

The insights of Gregory Bateson on the connections between language and the ecological crisis

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The challenge facing educators is far more complex than providing students with the data connected with the scientific findings about changes in the Earth ecosystems. It is also more complex than educating them in how to develop new technologies that are less disruptive of natural systems. As the late Gregory Bateson warns, our survival depends upon a radical transformation of the dominant patterns of thinking in the West. These patterns are widely shared, passed along in everyday conversations, and encoded in the built culture. The institutions that give special legitimacy to these patterns of thinking are the public schools and universities. They also have the greatest potential for providing the conceptual space necessary for understanding the historical roots of the misconceptions underlying the myth that if humans rely upon rational thought they can control the changes occurring in natural systems. They also are sites where students can learn about the nature of ecological intelligence, and how the exercise of ecological intelligence leads to correcting the destructive impacts of earlier assumptions and practices on natural systems and human communities. One of Bateson's key insights about the recursive nature of cultural belief systems reminds us that past ways of thinking, both in terms of the conceptual history of the culture as well as the conceptual history of the professor, may be ignored—thus dooming to failure the efforts to correct the conceptual errors of the past.

Before discussing the fundamental differences between the dominant view of individual intelligence (including the cultural assumptions that support it) and the nature of ecological intelligence, a brief sketch of Gregory Bateson's background would be useful. He was born into the family of a prominent British biologist in 1904 and died in 1980. He began as a student of zoology but quickly shifted to the field of anthropology—which led to his field work in New Guinea where he collaborated with Margaret Mead whom he eventually married and later divorced. According to his own account, his first book, *Naven*, contained his initial insights about the hidden influences on the observer's perceptions and analysis. Following his move to the United States, he began to work in the field of psychotherapy and to participate in the early discussions of cybernetics. Both fields led to important developments in his understanding of the connections between communication processes and what he refers to as the double binds in human and human and nature relationships that perpetuate the problems rather than solving them. His last two books, *Steps to an Ecology of Mind* (1972) and *Mind and Nature* (1979) are now recognized as his most important contributions. The former, which is now the most widely read, is a collection of essays and printed versions of talks he gave to various audiences. As in nearly all cases where radically different ideas are presented to groups that are encountering them for the first time, the introduction to key ideas and themes tend to be repeated in different sections of the book. The elaboration on certain key ideas, as well as Bateson's arguments with counter points of view require book length treatment—which Peter Harries-Jones has already

done in his excellent book, *A Recursive Vision: Ecological Understanding and Gregory Bateson* (1995).

My purpose in this book is to introduce several of Bateson's more fundamental ideas, and to explain how they lead to rethinking both the idea of individual intelligence and the cultural assumptions that support it. I also explain how his insights are the basis for understanding ecological intelligence, as well as their practical implications for introducing educational reforms that do not rely upon past misconceptions that are major contributors to putting our culture on an ecologically destructive pathway. While I introduce several ideas from his other writings, the clearest account of his insights can be found in the sub-section of his chapter on "The Cybernetics of 'Self': A Theory of Alcoholism" (1972, pp. 309-337). The sub-section is titled "The Epistemology of Cybernetics" and is a mere 6 pages in length. The challenge will be to expand upon his short explanations in a way that enables the reader to recognize how they transform our traditional individually-centered understanding of how we acquire knowledge, engage in relationships with others and the environment, and begin to make the transition to an ecological way of thinking. First I will present a summary of the different ways in which individualism and the supporting cultural patterns are part of the experience of most westerners. There are, of course, variations in how this sense of individualism is experienced. Differences can be traced to the influence of local cultural traditions, ideologies, religions, and what has been learned from personal experience.

Summary of Assumptions Underlying Being an Individual

The personal pronouns "I", "me", and "you", as well as the names we are given set us apart from others, and continually reinforce the sense of being an autonomous individual. This culturally mediated experience is further reinforced by the cultural tradition that emphasizes sight over the other senses as the most accurate way of acquiring knowledge—which reinforces the sense of being separate from the object observed. This leads to the subjective experience of having a unique perspective on events in the external world. The conduit view of language (which I have written about elsewhere) and the idea of objective knowledge promoted by the intellectual class also marginalize awareness of the cultural and environmental influences that must be ignored if the myth of being an autonomous individual is to be sustained. Taken-for-granted cultural assumptions required to support this myth include the idea that change is the engine of a linear form of progress, that this is a human-centered universe, and (for many fundamentalists), that their good works or evil deeds will determine their future destiny. Also reinforcing the idea of individualism are the Enlightenment assumptions about the power of rational thought. Today, Enlightenment thinkers and their followers have contributed to the widespread cultural amnesia by framing the meaning of the word "tradition" in a way that reduced its meaning to whatever is associated with maintaining privileges, with backwardness, and oppressive practices. The myth of progress, and the increased reliance upon computers also reinforces the idea that the individual is in control about where in cyberspace she/he wants to explore, further adds to a state of awareness that makes traditions appear as irrelevant.

In addition to the tradition of civil liberties, which George Lakoff wrongly identifies with progressive thinking, there are overwhelming economic and technological forces that further strengthen the special status that individualism has in western cultures. These include market liberalism, as it equates the expansion of capitalism with the expansion of individual freedom, and

libertarianism as a more extreme ideology that celebrates the “Virtue of Selfishness”-- to borrow the title of one of Ayn Rand’s books. The special status given to print-based technologies such as books and computers, while having many positive and essential benefits, also reinforces abstract thinking and the individual’s ability to exercise critical thought. Critical thinking has led to challenging many sources of oppression and has clearly contributed to important achievements in the area of social justice. However, more complex understanding of the many uses of critical thinking will reveal that it is also used by special interest groups who are working to overturn government regulations of exploitive practices, to manipulate public opinion in order to gain support for foreign wars that benefit corporations and the military personnel’s need for steady advancement through the ranks. Both are especially skillful in using critical thinking to come up with new strategies for manipulating the public’s consumer addiction and willingness to support a bloated military budget. Ad agencies and various extremist groups also rely as much on critical thinking to develop their strategies as do social justice groups—albeit for radically different purposes.

