Body, Breath, Mind, and Spirit:  
The Pursuit of Inner Health  
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**Abstract**

Illness and suffering inevitably bring one face to face with the ultimate questions of life. Thus it is no surprise that spirituality is currently the subject of intense study in medicine and allied disciplines. But these studies are floundering for want of a definition of spirituality, for one cannot research what one cannot clearly define. With very few exceptions Western investigators have yet to realize that the perennial wisdom already has a practical science of spirituality, which is known as Yoga. Here I will explore a very pragmatic definition of spirituality—furnished by the late Swami Rama—that can be applied to health and healing as an organizing context or map for the territory.

**Introduction**

Swami Rama was a highly skilled adept and yogi who was trained in the cave monasteries of the Himalayas. In the late 1960s, he began his work in the United States at the Menninger Foundation in Topeka, Kansas, where he was studied by Elmer and Alyce Green as part of their project on voluntary control of involuntary states. Swami Rama based his entire teaching on the interconnectedness of body, breath, mind, and soul. “All of the body is in the mind,” he would say, “but not all of the mind is in the body.”

As consciousness, the soul pervades the body and mind. Body, mind, and soul—yes—but why breath? The word spirit actually derives from the Latin word *spiritus*, which means breath. It soon came to mean also vital power or energy and eventually an intangible element that animates a material thing. The breath plays a key role in linking body and mind, and breath control (*pranayama*) in Yoga is a very important aspect of spiritual training as well as of the maintenance of health and longevity. Pandit Rajmani Tigunait writes in *Swami Rama of the Himalayas: His Life and Mission*:

> Spiritual practices which help us awaken our inner being are called Yoga, and those who have access to the deeper dimensions of their being can gain mastery over their body, breath and mind. They alone can enjoy life to the fullest. For such yogis none of their physical, biochemical, biological and psychological functions are involuntary or unconscious, for they have conscious control over every aspect of their being. This is what Swamiji called spiritual science, and according to him the techniques leading to the direct experience of these truths are spiritual practices (p. 51).

To make use of this pragmatic approach, however, one needs to ask what is meant by the personality in the perennial wisdom. The *Taittiriya-Upanishad* presents a model that can be visualized as concentric shells surrounding a central core that is reminiscent of a target. At the core is the Center of Consciousness called the Self. It is enrobed in five sheaths or *koshas*: three for various
levels of the mind, one for the energy body, and the outermost one for the physical body. The model is symbolic of interpenetrating energy fields of higher and higher vibrational frequency that are suffused with consciousness emanating from that core. In the Tantric view both the individual and the universe are perceived as Consciousness (the Shiva principle) enrobed in Energy (the Shakti principle). Modern medical science recognizes only the physical body and the lower levels of the mind. For the most part it is reductionistic and Newtonian in its worldview. It views reality with a perspective that is the polar opposite from that of the perennial wisdom. In Vedanta, “Reality is Consciousness” (Aitareya-Upanishad, 3:3), and from it all the sheaths of the personality manifest and have their being. The proper study of spirituality addresses this Center of Consciousness or central core. But in Western science, mind and consciousness are only emergent properties of matter.

Let us use this map from the perennial wisdom to guide our journey through the human personality from the outside to the core. We will examine some of the main currents of modern Western scientific thought along the way.

Body

Practitioners of Yoga will be most familiar with the science of biomechanics and the anatomy and physiology of the musculoskeletal system that informs Hatha-Yoga practice. The physical level also includes lifestyle issues that are encompassed by what Swami Rama called the four urges: diet, sleep, sex, and self-preservation. These four fully structure our everyday life insofar as we are biological beings. Diet raises questions about the science of nutrition, vegan diets and their influence in disease prevention, the use of vitamin and mineral supplements in disease prevention, and substance abuse of all kinds. Sleep could be explored from the perspective of the modern neurophysiology of sleep and waking, as well as yoga-nidra. Sexuality is a complex area that could be discussed from moral and philosophical as well as from medical (venereal disease and the AIDS epidemic) and reproductive physiological standpoints. In the modern world self-preservation might be reframed as stress, which is estimated to contribute in varying degrees to over 80 percent of illness.

I will touch on stress below, but I will not deal with progressive relaxation, meditation, biofeedback, or the relaxation response, nor with interventions such as hypnosis or guided imagery and visualization that are used for stress, since readers will already have some familiarity with them from the voluminous scientific and popular literature. Instead I will focus on current understanding of the biology of host response and homeostasis, what some would call psychoneuroimmunology (PNI) and what others would call “the healer within,” for the PNI system mediates the biochemistry and physiology of yogic sadhana.

Psychoneuroimmunology: The Paradigm for Holistic Health. Basically the PNI paradigm extends the concept of stress to join the nervous, endocrine, and immune systems into a functioning unity. The newcomer is the immune system. It is built as a stimulus-response mechanism, which like the nervous system has specific recognition of the stimulus along with memory built in.

Many research reports show that psychological factors, especially stress, can influence the immune response and, therefore, susceptibility to infectious, allergic, and autoimmune diseases as well as to cancer. The missing link in trying to understand these observations is how the nervous and immune systems communicate. It previously had been thought that the immune system was autonomous in the body since one can get a full immune response in a test tube. It is now thought that the cells of the immune system act in a sensory capacity like an extension of the nervous system, informing the brain about stimuli not detected by the classical sensory system, such as invading foreign pathogens or cancer cells. Both systems are in constant close communication and their mutual interaction seems to be modulated by mind. This new concept defines what is now called psychoneuroimmunology, the paradigm for host resistance and for mind-body medicine.

PNI is an outgrowth of Selye’s general adaptation syndrome, his model of stress. The concepts of adaptive balance and homeostasis are key. One usually thinks of stress in terms of abnormal activation of the sympathetic nervous system leading to arousal: fight, flight, and fright. But there also can be parasympathetic dominance leading to inhibition with lethargy, apathy, depression, and feelings of helplessness and hopelessness that can be seen in chronic diseases like cancer. This has been called the opossum response because these individuals may respond to threat with passive withdrawal much like a opossum, which when
threatened just rolls over and plays dead instead of running away.

