

MAKING SENSE OF SOUL AND SABBATH: BRAIN PROCESSES AND THE MAKING OF MEANING

by James B. Ashbrook

Abstract. Making sense of soul and Sabbath necessitates understanding these phenomena experientially and then suggesting “biochemical” or empirical analogues. *Soul*, which is defined as the core or essence of a person (or group), includes a working memory of personally purposeful behavior. The states of the soul are reflected in the states of the mind and their physiological correlates—the states of the brain. Such uniqueness appears similar to the biblical cycle of creation-Sabbath-consciousness and its analogue in the biorhythm of brain-mind—that is, waking and work, sleeping and rest, dreaming (rapid eye movement [REM]) and the reorganization-integration process that is ever making sense of our senses by synthesizing what they mean to us. Working memory and biorhythm, therefore, are crucial for the making of meaning, and meaning is the making of soul.

Keywords: biorhythm; brain-mind; memory; REM sleep; Sabbath; soul.

The word *soul* conjures up mixed meanings. In our day, attention to and celebration of “the black experience”—its expressiveness and rhythmicity, its spontaneity and emotionality, as well as its stress-reducing contribution to survival—have brought *soul* back into widespread usage (DuBois [1953, 1961] 1968; Pasteur and Toldson 1982). *Soul* has inspired people by expressing spiritual longing as well as by being the vehicle of cultural and political rhetoric, affirming the integrity of a group and awakening the hopes of those who have

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been oppressed. As a scientific concern, however, it passed from the scene centuries ago. Most scientists have dismissed the concept of an immaterial soul in order to deal with actual conditions of living (Kolb and Whishaw [1980] 1985, 304; Bergland [1985] 1988, 139; Churchland 1986).

What can be made of this simultaneous resurgence and rejection of soul? Is soul primarily a mystical quality of spirit—an elusive essence of a person or group? Is soul primarily a material feature of life—a specific bit of tissue or a literal continuation of oxygen intake? Or is soul merely folk psychology carried over from a prescientific past?

I suggest that recent advances in the neurosciences and in empirical theology enable us to move beyond such mixed reactions to an understanding that informs both domains of discourse. Simply put: *From an experiential view the state of the soul is reflected in the conscious experience of the states of the mind, and from an empirical view it has its physiological correlates in the states of the brain.* This paper will explore this intersecting of the experiential and the empirical.

An anecdote and an experience focus my speculation.

First the anecdote. It comes out of Africa. During the last century a caravan of traders had been pushing their porters hard. Eventually, the porters stopped; efforts to keep going failed; and the traders demanded to know what was wrong. The Africans explained: “We have been traveling so long and so fast that we need to wait for our souls to catch up with our bodies.”

Now the experience. Everyone who travels by air has suffered from “jet lag.” After crossing two or three time zones one is groggy, out of sorts, not oneself. Too far and too fast upset one’s entire biopsychological system. Thus I suggest that jet lag is an empirical equivalent of the cultural expression “wait for our souls to catch up with our bodies.”

It is the phenomenon of getting and keeping ourselves together—body and soul—that I examine. The meaning of *soul* points to the heart of our being the human beings that we are. We experience the loss of soul, or self, in a loved one’s inability to care for herself, say, because of Alzheimer’s disease. We sense the loss of soul in those who are confused about themselves. We know the resurgence of soul in those who fight to be members of the human community, as symbolized in the tearing down of the Berlin Wall, after having been denied full participation in society.

I therefore advance two interconnected speculations: First, as the essential structuring of our unique individuality, soul requires “sabbathing” for its coherent vitality; and second, as the periodic

recognition of a natural context of our origin and responsibility, sabbathing is found in the brain's biorhythms in which we alternate between periods of accommodation and assimilation. When our body optimizes its cycling of engagement and withdrawal, we experience life as meaningful at the psychic and spiritual level; and at the physical and evolutionary level, we function as integrated and adaptive organisms. Because we are creatures whose essence involves the making of meaning, the biorhythms of sabbathing and remembering are the means by which soul makes its story viable.

This, then, is an overview. I begin with soul and memory and then turn to Sabbath and biorhythms.

