)—or mind—as indicative of the nature of ultimately purposive reality, or God. It is “empirical” because it takes biochemical processes (both structures and functions)—or brain—as constitutive of fully functioning reality, or God. Instead of starting with a philosophical view of God as Being Itself, I turn to a neurophysiological understanding of brain as a metaphorical-analogical understanding of God as God. Study of how the brain works is showing that even though brain-mind is made up of at least three parts—the instinctual reptilian mind, the emotional mammalian mind, and the neocortical rational mind with its two distinguishable hemispheres—the parts

are not so much separate entities as necessary aspects of the functioning whole. And that idea abolishes dualism.

In pursuing my study of the brain, I have never sought to “prove the existence of God.” Rather, I have tried to make God—the reality of God and how people perceive God—meaningful in human experience. Even if God is not a demonstrable entity, nor is there anything that is an eternal “entity” or essence, we can explore the plausibility, the sensibility, the comprehensibility of that to which the word “God” refers. I think of God as the meaning-making reality of our various realities. In its materiality, the brain offers the most empirical anchor of intentionality. In its cognitive processes, the mind presents the most intelligible source of human imagination. For me, then, here is the integrity of reality. Reality works to create, maintain, and enhance the ultimate context for our becoming the human beings that we are.

Making Faith Sensible. Nowadays I think of the integrity of reality as making faith sensible. Faith becomes tangible as it is specifically associated with brain structure and function. Faith involves physical senses—touching, hearing, seeing, tasting, smelling, and feeling. Faith equally requires cognitive structuring—patterns, schemas, and expectancies. Initially, “making sense of God” is a metaphorical-conceptual expression. But, “making sense of God” is equally an analogical-tangible expression. Like all metaphorical expressions, God is *not* the brain-mind. To think of God *as* the brain-mind—that is, metaphorically—is to construct an understanding of God that assumes God *is like* the brain-mind—that is, analogically. God is similar to the brain-mind even though God is not the same as the brain-mind.

My exposure to biofeedback marked a shift in my thinking about God. I now linked imaginative interpretation to more empirical data. That helped me begin to bridge the metaphor of psyche and the mechanisms of soma.

Biofeedback learning is relatively straightforward. A person lies back in a recliner chair. Electrodes are attached to the part of the body relevant to the person’s pain. For migraines, the electrodes adhere to the forehead and report brain activity in the frontalis muscles. In some instances, a thermistor, which registers changes in body temperature, is attached to the middle finger. A machine translates the electrical impulses into clicks or pointer readings. These give the person objective signals of internal processes. Loud and rapid signals indicate the tension of beta waves; soft and slow signals are associated with the relaxation of alpha waves.

I came to think of this experience in sacramental language, namely, outward and visible signs of a person’s inward and spiritual state. In tension there is a lack of trust; in relaxation there is the presence of trust.

The intent is to help the person relax in order to dilute the gorged blood vessels in the forehead and to reverse the depleted blood supply in the fingers (which makes for cold hands). Mental and physical information combine into one integrating process.

I discovered we could access the autonomic nervous system through relaxation procedures in combination with guided fantasy and spoken mantras. What I had learned earlier in meditative practices I was now understanding in terms of brain activity. Attention to inhaling and exhaling could be linked with a word or a hymn or a prayer or an incantation such as "Lord Jesus Christ have mercy upon me" or "O-N-E" or "The Lord is my Shepherd" or "Sweet Je-sus."

The physical and the purposeful were inseparable. In fact, we could begin with the physical (as in tensing and relaxing muscles) and affect a person's mental state. Or, we could begin with a mental state (as in peaceful imagery or a soothing phrase) and affect a person's bodily state. Alpha waves reduce stress in the body and bring quiet to the mind. Herbert Benson's "relaxation response," I learned, was the bodily base of meditative practices. When he went "beyond the relaxation response," he drew on explicit religious resources. An empirical explanation for meditative practice made all meditative practice sensible.