There are cultural traditions that have not been totally marginalized by these various emphases on individualism. The traditions of the natural and cultural commons, while under threat by market forces, now are undergoing renewed support by members of local communities where mutually supportive values and interests are recognized as giving meaning to what is too often the autonomous individual’s sense of isolation and lack of meaningful purpose. Other individuals who are working to improve the quality of everyday life by strengthening the community’s infrastructure of roads and public services are finding, to quote the title of Robert Putnam and Lewis Feldstein’s book, that life is “better together”. They are an example of civic individualism mentioned earlier. These groups, as well as religious groups that are trying to live by the moral guidelines of the Social Gospel, are motivated by a connected sense of individualism that goes against the grain of market liberal and libertarian thinking. Social justice advocates and environmentalists also have political and moral agendas that differ radically from the larger segment of the population that places self-interest and reliance upon what they assume are their own ideas above all else.

Another powerful force that contributes to the myth of being an autonomous individual—or at least having the capacity to achieve this highest expression of human self-realization-- is a public school and university education. Classroom teachers and university professors have adopted a number of strategies for convincing students that they are accountable for the ideas and values they live by. Teacher educators reinforce this message by encouraging students to create their own values, to identify what careers they want to pursue, and to create their own ideas based on the wealth of information and data available on the computer. At the university level, students are expected to cite the source of ideas that they have not originated. The irony is that this expectation is supported by not informing students about how the language they rely upon to express their “own” ideas is actually metaphorical in nature and thus carries forward the prejudices and silences that were basis of the taken-for-granted patterns of thinking of earlier generations. Included in the misconceptions reinforced by most faculty are the ideas that the rational process is free of cultural influences, that there is such a thing as objective interpretations, information, and data-- and that abstract knowledge is more reliable than what is passed along through face-to-face communication and, generally, oral traditions. That the curriculum in most institutions of higher education mirrors that of a supermarket where individual choice maximizes the appeal of a university education also has a powerful influence on the students’ sense of being an autonomous, self-directed agent. The connections between the ways in which individualism

are reinforced and the actual culturally mediated embodied experience of the student are too complex to be fully addressed here. Nevertheless, this overview is adequate for highlighting why these various expressions of individualism inhibit the development of ecological intelligence. It is also adequate for recognizing why Bateson's ideas lead to a radically different and indeed more accurate understanding of human/nature relationships than the explanations provided by the conceptual and moral mainstream western cultures.

Bateson's Insights About the Nature of Ecological Intelligence

Any discussion of Bateson's core ideas is likely to be met with an immediate response of incomprehension and frustration, especially for the reader who has become accustomed to ideas being reduced to little more than sound bites. The following statements that appear in the six short pages I suggest as providing the best overall introduction turn out to be two of his most profound insights that will be more fully explained as we go more deeply into his other key ideas. Especially important is his statement: "A 'bit' of information is definable as a difference which makes a difference. Such a difference, as it travels and undergoes successive transformation in a circuit, is an elementary idea" (1972, p. 315). As we shall see, this statement about differences being the basis of the information networks we more conventionally know as an ecology is also critical to understanding the following statement:

The total self-corrective unit which processes information, or, as I say, 'thinks' and 'acts' and 'decides', is a *systems* whose boundaries do not at all coincide with the boundaries either of the body or of what is popularly called the 'self' or 'consciousness'; and it is important to notice that there are *multiple* differences between the thinking system and the 'self' as popularly conceived. 1972, p. 319

The question that might arise in trying to make sense of these two statements is: How did Bateson's education lead him so far astray? And his response would likely be the question: How did the West fail to recognize that it was making a major epistemological error when it emphasized things as separate entities? In the following statement he corrects what he regards as this basic mistake in thinking: "...while I can know nothing about any individual thing by itself, I can know something about the *relations between things*." (1987, p. 157).

Part of the answer to why things rather than relations between things has become a dominant pattern of thinking in the West can be attributed to the privileging of a print-based form of consciousness over that of oral/narrative-based cultures. Plato, according to Eric Havelock, played an important part in this transition which had the effect, along with many important benefits, of marginalizing the importance of contexts. Without an awareness of contexts the printed word takes on the role of referring to things—which is an abstraction just as the use of the personal pronoun "I" is an abstraction. Individuals, plants, animals, and rivers, geological formations, etc., can be represented in terms of their physical characteristics, and even in terms of their behaviors. But this leads to a highly restrictive understanding, one that largely omits the formative relationships and interactive patterns within the larger ecology. Print allows for explanations of causality but even these represent the writer's interpretation of relationships. The myth of objectivity helps to hide the author's interpretation, which is often framed by cultural

assumptions of which she/he is seldom aware. These assumptions, in turn, go far back into the past of the language community.

Contemporary examples of this cultural proclivity to think of things as distinct entities rather than the formative influence of their relationships (or what can be referred to as the ecology they are part of) can be seen in the way species from other parts of the world have been introduced into different regions of North America—with disastrous consequences for native species. Fields, rivers, forests, and even backyards are now undergoing dramatic changes as native species are being crowded out. This cultural emphasis on separate entities, rather than on formative relationships, can also be seen in how a worker is defined in terms of a salary, a student in terms of a grade, a product in terms of the price put on it—and the way in which an individual's identity can be reduced to a social security number. As David Goleman documents in his book *Ecological Intelligence* (2009), understanding a product in terms of its life cycle assessment—that is, its production history that includes the use of chemicals—including toxins released into the environment, the amount of energy required, the patterns of labor, and the ecological footprint connected with its recycling—represents an alternative to long tradition of thinking of things in terms of distinct entities. Similarly, in the past the student's grade was assumed to be an expression of her/his intellectual performance, but recently there is a greater emphasis on considering the formative relations that may be responsible for the student's level of performance. There are many other examples where things are no longer understood in isolation from their surroundings—that is, the larger ecology of relationships in which they participate. Nevertheless, the way in which print-based knowledge continues to marginalize contexts and tacit understanding continues to perpetuate the emphasis on “things”, as does our daily practice of relying upon nouns and pronouns rather than verbs.

