

The Ecological Cosmology of Consciousness

*“For things are things because of mind,
as mind is mind because of things.”*

Hsin Hsin Ming

Consciousness is an amazing reality. Through consciousness we experience and know of the world and ourselves. The content and objects of consciousness range from thoughts, emotions, desires, and our sense of body and self to the rich and colorful surrounding physical environment and the vast cosmic expanses of space and time.

Yet, the phenomenon of consciousness—of which we are so intimately acquainted since we are conscious beings—is paradoxically one of the great philosophical and scientific puzzles. What is consciousness and how does it come to be? How is consciousness, which seems so totally one kind of thing, connected with the physical world, which seems to be totally of another kind of thing? There are many answers, many solutions to the varied mysteries of consciousness, but all these answers and solutions seem to me flawed or inadequate. Consciousness remains a mystery.

In this paper, four fundamental mysteries regarding consciousness and its relationship with the physical world are identified. Various classical philosophical and scientific solutions to these mysteries are described. Subsuming the first four mysteries, a fifth deeper mystery is proposed, providing a new theoretical scheme of inquiry—“ecological reciprocalism”—for understanding the relationship of consciousness and the physical world. Some of the essential features of ecological reciprocalism are described, demonstrating how the self, the mind, thoughts and emotions, the physical body and environment, technology, social networks, and awareness of other conscious minds fit into this theoretical framework. The temporal and evolutionary dimensions of consciousness are then described, leading into a discussion of the cosmological directionality of the future evolution of consciousness.

The Mysteries of Consciousness

There are (at least) four fundamental mysteries connected to consciousness

- What is consciousness? Is it energy, spirit, an activity or process, a form of illumination, the interiority of all being, an ethereal or refined kind of substance, or something else? This is a perplexing question, since our very essence is

consciousness, and yet we can't seem to grasp what this very essence is (Velmans and Schneider, 2006).

- How is consciousness connected with biological and physical beings (like ourselves) who possess it? The existence of consciousness seems to clearly depend upon a supportive physical world, including an active brain and functioning body (Damasio, 1999; Damasio, 2010; Edelman, 2006; Edelman and Tonini, 2002; Koch, 2007), but the puzzle is that the qualities of consciousness seem very different than the qualities of the physical world, and notably the observable qualities of an active brain. For example—to pose a question often referred to as the “hard problem”—how can a physical brain of electro-chemical impulses produce conscious sensations, emotions, and thoughts (Chalmers, 1996)?
- Third, how can there be consciousness of a surrounding and yet physically distal environment that extends beyond the body and brain of the perceiver? If consciousness is somehow located in the brain, how can consciousness reach out and make epistemic contact with a physical world? Perhaps perceptual consciousness is awareness of brain states rather than the external physical world (Frith, 2007). This is the classical philosophical problem of the perception of an external world (Lombardo, 1987).
- The fourth mystery—a natural implication of the first three—has to do with what the physical world is. This question might seem strange since not only do we appear intimately conscious of it through perception (yet this is the third mystery) but we also have a deep and intricate knowledge of the physical world through the sciences. Yet, it is not clear whether our present understanding of the physical world suggests any understandable way that it could be connected with (or supportive of) consciousness. In fact, the two above puzzles regarding how consciousness is connected with the physical world largely derive from perceived incompatibilities between consciousness and the physical world. Perhaps some significant limitation in our understanding of the physical world contributes to these philosophical quagmires, as much as our lack of understanding of the nature of consciousness (Feigl, 1967).

The Solutions to Consciousness and the Physical World

Answers to these mysteries invariably involve general ontologies of the nature of reality. It is a deep and profound point about the mysteries of consciousness that answers seem to require the need to address the nature of reality as a whole; the nature of consciousness has cosmological significance.

- Idealism posits that the universe is, in its entirety, a mental reality or manifestation of consciousness. Since our conceptual understanding (including all of the theories of science and the very idea of an independently existing physical world) and the phenomenological manifestation of the physical world within perception arise within consciousness, one can argue that the physical world as experienced and understood depends upon (or is a manifestation of) consciousness (Berkeley, 1713; Kant, 1781).

