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The Ear as Organ of Cognition: Prolegomenon to the Anthropology of Listening

All resounding of music is only the flung out emanation of mightier and primeval processes whose forces spin around in the inaudible (Kurth 1968).

Within the concept of the interaction of the senses that symbolically and sensually construct the world from inside and outside through feedback spiral, the ear is not more nor less than a divided whole (cf. Stockmann 1981:71). The general nature of the ear always intertwines with the particular culture-specific intention of the listener. Knowledge of the reality of hearing and listening lies neither in the subject nor in the object, but in the cyclic activity and in the dynamic flow between them (cf. Bohm & Peat 1990:77). “You hear only what you know, and you only know what you hear” signifies that labyrinthic complexity which constitutes conceptions of reality in a spiral movement between the inside and outside (cf. Baumann 1990). The consciousness which taps the shell of reality from both sides—through which the inside becomes the outside and the outside becomes the inside—this consciousness proceeds in a way such as is expressed in the following *haiku* (Shigematsu 1981:732):

*Pecking the eggshell
at the same time
from inside and out.*

This consciousness incessantly listens with a “third ear” which finds between the two auricles the creativity that constructs reality in its own and special manner.

We know indeed that the sound of stereo equipment comes out of two speakers but in spatial terms we perceive it three-dimensionally. What is heard is extended through structured hearing which shapes—together with cultural factors—the sounding picture of appearance not only acoustically but also emotionally as a constructed reality.

Our ears and our acoustic nervous system (re)construct sound in such a way that it seems to come from a place which we know for certain cannot have produced this sound. Which is now reality: the appearance perceived or what we know as the physical arrangement that brought this appearance into being (Pribram 1990:27)?

In this sense hearing signifies creative, deep listening. The ear is always on the move and cannot—unlike the eye—close itself. Listening creates its reality in the interplay between consciousness and brain and in the feedback of the ears between the inside and outside worlds. The reality of the ear is a constructed one, a product of psychophysical experience and culturally related communication.

The most refined operation of the ear is the maintenance of a communication system between individuals. In addition to its specific analytical function of time, direction and frequency, the ear predominantly serves as an organ for speech recognition. In the function of analyzing complex time patterns it registers rapidly changing differences of intensity and frequency. The ear has learned to distinguish between vowels and consonants on the basis of “free intervals” (breaks) that appear between them (Keidel 1975:103). The act of listening with this finely tuned “third ear,” which “divines sense from a sequence of vocals and diphthongs” is the “conscience in the ears,” as Nietzsche (1988:189-91) calls it, and it is at the same time that creative deeper listening which finally transcends its own physiology.

Within the interaction of senses the third ear is directed towards the interior:

It can hear interior voices that normally are not audible because they are drowned out by the noise of our conscious chains of reasoning (Reik 1983:169).

It is that listening which questions the priority of the superficial eye, the power of the visual world and the primacy of visualized cognition.

“The third ear” as metaphor was ascertained by Nietzsche and later on was spun out into different variants, as for example by Joachim-Ernst Berendt (1988). The ear became the central control panel for the senses of time and space and for their crossing of the border into the infinite. The “*Hören der Welt*” [‘Listening of the World’] of Berendt is directed towards the interior and transcends the usual dimensions of em-

pirical experience; the ear is and becomes at the same instant the “gate to other worlds” (Berendt 1988:66). With these conceptual and cross-cultural observations, one seeks on the one hand a connection with ancient archetypes of spheric harmonies and on the other a synthesis towards a new consciousness that leaves behind the causal-mechanistic world view. The “*Nada Brama*” brings the “temple of the ear” to mind: “The world is sound” (cf. Berendt 1989:21). It is vibration and resonance together. The pictures of “hearing the world” are entwined with the concepts of physical matter which today are perceived as consisting of “rhythmic processes of activity, of energy bound and patterned within fields” (Sheldrake 1989:115).

