

CHAPTER THREE

LAO ZI, ZHUANG ZI AND COSMOLOGY

3.1 COSMOLOGY

Cosmology is unique among sciences because it deals with the whole physical universe, whereas other sciences only deal with part of it, for example, chemistry studies the properties of the chemical elements. However, all fundamental and unsolved problems of the other sciences usually lead us to cosmological problems. Problem, such as, the formation of the elements always leads us to the initial creation of the universe or to the formation and evolution of stars, which is, directly equivalent to cosmology or to branches of astrophysics intimately related to cosmology. Thus, it is a study that brings together natural science, particularly astronomy and physics, with the joint effort to understand the physical universe as a unified whole.¹ It is the basic issue of physics in conjunction with the concept of space and time.

Chinese views of the cosmos are unlike the Western notions on the subject in remarkable respects. Western traditional views rested on a religious monotheism which saw the universe as initially created, and then organized and

¹ *The New Encyclopaedia Britannica*, Chicago: Encyclopaedia Britannica, Inc., vol. 3, 1995: 661.

operated by a Divine Being superior to itself. On the other hand, a Chinese idea of such an external Creator or Controller was absent.

The Chinese believe that the world came into being without the intervention of an external Creator, but rather the evolution of the world from primordial chaos (*hundun*, 混沌). It was well preserved and incorporated in the Taoist classics. *Daode Jing* does not directly mention this term, but this concept is almost stated explicitly through the expression, “there is a thing confusedly formed, born before heaven and earth.”²

The most typical expression of cosmogony in the Chinese tradition is a statement to the effect that “the *Dao* begets one, one begets two, two begets three, three begets the myriad creatures.”³ *Dao* is the ultimate source of all things. It is viewed as being identical to chaos. David C. Yu, in his article, pointed out that there are two important theories hidden in the myth of *hundun*, namely separation and transformation.⁴ All things in the world came into being through the separation and transformation from *hundun* or *Dao*. Hence, the Chinese universe was not created, but rather born out from *Dao*, just like a mother giving birth to a child. In this sense, *Dao* is said to be the mother of the universe.⁵ Through the spontaneous action of *Dao*, the myriad things came into being. In short, *Dao* has never contained any idea of Creator or even creation, but only that of emanation from an immense reservoir of pure potentialities.⁶ It is far from being a merely mechanistic universe.

² *Daode Jing*, chap. 25, Lau, D.C. trans., *op.cit.*, 1963: 82.

³ *ibid.*, p.103.

⁴ David. C. Yu, ‘The Creation Myth and its Symbolism In Classical Taoism’, *Philosophy East and West*, vol 31, No 4, 1981: 479-500.

⁵ see *Daode Jing*, chap. 6.

⁶ Grava, A., ‘Tao: An Age-old Concept In Its Modern Perspective’, *Philosophy East and West*, vol 13, no 3, 1963 : 238.

The thought mentioned above has echoed everywhere in Chinese classics, such as *Lie Zi* (列子), *Huainan Zi* (淮南子), *Ling Xian* (*The Spiritual Constitution of The Universe*, 灵宪), *Lun Heng* (*Discourses Weighed in The Balance*, 论衡), *Zheng Meng* (*Right Teaching for Youth*, 正蒙) and so forth.

On the whole, the Chinese maintained that at the time before heaven and earth took shape, there was only undifferentiated formlessness (*hundun*). The most famous reference to *hundun* is the parable in *Zhuang Zi*, where it is portrayed as an undifferentiated being,

“ The Ruler of the Southern Ocean was Shu, the Ruler of the Northern Ocean was Hu, and the Ruler of the Centre was Chaos. Shu and Hu were continually meeting in the land of Chaos, who treated them very well. They consulted together how they might repay his kindness, and said, ‘Men all have seven orifices for the purpose of seeing, hearing, eating, and breathing, while this (poor) Ruler alone has not one. Let us try and make them for him.’ Accordingly they dug one orifice in him everyday; and at the end of seven days Chaos died.”⁷

According to *Daode Jing*, the cosmogonic condition prior to emanation is ‘invisible’, ‘inaudible’, ‘vague and elusive’.⁸ Hence, *Dao* as a ‘chaotic thing’ is imperceptible and formless, but it is not devoid of everything. It is only the absence of concrete things because ‘within it is an image, a substance and an essence.’⁹ In short, it is ‘shapeless shape’ and ‘forms without form.’¹⁰ *Daode Jing*, chapter 40 reads. “ The myriad creatures in the world are born from Something (*you*, 有) and Something from Nothing (*wu*, 无).”¹¹

⁷ *Zhuang Zi*, chap. 7, Legge, J. trans., *op. cit.*, 1962 : 267.

