Typography for a Modern World?
The Ways of Chinese Movable Types

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Abstract: This article presents a brief history and poses questions about traditional Chinese movable type printing. This is a technology that devel-
oped in the pre-modern period and never underwent in the mechanization in the ways that Western movable type printing did. Nevertheless, even today, Chinese traditional movable types continue to be used in some places in China. The authors not only describe the chronology of but also analyse significant cultural, political, and social factors affecting the development traditional Chinese typography.

The first part of this article discusses the movable type made of earthenware and of wood, which are described in various sources written by scholar-officials. In the case of movable type for the Tangut script, however, the main evidence come from chiefly religious imprints which provide information about material evidence as well as a few about printers, typesetters, etc. The second section describes the long hiatus from the Yuan until the second half of the fifteenth century in the utilization of metallic typography in the private circles in Wuxi in Jiangnan, whose publications still survive, and how during the last dynasty, the movable type production reflects some trends in book publishing in general, with the important engagement of some of the Manchu emperors. In the last section of the paper, the authors explain why although wooden types existed in the Kingdom of Xixia (1032-1227) and in the Yuan dynasty (1279-1368), it was only in the Ming (1368-1644) to Qing (1644-1911) periods that their use became more widespread in China. Wooden movable type played a key role in the printing of genealogies in various areas (e.g. Zhejiang, Anhui, Jiangsu, Hunan, and Fujian). That all also indicates that wood is the “material medium” of traditional Chinese printing, never mind if employed in blocks or types.

La stampa tra loro è più antica che fra noi, poiché l’hanno più di cinquecento anni addietro; ma essa è assai diversa dalla nostra. Percioché le sue lettere sono moltissime e difficilmente si potrebbe usarle del nostro modo, sebbene adesso ne sogliono fare qualche cosa per via di composizione di lettere. [Cioè per agglutinazione del radicale colla fonetica, giacché, in via di massima, ogni carattere cinese si compone di questi due elementi, che, pur variando, si ritrovano spesso in diversi caratteri]

(Matteo Ricci, Fonti Ricciane, documenti originali editi e commentati da Pasquale M. D’Elia, 1942)

E’ opinion commune che la stampa si trouasse in Europa l’anno della salute nostra 1458, per inuenzione di Giuanni Cutenbergo Tedesco, & che facendosi i primi caratteri di stãpa in Magonza, vn’altro Tedesco chiamato Corrado, la portasse in Italiä. Ma i Chini affermano essa hauer hauuto principio in loro Regno, & esser stata trovata da vn huomo, ch’essi honorano come santo, & che tenendo i loro progenitori moll’anni dapo commercio in Alemagna dalla parte della Rossia, & della Moscouia, che sono più commode per far il cammino per terra, vi fosse
portata questa invenzione, & che anco i mercanti alemani, che venivano alla China per il mar rosso, & per l’Arabia felice, portassero, alcuni libri stampati nel loro paese, i quali venendo nelle mani del Cutenbergo predetto, tenuto auttor della stampa nell’historie, gli dessero il lume, ch’egli comunicò poi a gl’altri. Il che essendo vero, come essi tengono per scritture autentiche, è necessario, che questa invenzione passasse da loro a noi, e tanto maggiormente quanto si trovano hoggi nella China, molti libri stampati, più di cinquecento anni inanzi, che l’invenzione d’Alemagna hausse principio, secondo il nostro computo vn, dei quali ho in poter mio, oltra molt’altri che ho veduto....

(De Mendoza, Dell’Historia della China, 1586)

De Cataio Lusitani negotiatores multa memoratu digna referunt, in primísque Cantam urbem Venetiarum similitude circumfluente mari ea ratione ædificata, ut lapideis pontibus ædificia coniungantur...

... & quod maxime mirandum uidetur, ibi esse typographos artifices, qui libros historias, & sacrorum ceremonias continentes, more nostro imprimant: quorum longissima folia introrsus quadrata serie complicentur. Cuius generis uolumen à rege Lusitaniç cum elephante dono missum Leo pontefix humaniter nobis ostendit: ut hinc facile credamus eius artis exempla antequam Lusitani in Indiam penetrarint, per Scythas & Moscos ad incomparabile literarum præsidium ad nos pervenisse....

(Giovio, Historiarum sui temporis libri 1550-1552)

The first two quotes, above, are taken from the works of two important European figures who wrote about China in the late sixteenth till early seventeenth centuries, at a time when Chinese typographic printing was already five hundred years old.

The first quote concerning typography is taken from the writings of Matteo Ricci (1552-1610). The passage in question has been the object of a good deal of discussion in that the already ambiguous Italian phrase (composizione di lettere) is rendered yet more equivocal by the later (and perhaps misleading) explanation offered by Pasquale M. D’Elia. It seems likely,
however, that Ricci is referring here to movable type. In the second passage, Juan Gonzalez de Mendoza (1540-1610) clearly expressed the same idea put forward centuries later by Thomas Francis Carter in *The Invention of Printing in China and its Spread Westward*. However, the modern scholar does not quote the Spanish priest in his book, opting for an earlier, more indirect and obscure source in the figure of Paolo Giovio (1483-1552), who wrote of “typography” and the transmission of books to Europe (Carter dates the text 1546, but the passage was possibly written earlier [1515?], since Giovio’s work was composed at different times of his life).

Carter’s approach to the history of printing always speaks, indirectly at least, of the transmission of printing techniques from East to West: the American scholar’s masterpiece has an explicit title and the contents are articulated around ideas, proofs and documents rather than definitive assertions. Mendoza did not mention typography, but the reference to Gutenberg, the description of the westward trajectory of printing and printed books, and the validation of Chinese primacy in this area are clear in the Italian version of the text. He wrote: “It is a commonly held opinion that printing was invented in Europe in 1458 by Johannes Gutenberg the German, and, having made the first printed characters in Mainz, another German by the name of Conrad brought it to Italy. But the Chinese claim that the practice was invented in their Kingdom, founded by a man that they reverence as a saint, whereby it is evident that many years after they had use thereof, it was brought into Germany by their ancestors by way of trade, ancestors who travelled via Russia and Muscovy, a straightforward, overland route, and also by German merchants, who came to China via the

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2 T. F. Carter (1931) pp. xxii, 120 and 259, note 3 [version on Googlebooks, verified 01/08/2013].

