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**I CHING COMPOSITIONAL SYSTEM : THE SYMBOLISM, STRUCTURES,
AND ORDERLY SEQUENCE OF THE SIXTY-FOUR HEXAGRAMS AS
COMPOSITIONAL DETERMINANTS**

by

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A dissertation submitted to the Graduate Faculty in
Music in partial fulfillment of the requirements for the
degree of Doctor of Philosophy, The City University of
New York.

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PREFACE

That which hath been is now;
and that which is to be hath already been;
and God requireth that which is past.

Ecclesiastes 3:15

I Ching has exerted a living influence in China for over three thousand years, and interest in this enigmatic archaic text has been spreading in the West.¹ As one of the five Confucian Classics, *I Ching* has gradually come to be known not as a book of divination but as a book of philosophy that reveals the formation of the universe and basic laws of nature. In the West, James Legge's and Richard Wilhelm's translations of the canonical text have contributed to its familiarity. On the other hand, Iulian K. Shchutskii in Russia paid more attention to the history of *I Ching* researches and the history of the text.² In China, in addition to much historical research, many modern sinologists' interpretations of the canonical text have been published since the Cultural Revolution and have been recognized as major scholarly works for the great amount of new information they contain.³ At the same time, contemporary composers such as John Cage, Wen-chung Chou, and Isang Yun have shown a growing appreciation

for the *I Ching* and have composed numerous works based on their understanding of it. This development has captured the interest of this author and inspired him to formulate a compositional system based upon the structures, orderly sequence, and symbolism of the sixty-four *I Ching* hexagrams.

Significance of Subject

In the nineteen-fifties, John Cage began to use chance in the process of composition. Cage consulted *I Ching*, but he concentrated only on the portion of the work that uses chance (coin tossing)--the first step of the primitive divination procedure--and neglected completely the basic text of the *I Ching* (*ching* portion) and its commentaries and appendices (*chuan* portion).⁴ As a result, it can be said that Cage adapted only the most superficial element of *I Ching* (divinatory coin tossing), with no understanding of the meaning and significance of the *I* as well as the symbolism of the hexagrams.

Isang Yun and Wen-chung Chou are two well-known Asian composers who have adapted principles from the *I Ching* in their compositions. Yun built his *Loyang* and *Shao Yang Yin* upon two primal ideas in accordance with the Yin-Yang Principle of the *I Ching*.⁵ In Chou's *Pien*, the underlying principle of the composition is based upon the meaning of *I*.⁶ Unfortunately, detailed analyses of these works, either by the composers themselves or by other theorists, have not yet been available. Therefore the exact methods these composers used to incorporate the essence of *I Ching* in their music are still unknown.

In February 1990, Xiaosheng Zhou published his definitive book *Taiji System in Composing*.⁷ Zhou became the first composer to explain his own compositional system solely based upon the essence of the *I Ching*. The author of this dissertation has drawn a great deal of inspiration from Zhou's brilliant work; however, there are major differences between these two systems.

Purpose of Study

The objectives of this study are threefold: (1) to present a basic introduction to the *I Ching*, explaining its origin, authorship, structure, and the basic concept of *I*; (2) to present this author's compositional system--called the "I Ching Compositional System" (ICCS)--and its use of the structures, orderly sequence, and symbolism of the hexagrams; (3) to illustrate this system by analyzing the author's orchestral piece *Under the Red Eaves*.

This author's compositional system is essentially a flexible compositional process and creative musical construction rather than a mechanical and rigid system. In the ICCS, the composer first determines the background structure and then constructs middleground layers and foreground fabric. The foreground fabric is in fact the composer's musical interpretation of the interaction of two primal musical ideas representing yin and yang elements. The procedure of the yin-yang interaction throughout the composition is guided by the composer's interpretation of the Judgments, Commentaries, and Orderly

Sequence of the hexagrams. In sum, composition by the ICCS is the universe in miniature: music is the microcosm, Nature the macrocosm.

Organization of the Dissertation

This dissertation is divided into two parts. Part 1 contains basic discussions of the ICCS and Part 2 is the full score of *Under the Red Eaves*. Part 1, Chapter 1 explains fundamental concepts of the *I Ching* with respect to its origin, authorship, textual structure, the meanings of *I*, and the formation of the hexagrams. Chapters 2, 3, 4, and 5 are the core of the study--the contents of the "I Ching Compositional System" (ICCS). Chapter 2 discusses the construction and properties of the fundamental series and Chapter 3 the background structure of the composition. Chapter 4 discusses the middleground structure and its association with the background. Chapter 5 illustrates the author's musical interpretation of the yin-yang interaction and the foreground pitch organization.

Miscellaneous Explanations

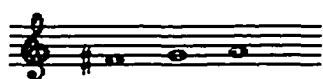
The author makes reference to six different editions of the *I Ching*. Three of them are modern Chinese versions and the other three are leading English translations. Their names and abbreviations employed in the text are listed as follows:

- | | |
|------------|---|
| <u>HG</u> | Heng Gao, <i>Zhou Yi Da Chuan Jin Zhu</i> [The Updated Commentaries of the Zhou-yi] (Jinan: Qi Lu Shu She, 1987). |
| <u>JL</u> | Ch'u Chai and Winberg Chai, eds., <i>I Ching--Translated by James Legge</i> (New York: Bantam Books, 1986). |
| <u>JFJ</u> | Jingfang Jin, <i>Zhou Yi Jiang Zuo</i> [Zhou-yi Symposium] (Changchun: Jilin University Press, 1987). |
| <u>RVO</u> | Raymond van Over, ed., <i>I Ching--Based on the Translation by James Legge</i> (New York: The New American Library, 1971). |
| <u>W-B</u> | <i>I Ching</i> , translated by Richard Wilhelm from Chinese into German, rendered into English by Cary F. Baynes (Princeton: Princeton University Press, 1977). |
| <u>W/Z</u> | Shouqi Wang and Shanwen Zhang, <i>Zhou Yi Yi Zhu</i> [The Commentaries of Zhou-yi] (Shanghai: Shanghai Gu Jie Chu Ban She, 1989). |

To facilitate immediate reference to the Legge and Baynes translations, this author has adapted the Wade-Giles system of romanizing Chinese characters. The Pin-Yin system will be employed only for names of contemporary Mainland Chinese scholars and biographies of books recently published in Mainland China.

Musical Terminology

Throughout this study, pitch-class names are given as either uppercase letters or integers 0-e (C=0; t=10, e=11). Names of specific pitches are comprised of uppercase letters and integers: C1 (three octaves below middle C), C2 (two octaves below middle C), C3 (one octave below middle C), C4 (middle C), C5 (one octave above middle C), and so forth, with corresponding letters and integers for pitches lying within the octave above each. References to pitch-class sets employ Allen Forte's set-names and prime forms.⁸ When the members of the collection are displayed within angle brackets and separated by commas, the order in which the members are displayed is irrelevant. By contrast, hyphens between the members denote a fixed ordering. In normal forms, members of the collection are displayed in letter notation within parentheses and separated by commas. Prime forms are also indicated with parentheses but notated with integers. Series Classes are displayed in curly braces and series in square brackets. Therefore, a series of pitches such as



can be notated in the following ways:

1. unordered pitch-class set
<F#,G,A> or <F#,A,G> or <G,F#,A> or <G,A,F#> or <A,F#,G>
or <A,G,F#>;
2. ordered pitch-class set
<F#-G-A>;
3. normal form
(F#,G,A);
4. prime form
{013};
5. Forte-name
3-2.

Normal form is generally used to refer to pitch-class sets. Set operation, set relationships and forms of the series are labeled by customary symbols (see Fig. 0-1).

(*A* refers to a collection and *n* to an integer 0-11)

$T_n(A)$	transposition of A by ordered pitch-class interval n.
$I_n(A)$	inversion of A around zero and transposition by pitch-class interval n.
$\underline{I}n(A)$	reverse rotational operation on A.
\underline{n}	order number (underlined integer).
P-0	primary series.
P-n	primary series at transpositional level n.
I-n	inversion of P-0 at transpositional level n.
R-n	retrograde of P-0 at transpositional level n.
RI-n	retrograde-inversion of P-0 at transpositional level n.
$PART_{(\underline{n}_1, \underline{n}_2, \dots)}(A)$	partitioning of Series A at order positions n_1, n_2, \dots
H1	hexachord formed by the first six pitch-classes of the series.
H2	hexachord formed by the last six pitch-classes of the series.

Fig. 0-1. Glossary of symbols

NOTES

¹Liao, Kang, and Liang point out that the prevalence of I-Ching in the West can be divided into two periods. During the first period, from the late seventeenth century to early nineteenth century, I Ching was introduced to the West mainly by missionaries: Philippe Couplet (1623-1693), Joachim Bouvet (1656-1730), Joseph Henri--Marie de Prémare (1666-1736), and Jean-Baptiste Régis (1663-1738). Complete translations of I Ching by European sinologists appeared during the second period, from late nineteenth century to the present time. For example, translations in English by McClatchie in 1876, by Lacouperie in 1882-1883, and by Legge in 1882; in French by Philastre in 1885-1893, and by de Harlez in 1887; and in Latin by Zottoli in 1880. Most recent and brilliant translation in German by Wilhelm in 1924 was immediately recognized as a standard universal translation. See Mingchun Liao, Xuewei Kang, and Shuxian Liang, *Zhou Yi Yan Jiu Shi [History of I Ching Studies]* (Changsha: Hunan Chu Ban She, 1991), 456-63.

²Originally written in Russian and published in 1968, Shchutskii's *Researches on the I Ching* contains two parts. In Part I, Shchutskii discusses the problems of I Ching studies undertaken in Europe and Far East. Part II contains Shchutskii's separate essays on the canonical text. Iulian K. Shchutskii, *Researches on the I Ching*, trans. William L. MacDonald, Tsuyoshi Hasegawa with Hellmut Wilhelm (London: Routledge & Kegan Paul Ltd., 1980).

³For example, Heng Gao, *Zhou Yi Da Chuan Jin Zhu [The Updated Commentaries of the Zhou-yi]* (Jinan: Qi Lu Shu She, 1987); Jingfang Jin, *Zhou Yi Jiang Zuo [Zhou-yi Symposium]* (Changchun: Jilin University Press, 1987); Shouqi Wang and Shanwen Zhang, *Zhou Yi Yi Zhu [The Commentaries of Zhou-yi]* (Shanghai: Shanghai Gu Jie Chu Ban She, 1989); and Lingshu Wu, *Yi Jing Tan Wei [Exploring I Ching]* (Beijing: Qi Xiang Chu Ban She, 1989); to name only a few. For detailed information about recent I Ching studies in China, see Liao, Kang, and Liang, 399-456.

⁴For detailed information about Cage's compositional procedures based upon I Ching, see John Cage, *Silence* (Middletown, Connecticut: Wesleyan University Press, 1961), 57-61; and Richard Kostelanetz, *Conversing with Cage* (London: Omnibus Press, 1989), 94-5.

⁵Shing-kwei Tzeng, *Xin Yin Yue Tou Xi [Analysis of Modern Music]* (Taipei: Tien Tung Publishing Company Ltd., 1985), 131-49.

⁶See Preface, Wen-chung Chou, *Pien* (New York: C.F. Peters Corporation, 1967).

⁷Xiaosheng Zhou, *Taiji system in Composing* (Guangzhou: Kexue Pu Ji Chu Ban She Guangzhou Fen She, 1990).

⁸Allen Forte, *The Structure of Atonal Music* (New Haven: Yale University Press, 1973).

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
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CHAPTER 1

I Ching--The Book of Changes

The Origin and Structure of the *I Ching*

I Ching, the most important book of the Five Confucian Classics,¹ consists of two parts--*ching* (text) and *chuan* (commentary). *Ching*, the basic text of the work, is originally a book of divination. *Chuan*, an additional part later added to the *Ching*, contains supplementary commentaries and appendices known as the "Ten Wings."

Ching consists of discussions of all sixty-four hexagrams. Each hexagram is in fact a pictograph which consists of six stacked horizontal lines, either broken or unbroken, like (). As a result, a total of sixty-four hexagrams can be obtained. The discussion of each hexagram contains five components: The name of the hexagram (*kua ming*), the symbol of the hexagram (*kua hsiang*), the so-called "Judgment"--the explanation of the hexagram symbol (*kua tz'u* or *t'uan*), the locations of the six lines, and the explanations of the six lines of a hexagram (*hsiao tz'u*)². In addition, *ching* is divided into two sections according to the order of the hexagrams.

The "upper *ching*" contains thirty hexagrams numbered 1 to 30, and the "lower *ching*" contains the remaining thirty-four numbered 31 to 64.

Tradition holds that the legendary Emperor Fu-hsi (2953-2838 B.C.) invented the Eight Trigrams around 2852 B.C. He used a continuous line to represent a positive principle and a broken line to represent a negative principle, then permutationally combined these two lines to obtain four digrams: two continuous lines (☰), two broken lines (☷), a continuous line above a broken (☱), and a broken above a continuous (☶). Finally he added a third line, either continuous or broken, on each of the digrams to get eight trigrams: (☰, ☷, ☱, ☶, ☳, ☵, ☲, ☴). King Wen, the progenitor of the Chou dynasty (1027-222 B.C.), formulated sixty-four hexagrams by stacking any two of the eight trigrams. He then named each hexagram, briefly discussed the name of each, and arranged the hexagrams in a definite order. King Wen's son Chou Kung, the Duke of Chou, later added a discussion of the individual lines of each hexagram. The *ching* portion is merely a manual on divination that was used in the Chou dynasty. In comparison to the tortoise shell that had been widely employed in the previous Shang dynasty (1600-1027 B.C.), the hexagrams are a far easier method of divination. The diviner could foretell the future by interpreting the symbolic expression of the Law of the Universe in the hexagrams and the movement of their lines.

The *chuan* portion, known as the "Ten Wings," was later added to the *ching* portion. The authorship of the *chuan* portion is generally attributed to Confucius and his disciples or followers, although this has not been established with certainty. The *chuan* consists of seven parts. Parts 1, 2, and 4 are further divided into two sections;

therefore, the *chuan* contains in all ten sections, the so-called "Ten Wings." The seven parts are arranged as follows:

1. *T'uan-chuan* (Commentary on the *T'uan*): divided into "Upper *T'uan-chuan*" and "Lower *T'uan-chuan*." A treatise on the appellation and the definition of each hexagram;³
2. *Hsiang-chuan* (Commentary on the *Hsiang*): divided into "Great *Hsiang-chuan*," explaining the *kua tz'u*, and "Little *Hsiang-chuan*," explaining the *hsiao tz'u*;⁴
3. *Wen-yen* (Notes): a commentary on the definitions and symbols of Hexagram 1 and Hexagram 2;⁵
4. *Hsi-tz'u* (Appended Judgment): divided into "Upper *Hsi-t'zu*" and "Lower *Hsi-tz'u*." An overall discussion of the entire *ching* portion;⁶
5. *Shuo-kua* (Symposium): a discussion of the eight trigrams;⁷
6. *Hsu-kua* (Sequence): a long poem explaining the orderly sequence of the sixty-four hexagrams;⁸
7. *Tsa-kua* (Miscellaneous Notes): a gloss on the nomenclature of the sixty-four hexagrams.⁹

"*Chou I*" (Pin-yin System: "Zhou Yi") was the original title of *I Ching*. The word "Chou" of "*Chou I*" denotes the Chou dynasty in which *I Ching* was written. Until the Western Han dynasty (206 B.C.-6 A.D.), Confucian scholars paid honor to *Chou I* and accepted it as one of the six greatest classics known as "Six *Ching*" (Six Books).¹⁰ Since then, *Chou I* is also called *I Ching*. The meaning of the word "Ching" of "*I Ching*" is not difficult to explain: it means "book" and

is actually borrowed from Confucian "Six Ching." On the contrary, the explanation of the word *I* is much more complicated and divergent.

The Meanings of I

The word "I" has three fundamental meanings: simplicity, change, and invariability.¹¹ Before the invention of *I Ching* in the Chou dynasty, the method of divination of the Shang Dynasty, using tortoise shells, was more difficult. Therefore, the word "I" from the title "*I Ching*" signifies the easier way of divination. The author of the *Hsi Tzu* also expressed the same quality--simplicity--of *I* in explaining the functions of the first hexagram (Creative) and the second hexagram (Receptive). In the *Hsi Tzu* Upper Part, it is said:

The Creative knows through the easy, the
Receptive can do things through the
simple.
What is easy, is easy to know; what is simple,
is easy to follow...

By means of the easy and the simple we grasp
the laws of the whole world. (W-E, 286)

In the original Chinese text, the character *I*, interpreted as "simple," appears four times in the first two sentences. Furthermore, while many scholars look for something mysterious and complicated in the *I Ching*, the last sentence quoted above reveals the ease and simplicity of the Law of Universe. The author of this dissertation strongly believes that this characteristic of *I* also

The second aspect of *I* (the constant change) is the basis of the *I Ching*. In fact, the most common translation of the word *I* is "change." In 100 A.D., Shen Hsu pointed out that the oracle inscriptions of the word *I* took the shape of chameleon, the symbol of changeability (see Fig. 1-1).



Fig. 1-1. Oracle inscriptions of the word *I*

According to *I Ching*, all changes are the result of movements caused by the interaction of two primal forces: the Yang (positive) and the Yin (negative). The movement of change is cyclic, instead of one-dimensional. Cyclic change is evident, for example, in the alternation of day and night, the succession of seasons, the flow of blood, the rise and fall of kingdoms, and even the process of life and death.

The third aspect of *I* is invariability. Since everything in the universe is ever in the state of change and the course of changing is fixed by the *Tao* (the Way), *I* thus reveals elements of constancy in the midst of variability. As early apocrypha already pointed out: the only change is the unchangeable in the world.

These three meanings of the word *I*, which determine the course of the world, are strongly represented in this author's compositional system (ICCS). First, ICCS expresses the essence of *I* in terms of the changeability and the fusion of Yin and Yang. Two primal musical ideas are stated at the outset, and the entire composition is in fact the physical representation of the interaction and constant transformation of these two principal musical cells in the spans of sixty-four sections. The manipulation of the cells is mainly based upon this author's musical interpretation of the orderly sequence of the sixty-four hexagrams discussed in *Hsu Kua*. Secondly, the ultra-skeletal background series, from which the embellished foreground structure is derived, expresses elements of simplicity and invariability in the midst of variability. The process of motivic change is neither chaotic nor random, but ordered and planned.

The Concept of Hsiang (Symbol)

In the *I Ching*, the fixed order underlying the entire world is symbolized by a broken line and an unbroken line within sixty-four six-line figures (hexagrams). The developmental process of the sixty-four hexagrams comprises four stages and the first three are clearly illustrated in the Upper Part of *Hsi T'zu*:

Therefore there is in the Changes [I] the Great Primal Beginning [T'ai Chi or Supreme Ultimate]. This generates the two primary forces [Two Primal Forces or Two Poles]. The two primary forces generate the four images [Four Symbols or Four Images]. The four images generate the eight trigrams. (W-B, 318)

T'ai Chi (the Supreme Ultimate), symbolizing the oneness, is the origin of everything. But the oneness also implies duality; therefore, out of the T'ai Chi, the Two Primal Forces, symbolizing the positive and negative aspects, are evolved and designated as an unbroken line (Yang) and a broken line (Yin). By adding another line upon the Yang and Yin, four two-line figures (the Four Symbols or Four Images) are thus evolved:

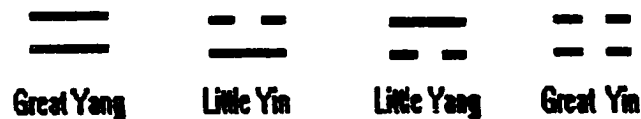


Fig. 1-2. The Four Symbols

The interaction of the yang force and the yin force causes the seasonal changes which are represented by the Four Symbols corresponding to the four seasons of the year. The Four Symbols in turn engender the Eight Trigrams expressing the eight basic elements in nature:

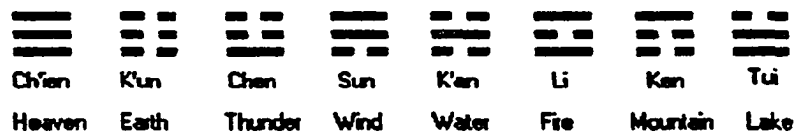


Fig. 1-3. The Eight Trigrams

A trigram consists of three lines (*hsiao*) of two types: unbroken (yang) line and broken (yin) line. The Eight Trigrams can be divided into four pairs: Ch'ien and K'un, Chen and Sun, K'an and Li, and finally, Ken and Tui. These four pairs of trigrams are inverse-related because all of their corresponding lines are different. In Chen and Sun, for example, the bottom yang line in Chen becomes yin in Sun, and the middle and top yin lines in Chen become yang in Sun. The inventor of the Eight Trigrams used these four pairs of inverted trigrams to symbolize four sets of natural elements of contrasting character: heaven vs. earth, thunder vs. wind, water vs. fire, and mountain vs. lake.

As the ancient Chinese expanded their knowledge, the Eight Trigrams came to have manifold meanings. For example, the trigrams might express eight different attributes of the things they

symbolized in addition to the things themselves. As it is said in

Shuo Kua:

Khien [Ch'ien] is (the symbol of) strength; *Khwan* [Kun], of docility; *Kan*, of stimulus to movement; *Sun*, of penetration; *Khan* [K'an] of what is precipitous and perilous; *Li*, of what is bright and what is catching; *Ken* [Ken], of stoppage or arrest; and *Tui*, of pleasure and satisfaction. (JL, 428)

Khien [Ch'ien] suggests the idea of heaven; of a circle; of a ruler; of a father; of jade; of metal; of cold; of ice; of deep red; of a good horse; of an old horse; of a thin horse; of a piebald horse; and of the fruit of trees.

Khwan [Kun] suggests the idea of the earth; of a mother; of cloth; of a caldron; of parsimony; of a turning lathe; of a young heifer; of a large wagon; of what is variegated; of a multitude; and of a handle and support. Among soils it denotes what is black... (JL, 430)

The formation of the Eight Trigrams is called "initial completion," since the things they symbolize are relatively limited. In order to encompass all possible situations on earth, ancient Chinese superposed any two trigrams upon one another and formed sixty-four hexagrams. In each hexagram, the lower trigram is called "the inner" and the one above "the outer." A hexagram thus consists of six lines. The lines are numbered from one to six, starting from the bottom. As a result, the bottom line is called the "initial line" or "starting line," the second line from the bottom is called the second line, and so forth. The top line is called the "upper line." In this dissertation, the hexagrams are numbered from 1 to 64, in accordance with the orderly sequence of hexagrams as presented in *Hsu-kua* of *I Ching*.