1. To See with the Ears and to Hear with the Eyes—The Ear Within the Unity and Multiplicity of Reality

Within the spiral reflexivity of subject and object and through the interaction of the senses, the consciousness creates a concept of reality as a result of multiple communication processes. Based upon its predisposition, the ear took over a central position within the “nested” reflexivity of the senses. Referring to the history of evolution, the ear is a further development of the sense of balance (verticular apparatus) of primitive times. At birth the human hearing mechanism is already completely developed. It is remarkable that the earliest reactions of a baby refer to auditory stimuli, which produce motoric kicking as a response. This is reliable evidence that perception and movement are internally linked (Reinhold 1975:137). The ear learns on the basis of the accumulated so-called “historic reaction base” of the organism and thereupon perceives acoustic information three-dimensionally as time, intensity and space; the consciousness of perceiving and recognizing converts all received sensations in interaction with learning and teaching situations. Acoustic phenomena are brought synaesthetically into consciousness, such as color, taste, odor and emotion. Sound can be perceived and verbalized as metaphoric impressions: One argues about the musical taste of tone clusters; the room is filled with sound pictures; the sound is located by pricked ears; low frequencies lie heavy on one’s stomach; the Queen of the Night climbs up to f’; scales are played up and down; one beats the time; a musical idea originates from a *Kopfmotiv* [‘head motive’] and inspires listening, sound colors, sound pictures and soundscape; rhyth-

mical patterns provoke the motoric system; the threshold of audibility is transcended; silence weighs heavily

The conscious man, i.e. his "mind," who is aware of himself and the things outside of him, does not understand himself as a separate and self-reliant consciousness because "he" always reflects an outer reality bound to space and time through the media of memory and imagination. The problem of the individual oneness in the multifaceted emic reflection of the other raises the question of the consciousness in general, a consciousness which comprehends itself as part of the other world and therefore as a problem of unity in its multiplicity. Seen through a Zen master's concept of reality, these conflicting fundamental thoughts were expressed by Fa Yen Wen around 900 in the following way:

The whole world is only one unique spirit. And everything that exists is only one unique cognition. Because there is nothing else than cognition and everything is only one spirit, the eye can recognize tones and the ear colors. If colors could not reach the ear, how could tones touch the eye?

But if the eye is focused on colors and the ear reacts to tones, then all things are discriminated and recognized. If things could not be so discriminated, then how could one see them in their dreamlike existence? Of all of these mountains, rivers and the great earth, what is to be altered, what is not to be altered (Izutsu 1986:38)?

The split dichotomy of subject and object, or rather, the binding unity of the creative circle in its reflexivity of participation and interpretation (Varela 1990:307) always refers to the potential other: it is another way of inner awareness that is revealed through the "third ear," or—in the words of Dietmar Kamper (1986:203)—it is "the recurrence of a (new) hearing," a precise listening to the contemporary history of what is not yet ascertained.

Every semantic field, in particular that of musical hearing, is deeply culturally specific and is alone a piece of circumstantial evidence of deviating concepts of reality. In different cultures sounds are "high" or "pointed" on the one hand or "low," "small," "round" or "big" on the other. The "soundscape" as one's sonic surroundings is conceived as narrow or broad, according to the specific culture. The concept reaches from the specialized interpretation of an abstract musical piece to the complex environmental noises that give us information about the past and present "soundscapes," as in "The Tuning of the World" (Murray Schafer 1977).

Numerous worlds of focusing and perceiving lie between the seemingly irreconcilable polarities of the mystic doctrine of the "harmonies of spheres" on the one hand and the empirical logic of "acoustic information" on the other. The classificatory and demarcating terminology of "noise," "din," "sound," "tone," and "music" always stands for the limited, superficial and visualized reality.

Within the ordered helical feedback of object-oriented perception on the one hand and the subjectively cast level of emotion on the other, Erich Moritz von Hornbostel categorized in his article "*Psychologie der Gehörserscheinungen*" (1986[1926]:315 *et seq.*) the acoustical field into "noise and tone density," "sound color," "light intensity," "movement, pitch, and distance," "extension, weight, and density," "vocality," "tonality," "tone relationship and interval," "volume" and "dynamic." The general condition under which something becomes perceivable is that it contrasts against a background. The primary factor that forms perception and sensation is actually space-time related change, i.e. the movement. What moves in time and space, contrasts from its stable background and seems to become a "real" thing, to materialize itself and confluences into a conspicuous perceivable unity: "The approaching hunter hears game even when the wind rustles in the leaves" (Hornbostel 1986[1926]:316).

