
Transverse Interaction: Re-Sighting Self-Environment Relations

Nouns dominate individualistic American culture. Each of us believes my individual existence is the foundational reality and grounding value of life. I believe that I see: individual things, animals, and persons; single events; separate acts; bounded and marked territories; private property; small numbers of events in short sequences with timed beginnings and endings. All these individual realities that I believe I see are united around my individual self. I am the 0,0 center around which I frame the world of individuals I see and know. In a word, Americans live in a hyperindividualistic world because that is, in fact, the way we see it. True believers in this individualized world argue that we live in a hyperindividualistic world because that is the way it truly is, and because that is the way the world is, that is the way we see it. The dominant cultural response is that hyperindividualism is realism.

In this cultural perspective, the world is nothing but aggregates of individual beings, acts, events, times, and territories. Larger realities, such as institutions, communities, nations, societies, cultures, histories, species, or ecological systems are taken to be mere words used as shorthand references to aggregates of individuals. Names for such "larger realities" are just nominal, constructed, or artificial references to the really real individual elements. Society and community are not real; they are just names we give to aggregates of individuals, each of whom sees and lives in a personal world, makes individual rational decisions, and personally acts rightly and for the good of all on the basis of these decisions. Society or community is an imagined or statistical pattern of real individual actors, actions, and moral decisions. Even interaction between two persons is seen as two autonomous individuals behaving toward each other so that each can attain personal goals. Interaction as a collective or joint reality is seen as an

overlay, a construction put over two really separate individuals and their behaviors. Interaction is constructed out of individual acts, like a building built with bricks that exist prior to and then make up the building. When the building is torn down, the individual bricks remain. Because the world is made up of autonomous individuals and behavioral bricks, that is the way we see it. The bricks are real; the building is a temporary and derived construction. Our hyperindividualistic eye-sight gives us the truth. Any other sighting is error. Today, however, other experiences are balancing this view.

A hyperindividualistic way of seeing makes it difficult if not impossible to see environmental responses to our actions. The environment is not an object or thing that any individual, as an individual, can grasp through the eyes or other senses in a single perception. We never see the environment as a whole responding to us. Yet, we know that there are gradual environmental responses to every behavior, no matter how small and unnoticeable (Graumann and Kruse, 1990). The perceptual problem is clear, though no solution is in sight. We need a new way of seeing ourselves in relation to the environment so that we can generate a more adequate sense of environmental insight. Rachel Carson told us how to see in the opening sentence of her substantive analyses in *Silent Spring*: "The History of Life on earth has been a history of interaction between living things and their surroundings" (1962/1994: 5).

This chapter develops a way of seeing through new glasses. The glasses contain lenses that focus our eyes on environmental issues within a framework of *systematic interactionism* that enlarges individualistic time and space. Systematic interactionism looks at issues in a range of *time frames*, including the long-term time frame of ecological forces playing themselves out. Aldo Leopold told us to "think like a mountain" and take the long-term view. As the Iroquois motto professes, policy decisions by the elders must consider the impact on the next seven generations.

Systematic interactionism also varies the *spatial focus*, from the habitat of the smallest organisms in the soil to the habitable space of earth's life-support systems. An apt metaphor for this spatial point of view is to imagine the earth as an encapsulated life-supporting spaceship within which all humans live together. Thinking in a wider range of time-space coordinates means we must interpret more extensive data dealing with statistical and empirical outcomes of cumulative actions.

Of course, no individual is capable of such large-scale seeing. The power of empirical thinking about the physical world grows within disciplined institutions such as natural and social sciences, engineering design, and systems analysis. For individuals, large-scale seeing involves *faith* in scientific authorities, religious teachers, or cosmologists. Faith in environ-

mental forces is not limited to revealed, divinely inspired, or inerrant biblical texts about transcendent realities. Secular faith is based on methodologies, evidences, inferences, and ever-reformable texts produced by communities of empirical scientists studying how the Earth supports our lives. Since we live by commonsense faith in objects and processes we do not see, we must all *choose*, or let someone else choose for us, how to imagine the environment and our relationships with it (cf. Berger, 1980).

As Heraclitus would say, everything is in process of connecting to everything else. Earthly reality is a single seamless system of interacting dynamics and ever-forming and reforming parts. In a metaphoric sense, this view of reality that frames us as passengers on a single Spaceship Earth is the world view informing our discussion. Seen through this frame, moderns are today experiencing a "reversal of sight," a re-sight of objects, events, and persons as interacting parts of life-support systems. Realities we were taught to see through hyperindividualistic frames are now re-sighted as interacting parts of dynamic systems. Earthly life is first of all ecological. As such, we more adequately understand it in relationship to contexts that are themselves in flux. Reality is dynamic, that is, events in process, processes that at first glance appear as orderly objects and events. The phrase, systematic interactionism, is intended to highlight a dynamic understanding of what appear as orderly objects.

The perspective of this book builds on the insight that the meanings of things, persons, and objects arise from interaction (Baldwin, 1986; Blumer, 1969; Mead, 1934). Social psychologists have given long and deep attention to meanings constructed within the social life process, that is, to "social and cultural meanings." They have somewhat ignored meanings constructed with reference to and by the world that is there, to "natural meanings." Indeed, a key modern move is to expand everyday understandings of meaning to include natural meaning as a prior context and constant consequence of social meanings. Natural meanings emerge from interaction with the environment. I focus attention, then, both on mixed interaction with the natural world that is there and on symbolic interaction with other persons through which we fashion understandings of both social *and* physical worlds.

