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### The Ecologist as Zen Master

Suddenly *ecology* has emerged from crossword puzzles, college catalogs and cloistered research institutes as part of the public consciousness. Politicians proclaim their support, disciples cluster hopefully around and professional scientists find themselves gurus of a new youth movement. I hope to demonstrate that remarkable parallels exist between ecology and Zen Buddhism, an ancient system of Eastern thought, whose superficial characteristics could not be more dissimilar. The evolutionary occurrence of equivalent parallelisms among organisms is generally attributed to adaptation to similar environments. A striking convergence in thought patterns originating from radically divergent premises may well suggest similarity (if not identity) of the "mind-world" in which they deal.

Zen is clearly nature-oriented, providing an immediate "opening" for the Western naturalist. Thus, when monk asks master "How may I enter in the Way?" the master points to a stream and responds "Do you hear that torrent? There you may enter." Walking in the mountains, the master asked, "Do you smell the flowering laurel?" The monk did. "Then," declared the master, "I have hidden nothing from you" (Suzuki, 1955). This is more than nature worship; it suggests a fundamental of Zen practice, the interdependence and thus, unity of all things and the consequent artificiality of "dualistic" thought patterns. Dichotomous thinking is basic to Western thought, deriving, perhaps, from the Greek Platonic constructs of ideal vs. real and intellect vs. emotion, and the Judeo-Christian: God vs. His creation, spirit vs. flesh, sin vs. redemption, and (most important for our purposes) organism vs. environment and man vs. nature. Such thinking was always anathema to Zen, as it now is to ecology.

Ecology has generally been defined as "the study of the interrelations between organisms and their environment"—a concept approaching the Zen mode by its recognition of "interrelation," although still dualistic, with identification of "organism" as distinct from "environment." However, ecologists tend now to modify this definition by pointing to the fundamental identity of subject and surroundings. Thus, the bison cannot be separated from the prairie, or the epiphyte from its tropical perch. Any attempt to draw a line between these is clearly arbitrary, so the ecologist studies the bison-prairie, acacia-bromeliad unit. The "food web" binding shrew, worm and oak tree expresses their trophic relation but also outlines their very being. Zen's suggestion that an organism's skin does not separate it from its environment but, rather, joins it (Watts, 1958) could just as well have come from a "master" of physiological ecology.

The very study of ecology, then, is the elaboration of Zen's nondualistic thinking.

The man-nature dichotomy of Western thought has had disastrous consequences, as a fundamentally antagonistic attitude has encouraged us to "conquer" outer space, mountains and forests and to exploit nature as something external to ourselves. Ecologists are now working desperately to awaken the public and politicians to man's existence *in* nature and to his fundamental stake in the disposition of our world. We are trying to impart the Zen consciousness to a gathering of tragically indifferent monks.

Western man is an activist, doing creature—"when in doubt, *do* something." Thus, we are developers, builders and also destroyers and polluters. Only rarely do we heed the advice of Theodore Roosevelt, gazing into the Grand Canyon: "Leave it be. The ages have been at work and you cannot improve it." Thus, ecologists more and more find themselves as a resistance movement, counseling Zen-like *inaction* as the best "action." The Taoist Chuang-tze advises: "Who can make muddy water clear? But if left alone, it will gradually come clear by itself. Who can secure a state of repose? But let time go on and the state of repose will gradually set in" (Lin Yu-tang, 1948). The Zen masters have long recognized that fundamental change of the world is impossible, while some efforts at superficial change can be most uncomfortable, if not deadly: "For a duck's legs, though short, cannot be lengthened without dismay to the duck, and a crane's legs, though long, cannot be shortened without misery to the crane. That which is long in nature must not be cut off, and that which is short in nature must not be lengthened" (Lin Yu-tang, 1948). However, Zen is not mere quietism; in fact, it cherishes direct and vigorous behavior, but always consonant with our place in nature and without destructive tampering. The ecologists' fondness for natural and integrated pest control is a Western extension of this Eastern wisdom.

There is a "rightness" about nature when seen with Zen eyes. With dualism overcome and the world seen in its organic wholeness, it becomes absurd to consider natural processes as "harmful" to themselves. The ecologist has also discovered this. For example, predation is now viewed, not as an evil, unwholesome activity, but rather as a necessity for the maintenance of healthy prey population levels. A basic dictum of ecology has arisen: everything has its place, from the estuarine molluscs essential to phosphorus cycling to mycorrhizal fungi upon which the boreal forests depend.

Western dualism is also manifested in linguistic conventions; thus, the subject-predicate dichotomy underlies the Western world view, often forcing separation of wholes into "doer" and "thing done." By contrast, the ideogram of most Eastern languages provides for a unified "picture" with emancipation from restrictive linear thinking. Significantly, ecologists are appreciating the coordinated complexity of natural communities and the need for "simultaneous apprehension of aggregates" (Siu, 1957). Hence, the recent attention to systems analysis with complex flow charts representing the numerous inputs and a bewildering array of interconnections. Significantly, such analysis, with its recognition of the futility of verbal description, has become particularly popular in ecological studies although it is admitted that the "boxes" themselves do violence to reality by representing an artificial encapsulation of influences.

The basic notion of cause and effect is essentially dualistic, setting events in opposition, and is thus foreign to Zen. Significantly, modern ecologists have recently also moved beyond simple "cause-effect" analysis. This derives in part from the conception of natural systems as multidependent, interacting complexes, as described above. Thus, a linear cause-effect relationship cannot be superimposed on the elaborate interconnecting networks ecologists now recog-

nize. In addition, organisms comprise part of the environment of other organisms and, in responding to the environment, change it as well. Are soils the cause or effect of vegetation? Is the prairie the cause or effect of grazing mammals? Is differential reproduction a cause or effect of evolutionary adaptation? "Organism" and "environment" interconnect such that neither can truly be labeled a "cause" or "effect" of the other.

