

TOWARD A NEW CREATION OF BEING

by James B. Ashbrook

Abstract. The author traces the path from split brains to basic beliefs by linking the deautomatized pattern of spiritual masters, as reported in Rorschach protocols, with subsymbolic, parallel, distributed processing. The older brain structures constitute humanity's common heritage, while the new brain constitutes particular cultural heritages. Expanding levels of complexity move from the limbic system through cognitive left-mind vigilance and right-mind responsiveness to belief patterns of proclamation and manifestation to the world-integrating mysticism of limbic input and the world-fulfilling action of the new brain. Whole brain activity combines emotional meaning and propositional explanation. Analogically speaking, the brain provides clues to understanding God. A dialectical theology parallels the reciprocal integration of brain processes. Whole brain belief originates in the old brain's evolutionary adaptation to our genetic inheritance and in the new brain's conscious intention to fulfill the will of God through our cultural inheritances.

Keywords : belief patterns; brain; consciousness; evolutionary adaptation; God; spiritual masters.

*Now I am revealing new things to you,
things hidden and unknown to you,
created just now, at this very moment,
of these things you have heard nothing until now,
so that you cannot say, "Oh yes, I knew all this."*

—Isaiah 48 : 6-7 JB

In an intriguing study of the Rorschach projective test of emotional and intellectual functioning, Diane Jonte-Pace (1987) presented protocols of three advanced spiritual masters—a Hindu Vedantist, Swami Sivanande; an Apache shaman, Black Eyes; and an enlightened Buddhist “master.”

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Herman Rorschach had discovered that the ambiguous sensory stimuli of his inkblots enabled him to infer and measure the relationship between the structure of their perception and the structure of their personality (see Schachtel 1966). Perceptual responses are evaluated according to two major groupings: location scores, which include whole, detail, or small detail responses; and determinant scores, which include form, color, movement, or shading. The protocols were decisively different and yet remarkably similar.

They differed in content. Each interpreted the cards in a way which reflected the ultimate concerns of his particular culture: the Swami saw the oneness of everything, the Buddhist the suffering in everything, and Black Eyes the life force in nature and the cycle of seasons. These responses came in an integrated, sequential, and systematic way as each subsumed his individual identity to that of his spiritual and cultural identity. These integrated protocols showed "no universalism of response" (Jonte-Pace 1987), which is not surprising in terms of what we know of the shaping of the brain by the impact of culture. Culture provides the means by which we perceive, represent, and interpret experience.

However, the masters were remarkably similar in the way they dealt with the cards—in their style of response and in various perceptual determinants. Under conventional Rorschach interpretations each of the masters exhibited responses which would be scored as pathological. These parallel patterns involved (1) an "unusually high shading responsiveness"—such as "diffuse cloudiness"—suggesting that one is "at the mercy of the environment"; (2) "amorphous form responsiveness"—which fails to perceive in a way that objectifies the field into definite objects and patterns—suggesting that one has lost a sense of boundaries and is manifesting signs of depression and anxiety; and (3) "(with certain exceptions) inanimate movement responsiveness," suggestive of "infantile intrapsychic tension" and/or "hostile and uncontrollable impulses." In short, from a psychological, and therefore normative, point of view each of the protocols reflected a disintegrated and disintegrating personality pattern (Jonte-Pace 1987).

Jonte-Pace put the protocols into what she termed "a spiritual rather than a psychological context." In a spiritual context the responses of shading, amorphous form, and inanimate movement take on different meaning. She identifies these determinants as mystical, namely: "reality is in constant flux; self-environment boundaries are blurred; and the experience of nothingness or groundlessness is common" (Jonte-Pace 1987). In spiritual experience, ordinary perception is deautomatized and then resymbolized primarily in terms which the particular culture has used to interpret and explain the cosmos.

While the data she reports are limited, the implications are suggestive. I link that deautomatized pattern of the spiritual masters to what is now being identified in explorations of the microstructure of cognition as subsymbolic parallel, distributed processing (Rumelhart et al. [1986] 1987). In effect, our older brain constitutes our common heritage, that which we share with every person regardless of culture, class, race, or gender. That older brain also connects us with other mammals, with other organisms, with every part of the physical universe.