From my clinical orientation I had understood migraines—and headaches in general—as the buildup of unexpressed emotion, usually anger and frustration. In the lab, however, while we acknowledged these dynamics, our approach was primarily behavioral and relational. We helped the person become aware of early warning signals of stress by means of the biofeedback amplification of bodily activity. Then we worked to develop strategies of relaxing to shift the autonomic system from sympathetic arousal to parasympathetic relaxation. By quietly attending to soma a person could influence psyche.

I was moved by the case of a fifty-three-year-old woman who had suffered from severe migraine headaches since her teens. Her daily medications were costly, and about once a month her doctor had to give her injections because the pain was so intense. As a rule she became bedfast once a week, totally incapacitated by pain. Hers was a most difficult case and the case that converted me to the awesome integrity of the brain-mind working together. Within three weeks she had learned to recognize the beginning of stress and had developed specific strategies to intervene before the process became irreversible. In a follow-up a year and a half later, she reported continued progress. I did not reject a psychodynamic understanding, but I was finding a more empirical integration of psyche and soma.

Although many biofeedback patients did not respond so dramatically as this woman, the practical results in the Biofeedback Center were

impressive. We are neither simple creatures nor complicated machines. We are “fearfully and wonderfully made,” as the psalmist sang (Ps. 139: 14). A Jamaican practical nurse advised her very stressed-out client and a client of mine, “Sister, you’ve got to ‘altar’”—by which she meant one has to let go of self-conscious control and lean on God, knowing that “underneath are the everlasting arms” (Deut. 33:27). This advice about “altaring” has struck me as a singular kind of medicine that she had learned as “folk” and I had learned as “clinical.”

Nowadays I use this idea of “altaring” or “the relaxation response” as a way to think about the brain and belief. The advice is sound religion and sound science. “How” to altar and relax have not always been clear, but “that” we need to trust God has been basic. Biofeedback demonstrated the way religious folk wisdom expresses what research supports, namely, relaxation activates the parasympathetic nervous system, which in turn activates the immune system and the well-being of the organism. Altaring is empirically reasonable, yet “how” we “intend” life remains a mystery. Relaxation/tension activity is cognitively mysterious, yet the “intelligibility” of psychobiochemical processes remains. As I have learned more about mind-body communication, the explanation of behavioral procedures has taken on increasing clarity, especially how to access and utilize the autonomic nervous system’s link with the immune, endocrine, and neuropeptide systems (which are probably the biochemical substrates of mind-body regulation, according to psychologist Ernest L. Rossi in *The Psycho-Biology of Mind-Body Healing* ([1986] 1993).

Neural Sciences in a Medical School. But biofeedback was not enough for me. I wanted to know more about the brain itself. I believed—and continue to believe—that the human brain actually is the bearer of an emerging and integrating cosmos of meaning.

Those years were an exciting period for me. I knew I was on the track of the holy of holies—the locus of the really real—the place of the presence of God in terms of general revelation. I regarded “brain” as empirical. By that I meant orderly and thereby an analogical expression of God. I thought of “mind” as natural. By that I meant imaginative and thereby a metaphorical expression of God. But I needed more concrete information.

So in 1976–77, I audited the course on neural sciences for second-year medical students at the University of Rochester, New York, School of Medicine and Dentistry. At the same time, I read widely in the literature and met weekly with Garth Thomas, then director of the Center for Brain Research. Although he expressed little confidence in my speculations—because I was extrapolating from one level of organization, namely hemisphericity, to other levels of organization, namely,

patterns of behavior and belief—he tolerated my wonderings and helped me be clearer about brain research.

My neuroscience lab included sixteen students. We each had a microscope, a set of dissecting tools, and a brain of our own with which to work. After three weeks of activity, three of the students asked me, “What are you doing here?” They were puzzled by my presence and probably by my quietness.

“I want to find out about the brain,” I replied.

Their impression seemed to be that nobody in his or her right mind would put themselves in such a place voluntarily. I, of course, was attempting to track how the mind might help me understand God. I was there to make sense of God by making sense of ourselves.

