1 Introduction

Printing has a much longer history in East Asia than it has in Europe: that much is indisputable. It is a history that stretches back to the eighth century in the case of Japan and Korea, and most likely to the seventh century in the case of China. For a long time, the oldest evidence of East Asian printing traditions was thought to lie in Japan, where a very large number of Buddhist invocations (in Sanskrit, *dhāraṇī*) were printed between the years 764 and 770. From a European perspective, this is an astonishingly early date. Nevertheless, it is indeed in the eighth century that the history of printing in Japan begins.

At that stage the only writing system used in Japan was the Chinese system of graphs (characters). Therefore, those Buddhist invocations were printed using Chinese graphs alone. For the same reason, literate Japanese in the eighth century used Chinese graphs alone to write either in literary Chinese or in Japanese: there was no alternative option. Thus, for example, the Japanese poems contained in the eighth-century *Anthology of ten thousand leaves* (*Man'yōshū* 万葉集) were inscribed using Chinese graphs, for their sound values to represent Japanese words and inflections, for their semantic value to represent Japanese words of similar meaning or in other related ways. The cursive *hiragana* syllabary and the angular *katakana* syllabary, which are used to this day to write Japanese verbal inflections and grammatical particles, both emerged later, in the course of the ninth century. From that time onwards literate Japanese had the additional options of writing in Japanese using a mixture of Chinese graphs and one or other of the two syllabaries, or of using the syllabaries alone.

In this section I first discuss the antecedents of woodblock printing in East Asia, for the history of printing in Japan is intimately connected with developments in other parts of East Asia. Then I turn to seventeenth-century Japan and discuss the range of technologies available for the production of books.

First of all, let us consider how it was that large quantities of Buddhist invocations ever came to be printed in Japan in the eighth century. The invocations were extracted from a Buddhist text called the *Sutra of the dhāraṇī of pure unsullied light*. The original Sanskrit text of this sutra is no

longer extant, but it had been taken from India to China, most likely in the seventh century, and there it had been translated into Chinese under the title *Wugou jingguang da tuouoni jing* 無垢浄光大陀羅尼経 (J. *Muku jōkō dai darani kyō*) by the year 705. The Chinese translation is known to have reached Korea in the year 706 and Japan at least by 737.[1] The invocations were extracted from it and in the 760s were printed in the capital, Nara; they were then rolled up one by one and placed inside miniature wooden pagodas. The pagodas were manufactured in Nara on lathes, which was then a new technology in Japan. Two workshops were established in Nara to undertake all this work, and although none of the printed invocations carries a date, some of the pagodas have an inscription on the base or another surface. For example, the pagoda in the Newberry Library in Chicago bears an inscription indicating that a man called 大田 (in modern Japanese this would be pronounced Ōta) made the pagoda on the twenty-eighth day of the fourth month of the second year of Jingo-Keiun (=768) in the Left Workshop (there were two workshops: a Left one and a Right one).[2]

Tens of thousands of these miniature pagodas and printed invocations survive to this day, both in Japan and elsewhere, and it is indeed possible, as the documentary sources record, that as many as one million were printed. These invocations are collectively known as the Hyakumantō darani (dhāraṇī of one million pagodas), and although printing on such a scale as early as the eighth century is truly astonishing, it is essential not to lose sight of two facts: firstly, this was indubitably a ritual act, and, secondly, the printed invocations were definitely not produced for the purpose of reading. After all, the texts were Sanskrit invocations written out using Chinese graphs for their sound value alone, so it is doubtful whether anybody in Japan could have read and understood them. The ultimate origins of this kind of ritual practice lay in Indian Buddhist practices, of which some

[1] Kornicki (2012), 50.

[2] The Newberry Library copy was purchased from Yamanaka & Co., Inc., New York, by Ernst Frederic Detterer (1888–1947), an American calligrapher and typographer who taught the history of printing at the School of the Art Institute of Chicago from 1921 to 1931. It was acquired by the Newberry Library in 1937.

archaeological traces survive and which were described in several sutras: these sutras were translated into Chinese in the seventh century and were then transmitted to other parts of East Asia in Chinese translation.[3]

Impressive though the Hyakumantō darani are, it is definitely not the case that printing was invented in Japan, although that claim has occasionally been made in the past. Nonetheless, nowhere in the world were any earlier examples of printing than the Hyakumantō darani known until 1966, when a startling find was made at the Pulguksa 佛國寺 temple in Kyŏngju in South Korea. The Sŏkkat'ap, a stone pagoda in the compound of the Pulguksa, was dismantled in that year and was found to contain a woodblock-printed copy of the *Sutra of the dhāraṇī of pure unsullied light*.