- Materialism posits that the universe is entirely physical. Since consciousness depends upon (at the very least) active states of the physical brain, perhaps consciousness is nothing but states of the brain, or of the body as a totality. There is no separate ontological realm of consciousness (Churchland, 1986; Dennett, 1991; Ryle, 1949).
- Monistic theories, such as materialism and idealism, explain the two mysteries of how consciousness is related to the physical world by attempting to derive one ontological realm from the other, in fact, to reject as an independent reality either consciousness or physical matter. Either consciousness doesn't "really" exist as something separate from the physical world (the materialist thesis), or physical matter doesn't "really" exist as something separate from consciousness (the idealist thesis).
- Neutral monism posits that the mental (consciousness included) and the physical are two manifestations of the same underlying reality (Spinoza, 1677). Perhaps, as in the identity theory of consciousness and brain, what we have are two different perspectives, interior and exterior respectively, on the same reality (Feigl, 1967). In a somewhat similar vein, Wilber (1996) identifies two different perspectives on reality—the interior and the exterior—the former being inner conscious experience, the latter being the observable physical world (Lombardo, 2006b, Chapter four).
- Dualism posits that there are two types of being: physical matter and consciousness. Dualism, which doesn't reduce one realm to the other, may or may not posit interactivity between the realms; conscious states and brain states may parallel each other, or brain states may "cause" conscious states, and conscious states, such as intentions and desires, may "cause" physical actions of the body. But dualism does not provide a convincing explanation for how the two realms could interact since it is assumed that the two realms are qualitatively different. For example, how can electro-chemical activity in a brain generate a conscious thought or feeling, or how can a conscious intention move a muscle (Chalmers, 1996)? Again, we are back to the hard problem.
- Evolutionism posits that physical reality is primordial and both mind and consciousness progressively emerge across time out of this physical substrate (Morowitz, 2002; Kauffman, 2008); as the physical world evolved in complexity—notably with the development of complex nervous systems and brains—consciousness emerged. Perhaps physical reality was even "primed" at the start (as in the "strong anthropic principle") for this evolutionary emergence (Tipler, 1994). But evolutionism can sound dualistic and magical, since consciousness appears to pop into existence (even if just in the most shallow and dimmest of forms) within a physical world at some point in time. Alternatively, one could argue that consciousness has always been there within the physical world, and as the physical world has evolved in complexity, consciousness and mind have concurrently evolved in complexity, clarity, and depth as well.

Ecological Reciprocalism

Two fundamental—and what would seem contradictory—theses are contained in the above solutions: First, consciousness depends on a physical support system; that

is, there is no disembodied consciousness. Second, the phenomenal manifestation and meaning of the physical world depends upon consciousness; that is, the physical world is only manifested and meaningful within consciousness. Both these theses seem true. But how is this possible? How can each depend on the other? And doesn't this reciprocity of consciousness and the physical world contradict our deep intuitive sense that the physical world exists independent of conscious minds that know it? Yet, I will take this conundrum as my starting point. Ecological reciprocalism posits that the physical universe and consciousness are interdependent realities, and it is this reciprocity that is the fundamental ontological truth and mystery.

Ecological reciprocalism goes beyond simple interactivity between the physical and conscious realms (this is the position of interactive dualism). It is not simply that consciousness and the physical world causally affect each other. Rather, each realm literally requires the other for its existence. Further, instead of supposing that the puzzles described above can be solved by explaining how one of the two realms can be derived from the other, as in monistic solutions, the deepest puzzle is explaining how the two realms are inextricably interdependent. Monistic solutions deny (or explain away) the existence of one of the two realms; ecological reciprocalism does not. Hence, reality is neither a reductionistic monism nor an incompatible dualism of two independent separate realms, but a reciprocity of consciousness and the physical world. In essence, ecological reciprocalism reformulates the mind-body and consciousness-physical matter problems (Lombardo, 1987; Lombardo, 2009b).

The two puzzles regarding the nature of consciousness and the nature of the physical world can be subsumed within this reciprocal framework. Though distinct, these two realms must possess some underlying incompleteness and relational dimension that requires the other. One can't answer the questions of what is consciousness and what is the physical world independent of each other. In adopting this ontological position, I am rejecting the view that "substance" (or whatever primordial concepts we use to identify the ground or essence of being) is an independent reality; that is, the primary ontological realities of the cosmos are not individually self-sufficient. The totality of existence is to be understood as a fundamental interdependency, rather than built upon some absolute and fundamental substrate.

I propose a symmetry or balance of the initial four puzzles: What is consciousness? What is the physical world? How does consciousness depend upon the physical world? And how does the physical world depend on consciousness? The fundamental puzzle, subsuming these four would be: What is it about consciousness and the physical world such that they are interdependent with each other? One can conceptualize this ontological interdependency in terms of the Taoist Yin-Yang. There are two realities—Yin and Yang—that are distinct yet interdependent with each other; neither can exist without the other. The Tao, which is symbolized as the sine wave defining the interface of Yin and Yang, represents the underlying reality of the interdependency of Yin and Yang. Consciousness and the physical world form such a reciprocal Yin-Yang.

The thesis of ecological reciprocalism, to be explored in more detail in the sections ahead, can be made more precise: Consciousness is always embodied, relative to a point of view, surrounded and locally situated within the physical universe,

and the meaningful manifestation of the physical universe is always an integrated and selective differentiation relative to an embodied consciousness.