Our newer brain constitutes our particular heritage, that which we share with some other mammals and which distinguishes us from all other organisms. Instincts and intuitions call forth consciousness and call for articulation. We cannot *not* interpret what we observe. The nonconscious mind attends to maintaining an inner equilibrium and our conscious mind attends to developing an outer rationale. We give voice to what we experience.

Most people tend to rely upon or prefer various parts of the whole more than utilizing the whole itself. That has led to the popular characterization of “right-brained people in a left-brained world” or “left-brained people in a right-brained world,” depending upon the particular values a person espouses. Whether we use brain processes or belief patterns to understand and interpret our experience, we need all our brains and the God of us all.

PUTTING THE PIECES TOGETHER

In 1952, Paul MacLean proposed that the frontal lobes of the two hemispheres are “the seat of the highest human faculties, such as foresight and concern for the consequences and meaning of events.” But he went on to suggest that the new brain—with its two hemispheres—may have these functions of conscious intentionality and assessment “by virtue of intimate connections between the frontal lobes and the limbic system” (quoted by Konner [1982] 1983, 147).

The years since then are proving MacLean correct. The limbic level does have extensive and intricate projections into the neocortex (MacLean 1985). Emotional meaning and propositional explanation combine. The head directs our destiny even as it is out of the heart that our destiny is decided. The neocortex acts in accordance with what the older cortex determines to be necessary for the long-term survival of humanity.

Figure 1 shows the connections between the brain and belief. I think of this as an expanding circle of complexity. At each level we find an integration of complementary processes, from the inner core representing the limbic system to the outer circle suggestive of the cosmos itself.

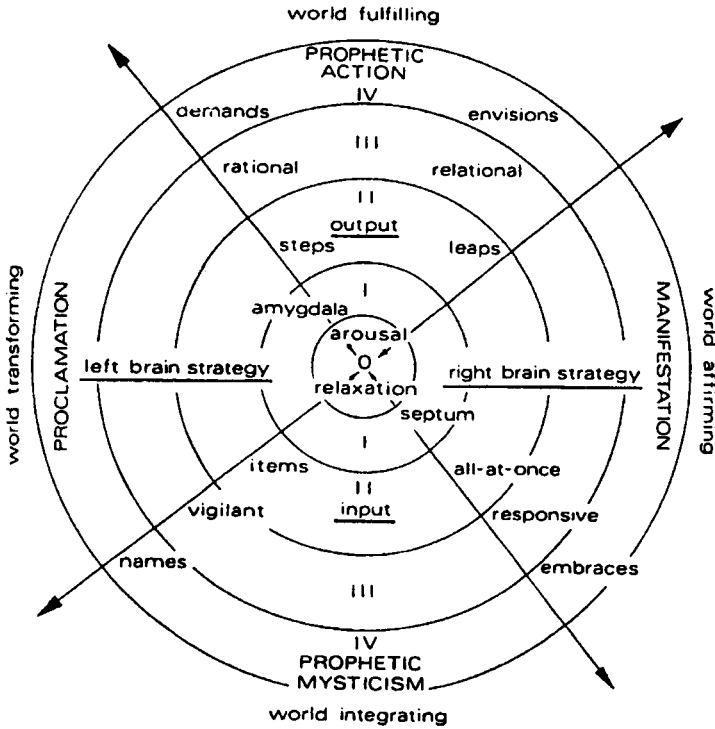


Fig. 1. Circle continuum of complexity of consciousness

1. In the limbic system is the integrated action of arousal in the amygdala and relaxation in the septum.¹
2. Conscious life extends outward by means of left brain item-by-item and step-by-step processes and right brain processes of all-at-once and leaps of imagination.
3. In the next circle are found the cognitive representations in left mind vigilant rationality and right mind responsive relationality.
4. These mental processes move outward into patterns of belief which name and demand (analyze) in proclamation and which embrace (immerse) and envision in manifestation.
5. And finally, in the emerging, evolving, rippling of what matters most in this human cosmos we find the world-integrating mysticism of limbic input and the world-fulfilling action of the new brain. The godlike brain calls us forth as creatures “made in the image and likeness of God” and entrusts us with the care of the created order of which we are a part (Gen. 1:26–27).