⁸ see *Daode Jing*, chap. 14, 35.

⁹ *Daode Jing*, chap. 21, Lau, D.C. trans., *op. cit.*, 1963 : 78.

¹⁰ *Daode Jing*, chap. 14, Waley, A. trans., *op. cit.*, 1956: 159.

¹¹ *Daode Jing*, chap. 40, Lau, D.C. trans., *op. cit.*, 1963: 101.

Lao Zi was the first scholar who proposed *Dao* as *wu*, which is the cosmological origin of all things. It is worth remarking that *wu* should not be described as absolute non-existence, but rather as the absence of conceptual perception.

Zhuang Zi goes a further step to give a clear elucidation to *Daode Jing*'s proposition of 'Something is born out from Nothing.' Chapter 12 writes,

“ In the Grand Beginning (of all things) there was nothing in all the vacancy of space; there was nothing that could be named. The One originates from it; it has oneness but not yet physical form. When things obtain it and come into existence, that is called virtue. That which is formless is divided [into *yin* and *yang*], and from the very beginning going on without interruption is called destiny. Through movement and rest it produces all things. When things are produced in accordance with the principle of life, there is physical form.”¹²

And many other parallel passages in *Zhuang Zi* could be cited.¹³

The *Huainan Zi* is the earliest Chinese text systematically and consistently concerned with cosmology.¹⁴ However, we noticed that the cosmology of *Huainan Zi* is a continuous development from *Daode Jing*. In *Huainan Zi*, chapter 3, we learn that,

“ When Heaven and Earth did not yet have form, there was a state of amorphous formlessness. Therefore this is termed the Great Beginning. This Great Beginning produced an empty extensiveness, and this empty extensiveness produced the cosmos. The cosmos produced the primal fluid, which had its limits. That which was clear and light collected to form Heaven. That which was heavy and turbid congealed to form Earth. The union of the clear and light was especially easy, whereas the congealing of the heavy and turbid was particularly difficult, so that Heaven was formed first and Earth afterwards. The essences of Heaven and Earth formed the *yin* and the *yang*, and the concentrated

¹² *Zhuang Zi*, chap.12, Legge, J. trans., *op. cit.*, 1962 : 315-316.

¹³ see *Zhuang Zi*, chap. 6, 23.

¹⁴ David, C.Y., *op. cit.*, 1981: 484.

essences of the *yin* and *yang* formed the four seasons. The scattered essences of the four seasons formed the myriad things. The hot force of *yang*, being accumulated for a long time, produced fire, and the essence of fire formed the sun. The cold force of *yin*, being accumulated for a long time, produced water, and the essence of water formed the moon. The refined essence of the excess fluid of the sun and moon formed the stars and planets.¹⁵

The passage from *Huainan Zi* contains a more extended account of the successive stages of cosmic evolution, proceeding from *Dao* which gives birth to the void, which in turn produces the Heaven and Earth, which then gives rise to *yin* and *yang* and finally the myriad things. Such cosmological scheme can be said to have been the basic model of the concept of cosmology of the Han Dynasty. It has remained the orthodox doctrine among Chinese philosophers, including Neo-Confucianists.¹⁶

The great first century astronomer, Zhang Heng also maintained that before creation, there was no physical form, but rather the undifferentiated mass (primal fluid). Then, a great Primordial Undifferentiatedness began to sprout and the primal fluid started to separate. That which was soft, hard, clear and turbid also began to part; each finally was in its proper place. The heaven was formed outside; the earth lay alone inside. The two vital forces *yin* and *yang* which were separated from primal fluid, were then interact in order to give birth to all myriad creatures.¹⁷

From the above mentioned discussion, we can well observe that Zhang Heng's cosmogonical process was much influenced by *Daode Jing*'s phrase 'Something is born out from Nothing.' According to Guan, Zhang Heng's statement about '*yuanqi poupan*' (the primal fluid separated, 元气剖判) and '*tian cheng yu wai*,

¹⁵ *Huainan Zi*, chap. 3, quoted from Fung, Y.L. trans., *op. cit.*, 1952 : 396-397.