TO WHAT MIGHT SOUL REFER?

Anne Harrington opens her *Medicine, Mind, and the Double Brain: A Study in Nineteenth Century Thought* (1987) by stating: "The Double Brain began its history, not so much as a scientific or medical problem but as a theological one." The earliest physiologists, and later Descartes, sought to find a unitary organ in the body that would correspond to "the indivisible unity of the ruling conscious self." Thus the pineal gland became "the site of the soul's interaction with the body." The body was assumed to be passive, while the soul was active and thereby outside of nature (Harrington 1987, 6-7).

What began in theology as a search for active, integrating, unitary coherence passed into the neurosciences—from the philosophical to the empirical. Today, however, we are recovering the centrality of subjective experience—of active, integrating, unitary, coherent consciousness (Sperry 1990; Barrett 1986). What has been separated for centuries—namely, body and soul—is emerging as a new reality because of the explosion of activity in the neurosciences.

Soul is not a "thing" but the core of experienced reality. Molecular biologists, according to brain researcher Richard Bergland ([1985] 1988, 139), are discovering that the molecules that "give life to the soul and guidance to the mind" are in each and every cell of our body. As philosopher Holmes Rolston III puts it, "The whole organic program is inlaid into nearly every cell" (1987, 85). These scientific descriptions are matched by Paul Tillich's theological conviction that "we are totally present in every cell of our body. You cannot have a 'soul'—or whatever you call it—without a body" (Ashbrook 1988, 145).

If soul is not a "thing"—a specific entity with definite features and distinct boundaries—then we can only think of soul as a process or an experience. But what might it mean for soul to be the core of

experienced reality? To ask to what process might soul refer shifts the focus from an assumed realm of Platonic essences—a dualistic split between an immortal soul and a mortal body. To inquire about the reality of experience—a stabilized image of self-world interaction—is to explore that which is most immediate and meaningful, namely, our experience of ourselves and our life in this universe. Soul expresses “meaning,” and the making of meaning depends upon memory.

In 1953 a twenty-nine-year-old man (with the initials H. M.) was operated on in a final attempt to relieve the effects of severe epileptic seizures (Scoville and Milner 1957). The procedure involved cutting some of the connecting neural pathways between the frontal lobes and the old mammalian brain, more particularly the amygdala and almost all of the hippocampus. Although the amygdala “plays as large a part in memory as the hippocampus” (Mishkin and Appenzeller 1987, 4), without the hippocampus, newly processed information is not “stored in an enduring and useful form” (Squire 1987, 194; Lynch and Baudry 1988).

H. M.’s seizures stopped; so too did his memory. He continues to remember remote events, those up to three years before the operation. But his memory of events during the three years prior to the operation appears to be vague and unreliable. Since the operation, he remembers nothing. Even though he can learn new tasks—procedural memory—“he cannot remember new events” (Winson [1985] 1986, 12). Cognitive functions such as attention and perception, and general intellectual ability are not affected. Other patients, suffering from the disorder of amnesia, show the same pattern.

I contend that meaning and the making of meaning depend upon long-term personalized memory. “The term memory, and the still broader term neural plasticity, encompass an enormous variety of phenomena,” according to neuropsychologist Larry Squire. “Survival of species is obviously advantaged not only by the capacity for genetic variability but also by the capacity for adaptive accommodation to environmental change. This latter, nongenetic mode of change is ubiquitous in biological systems and arguably deserves the label memory when it can be shown to operate by integrating environmental information across time” (Squire 1983, 491), but memory is neither a single phenomenon nor a single process.

Memory involves incorporating highly organized and emotionally significant information into a sense of the continuity of reality (Winson [1985] 1986, 30–34, 201–2; Fox 1986). What is novel and uncertain gets our attention. With the amygdala serving the “gate-

keeping function” of “selective attention” between our senses and our emotions (Mishkin and Appenzeller 1987, 10), we select information, sort it, filter it, and perhaps take it in, depending on whether it is interesting and pleasurable or dangerous and painful. Then, unless the hippocampus computes that information, it cannot be “stored in an enduring and useful form” (Squire 1987, 194; Fox 1986, 35–37).