I did not expect to find God in a nerve cell, except as every part discloses a whole. I did not expect to see the Holy Spirit in a synaptic gap, except as space transforms time into something significant. I did not expect to be converted, for I already was a believing seeker. I did not expect to be inspired, for I already came with a sense of awe at the mystery of life. What I did discover was a profounder sense of awe at the mystery of the meaning-making brain.

DEVELOPING THE BRAIN-MIND ANALOGICAL METAPHOR

I have come to find the brain at once sensible and surprising. As body-mind is a differentiating whole, so world-God is a differentiating whole. Theologically, this is not a pantheistic collapsing of Creator into creation. Rather, it is a panentheism in which the purposeful and the physical are distinguishable even though inseparable. As I make sense of human reality, ultimate reality becomes more sensible and more awesome.

The conventional saying that “mind is what the brain does” implies the *human* meaning of the tangible brain. “Human” means our capacity for imagination, creativity, consciousness, self-consciousness, yes, and transcendence of strict stimulus-response determinism. The concept of “mind” equally implies ultimate purposes characteristic of our contextual universe—culture, ethics, values, beliefs, yes, and God beyond perceptions of God.

BIMODAL CONSCIOUSNESS. In 1981, I participated in a seminar sponsored by the National Science Foundation and led by neuroscientist Robert B. Livingston. He and the group encouraged me with their excitement about the parallels I was suggesting between brain processes and belief patterns. I concentrated on left brain/right brain cognition. This seemed so obviously associated with dichotomies and dualities so characteristic of human thought—left/right, secular/sacred, part/whole,

figure/ground, intellect/intuition, *et alia*. The two hemispheres of the neocortex organize information by transforming biochemical activity into mental representations. The dominant (usually the left) brain processes in a sequential, analytic way. It observes the world and explains what it observes by abstracting discrete features. These features convey the impression of a fixed world. The nondominant (usually the right) brain processes in a simultaneous, impressionistic way. It responds from inside a context by creating meaningful patterns through feeling, gesture, image, story, and symbol. From an evolutionary perspective, human imagination and invention emerged with the explosive expansion of the cerebral cortex.

Patterns of Belief. In 1977 and again in 1979, I traveled to Greece and Israel. I was trying to comprehend the vitality and the vicissitudes of our Judeo-Christian tradition in light of what I was learning about the brain. I found myself, in part because of the interests of two of our children, immersed in Byzantine and Medieval Christianity.

I had come to the conviction that societal and symbolic forms combine the origins of human meaning-making in neurocognitive processes and the destiny of human meaning-making in theological aspirations. Thus, I sought cultural parallels, symbolic affinities, and central tendencies—with variations—which represented the coincidence of time, place, and idea. These could mark a period in history with a culturally significant style as found in a period's architecture, sculpture, painting, literature, music, and ideas. I had come upon the power of this approach in art historian William Fleming's *Arts & Ideas* (1974). Inadequate and/or dysfunctional styles could be identified by virtue of too much information processing or too little.

Nine years of speculation resulted in a book with the presumptuous title *The Human Mind and the Mind of God: Theological Promise in Brain Research* (1984). I extrapolated from bimodal consciousness—left-brain, right-brain cognition—to theological parallels. Philosopher Paul Ricoeur and theologian David Tracy had distinguished between the hermeneutics of proclamation and the phenomenology of manifestation. A belief pattern of proclamation was specifically focused in a structure of imperatives; a pattern of manifestation was implicitly distributed everywhere and anywhere. These distinctions became the basis for my neurotheological approach.

God's redeeming activity as a left-brain process found its cultural archetypal prototype in the medieval cathedral at Chartres, with its soaring spires and directed attention to the altar. In a proclamatory belief trajectory the locus of the holy was known and regulated in a hierarchy of authority, namely, the papacy. God's (re)creating activity as a right-brain process found its cultural archetypal prototype in the Byzantine

Basilica of Holy Wisdom (in Constantinople, now Istanbul) with its embracing dome and multiple foci of attention throughout the structure. In a manifestation belief trajectory the locus of the holy could be known anywhere and in anybody, with little hierarchy. The dome and the spire represented, respectively, central cultural tendencies and cultural convergences of a transformed-world view versus a fallen-world view.

