
Observations

The next two articles are different approaches to the same topic—the wholistic, integrative nature of permaculture and the importance of seeing networks and flows. "Patterning" means observing relationships in the natural world and applying them to environmental design. Tim Murphy and Kevin Dahl's article, adapted from a paper presented to an audience of design professionals, discusses using patterning as a design methodology. Joel Glanzberg stresses the importance of seeing the connections between things as well as the things themselves.

Patterning: A Theory of Natural Design

by Tim Murphy and Kevin Dahl

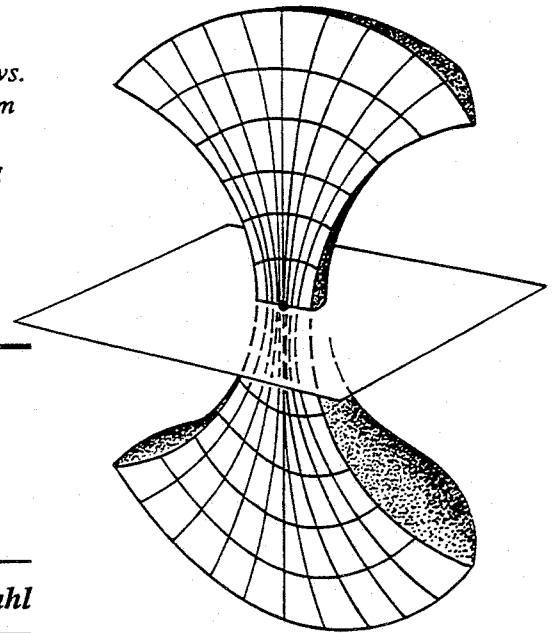
A landscape is a sophisticated system, a virtual organism formed by energy flows and nutrient exchanges (Lovelock, 1979). Each element is a part of the greater whole.

While species diversity is generally taken to be an indication of the health of an ecosystem, it is actually the diversity of connections or the energy exchange between elements that gives an ecosystem stability and resilience (Mollison, 1988). In a healthy ecosystem resources are transformed and stored at the highest potential; energy outflow is minimal. Nor is outside input needed; all products are consumed within, and recycled through the system. An intact ecosystem is stable and highly productive.

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Patterning means applying the spatial, temporal and social relationships observed in nature to the design process. Simply stated, it is the application of what you see to what you create (Mollison, 1988). This technique allows perception of the landscape as an organism, i.e. a symbiotic structure, with humans as one of the transient organic components.

Creating healthy landscapes modelled on healthy ecosystems requires a wholistic thought process. Our culture has tried to define the landscape scientifically, by collecting objective data about its parts. (The word science itself is derived from the Indo-European base *skei-*, "to cut or separate.") The results resemble those of the blind mullahs in the Sufi tale that are trying to describe an elephant. "Aha," said the first, who grasped a leg, "an elephant is like a tree." "No," said the second, holding the tail, "an elephant is much like a snake." A third, feeling the ear, says, "An elephant is like a thick rug." (Ornstein, 1972). Their error is in looking at the parts, for systems are far more than the sum of their parts. Indeed, the parts of any living system, not to mention their functional connec-



tions, may never be fully catalogued. Systems that function as integral components of the larger landscape cannot be fully comprehended except as they relate to process or flow.

According to Simpson (1989), the field of landscape ecology developed in part from the assumption that the landscape is too complex to be understood intuitively. In offering patterning as a methodology for design, we assume the converse: that the landscape is too complex to be understood objectively. Attempts to design landscape from a strictly objective perspective have produced "dysfunctional" landscapes, for pure objectivity is the antithesis of wholism. For example, the absence of food and other elements that connect our designs to human needs is an indication of dysfunction.

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Above:
A general model representing such diverse phenomena as events on the sun's surface and streamline flows in plants. Illustration: Silvia Parsons, drawn from an illustration in *Permaculture: A Practical Guide for a Sustainable Future*

Designers typically view the landscape as a series of two-dimensional maps and overlays. In this age of production deadlines and high overhead, many designs are created without even a brief on-site assessment. We believe that observation is of primary importance in patterning and that interaction with the landscape is essential to design effectively. Elevation drawings, profiles, and topographic relief maps can be used to depict the spatial components that extend above and below the soil line but, even when used in a "time sequence set" (Simpson, 1989), they fail to capture the dynamic quality of a site. The pattern literate designer realizes that 'the map is not the territory'.

Patterning empowers the designer. It balances our rational and nonrational knowledge by blending three components of awareness—intuition, pattern recognition, and rationality—to create functional integrated designs.

As an observer, the designer is empowered by intuition. A highly tuned intuition will flag patterns or processes previously unobserved, and inspire application of known dynamic relationships to diverse situations.

Pattern recognition is a skill learned in the field—a familiarity with the dynamics of a landscape gained in the same manner one learns to skip a stone across a pond or locate morel mushrooms in the forest.

Reason allows us to describe what we envision, to articulate our understanding and to share with others a desire for an ethical and sustainable future. Through reason and inference we can extend our observations into applications. Combined with observation, reason provides feedback on the effectiveness of our designs.