¹⁶ Chan, W.T., *op. cit.*, 1963 : 308.

¹⁷ see Zhang Heng, *Ling Xian (The Spiritual Constitution of the Universe, 灵宪)*.

di ding yu nei ' (the heaven was formed outside and the earth was developed inside, 天成于外, 地定于内,) were indeed congruent with the Chinese cosmological concepts, *Huntian* theory¹⁸. Zhang Heng in his *Commentary on the Armillary Sphere* (*Hunyi Zhu*, 浑仪注) wrote:

“ The Heavens are like a hen's egg and as round as a crossbow bullet; the earth is like the yolk of the egg, and lies alone in the center. Heaven is large and earth small. Inside the lower part of the heavens there is water. The heavens are supported by vapour (*qi*), the earth floats on the waters.”¹⁹

In the eleventh century A.D., a cosmical plan, *Explanations of the Diagram of the Great Ultimate* (*Taiji Tu Shuo*, 太极图说), was discussed by the pioneer of Neo-Confucianism Zhou Dunyi (周敦颐, 1017-1073). The diagram of *Taiji* is an emblem of Chinese culture. It delineates concisely the Chinese outlook colouring the whole of their cosmology regarding the origin, evolution and movement of the universe as well as all things. *Taiji Tu Shuo* reads,

“ The Non-ultimate (*wuji*, 无极) and also the Great Ultimate (*taiji*, 太极)²⁰! The Great Ultimate through movement generates *yang*. ... Through tranquillity the Great Ultimate generates *yin*. ... By the transformation of *yang* and its union with *yin*, the Five Agents of Water, Fire, Wood, Metal and Earth arise. ... When the reality of the Non-ultimate and the essence of *yin*, *yang* and the Five Agents come into mysterious union, integration ensues. *Qian* (Heaven, 乾) constitutes the male element, an *kun* (Earth, 坤) constitutes the female

¹⁸ Guan, Z.T., *Zhongguo Gudai Wuli Sixiang Tansuo* (An Exploration of The Physical Ideas In Ancient China, 中国古代物理思想探索), Hunan: Hunan Jiaoyu Publications, 1991: 14-15. There were three major cosmological schools, namely the *Gaitian* (hemispherical dome) school, the *Huntian* (celestial sphere) school and the *Xuanye* (infinite empty space) school. The *Huntian* theory conceived of the heavens as a celestial sphere and all celestial bodies move around the center of the earth. This school contributed in an important way to the growth of scientific instrumentation in China, leading to the construction of armillary rings and armillary spheres.

¹⁹ Zhang Heng, *Hunyi Zhu*, quoted from Needham J. trans., *op. cit.*, vol.3, 1970: 217.

²⁰ It should be noted that the terms '*wuji*' and '*taiji*' originate with *Daode Jing* (chap.28) and *Zhuang Zi* (chap. 6). These two concepts had nothing to do with original Confucian.

element. The interaction of these two material forces engenders and transforms the myriad things. ...”²¹

From Zhou’s point of view, *taiji* is identical with material force²², which refers to the undifferentiated *qi* in the cosmogonic beginning before it was divided into *yin* and *yang* and five phases as well. Through the interaction of *yin-yang* and five phases, it was then made into shapes.

We noticed that Zhou’s work also conformed to *Daode Jing*’s ‘Something is born out from Nothing.’ For Zhou, before creation, there was no physical form but only undifferentiated *qi*.

From what has been discussed, we can well observe that the Chinese cosmological theory advanced along the line of *Daode Jing*’s statement, ‘Something is born out from Nothing.’ The Chinese always maintain that before there was a heaven or an earth, there were no visible features. However, it is worth recalling here that there is nothing which *Daode Jing* has clearly stated. It is not absolute void or emptiness but rather the undifferentiated primal fluid. In fact, there has never been a notion of space without the existence of any object in the Chinese mind.²³ All in all, the whole process of cosmogony has excluded the external Creator or First Cause. It can be noted that the modern cosmological theory also maintains that the universe is completely self-contained and not affected by anything outside itself. As the English cosmologist, Stephen Hawking said,

“ With the success of scientific theories in describing events, most people have come to believe that God allows the universe to evolve according to a set of laws and does not intervene in the universe to break these laws. However, the laws do not tell us what the universe should have looked like when it started - it would still be up to God to wind up the clockwork and

²¹ Zhou Dunyi, *Taiji Tu Shuo*, quoted from Chan, W.T. trans., *op. cit.*, 1963 : 463.