Hexagram Relations

Several relations between hexagrams can be defined.¹² Two hexagrams will be said to be inverted if the character of all six corresponding lines are different (opposite). For example, Hexagram 27 is inverse-related to 28, as is 61 to 62:

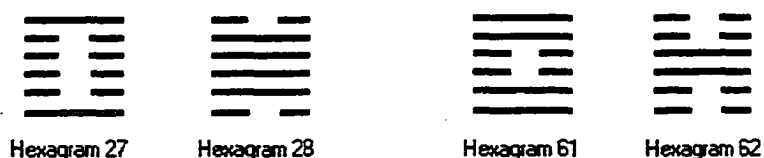


Fig. 1-4. The inverted hexagrams

Hexagrams can also display a retrograde relation. Given two hexagrams A and B, A and B will be considered retrograde-related if the first (bottom) line of A becomes the sixth (upper) line of B, the second line of A becomes the fifth line of B, the third becomes the fourth, the fourth becomes the third, the fifth becomes the second, and the sixth becomes the first. For example, Hexagram 3 is retrograde-related to 4, as is 9 to 10:

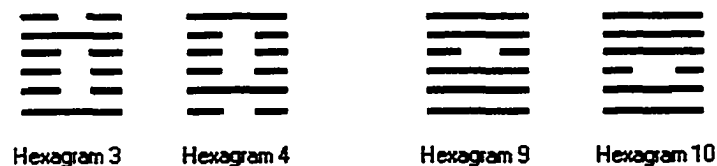


Fig. 1-5. The retrograde hexagrams

Another hexagram relation will be called "interchange." Given hexagrams A and B, A and B are interchanged if the inner (lower) trigram of Hexagram A becomes the outer (upper) trigram of Hexagram

B, and the outer of Hexagram A becomes the inner of Hexagram B. For example, Hexagram 25 is interchange-related to 34, as is 28 to 61:

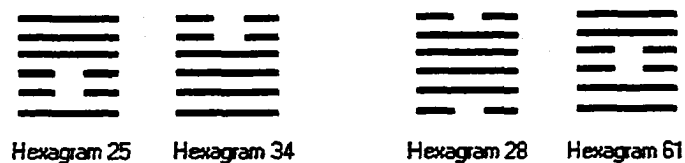


Fig. 1-6. The interchanged hexagrams

Sometimes a hexagram may be in two or even three relations to another hexagram. For example, Hexagrams 5 and 6 are related by retrograde and interchange; Hexagrams 63 and 64 are related by inversion, retrograde, and interchange:

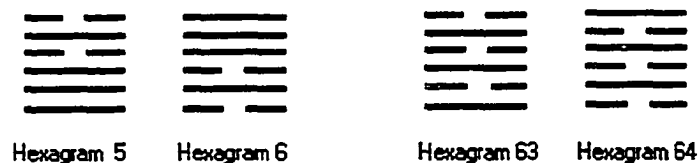


Fig. 1-7. Hexagrams of multi-relations

Sequence of Hexagrams and Hexagram Vector



The chapter *Hsu Kua* points out that the sequence of the sixty-four hexagrams reveals a definite order according to which all things in the universe constantly transform themselves. The sixty-four hexagrams in this sequence can be grouped into thirty-two pairs of related hexagrams. Their relations are listed in Table 1-1.

Table 1-1.--Hexagram Relations of Thirty-two Pairs of Juxtaposed Hexagrams in Hsu Kua Sequence

Hexagram	Relation	Hexagram	Relation
1.2	I	33.34	R
3.4	R	35.36	R.C
5.6	R.C	37.38	R
7.8	R.C	39.40	R
9.10	R	41.42	R
11.12	I,R,C	43.44	R
13.14	R.C	45.46	R
15.16	R	47.48	R
17.18	R	49.50	R
19.20	R	51.52	R
21.22	R	53.54	I,R
23.24	R	55.56	C
25.26	R	57.58	C
27.28	I	59.60	R
29.30	I	61.62	I
31.32	R	63.64	I,R,C

Abbreviations

I: inversion, R: retrograde, C: interchange

In this dissertation, the structures of hexagrams are designated by a "hexagram vector" where "1" is an unbroken line and "0" is a broken line. The first number on the left in the vector corresponds to the lowest line of the hexagram and the number at the extreme right is the topmost line.¹³ The numbers are enclosed in parentheses. For example, the vector for Hexagram 5 () is (111010) and the vector for Hexagram 6 () is (010111). The hexagram vector can display hexagram relations. For example, the retrograde relation between Hexagram 5 and Hexagram 6 can be represented as $R(111010)[5] = (010111)[6]$, and the inverse relation between Hexagram 27 and Hexagram 28 as $I(100001)[27] = (011110)[28]$. The last number enclosed by square brackets denotes hexagram number.

Hexagram Class and the Primary Hexagram

Hexagrams that are related to each other by either retrograde, inversion, interchange, or their combinations can form a single, closely related family of hexagrams. A family like this is called a "hexagram class." Within a hexagram class, the hexagram of the lowest number in the sequence of 64 is called the "primary hexagram."

There are a total of fourteen hexagram classes. Of these fourteen hexagram classes, there are four classes that consist of only two members, six classes that consist of four members, and four classes that consist of eight members. In addition, regarding intercrossed hexagram relations, please note that if Hexagram X and Hexagram Y are A-related and Hexagram X and Hexagram Z are B-related, then Hexagram Y and Hexagram Z are AB-related (A and B stand for either inversion, retrograde, or interchange).

In Fig. 1-8, the hexagram relations between hexagram class members are illustrated by comparing the relations between the primary hexagram and the remaining members. The relations between members other than the primary hexagram can be deduced by using the theorem of intercrossed hexagram relations mentioned above.

HEXAGRAM CLASS 1

Primary Hexagram: (111111)[1]

Number of Class Member: 2
Class Members: Hexagrams 1,2

R (111111)[1] = (111111)[1]
I (111111)[1] = (000000)[2]
C (111111)[1] = (111111)[1]
RI (111111)[1] = (000000)[2]
RC (111111)[1] = (111111)[1]
IC (111111)[1] = (000000)[2]
RIC(111111)[1] = (000000)[2]

HEXAGRAM CLASS 2

Primary Hexagram: (100010)[3]

Number of Class Member: 8
Class Members: Hexagrams 3,4,37,38,39,40,49,50

R (100010)[3] = (010001) [4]
I (100010)[3] = (011101) [50]
C (100010)[3] = (010100) [40]
RI (100010)[3] = (101110) [49]
RC (100010)[3] = (001010) [39]
IC (100010)[3] = (101011) [37]
RIC(100010)[3] = (110101) [38]

HEXAGRAM CLASS 3

Primary Hexagram: (111010)[5]

Number of Class Member: 4
Class Members: Hexagrams 5,6,35,36

R (111010)[5] = (010111) [6]
I (111010)[5] = (000101) [35]
C (111010)[5] = (010111) [6]
RI (111010)[5] = (101000) [36]
RC (111010)[5] = (111010) [5]
IC (111010)[5] = (101000) [36]
RIC(111010)[5] = (000101) [35]

HEXAGRAM CLASS 4

Primary Hexagram: (010000)[7]

Number of Class Member: 4
Class Members: Hexagrams 7,8,13,14

R (010000)[7] = (000010) [8]
I (010000)[7] = (101111) [13]
C (010000)[7] = (000010) [8]
RI (010000)[7] = (111101) [14]
RC (010000)[7] = (010000) [7]
IC (010000)[7] = (111101) [14]
RIC(010000)[7] = (101111) [13]

Fig. 1-8. Hexagram classes and their constituent members

HEXAGRAM CLASS 5

Primary Hexagram: (111011)[9]

Number of Class Member: 8

Class Members: Hexagrams 9,10,15,16,23,24,43,44

R (111011)[9] = (110111)[10]
 I (111011)[9] = (000100)[16]
 C (111011)[9] = (011111)[44]
 RI (111011)[9] = (001000)[15]
 RC (111011)[9] = (111110)[43]
 IC (111011)[9] = (100000)[24]
 RIC(111011)[9] = (000001)[23]

HEXAGRAM CLASS 6

Primary Hexagram: (111000)[11]

Number of Class Member: 2

Class Members: Hexagrams 11,12

R (111000)[11] = (000111)[12]
 I (111000)[11] = (000111)[12]
 C (111000)[11] = (000111)[12]
 RI (111000)[11] = (111000)[11]
 RC (111000)[11] = (111000)[11]
 IC (111000)[11] = (111000)[11]
 RIC(111000)[11] = (000111)[12]

HEXAGRAM CLASS 7

Primary Hexagram: (100110)[17]

Number of Class Member: 4

Class Members: Hexagrams 17,18,53,54

R (100110)[17] = (011001)[18]
 I (100110)[17] = (011001)[18]
 C (100110)[17] = (110100)[54]
 RI (100110)[17] = (100110)[17]
 RC (100110)[17] = (001011)[53]
 IC (100110)[17] = (001011)[53]
 RIC(100110)[17] = (110100)[54]

HEXAGRAM CLASS 8

Primary Hexagram: (110000)[19]

Number of Class Member: 8

Class Members: Hexagrams 19,20,25,26,33,34,45,46

R (110000)[19] = (000011)[20]
 I (110000)[19] = (001111)[33]
 C (110000)[19] = (000110)[45]
 RI (110000)[19] = (111100)[34]
 RC (110000)[19] = (011000)[46]
 IC (110000)[19] = (111001)[26]
 RIC(110000)[19] = (100111)[25]

Fig. 1-8--Continued

HEXAGRAM CLASS 9

Primary Hexagram: (100101)[21]

Number of Class Member: 8

Class Members: Hexagrams 21,22,47,48,49,50,59,60

R (100101)[21] = (101001)[22]
 I (100101)[21] = (011010)[48]
 C (100101)[21] = (101100)[55]
 RI (100101)[21] = (010110)[47]
 RC (100101)[21] = (001101)[56]
 IC (100101)[21] = (010011)[59]
 RIC(100101)[21] = (110010)[60]

HEXAGRAM CLASS 10

Primary Hexagram: (100001)[27]

Number of Class Member: 4

Class Members: Hexagrams 27,28,61,62

R (100001)[27] = (100001)[27]
 I (100001)[27] = (011110)[28]
 C (100001)[27] = (001100)[62]
 RI (100001)[27] = (011110)[28]
 RC (100001)[27] = (001100)[62]
 IC (100001)[27] = (110011)[61]
 RIC(100001)[27] = (110011)[61]

HEXAGRAM CLASS 11

Primary Hexagram: (010010)[29]

Number of Class Member: 2

Class Members: Hexagrams 29,30

R (010010)[29] = (010010)[29]
 I (010010)[29] = (101101)[30]
 C (010010)[29] = (010010)[29]
 RI (010010)[29] = (101101)[30]
 RC (010010)[29] = (010010)[29]
 IC (010010)[29] = (101101)[30]
 RIC(010010)[29] = (101101)[30]

HEXAGRAM CLASS 12

Primary Hexagram: (001110)[31]

Number of Class Member: 4

Class Members: Hexagrams 31,32,41,42

R (001110)[31] = (011100)[32]
 I (001110)[31] = (110001)[41]
 C (001110)[31] = (110001)[41]
 RI (001110)[31] = (100011)[42]
 RC (001110)[31] = (100011)[42]
 IC (001110)[31] = (001110)[31]
 RIC(001110)[31] = (011100)[32]

Fig. 1-8--Continued

HEXAGRAM CLASS 13

Primary Hexagram: (100100)[51]

Number of Class Member: 4

Class Members: Hexagrams 51,52,57,58

R (100100)[51] = (001001)[52]
 I (100100)[51] = (011011)[57]
 C (100100)[51] = (100100)[51]
 FI (100100)[51] = (110110)[58]
 FC (100100)[51] = (001001)[52]
 IC (100100)[51] = (011011)[57]
 RIC(100100)[51] = (110110)[58]

HEXAGRAM CLASS 14

Primary Hexagram: (101010)[63]

Number of Class Member: 2

Class Members: Hexagrams 63,64

R (101010)[63] = (010101)[64]
 I (101010)[63] = (010101)[64]
 C (101010)[63] = (010101)[64]
 FI (101010)[63] = (101010)[63]
 FC (101010)[63] = (101010)[63]
 IC (101010)[63] = (101010)[63]
 RIC(101010)[63] = (101010)[63]

Fig. 1-8--Continued

NOTES

¹The Five Confucian Classics are the *I Ching* (*Book of Changes*), *Shu Ching* (*Book of History*), *Shih Ching* (*Book of Odes*), *Li Chi* (*Book of Rituals*), and *Chun-Chiu Annals*.

²*Kua* means "trigram" or "hexagram." *Ming* means "name." *Hsiang* means "symbol." *Tz'u* means "text." *T'uan*, translated in JL, W-B, and RVO as "Judgment," means "the text of the hexagram." *Hsiao* means "lines." *Hsiao Tz'u* is translated in JL, W-B, and RVO as "the Lines."

³*T'uan-chuan* is translated in JL as "The Treatise on the T'uan" (Legge's Appendix I), in W-B as "Commentary on the Decision," and in RVO as "Commentary."

⁴*Hsiang-chuan* is translated in JL as "The Treatise on the Symbols" (Legge's Appendix II), in W-B as "Commentary on the Images," in RVO as "the Great Symbolism."

⁵*Wen* means "writing;" *yen* means "speaking." *Wen Yen* is translated in JL as "the Explanation of the Words and Sentences" (Legge's Appendix IV), in W-B as "Commentary on the Words of the Text," and in RVO as "On the First and Second Hexagrams."

⁶*Hsi* means "appended." *Hsi Tz'u* is translated in JL as "The Great Appendix" (Legge's Appendix III), in W-B as "The Great Treatise" or "the Great Commentary," and in RVO as "the Great Treatise."

⁷*Shuo* means "speaking of." *Shuo Kua* is translated in JL as "the Discourses on the Trigrams" (Legge's Appendix V), in W-B as "Discussion of the Trigrams," and in RVO as "Treatise of Remarks on the Trigrams."

⁸*Hsu* means "sequence." *Hsu Kua* is translated in JL as "the Treatise on the Sequence of the Hexagrams" (Legge's Appendix VI), in W-B as "the Sequence of the Hexagrams," and in RVO as "the Orderly Sequence of the Hexagrams."

⁹*Tsa* means "miscellanies." *Tsa Kua* is translated in JL as "the Miscellaneous Remarks on the Hexagrams" (Legge's Appendix VII), in W-B as "Miscellaneous Notes on the Hexagrams," and in RVO as "Treatise on the Hexagrams Taken Promiscuously."

¹⁰The word "*ching*" has different meanings in the cases of "Six *Ching* or *I Ching*" and "the *Ching* part of *I Ching*," although the pronunciations and the writings of them are identical. The former is referred to as classic and the latter as canonical text.

¹¹*C'hu Chai* and *Winberg Chai*, eds., *I Ching--Translated by James Legge* (New York: Bantam Books, 1986), xl.

¹²*Heng Gao*, *Zhou Yi Da Chuan Jin Zhu* [*The Updated Commentaries of the Zhou-yi*] (Jinan: Qi Lu Shu She, 1987), 10-1.

¹³The hexagram vector is in fact a representation of the hexagram using a binary numeral system.

CHAPTER 2

**I-CHING COMPOSITIONAL SYSTEM (ICCS)
PART I: FUNDAMENTAL SERIES**

Among the Five Confucian Classics, the *Li Chi* (*Record of Rites*) is of greatest interest to musicologists because the twenty-seventh chapter, the so-called *Yueh Chi* (the *Book on Music*), contains important information concerning ancient Chinese musical aesthetics. There are also passages in the *Shu Ching* (the *Book of Historical Documents*) that throw light on the origin of music, the categorization of musical instruments, and the performance practice in the Shang (1766-1122 B.C.) and Chou (1122-770 B.C.) periods.

Ironically, the *I Ching*, on which the ICCS is based, contains no valuable musical references, yet its Yin-Yang Doctrine, exercises a tremendous influence upon Chinese arts--whether music, drama, poetry, painting, calligraphy, or architectural design. The Yin-Yang Doctrine, together with that of Five Agents or Elements (*Wu-Hsing*, i.e., Metal, Wood, Water, Fire, and Earth), was elaborated in the Ch'in dynasty by Tsou Yen (305-204 B.C.). Tsou strongly believed that these this dualistic doctrine operated in a cyclical and continuous pattern. As a result, he also developed the cyclical

philosophy and the ideas of mutual production and mutual overcoming among the Five Agents.

Although the *I Ching* contains no musical references, various thinkers have recognized correspondences between its theories and music. As mentioned in the *Record of Music*, for example, the yin-yang principle serves as a basis for creating music:

The heaven is high above and the earth is down below and between the two are placed all beings with their various characteristics. In correspondence with this (view) the ceremonies were formed. (The modifying power of) heaven and earth move on without stopping. The interaction (of these powers) causes creation and change; out of this arises music.¹

In the *Tso Chuen* (*Tso's Commentary*), Chapter "Duke Cha'ou the First Year," yin and yang are included in the six heavenly influences which produce the five musical notes:

there are six heavenly influences, which descend and produce the five tastes, go forth in the five colors, and are verified in the five notes; but when they are in excess, they produce the six diseases [calamities]. Those six influences are denominated the yin, the yang, wind, rain, obscurity, and brightness.²

Additionally, in Chapter "Tai-Yueh" of Lu Pu-wei's *Lu's Spring and Autumn Annals* written in 231 B.C., it is said that music originates in the Supreme Ultimate and therefore is caused by the harmonious interaction of heaven and earth and peaceful balance of yin and yang.³ In Chapter "Yin-Lu" of the same book, the twelve pitches (the twelve *Lu*) are correlated with the twelve seasonal changes (twelve months).⁴ One specific pitch-class was used as a fundamental pitch of all music performed in its corresponding month (see Fig. 2-1). On the other hand, according to the Complete Diagram of Hexagram Vitality, twelve hexagrams are used as symbols of the twelve months of the year.⁵ As a result, these twelve hexagrams can

also be treated as symbols of the twelve pitch classes. Since yang Hexagram Ch'ien (Hexagram 1), representing April is associated with A# and yin Hexagram K'un (Hexagram 2) representing October with E as recorded in Chapter "Yin Lu" of Lu's *Spring and Autumn Annals*, it is safe to conclude that if a yang note is pitch-class x ($x=0$ to 11 , mod 12), then its opposite--yin note--will be pitch-class $x+6$. In other words, the yang note and yin note are T_6 -related. This is different from the T_1 -relation between the yin note and the yang note that Zhao Xiaosheng assumed in his "Taiji Compositional System."⁶

In an ICCS composition, any one of the twelve pitch-classes can serve as the yang note and can be represented by Hexagram Ch'ien that symbolizes the yang principle. For example, if Hexagram Ch'ien represents pitch-class 0, Hexagram Kou will be 1, Hexagram Tun 2, Hexagram Pi 3, Hexagram Kuan 4, Hexagram Po 5, Hexagram K'un 6, Hexagram Fu 7, Hexagram Lin 8, Hexagram T'ai 9, Hexagram Ta Chuang 10, and Hexagram Kuai 11.

Hexagram:	T'ai	Ta Chuang	Kuai	Ch'ien	Kou	Tun
Month:	1	2	3	4	5	6
Pitch:	G	G#	A	A#	B	C
	Pi	Kuan	Po	K'un	Fu	Lin
	7	8	9	10	11	12
	C#	D	D#	E	F	F#

Fig. 2-1. Correlation of hexagrams with 12 months and 12 pitch classes as recorded in Lu's *Spring and Autumn Annals*

Properties of the Fundamental Series

The background structure of all ICCS compositions is based on an ordering of the aggregate named the "Fundamental Series," and this series is constructed to have several special properties. First, the first and last notes of the series are a tritone apart, expressing the path of transformation from the yang pole to the yin pole. Second, the two hexachords of the series (H1 and H2) are retrograde-equivalent, creating transformational paths that are the same going forwards or backwards. Third, the series is all-intervallic, representing the all-inclusiveness of the Supreme Ultimate. Fourth, the hexachords are all-combinatorial so that constituents of H1 becomes constituents of H2 under transposition, inversion, retrograde, or retrograde-inversion, symbolizing the dual character of everything in the universe (yin can be yang, yang can be yin) as expressed in the *T'ai-Chi-T'u* (see Fig. 2-2).



Fig. 2-2. *T'ai-Chi-T'u* (Diagram of the *T'ai-Chi*)

According to the above conditions, H1 and H2 must be R_6 -related and contain all interval classes but interval-class 6. Interval-class 6 must occur only between H1 and H2 at the midpoint of the series. There are only three hexachords that contain all interval classes but 6 and can form series that are all-combinatorial and all-intervallic: 6-1 (012345), 6-8 (023457), and 6-32 (024579). Based upon these three hexachordal set classes, one can construct twenty-four series classes satisfying all the conditions. In addition, it is interesting to note that these twenty-four series classes can be divided into two retrograde-related halves (see Fig. 2-3). They are related by the $T_{(n_0-n_5)}I_5$ operation: T stands for transposition, n_0 stands for the pitch-class number of the first note of the Series n, n_5 for the pitch-class number of the sixth series note, I_5 for the retrograde operation which makes the sixth member within the series becomes the first member, the fifth becomes the second, the fourth becomes the third, the third becomes the fourth, the second becomes the fifth, the first becomes the sixth, the twelfth becomes the seventh, the eleventh becomes the eighth, and so on.