Although many of the studies are old, three major lines of experimental evidence underlie the PNI hypothesis:

- Stress alters the functioning of both the immune and the neuroendocrine systems.
- Pavlovian conditioning (a form of learning) influences both the neuroendocrine and immune systems.
- The immune and nervous systems mutually affect and interact with each other. Cells of the immune system function in a sensory capacity to tell the brain about stimuli that would not be detected by the classical sensory system (invading foreign pathogens and cancer cells). Both systems communicate mutually using immune, hormonal, and neural transmitters through interactions that are both anatomical and chemical.

So the traditional hypothalamic/pituitary/adrenal axis that mediates the stress response now is known to have connections to the immune system to handle noncognitive stimuli. And there are regulatory feedback loops that link the nervous, the endocrine, and the immune systems into a functioning unity. Environment and behavior, in the sense of lifestyle, exert further influence. The homeostatic nature of all these kinds of interactions is critical.

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6 turned on after a session of meditation, as indicated by the appearance of cytokine gene transcripts in circulating lymphocytes measured by the reverse transcription polymerase chain reaction. Other investigators have shown similar effects for IL-2 receptors. Perhaps closer to home, it is seldom appreciated that the action of corticosteroids as the principal stress hormone is inside target cells to influence gene activation.

The advent of a new discipline called neurocardiology is extending this model of host resistance further. The heart has its own independent nervous system called “the brain in the heart” that contains a complex network of at least 40,000 neurons. It used to be thought that the brain controlled the functioning of the heart by one-way signals via the sympathetic and parasympathetic nerves of the autonomic nervous system. But there is a two-way communication between the heart and the brain that projects to the amygdala, the thalamus, and the cortex. These three structures work together to compare new information coming into the brain with memory for emotional significance (amygdala) and then decide what actions would be appropriate (cortex). This network of nerves responds to stimuli such as blood pressure, heart rate, hormones, and neurotransmitters.

Besides this neurological communication, the heart “talks” with the brain and the rest of the body biochemically (through hormones and neurotransmitters), biophysically (through pressure waves), and energetically (through electromagnetic field interactions). Communication from the heart can influence brain function and behavior. Rhythmic beating patterns of the heart generate neural impulses that directly affect the electrical activity of the higher brain centers, which mediate cognitive and emotional processing. Research further shows that positive emotions such as happiness, appreciation, compassion, care, and love reduce sympathetic (stress) stimulation of the heart and enhance parasympathetic activity (relaxation), as well as improve hormonal balance and immunity. They increase coherence, order, and balance in the autonomic nervous system resulting in more efficient brain function.

Yogis are well familiar with how emotions alter breathing patterns. But emotional states also are reflected in heart rhythms as measured by heart rate variability (the beat to beat changes in heart rate). Since the heart is the strongest biological oscillator in the body, it entrains the other body systems with its own rhythm.

Negative emotions like anger and frustration create disorder and incoherence in the heart’s rhythm and in the autonomic nervous system, which then affect the rest of the body to create inefficient organ functioning and stress. Positive emotions do the opposite, creating enhanced harmony, order, and coherence in the heart rhythm and balance in the nervous system.

Thus heart rate variability, which reflects synchronization between the sympathetic and parasympathetic nervous systems, can be looked at as an indicator of mental and emotional balance in the same way that alternate nostril dominance can be viewed in svara-yoga. Stress can create a disordered heart rhythm and subsequent effects like blood vessel constriction, a rise in blood pressure, and wasted energy.
We use an open general systems model for host resistance, which allows one to approach the concept of host resistance holistically at molecular, cellular, psychophysiological, and behavioral levels all at the same time. Both health and disease outcomes become a dynamic balance between pathogenic agents and processes on the one hand, and host resistance on the other. In other words, the seeds of disease require a fertile “soil” in which to flourish. PNI, or host resistance, refers to that “soil.” The “soil” of host resistance is not just immunity, however, as is commonly thought. Imagine it to be more like a pie with many slices. And each slice has a different size in different contexts. There are slices for each of the components of the PNI system, for neuropeptides and growth factors, for nutrition and other factors, and likely for many other influences of which we are as yet unaware.

For the whole system the locus of control is at the plasma membranes, the surfaces of participating cells. Its essence is molecular communication between cell surfaces, the triggering of receptors by transmitters, cytokines, and hormones to activate or suppress genes inside the participating cells. There is a continuous informational exchange within this internal cellular milieu. At the level of mind, cognitive paradigms or “models of the world” with their component beliefs and values determine the setting of the whole system. This is a concept that leads to a more holistic and preventive approach to illness and wellness—a paradigm for holistic medicine.

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Breath

**Ultradian Rhythms, Homeostasis, and the PNI System.** Now let us introduce the role of breath into all of this, something which is a critical part of Yoga and of the perennial wisdom itself. It turns out, surprisingly, that the study of ultradian rhythms of nasal dominance, which were described in 1895 by Kayser, provide a very interesting window on the homeostatic nature of PNI function.

The nasal mucosa is erectile like the breasts and the genitals. There is an alternating cycle of nasal dominance in a 90–120 minute ultradian rhythm during every 24-hour period. It comes under the control of the autonomic nervous system where it is controlled centrally by a single oscillator, probably in the hypothalamus or perhaps in the medulla at the level of the respiratory center. The open, active, or dominant nostril shows sympathetic dominance with vasoconstriction of the nasal erectile tissues. There is an increase in mucosal gland secretion that facilitates the filtration of air by surface cilia in the membrane with the increased air flow. The passive, closed, or nondominant nostril shows the opposite pattern.