3 See Giovio’s online biography by T. C. P. Zimmermann (2001; checked online, last verified 29/01/2013). An original copy of Giovio’s *Historiarum sui temporis libri* held in National Library of France is also available online on the Gallica website (checked on 29/01/2013; Liber 14, p. 161). The text can be translated as follows: “… Amongst the numerous noteworthy anecdotes about China recounted by Portuguese merchants is that the city of Cantam [Canton?] was built in the same way as Venice, [with both cities] surrounded by the sea, and with stone bridges between the buildings … but what is most astonishing is that here [in Canton] there are typographers who print books about history and sacred ceremonies in the same way that we do; and as the pages [of these books] are very large, they are folded into four. They are of the same kind as the book offered as a gift by the King of Portugal, with the elephant, to Pope Leo, who graciously showed it to us, which permits us to believe in the authenticity of the examples of their art …” The idea that printing was also taking place in Cantam, interpreted as Canton and based on Giovio’s book, was first mooted by H. Bernard-Maitre (1945), p. 2. The notion is echoed in other specialized studies on the subject.
Red Sea and Arabia Felix, and brought back with them a number of books printed in China that subsequently fell into the hands of the aforementioned Gutenberg, who historians consider to be the inventor [of printing], thus giving him the idea, which he communicated to others. This being true, as they maintain in authentic writings, it doth plainly appear that this invention came from them unto us, as is clearly demonstrated by the fact that there are to be found amongst them many books that, according to our reckoning, were printed 500 years before the invention came to Germany, including one of which I have in my possession and many others that I have seen [...].”

Regardless of whether this hypothesis is true or false, it can be observed that Chinese printing processes and types were neither a “gadget” of modernity nor a media “revolution.” The old European text stresses the antiquity of Chinese books and printing (dating back to the eleventh century, five hundred years before Mendoza wrote his book). Whatever periodization we apply to Chinese history, no traditional printing technique has ever been considered an invention of modern times, or at least of “our” modern times as applied to Chinese history, generally thought of as beginning in 1842, the year in which the First Opium War ended.

In fact, some scholars suggest another kind of temporal comparison between the European Renaissance and the Song dynasty (960-1279), in which there was a flowering of the arts, literature and technology. Furthermore, while printing had already existed in China for hundreds of years, it was only in the eleventh-thirteenth centuries that texts on subjects other than religion and divination began to be published. The introduction of the examination system and the organization of a veritable administrative system implied the development of a cadre of “intellectuals,” including officers, men of letters, clerks and students who needed to appropriate knowledge, be literate in order to fulfill their professional functions, and use written media to make a name for themselves in their respective milieus. Negative opinions about printing were expressed at the time, but technology was used to increase the number of affordable texts, and a

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4 We consulted the original edition held in the library of the École Française d’Extrême-Orient in Paris, Dell’Historia della China (1586), Libro 3, p. 102.
5 On the development of an urban space in which “intellectuals” become “professionals” and join the administration as a precondition of the development of printing in Europe, see F. Barbier (2006), pp. 26-29. This does not imply a direct comparison between East and West, but as in Song dynasty China, where elite literati became officials, positions of power were no longer guaranteed by hereditary principles, and printing was a highly effective way of spreading written information and knowledge.
reciprocal dynamic between the diffusion of printing and the diffusion of written knowledge was thereby established.

— From antiquity to modernity? A synthetic view of the role of Chinese movable type in the development of a printing culture in East Asia

Even if the personality of Shen Kua 沈括 (1031-1095) and the times in which he wrote his Mengxi bitan 夢溪筆談 (Brush Talks from Dream Brook), which contains the first reference to movable type, correspond to the image of “Humanism” and have the Renaissance connotations with which the Song dynasty is sometimes associated in terms of governmental and intellectual features, we are still conscious of the fact that the beginnings of Chinese typography were marginal to the (woodcut) printing dynamic and the cultural developments of the era. The axiom that Chinese movable type never challenged the dominance of xylography reflects the fact that there are few sources describing its early development, and that those sources are geographically scattered. If we reject the idea that a funerary stele found in Yingshan 英山 in Hubei can be attributed to the same Bi Sheng 毕昇 who, according to the Mengxi bitan, made earthenware type in the 1040s, and if we choose to ignore the well-known but highly dubious Foshuo wuliang shou fojing 佛說無量壽佛經 (The Buddha Preaches of the Infinite Life Sūtra)—forgetting for a moment that this imprint, dating from around 1103, and found in Wenzhou 溫州 in Southern Zhejiang Province, is mentioned in every publication on the subject, but it was probably printed using wood blocks—we can assert that, during the Northern Song dynasty (960-1127), movable type was used exclusively in Northern Zhejiang (referred to as Liangzhe lu 梁浙路 at the time). This hypothesis is supported by the fact that ceramics were produced in the region during the period, and by the existence of local printing activities, well documented from the Yue period (tenth century) onwards. Furthermore, Qiantang 錢塘 County on the eastern borders of Hangzhou 杭州 Prefecture near Yuezhou 越州 is generally believed to be the original home of the Shen family who, in Shen Kua’s description, precisely conserved the type produced by Bi Sheng. (There are also some late, rather dubious documents in which it is claimed that this branch of the Shen family was originally based in Wucheng 烏程, now Huzhou 湖州, in Northern Zhejiang). At the time, the capital was Kaifeng 開封. Originally from Fujian, Deng Su 鄧肅 (1091-1132) was probably

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7 Zhang Xiumin and Han Qi (2006), p. 536.
8 Mengqi xitan jiaozheng, vol. 2, chap. 18, p. 597f.
employed in the town’s administration when he learned about “Bi Sheng’s twin metal plate” technique, and wrote about it in a poem contained in the Binglü xiansheng wenji, 輕欄先生文集 (Collected Works of Mr. Binglü). The term “double plates of metal” (er bantie 二板鐵) is interpreted as referring to the two trays in which the types were placed (er tieban 二鐵板 as the Mengxi bitan has it) in order to speed up the process by alternating type composition and printing. Of course, we should not ignore the fact that Shen Kua died when Deng was still a small child, and that many questions about the earliest versions and the Song edition(s) of the famous work on Bi Sheng type remain unanswered.

We have to wait until the advent of the Southern Song dynasty (1127-1279), when the capital was moved to Hangzhou (Lin’an 臨安), for more literary evidence of this kind of printing. In 1193, Zhou Bida 周必大 (1126-1204) from Jiangxi, but in service near what is currently the town of Changsha, wrote in his Yutang zaji, 玉堂雜記 “Miscellany of the Hall of Jade” about the “Shen method” (Shen Cunzhong fa 沈存中法) involving “clay [types and] bronze plates” (jiaoni tongban 膠泥銅板). This text forms part of Zhou’s correspondence with Cheng Yuancheng 程元誠, who some scholars have identified as Cheng Shuda 程叔逹 (zi Yuancheng) of Yi County in the south of what is currently Anhui Province. In this case, the fact that Cheng, a native and inhabitant of Yi County, was doubtless aware of the printing technique described by Zhou, suggests that people in many other parts of South-East China were aware of the possibility of using such characters.

There is another example of the use of “Shen type” — or, in other words, the earthenware type devised by Bi Sheng — dating from the 1240s, when Yao Shu 姚樞 (1201-1278), who had retired to Huixian 輝縣, urged his “disciple” Yang (Weizhong?) to use it to print texts by Zhu Xi 朱熹 (1130-1200) and Lü Zuqian 呂祖謙 (1137-1181). Once more, this example derives from the literary world and concerns the works of leading personalities in that milieu, although it should be pointed out that it is impossible to ascertain what really happened in this case, and whether it happened in the capital of the Mongol empire, when Yao was in charge, or later, when he had already retired to northern Henan.

