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Root Metaphor and Interdisciplinary Curriculum: Designs for Teaching Literature in Secondary Schools

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In *World Hypotheses* (1942) and *The Basis of Criticism in the Arts* (1945), Pepper lays the foundation for the development of interdisciplinary curricula. The four world hypotheses—formism, mechanism, contextualism, and organicism—are applied to such disparate subjects as astronomy, art, poetry, music, sculpture and drama. The categories of each world hypothesis are precise, yet one does not have to distort them to make them useful in interpreting the facts of any particular discipline. Pepper's categories are neither too broad nor too narrow; they are both rigorous and universal. As Pepper puts it, they meet the criteria of scope and precision. The development of interdisciplinary curricula requires the use of categories and processes based on a metadiscipline such as Pepper's philosophy. Extension of categories and processes drawn from popular movements and from particular fields have proved ineffective, producing curricula that are imbalanced in scope or precision. Root metaphors not only provide a balance of precision and scope; they also function as routing patterns, connecting experience with cognition, the subjective with the representative, and science with art. A broad range of disciplines can be taught from the perspectives of formism, mechanism, contextualism, and organicism. When the root metaphors of these world hypotheses are presented to students through physical analogies, puzzles and games, encounters, and in particular, centering processes, the intuitive and the rational can be coordinated. Root metaphors, taught in this way, give one the power to explore the whole range of human experience, from the most mundane and irrational fantasy, to the highest reaches of human cognition.

In *World Hypotheses* (1942) and *The Basis of Criticism in the Arts* (1945), Stephen Pepper lays the foundation for the development of interdisciplinary curricula. The four world hypotheses, formism, mechanism, contextualism and organicism, are applied across the board to such disparate subjects as astronomy, art, poetry, music, sculpture and drama. The categories of each world hypothesis are precise, yet one does not have to distort them to make them useful in interpreting the facts of any particular discipline. Pepper's categories are neither too broad nor too narrow; they are both rigorous and universal. As Pepper puts it, they meet the criteria of scope and precision.

Throughout the history of curriculum development, the meeting of the criteria of scope and precision has more often *not* been the case than it *has* been the case. Curricula organized around concepts such as the scientific method or the democratic process worked fine in certain restricted fields, but curriculum theorists were sometimes embarrassed when asked: "Just what does it mean to use the scientific method in teaching poetry?" or "Just what does it mean to use the democratic process to teach physics?" "Isn't there a bit of slippage

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going on in your usage or are you just using these terms figuratively?" The history of curriculum development will reveal similar problems all along the way. The whole history can be read in terms of a see-saw between the norms of precision and scope, but always accompanied by the subsequent realization and sense of dissatisfaction that one of the norms has been sacrificed for the other.

I think there is a reason for this pattern of development: namely, that if curricula have not been organized merely in terms of random topics or according to a simple chronology, they have been organized around concepts derived from a particular field—psychology, physics, or the social sciences. Thus curricula have been based on such varied themes as mental discipline, the inductive method, personality development; on concepts of perception, quantification, energy and order; on the structure of disciplines or on environmental balance (Tanner, 1972, pp. 254-315). These concepts tended to be either too narrow or too broad to provide the basis for interdisciplinary curricula. Some concepts were locked into the discipline from which they were taken; they were too narrow. Others, like Pepper's notion of "empty abstraction," could be applied to everything, but the applications were so general as to be useless; they were too broad (Pepper, 1942, pp. 124-127).

What has been needed in the development of interdisciplinary curricula is a foundation in a metadiscipline. We can define metadiscipline as a discipline, the categories of which stand outside particular disciplines and yet provide a basis for connecting and analyzing particular fields of knowledge in terms of universal categories. Pepper's philosophy does this. World hypotheses are "unrestricted products of knowledge" (Pepper, 1942, p. 1). In this sense they are metadisciplinary in character. The historian, the mathematician and the psychologist can reject certain facts as irrelevant to their fields. "The peculiarity of the world hypotheses," says Pepper, is that "they cannot reject anything as irrelevant" (Pepper, 1942, p. 1).

