A Theory of The Rational Origins of *Yi Jing*

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Abstract: *The emergence of Yi Jing (Book of Changes) is rooted in profound rational principles. as an important document from the early stages of Chinese civilization, Vandermeersch believes that the origins of Yi Jing underwent a leap from intellectual abstraction to numerical rationality, evolving into a mature semi-automatic "rational toolset". The formation of Yi Jing provided a key norms for early Chinese intellectual communities.*

Introduction

As a contemporary French sinologist, Léon Gérard Marie Joseph Vandermeersch (1928-2021) was one of the earliest European scholars to study the oracle inscriptions. He devoted his entire life to sinology research, served as a professor in the Chinese Department at the University of Paris VII, a researcher at the French Institute for Advanced Studies, and the director of the French School of Far Eastern Studies, in Chapter 5 of his book *Les Deux Raisons de La Pensée Chinoise: Divination et Idéographie* published in 2013, he conducted an in-depth exploration of the essence and origins of Yi Jing.

1. Yi Jing and Oracle Divination

Yi Jing features sixty-four hexagrams, each of them is composed of two overlapping tri-lined *trigrams* with which is yin line (⚊⚊) and yang line (⚊) arranged from bottom to top (2^3=8: ☰, ☷, ☳, ☴, ☵, ☶, ☲, ☱, what is called *Ba Gua or Eight Trigrams*, thus, 8^2=64: ䷀, ䷁, ䷂, ䷃, ䷄, ䷅, ䷆, ䷇, ䷈, ……). Each hexagram has its corresponding line inscriptions and hexagram inscriptions. In ancient China, people used these hexagrams to conduct divinations according to certain rules by divination sticks, namely Hexagram Divination.

Vandermeersch believes that there is a suspected direct connection between Yi Jing and Oracle Divination. Yi Jing and its hexagram divination is essentially a new divination mechanism, using six defined numbers to correspond to *Divination Omens* (divination cracks), but the symbols used to represent their meanings are not the ordinary numbers, but rather *Yin (⚊⚊)* representing *even numbers or Yang* (⚊) representing *odd numbers*. It essentially shares the same logic of application as the *Divination Omens* of Oracle Divination, which uses analogy, while the divination using the *Eight Trigrams* uses numbers. There is continuity between them. Ancient Chinese people hatched the more abstract *numerical* divination from the Oracle Divination *Omen chart* using the basic binary numerical thinking mode of standardized odd or even numbers.

According to archaeological discoveries, oracle bone fragments with *Numbered divinatory symbol* already existed for a very long time before the latter half of the Shang dynasty, while hexagram divination had just emerged then. Vandermeersch believes that this clearly indicates an improvement in divination methods. These hexagram were not an aid to *Divination Omens*, but a replacement for them. Vandermeersch has deduced the process of this rational leap.

2. *Intellectual abstraction* and *Numerical rationality* in Hexagram Divination

In the process of standardizing and transforming the divination cracks and generating ideographic symbols through Divination Formulas[1], the ShiGuan (diviners/historians) made the leap from the *instrumental abstraction* of " ⼘ " to the *Intellectual abstraction*, and developed a kind of numerical

rationality.

The improvement of the pit-drilling technology[2] provided a basis for classifying divination cracks, gradually narrowing their types to five or six. At this time, the ShiGuan began to realize that the efficiency of Oracle Divination could be greatly improved.

The first preparatory step in Oracle Divination is the collection and pre-treatment of oracle bones. Firstly, it is necessary to find freshwater turtles suitable for making oracle bones and maintain a certain inventory of turtle shells. These tasks require a certain amount of resource input. Then comes the time-consuming pre-treatment process of oracle bones. The oracle bones used are the plastrons of turtle shells. Tools must be used to first saw the plastrons away from the carapace and the bridge of the shell, then remove the remaining soft tissue, and smooth out the part where the spine connects to the carapace and the uneven surface of the shell through scraping, cutting, and some other processes. The bone glue on the surface of the nine bones of the plastron must be scraped off, followed by careful polishing.