That rippling effect of differentiated reciprocity implies these features are parallel at each level of analysis. From the autonomic nervous system to cultural systems of belief I have placed arrows moving back and forth from arousal-to-amygdala-to-items-to-vigilant-to-names and from relaxation-to-septum-to-leaps-to-relational-to-envisions as a way of suggesting our destiny is grounded in our origin. The whole brain is needed for full human activity.

That rippling outward into the human cosmos paradoxically reaches into evolutionary adaptation. The transcendent emerges in two ways: (1) upward in ever-more-complex levels of organization of the new brain, and (2) downward in the subcortical integration of the old brain. In the language of the mystical tradition, the inward is outward and the outward is inward. For in God, there is neither outer nor inner. There is only God and all that is therein.

Early Renaissance theologian Nicholas of Cusa (1401?–64) insisted that God is to be known only “beyond the coincidence of contradictories . . . and nowhere this side thereof” (Cusa 1928, 44). God is not one of the poles of any pair of opposites (Robinson 1967, 139–40)—not amygdalar tension or septal relaxation, not left mind logic or right mind intuition, not proclamation or manifestation, not outer or inner, not matter or meaning. As Augustine put the issue of the whole being more than the parts themselves: “Neither art thou [Oh God] the mind itself. For thou art the Lord God of the mind” (Augustine 1955, bk. 10, sec. 25, li. 223).

I use the brain as both a metaphor for God and an analogy of God. As a metaphor, the brain is not God. Despite their dissimilarity, they inform each other. As an analogy, the brain connects us to God. Despite the similarity in their structure and function, the two realities are distinguishable. When we think of the brain as an analogical metaphor for God, God is not reduced to left brain rationality. That would lead only to an atheistic denial of mystery. Nor is God contained in a right brain relationality. That would result only in a pantheistic engulfing by mystery. The reciprocity nature of the brain—at every level of organization—suggests a reciprocity nature in God.

This idea of reciprocity within the brain and within God is close to the “dialectical theism” expounded by theologian John Macquarrie. It is quite unlike the static rationality of classical theology. Macquarrie’s special “logic of the infinite” discloses a “dialectic of opposites” (Macquarrie [1984] 1987), after the pattern of Nicholas. As Cusa stated: “God embraces everything, even contradictions” (quoted by Macquarrie [1984] 1987, 99). Thus God is characterized with a mosaic of contradictions—being and nothing, the one and the many, knowable and incomprehensible, transcendent and immanent, unaffected and affected by the

world, eternal and temporal. But the idea of God is "an interpretative concept, meant to give us a way of understanding the relating to reality as a whole" (Macquarrie [1984] 1987, 29). In that respect the dialectic between contradictions is an organic view of reality. Everything is affected by everything and affects everything (Macquarrie [1984] 1987, 109).

The dialectical pattern between one feature and another appears similar to the reciprocal integration of brain processes. The whole is a unity and the parts reveal an internal relatedness. In the brain we can distinguish rapid beta waves from slow alpha waves, yet these are held together and integrated by the brain as a functioning whole. Just as the concept of brain gives us a way of understanding and relating to the whole of what we know, so the concept God serves a similar interpretive focus. Each idea provides coherence and accords with experience.

In the metaphor of the Nasrudin story about which is more important, the sun or the moon, neither is more important (Shah [1964, 1967] 1976, 76). Moon and sun are parts of the solar system. In fact, no moon, no solar system; no sun, no solar system. Neither amygdala nor septum is more important. Nor is a vigilant logic less important than a responsive intuition. Every part plays a part and every part is necessary to the whole and for the whole.