²² Chan, W.T., *op. cit.*, 1963 : 639.

²³ Tang, C.I., ‘Cosmologies in Western Philosophy and Science’, *Chinese Studies In Philosophy*, vol. V, no. 1, 1973: 23.

element. The interaction of these two material forces engenders and transforms the myriad things. ...”²¹

From Zhou’s point of view, *taiji* is identical with material force²², which refers to the undifferentiated *qi* in the cosmogonic beginning before it was divided into *yin* and *yang* and five phases as well. Through the interaction of *yin-yang* and five phases, it was then made into shapes.

We noticed that Zhou’s work also conformed to *Daode Jing*’s ‘Something is born out from Nothing.’ For Zhou, before creation, there was no physical form but only undifferentiated *qi*.

From what has been discussed, we can well observe that the Chinese cosmological theory advanced along the line of *Daode Jing*’s statement, ‘Something is born out from Nothing.’ The Chinese always maintain that before there was a heaven or an earth, there were no visible features. However, it is worth recalling here that there is nothing which *Daode Jing* has clearly stated. It is not absolute void or emptiness but rather the undifferentiated primal fluid. In fact, there has never been a notion of space without the existence of any object in the Chinese mind.²³ All in all, the whole process of cosmogony has excluded the external Creator or First Cause. It can be noted that the modern cosmological theory also maintains that the universe is completely self-contained and not affected by anything outside itself. As the English cosmologist, Stephen Hawking said,

“ With the success of scientific theories in describing events, most people have come to believe that God allows the universe to evolve according to a set of laws and does not intervene in the universe to break these laws. However, the laws do not tell us what the universe should have looked like when it started - it would still be up to God to wind up the clockwork and

²¹ Zhou Dunyi, *Taiji Tu Shuo*, quoted from Chan, W.T. trans., *op. cit.*, 1963 : 463.

²² Chan, W.T., *op. cit.*, 1963 : 639.

²³ Tang, C.I., ‘Cosmologies in Western Philosophy and Science’, *Chinese Studies In Philosophy*, vol. V, no. 1, 1973: 23.

choose how to start it off. So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. What place then, for a creator?"²⁴

Some people believed that the Taoist theory of the creation of the universe and the modern theory of the big bang may possess certain similarities. The fundamental principles of the cosmology underlying relativity and the new physics seems closely to those of the cosmology in Taoist philosophy, although it employs the kind of mathematics which is typically a product of the West. The Taoist cosmology was not substantiated by the experiments and systematic theories of science. It is more a matter of speculation. Nevertheless, the big bang theory is not a matter of speculation any more, but rather a subject of serious scientific research. However, this parallel is rather crude and requires more work to be credible.

3.2 SPACE AND TIME

Space and time serve to order things and events in our environment. Thus, they play an important role in our attempts to understand Nature through science and philosophy. There is no law of physics, which does not require the concepts of space and time for its formulation.

Chinese views of space and time are remarkably different from those developed in the West. The Newtonian universe was based on the notion of an absolute space, an empty container that was independent of the material objects it contains or the physical phenomena occurring in it. All changes in the physical world, for the West, are delineated in terms of a separated dimension, time, which again is

²⁴ Hawking, S.W., *A Brief History Of Time: from the big bang to black holes*, London: Bantam Books, 1989 : 149

absolute and flows smoothly from the past through the present to the future, independent of the material world.

On the contrary, the Chinese lack the concept of absolute time and space such as that held by Newton, which is discredited today. The following quotation illustrates a typically Chinese view of space and time,

“ The ‘Universe’ or ‘Cosmos’, as expressed in Chinese, is *yuzhou* (宇宙), designating space and time. What we call ‘*yu*’ is the collocation of three-dimensional spaces; what we call ‘*zhou*’ is constituted by the one-dimensional series of changes in succession - the past continuing itself into the present and the present, into the future. *Yu* and *zhou*, taken together, represent the primordial unity of the system of space with the system of time. *Yuzhou*, without a hyphen, is an integral system by itself to be differentiated, only later on, into space and time. The four-dimensional unity of Minkowski and the ‘Space-Time’ of S. Alexander even cannot adequately convey the meaning of that inseparable connection between space and time that is involved in the Chinese term ‘*yuzhou*’. The nearest equivalent to it would be Einstein’s ‘Unified Field’. *Yuzhou*, as the Chinese philosophers have conceived it, is the unified field of all existence.”²⁵

Thus, we may conclude that the Chinese did not develop any abstract concepts of space and time apart from the concrete happenings in the world.