The second preparatory step involves drilling and chiseling at the burning point. Use tools to drill a shallow round concave hole that does not penetrate through the oracle bone, carve another shallow oval or apricot-shaped hole close to the tangent line inside it, which is impervious to the penetration of the oracle bone, with a width approximately half that of the round concave hole. This kind of drilling and chiseling poses certain difficulties. In order to successfully achieve the desired shapes of the divination cracks during divination, it is necessary to neither penetrate through the oracle bone nor reduce its thickness.

The final step involves using a fine fire rod to stick in and cauterize the burning point until it cracks, creating intersecting cracks called CHE on the back of the concave holes. The longitudinal crack produced by chiseling is called Bu Gan, while the crack produced by drilling is called Bu Zhi. The technical processing ensures that the two are connected, forming a ⊢ shaped cracks (Bu).

The patterns of ⊢ shaped cracks was gradually summarized, forming a Oracle Divination Omen chart that encompassed 5 or 6 types, and been indexed and coded. This led to a crucial new knowledge: all the previous cumbersome processes could be streamlined and simplified by the transitioning from ***The procedure for obtaining oracle divination cracks*** to ***The procedure for obtaining the indexed codes corresponding to the oracle divination omens.*** Such simplification allowed for achieving results that previously required three steps with tremendous manpower and material resources, now could be attained by obtaining the indexed codes of the divination omens from the Oracle Divination *Omen chart*. This marked a significant leap forward.

During the transition from the Stone Age to the Bronze Age, the preparation and pretreatment of oracle bones, as well as the drilling and chiseling of oracle bones, were all manual operations. The resources invested and the difficulties encountered are immense. Turtles are living creatures, unlike products with uniform specifications on the production line. Factors such as the species and age of the turtle, as well as the storage duration of the turtle shell after pretreatment, can lead to significant differences in the thickness, texture, structure, hardness, and softness of the turtle shell. In these several processing steps, the crude tools and operational errors inevitably lead to a high rate of defects. Furthermore, As a solemn and sacred religious procedure, the consequences of failure in Oracle Divination due to the technical processing reasons can be extremely serious.

Therefore, the digitization of Oracle Divination become inevitable.

3. "—" and "--"

In ancient times, divination were sacred. How did the ancient Chinese simplify the procedures, save a significant amount of resource investment, and avoid the risk of failure due to technical processing defects, while maintaining the sacred form?

The fact is that they achieve this through the specialization of the Index code for the Oracle Divination *Omen chart*.

The Oracle Divination *Omen chart* reflects the induction of the divination omens, if there should be some index codes, they should be clearly distinguished from ordinary numbers and exhibit a unique external appearance.

Archaeological studies have confirmed that the hexagram system underwent a tortuous process, gradually eliminating the two-line, three-line, four-line, or five-line in numbered divinatory symbols, and

the numbers used to denote the six lines of the hexagram are also gradually becoming standardized.

The early numbered divinatory symbols did not employ consecutive numbers. Archaeological discoveries have revealed the presence of 1, 5, 6, 7, 8, and 9, with 10 also being found in rare instances, but 2, 3, and 4 are absent. A plausible explanation is to avoid confusion in symbols. Since 1, 2, 3, and 4 (一, 二, 三, 亖) all consist of horizontal strokes superimposed one on top of another, and the arrangement of oracle inscriptions follows a top-to-bottom order (which is also the origin of traditional Chinese writing), the presence of "two", "three", and "four" together or individually would inevitably lead to some confusion, thus they were initially excluded. Archaeological evidence confirms that the numbers 1, 5, and 10 were subsequently eliminated in practice.

The four numbers left, namely 6, 7, 8, and 9, are known as Ying numbers (stack numbers). In divination, these four numbers are obtained through a programmed lot-drawing process, but they are not yet the final hexagram marking numbers. Instead, their *even* and *odd* properties are used to represent the *Yin* and *Yang* (Yin and Yang are the opposing forces in Chinese culture like dark and bright, light and darkness etc.) properties of the six lines of the hexagram. 6 represents *Tai Yin* (Yin the utmost, also denotes the Moon), 7 represents *Shao Yang* (Yang the initial), 8 represents *Shao Yin* (Yin the initial), and 9 represents *Tai Yang* (Yang the utmost, also denotes the Sun). After the lot-drawing is completed, they change according to the rules: *Shao Yin* changes to a new *Tai Yin*, the original *Tai Yin* changes to a new *Shao Yang*, the original *Shao Yang* changes to a new *Tai Yang*, the original *Tai Yang* changes to a new *Shao Yin*.