Equally important are several other ideas that differ radically from the dominant way of thinking in the West—and are critical to understanding Bateson's statement that differences are elementary ideas and sources of information, and that the unit that processes information is much broader and inclusive than the thinking individual. These include the idea of recursion, that the map is not the territory, the nature of double bind thinking, that human intelligence and action do not occur as processes separate from the information circulating through the relationships that make up the system, and that in systems that show mental characteristics no part can exert unilateral control over the whole. Each of these ideas needs to be integrated so they are understood as part of a larger system of ecological intelligence. Ways of thinking that depart from ecological intelligence, as Bateson puts it, lead to an ecology of bad ideas that threatens the system as a whole. Each of ideas are essential to how Bateson understands an ecology of mind. Introducing each idea separately also makes it possible to identify how thinking of intelligence as one of the distinguishing attributes of the autonomous individual limits her/his awareness of how embodied experiences are nested in a larger information network.

The Many Faces of Recursion—and the one most related to ecological intelligence: Recursive patterns of thinking exist in a variety of areas-- including mathematics, computer science, and in a culture's ways of knowing—or what Bateson referred to as a “recursive epistemology”. The focus here will be on understanding what he means by a recursive epistemology and what this phenomenon helps us understand about why educators continue to reinforce the ecologically uninformed patterns of thinking that have their roots in earlier mythopoetic narratives (including the writings of major western philosophers), powerful evocative experiences—including experiences shaped by technologies mistakenly thought of as neutral “tools”.

As in so much of Bateson's writings, ideas are seldom presented in a straight forward manner where the reader obtains what might be considered a final definition, and not a further engagement with the ideas of other theorists. The possibility of a workable definition is often sacrificed by Bateson's own qualifications as he rethinks his own insights—and how far they can be generalized. The following list both presents a key feature of Bateson's understanding of recursiveness in the culture/language/thought process, as well as the difficulty of penetrating his conceptual process. In a collection of essays edited by his daughter, Mary Katherine Bateson, and published under the title of *Angels Fear: Toward an Epistemology of the Sacred* (1987), Bateson presents an explanation of recursion as a characteristic of structure, which he extends to the epistemological structure of a cultural way of knowing:

1. 'Structure' is an *informational* idea and therefore has its place throughout the whole of biology in the widest sense, from the organization within the virus particle to the phenomena studied by cultural anthropologists.
2. In biology, many regularities are part of—contribute to—their own determination. This *recursiveness* is close to the root of the notion of 'structure'....
3. The information or injunction which I call 'structure' is always *at one remove from its referent*. It is the name, for example, of some characteristic immanent in the referent, or, more precisely, it is the name or description of some relation ideally immanent in the referent.
4. Human languages—especially perhaps those of the West—are peculiar in giving undue emphasis to Separate Things. The emphasis is not upon the relations between' but upon the ends of relationship, the relata. This emphasis makes it difficult to keep clearly in mind that the word 'structure' is reserved for discussion of *relations* (especially to be avoid is the plural use 'structures').
5. Insofar as the name is never the thing named and the map is never the territory, 'structure' is never 'true.' (1987, p. 161).

Peter Harries-Jones summarized one of the ways in which Bateson's understanding of recursion can be understood: "Recursion as a process of continuous looping [is] a process without observable attributes of structure" . (1995, p 187). The metaphor of "looping" is useful here as it suggests that life forming and sustaining processes, including life-threatening processes, do not move in the linear direction modern thinkers associate with progress. To stay with Bateson's example, the original conceptual structure that leads to the use of language and thus to the pattern of thinking that is finely attuned to naming things rather than relations and contexts is further reinforced when this pattern of thinking is exercised today. To make the point more directly, the conceptual structures (or what I refer elsewhere to as the root metaphors) formed in the past continue to influence the present, and the present loops back to reinforce the conceptual structures (root metaphors) formed in the past. For example, the root metaphor of mechanism introduced by Johannes Kepler and other scientists--which enabled them to think of phenomenon terms of measurement, experimentation, and innovation—has become reified and today is the conceptual model for understanding a wide range of processes, including the human brain, the genetic engineering of seeds, and behavior modification. Other structures (root metaphors) inherited from the past continue to frame how people think today—including their use of vocabulary, shared silences, explanations of causal relationship. These different examples of recursion exist as part of the collective and tacit memory of the culture. Because Bateson often explains recursion

by using a thermostat to make his point about the looping or feedback of information in a self-perpetuating system, some readers have mistakenly assumed that he is promoting a mechanistic way of thinking. This has led to overlooking the more important implications of understanding cultures as recursive systems. They are also overlooking that he is identifying one of the key reasons that we continue to rely upon the same metaphorical language to extricate ourselves from the ecological crisis to which this language contributed.

There are two key insights that he brings to our attention: one being that we take for granted the conceptual structures rooted in the distant past and continually reinforced through the thought patterns of succeeding generations. The other insight is that the today's idea of linear progress, and the tendency to associate change with linear progress, is a cultural construction that loops back and repeats the earlier the symbolic structure that came into existence when Enlightenment thinkers interpreted the emergence of modern sciences and a technological form of consciousness, literacy, the idea that rational thought should replace traditions, and the idea that humans were not only given the power to name the participants in the natural world, but also to exploit them for their own purposes.

Bateson does not ignore other aspects of the West's recursive cultural epistemology. His criticisms would include all the characteristics of modern consciousness that can be traced back to the earliest mythopoetic narratives that focused attention on the abstract religious debates about what follows the death of the individual rather than on learning from the behavior of the natural systems people depended upon, of the powerful evocative experiences such as organizing daily life in accordance with the rhythms of a mechanical clock, of the many ways of representing and justifying a linear view of progress. Many of his most direct and explicit criticisms are directed at the Cartesian view of the individual that represents thinking and awareness as separate from the world of interacting relationships.