The "processing energy," which precedes sense impressions (Kurth 1922:8) locates the movement that stands out against its background. The ear as sense organ for time and space is the most important of our senses. Throughout the history of time, hearing has functioned as the central and dominant sense through its over-all synaesthesia (Reinhold 1975:125). It links the multiplicity of perception with the unity of the reality concept. Through its directedness towards rhythmical processes, towards frequencies, movement and flowing energy, the ear simultaneously adopts the sound of the world in resonance and self-resonance. It is faster than the eye. It calculates the sum of all hearing stimuli within the frequency spectrum of 16 to 20,000 Hz within 50 milliseconds (50 ms or 1/20 s). This is the same physiological constant which also determines the perception of the shortest phoneme, the smallest sound unity of speech (Winkel 1975:187-8). Similar to the visual system there exists a crossed connection from the ear to the primary auditory and sensory brain center, i.e. the right cochlea of the inner ear projects mainly to the left hearing center, and—in mirror image—the same applies to the left ear channel. Contrary to the process of seeing, in which the visual paths of the right half of each eye's field of vision lead to the left visual cortex—and correspondingly, the left field of vision leads to the right visual cortex, the connection of the ears do not cross complete-

ly. Both ears have direct channels to both brain hemispheres, whereby the weaker ipsilateral connection—from one ear to the same side—does not cross with the other ipsilateral connection (Popper & Eccles 1990: 333, 367-8). Dichotic hearing tests have proved that the right ear is better trained on the level of recognizing words. This circumstance is ascribed to the fact that the right ear has direct access to the left, verbally oriented hemisphere where the coded auditory input is decoded into recognizable words (Popper & Eccles 1990:368).

2. Left and Right Hemispheres—About Hearing Language and Hearing Music

Popper and Eccles (1990:309-452) summarize the results of empirical research on the question of conscious perception and the specific efficiency of the human brain, and they suggest that the left brain hemisphere is the dominant one and the right brain hemisphere is subdominant, whereby the halves relate to each other in a form of complementary specialization. The terminology of “hemispheric dominance” is maintained because the left hemisphere is regarded in close connection to the function of language and self-consciousness (Popper & Eccles 1990: 421). The subdominant hemisphere is coherent, the dominant one is detailed. The latter is predominantly symbolic and propositional in its function and specialized for speech with syntactic, semantic, mathematical and logical abilities. On the contrary, the subdominant hemisphere is said to be appositional and specialized for the perception of pictures, forms, and patterns, and additionally it is musical. The musical sense perceives the input of consecutive tones holistically as coherent, synthetic, sequential structures (Popper & Eccles 1990:424). The work of each hemisphere, which is popularly described as verbal vs. non-verbal, temporal vs. spatial, analytical vs. synthetic, and rational vs. intuitive, are schematically summarized by Popper & Eccles in the following way:

Dominant Hemisphere	Subdominant Hemisphere
Liaison to consciousness	No such liaison
Verbal	Almost non-verbal
Linguistic description	Musical
Ideational	Pictorial and pattern sense
Conceptual similarities	Visual similarities
Analysis about time	Synthesis about time
Analysis of detail	Holistic - images
Arithmetical and computer-like	Geometric and spatial

Fig. 1. "Various specific performances of the dominant and non-dominant hemispheres as surmised from the development of new concepts by Levy-Agresti and Sperry [1986] and Levy [1973]. Some have been added to their original list by Popper and Eccles" (1990:423, Fig. E6-6).

Tsunoda (1985) has also confirmed that the activities of the left and right brain hemispheres do not function identically or symmetrically, but rather in different ways. His studies suggest that language as a cultural factor exercises a crucial influence on brain functions, although the essential functions of the brain of man are universal. Referring to the left and right functions of the brain, Tsunoda sees a culturally related difference in the "Japanese" brain because vocal sounds are said to be dominant in the Japanese language in comparison to other languages. This is the reason that the Japanese process vowel sounds as verbal sounds in the linguistic hemisphere of the brain, unlike people who speak Western languages, who handle vowel sounds as non-verbal sounds in the musical brain center (Tsunoda 1985:63). Tsunoda also suggests the existence of a switching mechanism in the brains of all human beings that organizes itself from the ages of six to eight years old in such a way that a language can be efficiently processed as a mother tongue. Two different switching mechanisms have been found. One is the mechanism that is suited to languages such as Japanese and Polynesian that have abundant heavy vowels, and the other is adapted to handle consonant-heavy languages such as the Indo-European family of languages and others. Because of this switching mechanism, Japanese and Polynesian people are said to process human emotional noises and sounds of nature as a part of verbal sounds, while representatives of other languages handle these same sounds as having non-verbal content. The switching mechanism can be shifted over, from one to the other type, through emotional stimuli as well as through learning a lan-

