

# Sequence of Earlier Heaven: The Record As a Medium for the Electroacoustic Composer

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**Abstract**—Electroacoustic technology (the tape studio and digital synthesis and composition) has enabled the author to conceive of and execute a series of musical works (comprising a single phonograph record) that embody the archetypes and relationships found in one of the *I Ching* patterns of trigrams, namely the Sequence of Earlier Heaven. Although records have traditionally been regarded as preserved performances, he proposes viewing them as a compositional format. He also discusses the influence of the *I Ching* on the structure and imagery associated with the works on the record as well as the compositional approach found in each piece.

## I. THE PHONOGRAPH RECORD AND MUSIC COMPOSITION

Despite the decades of development that the phonograph record has undergone, our attitudes toward its use have remained stubbornly tied to its function of providing a reproduced musical performance. We often notice that a new medium, when first introduced, commonly imitates earlier forms (e.g. film imitating theatre) before it discovers its own unique character. Although the recording and studio post-processing techniques used for both classical and popular music have long since surpassed what could be produced live, composers, performers and listeners still tend to view the record primarily as a distribution medium for music—a sort of preserved 'ideal' performance for mass consumption.

As an electroacoustic composer, I have found myself working with much of the same audio technology as the recording engineer, and yet the normal outlet for my work has been assumed by the music community to be the concert hall. In the late 1960s, Morton Subotnick was commissioned by Nonesuch Records to compose *Silver Apples of the Moon* and *The Wild Bull* for release on its label [1]. As far as I am aware, this isolated case remains the exception that proves the rule that composers do not think about composing for the recording medium. Of course, given the production costs involved, it may be argued that few have

that opportunity. However, in my opinion, the electroacoustic composer is clearly in the best position to produce a record efficiently and economically, thereby creating a unique medium for the dissemination of his or her work.

My first record, *Sonic Landscapes* [2], collected together four works that I considered compatible, but which in fact had been composed for a variety of concert occasions. When given the opportunity to follow this with a second long-playing record (LP), I decided to explore an archetypal theme that was already present in several of my works from that period. The result was

*Androgyne*, a double LP which contains a wide variety of electroacoustic pieces inspired by the archetype of androgyny—"The union of opposites ... [and] the energy which manifests itself when such opposites act in harmony, instead of being polarized in conflict" [3].

Although these records seem to display a greater unity than usual due to their thematic concerns, I wanted to take this idea a step further and actually compose a record, not just compose pieces that would find their way onto a record. Although the pieces on such a record could be performed separately in concert, I wanted them to conform to the record

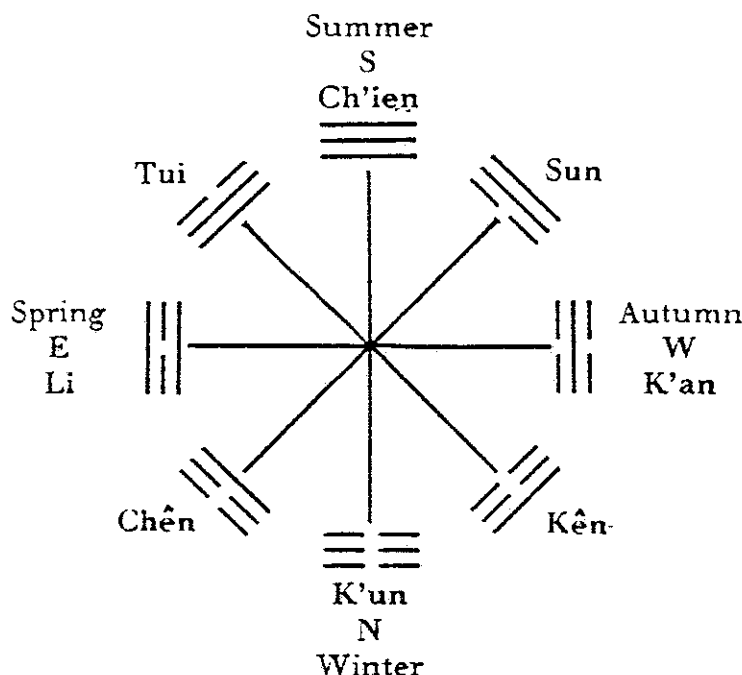


Fig. 1. Arrangement of trigrams in the Sequence of Earlier Heaven.