As the nasal cycle changes, it passes through a point of balance, where for a brief period, the air flow through the two nostrils becomes equal. There is an associated psychophysiological state that has been quite well characterized. Rossi thinks it may underlie the phenomenon of spontaneous hypnosis that Milton Erickson called the “common everyday trance.” He used it to facilitate his unique naturalistic approach to hypnosis using 90–120 minute sessions.

Sperry and Gazzaniga developed the concept of hemispheric dominance based on their studies of patients who had cerebral commissurotomies. Initially it was thought that hemispheric dominance was fixed: that people were mainly right-brained or left-brained. But subsequently it has become clear that there is a spontaneous 90-minute alteration in dominance between the left and the right cerebral hemispheres as measured during sleep on the EEG, and during wakefulness as measured by changes in cognitive style. There is a direct relationship of this cerebral hemispheric activity as measured on the EEG with the ultradian rhythm of the nasal cycle. The two are “hard-wired” together.

It is quite possible voluntarily to change nasal dominance by forced uni-nostril breathing through the nondominant nostril. (We owe that knowledge also to Yoga, as well as many other ways to change the reflex.) This results in an accompanying shift in cerebral hemispheric dominance to the contralateral or opposite side. So the yogis have known that changing nasal air flow voluntarily will shift the relative activity in the highest centers of the brain, and thereby will influence the autonomic nervous system, which in turn regulates virtually every other function of the body, including the PNI system and host resistance.

The nasal cycle is an easily measured indicator, or window, for autonomic nervous system regulation and for its integration with cerebral hemispheric activity. The whole body is thought to go through a rest/activity or parasympathetic/sympathetic oscillation, while simultaneously pass-
ing through a left body–right brain or right body–left brain shift every 90–120 minutes in a healthy individual. This produces dozens of ultradian rhythms at all levels of organization, from pupil size all the way up to higher cortical functions and behavior.

While all of this represents perhaps 50 years of Western research, it and much, much more has been known to the Yoga science for probably 5,000 years. It comes under a branch of Yoga called svara-yoga, which is documented in a Tantric text called the Shiva-Swarodaya.

**Energy Fields: The Missing Mind-Body Link.** Our fourfold model introduces some aspects of the personality that the Western paradigm still cannot handle. One is the subtle energy body or pranamaya-kosha. These subtle energy fields are the missing link between mind and body, and the breath is the key to accessing them. The current formulation of PNI still does not bridge mind and body. As a concept, this pranic or energy field or body is not new. There are historical references back to 5000 B.C.E. in India, 3000 B.C.E. in China, and 500 B.C.E. in Greece at the time of Pythagoras to a universal energy field. It has many synonyms: prana, chi, vital (energy), illiaster, magnetic fluid, odic force, aura, orgone, life field, bioplasma, etc. I will use the word prana to refer to it.

In Yoga the human energy field is the vehicle that carries one’s energy or life force. It is primary, providing an energy matrix structure upon which cells grow. The field exists prior to the physical; the body is created by the field. Thus an imbalance or a distortion in this field eventually causes disease in that part of the physical body that it governs. Therefore, correcting distortions in the field brings about healing in the physical body. Healing becomes learning how to correct the field by restructuring, balancing, and charging it. The events in the energy field are primary and always precede a physical event and precipitate it. Illnesses show up in the field before they do in the physical body, and they can be healed in the field before they precipitate in the physical body. The aura is the vehicle for all psychosomatic reactions, the place where emotional processes occur. To a healer, all disease is psychosomatic. A balanced functioning of the aura is necessary to maintain health.

In the ancient wisdom, pranayama is the science that deals with the energy body, and the breath is the gateway. The rewards of pranayama are robust health and longevity. The ancient texts show that the energy field has both structure and function. It is important to understand that prana is subtle, i.e., nonphysical energy, and is not to be confused with physical electromagnetic energies. The field is comprised of a network of subtle nadis or channels through which the prana flows and energy transducers called cakras that are arranged vertically along the central axis of the subtle body corresponding to the physical spine. These nadis are analogous to the acupuncture meridians (and not the physical nerves and endocrine glands or nerveplexuses as is often said). Acupuncture also recognizes about 700 cakras where nadis cross. There are comparable concepts in Japanese systems like Judo or Shiatsu.

In Yoga, 14 of these channels are important and 3 are key to spiritual practice. One is called ida, which runs up the left side of the spinal column but in the subtle body, one is called pingala, which runs up the right side, and one is called sushumna, which runs up the center of the spine but in the subtle body. Remember that we are speaking about the subtle body, beyond the physical. These structures will not be found in an autopsy. They can be seen by psychics and by the illumined. These fields underlie therapeutic touch, Reiki, pranic healing, laying on of hands, the action of homeopathic medicines and flower essences, and so on. All of these come under the science of prana-vidya, which in Yoga is a branch of applied pranayama that includes healing techniques and intuitive diagnosis.

**Svara-Yoga: The Science of Breath Rhythms.** What does the meditative tradition have to say about these cycles and about breath at the level of these energy fields? Again it comes under this branch of Tantra called Svara-Yoga. This Yoga describes the science of the flow of these energy fields in the breath and in the nadis of the subtle body. The word nadi refers to the flow of prana-shakti in the subtle body, in the cakras, and in the 72,000 channels or nadis. The word svara refers to the flow of prana-shakti, the energy fields, in the breath itself. Three subtle forces or shaktis are said to flow in the breath:

- *Citta-shakti* is what is called the force of ida, the mental energy. This is the energy that governs thought and mind, emotion, and mental activity. The latter come together to create one’s experience of a subjective world. In Yoga the mind is a subtle energy field. There is no mind-body dichotomy in Yoga. This force is associated with air flow in the dominant left nostril, which is associated with right cerebral hemispheric and parasympathetic domi-
nance. It is called the *candra*, the moon *svara*, and it gives the body a negative energy polarity.