The problem with using Pepper's philosophy as a basis for curriculum building does not reside in its philosophical justification; Pepper's stress on scope and precision match the continual quest of curriculum builders for clarity and comprehension. The problem resides in its practical implementation. The natural assumption is that it will be more comprehensible to the average high school student to organize curricula around some such concept as "problem solving" (something everyone can understand) than to organize curricula around epistemic categories drawn from formism, mechanism, contextualism, and organicism. A good way to stop conversation, whether it be in a dentist's office, a cocktail party or a curriculum meeting is to ask for one's latest thoughts on metaphilosophy. So how will one build a curriculum out of such an abstract discipline, particularly for high school students, who are assumed already confused enough.

The assumption of extreme abstraction, however, at least in respect to

Pepper's philosophy, requires considerable qualification. His system is both abstract and concrete, and it is his "root metaphors" discovered in common sense which provide such rich concreteness. Of course, after the root metaphors are cognitively refined and translated into world hypotheses they are, indeed, very abstract (Pepper, 1942, p. 91, 112). But, pedagogically, this is not where one should begin. One should begin with the root metaphors and move on to the development of world hypotheses. Pepper says that root metaphors are like clues to understanding the world, clues which come to one in a common sense search for comprehending seemingly random facts. Knowledge, Pepper says, does not begin with certainties, but "dawn(s) like day out of a half-light of semiknowledge and gradually grow(s) to clarity and illumination" (Pepper, 1942, p. 39). I should like to adopt Pepper's analysis of epistemic growth as a model for the learning process. Root metaphors will be presented to the student, and the student, with some guidance from the teacher, will translate the root metaphors into world hypotheses. Students will internalize the basic categories of world hypotheses and gain a greater mastery over whatever disciplines they are studying; they will be able to see relationships between disciplines they have not noticed before, and they will be able to interpret their chosen field in terms of a variety of cognitive styles.

Root metaphors are born out of common sense, out of that domain Pepper calls the pre-rational. Common sense, he says, is always available as a starting point in knowledge, yet it is "unreliable, irresponsible, and, in a word, irritable" (Pepper, 1942, p. 44). Root metaphors are but the first glimmering of rationality. From a pedagogical standpoint, I think they should initially be presented to the student as possible visions of the world. To see the world formistically is to see the world in terms of similarity—the similarity of trees, the similarity of rectangles, the similarity of poems and of human types, the similarity of botanical specimen. It is to see the world in terms of identity and difference, as type and subtype, class and subclass. Mathematical, logical, and aesthetic forms lift off the face of the world as essential realities. There are two days, two fish, two persons, two songs—there are two . . . . To see the world mechanistically is to envision space, time, action and reaction, stimulus and response, to see quantities emerge, to ask the questions when, where, how much, how often; it is to see the world as a machine. To see the world contextually is to see it as a series of experiential moments, always coming to completion, only to begin again, opening into new textures, becoming new strands of experience. It is to see the world as a continual unfolding of experience, an encountering of new streams of experiencing and re-experiencing, of interpreting and reinterpreting. To see the world organically is to see it as integrated organism, as completed puzzle. It is to see that all the pieces in the puzzle must fit or else find a larger whole. All things are related, all things are integrated: poems are integrated, suns and moons are integrated, bodies are integrated, tapestries are finished and perfect. To see in this way is to see the

whole in relation to its parts.

These are imagistic expansions of Pepper's primary root metaphors. If Pepper is correct, these seedling visions, or something like them, will be located in common sense. Even in free association and in the uncritical and irresponsible examination of data—what Pepper calls *dubitanda*—these visions, these glimmerings of rationality, are potentially present (Pepper, 1942, pp. 39-48, 68). It is the job of the teacher and curriculum builder to draw them out.

There are at least five processes which when used together elicit the root metaphors, lead to cognitive refinement, and finally to the application of world hypotheses. These processes are: (1) the use of physical analogies; (2) the use of encounter experiences; (3) the use of games and puzzles; (4) the use of centering techniques, including guided imagery, fantasy journeys, body awareness, dream exploration; and (5) the translation of categories generated by the root metaphors into questions which are comprehensible to the student.