Studies of social meanings and everyday practices give us needed insight into symbolic interaction. They are not, however, exhaustively adequate for the foundation of human interaction that depends on a supportive environment. We need to include transverse interaction to bring an ecological perspective into social psychology. On the other hand, merely behavioral or naturalistic studies of human intervention in nature do not exhaust the meanings of transverse interaction. Moderns need a combined symbolic-naturalistic frame for inquiry (Bennett, 1993). A pragmatic social

constructionism combines behavioral naturalism and symbolic realism to study the interface between constructed social selves and naturalistic others. This chapter focuses on interaction and, specifically, transverse interaction between humans and the natural environment.

Systematic interaction always requires an "other" as a cogenerator of meaning. Isolated individuals as such cannot make their own private meanings socially real unless relevant others validate them. Meanings derive from self-other interaction. In the next section, I expand the idea of other to include a thing, person, event, or symbol to which meanings refer; in which they exist; and around which they are patterned. As a result, meaningful objects are socially constructed. Meanings are always about something grasped as other than self.

To understand natural environment, we learn to think of it as an other in systematic interaction with self. In short, we re-sight the meanings we give to environment as other by taking account of our interaction with it and its responses to our actions, whether we are aware of them or not. As we unpack self-environment interaction, we realize that meanings are more fundamentally in nature than in society. Naturalistic meanings ground and eventually support or destroy social meanings. Just as society is prior to the individual, so nature is prior to society. Individuals are born into ongoing societies, and societies are formed within ongoing environments. Ambiguities and challenges in the modern situation highlight the order of dependencies: nature and society come before and continue beyond individuals.

Systematic interactionism includes transverse interaction with particular environments that have implications for our shared environment. Just as social interactionists note that individuals think of themselves, their motives, and their actions in terms of a generalized social other that represents anticipated organized responses to individual actions, so too, I argue that in an ecological age we are learning to think of meaning in terms of the anticipated responses of the environment as a generalized natural other. Moderns come to see, think, and act in terms of a "generalized environmental other." The idea of generalized environmental other recognizes the order of dependencies: nature → society → individual. The interactional processes also make us aware of the impact of individuals: individual → society and individual → nature.

As modern persons become more powerful biospheric actors, the translation of natural meanings into adequate social meanings becomes more important. Today, new instruments orbit the Earth and relay new information and new images of natural meanings. Even the term *ecology* is barely a hundred years old (McIntosh, 1986). Earthly data beamed from orbiting satellites are hardly twenty-five years old. These concepts and data

create an awareness of environmental responsibility. For the first time in history, we must think about the concepts, images, and irony involved in the fit, or lack of it, between social and natural meanings. The chances of desirable human survival teeter in the balance of the fit.

Individual meanings, what you and I know, never equal the knowledge available in social meanings. Furthermore, social meanings never exhaust natural meanings. We never know all the responses that nature is making. Paradoxically, however, social meanings are all we have in our struggle to grasp natural meanings. We are, as it were, first dealt those social meanings that dominate our historical moment on stage. History, science, and art, however, offer alternative ways of interpreting the present and imagining various futures. We must choose which meanings we shall believe in and live by and hope that the consequences of these meanings sustain an environment that continues to support us. An ironic pathos lies in the fit between natural and social meanings. The Sartrean dictum is that humans are "condemned to be free." I add that they are condemned both to be free *and* to know that their freedom to choose is always based on partial ignorance and contingency. This ironic pathos deepens in modern awareness of environmental outcomes.

The pathos hides in the gaps between social meanings and natural meanings (see chapter 2). Social meanings reside in constructed social objects and interpretive schema based on our trust and faith in culture and authority. Natural meanings, on the other hand, are a mix of cosmic processes and social meanings. This cosmic-social mix locates understandings of the world that is there in the realm of natural faith objects. They do not refer to transcendent constructions like the eschatological eternity or wheel of rebirth of religious believers, but actually and ironically to the world that is under our feet and in our lungs, mouths, and stomachs. Like the eternal world, however, individuals cannot see natural events as systemic realities, because these realities lie beyond our sensory range. Atmosphere, ozone layer, ecosystems, and the life-support cycles of carbon, water, nitrogen, or oxygen lie outside the framing power of individual minds, eyes, and ears. Natural systems are known only because experts with institutional ways of knowing tell us so. Key questions for contemporaries always include, Says who? Whom do we believe? How should I act?

Wide and deep changes in the social meanings through which we know the environment define our time. If I may oversimplify an issue discussed in the next chapter, there are three worldviews through which contemporaries typically see the natural environment. The first is rapidly disappearing, namely, a traditional worldview based on low technology links with the environment seen as interwoven with a sustainable local way of life. It is a worldview we may know as linked to "primitive," tribal, or

autochthonous ways of living in long-term sustainable interaction within the local habitat. Traditional worldviews inform the long success, until now, of natives in the Amazon jungle or pygmies in the rain forests of central Africa for five thousand years, or as long as we have written reference (Turnbull, 1962).

A second and contrasting worldview dominates industrialized nations and modernizing sectors of developing societies. This worldview frames natural environment through markets, technology, and desire in support of large-scale production and expanding consumption. This industrial worldview is based on short-term utilitarian values that drive contemporary lifestyles and national policies as signs and means of Progress. It is eliminating traditional world views in the light of rain forests ablaze and logs aground.

