CHAPTER EIGHT

FAZANG THE TECHNICAL INNOVATOR

The last chapter discussed a mirror-lamp device that Fazang either invented or constructed on the basis of earlier ideas and practices in order to explain the complicated Avatamsaka tenet of universal interconnectedness. We focused mainly on historical contexts and religious implications in order to bring out the scientific value. It is important to note the mastery of several mathematical and physical principles that Fazang exhibited when he designed the heuristic mirror-lamp. As Joseph Needham has pointed out, an inward-facing mirror construct would prove useful to mathematicians in their efforts to describe and list all the possible uniform polyhedral vertices.¹ Fazang’s familiarity with principles fundamental to the scientific disciplines now known as mathematics and physics should not come as a surprise, given his probable role in improving and diffusing—if not inventing—the technology of woodblock printing (i.e., xylography).

1. A GREAT SECRET WRAPPED IN A SMALL PACKAGE

Fazang’s name became linked to the art of xylography shortly after modern scholarship learned of the archaeological discovery that was discussed in the Preface. We recall that it brought to light what is so far the earliest datable woodblock-printed specimen,² which was excavated from the reliquary of the Sōkkat’ap 釋迦塔 (Śākyamuni Pagoda) at Pulguksa 佛國寺 (The Monastery of Buddha Land) in Kyōngju 慶州, Korea, a sixth-century temple that was rebuilt in the eighth century. The copy was wrapped in a small package when it was excavated from the second story of the pagoda. It is composed of separate pieces of thick

¹ Needham, Science and Civilisation in China, vol. 4, 93.
² On this discovery, see Ri Hongsik, “Keishū Bukkokuji shakatō hakken no Muku jōkō dai darani kyō”; Kawase, “Shiragi Bukkokuji Shakatō shutsu no Muku jōkō dai darunikyō ni tsuite”; Twitchett, Printing and Publishing in Medieval China, 13-14. It should be noted that before the discovery of this printed specimen scholars had tended to identify two printed pieces discovered in China as belonging to the early Tang or the reign of Empress Wu (690-705); the specimens are discussed in Pan, Zaoqi yinshuashu, 30-34. However, they are short and/or damaged, and scholars have reached no consensus as to their dates.
mulberry paper joined together in a continuous scroll about twenty feet long and two and one quarter inches wide. It was mounted on a wooden roller lacquered at each end. The printing was done from a series of twelve woodblocks, each about twenty or twenty-one inches long and two inches wide, with fifty-five to sixty-three vertical lines, each of which contain seven to nine characters (most with eight characters).³

Figure 5. Wugou Jingguang Tuoluoni Jing
Copy of Wugou jingguang tuoluoni jing excavated from Sŏk-kat’ap, at Pulguksa in Kyŏngju, Korea, in 1966. After Ch’ŏn, Han’guk ko insweasesa, unpag. plate; permission of author.

The text was a dhāranī sūtra translated by Fazang in 704 in collaboration with a Tokharian Buddhist translator-missionary, whose name is probably Mitrasena or Mitrasanta.⁴ Although Pulguksa—and presumably also the Šākyamuni Pagoda—is generally believed to have been completed in 751, in fact its reconstruction was not completed until sometime after 774,⁵ thus not as old as the remnants of an immense printing project of a Japanese empress carried out between 764 and 770 (see below). However, various special characters on the dhāranī sūtra reflect the unusual orthographies adopted under the reign of Empress Wu (690-705). Thus, even though the pagoda was built much

³ Tsien, Paper and Printing, 135.
⁴ I believe that this sūtra was translated in 704. Pan Jixing attempts to prove that it was translated in 701 in Luoyang. This is not likely given that Mitrasena did not arrive in China until 702. It is also clear that the text was translated in Chang’an, rather than in Luoyang. See Chapter 9.2.2.
⁵ This is the year of Kim Tae-sŏng’s death; he was a Silla prime minister who vowed to renovate Pulguksa in memory of his parents. See Welch, Fa-tsang, Pure Light and Printing, 27-28.