山水

SHANSHUI

Kun Can, the Neijing Tu, and the Method of Analogy

Fu Xiaodong

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By; Fu Xiaodong

I. The Expansion of Cognition

As a curatorial project of critical education, starting in 2012 I organized the "Eighth Day — Artists Visit Scientists' Laboratories" program, hosted by Space Station and Guokr. Over four years, I organized artists to visit the laboratories of different scientists at Peking University, Tsinghua University, and the Chinese Academy of Sciences, with each visit including three or four lectures by the relevant scientists, covering more than 20 disciplines. In October 2017 I curated the art project *The Plan to Create Images* in cooperation with the Microsoft AI division. In November I conducted a five-day graduate workshop on "Daoist Images and the Philosophy of Technology" at Xi'an Academy of Fine Arts. Through the exploration of the unknown, thinking originally confined to the field of art expanded into different knowledge systems, enlarging the domain of cognition and opening up a field of even greater possibility.

How can these fragments of knowledge be structured and systematized? Western philosophy of technology traces its origins back to Greek mythology. For example, Latour champions the "Gaia hypothesis," likening the Earth to a self-regulating, living superorganism. There exist complex, coherent interactions of energy among living beings and the natural environment—including the atmosphere, oceans, polar ice caps, and the rocks beneath our feet. If we trace the origins of the ancient Chinese historical philosophy of technology, we encounter Daoist theory, a kind of proto-scientific doctrine. From Fuxi's Eight Trigrams to the Shang Dynasty's astronomical calendar, ancient China believed in a relation of "unity of Heaven and humanity" between the entire cosmos and human beings. Heaven was deified, representing the laws of natural operation, which could also be understood as a kind of respect for objectivity similar to that of the natural sciences. Confucianism is more concerned with social ethics and the norms of social institutions. Daoist doctrine is more concerned with cosmology, the relations among the Three Realms of Heaven, Earth, and Humanity, the relationship between body and mind, and doctrines of aesthetics and technology. In Joseph Needham's *Science and Civilisation in China*, astronomy, geography, writing, chemistry, medicine, and other fields all involve Daoist doctrine, which centers on natural laws. Once we have opened a knowledge horizon across different disciplines, how do we face anew the Daoist heritage, which was most passionate about image-making in history? The combination of technology and art is not simply the transplantation of scientific and technological achievements into works of art, but the use of new knowledge systems to open up the unknown world behind images. This offers us a new opportunity.

Latour, as an anthropologist, observed scientists' laboratories as objects of anthropological study, proposing that the object scientists study—"science"—is itself a socially constructed product. Scientific research itself is composed of a series of everyday beliefs and cultural traditions; it is a practice with cultural specificity. Science is not an absolute truth but is continuously constructed within the cultural development and historical stages of human civilization, connected to the cognitive level, worldview, cosmology, and other cognitive methods of the people of that time. Science is also a culture. For example, in astronomy, the heliocentric theory of Copernicus that once overturned the geocentric theory has itself already been replaced by the theory of the cosmic "membrane." Truth and error are constantly transformed as the scope of cognition expands. Everything we regard as solid and trustworthy knowledge may still become a partial theory within the process of cognition.

The ancient texts that have survived the long river of time, after being cut off by

different regimes, cultures, beliefs, migrations, and wars, leave behind only the empty shells of images that appear on the surface—like slices, evidence that summons thoughts once preserved, collective human understandings and interpretations of the world that truly existed in another time and space. In an age when gravitational waves are frequently recorded, gene scissors are in use, the God particle has appeared, and the AI AlphaGo has crushed Go players, the mysteries of the natural universe are being revealed bit by bit. The mixture of knowledge constantly appearing in globalized social media has also given us new angles from which to understand ourselves and the world we inhabit. We are still in a process of gradually understanding the world.

In *Order Out of Chaos* by Ilya Prigogine and Isabelle Stengers, the authors summarize three hundred years of the history of modern natural science, examining the evolution of science within a cultural context, and pointing out that we should combine dynamics with thermodynamics, physics with biology, natural sciences with the humanities, and Western cultural traditions with Chinese cultural traditions, establishing on a higher foundation a new alliance between humanity and nature, and forming a new view of science and nature.

Every kind of image in the history of art can serve as proof of a particular history, region, religion, and level of technology—the external expression of a school of thought or concept. We no longer focus simply on the evolution of a style or technique; images have become collections of ideas. The history of images and of the perception of images is also a discussion among various cognitive systems carried out by creators and viewers across different times and spaces. The paintable painting has become the readable image. Crossing the research domains of various disciplines, my understanding of art has long since removed the division between tradition and the contemporary. Let us return then to some origins and fundamental questions: How did ancient China understand nature? How did it handle the relationship between the subject and objective nature? What different conceptual distinctions existed between East and West? Let us begin another journey of knowledge exploration within images.

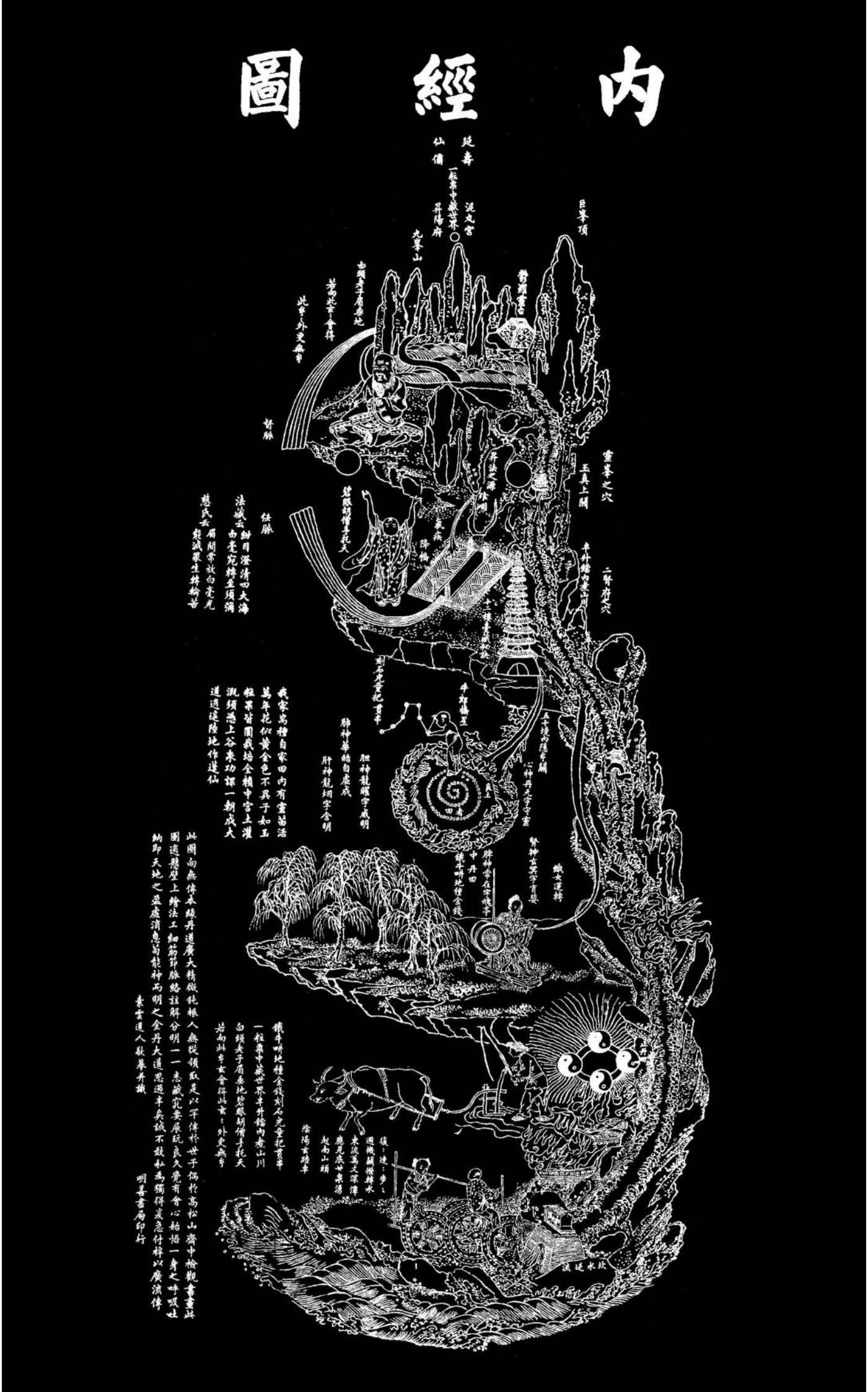
II. Kun Can and the *Neijing Tu*

Mountain-and-Water painting (*shanshui hua* 山水画) is the mainstream of Chinese scroll painting history. How can natural images be restored within a cognitive framework? This was my point of entry. In June 2017, the exhibition of the Four Monks of the early Qing at the Palace Museum triggered this path. Kun Can 髡残 (1612-1672), one of the Four Monks of the early Qing, was a monk painter of the late Ming and early Qing who once declined the robe of the Caodong sect and was a famous monk known for his enlightenment through the Dharma. The Caodong 曹洞 sect mainly expounds the relationship between "suchness" (*zhenru* 真如) and the phenomenal world, holding that between all things there is a relation of "mutual interpenetration" (*huihu* 回互) and "non-mutual interpenetration" (*buhuihu* 不回互). "Mutual interpenetration" means that all things interpenetrate and fuse with one another: although the boundaries of things are clearly distinguishable, within one there is the other, and within the other there is one; they mutually enter into each other without distinguishing self from other. "Non-mutual interpenetration" means that all things each have their own position, each abiding in its own place without confusion. The Caodong sect's most important practice was silent, practical seated meditation; it held that by simply meditating in this way, one could depart from the five desires, remove the five hindrances, and meet the Buddha—without burning incense, prostrating, chanting the Buddha's name, performing repentance, or reading sutras. These practical experiences of seated meditation, together with the Caodong sect's understanding of the relations among all things, formed the intellectual foundation of Kun Can.