This is, of course, the same Buddhist sutra that contains the invocations printed in Japan, and, like the Japanese invocations, it includes some of the unorthodox characters introduced during the reign of Wu Zetian 武則天 (624–705), the only woman emperor of China, who ruled from 690 to 705. However, since these unorthodox characters continued to be used up to the ninth century, they cannot be taken as evidence that the sutra found in the Pulguksa was printed in the eighth century. Nonetheless, they do show that it was most likely printed before the year 900.[4]

The use of the same sutras in Japan and Korea is unlikely to be a coincidence. The *Sutra of the dhāraṇī of pure unsullied light* expounds the blessings and benefits that accrue from making multiple copies of the

[3] Kornicki (2012). There is no inventory of examples outside Japan, but there are several examples in the UK, including the British Museum (5), Cambridge University Library (4) and the National Library of Scotland (1), and in the USA, including Princeton University Library (2), Chicago University Library (1 without pagoda), the Newberry Library, Chicago (1), the Art Institute, Chicago (1), Yale University Library (4), the Metropolitan Museum of Art (1), the Minneapolis Institute of Art (1), the Library of Congress (1) and Columbia University (1). There are other examples in Germany (one each in the Stiftung Preußischer Kulturbesitz in Berlin; in the Gutenberg Museum in Mainz; in the Deutsches Buch- und Schriftmuseum, Leipzig; in the Deutsches Museum, Munich; and in the Bayerische Staatsbibliothek, also in Munich) and in France (one in the Bibliothèque Nationale in Paris).

[4] Tokiwa (1936); Drège (1984).

invocations contained within it and placing them inside miniature clay pagodas. Similar practices were recommended in other sutras which were translated into Chinese during the reign of Wu Zetian. These various translations are known to have been transmitted to Japan in the eighth century, and it is reasonable to assume that they had already been transmitted to Korea.[5] It seems likely, therefore, that the newly translated sutras from the court of Wu Zetian were transmitted both to Korea and to Japan and encouraged the ritual practices described therein. The *Sutra of the dhāraṇī of pure unsullied light* does not mention printing, but that was the technique used in Korea and Japan for the purpose of making multiple copies, although only one copy survives in Korea. It may well be that similar practices had been undertaken in China during the reign of Wu Zetian, but no evidence has yet come to light to support this hypothesis.

Since Korean records state that the Sŏkkat'ap pagoda had been sealed up in the year 751, it was evident, or so it was claimed, that the sutra found there must have been printed by that date. In fact, it has subsequently been shown that the pagoda had been opened on at least one occasion after 751. Nevertheless, there is widespread acceptance in Japan and in China, as well as in Korea, that this sutra was indeed printed in the eighth century at some point before 751. However, there is no documentary evidence whatsoever relating to printing in eighth-century Korea. As a result, it has been suggested by some Chinese and Japanese scholars that this sutra must actually have been printed in China and then been taken back to Korea by Korean monks or diplomats visiting China. The fact that the paper on which the sutra was printed is now known to be of Korean origin does not altogether rule that suggestion out of court, for Korean paper was frequently sent to China along with other tribute goods at this time. The Chinese scholar Pan Jixing has gone so far as to claim that the Korean copy of the *Sutra of the dhāraṇī of pure unsullied light* was in fact printed in Luoyang in 702, but he provides no evidence to support this claim. Unless new evidence comes to light, it is unlikely that this question will be definitively resolved. However, since Korea was in the eighth century a technologically more advanced society than Japan, it seems reasonable

[5] Kornicki (2012), 51–4.

to suppose that, if printing was undertaken in Japan in the 760s, it is all the more likely that it was already being practised in Korea.[6]