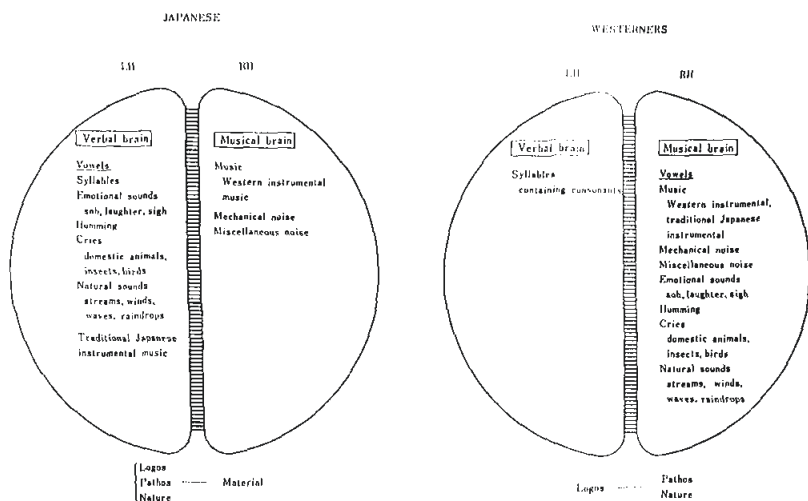


Fig. 2. "Dominance Patterns of Japanese and Non-Japanese People for Natural Sounds.—The auditory dominance patterns of Japanese and Westerners suggest that the Japanese brain handles logical processes, emotional functions, and even perceptual affinity with nature, all in the left hemisphere, while processing only harmonic and mechanical sounds in the right hemisphere. In the Western brain, the left brain specialises in the processing of linguistic and logical functions, while all other auditory information and functions are handled in the right brain" (Tsunoda 1985:76-7, Fig. 23).

guage belonging to the other linguistic group (Tsunoda 1985:96, 138) (Figure 2).

Tsunoda states that the "Japanese" brain processes logical as well as emotional functions in the left, verbal-oriented hemisphere. As explanation for this fact, Tsunoda asserts that, within the Japanese culture, the unifying coexistence of mind and emotion has been developed in everyday life, as well as through its art and history, while the "Western," verbal-oriented brain has specialized predominantly in logical functions, within which there has been no place for emotional elements (Tsunoda 1985:81-2).

The research results of Popper and Eccles and Tsunoda agree in the general rule that verbal-oriented functions refer to the left hemisphere of the brain and the musically-oriented ones to the right hemisphere. Traditional Japanese music (but not Western music) is said to be processed by Japanese predominantly in the language-oriented hemisphere (Tsunoda 1985:83). This should be considered in connection with the special form of Japanese lyrics, which are sung primarily by ex-

tending vowel sounds, while the extension of consonants plays a subordinate role.

According to Popper and Eccles (1990:434 *et seq.*), the unity of experience is carried out by the consciousness itself, which interacts with the neural events in the liaison-brain. This is the hypotheses of the interaction between the self-conscious mind and the human brain. The hypotheses is strongly dualistic-interactional in orientation, and the self-conscious brain is given priority (Popper & Eccles 1990:449). It is proposed that at some places in the cerebrum hemisphere (the liaison centers) efficient interactions exist with the self-consciousness, which is receiving as well as giving (*ibid.* 432).

This theory of brain-mind interaction was developed on the basis of empirical studies and in terms of the three-world theory of Popper (Popper & Eccles 1990:428 *et seq.*). According to Popper, the reality of the cosmos can be divided into three worlds:

- (a) in the physical World 1 of substance and physical state, processes, and forces;
- (b) in the psychical World 2 of states of subjective consciousness, of experience, and of unconscious psychical processes;
- (c) in the World 3 of human-created culture and products of human mental activity (Popper 1989:16-8).

