On the origin of patterning in movable Latin type : Renaissance standardisation, systematisation, and unitisation of textura and roman type

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Issue Date: 2016-10-11

CHAPTER 6

There is no known documentation about the production of movable type that dates from the fifteenth or sixteenth century. This could imply that this information was never written down, for instance because of trade secrets protection; that it got lost over time; or even that there was never any standardisation applied. Nevertheless, in the absence of recorded information, measurements and analysis of Italian Renaissance prints and French Renaissance matrices and type, as well as actual casting from these matrices are useful in distilling evidence of a standardised and systematised Renaissance font production process.

The previous chapter made a case for the standardisation of character widths both in textura and roman type. It provided evidence of the application of a unit-arrangement system in type production by applying a standardised grid to historical prints and font revivals. The aim of the next chapter is to provide further evidence of the use of such a system by distilling it from artefacts. However, an understanding of the Renaissance type production process is necessary in order to explain the standardisation and systemisation of type by the early punchcutters. For this reason, the present chapter describes technical details of the Renaissance type production, discussing first the general process and then focusing on the technical possibility for width standardisation of the matrices.

6.1 Historical artefacts

In the inventory of the Museum Plantin-Moretus in Antwerp one can view the records of the type cast for Christoffel Plantin, catalogued as *Volume 153* (Figure 6.1). These records date from Plantin's life. The figures in *Volume 153* look impressive.

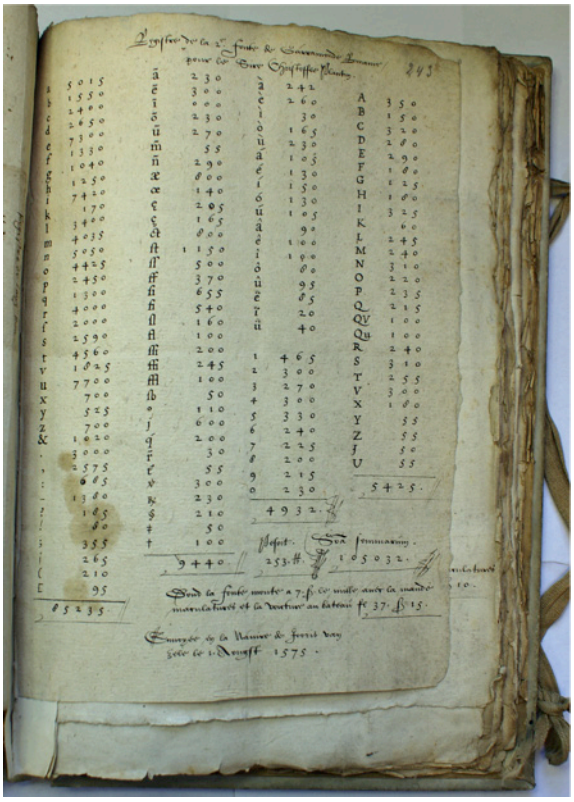

Figure 6.1 Records of type cast for Plantin, as collected in *Volume 153*.

The Museum Plantin-Moretus has an imposing assortment of matrices and punches from the French Renaissance. Vervliet notes that the most important part of the typographical collection consists of 4,500 punches, 20,000 matrices, and 60 moulds, which are largely the work of Garamont, Granjon, Le Bé, Haultin, Van der Keere, Guyot, and Tavenier.[164]

Figure 6.2 Matrices of Van den Keere's Canon Flamande from 1570.

[164] Vervliet, 'The Garamond Types of Christopher Plantin', p.15.

For my measurements I focused especially on the material produced by punchcutters renowned for the technical quality of their work, such as Garamont, Granjon, and Van den Keere. The idea behind this selection is that if these very skilled punchcutters did not apply standardisation, then it is also likely to be missing in the work of somewhat less sophisticated punchcutters, such as François Guyot, Joost Lambrecht, Ameet Tavenier, or Jean Thibault.