Recently, new world views are emerging, or new renditions of older frameworks, especially and paradoxically in industrialized nations. A core value in these new-old world views gives priority to sustaining the natural environment rather than to economic growth through increasing population, production, and consumption (Dunlap et al, 1993; Inglehart, 1990; Olsen et al, 1992). These attitudes reflect a "postmaterialist" set of values growing from awareness that environmental degradation is a humanly produced threat to our lives and the lives of our children.

Different ways of seeing the environment lead to general questions. How do we believe we know how things work in the natural environment? How can people with different ideologies arrive at a shared understanding? One pathway is to share relevant data concerning the *empirical workings* of the environment. With data in hand, we can discuss how we are to respond to accepted environmental facts. A different response is to believe that we have *divinely revealed* truth about the natural environment and how we should act. Or, we believe that we have an adequate framework within a *rational worldview* for guiding how we should act toward the environment, even if our data and knowledge are incomplete. A postmodernist may say that contemporary society is characterized by simulated and uncertain stories about nature and moral narratives about how we should act.

Traditional societies had a kind of "hands-on" or "tacit" knowledge about nature, that is, knowledge carried by our senses in direct contact with the physical world, much the way a blind person knows the world in a limited but direct way by tapping a delicate cane on the ground in front of her (cf. Polanyi and Prosch, 1975). In contrast, the postmodern person knows only images, signs, stories, and authorities' dicta with no direct touching of the natural world. A powerful version of this mediated and uncertain way of seeing is "virtual reality," a sensory experience that carries appearances of reality, but which in fact is an array of images with no sensory or certain link to physical realities. Virtual reality breaks the sensory

tacit links to the natural environment; it is nothing but a simulation, a similitude, of the real world. Virtual reality is a reality, but not the reality it appears to be. Virtual reality can even contradict direct experience of the world that is there, putting ambiguity between us and nature. In virtual reality, the only pathway to the natural world is the appearance that the programmer puts into the software now downloading through our senses and into our brains' virtual minds. Individuals can: believe and act as though they "live" in virtual reality; acquire a "virtual identity"; have "virtual sex" with "virtual others"; and form "virtual communities" existing in the cyberspace and time of "cyberia" (e.g., Rheingold, 1993).

The honest response to the question about how the natural world works is that we simply do not know enough about environmental dynamics to think and act so that we make the world we intend or sustain the one that we have (Miller, 1994). For the everyday citizen, postmodern ways of knowing increase the cognitive distance between the world that is there and institutional means for knowing that world. This distance is illustrated by the break between the experience of virtual reality—a "sensed" reality carried by dots on a screen that elicit images and sensations generated by computer software with no intrinsic links with the world that is there; and the experience of natural reality—a sensed reality entering our bodies through images and sensations generated by physical things, that is, tacit hands-on knowledge about the physical environment.

The virtual break between seeing and reality and the inability of individuals' senses to know ecological dynamics make the links between social meanings and natural meanings a definitive issue of our time. Peter Berger (1980) argues that contemporary religion in pluralistic societies brings believers face-to-face with a supermarket of options from which they must choose what to believe and how to live the good life. As a salient source of worldviews, religion illustrates how individuals relate to other faith objects as well. Individuals' perceptions and interpretations of the natural environment are faith dynamics. We who live in a postmodern context must choose a framework through which we believe we know the natural world and how to act toward it and toward others who share it.

Never before has an empirical and self-aware choice of a world view been a general task for humans in their struggle to understand the world and live sustainably within it. It is now! We must make these choices in the face of ignorance and uncertainty. There is not likely to be a time at which humans believe that all the data are sufficiently known to guide a sustainable moral life in the face of environmental challenges. Contemporaries must learn to act, not on the basis of empirical, divine, rational, or scientific *certitude*, but on reasonable yet contingent moral, faith-based commitment to one or another framework for knowing and living in the world. Do we

choose business as usual as the way to a world for our children's children, or is now a moment of critical searching for new ways of living?

A contemporary, you or I, must choose a framework for seeing the natural world. The moral and rhetorical purpose of this book is to argue that a more inclusive and shared way of seeing, a framework of systemic transverse interaction, is needed in our time. I assume that a re-sighting to this kind of seeing alters the dominant hyperindividualist and consumptionist frame at the core of Western and American culture. Within a systemic transverse interactionist framework, particular behaviors of isolated individuals are not the foundation blocks from which we construct sustainable institutions and societies. Rather, it is the reverse. I accept systemic transverse interaction as the foundational empirical framework. Person as individual and action as particular are abstractions that we select out of the fundamental world and the social life process dependent on that world.

This re-sighting not only reframes how we see. It turns the cultural world upside down. Through this inverted frame, the biosocial life process generates individuals. Individuals as such do not generate the biosocial life process, though we reproduce it and introduce changes. If individuals destroy supportive ecosystems, the species they support are transformed or go extinct. Of course, individuals in their subjectivities do experience self as fundamentally individual and real. As living organisms, however, individuals are totally dependent on often out-of-awareness dynamics of energy, air, water, food, acidity, and temperature for their existence, not just as individuals but as populations that sustain individuals. Species go extinct because their populations fall below a critical level, not because the last two individuals decide not to reproduce. Individuals die, species become extinct. Extinction is a systemic collective outcome. In this framing, we see the *team* losing the World Series, not the individual batter who strikes out with the tying and winning runs on base with two outs in the bottom of the ninth inning of the seventh game.