The change of beings is intimately related to time and space. *Zhuang Zi* has touched on this problem. We are told in chapter 17, through the mouth of the Spirit of the North Sea,

“ *Dao* has neither beginning nor end. Things are born and die, and their completion cannot be taken for granted. They are now empty and now full, and their physical form is not fixed in one place. The years cannot be retained. Time cannot be arrested. The succession of decline, growth, fullness, and emptiness go in a cycle, each end becoming a new beginning.

²⁵ Fang, Thome H., *The Chinese View of Life*, Hong Kong: The Union Press, 1957: 47.

This is the way to talk about the workings of the great principle and to discuss the principle of all things. The life of things passes by like a galloping horse. With no activity is it not changing, and at no time is it not moving.”²⁶

It is apparent that *Zhuang Zi* does not make any distinction among time, space and all changes in the world.

In dealing with the concepts of space and time, the question about infinity of space and time is inevitable. Whether space and time is infinite or not, is a question that has given rise to much controversy, which until now, is still taken seriously by scientists.

Zhuang Zi was probably the first scholar who put forward the notion of endless time and boundless space in China.²⁷ Chapter 7 says,

“ When wearied, I would mount on the bird of the light and empty air, proceed beyond the six cardinal points, and wander in the region of non-entity, to dwell in the wilderness of desert space.”²⁸

Also, chapter 11 says,

“... Therefore I will leave you, and enter the gate of the Unending, to enjoy myself in the fields of the Illimitable.”²⁹

It is clear that *Zhuang Zi* affirms the existence of an infinite space. Not only space is infinite in scope; time, likewise is infinite in span. We are told in chapter 2,

“ There was a beginning. There was a beginning before that beginning. There was a beginning previous to that beginning before there was the beginning.”³⁰

²⁶ *Zhuang Zi*, chap. 17, quoted from Chan, W.T. trans., *op. cit.*, 1963 : 206.

²⁷ Liu Xiaogan 刘笑敢, *Zhuang Zi Zhexue Ji Qi Yanbian (Chuang Tzu's Philosophy And It's Development. 庄子哲学及其演变)* Beijing : Zhongguo Shehui Kexue Publications, 1993 : 217.

²⁸ *Zhuang Zi*, chap. 7, Legge, J. trans., *op. cit.*, 1962 : 261.

²⁹ *Zhuang Zi*, chap. 11, Legge, J. trans., *op. cit.*, 1962 : 300.

³⁰ *Zhuang Zi*, chap. 2, Legge, J. trans., *op. cit.*, 1962 : 187.

Also, chapter 25 reads,

“ When I look for their origin, it goes back into infinity; when I look for their end, it proceeds without termination.”³¹

Thus, for *Zhuang Zi*, time is infinite in respect to the past as well as to the future.

Prior to *Zhuang Zi*, the concept of infinity was known, but this concept was frequently used by *Zhuang Zi* than other scholars, such as *Mo Zi*, *Han Fei Zi*, *Sun Zi* and so forth. *Zhuang Zi* pays great attention to this concept, such as, *wuqiong* (无穷, chapter 1, 2, 4, 17), *wuya* (无涯, chapter 2), *wuji* (无极, chapter 2)³², *wudian* (无端, chapter 11), *wushi* (无始, chapter 11), *wu gujing* (无古今, chapter 22). And many other examples could be cited.

For the Chinese, the expression which is now used for ‘the universe’, *yuzhou*, has essentially the meaning of ‘space and time’. *Zhuang Zi* gives an interesting definition of *yuzhou*, with an emphasis on infinity. Chapter 23 reads, ‘Existence without limitation is space (宇); continuity without a starting-point is time (宙).’³³

Needham, in his work, *The Grand Titration*, pointed out, “Nothing could be more striking than the appreciation of cyclical change, the cycle-mindedness, of the Taoists.”³⁴ According to this cyclical concept, any object or phenomenon which perishes can be born again. In *Zhuang Zi*, chapter 27, we learn that,

“ All things are divided into their several classes, and succeed to one another in the same way, though of different bodily forms. They begin and end as in an unbroken ring, though how it is they do so be not

³¹ *Zhuang Zi*, chap. 25, Legge, J. trans., *op. cit.*, 1962 : 130.