In other cases, the complexity of natural systems involves the interaction of so many factors that no one can be singled out as *the* cause—and indeed, the impact of these factors is so multifaceted that no single "effect" can be recognized as well. Systems exist as a whole, not as isolated causative sequences. Recent analyses of negative feedback in information-theoretic systems (Sayre and Crosson, 1967) exemplify the web of interdependence that has always permeated Zen's *weltansicht* and which is now increasingly recognized as characteristic of much of the natural world. From Schrodinger's principle of uncertainty to the study of human ecology, there is increasing recognition that even as man seeks to operate upon a system, he is himself part of that system, influencing it by his presence and changing it as he is himself changed.

The distinction between object and nonobject, matter and space, would at least appear to be a fundamental duality of the natural world. Yet, to the Zen master, space is no more "empty" than is matter: one is defined only by the other, with the convexity of one forming the concavity of the other. From the arrangement of flowers on a ceremonial table to the placement of rocks in a monastery garden, space is "used" as a commodity as real as the flowers and rocks themselves. Similarly, ecologists recognize the significance of "nothing": the physical spaces between plants are no less important than the plants themselves.

"Interaction" implies *action* as well as *inter*. Thus, the connectedness of events involves a dynamic state, with components intermingling to varying degrees at different times, constantly changing themselves and others. This suggests the evolutionary concept of life as process, as a constantly shifting nexus of reality spanning a receding past and a progressing future. The dynamics of natural communities dictate moment-by-moment adjustments in interactions between predator and prey, mutuals, symbionts, breather and breathed, shadher and shaded, and so on. In addition, such changes are superimposed upon diel cycles, seasonal progressions and, finally, seral succession. Things are very complex indeed.

Thus, with the growth of ecology, appreciation of nature's complexity has likewise grown. It is almost an ecological axiom that things aren't simple. Simplistic, cause-effect explanations invariably turn up wanting as full understanding requires sensitivity to the "grayness" underlying each superficial "black-white" duality. In a sense, therefore, the successful pursuit of ecology requires a "Renaissance man" among scientists, a specialist in generalism. The necessary roundedness of training and character recalls the truly integrated, whole man of Eastern thought.

Awareness of the futility of sharply defined "either-or" dichotomies is actually not unique to ecology, but is becoming characteristic of nearly all branches of modern science. A partial list includes: ethology (learning-instinct); genetics (genotype-phenotype); cellular biology (proteins-nucleic acids); morphology (structure-function); physiology (chemical-electrical); chemistry (ionic-covalent); and even that bastion of the "definite," physics (particle-wave, matter-energy).

Zen itself owes a great deal to the nature philosophy of Taoism and the personal enlightenment of Buddhism. Hinduism had preceded Zen in denying causality. In fact, it is entirely possible that support for any scientific system

could be documented through sufficient research into the world's great philosophies. But the clear and consistent mutual reflection of ecology and Zen remain a source of wonder and hope.

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### Pollen Analysis of Deeply Buried Quaternary Sediments from Southern Michigan

**ABSTRACT:** *Samples of peat and clay recovered from deep beneath glacial drift in the Saginaw lobe region of S-central Michigan have pollen assemblages dominated by Pinus, Picea, Betula, Cyperaceae and Gramineae. These agree with pollen accumulations at the surface in the boreal forest region of Canada SE of James Bay between 51 and 48° N Lat and with pollen spectra from "pre-classical" Wisconsin peats and inorganic sediments recently found near Grand Rapids in western Michigan. A combined sample of the peat and clay has been radiocarbon-dated at >32,000 years B.P. Correlation with the mid-Wisconsin Port Talbot interstade is considered plausible but not certain in the absence of a finite age determination.*

#### INTRODUCTION AND GEOLOGICAL SETTING

Numerous studies employing the technique of pollen analysis have led to a fairly clear understanding of the nature of vegetation change following deglaciation across much of central and eastern North America. However, comparatively little is known of the plant life of this region during the various Wisconsinan interstades and during interglacial times, although geological information on these more or less ice-free periods has accumulated rapidly in recent years. The present study is a result of work on associated organic and inorganic sediments recently found beneath glacial till in S-central Michigan within the region invaded by Saginaw lobe ice.

Through the courtesy of K. E. Vanlier, formerly of the U. S. Geological Survey office in Lansing, Mich., a sample of peaty and clayey sediment containing wood chips, collected during the drilling of a water well, was brought to the palynological laboratory at Michigan State University. The well is located in Clinton Co. about 2 miles NE of Hubbardston in the southern half of the NW quarter of Sect. 6, T. 8 N./R. 4W, in a barnyard on the farm of Harry Sanborn. The surface drift at this point is mapped as the Fowler-St. Johns Moraine (Flint, 1959; Martin, 1955), one of numerous arcuate recessional moraines in southern Michigan, developed during the retreat of the Woodfordian Cary ice (Wayne and Zumberge, 1965). With the aid of a dissecting microscope, the wood chips (none greater than 1 cm<sup>2</sup>) were picked from the sample and two distinct kinds of sediment were recognized — (1) humified, weakly silty, blocky peat, much like that found at exposures of the Two Creeks forest bed along the shore of Lake Michigan in eastern Wisconsin, and (2)