The Phenomenology of Consciousness

Beginning with consciousness, at the most basic level there is perceptual awareness of (what appears to be) an ambient, structured, and dynamic physical world surrounding and spreading outward from a proprioceived localized body. The body is experienced at the center of this ambient surround, that is, within the physical world, and consciousness is experienced as situated and manifested within this body. That is, although there is perceptual consciousness (through sight, hearing, and other senses) of a physically distal surrounding world, consciousness feels relatively localized in the body. Further, consciousness is felt (through tactual, kinesthetic, and articular awareness) throughout the body; for example, in grasping an object with a hand, consciousness is felt (or experienced) within the hand. Consciousness also accompanies, to varying degrees, purposeful actions of the body within the surrounding environment; not only is there consciousness of purposeful actions, consciousness (intentional and motivational) is experienced as driving and guiding the actions. Synthesizing these points, the basic sensory-motor configuration of consciousness is of an embodied and active conscious being within an ambient environment moving within it.

Accompanying experienced movement and changes in bodily position, the appearance of the perceived physical world changes. Phenomenologically what is revealed are physically situated perspectives of the surrounding physical environment; that is, the surrounding world appears to change perspective as the proprioceived location of the body moves within it. Hence, perceptual consciousness of the world is relative to a point of view (the position of the body) within the world; that is, the world always appears relative to a point of view. Reciprocally, the position and configuration of the body is proprioceived relative to the perceived layout of the environment (Lombardo, 1987). This is the fundamental ecological reciprocity within the structure of sensory consciousness—of the proprioceived body localized relative to the world and the world perspectively revealed relative to the body. Conscious purposeful actions are guided and informed by this reciprocal awareness of the configuration of the body relative to the surround. Hence, bodily behavior and perceptual-proprioceptual awareness form another fundamental reciprocal loop of interdependency; action and sensory awareness are coupled together.

The experience of “point-of-view” relative to the body within consciousness is the primordial foundation of a sense of self. The self is grounded in this proprioceptual awareness of the body and sense of distinctive point of view (Damasio, 1999). The self is the conscious sense of identity, configured, distinguished, and localized within a physical and social environment. The self is experienced as both the agency possessing consciousness and an object of consciousness (Baars, 1997); that is, the body as self is experienced both as the source of consciousness and as an object of consciousness. This agent/object dual manifestation is the foundation of self-consciousness.

Aside from perceptual-proprioceptual consciousness and conscious action, at least some conscious beings (such as humans) experience emotional states, conscious desires, sequences of conscious thoughts, and sensory-like imagery and memories. (This is not to discount the strong possibility that at least some higher mammals have all these types of conscious experiences as well.) All these additional conscious states are experienced as localized within and frequently volitionally created by the embodied conscious being. Thoughts and emotions are experienced as situated within an embodied consciousness, itself within the perceived ambient physical world, rather than experienced in some second separate ontological realm or space. Thoughts and emotions are experienced “within oneself” but of a self that is experienced within a world.

Also, when one conscious being encounters another conscious being within the perceived environment, consciousness clearly seems to be manifested and expressed through the body of the other conscious being; the consciousness of the other, through attention, purposeful behavior, emotional expressions, and efforts to connect and communicate, shows itself. The consciousness of the other is not entirely private and hidden away. One can perceive the consciousness of another. In this sense, consciousness is not entirely within the realm of the “interior” as Wilber, for example, argues.

As one final point in this section, consciousness possesses the quality of focalized center-contextual surround or as the Gestalt psychologists described it, “figure-ground” configurations (Koffka, 1935; Kohler, 1947). Consciousness focuses; consciousness attends. Phenomenologically at any given moment, there will be some object or feature of the world, or some thought or image, that will be the attentive focus of consciousness, though set and contextualized within a dimmer, peripheral ambience of consciousness. As Baars (1997) describes it, consciousness involves selective, momentary integrations. For example, a sound may grab one’s attention—becoming the figure—set in the ongoing dimmer, unattended consciousness of the surrounding physical world. In fact, perception and proprioception may oscillate in figure/ground relationship; a conscious being may focus upon the feelings within the body or focus upon the objects in the environment, each in turn setting the context for the other. Hence, within any momentary state of consciousness there are simultaneously varying degrees of consciousness associated respectively with attended and focused “objects” and non-attended surrounding/contextual elements. Following the Gestalt psychologists on this point, since figure and ground are experienced in relationship to each other—so to speak defining each other—this is another reciprocity within the structure of consciousness. As Gibson has noted in the study of perception, for example, nothing is perceived in and of itself; everything is perceived in relationship and discrimination relative to a context (Lombardo, 1987).