³² This term comes from *Daode Jing*.

³³ *Zhuang Zi*, chap. 23, Giles, H.A. trans., *op. cit.*, 1969: 304.

³⁴ Neeham, J., *The Grand Titration: Science And Society In East And West*, London: George Allen & Unwin Ltd, 1969: 227.

apprehended. This is what is called the Lathe of Heaven."³⁵

This line of thought has echoes everywhere in *Daode Jing* (chapter 16,25,40) and *Zhuang Zi* (chapter 6, 21). On the basis of 'the reversal of procedure' in the function of *Dao*, it seems that the 'bygone' may always 'come back'.

The philosophical Taoists experienced infinity through the infinite comings and goings of objects and events. Therefore, they see space and time as boundlessly infinite, especially in *Zhuang Zi*. *Zhuang Zi*'s concept of infinity was much influenced by this kind of thought: reversion is the universal mode of the *Dao*³⁶, which is proposed by *Daode Jing*.

Needham pointed out that one of the major Chinese cosmological theories, known as *Xuanye* system (The Theory of Infinite Empty Space, 宣夜说), had a close connection with the 'great emptiness' of *Daode Jing* and with the idea of heaven as piled-up *qi* in *Lie Zi*.³⁷ Nevertheless, *Xuanye* theory has more *Zhuang Zi*'s flavour than *Daode Jing* and *Lie Zi*. *The Encyclopaedia of China* states: "The historical origins of the *Xuanye* theory can be traced back to the *Zhuang Zi*."³⁸ Liu pointed out that this theory germinated in *Zhuang Zi*'s concept of infinite universe.³⁹

The *Xuanye* School maintains that "the heavens were entirely empty and void of substance. When we look up at heavens we can see they are immensely high and far away, without any bounds. It is like seeing yellow mountains sideways at a great distance, for then they all appear blue; or when we gaze down into a valley a thousand fathoms deep, it seems somber and black. But the blue of the mountains is

³⁵ *Zhuang Zi*, chap. 27, Legge J. trans., *op. cit.*, 1962 : 144.

³⁶ Fang, Thome H., *op. cit.*, 1957 : 113.

³⁷ Needham, J., *op. cit.*, vol 3, 1970 : 221.

³⁸ *The Encyclopaedia of China (Zhongguo Dabaikequanshu, 中国大百科全书)*, the vol. of astronomy (天文卷), Beijing: Zhongguo Dabaikequanshu Publications, 1980:491.

³⁹ Liu, X.G., *op. cit.*, 1993 : 222.

apprehended. This is what is called the Lathe of Heaven."³⁵

This line of thought has echoes everywhere in *Daode Jing* (chapter 16,25,40) and *Zhuang Zi* (chapter 6, 21). On the basis of 'the reversal of procedure' in the function of *Dao*, it seems that the 'bygone' may always 'come back'.

The philosophical Taoists experienced infinity through the infinite comings and goings of objects and events. Therefore, they see space and time as boundlessly infinite, especially in *Zhuang Zi*. *Zhuang Zi*'s concept of infinity was much influenced by this kind of thought: reversion is the universal mode of the *Dao*³⁶, which is proposed by *Daode Jing*.

Needham pointed out that one of the major Chinese cosmological theories, known as *Xuanye* system (The Theory of Infinite Empty Space, 宣夜说), had a close connection with the 'great emptiness' of *Daode Jing* and with the idea of heaven as piled-up *qi* in *Lie Zi*.³⁷ Nevertheless, *Xuanye* theory has more *Zhuang Zi*'s flavour than *Daode Jing* and *Lie Zi*. *The Encyclopaedia of China* states: "The historical origins of the *Xuanye* theory can be traced back to the *Zhuang Zi*."³⁸ Liu pointed out that this theory germinated in *Zhuang Zi*'s concept of infinite universe.³⁹

The *Xuanye* School maintains that "the heavens were entirely empty and void of substance. When we look up at heavens we can see they are immensely high and far away, without any bounds. It is like seeing yellow mountains sideways at a great distance, for then they all appear blue; or when we gaze down into a valley a thousand fathoms deep, it seems somber and black. But the blue of the mountains is

³⁵ *Zhuang Zi*, chap. 27, Legge J. trans., *op. cit.*, 1962 : 144.

³⁶ Fang, Thome H., *op. cit.*, 1957 : 113.