Physical Analogy as Method

An effective physical analogy for formism is the use of a container. Bring to class a large box. Open the box and take from it several cans, all the same size and shape. Ask students what they notice about the cans. Then open the cans. Each can contains several smaller boxes. In the boxes are marbles with varied inscriptions on them, some the same, some not the same. By questioning the students about the boxes, cans, and marbles, an outline can be generated showing the classification system represented by this physical analogy. From that point more complex applications of formism can be introduced. The root metaphor of similarity is driven home with concrete example so that the concept of classification emerges from it. The idea is that every object in the world is a member of classes of things and this is what gives the object its characteristics. Formism can be manifested in many ways. Examples are the use of filing systems, the grouping of merchandise in stores, classification systems used in libraries, subjects in a curriculum, grammatical nomenclature, zoological and botanical taxonomies, the concept of class in mathematics and logic, and the concepts of genre, style, theme and literary period. All of these entities emerge from the use of the root metaphor of similarity as a basis for discribing the world. Similar entities are grouped into categories or classes. The content does not matter. One can group numbers, merchandise or literary styles. Classes are formed in any case.

Other physical analogies are the use of a tapestry or jigsaw puzzle for organicism, the use of the kaleidoscope and optical illusions to convey change and shift in point of view for contextualism, and the use of the game of billiards and the pinball machine to convey stimulus and response for mecha-

nism. Some of my graduate students have used photographs in a series and wood carvings in different stages of development to convey the idea of contextualism. In the latter process the wood carvings were used in conjunction with teaching Harriette Arnow's *The Dollmaker*. In this case, the physical analogy parallels the woodcarving created by the central character in the novel. The carving changes according to the way the protagonist sees the world.

Planned Encounters as Method

Planned encounters can be enacted in the classroom or as an outside assignment. Students can be sent on imaginary or actual trips to their local grocery store to describe the contents and organization of the store in terms of the four root-metaphors. They can classify and quantify the groceries; they can note experiential patterns from different points of view in the store; and, they can note the integration of item with item, department with department, and person with person (Quina and Alessio, 1980).

An in-class encounter using the categories of mechanism requires surveying the work of literature being taught for recurrent images, then collecting photographs of like images. The photographs are projected onto a screen and students are asked to list their emotional responses to each photo on a sheet of paper. One graduate student teaching John Knowles' *A Separate Peace*, made photos of buildings in Detroit: homes, hospitals, jails, restaurants, churches—all buildings that students living in Detroit would recognize. Following a listing of students' responses to the photos and a discussion, the class read the novel, and the students were then asked to list their responses to the buildings in the novel, particularly the school building at Devon. This exercise was then expanded to include the central symbol of the tree in the novel. In this way students were prepared for a stimulus-response approach to the novel and the root metaphor of mechanism was able to function with full range, connecting the experience of the world with response to art.

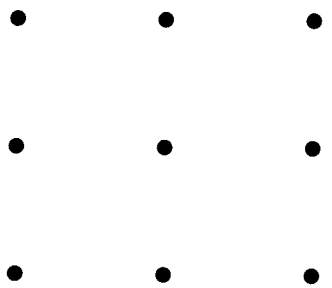
An encounter process with organicism makes use of deleting the ending of the poem or short story, having the students complete the poem or story. Debate should follow on what is the best ending. The author's version is read, and students are asked to judge which is best and why. During the dialogue, the criteria of appropriateness and relatedness will naturally emerge.

One teacher conveyed the idea of appropriateness through an oral reading of a scene from Steinbeck's *Of Mice and Men*. Being a good actor, he was able to create convincing voices for Lenny and George. But then he read the same parts a second time, this time reversing the voice roles—that is, Lenny's voice now became George's voice and vice versa. The idea of appropriateness carried.

Problems, Puzzles, and Games as Method

Problems, puzzles and games are useful in lightening the mood, stretching student's powers of perceiving analogies and expanding their abilities to perceive in alternative cognitive modes.

There are any number of geometrical puzzles which challenge students to think beyond the usual boundaries they may place on their thinking. A classical example follows:



Ask students to connect all the dots represented above by drawing only four straight lines, never retracing and never raising their pencils from their paper until they have connected the dots. Many students will "lock into" their perception of the dots as a rectangle, thinking there is an implicit rule which says one can't draw a line outside the imaginary boundary of the rectangle. But no such rule is stated.

Many teachers report that, after they have presented a few puzzles in class, their students begin supplying and challenging them with puzzles. An atmosphere of quest is produced—quest for optional ways of thinking about and experiencing the world. This atmosphere in turn supports the attitude necessary to exploring the categories of the world hypotheses with intellectual curiosity and openness. At the same time it stresses cognitive responsibility. Solutions to these puzzles are not quite arbitrary.