The Platform Sutra 《坛经》 states: "The nature of people in the world is pure, like a clear sky; wisdom is like the sun, knowledge like the moon, wisdom and knowledge always bright. When one clings to external objects, delusive thoughts cover it like floating clouds, and one's own nature cannot be made clear." This already clearly presents the metaphor of sun, moon, and floating clouds for mind-nature and wisdom. The Caodong sect, which valued the *Yijing* 《易经》 and the study of changes, was described in the Qing dynasty as follows: "The family style of Caodong: the sovereign and ministers unite in the Way; the upright and the partial support each other; the bird's path and the dark journey, the golden needle and jade thread, mutual interpenetration within and without; principle and matters intermingle, without establishing a single dharma." The Caodong sect was saturated with a temperament that valued the six lines and the foundations of Yijing thought. During the Ming and Qing dynasties, Buddhism and Daoism were connected in cultivation practice, with an evident tendency toward the fusion of the Three Teachings; many monks also practiced inner alchemy. In his colophons, Kun Can signed under the names "Daoist of Remnant" (*Can Daoren* 残道人), "Daoist of Patience with Humiliation" (*Renru Daoren* 忍辱道人), and "Daoist Dwelling in Lightning" (*Dianzhu Daoren* 电住道人), revealing his daily practice of cultivating both Buddhism and Daoism, closely connected to the inner alchemy of Daoist cultivation.

The *Neijing Tu* 《内经图》 is a secret diagram of the qi channels and heart-method of Daoist inner alchemy, originating from the *Huangting Neijing Jing* (*Scripture of the Yellow Court's Inner View*《黄庭内景经》). It uses the form of a Mountain-and-Water painting to connect the five viscera and six bowels of the body's internal anatomy with the two meridians of conception and governor (*ren* 任 and *du* 督), designing them as a harmonious small celestial cycle of mountains, waters, pavilions, and terraces—a secret essential diagram not transmitted for a thousand years. *The Neijing Tu* represents the true essence of Daoist still-cultivation thought and technique. Its cryptic expressions, riddles, and hidden language appear extensively in both diagrams and discourse, expressing the inner-work concepts of cultivating life and firming fate and of the interaction between Heaven and the human. The inner alchemy method began in the pre-Qin period; the *Neijing Tu* passed through several versions over time, and the version seen today was formed in the late Ming and early Qing. In the thirteenth year of the Guangxu reign, it was discovered and made public by Liu Suyun, a chief eunuch of Empress Dowager Cixi, at the "Gaosong Shan Zhai" temple of the Huoshan school; the woodblock version can still be seen on the wall of the Baiyunguan (White Cloud Temple) in Beijing.

In the *Neijing Tu*, the internal structure of the human body is likened to a set of natural landscapes, accompanied by highly metaphorical poems that make visible the important acupoints and essential techniques of the practice through images. In the picture, the essence-*qi* of the kidneys is likened to water, as the kidney governs yin and belongs to water. The spring willow in the middle is the liver governing wood; the child of the heart-spirit governs fire; the Weaver Girl belongs to metal and represents the lungs; the field of the heart-mind belongs to earth and needs harmonization and stillness—corresponding to the concept of the Five Phases. The *qi* channel runs upstream along the mountain path representing the spine, converging at the "Nine Peaks Mountain," which is wider at the top and narrower at the bottom—namely the niwan palace (the upper elixir field). The pagoda of the Twelve Storied Tower is the throat; the three acupoints—*weilü* (tailgate 尾闾关), *jiaji* (spine 夹脊关), and *yuzhen* (jade pillow 玉枕关)—are all drawn as small city gates, respectively representing the *changqiang* 长强穴, *shendao* 神道穴, and *fengfu* points 风府穴. The qi channel breaks through these three barriers and reaches the top of the head, then connects the conception and governor meridians through the tongue, com-


內經圖
延壽
仙僧
泥丸宮
一粒粟中藏世界
昇陽府
九峯山
昆峯頂
靈峯之穴
五真上關
二腎府之穴
尾閭穴
夾脊
玉枕
重樓
肺神華蓋自虛成
肝神龍姓字含明
心神丹元字守靈
脾神常在黃庭中
腎神玄冥字育嬰
鐵大運轉
中丹田
神水華池種金液
一粒粟中藏世界 芥納須彌山
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Kun Can, *Layers of Peaks and Ridges* 髡残《层峦叠嶂图》



pleting the small celestial cycle. This corresponds to such cultivation methods as visualizing the lower elixir field, breathing the original qi, and swallowing the fluids of the mouth, realizing the process of refining essence into qi, refining qi into spirit, and refining spirit back to emptiness. Inner alchemy cultivation seeks through the agitation of water and fire to exclude the conscious mind, enter the subconscious, activate the original spirit, cultivate both nature and life, and regulate the mind and nourish the disposition. The alchemist imagines the body as a furnace, with essence, qi, and spirit as the medicines, regulating breathing and igniting the fire, driving the Three Corpses and Nine Worms out of the body, while gathering the original spirit within the niwan palace at the top of the head.

Kun Can was surely fully aware of the referents of these metaphors. Using his masterful brush and ink, he repeatedly reproduced this process in a series of *shanshui* paintings, confirming the realization of the inner-work heart-method. All his pictorial schemas are alike: the bottom of the picture is a great body of water, representing the spine as a winding, unbroken mountain path; at the top are complex ninefold peaks wider at the top and narrower at the bottom; overall it is the image of a solitary Kunlun Mountain peak, and the streams flowing from the mountain's head are the precious saliva of the mouth and tongue. Although each image differs slightly—some works have a twelve-story pagoda at the throat in the middle, or a cluster of buildings, and the spine sometimes leans left or right—almost all accord with every claim and positioning of the *Neijing Tu*. In *Layers of Cliffs and Valleys* (*Cengyan Diehe Tu* 《层岩叠壑图》), exhibited at the Palace Museum, the positions of the Three Barriers are accurately drawn with pavilions and buildings; in a cave at the mountainside is drawn a monk meditating in seated meditation; below, a small waterfall flows out and bends into an anomalous S-shaped symbol hinting at the Eight Trigrams. The work is clearly filled with the symbolic markers of the Daoist inner-alchemy seated-meditation metaphor. Contrary to an abstract aesthetic dominated by visual elements, Kun Can's work is filled with the symbolism and metaphor of images. Because of the untransmitted knowledge system of inner-alchemy cultivation, Kun Can's shanshui paintings surpassed his era; like Magritte, he concealed countless riddles within his pictures, becoming a master of obscure, circuitous pictorial metaphor.

II. The Topological Sacred Landscape

This notion of the *shanshui* painting as a metaphor for the body was not founded by Kun Can but had existed since antiquity. According to the Tang dynasty Buddhist treatise *Guang Hongming Ji* (*Extended Collection on Spreading the Light*, 《广弘明集》), which cites Daoist sayings, when Laozi created the world, his body transformed into Heaven and Earth and the myriad things: "His left eye became the sun, his right eye the moon, his head became Mount Kunlun, his hair became the stars, his bones became dragons, his flesh became beasts, his intestines became snakes, his belly became the sea, his fingers became the Five Sacred Peaks, his hair became plants and trees, his heart became the ornate canopy—even his two kidneys united to become the true parents."

Even more directly corresponding is Guo Xi's 郭熙 *Linquan Gaozhi* (*The Lofty Message of Forests and Streams*, 《林泉高致》), which writes: "Stones are the bones of Heaven and Earth," and "Water is the blood of Heaven and Earth." "Mountains take water as their blood vessels, plants and trees as their hair, and mist and clouds as their spirit." Guo Xi's *Early Spring* (*Zaochun Tu*, 《早春图》), with its enormous S-shaped twisting mountain range and connected qi channels, although lacking the landmark touch of the Three Barriers pavilions and terraces, can nevertheless in its composition and structure be seen as a reproduction of an early version of the *Neijing Tu*. Fan Kuan's 范宽 *Travelers Among Mountains and Streams* (*Xishan Xinglü Tu*

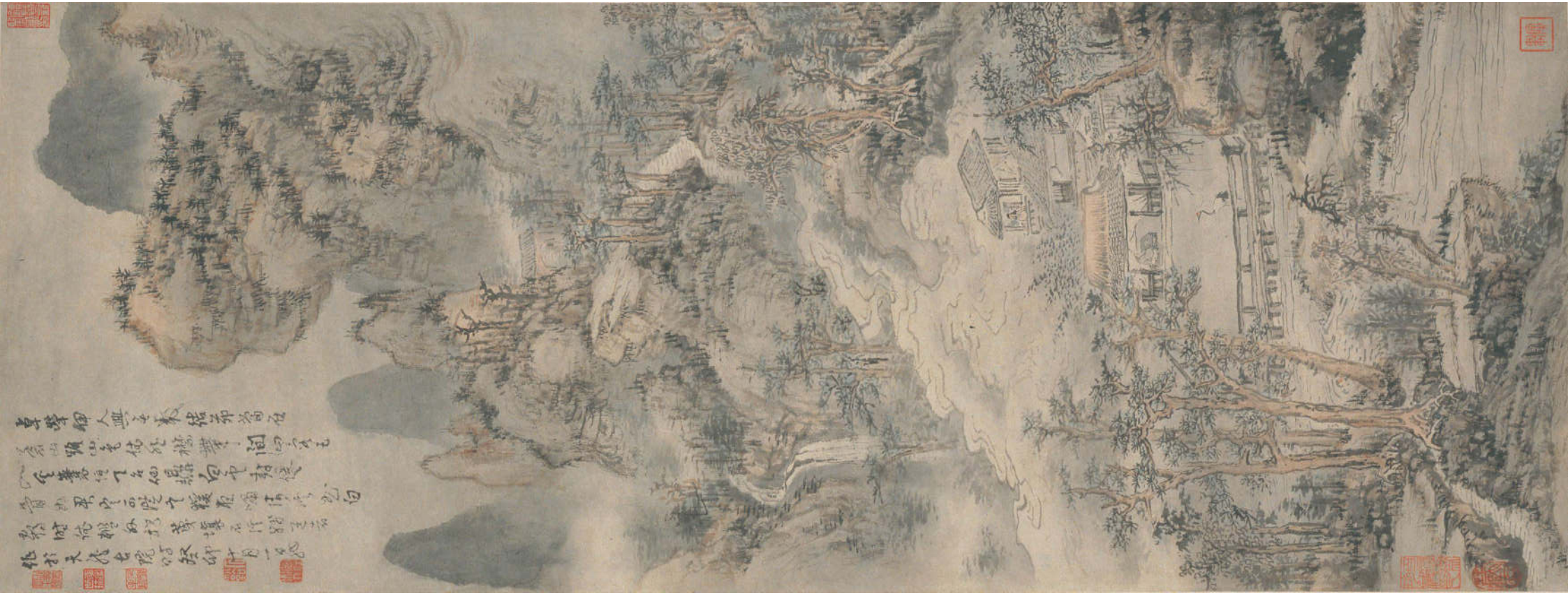
Kun Can, *Chan Secrets and Conversational Wit* 髡残 《禅机话趣图》



Kun Can *Clouds and Streams* 髡残《云洞流泉图轴》



Kun Can, *Hut Among Verdant Mountains* 髡残 《苍山结茅图轴》



《溪山行旅图》) appears more like another variant of the same theme, and the Southern Song's *Diagram of the Ascending and Descending of the Body's Form* and the *Mutual Lifting of Yin and Yang* (*Ti Xiang Yin Yang Sheng Jiang Tu* 《体相阴阳升降图》) turns the body into a huge upright mountain form, with the qi channels running upon it.