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9 Binglü ji, chap. 6, pp. 3b-4a. See also Han Qi (2004).
10 Wenzhong ji, chap. 189.
12 Mu’an ji, chap. 15, pp. 174f.
While there are a number of literary references to printing techniques from the Song and Yuan (1279-1368) dynasties, there are few sources for the Xixia 西夏. However, specialists maintain that movable type was used in numerous publications. Indeed, most items found in the territory of the Tangut people—a territory which, at its apex, included the regions around the handle of the Yellow River in present day Inner Mongolia, as well as Ningxia, Gansu, western Shaanxi and northern Qinghai—were thought to have been printed using type on the basis of the empirical observation of the (poor) quality of the printing and the (unequal) features of the printed pages. This analysis is sometimes pushed to extremes, with certain researchers making the distinction between the use of clay type and wood type.\footnote{Shi Jinbo and Yasen Wushou’er (2000), pp. 38-59.} As neither of the authors of the present article are specialists of Xixia culture, we will content ourselves with indicating the locations in which these documents were found, the nature of the documents (they are essentially Buddhist texts) (Appendix I-1 and 2), and the fact that, at least if the specialists are right, the oldest, still extant examples of books printed with movable type were produced in Xixia by the Tanguts (in approximately the same era as the problematic fragment of the *Foshuo wuliang shou fojing* mentioned above). These typographic imprints—amongst which is to be found the *jixiang bianzhi kouhe benxu* 吉祥遍至口合本續 (Samputa Tantra), discovered in Ningxia, which according to experts dates from the years 1102-1180 or later, but, in any case, from before the Mongol conquest of 1227—vary considerably in size. A number of documents found in Khara-Khoto (Inner Mongolia) are also believed to have been printed in the second half of the twelfth century.

An interesting example is provided by the fragments of a calendar from 1211 corresponding to the period from May to October. Most of the fragments, in Chinese, which were found in Tangut territory, were pasted to Buddhist texts in the Xixia language. The calendar, attributed either to the Chinese or the Tanguts, seems to be emblematic of cultural transitions, not only between Xixia and Chinese, but also between an ancient tradition of Western origin: the use of the character *mi* 蜜 for “Sunday,” already employed in Dunhuang manuscripts and considered to be a Sogdian heritage; and the use of the Chinese “28 Mansion” approach to organizing time.\footnote{Eluosi kexueyuan dongfang yanjiusuo (2000), vol. 6, p. 315, 俄 ИИВ. no. 5285.} This “transnational” aspect is unsurprising in a cultural context that had been highly receptive to Chinese traditions since the early twelfth century.

A major difference can be observed between the earliest evidence, provided by men of letters, of the use of Chinese movable type, and Xixia examples, which were more closely related to structured (religious) activi-
ties organized by various (religious) institutions. Nevertheless, a colophon found in a Xixia manuscript of a religious text dated 1216 suggests a different approach to publishing for which movable type was used, including names of institutional function. The existence of such terms, used as titles, implies that the government was involved in typographic printing activities.\textsuperscript{15} Other fragments are also of interest in that they strongly suggest that craftsmen were employed to prepare types.\textsuperscript{16}

To conclude our “Tangut digression,” we would like to recall the hypothesis of a number of authors who explain that, because of his military duties, Shen Kua was in contact with this northern population and probably encouraged the use of this method of printing in the region.\textsuperscript{17} Even if the dates provided by Shen Kua, who was born in the eleventh century, are earlier than those suggested for all the Xixia supposedly type-printed texts ever found, it is nevertheless, due to the military defeat that he suffered there, hard to imagine him extolling the merits of Bi Sheng. This is a good example of the Sinocentric view of the East, a topic that, although beyond the scope of this paper, cannot be ignored, since it still exerts an influence on Chinese Studies, which dominates the field of Chinese printing technology. Meanwhile, the kind of cultural studies more often promoted by Western scholars ignore Chinese typography: how can “movable type” be dealt with when it does not provide concrete aid to the process of the affirmation of critical and scientific thinking, politicization and democratization, mechanization and industrialization, and the massification of education and culture? Indeed, some Western scholars claim that, even in the Chinese context, the technique is bereft of interest compared to home-grown woodcut methods and all-conquering Western typography.

Returning to our main discussion, the Xixia case provides elements reflecting Eastern typographic practices: the production of a few thousand characters, the repetitive content of publications and a lack of timber that justified the use and re-use of characters. There was a good deal of publishing in the Tangut territory, which represented one of the three leading “printing areas” of North-West China in the twelfth and early thirteenth centuries. Meanwhile, the Jin (1115-1234) were active in Pingyang 平陽, Kaifeng (which continued a tradition originating in the Northern Song

\textsuperscript{15} Shi Jinbo and Yasen Wushou’er (2000), pp. 53f, fig. 2-34: document from Heishuicheng 黑水城 no. 5130.


\textsuperscript{17} For example in Xu Yinong (2002), pp. 89f.
dynasty), and ancient Beijing. Although movable type printing spread to other areas of the country during the Southern Song dynasty, Hangzhou remained very much at the heart of the industry. But this situation did not last, because in the early part of the new century the Xixia were pushed westward, and the Southern Song were chased away by the Mongols.

Wooden movable type existed before the Yuan dynasty, but it was in this period that Wang Zhen (fl. 1290-1333, a native of Shandong) produced a systematic presentation of the technique in *Nongshu* 农书, and it was claimed that the wooden types were used in the publication of the Jingde 旌德 County gazetteer in the late thirteenth century (*Dade Jingde xianzhi* 大德旌德縣志, printed around 1298 and lost in the Wanli era, 1573-1619). Jingde is in Anhui, where Wang Zhen worked for five years before moving to Yongfeng 永豐 (Jiangxi) in 1300. Twenty years later, Ma Chengde 马称德 (?-1322, from Guangping) printed the *Daxue yanyi* 大学衍義, “An Explanation of the Great Learning” by Zhen Dexiu 真德秀 (1178-1235), and perhaps the Fenghua 奉化 gazetteer (*Yanyou Fenghua zhouzhi* 延祐奉化州志) in Zhejiang, where he was posted for the last three years of his life. So, again, we have an example of two officers stationed in central China writing about movable type and printing in the towns to which they were posted.

In addition to these examples, all verified by literary sources, in around the same period, a copy of the Yuan dynasty *Yushice* 御試策 (Dissertations [for Examination] at the Imperial Palace) was printed, probably between 1334 and 1368: this copy is now held in the National Library of China, in the catalogue of which it is described as having been printed with bronze movable type. Meanwhile, the emblematic and enigmatic set of fourteenth century Uighur movable types found in the Dunhuang grottoes by Paul Pelliot (1878-1945) is currently held in Paris. In this case, there is not one type per letter; instead, the wooden pieces are engraved with words, phonetic groupings, and punctuation marks. An examination of the types reveals that they differ in thickness, are characterized by non-perpendicular angles, and are engraved on both sides. It is, therefore, difficult to decipher the true nature of this incomplete font(s).