Although neither documentary sources nor archaeological finds have yet confirmed the prior development of printing in China, it is universally, and rightly, taken as given that the technology of woodblock printing developed there first and was subsequently transmitted to Korea and Japan.[7] This technology eventually gave rise in due course to a printed version of the Chinese translation of the *Diamond sutra*, of which a copy was found in the early twentieth century in Dunhuang, an important Silk Road settlement in north-west China. This printed version of the *Diamond sutra* bears a date corresponding to 868 and survives in just a single copy; what is more, it was printed not in the capital but in remote Sichuan province in south-western China and was subsequently taken to Dunhuang. Consequently, it is overwhelmingly probable that printing was already being widely practised in central China well before that time. Indeed, several Buddhist invocations, printed either in Sanskrit or Chinese, have been found in China that appear to be of greater antiquity than the *Diamond sutra*, but unfortunately none of them can be accurately dated. Doubtless the domestic warfare and the persecution of Buddhism that came at the end of the Tang dynasty (618–907) can be blamed for the destruction of most examples of early Chinese printing, and much else besides, but it is not out of the question that the archaeological investigation of tombs in and around the capital, Chang'an, may yet bring to light some texts printed in seventh-century China.[8]

The printing technology that was used in East Asia, both in these early centuries and, subsequently, right up to the twentieth century, was overwhelmingly woodblock printing or xylography. What kind of a technology is this? Woodblock printing is in fact a process that does not require special equipment and instead relies entirely on human labour and craft skills. It is, of course, not unique to East Asia. As early as the tenth century xylography was in use in what is now Egypt and elsewhere in the Middle East to print

[6] Pan (1997); Pan (2009), 216–17; Kornicki (2012).
[7] Barrett (2001a, 2001b, 2005, 2008, 2011); Kim (2000, 2007); Kornicki (2012).
[8] Seo (2003, 2009); Tsiang (2010), 233–7; Kornicki (2018), 109–14); Wood (2010).

amulets, pilgrimage certificates and the like, but it is not clear whether this was an independent development or was stimulated by knowledge of woodblock printing by the Uyghurs or in other parts of East Asia.[9] Further to the west, woodblock printing was also practised in Europe before Gutenberg's invention. Woodblock printing in Europe took the form of the woodcut, sometimes with text as well as an image. For example, a woodcut of St Christopher printed in southern Germany in 1423 contains two lines of text and is a particularly early example of a European woodcut with text.[10] In his classic account *The invention of printing in China and its spread westward*, which was first published in 1925, Thomas Carter claimed that the development of printing in Europe was connected with Asian printing traditions. Later writers, including Peter Burke and Joseph McDermott, have been unable to find any hard evidence to substantiate this claim, but recently Kristina Richardson has argued persuasively that the significance of the amulets printed in Egypt should be reconsidered, and she has put forward a new hypothesis concerning the antecedents to Gutenberg's printing activities.[11]

The woodblock-printing process as it was practised in East Asia is a simple one. The text to be printed was written on thin sheets of paper in uniform columns, usually by a professional scribe, and then the sheets were pasted face down onto a wooden block. The white parts were then cut away by skilled carvers, leaving the text and/or the lines of the illustrations raised from their surroundings. Printing was carried out by applying water-based ink to the upraised text and then impressing dampened paper onto the inked surface by hand. The woodblocks were usually approximately 45 centimetres wide, so this technology enabled a substantial section of text to be printed in a single operation. The *Diamond sutra* and other early printed

[9] Bulliet (1987); Schaefer (2006, 2014).

[10] On European woodcuts see Parshall and Schoch (2005). The German print of 1423 is held in the John Rylands University Library of Manchester and an image can be found here: https://bit.ly/4hl1rFh.

[11] Carter (1955); Burke and McDermott (2015); Richardson (2022), ch. 6 'A new narrative of premodern Afro-Eurasian printing'.

books were scrolls, so each section was printed separately and the sheets were then pasted together; the same technique was used for printing maps.[12]

From around the end of the first millennium, however, the codex (a number of leaves gathered together to create a book format) began to replace the scroll, and that shift resulted in a change in the way in which printing blocks were prepared. When printing was undertaken to produce books in the form of a codex, each folio (sheet containing two pages) was printed with a single block. Each sheet was printed on one side only: it was then folded in the centre with the text on the outside to produce a single leaf with text on both sides and, in the central fold (called the 'heart of the block', in Japanese *hanshin* 版心), an abbreviated title and the folio number. In the case of a full-page illustration covering the entire opening, half of the illustration would have to appear on the verso of one folio and half on the recto of the next – in other words, on the right half of one block and the left half of the next block – since East Asian books are read from right to left.[13]

It is important to be aware of the fact that since the text to be printed was written out by hand, woodblock printing is essentially a technology for the reproduction of handwriting, and the same can be said of the use of lithography for printing texts in Arabic, Persian and Urdu.[14] What is