From a systemic transverse interactionist standpoint, individuals are temporary forms in the coming together at birth of physical realities that recombine into other forms at death. Individuals live a limited organic time; populations live a far longer collective time. Both depend on supportive environmental dynamics. These dynamics are central to an interactionist framework which sees environment as an interactional other. George H. Mead's self-other paradigm generates a naturalistic social psychology. His perspective is grounded in an assumed "world that is there," and a to-be-explained "social life process" of symbolic interaction among selves and others. Irreducible social processes emerge through symbolic interaction. Analysis of these processes starts with the social act as the basic unit. Mead recognized natural and cultural types of the social life process illustrated by the differences

between ants and humans. He worked toward a naturalism that included human social organization based on significant symbols irreducible to, yet dependent on, natural physical processes. "Self interacting with other" is the foundational paradigm that undergirds the social interactionist tradition. The next section presents a simplified schema of types of interaction with a focus on interaction between humans and the natural environment, or transverse interaction.

Types of Interaction: Looking for Transverse Interaction

Analysts of self-other interaction use dichotomies such as: biologic and reflective, nonsignificant and significant, behavioral and communicative, nonsymbolic and symbolic, natural and social, or signal and symbolic (Goffman, 1974; Mead, 1934: 81; 1982; Blumer, 1969; Weigert, 1983). George H. Mead's metaphor of animals engaged in a "conversation of gestures" exemplifies the first term in each dichotomy. Two dogs fighting illustrate gestural interaction between animals that do not use symbols. The second term in the dichotomies refers primarily to humans interacting in a situation through shared meanings generated in social actions. We see this type of interaction everyday in casual conversations, formal courtroom proceedings, or the deference and authority between doctors and patients. Such interaction takes on deep importance in critical situations that redefine the path of a person's life (Denzin, 1989).

Mead provocatively anchors his naturalistic evolutionary account by arguing that human interaction develops from the physical processes constituting nonhuman life (e.g., 1982: 116). Yet, he argues against reductionism by positing emergent social processes that demand their own explanation so that, paradoxically, physical processes generate types of social interaction and organization that cannot be totally explained by the laws governing their genesis (e.g., 1934: 30; cf. Baldwin, 1986). The same central nervous system cannot explain different moral meanings.

Social scientists often study the many modes of symbolic interaction (Reynolds, 1990). There are also studies of mixed interaction, nonsymbolic and symbolic, between people and their pets, even therapeutic pets (Rochberg-Halton, 1986). Symbol users teach simians and other species to manipulate symbols and engage in proto-social acts with their human teachers. Animals, in turn, manipulate humans in many ways from goring them to licking their wounds. Mixed interaction between humans and animals generates mixed shared meanings with one-sided interpretations of what is shared, since only humans write or talk about it later. Scholars appear comfortable interpreting mixed interaction. It yields well to the anthropocentric perspective of analysts and their audiences.

Today's population and technological developments make transverse interaction increasingly important. Mead told students about the humble ox. An ox's internal "bacteriological laboratory" (1934: 131) is a natural mechanism that physically links the organism with selected elements of natural surroundings, thus constructing a supportive "environment" for that ox-form (1934; 1982: *passim*). Animals have internal mechanisms enabling them to select their interactive environment out of the physical world. For biologic individuals such as nonsymbol-using oxen, the mechanism is totally in the natural world—physiologically, neurologically, anatomically. For humans, however, selective mechanisms include symbolic constructions that have no evolutionary or natural functional guarantees. Symbols add another level of psychological functionalism to the organism (Cook, 1993). The symbolic realm adds potential infinity and eventual pathos to humanly selected environments. The possibility of dysfunctional or self-destructive interaction that may destroy the ability of the environment to support the interactors' survival also arises. Natural pathos emerges with symbols.

In Mead's example, the ox transforms the brute physicalness of grass into a new object, "grass-as-food." Grass in itself is not food. It becomes food through its physical relationship to an animal with selective impulses toward, and a mechanism for, filling its stomach with grass that it digests and changes into its body. The ox "eats" grass, that is, makes grass into its body, but not intentionally. The ox's supportive environment is realized through an objective perspective and enacted through an interactional mechanism built into oxen without self-awareness on their part.

Symbol-using humans selectively construct their environments through cognitive and emotional processes that guide action on the natural world by transforming it into cultural categories. Grass and hamburger are grasped by organisms and made into oxen or human food for the body. Natural environments are constructed by society and made into suburban lawns and gross national products. Regardless of the symbolic content of cognitive and emotional processes, it is only what we do that gets into the natural stream shaping the empirical future and that sustains the social life generating that future. Actions are fateful in a deeper causal sense than mere ideas or symbols. It is through action that symbol users make the world real, regardless of what they think or intend. Ironic, unforeseen, unintended, and pathetic outcomes of interaction become physical realities—even for self-conscious knowers, sometimes against their own best intentions.