- Then there is the opposite one, the force of *pingala* or *prana-shakti*. This is the vital life force that governs active physical functioning. The forces of physical functioning come together to create one's experience of the objective world. They are associated with right nostril dominant flow, as well as left hemispheric and sympathetic dominance. This is called the sun, or *surya-svara*, which gives a positive energy polarity to the body.

- And finally there is the *atma-shakti*, the force of *sushumna*, the spiritual energy force. When it flows, both nostrils flow equally. The *ida* and *pingala* forces are harmonized. This is an energetically neutral force. It influences higher dormant brain centers and the autonomic nervous system.

The *sushumna* is dormant in all of us unless it is awakened by yogic practice. We live entirely under the control of the other two—the subjective and objective worlds. The direct awareness of spirit is not a part of the everyday experience of most of us. These three energies also have the same 24-hour ultradian rhythm of 90–120 minute cycles as the breath, during which the *sushumna* force flows only for a second or two as the energies cycle between *ida* and *pingala*, between the subjective and the objective sides. It is interesting that these cycles are adjusted to the lunar fortnights. On the bright fortnight, the first day of which is the new moon, the left nostril flows at dawn and the right at dusk. This switches like clockwork in a healthy individual every three days. During the dark fortnight, which begins with a full moon, the opposite pattern occurs.

The practicality of it all is that in any therapeutic program for optimizing host resistance one should include major work with the breath. At the simplest level, the breath can be used to consciously balance neural inputs into the autonomic nervous system and the PNI system.

At the simplest level, the breath can be used to consciously balance neural inputs into the autonomic nervous system and the PNI system. This is accomplished using diaphragmatic breathing or two-to-one breathing (prolonged exhalation). Through innervation of the respiratory muscles, especially the diaphragm with the Hering Breuer reflex and vagus nerve, inhalation produces sympathetic input and exhalation gives parasympathetic stimulation to the system. This is most easily observed with the sinus arrhythmia associated with respiration on an electrocardiogram. The foundation exercise for this kind of regulation is called *nadi-shodhana* or alternate nostril breathing. It has utility for calming emotional disturbance, in drug dependency, in anger management, in manic depression, in resolving migraines, and in relieving angina from coronary spasm. The breath is the only bodily function that can be conscious or unconscious [Ed.: with the exception of advanced yogis]. As such it becomes a window to observe and to control host resistance and the PNI system, as well as the emotions and the mind, because the mechanisms of host resistance lie within the subconscious and unconscious levels of the mind. All of this the science of Yoga has known for millennia.

The Neurophysiology of Emotion. The subjective feelings we call emotions are an essential feature of normal human experience. When we think about emotions we usually think about the body's subtle energies. Breath patterns reflect emotions and the breath can be used to modify emotional states. Emotional purification is central to yogic *sadhana*. But what are emotions actually? The product or emergent property of our neurology? The result of our biochemistry—the so-called psychosomatic network? Or something more subtle as the experience of subtle energy fields in the *pranamaya-kosha* or *manomaya-kosha* of the subtle energy body—some even use the term "emotional body"?

At the level of neurophysiology, emotions are expressed through physiological changes of the autonomic nervous system (ANS) and through stereotyped motor responses, especially of the facial muscles. The subjective experiences are much the same in all cultures. Emotional expression is linked closely to the ANS through activity of certain brainstem nuclei, the hypothalamus and the amygdala, and structures in the spinal cord along with the autonomic ganglia. The amygdaloid complex is a critical link in the processes that give sensory experience their emotional significance. The limbic system refers to all of the centers that coordinate emotional responses. It has three functional subdivisions that control emotions related to personal survival, reproduction, and survival of offspring. Some investigators consider this concept of the limbic system as outdated, but the
Emotional arousal changes the activity of the sympathetic, parasympathetic, and enteric (gastrointestinal) components of the ANS controlling cardiac and smooth muscle and glands, resulting in changes in sweating, heart rate, blood flow in the skin (blushing or pallor), piloerection (body hairs standing on end), and gastrointestinal mobility. This is tied into the “fight or flight” alarm mechanisms of stress. Different patterns of activation characterize various situations and their associated emotions. Various patterns of facial muscle activity are associated with specific patterns of ANS activity. Muscular expression of a particular emotion may lead to the subjective experience of that emotion. The hypothalamus regulates many behaviors including body temperature, sexual activity, and the endocrinology of reproduction. But in this regard it also regulates aggressive attack-and-defense behaviors, such as sham rage in cats. Indeed, some researchers feel that emotional behaviors are often directed toward self-preservation—a point also made by Charles Darwin in his book on the evolution of emotion.

The two cerebral hemispheres contribute differently to the control of emotion. The left hemisphere is more concerned with positive emotions and the right with negative emotions. The right hemisphere is involved in identifying emotions from facial expressions. Although both hemispheres participate, the right hemisphere overall is more involved in the perception and expression of emotion. From this materialistic perspective, like sensory experience, feeling, emotion, and consciousness also are functional emergent properties of neural networks. Our sensory experience of the world is a grand illusion.

If there is no universal agreement about what constitutes an emotion. The six primary or universal emotions are happiness, sadness, fear, anger, surprise, and disgust. Examples of secondary or social emotions are embarrassment, jealousy, guilt, and pride. There are also background emotions like well-being, malaise, and calm or tension, and the term even has been applied to feelings associated with drives, motivation, and states of pain and pleasure. But all of these phenomena share a biological core of complicated patterns of chemical and neurological responses that play a regulatory role to create circumstances advantageous for survival of the organism. They are biologically determined processes arising from specific brain structures that have been laid down during a long evolutionary history—even though learning and culture can alter emotional expression and meaning. The neural substrates of emotion are triggered automatically, leading to stereotypical responses with a regulatory purpose that have their effect on the body’s internal milieu as well as on its visceral, vestibular, and musculoskeletal systems.

