

Scientific Implication and Time Value of Confucius' View on Science and Technology

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Abstract—Confucius wrote a lot works in his life. His compilation of six Confucian classics, such as "The Book of Songs" and "Shangshu", and "The Analects of Confucius" and "The Book of Rites", completed by his disciples and disciples of later generations, not only kept the original appearance of ancient documents, but also recorded and reflected Confucius' political ideals, educational thoughts and a lot of ancient scientific and technological knowledge. It has become a unique Confucian view of science and technology. Although Confucius' view of science and technology is scattered in various classics, its system is relatively complete. It contains rich ideas of heaven, earth, humanity, life, agriculture, mathematics, music and so on. Confucius' view of science and technology is prominently embodied in its scientific implications, such as its strong exploratory spirit of seeking truth and innovation, its distinct scientific characteristics of knowing morality and godlessness, its deep humanistic concern for cherishing life and loving things, and its scientific sense of law of reverence for heaven and fear for destiny. Deeply exploring the contemporary value of Confucius' scientific and technological outlook and drawing on his scientific and technological wisdom of being noble in nature, being objective and realistic, benevolent and righteous will help to guard against the possible harm to human beings caused by the "double-edged sword" of scientific and technological progress. In the past, scholars intentionally or unintentionally forgot, neglected or even criticized Confucius' view of science and technology when they studied and absorbed his political wisdom and educational thoughts. Therefore, it is an important academic task for the study of contemporary philosophy of science and technology to clarify the historical misunderstanding of Confucius' view of science and technology and to pursue its realistic value and restore the original theory of Confucius' view of science and technology.

Keywords—Confucius; view on science and technology; characteristics; value

I. INTRODUCTION

Confucius, as a master of Chinese culture in the Axis Age, had a vast knowledge of the world at that time, and scholars of later generations could hardly catch up. Its profound thoughts shocked the past and sparkled the present. It can penetrate more than 2,000 years of history and influence all parts of the world today. However, while his political and educational thoughts have been extensively studied, Confucius' scientific and technological views are often forgotten, neglected or even criticized. Although there are some defects of Confucius'

thought which lead to people being imprisoned in the process of scientific and technological exploration, more of them are the misunderstanding of Confucius' scientific and technological view and the confusion between feudal autocracy and his political and ethical thought. Especially in the May 4th Movement, people held high the banner of "science and democracy" and shouted "knock down Confucian school" in the process of anti-feudalism, pushing traditional China into the process of modernization, thus opening the prelude to the great rejuvenation of the Chinese nation. While breaking away from the shackles of feudal autocracy, scholars often oppose Confucianism with modern science and democratic ideas, and unilaterally consider Confucius as a typical representative of anti-democracy and anti-technology. This is obviously a misunderstanding of Confucius' thought. Thus, it is an important academic task for today's academia to clarify the historical confusion and to clear up the source of Confucianism to study Confucius' view of science and technology and pursue its realistic value.

II. CONFUCIUS' SUMMARY AND EXPLORATION OF THE ACHIEVEMENTS OF ANCIENT SCIENCE AND TECHNOLOGY

Confucius lived in the relatively free Spring and Autumn Period. The decline of the Zhou Royal Family led to the emergence of all groups of men and the continuous expedition. On the contrary, the chaos of the country has created a social environment in which thinkers are not subject to institutional constraints, and hundreds of schools of thought have sprung up. Confucius, who served as a teacher all his life, not only established his own ideological system in political ethics and social enlightenment, but also made a unique contribution to summarizing the achievements of ancient scientific and technological development. He collated a large number of ancient books, and his compilation of the Six Classics (六经) had a great impact on future generations. In sorting out ancient books, Confucius deleted and compiled them generally with the attitude of "trusting thoughts of the ancient, stating them and not adding self-comments", which better preserved the original appearance of ancient documents. But many documents are miscellaneous, incomplete, or obscure. For this reason, Confucius carried out arduous collection, deletion, selection and collation work, and also added small prefaces to clarify its gist. Confucius thought carefully and simplified his words, and his personal thoughts were also fully presented in "The Six Classics". After Confucius's death, "The Analects of

Confucius (论语)" and "The Book of Rites (礼记)", completed by his disciples and his disciples of later generations, also recorded that "when Confucius spoke with his disciples and people at that time, their discourses were recorded" [1]. In "The Six Classics", "The Analects of Confucius" and "The Book of Rites", Confucius recorded a great deal of ancient scientific and technological knowledge and formed a unique Confucian scientific and technological concept.

