

# Seeing is Believing

## Ecological Consequences of the Scientific View of Mind

Graham Dey

**Science, by presenting the mind as an individual phenomenon separate from its wider ecological setting, offers a perspective that is inherently problematic and one that reinforces ecologically destructive cultural patterns.**

The declaring of the 1990s as the Decade of the Brain by former President Bush underlines the seriousness of efforts on the part of scientists today to interpret the complex functioning of the brain and to redefine our understanding of mind. Legitimized by the dramatically increasing body of information gathered by researchers through the use of new imaging technologies, we are currently being led to believe that an understanding of the complex relationships of brain and mind are being unraveled, and that scientists are nearer to comprehending phenomena such as consciousness and intelligence than at any time prior in human experience. As a result, it is increasingly common for classroom teachers, educational theorists, and the general public to accept and incorporate views concerning the nature of mind put forth by the scientific community, as well as the new definitions of intelligence that accompany these views. It is therefore critical that professional educators pay careful attention to questions concerning the ramifications of basing educational practices on these new models, and to recognize and understand the assumptions inherent in these beliefs.

The popularizing article, "Glimpses of the Mind," that appeared in *Time*, posited the following question: "What, precisely, is the mind, the elusive entity where intelligence, decision making, perception, awareness and sense of self reside?" (Lemonick 1995, 45). The answer, if we are to believe the author, is based largely on the currently held notions of scientists and the "discoveries" they have made within the last few decades. Underlying these efforts is the belief that science can illuminate and interpret the "mysteries" of human consciousness, a pursuit which has long captivated Western thinkers since the

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times of Plato and Aristotle. According to this historical-scientific view, the human brain is seen as a system composed of complex chemical structures that are capable of producing minute electrical fields. Information is transmitted by these electrical impulses through neurons, 10 billion of which are connected to one another in a geography of energy that is responsible for the control of all mental functions. The brain is thus a control center for movement, sleep, hunger, thirst, and all other activities that are vital to the survival of the individual. Further, all human emotions are controlled by the brain which acts as a processing center for emotional perceptions and memories. It also receives and interprets the countless signals that are sent to it from other parts of the body and from the external environment, the latter being seen as separate from the individual.

Intelligence, the capacity to learn or understand, is also thought by scientists to reside within the brain and to be largely a function of neurons. The number and type of functioning neurons and how they are structurally connected with one another determines just how smart one is. Patterns among neurons are also thought to be responsible for learning and memory, both being processes through which individuals acquire and store information. Additionally, the patterns formed by neurons are also believed to connect in ways that form mental switching stations called "convergence zones." These zones provide access to information and relate it to other pieces of data which enable individuals to process language and coordinate disparate bodies of information contained within the neurological framework (perception, memory, emotion, etc.). Scientists believe that these convergence zones, acting in concert, may provide the individual with a sense of being present "here and now," or in other words of being conscious.

"Consciousness," says neuroscientist Antonio Damasio, "is a concept of your own self, something that you reconstruct moment by moment on the basis of the image of your own body, your own autobiography and a sense of your intended future" (quoted in Lemonick 1995, 52). This quote embodies a linear scientific view that the mind is individually centered. Within the context of other scientific ideas regarding cognition, this suggests that the individual

operates in a manner that is free of the constraints of an environmental context, that information is the basis of thinking, and that the individual can be considered as a fundamental social unit. For a mode of inquiry that is purportedly free of cultural bias, this sounds somewhat suspect and leads us to wonder what is missing from the scientific approach to explaining the nature of mind?

In addressing this question it is useful to first examine the method scientists employ in arriving at such a theory. This is an effective critique in that it illuminates the pathways that lead scientists to propound the idea that aspects of mind are only the result of an electrochemical stew, and reveals the problematic nature of such discoveries — *scientific experiments being largely cultural experiments*. Additionally, by briefly examining the assumptions upon which science bases the enterprise of discovery, we can better grasp how the distinctions science has made with regards to mind reflect a selective recognition of the information being communicated to scientists, and why these rationalized conceptual maps are inadequate for this task.