Consciousness comes with the development of the neocortex. However, we must intend—or choose—to be what we are. At the level of our embeddedness in nature our nonconscious minds—reptilian and mammalian—make us be what we are in the long evolutionary scheme of things. At the level of our emergence into culture our conscious mind—neocortex—demands that we become what we are in the midst of the history which is ours. We make sense of our sensibilities by the making of meaning. Interpretations must fit with intuition and instinct. And that fit requires that we fulfill our cultural inheritances by integrating these with our genetic inheritance.

Under normal circumstances each mind acts with the whole brain involved. No matter which strategy we choose, or which hemisphere takes the lead over the other, full consciousness is present. Sometimes we rely only on one strategy or even one representational system, such as hearing or seeing. At other times we use the alternate strategy and additional representational systems, such as sensing and smelling. Except under conditions of impairment or stress, we draw upon input from all parts of the brain.

Language reflects a translation of subsymbolic (parallel distributed) processing into symbolic (sequential abstract) codes of communication. These re-presentations from sensory perception into symbolic expression constitute maps of reality. They are not reality itself (Bandler and

Grinder 1975; Grinder and Bandler 1976). In the transformation of subsidiary awareness into images and on into symbols and concepts, the brain reduces a vast amount of information to simpler data. It organizes what it knows into manageable form. The conscious mind lives according to its map instead of the territory.

In the desert experience—withdrawal from society—or in the experience of being a stranger, our maps no longer help. We have given up or lost the bearings which come with our being creatures of habit. We cannot depend upon the habits in which we are so practiced. Under these conditions the left brain is useless and the right brain takes the lead.

In desertlike experiences, if we have chosen to destructure our everyday life, then the withdrawal becomes an experience of freshness—freedom from the constraints of ordinary left brain time and space.

In stress, if we are thrust into an uncertain context, then the loss of orientation turns into a nightmare of anxiety—an overload of input which can result in a runaway limbic system unable to maintain its equilibrium.

Situations of excitement or anxiety often evoke an encounter with God. In terms of brain process, coming upon or finding God involves that other part of ourselves which is waiting or wanting to be found so as to become a part of something more than itself. That other part most likely means participation in the life of the whole—a septal relaxation of survival reactions. For individuals who have identified themselves too closely with others, that other part waiting or wanting to be found requires a differentiating of themselves from others—an amygdalar arousal of self-awareness. In either instance—courage to be as a part of the whole or courage to be as oneself—we become freer than we were under the ordinary consciousness of our map of the way things are.

The whole brain engages all levels of brain organization, draws upon all sensory systems, and balances tension and relaxation in the service of optimal adaptation. In the metaphor of Pentecost, people hear and see and feel (Acts 2:1–4). As the spiritual masters modeled, their major sensory systems processed information with fresh perception. In the metaphor of the heavenly Jerusalem, every mind can lead us into the whole of reality (Rev. 21:12, 21, 25–26). There are twelve gates into New Reality, and in the injunction of Jesus, we are to love “with all our mind.” Godlike brains in a godlike world!

ASSESSING CONSCIOUS REALITY

That perspective of godlike brains enables us to view consciousness on a continuum. We range between a crippled and constricted use of the brain to a creative and expanded use. While we tend to exhibit a

dominant pattern of brain activity, we also give evidence of significant and fluctuating variation (Ashbrook 1984, 85–91).

At the regressive end of the continuum of consciousness our minds are deficient or disturbed. Under these conditions we use only one part of the circle of consciousness. Just as drowsiness or drunkenness or anxiety makes it difficult to sustain attention, so our use of one strategy or one sensory system leaves us with inadequate or conflicting information.

At the creative end of the continuum of consciousness our minds—like the spiritual masters—combine subsymbolic and symbolic processing in a differentiated, integrated, and synergistic way. Ordinary life is transformed. Here we find paradigm shifts, for instance when Martin Luther insisted that Scripture was more important than tradition or when the theory of quantum physics went beyond Newtonian physics.

Between regression and creativity we function in a more ordinary everyday way. Here the various processes of brain and belief supplement each other, depending upon the nature of the task. Adequate functioning requires the whole brain.

