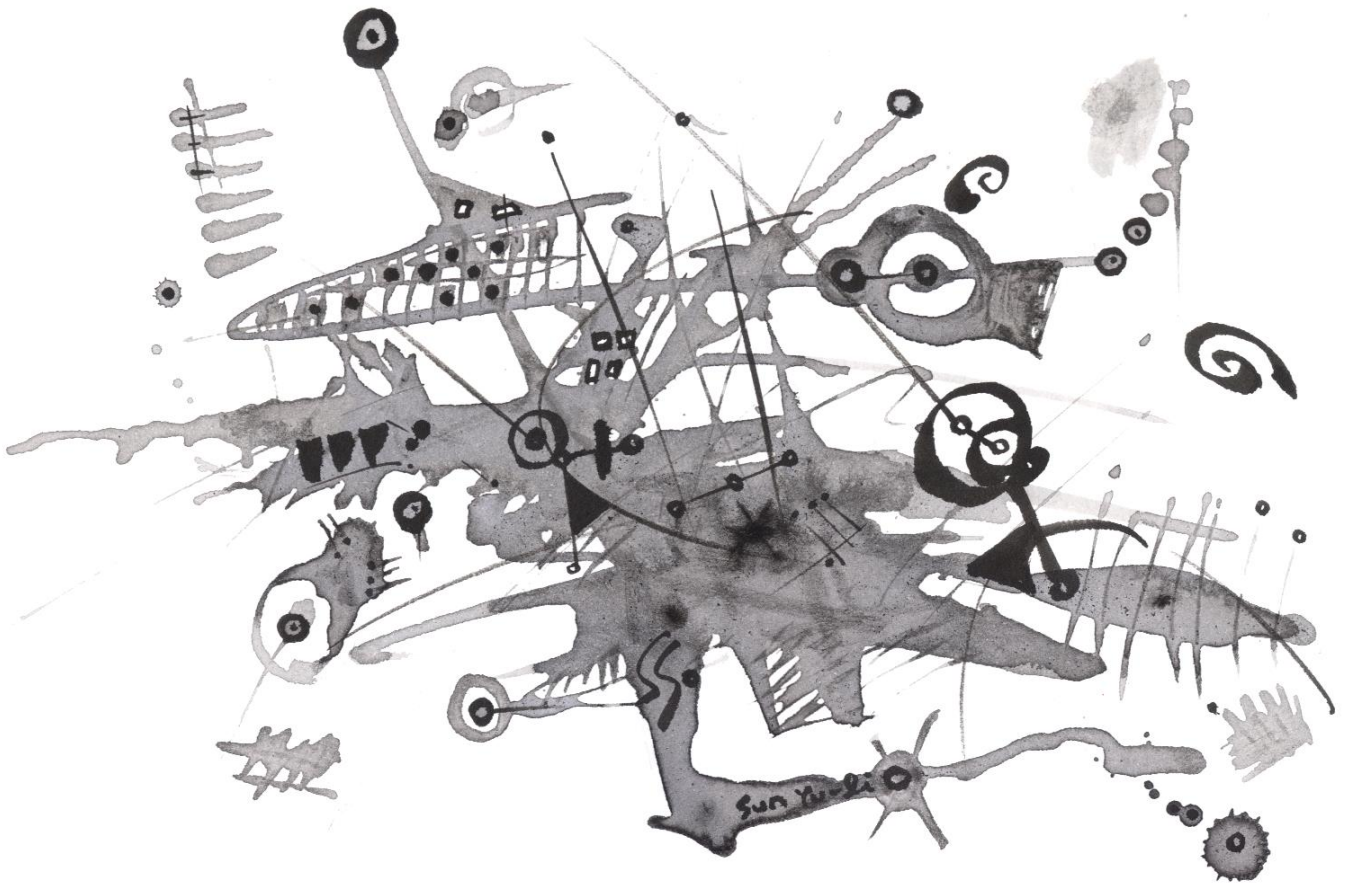


# THE FORMAL LANGUAGE OF THE METAPHYSICAL



**to my Father my source of inspiration**



## PREFACE

The publishing of "The Formal Language of the Metaphysical" and "I-Ching and the Formal Language of the Metaphysical" represents the completion of a stage of my efforts, since 1976, to search for an answer to this question.

In all these years, in order to find the answer, I read extensively into relevant areas of topology, geometry, physics, philosophy, archaeology, linguistics, architecture, space theories and I-Ching. Much effort and soul-searching was put into conceptualizing and re-designing of symbols; finding meanings behind wordings and structuring of forms. This publication is the result of my research efforts.

The next step after the establishment of "The Formal Language of the Metaphysical" is to research into Language itself. In fact:

"Dot" represents the Subject of Language  
"Line" represents the Verb of Language  
"Plane" represents the Object of Language

After an understanding in this aspect, the "Form" and "Content" of a language can be formally (graphically) recorded, orderly and separately, into a form of "Form" and a form of "Content". It will surely be a solid first step if this method can be processed by computer and applied to the design and development of the most efficient artificial intelligence, simultaneous translations and super computers.