Indigenous peoples in traditional settings use patterns to effectively understand and interact with their landscape. They do not differentiate between themselves and their environment, but relate to the natural world as

family. This relationship is experiential and respectful. A 1983 study by Nabhan et al illustrates how indigenous desert people significantly improved their environment over similar natural (wild) areas while achieving a sustainable agriculture.

Song, dance, art, architecture, and tradition are ways of storing vast amounts of patterned information, combining art, science, and spiritual beliefs in one understanding. An illiterate "primitive" person is usually "pattern literate" and carries a virtual library of references on her/his environment. Information about appropriate land use, cyclic and sporadic events, geography, medicine and appropriate behavior is stored in objects—sculpture, tools, pictographs, body paint, etc.—and accessed holographically with accompanying songs or dance.

By perceiving the landscape as a system of interacting dynamic patterns, we are led to ask how the elements of a design relate to one another and to the whole. We are also led to thinking of designs as sequences of events patterned after succession. We can evaluate a system's growth or state of health, and then decide rationally where and when to nudge.

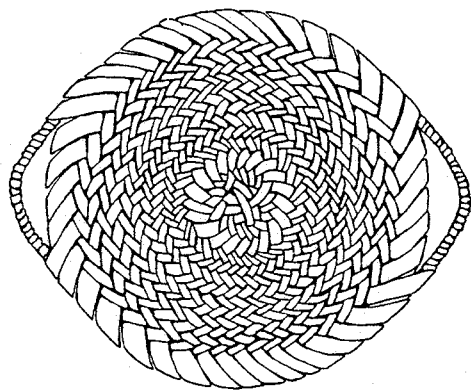
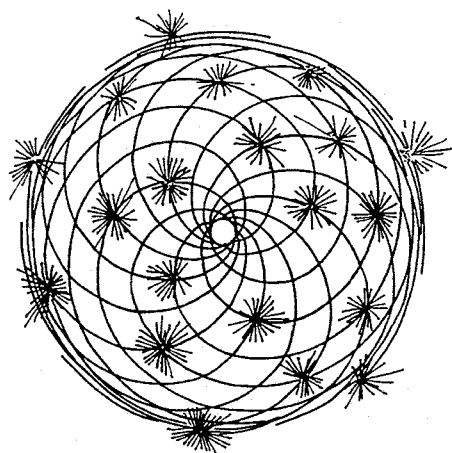
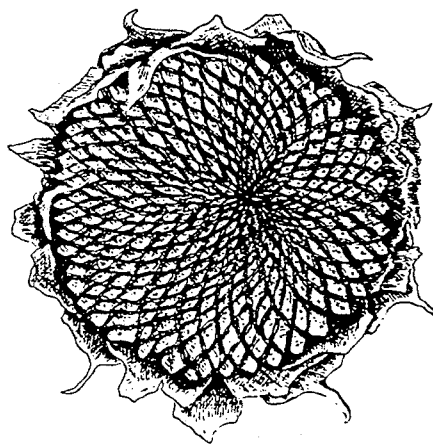
Here are some examples of patterns in landscape:

Edge

Spatial patterns like array, slope, and aspect affect the flow and storage potential of energies crossing a landscape. One of the most significant spatial patterns for designers is edge, the boundary between different media or ecosystems. Edges extend above and below the surface of the soil, which is itself an edge. They function as membranes of nutrient storage and exchange.

In general, the more edge in a landscape the more potential for overall diversity.

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Above, from top to bottom:

Pattern on the face of a sunflower.

Illustration: Roxanne Swentzell

Pattern on a pinecone.

*Illustration: Silvia Parsons, from an illustration in
The Power of Limits*

Pattern on a Tarahumara basket.

Illustration: Roxanne Swentzell

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Time

Time interacts with spatial patterns and energy flows to produce velocity, periodicity, and turbulence. With experience, these flow forms and eddies are predictable. Sequential patterns like succession (or desertification) and cyclic patterns like migration, foliage, flowering, and fruition all relate to the whole either periodically, erratically, or even spatially.

Guilds

Perhaps the most intricate and promising dimension of patterning is the social facet of ecosystems. Mollison (1988) defines a guild as "a harmonious assembly of species clustered around a central element (a plant or an animal)." Guilds not only consist of flora and fauna but also of the energy transactions that bind them. We are only beginning to explore and define existing guilds,

and the social relationships between their elements.

With observation one can note spatial relationships between guild elements that result in higher yields. Patterns associated with existing guilds may be extrapolated to design for human sustenance. Cultivars or highly productive species can be substituted for others from the same genus. The connections between elements can still be made using the same living bridges or symbionts.

By envisaging guilds as basic structural units of landscape, the designer begins to shift focus from individual, static elements to the energy dynamics of the landscape as a whole.

McHarg and others argued several decades ago that designers must learn to "design with nature" instead of ignoring it or designing against nature (McHarg, 1969). To take this one step further we

challenge designers to learn how to design *like* nature, so that the landscapes we create are healthy natural systems, where energy is conserved, resources are abundant and pollutants do not exist. This is the essence of patterning.

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