Much further west, in the northern Persian town of Tabriz, then occupied by the Mongols, there is evidence of a (failed) attempt to apply Chinese printing techniques to the production of banknotes in 1294. Back in the East, the Mongol invasion of Korea in the thirteenth century corresponds to

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19 The authors would like to thank Mme Valerie Zaleski, curator of the Guimet Museum, who allowed them to check the original types in June 2013.
a period of local printing activity and exchanges of printed books with China. It was in Korea that the world’s first type-printed book was produced. According to the colophon it was printed by cast type in the Hŭngdŏk Monastery in the seventh year Xuanguan, in the Yuan dynasty (1377). Although this particular book came from a small monastery, Korean movable type printing is usually associated with enterprises under state control. Moreover, it is not only written documents that bear witness to the existence of Royal movable type printing. Indeed, there exist a number of examples of metal type fonts—most of them, according to Hee-Jae Lee, using copper. Academic approaches to Korean typography are quite different to those applied to Chinese typography, since, in China, it seems that metal type was first introduced in the sphere of private publishing, while no ancient type or ancient descriptions of works produced with metal type have survived. To get around this problem, some scholars, like Pan Jixing, emphasize the link between movable type and money, and between other items printed by or made from metal plates. Meanwhile, Western studies on ancient books describe, without any hint of “nationalism”—inverted or otherwise—, Chinese techniques for casting coins dating back two thousand years. Even if, in such studies, no explicit link between type and coinage is made, their authors tend to assume that China had long since developed the technology required to produce and use identical matrices/moulds (this is different from a “disposable” matrix; in the process described, a “primary” matrix plays a role similar to that of a Western typographical punch, even if softer materials than steel were used).

— The Ming (1368-1644) and Qing (1644-1911) dynasties: development and consolidation of typography

A number of observations made by Shen Kua lead us to deduce that he was already aware of the characteristics of wooden movable type in the Song dynasty, while Wang Zhen mentions the use of tin type in the Yuan dynasty. But movable type applications were not established until the early fifteenth century, when the capital had already been moved from Nanjing to Beijing. This has already been pointed out by numerous Chinese scholars, who have also emphasized the fact that the blossoming of metal typography occurred in the dynamic region of central China, well known as a key region for “literary entrepreneurs,” often described as the major intellectual and economic actors of the time. More generally, at that time, many more books were being printed than in the first century of the Ming dyn-

\[22\] See also, Lee Hee-Jae (1987).
\[23\] Pan Jixing (2001).
asty, a phenomenon already described, amongst others, by Joseph McDermott.25

Metal type was mostly used in Jiangsu, but there is evidence that it was also used in Zhejiang and Fujian. Wuxi 無錫 (see map in Appendix II-1) was the main centre for metal type printing, as is demonstrated by the “synthetic” representation of known extant titles in the geographical map in Appendix II-2. The city occupies a privileged position in the Yangzi Delta region on a fertile plain in the middle of a river network. Initially known for its rice, it later became a centre for textile production during the last dynasty. In the Ming period, the local economy was so strong that Wang Shizhen 王世貞 (1526-1590) was able to describe two merchants from Wuxi as being amongst the seventeen richest men in the country.26 Unfortunately, there are no contemporary descriptions of metal manufactories in the area, and most information concerning metal typography is to be gleaned from brief passages in books or from later publications by bibliophiles. In fact, multidisciplinary investigations on the development of metallurgy in Jiangsu and on family activities and relationships between the people involved in them, as well as an in-depth analysis of the original printed items would perhaps be useful in terms of resolving problems. Their resolution would otherwise be dependent on the same sources and same bibliographical and philological considerations used up until now to generate theses and antitheses. According to the traditional view, printing was dominated by the members of two families from Wuxi, namely the An 安 and the Hua 華. The fact that they used metal type is not disputed, but questions about the technique that they employed (casting or engraving), and which kind of metal they employed have not yet been answered, although it is not beyond the bounds of possibility that they used a metal alloy such as bronze, used in earlier eras in metal plates employed for printing purposes. Four members of the Hua family were involved. One of them, Hua Sui 華燧 (1439-1513), who did not have a public career, is celebrated in later family publications for his “bronze plates and tin characters” (tongban xizi 銅板錫字). The use of “movable type” (huoban 活板) is also attributed to his paternal uncle, Hua Cheng 華珵 (1438-1514), a collector with many contacts in the literary milieu who failed his doctoral examination. Meanwhile, we know that An Guo 安國 (1481-1534), who is said to have used bronze type, was responsible for around a dozen titles, printed in the 1520s and 1530s. He was one of the two wealthy men mentioned by Wang Shizhen. Although he had no official titles, he enjoyed travel and the arts, and had a great love of books. Some of the information about him is to be found in texts written by family members, some from later writings by

26 Yanzhou shiliao qianji houji, by Wang Shizhen and Dong Fubiao, 1614 (original copy held at the IHEC Library, Paris).
Bibliophiles, and some from the publications themselves. It should be
stressed that his type may well have been shared between his heirs, who
may have broken up the set and made it practically unusable. If this was
indeed the case, the “font” would have been considered as the material
property of the family, rather than as equipment used in a professional
printing exercise.

During the Ming dynasty, wooden movable type continued to be used
for the most part by private concerns; over a hundred titles were printed
using this method, most of them in the Wanli period (1563-1620). Only one
academy edition and one or two royal editions are known.27

The table in Appendix III-1 provides a survey of the typographic produc-
tion listed in the “Ancient and Rare Books of China” (Zhongguo guji shanben
shumu 中國古籍善本書目) catalogue published in the 1980s in Shanghai.28
Although there is only limited interest in this source, generated some years
ago using the catalogues of the “rare books” collections in the state libraries
of mainland China, it still provides a general overview of typographic pro-
duction in relation to printing and publishing activities as a whole, which
also encompassed woodcut editions and various types of manuscripts.
Movable type editions account for a small percentage of existing, cata-
logued titles, but the absolute figures increase when larger corpuses are
taken into consideration (see the bottom of the table), or less “precious”
editions are included, for example later gazetteers and the genealogies
discussed in the third part of this paper (genealogies are the largest sub-
category of historical works in the catalogue). These sources concern extant
original copies, so that the figures should be a little lower when editions
are taken into account (as there is sometimes more than one copy of the
same edition). In all, there are around 280 titles. In the subsequent graphic,
276 are represented, including 93 titles from the Ming dynasty, and 183
from the Qing dynasty (there are 47 undated titles from the first period,
and 36 from the second, equally distributed on the graph). There is a peak
during the Qianlong period (1736-1795) corresponding to the activities of
Wuying dian, the printing office of the Imperial Palace in Beijing (see the
graphics in Appendix III-2). Furthermore, seven titles were produced in the
Qing period with “ceramic,” and a number of editions of three titles were
produced with lead at the end of that dynasty, which might point to the
use of foreign techniques (at least for one of them, a periodical published
by the London Missionary Society Press—Mohai shuguan 墨海書館—in the
late 1850s).29 Meanwhile, relatively few volumes were printed with tradi-

004/001/085.pdf, last verified 22/02/13.
29 Zhang Xiumin and Han Qi (1998), pp. 186f.
tional metal type (or “plates,” as tongban characters were sometimes used), and most of those were produced in the Ming dynasty.