Action is primary in the genesis of the human species and in the probabilities of its survival. Action is the biophysical foundation of human life. Modern life, however, is characterized by technologically extended ways of seeing and acting through powerful and disjunctive instruments. Instruments that break the links between what we see and what is really

there take away the tacit or tactile ground for what we think we know. Contemporaries risk losing the tacit dimension of knowing the environment through the senses and their extensions. Compare the cane of the blind walker, glasses for the nearsighted, or hearing aids for the near deaf with the virtual contact of computer simulations. Rather, as exemplified by the reconstruction of sensory similitudes through virtual objects that appear real but have no certain link to the world that is there, moderns believe in a natural reality and, more fateful still, interact with it through instruments that have no direct contact with that world. Increasingly, human actions have effects that many individuals do not know and do not intend, or do know and do not intend but must do, and thus cannot avoid the outcomes they foresee but do not intend. Consider the automobile commuter who wishes she did not have to pollute the air in order to get to work. This systematic interactional dilemma characterizes modern life in developed societies and the plans of developing societies (see "trippers" in chapter 3).

Types of Interaction: A Listing

This section presents a listing of types of interaction to glimpse the scope and to clarify the sense in which I use the term, although the particular nuance emerges from the immediate context. Social scientists widely analyze human communication and interactional patterns, as in studies of families, race relations, or bureaucratic encounters. In spite of its bulk, however, social scientists have overlooked the relevance of Mead's ox and its selective biological mechanisms for interacting with grass and transforming it into grass-as-food. Building on the parallelism of nonsymbolic interaction between biologic individuals and symbolic interaction between self-conscious actors, transverse interaction refers to a universal type of interaction between living forms and the natural environment.

Consider these types of interaction:

Human interacting meaningfully with Human = Symbolic Interaction

Human interacting with Ox = Symbolic-Signal, or Mixed Interaction

Ox interacting with Ox = Non-symbolic or Signal Interaction, e.g., Conversation of Gestures

Human interacting with Environment = Transverse Symbolic Interaction

Ox interacting with Environment = Transverse Signal Interaction

Environment interacting with Environment = Physical Interaction.

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The types are listed in analogical order starting with human interactors, rather than in a genetic or evolutionary order. Each type of interaction except the last is part of a social act in the broad sense of interactors forming new objects through impulses, gestures, symbols, and responses. Each interactional order is interpreted as a totality that is studied as an emergent and functioning dynamic among actors that grounds the possibilities of their existence (Mead, 1934: 8; cf. Goffman, 1983). Furthermore, each type of interaction is interrelated with all others in the real world, although analysts perforce must select and abstract aspects of the totality. Eventually, all interaction that concerns immediate human survival constitutes the biosphere, the realm of living dependencies, as far as we know.

Today's awareness is beginning to recognize the wide scope of interaction within the biosphere as the ultimate empirical context for making sense of even our personal lives. The tools for knowing, or more accurately, believing in a total system of interaction and its implications for self and society range from measuring instruments beneath and beyond the earth to imaginative scenarios of temperature and climate change into the next century. Scientists depict scenarios for anticipating actual futures through the same computer potentiality that produces virtual realities with no intended link to tomorrow's conditions.

The primary analogue for a social act is human-human interaction, and the most derived type is organism-environment interaction. Mead states that a social act involves the response of one form to another that shares the same environment. The way interactors share the environment varies significantly with technological transformation of the channels of interaction. Computer technology introduces virtual human-human interaction in which there is no tacit link between self and other. In virtual communication, the body is not available. There is no grounding of personal identity beyond computer visuals that have no validated link to a biological individual. Just as virtual interaction and virtual communities emerge, ecologists and environmental scientists are enlarging our understanding of the real processes linking humans and the natural world. The range of interaction even within each type continues to grow with expanding channels of communication informing social life and more complex ways of collecting and interpreting data about the natural world. Throughout the changes, I emphasize that even social acts performed within a selected environment always have effects beyond it: every animal affects the world that is there, as well as the social life process within which its selectivity primarily operates. Just as human sensation carries more knowledge of the world than senses know, so each action affects the world more than individual or collective actors know.

These are types of social interaction in a broad naturalistic sense. The interacting organism, to the extent that the organism knows anything, is simul-

taneously two “things” at once—Mead’s basic notion of sociality. The organism both is itself interpreting surroundings as signs eliciting its responses, and takes account of the other whose anticipated responses guide the first organism’s behavior. The behaving organism, as it were, “takes” the role, attitude, gesture, reaction, or, in general, the anticipated response of the other.

Different terms refer to responses specific to each type of interaction. Physicalistic responses within the world that is there are “reactions,” as in physical or chemical reactions. Responses by nonsymbol-using organisms are “behaviors”; those by symbol-using organisms are behaviors-plus-intentions, or “actions.” The level of response self must “take” is situationally specific to the type of interaction, for example, the bureaucratic logic of an institution; the role of a social actor; the intending attitude of an individual actor; the gesturing attitude of a nonsymbol-using organism; or the determined physical reaction of an inanimate other. The complexity of human-environment interaction derives from the fact that humans can act toward two or more others at different levels of reality simultaneously. Types of interaction emerge from different objective perspectives on the one natural world that paradoxically grounds many social life processes and from the different social and psychological worlds within which persons live.

Our discussion focuses on human-environment interaction, that is, transverse symbolic interaction, or simply, transverse interaction. Transverse interaction combines categories that scholars usually separate: intentional action and inanimate reaction; assumed freedom and a realm of determinism; individual response and systemic interaction; personal motives and institutional logics; the social life process and the world that is there. Looked at through a physical frame, such interaction falls within the natural science of ecology. Seen through a symbolic frame, it falls within the disciplines that study human constructions of reality and motives, for example, individual and social psychology, anthropology, and in general, the semiotic and social disciplines. This book moves toward an ecological social psychology, that is, a study of ways in which humans frame and interpret their relationships with the natural environment (Catton and Dunlap, 1978; Howard, 1993).