All three worlds are related to one another by a spiral of feedbacks which reinforce themselves reciprocally (cf. Figure 3).

Although the open liaison modules seem to be predominantly located in the left hemisphere, Popper and Eccles surmise that, when active, the liaison brain expands over the corpus callosum, in the course of which sections can be involved that are competent for non-verbal kinds of conscious experience. It thereby involves, for example, the metaphorical, musical and polymodal centers (Popper & Eccles 1990:431).

One has to question why, theoretically, an "unconscious self" in World 2 is not also accepted that would be associated with the conscious self. This would be obvious in view of, for example, psychological theory as suggested by C. G. Jung in his concept of the (collective) unconsciousness, as it is expressed in his "anima/animus concept." David Bohm and F. David Peat (1990:222-3) also distinguish between conscious awareness and unconscious awareness, i.e., between clear and unclear consciousness. A comparable concept, although on another level, can be found in Zen Buddhism in which, according to T. Izutsu (1986:23 *et seq.*), consciousness is differentiated from an "unconscious" form of consciousness or from the higher consciousness. The materializ-

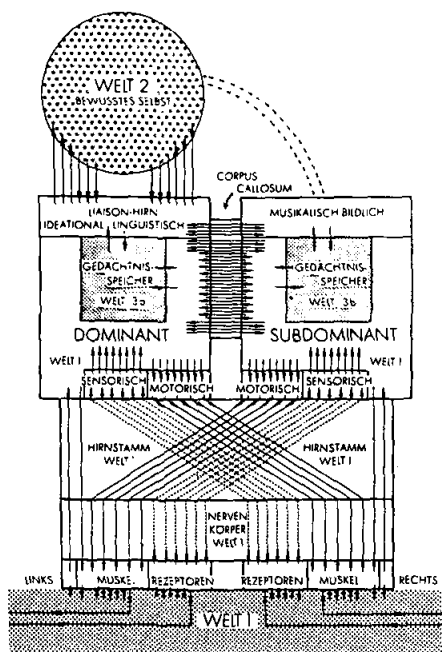


Fig. 3. "Communication to and from the brain and within the brain. The diagram shows the main communication paths from the peripheral receptors to the sensoric cortex and then to the hemispheres of the cerebrum. In a similar way this drawing displays the output from the hemispheres of the cerebrum through the motoric cortex to the muscles. These two path systems largely cross each other, as shown, but unessential non-crossed paths are also represented by the vertical lines in the brain stem. The dominant left hemisphere and the subdominant right hemisphere are shown, together with some properties of these hemispheres, which are listed in Fig. E6-6 [cf. above, Fig. 2]. The corpus callosum is represented as a powerful coupling body of the two hemispheres, and in addition this diagram shows the manner of interaction between the Worlds 1, 2, and 3." - "The dotted lines indicate possible communication lines of World 2 to the non-dominant hemisphere" (Popper & Eccles 1990: 450, Fig. E7-5 (Diagram), and text translated from the German: *ibid.* 394).

ing tendency of the empirical self which sets itself as "substance" within a pseudo-reality, is to be transcended in order to reach "higher consciousness." This state of higher consciousness is never a mere matter of constricting and discriminating intellect. Higher consciousness surmounts the mind-body dichotomy through a psychological state of mind concentrating itself to complete clarity at the highest point of tension. The consciousness illuminates itself in its own light, engrossed "in the womb of absolute reality" (1986:25). Izutsu illustrates this idea as follows with an anecdote about a zither player:

The musician is so completely engrossed in the action of playing, he is so thoroughly one with the chin and the music, that he no longer has any consciousness of the particular movements of his fingers, of the instrument he is playing or of the fact that he is really playing. Referring to such a situation, no one would say, at least in a loose and metaphoric sense, that the musician was "unconscious". For he is conscious. On the contrary, his consciousness is found at the farthest border of self-enlightenment. The aesthetic tension of his mind is so great in his whole body that he is the music itself that he plays. Paradoxically he is so aware of himself as identical with the music, that, in the general sense of the word, he has no "consciousness" of the action of playing. In order to distinguish between this state of consciousness and that which normally is understood as "consciousness" or "unconsciousness", we will use the term "higher consciousness" (Izutsu 1986:22).