6.2 The typefounder's mould

'A typefounder's mould is a very simple instrument.'[165] With this line Mike Parker starts his inventory and description of moulds in the collection of the Museum Plantin-Moretus. A hand mould consists of two halves that are held together by the caster (Figure 6.3). The interieur of the mould is made of metal that is surrounded with wood. Moxon's moulds were made of iron but those of the early typefounders were made of brass.[166] The halves can be slid in one direction to control the width of the shank, which determines the width of the cast character.[167]

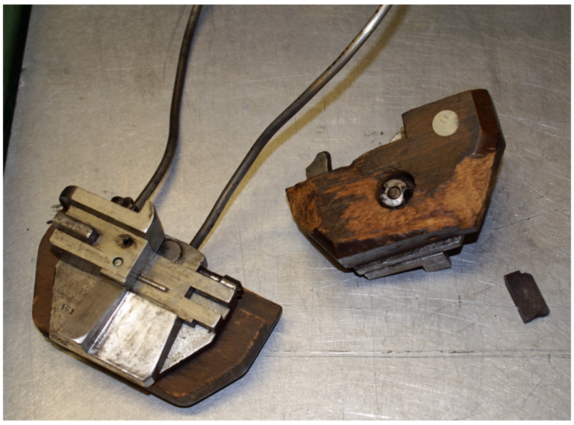

Figure 6.3 Two halves that, together, form a nineteenth-century mould.

In Figure 6.4 the aperture of the shank can be seen in the centre of the mould. The height of the aperture, which determines the body of the cast type, is usually fixed and for every body size a different mould is required. De Vinne describes the fixed vertical height (body) in combination with the horizontal flexibility of the mould: 'Although the two sides of the mould are fixed so as to be immovable in the

165 Parker, 'Early Typefounders' Moulds at the Plantin-Moretus Museum', pp.93–102 (p.93).

166 De Vinne, *The Practice of Typography*, p.20.

167 Vervliet, *Sixteenth-Century Printing Types of the Low Countries*, p.8.

direction which determines the body of the type, they have great freedom of motion and nicety of adjustment in the direction which determines its width.'[168]

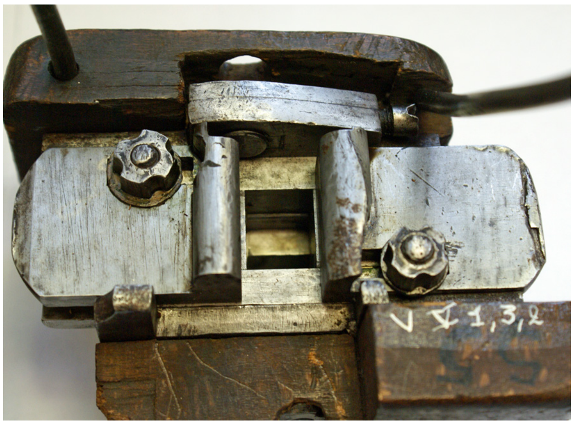

Figure 6.4 The aperture in the centre is the result of sliding the two halves.

In fact, there were (early) moulds in which the dimensions of the body could also be altered vertically. Carter notes that the Dutch mould specifically, unlike other moulds, could be justified to the body size.[169] According to Vervliet the French mould could also be adjusted to the body, but this required a complicated series of operations and it was normal practice to use different moulds for different body sizes.[170] Fournier mentions differences when it comes to material and details between moulds from France, Holland, Flanders, 'and elsewhere', and that the ones from France ('ours') were more complicated, but also more accurate.[171]

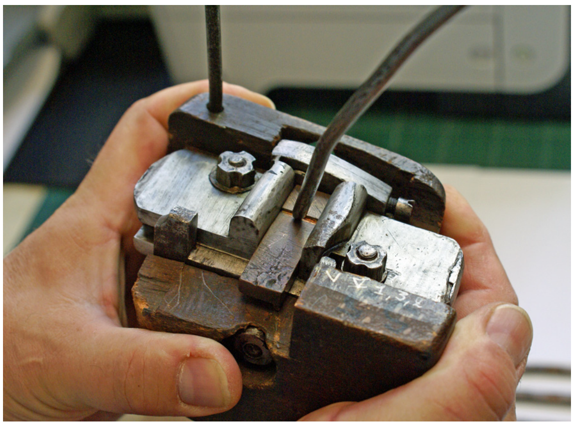

Figure 6.5 A large metal spring keeps the matrix in position.

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[168] De Vinne, *The Invention of Printing*, p.58.
[169] Carter, *Fournier on Typefounding*, p.197.
[170] Vervliet, *Sixteenth-Century Printing Types of the Low Countries*, p.8.
[171] Ibid., p.8.

For the casting of type a matrix is placed at the end of the shank, i.e., at the bottom side of the mould. The matrix is kept in position by a large spring (Figure 6.5).