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format (the two stereo sides and their duration) and, most importantly, to create an artistic unity. But on what basis would this be done? Ever since about 1976, I had occasionally used the Chinese *Book of Changes*, the *I Ching*, as a source of images with which to focus the composition of various pieces. Thus I came upon an answer through an extended exploration of a configuration of trigrams found within that tradition, known as the "Sequence of Earlier Heaven", or the Primal Arrangement [4]. In this configuration, the eight basic trigrams are placed in an octagon with each trigram positioned opposite its inverse (Fig. 1).

Of the four pieces on the record *Sequence of Earlier Heaven* [5], two are for a solo live performer accompanied by tape (side 1)—*East Wind* (1981), for recorder and tape, and *Nightwatch* (1982), for marimba and tape—and two are tape compositions composed of sounds produced digitally (side 2)—*Wave Edge* (1983) and *Solar Ellipse* (1984–85). The performers on side 1 are Peter Hannan and Russell Hartenberger, and the works featuring these musicians are further unified by the fact that the tape accompaniments are derived exclusively from the sounds of the solo instruments as recorded by them. In contrast to the acoustic origins of these two pieces, the two on side 2 are synthesized and therefore inhabit an 'imaginary' realm of sound, even though they contain references to the real world, such as waves breaking on a shore, vocal qualities or patterns of spatial movement. However, both types of pieces can be called 'electroacoustic' because their sounds were created or processed electronically. The contrast between the two sides is not coincidental—in fact, it is central to the overall concept of the record and the basis of its design.

## II. INFLUENCE OF THE *I CHING*

The guiding concept of the record, as well as its symbolic representation in terms of the *I Ching*, is shown on the cover (Fig. 2). On the simplest level, the record can be understood as a cycle of four pieces which correspond to the four elements (air, earth, water, fire), to the cardinal points of the compass (with south at the top), to the seasons and to pairs of symbols—such as heaven and earth, fire and water, lake and mountain, wind and thunder. Some of the imagery is quite direct—the air and breath of the recorder player in *East Wind*, the wood and resonance of the marimba in *Nightwatch*, the simulated seascape of *Wave Edge* and the restless energy

suggesting fire in *Solar Ellipse*. Such imagery is general enough, universal in fact, to allow for individual interpretation while retaining a metaphoric level that transcends differences in interpretation. I have found these properties in many instances of sound symbolism [6].

Within the larger pattern of the four pieces, there are relationships between pieces that may be identified. Just as each side of the record contrasts and complements the other, so too each piece on a side is similarly related to the other. Much of the *I Ching* imagery plays on the dynamic relation of opposites—or better, complementary forces—as symbolized by the broken versus the solid line, the yin and yang. The pattern known as the "Sequence of Earlier Heaven" places each of the eight basic elements and trigrams opposite each other on a circle (Fig. 1). However, instead of portraying such relations as a conflict that must be resolved (as, for example, we find in nineteenth-century music where 'harmonic tension' inevitably resolves in a cadence), the *I Ching* plays on a balanced energy that results from the interaction of contrasting forces. In a similar fashion, these pieces play on various sonic and musical contrasts without trying to 'resolve' them.

*East Wind* is related to the *I Ching* hexagram number 9, "The Taming Power of the Small", comprised of the trigrams for wind and heaven, in which a single broken line is embedded within five solid lines (see Fig. 3), much as the live performer (solo recorder) is surrounded by and must relate to the magnified tape environment—mimicking it, commenting on it, riding its waves and, in the end, perhaps restraining it. Rain clouds in China, observes the *I Ching*, are brought by the east wind; it condenses water vapour into clouds but, in this case, is not strong enough to create rain.