6-1 H1 and H2

a:	{01e2t3 948576}	$T_{(a0-a5)}I_5(a):$	{07e8t9 342516}
b:	{0te8t9 372546}	$T_{(b0-b5)}I_5(b):$	{04e2t3 9785t6}
c:	{0e92t1 748356}	$T_{(c0-c5)}I_5(c):$	{0918te 542736}
d:	{0e2t3t 794856}	$T_{(d0-d5)}I_5(d):$	{0291te 547386}
e:	{023e4t 7t5986}	$T_{(e0-e5)}I_5(e):$	{03t21e 578496}

6-8 H1 and H2

f:	{01t83e 592476}	$T_{(f0-f5)}I_5(f):$	{049e2t 7853t6}
g:	{0972re 548136}	$T_{(g0-g5)}I_5(g):$	{0e38t1 742956}
h:	{0e22t7 148356}	$T_{(h0-h5)}I_5(h):$	{037245 et8196}
i:	{022t7e 514386}	$T_{(i0-i5)}I_5(i):$	{08et3t 794526}

6-32 H1 and H2

j:	{0158t3 942e76}	$T_{(j0-j5)}I_5(j):$	{0752t9 348e16}
k:	{045279 318et6}	$T_{(k0-k5)}I_5(k):$	{0t5873 912e46}
l:	{027r95 e34186}	$T_{(l0-l5)}I_5(l):$	{045297 138et6}

Fig. 2-3. Twenty-four all-intervallic and all-combinatorial series classes with RT_6 -related H1 and H2

.

Of these twenty-four series classes in Fig. 2-3, only members of Series Classes a , $T_{(a0-a5)}I5(a)$, j , and $T_{(j0-j5)}I5(j)$ possess hidden systematic patterns of note orderings and thus are called the "Fundamental Series Classes." Fundamental Series-Class a is indicated by $FS1$, Fundamental Series-Class $T_{(a0-a5)}I5(a)$ is indicated by $FS2$, j by $FS3$, and $T_{(j0-j5)}I5(j)$ by $FS4$ in the ICCS. The members of these four Fundamental Series Classes are called "Fundamental Series" and indicated by " $FSxSn$." FSx denotes the name of the Fundamental Series-Class, while Sn denotes the series forms. Therefore, Fundamental Series [0158t3942e76] is indicated by " $FS3P0$," and Fundamental Series [102e3t495867] by " $FS1I1$." All four Fundamental Series Classes and ninety-six Fundamental Series are displayed in Fig. 2-4.

By analysing the Fundamental Series, it is safe to conclude that if x is an integer $0-11 \pmod{12}$ and represents the yang note (the first member of the Fundamental Series), $x+6$ will be the yin note (the twelfth member of the Fundamental Series), and x and $(x) +6$ will be either the fifth or sixth members of the Fundamental Series. Also note that the second, third, tenth, and eleventh members are constituted only by x and $(x) +6$; and the fourth, fifth, seventh, and eighth members only by x and $(x) +6$. As a result, a Fundamental Series can be divided into eight segments, $PART((0), (1,2), (3,4), (5), (6), (7,8), (9,10), (11))$, corresponding to the structures and arrangement of the Eight Trigrams (see Fig. 2-5).

<i>FS1,</i>					
<i>P0</i> = <i>R6</i> :	[01e2t3	948576]	<i>I0</i> = <i>RI6</i> :	[0elt29	384756]
<i>P1</i> = <i>R7</i> :	[1203e4	t59687]	<i>I1</i> = <i>RI7</i> :	[102e3t	495867]
<i>P2</i> = <i>R8</i> :	[231405	e6t798]	<i>I2</i> = <i>RI8</i> :	[21304e	5t6978]
<i>P3</i> = <i>R9</i> :	[342516	07e8t9]	<i>I3</i> = <i>RI9</i> :	[324150	6e7t89]
<i>P4</i> = <i>Rt</i> :	[453627	1809et]	<i>I4</i> = <i>RIt</i> :	[435261	708e9t]
<i>P5</i> = <i>Re</i> :	[564738	291t0e]	<i>I5</i> = <i>RIe</i> :	[546372	8190te]
<i>P6</i> = <i>R0</i> :	[675849	3t2e10]	<i>I6</i> = <i>RI0</i> :	[657483	92t1e0]
<i>P7</i> = <i>R1</i> :	[78695t	4e3021]	<i>I7</i> = <i>RI1</i> :	[768594	t3e201]
<i>P8</i> = <i>R2</i> :	[897t6e	504132]	<i>I8</i> = <i>RI2</i> :	[8796t5	e40312]
<i>P9</i> = <i>R3</i> :	[9t8e70	615243]	<i>I9</i> = <i>RI3</i> :	[98t7e6	051423]
<i>Pt</i> = <i>R4</i> :	[te9081	726354]	<i>It</i> = <i>RI4</i> :	[t9e807	162534]
<i>Pe</i> = <i>R5</i> :	[e0t192	837465]	<i>Ie</i> = <i>RI5</i> :	[et0918	273645]
<i>FS2,</i>					
<i>P0</i> = <i>R6</i> :	[07e8t9	342516]	<i>I0</i> = <i>RI6</i> :	[051423	98t7e6]
<i>P1</i> = <i>R7</i> :	[1809et	453627]	<i>I1</i> = <i>RI7</i> :	[162534	t9e807]
<i>P2</i> = <i>R8</i> :	[291t0e	564738]	<i>I2</i> = <i>RI8</i> :	[273645	et0918]
<i>P3</i> = <i>R9</i> :	[3t2e10	675849]	<i>I3</i> = <i>RI9</i> :	[384756	0elt29]
<i>P4</i> = <i>Rt</i> :	[4e3021	78695t]	<i>I4</i> = <i>RIt</i> :	[495867	102e3t]
<i>P5</i> = <i>Re</i> :	[504132	897t6e]	<i>I5</i> = <i>RIe</i> :	[5t6978	21304e]
<i>P6</i> = <i>R0</i> :	[615243	9t8e70]	<i>I6</i> = <i>RI0</i> :	[6e7t89	324150]
<i>P7</i> = <i>R1</i> :	[726354	te9081]	<i>I7</i> = <i>RI1</i> :	[708e9t	435261]
<i>P8</i> = <i>R2</i> :	[837465	e0t192]	<i>I8</i> = <i>RI2</i> :	[8190te	546372]
<i>P9</i> = <i>R3</i> :	[948576	01e2t3]	<i>I9</i> = <i>RI3</i> :	[92t1e0	657483]
<i>Pt</i> = <i>R4</i> :	[t59687	1203e4]	<i>It</i> = <i>RI4</i> :	[t3e201	768594]
<i>Pe</i> = <i>R5</i> :	[e6t798	231005]	<i>Ie</i> = <i>RI5</i> :	[e40312	8796t5]
<i>FS3,</i>					
<i>P0</i> = <i>R6</i> :	[0158t3	942e76]	<i>I0</i> = <i>RI6</i> :	[0e7429	38t156]
<i>P1</i> = <i>R7</i> :	[1269e4	t53087]	<i>I1</i> = <i>RI7</i> :	[10853t	49e267]
<i>P2</i> = <i>R8</i> :	[237t05	e64198]	<i>I2</i> = <i>RI8</i> :	[21964e	5t0378]
<i>P3</i> = <i>R9</i> :	[348e16	0752t9]	<i>I3</i> = <i>RI9</i> :	[32t750	6e1489]
<i>P4</i> = <i>Rt</i> :	[459027	1863et]	<i>I4</i> = <i>RIt</i> :	[43e861	70259t]
<i>P5</i> = <i>Re</i> :	[56t138	29740e]	<i>I5</i> = <i>RIe</i> :	[540972	8136te]
<i>P6</i> = <i>R0</i> :	[67e249	3t8510]	<i>I6</i> = <i>RI0</i> :	[651t83	9247e0]
<i>P7</i> = <i>R1</i> :	[78035t	4e9621]	<i>I7</i> = <i>RI1</i> :	[762e94	t35801]
<i>P8</i> = <i>R2</i> :	[89146e	50t732]	<i>I8</i> = <i>RI2</i> :	[8730t5	e46912]
<i>P9</i> = <i>R3</i> :	[9t2570	61e843]	<i>I9</i> = <i>RI3</i> :	[9841e6	057t23]
<i>Pt</i> = <i>R4</i> :	[te3681	720954]	<i>It</i> = <i>RI4</i> :	[t95207	168e34]
<i>Pe</i> = <i>R5</i> :	[e04792	831t65]	<i>Ie</i> = <i>RI5</i> :	[et6318	279045]
<i>FS4,</i>					
<i>P0</i> = <i>R6</i> :	[0752t9	348e16]	<i>I0</i> = <i>RI6</i> :	[057t23	9841e6]
<i>P1</i> = <i>R7</i> :	[1863et	459027]	<i>I1</i> = <i>RI7</i> :	[168e34	t95207]
<i>P2</i> = <i>R8</i> :	[29740e	56t138]	<i>I2</i> = <i>RI8</i> :	[279045	et6318]
<i>P3</i> = <i>R9</i> :	[3t8510	67e249]	<i>I3</i> = <i>RI9</i> :	[38t156	0e7429]
<i>P4</i> = <i>Rt</i> :	[4e9621	78035t]	<i>I4</i> = <i>RIt</i> :	[49e267	10853t]
<i>P5</i> = <i>Re</i> :	[50t732	89146e]	<i>I5</i> = <i>RIe</i> :	[5t0378	21964e]
<i>P6</i> = <i>R0</i> :	[61e843	9t2570]	<i>I6</i> = <i>RI0</i> :	[6e1489	32t750]
<i>P7</i> = <i>R1</i> :	[720954	te3681]	<i>I7</i> = <i>RI1</i> :	[70259t	43e861]
<i>P8</i> = <i>R2</i> :	[831t65	e04792]	<i>I8</i> = <i>RI2</i> :	[8136te	540972]
<i>P9</i> = <i>R3</i> :	[942e76	0158t3]	<i>I9</i> = <i>RI3</i> :	[9247e0	651t83]
<i>Pt</i> = <i>R4</i> :	[t53087	1269e4]	<i>It</i> = <i>RI4</i> :	[t35801	762e94]
<i>Pe</i> = <i>R5</i> :	[e64198	237t05]	<i>Ie</i> = <i>RI5</i> :	[e46912	8730t5]

Fig. 2-4. Four Fundamental Series Classes and ninety-six Fundamental Series

Fundamental Series

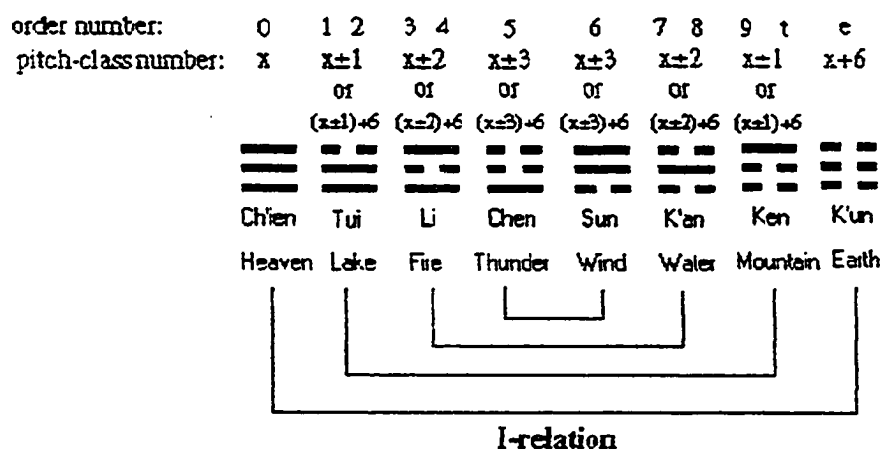


Fig. 2-5. Structure of the Fundamental Series corresponding to the structures and arrangement of the Eight Trigrams

The peculiarity of the Fundamental Series' note orderings can be further revealed by their corresponding hexagram relations and arrangements. Given that Hexagram Ch'ien represents C and C=0 which serves as the yang note, the correlation of hexagrams with pitch classes revealed in the Complete Diagram of the Hexagram Vitality will have to be transposed upward by a major second. For example, Hexagram T'ai is associated with pitch-class A instead of pitch-class G, Hexagram Ta-chuang with A# instead of G#, Hexagram Kuai with B instead of A, Hexagram Ch'ien with C instead of A#, and so on. Note orderings of *FS1P0*, *FS2P0*, *FS3P0*, *FS4P0*, *FS1I0*, *FS2I0*, *FS3I0*, and *FS4I0* demonstrate distinctive arrangements of their corresponding hexagrams in terms of hexagram relations (see Fig. 2-6).

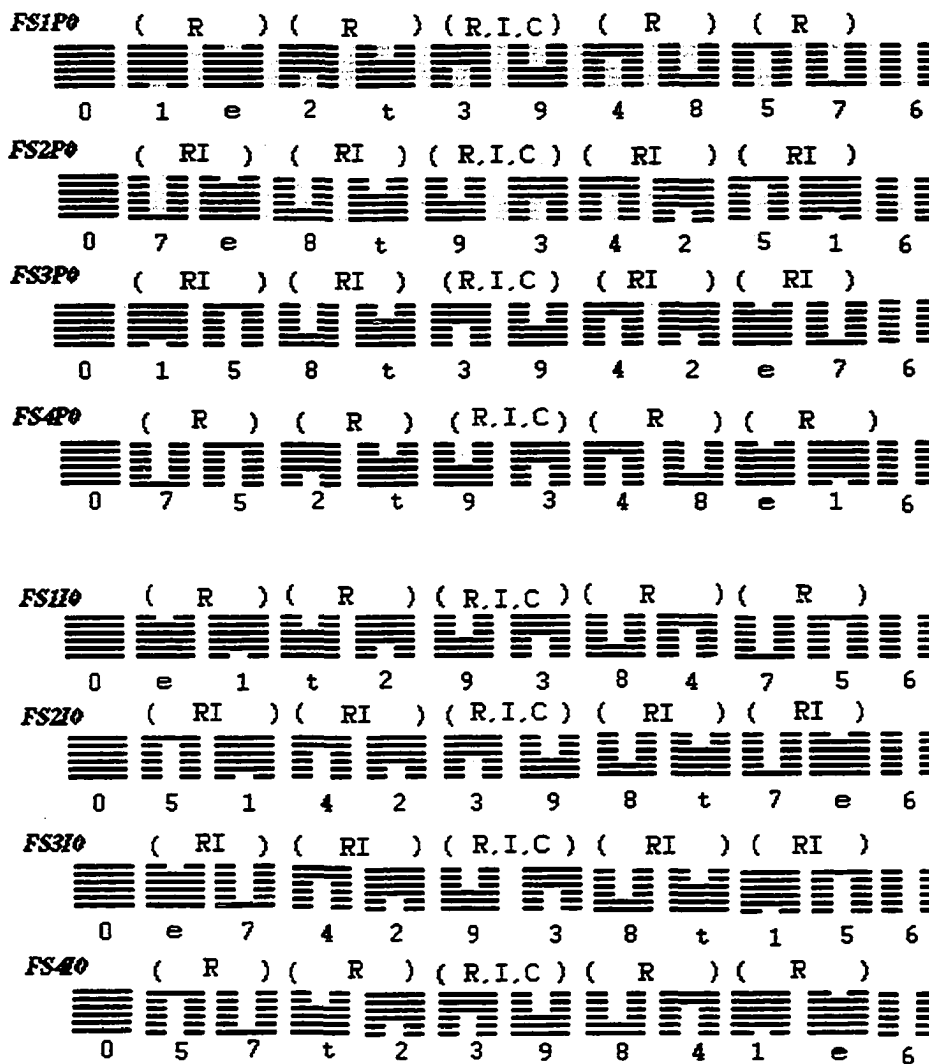


Fig. 2-6. Fundamental Series and their hexagram arrangements
 (Hexagram Ch'ien = C = 0)

Furthermore, the eight hexagram arrangements displayed in Fig. 2-6 can be in fact applied to all Fundamental Series. In any Fundamental Series-Class FS_n , n is an integer ranging from 1 to 4, Fundamental Series FS_nP_x and FS_nI_x will also demonstrate the same hexagram arrangements as FS_nP_0 and FS_nI_0 if $C = 0$, Hexagram Ch'ien represents pitch-class x , and the Complete Diagram of the Hexagram Vitality is transposed accordingly (see Fig. 2-7).

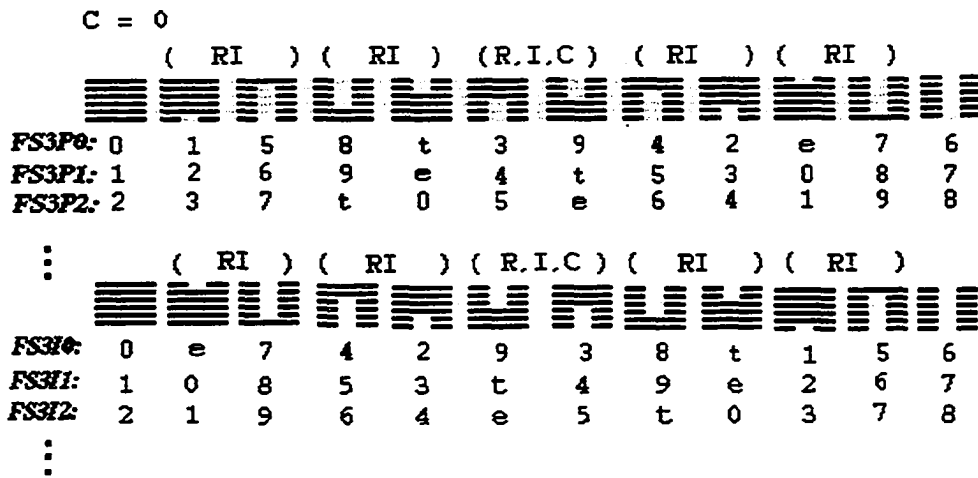


Fig. 2-7. The hexagram arrangements of the Fundamental Series under transpositions

In addition, the hexagram arrangements in all Fundamental Series are based on an inversionally symmetrical pattern that mimics that of Shao Yung's sequence (see Fig. 2-8).⁷

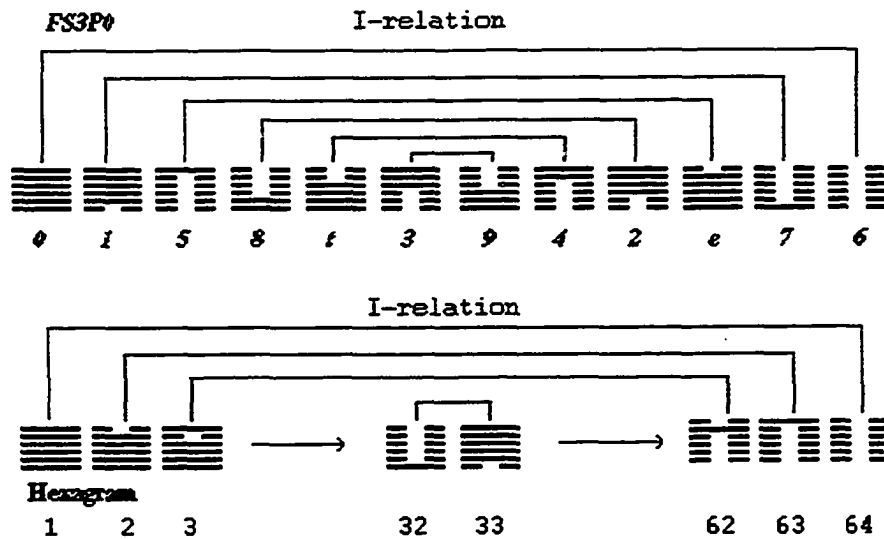


Fig. 2-8. Similarity of arrangement of hexagrams in the Fundamental Series and that of Shao Yung's hexagram sequence (Hexagram Ch'ien = C = 0)

Symbolism of the Fundamental Series and the T'ai-chi Series

The sixth and the seventh hexagrams, located at the midpoint of the Fundamental Series, are RIC-related. As some *I-Ching* scholars have pointed out, the symbols of these two hexagrams graphically represent the interaction of the yang (Hexagram 1) and yin (Hexagram 2).⁸ Due to their exceptional relationship and graphic symbolism, placing these two hexagrams at the center of the series can interpret the meeting of yin and yang in the *T'ai-Chi-T'u*, enhance its symmetrical balance, and create a sense of centric focus within the series. The sixth and seventh notes in the Fundamental Series, therefore, are called the "Notes of Yin-yang Interaction."

Besides the yang note, yin notes, and the Notes of Yin-yang Interaction, each remaining member of the Fundamental Series which symbolizes the process of yin-yang transformation has its particular function and name. The second member that initiates the transformation process is called "Note of Activation" and the eleventh member that accomplishes such process is called "Note of Stabilization." The third member in the developmental stage of the transformation process is called "Note of Development" and the tenth member in the reversional stage is called "Note of Reversion."⁹ The fourth and ninth members which actually undergo transformation are thus called "Notes of Transformation." The fifth and eighth members are in the process of the yin-yang displacement before and after the interacting of the yin and yang principles are called "Notes of Yin-yang Displacement."¹⁰

Most important of all, the note orderings in the Fundamental Series express systematic patterns of yin-yang transformation. The second and third, fourth and fifth, sixth and seventh, eighth and ninth, as well as tenth and eleventh hexagrams are grouped into five pairs as shown in Fig. 2-6. If one counts the number of similar lines (*hsiao*) from the bottom to the top of the initial and final hexagrams as well as the first of all five above-mentioned pairs, one will find that each Fundamental Series gives a numerical sequence based upon an arithmetic progression (see Fig. 2-9).

(Taking continuous line as "+", broken line as "-")
(Hexagram 1 = C = 0)

1. *FS1P0*

C	C#	B	D	Bb	Eb	A	E	Ab	F	G	F#
0-	1-		2-		3-		4-		5-		6-

FS1, I0

C	B	C#	Bb	D	A	Eb	Ab	E	G	F	F#
6+	5+		4+		3+		2+		1+		0+

2. *FS2P0*

C	G	B	Ab	Bb	A	Eb	E	D	F	C#	F#
0-	1+		2+		3+		4-		5-		6-

FS2I0

C	F	C#	E	D	Eb	A	Ab	Bb	G	B	F#
6+	5-		4-		3-		2+		1+		0+

3. *FS3P0*

C	C#	F	Ab	Bb	Eb	A	E	D	B	G	F#
0-	1-		2+		3-		4-		5+		6-

FS3I0

C	B	G	E	D	A	Eb	Ab	Bb	C#	F	F#
6+	5+		4-		3+		2+		1-		0+

4. *FS4P0*

C	G	F	D	Bb	A	Eb	E	Ab	B	C#	F#
0-	1+		2-		3+		4-		5+		6-

FS4I0

C	F	G	Bb	D	Eb	A	Ab	E	C#	B	F#
6+	5-		4+		3-		2+		1-		0+

Fig. 2-9. The arithmetic progression expressing the hexagram arrangements of the Fundamental Series

In sum, Fundamental Series represent the concepts of *I ching* in four ways: 1. they express a path, consisting of two mirror-symmetrical halves, which transforms a yang note to a yin note, including mirror symmetry that is reinforced by the RT_6 -relationship between H1 and H2; 2. the all-combinatoriality of the hexachords symbolizes the duality expressed in the *T'ai-Chi-T'u*; 3. the series contain all twelve notes and all intervals to symbolize the all-inclusiveness of the Supreme Ultimate; and 4. their note orderings depict the systematic patterns of yin-yang transformation process.