Among the recursive patterns classroom teachers reinforce is the idea that individuals have the power to originate their own ideas. This is reinforced by questions the teacher asks students such questions as: what do you think? What do you see (where it is assumed that the student has a unique vantage point on the external world)? What do you want to happen? What do you want to become as an adult? And so forth. The emphasis on nurturing the student's creativity, experimentation, and even achieving the fullest expression of freedom by re-writing the ends of traditional stories in ways more in line with what the student values and wants to happen, are all common examples of what is reinforced in classrooms—especially in the earliest grades. The recent emphasis on students constructing their own ideas, relying increasingly upon computers as a way of accessing abstract information, explanations, and simulations, and now the addiction of students to communicating through cell phones and text messaging, all reinforce the Cartesian view of the individual who, as Rene Descartes announced, possesses the power to exercise rational thought that is free of the influence of traditions. This is, of course, an illusion promoted by progressive-oriented cultural forces that too often have given legitimacy to replacing the non-monetized traditions with reliance upon consumerism of good and services. However, unlike the Santa Claus illusion, most people never wake up to the reality of how many traditions they rely upon.

The irony is that while some classroom teachers are encouraging students to be more conscious about relying upon local sources of food and recycling, they are still reinforcing the abstraction that represents the individual as autonomous—or at least has the potential to become so. Even the more ecologically informed approaches taken in environmental education classes fail to challenge the Cartesian misconception that represents the individual as an independent

observer of phenomena occurring in the local streams and other environmental sites. To give this criticism greater credibility, one has only to look at the failure of teachers of environmental education to introduce students to the idea that words they use have a history, and that these words-- such as progress, technology, community, science, and so forth— involve the recursive process of repeating the same silences and misconceptions of earlier thinkers who also took-for-granted the conceptual structures of their culture and era.

With the major exceptions being in the sciences that have taken an ecological turn, most university faculty also reinforce the idea of the student as an autonomous entity who is responsible for making explicit the distinction between their own ideas and those derived from outside authorities. The same use of personal pronouns is relied upon, as is the emphasis on things, events, and causal explanations that hide the influence of the languaging processes that reproduce the interpretive frameworks currently taken for granted or represented as the latest revisionist achievements of critical thinkers. The result is that most students graduate from college and universities thinking of language as a conduit in a sender/receiver process of communication, and that what is shared in this sender/receiver process of communication are their own thoughts and values. Few are aware that their use of language and their thoughts repeat earlier deep patterns of thinking formed before there was an awareness that many non-western cultures had prioritized the importance of understanding relations within natural systems and had developed an ecological form of intelligence, an awareness that there are environmental limits, and an awareness that the printed word is profoundly different than the living nature of the spoken word. Just like the public school teacher who continually recycles the myth of linear progress as a way of justifying an individually-centered view of intelligence, most university graduates also take-for-granted this cognitive pattern (“structure” in Bateson’s language) and thus give legitimacy to a misconception that J. B. Bury traces back to such Enlightenment thinkers who assumed that reliance on the rational process and experimental inquiry was accumulative and thus guaranteed progress into an infinite future (1932). Unfortunately, myth is usually seen as having been banished by the power of science, technology, and rational thought. Yet there are many examples where myth has influenced the development and use of modern technologies. For example, the accumulated knowledge in the field of chemistry-- which has led to natural systems (including the human body) being impacted by thousands of synthetic substances such as DDT, PCBs, and dioxins—were all initially understood as breakthroughs and celebrated as further examples of progress. The accumulation of knowledge in other high-status fields of inquiry that most westerners associate with a linear form of progress are now being discovered to be ecologically problematic—yet the ways in which language perpetuates this recursive process continue to go largely unnoticed.

Bateson’s reliance on the process of recursion to explain why we unknowingly continue to rely upon the misconceptions of the past leads to another basic insight that has particular importance for educational reformers. This insight was borrowed, as Bateson acknowledges, from Alfred Korzybiskj who was a Polish-American philosopher and scientist. Bateson sums it up in the phrase “map is not the territory”.

The Map is Not the Territory: How the Metaphorical Nature of Language Misrepresents the Differences Which Make a Difference . Bateson recalled when he arrived at the insight that enabled him to make the connection between Korzybiski’s distinction between map and territory and the epistemological issues he was working through. It was in 1970 when he was preparing his talk for the Korzybiski Memorial Lecture. In response to the question he asked himself, “What gets from the territory onto the map?” it became clear to him what the answer was. The answer,

which he recalled as being obvious, is “News of difference is what gets across, and nothing else” (1991, p. 188). The connection Bateson made between Korzybiski’s now famous phrase and his own insight about what represents the most basic unit of information that undergoes constant transformation while circulating through all levels of the Earth’s ecosystems may appear as quite mystifying.

The problem Bateson was attempting to resolve is the problem of the relationship between the mind and the external world—a problem that is ignored by nearly all public school teachers and even most university professors even though their task is to provide the conceptual frameworks that will guide how students think about the external world—as well as their internal world. In elaborating further on the mind/external world relationships, Bateson made a further observation that is fundamental to recognizing the conceptual error that dominates education in the West. Following a restatement that what gets from the outside world to the brain is “*news of difference*”, he goes on to make the following observation. “If there is no difference in the territory, there will be nothing to say on the map, which will remain blank. And, further, I saw that any given map has rules about what differences in the territory shall be reported on the map” (Bateson, 1991, p. 200).

The reference to map and territory are metaphors. What they refer to are the cultural/metaphorical language/thought connections (the map), while the territory is the world of geo-biological processes which we commonly refer to as the environment we live in. An especially important part of Bateson’s statement about maps (a culture’s way of knowing) is that they contain the interpretative frameworks that govern which differences which make a difference will be recognized, and how they will be understood. For example, if only the increase in profits is given attention when planting genetically modified seeds the differences which make a difference that signal environmental damage will go unnoticed. Concern with the loss of employment may lead to ignoring the carbon dioxide that the industry releases into the atmosphere, and that is contributing to changes in the ocean’s chemistry. What Bateson is getting at in this statement about how cultural rules influence what will be recognized and about how it will be interpreted is the role that the deep assumptions of the culture (root metaphors) play in framing what we are aware of. To reiterate an important point: these cultural assumptions are largely taken-for-granted, thus leading to the process of selective awareness and interpretation to be experienced as natural and not as a cultural construction.