The line properties of 6 and 9 change. Ultimately, the four numbers become a pair of binary symbols, "—" and "--" (*Yin* and *Yang*).

Vandermeersch believes that the two binary symbols "--" and "—" are derived from the numbers 8 and 7. Among the four Ying numbers, 7 and 8 represent *Shao Yang* and *Shao Yin*, whose properties do not change. The oracle bone script for 8 is a symmetrical vertical short arc shape, while the shape of the character 8 in the documents unearthed from the Han tomb at Mawangdui is "⌐ └". The symbol "--" of the *Yin* line may have evolved from it. The oracle bone script for 7 is shaped like "十", and in the documents unearthed from the Han tomb at Mawangdui, it is written with a longer horizontal stroke and a vertical stroke reduced to a dot, which may eventually develop into "—". In the context of using binary numbers, since only two symbols are needed to represent all, the simpler the better. Therefore, the morphological evolution of the Yin and Yang symbols "--" and "—" was completed.

4. A Hypothesis about The Formation of Yi Jing

Yi Jing is known as an intellectual tool compiled by King Wen of Zhou for national supreme decision-making, akin to a semi-automatic *rational toolkit*. Decision-makers derive rational thinking from it, *retrieving* codes compiled in the toolkit through divination procedures according to certain rules. They comprehend the critical thinking embedded within, and then make decisions based on practical application, realizing the auxiliary decision-making role of Yi Jing.

It is impossible to fully reconstruct the details of history. But can we outline the compiling process of the sixty-four hexagrams of Yi Jing through hypothesis?

In the sciences of direct observation, when a certain fact is missing in a series of facts, it can be discovered through a new observation. In history, we do not have such resources, so we rely on reasoning to expand our knowledge. Starting from the facts we know from literature, we strive to obtain new facts through reasoning. If the reasoning is correct, then this method of knowledge acquisition is legitimate.

- By Charles-Victor Langlois and Charles Seignobos[3]

We can make deductive hypotheses based on logical rationality. The oracle divination activities gave rise to oracle inscriptions. The accumulation and induction of these inscriptions should have led to the formation of higher-structured forms and the relationships between their various parts, ultimately resulting in the current structure of hexagrams and lines in Yi Jing, as well as the transformation rules between them.

This hypothesis can be specifically subdivided into the following phases.

Phase 1: At the beginning, oracle divination activities use divinatory inscriptions for recording. As divination activities gradually increased, the scope of divination expanded, and divinatory inscriptions

produced and proliferated the ideographic symbols. However, the accumulation rate was slow relative to the needs of divination, prompting the ShiGuan to devote more effort to creating ideographic symbols suitable for divinatory inscriptions to be applied in various divination activities;

Phase 2: After a certain period of development of oracle divination activities, although the frequency of divination activities has increased, and the scope of divination has further expanded, due to the efforts of the ShiGuan, the speed of creating new ideographic symbols in divinatory inscriptions has kept pace with the development of divination activities, and the supply of new divinatory inscriptions can meet the demand.

Phase 3: The oracle divination activities, which were in a period of steady accumulation, further developed into a new phase. The frequency of divination activities, as well as the scope of divination became relatively stable and normalized. At this time, the demand for creating ideographic symbols in divinatory inscriptions decreased, but the accumulation of ideographic symbols had already reached a certain amount, and the content of the existing divinatory inscriptions was rich.

In divination activities, it occasionally happens that the divinatory inscriptions are similar to those recorded in previous divination activities, resulting in records redundancy. Therefore, the ShiGuan will select the most incisive and efficacious records from the divinatory inscription database, while eliminating those that are similar to them.

Phase 4: Due to its mechanism and structural factors, the recording of divinatory inscriptions approached its creative bottleneck and reached a saturation stage. During this phase, the most incisive and efficacious divinatory inscriptions accumulated by the ShiGuan maintained an increase, while gradually eliminating those of slightly inferior quality.

The divinatory inscription data gradually reached a state where most of the newly conducted divination activities could find corresponding divinatory inscription records applicable to them in the divinatory inscription database, from occasionally being able to be applied again to a new divination activity.