Although transformation represents conversion of yang to yin, symbolizing progress and development, the complete transformational cycle presented in the background structure actually starts from the yang note, through the yin counterpole, and ends on the yang note itself. As a result, this background cycle symbolizes a transformational path yang-yin-yang. Moreover, the complete background cycle mimics the *T'ai-Chi-T'u* in which the white area and the black area are RI-related; thus a complete background transformational cycle is represented by a Fundamental Series' P-0 and RI-0 form, called the "T'ai-chi Series," with the last member of the P-0 form as the pivotal note. The T'ai-chi Series serves as the "urlinie" in the composition. For example, a T'ai-chi Series based upon the Fundamental Series *FS410*: [057t239841e6] would be:

P-0	RI-0
C F G B \flat D E \flat A A \flat E C \sharp B	F \sharp C \sharp B G \sharp E E \flat A B \flat D F G C

Fig. 2-10. The T'ai-chi Series based upon the Fundamental Series *FS410*: [057t239841e6]

NOTES

¹Walter Kaufman, *Musical References in the Chinese Classics* (Detroit: Information Coordinators, Inc., 1976), 36.

²James Legge, *The Chinese Classics*, vol. 5, *The Ch'un Ts'ew with The Tso Cheun* (Taipei: SMC Publishing Inc., 1991), 580.

³Music Research Center of Ministry of Culture, *Zhong Guo Gu Dai Yue Lun Xuan Ji [Selected References of Ancient Chinese Music Theory]* (Beijing: Ren Min Yin Yue Chu Ban She, 1983), 35.

⁴*Ibid.*, 39.

⁵The Complete Diagram of Hexagram Vitality is shown in Chengxu Zhang, *Zhou Yi Xiang Li Zheng [The Symbolism, Theory, and Examples of the I-Ching]* (Tianjin: Tianjin Shi Gu Jie Shu Dian, 1989), 37.

⁶Xiaosheng Zhou, *Taiji System in Composing* (Guangzhou: Ke Xue Pu Ji Chu Ban She Guang Zhou Fen She, 1990), 64.

⁷The Shao Yung's Sequence, the so-called "Natural Order" is shown in Hellmut Wilhelm, *Change, Eight Lectures on the I Ching*, trans. Cary F. Baynes (Princeton: Princeton University Press, 1973), Figure 1. If we take the broken line for a "zero" and the unbroken line for a "1", the first number to the left for the corresponding lowest line of the hexagram and the number of the extreme right for the topmost line, and disregard all the "zeros" preceding "1", Shao Yung's Sequence corresponds point for point with the numerical sequence of the binary system in a reverse order: 111111, 111110, 111101, 111100, 111011, 111010, 111001, 111000, ... 1000, 111, 110, 101, 100, 11, 10, 1.

⁸See Lingsou Wu, *Yi Jing Tan Wei [Exploring I Ching]* (Beijing: Qi Xiang Chu Ban She, 1989), 57; Heng Gao, *Zhou Yi Za Lun [Miscellaneous Commentaries of the I Ching]* (Jinan: Qi Lu Shu She, 1979), 10; and also Commentaries of Hexagrams 11 and 12.

⁹The process of change contains "development" and "reversion." When things develops to its extreme, they reverse to their opposite. As what the Commentary of Hexagram 55 explains: "When the sun has reaches its meridian height, it begins to decline. When the moon has become full, it begins to wane. The [interaction of] heaven and earth is now vigorous and abundant, now dull and scanty, growing and diminishing according to the seasons." (JL, 259)

¹⁰The displacing of yin and yang principles is the vital step during the course of yin-yang transformation. As what the Great Treatise explains: "The strong and the weak displace each other, and produce the changes and transformations." (JL, 350)

CHAPTER 3

**I CHING COMPOSITIONAL SYSTEM (ICCS)
PART II: BACKGROUND STRUCTURE**

All-Intervallic Tetrachordal Subsets Within the Fundamental Series

Several properties of the Fundamental Series have already been examined in Chapter 2. These ninety-six Fundamental Series, however, have another common characteristic that establishes the foundation of the background and middleground structures. If a subset of set-class 4-Z15 (0146) or 4-Z29 (0137) is extracted from a Fundamental Series, notes of the same order positions in any other Fundamental Series will also form a member of set-class (0146) or (0137). For example, the second, third, fifth, and tenth members of *FS1P0* form a (0137) tetrachord <1,e,t,5>, notes of the same order position in *FS1I0* form a (0137) tetrachord <e,1,2,7>, in *FS2P0* a (0146) tetrachord <7,e,t,5>, in *FS2I0* a (0146) tetrachord <5,1,2,7>, in *FS3P0* a (0137) tetrachord <7,5,t,e>, in *FS3I0* a (0137) tetrachord <e,7,2,1>, in *FS4P0* a (0146) tetrachord <7,5,t,e>, and in *FS4I0* a (0146) tetrachord <5,7,2,1> (see Fig. 3-1). Notes of the same order positions in the other eighty-eight Fundamental

positions in the other eighty-eight Fundamental Series will also form members of either set-class (0137) or (0146), since every T-related or I-related form of a series will have the same subset structure. The same holds true in any other possible partitioning that creates a member of set-class (0137) or (0146) in any Fundamental Series.

PART_(1.2.4.2)(FS1P0 :{01e2t3 948576}) = <1,e,t,5>, set-class (0137)
 PART_(1.2.4.2)(FS1I0 :{0e1t29 384756}) = <e,1,2,7>, set-class (0137)
 PART_(1.2.4.2)(FS2P0 :{07e8t9 342516}) = <7,e,t,5>, set-class (0146)
 PART_(1.2.4.2)(FS2I0 :{051423 98t7e6}) = <5,1,2,7>, set-class (0146)
 PART_(1.2.4.2)(FS3P0 :{0158t3 942e76}) = <1,5,t,e>, set-class (0137)
 PART_(1.2.4.2)(FS3I0 :{0e7429 38t156}) = <e,7,2,1>, set-class (0137)
 PART_(1.2.4.2)(FS4P0 :{0752t9 348e16}) = <7,5,t,e>, set-class (0146)
 PART_(1.2.4.2)(FS4I0 :{057t23 9841e6}) = <5,7,2,1>, set-class (0146)

Fig. 3-1. Members of set classes (0137) and (0146) with the same partitioning (1.2.4.2) in Fundamental Series

Since members of set classes (0137) and (0146) are the all-interval tetrachords--their interval vector is 111111--the all-intervallic property of the Fundamental Series is reflected in its internal pitch structure. Therefore these two set classes are used to establish principal structural elements in the ICCS background structure. As has already been discussed in Chapter 2, the urlinie in the background contains the T'ai-chi Series which consists of a Fundamental Series' P-0 and RI-0 forms. This chapter will illustrate how the Note of Activation (the second member of the Fundamental Series) and Note of Stabilization (the eleventh member of the Fundamental Series) play important roles in establishing the background structure.

Four Background Structural Layers and The Notes of Vitality

An ICCS background structure is based on a musical representation of the yang-yin-yang transformational path and the procedure of the formation of myriad things, as explicated in the *Hsi-tz'u of I Ching*:

Therefore there is in the Changes the Supreme Ultimate, which generates the two Primal Forces. The two Primal Forces generate the Four Symbols which again generate the Eight Trigrams.

The Eight Trigrams [generate the Sixty-Four Hexagrams which] determine good fortune and misfortune, and from this determination are created the myriad things. (HG, 538; translation mine)

Corresponding with the procedure of the formation of myriad things, the ICCS background structure can be viewed in four layers. Given that the Two Primal Forces are represented by the yang note C and yin note F# which constitute the first layer, the Four Symbols would be represented by the yang note C, yin note F#, and the Notes of Yin-yang Interaction Eb and A--the resultant notes after yang and yin principles interact with each other--which constitute the second layer. These four pitch classes are arranged to form four (03) dyads, outlining a yang-yin-yang transformational path which consists of two RI-related halves as expressed in the *T'ai-Chi-T'u* (see Fig. 3-2).

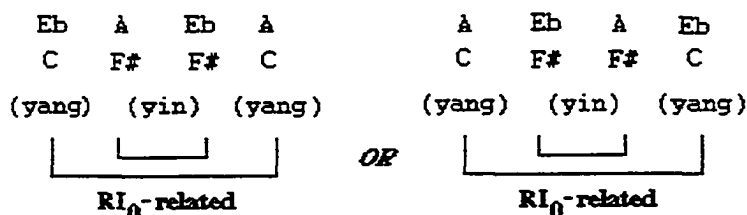


Fig. 3-2. Four pitch classes representing the Four Symbols
(C = yang note = 0)

In the ICCS, all-interval tetrachords are used to establish referential pitch-class sets in the background structure and therefore foster compositional associations between sections over large musical spans. Maintaining the RI₀-relation in the second layer, by adding four more new pitch classes to the four (03) dyads mentioned above to form four all-interval tetrachords of the same set-class, there arise eight different pitch classes to represent the Eight Trigrams in the third layer. Regarding the added notes, there are only two possibilities--<B,F> with <C#,G> and <E,Bb> with <G#,D>--which satisfy all the conditions (see Fig. 3-3).

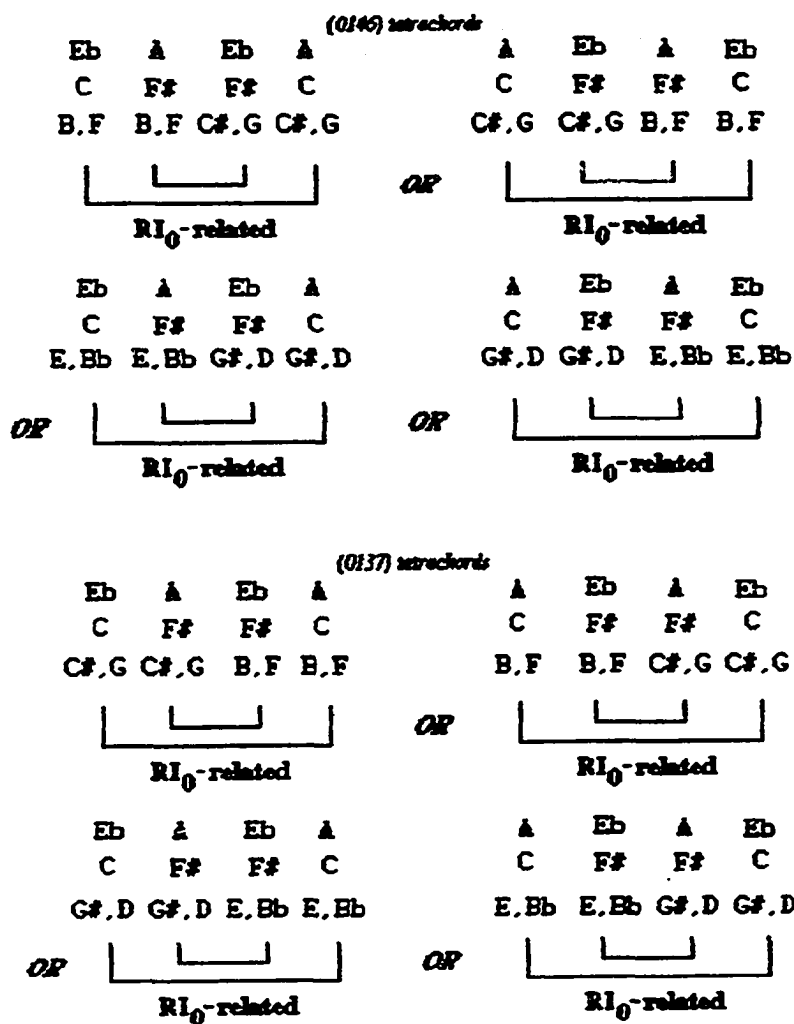


Fig. 3-3. Four all-interval tetrachords stating eight different pitch classes to represent the Eight Trigrams (C = yang note = 0)

Finally, in the fourth layer, the Eight Trigrams generate the myriad things resulting in the aggregate--all pitch classes in the Universe. The fourth layer contains a T'ai-chi Series that connects the yang note and yin note of the third layer and serves as the urline of the composition. In order to create an associational model and draw together elements separated in time, every member of the T'ai-chi Series is supported by the all-interval tetrachords of the same set-class established in the third layer, using the added notes in the third layer as common tones. Besides enhancing structural coherence, the use of the common tones in the background structure also symbolizes the flowing of vitality (*ch'i*) between the heaven and earth.¹ These common tones in the background structure are thus called "the Notes of Vitality."

By examining the internal structure of the Fundamental Series, one can find out that if its second member (Note of Activation) and eleventh member (Note of Stabilization) function as the Notes of Vitality, they can form an all-interval tetrachord of the same set-class with the first member (yang note) and sixth member (Note of Interaction), with the seventh member (Note of Interaction) and twelfth member (yin note), with the third and fourth members, as well as with the ninth and tenth members (see Fig. 3-4). Although Fig. 3-4 uses only *FS1P0* and *FS2P0* as examples, the same holds true in the remaining ninety-four Fundamental Series because of the all-intervallic tetrachordal subset property of the Fundamental Series as already been discussed at the beginning of this chapter.²

PART_(0,1,5,1)(FS1P0 :[01e2t3 948576]) = <0,1,3,7>, set-class (0137)
 PART_(1,5,1,2)(FS1P0 :[01e2t3 948576]) = <1,9,7,6>, set-class (0137)
 PART_(1,2,2,1)(FS1P0 :[01e2t3 948576]) = <1,e,2,7>, set-class (0137)
 PART_(1,8,2,1)(FS1P0 :[01e2t3 948576]) = <1,8,5,7>, set-class (0137)

PART_(0,1,5,1)(FS4I0 :[057t23 9841e6]) = <0,5,3,e>, set-class (0146)
 PART_(1,5,1,2)(FS4I0 :[057t23 9841e6]) = <5,9,e,6>, set-class (0146)
 PART_(1,2,2,1)(FS4I0 :[057t23 9841e6]) = <5,7,t,e>, set-class (0146)
 PART_(1,8,2,1)(FS4I0 :[057t23 9841e6]) = <5,4,1,e>, set-class (0146)

Fig. 3-4. All-interval tetrachords embedded within Fundamental Series with the second and eleventh members as invariant elements

Chang Tsai mentions the integration and disintegration of the vitality in his *Great Harmony*:

If material force [vitality] integrates, its visibility becomes effective and physical form appears. If material force does not integrate, its visibility is not effective and there is no physical form...

The integration and disintegration of material force is to the Great Vacuity as the freezing and melting of ice is to water...³

The integration and disintegration of the vitality can be musically represented in the background structure if the second and eleventh members of the Fundamental Series function as the Notes of Vitality. The dyad made up of the second and eleventh members cannot form an all-interval tetrachord with either the fifth or eighth member. When the dyad is disintegrated, however, the second member can form an all-interval tetrachord with the sixth, seventh, as well as eighth members, and the resultant set-class is same as that of the all-interval tetrachord formed by its parent dyad with other Fundamental Series

Fundamental Series members. The same holds true when the eleventh member is combined with the fifth, sixth, and seventh members. Using the Note of Interaction as the common elements, the interlocking of these two all-interval tetrachords symbolizes the meeting of the yang and yin principles at the midpoint of the Fundamental Series as expressed in the Tai-chi-t'u (see Fig. 3-5).

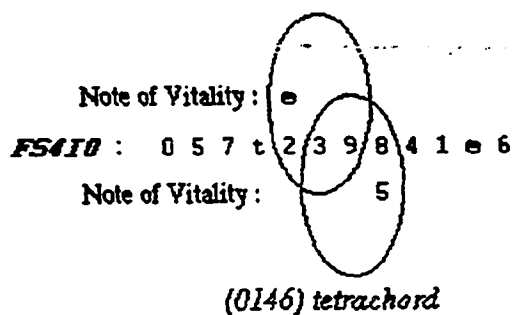


Fig. 3-5. Disintegration of the Notes of Vitality

Yin-yang Tetrachords

The use of the second and eleventh members of the Fundamental Series as the Notes of Vitality can establish a well-ordered background structure of greatest structural unity. Given C as the yang note, either the F-B pair or C#-G pair will be the second and eleventh member of the Fundamental Series.⁴ Let the F-B pair, the first and eleventh member of the Fundamental Series *FS4I0*, be the Notes of Vitality, the background structure with the T'ai-chi Series based on *FS4I0* will look as follows:

The image displays two musical systems, each consisting of two staves. The top staff in each system is labeled 'Notes of Yin-yang Interaction' and the bottom staff is labeled 'Notes of Vitality'. Both systems are based on the Fundamental Series *FS4I0*. The first system is labeled 'T'ai-chi Series: P-O(*FS4I0*)' and the second is labeled 'RI-O(*FS4I0*)'. Each system contains five tetrachords, each enclosed in a box and labeled '(0146)'. The notes are arranged in a sequence that demonstrates the relationship between the Fundamental Series and the T'ai-chi Series.

Ex. 3-1. The background structure with the T'ai-chi Series based on Fundamental Series *FS4I0* and its second and eleventh members as Notes of Vitality

In Example 3-1, the Tai-chi Series consists of *FS4I0*'s P-0 form and RI-0 form. There are six all-interval tetrachords formed upon P-0 and six upon RI-0 and all of them are called "Yin-yang tetrachord." Since the Fundamental Series represents a yin-yang transformational path, therefore these six yin-yang tetrachords constructed upon the Fundamental Series represent the six stages of the transformation, as the six hexagram lines to the Law of Change represent every event's six changing transitional phases. The first six yin-yang tetrachords upon the Fundamental Series' P-0 form symbolize six transformational stages from yang to yin, and the next six upon the Fundamental Series' RI-0 form symbolize six transformational stages from yin back to yang. Serving as the formal articulators, these twelve yin-yang tetrachords upon the T'ai-chi Series have the greatest structural weight and are strongly emphasized in the composition. Being widely separated in the music, each member of the T'ai-chi Series is also a member of the same yin-yang tetrachordal set-class and is thus strongly associated over large musical spans.

Not only *FS4I0* does, *FS1I0*, *FS2I0*, and *FS3I0* also have the F-B pair as the second or eleventh member, and *FS1P0*, *FS2P0*, *FS3P0*, and *FS4P0* all have the C#-G pair as the second or eleventh members. Therefore, one can establish eight possible background structures by using <F,B> or <C#,G> as Notes of Vitality (see Fig. 3-6).

T'ai-chi Series based on *FS1P0*
Yin-yang Tetrachord: set-class (0137)

3					9	3				9
1	1			1	1	5	5		5	5
7	7	7		7	7	e	e	e	e	e
<u>0 1 e 2 t 3 9 4 8 5 7 6 6 5 7 4 8 3 9 2 t 1 e 0</u>										

T'ai-chi Series based on *FS2P0*
Yin-yang Tetrachord: set-class (0146)

9					3	9				3
1	1			1	1	5	5		5	5
7	7	7		7	7	e	e	e	e	e
<u>0 7 e 8 t 9 3 4 2 5 1 6 6 e 7 t 8 9 3 2 4 1 5 0</u>										

T'ai-chi Series based on *FS3P0*
Yin-yang Tetrachord: set-class (0137)

3					9	3				9
1	1			1	1	5	5		5	5
7	7	7		7	7	e	e	e	e	e
<u>0 1 5 8 t 3 9 4 2 e 7 6 6 5 1 t 8 3 9 2 4 7 e 0</u>										

T'ai-chi Series based on *FS4P0*
Yin-yang Tetrachord: set-class (0146)

9					3	9				3
1	1			1	1	5	5		5	5
7	7	7		7	7	e	e	e	e	e
<u>0 7 5 2 t 9 3 4 8 e 1 6 6 e 1 4 8 9 3 2 t 7 5 0</u>										

Fig. 3-6. Eight possible background structures using <B,F> or <C#,G>
as the Notes of Vitality
(C = yang note = 0)

T'ai-chi Series based on FS1I0
Yin-yang Tetrachord: set-class (0137)

9	3 9	3
5 5	5 5	1 1
e e e	e e 7 7 7	7 7 7
<u>0 e 1 t 2 9 3 8 4 7 5 6 6 7 5 8 4 9 3 t 2 e 1 0</u>		

T'ai-chi Series based on FS2I0
Yin-yang Tetrachord: set-class (0146)

3	9 3	9
5 5	5 5	1 1
e e e	e e 7 7 7	7 7 7
<u>0 5 1 4 2 3 9 8 t 7 e 6 6 1 5 2 4 3 9 t 8 e 7 0</u>		

T'ai-chi Series based on FS3I0
Yin-yang Tetrachord: set-class (0137)

9	3 9	3
5 5	5 5	1 1
e e e	e e 7 7 7	7 7 7
<u>0 e 7 4 2 9 3 8 t 1 5 6 6 7 e 2 4 9 3 t 8 5 1 0</u>		

T'ai-chi Series based on FS4I0
Yin-yang Tetrachord: set-class (0146)

3	9 3	9
5 5	5 5	1 1
e e e	e e 7 7 7	7 7 7
<u>0 5 7 t 2 3 9 8 4 1 e 6 6 1 e 8 4 3 9 t 2 5 7 0</u>		

Fig. 3-6--Continued

Given C as the yang note, sometimes the F-B pair or the C#-G pair are the third and tenth members of the Fundamental Series. Under this circumstance, the use of the F-B pair or C#-G pair as the Notes of Vitality can never establish a well-defined background structure (see Ex. 3-2).