Figure 6.6 Molten lead is poured into the shank.

The caster pours molten lead (more specifically an alloy) into the shank (Figure 6.6). The hollow image of the letter in the matrix at the end of the shank is filled with molten lead. To distribute the lead evenly in the hollow image and in the shank, the caster gives the mould a strong shake.[172]

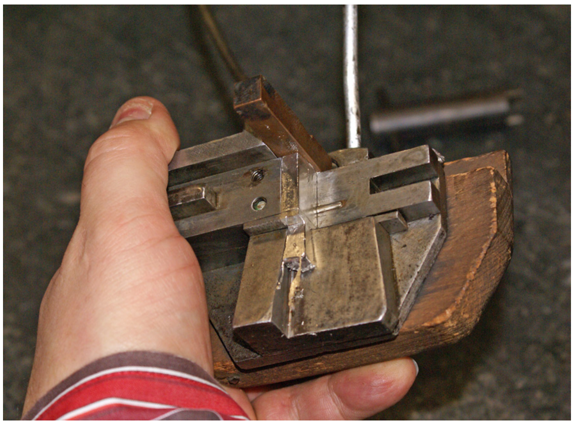

Figure 6.7 The two halves of the mould have to be separated to remove the cast letter.

The caster subsequently separates the two halves of the mould (Figure 6.7) and removes the letter from the matrix. The shank is actually longer than the height of the type; it accommodates space for the tang (Figure 6.8). Thanks to this wedge-shaped tail the caster can remove the letter –when it sticks– with a hook that is mounted on the mould. This prevents that the caster will burn his fingers on the hot metal parts at the bottom of the mould, or will damage the letter.

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[172] Moxon, *Mechanick Exercises*, p.169.

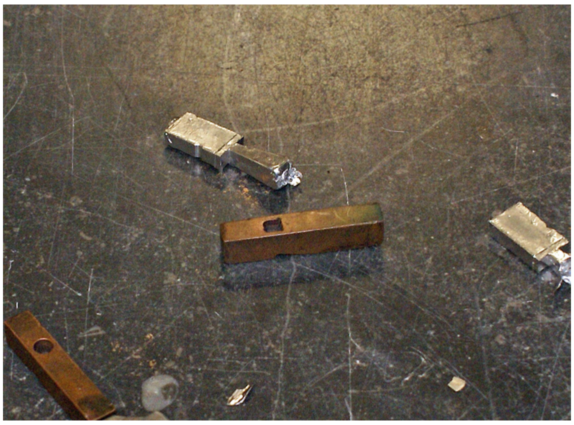

Figure 6.8 The tang is a wedge-shaped tail.

The tang is actually wedge-tailed because the opening of the shank is widened to make the pouring of the lead easier.

Figure 6.9 The rough edges are filed.

The tang is broken off and next the caster files the rough edges to make sure that all cast letters have the same height. Also other irregularities are removed by filing (Figure 6.9). Moxon describes this process as 'rubbing of letters', and in his time a stone was used for this.[173]

Moxon notes that a workman could cast 4000 letters ordinarily in one day. Davis and Carter annotate that Fournier mentions 2000–3000 in his *Manuel Typographique* and that later descriptions cite increased numbers due to technically improved hand moulds. [174]

[173] Moxon, *Mechanick Exercises*, p.173.
[174] Ibid. p.173.

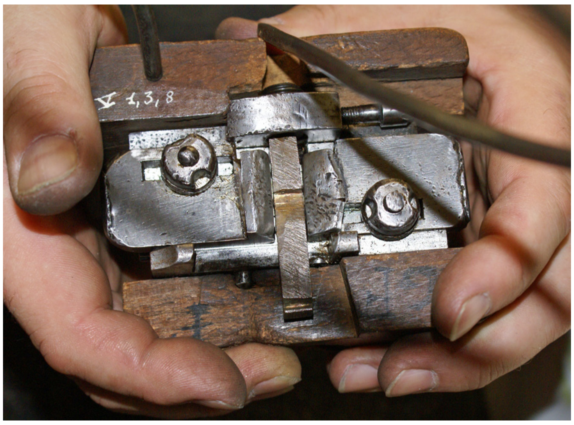

Figure 6.10 Mould's registers with matrix.