Here was my espousal of what I call "a new natural theology in an empirical mode." In contrast to the rationalism of medieval natural theology, I attended to the fuller cognition of contemporary research. In contrast to a philosophical anchoring in traditional theology and to lived experience in twentieth-century empirical theology, represented by Bernard Meland and the Chicago School, I turned to empirical data in both experiential and experimental forms, from attention to philosophical Being to empirical brains. On the one hand, I associated experiential cognition with the constructed patterns of metaphor and, on the other, realistic perception with a tangible analogical focus.

During this period, two additional considerations provided powerful heuristic possibilities. One was the popularization of neurolinguistic programming and sensory languages. An African-American pastor, the Reverend Samuel Adams, made the connection between the major sensory systems of the visual, the auditory, and the kinesthetic and biblical assertions about blind eyes, deaf ears, and hard hearts (Isa. 6:10). Further, he riveted attention on the experience of Pentecost in which people "saw" something like tongues of fire, they "heard" something like the sound of a mighty wind, and they "felt" something being filled with the Holy Spirit (Acts 2:1-4). When people draw on all their sensory systems, they find themselves gathered in a community that transcends and transforms their separate cultures.

The other consideration came with a suggestion by neuroscientist Robert B. Livingston. He speculated that the limbic arch (septum to amygdala) might well be the neurological correlate for the psychosocial phenomena of the courage to be part of the whole and the courage to be as oneself, distinctions made by Tillich in *The Courage to Be* (1952). The amygdala is associated with arousal and survival of the self; the septum with relaxation and continuity of the species. This speculation provided the impetus for subsequent investigation.

By 1984 I was tired of studying the brain. It was a strenuous left-brain process. I wondered whether I was saying anything more than I had nine years earlier. I felt as though I was holding mercury in the palm of my hand. As long as I kept my hand open, the mercury of ideas stayed put. As soon as I tried to grasp it tightly, it squirted away. The data were ambiguous; the generalizations were loose; a focused picture

was continually fuzzing.

Both theologians and neuroscientists questioned my leaps of complexity from physics through chemistry and biology to cognitive neuroscience to hemisphere lateralization to bimodal consciousness to “a pathway to God,” a phrase coined by theological colleague Paul W. Walaskay. CASIRAS, the Center for Advanced Study in Religion and Science; the summer conference sponsored by IRAS, the Institute for Religion in an Age of Science; and *Zygon: Journal of Religion and Science* (under the respective editorships of Karl Peters and Philip Hefner) have provided forums for my ideas and their critiques since 1982. Biopsychologists Jerre Levy and Robert Glassman, neurophysiologists Paul D. MacLean and H. Rodney Holmes, theologians Don S. Browning, John Cobb, and Loyal D. Rue, and psychiatrist Eugene G. d’Aquila, among many, have raised helpful reservations about my speculations.

Theologians Philip Hefner and Ralph Wendell Burhoe pointed out that I was too preoccupied with lateralization and ignored other levels of brain activity reflective of emergent evolutionary developments. Further, Hefner (1985) pointed to my ascribing an “unquestioning normativeness . . . to Ricoeur’s typology of manifestation and proclamation.” I failed to give attention to the phenomenology of religion. I needed also to give more attention to philosophical and theological assumptions. The two modes of consciousness did not resolve dualism; they only reinforced it. How could physical immanence and psychic transcendence be inseparable?

The effort to connect neuroscience explanation and religious understanding seemed to have run its course. At its best, the conversation about levels of complexity and types of analysis were clarified. These ranged from the organized regularities of neuroscience through the emerging features of mind to the purposeful patterns of theology. I took over the idea of making sense of God from John Bowker’s *The Sense of God: Sociological, Anthropological, and Psychological Approaches to the Origin of the Sense of God* (1973), recommended to me by Burhoe. I had to give more attention to the interrelated distinctions of empirical sense, of experiential sensibility, and of cognitive coherence. Each level has its own logic, its own language, and its own relevant data. At the same time a method of correlation must include both an analysis of similarity of forms and processes in an analogical analysis and a recognition of substantive differences and tensions in a metaphorical framing of issues.