The embarrassing situation in intellectual fields today, when faced with a "core" problem, that only "Approximation" and "Simulation" are dared to be attempted, "Preciseness" and "Perfection" is beyond reach, can be resolved.

Even more so, this article may subtly hold the key to solve the ultimate quest of the twentieth century man:

Finding the "Grand Unification Theory" to merge the "General Theory of Relativity" and the "Theory of Quantum Mechanics".

**I firmly believe so.**

*"So-called space is actually something which can be held by man. It is something that is created by man. However, how can man show the presence of space? It can only be done when he introduces Metaphysical Moulds into his world. Metaphysical Moulds link the mind and the form. The application is the birth of language." Shi Zuo-Cheng*

## **1. THE UNFOLDING OF SPACE**

### 1.1 Zero-Dimensional Space

It is a non-space. It has no elements. Nothing can be registered.

### 1.2 One-Dimensional Space

It is a linear space. Its element is a dot. A position can be registered.

### 1.3 Two-Dimensional Space

It is a planar space. Its elements are a dot and a line. A length can be registered.

### 1.4 Three-Dimensional Space

It is a volumed space. Its elements are a dot, a line and a plane. An area can be registered.

## **2. THE COMPONENTS OF SPACE**

Space is the co-existence of two sub-spaces which are different but complementing in nature.

Topological Space	--	a conceptual space	(C-Space)
Geometrical Space	--	a structural space	(S-Space)

## **3. THE ELEMENTS OF C-SPACE AND S-SPACE**

### 3.1 C-Space Elements

#### a. The Conceptual Dot (CD)

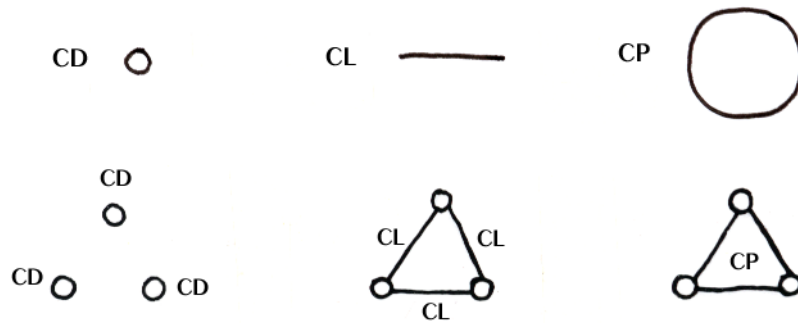
A CD only indicates a position in a space. It has no length, width nor depth.

#### b. The Conceptual Line (CL)

A CL is formed when a CD extends itself. It has a length but has no width nor depth.

c. The Conceptual Plane (CP)

A CP is formed when a CL extends sideways. It has a length and a width but no depth.



3.2 S-Space Elements

a. The Structural Plane (SP)

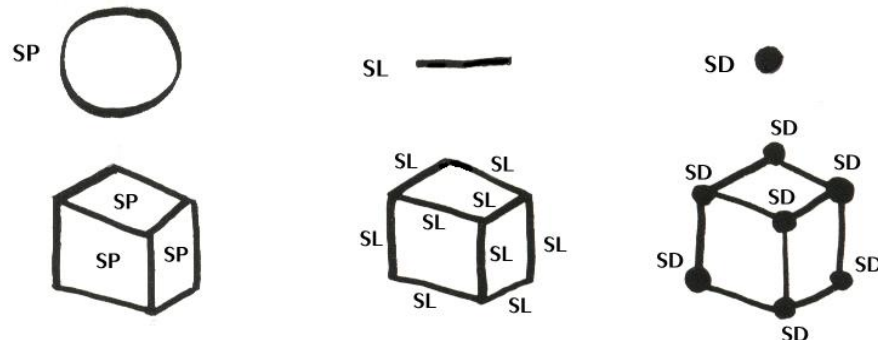
The SP is the surface of a three-dimensional volume in space. It has a length and a width but has no depth.

b. The Structural Line (SL)

The SL is the meeting line of two SPs. It has a length but has no width nor depth.

c. The Structural Dot (SD)

The SD is the meeting point of three SPs. It has no length, width nor depth.



**4. THE RELATIONSHIP BETWEEN C-SPACE AND S-SPACE ELEMENTS**

4.1 Twin Genesis of the Basic Elements

The initial two CD and SD co-exist infinitely close to each other as different but complementing dots. The CD is a condensation of the Topological space or C-Space and the SD is the condensation of the Geometrical space or S-Space.

The two dots, CD and SD, are the Basic Elements because it is from them that the respective lines, CL and SL, and planes, CP and SP, are derived.

4.2 Active and Reactive Nature of the Basic Elements

a. The CD is an Active Element. It always initiates a change.

b. The SD is a Reactive Element. It always and only reacts to a change initiated by a CD.