The image shows three staves of music. The top staff is labeled 'Notes of Yin-yang Interaction' and contains a sequence of notes with question marks above them. The middle staff is labeled 'Notes of Vitality' and contains a sequence of notes. The bottom staff is labeled 'FS4I0' and contains a sequence of notes with interval labels '(0137)' below them. The notes in the bottom staff are: C, F, B, C#, G, Bb, C, F, B, C#, G, Bb, C.

Ex. 3-2. The questionable background structure using Fundamental Series *FS4I0*'s third and tenth members as Notes of Vitality

On the other hand, given C as the yang note, the use of dyads <E, Bb> and <G#, D> also makes the resultant background structure untenable, no matter whether they are the fourth and ninth members or fifth and tenth members of the Fundamental Series.⁵ Take the Fundamental Series *FS4I0* as example. Given that the fifth member D and tenth member G# are treated as the Notes of Vitality, they can form an all-interval set-class (0137) with the yang note C and Note of Interaction Eb, with the yin note F# and another Note of Interaction A, with the third and fourth members G and Bb, and with the ninth and tenth members E and C#. They, however, fail to form the same set-class with the second member F or the eleventh member B. Although the second member F can form the (0137) with the Notes of

Interaction Eb and A as well as Note of Vitality D, and the eleventh member B can form the same set-class with the Notes of Interaction Eb and A as well as Note of Vitality G#, the resultant structure is still difficult to substantiate (see Ex. 3-3).

Ex. 3-3. The ambiguous background structure using Fundamental Series FS4I0's fifth and eighth members as the Notes of Vitality

As illustrated in Example 3-4, the structure using Fundamental Series' fourth and ninth members as Notes of Vitality also fails to stand up to scrutiny.

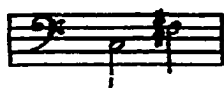
Ex. 3-4. The ambiguous background structure using Fundamental Series FS4I0's fourth and ninth members as the Notes of Vitality

Therefore, it is safe to conclude that using the second and eleventh members of the Fundamental Series as the Notes of Vitality is the only choice to establish a well-ordered and unambiguous

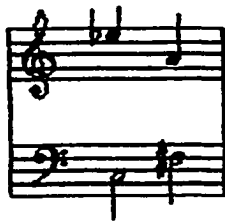
background structure. The four background structural layers based on the Fundamental Series *FS410* are illustrated in Ex. 3-5.



The Supreme Ultimate
generates
the Two Primal Forces



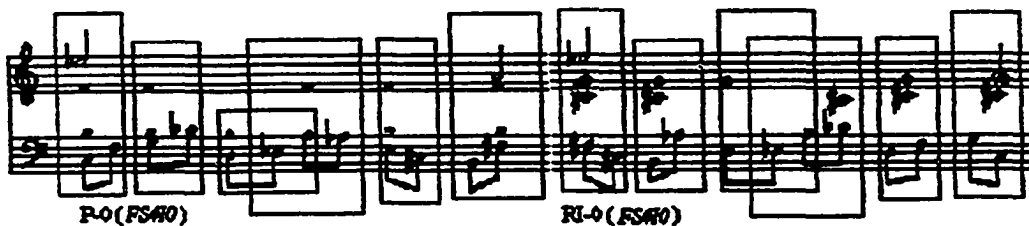
The Two Primal Forces
generate
The Four Symbols



The Four Symbols
generate
the Eight Trigrams
(eight different pitch-classes)



4-2 15 4-2 15 4-2 15 4-2 15



The Eight Trigrams generate the Sixty-four Hexagrams
that represent the myriad things

Ex. 3-5. Four background structural layers based on Fundamental Series *FS410* corresponding with the procedure of the formation of myriad things

Notes

¹Chang Tsai (1020-1077) explained the "flowing of vitality" in his *Great Harmony* :

As the Great Vacuity, material force [vitality] is extensive and vague. Yet it ascends and descends and moves in all ways without ever ceasing. This is what is called in the *Book of Changes* "fusion and intermingling" and in the *Chuang Tze* "fleeting forces moving in all directions while all living beings blow against one another with their breath."

See Wing-tsit Chan, *A Source Book in Chinese Philosophy* (Princeton, Princeton University Press, 1973), 503.

²For more information of this matter see pp. 37-38.

³Chan, *A Source Book*, 503.

⁴Let pitch-class C be the yang note. If the F-B pair is the second and eleventh member of the Fundamental Series, C#-G must be the third and tenth member of the same series and vice versa. In addition, if the F-B pair is the second and eleventh member in the Fundamental Series' P-0 form, C#-G must be the second and eleventh member in the same Fundamental Series' RI-0 form and vice versa. For more explanation of this matter see pp. 27-29 above.

⁵Let pitch-class C be the yang note. $\langle 4, 9 \rangle$ and $\langle 5, 1 \rangle$ are the only two possible ordering positions of the dyads $\langle E, Bb \rangle$ and $\langle G\#, D \rangle$ in the Fundamental Series.

CHAPTER 4

I CHING COMPOSITIONAL SYSTEM (ICCS)
PART III: MIDDLEGROUND STRUCTUREFormations of the Yin-yang Series and the Middleground Structure

In Schenker's theory of tonal music, the foreground strata exhibit multifarious musical elaborations transformed from the ultra-skeletal *Ursatz* through the process of *auskomponierung*. Each composition expresses a developmental procedure that connects the simple *Ursatz* with the highly embellished foreground fabrics. Although every composition is derived from the same nucleus (the unfolding of the Chord of Nature), the uniqueness of the middleground and foreground structures gives the composition its individuality. In terms of developmental procedure, the same is true in the ICCS.

Chapter 3 has already shown how the Fundamental Series serves as the basis of the background structure. This chapter will illustrate how another combinatorial series governs the middleground

layers and helps to bridge the Fundamental Series and middleground structure. In the ICCS, the H1 and H2 of the middleground series must be either T_n^- , RT_n^- , I_n^- , or RI_n^- -related. In addition, the pre-determined yin and yang musical cells, serving as series subsets, are embedded within this series. Since the middleground series is built up from the yin and yang subsets, this series is thus called the "Yin-yang Series."

Consider the middleground level in *Under the Red Eaves*. Fig. 4-1 shows that the H1 and H2 of the middleground Yin-yang Series is RT_6^- -related and contains two types of discrete trichordal subsets: 3-3 (014) and 3-9 (027); and two types of discrete tetrachordal subsets: 4-9 (0167) and 4-23 (0257). As we will see in Chapter 6, set classes 3-3 (014) and 4-9 (0167) function in the foreground as the yang pitch elements whereas 3-9 (027) and 4-23 (0257) as the yin.

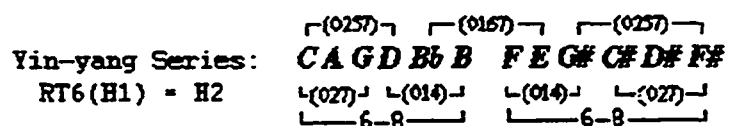


Fig. 4-1. The Yin-yang Series and its subset structure in *Under the Red Eaves*

All compositions in the ICCS have three features in common: they all have sixty-four sections, although the number of movements is variable; each section symbolizes one hexagram and the section ordering corresponds with the *I Ching* hexagram orderly sequence, e.g., Section 1 symbolizes Hexagram 1, Section 2 symbolizes Hexagram 2, Section 3 symbolizes Hexagram 3, and so on; and each section contains six middleground structural notes that are determined by the Yin-yang Series and symbol of each section's corresponding hexagram.

Since H1 and H2 of the Yin-yang Series are either T_n^- , RT_n^- , I_n^- or RI_n^- -related, each member of H1 must have its related counterpart in H2 (see Fig. 4-2). In addition, to determine the middleground structural notes, we consider the bottom line of the hexagram as the corresponding line to the first note of H1 of the Yin-yang Series, the second line to the second note, the third line to the third note, and so on. The status of each line of the hexagram determines whether this line's corresponding note in H1 or this note's counterpart in H2 will be selected as the middleground structural note. If the bottom line of the hexagram is an unbroken line we select the first note of H1 as the middleground structural note; if it is a broken line we select this note's counterpart in H2. Similarly, if the second line is unbroken we select the second note of H1 as structural note; if it is broken we select this note's counterpart in H2. Since each hexagram constitutes six lines, we therefore obtain in total of six middleground structural notes in each section.

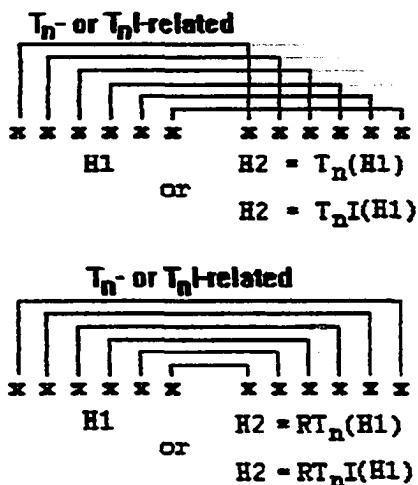
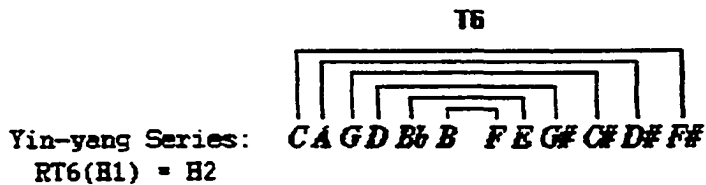


Fig. 4-2. The symmetrical placements of members of the Yin-yang Series

For example, in *Under the Red Eaves*, the six middleground structural notes in Section 3, symbolizing Hexagram 3, are C, D#, C#, G#, Bb, and F (see Fig. 4-3).



Section 3



top line	broken	F in H2
fifth line	unbroken	Bb in H1
fourth line	broken	G# in H2
third line	broken	C# in H2
second line	broken	D# in H2
bottom line	unbroken	C in H1

Fig. 4-3. Six middleground structural notes in Section 3 of *Under the Red Eaves*

Ordering of the Middleground Structural Notes

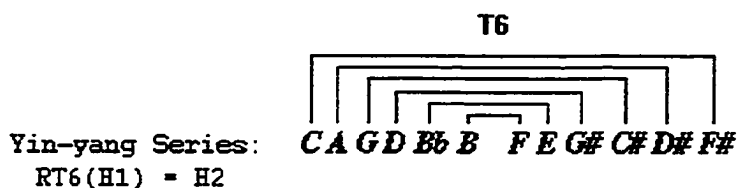
In the ICCS, the hexagram relations also govern the order of appearance of the middleground structural notes. To determine the middleground structural note ordering by performing hexagram-relation operations, the structural note ordering should therefore be first transformed into the "hexagram line ordering," an ordering of hexagram lines in accordance with their corresponding middleground structural notes, expressed by bold and underlined arabic numerals within square brackets.

For example, the ordering of the six middleground structural notes in Section 3 of *Under the Red Eaves* is C-G#-D#-F-Bb-C# and it is notated as [**1**,**4**,**2**,**6**,**5**,**3**]. The first structural note C corresponds with Hexagram 3's first [bottom] line, second note G# with the fourth line, third note D# with the second line, and so forth (cf. Fig. 4-3).

In a hexagram class, the structural note ordering of the primary hexagram--the first hexagram of this hexagram class to appear in the composition--can be freely arranged. Once the composer predetermines the structural note ordering of the primary-hexagram section, the structural note orderings in the remaining hexagrams of the same hexagram class are naturally derived from their hexagram relations with the primary hexagram.

In Hexagram Class 2, Hexagram 3 is the primary hexagram, Hexagrams 3 and 4 are R-related, Hexagrams 3 and 50 are I-related, Hexagrams 3 and 40 are C-related, Hexagrams 3 and 49 are RI-related, Hexagrams 3 and 39 are RC-related, Hexagram 3 and 37 are IC-related,

and Hexagrams 3 and 38 are RIC-related. Since the hexagram line ordering in Hexagram 3 of *Under the Red Eaves* is [1,4,2,6,5,3], the hexagram line ordering in the R-related Hexagram 4 will therefore be [3,5,6,2,4,1] (retrograde of [1,4,2,6,5,3]). Considering the status of each line of Hexagram 4, 3 corresponds with the C# in H2 of the Yin-yang Series since the third line of Hexagram 4 is broken, 5 corresponds with the E in H2 since the fifth line of Hexagram 4 is broken, 6 corresponds with the B in H1 since the top line is unbroken, 2 corresponds with the A in H1 since the second line is unbroken, 4 with the G# in H2 since the fourth line is broken, and 1 with the F# in H2 since the bottom is broken (see Fig. 4-4). The hexagram line ordering [3,5,6,2,4,1] in turn determines that the middleground structural note ordering is C#-E-B-A-G#-F# in Hexagram 4.



Section 4



top line-- <u>6</u>	unbroken	B in H1
fifth line-- <u>5</u>	broken	E in H2
fourth line-- <u>4</u>	broken	G# in H2
third line-- <u>3</u>	broken	C# in H2
second line-- <u>2</u>	unbroken	A in H1
bottom line-- <u>1</u>	broken	F# in H2

[3, 5, 6, 2, 4, 1] = C#-E-B-A-G#-F#

Fig. 4-4. Six middleground structural notes and their ordering in Section 4 of *Under the Red Eaves*

Similarly, given the hexagram line ordering of Hexagram 3 is $[1, 4, 2, 6, 5, 3]$, the hexagram line ordering in the I-related Hexagram 50 will be $[6, 3, 5, 1, 2, 4]$ (1 is inverted to 6, 4 is inverted to 3, 2 to 5, 6 to 1, 5 to 2, and 3 to 4), in the RI-related Hexagram 49 will be $[4, 2, 1, 5, 3, 6]$ (the retrograde of $[6, 3, 5, 1, 2, 4]$), in the C-related Hexagram 40 will be $[6, 5, 3, 1, 4, 2]$ (positions of original $[1, 4, 2]$ and $[6, 5, 3]$ in Hexagram 3 are interchanged), in the RC-related Hexagram 39 will be $[2, 4, 1, 3, 5, 6]$, in the IC-related Hexagram 37 will be $[1, 2, 4, 6, 3, 5]$ (the inversion of $[6, 3, 5, 1, 2, 4]$), and in the RIC-related Hexagram 38 will be $[5, 3, 6, 4, 2, 1]$ (retrograde of $[1, 2, 4, 6, 3, 5]$).

Under the circumstance that two hexagrams have multi-relations, there may be more than one interpretation of the hexagram line ordering. Fig. 4-5 shows that Hexagram 31 and Hexagram 41 are both I- and C-related. If the hexagram line ordering in Hexagram 31 is $[1, 6, 3, 2, 4, 5]$, that of Hexagram 41 can be interpreted as $[6, 1, 4, 5, 3, 2]$ (I-relation) or $[2, 4, 5, 1, 6, 3]$ (C-relation).

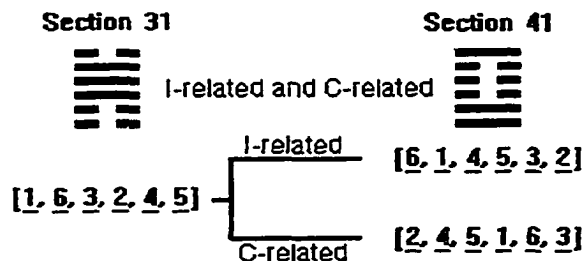


Fig. 4-5. Multi-relations between Hexagrams 31 and 41 and two possible interpretations of the hexagram line ordering of Hexagram 41

In Example 4-1, all the midground structural notes of *Under the Red Eaves* are shown according to their structural note ordering in each section.

The image displays a musical score for the piece "Under the Red Eaves". The score is presented in a single system with 12 staves, each containing a sequence of measures numbered 1 through 64. Above the notes, various structural annotations are present, including numbers (e.g., 1-6, 6-8, 6-14, 6-20, 6-32, 6-34, 6-37, 6-40, 6-44, 6-48, 6-54, 6-58, 6-62, 6-64) and letters (L, R, I, C). A tempo marking "1/4" is located above measure 3. A rehearsal mark "L.R.I.C." is placed below measure 12. The notation includes treble clefs, stems, and beams connecting notes across measures. The overall structure is organized into sections, with some measures grouped by brackets or dashed lines.

Example 4-1. Midground structure of *Under the Red Eaves*

Bridging the T'ai-chi Series with the Middleground Structure

The ICCS middleground is constructed to compose out the background structure. The essential background element that the middleground unfolds is the Yin-yang Tetrachord. Twelve members of the Yin-yang Tetrachordal set-classes, 4-Z15 (0146) or 4-Z29 (0137), are formed by members of the T'ai-chi Series and linearly presented in the middleground (see Example 4-2).

Yin-yang Tetrachord <B,C,D#,F>

Note of Yin-yang Interaction

Notes of Vitality

The first two notes of the T'ai-Chi Series based on FSAIO

Middleground Structural Note Orderings:

C-A-B-B \flat -D-G F-E-F \sharp -D \sharp -C \sharp -G \sharp C-G \sharp -D \sharp -F-B \flat -C \sharp C \sharp -E-B-A-G \sharp -F \sharp

Section 1 Section 2 Section 3 Section 4

Ex. 4-2. Linear presentation of the Yin-yang Tetrachord <B,C,D#,F> in the first four sections of *Under the Red Eaves*

In ICCS, one of the major tasks of the composer before working out the foreground details is to connect the background T'ai-Chi Series with the middleground structure. This is achieved when the composer selects the linear ordering of the Yin-yang Tetrachord. While this ordering is freely determined, the arrangement of the members Ta'i-Chi Series in the middleground must strictly follow the

original note ordering within the background Fundamental Series' P-0 and RI-0 forms. For example, in the first four sections of *Under the Red Eaves*, although the ordering of Yin-yang Tetrachord <B,C,Eb,F>'s members can be freely arranged, the C must be placed before the F since they are members of the T'ai-Chi Series. In addition, each section of the composition may not contain more than one member of each linear Yin-yang Tetrachord. Therefore, if members of Yin-yang Tetrachord <B,C,Eb,F> are to be allocated in the first four sections of the *Under the Red Eaves*, there will be two possible arrangements as shown in Fig. 4-6.

Section 1	Section 2	Section 3	Section 4
1. <u>C</u> -A-B-Bb-D-G	F -E-F#-D#-C#-G#	C-G#- <u>D#</u> -F-Bb-C#	C#-E-E-A-G#-F#
2. <u>C</u> -A-B-Bb-D-G	F-E-F#- <u>D#</u> -C#-G#	C-G#-D#- F -Bb-C#	C#-E-E-A-G#-F#

(Underlined pitch-class denotes selected Yin-yang Tetrachord member)
 (Bold pitch-class denotes selected T'ai-Chi Series member)

Fig. 4-6. Two possible arrangements of Yin-yang Tetrachord <B,C,Eb,F>'s members allocated in the first four sections of *Under the Red Eaves*

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Any members of the Yin-yang Tetrachords may be associated over a span of several sections by a variety of contextual means, including register, timbre, rhythmic value, dynamics, and articulation. Associated members may be separated by other elements or retained over a few consecutive sections. For example, association draws together the G of Section 5 and the G of Section 11 separated by the B of Section 6, F of Section 7, and the Bb's of Sections 8, 9, and 10; whereas the G of Section 56 is retained until Section 62 (cf. Ex. 4-1).

In the ICCS, notes that are both members of the Yin-yang Tetrachords and T'ai-Chi Series in the middleground must be supported in the foreground by the Yin-yang Tetrachords to which these notes belong. A consistent use of referential harmonies, the Yin-yang Tetrachords, strongly associates the members of T'ai-Chi Series separated over a larger musical spans and establishes a consistent pitch-defined basis for determining relative structural weight (see Ex. 4-3).

Yin-yang Tetrachord <0-5-3-e>

Section

1 2 3 4
 <e,0,3,5> <e,0,3,5>

♪ = Yin-yang Tetrachord member
 ♫ = T'ai-Chi Series member and Yin-yang Tetrachord member

Six middleground structural notes

in Section 1: 0-9-e-t-2-7
 in Section 2: 7-4-6-3-1-8
 in Section 3: 0-8-3-5-t-1
 in Section 4: 1-4-e-9-8-6

Ex. 4-3. Linear and vertical presentations of the Yin-yang Tetrachord <e,0,3,5> in the first four sections of *Under the Red Eaves*

CHAPTER 5

**I CHING COMPOSITIONAL SYSTEM (ICCS)
PART IV: FOREGROUND STRUCTURE**

To illustrate the compositional procedure of the ICCS is not complicated. All ICCS compositions contain sixty-four sections, although the number of movements can be varied. The composer first determines the attributes of the yang and yin musical elements reflected by their pitch structures and instrumentations, then selects the background fundamental series, designs the middleground yin-yang series within which the yang and yin elements are embedded, constructs the middleground structure and bridges it with the background fundamental series, and finally develops the yang and yin elements according to their interplay revealed by the Judgments, Commentaries, and Orderly Sequence of the sixty-four hexagrams while giving middleground structural notes more structural weight. This chapter discusses the last step of the compositional procedure: musical interpretation of the Judgments, Commentaries, and Orderly Sequence of the sixty-four hexagrams.

Musical Interpretation of the Hexagrams

The chapter "Orderly Sequence" in *I Ching* points out the reason why the sixty-four hexagrams are arranged in such an order. If this order, interpreted by many sinologists as the path of yin-yang transformation, is represented by an ICCS composition, the resultant form thus bears strong resemblance to the classical sonata form (see Figure 6-1).

EXPOSITION

Hexagram 1 - Hexagram 2	Introducing element A and element B;
Hexagram 3 - Hexagram 11	Initial Interaction of A and B;
Hexagram 12 - Hexagram 24	Second Interaction of A and B;

DEVELOPMENT

Hexagram 25 - Hexagram 38	Introducing element C, a completely new element;
Hexagram 39 - Hexagram 44	Introducing element D, a completely new element;
Hexagram 45 - Hexagram 52	Interaction of all four elements A, B, C, and D;

RECAPITULATION

Hexagram 53 - Hexagram 59	Restatement of A, B, C, and D, and their further interaction;
Hexagram 60 - Hexagram 62	Another restatement of A, B, C, D, and their further interaction;

CODA

Hexagram 63	Restatement of A and B;
Hexagram 64	Restatement of C and D.

Fig. 5-1. Formal structure of an ICCS composition

The following explains the nucleus of the I Ching compositional System--the musical representation of the quality and ordering of the hexagrams from one through sixty-four.