An Interactional Other Codefines Meaning

The idea of transverse interaction helps us interpret the ways we speak about and act toward the environment. Mead, for example, saw the engineer as an exemplar of rational human-environment interaction. Imagine an engineer designing a bridge that will physically do what bridges are supposed to do even though the engineer is neither a bridge, nor the outcropping of rock over the river, nor the feet or wheels that will cross the bridge. Yet, the

successful engineer somehow takes the attitude of all of these simultaneously if that bridge is to span the river while walkers and wheels cross over. As Mead said:

An engineer who is constructing a bridge is talking to nature in the same sense that we talk to an engineer. There are stresses and strains there which he meets, and nature comes back with other responses that have to be met in another way. *In his thinking he is taking the attitude of physical things.* He is talking to nature and nature is replying to him. (1934: 185, italics added)

We continue the engineer's discussion with nature whenever we cross the bridge, perhaps with a touch of fear as we wonder whether it is like the Bridge of San Luis Rey.

Although we too address physical things at times (Cohen, 1989), such interaction does not imply that we or the engineer are hearing voices. Communicating is an activity before it is a vocality. What we do becomes what we communicate. Thus do nature's reactions "tell us" what we are doing. Meaning is in nature more basically than it is in symbols. Indeed, the temporal lag between humanly intended outcomes and nature's reactions, as well as differences between intention and responses, make it difficult in practice and impossible in principle for us to know all the natural meanings of our actions. Hence the ever-present pathos of interaction in which we do more than we intend. Society's laws and social graces recognize this gap. Sometimes society holds us responsible for outcomes we did not intend by declaring us "negligent," that is, failing at foresight that a normal person is legally expected to have. Social disclaimers and excuses right the wrongs committed in the social life process, but they are literally meaningless within the physical world. Nature is unforgiving in the face of interactional pathos: it reacts to what we do regardless of what we intend. This truism gains importance each time we flip a switch.

Transverse interaction engages us with an environmental other. To understand self conceptually and empirically, it is necessary to develop the other engaged in the interaction (Hughes, 1962). Scholars have studied various others such as: generalized, significant, reference, authoritative, intimate, confirming, labelling, victimizing, oppressive. Each particular other, with the structured exception of the generalized other, is usually taken to be another symbol-using individual on an analytic par with the self. Self and other, then, are often taken as interpretive pairs on the same level of symbolic use, like two humans.

The environmental other in transverse interaction, however, exists at two levels. It comes to us, first, as a *constructed* other, that is, a perceptual

object seen from self's perspective looking through cultural lenses. Self anticipates a constructed environment's reactions by analogy with taking the role of human others and expecting them to respond in typical ways as they normally do. The environment, however, is also a *nonconstructed* other that reacts through naturalistic causal patterns that are only partially seen through cultural lenses (cf. Greider and Garkovich, 1994; McCarthy, 1984). A crucial aspect of contemporary environmental awareness is that constructed meanings increasingly include physical "substructured" meanings that are foundational to symbolic meanings. Here is the rub that makes transverse interaction both so crucial to modern life and so difficult to analyze: it is interaction constituted by both conscious and nonconscious others; by both symbolic and physical processes, each with partial functional autonomy and no guarantee of harmony, indeed with growing evidence of conflict; and by centaurlike configurations of meaning that combine symbolic and physiconatural meanings.

As we learn to see symbolic-natural meanings with reference to particular environmental others like my lawn or the local landfill, the realization grows that the environment, writ large, is common to all of us. That is, we come to see a Generalized Environmental Other as the counterpart to the human species, indeed, to all living beings. We gain a more complete social self when we take the role of the organized responses of a community. Self knows a Generalized Social Other by anticipating the organized responses of collectivities or institutions, such as the responses of players on a "baseball nine" to a squeeze bunt. Transverse interaction reveals self in relation to a "Generalized Environmental Other," or GEO. Humans have long believed in holistic views of physical reality, that is, some form of a GEO. Within western history, there are religiously based GEOs from the vaulted cosmos of the ancient Hebrews to the divinely bounded spheres of Greek religions. Outside of western traditions, vivid cosmological myths picture the origins, design, and destiny of the universe precariously balanced on the back of a turtle, elephant, or Atlas himself. These views of the physical universe are now discarded as primitive, religious, mythic, erroneous, or in general, prescientific.

Even scientific worldviews change profoundly, however, as instruments for knowing and interacting with the earth change. Scientific views of the universe have changed from static concentric spheres to Ptolemaic wheels to exploding and imploding gases in an ever expanding spatial medium. Today, we see the earth simultaneously within different and often competing frames. A dominant frame is that of optimistic technological and scientific rationality summarized in the ideas of Progress and Control. Progress and Control are enlightenment beliefs about the universe according to which we increasingly intervene in nature and nature continuously supports this intervening species ever more comfortably—no matter what it does. Followers of

Progress and Control find support in their version of Darwinian evolutionism through "struggles for survival" and the resulting "survival of the fittest."