Shanshui paintings from before the Song and Yuan dynasties and a minority from the Ming dynasty repeatedly describe this theme: from the thatched cottages of the mundane world where roosters and dogs are heard, through hidden caves or steep Three Barriers, reaching the soaring eaves and jade towers at the cloud-touched mountain summit—this is a sacralizing supernatural journey. The blue-and-green *shanshui* of the ancients and the terrace-and-tower *shanshui* of the boundary-painting style were almost without exception descriptions of the realm of the immortals. Among the layered cliffs and stacked ridges, the ornate bracketed terraces, the double-eaved hip roofs with cross-shaped ridgepoles and the hip-and-gable roofs, all are symbols of temples and palaces, marking the main hall as the sacred space of the immortals' residence. The cloud-qi outlined and shaded with washes conceals the blue-green immortal mountains; the auspicious clouds and radiant colors illuminated by the rising sun, the banners fluttering in the wind that summon the spirits, the groups of fine cranes appearing in pairs, even immortals riding phoenixes appearing directly in the sky, and the square ritual altars hidden beneath the peaks and above the precipices—these are all typical iconographic markers of sacred space. Passing through peach blossoms and bamboo groves and entering caves, what reveals the immortal realm is often verdant pines and cypresses; the pine is the evergreen tree, marking a timeless and unchanging time and space. Like what is described in Tao Yuanming's 陶渊明 *Peach Blossom Spring* 《桃花源记》, this is the dwelling of Heaven and humans, where one day above equals ten years below. Three mountains, not connected, separated by broad waters, are classified as the Three Islands of the Sea—Fangzhang方丈, Penglai蓬莱, and Yingzhou瀛洲—as for example Wang Ximeng's 王希孟 Song dynasty *A Thousand Li of Rivers and Mountains* (*Qianli Jiangshan Tu* 《千里江山图》).

The small figures in the scene are all travelers in transitional spaces amid the mountains and waters, difficult journeys of seeking—at the mouths of waterfalls or caves in barren mountains and steep cliffs they search for an opening in time and space, hesitating on bridges where they know neither advance nor retreat, travelers tossed about by fate on the track of time and the journey of the mind-nature. A cave is like a cosmic wormhole, connecting worlds of different natures. Combined with the *Neijing Tu*, besides the theme of the external image of the immortal realm and long life without aging, the landscape is also a space of the mind-nature that one can enter—through holes, through tranquil, concentrated, inner-visualizing meditation amid hardship and tribulation—flipping inside and outside to enter a sacred space. Inside is outside; outside is also inside. The landscape thus becomes a "Klein bottle" with humanity within and nature without—a topological space with the functions of convergence, connectedness, and continuity.

Zong Bing's 宗炳 *Preface to Painting Landscape* (*Huashanshui Xu* 《画山水序》), the first treatise on Chinese *shanshui* painting, describes this topological experience in words:

"The sage embodies the Way and mirrors things; the worthy clears his mind and savors images."

"Moreover, great as Mount Kunlun is, small as the pupil of the eye is—if you press the eye close to it within an inch, its form cannot be seen; but if you withdraw to a distance of several li, it can be enclosed within the pupil. Truly, the farther away one is, the smaller it appears."

"Now with regard to what responds to the

eye and meets the mind as principle, when the class is perfected in skill, then the eye responds in the same way and the mind joins in. Response and meeting move the spirit, and the spirit transcends and attains principle."

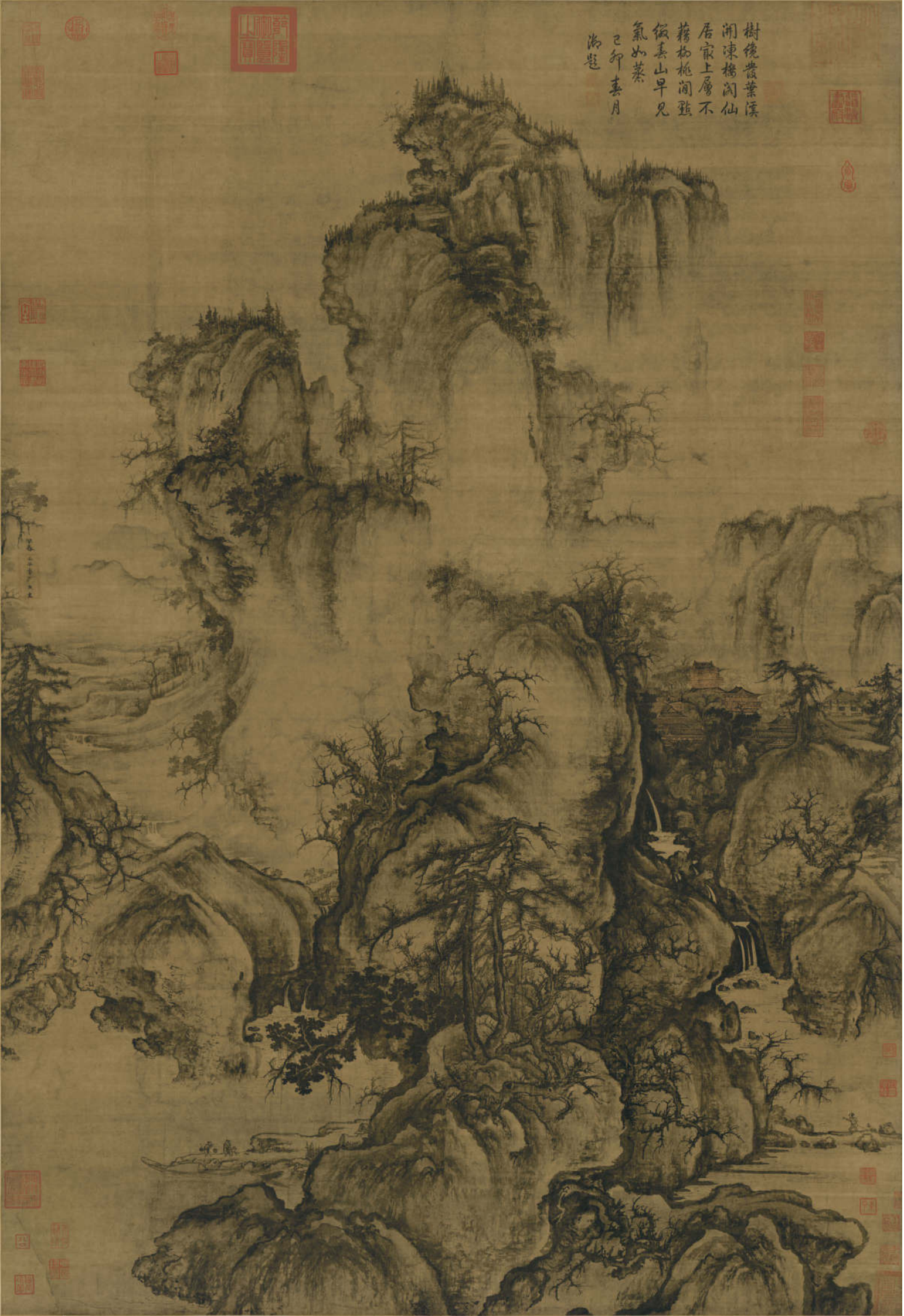
During the Northern Song, *shanshui* paintings flourished without decline: they were huge in size, intricate in depiction, time-consuming to make, and inevitably hung on the main wall of the grand hall of a great residence—which in the structure of old dwellings is the position of the deity image. In the early Daoist system in China, image-worship was not the primary focus; the ritual platform of Daoist altars still took the *boshan* censer (hill censer) as the center of worship, and artificial rockeries in courtyards once served the function of summoning the spirits. To this day, the perforated Taihu stones still appear on desks and in gardens, though the ideas behind them have long been buried in the torrent of history. The *shanshui* painting with topological spatial properties is undoubtedly a marker of the cosmic view of the unity of Heaven and humanity, once possessing the function of immortal faith and sacred totemic worship.

In the Zhuangzi, *Discussion on Making All Things Equal* (*Qiwu Lun* 《庄子齐物论》), it says: "Beyond the Six Receptacles (*liuhe* 六合), the sage preserves them but does not discuss them; within the Six Receptacles, the sage discusses them but does not argue about them." The "Six Receptacles" are interpreted by Pan Yuting 潘雨廷 in *Yi Lao yu Yangsheng* (*The Changes, Laozi, and Nourishing Life* 《易老与养生》) as a regular cube of three-dimensional space; "within" is three dimensions, "beyond" is multidimensional space. In the Zhuangzi, chapter *Great Ancestral Teacher* (*Dazongshi* 《庄子大宗师》), Confucius says: "He roams beyond the bounds; I roam within the bounds." Roaming beyond the Six Receptacles is "roaming in the single *qi* of Heaven and Earth." Daoism pursues infinite time and space; long life is infinite time, the immortal realm is infinite space, and all this can be experienced only by entering a higher-dimensional state of consciousness through seated meditation and visualization. Rather than saying one ascends to immortality, it is better to say one enters a subconscious state, lifting the heart-mind from the external three-dimensional world into a higher-dimensional space, and obtaining the infinity of time and space through spiritual wandering. If length, width, and height are the coordinate axes measuring three-dimensional space, then one can imagine human consciousness as the endpoint of a fourth coordinate axis, continuously shifting and transforming space amid constant wandering and karmic conjunction. It can be said that human consciousness is the opening to the higher-dimensional time-space that the ancients long sought—obtaining within the human body itself a vast infinity in union with the cosmos. *The Neijing Tu* is the secretly transmitted method of the Daoist dual cultivation of nature and life, the key to opening the mouth of the time-space cave, all metaphorized in the form of *shanshui* painting.