Empiricizing My Interpretive Leaps. Graduate students made significant advances beyond using bimodal consciousness as an interpretive lens. Psychologist and theologian J. David Pierce (1986, 1989) empiricized my impressionistic hunches by translating the ways people (fifty-four male and fifty female, white, mainline seminarians) organized

their beliefs into analytic and impressionistic cognitive styles.

He used a multidimensional scaling technique called Individual Differences Scaling (INDSCAL). This preserved subjects' own phenomenological perspectives in response to a painting and a passage of scripture, each dealing with the same thematic material of Jesus in a storm with the disciples on the Sea of Galilee. He found three distinct cognitive dimensions resulting from a clustering of twelve representative phrases. The clusters accounted for 92 percent of the variance in similarity judgments. The dimensions were: (1) Blessing versus Cost of Discipleship, that is, a sense of peaceful light versus a test of faith; (2) Relational versus Instrumental (taking charge), that is, obedience to Christ versus attempting to stay in control; and (3) Human Efforts versus Divine Power, that is, the power of God in the storm versus crossing over to the other side. An interaction effect between gender and belief emerged. Students classified as liberal female used the Relational versus Instrumental and the Human Efforts versus Divine Power dimensions significantly *less* than the other students. In addition, male liberals used the Human Efforts versus Divine Power significantly *more*.

Pierce concluded that "the *nature* of the dimensions in this study provide strong support to the thesis that the metaphor of left and right brain processing strategies is relevant to the way that theologians perceive biblical material." In short, he corroborated the speculative analysis of the hermeneutics of proclamation being a left-half cognitive style and the phenomenology of manifestation being a right-half cognitive style.

Further, Pierce's data distinguished between the perceptions of women socialized in a male-dominated world and these struggling to experience and express a female way of knowing. The average male tends to organize reality in terms of polar contrasts—such as human effort or God's acting, a rational doing or a relational being, a redeeming God or a creating God, proclaiming what is right or manifesting what is real—contrary to what women naturally know and intuitively believe.

Psychotherapist Charlotte Smith (1989) wanted to know whether experienced and novice wakeful dreamers had different brain-wave patterns in responding to the task of guided imagery. Her sample consisted of thirty-two dreamers, half men and half women. Half of each gender group were experienced, and half were novice dreamers. EEG (electroencephalogram) differences were examined. The results suggested that "females processed their imaging experiences differently than males in both degree and location of brain wave amplitudes." Males processed in the frontal regions and conceptualized, females in the central regions and intuited.

These data support other data about sex- and gender-related differences. I speculate that late maturation of language, mostly in males, makes for hemisphere specialization and therefore contributes to conceptual and categorical distinctions, polarities, and dichotomies. Early maturation of language, mostly in females, makes for hemisphere bilaterality and therefore contributes to experiential integration and uncomfortableness with all kinds of contrasts that suggest dichotomies and dualism.

WHOLE-BRAIN FUNCTIONING. In addition to learning from students' empirical investigations, I began exploring evolutionary emergence on the one hand and philosophical and theological assumptions on the other. The more I searched, the clearer the focus became. The window to the soul—that which connects the meaning of life with the materiality of life—lay below consciousness and not in consciousness itself. I found myself returning to what I had learned in biofeedback, only with more knowledge and new appreciation.

The old mammalian brain, or emotional mind, monitors and manages our interaction with the environment. Arousal responses relate to survival, both physical and psychic; relaxation responses involve cooperating with the environment, again, physically and psychically. These limbic functions also lead to nurturing the well-being of others and assimilating what is either new or disconcerting into an ongoing sense of reality. I associate this whole-brain processing with a belief pattern of caring for the world. This is most apparent in all forms of prophetic theology—liberation, feminist, third world, political. The locus of the holy is the concrete tangible situation of people in response to specific pragmatic concerns for survival and significance.