### 4.3 Derivative Elements (CL, SL, CP and SP)

The constructing and transforming of the Basic Elements and the Derivative Elements form:

Conceptual Graph (C-Graph) in C-Space  
Structural Graph (S-Graph) in S-Space

## 5. RULES OF CONSTRUCTION AND TRANSFORMATION

### 5.1 Rules of Construction for Conceptual Graphs (C-graph)

a. A CD can remain at its position, unchanged (Fig. 1, Fig. 2).

b. A CD can extend from its position, forms a CL (Fig. 1, step 1), stops at another position, and establishes another CD (Fig. 1, step 2).



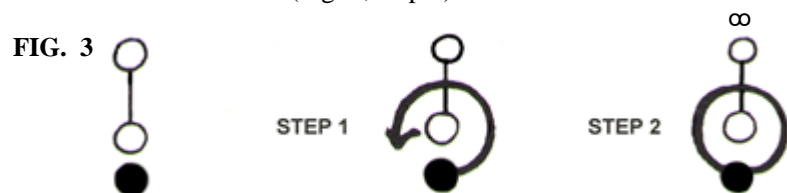
c. A CD can extend from its position, forms a CL, loops back to its original position (Fig. 2, step 1), and establishes another CD which merges with the original CD, and a CP is created (Fig. 2, step 2).



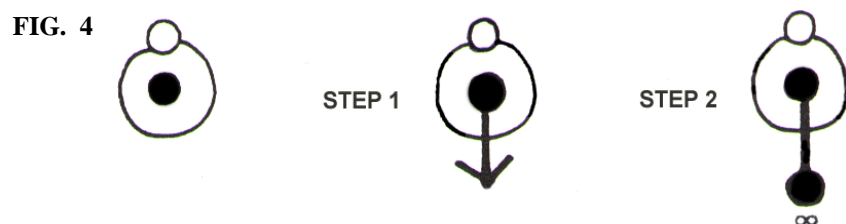
### 5.2 Rules of Transformation for Structural Graphs (S-graph)

a. An SD will always remain at its position, unchanged and will always and only react to a change initiated by a CD (Fig. 3, Fig. 4).

b. A CL formed must be intersected once and only once by an SL formed by a reacting SD which loops back to its original position (Fig. 3, step 1), and establishes another SD which merges with the original CD and a SP is created (Fig. 3, step 2).



c. In every CP, there should exist one and only one SD which cuts across CL (Fig. 4, step 1), stops at another position, and establishes another SD (Fig. 4, step 2).