Memory has been divided into two types (Squire 1987, 162–63, 170): declarative memory, or what we can declare and bring to mind as an idea or an image, and procedural memory, which involves skills and other things that improve with experience. These two types differ in the kind of information stored, how that information is used, and which neural systems are involved. Procedural memory is more automatic and adapted to learning in small increases over time, whereas declarative memory is more cognitive and capable of immediate learning.

Declarative memory embraces both a short-term and a long-term stage (Squire 1987, 242). In addition, researchers distinguish between episodic or working memory and semantic or reference memory (Olton 1983). Working memory involves the specific personal context, while reference memory ignores the context in that it processes information that applies to many similar instances.

I am dealing here with working or episodic memory, the memory of meaning-making as the core of experienced reality. This memory refers exclusively to “autobiographical” remembering and ordinarily permits a sense of personal relation to that of which we are part (Squire 1987, 169, 173). Our view of what goes on is more constructed than photographic, an inside process that organizes and interprets outside information (Loftus and Yuille 1984, 168). This is memory for past events, events that are “specific and personally experienced” (Neisser 1988, 357). By storing and retrieving the cumulated events of our lives we develop individual histories, our own unique, self-repeating styles and stories that contribute to the emergence of models of self-world interactions. These stable internal images inherently resist conditioning and accommodation. Here are the continuities—yes, the essences—of whom we experience ourselves to be. Without working memory we lack soul. We become soul-less.

What we remember may not be accurate historically. Instead, it will be “narrative truth” (Spence 1982), truth that accurately reflects “some overall characteristic of the situation” (Neisser 1988, 365–66). Knowledge of ourselves appears to be a “by-product” of ordinary, everyday memories. These recollections give us our life themes and

sense of self (Barclay and DeCooke 1988, 91–92; see Barsalou 1988). A sense of coherence (Antonovsky 1987; Squire 1987, 223) and cohesion (Erikson 1968) is the result of our knowing our own life stories. Other people have access to these memories only to the degree they share our experience. Events that may seem isolated to them make sense for us “only because [these events] fit into a broader framework of self-knowledge” (Barclay and DeCooke 1988, 120).

Without working memory, nothing is personally meaningful. We have no unique identity. We have no sense of continuity. We lack a sense of self (Winograd 1988, 17). In truth we lose our soul—that basic structuring of our unique self-world interaction.

Working memory, and its consolidation (Weingartner and Parker 1984), appear to constitute the core or essence of a functioning person. Memory consolidation takes place “during memory retrieval as well as memory storage; that is, consolidation takes place when output is required in the same way as when input was established” (Spear and Mueller 1984, 116). Without the capacity for long-term memory we exist in the hell of an eternal present, a present without a future because it is a present without a recoverable past (Kolb and Whishaw [1980] 1985, 481–94).

The making of meaning requires purposeful behavior, and purposive behavior is the result of a working memory. Consolidation takes time (Squire, Cohen, and Nadel 1984, 188), specifically a period of one to three years (Eccles 1983, xv; Fox 1986, 35). To be retained, memories must be dreamed, and dreaming involves intense emotional appraisal over time (Fox 1986, 38). Perhaps that is the neurobiological basis for the typical experience, that it takes about three years to assimilate major changes in life—be they death, divorce, moves, failure, or success.

Imagining a future requires remembering a past. As one researcher says, “Memory development is about the future, not the past” (Winograd 1988, 17). Without a past there is no future, no sense of purpose, no awareness of anything as personally significant. It is only in retrospect, in remembrance, that we discover and create a universe full of meaning. The pattern of events comes as we sift and sort what happens, taking in that which matters to our well-being and letting go of that which does not matter (Ornstein [1972, 1977] 1986).

Memory, therefore, is “a dynamic process.” It changes over time. With consolidation we reorganize and assimilate preexisting memories. And it is this synthesizing process that is affected by the ability to store in memory what goes on in daily life (Squire, Cohen, and Nadel 1984, 206).