At a biochemical level, Candace Pert sees emotions arising as a result of the operation of the psychosomatic network. The peptides that mediate the network make up a universal biochemical language of emotions whose influence extends throughout the organism rather than just within the brain. This chemical network integrates mental, emotional, and biological activities.

A completely different conception of emotions is held by psychic healers who work with the human aura and energy field. Many are sensitive and can sense thoughts and emotions in the human energy field as well as their movement between people in time and space. Psychics describe a variety of models of the human energy field that include an emotional or astral body, which forms as a layer in the subtle body or pranamaya-kosha. But there is little agreement on the nomenclature or the structure of these fields.

A recent and very different conceptualization of emotions comes from energy psychology. It postulates that psychopathology and some physical symptoms can be treated through the subtle energy systems of the body. The cause of negative emotions and some physical symptoms is viewed as a disruption in the body’s energy system. This is reminiscent of the yogic concept of localized turbulence, whirlpools, or disruptions of the normally harmonious flow of the fields of prana in the subtle body (turbulent versus laminar flow in a fluid in physics). Energy psychology sees the emotional essence of psychological problems as a disruption of the body’s energy fields. This energetic disruption triggers and instructs all the rest of the physical processes that underlie emotional expression behaviorally, systemically, cognitively, neurologically, and chemically. Recalling my above comments that prana is the missing link between mind and body, this idea is potentially compat-
ible with the more biologically based descriptions reviewed above as an extension of the chain of causation. Clearly, thought, emotion, sensation, and physiology/biochemistry operate as an instantaneous unity, whatever the actual mechanisms may be.

If thoughts exist in fields (and in Yoga the mind is conceived of as a very subtle energy field), and negative emotions exist as turbulent energy configurations, then psychological phenomena can be considered fundamentally as quantum mechanical events or processes, since quantum physics deals with the domain of subtle energy. Since energy fields form with very low inertia, then psychological problems can be resolved easily by altering the energy field. At this point energy psychology is still too new, hardly even a discipline, to be able to evaluate these ideas. But the preliminary anecdotal clinical evidence of the rapidity, ease, power, and permanence of these meridian interventions for relieving emotional and some functional physical problems is very impressive. These meridian therapies should be considered to be a practical extension of pranavidya in Yoga and should be explored for their efficacy in easing the purification process of yogic sadhana.

Mind

Of Models and Paradigms.

Carl Pribram has said that the brain processes data consistent with what it is used to. What that means is that the map is not the territory. This is an old presupposition of cybernetics, that there is an irreducible difference between the world and how we experience it. We do not operate directly on the world. We create a representation of it, a map, a model. And that model determines how we experience the world, how we perceive it: our choices, our behavior, our host resistance, our physiology through this PNI system, and, yes, even our state of health to some extent. These models and the belief systems on which they are built are based in part on experience. No two people have exactly the same experiences. Therefore, each of us creates a different model of the world that we share, and we each live in a unique reality.

In this century this idea originates largely from the writings of Alfred Korzybski, but it has been elaborated in psychology, Neurolinguistic Programming, and other areas, as well as in the social and organizational sciences, constructivism, institutional theory, and postmodernism. But it is not a new concept. It is really part of the theory of maya in Vedanta. In this context it refers to the mental conditioning that has to be purified before spiritual consciousness can be experienced. We simply cannot emphasize enough the importance of this concept of models of the world for understanding the perennial wisdom.

In the postmodern view, for example, models of the world are dynamic and constantly unfolding into a life narrative. Each individual develops a story about his or her life that becomes the basis of all identity. Thus a permanent personal self or ego is merely an illusion that we cling to. It is an identification with our model of the world. It is a narrative we develop in relation to others over time that we come to identify as who we are. The personal self is an illusion, a fiction.

This concept has important parallels in Eastern thought. The things we "see" are only the concepts stemming from our narrative structures, rather than what is really there. The Buddha taught that one should see things as they really are. We are to view the world realizing that our experience of it is our construction based on our desires and fears. We continually create our world (i.e., our experience of reality) based on our beliefs. We grasp at what brings us pleasure and we push away what causes us pain. But our construction is changing, a dynamic narrative, and because nothing can be held onto or repelled forever then all of our effort leads to suffering if we get caught up in this cyclical attraction and avoidance process (called raga and dvesha in the Yoga-Sutra of Patanjali). Indeed, in the Yoga philosophy a metaphor is often used in which life is considered to be a book with no beginning and no ending, the pages of which we write from day to day and moment to moment.

This approach then leads to the hypothesis that changing an individual's mental model of the world should lead to altered psychoneuro-immune (PNI) functioning and host resistance in a given context. These models of the world or mental paradigms obey "laws." Like the PNI system at the molecular and physiological levels, they tend to behave like homeostatic systems, which are self-regulating and resist change. They operate mostly below the daily level of awareness and likely influence physiology through the unconscious mind, or the right brain as some would suggest. These unconscious models can then produce behavior that may seem irrational or be dismissed as emotional or reactive. Rather, if one knew the underlying model with its beliefs and values, the behavior in fact would be quite rational. Part of the business of mind-body medicine is modeling dysfunctional belief systems in disease so that they can be changed to generate a secondary effect on the physiology of host resistance. More effective psychological coping leads to a beneficial rebalancing of host resistance.
and the PNI system.

Paradigms can be modeled in terms of both content and structure. Their content is composed operationally of cause-effects and criteria, the latter referring to the values, beliefs, and expectations we use to codify, judge, and make meaning out of our everyday experience. These internal models of the world represent a secondary level of experience, often coded in language and produced by the intellectual faculties through, in linguistic terms, distortion, deletion, and generalization of primary sensory experience as represented by mental imagery linked to affect and stored in the unconscious mind. Strong beliefs form from life’s compelling reference experiences with strong affect, and the primary data in the form of images in memory and their associated affect can be accessed (and altered) by various techniques. Some examples of the latter include hypnosis, reframing, altering the submodalities of the imagery, and changing the arrangement of the structure of the internal subjective experience of space, time, and neurology.