Hexagram 1, "Creative"

Judgment: Spring, Summer, Autumn, Winter (JFJ, 101).

"Creative" represents what is great and originating, penetrating, advantageous, correct and firm... (RVO, 47)

Commentary: Vast is the 'great and originating power indicated by

"Creative"! All things owe to it their beginning--it contains all the meaning belonging to heaven... (RVO, 47)

Sequence: When there were heaven and earth, then afterwards all things were produced... (JL, 433)

ICCS: Spring, Summer, Autumn, and Winter represent Nature and all beings. "Creative", representing heaven in the Orderly Sequence, is the primal cause of all beings. Therefore, Section 1 of the composition is the introduction of the yang element which serves as the basic material of the composition.

Under the Red Eaves: (mm. 1-20)

All trichordal set classes which contain interval-class 1 are the yang elements of the piece. In addition, set classes 3-3 (014) and 4-9 (0167) are primordial yang elements and thus are the subsets embedded within the middleground yin-yang series. In terms of instrumentation, "Creative" represents metal percussion, brass, and strings.

The fundamental sonority, the Yin-yang Tetrachord, is introduced as early as the pitched instruments first enter. The doublebass's C in measure 4 is the first member of the fundamental series and is harmonized by the yin-yang tetrachord <B,C,Eb,F> played by the low brass instruments in measure 5. Fig. 5-2 shows that Section 1 is virtually saturated with occurrences of set classes 3-2 (013) and 6-8 (023457) which is the hexachord of the yin-yang series. Timbre, registers, and instrumentation play an important role in the pitch-set segmentation. The cello and bass, for example, state the <C-B-D> 3-2 (013) set-class in measures 4-8; while violin and viola state another member of 3-2, <A-G-Bb>, in harmonics in measures 7-8. <C-B-D> and <A-G-Bb> form a member of set-class 6-8. In measure 9, in the middle register, violin II and viola introduce two new members of 3-2 set-class <F,F#,Ab> and <C#,Eb,E> respectively. <F,F#,Ab> and <C#,Eb,E> form another member of set-class 6-8 which, combining with the previous 6-8 member played by cello and bass, complete the aggregate.

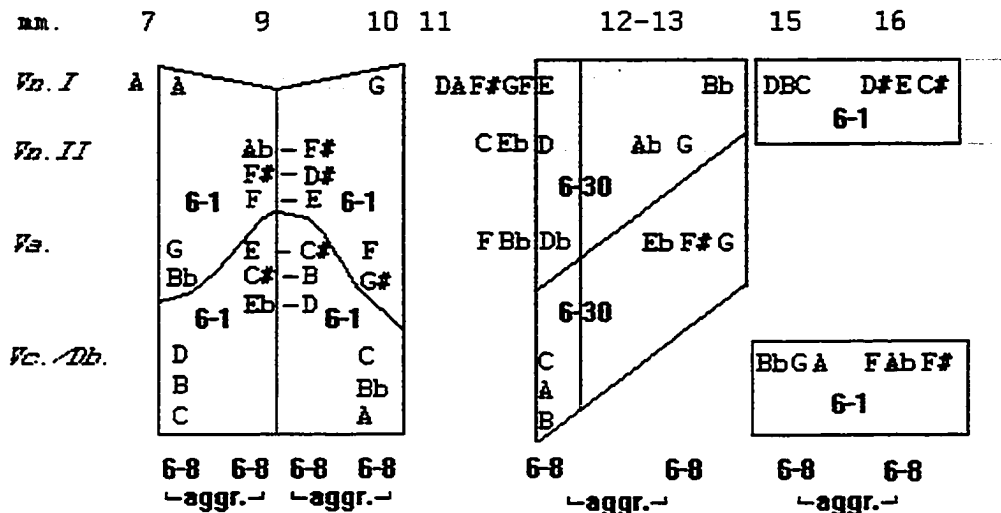


Fig. 5-2. Pitch structure of mm. 4-16, *Under the Red Eaves*

A set-class can be most strongly represented by a "set-class matrix" in which members of this set-class are stated both linearly and vertically. For example, all three parts in Violin II and Viola state members of set-class 3-2 (013) linearly and vertically in measure 9, and in the same manner trumpets and trombones state members of another yang tetrachordal set-class 4-18 (0147) in measure 14 (see Fig. 5-3).

m.7:	Violin II	Viola	m. 14:	Trumpet and Trombone
	8 5 6	4 3 1		t e 5 2
	6 4 3	1 2 e		1 8 2 5
	5 7 4	3 0 2		4 5 e 8
				9 0 6 1
	(013 matrix)	(013 matrix)		(0147 matrix)

Fig. 5-3. Set-class matrix in m. 7 and m. 14, *Under the Red Eaves*

Hexagram 2, "Receptive"

Judgment: "Receptive" represents what is great and originating, penetrating, advantageous, correct and having the firmness of a mare... (RVQ, 51)

Commentary: Complete is the 'great and originating (capacity)' indicated by "Receptive"! All things owe to it their birth;--it receives obediently the influences of Heavens. "Receptive", in its largeness, supports and contains all things. Its excellent capacity matches the unlimited power of "Creative"... (RVQ, 51)

Sequence: When there were heaven and earth, then afterwards all things were produced... (JL, 433)

ICCS: In the Commentary, the word "complete" is crucial to understand this Hexagram. "Receptive" is another primordial force to produce all beings and its excellent capacity matches the unlimited power of "Creative". Although "Creative" represents the origin of all beings, Creation will not be "completed" until "Creative" interacts with "Receptive". Section 2 of the composition thus introduces the yin element that is another basic element of the piece.

Under the Red Eaves: (mm. 21-32)

All trichordal set classes which contain no interval-class 1 are selected as yin elements. In addition, set classes 3-7 (025) and 4-23 (0257) are primordial yin elements and thus are subsets embedded within the middleground yin-yang series. In terms of instrumentation, "Receptive" is

represented by wooden percussion and woodwinds. In measure 21, the piccolo F is the second member of the fundamental series and is thus accompanied by the Yin-yang Tetrachord that is also played by the same low brass instruments as in measure 5 in order to bring strong reminiscence. Set-class 4-13 (0136), formed by the tenth, eleventh, twelfth, and first members of the yin-yang series, is also an important yin element. Example 5-1 shows that the middleground structure of measures 21-32 is in fact based on many members of set-class 4-13 stated vertically or linearly, while the bass line is based on set-class 4-23 (0257).

The diagram shows a musical score for measures 21-32. The top staff is labeled 'Pic.' and the bottom staff is labeled 'Cls. Bsns.'. Above the Pic. staff, two boxes labeled [0136] are positioned over measures 21-24 and 27-30. Below the Bsns. staff, a box labeled [0257] is positioned under measures 21-32. Vertical ovals connect notes between the Pic. and Bsns. staves, with labels (0136) placed between them. Measure numbers 21, 23, 24, 27, 29, 31, and 32 are indicated above the Pic. staff.

Ex. 5-1. Middleground structure in mm. 21-32, *Under the Red Eaves*

Hexagram 3, "Initial Difficulty"

Judgment: Difficulty at the beginning works supreme success,
furthering through perseverance... (W-B, 399)

Commentary: The firm [yang] and the yielding [yin] unite for the
first time, and the birth is difficult. (W-B, 399)

Sequence: After heaven [yang] and earth [yin] have come
into existence, individual beings develop. (W-B, 398)
"Initial Difficulty" denotes the birth of all being.

ICCS: The yang and yin elements begin interacting. As Richard
Wilhelm points out, "difficulty" represents the initial
birth like the grass pushing its tips out of the earth.

Under the Red Eaves: (mm. 33-42)

The initial interaction of yang and yin is represented
musically by a linear presentation of interlocking yin and
yang set-class members. Yin set classes 4-23 (0257) and
yang set-class 4-18 (0147) are interlocked in Oboes 1 and 2,
measures 36-41 (See Fig. 5-4). Underneath these oboe lines,
C is being prolonged in the strings by a chain of members of
yang set-class 3-2 (013).

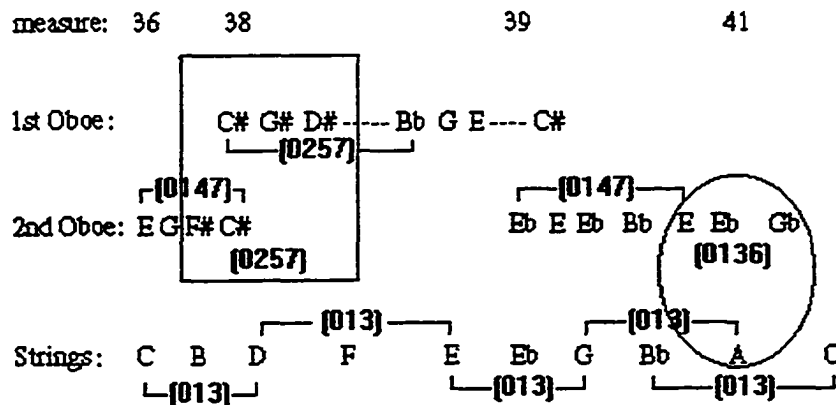


Fig. 5-4. Interlocking of the yin and yang elements

Hexagram 4, "Obtuseness"

Sequence: "After Initial Difficulty, things have just been born, they are always wrapped at birth in obtuseness..." (W-B, 406)

ICCS: The obtuseness in the early stage of interaction is represented by "undifferentiation" of yin and yang elements. Members of yin and yang set classes in this section share as many common notes as possible.

Under the Red Eaves: (mm. 43-47)

The dyad <F#,C#> in cello and bass combines; with <G,Bb> and <A,C> in viola (m.44) to form two members of yang set-class 4-18 (0147); with <A,C> and <G,C> in violin I (m.45) to form a member of yang set classes 4-18 (0147) and 4-9 (0157); with <E,B> in violin II (m.46) to form a member of yin set-class 4-23 (0257); and finally with <E,G> and <C,Eb> in viola (m. 46) to form two members of yin set-class 4-13 (0136).

:

Hexagram 5, "Waiting"

Sequence: "When things are still small, one must not leave them without nourishment..." (W-B, 410)

ICCS: Nourishment needs waiting. All elements in this section thus stop developing.

Under the Red Eaves: (mm. 48-56)

This section contains mainly six middleground structural notes. G#, A, and C are sustained in cello and bass while F, G, and Bb serve as the principal notes in the flute melody. The sustained F, A#, and B in the clarinets form the yin-yang tetrachord with the most prominent note G in the flute melody.

Hexagram 6, "Conflict"

Judgment: "...a cautious halt halfway brings good fortune..." (W-B, 416)

Sequence: There should be conflict after nourishment.

ICCS: There are no common tones shared by yang and yin elements.

Under the Red Eaves: (mm. 57-63)

Yang set-class 3-3 (014) prevails in the violin I part in the high register while yin set classes 3-7 (025) and 3-11 (037) prevail in the viola part in the low register.

Hexagram 7, "Army"

Commentary: "The Army means masses...The man who can effect discipline through the masses may attain mastery of the world. The strong one is central and finds response..."
(W-B, 421)

Sequence: "When there is conflict, the masses are sure to rise up..." (W-B, 421)

ICCS: Yang and yin elements are mixed, with one structurally dominating another.

Under the Red Eaves: (mm. 64-70)

The 3rd flute's C# in measure 64, 2nd oboe's F# in measure 65, and G# in 67, are three durationally accented notes that together form a yin trichord (027) over a larger musical span. Each note in this large-scale statement of the yin motive at the same time combines with other notes to form small-scale statements of yang motives. In measure 64, the 3rd flute's C# forms two statements of yang trichord (015) with the first oboe's <Ab-C> and <F#-D>; in measure 65, 2nd oboe's F# forms a yang tetrachord (0123) with the piccolo's <F-G-Ab-G>; and in measure 67, the 2nd oboe's G# forms yang trichords (013) with the 1st flute's <A-F#>, <F#-F>, <G-Bb>, and finally <A-B> in measure 68.

Hexagram 8, "Union"

Commentary: ... "Holding Together" ["Union"] means mutual help.

Those below are devoted and obedient. (W-B, 426)

Sequence: Among the masses there must be some bond of union.

ICCS: To represent a high degree of union, two elements together govern the middleground structure.

Under the Red Eaves: (mm. 71-76)

Six middleground structural notes are grouped into two trichords (027): <Bb-Eb-F> stated in the high register by the piccolo and 1st oboe in measures 71-74, and <G#-F#-C#> in the low register stated by the 1st bassoon and bass clarinet in measures 74-76.

Hexagram 9, "Small Accumulation"

Commentary: The yielding [yin element] obtains the decisive place, and those above and those below correspond with it... (W-B, 431).

Sequence: Union must be subject to accumulation... (JL, 431)

ICCS: Only the yin element governs the middleground structure.

Under the Red Eaves: (mm. 77-82)

Six middleground structural notes are grouped into two yin trichords (024): <C-Bb-Ab> stated by piccolo in the high register and <A-G-B> by cello in the low register. In addition, two corresponding notes in each trichord (C and A, Bb and G, Ab and B) form three (03) dyads which are also subsets of three (0247) tetrachordal verticalities (see Fig. 5-5).

(024)	C	Bb	Ab
	G	F	Eb
	F	Eb	Db
(024)	A	G	B

Fig. 5-5. Three yin (0247) verticalities with six middleground structural notes constituting two outer yin (024) trichords

Hexagram 10, "Treading" ("Politeness")

Judgment: "One treading upon the tail of the tiger, which does not bite him..." (RVO, 87)

Commentary: "Treading" denotes that Yin treads on Yang.

Sequence: When beings are subjected to restraint, the mores arise; hence there follows the hexagram of "politeness."

ICCS: Hexagram 10 stands for treading and politeness. The words "treading" and "politeness" seem to contradict each other. However, according to what Judgment shows, if one treads on other person who does not therefore take revenge afterwards, this is the sign of politeness. In the ICCS, the yin element governs the yang.

Under the Red Eaves: (mm. 83-87)

Section 10 has the same structure as Section 9. Six middleground structural notes are grouped into two yin (024) trichords: <D-Bb-C> stated by piccolo in the high register and <B-C#-A> by cello in the low register. In addition, two

corresponding notes in each trichord (D and B, Bb and C#, C and A) form three (03) dyads that are also subsets of three (0247) tetrachordal verticalities (Fig. 5-6).

(024)	D	Bb	C
	A	F	G
	G	Eb	F
(024)	B	C#	A

Fig. 5-6. Three yin (0247) verticalities with six middleground structural notes constituting two outer yin (024) trichords

Hexagram 11, "Peace"

Image: "Heaven [Yang] and earth [yin] unite..." (W-B, 442)

Sequence: "Good conduct, then contentment; thus calm prevails..."

Peace means union, interrelation." (W-B, 440)

ICCS: Unification of yin and yang elements.

Under the Red Eaves: (mm. 88-90)

Six middleground structural notes are grouped into one yang (015) trichord <E,G#,A> prominently presented by the strings and one yin (027) trichord <C,F,G> sustained by flutes and piccolo. At the same time, these two trichords are combined by means of Boulez's "Multiplication" technique. The resultant septachord <D#,E,F#,G#,A,A#,B> is strongly stressed by the brass section.¹

Hexagram 12, "Stagnation"

Image: "Heaven [Yang] and earth [yin] do not unite..." (W-B, 448)

Sequence: "Things cannot be forever united; hence there follows the hexagram of Standstill [Stagnation]." (W-B, 446)

Miscellaneous Notes: "The hexagrams of "Stagnation" and "Peace" are opposed to each other." (W-B, 447)

ICCS: Wilhelm pointed out that when heaven and earth are disunited, life in nature stagnates (W-B, 447). Yang and yin musical ideas are clearly separated.

Under the Red Eaves: (mm. 91-93)

Initial interaction of yin and yang elements ends in this section. Yin (025) trichord <E-A-G> played by the piccolo and yang (015) trichords <B-Bb-Eb> and <D-F#-C#> played by the marimba are isolated by means of timbral contrast and absence of a common tone. Hexagram 11 and Hexagram 12 are RIC-related, and such a relationship is enhanced by the sudden change of texture, orchestration, and dynamic level.

Hexagram 13, "Companionship"

Commentary: The broken (yin) line has the place of influence, the central place, and responds to Ch'ien [the upper trigram]...
(RVO, 100)

Image: ...Thus the superior man organizes the clans and makes distinctions between things. (W-B, 453)

Sequence: Things cannot be at a standstill [stagnation] forever. Hence there follows the hexagram of "Companionship." (W-B, 451)

ICCS: The second interaction of yin and yang elements starts from this section and extends to Section 25. Yang elements predominate in this section.

Under the Red Eaves: (mm. 94-98)

Formed by three middleground structural notes and played by marimba, cello and bass, the yang (013) trichord <B,C,D> provides the ostinato background of this section.

Hexagram 14, "Abundance"

Commentary: The yielding [yin] receives the honored place in the great middle, and the upper and lower correspond with it... (W-B, 457)

Sequence: To him who cultivates union with men, things must come to belong... (RVQ, 438)

ICCS: Yin elements predominate in this section.

Under the Red Eaves: (mm. 99-105)

In measures 99-100, the marimba's left hand part emphasizes yin (0257) tetrachord <Ab,Bb,Db,Eb>. In measures 101-102, the entire orchestra plays <C,D,F,G>, another member of set-class (0257).

Hexagram 15, "Modesty"

Commentary: ...it is the way of heaven [yang] to shed its influence downward and to create light and radiance. It is the way of the earth [yin] to be lowly and to go upward. (W-B, 462)

Sequence: He who possesses something great must not make it too full... (W-B, 461)

ICCS: The yang element is placed on top of the yin element.

Under the Red Eaves: (mm. 106-113)

In measures 106-108, the reiterated chord consists of a yang (0167) tetrachord <G#,C#,D,G> at the top and a yin (0257) tetrachord <F#,G#,C#,D#> at the bottom.

Hexagram 16, "Harmony"

Commentary: The firm [yang] finds corespondence, and its will is done... (W-B, 467)

Sequence: When great possessions are associated with humility, there is sure to be pleasure and satisfaction [harmony]. (RVO, 438)

ICCS: Elements A and B are combined in harmony.

Under the Red Eaves: (mm. 114-118)

In measures 114-116, the reiterated chord consists of a yang (0167) tetrachord <A#,B,E,F> at the top, and a yin (027) trichord <E,F#,B> at the bottom. They share two common notes E and B to represent great similarity and "harmony."

Hexagram 17, "Following"

Commentary: ... the firm [yang] comes and places itself under the yielding [yin]... thus one is followed by the whole world. (W-B, 472)

Sequence: After harmony and satisfaction, there is certain to have followers.

ICCS: The strong who has power can obtain followers by placing himself below the weak. Thus the yang element thus predominates in this section.

Under the Red Eaves: (m. 119)

The yang (014) trichord <B,D,D#> is the most prominent sonority in this section. This trichord is also the subset of the yin-yang tetrachord <A,B,D,D#>.

Hexagram 18, "Undertaking"

Commentary: The firm [yang] is above and the yielding [yin] below; gentle and standing still... (W-B, 478)

Image: ...the superior man addresses himself to help the people and nourish his own virtue. (RVO, 119)

Sequence: When one follows others with pleasure, there are certain to be undertakings... (W-B, 476)

ICCS: The superior man helps the people (the inferior); therefore, the yang element still predominates.

Under the Red Eaves: (mm. 120-121)

The yang (014) trichord <B,D,D#>, the subset of the yin-yang tetrachord <A,B,D,D#>, is still the most prominent sonority in this section.

Hexagram 19, "Advance"

Commentary: The strong [yang] gradually increasing and advancing... (RVO, 123)

Image: ...The superior man... has his purpose of instruction that are inexhaustible, and nourishes and supports the people without limit. (RVQ, 123)

Sequence: When there are things to do, one can become great... (W-E, 481)

ICCS: The yang element governs the middleground structure.

Under the Red Eaves: (mm. 122-124)

Six middleground structural notes are grouped into two yang (015) trichords: <F-E-A> and <G#,C#,C>, the first six notes of the marimba part. In addition, the first eight notes of the marimba part state two successive yang (0145) tetrachords: <F-E-A-G#> and <C#-C-E-F>.

Hexagram 20, "Contemplation"

Commentary: ...The sages [yang] laid down their instructions, and all under heaven [yin] yield submission to them. (RVQ, 127)

Sequence: When things are great, one can contemplate them... (W-E, 485)

ICCS: Yang elements still predominate.

Under the Red Eaves: (mm. 125-129)

This section is virtually saturated with occurrences of the yang (0145) tetrachords. For example: in measure 126, <F#-F-D-C#> in the 1st Oboe part; the 1st Oboe's C# together with the 2nd Oboe's <C#-A-G#>; and two (0145) matrices in the brass section in measures 127-129.

Hexagram 21, "Biting Through"

Commentary: There is something between the corners of the mouth.

This is called "Biting Through"...firm [yang] and yielding [yin] are distinct from each other. Movement and clarity. Thunder [yang] and lightning [yin] are united and form lines... (W-B, 490)

Sequence: When there is something that can be contemplated, there is something that creates union... Biting through means union. (W-B, 489)

ICCS: Unification of elements A and B.

Under the Red Eaves: (mm. 130-140)

The reiterated chord in measures 130-136 is the combination of the yang (0156) tetrachord <B,C,E,F> at the top and the yin (0257) tetrachord <C#,D#,G#,A#> at the bottom. The distinction between these two elements is enhanced by the absence of common notes. In measures 138-140, the combination of tetrachords <B,C,E,F> and <C#,D#,G#,A#> is represented by mapping the <F,E,C,B> on C# resulting in <C#,C,G#,G> played by the tuba and 3rd trombone, and by mapping the [F,B,C,E] on D# resulting in <D#,G,G#,D> played by the 1st and 2nd trombones.

Hexagram 22, "Grace"

Commentary: ...We see the weak line [yin] coming and ornamenting the strong lines [yang]...On the other hand, the strong line above ornaments the weak ones...(RVO, 135)

Sequence: Things should not unite abruptly and ruthlessly; hence there follows the hexagram of "Grace." Grace is the same as adornment. (W-B, 494)

ICCS: Elements A and B ornament each other and finally become indistinguishable.

Under the Red Eaves: (mm. 141-149)

Each single note in this section sounds independent and rejects any aural association.