The width of the cast type is set with the mould's registers. Figure 6.10 shows the bottom part of the mould with a matrix in between two sliders of which the positions are fixed by bolts. These sliders are called registers and they are used to control the offset between the matrix's width and the side bearings of the cast type. This offset is a prerequisite: if the width of the matrix was identical to the character width, the molten lead would leak out of the mould. The setting of the registers determines the width of the shank. Fournier describes this as follows: 'The thickness is regulated by the two registers of the mould, which hold the matrix between them. Their position determines the width of the cavity between the bodies of the mould, into which flows the metal destined to form the shank with the letter on its end.'[175]

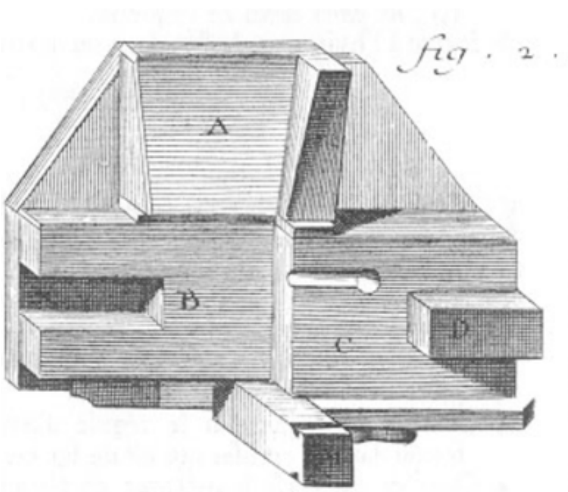

Figure 6.11 Plate from Diderot & d'Alembert's *Encyclopédie* showing part of a hand mould.[176]

[175] Carter, *Fournier on Typefounding*, p.158.

[176] <http://www.circuitousroot.com/artifice/letters/press/hand-casting/literature/index.html #diderot-dalambert-encyclopedie-1752>

Looking at historical images of the construction of moulds, such as for instance the ones shown in Diderot & d'Alembert's *Encyclopédie* from 1752, one is provided with a lot of details (Figure 6.11). To understand the relation between body size, character width, and the shank of the mould, more simple diagrams can be useful. Therefore I have created the following images, although I realise that they may be considered a simplification.

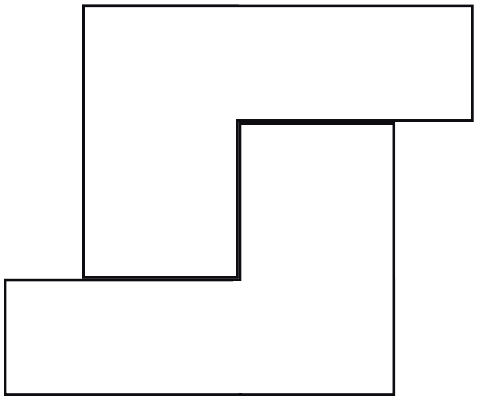

Figure 6.12 The two halves of the mould.

Figure 6.12 shows the two halves of the mould put tightly together and seen from above; for this reason there is no aperture. Figure 6.13 shows the bottom part of the mould. A matrix is positioned between two registers, the positions of which are fixed by nuts (could also be bolts or screws). The registers can be moved sideways and in this way determine the offset of the matrix, which is the relation between the width of the shank, i.e., the character width, and the width of the matrix.

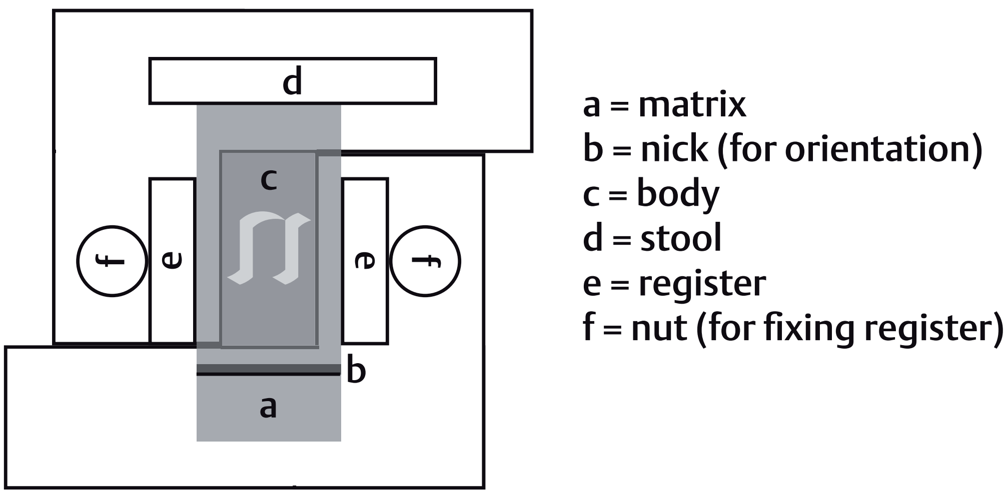

Figure 6.13 Bottom part of the mould with the matrix positioned between the registers.