³⁷ Needham, J., *op. cit.*, vol 3, 1970 : 221.

³⁸ *The Encyclopaedia of China* (*Zhongguo Dabaikequanshu*, 中国大百科全书), the vol. of astronomy (天文卷), Beijing: Zhongguo Dabaikequanshu Publications, 1980:491.

³⁹ Liu, X.G., *op. cit.*, 1993 : 222.

not a true colour, nor is the dark colour of the valley really its own."⁴⁰ The origin of this *Xuanye* thought can be found in *Zhuang Zi*. Chapter one, states, "We do not know whether the blueness of the sky is its original colour, or is simply caused by its infinite height. When the *peng* (鹏, a kind of big bird) sees the earth from above, just as we see the sky from below."⁴¹

The *Xuanye* School pointed out subsequently that "the sun, moon and company of stars float freely in empty space, moving or standing still and all of them are nothing but condensed vapor (*qi*)."⁴² *Zhuang Zi* also shows the same idea, which is very famous that "the world is permeated by a single vital fluid."⁴³ Thus, from comparing between the two texts, we may say that the *Xuanye* theory was much influenced by *Zhuang Zi*.

This cosmological view which was part of a prevailing Chinese thought of trend, is far more advanced than the rigid Aristotelian-ptolemaic conception of concentric crystalline spheres that dominated Western thought for more than a thousand years. Although another cosmological view, *Huntian* theory seems to have been generally accepted at the end of the Han period, the influence of *Xuanye* theory should not be belittled. On the whole, the Chinese astronomers considered the *Huntian* theory to be the correct one, but they still admitted *Xuanye*'s infinite space. The great first century astronomer, Zhang Heng who was a supporter of *Huntian* theory, said,

"The diameter of the 'bond' (which holds the sphere together) is 2,032,300 *li*, but in the north-south direction it is 1000 *li* shorter than this and in the east-west 1000 *li* longer. The distance from earth to heaven is half that between the eight limits, and the depth

⁴⁰ see *Jinshu* (History of the Jin Dynasty, AD 265-419, 晉書), chap. 11, Beijing: Chong Hwa Book Store, vol. 2, 1974: 277. See Needham, J., *op. cit.*, vol 3, 1970 :219

⁴¹ *Zhuang Zi*, chap. 1, Fung, Y.L., *op. cit.*, 1964: 28-29.

⁴² see *Jinshu*, chap. 11, quoted from Needham, J., *op. cit.*, vol 3, 1970 : 219

⁴³ *Zhuang Zi*, chap. 22, Giles, H.A. trans., *op. cit.*, 1969: 278.

below the earth is the same distance. The measurements are made with the graduated hun instrument (armillary sphere). For calculations the method of two right-angled triangles is used. The shadow of the gnomon faces the heavens and (explains the) meaning of the spheres celestial and terrestrial. A difference of a thousand miles south or north in the gnomon's position means a difference of one inch in the shadow's length. These things can all be calculated, but what is beyond (the celestial sphere) no one knows, and it is called the 'cosmos' (*yuzhou*, 宇宙). This has no end (*wuji*, 无极) and no bounds (*wuqiong*, 无穷).⁴⁴

Zhang Heng held that the space that can be calculated and seen is finite. The investigation failed in the face of what is beyond the range of observation. Before Zhang Heng, Zhuang Zi had already noticed this problem. He said, "What is beyond this world, the sages do not discuss, although they do not deny its existence."⁴⁵

Liu Ji (1311-1375), a scientist in the end of Yuan and early Ming period, made an interesting comment to this problem,

"Zhu Nan-Gong asked Xiaoliao, Zi-Yun, 'if Heaven has a boundary, what things could be outside it? Yet Heaven must have a boundary, for all things which have form must have boundaries; according to all general principles and influences which we know.'
Xiaoliao Zi-Yun replied, 'About those things which are outside the six cardinal points the sages did not speak.'
Zhu Nan-Gong laughed and said, 'As the sages did not know anything about them, of course they could not speak of them. But the sages followed the motions of the heavens with the help of astronomy and calendrical science. They examined the constellations by the use of instruments. They checked the quantitative changes of the heavens using calculations. Heaven's principles they elucidated by the assistance of the *Yijing*. Everything which the ear can hear, the eye can see, or the mind can think, the sages investigated, leaving not the minutes matter in darkness - except what Heaven obstinately

⁴⁴ Zhang Heng, *Ling Xian*, quoted from Needham J. trans., *op. cit.*, vol 3, 1970: 217.