III. The Yin-Yang Five Phases Doctrine and the Method of Analogy

Dong Zhongshu 董仲舒 writes in *Chunqiu Fanlu* (*Luxuriant Dew of the Spring and Autumn Annals* 《春秋繁露》): "The *qi* of Heaven and Earth unites as one, divides into yin and yang, is judged into the four seasons, and is arrayed into the Five Phases. 'Phases' means movement; their movements differ, and therefore they are called the Five Phases. The Five Phases are the five offices; they generate one another in sequence and overcome one another at intervals. Thus they govern order; if one goes against them, there is chaos; if one follows them, there is order."

The theological thought of "unity of Heaven and humanity" incorporates all things in the universe into the system of yin-yang and the Five Phases for classification and explanation. The cosmic model can be understood through the *Xici Zhuan* (*Commentary on the Appended Judgments* 《周易系辞上》) of the Zhouyi: "In the Chang-



Guo Xi, *Early Spring* 郭熙《早春图》

es there is the Supreme Ultimate, which generates the Two Principles; the Two Principles generate the Four Images; the Four Images generate the Eight Trigrams." In Chen Tuan's *Wuji Tu* (*Diagram of the Ultimate of Non-Being* 无极图), yin-yang, the Five Phases, and the Eight Trigrams correspond to one another both spatially and dynamically, extending through the myriad things, interlocking with one another to form a whole. Pan Yuting held that "the Hexagram Position Diagram of Fuxi's Sixty-Four Hexagrams corresponds to all events in four-dimensional space—within the eight-cell cavity." The *najia* method 纳甲法 uses the phases of the moon to correspond the twelve double-hours of the day and the heavenly stems' temporal attributes within it. This is a topological cosmic structure relation in which time and space are unified, flipping from within to without, continuously transforming in motion. The four directions of east, west, south, and north correspond to the four divine beasts—the Azure Dragon, Vermilion Bird, White Tiger, and Black Tortoise—and at the same time represent the twenty-eight lunar mansions, the groups that govern the rotation of the heavens, establishing a unification from astronomy to geography, with the human being at the center between Heaven and Earth. The Five Phases correspond to the different internal organs of the human body and the operation of the qi channels, and also to different animals, plants, minerals, double-hours, solar terms, and feng shui. This set of numeral trigrams from three thousand years ago, possessing the heavenly stems and earthly branches, the four directions and four seasons, the Five Phases and six lines, the *Hetu Luoshu* 河图洛书 of yin-yang and the Five Phases generating and overcoming one another, as well as such time-space insights as mutual information, the repetition of reversal, and the interweaving of threes and fives, layer upon layer forming the integral structure of the Three Realms of Heaven, Earth, and Humanity—has been transmitted to the present day, its most common applications being the system of traditional Chinese medicine, mathematical geometry, pictographic writing, and computer algorithms.

The Five Phases doctrine is used to describe the relations of mutual movement among different systems, with the generative and overcoming transformations based on their inner natures. Just as in computer algorithms, how each word in a storage register should be understood depends entirely on the role that word plays in the program. The "method of analogy" enables all things to establish a tightly connected viewpoint. It is used to explain the accumulation of observation and knowledge in everyday life, and also to construct an entire grand symbolic system of political rule. The movements of the celestial bodies, the contingent events of natural climate, the order and chaos of state politics, and the social ethics and morals of human beings—all are constructed into a corresponding system of explanations.

If one understands it mathematically, the Chinese yin-yang, Five Phases, and Eight Trigrams are very much like a Möbius strip—a self-looping ring with no beginning or end, no obverse and reverse, no inside and outside—also a topological system. Topology studies the properties of geometric figures that remain unchanged under continuous deformation, considering only the positional relations among objects without considering their distance and size. Lacan also used topology to construct the structure of human psychoanalysis: the subject receives its own message from elsewhere; each term is already foreshadowed in the structural relations of the other terms; conversely, each term, through its retroactive action, determines the meaning of the other terms—a loop of the unconscious circuit. Chen Tuan's 陈抟 *Wuji Tu* is interpreted as a method of inner-alchemy cultivation; the Eight Trigrams are often used to divine external changes; yin and yang are the 1 and 0 used by Leibniz to invent binary; the changes between yin and yang metaphorize the internal operating structure of the human body, the circumstances of a person's life, the course of social history and celestial movement, all represented by the sym-

Fan Kuan, *Travelers Among Mountains and Streams* 范宽《溪山行旅图》



Li Cheng, *Temple in the Clear Mountains* 李成《晴峦萧寺图》



bols of the sixty-four hexagrams, continuously turning, flipping, and extending up and down, inside and outside, on circular tracks. The *Xici Zhuan* of the *Zhouyi* 《周易系辞上》 says: "The virtue of the yarrow stalks is round and spiritual; the virtue of the hexagrams is square and knowledgeable; the meaning of the six lines is easy and communicative." For two thousand years the changing images of yarrow stalks, hexagrams, and lines have all turned back to be obtained in the five viscera and six bowels and the circulation of *qi* and blood.

The AI theorist Douglas Hofstadter, by writing programs that can think for themselves, explores the way human beings think. He hypothesizes that the human brain is an extraordinary piece of software that, through continuous measurement, comes to understand its own thinking mechanisms, in order to build machines that can think. He wrote *GEB* (*Gödel, Escher, Bach*) and *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*. He holds: "Your mind is at all times trying to place the new situation you are in into the context of other situations you have encountered before, that is, to understand the new situation at a higher level of abstraction; this involves stripping away irrelevant and superfluous details and isolating what is truly important." "I believe that thinking involves finding the essence of a situation, and this idea is closely related to the notion that analogy is the core of cognition. Basically, this view holds that analogy arises when we ignore surface appearance and find the deep core essence shared by an old and a new situation, and treat the new situation as the same as (or a kind of) a previous situation." To give the simplest example: in teaching the AI to attach recognition labels of repetition and sequence to "ABC" and "IIJJKK," when the condition "ABC" becomes "ABD," the AI can automatically generate "IIJJLL" through the sequence label. The deeper connections and abstract relations among symbols have become the essence of the subconscious automatic association of the human brain. This way of thinking—not the direct classification of surface categories and subjects, but the search for identity of inner, deep nature—corresponds strongly to the cosmic view of universal connection and mutual transformation formed by the yin-yang, Five Phases, and Eight Trigrams doctrine, in which any phenomenon can be understood as an embedded relation within a time-space structure.

From the 1940s onward, with the development of mathematical logic and artificial intelligence, computation characterized by cognitive-computational representation emerged. To bridge the gap in intelligence between humans and machines, thinking about the human mind and cognitive science became a prominent subject in AI research. Its indirect philosophical sources are mainly Pythagoras's "number," Platonism's "doctrine of Forms," and Aristotle's "teleology"; its direct sources are mainly Descartes's "mind-body dualism," Hobbes's "reasoning as computation," Leibniz's "pre-established harmony," and early analytic philosophy and logical empiricism. These all neglect the role of the cognizing subject's brain, body, and environment in cognition and intelligent activity, and are called non-embodied cognition and the computational-representational view. The concept of embodiment points out that cognition is embodied, that cognition arises from the interaction between the body and the world, that the human mind is not confined to the head but is rooted in the entire organism and the environment in which the organism is situated, depending on the neural layer and its lower processing processes and structural relations—an activity process of a complex system in which brain, body, and environment are integrated and interwoven, a self-organizing mega-system formed through continuous activation, selection, competition, and recombination. From the 1980s, the second generation of cognitive science made a turn, mainly encompassing "embodied cognition," "situated cognition," and "embedded cognition." Embodiment emphasizes the interaction among brain, body, and environment—a mutually triggered karmic conjunction—holding that

humans are closely connected with their external environment and the external things within it, together forming a dynamically coupled system.

Researchers used a mathematical model called "algebraic topology" to determine the geometric structure positions in a virtual brain built by software. To test the model, they conducted experiments on real brain tissue.

In 2015 the *Blue Brain Project* published the first digital copy of a cerebral cortex, and researchers, using algebraic topology to study neuroscience for the first time, revealed a space and cosmos with multidimensional geometric structures within brain networks, in which each neuron connects with other neurons in a specific way to produce geometric objects. When researchers apply stimuli to the virtual brain tissue, more and more higher-dimensional neuronal cliques temporarily combine, enclosing higher-dimensional voids—namely higher-dimensional cavities. The brain responds to stimulation by building and then erasing multidimensional towers of blocks, somewhat like sand being cast into shape and then collapsing into a multidimensional sand tower. After repeated tests, the laboratory found that this higher-dimensional brain structure could never arise by chance. Then, following the diagram of the *Neijing Tu*, gathering the original spirit at the *niwan* palace in the brain to obtain infinite time-space, and using the Eight Trigrams and the sixty-four hexagrams and their changing lines to perform numerical derivations, the body-mind training techniques accumulated from two thousand years of experience can also be understood as a special symbolic system that seeks to approach the truth.