Phase 5: The creation of divinatory inscriptions reached a satisfactory stage. The most concise and efficacious inscriptions recorded by the ShiGuan over a long period of time reached a peak and basically stopped being updated. They were systematically organized and studied, classified and identified according to certain rules, and necessary improvements and refinements were made to them.

Meanwhile, the ShiGuan have gained new insights through systematic organization and research practices. In the process of dividing divinatory inscriptions into genealogical records according to certain rules, those theoretically missing parts have been supplemented. Even though these missing parts are rarely used, they are theoretically necessary in the conceived system. These unlikely divinatory inscriptions have been deduced.

Phase 6: After being categorized and summarized, the divinatory inscriptions that exist as documents form a complete lineage. The application theories have also been developed, allowing for rational deduction and transformation according to rules, resulting in a natural extension of *Intellectual abstraction*. This application is gradually perfected in practice, forming a compiled instruction set and its deduction mechanism.

Eventually, during the reign of King Wen of Zhou, the optimization and upgrading of this structured compilation of divinatory inscriptions, which already possessed all the rationality and operational mechanisms of divination, was completed. This is Yi Jing.

History is full of accidents and uncertainties. The above derivation is entirely based on idealized assumptions, which may differ from the actual situation, and often inevitably do so. However, this cannot negate the necessity of derivation.

Hypotheses are nets: only those who cast the net can catch the prey.

- Novalis[4]

5. Symbolic Application Systemology of the Oracle Inscription

Before the emergence of Yi Jing, there was a lack of systematic and rational research on the generation, preservation, and application of divinatory inscriptions. The emergence of Yi Jing marks the completeness of the induction, collation, and application of divinatory inscriptions. One of its important

functions is to serve as a normative compilation of divinatory inscriptions.

Through the work of summarizing divinatory inscriptions, Yi Jing has formed a self-consistent quasi-scientific rational decision-making system. On the one hand, it facilitated the ShiGuan's mastery of divination and augury techniques, greatly improving their work efficiency. On the other hand, it facilitated the memorization and application of the quasi-scientific symbols for divinatory inscriptions, which gave it an advantage as a learning material. At that time, the intellectual class or the group of ShiGuan, when they were just beginners, greatly benefited from having Yi Jing as a stable learning material and the knowledge domain it defined, which greatly promoted the process of their rational thinking formation.

The systematic induction emerged in Yi Jing for the divinatory inscription became a new branch of learning in ancient China. Here, in order to provide a better conceptual description, we refer to it as the *Symbolic Application Systemology of the Oracle Inscription*. It extracts and summarizes universal divinatory inscriptions and symbols in divination, providing reliable models for writing corresponding sentences to meet the needs of the era, and also providing theories and methods for maintaining the system of divinatory inscription symbols itself. The formation of Yi Jing marks a new stage in the development of Chinese civilization

Yi Jing providing a more standardized theoretical model for mutual communication within the ShiGuan community and promoting their collective cooperation mechanism to a certain extent. The production of knowledge in ancient China became more standardized, and at the same time, it invisibly expanded the development space of intellectuals, accelerated the historical process of expanding divinatory inscription symbols to the field of record keeping, and provided the first basis and possibility for the expansion of the knowledge group monopolized by ShiGuan.

Conclusion

Yi Jing is a key optimization of knowledge dissemination in ancient China. It providing an important rational basis for the coding standardization of the new historical document ChunQiu (the Spring and Autumn Annals) that emerged in ancient China, thus preparing for the formation of Vandermeersch 's *Confucian Revolution*[5] in history.

The formation and development of oracle divination rationality is an important part of the Chinese rational thought theory reflected in Vandermeersch's *Les Deux Raisons de La Pensée Chinoise: Divination et Idéographie*. Vandermeersch passed away on October 17, 2021. The above deduction hypothesis does not come from him, but can constitute a certain inheritance of his theory. His theory on the formation and development of Yi Jing is the basis of the above hypothesis.

Finally, we conclude with the words of Karl Marx in *German Ideology: Feuerbach*: All social life is essentially practical. Anything that leads theory into mysticism can be reasonably resolved in human practice and the understanding of this practice[6].

References

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