The Physical World

Through the physical sciences, invariably guided by abstract thought and facilitated through technologies that heighten sensory and behavioral capacities, it has been discovered that there are many scales and dimensions of structure within the physical world beyond what is revealed directly through perception (Gell-Mann, 1994;

Maddox, 1998; Hawking, 2001). Psychophysiological research has repeatedly demonstrated that perceptual systems are highly selective, only reacting to certain forms, scales, and patterns of energy. The experienced perceptual world is highly selective (Boring, 1942; Wade and Tavis, 2003). Science has also explored the intricate bodily systems (including the nervous system) that seem necessary for the realization of consciousness and its complex structure and dynamics; these biological systems, through elaborate integrative and differentiating processes, constrain and configure the make-up of consciousness and the selective apprehension of the world (Koch, 2007). In general, the physical systems of the body, at the level of perception, selectively and significantly constrain the direct physical input of the world.

But science has also discovered that the physical universe, at all levels of magnitude or scale, structures the forms of physical energy within it, and these patterns of structured energy permeate through it. Hence, physical realities produce specific structured energetic effects within the universe providing information about their existence and make-up, affording the possibility of being known. As Bertrand Russell (1927), for example, has noted, our knowledge of the physical world, which includes what we have learned through science, derives from the effects physical realities have on other physical realities (Maxwell, 1968, 1970). Something which had no differential impact on anything else would, in principle, be unknowable. And consequently, if a physical reality had no differential impact upon a sentient and embodied observer (either directly through the senses or mediated via instruments or technologies) the physical reality would be unknowable.

Further, at each and every location within the universe there is a structured energetic array deterministically specific to the location and the relational configuration of its surround (Gibson, 1966, 1979; Lombardo, 1987). The universe differentially impacts, via structured energy, each and every location within it. The fundamental perceptual-proprioceptual experience of centered body and surrounding environment is informed and grounded in stimulus information specific to the physical configuration of an embodied and localized conscious being within a world.

As a general model to describe the pattern of energetic flow of an animate body with a nervous system localized within a physical world, one observes convergent and divergent flows of structured energy. Patterns of energy converge upon a body and patterns of energy diverge from a centralized nervous system outward into the muscles of the body. But it should also be noted that loops of patterned energy are also present. For example, input converging upon a body is impacted or affected by activity and behavior running out from the relative center of the body/nervous system, and output instigated in the relative center is modified or impacted by input coming from the surround. There are multiple loops of such input-output interdependency located at various locations running from the peripheral/outside to the center/inside of an animate body (Carlson, 1986). In fact, overt behavior (instigated from within) modifies the sensory input by causing changes in bodily position; when the observer moves, a different pattern of structured energy (specific to the change in location in the universe) impacts the body. Hence, loops of interdependency run outward from the body into the surrounding external physical world (Gibson, 1966, 1979). One can envision the general pattern of energetic flow as convergent-divergent loops centering around and penetrating into the animate body, with the body-environment loops encapsulating the

“inner” physiological loops. These physiological and physiological-physical loops of interdependency in patterns of structured energy underlie the perceptual-behavioral interdependency described in the last section.

The physical environment that surrounds a living organism provides the necessary conditions to support the continued existence of the living organism. A living organism requires a physical environment to grow and to thrive. Take away the supportive environment and the living organism would immediately dissipate. A living organism, in fact, can be described as an “open system,” taking in necessary resources in order to function (Prigogine and Stengers, 1984; Kauffman, 1995b; Smolin, 1997). Living organisms also, in numerous ways, impact or affect the environment, thus creating and supporting interactivity between themselves and their environment (Lovelock, 1979, 1988; Sahtouris, 2000). Hence, just as there is an interactive flow of patterned energy between a living form and its surround, supporting perception and behavior, there is an interactive flow of energy and material between the life form and its environment, supporting the continued biological existence of the life form.

Another significant dimension regarding the relationship between living forms and their environment is the ecological reality of “affordances.” As Gibson has argued, perceptual experience is meaningful since the world is perceived as meaningful and of value relative to an embodied conscious organism and its ways of life. Affordances are the properties that the environment has in relationship to an embodied conscious mind—the uses, opportunities of action, dangers, and values relative to a particular way of life. The perception of affordances, as relational properties of the environment, is foundational and critical to the survival and flourishing of an embodied conscious mind. The meanings of affordances are neither intrinsic to an independently existing physical world nor simply in the conscious mind, but rather in the relationships (potential and real) between the conscious organism and the world (Gibson, 1979; Lombardo, 1987). The general principle at work here is that perceptual experience and knowledge is built upon relationships between a living, sentient organism and its environment. It would follow that the environment perceived would vary according to the unique ways of life of each living organism.

In summary on the last few points, at a physical level, a sentient living form and the surrounding environment (or universe) are open to each other, each differentially impacting the other. This openness is essential both to the continued existence of a life form and its capacity to know about and impact the physical world, and to the “knowability” of the physical world. But openness is differential, depending upon the sensory capacities and unique ways of life of different living organisms.