We return to the pictorial metaphors that the ancient Kun Can and the *Neijing Tu* have brought us: everything is hidden within the secrets we use daily without knowing. The Klein bottle is a surface that can only truly manifest itself in four-dimensional space—a non-orientable topological space, which can be simply described as a bottle whose opening and the hole at its bottom connect with each other, having no distinction between inside and outside. If it is projected onto a two-dimensional plane, it happens to be exactly the yin-yang fish of the Eight Trigrams—yin and yang, black and white, continuously flipping from inside to outside, circulating, like the projection of a four-dimensional figure onto two dimensions. From Kun Can's seemingly conventional landscape paintings, to the Neijing Tu, to the method of analogy: if these images, from the very beginning, understand the relation between the human body-mind and cosmic time-space in terms of higher-dimensional mathematical structures, then after bridging the walls among disciplines and between ancient and modern, China and the West, can we decode and recognize anew those systems of knowledge experience preserved within the images that lie in the rubbish heap of history?



Diagram of the Ascending and Descending of the Body's Form and the Mutual Lifting of Yin and Yang
《体相阴阳升降图》

髡残、内经图与类比法

文：付晓东

——道家图像与技术哲学演讲稿之一

这是2017年9月，在歌德学院《土地、导灵、科学与政治——关于后人类主义和新唯物主义》讨论会上的演讲，后来又在关山月美术馆和四川美院演讲过，作为一个将科学、艺术与传统联系起来进行图像分析的起点，将延展出一系列以不同图像作为切入点的更多方面的研究。

一、认知的扩展

作为批判性教育的策展项目，从12年开始，我组织了由空间站和果壳网主办的“第八日——艺术家的访问科学家实验室”计划。在4年的时间，组织艺术家们去北大、清华、中科院的不同科学家实验室访问，每次进行相关科学家进行3、4场的演讲，接触了20多个学科。17年10月策划了微软人工智能部门合作艺术项目《造图计划》。11月在西安美院做了为期5天的《道教图像与技术哲学》的研究生工作坊。通过对未知的探索，原本局限在艺术领域的思考扩展到不同的知识体系,扩充了认知领域，也打开了一个更具可能性的领域。

如何把这些知识的碎片结构化系统化？法国的技术哲学，会把源头追溯到希腊神话中去。比如拉图尔所推崇的“盖亚假说”，把地球比喻成一个自我调节的有生命的超级有机体。生命体与自然环境，包括大气、海洋、极地冰盖以及脚下的岩石之间的能量存在着复杂连贯的相互作用。如果追朔中国古代的历史技术哲学理论的源头，会遇到道家理论，是一种原始科学的教义。从伏羲八卦，到商代天文历法，中国古代认为整个宇宙和人之间是一种“天人合一”的关系，天被神性化，代表自然运行的规律，也可以说是一种类似自然科学对客观性的尊重。儒家更多是关于社会伦理和社会制度的规范。道家学说更多是关于宇宙论、天地人三才的关系、身心关系、美学与技术的学说。李约瑟在《中华科技文明史》中，天文、地理、文字、化学、医药等方面都涉及到以自然规律为主体的道家学说。当我们已经获得了一个打开不同学科的知识视野，如何重新面对历史中最热爱制造图像的道家遗产？科技与艺术的结合不是简单地把科技成果挪用到艺术作品中，而是用新的知识系统去打开图像背后的未知世界，这给我们提供了一个新的契机。

拉图尔作为一个人类学家，把科学家的实验室当成人类学的研究对象进行观察，提出科学家研究的对象——“科学”也是社会建构的产物。科学研究本身也是由一系列的日常信仰和文化传统构成，是具有文化特异性的实践。科学不是一个绝对化的真理，是在人类的文化发展和历史文明阶段不断地被建构出来的，与那个时间段的人的认知水平，世界观、宇宙观等一系列认知方法有联系。科学也是一种文化。比如天文学里，曾经颠覆“地心说”的哥白尼“日心说”早已被宇宙“膜”的理论所替换。真理和谬误总是随着认知范围的扩大而不断转变，一切我们认为坚固可信的知识，依然可能成为认知过程中的局部理论。

在漫长的时间之河存留下来的古代文献，经过被不同政权、文化、信仰、迁徙、战乱的时空阻隔之后，只留下表面显现的图像空壳，如同一个个切片，是召唤曾经存留过的思想的证据，是另一个时空中，曾经真实存在过的人类集体性的对世界的认知和解读。在引力波记录频繁，基因剪刀的使用，上帝粒子现身，人工智能阿拉法狗碾压围棋的今天，自然宇宙的神秘之处正在被一点一点的揭示。不断出现在全球化社交媒体中的知识混合，也使我们对自我和身处的世界产生了重新认知的角度。我们依然身处在一个渐进式认识世界的过程之中。

在 Ilya Prigogine 和 IsabelleStengers 的《从混沌到有序》中，则总结了三百年近代自然科学发展的历史，把科学的演进放在一定的文化背景中加以考察，指出应当把动力学与热力学、物理学和生物学、自然科学和人文科学、西方文化传统与中国文化传统结合起来，在一个更高的基础上建立人与自然的新的联盟，形成一种新的科学观和自然观。

艺术史上的种种图像，都可以作为一个特定的历史、地域、宗教、技术水平的证明，一种思潮和观念的外现。我们不再单纯地关注一种风格和技法的演化了，图像变成了一系列观念的集合体。图像和图像认知的历史，也是创作者和阅读者在不同时空中进行的多种认知体系的讨论。可看的绘画变成了可读的图像。在穿越各个学科研究领域的基础上，我对艺术的认知也早已去除传统和当代的间隔，那么先回到一些原点和基础问题，中国古代是如何认识自然的？如何处理主体和客观自然的关系？东西方曾经有着怎样不同的观念上的区分？让我们开启在图像之中进行的另一种知识探险的旅程。

二、髡残与内经图

山水画是中国卷轴画的主流历史。如何把山水图像还原到一个认知论的框架背景？这是我的一个切入点。17年6月在故宫里的清初四僧展览触发

了这一路径。清初四僧髡残作为一位明末清初的画僧，曾经拒绝了曹洞宗的衣钵，是以佛法参悟而著名的高僧。曹洞宗主要观点是阐释“真如”与现象世界的关系，万事万物之间存在着一种“回互”与“不回互”的关系。“回互”指万事万物互相融会贯通，虽然万物的界限脉落分明，但在此中有彼，彼中有此，互相涉入，不区别彼此。“不回互”是说万物各有自己的位次，各住本位而不杂乱。曹洞宗最主要是默默地实修坐禅，认为只要打坐，就能离五欲、除五盖，便是和佛祖相见，不用烧香、礼拜、念佛、修忏、看经。这些实操性的坐禅经验，和曹洞宗的对万物之间关系的理解，皆是髡残的思想基础。《坛经》认为：“世人性净，犹如清天，慧如日，智如月，智慧常明，于外着境，妄念浮云盖覆，自性不能明。”已经明确的出现了将日月浮云，比喻为心性和智慧的说法。重视《易经》和易学的曹洞宗，在清代被描述为“曹洞家风，君臣道合；正偏相资，鸟道玄途，金针玉线，内外回互；理事混融，不立一法。”曹洞宗充满了重视六爻，易经基础的思想气质。明清时期，佛道在修炼上相通，三教融合倾向明显，很多和尚也炼制内丹。髡残在题跋中署名“残道人”、“忍辱道人”、“电住道人”，可见其佛道兼修的日常实践，跟道家修炼的内丹术有很大的关系。

《内经图》是道家内丹术的气脉心法秘图，源于《黄庭内景经》，用山水画的形式将人体内在解剖的五脏六腑与任督二脉关联，设计为山水亭台和谐的小周天，是千年不外传的秘要图示。《内经图》代表了道家静养功思想和技术的真谛，其廋辞、谜词、隐语在图示与论述上大量出现，表现了修性固命，天人感应的内功观点。内丹功法始于先秦，《内经图》中间经过数个版本的变更，目前看到的成型于明末清初年间。光绪十三年在慈禧太后的大太监刘素云在霍山派宫观“高松山斋”发现，并公布于世，至今木刻版还在北京白云观的墙上。

在《内经图》里，人身体的内在结构比喻成了一组自然的山水，配合画面充满隐喻的诗句，将功法的重要窍穴与机要用图像直观化。画面中，把肾的精气部分比喻成水，肾主阴属水。中间春柳是肝主木，心神的儿童主火，织女属金代表肺，心田属土需要调和静止，是五行对应的观念。气脉沿着代表脊椎的山路逆流而上，汇聚到上大下小的九峰山既泥丸宫处。十二楼台的宝塔是咽喉，三个穴位尾闾关、夹脊关、玉枕关都被画成小的城门，分别表示为长强穴、神道穴和风府穴。气脉突破了这三个关口一直来到头顶，然后通过舌头把任督二脉连接，完成小周天循环。对应着存想下丹田、呼吸元气、漱咽津液等修炼法门，实现炼精化气，炼气化神，炼神还虚的过程。内丹修炼就是要通过水火激荡，排除意识，进入潜意识，激活元神，性命双修，调心养性。炼丹者想像身体为丹炉，以精气神为药，调理吐纳，起火通明，将三尸九蟲驱除体外，而将元神聚集在头顶的泥丸宫内。

髡残想必对这些隐喻的所指心知肚明，他使用了擅长的笔墨功夫，在一系列的山水画中，反复重复着这一过程，印证着内功心法的体悟。他的所有图式都如出一辙，画面底部是一片大水，代表脊椎一条蜿蜒不绝的连贯的山路，顶上是复杂的上宽下窄的九连山峰，总体上是一个昆仑山孤峰的形象，山头里流出的溪水就是口舌处宝贵的津液。每一张图像虽然略有出入，有的作品中间咽喉处有十二层宝塔，或是一组建筑，脊椎或向左，或向右，但几乎符合内经图所有的说法和定位。故宫展出的《层岩叠壑图》中，三关的位置准确的画了亭子和建筑，山腰处的山洞里中画一个正在坐禅的和尚，下面流出小瀑布拐成了一个反常的暗示八卦的S形符号。作品中明显的充满了仙道的内丹打坐的隐喻性图像的标志。髡残一反视觉元素主导的抽象审美，却充满了图像的象征和隐喻。由于内丹修炼的秘而不传的知识体系，使髡残的山水画超越了那个时代，如同马格里特一般，在画面上暗藏了无数的哑谜，成为了一个晦涩曲折的图像隐喻性的大师。