*Nightwatch* is based on *East Wind*'s inverted hexagram, namely number 16, "Enthusiasm", comprised of the trigrams for earth and thunder (see Fig. 3), just as the solo instrument (the marimba), in which wood activates air, is the inverse of the recorder (air activates wood). The sound of thunder, the text observes, is the prototype of music, and both have the power to release tension. This hexagram also suggests the image of "the night watchman making his rounds with a clapper and encountering danger" [7]. It is here the piece begins, in the darkness of night. As time passes, the primal sounds evolve into musical entities, both solemn and exhilarating. By the end, the soloist is

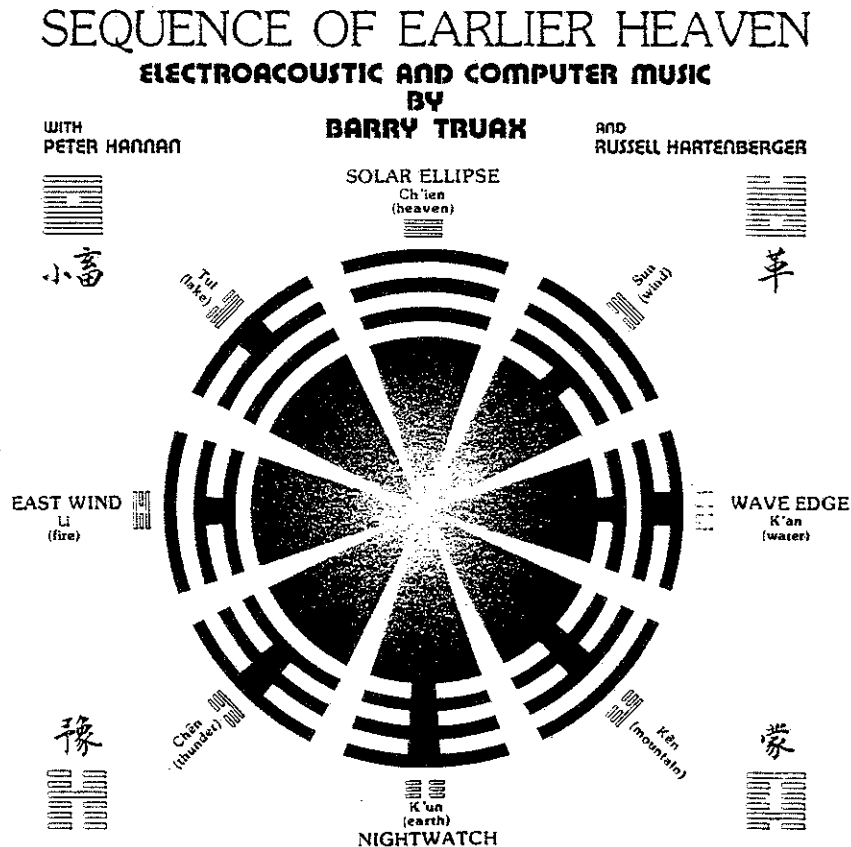


Fig. 2. Cover of *Sequence of Earlier Heaven* showing the *I Ching* arrangement of trigrams and related symbols used to create a cycle of four works, each associated with one of the hexagrams shown. Cover design by Lou Crockett, Instructional Media Centre, Simon Fraser University.