It is important to note that the image of the letter is not visible at the bottom of the mould; it is on the other side of the matrix, where it connects to the shank. The nick is a groove that indicates the orientation of the matrix: after all the hollow image of the letter is invisible for the caster. Additionally the nick can be used to fix the spring that holds the matrix in its place. The stool determines the vertical position of the matrix. The position of the stool is usually fixed, but, as mentioned, some types of moulds have adjustable stools. Figure 6.14 shows a mould with bolts for extra control over the vertical positioning of matrix and hence of the vertical position of the characters on the body. The cast type that is kept in position by the thumb in Figure 6.14 is used here for checking the vertical positioning of the character on the body.

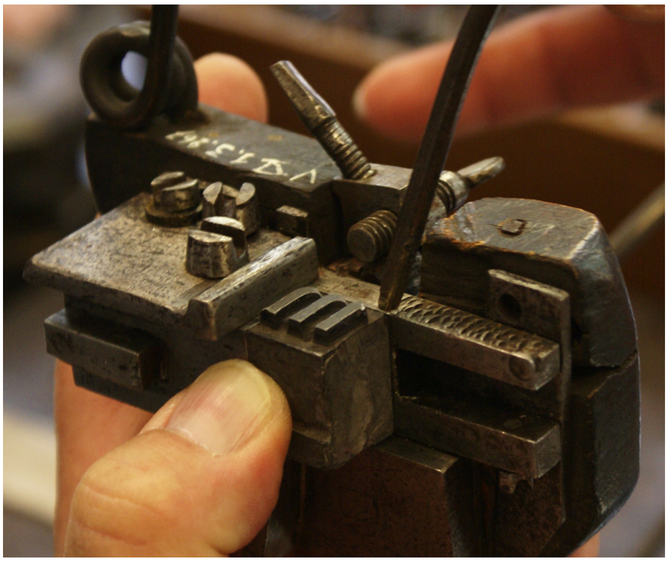

Figure 6.14 Half of a mould that contains an adjustable stool in the form of a bolt.

6.3 Width standardisation of matrices

In the early days of foundry type, the punchcutter was often also the caster but around the end of the fifteenth century casting became a separate profession.[177] The result of this change was that the punchcutters did not have any control over the fitting of the type if it was cast by a third party. The spacing of type during the casting process required that the caster had a trained eye, such as that of the punchcutter. However, one can hardly expect that every caster had such a trained eye. To preserve the quality of the fitting and to ease the casting process, the punchcutters often standardised the matrices in such a way that the process of

177 Vervliet, *Sixteenth-Century Printing Types of the Low Countries*, p.12.

casting did not require optical skills. This section discusses the technical aspects of this standardisation and illustrates it with the use of the geometric letter model.

The image of the letter in the matrix is represented in Figure 6.13 by the n from the geometric letter model. In the underlying pattern of the Humanistic minuscule (and morphologically related textura), represented by this model, many letters share the same character widths. In line with this one can imagine that when the punches –for the purpose of striking– were positioned according to the similarities of the letters, this resulted in a standardisation of matrices' widths analogously to the shared character widths.