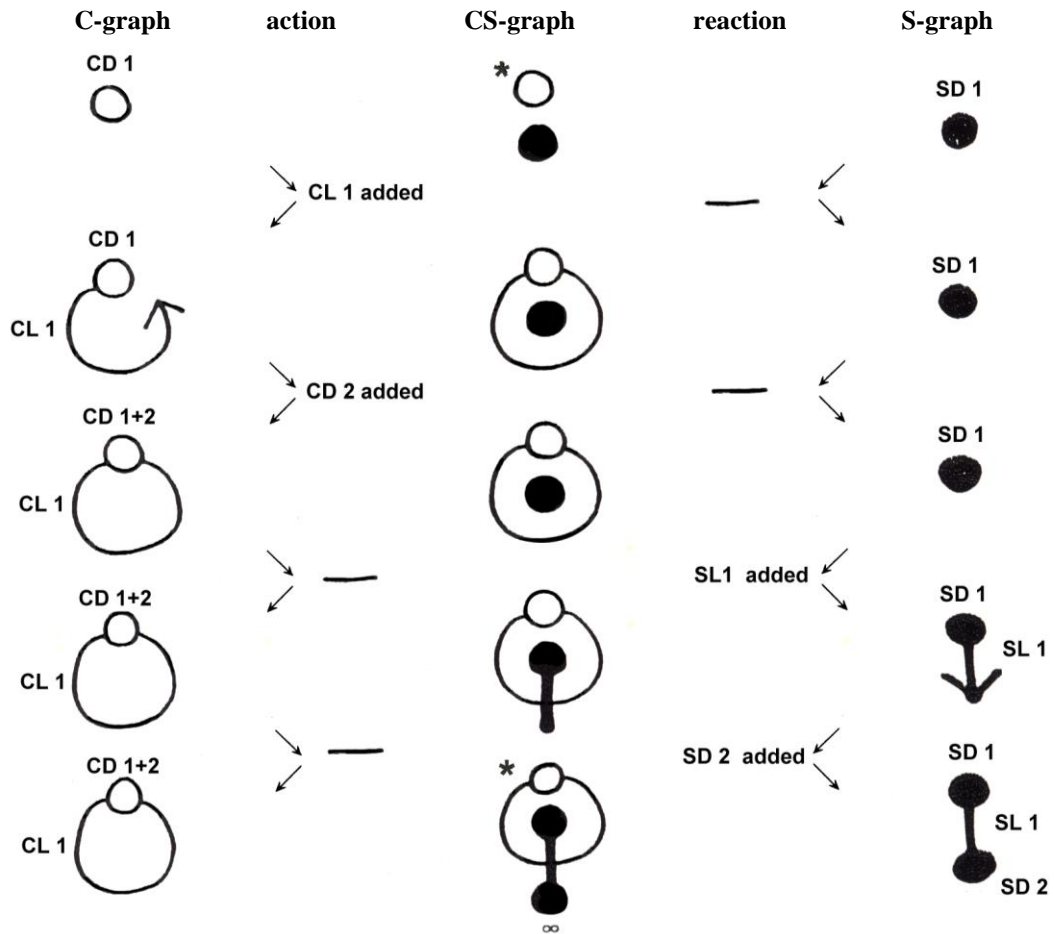


There is a type of Graph called "Planar Graph and its Dual". Any given pair of corresponding Planar Graph and its Dual Graph should respectively satisfy the Rule:  $D + P - 2 = L$ . This type of Graph with its Rule was formulated by 18th Century mathematician Leonhard Euler. The C-graph is in fact, Euler's Planar Graph and the S-graph Euler's Dual Graph. So the CS-graph is Euler's Planar Graph with its Dual.

There are numerous types of Graphs, each with dots, lines and planes as elements and all have their own expanding rules in Graph Theory. However, Planar Graph and its Dual is the only type of graph to have eluded mathematicians, in their search for the formula capable of calculating all the possible number of graph, given a fixed number of dots, lines and planes. Will this formula remain unknown to man? The reason behind its elusiveness is intriguing.

## 6. DERIVING THE FRAMEWORK OF THE FORMAL LANGUAGE

The framework below shows how C-graphs and S-graphs are derived, combined as CS-graphs, by applying the Rules that have been established.



### \* representing a stabilized CS-Graph

a stabilized C-graph should satisfy the Rule:  $CD + CP - 2 = CL$

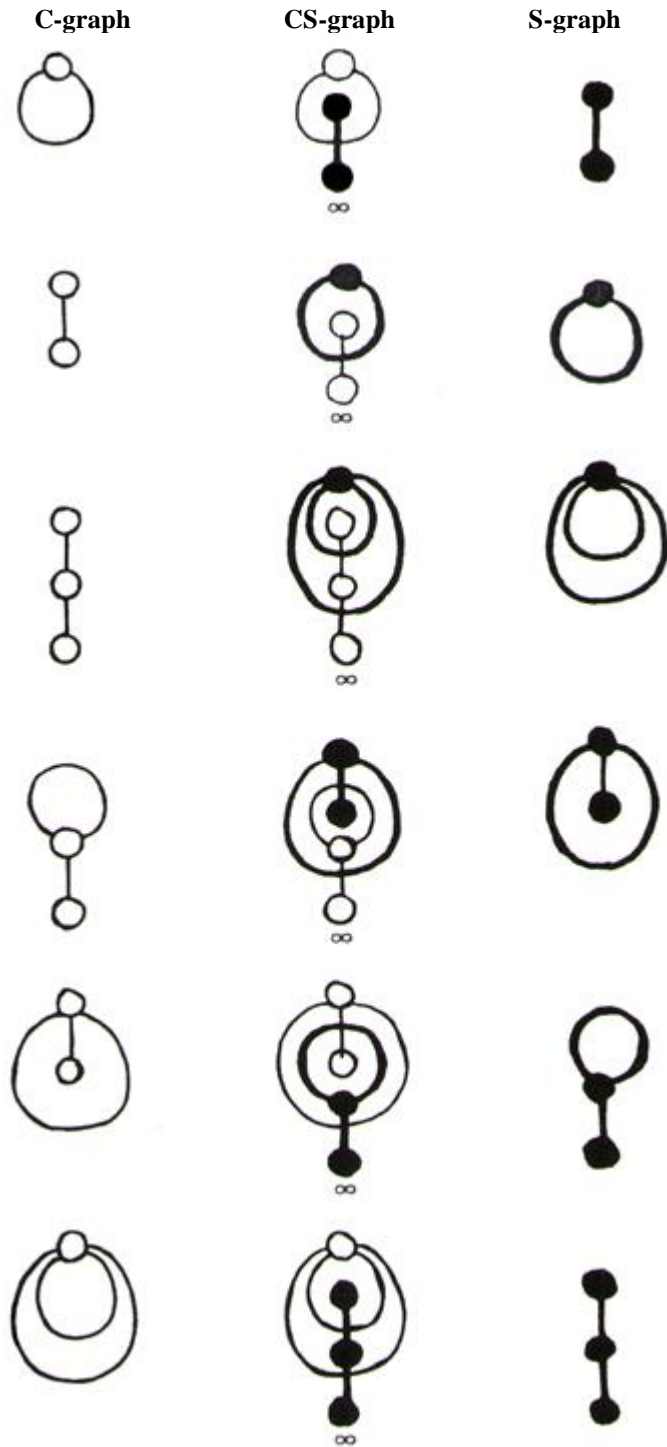
a stabilized S-graph should satisfy the Rule:  $SD + SP - 2 = SL$

a stabilized CS-graph is obtained only when both C-graph and S-graph are stabilized.