"The Book of Changes (易经)" came into being in the Zhou Dynasty and became the first Confucian classics after Confucius compiled it. This book explores the law of development and change of things, pointing out that things have the duality of Yin and Yang. The change is caused by the interaction of Yin and Yang. The process never ends, but can be controlled. Ancient Chinese scientists and technicians, from Zhang Heng in the Han Dynasty to Fang Yizhi in the Qing Dynasty, were inspired by Yi-ology. The cyclotomy technique, invented by Liu Zheng in Jin Dynasty, was inspired by the thinking of image number in Yi-ology. Modern chaos principle, quantum mechanics, positive and negative particles, genetic code, earthquake periodic law, binary computer invention and so on, all contain Taiji thinking in "The Book of Changes". "The Book of Changes" contains induction, deduction, analogy and imagery thinking, intersection thinking and mutual thinking, which formed the innovation method of science and technology in ancient China. As the earliest historical book in China, "Shangshu (尚书)" recorded a large number of achievements in astronomy, geography and agriculture in ancient times. "Shangshu · Yaodian (尚书·尧典)" records the situation of Emperor Yao's calendar making, "Shangshu · Yugong (尚书·禹贡)" records the distribution of several states in the country after Xia Yu's water control, and even describes water conservancy projects, rivers, soil, vegetation and even the trend of mountains in each state. Joseph Needham called it "the earliest book of physical geography investigation in Chinese history" [2]. "The Book of Music (乐经)" explores the rules of music performance, but it was lost after the First Emperor of Qin burning books.

"The Analects of Confucius" and "The Book of Rites", completed by Confucius' disciples, preserved Confucius' understanding of natural phenomena such as astronomy, physics, chemistry, animals and plants, as well as agricultural technology. For example, "The Analects of Confucius · Yanghuo (论语·阳货)" records "Did the Heaven ever say anything? Spring, summer, autumn and winter run according to the time of the day, and all things thus cycle". "Heaven" is nature, which contains the form and changing law of all things in the universe. In particular, it is worth mentioning that "Xia Xiao Zheng (夏小正)", written by Confucius, is the earliest work on phenology in China, involving astronomy, meteorology, animal and plant knowledge. According to "The Book of Rites · Liyun (礼记·礼运)", Confucius once said, "I want to gain the rites of Xia Dynasty, so I went to Qi State, a fief of decedents of Xia Yu. But materials found there is not enough to verify the rites of Xia Dynasty. Fortunately, I found the calendar of Xia." These works fully show that Confucius paid great attention to the development of ancient Chinese science and technology. He

not only made a comprehensive exploration, but also opened a historical precedent in many aspects.

III. SCIENTIFIC IMPLICATION OF CONFUCIUS' VIEW ON SCIENCE AND TECHNOLOGY

Confucius' view of science and technology is scattered in his writings, but the system is relatively complete, forming a unique Confucian view of heaven, earth, humanity, life, agriculture, mathematics, music and so on. These thoughts present distinct personality characteristics and scientific implications.

A. *The Spirit of Seeking Truth and Innovation*

Confucius pursued truth all his life, and adhered to the doctrine of "one has not lived in vain if he dies after he is told of the Truth". Confucius believed that in scientific exploration, people must have the ideological preparation for arduous exploration. "It is not worth talking with a scholar who aspires after the truth, yet disgraces himself by not dressing well or eating well" (The Analects of Confucius · Liren, "论语·里仁"). An objective attitude of seeking truth from facts should be taken in the study. People should not pretend to understand unless they know how to study and ask questions. They should also have the spirit of constant innovation and exploration, and always strive to "keep pace with the times" (The Book of Rites · Daxue, "礼记·大学").

B. *The Scientific Characteristics of Knowing Morality and Godlessness*

Confucius believed that knowledge played an important role in human virtue. If morality lacks the support of knowledge and truth, the behavior will go to the opposite side. Because "Love of benevolence and not love of learning is to be fooled; Love of wisdom and not love of learning, its drawback is debauchery; Love of integrity and not love of learning, its shortcoming is the harm of relatives; Frank but not fond of learning, its drawback is sharp words; The malady of loving courage but not learning is insurrection; The malady of loving strength but not learning is hubris." (The Analects of Confucius · Yanghuo). In scientific and technological exploration, people should constantly enrich knowledge and pursue truth, so as to maintain good morality. At the same time, Confucius advocated maintaining scientific rationality and warned disciples not to believe in the strange phenomenon of unscientific, "not to talk about strange forces and gods" (The Analects of Confucius · Shuer, "论语·述而"), and should "respect but keep away from ghosts and gods" (The Analects of Confucius · Yongye, "论语·雍也").

