Chapter 4

Science and the Confucian Tradition in the Work of Chŏng Yak-yong*

There is no single subject to be identified as ‘science’ or ‘science and technology’ for late Chosŏn Confucian scholar Chŏng Yak-yong (1762-1836). What is usually regarded as such was a collection of many separate things: 1) basic natural philosophical ideas, usually involving such concepts as li 理, qi 氣, yin and yang 阴阳, the five phases (wuxing 五行), etc.; 2) knowledge about heaven and earth (tiandi 天地), the myriad things (wanwu 萬物), man (ren 人), etc., usually on a very general level; 3) specialized knowledge in such subjects as calendrical method (lifa 曆法), harmonics (lü 律), medicine (yi 醫), geography (dili 地理), etc. (This genre also includes areas that we do not consider ‘scientific’: e.g., the bureaucratic system [guanzhi 官制], criminal justice [xingyu 刑獄], finances and taxes [caifu 財賦], the military [junlü 軍旅], etc.); 4) knowledge about various techniques; and 5) such borderline ideas and practices as guishen 鬼神, occult techniques (shushu 術數), etc., which touch upon natural phenomena.

From studies carried out by many scholars so far, we more or less know what Chŏng Yak-yong knew and wrote about these topics, and what his attitudes to them were.¹ But what did ‘science’ mean for him? What weight, in other words, did he give to his own knowledge and thoughts about these topics? In taking up this difficult question in this paper, however, I will not attempt to answer it. Instead, I will try to put the question in context, both of Chŏng Yak-yong’s life and work and of the society he lived in. In doing so, I shall raise a number of related questions, consideration of which will hopefully throw light on our attempts to answer the original question, and will help us better understand Chŏng Yak-yong’s thought and his place and significance in Korean history.


Much is known about Chŏng Yak-yong's knowledge of the natural world and techniques. Most notable is the weight-lifting machine he developed, which was used and said to have proved very efficient in the construction work of the Hwasŏng (華城) castle. Also known are his trials of a smallpox vaccination method, his advocacy for the unification and standardization of weights and measures, the adoption of the decimal system in particular. We are also familiar with his belief in the continuing advancement of techniques, and his proposal of policies for attracting craftsmen ("lai baigong" 來百工) and importing advanced techniques. He proposed, for example, to send technical specialists, including officials in the Astronomical Bureau, to Beijing for training. Also well known are his criticism of the five-phase theory,2 his rejection of the stem-branch (gan-zhi 干支) system and the various occult techniques based on it, as well as his objection to superstitious beliefs and practices, including divination, astrology, and the so-called technique of ‘winds and waters’ (fengshui 風水). We also know that he accepted the idea of a spherical earth, and that he accepted the three-way distinction between plants that have knowledge (zhī 知), animals that have knowledge but are not numinous (líng 靈), and man who both has knowledge and is numinous.3 His discussions of certain optical phenomena – the bending and deflection of light, the lens, the camera effect, and man’s eyesight – are also well known.

Of course, there are items of particular scientific and technical knowledge Chŏng Yak-yong had which are not so well known. For example, he had certain ideas about human reproduction: “comparing it to plants, the father is the seed, while the mother is the soil.”4 He believed nevertheless that man receives his qi from his maternal grandfather as well.5 Regarding reproduction in general, Chŏng Yak-yong was of the view that only those things that have seeds can “keep coming into being ceaselessly.” Things like water, for example, do not

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3 Nonŏ kokŭm chu 論語古今註, Chap. 9, in Yŏyudang chŏnsŏ 與猶堂全書 (Seoul: Yŏgang ch'ulp'ansa 驪江出版社, 1985), Part II 第2集, vol. 15 第15卷, 11a-11b (hereafter cited as “Yŏyudang chŏnsŏ II.15.11a-11b”). See also Chungyong kang’ŭi po 中庸講義補: Yŏyudang chŏnsŏ II.4.47a.

4 “Sang chungssi” 上仲氏: Yŏyudang chŏnsŏ I.20.19a. He goes on to say that it is the “seed” that determines the species.

5 Ibid. I.20.22b.