二、拓扑的神圣山水

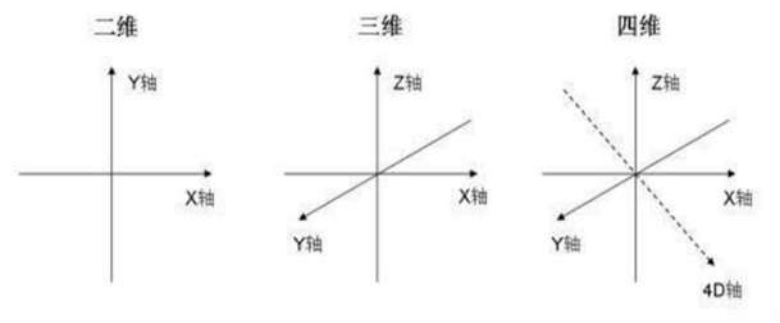
这种关于山水画比喻身体的观念，并非髡残创立，而是古而有之。据唐代佛教论著《广弘明集》转记道教说法，形容老子创世的身体化为天地万物：“左目为日，右目为月，头为昆山，发为星宿，骨为龙，肉为狩，肠为蛇，腹为海，指为五岳，毛为草木，心为华盖，乃至两肾，合为真要父母。”

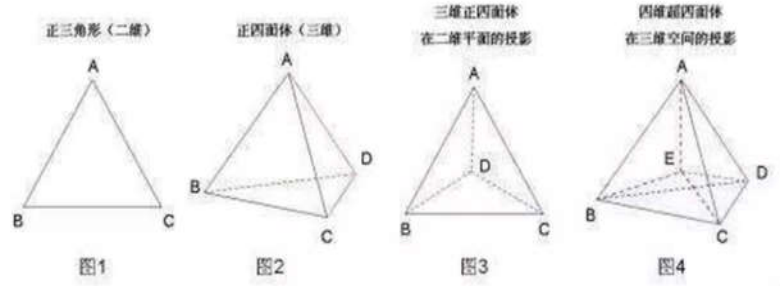
更为直接对应的是郭熙的《林泉高致》中写到“石者，天地之骨”，“水者，天地之血”。“山以水为血脉，以草木为毛发，以烟云为神采。”郭熙的《早春图》以巨大的S型扭曲山脉，气脉连通，虽然没有三关亭台这样的标志性的点睛之笔，但从布置构图上亦可以看做是早期《内经图》版本的再现，台湾学者黄士珊在《写真之形》中曾经对郭熙的人体山水进行过剖析。范宽的《溪山行旅图》则更像是同样题材的另外一个变体，南宋的《体相阴阳升降图》，身体成为一片巨大直立的山形，气脉运行于其上。

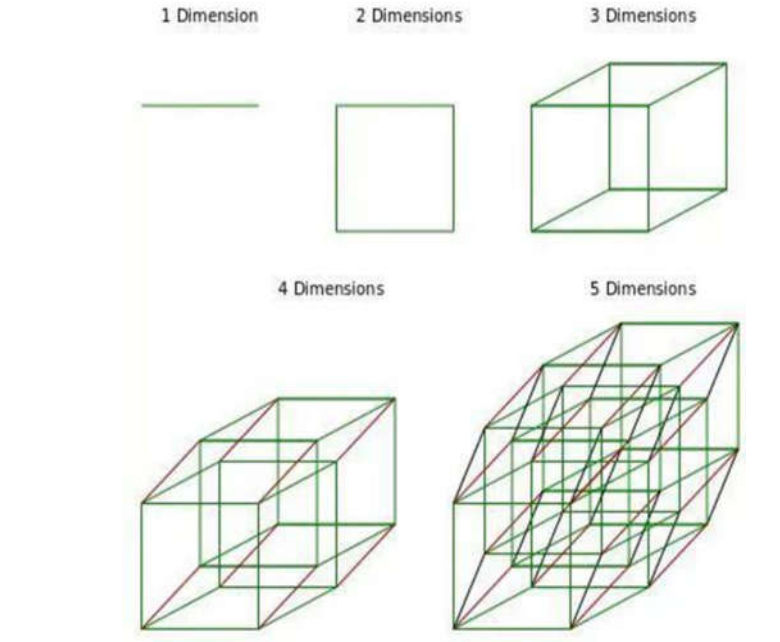
宋元以前和少部分明代的山水画，反复的描述这样一个题材，从人间鸡犬相闻的茅草房景色，通过隐藏的山洞或陡峭的三关，达到云端山顶上飞檐翘角的琼楼玉宇中去，这是一个神圣化的超自

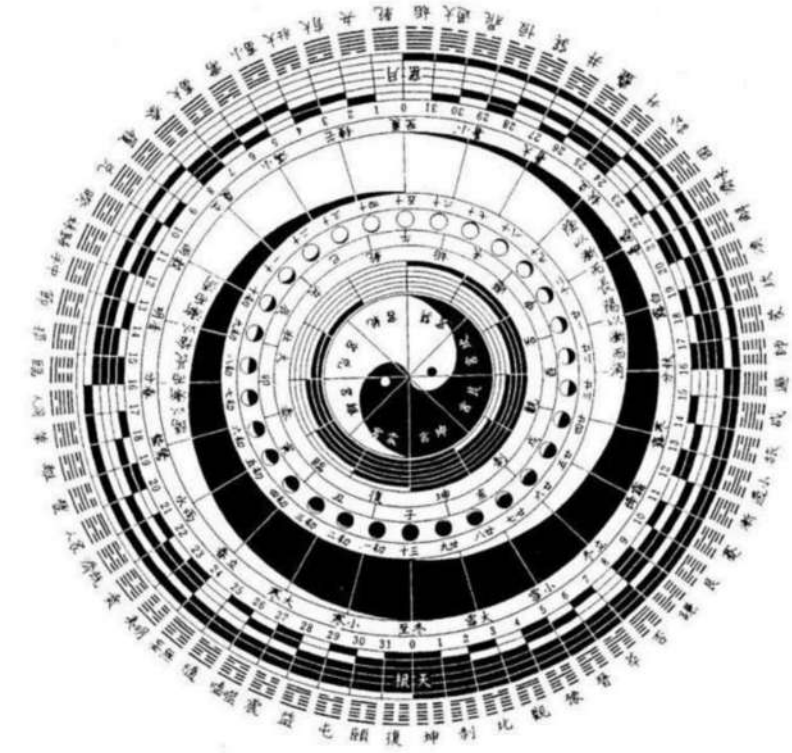


Boshan censer 博山炉









The Hexagram Position Diagram of Fuxi's Sixty-Four Hexagrams 伏羲六十四卦方位图

然之旅。古人的青绿山水和界画的楼台山水，几乎无一例外是对仙界的描述。山间层岩叠嶂，楼台斗拱华丽，十字重檐庑殿顶和歇山顶，都是庙宇宫殿的象征，标志着主殿是神仙居所的神圣空间。勾勒渲染的云气遮掩着青碧的仙山，日出照耀的祥云彩霁，迎风飘动的降神的经幡，成组出现的细微仙鹤，甚至有骑着凤凰的仙人直接在空中神显，隐藏在顶峰之下危崖之上的四方形的道坛，这些都是典型的神圣空间的标志性图像。穿过桃花和竹林，进入山洞，展现仙境的经常是苍松翠柏，松树是长青之树，标志着一个恒久不变的时空。如同陶渊明《桃花源记》里面描述的，这是天上一日地上十年的天人居所。宽广的水域阻隔的三座不相连的山峰，则被归为海上三山，方丈、蓬莱、瀛台，比如宋代王希孟的《千里江山图》既是此类。

点景人物皆是在山水间处于艰难寻旅的过渡空间，在荒山陡崖或者瀑布洞口便出寻找时空开口，在不知进与退的桥之上徘徊，在时间轨迹和心性之途中颠簸于命运的旅人。山洞如同一个宇宙的虫洞，将不同属性的世界相连。结合《内经图》，除了外在长生不老的仙境图像的题材，山水又是一个通过孔洞所连接的，可以通过坎坷磨难的静心秉神冥想内观而进入的心性空间，内外翻转，可以得以进入的神圣空间。里面既是外面，外面也是里面。山水又成为一个以人为内，以自然为外的“克莱因瓶”，是一个具有收敛、连通和连续功能的拓扑空间。

宗炳《画山水序》是中国山水画第一篇论著，用文字描述了这种拓扑经验：

“圣人含道暎物，贤者澄怀味像。”
“且夫昆仑山之大，瞳子之小，迫目以寸，则其形莫睹，迥以数里，则可围于寸眸。诚由去之稍阔，则其见弥小。”
“夫以应目会心为理者，类之成巧，则目亦同应，心亦俱会。应会感神，神超理得。”

北宋时期盛兴不衰山水画尺幅巨大，描绘繁复，耗时漫长，也必然挂在正厅高堂的大宅主墙之上，这在目前的古宅结构中都是神像的位置。在中国早期的道教体系里面并不是神像崇拜为主，道教坛场的仪轨也依然以博山炉作为礼拜中心，假山石在庭院中也曾经起到降神的功能，至今带有孔洞的太湖石依然出现在案头和园林，只是其中的观念早已湮没在历史洪流之中。具有空间拓扑属性的山水画无疑是一个代表了天人合一宇宙观的标志，曾经具有神仙信仰和神圣性图腾的功能的存在。

《庄子齐物论》中说：“六合之外，圣人存而不



Chen Tuan, *Wuji Tu* 陈抟《无极图》

论；六合之内，圣人论而不议。”“六合”被潘雨廷在《易老与养生》中解释为三维空间的正立方体，“之内”是三维，“之外”就是多维空间。《庄子大宗师》中孔子说：“彼游方之外者也，而丘游方之内者也。”游于六合之外，就是“游乎天地一气”。道家追求的是无限的时间和空间，长生就是无限的时间，仙境就是无限的空间，这一切只有通过打坐冥想使意识进入到高维状态得以体验。与其说是升仙，不如说是进入潜意识状态，将心神从外在的三维世界升至高维空间，以神游的方式获得时空的无限性。如果长、宽、高是丈量三维空间的坐标轴，那么可以把人的意识想象为第四个坐标的端点，在不断的游移和因缘际合之间，延展和转换空间。可以说人的意识，便是古人苦苦寻觅的高维时空的开口，就在人身体的内部获得广大的与宇宙相合的无限性。《内经图》则是道家性命双修，打开时空洞口钥匙的秘传方法，这一切则以山水画的形式来进行图像的隐喻。