Here in the old brain, then, are the components necessary for life. Here is the zone in which matter and meaning are transformed into each other. Interpretations trigger biochemical processes, even as biochemical processes generate interpretive perceptions. Here is our most specific link with the rest of the universe—with the whole-making reality of God.

Cognition, or consciousness, connects neuronal activity and cultural influences by mapping mental representations resulting from biochemical processes. Schema are derived from the rational interpretation of the dominant hemisphere; images are generated by the relational impressions of the nondominant hemisphere. Together, they create a cosmos, an orderly and ordering world of meaning. The mind does not "mirror" an objective reality. Rather, the mind combines visceral and subsymbolic processing to create a human world and to construct a physical environment.

The concept of mind enlarges the human significance of the brain. It does so by defining values and purposes, transcendent assertions and aspirations as attributes of the brain. These features of cognition and commitment reflect the universe in which we live and our interpretations of that universe. The dominant hemisphere's interpretation, based on the felt-meaning experienced by the nondominant hemisphere, is integrated at the limbic level and then evaluated for consistency by the collaboration of both hemispheres. This integration requires a fully functioning and mature corpus callosum, the fiber tract that passes information back and forth between the two halves of the brain.

In 1988, I pulled these further explorations together in a book entitled *The Brain and Belief: Faith in Light of Brain Research*. During the same period I edited two complementary volumes. The first was intended for applied knowledge: *Faith and Ministry in Light of the Double Brain* (1989). The essays explored various aspects of faith and practice by pastors, educators, and an artist as informed by what we are learning from brain research. The second was intended for basic knowledge in our growing appreciation of the human brain and its reaches: *Brain, Culture and the Human Spirit: Essays from an Emergent Evolutionary Perspective* (1993). These were classic contributions of Paul MacLean, Victor Turner, Eugene d'Aquili, Roger Sperry, Colwyn Trevarthen, and myself.

My Rediscovery of Soul. In 1989 I was invited by the Department of Spiritual Ministry of the National Institutes of Health in Bethesda, Maryland, to give the first memorial lecture for Leroy G. Kerney, who had guided the development of the department. In the course of talking about what I might say, reference was made to the issue of "a locus [in the brain] for the repose of the soul." Behind that request was the recent biomedical ethics committee's concern with the appropriateness of fetal transplant research. Questions had been raised about the locus of the soul—whether there was privileged tissue, a special place that was the seat of the soul and therefore inviolable. Instead of an abstract philosophical matter, this was a concrete issue of brain tissue and human meaning.

Only after I had been working on the lecture for several weeks did I remember that, in 1954, thirty-five years previously, Rollo May had directed me to research "The Functional Meaning of the Soul in the Christian Tradition" (Ashbrook 1958). He believed an affinity existed between "the capacity for self-conscious affirmation of [our] own being" and the classical meaning of "soul." At the time, as I have indicated above, I was more enthralled with intrapsychic and interpersonal processes. They were the real seat of human reality, or so I thought. Dreams, myths, and altered states of consciousness added experiential possibilities to the meaning of human life, but with little experimental-empirical anchoring.

In that invitation to speak at the National Institutes of Health I discovered that in all the years of my professional life of probing the psyche and befriending the self, I never realized what I have come to understand, namely, that I have been dealing with soul all the time. I explored the issue "Making Sense of Soul and Sabbath: Brain Processes and the Making of Meaning" (Ashbrook 1992). I linked soul and sabbath (rest and renewal) in the whole-brain processing of the making of meaning. Episodic working memory or autobiographical memory and the Basic Rest/Activity Cycle of 90 to 120 minutes, around the clock, combine to give us our sense of who we are. We take in from short-term experience that which makes sense of our long-term memory of meaning, thereby developing an integrating and adapting sense of self-and-species continuity.