Moreover, according to this conceptualization, when a mental paradigm changes, it does so in a characteristic pattern. Much like a system in general systems theory, the force for change provided by external input of experience and information builds against the inherent internal homeostatic resistance to a threshold.

Then a sudden, irreversible expansion of insight called a paradigm shift occurs, which the individual may experience as an “aha” reaction. The mental paradigm or model of the world has now been irreversibly changed so that this person no longer views or makes meaning of the situation and hence reacts to it in the same way. The new worldview includes, but is a major expansion of, the old one and hence introduces greater flexibility and choices for more effective coping behaviors.

This model provides us with a way in which we can think about the role of mind in influencing and setting the level of host resistance as described by the PNI model discussed above. Mind can be envisaged as setting the level of PNI balance, perhaps analogous to a thermostat attached to a heating system. It sets the level of responsiveness of the system and may trigger it. The belief systems and values that comprise the structure and content of cognitive maps—an individual’s perceptions of life events and experiences—determine our unique behaviors and responses to any context or situation, including corresponding shifts of internal states and host resistance.

Clinically these paradigm shifts are often accompanied by rapid autonomic changes involving gestures and involuntary muscle activity, shifts in emotions and other internal states, and changes in pupillary size, heart rate, blood pressure, and breathing patterns, some of which are readily visible to the observant clinician. One has no doubt that a psychotherapeutic intervention hit home. Along with the autonomic changes at the physiological level, one also would expect changes in the rest of PNI function at the biochemical level, especially in molecular communication patterns—perhaps as Candace Pert has suggested for neuropeptides and emotional states—reflected in characteristic cytokine and mediator profiles.

Whether a particular situation, for example mountain climbing, is experienced as an exciting challenge, a neutral event, or a stressful threat is a matter of individual perception. And host resistance responds in kind. This also highlights a control point. The trick is not necessarily trying to change the external situation (although that may be appropriate in some cases), but rather one’s subjective experience of it. This is the great blessing of nonattachment bestowed by the meditative tradition. Thus behavior is truly a biologic response modifier. The paradigm begins to give some biologic basis for both a holistic approach to health and for the role of preventive strategies.

Working with this model rapidly takes one into some very deep water. One comes to think of a disease as a behavior with a functional attribute that has a positive intent for the patient. Or one may view the disease as a decision stored in the unconscious on a metaphoric time line as a gestalt of emotionally related memories called significant emotional experiences—what the ancient wisdom would call vasanas (latent desires) and samskaras (unconscious residues) that drive the forces of karma, sometimes from past lives.

Is this a metaphor from the unconscious or is it a reality? One cannot know. One works with what the client presents, with his or her unique model of the world, which by definition is a relative and personal construction. Recall from physics that
models are important for their utility, not their truth. Indeed, the philosophy of science says that the scientific method can neither prove nor disprove truth in some absolute sense.

**Spirit**

The Transformational Core: Spirit or the Center of Consciousness. Now we come to the goal of our journey into the personality—the spiritual core, what Swami Rama called the Center of Consciousness from which consciousness flows into the personality in various degrees and grades. The ancient wisdom is very clear about the existence and the primacy of the Divine Core in each of us. It is at the center of that Vedantic model of the personality as the \textit{atman}, or Self. The Eastern sages were also quite clear that the goal of life is the realization of that Self: \textit{tat tvam asi} or "I am That"—the "Ground of Being," to use Paul Tillich’s phrase.

The ancient wisdom is also clear about the root cause of suffering, including illness. It is ignorance of that Center of Consciousness, loss of awareness of and being cut off from it as a realized experience. Moreover, the ancient wisdom is also very clear about the ultimate means to remove suffering, including illness. One must work to reduce that ignorance in the personality: to "purify" it, so that the Spiritual Core can be revealed into awareness—a kind of healing journey.

The ancient wisdom also makes clear that the various Yogas, and especially the meditative science, are the key tools for this journey. Indeed, Yoga has been called the science of spirituality. Many of the methods used in this context as healing techniques can also be spiritual paths, for example, meditation. In a sense, the same methods that produce inner health also produce progress toward the highest states of consciousness.

The ancient wisdom says that good health is grounded in growth toward spiritual realization, that healing can be a spiritual journey. This sounds very New Age, but it is not at all new.

So when I write of Spirit, I mean it in the sense of the ancient wisdom. Its awakening brings a qualitatively and completely new dimension to awareness that can only be described metaphorically. It brings with it a profound change in the whole personality, which awakens to a transpersonal existence. Until this Center of Consciousness, this core awareness, has awakened and stabilized, we are intellectualizing, talking of a surrogate spirituality, as useful as that may be. There are no arguments about direct experience, but we can fight endlessly and even do terrible things to each other under the tyranny of ideology.

This Center of Consciousness is known by many names in different traditions. To the yogi, that Center is the Inner Teacher or True Guru. Once awakened into awareness, the initiate has truly entered upon the spiritual path.

Again the perennial wisdom is clear. Full health only comes when all parts of the personality are fully and harmoniously aligned with the intention and will, flowing from the Divine Core. For this to occur, the experience of true spiritual awareness must be continuous, moment by moment, an ongoing epiphany. The restoration of balance in the personality is the first step, but adding the spiritual dimension means to shift the balance point into the Center of Consciousness, the spiritual core, the only truly stable place for it. For the individual whose spiritual awareness has begun to awaken, all action flows from that Center of Consciousness using the personality as its instrument for manifestation in space and time. One remains centered, connected to one's core energies and core purpose, present in the unfolding moment. Thus all action is moment to moment creativity—thought, speech, behavior, and health. The ancient wisdom calls this Karma-Yoga. True Karma-Yoga is action flowing from the Center of Consciousness.