From the use of puzzles it is an easy transition to the use of games and vice versa. I have had good reports from teachers on the usefulness of Charades as an introduction to formism for younger students. Five Square, a game of categories, has also been recommended. Older students may enjoy some variant of the games "Twenty Questions" or "Botticelli," an introduction to the game of classification. In all of these games the root metaphor of similarity is reinforced and extended.

Centering as Method

All of the foregoing strategies have been found useful by teachers, but by far the most powerful pre-activity from the standpoint of introducing world hypotheses, based on reports from teachers who have tried the technique, is centering, usually an eyes closed process focusing on guided imagery, fantasy journeys, body awareness and dream exploration. Centering teaches focused attention, providing a bridge from the non-verbal, intuitive, creative awareness experienced out of time—the world of the non-rational or irrational self—to the external world, the world of subject matter and disciplines and constructs for organizing the data of the world. Its effectiveness requires temporarily suspending rational processes. Hendricks comments on this point:

> In a fantasy journey anything is possible. *Every thing* is possible. Don't allow yourself to stop your imagination with thoughts like "That doesn't fit it" or "How can that be?" Don't limit yourself to your past experience or to what's logical. One moment you might be at a beach sunning yourself and the next skiing down a mountain in your bathing suit. If that bothers you, imagine ski boots and a parka. Or imagine a new kind of snow that doesn't melt in 80-degree heat. You can even be in two places at once, see something from several perspectives, or even be two, three, or more characters in your fantasies. If an inconsistency comes in, let it. You can learn first to tolerate inconsistencies, then to enjoy them, finally to create your own. (Hendricks, 1977, p. 38)

My intent in quoting this passage is not to irritate logicians, nor to recommend the development of a new logic, neo-Hegelian or otherwise, but simply to make clear that the starting point in knowledge acquisition can be irrational. Nevertheless, this subjective exploration is methodologically useful in the sense that raw experiential data (Pepper's *dubitanda*) are called up—which can then be used as a basis for discovering root metaphors. As Pepper states it, "If man is to be creative in the construction of a new world theory, he must dig among the crevices of common sense. There he may find the pupa of a new moth or butterfly" (Pepper, 1942, p. 112). Centering can assist students in experiencing established root metaphors and can open the door to the experience of new root metaphors.

To introduce centering, the teacher will find it useful to prepare students by describing the process as one which aids the imagination, guides the formation of images or assists one to focus attention on various aspects of a literary work or experience. It is a good idea to use a pre-activity such as a brief discussion of a topic related to the centering process. Also, the physical space should be comfortable, including seating or reclining arrangements and proper acoustics. Sometimes, changing the lighting in the room—using a softer light or total darkness—can enhance a centering process. Music and sound effects are sometimes effectively used as background.

In the centering process, the teacher typically asks students to sit up straight

or to lie on the floor, whatever is appropriate. In most processes students are then asked to close their eyes and to begin noticing aspects of their bodies, their thinking and experiencing. The teacher may work with a script or create a spontaneous process.

The following is a script of a centering process which interprets a passage of Whitman's, *The Leaves of Grass*, in respect to the root metaphor of mechanism:

CENTERING SCRIPT

Sit up straight. Uncross your legs. Place your hands on your lap and find a position which is most comfortable to you. Now close your eyes. Listen. Listen to the sounds inside this room. Now listen to the sounds outside this room. Now listen to the sounds inside your own body. Become aware of your left foot. [Pause] Become aware of your right foot. Become aware of both legs. [Pause] Become aware of your knee joints. Become aware of your hip sockets. [Pause] If any sensation of thoughts come up, just notice them. [Pause] If any tension comes up, just notice the location in your body and let go of it. [Pause] Now place your awareness in your thighs and hips. If any feelings or judgments come up, just notice them. [Pause] Now become aware of your genitals. [Pause] Become aware of your stomach. [Pause] If you have tension there, just notice it. [Pause] Now listen to your breathing. Notice the sound of your breathing. Visualize your lungs breathing. [Pause] If you have any sensations in your body, just notice where they are. Notice exactly where they are. [Pause] Locate your lungs in your body. [Pause] Now visualize your heart. Locate your heart in your body. [Pause] If any feelings, judgments, or opinions come up just notice them. [Pause] Now visualize your brain and all of its folds and convolutions. Become aware of your head . . . of your head . . . of your head: [Pause]