Here, then, is the eternal cycle of creation and sabbath and the rhythmic activity of brain-mind states: work, rest, reorganization, and integration. The coordinating center lies in the upper regions of the reptilian brain, with its instinctual and attention-arousing mind; the reorganizing integration comes in the old mammalian brain with its emotional meaning-making mind. The older brain-mind connects us with other mammals, with nature itself, and, in faith, with God. The results of cultural historical activity are taken in by the neocortex, the new brain-mind. We are ever making sense of our senses by conceiving and saying what they mean. In short, autobiographical memory is adaptive to an ever-changing scene. For life to be meaningful, we need to be able to remember. Without memory, we are without meaning.

So, I suggest that working memory is synonymous with soul. Soul is that centering, whole-making activity of the brain-mind. Without soul, we are not ourselves. Sabbath rest and reorganization are built into our very being. The basic cycle of rest/synthesis/activity is the means we have for the making of meaning, and meaning-making is the making of soul. I have developed these ideas in an applied book on *Minding the Soul: Pastoral Counseling as Remembering* (1996).

AN EMERGING AGENDA

Work in progress holds promise of future directions. Some of this is sketchy; some of it is already fleshing out possibilities of interdisciplinary developments. These include the human relatedness of religion, cross-cultural variations, and sensory processes and spirituality.

One student has characterized my work as theology and neuroscience sharing

some great similarities. Theology is concerned with making sense of God as God is experienced through scripture, history, worship, and so on. Research on the brain indicates that one of its chief functions is to make sense of an overwhelming

environment so that the human organism can adapt and cope. In effect, the brain is an almost inherently theological organism. Thus, understanding empirically how the brain makes sense of the environment in which we exist can inform how theology is done.

This is an accurate description of my thinking up to the present. However, I am coming to qualify this further. Much, if not all, of the above points to the human brain as a *humanizing* brain. This phrase was suggested to me by humanities professor Rachel M. Caldwell. The human brain develops in an active receptivity to the presence and impact of other human beings. In short, attachment and aspiration go together.

Developments in the neurosciences are specifying ever more precisely what attachment means for human life. There is the neural core of chemistry, anatomy, and functioning of human motivation, themes developed by psychologist Colwyn Trevarthen, among others. The core brain is hard-wired for intentional attention to faces and places. Our instinctive motor patterns are to act on our curiosity about people as well as things. Instead of randomness, such selectivity is primary. Neurochemical activity consists of quick-acting excitatory/inhibitory ionotropic agents acetylcholine and noradrenalin and of slow-acting metabotropic regulators serotonin and dopamine.

In summary, the primitive and core brain focuses our attention. The old mammalian brain involves the psychosocial processes of belonging and connectedness and of owning and differentiating. The highest level of complexity, the neocortex, is the locus of conscious cognition and conceptual coherence or interpretive integration. Because of our genetic capacity for empathy and attunement, we are object-seeking; because of our capacity for cognitive organization, we are makers of meaning.

I insist that these twin aspects of meaning-making and object-seeking represent the reality of religion. Religious understanding in its unconscious roots suggests there is "more" to God than rationalization of feelings. In the conscious reaches of religious understanding there is the "more" of imagination and mystery. With such a background of knowledge and understanding I link the cry for the other, including the cry for God, and the biocultural womb of human development (Ashbrook 1994).

Meaning-making arises from the basic experience of separation from a loved object, suffered by all mammals, and, in general terms, from the experienced gap between ourselves and our environment. We fill this gap with transitional objects and symbols that reassure us of a basic continuity in ourselves and in the world. These objects and symbols serve the neurognostic cognitive function of demonstrating what the world is like and what we need to know.

Thus, we live by faith, as manifested in our pattern-making capacity, and not by literal sight. Our humanizing brains make our universe real. As T. S. Eliot expressed the questioning that ends in commitment in his *Four Quartets*:

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.

Such is my experience and my exploration.

NOTE

1. This was the title of an article that appeared in *The Seminary Times*, Late Fall, 1988. It has been substantially revised and expanded for this profile.

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