The core of the biblical witness revolves around memory. “Remember” is the recurrent theme, from the Sabbath commandment (Exod. 20:8), to the escape from Egypt, to Jesus’ “Do this in remembrance of me” (Luke 22:19; 1 Cor. 11:24), to the Book of Revelation’s injunction to have one’s name “found [remembered] . . . in the book of life” (20:15). Imagining a future requires remembering a past.

Soul: The Meaning of Meaning-Making. Forty years ago psychologist Rollo May expressed dissatisfaction with the body-mind dichotomy that arose from Cartesian thought. It was his conviction that an affinity existed between the “capacity for selfconscious affirmation of [our] own being” and the classical meaning of the term *soul* (May 1951, 312, 315). With his urging, I undertook a study of “the functional meaning of the soul in the Christian tradition” (Ashbrook 1958), that is, with the way people used the term through history.

I found that the idea of soul identifies our unique personality—our capacity for centered decisions, initiative, and wholeness. It conveys a sense of the “inside” or uniquely personal meaning of events.

Those who question soul as a meaningful concept tend to do so on an assumption that reflects Greek dualism rather than biblical holism. While the main Judeo-Christian-Hellenic tradition has distinguished body and soul experientially, it has been cautious in defending an ontological dualism. Generally, people have tended to use the term *soul* in ways that do justice to higher cognition, personal meaning, and brain processes (see Jung 1939; Sherrill 1951; Hillman 1975; Gillett 1985; Browning 1987) while bracketing or keeping open the possible separation of soul and body at death—that is, an immortal soul, a substantive entity, distinct from a mortal body (see Eliade 1987, 431–62). I am taking a functional rather than a substantive view.

For a historical-theological view I turn to Augustine, who has served as an intellectual and spiritual center of gravity for Western civilization. He described that intuitive awareness of the union of body and soul by saying that “the soul . . . is the life of the body” (Augustine 1873, 93). In other words, soul has the power to affect and change bodily substance. It is simultaneously present in the whole body as well as in each of its parts (Oates 1948, 766). While he thought of soul as lacking measurable dimensions, he believed it was located within the body (Morgan 1932, 127).

Augustine’s understanding of soul is similar to what we are learning about memory. Memory, understanding, and willing come to

mind apart from information from the outside. By the very act of understanding the experience of knowing, the mind knows itself. It is impossible to doubt that one lives, remembers, understands, wills, thinks, knows, and judges, he claimed. The mind's beholding itself is inherent in its very nature (Oates 1948, 794; Augustine 1873, 254, 256, 354).

For Augustine, the soul has been endowed with the ability "to feel and measure . . . time" (Augustine 1955, 255). Therefore it must be both within time, in a chronological sense, and beyond time, in a gathering together of future and past into a present full of meaning. To have such a sense of time is to stand above it and to shape it simultaneously.

We seek a center of meaning and power inside ourselves, that is, within, yet beyond, consciousness (Augustine 1952, 225, 1). I link the idea of "beyond consciousness" to the rhythmicity of older brain activity. From the standpoint of faith, here is the power of God, the ultimate creating activity of the universe. This transcendence frees us from bondage to the isolated external stimuli of space and time.

Apart from that transcendent center we are "torn piecemeal," to use Augustine's words. We lose ourselves in the multiplicity of things (Augustine 1952, 59, 20). Being unable to distinguish and decide, we fall victim to conflicting and chaotic forces inside us and around us.

In the court of memory, to continue Augustine's imagery, we confront ourselves with ourselves: when, where, and what we have done and under what feeling and with what meaning (Augustine 1955, 209). Augustine believed the image of God resided not in the capacity for abstract thought (Browning 1987, 23) but rather in the capacity for self-knowledge and introspection. When we lack memory—as in amnesia or in not taking time to remember, to reconnect and gather together the many facets of brain activity—then we have lost our soul.

This Augustinian tradition is more mystical than rational. It unites "the experience of the identity of subject and object" with "Being itself" (Tillich 1959, 14; see Dourley 1975). In the language of brain processes, here is an awareness that is unconditional, parallel, distributed, subsymbolic, and symbolic (Ashbrook 1989a, 77; see Rumelhart et al. [1986] 1987).