三、阳五行说与类比法

董仲舒在《春秋繁露》“天地之气，合而为一，分为阴阳，判为四时，列为五行。行者，行也，其行不同，故谓之五行。五行者，五官也，比相生而间相胜也，故为治，逆之则乱，顺之则治。”

“天人合一”的神学思想，将宇宙中的万事万物纳入到阴阳五行系统中来进行分类和阐释。宇宙模型可以理解为《周易系辞上》所说：“《易》有太极，是生两仪，两仪生四象，四象生八卦。”，在《无极图》中阴阳五行和八卦进行空间上和动态上的相对应，延展于万事万物，互相套嵌，形成一个整体。潘雨廷认为“伏羲六十四卦方位图对应四维——八胞腔内一切时空事件”。“纳甲法”用月亮蚀相将十二时辰和天干的时间属性也对应其中。这是一个时空一体化，由内及外，互相翻转，连续运动转化的拓扑式的宇宙结构关系。东南西北四个方位，对应着青龙、朱雀、白虎、玄武四种神兽，同时又代表了天象运转的方位二十八星宿的组群，建立了从天文到地理的统一，而人处在天与地的中心。五行对应着人的身体不同的内脏器官和能量气脉运行，也对应着不同的动物、植物、矿物、时辰、节气，以及风水。这套来自三千年前的具备天干地支、四方四时、五行六爻的数字卦，阴阳五行相生相克的河图洛书，以及时空认识的消息旁通、贞悔反复、参伍错综等内容，层层叠加形成天地人三才的整体结构流传至今，最普遍的应用是中医系统、数学几何、象形文字和计算机算法。

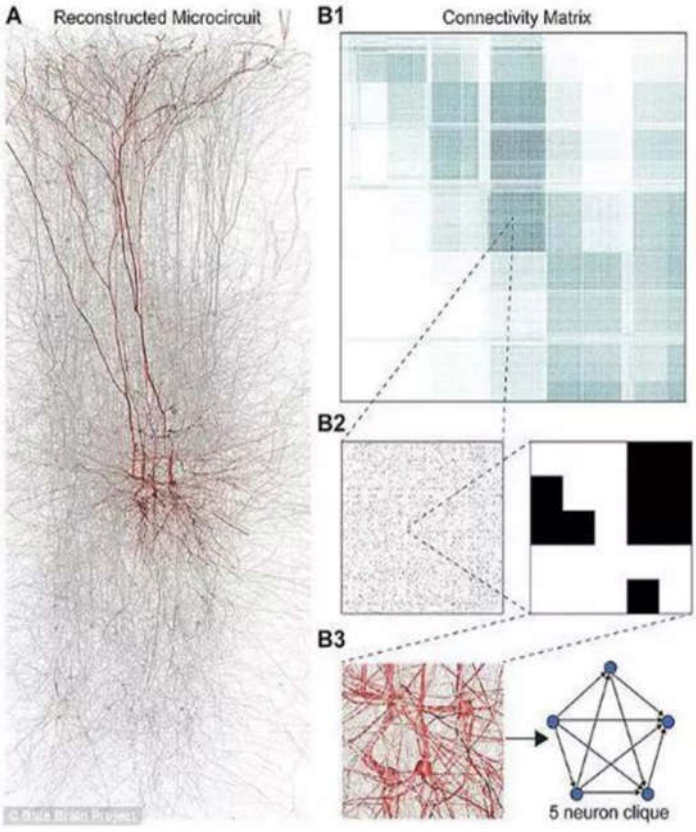
五行说用来描述不同系统互相运动的关系，用其

内在性质而形成的相生相克的转化关系。如同计算机算法中，储存器中每一个字应该如何理解，也完全取决于这个字在程序中所扮演的角色。“类比法”使一切建立起了一种紧密联接的观点。这来用解释日常生活的观察和认识的积累，也用于建构一整套庞大的政治统治的象征体系。宇宙之间的天体运行，自然气候的偶然事件，与国家政治的治乱，人的社会伦理道德，也建构起一套对应性的解释关系。

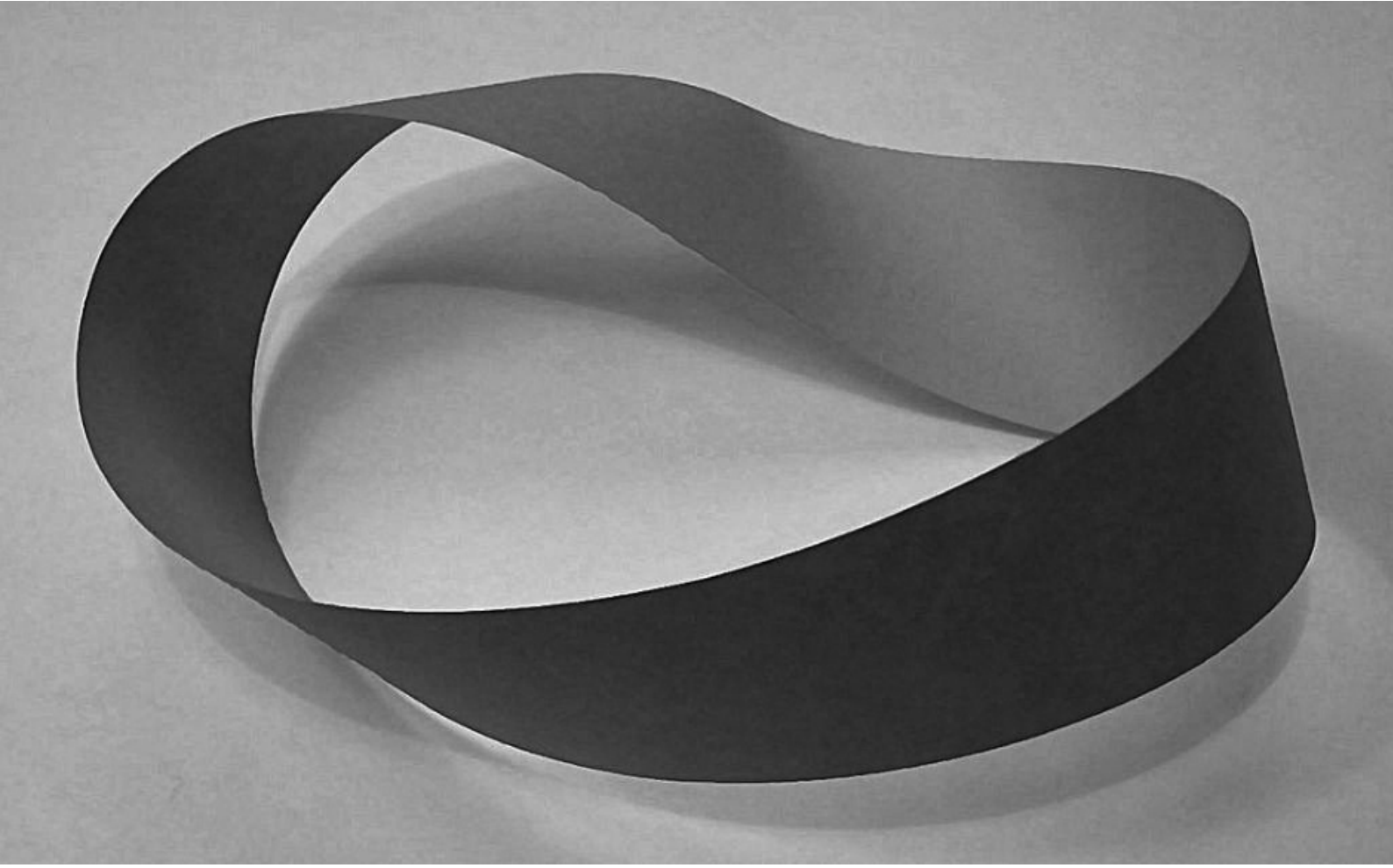
如果用数学的方法来理解，中国人的阴阳五行八卦，非常像一个莫比乌斯圆环，一个自我循环，没有起始结尾，没有反正、没有里外的无限循环的环，也是一个拓扑学的系统。拓扑学研究几何图形在连续改变形状时还能保持不变的一些特性，只考虑对象之间的位置关系而不考虑它们的距离和大小。拉康也用拓扑学来建构人的精神分析结构，主体从他处接受自己的信息，每个词项都已在其他词项的结构关系中得到预示；反过来，每个词项又都通过其回溯作用来确定其他词项的意义，是一个无意识回路的循环。陈抟的《无极图》被解释为内丹修炼的方法，八卦经常拿来占卜外在的变化，阴和阳就是莱布尼茨发明二进制所使用1和0，阴和阳之间的变化，隐喻人身体内部的运行结构，人一生里面的人生境遇，社会历史和天体的运行等等，用64卦的卦象的符号作为表征，不断在循环轨道中上下内外连续、翻转、延伸。《周易系辞上》说：“蓍之德圆而神，卦之德方以知，六爻之义易以贡。” 蓍、卦、爻两千年以来变化的象数，一切又反身以得于五脏六腑及血气运行。

人工智能的理论科学家侯世达通过编写可以自己思考的程序来探索人类思考的方式。他假设人脑是一个非比寻常的软件，通过不断的测量了解自己的思维机制，而来制造懂得思考的机器，曾写过《GEB》和《流动性概念和创造性类比：思维基本机制的电脑模式》。他认为“你的思维无时无刻不在试着将你所处的新情境和你曾经遇到过的其他情况作比较，也即在更高的抽象层面上理解新的情境；这涉及剔除无关和多余的细节，分离出真正重要的东西。”“我相信思考牵涉到找出情境的本质，这一理念与类比是认知的核心这一观点密切相关。基本上讲，这一观点认为当我们忽略表象，找到了新旧两种情境共有的深层核心本质，而将新的情境视为与之前的某个情境（或某一类情境）一样时，就产生了类比。”举一个最简单的例子，我们在给“ABC”与“IIJJKK”贴上人工智能的识别的重复性标签和连续性标签，当条件“ABC”变为“ABD”的时候，人工智能可以通过连续性标签自动生成“IIJJLL”。符号之间更为深层的联系和抽象性的关系，成为了人脑潜意识的自动联想的本质。这种并非表面上科目纲属的直接的分类，而是寻找内在深层的性质上的相同的思维方式，与阴阳五行八卦说所形成的普遍联系互相转变的宇宙观有很强的对应之处，任何一个现象都可以理解为在时空结构里的一个嵌入式的关系。