The question that is likely to arise is: what does Bateson mean by saying that differences which make a difference are basic units of information, and why does he suggest that when differences are not present we have nothing to respond to? First, we need to clarify what he means by the statement that “a ‘bit’ of information is definable as a difference that makes a difference. Such a difference, as it travels and undergoes successive transformation in a circuit, is an elementary idea” (1972, p. 315). What he does not mean is that the “elementary idea” is not like the metaphorical representation of ideas. Rather, it is information that is processed at various levels—genetic, chemical, energy, behavior, etc.—that leads to a change in the organism or system that can process the way in which information is coded. For example, the introduction of toxic chemicals during the development of the fetus may represent a difference that makes a difference in terms of chromosomal damage that becomes, in turn, a difference which makes a difference in the development of the immune system—which then leads a chain of differences that results in a variety of physical problems that then become a lifetime of differences which make a difference for both the child, parents, and various social agencies. In this example the information communicated through differences circulates through interdependent systems where

differences in the chemistry of an industrial process leads to differences in the functions of genes—and eventually to differences at the cultural level.

The introduction of a non-native plant starts another cycle of differences which make a difference. That is, when the chemistry of insects, including pollinators, does not fit with the chemistry of the non-native plant, differences which makes a difference circulate through the local ecology—affecting the plants that rely upon the bees and other insects essential to the pollination process, and to birds that rely upon the insects, and to other participants in the local food chain. Bateson's seemingly simple phrase encompasses the information exchanges that support both the self-development processes of every organism in an ecosystem as well as provide for the sources of energy that are shared. When the different sources of energy are lost or changed, another complex set of differences circulate through the interdependent systems. He is challenging the western idea that only humans are intelligent and can process information when he states that differences are sources of information, and "an elementary idea". Ecosystems also process information in ways that are often beyond what humans can understand or replicate. What the dominant western epistemology fails to understand is that the natural environment is not reducible to matter and blind forces. Rather, it is sustained by the different ways in which "differences" are processed, and this is dependent upon eons of genetic development within different environmental contexts.

For Bateson, the maps are the metaphorical constructions that provide the interpretive and moral frameworks of the culture. What is important about the map/territory metaphor, is that the map has a history rooted in an earlier cognitive/mythopoetic history. That is, the meanings of words (metaphors) are framed by people who are successful in having the analog they selected accepted by others, and even by later generations. Furthermore, their process of analogic thinking is framed by the taken for granted root metaphors of earlier times. In terms of the West, these root metaphors include patriarchy, anthropocentrism, mechanism, progress, individualism, economism, and now evolution—with ecology becoming a new totalizing interpretive framework that is challenging the earlier root metaphors that underlie the industrial/consumer oriented culture. These root metaphors, or "cognitive structures" as Bateson refers to them, are the recursive epistemologies that are take for granted today. They also underlie the cultural colonizing as westerners attempt to force other cultures to base their daily lives on these root metaphors.

To state the problem more directly: (1) The metaphorical maps are generally out of date—that is, the metaphorical language relied upon to respond to changes circulating through both the natural and cultural message systems contribute to the lack of recognition of what is most critical to slowing the rate of environmental degradation and the increase in social injustice. (2) The modern, western influenced maps, when relied upon by cultures existing in different bioregions, distort awareness of the interdependence between the local culture and natural systems that need to be taken into account if the rate of environmental degradation is to be reduced. For example, the cultures in the Peruvian and Bolivian Andes are unlikely to reduce the catastrophic consequences that lie immediately ahead (where the key difference which makes a differences is the melting of the glaciers that are the sources of their water) if they rely upon the conceptual maps borrowed from the western cultures for guiding how they are to live—as these maps are major contributors to global warming. (3) The root and image metaphors need to be continually revised in order to limit even greater human suffering and environmental damage. Updating the maps requires being aware of the differences in the first place. This is not the old problem of what came first, the chicken or the egg—especially if it is understood that updating the maps that the next generation relies upon requires that classroom teachers and university professors be

aware that there is an ecological crisis. They also need to recognize that science and technology alone will not help to mitigate the crisis, and that there are cultural traditions (recursive patterns) that are deepening the crisis. Solutions other than technological fixes are especially needed, and should introduce students to community-centered and mutually supportive lifestyles that are less dependent upon consumerism and less dependence upon the industrial model that is based on a money economy and the pursuit of profits.

The Problem of Double Bind Thinking: The issues discussed up to this point—recursive looping where the present repeats the conceptual patterns and errors of the past, the problem of conceptual maps that are outdated and are maps of the wrong territories---all represent different aspects of double bind thinking. Many of Bateson's original comments on the nature of double bind thinking were intended to clarify abnormal communicative patterns of schizophrenics, and the communication problems in general. However, what is most pertinent here are his views on how double bind thinking prevents us from moving beyond the recursive pull of basic misunderstandings of human/nature interdependencies. Peter Harries-Jones quotes how Bateson's understood the connections of double bind thinking and the ecological crisis "all communicative activity should be considered as a set of propositions about the world or the self, whose validity depends on the subject's belief in them. It [is] these beliefs *about* the world that should be the major topic of investigation". Harries-Jones further notes that "double bind, in Bateson's view, was never a matter of simple intellectual confusion or of being caught in a dilemma of 'I am damned if I do and I am damned if I don't.'" Double bind, for Bateson, involves "a situation in which simple dilemmas [are] compounded by falsified contexts, supported by patterns of interpersonal communication which ensured continuation of the denial that a falsified context [exists]". (1995, p. 135)