I speculate that the limbic process may be the most identifiable, though not exclusive, locus of the core structure of self-world interaction. To use the philosophical language of Tillich (Dourley 1975, 55), it is here, in the older brain, that "the infinite and finite

interpenetrate.” It is here, in the older brain, that we become “at one with our own essence.” It is here, in the older brain, that we take outer and inner stimuli, organizing and modifying them for optimal adaptation. This is an active process, one that includes the peripheral nervous system and subsymbolic processes as initiators and integrators of cortical and symbolic activity.

In sum, people have used *soul* when talking about that which is central to our being the human beings that we are. Quite simply, soul is that which each of us can call our own—not “things” that are ours but rather our own unique essence, that which distinguishes us from everything else in the universe.

HOW MIGHT SOUL COME ABOUT?

I speculate that the physiological correlates of meaningful memory as the core of our experienced self are in the three mind states of waking, sleeping, and dreaming—the biorhythms that govern the state of our existence. Although people have been intrigued and dismayed by their dreams for millennia, it was not until 1900, with Sigmund Freud’s *The Interpretation of Dreams*, that people began to investigate dreams systematically. Yet it has only been since 1952 that the nonwaking state has been studied empirically. In that year, at the University of Chicago, dreaming moved from the bedroom into the laboratory. Physiological processes replaced psychological significance.

Sleeping and Resting. The human sleep cycle (Arkin, Antrobus, and Ellman 1978; Drucker-Colin, Shkurovich, Sterman 1979) has been thoroughly documented (Hobson 1988, 148). A typical night’s sleep includes an initial drop into a deep phase in which we are really “out of it.” That is, if wakened, we are disoriented. This is a four-stage period known as non-REM sleep. Think of it as “sleeping sleep.” In the nonwaking states, deep sleep takes up about 75 percent of the time.

We now know that in the non-REM state, brain activity is inhibited or held in check. Both body and brain are quiet. The findings, building upon the earlier work of behavioral physiologist Michel Jouvet and others (Jouvet and Moruzzi 1972; McCarley and Hobson 1979; Hobson 1988, 146–54), have led to “the theory of selective neuronal rest” of the rapidly firing smaller neurons during sleeping sleep (Hobson 1988, 167–71). The brain selectively decreases the activity of that subpopulation of “cells specifically crucial for normal waking” (Hobson 1988, 171). With “sleep-onset

mentation” people report “a steady decline in control over the course of mental activity and an awareness of the immediate environment and a steady rise in the frequency of hallucinatory experience” (Vogel 1978, 97–98). When the brain’s activity is held in check our entire system becomes quiet. When we “fall” asleep, we are indeed “at rest.” That total physiological state of rest has its analogue with the Sabbath, where we are also admonished to rest.

Evidence suggests that “delta sleep is related to somatic recovery, while REM sleep has something to do with the recovery of higher mental functions. Blood flow measures support such a view. During delta sleep blood flow is directed mainly to the muscles, while cerebral arteries are constricted. During REM sleep cerebral blood flow increases, while blood flow to the large skeletal muscles is constricted” (Hauri 1979, 256).

Dreaming and Synthesizing. Deep sleep is followed by REM (rapid eye movement) sleep, a meaning-making process in which the body is inhibited while the brain is active. Whom we are now, whom we were, and what will happen—these images of ourselves and our model of self-world interaction—converge. The kaleidoscopic pieces form a narrative of being, no matter how illogical it seems. Normally we cycle through non-REM and REM stages on the average of 90 to 120 minutes about five times a night (Fiss 1979, 22–26).

The dreaming state presents a contrasting and fascinating pattern to the nondreaming state. This stage has been called *paradoxical sleep*, *paradoxical* because, except for the rapid movement of the eyes, it is a period of intense neuronal activity and little physical activity (Fiss 1979, 24). The psychophysiology includes three features: (1) activating the brain-mind to process information; (2) blocking sensory input, which inhibits signals coming from the outside and increases activity for messages arising from the inside; and (3) blocking motor output so we do not act on the data generated (Hobson 1988, 205–10). Even though inactive physically, we are very much “on the go.” We’re watching what we’re doing when we’re dreaming it.