The Reciprocity of Consciousness and the Physical World

Energy converging to any local area is structured at multiple levels of magnitude and complexity, across all forms and variable ranges of energy, containing an indeterminately rich and immense set of differences and patterned relationships, often in mixtures and interference patterns with each other. Further, the potential types of relationships living forms can enter into with the environment is as vast as the potential types of living forms and their distinctive ways of being in the world. The relational properties of the world are contingent upon the nature of the constituents within it.

Hence, one could argue that the function of a highly selective embodied conscious being is to differentiate and integrate out of this indeterminately rich plenum a distinctive conscious apprehension of itself in relationship with a physical environment. The physical world can only manifest itself relative to a selective, localized, and integrated perspective; this active and relational process of selecting, differentiating, and integrating is, in fact, the nature and fundamental function of consciousness.

In the broadest sense, even our scientific explorations into the physical world, which expand and deepen our understanding of reality, are realized through embodied consciousness, selective abstract thinking, and selective technologies that augment our capacities. Following Smolin (1997), physical reality can only be consciously apprehended from within an ambient universe from a point of view (or a series or collection of points of view). There does not seem to be such a thing as a detached, absolute, or non-relative realization of consciousness—consciousness is manifested always from a point of view within an ambient universe (Damasio, 2010). And complementarily, there does not seem to be such a thing as a non-relative, non-selective revelation of the physical world.

Still, the actual existential content of perceptual consciousness is a particular relational manifestation of the physical world, rather than some constructed representation hidden away in either the brain or mind. First, consider that physical realities are knowable and therefore in fact only potentially meaningful in so far as the reality generates a differential impact on its surround. Properties of the physical world, in so far as they are knowable, are relational properties. Hence, even though what is perceived or known about the physical world is relational (relative to the perceiver/knower), it doesn't follow that such properties are not properties of the world, since all knowable properties of the world are relational. Second, the idea that consciousness is exclusively and totally localized inside the central convergent point of the sentient organism appears mistaken. Though anchored to a sentient body, consciousness is an open, active, and selective relationship between such a sentient body and a surrounding world. The physical support for consciousness are interactive loops bridging the body and the world. Just as life is not simply a property of an isolated biological system, consciousness is in the active relationship between the body and the physical world. Metaphorically speaking, consciousness and the world reach out and interpenetrate each other.

Kant argued that everything we know and everything we experience is structured through the capacities and conceptual framework of our minds. Even if one were to say that there existed a reality independent of our conscious minds, this very notion is a conceptualization or theory of the mind. This point notwithstanding, Kant postulated a "ding-an-sich" (thing in itself) but argued that it was unknowable. But consider the idea that something could exist (be real) that in no manner or form affected anything else, or in any sense could be known. What would such a notion mean? Berkeley, the idealist, in fact, argued that postulating an unknowable reality was meaningless. The actual existential content or objects of perceptual consciousness are indeed properties of the physical world (rather than representations in the mind or brain), but this content is, none the less, framed and selected by a conscious mind. There is no "ding-an-sich" beyond it.

The use of tools and technologies further undermines the presumed boundary between consciousness and the physical world. Though locally grounded in a biological system, the embodiment and relational reach of consciousness is not fixed. The central nervous system forms the physical nexus of coordinated activity within a conscious being, but instrumentalities (such as tools and technologies) can be attached or functionally coupled with the biological body, extending its functional integration and reach, both perceptually and behaviorally. Consciousness (and embedded psychological processes such as purposeful behaviors, perceptions, and even thinking) is realized and experienced throughout both the conscious body and functionally integrated instrumentalities (Clark, 2003, 2008; Noe, 2009; Shapiro, 2011).

We can ask the question: What is the physical system that a conscious mind uses to think with? We could state that it is the brain, but this is too narrow a perspective. As one outstanding example, whether through writing with pen and paper, or composing text on a computer, humans use external physical tools and technologies as both an instrument of thought and a medium for representing thought. That is, the thinking goes on in the body/tool system as a whole. If a person holds a pointed object and rubs it across a surface, the surface is felt through the pointed object. (Just as we can feel the road through the tires of the car we are driving.) The object (instrument, tool) becomes part of the functioning sensory system. When a person uses a tool to accomplish some physical objective, such as digging a hole in the ground with a shovel, the shovel becomes functionally part of the body and an instrument of action. (Aside the fact that we also feel the ground—its composition and hardness—through the shovel.) In all these cases—thinking, perception, and behavior—tools are “detachable” body parts, used to perform different psychological operations (or to enhance existing ones). As we have used books (a technology) to think with, we now use computers as well. And if we were to ask, “where” is consciousness and mind in such technologically augmented activities, the answer would be in the entire functional system.