A falsified context can take many forms, such as the lack of awareness of the cultural construction of different interpretations of reality. Apathy and indifference toward exposing the reifications that lead people to take-for-granted that the interpretations are accurate representations of "reality" is yet another example of a falsified context. The prevalent examples of a falsified context involve relying upon a system of knowing borrowed from the distant past and used as a guide for understanding today's world, and thus representing language as free of historical and cultural influences. Again quoting Harries-Jones, Bateson associated double bind thinking "with some combination of denial and inflexibility derived from the cultural predisposition about the salience of rationality and rejection of holism. He was very specific about the nature of this inflexibility when he noted in one of his letters that "as long as the West remains tormented by a false pride in individualism, it will pursue perversions of individualistic thinking. This tormented perspective", he continued, "can lead to strategies in which killing the whole biosphere becomes preferable to risking one's own skin". (Harries-Jones, p. 227)

The Unit of Intelligence is the Individual plus the Immediate Differences Which Make a Difference—Plus the Recursive Cultural Epistemology that the Individual Takes for Granted:

Bateson's challenge to the modern idea of individual intelligence has many dimensions. Included in the earlier quotation where he refers to the 'total self-corrective unit' are three key points: (1) Thinking or what is generally referred to as the exercise of intelligence is not like a process that leads to an idea that is like a photograph— such as a mental image where the boundaries are clearly framed off from the local contexts. Rather, Bateson refers to processing information in a way that involves continual self-correction and adjustments as differences which

make a difference are taken into account. (2) Processing the elementary (and non-metaphorical) idea or information undergoing transformation as it circulates through the system occurs even when the individual is not involved. As Bateson put it, “there are multiple differences between the *thinking system* and the ‘self’ as popularly conceived” (1972, p. 319, italics added). That is, the metaphor of intelligence needs to be expanded in ways that take account of the different ways in which information is coded and intergenerationally passed along.

(3) The way the individual processes information is not always aligned with the cognitive/moral epistemology she/he inherited from the past. The individual may engage in the self-correcting behavioral responses, while still taking-for-granted the reified ideas of an earlier time. That is, the individual’s reified ideas may contribute to a state of self-denial—even as behaviors are undergoing changes in response to differences circulating through the different pathways of information exchange that make up the larger ecology.

The question may arise: Who is correct, the classroom teachers and university professors who reinforce the idea that students are autonomous thinkers who are responsible for constructing their own ideas? This view of human intelligence carries with it the moral obligation in the West of citing others from whom ideas are borrowed—or they are deemed guilty of plagiarism. Or is Bateson correct when he claims that the unit of intelligence (which he treats as a verb) is the individual, plus information circulating through the natural systems, plus the cultural epistemology that was constituted in the past and encoded in the languaging processes, and the intergenerational legacy acquired as part of the taken-for-granted stock of knowledge? In *Steps to an Ecology of Mind* Bateson uses the following example to highlight what is missing in the western view individual intelligence. The example also highlights the interconnections between intelligence and the “difference which makes a difference”.

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. The 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. (1972, p. 317)

Other examples where the exercise of intelligence can be seen as participatory—and including the information flowing through the life-sustaining pathways of the larger system within which the individual is embedded—can be seen in the processes of non-verbal communication. A change in tone of voice, facial expression, even a lengthy pause in a conversation, leads the person who is aware of the differences which make a difference to alter both behavior and thinking—which in turn leads to altering the response of the other person. Indeed, the adjustments take account of the response to what was previously said as well as the behavioral cues that accompanied what was said. The traditional farmer who is making a decision about when and where to plant a crop also exercises intelligence in a way that is influenced by the information circulating through the different interacting ecosystems of soil, plants, weather, quality of seeds from last years harvest, and so forth. If the reader has had experience in sailing a boat, she/he will recognize that the decisions about the adjustment of the sail and rudder are continually modified in terms of the differences which make a difference in the water/wind ecology. Changes in the color of the water often signal a change in the velocity of the wind. The size of the waves and the direction of the current also influences the degree of heeling

of the boat, and the change in tacks always takes account of the direction of the wind as well as where one hopes to arrive.

In these examples, which can be endlessly multiplied, thinking and behavior are continuously adjusted by taking into account the differences taking place in the local environment. All of the above examples involve giving careful attention to relationships. Changes in the cut-face of the tree, the non-verbal patterns of communication of the other person with whom one is engaged in a conversation, the soil that is to be planted, and the course that is to be sailed, could (and too often) are erroneously thought of as separate things, entities, and objectives. When the interactive relationships are ignored, the exercise of intelligence then becomes formulaic where a preconceived strategy is put into play. When this occurs, the information circulating within natural and cultural systems becomes ignored, with attention being given to what the individual has been culturally conditioned to be aware of. That is, the old conceptual maps take over, with the individual's awareness being limited primarily to what the misconceptions of earlier thinkers bring into focus. For example, today's market liberals, whose focus on achieving greater profits is guided by the abstract theories of classical liberal thinkers, do not consider the differences which make a difference in the cultural and natural ecologies they are embedded in, and thus ignore the differences introduced by their actions such as increased levels of poverty, deskilling of workers, increases in toxic pollution, damage to the self-renewal of natural systems, and so forth. That is, if they were educated in a manner that reinforced the importance of giving attention to relationships—rather than rigidly being guided by the abstract free-market ideology—perhaps they would recognize another point that Bateson makes. Namely, that “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*”. (1972, p. 316)

This statement relates directly to the moral values that should be integral to the exercise of ecological intelligence. The epistemological shift from focusing on things to relationships also involves a shift in the role that language plays in carrying forward the a culture's moral templates. Metaphorical thinking, which is framed by the analogs settled upon by earlier thinkers, carries forward how they understood the attributes of things, such as trees, wilderness, the ocean and rivers, non-native plants, animals, and so forth. For example, when wilderness was understood as source of danger it was both rational and moral to treat it as an exploitable resource. Similarly, plants not considered to have any useful attributes were called weeds and in need of being eradicated. One of the attributes of the oceans, namely their vastness, made it impervious to human impact and moral responsibility. As insects were thought of as totally lacking in any useful attributes, exterminating them with a pesticide was a morally appropriate behavior. Root metaphors such as anthropocentrism and progress provided moral legitimacy for introducing into the environment thousands of synthetic chemicals that we are only now recognizing as part of the emerging health catastrophe that is the legacy of these early and current scientists. The root metaphor that represents the world as a collection of things, which included autonomous individuals, framed how earlier thinkers understood the attributes of things that range from women, indigenous peoples, pre-literate cultures, and so forth. By reducing them to things rather than recognizing their relationships within their cultural and natural ecologies, which would have led to a more complex understanding, made it easier to label each as possessing only a negative attribute.