⁴⁵ Zhuang Zi, chap. 2, Fung, Y.L. trans., *op. cit.*, 1964: 57.

conceals, and for that man has no methods whereby he can reveal it. That is the point. If you had said, "They did not know" instead of, "They did not speak about it", you would have been quite right."⁴⁶

In short, the Chinese admitted the existence of space which is outside the range of observation. And it should also be noted that *Xuanye* work picture (that is infinite space) - together with *Huntian* spherical motions - came to form the background of Chinese astronomical thinking.⁴⁷

As we know *Zhuang Zi* holds that time is infinite. But to return to the *Daode Jing*, chapter 52, we learn that "The world had a beginning. And this beginning could be the mother of the world."⁴⁸ From *Daode Jing*'s point of view, time has a beginning. It seems that Lao Zi denied that time is infinite. Such attitude is obviously an apparent contradiction with *Zhuang Zi*'s idea. However, this idea is luckily further clarified by the later Taoists. Chapter 3 of the *Huainan Zi* tells us, "The empty extensiveness⁴⁹ produced the *yuzhou*"⁵⁰, pointing out that space (*yu*) and time (*zhou*) derived from the silent and misty condition. The beginning of time terminates the state of standstill.

For the Chinese, the very meaning of time is change (which has already demonstrated), and therefore in the absence of change, there could be no time. It is because the flow of time can only be sensed through the movements and changes of things. Under the condition of *hundun* (chaos), there is no existence of any orderly process of change, thus the flow of time cannot be known. That is to say the application of the concept of time is limited.

⁴⁶ Liu Ji 刘基, *Yu Li Zi* (郁离子), p. 4a, quoted from Needham, J., *op. cit.*, vol 2, 1969 : 388-389.

⁴⁷ Needham, J., *op. cit.*, vol 3, 1970 : 221.

⁴⁸ *Daode Jing*, chap. 52, Lau, D.C. trans., *op. cit.*, 1963: 113

⁴⁹ The empty extensiveness suggests an object which is empty inside and has no features, like a bag, an egg, or a cave. It is perhaps a metaphor for *hundun* (chaos).

⁵⁰ see *Huainan Zi*, chap. 3.

The modern cosmology also faces the same problems. As one of the greatest theoretical cosmologists, Stephen Hawking pointed out,

“ In fact, all our theories of science are formulated on the assumption that space-time is smooth and nearly flat, so they break down at the big bang singularity, where the curvature of space-time is infinite. This means that even if there were events before the big bang, one could not use them to determine what would happen afterwards, because predictability would break down at the big bang. Correspondingly, if, as is the case, we know only what has happened since the big bang, we could not determine what happened before hand. As far as we are concerned, events before the big bang can have no consequences, so they should not form part of a scientific model of the universe. We should therefore cut them out of the model and say that time had a beginning at the big bang.”⁵¹

If we compare Hawking’s words with the philosophical Taoists thought already demonstrated above, it is truly amazing how modern this more than 2000 years old concept sounds, if interpreted correctly, and viewed from the modern perspective.

As what *Daode Jing* says: “The-myriad creatures in the world are born from Something, and Something from Nothing.” This implies that for anything to come into beings, first of all there must be Something (or *you*) before them. Fung pointed out, “ These words, ‘first of all’ here do not mean first in point of time but first in a logical sense.”⁵²

We must bear in mind that *Daode Jing*’s movement of *Dao* is cyclical. Thus, *Daode Jing*’s statement ‘the world had a beginning’ does not mean the

⁵¹ Hawking, S.W., *op. cit.*, 1989 : 50.

⁵² Fung, Y.L., *op. cit.*., 1966 : 96.

beginning of time, but rather just referring to a prior point of the continuous cycle that has no end or beginning.⁵³ One may see that *Zhuang Zi* has extensively developed this point of *Daode Jing*.

The Chinese cosmologists and astronomers were practically free from the cramping of an enclosed universe shaped like a sphere, whereas the Westerners still firmly believed it not until the seventeenth centuries. However, it should be noted that the Chinese achievement of infinite *yuzhou* was much influenced by philosophical Taoist thoughts, which very much emphasize the infinity of the universe.

⁵³ Peerenboom, R.P., 'Cosmogony, The Taoist Way', *Journal of Chinese Philosophy*, vol 17, 1990: 161.