Hence, the boundary between an embodied consciousness and the environment is fluid; objects of apprehension and manipulation can become instruments of apprehension and manipulation. Consciousnesses (and mind) reach out through the physical instruments and physical embodiment of its operations.

Mind, Self, Thought, and Emotion

Within this framework of ecological reciprocalism, what is the mind? In our everyday way of speaking and thinking, we naturally assume that conscious beings possess minds. A mind is the relatively integrated set of cognitive-affective-motivational and perceptual-behavioral states and capacities embedded within and supported by the ecology of the body and physical world. Minds perceive, think, feel, and desire, and we could say—through its physical embodiment—act upon the world. The mind though is not simply localized in the brain, but rather is physically supported within the entire biological body and all those instrumentalities used in the exercise of its functions. Within an ecological framework, a mind is the functional and integrative Gestalt of a biological body (and in many cases tools) realized within and coordinated relative to a world. Conscious beings have minds in so far as the content, structure, and activities of

consciousness are states and capacities of a mind. Consciousness is the arena of coordinated sensitivity and control of the embodied and extended mind.

And what then is the self? As noted earlier, the foundation of the self is the experienced locally situated body within the world and the unique perspective connected with sensory consciousness. The self arises because consciousness is always individuated and subjective, that is, it is a unique and embodied perspective on reality. The self is an individual's sense of identity, configured, distinguished, and localized within a physical and social environment. The self is a relational distinction relative to a physical surround and social "others." As noted earlier, the self is both the subject, or agency, possessing consciousness, and within self-consciousness, an object of consciousness. It is the self that is conscious and it is the self that possesses a mind and a body. Building upon this ecological structure, the self constructs through memories and interpretations an "autobiographical self," a narrative giving enriched meaning and coherence to self-identity, but still, a narrative describing a complex stream or series of interactions between the self and the world (Damasio, 1999). The "I am" within consciousness is no mere thinker, as Descartes argued, but a person (with feelings) embedded within a complex drama involving numerous interactions with the world.

In our everyday thinking, we see ourselves and numerous other conscious beings as persons (White, 1991). (Depending on the circumstances, humans may or may not see sufficiently intelligent animals as persons.) We tend to see our own conscious self or the conscious self of another as a person. It is the person that is met, known, and communicated with by other persons. It is the unique Gestalt of an embodied conscious being (Strawson, 1959); persons possess personalities, unique configurations of traits, attitudes, and dispositions (Hergenhahn and Olson, 2003). The self is both private and public but it is the self or the person that reveals itself to others. We perceive and know other selves—other persons. Hence, as noted earlier, consciousness is not totally private. Nor is it disinterested. Consciousness reaches out. Consciousness wants to be known.

How are the concepts of subjective and objective understood within this framework? The subjective and objective are relative and reciprocal; they are not two absolutely distinct and separate realities. The objective is always defined through an integrated set of subjective perspectives; the subjective is both embodied and configured as a perspective within the physical universe.

What are thoughts, emotions, memories, images that we "see" (imagine) within consciousness? Though thoughts, memories, images, and emotions possess a relatively private or subjective dimension, none exist in an ontological space separate from the physical environment. All occur within the person in the physical world. Phenomenologically, all are felt as localized within the physical world. Further, it is the person that thinks, imagines, remembers, and feels—this is how it is experienced and this is how it is perceived as happening in others during conversation and interaction.

Thought, emotion, memory, imagery—all require a functioning embodied conscious mind. All can be shared (or expressed) between one conscious mind and another. All influence and guide our perception and behavior, and inextricably contribute to the meanings of things we apprehend in consciousness. All require for their development—if not their very existence—ongoing interaction between an embodied

conscious mind and a world. All are grounded and anchored in the sensory particulars and qualities of perceptual and proprioceptual consciousness of the physical world and the biological body.

Yet all these constituents of consciousness have a puzzling quality. If a person is thinking or imagining something, another person cannot directly observe such conscious events. Such events seem inescapably private. In everyday expression, we don't seem to be able to read or observe another person's conscious mind. This inaccessibility to the thoughts or feelings within another conscious mind can lead one to suppose that such events exist in a separate ontological realm from the physical world. Even if one were to open the skull of a person and observe his brain while he is thinking, imagining, or feeling, one doesn't observe anything remotely similar to the thoughts or feelings he is having. But as stated earlier, whether one is observing oneself or observing another person while he is thinking, it definitely appears as if the thoughts are occurring within the body of the conscious thinking person. Yet why can't they be directly observed in the other, even though the person having the conscious thoughts clearly experiences them as localized within his body?