Bateson's emphasis on understanding ecosystems as layered, interactive, and interdependent self-renewing systems, ranging from genes to cultural assumptions leads to a shift

in how moral values are to be understood. He recognizes that in some systems the relationships are disruptive and thus are ecologies that are not likely to survive. He refers, for examples, to them as an ecology of weeds and of bad ideas. One of these bad ideas is that humans, by relying upon the rational process and new technologies, will be able to survive the destruction of natural systems.

In a passage that recalls his criticism of the West's recursive epistemology that continues to separate the fate of humans from the fate of the environment, he issues the following warning:

The environment will seem to be yours to exploit. Your survival unit will be you and your folks or nonspecifics against the environment of other social units, other races and the brutes and vegetables. 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. You will die either of the toxic by-products of your own hate, or, simply, of over population and over grazing. The raw materials of the world are finite. (1972, p. 462).

Following this passage, Bateson goes on to say that the most important task today is to learn to think in a new way. Before considering what he describes as the three levels of learning, and how the latter level leads to what can be called ecological intelligence, it would be useful to address a response that both philosophers and educational theorists are likely to make. Because Bateson appears at first glance to be a process thinker, they are likely to associate his ideas with those of John Dewey. This would be a major mistake, and for the following reasons.

Basic Differences Between the Ideas of Gregory Bateson and John Dewey

On the surface there appear to be many similarities between Bateson and Dewey. Both understood that knowledge had to be continually revised in order to take account of a constantly changing world—but there are fundamental differences that remain hidden if the reader fails to go beyond this generalization. A second surface similarity is that both rejected the idea that intelligence is an attribute of the autonomous individual. For Dewey, intelligence involves problem solving in a democratic context; and it becomes more efficient as communication with others is enhanced. The argument that Dewey was an early environmental thinker, which would suggest another favorable comparison with Bateson, is based on interpreting Dewey's understanding of intelligence as an integral part of experience—and experience as part of the natural world. This view of intelligence avoided the error inherent in the Cartesian mind/body separation of which Bateson was also critical.

Given these surface similarities between Dewey and Bateson, educational reformers who have recently recognized that there is an ecological crisis, and are searching for a conceptual framework that will guide their thinking, are likely to feel that their years of relying upon Dewey's progressive and democratically oriented theory of knowledge make it unnecessary to take on the challenge of understanding Bateson's admittedly difficult vocabulary and concepts. However, if these reformers were to examine the differences in any depth they would realize that Dewey, for all of his useful insights, is part of the problem. Let me cite the following as evidence. First, he grew up during successive waves of environmental devastation, such as the killing off of millions of bison, the clear-cutting of forests across the country, the destruction of prairie grasses—not to mention his support of the industrial process that was spewing billions of

tons of carbon dioxide and other toxic chemicals into the rivers and into the atmosphere. He says nothing about the environmental destruction of his era. In fact, while he wanted democratic socialism to replace capitalism, he also thought that the growth and successes of the industrial culture would lead to wider acceptance of this scientific and experimentally-oriented theory of knowledge

Second, during his most formative intellectual years the indigenous cultures were being decimated (by some estimates that range to 90 percent of their previous population). Their lands were being taken over by the Anglo/Euro Americans, and Dewey remained silent. His understanding of indigenous cultures, which exhibited many of the characteristics of ecological intelligence, was summed up in several books where he describes the thought patterns of “savages”. Dewey’s racism has been defended on the grounds that he shared many of the taken-granted prejudices of his era—which seems a weak excuse for assuming that his ideas are relevant in today’s world where there is an increasing awareness of the connections between linguistic diversity and preserving biodiversity. There is another aspect of Dewey’s thinking about other cultural ways of knowing, which he lumps together under the category of “spectator knowledge”, that makes his theory of knowledge and the educational reforms derived from it especially problematic. He did not represent instrumental experimental inquiry as just one of many approaches to knowledge. Rather it was the only legitimate approach. Dewey’s colonizing mentality led to reducing all forms of knowledge as fitting into three categories: savage, spectator, and experimental inquiry. These stages of cultural development were also his way of understanding stages of social progress. He was, like other intellectuals of his era, a Social Darwinian thinker who was driven by the idea that if the educational process taught students the importance of participatory decision making in solving problems by using the scientific mode of experimental inquiry they would be able to escape the intellectual prisons of their immigrant parents. For Dewey, there was only one approach to knowledge, and this approach required over turning the traditions of intergenerational knowledge that sustained the cultural commons of these diverse immigrant groups.

A criticism that can be made of Dewey, which is the same one that Bateson makes of scientist is that Dewey was not a reflexive thinker. He was indifferent to the need to make explicit the deep cultural assumptions that led to his silence about the environmental devastation, the threat the industrial model of production and consumption posed for the environment and other cultures, and his inability to recognize the ecological knowledge of the indigenous cultures he labeled as savages. While Edward Sapir and Benjamin Lee Whorf were beginning to explore the connections between language, ways of knowing, and cultural practices, Dewey remained indifferent to the reality constituting role of language—particularly how the metaphorical thinking of earlier eras carried forward their misconceptions and silences. Friedrich Nietzsche was writing about this problem in the 1880s, so it would be unfair to excuse Dewey for being unaware of the cultural/metaphorical language issues that are receiving such wide attention today. The important point is that today’s followers of Dewey reproduce in their own thinking about educational reforms the same silences that resulted from Dewey’s lack of reflective thinking.