Yet the evidence suggests a reciprocity of components and a division of labor. Under normal conditions, one hemisphere takes the lead over the other. It responds milliseconds faster, depending upon perception of the nature of the task (Levy and Trevarthen 1976). Further, when one half is activated, the other is suspended (Galín [1976] 1977, 42–45; Galín and Ornstein 1972). In activity triggered by a rational strategy, the left brain shows active beta and the right, quiet alpha. Conversely, in activity triggered by a relational strategy, the right brain shows active beta and the left quiet alpha. When one side is “on,” the other side is “off.”

In split brain operations the cutting of the corpus callosum showed what happens when the two halves do not communicate. The fewer the connections, the greater the confusion. The operation put people “more at the mercy of uncontrollable surges of hemispheric preponderance and to that extent [they are] handicapped in [their] ability to select strategies to fit a given situation.” Patients were left with “an extreme and rigid right or left hemisphere approach” (Kinsbourne and Smith 1974, 288–89).

Neuroscientist Michael Gazzaniga described pitching horseshoes with a split brain patient (Gazzaniga 1970, 107). In the midst of their match, the patient’s right hemisphere—the emotional reactive half—suffered an electrical explosion. It reacted with violence. With his left hand he grabbed an ax lying on the ground and started after Gazzaniga.

Gazzaniga ran, realizing that was not the moment to explain the complexity of brain function. The patient, however, grabbed his own left wrist with his right hand. His left hemisphere, unaffected by the seizure,

acted to restrain the other side. A battle ensued—right hand restraint versus left hand fury.

The account dramatizes conflicting input. We all experience moments of confusion. Each hemisphere processes different information. Like Saint Paul, we do not understand our own actions, for we experience ourselves wanting to act one way and find ourselves acting the opposite (Rom. 7:15–17). What the operation accomplished structurally in disconnecting the two halves, anxiety and stress accomplish functionally. Information from the two hemispheres becomes fragmented and conflicting, inadequate and misleading.

I think of such conflict as a lack of synchronization between the survival mechanism of the amygdala and the sharing mechanism of the septum. The imbalance results in a desperate attempt by the interpreting left brain to make sense of information which is discordant at the sub-cortical level. Thinking is impaired; memory is disturbed; attention is too narrow or too broad; the immune system is disrupted (Gazzaniga 1988, 196–210; Ornstein and Sobel, 1987; Rossi 1986, 57–67; Selye 1976).

This is especially poignant for people who have been abused as children—sexually, physically, emotionally—or suffer severe stress resulting in post-traumatic syndromes. Symptoms include (1) psychic numbing, (2) intrusive recollections of the traumatic events, and (3) a hypervigilance and lateralization of left hemisphere activity (Brende 1982). Recovery requires the establishment of a stable and trusting relationship which gradually allows a more integrated balancing of threatening and relaxing input (Brende and McCann 1984).

At the conscious level, information says everything is “all right,” which activates septal relaxation, and at the emotional level information says everything is “all wrong,” which activates amygdalar arousal. The confusion makes for psychic uncertainty and biological disturbance. A person cannot trust one’s own experience. One oscillates between approaching the situation and avoiding it. The limbic system’s consolidating attention, emotion, learning, and memory are in a runaway condition, unable successfully to mediate between the outer world and the inner world.

The hippocampus transfers information from short-term memory into long-term memory (Gazzaniga 1988, 204). We can chart the course of such transfer by attending to our pattern of sleeping and dreaming (Winson [1985] 1986). Rapid eye movement sleep (REM) is the condition which occurs about every 90 to 120 minutes, three or four times a night. In this condition of suspended animation we experience our most vivid and bizarre dreams. Under our eyelids our eyes move as though we are watching a movie. Because this imaging process appears central to

memory, survival, and transforming new experience into familiar experience, infants have the largest ratio of REM sleep and elderly people the lowest ratio. Every significant change in a person's routine will activate REM sleep.