It is hypothesized that this activation process is a synthesizing activity. Although we fall into sleep passively, we come out actively dreaming. The brain processes information essential to both “how” we are as a physical organism and to “whom” we are as an intact mammal. The function of the dreaming state is not resting from what we’ve been doing but rather reorganizing the meaning of what’s gone on (Hobson 1988, 169, 194).

The REM state, then, is what J. Allan Hobson, professor of psychiatry at Harvard Medical School and director of the Laboratory of Neurophysiology of the Massachusetts Mental Health Center, has labeled “a *meaning-added process*” (Hobson 1988, 218; italics in original). By “meaning-added,” Hobson refers to residue from being awake together with persistent concerns cumulated over time (whether we are conscious of them or not). Residue from the day and concerns over time are transformed into enhanced information, that is, information weighted in the direction of what matters emotionally in our survival as a psychophysical mammal.

A dramatic example of emotional survival can be found in Newton’s 1970 research with 127 quadriplegic and paraplegic men (reported by Schwarz, Weinstein, and Arkin 1978, 187–88). He viewed “dreaming kinesthesia as having an emergency repair function of a disrupted body image” and predicted “an increase of physical activity immediately following the disability and dropping off below normal when the new body image [became] stabilized and kinesthesia [was] no longer necessary for its maintenance.” The “emergency repair hypothesis” of dreaming was supported in that “immediately after the onset of the paralysis there was an upsurge of dreamed physical activity in excess of that of the normal controls and that with the passage of time, its level decreased and remained stable at lower than normal levels.”

The dream is a constructive process, taking stimuli with low-recognition value and turning them into high-information narratives. Neural signals become visual imagery. Despite uncertainty about the logic of the dream, these images are “singlemindedly” woven into narratives—stories—that convey the persistent themes of our lives (Hobson 1988, 271).

REM sleep has been found in all mammals except the spiny anteater (echidna) (Winson 1990). The percentage of REM varies, making up about 25 percent of the sleep cycle for ourselves and cats, about 15 percent for rabbits, less for animals subject to predators, and more for predators with secure sleeping places (Winson [1985] 1986, 53). This evolutionary aspect of sleep may have contributed to the inclusion of “cattle” in the Sabbath commandment (Exodus 20:8). All mammals, ourselves included, need “rest” in order to “reorganize” information about themselves and their place in the environment.

REM appears *in utero*. It has been thought to prepare “the young organism to handle the enormous quantities of stimulation to which it is exposed during the early stages of growth” (Fiss 1979, 26). Newborns spend at least 50 percent of sleep in REM. By age five the

percentage stabilizes at the adult level of about 20–25 percent. It remains at that level until old age, when it declines to about 18 percent or less. Researchers (Roffwarg, Muzio, and Dement 1966) theorize that REM is an internally generated source of stimulation that provides higher brain centers with large amounts of excitation. Such stimulation appears crucial for the maturation and the maintenance of the central nervous system.

In REM we systematically process information that mixes recent events with earlier memories. Any change is likely to activate more REM. Simply going to a conference reorganizes neuronal information. More importantly, transitions—trips, moves, separations, loss as well as gain; whatever carries emotional significance—all contribute to enhanced REM activity.

Waking and Acting. Sleeping and dreaming are states over which we have little control. They link us with other mammals and reflect that we are “in but not of” the world. They are the necessary, though not sufficient, conditions for the waking state.

When awake, our brain actively responds to external input. It avoids overload by eliminating information. Our sensory systems are made to *reduce* the amount of stimuli we take in (Ornstein [1972, 1977] 1986, 24–29). Under normal circumstances the mind constructs a stable world with the observational-explanatory process (Gazzaniga 1985; 1988), which establishes “linearity of cause-effect relations between events” (Hobson 1988, 268). The abstract operations of the waking brain-mind, most particularly the left hemisphere, create what we ordinarily think of as real-world events.