Hexagram 23, "Splitting Apart"

Commentary: ...The yielding [yin] changes the firm [yang]... Inferior people [yin] increase. (W-B, 501)

Image: ...Those above [yang] can ensure their position only by giving generously to those below [yin]. (W-B, 501)

Sequence: When one goes too far in adornment, success exhausts itself..."Splitting Apart" means ruin. (W-B, 500)

ICCS: Element B tries to outmatch element A.

Under the Red Eaves: (mm. 150-154)

Yang interval-class 1 is severely repressed.

Hexagram 24, "Redintegration" ("Restoration")

Commentary: The firm [yang] returns...The firm is on the increase... (W-B, 505)

Sequence: When decadence and overthrow have completed their work at one end, redintegration (restoration) commences at the other... (RVO, 439)

ICCS: Element A tries to outmatch element B.

Under the Red Eaves: (mm. 155-159)

Yang trichords containing interval-class 1 prevail in this section.

Hexagram 25, "Unerroneousness"

Commentary: The firm [yang] comes from without and becomes the ruler within... (W-B, 510)

Sequence: When the redintegration [Hexagram 24] has taken place, we have not any rash disorder... (RVO, 439)

ICCS: The development section begins. Element C, a brand new element and/or derivation of element A, appears unexpectedly.

Under the Red Eaves: (mm. 160-166)

Featuring the drums (leather percussion instruments with rim sound), element C becomes a dominant element. Set classes such as 4-1 (0123), 5-1 (01234), and 6-1 (012345), which contain the maximal number of yang trichord 3-1 (012) as their subsets, are prominent.

Hexagram 26, "The Great Accumulation"

Commentary: Firmness and strength...The firm [yang] ascends and honors the worthy. He is able to keep strength still... (W-B, 515)

Sequence: When unerroneousness [Hexagram 25] is present, there may
be the accumulation of virtue.

ICCS: Element C gains strength.

Under the Red Eaves: (mm. 167-171)

The drum parts become more energetic. Trichord 3-1 (012) is
still prominent.

Hexagram 27, "Nourishment."

Commentary: ...Heaven [yang] and Earth [yin] nourish all things...

(RVO, 155)

Sequence: Such accumulation having taken place, there will follow
the nourishment of it... (RVO, 439)

ICCS: Element C is still on the increase.

Under the Red Eaves: (mm. 172-178)

The drums become more and more predominant.

Hexagram 28, "Big Mistake"

Judgment: ...The ridgepole sags to the breaking point... (W-B, 111)

Commentary: ...The firm [yang] preponderates and is central...

(W-B, 526)

Miscellaneous Notes: The hexagram of Big Mistake denotes
overthrow.

Sequence: Without provision of nourishment one cannot move; hence
follows the Hexagram of "Big Mistake". (W-B, 525)

ICCS: Element C and/or A is prominent.

Under the Red Eaves: (mm. 179-182)

The drum solo, element C, is still growing. Rhythms of the woodwinds try to "overthrow" the percussion's 4/4 meter. Six middleground structural notes <A-F#-F-G-D-Bb>, linked together by members of yang set-classes, are the most prominent notes in the melody played by piccolo and oboe.

Hexagram 29, "Pit"

Commentary: ...This is the nature of water;--it flows on, without accumulating its volume... (RVO, 163)

Sequence: When one makes big mistakes, he is sure to fall into peril.

ICCS: Element C, like water, flows on continuously.

Under the Red Eaves: (mm. 183-188)

The drum solo is still the most dominant element. On the other hand, six middleground structural notes <Bb-A-F-C#-G#-F#>, linked together by members of yang set-classes, are the most prominent notes in the melody played by viola and cello.

Hexagram 30, "Clinging"

Commentary: "Clinging" means resting on something. Sun and moon cling to heaven [yang]... (W-B, 536)

Sequence: When one falls into peril, he is sure to attach himself to some person or thing..." (JL, 435)

ICCS: Everything clings to the yang element; therefore, the yang element is predominant.

Under the Red Eaves: (mm. 189-196)

Yang elements represented as set classes 3-1 (012), 4-1 (0123), 5-1 (01234), as well as microtonal clusters, are prominent, especially in the strings.

Hexagram 31, "Influence"

Commentary: "Influence" means stimulation. The weak [yin] is above, the strong [yang] is below. The forces of the two stimulate and respond to each other, so that they unite...
(W-B, 541)

Sequence: Heaven and earth existing, all things then got their existence. All things having existence, afterwards there came male and female. From the existence of male and female there came afterwards husband and wife... (RVO, 439)

ICCS: The Lower Part of *Ching* begins. Element C still exists. On the other hand, elements A and B unite, B at the top and A at the bottom.

Under the Red Eaves: (mm. 197-201)

The drum solo is still dominant. In accordance with the commencement of the lower part of *Ching*, the metric cycle $5/8 + 7/8 + 5/8 + 7/8 + 5/8$ starts. The yin-yang tetrachord $\langle C\#, D\#, F\#, G \rangle$, prominently expressed by the high woodwinds, contains two yang trichordal subsets 3-3 (014) $\langle D\#, F\#, G \rangle$ and 3-5 (016) $\langle C\#, F\#, G \rangle$ and two yin trichordal subsets 3-7 (025) $\langle C\#, D\#, F\# \rangle$ and 3-8 (026) $\langle C\#, D\#, G \rangle$. Thus it represents the unification of the yin and yang elements. The yang interval-class 1, expressed as $\langle D, D\# \rangle$ dyad, is strongly represented

in the low register by the bass clarinet, bassoons, and
 contra-bassoon. The drum solo continues.

Hexagram 32, "Perseverance"

Commentary: ...The strong [yang] is above, the weak [yin] is
 below; thunder and wind [yang and yin] work together.

Sequence: The rule for the relation of husband and wife is that it
 should be long-enduring... (RVO, 439)

ICCS: Element C still exists. On the other hand, elements A and B
 unite, A at the top and B at the bottom.

Under the Red Eaves: (mm. 202-206)

The yin 4-21 (0246) tetrachord <E,F#,G,A> is strongly
 expressed by the trombones and tuba in the low register
 while the yang 3-4 (015) trichord <D,F#,G> is sustained by
 the violin and viola. In addition, members of yang set
 classes are also strongly represented by the piccolo and the
 1st oboe. The drum solo continues.

Hexagram 33, "Retreat"

Image: ...Thus the superior man [yang] keeps the inferior man
 [yin] at a distance... (W-B, 551)

Sequence: Things cannot abide forever in their place: hence there
 follows the Hexagram of "Retreat"... (W-B, 550)

ICCS: Element C still exists. Elements A and B are separated
 registrally.

Under the Red Eaves: (mm. 207-211)

Since the violin II part is T_4 of the viola part, and violin I is T_4 of the violin II part, yin set-class 3-12 (048) is represented vertically in the upper strings. At the same time, members of yang set classes are represented by winds and lower strings in other registers. The drum solo continues.

Hexagram 34, "Great Strength"

Commentary: ...the great [yang] are powerful. Strong [yang] in movement--this is the basis of power. (W-B, 556)

Sequence: Things cannot forever retreat, and hence the hexagram of "Retreat" is succeeded by the hexagram of "Great Strength."

ICCS: Element C still exists. Element A is extremely prominent.

Under the Red Eaves: (mm 212-216)

Since the entire section is saturated with occurrences of interval-class 1, yang set classes are therefore extremely prominent. The drum solo continues.

Hexagram 35, "Progress"

Commentary: ...Devoted, and clinging to this great clarity [yang], the weak [yin] progresses and goes upward... (W-B, 560)

Sequence: Things cannot remain forever powerful, hence there follows the hexagram of "Progress."

ICCS: Element C still exists. Element A overpowers B but there is a gradual development of element B.

Under the Red Eaves: (mm. 217-221)

Played by double-basses, members of yin set-class 3-10 (036) go upward gradually. Yang interval-class 1 is still prominent in the upper strings. The Yin-yang Tetrachord is represented linearly by the 1st and 2nd clarinets. The drum solo continues.

Hexagram 36, "Darkening"

Commentary: The light [yang] has sunk into the earth... (W-B, 565)

Image: ...the superior man [yang]... conducts his management of men;--he shows his intelligence by keeping it obscured. (RVO, 191)

Sequence: "Expansion [Progress, Hexagram 35] will certainly encounter resistance and injury..." (W-B, 564)

ICCS: Element C is still present. Although the supremacy of element A is challenged by element B, element A is still predominant.

Under the Red Eaves: (mm. 222-226)

"The light is sunk into the earth" is reflected by the melody saturated with yang trichords 3-1 (012) and (01) dyads played by the unison strings in the lower register. Statement of a yin set-class occurs only once in this melody--3-9 (027) <E,A,B> in measure 224.

Hexagram 37, "Family"

Commentary: The correct place of the woman is within; the correct place is without. That man and woman have their correct places is the greatest concept in nature... (W-B, 570)

Sequence: "He who is injured without, of a certainty draws back into his family..." (W-B, 569)

ICCS: Element C is still present. Elements A and B coexist, A without and B within.

Under the Red Eaves: (mm. 227-231)

A fragment of a Chinese folk tune "Lan-hua-hua", <G-A-A-D-G-E-D>, is expressed by the French Horns 1,3 in the middle register (the initial two notes <G-A> appear in measure 225-226 in the previous section) and states a yin 4-23 (0257) tetrachord <D-E-G-A>. Meanwhile, the double-basses reiterate the yin-yang tetrachord <G-Ab-B-C#> in the low register and the woodwinds express a yang 6-1 (012345) hexachord <G,Ab,A,Bb,B,C> microtonally in the high register. The drum solo continues.

Hexagram 38, "Disunion"

Commentary: ...Heaven and earth are opposites, but their action is concerted. Man and woman are opposites, but they strive for union. All beings stand in opposition to one another: what they do takes on order thereby... (W-B, 575).

Sequence: "When the way of the Family [Hexagram 37] draws to the end, misunderstandings come. Hence there follow the Hexagram of Opposition [Disunion]..." (W-B, 573)

ICCS: Element C still exists. Elements A and B stand in opposition but strive for union.

Under the Red Eaves: (mm. 232-236)

Another fragment of a Chinese folk tune "Lan-hua-hua", <A-D-E-A-F#-E-B-E>, is expressed by the 1st Trumpet (the last note E is changed to G# in measure 237 in the next section) and forms a yin 3-7 (025) trichord <D,E,A> and 4-23 (0257) tetrachord <E-F#-A-B>. Double-basses continue reiterating the yin-yang tetrachord <G-Ab-B-C#>, while the woodwinds are expressing a yang 6-1 (012345) hexachord <Bb,B,C,C#,D,Eb> microtonally, and the upper strings are stating two 3-2 (013) trichords <A-B-C> and <C#-D-E>. However, unlike in the previous section, the registral contrast of Elements A and B is not marked. The drum solo continues.

Hexagram 39, "Obstruction"

Commentary: "Obstruction" means difficulty. The danger is ahead.

To see the danger and to know how to stand still, that is wisdom... (W-B, 580)

Sequence: "Through opposition [Hexagram 38], difficulties [Hexagram 39] necessarily arise..." (W-B, 579)

ICCS: Obstruction causes the decline of old elements (Elements A, B, and C) and brings in new Element D. Introducing Element D, the second development starts.

Under the Red Eaves: (mm. 237-240)

The $5/8 + 7/8 + 5/8 + 7/8 + 5/8$ metric cycle in the drum part, element C, ends in the previous section. Element D, a new drumming pattern without rim sound in $2/16 + 2/16 + 4/16 + 1/16 + 3/16 + 3/16$ but notated as a full measure in $15/16$ with accents stressing each subdivision, is introduced in

this section (see the drum part in measure 237). This rhythmic pattern is repeated in measure 238 and its retrograde, in $3/16 + 3/16 + 1/16 + 4/16 + 2/16 + 2/16$, is introduced in measure 239 and repeated in measure 240.

Hexagram 40, "Deliverance"

Commentary: ...Danger produces movement. Through movement one escapes danger: this is deliverance... (W-B, 585)

Sequence: "Things cannot be permanent amid obstructions. Hence there follows the Hexagram of "Deliverance". Deliverance means release from tension..." (W-B, 584)

ICCS: Element D suddenly declines.

Under the Red Eaves: (mm. 241-242)

The continuation of the drum solo produces movement. The sudden piano in the drum solo represents a temporary release from tension. In measure 241, the rhythmic pattern $3/16 + 3/16 + 5/16 + 2/16 + 4/16 + 4/16$, notated as a full measure in $21/16$, is actually a retrograde-inversion of the pattern $2/16 + 2/16 + 4/16 + 1/16 + 3/16 + 3/16$ in measure 237.

Hexagram 41, "Decrease"

Commentary: What is below [yin trigram] is decreased, what is above [yang trigram] is increased... (W-B, 590)

Sequence: Through release of tension something is sure to be lost. Hence there follows the Hexagram of "Decrease". (W-B, 589)

Miscellaneous Notes: The Hexagrams of "Decrease" [Hexagram 41] and "Increase" [Hexagram 42] represent the beginning of flowering and of decline respectively.

ICCS: Element D first drops to the lowest level and then gradually strengthens itself.

Under the Red Eaves: (m. 243)

The dynamic of the drum solo decreases to pianissimo and then gradually builds up to fortissimo in the next section.

Hexagram 42, "Increase"

Sequence: "If decrease goes on and on, it is certain to bring about increase..." (W-B, 595)

Miscellaneous Notes: The Hexagrams of "Decrease" [Hexagram 41] and "Increase" [Hexagram 42] represent the beginning of flowering and of decline respectively.

ICCS: Element D becomes predominant.

Under the Red Eaves: (m. 244)

The dynamic of the drum solo builds up to fortissimo.

Hexagram 43, "Break-through"

Commentary: ... The firm [yang] resolutely overpowers the yielding [yin].

Sequence: "If increase goes on unceasingly, there is certain to be a break-through... Break-through means resoluteness." (W-B, 602)

ICCS: "Break-through" denotes the sudden appearance of Element A which overpowers Elements B and D.

Under the Red Eaves: (m. 245)

The brass instruments, flutes, and oboes, which strongly represent yang tetrachords 4-1 (0123) <Bb-A-B-C> and 4-9 (0167) <B-C-F#-F>, are set against the drum solo that represents Element D and the low woodwinds' hexachord <F,G,A,Bb,C,D> that is registrally partitioned into a yin 4-23 (0257) tetrachord <F,G,Bb,C> and a yin 3-9 trichord <G,A,D>.

Hexagram 44, "Encountering"

Judgment: ... The maiden [yin] is powerful... (W-B, 609)

Sequence: Through resoluteness one is certain to encounter something... (W-B, 608)

Miscellaneous Notes: ...Yin encounters yang.

ICCS: Element D still exists. Element B becomes more and more powerful so that Elements A and B are equally prominent.

Under the Red Eaves: (m. 246)

Six middleground structural notes are registrally partitioned into a yang 3-4 (015) trichord <F#,Bb,B> at the top and a yin 3-9 (027) trichord <G,A,D> at the bottom played by strings, clarinets, and bassoons. Meanwhile, the brass instruments, flutes, and oboes still strongly represent yang elements: 3-4 (015) trichords <B-F#-Bb> and <F#-G-D> played by horns and the 3rd trumpet, 3-5 (016) trichord <G-Ab-D> by flutes and oboes, and 3-3 (014) trichords <F#-A-Bb> by the 1st and 2nd trumpets and <F#-D#-D> by the 3rd trombone and tuba. The drum solo continues.

Hexagram 45, "Gathering Together"

Commentary: ...The strong [yang] stands in the middle and finds
correspondence. Therefore the others mass around it... (W-
B, 615)

Sequence: "When creatures meet one another, they mass together..."
(W-B, 614)

ICCS: The third development section--the massing together of all
four elements--begins.

Under the Red Eaves: (mm. 247-248)

As what explained in Section 31, the Yin-yang Tetrachordal
set-class 4-Z15 (0146) represents the unification of the yin
and yang elements. In this section, to represent the
amassing of all four elements, six middleground structural
notes <D-C#-F#-F-Bb-Eb> are basically linked by members of
set classes 4-Z15 (<D-Ab-Bb-C#>, <Ab-Bb-C#-D>, <D-F-F#-C>,
<F#-C-D-F>, <F-G-Bb-B>, <A-Bb-C#-Eb>, <Eb-E-G-A>, <A-Bb-C#-
Eb> in the strings part) while Elements C (drum with rim
sound) and D (drum without rim sound) are expressed together
in the same rhythm.

Hexagram 46, "Ascending"

Commentary: The weak, as it finds the opportunity, ascending
upwards...

Sequence: Massing toward the top is called "pushing upward"
[ascending]... (W-B, 619)

ICCS: All four elements are still present and Element B is placed at the top.

Under the Red Eaves: (mm. 249-250)

From the top to the bottom, the subsets of the sustaining chord are: yin 3-8 (026) <Eb,F,A> played by flutes, 1st oboe, clarinets, and 1st trumpets; yin 3-9 (027) <Eb,F,Bb> played by 2nd and 3rd oboe, 2nd and 3rd trumpet, and horns; and yang 3-4 (015) <C#,D,F#> played by trombones, tuba, bassoons, cello, and bass. Elements C and D, represented by the drum solo, are still prominent.

Hexagram 47, "Oppression"

Commentary: The yang element is covered and obscured by the yin element...

Sequence: If one pushes upward without stopping, he is sure to meet with oppression... (W-B, 624)

ICCS: All four elements are obscured. Element A is oppressed by Element B.

Under the Red Eaves: (mm. 251-266)

Only percussion instruments of indefinite pitch are used in this section. Therefore the identity of each element is represented by the timbre of instruments rather than by definite pitches.

Hexagram 48, "The Well"

Commentary: Penetrating under water and bringing up the water, this is the well... The town may be changed, but the well

cannot be changed, because central position is combined with
firmness [yang]... (W-B, 630)

Sequence: "He who is oppressed above is sure to turn downward..."
(W-B, 629)

ICCS: Element A becomes dominant.

Under the Red Eaves: (mm. 267-270)

Expressed linearly by the orchestra, six middleground
structural notes are partitioned into yin 3-1 (012) trichord
<G#-F-G> and yin 3-3 (014) trichord <F#-Bb-A>.

Hexagram 49, "Revolution"

Commentary: ... Water and fire subdue each other... Heaven [yang]
and earth [yin] bring about revolution, and four seasons
complete themselves thereby... (W-B, 636)

Sequence: "The setup of a well must necessarily be revolutionized
in the course of time..." (W-B, 635)

ICCS: Water extinguishes fire, and fire makes the water evaporate.
"Revolution" denotes changing of form thus Elements C and D,
the derivation of A and B respectively, are predominant. At
the same time, Elements A and B are juxtaposed.

Under the Red Eaves: (mm. 271-272)

Six middleground structural notes are partitioned into a
yang 3-2 (013) trichord <D-Eb-C> and yin 4-23 (0257)
tetrachord <C-Bb-G-F>. Elements C and D represented by
leather percussion are once again dominant.

Hexagram 50, "Caldron"

Miscellaneous Notes: "Caldron" takes what is new.

Sequence: "Nothing transforms things so much as the caldron..."

(W-B, 641)

ICCS: Sustained action of the previous section. All four elements exist but Elements C and D are still dominant.

Under the Red Eaves: (mm. 273-276)

Elements C and D represented by leather percussion are still dominant. The Bartók pizzicato, used for the first time in the piece, plays an important role in this section. The yin 4-23 (0257) tetrachord <D-A-E-B> is presented by the 3rd trombone, tuba, and bassoons in the low register, while the yang 3-2 (013) trichords are presented in the woodwinds in the high register. French horns in the middle register introduce <B-F-Bb-E>, a member of another yang set-class--4-9 (0167).

Hexagram 51, "Shock"

Judgment: ... The movement (like a crash of thunder) terrifies all within a hundred li [miles]... (RVQ, 258)

Sequence: "Among the custodians of the sacred vessels, the eldest son stands first..." (W-B, 647)

Symposium: Trigram "Thunder" denotes the eldest son. (Both the upper and lower trigrams which constitute Hexagram "Shock" are Trigram "Thunder.")

ICCS: Continuation of the previous section. Elements C and D are still dominant and a huge climax is finally reached in this section.

Under the Red Eaves: (mm. 277-282)

The climax of the entire composition. In this section, a new timbre--the human voice--is first introduced.

Hexagram 52, "Keeping Still"

Commentary: "Keeping Still" means stopping. When it is time to stop, then stop. When it is time to advance, then advance... (W-B, 653)

Sequence: Things cannot move continuously, one must make them stop... (W-B, 652)

ICCS: "Stopping" denotes the end of development; therefore, this hexagram represents the last section of the development. Elements do not stop abruptly all at the same time but gradually one by one.

Under the Red Eaves: (mm. 283-296)

It is the yin-yang tetrachord <C#,D,F,G> which starts this section (see measure 283). Then six middleground structural notes <D#,E,F#,G,G#,B> are presented by horns, trombones, and tuba which are taken out gradually one by one (m. 285). Finally, only leather percussion instruments, Elements C and D, are left to close the development section.

Hexagram 53, "Gradual Progress"

Commentary: ... Progressing and thereby attaining the right place... Keeping still and penetrating: this makes the movement inexhaustible. (W-B, 658)

Sequence: Things cannot be kept forever in a state of repression, and hence Hexagram of "Keeping Still" is followed by Hexagram of "Gradual Progress," which gives the idea of (gradually) advancing. (RVQ, 440)

ICCS: Restatement of Elements A, B, C, and D.

Under the Red Eaves: (mm. 297-300)

The brass instruments' yang 4-18 (0147) matrix in Section 1 (see measure 14) is now recapitulated by two violas and two cellos in mm. 297-299. The harmonic structure based upon yin 4-13 (0136) tetrachords presented by the piccolo and bassoons in Section 2 (see mm. 22-23) is now mirrored by the alto flute and clarinets (mm. 299-300). Element C, represented by bass drum and rim sound, and Element D, by bongos, function here as Gagaku-like accompaniment.

Hexagram 54, "Marrying Maiden"

Commentary: The "Marrying Maiden" describes the great meaning of heaven and earth. If heaven and earth do not unite, all creatures fail to prosper... (W-B, 664)

Sequence: Through progress one is sure to reach the place where one belongs... (W-B, 663)

ICCS: Elements A and B unite.