Therefore, beyond the conscious self states of consciousness exist which can hardly be mediated by discursive speech; numerous experimental reports and metaphors testify to this fact which are normally interpreted as mystical or metaphysical. The human world of everyday sense perception is trapped in limited focusing. There are sounds we do not hear, colors we do not see, odors and tastes we do not sense—nevertheless they do exist. Only when "sitting in meditation with the legs crossed" does the quietness of creative listening creep up; this in the epoch of the predominance of the controlling eye and of "the repression of the ear." "The self-imprisonment of knowledge that only relies on the eye" (Kamper 1986:89) will make it difficult to open the gates of perception to the "unconscious self." Historically, the dominance of the left hemisphere has hindered this opening process. The spoken language that became written led to the supremacy of the eye, musically frozen in scores, extraverted into the visual in such a manner that ultimately even the commercial promises triumphantly the inverted as reality: "Now, finally the ears can read!"

The usurping eye has gained control over the contemplation of the listener. Dietmar Kamper (1986:189) sees the end of the spectator through the death of seeing as already heralded; expectation is placed on the intervention of the ear. This intervention can only succeed where—beyond the experimental stimuli of sensation—the "third ear" begins comprehending creative intentionality.

Left and right hemispheres are more than empirical experiences; they represent a metaphor for the analytical-discursive and the holographic-intuitive. The male dominance of fragmentation and splitting has risen above the female (non-dominant) unification. But the brain

functions at the same time (rational-)analytically and (metaphorical-)holographically (Samples 1990:127).

The structure of the dominant hemisphere processes information in an analytical way (linear, in sequence), and one believes that it is instrumental in recognition. The non-dominant hemisphere can process information in a holographic (holistically, transforming) way, and one believes that it is instrumental in intuition and dreams (Battista 1990: 147).

The change in paradigm towards a holistic world view marks a turning point where the goal becomes a new consciousness that rehabilitates both holistically functioning hemispheres in their balanced complementarity. The two biological moments cross each other from the outer visual field to the inner: the eye in the *chiasma opticum*, the ear in the *nucleus cochlearis*. Spiral feedback as interaction mediating the two modes of consciousness is suggested to be irreversible. Both modes become complementary: on the one hand, the Cartesian method of analytical fragmentation (with its reduction to the smallest unit) and on the other, the concept of a method synthetically formed which holographically penetrates the world through its organismic view. The rational way begins to cross over that of mystical intuition, in the middle of the polarities of thinking vs. being, of logos vs. mythos (Panikkar 1989:206). Fritjof Capra (1988) uses the intermediating terminology of Tao to reflect on the crisis of cognition in relation to its background of the changing times of science and society:

While the mechanistic world view was developed, our society has persistently promoted the values and approaches which the Chinese designate as Yang and has neglected the complementary values and approaches of Yin. We prefer, for example, self-confirmation to integration, analysis to synthesis, rational knowledge to intuitive wisdom, science to religion, competition to cooperation, expansion and exploitation to preservation, etc.

Since the earliest times of Chinese culture, Yin was also integrated within the female and the Yang within the male, and in our times the feminists have repeatedly pointed out that the values and attitudes that are promoted in our society are typical characteristics of a patriarchal society. The Cartesian world picture and the value system related to it have been supported by a patriarchal culture, but both the Cartesian world picture and patriarchal society are now in decline. The feminist perspective will become an integral component of the new world picture (Capra 1988:290).

Between the two dominating world views there is a third way that endeavors to mediate between them—the path of listening, reflection,

and meditation that never lets the dialogue cease (Wilber 1990:187). It is the getting-away from everyday life, beyond the emptiness of time. Within the heightened awareness of the human mind and within the hearing of the "great theory of liberation through listening," the science of death announces itself, revealing the secret of life (Evans-Wentz 1971: 37, 159).