Even though the brain-mind is active in both dreaming and waking, for some physiological reason it “lacks the capacity to test both external and internal realities” (Hobson 1988, 209) at the same time. When awake and alert, the mind tests our inner reality against the world around us. The modulating neurons analyze incoming stimuli, “integrating them with the priorities of the day, and producing the appropriate actions upon the environment” (Hobson 1988, 209). When dreaming, the brain tests the outer world against the inner world. Perhaps that is the biochemical correlate of what Tillich (1957) spoke of as “dreaming innocence”; there is the “potential” for action without the consequences of action. The essence of whom we are emerges out of this constant alternating of potentiality and actuality in dreaming and waking.

In 1957 researchers William Dement and Nathaniel Kleitman reported a 90- to 120-minute rhythm, continuing around the clock,

which they called the “basic-rest-activity-cycle” (the BRAC hypothesis) (Rossi 1986, 133–36). That cycle has been associated with endocrine metabolism and a variety of behavioral and psychological processes, including “cycles in fantasy, hemispheric dominance, and perceptual processing. . . . Episodic hormone secretion seems to be a fundamental property of endocrine metabolism, and it is somehow related to the REM cycles” (Kripke 1982, cited by Rossi 1986, 133–34). In other words, under normal conditions our whole life appears regulated by a typical pattern of acting and resting, with something like a REM-reorganizing process part of the cycle, both day and night (Klein and Armitage 1978).

The day’s ultradian cycle parallels the night’s circadian cycle, when we fall into sleep/rest through a twilight zone of disorientation and daydreaming and then into a REM world of kaleidoscopic possibilities. I call this cycle *mini-Sabbath* because in it we are gathering up and reorganizing our own mosaic of meaning.

The meaning of information depends upon the accumulation and consolidation of input from the outer world and input generated by the inner world. When we lose sleep, especially REM sleep, we exhibit disturbed behavior (Hauri 1979; Dement 1979; Ellman et al. 1978). We become irritable, disoriented, anxious, uncertain. In extreme cases we forget whom we are. (Remember the experience of jet lag and the African porters who insisted on waiting for their souls to catch up with their bodies.)

Apparently, REM-like mentation bridges our biological brain and our psychological mind. That combination of brain-mind activation and motor inhibition couples sensory perception with emotional states to “establish memories and associations” that subsequently influence how we act (Winson [1985] 1986, 34). These ideas are re-presented as images, which get translated into memories, and that limbic-frontal cortical system works mostly on the basis of motor activity (whether actual when we are awake or imagined when we are dreaming) (Winson [1985] 1986, 217–18).

In view of such data, I conclude that mind states are “active central neural” processes under the control of the brain. The brain is active in and for itself. Gone is the Lockean view of the human organism as a “*tabula rasa*”—a blank tablet—upon which the environment writes its scenario and to which we react passively. Sensory stimulation is neither sufficient cause of brain activity nor necessary for that activity. The brain itself controls sleeping, dreaming, and waking, with the coordinating center located “within the brain stem,” the most primitive of the three levels of brain organization. In short, the brain creates its own energy and its own information

(Hobson 1988, 123–33). It “constantly imposes its own truth upon the external world” (Hobson 1988, 15).

Sabbath and Meaning-Making. I submit that what we find in the Sabbath myth of Genesis is strikingly similar to what we find in the mind states of dreaming, waking, and sleeping.

From a biblical-theological viewpoint, the phenomenon of Sabbath is the means of making meaning (Morgenstern 1962; Andreassen 1978). The two myths of creation in Genesis provide a picture of the God–world interaction and the generating of emergent meaning. Genesis 1 sketches the glory of the natural world in all its goodness, while Genesis 2 portrays the ambiguity of the sociohistorical order in all its anxiousness. To use philosophical language, essence (in Genesis 1) precedes existence (in Genesis 2). In other words, the seventh day unites nature and culture (Gen. 2:1–3).

Coming, as it does, between the first three commandments, which focus on our relationship to God, and the last six commandments, which deal with our relation to our neighbor, the Fourth Commandment, to remember the Sabbath day, connects heaven and earth. In Exodus the commandment is linked with creation (Exod. 20:11), while in Deuteronomy it demonstrates Israel’s being free to rest because it has been redeemed from bondage (Deut. 5:12–15) (Jacobs 1987).