Moreover, it should be observed that some of the still extant works are only a few chapters long, while others consist of complete collections. In the “Collectanea” category, there are only eight entries for seven titles, but two of these include a large number of works (138 and 430), all of them printed in the last dynasty using wooden type. There is no substantial difference in terms of the figures given for the numbers of books printed with movable type in the four traditional bibliographical categories used to classify ancient Chinese works. In fact, the percentage of extant books is very similar for the four categories (around 0.5%), which implies that movable type was a “minority” printing method, even though it was not different from other printing techniques in terms of use. On the other hand, more detailed, single topic analysis of the catalogue reveals some surprising facts, for example the absence of Buddhist titles in Chinese (Buddhist titles were extremely numerous in Xixia publications printed with type).

As has been demonstrated in many studies on the Qing dynasty (1644-1911), the period was extremely dynamic in terms of book production. This is also true for movable type printing activities, even if, in this overview, the processes resulting in the introduction of Western techniques by foreign missionaries/merchants are not described. The most novel aspect is the involvement of the imperial authorities in these processes, a phenomenon that mirrors the involvement of the Manchu emperors in cultural activities. Indeed, this contrasts to the attitude of the last Ming rulers in Beijing, whose lack of involvement is often considered the obverse of the flourishing business in private editions in the towns of Jiangnan that were produced, inter alia, with metal movable type in Wuxi and other locations in the south of the country. Clearly, an “economic” reading of this geographical expansion of printing practices is feasible, a reading that concentrates, for example, on the development of printing in Beijing, where the Dibao 周恩来 gazette switched to wooden type in 1638, around the same time as other centres of the commercial market in the Qing empire. Moreover, the publication of novels like Hongloumeng 红楼梦 (Dream of the Red Chamber; 1792) and Honglou mengying 红楼梦影 (Dream Shadow of the Red Chamber; 1877) ensured a role for movable type in commercial printing activities. But the importance of the foreign/northern origin of the Manchu emperors and their involvement in literature and the arts is not to be underestimated.

For the first time, the most ambitious typographic programs were carried out at the behest of the emperor. In addition to the manufacture of

30 Ibid., pp. 76-77.
movable type, they required a huge amount of editorial work. The movable type was made of metal, and was probably engraved for the encyclopaedic compilation of the *Gujiin tushu jicheng* 古今圖書集成 (Collection of Texts and Illustrations of Ancient and Current Times), which is around a thousand chapters long. Chen Menglei 陳夢雷 (1650-1741) worked on the compilation between 1701 and 1706, and a team of eighty people continued the task up until 1720. The various phases of editing and printing went on for a further eight years. Approximately sixty copies were eventually printed. In spite of the discrepancy concerning the number of printed copies of *Gujiin tushu jicheng*, it is clear that the fact that movable type was the cheaper option was not the reason why it was chosen. Indeed, the metal type was melted down in 1744. Consequently when, a few decades later, the Qing emperor, Qianlong, decided to publish another large compilation using movable type, the material selected for the type was wood. Again, a modest number of copies (circa 320) were printed. Indeed, the publication was the “printed consequence” of highly ambitious manuscript programs. Since the previous compilation of the *Siku quanshu* 四庫全書 contained ancient works originally included in the lost Ming manuscript encyclopaedia, the *Yongle dadian* 永樂大典 (Yongle Encyclopaedia), the emperor decided to promote the publication of a number of works recovered from the old encyclopaedia under the title of *Wuyingdian juzhenban congshu* 武英殿聚珍版叢書 (Collection Printed by Type of the Wuyingdian (Imperial Printing Office)). The *ex-novo* production of types was described in detail in the *Qinding Wuying dian juzhenban chengshi* 欽定武英殿聚珍版程式 (Printing Manual for Wooden Movable Type of the Wuyingdian), published in 1774. While this description of wooden movable type, which is even more detailed than that published in the earlier *Nongshu*, ensures that the *Wuyingdian juzhenban congshu* is the most studied and best known text in the history of Chinese movable type, it would also, at the time of its publication, have encouraged printers, even those in provincial publishing houses opened by the Qing administration, to use the method.

More generally, beyond the sphere of public administration, book publishing flourished all over the country in the Qing dynasty, and the use of movable type by academies, families and private individuals followed this general trend. The abundance of Qing sources, as well as the initial, detailed observations made by foreigners about printing practices and the technical/economic advantages associated with them (*Chinese Repository,*)

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32 See Xiang Xuan (2013).
33 *Qinding Wuying dian juzhenban congshu*, 1991.
encouraged academic studies, some of which provided subtle analyses of prices in the early nineteenth century, demonstrating that traditional, common types of wood were cheaper for low print runs, but that prices did not go down as the size of those print runs grew (see Appendix IV below, for the case study conducted by Martin J. Heijdra, in which a comparison is made between the costs of different printing methods in the early nineteenth century for runs of 100, 2,000, or 5,000 copies. These are relatively high figures for traditional publishing in China).

Although the need to summarize has made it impossible to explore movable type printing in the Qing dynasty in detail, we would nevertheless like, in conclusion, to recall a number of cases of printed works from this era that re-establish a link with the earliest manufactory of earthenware type. Lü Fu 呂撫 (1671-1742) of Xinchang 新昌 County in Zhejiang made earthenware plates using a printing technique comparable in some respects to Western linotype; Li Yao 李瑤, originally from Suzhou, but active in Hangzhou since 1830, and Zhai Jinsheng 翟金生 from Jingxian 涇縣, Anhui, both made earthenware type. All of them pose the problem of the real significance of these technical applications, which remained “isolated.” Not only did new combinations of the kind that made the Western printing revolution possible fail to arise (new materials, new sets of techniques that would be more profitable when applied together, conditions encouraging demand), but the examples referred to above could be described as “self-referential,” because type was used to produce either a single work or a few publications associated exclusively with a family context and/or relating solely to the observations of Shen Kua. Nevertheless, these texts are mentioned very frequently in works by Chinese scholars about printed books. Such studies are dominated by a technical approach, and are characterized by an emphasis on the past and antiquity, rather than on “modern” positivistic values. This is especially true in regard to Zhai Jinsheng, some of whose type has been conserved. According to written sources, he worked with members of his family, producing thousands of characters. But the type was used for only very few editions, including his family genealogy, printed in 1857, when he was already eighty-three years old. There is a copy of this genealogy in the Chinese National Library in Beijing on the title page of which earthenware characters are mentioned. This Qing dynasty edition was a re-publication of a Ming dynasty compilation edited by Zhai Tai 翟台. At the end of the volume, we find the only two pages written by Zhai Jinsheng, who explains that he asked his grand-

34 In this periodic journal, published between 1832 and 1951, see the famous text of [Typographus Sinensis], “Estimate of the Proportionate Expense of Xylography, Lithography, and Typography...” 1834.
son, Jiaxiang 家祥, to use the type he made to reprint the genealogy and points out that a number of blank pages are included so that they could be filled in by later generations (in the volume in question, the manuscript table ends in the Republican period).  