The paradigm Western science has chosen for perceiving the world is the visual, and the act of seeing is mainly considered a physical rather than cultural act. The eyes of scientists are understood as being simply data recorders providing information for their minds to interpret the world by. Michel Foucault, in tracing the archaeology of natural history, states that sight was given an exclusive privilege amongst the senses, it being the sense by which scientists were able to perceive and establish proof acceptable to everyone — seeing is believing. By preferring the visual, images became central to the conceptual framework with which scientists began to map, classify, and convey the world to the Western mind. Commenting on this visual orientation, Foucault (1973, 133) writes: "To observe, then, is to be content with seeing — with seeing a few things systematically. With seeing, what, in the rather confused wealth of representation, can be analyzed, recognized by all, and thus given a name that everyone will be able to understand." Thus, like a photographic image, the natural world is taken, limited, filtered, and reduced to those elements of form whose visual representations will provide science

with what it needs most: a distinct, proper object divorced from its contextual setting. This reduction of the world to purely instrumental terms reflects the rationalistic orientation of modern science, a view whose genesis is to be found in the *Meditations* of Rene Descartes.

The philosopher and social theorist Martin Heidegger believed that the responsibility for the instrumentality of modern science rested with the way in which Descartes had radically altered the meaning of how the subject was understood. In the essay, "The Age of the World Picture," Heidegger (1977, 128) argues that prior to Descartes the subject had been thought of as a foundational aspect of beings — one that had "no special relationship to man and none at all to the I." However, with Descartes a sudden shift in subjectivity occurs that shatters this notion, for Descartes turns ourselves into the "primary and only real *subjectum*." As a consequence, humanity "becomes the relational center of that which is as such" (Heidegger 1977, 128). Simultaneously, "that which is" is turned into objects, to be perceived from this human center. By drawing this distinction, Heidegger argues that Descartes has withdrawn us from the primacy of experience and instead instituted a mind-body dualism that accepts the existence of two separate spheres, the objective world of physical reality, and the subjective inner world of our thoughts and feelings. In such a view the world is reduced to a passive stage on which the human drama is played out. The Cartesian consciousness comes to grasp the world as a picture, images becoming a form of appropriation that enables us to fix a place in which we feel secure, and as a result of this we diminish the world to terms of calculability. Another way of thinking of this is that the modern mind projects a conceptual map or grid onto the world, and is aware of only those elements that will fit neatly into this framework. In Heidegger's view this is the underlying essence of the rationalist orientation, the reductionism of which science is so often accused and which is reflected in the famous remark by the physicist Max Plank, whom Heidegger (1977, 169) cites: "That is real which can be measured."

Pioneering scientists in the field of neurophysiology must have felt akin to the early fifteenth century

Portuguese mariners faced by the unknown "Green Sea of Darkness." Early brain research was and still is largely centered about the attempt of making the unknown known. Classification and description provide the conceptual framework scientists use in this endeavor, and the determining factor in what is noticed are those elements of the mind that can be reduced to numeric representation. Scientific theory of the mind is therefore determined by the reduction of the brain to differences in electric potential or charge. In this way the mind becomes a system, and the system little more than a mechanism, and the mechanism is understood by looking at the short causal pathways involved in a given thought process. By believing that this method of inquiry can serve as a basis for understanding the phenomena of mind, the rationalist tradition generates a blindness that limits the efforts of scientists to understand human thought, language, and action. For at an essential level no aspect of mind (or any natural system) may be understood by considering only those elements that may be assessed empirically. This notion was understood by Gregory Bateson (1972, 144), who wrote that "the content of consciousness is, at best, a small part of truth about the self. But if this part be selected in any systematic manner, it is certain that the partial truths of consciousness will be, in aggregate, a distortion of the truth of some larger whole."

It should be noted that in embracing the elaborate construction of objective science we discarded, as E. F. Schumacher (1973) stated, the two great teachers of humanity: "the marvelous system of living nature" and "the traditional wisdom of mankind" by which we know about it. The latter contains a view of the mind very different from that which science provides us, and the work of Gregory Bateson expresses, in our own cultural terms, an explanation of mind that is ecologically centered. Such a view places cognition within the participatory relationship between the elements of any system, and it is this foregrounding that keeps the moral nature of these relationships clearly in sight. This fundamentally reframes Western notions of mind that are centered within the human individual.