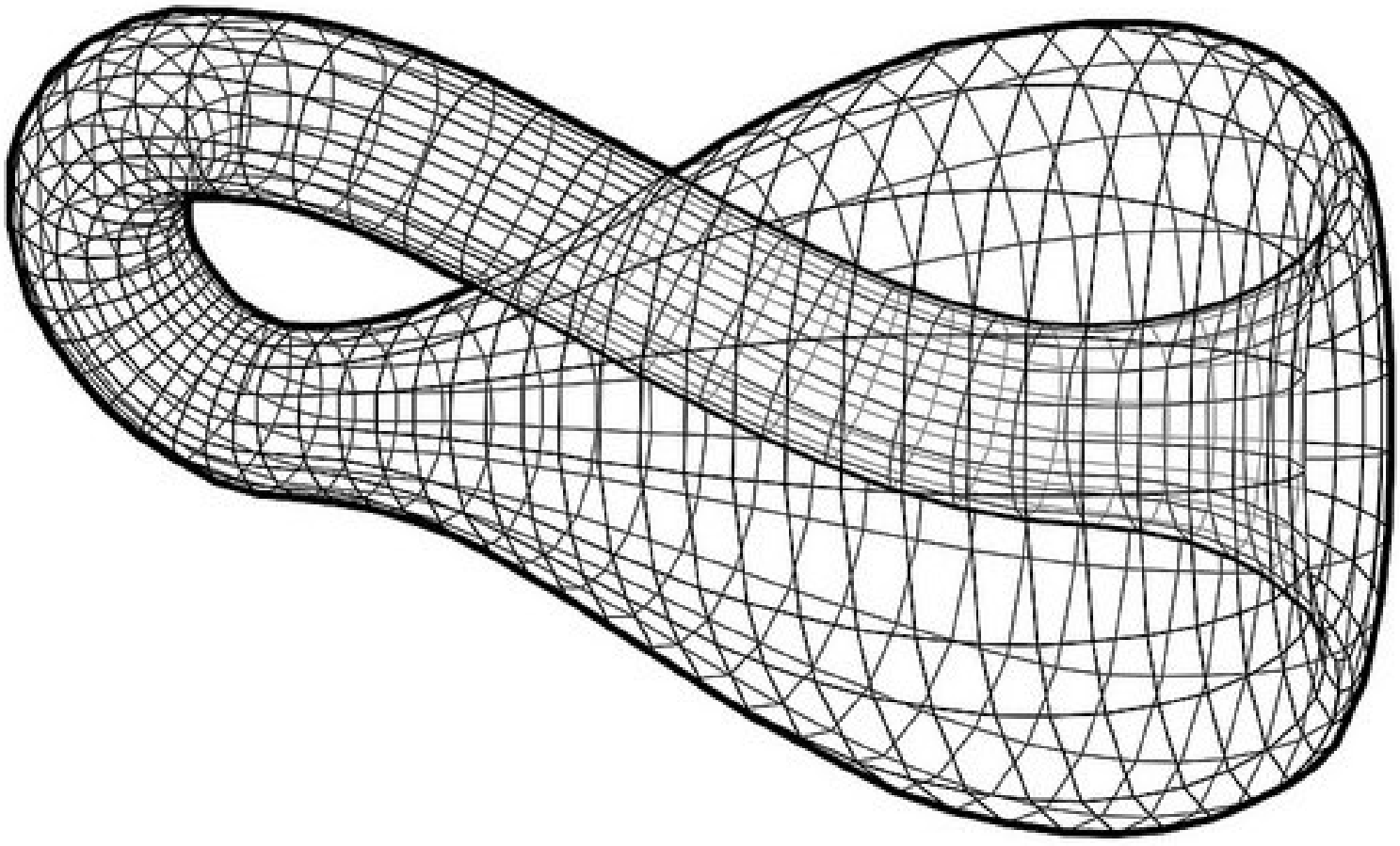
20世纪40年代开始，随着数理逻辑与人工智能的发展，出现了以认知计算-表征为特征的计算。为了跨越人机之间智能差距的鸿沟，对于人的心智和认知科学的思考，成为了人工智能研究的显学。其间接的哲学来源主要是毕达哥拉斯的“数”，柏拉图主义的“理念说”和亚里士多德的“目的论”；直接的这些来源主要是笛卡尔的“身心二分法”，霍布斯的“推理及计算”，莱布尼茨的“前定和谐”和早期的分析哲学和逻辑经验主义思想。这些都忽视了认知的主体大脑、身体与环境之间在认知和智能活动中的作用，被称为非涉身认知和计算-表征观。涉身性概念指出，认知是涉身的，认知源于身体和世界的相互作用，人的心智并不是局限于头脑之中，而是根植于整个有机体及有机体所处的环境之中，依赖于神经元层面与其更下层的处理过程和结构关系，是大脑、身体与环境整合交织而成的复杂系统的活动过程，是在过程中不断的激活、选择、竞争和重组中形成的自组织织巨系统。从80年代开始的第二代的认知科学转向，主要包含了“涉身认知”、“情境认知”和“嵌入性认知”。涉身性强调了大脑、身体、环境之间的交互作用，是一种相互触发的因缘际会，认为人类与其所处的外在环境及环境中的外在物紧密联系在一起，共同构成了一种动态耦合的系统。



B1 A Reconstructed Microcircuit Connectivity Matrix B2 B3 5 neuron clique

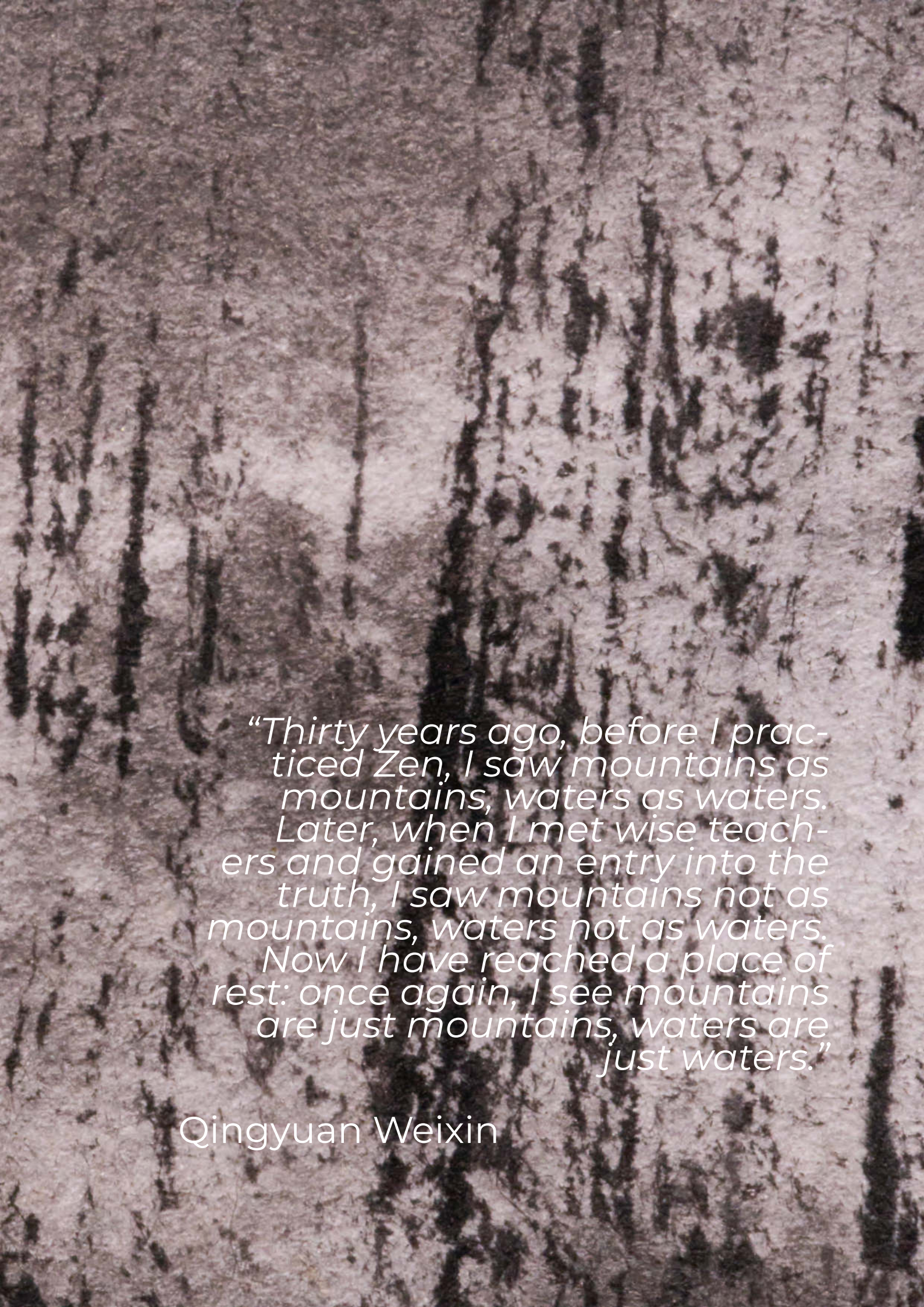


Möbius strip 莫比乌斯圆环



Klein bottle 克莱因瓶





“Thirty years ago, before I practiced Zen, I saw mountains as mountains, waters as waters. Later, when I met wise teachers and gained an entry into the truth, I saw mountains not as mountains, waters not as waters. Now I have reached a place of rest: once again, I see mountains are just mountains, waters are just waters.”

Qingyuan Weixin