37 Genealogies printed with wooden type: the dominant Chinese typographical methods up until modern times

The ancient Chinese paid considerable attention to family and clan relationships, a fact exemplified by the production of genealogies, the most common names for which are jiapu 家譜 or zongpu 宗譜. All genealogies compiled before the Sui (589-618) and Tang (618-907) dynasties have been lost.  

38 However, genealogies concerning not only aristocratic clans, but also the families of officials began to appear in the Song dynasty, became popular in the Ming period, and were quite prevalent during the Qing dynasty. From this last dynasty they have generally been printed using wooden type. Genealogies mainly recorded the origin and history of a lineage, information about dates of births and deaths, the teachings of ancestors, family and clan rules and rules concerning the ancestral home, as well as portraits and biographies of ancestors and essays written to celebrate them. Some genealogies also included passages from books and poems written by ancestors, and descriptions of the tombs of ancestors, family landholdings, and sacrificial rites and offerings. Together with official histories and local gazetteers, genealogies are amongst the most valuable types of historical record in China, and provide a vital resource for the study of migration and demographic change, social customs, literature, and local history. In the patriarchal society of ancient China, the lineage system played a particularly important role. There were strict prohibitions against showing genealogies to other clans. Genealogies had to be preserved carefully by the descendants of the family and passed down from generation to generation. Genealogies could not even be lent to relatives or friends. Indeed, some genealogies warn that “Clan members should preserve the genealogies carefully. If they are broken or damaged by worms, the person who is in charge of preservation will be punished by the clan.” In the Qing dynasty, a substantial number of wooden type genealogies were produced in Zhejiang, Jiangsu, Anhui, Jiangxi, Hunan, Hubei, Sichuan and Fujian. However, there are few examples of genealogies from northern China, and only a very small percentage of those there are were printed with wooden type.

38 On the production of the earliest genealogies, see Li Qing (2005).
39 The genealogies attributed to Su Xun 蘇洵 (1009-1066) and Ouyang Xiu 歐陽修 (1007-1072) provided models for subsequent ones.
During the Kangxi period, about one million bronze movable types were cast and engraved for the printing of Gujing tushu jicheng, one of the most important encyclopaedia in Chinese history. However few other books were printed using this type afterwards, and the bronze type used in the project was eventually melted down for making bronze Buddhas and coins in the Qianlong period. In 1774, when the Siku quanshu was compiled, 253,500 wooden types were engraved with financial support from the emperor Qianlong at the suggestion of Jin Jian 金簡 (died in 1794), an official in charge of printing at the Wuying Palace. This type was used to print the series entitled Wuyingdian juzhenban congshu, including 134 titles in 2,389 juan. Between five and twenty copies were printed for imperial palaces, and approximately 300 additional copies were sold and distributed in the provinces. In 1777, this series was sent to different provinces and reprints were allowed. A manual on the use of wooden movable type entitled Wuyingdian juzhenban chengshi was written in 1776. This illustrated account includes descriptions of how to make the body of the type, how to cut type and make type cases and trays, as well as guides to setting, printing, and other procedures. Due to the support of the emperor, wooden movable type was also adopted by local governments and local academies around the country, and even more widely by private printers. These developments greatly stimulated the production of genealogies printed using wooden movable type.

Zhejiang Province provides an interesting example. As mentioned above, Ma Chengde, a magistrate from Fenghua, used his collection of 100,000 movable types to print the classical commentary Daxue yanyi, as well as a number of other books. However, all extant genealogies dating from before 1428 are handwritten. Later, some were printed using wood blocks. Among the 103 genealogies produced in the Ming period, 13 were printed with wooden movable type. The earliest extant movable type genealogy is entitled Dongyang Lushi jiachen 東陽盧氏家乘 (Genealogy of the Lu Family of Dongyang). It was printed in Jinhua 金華 Prefecture during the Longqing period (1567-1572). Another such genealogy is entitled Jinhua Lianchi Zhangshi zongpu 金華蓮池張氏宗譜 (Genealogy of the Zhang...

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40 See Xiang Xuan (2013).
41 According to the Zhejiang jiapu zongmu tiyao 浙江家譜總目提要 or “Catalogue of Genealogies of Zhejiang Province” (Zhejiang jiapu zongmu tiyao bianji wei-yuanhui (2005), compiled by Cheng Xiaolan 程小瀾), there are a total of 12,775 titles, of which about 9,300 were printed with wooden movable types. See also Ding Hong (2008).
42 Ding Hong (2008), p. 76. However, the copy that she mentions, held in the National Library of China, Beijing (call number A01294), does not feature a date of publication.
family of Lianchi, Jinhua), which was printed in 1573, and is now held in the Shanghai Library;\textsuperscript{43} held in the same library, the other twenty genealogies of the Zhang family of Lianchi, produced between 1767 and 1947, were all printed using wooden movable type.\textsuperscript{44} Several Ming movable type genealogies from the Wanli (1573-1620) to Chongzhen (1628-1644) periods were printed in Pujiang 浦江, Yiwu 義烏, and Yongkang 永康 in the same prefecture. In addition to Jinhua, there are also movable type genealogies from the Ming dynasty in Hangzhou 杭州, Ningbo 宁波, and Shaoxing 紹興 prefectures. This demonstrates that movable type printing in Zhejiang Province was quite common during late Ming. Wooden type was used on a much wider scale during the Qing dynasty. It was widely used not only by the imperial court, but also by private printers, especially for printing genealogies. The compilation and printing of genealogies flourished in Zhejiang Province, producing 6,430 titles, of which 5,100 were printed with wooden movable type from the mid-Qianlong period (1736-1796) onwards, the most during the Guangxu period (1875-1909).\textsuperscript{45}

One interesting feature of wooden type printing was the production of clan records of family registers by travelling printers. In and around Shaoxing Prefecture, printers specializing in genealogies were referred to as pujian 譜匠 (genealogy craftsmen), or pushi 譜師 (genealogy masters). In the late Qing period, in Sheng County 嵊縣 alone there were up to a hundred genealogy masters carrying their equipment with them as they travelled around the countryside on their way to see clients in Shaoxing and Ningbo. After the autumn harvests, they travelled together in groups, bringing with them some 20,000 types, including two Song styles, large and small sets made of pear wood, required to print a single family genealogy.