The following example reveals how Bateson's view of information flowing through a system is

characterized by relationships developed in a domain of interactions, and not individualistic:

Consider a man felling a tree with an axe. Each stroke of the axe is modified or corrected, according to the shape of the cut face of the tree left by the previous stroke. This self-corrective (i.e., mental) process is brought about by a total system, tree-eyes-brain-muscles-axe-stroke-tree; and it is this total system that has the characteristics of immanent mind. More correctly, we should spell the matter out as: (differences in tree)-(differences in retina)-(differences in brain)-(differences in muscles)-(differences in movement of axe)-(differences in tree), etc. What is transmitted around the circuit is transforms of differences. And as noted above, a difference which makes a difference is an idea or unit of information. (1972, 317)

Differences, which represent fundamental units of information, are the parts of which ongoing dialogues between the systems components are constituted. This associative process emphasizes that exchanges of information are expressions of interacting systems (man-tree-axe), and demonstrates that the mind is not bounded by the skin, but must include the external vectors through which information can pass. As Bateson (1972, 316) writes: "... in no system which shows mental characteristics can any part have unilateral control over the whole. In other words, *the mental characteristics of the system are immanent, not in some part but in the system as a whole.*" In acknowledging this view it is readily apparent that we can no longer consider cognition in the light of the narrow definition that Western science has provided us, one that holds that the mind is individually-centered and largely a characteristic of human mental activity. Instead, Bateson has presented us with a view of mind that necessitates an awareness of the many ways in which systems are dependent upon the exchange of information and how humans are a part of these interactive systems.

To consider humans as interactive participants in a wider ecological context runs against the convictions of Cartesian thought and may seem an unwarranted claim. But the same way of understanding cognitive aspects as immanent in the entire system is to be found in the work of the Chilean biologist, Humberto Maturana, who writes of language:

The basic function of language as a system of orienting behavior is not the transmission of information or the description of an independent universe about which we can talk, but the creation of a consensual domain of behavior between linguistically interacting systems through the development of a cooperative domain of interactions. (1978, 50)

Like Bateson, Maturana perceives that in the unwinding of language we are not conveying information about an external reality, but are creating a set of distinctions that relates ourselves to a domain shared by others. This suggests that cognition must not be viewed as some inner mental realm, but as a pattern of behavior that is relevant to the functioning of living beings in an ecological context.

Bateson's essential premise, that we are interrelated and dependent upon our wider ecological context, seems to be so common-sensical that it is difficult to understand how one could think otherwise. But if we examine the condition of living systems today we recognize that such premises are not the coin of the realm. Instead, we see the results of a culture that has approached the land with inappropriate visions based upon notions of an individually centered understanding of mind. Scientific paradigms that are based upon this view have played a great part in wreaking havoc among living systems on a global scale, in part because these paradigms render invisible the phenomena that are vital to the functioning of these systems. Scientists, examining what they have chosen to make visible, deny the integration of natural systems, which in turn leads to loop after loop being removed from ecological contexts. In this way it is possible to lose sight of the distinctions which are vital, and this often results in ecological catastrophe. If the entire ecosystem is to survive, as Bateson points out, the Cartesian view of the physical world as mindless must change.

The writer Mary Austin once wrote of the Californian Shoshones: "The manner of the country makes the usage of life there, and the land will not be lived in except in its own fashion. The Shoshones live like their trees, with great spaces between" (Stegner 1987, 24). This comment evokes a sense of what may be considered an ecological frame of mind and suggests how other cultures have viewed themselves as a part of living systems. Within such a circuitry the funda-

mental unit of survival is not the individual, but the entire ecological context. Bateson's discussion illuminates this fact and the ethical ramifications carried with it. This is to say that when the fundamental unit of culture is me and others like me (or one among many) then the environment is ours to do with as we please. Bateson (1972, 462) writes: "If this is your estimate of your relation to nature *and you have an advanced technology* your likelihood of survival will be that of a snowball in hell."