C. *The Humanistic Care of Cherishing Life and Loving Things*

Confucius advocated the principle of cherishing life and rebirth. He believed that when using scientific and technological ability to conquer nature, human beings should keep their awe and love for all things in nature, and take things in season and with a certain degree. Confucius insisted on "not eating cereals or fruits out of season" (The Analects of Confucius · Xiangdang, "论语·乡党"). He believed that it is not

only natural but also beneficial to health to be punctual and to arrange meals in a reasonable manner according to the seasons. Even if it's a simple diet, it is better to not eat too much, not waste and be husband. Moreover, gentlemen "don't fish with nets and don't shoot birds when they are asleep" ("The Analects of Confucius · Shuer"). People should control the killing of living things and protect small and weak animals, which is not only a means to maintain ecological balance, but also a manifestation of the spirit of benevolence.

D. The Law Consciousness of Reverence for Heaven and Fate

Confucius believed that in scientific and technological exploration, people must conform to the rule, or they will be punished by nature. "The Book of Changes" he edited is not only full of reverence and praise for nature, but also reveals the truth that heaven and earth nurture human beings, reflecting the feeling of gratitude for nature. Confucius also condemned the use of scientific and technological progress to destroy the ecology in some chapters selected in "The Book of Songs (诗经)". For example, "Guofeng · Fatan (国风·伐檀)" recorded the scene of people wantonly cutting down trees after having good tools; "Guofeng · Dashuyutian (国风·大叔于田)" accused aristocrats of setting fire to forests.

IV. CONTEMPORARY VALUE OF CONFUCIUS' VIEW ON SCIENCE AND TECHNOLOGY

With the progress of modern science and technology, human society has become more and more closely linked. Scientific and technological progress is a "double-edged sword", and obedience to the law will bring progress, harmony and prosperity, while misuse of science will lead to slavery, disaster and destruction. In 1988, when the Nobel Prize winners gathered in Paris, they declared that to survive, human beings must go back to 25 centuries ago and learn from Confucius' wisdom³. This wisdom of course includes Confucius' scientific and technological outlook.

A. To Draw on Confucius' Natural View of Heaven and Life

Confucius said, "Did the Heaven ever say anything? Spring, summer, autumn and winter run according to the time of the day, and all things thus cycle" ("The Analects of Confucius · Yanghuo"). Since human beings are born with the great virtues of heaven and earth, they should conform to the Heaven and respect nature. If conquering nature arbitrarily by the power of science and technology, he will eventually suffer the Revenge of nature.

B. To Absorb Confucius' View of Truth of Being Objective and Realistic

Science and technology permit no dishonesty. One shall admit "what he knows and what he doesn't" (The Analects of Confucius · Politics, "论语·为政"), otherwise it is self-deception. At the same time, the pursuit of truth is a bumpy road, which requires arduous efforts. It is impossible to achieve innovative achievements if someone are eager to enjoy and do not want to make progress.

C. To Absorb Confucius' Ethics of Benevolence by Science and Technology

The purpose of pursuing truth and knowledge is to make human life happier. But happiness is not only material enjoyment, but also noble morality which should be the ultimate aspiration of human beings. In the process of exploring and seeking knowledge, people must maintain noble sentiment and use science and technology to achieve the realm of "benevolence" and "goodness".

Of course, the dross in Confucius' scientific and technological outlook should also be eliminated. For example, he called the peasants "despicable men", thought that their skills were inferior, that "a good scholar can be an official" and "He who rules lives by mental perplexity". These views hinder the progress of science and technology in China, and people should resolutely abandon them.

V. CONCLUSION

In his works, Confucius not only recorded the scientific and technological discoveries in ancient China, but also made a relatively complete comb of ancient scientific and technological knowledge, forming a unique scientific and technological view of Confucianism. Although Confucius' view of science and technology is scattered in various Confucian classics, its system is relatively complete. It has unique and systematic ideas in many aspects, such as the view of heaven, the view of authenticity, the view of humanity, the view of life, the view of agriculture, the view of mathematics and the view of music. Confucius' strong spirit of seeking truth, innovating and exploring, distinct scientific characteristics of knowledge, morality and atheism, strong humanistic concern for life and love for things, and scientific consciousness of reverence for heaven and fear for destiny not only reflect Confucius' deep thinking on nature, society, human behavior and spiritual development, but also radiate the scientific light of ancient simple materialism. It has important reference significance for promoting the development of science and technology in future generations. Faced with the harm caused by the "double-edged sword" of science and technology to mankind today, it is feasible to absorb its scientific wisdom of being noble in nature, being objective and realistic, benevolent and kind, and follow the value pursuit of people-oriented development of science and technology, which can resolve the ethical disaster caused by the negative effects of many scientific and technological development. It is a scientific attitude that people must always uphold to explore the realistic value of Confucius' scientific and technological view, to clear up the source of Confucian scientific and technological theory, to return the true face of history, to extract the essence from the rough, to remove the false and to preserve the true, and to treat Confucius' scientific and technological view correctly with the method of "sublation".

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