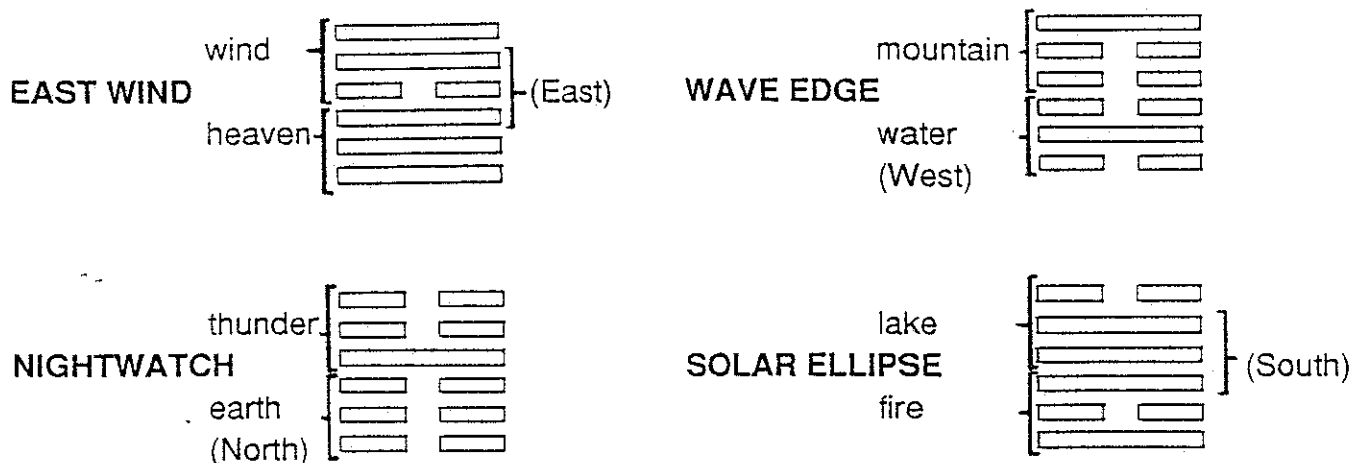


Fig. 3. Hexagrams associated with each composition with their respective symbols.

left intertwined with his own musical image, involved in the ritual of music-making that constructs, as the *I Ching* observes, a “bridge to the unseen”.

*Wave Edge* is inspired by the *I Ching* hexagram number 4, “Youthful Folly”, comprised of the trigrams for water and mountain (see Fig. 3), which portrays a spring bubbling up at the foot of a mountain; *Solar Ellipse* is based on the inverted hexagram, number 49, “Revolution”, comprised of the trigrams for fire and lake (see Fig. 3). Their related directions are west and south respectively, in contrast to the directions and images of the pieces on side 1. The initial letters of the words in each title reflect these points of the compass.

### III. THE FOUR COMPOSITIONS

On side 1, an important element is the extensive interplay between the live performer and the tape accompaniment. At times they practically merge into one, at other times one dominates and at still other times—producing some of the most interesting moments—they interact on an equal footing (an alternative to a ‘resolution’ of their differences). Since the tape in each piece is comprised of sounds derived from the solo instrument made during studio recording sessions, the tape accompaniment—amplified in a concert through loudspeakers—seems ‘larger than life’, a more powerful extension of the solo voice. This is particularly true in *East Wind*, because the solo recorder is acoustically a rather diminutive instrument of narrow pitch and dynamic range. A fundamental musical problem in the piece is how the live performer is going to cope with the more versatile and powerful environment in which the instrument is embedded. How will the performer ‘tame’ this environment? Of course, in a performance the solo instrument is

amplified, but musically it is as if the live performer is riding the waves of the tape environment—balancing like a bird on an air current, a surfer on the crest of a wave or a child on a bicycle.

*East Wind* begins with air blown through the instrument, leads to a soaring melody, then concentrates the breath in a fast staccato passage and culminates with a series of richly resonant drones and multiple pitches—called multiphonics—in which the instrument stretches its sound to the limit, still punctuated by the breath cycle. In *Nightwatch*, by contrast, the character of the sections tends to proceed in the reverse order: the most melodic section occurs at the end, and the opening suggests a kind of primal energy, with the soloist hitting the body of the instrument and producing sounds that are similar to the source of what is heard on tape (slowed down and magnified). The music gradually evolves through increasing stages of complexity, first with simple intervals from the harmonic series, and then with growing instrumental virtuosity and contrapuntal techniques. In the final duet for the soloist with a relatively untransformed version of the marimba on tape, each part proceeds independently but with constant interaction, as in an intimate conversation. The live part consists of pitch ranges that expand until large discontinuities are heard between phrases, and the tape part becomes more distant, as if the music seeks to break free from the instrument to establish the “bridge to the unseen” described by the *I Ching*.