Science and Consciousness. I have stated that Yoga is the science of spirituality and that the scientific study of spirituality is really the scientific study of consciousness. What then does Western science say about consciousness?

Classical physics has no place for consciousness, but quantum theory can make a place for it and there is considerable theoretical exploration taking place. Two concepts allow this change: Heisenberg’s indeterminacy (uncertainty) principle and Bell’s theorem, which shows that physical reality in quantum theory is nonlocal. Nonlocality allows us to infer (though not to prove) that the universe can be viewed as a conscious system. One version of the many theories says that it is the nonlocal consciousness that collapses the mind’s wave function and then experiences the outcome of this collapse. Some recent calculations, however, show that collapsing wave functions for tiny structures in the brain cannot explain the mystery of thought—"quantum conscious-
ness"—the idea that thoughts arise in the brain through the workings of quantum mechanics. As interesting as these models are, they deal only with how consciousness might interact with mind and matter. But they do not address the existence or nature of consciousness itself.

Surprisingly, modern neuroscience has little to say about consciousness. Most modern neuroscientists are materialists—mental phenomena arise from and obey the same physicochemical laws as the entire realm of nature. The physiology of physicochemical laws as the entire phenomena arise from and obey the same materialists—mental phe- nomena arise from and obey the same physicochemical laws as the entire realm of nature. The physiology of sleep and wakefulness and the role of the reticular activating system and its neural connections are dealt with at length in neuroscience. But despite great interest, the definition of consciousness is uncertain, much less its evolutionary origin and relationship to the mechanics of brain function.

Two major challenges are freedom of will and action, and also self-consciousness, the internal observer or self. Not only do we know, but we know that we know and have a sense of personal self as the knower. Yet no amount of analysis or examination can find an actual inner self. Despite centuries of debate the riddle remains unresolved. Neurobiologists now treat consciousness as an emergent property of the brain rather than as some kind of specific entity that can be studied in its own right. By emergence is meant the sudden appearance of previously unknown properties in a system. In the case of the brain it results from a long evolution toward ever more complex networks of neurons improving the chances of survival for the organism. The identity hypothesis eliminates mind by making it an emergent property of physicochemical processes in the brain.

But the mind-body paradigm has much to say about consciousness. Pert's psychosomatic network was mentioned above as part of the psychoneuroimmune (PNI) system, which is being examined by some scientists for its potential to be conscious. Pert has hypothesized that the entire group of sixty or seventy neuropeptides may constitute a universal biochemical language of emotions. Most of these peptides alter mood and behavior. It is hypothesized that each peptide may evoke a particular emotional tone.

Unlike the central nervous system, a network is not hierarchically structured. This may imply that the phenomenon of cognition, of knowing, extends throughout the whole organism through this intricate chemical "psychosomatic network" of pepti- de informational molecules that integrates mental, emotional, and biological activities. As Pert says, "...these biochemicals are the physiological substrates of emotion, the molecular underpinnings of what we experience as feelings, sensations, thoughts, drives, perhaps even spirit or soul."

Rossi champions information transduction, claiming that "information theory is capable of unifying psychological, biological, and physical phenomena into a single conceptual framework that can account for mind-body healing, personality development, the evolution of human consciousness, and a fascinating panorama of cultural practices"! He includes the ultradian rhythms of nostril dominance as part of the PNI system and refers to them as the "wave nature of consciousness" or the "Unification Hypothesis of Chronobiology." He goes on to equate consciousness with mind and to define them as "a process of self-reflective information transduction mediated by the messenger molecules of the body."

Readers will already be familiar with Herbert Benson's pioneering studies of the physiological responses to transcendental meditation, which he eventually formulated into the relaxation response. We now know that the PNI system mediates this response. But to characterize medita- tion as only the relaxation response is to trivialize it.

These few contemporary examples from psychobiology are instructive for showing the tendency to confuse mind and emotions with consciousness. There is an underlying materialistic assumption that mind and consciousness are composed of information (whatever that means) and are emergent properties of biochemistry—the peptides of the PNI system. This is a new twist on the human being as machine. At its basis our awareness, even our self-awareness, is held to be purely chemistry.

Cognitive science refers to the study of the mind or what is cogni- tion. Artificial intelligence with its computer model of the mind dominates the field, but other disciplines are involved such as linguistics, neuroscience, psychology, sometimes anthropology, and the philosophy of mind. Its core is cognitivism, or "dry cognitive science" with its guiding metaphor of the digital computer. Human cognition is the manipulation of symbols as in a digital computer. Cognition is the mental representation that results when the mind is thought to operate by manipulating symbols that represent the world in some way.

In opposition to this idea of cognition as mental representation and symbol processing as its vehicle is the field of connectionism (or "wet cognitive science," since it deals with real brain experiments). It views cognitive tasks like vision or memory as global behaviors that emerge from neural networks (which are examples of systems composed of many simple components—neurons—that are connected by appropriate rules), which give rise to global behavior.
Connectionist models substitute localized, symbolic processing for distributed operations extending over the entire network of components resulting in the emergence of new global properties that are resilient to malfunction. The representation is the correspondence between the emergent global state and the properties of the world. No preprogrammed processing of symbols is involved. The ability of neural networks to learn and to recognize patterns is an example.

A third and more recent stream of thought has been called "enactive." It criticizes not only the idea of symbolic processing, but even that cognition is representation. Rather than thinking of cognition as the representation of a pre-given world by a pre-given mind as well as a subject who does it, cognition becomes an ongoing enactment of a world and a mind based on the history of the various actions that the being in the world performs. Cognition or knowing becomes a process of bringing forth rather than representing a world. One could consider it a further development of the concept of paradigms and models of the world discussed above.

The most influential version of the enactive model is the Santiago Theory of Cognition developed by Humberto Maturana and Francisco Varela around 1960. The essence of the theory is that mind is a process of cognition (rather than a thing that cognizes or knows) and the brain is a specific structure through which mental process (the process of cognition or knowing) operates.