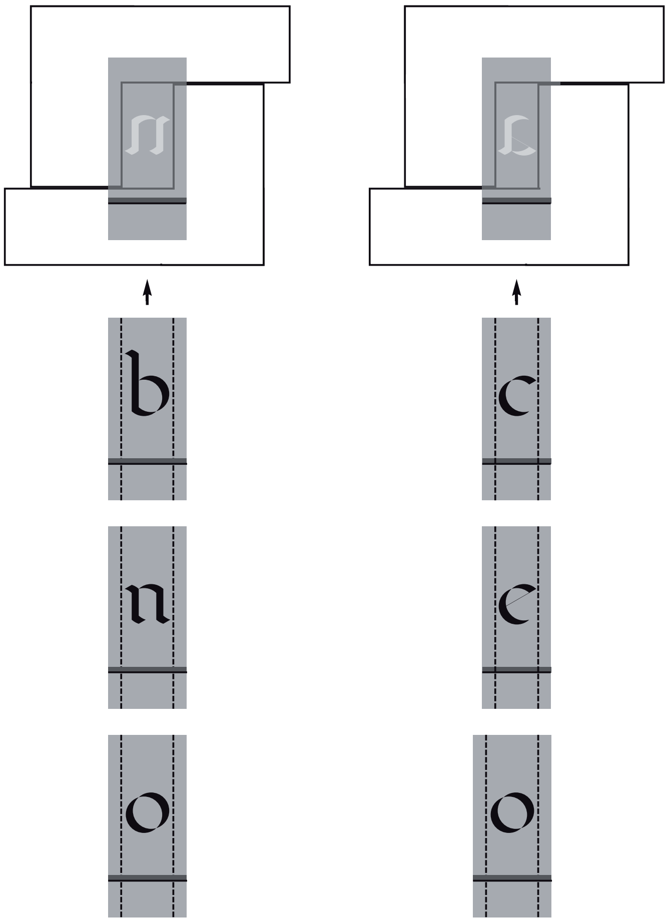

Figure 6.15 Matrices of corresponding letters on standardised widths.

However, it is important to note that although standardised widths of the matrices can simplify their production, it is as such not a prerequisite for casting with fixed registers. Matrices can have different widths while the offset remains identical across all of them. After all, character widths can deviate while remaining the same offset because of the sliding two halves of the mould. Figure 6.15 shows a mould containing the matrix of the n on the left and the same mould containing

the matrix of the a on the right. In case of the matrix of the a, the two halves of the mould come closer together horizontally than in case of the matrix of the n. However, the offset of the registers is identical in both cases.
Figure 6.15 also represents three matrices for n, o, and b that have identical widths. The dotted lines indicate the positioning of the side bearings. The left and right offsets created with the registers are identical, as are the widths of the characters. In the row on the right the matrices of the c and the e share the same width, but the matrix of the o is clearly wider. However, the dotted lines indicate that the offsets at both sides are identical for all three matrices. The two halves of the mould will be closer together for the c and the e, and hence the widths of these characters will be smaller than those for the n, b, and o. But the caster does not have to adjust the registers when he changes matrices. If a whole set of matrices was prepared, i.e., justified for the use of fixed registers, the caster would only have to set the registers once and could then cast all other letters without further alteration.[178] As I have determined empirically, for setting the registers for roman type, the caster could use the lowercase l. This letter is symmetrical within the x-height and the caster could simply add the same space to both serifs. There was no optical judgement required. My measurements seem to prove that the lengths of the serifs were related to the preferred spacing: for instance Garamont shortened the serifs for his display types, which made possible a tighter spacing than for his text types.

Figure 6.16 shows the matrices of Granjon's Ascendonica Romain or Double Pica Roman, from the collection of the Museum Plantin-Moretus (archived under 'MA7'). The matrices were clearly justified for casting with fixed registers. This was empirically tested at the Museum Plantin-Moretus in early 2014 when Guy Hutsebaut, who is the technical expert at the museum, and I cast a range of letters directly from these matrices.

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[178] Harry Carter, *A View of Early Typography: Up to About 1600* (Oxford: Clarendon Press, 1969), p.20.

Figure 6.16 Granjon's Ascendonica Romain matrices in rows with lines that indicate the registers' settings.[179]

Type founding was a complex and sophisticated production process that comprised, besides the design aspect, the cutting of punches, the striking and justification of matrices, and the casting of type. Everything that reduces variable factors in the type production will be embraced by the manufacturer. That is the case nowadays, and it was undoubtedly the case in the time of foundry type. The standardisation of the character widths made the standardisation of the matrices easier. The standardisation of the matrices made casting without any optical skills possible. Hence the punchcutter could preserve the quality of the cast type from a distance, because its spacing was an extrapolation of the inherent patterning.

This chapter introduced the Renaissance type production and discussed the technical aspects of the matrix width standardisation for simplified type casting. The next chapter will present evidence based on artefacts from the Museum Plantin-Moretus to support my hypothesis that, like textura type, roman type was the result of the standardisation of its written origin to the type production process.

[179] These were used by former EcTd-student Nicolas Portnoï (he took the photograph) as basis for his revival named 'Ascendonica'.