On side 2, which does not include the participation of a live performer, one can hear the same kind of dynamic relationship between the types of sound quality (or timbres) used in each piece. I have subtitled similar pieces ‘sonic environments’ in order to suggest their spatial, environmental quality and to direct the

listener’s expectations away from traditional musical organization. Both *Wave Edge* and *Solar Ellipse* were realized with my software system—the PODX system for sound synthesis and computer assisted composition [8] using the frequency modulation (FM) technique to create the sounds. The two works are based on a particular type of spatial movement, both as sound image and as archetype. The PODX system allows the composer to plot such a spatial pattern (or trajectory) on the computer screen and to map various timbres onto it. The basic spatial image in *Wave Edge* is that of right-to-left linear movement, such as found with waves breaking along a beach. But only the crest (or ‘edge’) of the wave appears to move in such a manner—the sound of the water itself comes from all parts of the wave simultaneously. Throughout the piece, the pattern of ebb and flow is found in the dynamic shape of the loudness contours as well as in the characteristic downward helix-like glissando.

*Solar Ellipse*, however, is based on sound that seems to spin. Most of the spinning is very fast (4 revolutions/second), so it sounds blurred; but the sense of movement creates a restless and incessant energy flow that contrasts with the solidity of the fundamental pitch (G) heard throughout the piece. The spinning pattern is imbedded within a larger quasi-elliptical path, creating the form known as the epicycle—circular motion within a circular orbit, much like planetary movement. The image is that of fire whose energy is being dissipated yet, like the sun, appears to remain constant.

Eight component stereo tracks were formed from the basic epicycle pattern, four created with vocal formant-like timbres and four with noise band components, their durations in the proportions of 6, 8, 8 and 9. When these materials are looped, they create a phase

pattern which comes together and repeats after 72 repetitions, at the midpoint of the piece, thereby forming another level of cyclic behaviour. However, the tracks are not all heard at once; they are mixed in all combinations of 2, 4, 6 and 8 at a time, with all of the tracks present at the midpoint and only the highest and lowest in pitch at the beginning and end. The rule used during the mixing of the various tracks is that no component pair or combination of pairs be combined with other pairs until it has been heard alone. This pattern is also found in ascending binary numbers, similar to the solid and broken lines of the hexagrams in the *I Ching*.

At the midpoint of the piece a spiral pattern is heard, composed of an upward glissando and a spinning pattern followed by its retrograde. The second half of the work consists of the retrograde of the sequence used in the first half, except that the timbre of each pattern is reversed between the vocal and noise properties mentioned above. For instance, at the start of the piece one hears a pattern that consists of a low-pitched vocal drone and a high-frequency noise band, while at the end one hears its opposite, a low-pitched noise band and a high-pitched vocal sound. Therefore, the piece is symmetrical about its midpoint but timbrally 'inverted' in each half. The work unfolds as an inexorable process of cycles within cycles,

with the macro-level form mirroring the micro level and each level consisting of a complementary yin-yang pair of elements.

#### IV. CONCLUSION

Electroacoustic technology in the form of the tape studio and digital synthesis and composition has enabled me to conceive of and execute a series of musical works (comprising a single phonograph record) that embody the archetypes and relationships found in one of the *I Ching* patterns of trigrams. The format of the record allows the listener to experience these works repeatedly in pairs or as a sequence—something the constraints of concert production normally would prevent. At the compositional level, particularly in the computer-realized pieces, the possibility of working with macro-level patterns and having their details realized by algorithmic processes has been a powerful means for realizing new forms of musical organization [9]. One might draw a parallel between the idea of working with the kind of higher level musical gestures described here and the 'higher level' of pattern found in the *I Ching*'s archetypes and symbols. Each is a useful way to express and organize complexity. Equally important, however, this approach provides the listener with a framework and set of imagery for

understanding what otherwise might be a purely abstract musical work.

#### REFERENCES AND NOTES

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2. B. Truax, *Sonic Landscapes*, Melbourne SMLP 4033.
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4. *The I Ching*. The Richard Wilhelm translation rendered into English by Cary F. Baynes, 3rd. Ed. (Princeton: Princeton University Press, 1967).
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