Santiago Theory has influenced many fields of science. One of these is immunology. Returning to the psychoneuroimmunne (PNI) system discussed above, Santiago Theory views the immune system as an autonomous, cognitive, self-organizing, and self-regulating network that maintains the body’s molecular identity. A war metaphor of soldiers searching out to destroy an invading enemy is replaced by a metaphor of a communication network of people talking to each other. By adding cognition (the ability to know) as a property of the PNI system, Santiago Theory adds an interesting dimension of rudimentary consciousness to the system.

Varela’s attraction to Buddhism goes beyond just the use of mindfulness meditation as an experiential and experimental method. The Buddhist doctrine of impermanence also includes the idea that there is no self. There is no persistent subject of all of our varying experiences. The idea of a separate or individual self is an illusion, just another form of *maya*, an intellectual concept that has no reality. For the Buddhist, clinging to this idea of a separate self leads to pain and suffering.

**Self-awareness arises when we use “languaging” (abstract concepts and notions of objects) to describe ourselves.**

Psychosomatic and informational network proposals mentioned above.

Consciousness in Santiago theory refers to the self-awareness that begins only in higher animals and manifests fully in the human mind. If cognition means knowing, then awareness of the environment is a property of cognition at all levels of life. To be conscious is to be aware not only of our environment but also of our inner world and ourselves. We know that we know. We are aware that we are aware.

In Santiago Theory, self-awareness arises out of language that is studied through analysis of communication. It looks at language as a network of structural couplings or relationships among its words, concepts, and abstractions. Thus meaning is an emergent property of this pattern of relationships among linguistic distinctions, just as other global properties emerge out of similar networks of densely interconnected components. Thus we come to exist in a "semantic domain" (what I called a model of the world above—encoded in language), which emerges from the process of "human languaging." To be human is to exist in language and the meaning that is emergent from it. In language we coordinate our behavior, and together in language we bring forth our world. Self-awareness arises when we use “languaging” (abstract concepts and notions of objects) to describe ourselves. This semantic domain then expands in human beings to include reflection (self-awareness).

**Consciousness in the Perennial Wisdom.** In stark contrast to the Western scientific views summarized above, the basic claim of Vedanta is that transcendent, nondual Consciousness is the essence of both the subjective and objective elements of our experience and of ultimate Reality Itself. This is a vision of a nondual, transcendental, and purely spiritual Reality. That Reality is called *brahman* (the ultimate foundation of the cosmos) or *atman* (the ultimate core of the human being). This is what constitutes the spiritual center of the Vedantic model of the personality. This concept of the Self underlies the essence of the understanding of the meaning of human life and the nature of the universe that is called enlightenment.

Three statements lie at the heart of Shankara’s Advaita Vedanta. The first is that *brahman* or absolute Consciousness is nondual, unchanging Reality. The second is that the world is illusion (*maya*). And third, man’s Eternal Self (the *atman* at the center...
of the model of the personality) is not different from that ultimate Reality or brahman. Thus the central principle in Advaita Vedanta is the nonduality of brahman, absolute Consciousness or Reality.

Conclusion

This brief excursion through consciousness uncovers some major sources of confusion in our understanding of spirituality in science.

• The lack of a clear definition of spirituality. One cannot use the scientific method to study something that is not clearly defined.

• A confusion among the definitions, roles, and functions of brain, emotions, mind, consciousness, and spirit.

• Through lack of appreciation of the existence and role of the pranamaya-kosha within the human personality, there is a confusion of subtle prana with Spirit and with physical electromagnetic fields, as well as a confusion of pranic forms of healing ("energy" or "vibrational" medicine) with spiritual healing. From an Eastern perspective of Spirit as absolute Consciousness, Spirit (or the Self) is in no need of healing! Indeed, Self-realization may be considered the ultimate healing as the transcendence of the ultimate disease—samsara or cyclic phenomenal existence.

• There is a confusion of science with technology. Science is simply a systematic way of learning from experience—of gaining valid knowledge through proper experimental method and analysis. Technology is the instrument for this process.

But nowhere does the gulf between science and spirituality seem greater than in the reductionistic and materialistic assumptions that underlie modern science—except perhaps the recent trend to postmodern subjectivism. Clearly, the Western scientific approach is based in Willis Harman’s M-1 metaphysics, which is materialistic monism: Consciousness is derived out of matter or energy. In the middle stands dualism or M-2 metaphysics in which consciousness plus matter/energy both exist. The perennial wisdom is based on the revelations of awakened sages and on M-3 metaphysics or transcendental monism: Matter/energy are derived out of Consciousness. The first and third approaches are polar opposites!

Can this conceptual chasm between Western science and the perennial wisdom be bridged? As part of his mission, Swami Rama was sent to the West by his teacher to see whether Western science could deal with Yoga. After extensive work with the Menninger Foundation and elsewhere, he concluded sadly that it could not. But bridging East and West remained central to his mission, which he carried out by teaching Yoga as a science of spirituality.

In Yoga the practitioner is the researcher, the object of the research, and the instrument of the research. There is no room here for the disinterested and objective observer of the positivistic scenario. Just as in quantum theory, the researcher in Yoga is a full participant in the research process and, moreover, is transformed as a result. The process is very precise, and the outcomes, the signposts along the way, mark its progress. The whole endeavor is more like the training of an Olympic athlete, a skilled surgeon, a mathematician, a concert pianist, or an artist. The Bhagavad-Gita tells us that “Yoga is skill in action.” One thinks nothing of spending ten to twenty years of intensive concentrated effort to achieve the heights of the aforementioned worldly endeavors. Why would one think that a similar effort would not be required to achieve superconsciousness? The choice of effort boils down to one of values, of mission, of what is the most important use of the resources of an individual life.

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