In terms of type-setting, the genealogy craftsmen of Sheng County used an “interior tray” (neipan 内盘) for frequently used characters, and an “exterior tray” (waipan 外盘) for more rarely used ones. Interior trays were used to house types, such as those for the names of imperial reigns; the Heavenly Stems and Earthly Branches; the time, day, month and year; naming taboo characters; words for marriages and funerals; numbers; and the most frequently used particles such as zhi 之, hu 乎, zhe 者, and ye 也. Meanwhile, in the exterior trays, characters were arranged by means of a five-character poem with twenty-eight sentences, with five characters per sentence. Characters with the same radical as in the poem were grouped together, thus making it easy to pick the one required. Generally speaking, craftsmen were organized into teams of five or six, plus a manager, and carried out tasks such as engraving, making type, illustrations and calligra-

\textsuperscript{43} Shanghai tushuguan (2000), p. 732, 館藏 1274/A.
\textsuperscript{44} Ibid., pp. 732ff.
\textsuperscript{45} Ding Hong (2008), p. 77.
phy, 46 typesetting, printing, and other services. Such teams were able to produce genealogies in as little as one to two months; often the task would require four or five months (but no more than half a year), depending on how large the clan was and how much information was to be included in the publication. 47

Wooden movable type is still used in Wenzhou 温州, in the south of Zhejiang Province. 48 The technique only recently attracted the interest of local government, which was keen to protect this interesting piece of cultural heritage. In 2008, wooden movable type was added to the Ministry of Culture’s National List of Intangible Cultural Heritage; two years later, it was added to UNESCO’s Urgent Protection of Intangible Cultural Heritage List, on the initiative of the Ruian 瑞安 community, according to whom, at that time, only eleven men, all of them over fifty (born between 1938 and 1962), had mastered the process as a whole, from preparing wooden characters to printing. 49

Between 1949 and 1978, compiling genealogies was illegal. However, in defiance of the law, genealogies continued to be compiled and printed in Ruian, Pingyang 平陽 and Cangnan 蒸南 Counties in Wenzhou District. 50 The repeal of the law in 1978 made life easier for those continuing the tradition. Even now, in the village of Dongyuan 东源 in Ruian County, near Wenzhou and the northern part of Fujian Province, which has 450 families totalling 2,000 people, less than 100 “genealogy masters” are said to be still engaged in the compilation and printing of genealogies (with both wooden and lead types). It is interesting to note that the poem once used in Shaoxing Prefecture to organize type-setting is still being used in Ruian. To some extent, genealogies are the only reason that movable wooden type survives to this day. Furthermore, it should be borne in mind that, independently of the production of genealogies, the paper-making industry in the area was quite advanced.

46 Maps and portraits, as well as para-texts in calligraphic style, were reproduced with wood-blocks, thereby demonstrating the specialized craftsmen’s range of talents.
47 Zhang Xiumin and Han Qi (2006), p. 600.
48 As far as we know, wooden types are still used for printing genealogies in Ninghua 宁化 County in Fujian Province and in Jinxin 金溪 County in Jiangxi Province.
49 All this information is available on the UNESCO website. One reason for the need for the practice to be added to the list is that in the workshops of Ruian, where genealogies are still produced, stereotype printing is being used with increasing frequency. See the documents online: http://www.unesco.org/culture/ich/index.php?lg=en&pg=00011&USL=00322.
50 About 500 titles were printed between 1950 and 2000.
Genealogies, like local gazetteers, are still being published. There is a Chinese saying, “a small revision every fifteen years and a big revision every thirty years.” The ancient Chinese referred to a period of thirty years as a shì 世 (generation), so it comes as little surprise that it was considered a family duty to revise genealogies every thirty years. Genealogies were usually paid for out of clan funds, and sometimes from donations from members of the family. Producing a genealogy was an important event for the whole clan. The completion of a new genealogy was marked by performances and rites. Prior to the revision of a genealogy, the dates of births and deaths in the family were checked. Many editions were marked “revised,” “third revision,” “fourth revision,” and even “fourteenth revision,” in order to show that they were different from the original text.

Print runs generally included between five and ten copies. Some prints ran to twenty or thirty copies, others up to a hundred. Each copy was numbered and kept by one branch of the family. Genealogies were often printed on white Liansi 連四 paper. A large format (30cm by 20cm) was used to accommodate the bulky wood type characters; the genealogies were printed in a traditional way, on sheets of paper twice the size of the printed page [two pages were printed at once]. Some editions printed in Shaoxing and Ningbo prefectures were 46cm by 37.5cm. The number of volumes in these genealogies varies from one to sixty; however, most contained between ten and twenty volumes. Although European typography was introduced into China in the 1830s, it was not widely used until the 1870s. Even in the early Republican period, wooden movable type was still used frequently in Zhejiang Province, and of 4,498 titles from the Republican period, 3,700 were printed with wooden movable type.

In this article, we have attempted to present an explanation not only of why movable type was never the most widespread method of printing in Imperial China, but also of why, in spite of everything, traditional Chinese wooden movable type continued, and still continues, to be used after the introduction of European typography during the nineteenth century.

Block printing and movable type printing serve different purposes: the former is more suitable to recurring demands for relatively small quantities of copies over relatively long periods of time, while the latter are better suited to large, one-off projects. Printing blocks can be preserved indefinitely and used over and over again, requiring only occasional repairs. For the printing of genealogies, a large initial investment would be required if wood blocks were to be used; the cost would be less if a decision was made to employ a professional team with its own set of movable type. In the long run, the fact that movable type could be re-used can be an advantage: this is especially true for the kind of publications in which certain sections, terms and characters recur on a frequent basis, a category
that includes genealogies. This is why movable wooden type has survived to this day.\footnote{51}
Appendix

APPENDIX I: Locations of Xixia movable type production and list of such documents

I-1 Map from Tan Qixiang 譚其驤 et al. (eds.), Zhongguo lishi ditu ji 中國歷史地圖集 (Historical atlas of China), Beijing: Zhongguo ditu chubanshe, 1987, georeferenced in WGS84 (map by Cécile Lochet & M Bussotti-Efeo).
I-2 Xixia documents by types, on the basis of Shi Jinbo’s work (Shi Jinbo and Yasen Wushou'er (2000)) and Eluosì Kexueyuan Dōngfāng Yānjūsuō (1997-).