Under the Red Eaves: (mm. 301-307)

Two yin 3-7 (025) trichords <D,E,G> and <G#,Bb,C#> in the strings combine in such a way that the yang 4-9 (0167) tetrachord <C#,D,G,G#> is brought to the surface at the outset (see measure 301). The unification of Elements A and B is also shown by the employing of metal (yang) and wooden (yin) percussion instruments at the same time.

Hexagram 55, "Abundance"

Judgment: Hexagram of "Abundance" intimates progress and development... (RVQ, 276)

Commentary: The (interaction of) heaven [yang] and earth [yin] is now vigorous and abundance, now dull and scanty, growing and diminishing according to the seasons... (RVQ, 276)

Sequence: That which attains a place in which it is at home is sure to become great... (W-B, 669)

ICCS: Elements C and D are added in this section to picture the "fullness" of the universe. Elements A and B are still interacting, sometimes growing sometimes diminishing.

Under the Red Eaves: (mm. 308-313)

Elements C and D, represented by the rattan percussion sound and drums, are added at measure 309. Elements A and B interact vigorously at the outset. In measures 308-309, the 1st violin part, except for the first verticality <C#,D,F,G> which is the yin-yang 4-13 (0136) tetrachord, is predominantly partitioned into two yin 3-7 (025) or 3-9 (027) vertical halves. At the same time, the yang set-classes, emphasizing on interval-class 1, saturate their linear

structure. In measures 309-313, the interaction of Elements A and B diminishes; the only presence of element A is the cello yang 4-1 (0123) tetrachord <E,F,G,G#> and 3-3 (014) trichord <E-F-C#> (measures 309-310), the 2nd violin yang 4-8 (0156) <F-F#-C-C#> and 4-9 (0167) <F#-C-C#-G> (measure 311), and the 1st clarinet yin 3-7 (025) <G-E-D> (measures 311-312).

Hexagram 56, "Wanderer"

Commentary: ... The yielding [yin] attains the middle outside and submits to the firm [yang]... (W-B, 675)

Sequence: "Whatever greatness may exhaust itself upon, this much is certain: it loses its home..." (W-B, 675)

ICCS: Element B submits to Element A.

Under the Red Eaves: (mm. 314-316)

Presented by the 1st flute, six middleground structural notes <D-F#-G-E-D#-B> are partitioned linearly into two yang 3-3 (014) trichords <D-F#-G> and <E-D#-B>. Element B governs only the notes connecting these middleground structural notes: yin 3-10 (036) <Eb-C-F#> (m. 314) and <Ab-F-B> (m. 315), yin 3-7 (025) <F#-C#-E> (m. 315) as well as yin 3-10 (036) <D-F-B> (m. 317).

Hexagram 57, "Penetrating"

Commentary: ... the firm [yang] penetrates to the middle and to the correct, and its will is done. Both of the yielding lines submits to the strong (W-B, 680)

Sequence: The wanderer has no place to receive them, hence there follows the Hexagram of "Penetrating"... (W-B, 679)

ICCS: Element A is dominant. Element B still submits to Element A.

Under the Red Eaves: (mm. 318-322)

Six middleground structural notes <B-G-Bb-A-F#-G#> are partitioned linearly into two yang trichords: 3-3 (014) <B-G-Bb> and 3-2 (013) <A-F#-G#>. In measure 318, the 3rd flute part, yin 3-8 (026) trichord is employed to connect the first two structural notes B and G. In the same measure, the solo violin part, two yin trichords 3-7 (025) <C-A-D> and 3-8 (026) <D-G#-Bb> are employed to connect the structural B and Bb, although the structural note G does not appear.

Hexagram 58, "Rejoice"

Commentary: ... The firm [yang] is in the middle, the yielding [yin] is without... (W-B, 686)

Sequence: When a wanderer finally enters his home, he rejoices.

ICCS: Element A is placed in the middle and B without.

Under the Red Eaves: (mm. 324-328)

This section contains only six middleground structural notes. Although their order of appearance is <D-C-A-Bb-C#-F>, the orchestration partitions these six notes into a yin 3-6 (024) <D-C-Bb> played by bassoons as well as bass clarinet and a yin 3-12 (048) <A-C#-F> played by cello. At their meeting point (mm. 327-328) a yang 4-3 (0134) tetrachord <A,Bb,C,C#> is formed.

Hexagram 59, "Dispersion"

Commentary: ..The firm [yang] comes and does not exhaust itself.

The yielding [yin] receives a place without, and the one above is in harmony with it.. (W-B, 690)

Sequence: After joy comes dispersal ... Dispersion means scattering. (W-B, 689)

ICCS: Element B is still placed without and in harmony with Element A.

Under the Red Eaves: (mm. 329-334)

This section contains only six middleground structural notes. Although their order of appearance is <F#-A#-A-G#-B-C#>, the orchestration partitions these six notes into two yin 3-6 (024) trichords: <F#-A#-G#> played by viola as well as 1st and 2nd clarinets, and <A-B-C#> played by the 2nd violin. At their meeting point (mm. 332-333) a yang 3-1 (012) trichord <G#,A,A#> is formed.

Hexagram 60, "Regulation"

Commentary: ... The firm [yang] and the yielding [yin] are equally divided, and the firm have attained the middle place... (W-B, 695)

Sequence: A state of dispersion cannot continue forever; there comes system of regulation.

ICCS: Element A and Element B are equally prevalent.

Under the Red Eaves: (mm. 335-339)

This section contains only six middleground structural notes. According to their order of appearance, these six notes are partitioned into a yin 3-11 (037) trichord <C#-F-A> and a yang 3-2 (013) trichord <A-Bb-C>.

Hexagram 61, "Inmost Sincerity"

Commentary: The yielding [yin] are within, yet the strong hold the middle... (W-B, 699)

Sequence: The system of regulation of regulation having been established, men believe in it, and hence comes the hexagram of Inmost Sincerity. (JL, 438)

ICCS: Elements A and B co-exist and A is more prominent.

Under the Red Eaves: (mm. 340-343)

This section contains only six middleground structural notes. According to their order of appearance these six notes are partitioned into a yin 3-7 (025) trichord <C#-G#-A#> and a yang 3-2 (013) trichord <A-C-B> and played by woodwinds. In the strings, the prominent yang 3-3 (014) trichord <A,C,C#> is a subset of the middleground structural hexachord. All members of this trichordal subset, however, are sustained from the previous section.

Hexagram 62, "Small Mistake"

Commentary: ... The yielding [yin] attains the middle, hence good fortune in small thing. The hard [yang] has lost its place and is not in the middle: hence one should not do great things... (W-B, 705).

Sequence: One who treats people with truth and sincerity is sure to make a small mistake sometimes.

Miscellaneous Notes: "Small Mistake" signifies a transition. (W-B, 704)

ICCS: Continuation of the previous section. Element B is predominant.

Under the Red Eaves: (mm. 344-347)

Played by three clarinets, six middleground structural notes <F-F#-D#-E-D-G> are partitioned linearly into a yang 3-2 (013) trichord <F-F#-D#> and a yin 3-7 (025) trichord <E-D-G>. At the beginning of this section, the yang attribute of the structural trichord <F-F#-D#> is diluted by the oboes' sustained B from the previous section since this B forms a yin 3-11 (037) <B,D#,F#> with the clarinets' F# and D# in measure 345. The sustained yang 3-3 (014) <A,C,C#> trichord comes from the previous section; it forms a yin-yang tetra-chord together with the structural note G at the end of this section (mm. 346-347).

Hexagram 63, "Completion"

Commentary: ... The firm [yang] and the yielding [yin] are correctly placed...

Sequence: One who gains knowledge by making a small mistake is sure to have success [completion].

ICCS: Elements A and B are in harmony.

Under the Red Eaves: (mm. 348-352)

In the vibraphone part, six middleground notes <G-G#-F-Eb-C-Bb> are connected by members of yang and yin set-classes: G and G# are connected with C# and D to form a yang 4-9 (0167) tetrachord <C#,D,G,G#>, G# and F are connected with A# and D# to form a yin 4-23 (0257) <D#,F,G#,A#>, F and Eb are connected with E and F# to form a yang 4-1 (0123) <Eb,E,F,F#>, Eb and C are connected with Bb and F to form a 4-23 (0257) <Bb,C,Eb,F>, and C and Bb are connected with B and C# to form a 4-1 (0123) <Bb,B,C,C#>. These six middleground structural notes are played by the vibraphonist's acrylic mallet in his right hand and at the same time by the crotales.

Hexagram 64, "Before Completion"

Commentary: ... Although the lines are not in their appropriate places, the firm [yang] and the yielding [yin] nevertheless correspond. (W-B, 715)

Sequence: A state of completion cannot continue forever, and therefore comes the Hexagram of "Before Completion".

ICCS: Although Element A and Element B are not in perfect harmony, they nevertheless are not separated. Neutral elements, which are neither A nor B, are predominant.

Under the Red Eaves: (mm. 353-368)

In the vibraphone part, six middleground notes <D-C#-F#-E-B-A> are connected by members of yang and neutral set-classes: D and C# are connected with F and Ab to form a yang 4-18 (0147) tetrachord <C#,D,F,Ab>, C# and F# are connected with

C and A to form a yang 4-18 (0147) <F#,A,C,C#>, F# and E are connected with D# and B to form a neutral 4-10 (0235) <B,D#,E,F#>, E and B are connected with F# and G to form a neutral 4-14 (0237) <E,F#,G,B>, and B and A are connected with G# and E to form a neutral 4-14 (0237) <E,G#,A,B>.

These six middleground structural notes are played by the vibraphonist's acrylic mallet in his right hand and at the same time by the crotales.

NOTES

¹From the viewpoint of set theory, Boulez's multiplication means: For any two pitch-class sets $\langle a, b, c \rangle$ and $\langle x, y \rangle$, $\langle a, b, c \rangle \times \langle x, y \rangle = T_{(x-a)}\langle a, b, c \rangle \cup T_{(y-a)}\langle a, b, c \rangle$, or $T_{(x-b)}\langle a, b, c \rangle \cup T_{(y-b)}\langle a, b, c \rangle$ or $T_{(x-c)}\langle a, b, c \rangle \cup T_{(y-c)}\langle a, b, c \rangle$, or $T_{(a-x)}\langle x, y \rangle \cup T_{(b-x)}\langle x, y \rangle \cup T_{(c-x)}\langle x, y \rangle$, or $T_{(a-y)}\langle x, y \rangle \cup T_{(b-y)}\langle x, y \rangle \cup T_{(c-y)}\langle x, y \rangle$; \times stands for Boulez's multiplication operation and \cup stands for set union. As a result, in Section 11, *Under the Red Eaves*, $\langle F, G, C \rangle \times \langle E, G\#, A \rangle = T_{(4-5)}\langle F, G, C \rangle \cup T_{(8-5)}\langle F, G, C \rangle \cup T_{(9-5)}\langle F, G, C \rangle = \langle E, F\#, B \rangle \cup \langle G\#, A\#, D\# \rangle \cup \langle A, B, E \rangle = \langle D\#, E, F\#, G\#, A, A\#, B \rangle$, one of the possible results of $\langle F, G, C \rangle \times \langle E, G\#, A \rangle$. For more information of Boulez's multiplication see Boulez on Music Today (London: Faber and Faber, 1971), 79-80.

CHAPTER 6

EPILOGUE

By observing the mysterious universe, the ancient Chinese found two ever-lasting phenomena: the cycle of change such as day following night and the process of growth and decay as revealed in the life cycles of plants, animals, and human beings. By summarizing these two observations, they revealed that everything in the universe has its opposite, such as day and night, heaven and earth, summer and winter, male and female, and then labeled these opposing poles of existence as yang and yin. The ancient Chinese, however, never viewed yang and yin as two irreconcilable opposites, but as two complementary principles which come from their common origin, the Great Ultimate, and constantly interact with each other. As a result, the yang motive and the yin motive in ICCS do not have to oppose to each other irreconcilably and therefore may share common properties. For example, in *Under the Red Eaves*, both yang element 3-3 (014) and yin element 3-7 (025) contain interval-class 3; and both yang 4-9 (0167) and yin 4-23 (0257) contain interval-class 5.

King Wen formulated sixty-four hexagrams so that the entire universe might be perceived therein. In other words, he demonstrates the

most profound truth--the Law of Nature--by using the most simple means--yang (unbroken) and yin (broken) lines. As Confucius explained in *Hsi-t'zu* (Commentary on the Judgment), the yang and yin interact constantly and thus give rise to all things in the universe:

The sun goes and the moon comes; the moon goes and the sun comes;- the sun and moon thus takes the place each of the other, and their shining is the result. The cold goes and the heat comes; the heat goes and the cold comes;-it is by this mutual succession of the cold and heat that the year is completed. That which becomes less and less, and that which comes waxes more and more;-it is by the influence on each other of this contraction and expansion that the advantages (of the different conditions) are produced. (RVC, 405)

In connection with the course of the day and the year, the ancient Chinese also realized that the universe is a realm of perpetual movement activated by the yin-yang interaction in the form of cyclic changes. In fact, the Yin-yang Doctrine and the Law of Cyclic Interaction had a profound influence on almost all aspects of ancient Chinese civilization. They are the basis of ancient Chinese metaphysics such as Confucianism, Taoism, and Tsou Yen's Yin-Yang School; of medical science such as herbal remedies and acupuncture; of agriculture such as analysis of seasonal phenomena, weather, and soil; of politics such as the cyclical theory regarding the rise and fall of an empire; and of arts such as the aesthetics of *ch'in* (the Chinese zither) playing and calligraphy.

Though the Law of Nature is too profound to grasp, the Yin-Yang Doctrine and the Law of Cyclic Interaction for *I Ching* have already illustrated it in detail. Thus if we grasp the Yin-yang Doctrine and the Law of Cyclic Interaction by studying *I Ching*, we grasp the Law of Nature. A masterpiece should be created in accordance with the Law of Nature. Therefore, the most direct way to create a masterpiece is to

apply the Yin-yang Doctrine and the Law of Cyclic Interaction on constructing the piece--i.e., to select yang and yin primordial motives, to select a background T'ai-chi series that represents the cyclic path of yin-yang transformation, to construct a middleground yin-yang series based upon the yang and yin motives which controls the ordering of middleground structural notes, to complete the foreground by carrying out the interaction of the yang and yin motives according to the composer's own understanding of the orderly sequence of sixty-four hexagrams. This is what Confucius explains in *H'si T'zu*:

By means of the easy and the simple we grasp the laws of the whole world. When the laws of the whole world are grasped, therein lies perfection. (W/B, 287)

The ancient Chinese believed that the complex universe is actually a process of systematic and progressive development that can be traced to its simplest beginning, the Supreme Ultimate. In addition, the universe is also a well-coordinated system in which all things are interrelated. This author strongly believes that such a theory of cosmic development can be applied equally to all things in the integral universe, including musical composition. We should view the creation of art as reproducing the complex universe in miniature by reflecting the interacting flow of yang and yin through space or time. The understanding of the Law of Nature is the indispensable prerequisite for an organic masterpiece; ignorance of this law predicates the arbitrary creation of mediocrity. The ICCS, however, is not a magic formula by which one can "put together" a piece of good music. The music composed according to the ICCS is exactly like other music that follows other compositional principles. That is to say, it is either good or bad

music, depending upon the composer's creativity and artistic ability. The well-coordinated structural layers, which the ICCS can guarantee, is an indispensable, but not the sole prerequisite of creating a masterpiece.

By virtue of its flexibility and logic based on *I Ching*, the ICCS exploits a new procedure in musical construction. The intellectual and the artistic are carefully balanced in the ICCS. The compositional sequence, background-middleground-foreground, assures well-ordered fundamental structural layers within which the composer's musical imagination can be freely developed. The flexibility of the ICCS enables the composer to develop from the system's central idea an individual technique with complete artistic freedom, to suit the composer's own imagination and musical language. The use of *Under the Red Eaves* as an example shows how great a part musical imagination can play in the actual application of this compositional system.

BIBLIOGRAPHY

- Babbitt, Milton. *Words about Music*. Edited by Stephen Dembski and Joseph Straus. Madison, Wisconsin: University of Wisconsin Press, 1987.
- _____. "Twelve-Tone Invariants as Compositional Determinants." *The Musical Quarterly* 46/2 (April 1960): 246-259.
- Baker, James. "Schenkerian Analysis and Post-Tonal Music." In *Aspects of Schenkerian Theory*, edited by David Beach. New Haven: Yale University Press, 1983.
- Boulez, Pierre. *Boulez on Music Today*. Translated by Susan Bradshaw and Richard Rodney Bennett. London: Faber and Faber, 1975.
- Cage, John. *Silence*. Middletown, Connecticut: Wesleyan University Press, 1961.
- Chai, C'hu, and Winberg Chai, eds. *I Ching--Translated by James Legge*. New York: Bantam Books, 1986.
- Chan, Wing-tsit. *A Source Book in Chinese Philosophy*. Princeton: Princeton University Press, 1973.
- Cho, Gene Jinsiong. *Lu-Lu--A Study of Its Historical, Acoustical and Symbolic Signification*. Taipei: Caves Books, Ltd., 1989.
- Chou, Wen-chung. "Toward a Re-Merger in Music." In *Contemporary Composers on Contemporary Music*, edited by Elliot Schwartz and Barney Childs. New York: Da Capo Press, 1978.
- Fang, Thom H. *Chinese Philosophy: Its Spirit and Its Development*. Taipei: Linking Publishing Co., Ltd., 1986.
- Forte, Allen. *Contemporary Tone-Structures*. New York: Bureau of Publications, Teachers College, Columbia University, 1955.
- _____. *The Structure of Atonal Music*. New Haven: Yale University Press, 1973.
- Gao, Heng. *Zhou Yi Da Chuan Jin Zhu [The Updated Commentaries of the Zhou-yi]*. Jinan: Qi Lu Shu She, 1987.
- Griffiths, Paul. *Modern Music: The Avant Garde Since 1945*. London: J.M. Dent & Sons Ltd., 1981.
- Hasty, Christopher. "Segmentation and Process in Post-tonal Music." *Music Theory Spectrum* 3 (1981): 54-73.

- I Ching*. Translated by Richard Wilhelm from Chinese into German, rendered into English by Cary F. Baynes. Princeton: Princeton University Press, 1977.
- Kostelanetz, Richard. *Conversing with Cage*. London: Omnibus Press, 1989.
- Legge, James, transl. *The Chinese Classics*. Vol. 5, *The Ch'un Ts'ew with the Tso Cheun*. Taipei: SMC Publishing Inc., 1991.
- Li, Zhilin. *The Theory of Vitality and the Traditional Chinese Way of Thinking*. Shanghai: Xue Lin Chu Ban She, 1990.
- Liao, Mingchun, Kang Xuwei, and Liang Shuxian. *Zhou Yi Yan Jiu Shi* [The History of I Ching Studies]. Changsha: Hunan Chu Ban She, 1991.
- Liu, Changlin. *Zhongguo Xitong Siwei* [Chinese Systemic Thinking]. Beijing: Zhongguo Shehui Kexue Chu Ban She, 1990.
- Jin, Jingfang. *Zhou Yi Jiang Zuo* [Zhou-yi Symposium]. Changchun: Jilin University Press, 1987.
- Kaufman, Walter. *Musical References in the Chinese Classics*. Detroit: Information Coordinators, Inc., 1976.
- Kalib, Sylvan Sol. "Thirteen Essays from the Three Yearbooks "Das Meisterwerk in der Musik" by Heinrich Schenker: An Annotated Translation." 3 vols. Ph.D. diss., Northwestern University, 1973.
- Mead, Andrew. "Some Implications of the Pitch Class/Order Number Isomorphism Inherent in the Twelve-Tone System: Part One." *Perspectives of New Music* 26/2 (1988): 96-163.
- _____. "Some Implications of the Pitch Class/Order Number Isomorphism Inherent in the Twelve-Tone System, Part Two: The Mallalieu Complex--Its Extensions and Related Rows." *Perspectives of New Music* 27/1 (1989): 180-233.
- Ministry of Culture, Music Research Center. *Zhong Guo Gu Dai Yue Lun Xuan Ji* [Selected References of Ancient Chinese Music Theory]. Beijing: Ren Min Yin Yue Chu Ban She, 1983.
- Morris, Robert D. *Composition with Pitch-Classes: A Theory of Compositional Design*. New Haven: Yale University Press, 1987.
- Rahn, John. *Basic Atonal Theory*. New York: Longman, 1980.
- Shchutskii, Iulian K. *Researches on the I Ching*. Translated by William L. MacDonald and Tsuyoshi Hasegawa with Hellmut Wilhelm. London: Routledge & Kegan Paul Ltd., 1980.
- Straus, Joseph N. *Remaking the Past--Musical Modernism and the Influence of the Tonal Tradition*. Cambridge, Massachusetts: Harvard University Press, 1990.
- _____. *Introduction to Post-Tonal Theory*. Englewood Cliffs, New Jersey: Prentice Hall, 1990.
- _____. "The Problem of Prolongation in Post-tonal Music." *Journal of Music Theory*, 31/1 (1987): 1-22.

- Wilhelm, Hellmut. *Change--Eight Lectures on the I Ching*. Translated by Cary F. Baynes. Princeton, New Jersey: Princeton University Press, 1973.
- Wu, Lingshu. *Yi Jing Tan Wei [Exploring I Ching]*. Beijing: Qi Xiang Chu Ban She, 1989.
- Van Over, Raymond, ed. *I Ching--Based on the Translation by James Legge*. New York: The New American Library, 1971.
- Vinton, John, ed. *Dictionary of Contemporary Music*. New York: E.P. Dutton & Co., Inc., 1974. S.v. "Asian Music and Western Composition," by Wen-chung Chou.
- Zhang, Chengxu. *Zhou Yi Xianh Li Zheng [The Symbolism, Theory, and Examples of I Ching]*. Tianjin: Tianjinshi Gu Jie Shudian, 1989.
- Zheng, Yinglie. *Xulie Yinyue Xiezuo Jichu [The Foundation of Serial Music Writing]*. Shanghai: Shanghai Yinyue Chu Ban She, 1989.
- Zhou, Xiaosheng. *Taiji system in Composing*. Guangzhou: Kexue Pu Ji Chu Ban She Guangzhou Fen She, 1990.