Head, neck, hair, ears, drop and tympan of the ears,
Eyes, eye-fringes, iris of the eye, eyebrows, and the waking or sleeping of the lids,
Mouth, tongue, lips, teeth, roof of the mouth, jaws, and the jawhinges,
Nose, nostrils of the nose, and the partition,
Cheeks, temples, forehead, chin, throat, back of the neck, neckslue,
Strong shoulders, manly beard, scapula, hind-shoulders, and the ample side-round of the chest,
Upper-arm armpit, elbow-socket, lower-arm, arm-sinews, armbones,
Wrist and wrist-joints, hand, palm, knuckles, thumb, forefinger, finger-joints, finger-nails,
Broad breast-front, curling hair of the breast-bone, breast-side,
Ribs, belly, backbone, joints of the backbone,
Hips, hip-sockets, hip-strength, inward and outward round, man-balls, man-root,
Strong set of thighs, well carrying the trunk above,
Leg-fibres, knee, knee-pan, upper-leg, under-leg,
Ankles, instep, foot-ball, toes, toe-joints, the heel;
All attitudes, all the shapeliness, all the belongings of my or your body or of any one's body, male or female,
The lung-sponges, the stomach-sac, the bowels sweet and clean,
The brain in its folds inside the skull-frame,
Sympathies, heart-valves, palate-valves, sexuality, maternity,
Womanhood, and all that is a woman, and the man that comes from woman,
The womb, the teats, nipples, breast-milk, tears, laughter, weeping, love-looks, love-perturbations and risings,
The voice, articulation, language, whispering, shouting aloud,
Food, drink, pulse, digestion, sweat, sleep, walking, swimming,
Poise on the hips, leaping, reclining, embracing, arm-curving and tightening.

The continual changes of the flex of the mouth, and around the eyes,
The skin, the sunburnt shade, freckles, hair,
The curious sympathy one feels when feeling with the hand the naked meat of the body,
The circling rivers the breath, and breathing it in and out,
The beauty of the waist, and thence of the hips, and thence downward toward the knees,
The thin red jellies within you or within me, the bones and the marrow in the bones,
The exquisite realization of health;
O I say these are not the parts and poems of the body only, but of the soul,
O I say now these are the soul! (Whitman, 1855/1980, pp. 84-85)

Now allow the emotions you had to flow back into you. Notice any sensations, any emotions. [Pause] Notice how long each feeling lasts. [Pause] Notice the intensity of each feeling. [Pause] Notice any associations you had with the feelings. [Pause] Notice any patterns of images associated with the feelings, emotions, and sensations. [Pause] Notice pleasures. Notice displeasures. [Pause] Now notice any judgments you had about what you experienced. [Pause] Relax. Get a picture of the room you are in. Gradually open your eyes and bring your awareness back into the room.

This centering script is used to focus on mechanism. The process includes mechanistic suggestions throughout. For example, the student is asked to notice the location of parts of the body, to note stimulus-response and cause and effect patterns—all mechanistic categories.

Centering, however, can be used to focus on contextualism, formism, or organicism. The student can be asked to consider conflict, change and serialized perception, or to group the recurrent pattern of language or images into similar categories, or to note relationships of part to whole—the body in relation to its parts—and to consider the appropriateness of image and language.

Centering can be used to focus students' awareness on plot, theme, character, image and motivation. It can be used with any form of literature: short story, poetry, or novel. It is particularly adaptable to the teaching of drama, for role playing can be created in fantasy journeys and later enacted. It can be used for pre and post activities, combined with music and with paintings. And it can be used to explore the root metaphors of world hypotheses.

Translation of Root Metaphors into Questions as Method

Finally, it is possible to translate root metaphors into basic questions. For example, the basic question that the root metaphor of similarity generates is "What is it?" Or, conversely, "What is it not?" These questions, I think, lead naturally to corollary questions such as "What qualities or characteristics does the object have?" These questions can be asked about virtually everything in the student's experience. Lists of qualities each item must have can be drawn up, compared and contrasted. As the student gains facility with the

definitional process, questioning can proceed along more difficult lines, for example, problems of correspondence and reference, problems and paradoxes relating to class membership. Even before this, however, easy transitions can be made to literature. The classic question, "What do the two things have in common?" can be applied to two or more sonnets, haiku, or short stories. Again students draw up lists and, through noting similarity, discover definitions of types of poetry and genre. Definition of character and social norms can be developed in the same way. Students can, in effect, be taught formistic criticism through a questioning process which leads to the extended application of the root metaphor of similarity.