According to Graph Theory of the planar graph and its dual, a CD or SD, outside of a stabilized graph, is at infinity ( $\infty$ ).

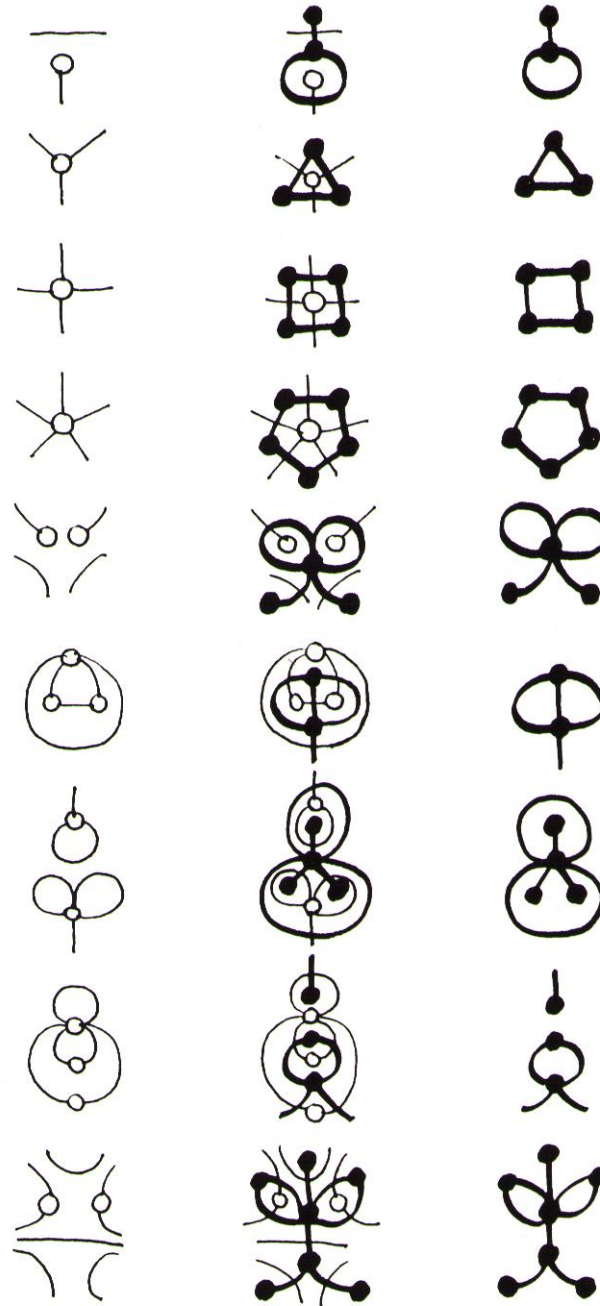
## 7. THE BASIC METAPHYSICAL MOULDS

The combined stabilized CS-graphs are the basic Metaphysical Moulds.



## 8. The FORMAL LANGUAGE OF THE METAPHYSICAL

The Metaphysical Moulds are infinite in number and are the concrete forms of the Formal Language of the Metaphysical.



The CLs or SLs, outside of the Metaphysical Moulds (Stabilized CS-graph), are linked to one (and only one) CD or SD at infinity ( $\infty$ ).

**I-CHING**  
**and**  
**THE FORMAL LANGUAGE OF THE METAPHYSICAL**



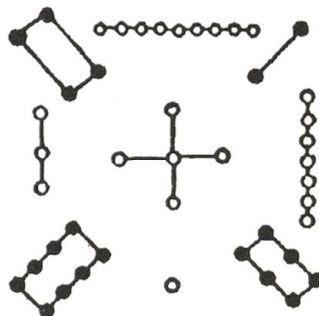
The I-Ching is considered the oldest scripture in Chinese culture and respected as the progenitor of all writings. But the birth of I-Ching is from the Eight Trigrams which comes from He-Tu and Luo-Shu.

According to an ancient legend, a dragon-horse surfaced from the Yellow River carrying the He-Tu on its back. And from the River Luo, A sacred turtle surfaced with the Luo-Shu. The He-Tu and Luo-Shu were graphs symbolizing nature's phenomena and containing the metaphysical rules and principles of the universe in motion.

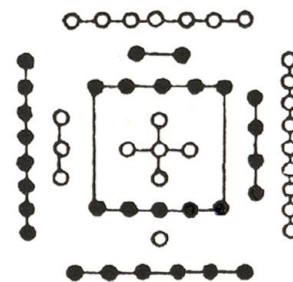
The wise man Fu Xi drew the Eight Trigrams based on the He-Tu. Da Yu wrote the rules of dividing land based on the Luo-Shu. Wen Wang wrote the I-Ching from the Eight Trigrams. These recordings established the foundation and framework of Chinese civilization.

He-Tu and Luo-Shu were subsequently lost. Later man, basing on the bits of fragmented information and using their reasoning, managed to re-create some of the graphs. However, the important metaphysical rules and principles contained in the graphs of He-Tu and Luo-Shu were never found.