3. The Path of Listening—The Ear in Resonance with Morphic Fields

The metaphor of left and right hemispheres suggests a duality which, however, is to be understood—beyond its opposition—as complementary in itself. In analogy to the two complementary ears that form the prerequisites of acoustic perception in crossing their path systems from outside to inside, listening with the "third ear" is the metaphor for the dynamic unity of opposite poles. It integrates the female as counterpart of the left hemisphere. The instant, past and present are synthesized in musical listening and at the same time the future is formed (Lauf 1977:64, 66). The "third ear" is comparable to the opened "third eye" which in the cosmic consciousness transcends the human condition and allows opposite polarities to flow into creative imagination. It symbolizes the central point of all essential consciousness in the tantric Asana ritual, where the unification of all opposites is experienced, where all sounds and colors are neutralized, all functions of cognition and aspiration flow together into one unity penetrating all (Mookerjee & Khanna 1987:194).

But the question of where the self-conscious mind—the consciousness pure and simple—is located in principle cannot yet be answered, according to Popper & Eccles (1989:451-2). The authors proceed from the assumption that the consciousness is not a part of the physical nor biological world and that it probably has other formal properties, although it works in liaison with special zones of the neo-cortex. The conscious self presumably possesses no quality of spatial dimension, but otherwise a temporal characteristic. It seems that the conscious mind immediately integrates everything processed through the two active halves of the brain. These far-reaching questions demand broader research approaches (Popper & Eccles 1990:452).

"Where is the consciousness located?" Is it an epiphenomenon of the brain or is it pure incorporeal mind in some kind of interaction with matter? Bohm and Peat (1990:220) draw the conclusion that there is no

sharp "cut" or break between consciousness, life, and matter, whether animate or inanimate. Bohm's theory of implicate order (1988:175) states that mind as well as matter stand out against a common ground outside of time (i.e. one complete universal order), a common ground that lies beyond both of them and ultimately is unknown (cf. Sheldrake 1990: 368-9) This common ground is folded into the totality of the flowing holo-movement as implicate order and it unfolds itself within space and time, and in seemingly isolated things and events as explicate order perceptible for our senses.

This is the starting point of the biochemist and cell biologist Rupert Sheldrake (1990) in developing his theory of morphic fields. His preliminary hypothesis of formative causation states that every unit of form or organization, i.e. all morphic unities, are organized through morphic fields through all levels of development. Each morphic unit (for example, an atom, molecule, plant, animal, pattern of instinctive behavior, social group, cultural element, eco-system, planet, planetary system, galaxy, etc.) is organized in nested hierarchies of units within units. Within and around every morphic unit is a morphic field which organizes its characteristic structure or activity pattern. The morphic field is also embedded in the hierarchy of other morphic fields and is individually set up and maintained through morphic resonance with similar fields of present or past organisms of the same species: "The stronger the similarity" of such morphic fields, "the stronger the morphic resonance" (Sheldrake 1990:152-3, 463). A kind of memory is inherent in the morphic fields. They represent a kind of "probability structure" and are potential organizational patterns that expand in space and persist in time. Given the proper physical conditions, they can rematerialize in another place and in another time. The fields are non-material energy zones (rhythmical activity structures), similar to the fields in physics:

Fields cannot be explained in terms of matter; rather, matter is explained in terms of energy within fields. Physics cannot explain the nature of the different kinds of fields in terms of anything else physical, unless it be in terms of a more fundamental unified field, such as the original cosmic field (Sheldrake 1989:99; 1990:132).

Morphic resonance creates organisms and provides them with their stabilizing potential. In translating these morphic fields as probability structures into reality, self-resonance allows the maintenance of a particular form of organism (Sheldrake 1990:11, 143, 174). Morphic fields influence organisms, just as these also influence the morphic fields:

If this interpretation is valid, then the persistence of matter itself, and indeed of radiation, depends on a continuous process of resonance of the fields with their own past states. The continuity of any self-organizing pattern of activity at any level of complexity—from an electron to an elephant—results from this self-resonance with its own past patterns of activity. All organisms are dynamic structures that are continuously recreating themselves under the influence of their own past states. The causal influences from an organism's own past states must be capable of passing through or across not only time but space, or rather space-time Or, to look at it in another way, its past patterns of activity, wherever and whenever they were, can become present by morphic resonance (Sheldrake 1989:133-4; 1990:173-4).