At first glance, moderns can congratulate themselves for being the fittest, since obviously they survived. Understanding evolutionary dynamics, however, includes ecological ways of seeing. The idea of Progress is limited in a powerful way, namely, the "fittest" are defined in terms of *dependency* on the precarious sustainability of environments. The realization dawned that in trying to control nature, humans may transform their environment in far-reaching ways that have unknown links to supporting human life. Breakdown in life-support systems of air, water, or soil would render humans "unfit." Such breakdowns, paradoxically, could result from our interventions into those life-support systems. Ecological biology carries a cautionary and perhaps pessimistic message for believers in unlimited intervention in pursuit of Progress and Control. For such believers, it is a "dismal science" (Worster, 1977).

In an ecological framework, the earth is known or believed in as a biosphere, that is, a functioning set of systems that support life, including human life. No one has direct sensory or empirical access to the biosphere; no one of us as an individual citizen directly knows the biosphere. It is not an object that we can hold in our hands or line of sight. The biosphere, like heaven or hell, is a faith object. But unlike heaven or hell, it is a faith object linked to us through chains of data and measuring instruments. We know it on the basis of our trust in systems of knowledge, networks of experts, and media that tell us about data generated by scientific communities. The recent development of ecological and environmental sciences (McIntosh, 1986; Miller, 1994) underwrites belief in the physical reality of a biosphere. Indeed, belief in the biosphere realizes a generalized physical other in relation to which we are developing a new sense of self (see chapter 7). A decisive moment for this new self is acceptance of a Generalized Environmental Other like a biosphere that supports the human species. In a word, we now have a new psychological and moral responsibility to choose whether to believe in a generalized environmental other that is adequate to our sense of who we are as moral environmental actors.

GEO is constructed through our internalized patterns of anticipated environmental reactions to individual and collective actions. GEO includes both humanly constructed symbolic meanings and naturally given environmental meanings. We define symbolic meanings however we want. Naturalistic meanings, however, are the objects of ceaseless searching. Our challenge is to construct symbolic meanings that adequately fit and grasp the ever-changing date on the environment. Rather than take a symbolic turn toward the constructed meanings of transverse interaction, I turn to the naturalistic meanings. Reactions by environmental others continually

modify the symbolic meanings of what we do. Just as interaction implies one or more relevant others, so too, each interaction generates different kinds of meaning such as personal, generalized, or species meaning. The species meaning of millions of car exhaust systems goes beyond the personal meaning of each driver's intention. Meaning is not solely grounded in intentional or symbolic meanings, such as intended market profits for transnational corporations or the individual rationality of commuting to work. It also derives from the cumulative, even if unintended, impact of burned gas on atmospheric carbon levels. That is, our actions impact environmental others, known and unknown.

For a larger authentic self to emerge from transverse interaction, a modern person must take the role of the anticipated reactions of relevant natural systems, that is, self must know and respond to a GEO. The powerful consequences of human-environment interaction make it increasingly salient to, if not definitive of, social life. Walking across a natural meadow is a different social act than spraying pesticides on our lawn or, at the extreme, launching nuclear missiles from a command silo. What is similar is that each action, regardless of actors' intentions or knowledge, impacts on the world that is there. Social meanings inform individual actions and thus render them real and normal. Nature's reactions to us, on the other hand, are real in themselves through their effects on human life even before we impose social meanings to render them secondarily meaningful to us. The sum of all actions and reactions make up the physical world that we grasp as GEO. The key question is, Can actions rational within the social life process be irrational within the objective perspective of the world that is there? To the degree that the answer is "Yes" or "Maybe," the question points to a crisis, that is, a critical juncture of meaning. We need to relate symbolic and natural meanings to address this critical issue and choose how to act.

Scholars of the symbolic and affective meanings of built urban environments and of the "daydreams and nightmares" regarding the natural environment help us integrate transverse interaction within larger social actions (Firey, 1945; Burch, 1971). Newer perspectives such as "critical animism" and "topistics" show how subjective and emotional meanings are projected onto things and rooted in physical surroundings (Rochberg-Halton, 1986; Walter, 1988). We do find meanings in objects like furniture, photos, houses, cars, caves, trees, landscapes, and mountains. In such interactions, self embraces physical things within life's projects and bestows vital meaning on them. Our physical surroundings become a "furniture of the self" for living meaningfully (Erikson, 1976). Biologists argue that the long evolution of the human species formed genetically based affective ties between humans and natural others, that is, we have an inherited love of life's forms or "biophilia" (Wilson, 1984).

These new perspectives underline the significance of natural meanings for an adequate understanding of human life.

Understanding transverse interaction generalizes biologically selected environments such as the ox's grass-as-food to include symbolically selected human environments ranging from "thing-as-my-consumable-resource" to "thing-as-species-life-support-system." The biological *Umwelt* of natural meaning for animals is incorporated into the transformative power of the symbolic *Lebenswelt* of constructed meanings for human animals. There are no ironclad guarantees that symbolic worlds will sustain biological ones, or that our social life process will sustain the world that has been there for us.

Fitting Natural and Social Meanings Together: Irony and Image

The partial autonomy of physical versus symbolic interaction generates paradox. Rational and desired acts can cause negative physical reactions. In using, we destroy usable energy; in producing, we make toxic waste; in consuming, we destroy the consumed object; in living, we threaten life-support systems. Ironies follow the actions through which we give meaning to self and other. Institutional logics pursue actions that threaten the environments that support them and the communities that birth us. An interactional paradigm explicitly recognizes positive and negative outcomes; it builds understanding by making us aware of previously hidden physical outcomes.