### WHAT WERE THESE RULES AND PRINCIPLES?



**LUO-SHU**



**HE-TU**

# 1. FROM NULL TO EXISTENCE

## 1.1 Wu-ji (Null)

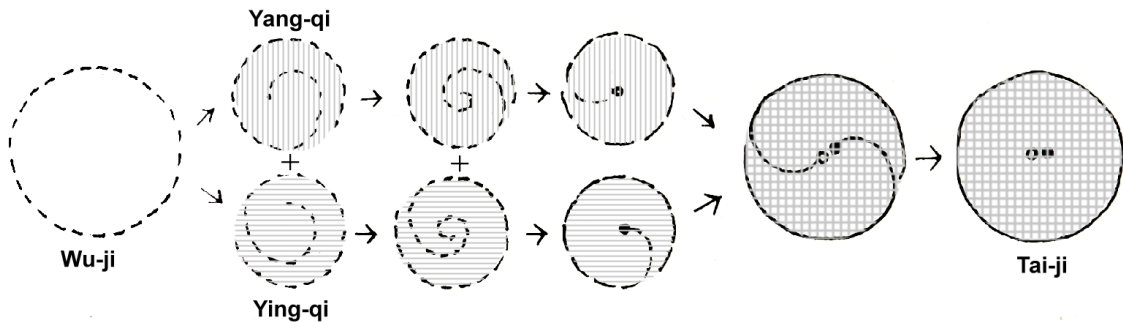
This is before matter existed. The primeval state of the universe. There is no concept to describe it. It is beyond description.

## 1.2 Tai-ji (Existence)

Although Tai-ji or Existence is conceived from Wu-ji or Null, Tai-ji is originally Wu-ji. Somehow the null state of the universe started to turn and spin like a vortex. It gained velocity and concentrated on a point. That is the point of Tai-ji which contains the essence from which all things are derived.

## 1.3 Tai-ji to Liang-yi (Yin and Yang)

The spinning of the null state of the universe is in fact caused by the two opposing spirits of Yin-qi and Yang-qi. Therefore the point created, Tai-ji, actually comprises the concentrated spirit of the Yin-qi and Yang-qi which are infinitely close but never touching (Fig.1). This pair of spirits symbolizes and forms the basis of the universe.



## 1.4 Liang-yi to Four Graphs

The shift from Tai-ji to Liang-yi is a shift from the static to the dynamic. And therein lies the metaphysical rules and the principles of an universe in motion.

What are these rules and principles which the wise man Fu Xi had inferred and applied them to obtain the Liang-yi and Four Graphs from which came the Eight Trigrams?

## 2. I-CHING AND THE FORMAL LANGUAGE OF THE METAPHYSICAL

### 2.1 The Eight Trigrams of I-Ching

The Eight Trigrams are eight sets of permutations of solid and broken strokes in three positions.

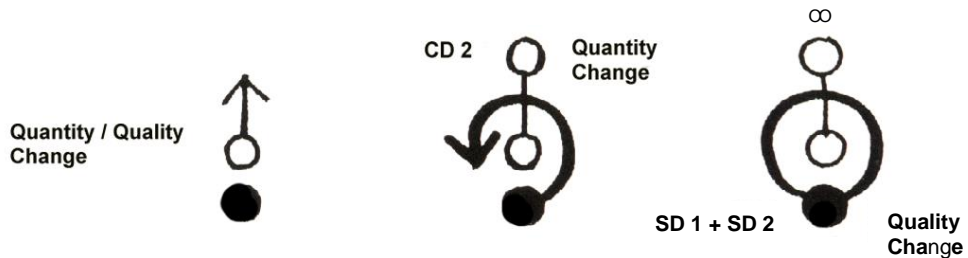
Fu Xi who first drew them and assigned to them their very first meanings, had followed the rules and principles found in He-Tu and Luo-Shu. Wen Wang who later wrote the I-Ching and derived the 64 Hexagrams from the Eight Trigrams had followed the very same rules and principles.

On one hand, the derivation of I-Ching is from Tai-ji(1), Liang-yi(2), Four Graphs(4), Eight Trigrams(8), .... On the other hand, after basic elements of CD and SD acts and reacts, the number of stabilized CS-graphs in stages is 1,2,4,8, .... What is the interesting correlation between the two?

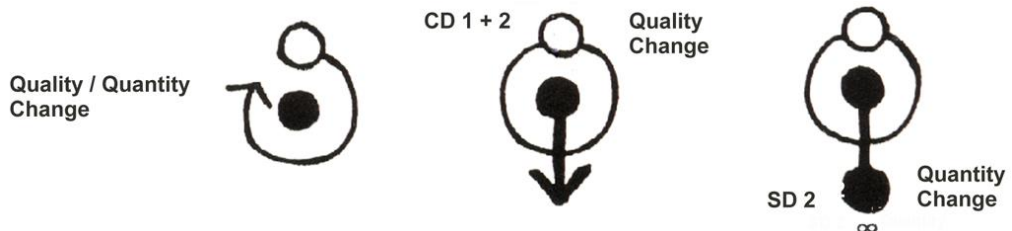
### 2.2 Rules of Construction and Transformation

When Rules of Construction and Transformation apply, Basic Elements CD acts and SD reacts.