Morphic resonance differs from the kinds of resonance already known to science, such as acoustic resonance (as in the sympathetic vibration of stretched strings), electro-magnetic resonance (as in the tuning of a radio set to a transmission at a particular frequency), electron-spin resonance, and nuclear-magnetic resonance. Unlike these kinds of resonance, morphic resonance does not involve a transfer of information. However, morphic resonance does resemble the known kinds of resonance in that it takes place on the basis of rhythmic patterns of activity (Sheldrake 1989:108; 1990:143-4).

According to Sheldrake's interactionistic interpretation, human consciousness does not exist above the fields, but somehow within the fields. A kind of memory is inherent in all morphic fields (and not only those of the brain, but in all morphic unities). The morphic fields interact with the conscious (and unconscious) self, which itself interacts with the neural system. Using a computer analogy, the mind or consciousness is comparable with the software (= morphic fields), the neural system (brain) with the hardware. The conscious self is the programmer who either stabilizes or varies pre-existent probability structures within morphic resonance. One fundamental law could be: "Structures of activity tend to occur more readily the more often they have occurred before" (Sheldrake 1989:307; 1990:371). On the other hand, by the means of attractors, new special fields can emerge within already existing higher fields. Such new fields feed back in an interactive process to "the higher-level fields" within which these new fields come into being and are "modified by these new patterns of organization" (Sheldrake 1989:322; 1990:389).

Sheldrake's hypothesis of formative causation is especially interesting because it holistically refers to all levels of existence. Morphic fields are related to inanimate as well as to animate nature, to the behavior fields of animal and man as well as to mental, social and cultural fields:

Social and cultural fields are of a nature similar to the morphic fields that organize biological and chemical systems, although they are not, of course, *reducible* to these biological and chemical fields (Sheldrake 1989:255; 1990:311).

According to the hypothesis of formative causation, myths as well as scientific paradigms are formed by morphic fields and stabilized by morphic resonance (Sheldrake 1989:256; 1990:314). If it is true that memory is inherent to nature and nature is not simply dominated by eternal laws, old habits of thought must be given up and replaced with thinking "that [is] better adapted to living in the presence of the future and open to continuing creation" (Sheldrake 1989:326; 1990:393).

Sheldrake's hypothesis lives through the broadening of the mechanistical world view. His thoughts appear to be fanciful. Since no proof yet exists that memory is stored in the brain, it would be conceivable, using the words of Sheldrake, that these memories operate directly from the past through their morphic resonance to the present time. Apart from individual memory, there would also exist a kind of summarizing memory of the whole species, a kind of collective memory as potential probability structures which the single individual could receive (Sheldrake 1989:280-1). But because of the superior force of the paradigms of the reductionistic world view, access to the gates to other forms of consciousness are more or less buried and access to other forms of seeing and hearing can be only achieved by a new openness *vis-à-vis* the imagination in listening to the unheard. Sheldrake's paradigm opens new models of explanation for those musical phenomena connected to a special kind of perception. Mythical narrations about music as revealed to men, reports of how melodies were given to mankind by gods or animals, altogether the inspiration theories of composers, meditators, trance dancers, of all forms of listening—all these phenomena could suddenly be interpreted in the light of morphic fields. They are the messages of the "third ear," revealing other concepts of reality, because the "believing concept of reality" cannot be separated from the reality one experiences. The self always reflects only the part of reality that is accepted by the self and of which the self is conscious. The mole in its lightless tunnel as a symbol of human hearing shows in its own manner the imagination on the inner route to discover those labyrinthic empires that are only known through hearsay. Directed towards vibration, energy and movement, the ear is the shell of cognition seismographically sounding that which is still to be located:

Bare "hearing" (perception of the acoustic sense impression) is only one component of the complex sensational process: "musical hear-

ing" is a thorough, comprehensive operation by which, through the choice of the term "hearing", only the concrete "comprehensible" is denoted, through which it communicates to the outside. Musical hearing is more and something else than bare hearing with the ear Surely tones themselves emerge from the outside real world and their vibrations strike our sense organ from outside; and it is also correct up to a certain degree to say that these sound impressions are processed through music; but the central point is that in musical processing the primate is not the processing matter (the resounding being based on physical manifestations), but the processing energy, the thinking psychic energy movements in us, which touches matter when they aim at concretization within sensual perceptivity. The processing energies precede the sense impressions (Kurtz 1922:7-8).

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