I infer from this evidence that creative consciousness requires (1) an encounter with novel events, and (2) the incorporative process of REM sleep. We combine something unfamiliar with what is old to create an unexpected-though-recognizable reality. The process of assimilating emotionally powerful new experience seems to take about three years (Winson [1985] 1986), even under the best of circumstances. That is why people find it takes three to four years to assimilate major changes in their lives—be they death, divorce, moves, or successes. The increase in REM sleep, reflecting novel input, and the appearance of nightmares, reflecting disturbed input, are understandable mechanisms.

Genuine integration, it seems, is more subcortical than cortical. The pattern-making right brain and the interpretive left brain collaborate in putting together information which is visceral and visual—what Polanyi (1966) referred to as “the tacit dimension” of subsidiary awareness. But the consolidated memory comes only with a balance in the limbic system. We cannot will the integration; we can only attend to the process of information assimilation. Integration comes in the old brain, not the new brain.

We are conscious of discrepant information whenever we cannot make sense of situations. Logical explanations do not help. Choices are inadequate as well as inconceivable. Under these circumstances most of us give up, only to discover that after a night's sleep or a time out, a solution comes to us. Under extreme stress people sometimes “hear” a voice or “see” a vision which resolves the dilemma. Since life is on the side of life, such resolutions are adaptive. If we can relax, our subsymbolic image processing produces a resolution—what can be viewed as a higher-order synthesis.

The key to full consciousness is the whole circle of consciousness, from the subsymbolic system to the symbolic system of the culture. The rippling consequences are always emergent and never stereotyped. We possess godlike brains because we live in a godlike reality.

Some interpreters of full consciousness argue for a “multimind” (Ornstein 1986), “the social brain” (Gazzaniga 1985), or a “society of mind” made up of ever-smaller agents which themselves are mindless (Minsky [1985] 1986). I agree with these views of variability in the brain. They help substantiate the viability of many “frames of mind,” to use the language of cognitive psychology (Gardner 1983), or encourage Christian tolerance, to use the language of Pauline theology (Jewett 1982). With a full flow of information the cooperative, balancing strategies of

left and right minds and new mind/old brain “combine to program a unitary pattern of behavior” (Kinsbourne 1982). People use whatever works best in the situation in which they find themselves. Every response draws upon the whole brain.

From a theological point of view, the uttered word of proclamation requires the renewing power of presence if that explanatory vigilance is not to become merely “abstract and cerebral” (Ricoeur 1978). For those of us in the Christian tradition, only the incarnation, as Ricoeur put it, “ceaselessly reinterpreted gives this word something to say.” That “something” is addressed to “our imagination and our heart” as well as to “our understanding and will . . . in short, to the whole human being” (Ricoeur 1978, 35).

In prophetic mysticism and prophetic action, saving the world by transforming the world is integrated into evolutionary adaptive behavior. In parallel fashion, savoring the world by affirming the world is fulfilled in our being part of the whole family of humanity. Caring for the world thereby expresses both saving and savoring in concrete historical situations.

SUMMARY

The path from split brains to basic beliefs is both simple and complex. It is simple in that there is a continuity, a pattern of parallel processing from lower to higher levels of life (table 1). These all function on behalf of persons-in-community. There is no one way to be whole minded. For that we need humanity itself: many minds, many hearts; living in one universe, on one earth, as one family. The issue of the brain is never an individual matter. No brain is godlike in itself.

Whole brain belief originates in the old brain’s evolutionary adaptation to our genetic inheritance and in the new brain’s conscious intention to fulfill the will of God through our cultural inheritance. That mystical connection with the physical universe directs our action in the immediate contexts in which we live and move and have our being. We identify the oppressive forces in culture—a left brain transforming the world by naming and analyzing the truth of what is. We simultaneously engage the liberating power in the world—a right brain affirming the world by immersion in a concrete context and imagining “a new heaven and a new earth.”

From a theological perspective no one is “created in the image and likeness of God,” complete in oneself. According to Gen. 1:26–28, generic humanity is plural—“them”—“male and female” (Bird 1981; 1988). No one carries the whole image of God. We need each other. By ourselves we are only a half-begotten image of God.