The Sabbath reflects a periodic recognition of our natural, God-given context, that “superior system of reality” to which we must “adapt . . . or else cease to be,” to use the language of Ralph Wendell Burhoe (1973, 417). I find the Genesis account strikingly similar to the three states of waking, dreaming, and sleeping.

God “saw everything that he had made . . .” (Gen. 1:31a). Does that not sound like the “rapid eye movement” process—a watching and surveying of the kaleidoscopic input resulting from combining internal and external activity? In REM sleep the brain is active, yet that activity occurs within the mythic state of dreaming innocence. All is present, all is possible—but activation of the mind is not the same as activation of the body.

“. . . and behold, it was very good (Gen. 1:31a–b). Does that not sound as though what had been done was reorganized in such a way as to give it a sense of fulfillment? I note, as I did above, the passive mode of expression: “it was . . .” The reorganizing process, while under central control and not in reaction to external stimuli, is nevertheless something we “experience” more than something we “manage.” It “happens” in us yet seems “other than” or “beyond”

us. Such knowing-all-together is a deeply satisfying and renewing experience (see Gendlin 1962; 1978).

“*And on the seventh day God finished his work which he had done . . .*” (Gen. 2:2a). Does that not sound as though the surveying-reorganizing activity resulted in a completion, a closure, an integration of all God had done? That “finishing” of creation was not the finality of a closed system but the fulfillment of an open system. Work was brought to a state of perfection in terms of what God had intended, an ordering of God-world interaction. And that fulfillment of the essence of creation was the groundwork, the basis of what could and would emerge in history.

“*. . . and God rested on the seventh day from all his work which he had done*” (Gen. 2:2b). Does that not sound like the inhibition of the rapidly firing nerve cells related to phasic, episodic activity that characterizes non-REM sleep? Except for the continuous tonic work required to maintain biological life, the system stops “work.” The brain-mind falls into a state of rest.

“*So God blessed the seventh day and hallowed it . . .*” (Gen. 2:3a). Does not that making-whole of the meaning of creation seem like the single-mindedness of the narrative-thematic constancy of dreaming?

Here, then, are the eternal cycle of creation and Sabbath and the rhythmic cycle of brain-mind states: work, rest, reorganization, integration. The coordinating center lies in the upper regions of the reptilian brain, with its instinctual mind; the reorganizing integration comes in the 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 (Ashbrook 1989b). The results of consciousness, which means cultural-historical activity, are taken in by the neocortex, the new brain. We are ever making sense of our senses by synthesizing and interpreting what they mean to us. In short, 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.

CONCLUSION

Consider soul, then, as what we call our own and what distinguishes us from all others. The limbic process combines molecules of meaning and symbolic representations into a model of self-world interaction that exhibits both assimilation and accommodation. This is not a substantial view, an immortal substance separate from a mortal substance, but a functional one. *Soul* refers to an interpreting,

integrating, adapting activity necessary for meaning within each individual and for the species as a whole.

Significantly, in terms of my connecting Sabbath and soul, the biorhythms of the basic rest/activity cycle "are regulated by the same hormones that modulate memory and learning" (Rossi 1986, 133). The brain changes with experience, and those changes "are influenced by hormones found to modulate memory" (Gold and McGaugh 1984, 65, 78-79).

Though specific brain structures and systems can be identified as loci in meaning-making, evidence suggests that "it may be unjustifiable to assume that any particular psychological concept [such as *self* or *meaning*] has a discrete . . . equivalent somewhere in the brain" (Vanderwolf and Ledung 1983, 297). Instead of "a static conception of individual neurons, small neuronal populations, and molecules within neurons," the current model of memory is a dynamic one. "Critical molecular processes appear to be in constant flux" (Black et al. 1988, 4; see Bergland [1985] 1988). In short, memory is adaptive to an ever-changing scene.

I suggest that working memory is synonymous with soul, that centered, whole-making activity of the brain-mind in its representation of self-world interaction. 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.

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