[12] Suzuki, Tinios and Ruben (2013). The Korean sutra found in 1966 and the *Diamond sutra* were both indubitably printed with woodblocks. For some time, a theory held sway in Japan that the Hyakumantō darani were instead printed with metal plates, as explained by Hickman (1975). The argument was that woodblocks would have been incapable of printing the one million copies that, according to the documentary evidence, were printed and then distributed to ten temples. However, this takes no account of the fact that all the surviving printed *dhāraṇī* are connected with the Hōryūji temple in Nara. Multiple woodblocks could have been made to print the *dhāraṇī* supplied to the other nine temples thought to have received them. Consequently, the argument seems to me flawed. In any case, no evidence has been found to support the metal-plate theory, and it seems to have few supporters now.

[13] Suzuki, Tinios and Ruben (2013); Volker (1949).

[14] Davis and Chance (2016); Robb (2020), ch. 3 'Urdu lithography as a Muslim technology', 90–125.

more, it will be obvious from what has been said so far that woodblock printing (xylography) did not require the substantial capital investment that was required for the purchase of a printing press and founts of type in Europe. In East Asian xylography, the costs, apart from the paper and the ink, consisted of the purchase of the blank wooden blocks and the employment of the labour required to carry out the carving, printing, assembling and binding operations. Thus, the technology was portable and could be employed wherever the materials and labour could be found. It is for this reason that it was possible for the *Diamond sutra* to be printed in Sichuan, far from the Chinese capital, as early as the ninth century.

Up to this point my focus has been on the origins and early development of woodblock printing in East Asia as a whole. Let us now turn our attention to early seventeenth-century Japan. In the first half of the seventeenth century, three technologies for the production of books were in use in Japan at one and the same time. They were, in historical order of development, brush and ink on paper to produce manuscripts; woodblock printing or xylography, which had already been in use for hundreds of years; and moveable type printing or typography, which was first introduced to Japan in the 1590s. By the end of the seventeenth century one of those three technologies had fallen into disuse. Contrary to what might be expected, it was in fact the newest of those technologies – typography – that fell into disuse, even though in the West it is widely considered to be a more advanced printing technology than xylography. This perception of typography as superior is probably due to the fact that typography in the West was from the beginning a mechanical process owing to the invention of the manual printing press, while both xylographic and typographic printing in East Asia were unmechanised and relied solely on manual labour. However, it is an unwarranted assumption to consider typography as a more advanced technology, for in East Asian societies, at least, xylography proved more flexible and more commercially viable a technology than typography, all the way up to the nineteenth century.[15]

It goes without saying that, after the Meiji Restoration of 1868, which led to an influx of new technologies and ideas from the West, typography

[15] On this point, see Chow (2004).

in its more advanced nineteenth-century forms, including steam-powered presses, was adopted in Japan and xylography went into a decline from which it never recovered.[16] Thus, the second leg of the match between xylography and typography was decisively won by typography, but the first leg, in the seventeenth century, was equally decisively won by xylography.

My main aims in this Element are to consider what the impact of typography was on Japan in the seventeenth century, and to explain precisely why the first encounter was won by xylography. The question addressed here is therefore a simple one: why did Japanese publishers abandon the newly introduced technology of typography in the first half of the seventeenth century? In order to answer this question, I first consider the invention and spread of typography in East Asia and explain how it came about that typography was introduced to Japan in the 1590s. I then examine the data which shows a decline in the use of typography from the 1620s onwards and consider the merits of the various explanations which have so far been put forward. Finally, I present new evidence that suggests a different explanation and argue that the abandonment of typography in the seventeenth century can by no means be described as a technological step backwards to an inferior technology, but should instead be seen as a rational choice, one that makes good sense in the context of the time.

Before we consider the introduction of typography, however, we should absolutely not lose sight of the fact that the production of manuscript books in Japan continued right up to the end of the nineteenth century, notwithstanding the availability of two printing technologies. Although woodblock printing had triumphed by the middle of the seventeenth century and typography had dwindled into insignificance, manuscript production remained important, extensive and quantitatively significant until the early years of the Meiji period. This represents an easily overlooked continuity with the Kamakura (1189–1333) and

[16] Heijdra (2004a); Shockey (2019). On the transition and the early development of typography in Meiji Japan, see Suzuki (2022) and the other articles in issue no. 11 of the journal *Shomotsugaku* 書物学, which is devoted to Meiji typography.