An identity theorist or materialist would argue that the thoughts and feelings are actually inner states of the brain, experienced from within rather than observed from outside of the brain. That is, when one looks at a body or specifically a brain, one sees it from the outside. For the person who has the brain—who is, in fact, in this context, the brain itself—the states of the brain are experienced from the inside looking out. Hence, materialists would say that thoughts and feelings are nothing but states of the brain, and an identity theorist would say something similar: Consciousness is the inner (or interior) perspective on reality, whereas the physical world (as it appears in perception) is the exterior perspective on reality.

Yet, as a first point, it should be noted that we cannot observe the particular manifestation of the physical world as it appears within perception to another. Perceptual consciousness seems just as private as thoughtful or emotional consciousness. If we look at a person's brain while the person is perceptually experiencing the world, we do not observe the rich and intricate manifestation of sights, sounds, and other qualities the person is experiencing. As stated above, perceptual consciousness is a relational configuration—a convergent manifestation to a localized observer. One cannot observe directly this relational configuration from the outside because one is not localized in exactly the same body in the same place within the physical world. There is no need to postulate a second ontological realm, somehow cut off from the physical world.

A second relevant point regarding this puzzle of privacy is that thinking can transpire through the medium of external and perceptually observable speech. We can think through talking. It is not the case that in all circumstances we first think (on the inside) and then express our thoughts through speech, but rather, as we frequently do when we are engaged in conversation or debate, the thinking goes on in the talking. That is, we think out loud. Hence, the logic and meaning of thought—that is, the reality of it—does not have to be supported or carried through a medium of private events. Whatever thought is, it clearly can occur within the ecosystem of the thinker and the world. Thought is not an inherently private reality. A similar point can be made regarding emotion; the manifestation of emotion can occur overtly. This same argument was

presented earlier regarding instrumentalities as tools or vehicles of thinking, perceiving, and purposefully acting. We can think with tools; we can think with speech.

Leibnitz argued that conscious minds are monads—distinct and unique perspectives on the physical world. But for Leibnitz, monads are private bubbles of consciousness that mirror the world but do not actually interface or connect with the external world. The world, in fact, for Leibnitz, is nothing but a great plurality of monads (conscious bubbles); hence, Leibnitz was an idealist. The totality of the whole (the universe) is a plurality of self-contained unique conscious perspectives. According to Leibnitz, perceptual experiences are as private as thoughts and feelings.

Yet, if one argues instead that perceptual consciousness of the physical world is a selective relational configuration between an embodied conscious being and the world, then consciousness does not emerge as a private event separate from the physical world; the physical world is manifested within consciousness. Further, if one asks what the physical world is, within such an ecological perspective, one must answer that it is an incredibly rich, inexhaustible set of relational and perspectival configurations. The universe is a great plurality of monads, but everything is open rather than closed. Thoughts and emotions, as well as perceptions, selves, and consciousness, in general, exist within these relational configurations.

Finally, what is the connection between an embodied conscious mind and other conscious minds? Embedded within a primordial social intimacy, the self, the mind, and even consciousness are developmentally articulated through social interaction. Each individual conscious mind exists in an ecology of other minds. Each person is taught by other persons what it means to be a person (Dead, 1936). This is a significant feature of the reciprocity of conscious beings and their environment. The distinction between one self and other selves is also fluid and not absolute. Conscious beings form into relatively integrated collectives, in the sharing of their emotions, thoughts, and values, and act with relative degrees of coherence and focus in their involvement with the world. Love, sharing, cooperation, and empathy bring embodied conscious beings together.

Time and the Cosmological Evolution of Consciousness

Just as consciousness is localized and configured within the space of the physical universe, consciousness is localized and configured within the time of the universe. There is a temporal dimension and directionality to consciousness. Time is an integral part of the ecology and phenomenology of consciousness; consciousness is not a static reality.

Conscious beings are aware of duration, relative stability, and patterns of change; of becoming and passing away; and of an experiential direction to time. The perceptual experience of time is contextual, built on the relative awareness of persistence and change and anchored to concrete events and the temporal relationships between events in the environment. The temporal structure of the ecological universe structures and informs the time of consciousness.

Objects of consciousness are configured within the flow of consciousness. Identity and persistence are experienced across time in the context of change. All objects of consciousness have a temporal dimension; are, in fact, temporal Gestalts.

The conscious now—which is inherently transformative and not instantaneous—is anchored at the level of perception, and contextualized within consciousness of the past (memories) and conscious anticipation of the future, all three phenomenologically blurring together at the “edges” (Johnson and Sherman, 1990; Lombardo, 2006a, 2007c).