- a. When CD acts, it forms a CL, stops at another CD (a quantity change), SD reacts, it forms a SL, loops back, cuts across CL, establishes another SD which merges with the original SD ( a quality change ). This whole process is recorded as Quantity/Quality.



- b. When CD acts, it forms a CL, loops back to its original position, establishes another CD which merges with the original CD (a quality change). SD reacts, it forms a SL, stops at another SD (a quantity change). This whole process is recorded as Quality/Quantity.



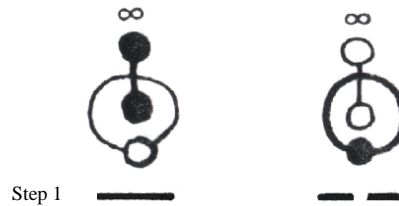
### 2.3 Action and Reaction

By assigning:

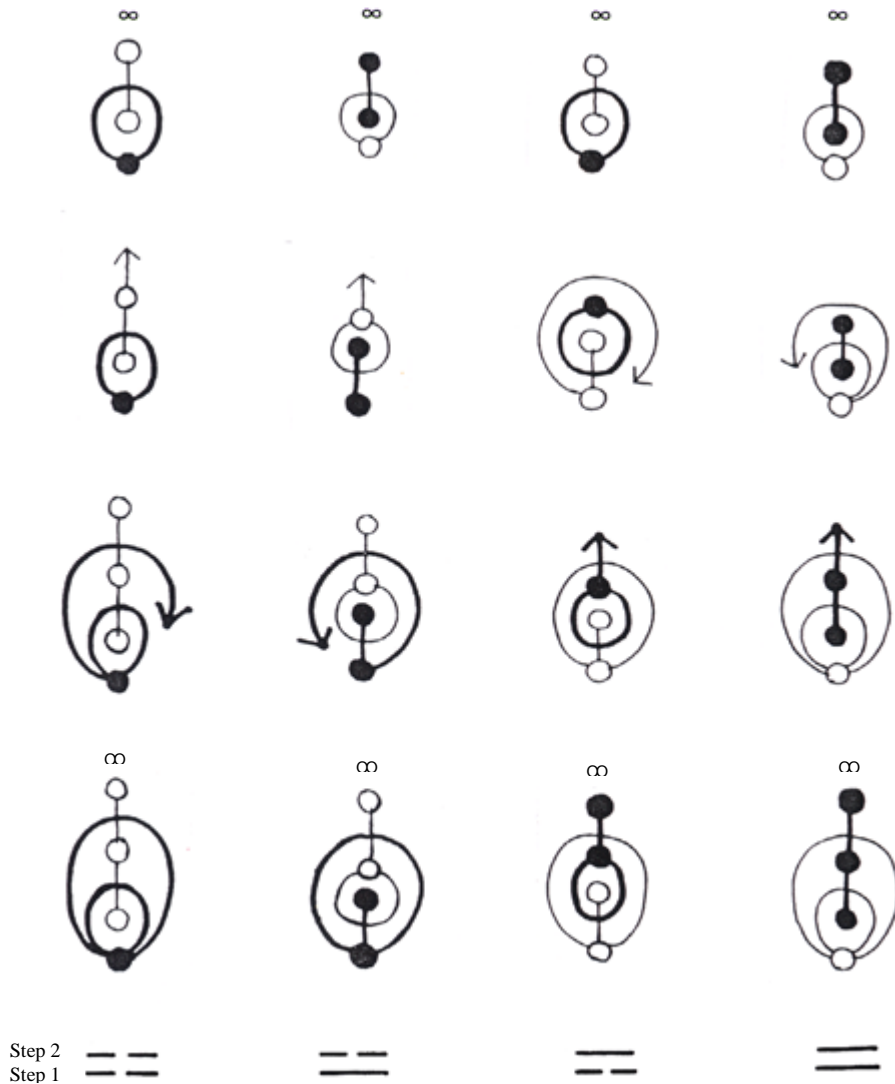
— (Yang or Positive) to represent Quality/Quantity