*Type in wood (=W) or earthenware (=E) in Shi Jinbo’s opinion
**Text in Chinese (=C) or Xixia (=X)

<table>
<thead>
<tr>
<th>Title and Date</th>
<th>Type*</th>
<th>Text**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heishuicheng</td>
<td></td>
<td></td>
</tr>
<tr>
<td>233, 4326 (上卷); 361-362, 232 (中卷); 737, 2310 (中、下卷); 4264</td>
<td>W?</td>
<td>X</td>
</tr>
<tr>
<td>ИНВ п. 5153, 5153v</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td>4166</td>
<td>W ?</td>
<td>X</td>
</tr>
<tr>
<td>俄 ИНВ п. 799, 3947</td>
<td>W ?</td>
<td>X</td>
</tr>
<tr>
<td>F177:W1</td>
<td>?</td>
<td>X &amp; C</td>
</tr>
<tr>
<td>F177:W2/2187</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td>F20:W66; F20:W67</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>F79:W90/1025</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td>F97:W6 F180:W2</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>F225:W29</td>
<td>X?</td>
<td>?</td>
</tr>
<tr>
<td>ИНВ п. 5229 Menghuilu306</td>
<td>?</td>
<td>C</td>
</tr>
<tr>
<td>ИНВ п. 5285 Menghuilu305</td>
<td>?</td>
<td>C</td>
</tr>
<tr>
<td>ИНВ п. 5306</td>
<td>?</td>
<td>C</td>
</tr>
<tr>
<td>ИНВ п. 5469 Menghuilu307</td>
<td>?</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>ИНВ n. 8117</td>
<td>Fragments of a calendar (May 1211) 宋或夏活字印本 18.4x21.6 cm, 6.4x19.4 cm</td>
<td>?</td>
</tr>
<tr>
<td>ИНВ n. 269 Menghuilu308</td>
<td>Fragment of a calendar (February 1211) 宋或夏活字印本 8.5x54.8 cm</td>
<td>?</td>
</tr>
<tr>
<td>Ningxia, Helan County, Helanshan 贺兰山 Baisigou</td>
<td>吉祥遍至口合本経 (before 1227, probably dated to twelfth century); 9 fasci-cules (numerous <em>juan</em>, few hundred pages)</td>
<td>?</td>
</tr>
<tr>
<td>Ningxia, Lingwu 靈武 County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kept in China in different places, and in Japan</td>
<td>大方廣佛華嚴經 77 <em>juan</em> (undated: for Shi Jinbo before 1227, for other scholars, after that date)</td>
<td>?</td>
</tr>
<tr>
<td>Gansu, Wuwei 武威 County</td>
<td>维摩诘所說經 (下卷), 1224-1225?</td>
<td>?</td>
</tr>
<tr>
<td>Gansu, Dunhuang 敦煌 Grottoes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>北 59: [E26]:62, 63, 64, 65; 159, 494:51</td>
<td>地藏菩薩本願經 (undated), few pages</td>
<td>?</td>
</tr>
<tr>
<td>121: 18-27, 29, 31, 34(1), 34(2), 36(1), 36(2)</td>
<td>诸密咒要语 (late Xixia?)</td>
<td>?</td>
</tr>
<tr>
<td>464:119</td>
<td>Fragments, undated, Buddhist texts</td>
<td>?</td>
</tr>
<tr>
<td>159:25</td>
<td>Fragments, undated, Buddhist texts</td>
<td>?</td>
</tr>
</tbody>
</table>

Grotto Temple in Shanzuigou Valley 山嘴溝 [Helan Mountains]; documents discovered in 2005 in 4 grottoes (Ningxia wenwu kaogu yanjiusuo 2007). Most of the printed documents are from K2: 544 pages or fragments, from around 100 works, 99% in Xixia. The printed texts are essentially Buddhist texts in Xixia, but there are also a few glossaries in Xixia (K2: 157, 286; 201-1/2, 218, 329; 306, 287), and a small number of incantations in Tibetan (K2: 235-1/2/3/4/5/6, 6, 232, 422-1/2) and a printed text in Chinese (K2: 100-1/2).

Among the 21 entries concerning printed editions or printed fragments, there are some that were printed using movable type.
| K2: 129, 243, 237-1, 237-2, 237-3, 76, 196, 184, 74, 263, 95, 52, 36, 222-3 | 圓覺注之略疏第一上半 (Buddhist text, printed, 14 fragments) | Considered to have been printed using earthenware type due to resemblance to 維摩詰所說經 and 大方廣佛華厳經 in the table above |
| K2: 12, 408 | 占察善惡業報經 (Buddhist text, printed, 2 fragments) | Printed by wooden type: marks of the types evident on the imprint |
| K2: 244, 116, 245, 168, 173-4/1/2/3/5/5, 277, 142-5/4/2/3/6/7/8/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27, 169-1/2/3/4/5, 222-1/2, 221-1/2/3/4/6/5/8/7/9/10/11/12/13/14/15/16/17/18, 195, 331, 238, 237-4/5/6, 137 | 妙法蓮華經集要義鏡注 (Buddhist text, printed, 66 fragments, originally hudie binding, pages of 32x45 cm) | Considered to have been printed using earthenware type due to resemblance to 維摩詰所說經 and 大方廣佛華嚴經 [see above, Appendix 2-a]: allusion to “artisans & type” in K2-137. |
| K2: 67-1, 67-2, 117, 139 | 佛經 (Buddhist text, printed, 66 fragments, originally hudie binding) | Considered to have been printed using earthenware type |
| K2: 66, 148, 216, 190-2/1, 176, 65, 217, 37-1/2, 87, 324-1/2, 319-1/3/4/5/7/8/9/10, 219, 407, 406-1, 325, 415 | 佛經 (Buddhist text, printed, 26 fragments) | Considered to have been printed using type |
| K2: 96, 56, 328 | 佛經 (Buddhist text, printed, 3 fragments) | Considered to have been printed using type |
APPENDIX II
II-1 Map of the area around Lake Taihu, taken from Bell (1999), p. 35.

Map 1. The Yangzi Delta silk region
II-2 Map showing the locations in which metal type was used during the Ming dynasty (map by Cécile Lochet & Michela Bussotti – Efeo); the quantitative representation is based on the titles of publications printed using type listed by Zhang Xiumin and Han Qi (2006).
**APPENDIX III**

III-1 Movable type editions from the Ming and Qing dynasties in Zhongguo guji shanben shumu bianji weiyuanhui (1986-1996).

<table>
<thead>
<tr>
<th>Movable type editions</th>
<th>Classics</th>
<th>History</th>
<th>Masters</th>
<th>Literary collections</th>
<th>Collecteda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ming and Qing</td>
<td>19+6</td>
<td>23+51(+4 no date)</td>
<td>32+47</td>
<td>52+88</td>
<td>0 + 8</td>
</tr>
<tr>
<td><strong>Total number</strong></td>
<td><strong>25</strong></td>
<td><strong>78</strong></td>
<td><strong>79</strong></td>
<td><strong>140</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>(in metal)</td>
<td>(11)</td>
<td>(3)</td>
<td>(16)</td>
<td>(20)</td>
<td>(0)</td>
</tr>
<tr>
<td>Percentage compared with the total number of entries</td>
<td>0.47% (5239)</td>
<td>0.49% (15808)</td>
<td>0.64% (12294)</td>
<td>0.61% (22924)</td>
<td>1.53 (522)</td>
</tr>
</tbody>
</table>

*Figures from Zhang Xiumin and Han Qi (1998), pp. 109-132*
III-2 Graph based on Zhongguo guji shanben shumu bianji weiyuanhui (1986-1996): left, chronological production of works printed by type; right, distribution of traditional metal type editions in four categories of publication produced during the Ming and Qing dynasties.
APPENDIX IV

Comparison of cost for printing by traditional methods, taken from Heijdra (2004).
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