Consciousness exhibits a sequential directional flow (Fraser, 1978, 1987; Carroll, 2010). Consciousness has been phenomenologically described as a “flow” (of thoughts, perceptions, feelings, images, and memories) or perhaps somewhat more accurately as a sequence of “perchings” and “flights” from one focus of attentional consciousness to the next (James, 1890; Baars, 1997). Though conscious states pulsate through an ongoing series of relatively distinct, highly selective and integrated apprehensions, conscious time is always opening into the future (and complementarily away from the past). Our conscious anticipatory thoughts and emotions, our desires or motives, and purposeful behaviors are directed toward the future (Lombardo, 2006a). Perhaps the primary function of our cognitive-cerebral processes is anticipation and guidance of the future (Frith, 2007; Hawkins, 2004).

Future oriented consciousness is tied to the ecology of life. Motivational or purposeful behavior and thinking is directed toward the manipulation of both the physical environment and states within the conscious organism. The function of the embodied conscious mind is ecological, involving the acquisition of knowledge about the environment and the self in order to facilitate the informed guidance of behavior to alter environmental and personal conditions.

It has been frequently argued that the function of the mind is to create order within a chaotic physical world (Lombardo, 1987). But the physical universe, as noted above, possesses an unimaginably immense amount of order that must be differentiated out by a conscious being. In fact, the direction of evolution is toward both increasing order and complexity (Prigogine and Stengers, 1984; Morowitz, 2002). Building upon the evolved complexities of physical systems, the evolution of future-focused conscious minds selectively and purposefully creates even more order and complexity within the physical universe (Gell-Mann, 1994; Kurzweil, 1999, 2005). Generally speaking, the function of a purposeful conscious mind is to facilitate the evolution of the universe.

The evolution of consciousness moves in the direction of increasing awareness of ever more expansive spheres in space and time. Consciousness evolves from the relatively egocentric “here and now” toward widening spatial-temporal vistas, which includes a deeper sense of both the past and the probabilities and possibilities of the future (Stewart, 2000; Shlain, 2003; Lombardo, 2006a). As already noted, each conscious apprehension of the physical world through perception involves a unique perspective of the world from a particular point of view, but animate life forms can move through sequences of perspectives, gaining a more expansive experience of the world. In the exploration of the world, perspectives are integrated across time; this occurs both in perception as well as in thought and conceptualization. If one were to identify the narrowly constrained perspective of the immediate here and now with the subjective, then in bringing in more and more perspectives of the world, we move in the direction of the increasingly objective. We could define “laws of the universe” as those regularities we discover across vast samples of perspectives. Hence, we could say that

consciousness evolves to increasingly apprehend more objective and “invariant” features of the physical world, but we should keep in mind that what is “objective” is understood as the invariance across perspectives.

Since populations of conscious minds organize into coordinative agencies, the physical embodiment and reach of consciousness spreads outward into greater expanses and more complex networks. With the ongoing evolution of technologies that amplify capacities to perceive and manipulate the surrounding environment, the conscious reach of minds also evolves and expands. Taken together, technologically facilitated communication and collaboration among multiple conscious agents further expands the physical embodiment, complexity, and outward reach of consciousness. Many argue that technologically facilitated social networking, enhancing knowledge acquisition, communication, and collective thinking, is leading to the emergence of a “global consciousness,” or global and planetary minds (or brains), that potentially could expand into a “cosmic consciousness” (Stock, 1993; Tipler, 1994; Lombardo, 2006b). Consciousness will more pervasively and coherently drive the evolution of its own cosmic embodiment. In this evolutionary process, consciousness, through advancing theoretical abstractions and enhanced technologies, will progressively differentiate and integrate more of the cosmos.

Summary and Conclusion

In so far as the physical universe is structured and organized and, through the myriad energetic effects of its constituents into the encompassing spatial-temporal surround, impacts and consequently reveals itself to its constituents, it sets the conditions for its being known. The universe affords the possibility of being known but it is indeterminately rich in information.

Further, it is the physical totality of the cosmos, grounded in its simplest and most pervasive dimensions, that affords the support and realization of embodied conscious minds—of knowing and purposeful directionality—and it is the evolutionary thrust of the cosmos that supports the evolution of increasingly more complex conscious minds. Consciousness is realized within the context of ecosystems in the universe.

Grounded in localized and embodied center-surround relationships, consciousness arises as perspectival and ecological. Conscious beings extract and integrate meaningful perspectives or manifestations of the cosmos in relationship to themselves.

Consciousness is relational with respect to the cosmos because it involves embodied, selective, and integrated apprehensions and purposeful manipulations of the universe; and the universe is relational with respect to consciousness because it reveals itself as differentiated and unique perspectives and opportunities of action to consciousness.

Consciousness is temporal and future-directed and evolves through increasing mental complexity and the ongoing functional integration of social networks and embodied instrumentalities. In essence, the universe is evolving an embodied conscious mentality that progressively differentiates and integrates and brings under its volitional control more of its indeterminately rich and complex physical structure.