Environment-as-system is a constructed faith symbol that informs the selective perception of human knowers. In the currently dominant cultural paradigm, this cultural selectivity works toward legitimating lifestyles of production and consumption. The environmental challenge, on the other hand, focuses on sustainability. We need to locate both human responsive gestures and cumulative reactions of the natural environment in relevant temporal and causal frameworks. Environmental meanings are both within the time-action frames of individual intentions and social institutions and, more telling, within the time-reaction frames of natural physical processes. It may take generations, for example, to assess organic reactions to food additives or radioactive waste. The constructed times of symbolic interaction remain dependent on physical and geological times. The latter set the limits for human viability. Time frames are asymmetrical and potentially contradictory, like seeking freedom to consume now but facing the determinism of famine later, or desired nuclear energy now and undesired threat from radioactive waste for a foreseeable future.

We need to constantly remind ourselves that meaning is in nature both before and after it is in symbols. In taking the attitude—an imagined incipient or truncated response—of nature, we, like engineers, anticipate and partici-

pate in nature's reactions to our interventions. We grasp nature's reactions through vivid affective imagery or rationalized abstract constructs. Both are needed. Imagery carries emotional weight; constructs allow instrumental manipulation. Interaction is affective and cognitive, processual and emergent. Images and constructs function in all phases of the social act: impulse, perception, manipulation, and consummation.

A critical question is whether nature's responses to our interaction are "functional" for us. That is, will nature continue to sustain human life as we want it, no matter what we do? Are our images and constructs physically adaptive; do they bestow an evolutionary advantage; do they sustain our social life within nature? These are questions many scholars appear to beg or simply assume, perhaps because of optimistic evolutionary views. I believe that there is no evolutionary necessity that the images and constructs underlying human-environment interaction lead to adaptive or cooperative interaction with nature. Nor is there any assurance that the empirically most likely futures implicated in our actions are the same that inform our images and motives. Without our knowledge or intention, we are projecting some mythic, counterfactual, and destructive imagined futures in a "future perfect tense" so that they function as purposive motives guiding our action (Schutz, 1962). We may be forging a future that is not part of our intentions or images. Environmental science suggests alternative imagined futures to complement inherited images of Progress and Control.

Changing Frames for Seeing the Environment

Environmental scholars argue that the images of today's world point to new paradigms for what we see and how we act. Among sociologists, a "new environmental paradigm" posits the dependency of human life on the physical environment versus the "human exemptionalist paradigm" that analyzes society apart from its relationship to nature (Catton, 1994; Catton and Dunlap, 1978; Dunlap and Catton, 1983). In addition to scientific paradigms, cultural value systems need imagery adequate to symbolic and physical interaction. Transverse interaction is basic to the development of both new ecological paradigms for social science and new imagery for everyday motivation. Along with the socially constructed "facticities" of life, we need the physical "facts" of environmental responses as best these can be estimated. On this dual foundation rests our chances for "envisioning a sustainable society" (Milbrath, 1989).

Modern leaders, however, typically use counterfactual imagined futures built on mythic ideologies of unlimited material consumption, ever-rising standards of living, total free market functionality, increasing populations, and the assumed taken-for-granted viability of life-support systems. Inglehart

(1990) documents distinctions between traditional materialist and emergent postmaterialist value configurations that divide First-World cultural attitudes and the perceptions of older and younger generations. Older First-World political leaders tend to favor policies grounded in Progress and Control images of the future. Inglehart suggests that societies are approaching limits of physical sustainability faster than younger generations can move into leadership positions. There is a cultural and socialization lag in leadership during periods of rapid social and environmental change. As a result, nations are ruled by leaders who came of age "worlds" ago and who often do not adequately frame environmental issues. Leaders who grew up in an age of Progress and Control are not likely to see the world through an ecological framework.

Social action, especially technological intervention, is characterized by the historical irony of unintended or unforeseen outcomes. The future we build through collective action may not be willed by any individual, planned by any social agency, nor included in any institutional policies. No one explicitly intends climatic change, soil degradation, increasing toxicity, thinning ozone, growing garbage, or species extinction. Many ignore, others decry, these dawning images.

Empirically grounded, species-sustaining imagery challenges ideologically functionalist interpretations of human evolution or co-evolution as though human history were outside yet in tandem with biological evolution. Oppositional social movements generate different readings of environmental concerns. From highly bureaucratized environmental organizations with Washington offices alongside equally bureaucratized government and business offices to neighborhood groups protesting a toxic landfill, industrialized societies feature a range of environmental movements and organizations. Indeed, the patent irony of human exemptionalist thinking contradicts an overly literal reading of George H. Mead's comment that the human capacity to build environments spells "an end to the process of organic evolution" (1934: 252). Organic evolution does not end. It is not replaced by sociocultural or technological processes. It continues apace, even quickening, though not only along lines of natural physical processes, but also along channels of constructed technological intervention. Humans are speaking in more powerful engineering languages, and the natural environment is answering in more challenging systemic reactions.

Which Knowledge? The Imperative to Choose an Adequate Frame for Seeing the Environment

The bacteriological laboratory in an ox stomach is not my primary concern, though eating is an issue. Rather, I focus on the epistemological