The same technique will work for mechanism, contextualism and organicism. For mechanism one asks not what is it, but where is it located in space and time, how much of it is available, and what are its functions in respect to cause and effect. The teacher can ask students about their emotive reactions to events and images in literary works: "How did you feel when Gene jounced the limb in Knowles', *A Separate Peace*? Was your feeling intense? Of long or short duration? Why did you feel that way? What in the text caused you to feel that way?" (Blaszczak, 1981, p. 11). In teaching the *Rime of the Ancient Mariner* one could again ask for "lists of emotions and sensations students experienced. The responses could be written on the board—silence, motionless, heat, thirst, desolation, death, suffering. . . . Then students would be asked to identify colors, shapes, and events in the poem which they think cause their feelings, sensations and emotions" (Blaszczak, 1981, p. 17).

The asking of basic root metaphor type questions can be applied across the board to make connections between different disciplines. A student who has been reading Ovid's *Metamorphosis* is asked to examine Brugel's painting, *The Fall of Icarus*. The question posed is, "What are the relationships between the details of the painting and the title?" Using a guided fantasy, students are transformed into Icarus, flying too close to the sun, their wings melting, then plummeting into the sea. Now it is *their* legs sticking out of the water in the painting and the ploughman in the painting does not see *them*—and these details make all the difference. Coming out of the fantasy the students are again confronted with the same basic questions: "What are the relationships between the details of the painting? Are the details integrated appropriately? Do the same relationships hold for Ovid's *Metamorphosis*?"

This technique can be further expanded to include the sciences. The student can be asked to search for the integration of detail in the history of astronomy. "Show," says Pepper, "any astronomical facts observed previous to Newton's integration that were not taken up by Newton" (Pepper, 1942, p. 306). For the organicist, every element in the system implies every other. This holds true for the organic interpretation of Brugel's painting and Ovid's *Metamorphosis*; it holds true for the organic interpretation given the history of astronomy. In

short, science, literature and art can be taught in terms of Pepper's theory of root metaphor.

Coordinating Intuitive and Rational Processes

The research of Ornstein (1972) and his colleagues supports the view that the human mind functions at an optimum when both left and right brain functions are coordinated. At the present stage of research, it is not known whether the mind functions as a unitary energy field or as a discrete bilateralized physiological process, whether the *corpus collosum* coordinates left and right brain function, or whether coordination is controlled by focused energy, the mind being unitary, manifesting itself sometimes in a right brain mode, sometimes in a left brain mode (see Fadley and Hosler, 1979). These empirical problems, however, do not stand in the way of interpreting root metaphors as epistemic maps which can connect the highly rational with the non-rational world of *dubitanda*.

Root metaphors provide a philosophic bridge between left and right brain functions, so that the verbal, analytical, sequential, linear, and time dependent rational world can find epistemic coordination with the spatial, relational, timeless non-verbal, holistic non-rational world. As Ornstein states it, "It is the polarity and the integration of these two modes of consciousness and the complementary workings of the intellect and the intuitive which underlie our highest achievements" (Ornstein, 1972, p. 64).

In summary, the development of interdisciplinary curricula requires the use of categories and processes based on a metadiscipline such as Pepper's philosophy. Extension of categories and processes drawn from popular movements and from particular fields have proved ineffective, producing curricula that are imbalanced in scope or precision. Root metaphors not only provide a balance of precision and scope; they also function as routing patterns, connecting experience with cognition, the subjective with the representative and science with art. A broad range of disciplines can be taught from the perspectives of formism, mechanism, contextualism, and organicism. When the root metaphors of these world hypotheses are presented to students through physical analogies, puzzles and games, encounters, and in particular, centering processes, the intuitive and the rational can be coordinated. Root metaphors, taught in this way, give one the power to explore the whole range of human experience, from the most mundane and irrational fantasy to the highest reaches of human cognition.

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