- - (Yin Negative) to represent Quality/Quantity

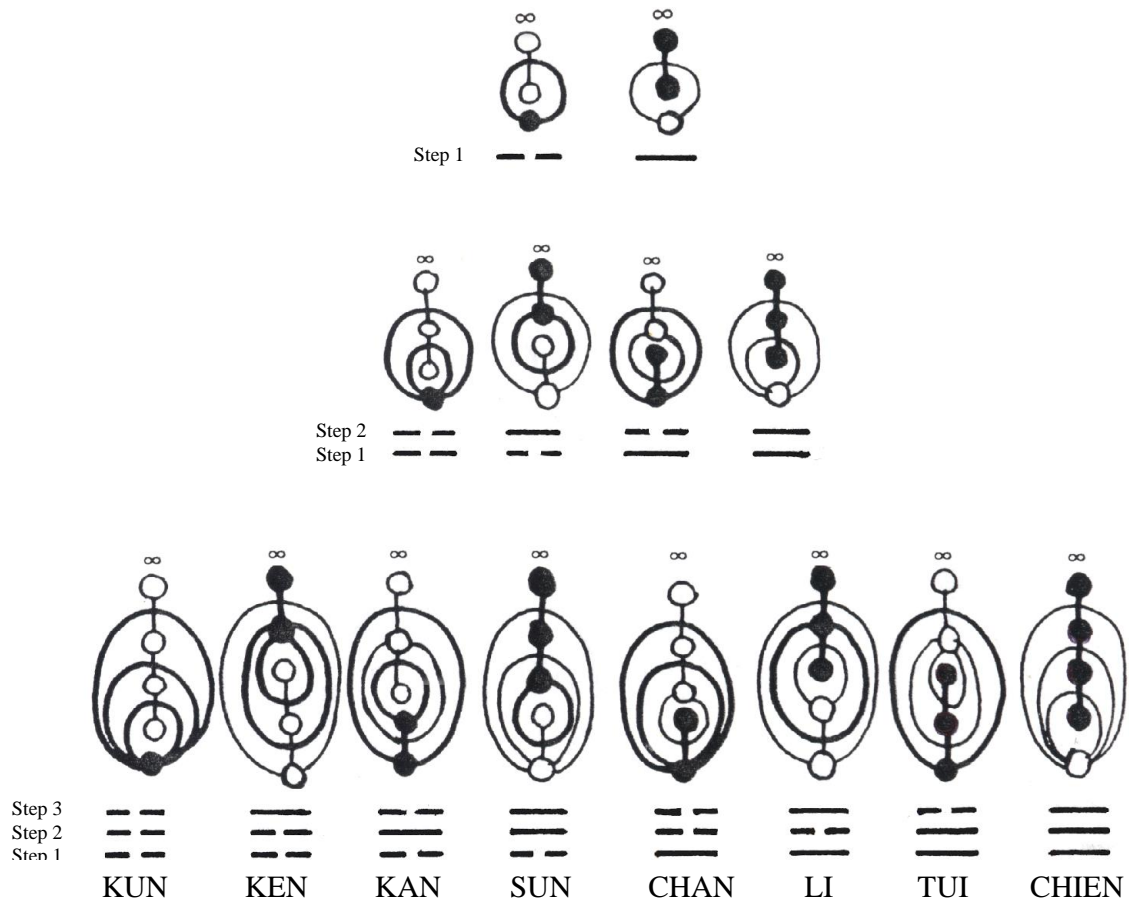
When CD acts and SD reacts, by applying the rules established, there will be only two possible derivatives to achieve the stabilized Graphs at this initial stage.



There will be only four possible derivatives at the second stage.



Further derivations prove that the Bar-grams of I-Ching and the Graphs of the basic Metaphysical Moulds correspond exactly (even beyond Eight Trigrams, 16, 32, 64....).



Bar-grams of I-Ching is the sequentiality of Binary Signals in Time.

Metaphysical Moulds of the Formal Language is the planes in Space.

Time (Bar-grams) can be concretized in Space (Metaphysical Moulds).

Space (Metaphysical Moulds) can be dissolved sequentially in Time (Bar-grams).

**Space and Time is one.**



Listed below are the most important books and articles which contributed to my research:

1. *"Syntactic Structures"* by Noam Chomsky, 1957, published by Monton & Co., Netherlands.
2. *"The Image of the City"* by Kevin Lynch, 1960, published by M.I.T. Press, U.S.A.
3. *"Notes on the Synthesis of Form"* by Christopher Alexander, 1964, published by Harvard University Press, U.S.A.
4. *"Topological Organization of Architectural Spaces"* by Jean Cousin, 1970, published by Montreal University Press, Canada.
5. *"The Spatial Representation of Science, Philosophy and Geometry"* by Shi Zuo-Cheng, 1970, published by Buo Xue Press, Taiwan, R.O.C.
6. *"Principles of Three Dimensional Design"* by Wong Wu-Xie, 1970, published by Lion Press, Taiwan, R.O.C.
7. *"Existence, Space and Architecture"* by Christian Norberg-Schulz, 1971, published by Studio Vista Limited, Great Britain.
8. *"Writing Transformational Grammars: an introduction"* by Andreas Koutsoundas, 1972, published by McGraw-Hill Book Company, U.S.A.
9. *"History, Nature and Man"* by Shi Zuo Cheng, 1974, published by Yang Zhe Press, Taiwan, R.O.C.
10. *"Space Syntax "* by B. Hillier, A. Leaman, P. Stansall, M. Bedford, 1976, published by "Environment and Planning B" Vol 3, p.147-185, England.