Bateson did not adopt any of the prejudices that characterize Dewey’s thinking. It is difficult to find any reference to Dewey in Bateson’s writings, just as it is difficult to find in Dewey’s writings any reference to ecology—even though the word was widely used in the early 1900s to refer to the study of natural systems. My suggestion, in light of the rate of changes taking place in the Earth’s ecosystems, is that thinking about educational reforms that contribute to an ecologically sustainable future should focus on developing a deeper understanding of

ecological intelligence—including what Bateson's contributions are to introducing educational reforms that foster ecological intelligence. Dewey can be credited with introducing educational reforms in an era of rote learning and childhood repression, but these reforms are now widely accepted. It is time for his followers to begin addressing reforms that foster lifestyles and patterns of thinking that are less damaging to the environment. Among these reforms are life-style changes that do not fit with Dewey's emphasis on continual change and experimentation—which he associated with progress in moving beyond the non-scientifically grounded traditions of the past.

A good place for starting this transition from the recursive epistemology of ecologically problematic ideas is to following Bateson's suggestion that we need to move beyond what he calls Learning I and II, by participating in Learning III. In an essay on learning written in 1964 and revised in 1971 in for inclusion in *Steps to an Ecology of Mind*, Bateson summarizes the scientific research on what he refers to as Learning I and II. Learning I is limited to responding to a stimulus, and correcting the choice being made when given a set of alternatives. This is the form of learning observed in studies of rat behavior. Learning II involves a more complex set of responses, such as being aware of changes in the context within which choices are made. It also includes a range of attitudes that influence the process of learning. These include being fatalistic (e.g., accepting a given set of relationships and possibilities); an inability to question otherwise tacit understandings of relationships and contexts; adopting an attitude of dominance or submissiveness that closes off recognition of other possible relationships and ways of thinking; adopting a pattern of thinking where events are understood as discrete rather than interconnected. To this list can be added learning within the limits established by reified beliefs and traditions.

If we translate the list of characteristics associated with Learning II into more contemporary language, it then can be understood as the ability to learn being restricted by a sense that events are beyond human intervention, that the culture's beliefs and values are taken-for-granted (which means that their cultural origins will not be recognized), that one's sense of authority and right to dominate others is absolute (either derived from God or reified ideology), and that events are to be judged without consideration of their antecedents and future consequences. This level of learning is more likely to ignore that others may have different interpretations and even different belief systems. Other characteristics include a willingness to accept the authority of the printed word and abstract knowledge generally, specially when they help to give legitimacy to ideas and values that the individual claims to originate. In short, Learning II can be seen in the cognitive style of the authoritarian personality. It can also be seen in the cognitive style of the indifferent and passive individual who seeks strength in following social conventions—even those that serve the interests of authoritarian individuals. Both types, and the many individuals who are both authoritarian in some areas and who find strength in belonging to mass emotionally charged movements, view themselves as individuals who are not dependent upon either culture or the natural environment. Their sense of autonomy leads to thinking that they have no responsibilities except for what serves their personal interests or that of their immediate family.

That people engaged in Learning II are not the only ones existing in society led Bateson to consider the characteristics of people who exhibit learning III characteristics. These are the characteristics that are essential for moving from an individually-centered intelligence (Learning II) to that of ecological intelligence. Among the qualities Bateson associates with Learning III are: (1) An ability to question the premises underlying both one's own behavior as well as practices and policies that govern society; (2) A willingness and conceptual ability to question what is

taken-for-granted by Learning II individuals, and to introduce changes; (3) An awareness of the importance of understanding differences in cultural contexts; (4) An ability to assess habits (whether personal or culturally shared) in terms of whether they need to be revised, changed completely, or conserved, such as conserving habeas corpus and other civil liberties as well as those aspects of the cultural commons that reduce dependence upon a market economy ; (5) Awareness of cultural continuities and interdependences in both cultural and natural ecologies—and of the conceptual double binds that put the well-being of both at risk. These characteristics are mutually supportive, and if taken seriously would lead to profound reforms in both public schools and universities. Bateson recognized that making the transition to Learning III will be difficult, so the question might come up as to why we should persist in recommending reforms in the two institutions that most people operating at the Learning III level regard as tradition-bound—even as these institutions appear on the cutting edge of promoting even more extreme forms of modernism. I use “tradition-bound” instead of the word “conservative” as the latter is chronically misused in today’s discourse—and in later chapters I will make the case that “mindful conservatism” is an essential aspect of ecological intelligence.

If public schools and universities are continuing to reinforce the same deep cultural patterns of thinking that gave conceptual direction to the consumer/industrial culture that is now being globalized, even as some professors are working on new technological solutions, why argue that attention should be focused on reforming the modernizing traditions of public schools and universities? If we keep in mind that one of the principal characteristics of Learning III is the ability to question the premises upon which the taken-for-granted cultural practices are based, it quickly become obvious that there few institutions in the mainstream culture where the underlying premises (what I prefer to call the cultural assumptions and root metaphors) can be questioned without facing personal, economic, and political punishment. Many families will not allow the assumptions that guide their economic, political, and moral decisions to be questioned and revised, and there are few other social organizations and institutions that would welcome this. The list includes most churches, community organizations such as the local city club and chamber of commerce, Rotary and other civil organizations, national guard gatherings, local sailing clubs and other sporting groups, gun clubs, place of employment—indeed, the list goes on and on .

I have serious reservations about whether most classroom teachers and university professors possess the conceptual background necessary for recognizing why many of the taken-for-granted cultural assumptions that underlie their academic discipline are ecologically problematic, or the willingness to take the ecological crisis seriously enough to begin questioning these assumptions. Nevertheless, public schools and universities are the two institutions that provide what can be called the psycho-social moratorium necessary for raising difficult questions and obtaining a historical perspective on how, in the name of progress, intellectual elites have succeeded in poisoning much of the environment, and in promoting a form of individualism that equates a level of consumerism that is ecologically unsustainable with personal happiness and success. While public schools have less protection from public censorship, they nevertheless can provide students with the initial conceptual basis for making the transition to exercising ecological intelligence without embroiling the school in controversy. The tradition of academic freedom is well established for universities, which allows for a more far-reaching examination of the guiding assumptions of the dominant culture. Thus, universities have the fullest potential for providing the conceptual space necessary for students to move to learning III and to exercising ecological intelligence.

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