Table 1
 Organization, Brain, Mind, and Belief

Level of Analysis, Discourse Domain, & Universe of Influence	Left Brain Active Process	Right Brain Receptive Process
0. autonomic nervous system	arousal (ergotropic) sympathetic system	relaxation (trophotropic) parasympathetic system
1. limbic system	amygdala	septum
2. hemisphere process	item-by-item step-by-step	all-at-once leaps of imagination
3. mind activity	vigilant-rational	responsive-relational
4. belief pattern	proclaims by naming & analyzing prophetic mysticism (within the self) prophetic action (in society)	manifests by embracing & envisioning
5. synergistic	world transforming world integrating world fulfilling	world affirming

From a neuroscience perspective there is no such thing as the brain. There are only individual brains. Each brain bears its own marks of meaning, its own evolved network of synaptic transactions which make for unique perceptual realities. Every cognitive category is the imaginative construction of visceral and visual perceptions. Cultural expressions consist of prototypical exemplars of shared meaning, not propositional

and substantial entities of eternal truth. By ourselves we are only one brain among many brains.

My point is simple: each of us has a brain unique to her or himself. Yet each brain links us to the universe. Not the brain but brains. Not “the image of God” in individuals but only in humanity, only in male-and-female, only in *Homo sapiens*.

This is as systemic and intricate as the story of Nasrudin supposedly arguing that the moon is more important than the sun because “at night we need the light more.” Not physical or mental, not body or mind, not brain or belief but only every part in an indivisible reality of making the whole meaningful.

We ignore the brain’s uniqueness to our peril.

We believe in God’s graciousness for the possibility of our becoming the genuinely human beings that we are born to be.

Neuroscientist Candice Pert pioneered in identifying opiate receptors which mediate altered states of consciousness and the brain’s natural pain relievers (Hooper and Teresi [1986] 76–80, 83–85, 88–92, 101–2). Molecules and mystical states are one reality—the biological brain and the cognitive mind, the old brain and the new mind, neither higher nor lower, better nor worse, more important nor less important. When asked whether she felt any sense of awe about the universe as Einstein had expressed when contemplating the laws of the universe, she said:

No, I don’t feel an awe for the brain. I feel an awe for God. I see in the brain all the beauty of the universe and its order—constant signs of God’s presence. I’m learning that the brain obeys all the physical laws of the universe. It’s not anything special. And yet it’s the most special thing in the universe. (Hooper and Teresi [1986], 1987, 390)

The beginning of the brain and belief is ever an act of faith, a sense of awe for God. So the fulfillment of the brain and belief is ever an expression of sensibility, an orderliness which is “not anything special” and yet is “the most special thing in the universe.”

After my sabbatical lecture, “Can the Brain Speak of God?” and an evening’s discussion with faculty colleagues, Professor Larry G. Murphy sent me a copy of a traditional Pygmy hymn which reminded him of the event. I close with it because it sings the hymn that I would sing:

In the beginning was God,
Today is God,
Tomorrow will be God.
Who can make an image of God?
He has no body.
He is as a word which comes out of your mouth.
That word! It is no more,
It is past, and still it lives!
So is God.

NOTE

1. I have not dealt with the biological framework in terms of the neurotransmitter systems which subserve each sphere of consciousness and the coordinating system which holds the hemispheres in a common process. Three of these systems appear to be particularly distinctive in that regard: (a) norepinephrine in relation to the nondominant (right) hemisphere, (b) dopamine in relation to the dominant (left) hemisphere, and (c) serotonin in relation to interhemispheric (corpus callosum collaboration) activity. For an extended description and analysis see Harris (1986). A more easily understood analysis of cognitive and biochemical communication can be found in Rossi (1986) and in Ornstein and Sobel (1987). In developing the new language of mind-body communication, Rossi explains the autonomic nervous system, the endocrine system, the immune system, and the neuropeptide system and how we can access each and the influence of each on our health and well-being.

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