Keith Basso's work with the Western Apache, which appears in the book *Wisdom Sits in Places*, provides us with an analog of what Bateson would perhaps refer to as "correct thought," those patterns of thought that lead to long-term survival. The Apache, exhibiting an ecologically based concept of the mind, are a culture whose fundamental unit of survival includes their ecological context. Basso relates to us how the symbolic representations of the land, which reflect an experience of place that is cultural (not physical as in our own perception), provides the means to adhere to ethical strictures that ensure this survival. The Apache, by incorporating a sense of place into an endless spiritual cycle that is reproduced through tradition and which includes the actions of their ancestors, effectively mediate a relationship to their environment that has moral reciprocity as a core consideration. Basso, reflecting upon this sense of place, writes:

Incorporating places and their meanings into a compact model of mental and social development, the theory of "igoya i" proposes that the most estimable qualities of human minds — keen and unhurried reasoning, resistance to fear and anxiety, and suppression of emotions born of hostility and pride — come into being through extended reflection on symbolic dimensions of the physical environment... Like their ancestors before them, they display by word and deed that beyond the visible reality of place lies a moral reality which they themselves have come to embody. And whether or not they finally succeed in becoming fully wise, it is this interior landscape — this landscape of the moral imagination — that most deeply influences their vital sense of place, and also, I believe, their unshakable sense of self. (1996, 146)

The Western Apache, for whom the landscape resonates with symbolic meaning, are intimately

aware of the relationships between themselves and the land they dwell within. It is this intertwining of place and self, combined with the authority of tradition, that creates for the Apache a complete awareness of the interdependencies that sustain them. Wisdom (a sense and recognition of this circuitry) therefore consists of a mental capacity that facilitates the avoidance of harmful events by perceiving alterations that are threatening. This sensitivity to differences, central to the Apache conception of the mind, is thus first and foremost an instrument of survival. An example that illustrates this way of thinking is to be found in the Apache practice of assigning place names and stories to aspects of the desert landscape. Terms like Tsee Bika Tu Yaahiline (Water Flows Down On A Succession Of Flat Rocks), T'iis Bitl' ah Tu Oline (Water Flows Inward Under A Cottonwood Tree), or Tsee Ligai Dah Sidile (White Rocks Lie Above In A Compact Cluster), are intended to evoke mental pictures of places where significant moral dramas unfolded in the past. By so doing, the Apache incorporate their physical geography into a community of living memory, one in which reference to a particular place reminds one of the moral obligations that must be observed. It is this foregrounding of moral relationships that shapes the actions of individuals in their daily lives, an acknowledgment of limits that confers the practical advantage of sustaining life over the long term. As the Apache Dudley Patterson remarked in a conversation with Basso, "You can't live long without water and you can't live a long time without wisdom. You need to drink both" (Basso 1996, 134).

It is apparent that the Apache conception of mind differs markedly from the view contained in Western ideologies, the ability to discern those changes that are vital from those that are ultimately destructive being a hallmark of the former. The analytical error of our own perception lies in the fact that we have not understood in cultural terms the meaning of that which has been presented to us by the empirical revelations of sensory perception. In short, by rationally describing the world we have misunderstood it, and in so doing have replaced the experience of place with explanations of place. Basso writes:

Requiring neither extended analysis nor rational justification, sense of place rests its case on the

unexamined premise that being from *somewhere* is always preferable to being from *nowhere*. All of us, it asserts, are generally better off with a place to call our own. Places, it reminds us, are really very good. (1996, 148)

Today, when educators are pressed to an ever greater extent to rely upon the high-status views of scientific research for understanding how the mind functions, it is unfortunate that we do not consider what other people have made of this question. In light of the destruction wrought upon living systems globally by industrial activity and the threat of ecological catastrophe that has resulted, it is critical to understand that our cultural patterns of belief have led us to this point, because at the most fundamental level *the ecological crisis is a cultural crisis*. The scientific model of the mind being presented to educators and the general public is inherently problematic and reinforces cultural patterns that are ecologically destructive. Science, by interpreting the mind as an individual phenomena perpetuates the belief that we are separate from our wider ecological setting. In subscribing to such a view it becomes that much more difficult for our communities to fashion workable adaptations to the living systems of which we are a part. If we remain unaware of how we constitute our landscapes and fail to understand our connections to them, we will continue to degrade the environment and remain victim to the rootlessness that is so much a part of our experience.

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