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

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CHAPTER 7

Having discussed the technical aspects of Renaissance type production in the previous chapter, the present chapter presents my investigation of Renaissance artefacts at the Museum Plantin-Moretus in Antwerp. After all, if the fitting of roman type was based on the system used for textura type, then this system should be present in Renaissance matrices and foundry type. To distil evidence for standardisation and unitisation from Renaissance artefacts, I examined and measured type and matrices from the sixteenth century. This in an attempt to further support my hypothesis that roman type was the result of the standardisation of handwriting to the type production process, in a process analogous to the textura type production.

7.1 Renaissance foundry type

I began my research at the Museum Plantin-Moretus by examining foundry type. Garamont's Gros Canon Romain (Figure 7.1), which appeared for the first time in 1555, was extremely widespread over Western Europe from about 1560 onwards.[180]

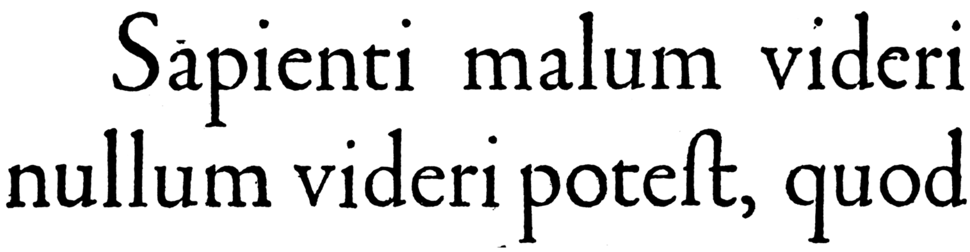

Figure 7.1 Garamont's Gros Canon Romain in print.[181]

The Moyen Canon Romain (Figure 7.2) is an adaptation of this type commissioned by Plantin, for which Van den Keere shortened the ascenders and descenders.[182] The characters within the x-height coming from Garamont were combined with the letters Van den Keere cut. The latter also cut the smaller accompanying capitals, which appear in Plantin's books from 1571 onwards.[183]

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[180] Hendrik Désiré Louis Vervliet and Harry Carter, *Type Specimen Facsimiles* 2 (London: The Bodley Head Ltd, 1972), p.3.

[181] Ibid., Plantin's Index Characterum, no.16.

[182] The Moyen Canon Romain is also known as Middelbaar Canon.

[183] Vervliet and Carter, *Type Specimen Facsimiles* 2, p.8.

The shortening of ascenders and descenders, which was often executed by individuals other than the original punchcutters, was a practice adopted by Plantin and his contemporaries for economical reasons.[184] This changed the relationship between x-height and descenders/ascenders of Jenson's archetypal model.

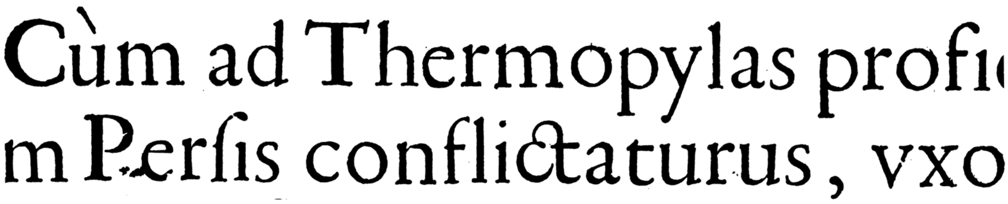

Figure 7.2 The Moyen Canon Romain.[185]

In 1959 type was recast from the original matrices of the Gros Canon Romain. This was done under the supervision of Vervliet, who writes that 'by casting sharp new types and carefully proofing them we can see these letters for the first time with the clarity that modern methods make possible.'[186] The newly cast type shows many different character widths (Figure 7.3). The clearly different fittings of the h and n indicate that the applied spacing method was not very accurate or consistent and that no fixed register settings were used. That does not come as a surprise because there is no literature on this subject.

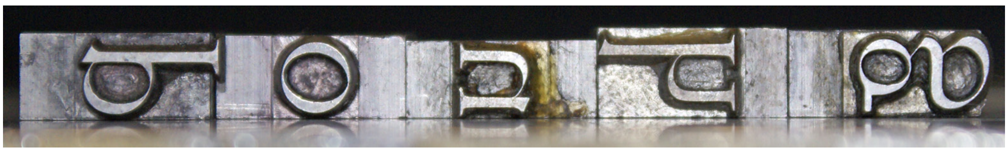

Figure 7.3 Garamont's Gros Canon Romain, as cast in 1959.

There is much older foundry type cast from the matrices of Gros Canon Romain and Moyen Canon Romain in the collection of the Museum Plantin-Moretus. It probably dates from the sixteenth or, at the latest, the seventeenth century. In contrast with the type that was cast in 1959, this type shows a clear standardisation of widths. The letters can be placed in a limited number of groups, like [a, c, e] [b, d, g, h, n, o, p, q, v, fi] [I, j, l] and [r, s, t] (Figure 7.4).

[184] Vervliet, *Sixteenth-Century Printing Types of the Low Countries*, p.66.
[185] Vervliet and Carter, *Type Specimen Facsimiles* 2, Plantin's Folio Specimen, no.5.
[186] Vervliet, 'The Garamond Types of Christopher Plantin', p.17.

Figure 7.4 Historic foundry type: Garamont's / Van den Keere's Moyen Canon Romain.

The results of the measurements (listed in Appendix 5) of the widths of the old foundry type, for which I used a digital calliper, show deviations within these groups of approximately 0.2–0.4 mm. The deviations cannot be felt with one's fingers, even when a nail is used to check differences in thickness in rows of letters, such as shown in Figure 7.4.

The quality of the applied alloy influences the degree of expanding or shrinking. The more precious the applied metal, the more expensive the alloy is. Plantin reportedly used cheap alloys to reduce costs. In *Calligraphy & Printing in the sixteenth century*, a dialogue attributed to Christoffel Plantin, the editor Ray Nash refers to Plantin's cheap alloys.[187] In *The Golden Compasses* Leon Voet explains that Plantin started to make his own metal, of which the quality was not always very good, after all his possessions were sold in April 1562, because it was quicker, or cheaper, or both.[188] Plantin provided punchcutters and casters, such as François Guyot, with his alloy.

The age of the historic foundry type shown in Figure 7.4 is not exactly clear. It could well date from Plantin's times, but the possibility cannot be excluded that the type dates from the seventeenth century. Radiocarbon dating would have been an option if there was enough carbon in the alloy, but there is not.

That being concluded, it made sense to put foundry type aside and to focus on matrices. After all, these should show the same standardisation if casting with fixed registers results in standardised character widths.

7.2 Evidence of standardisation in matrices

As evidence of the use of standardised widths in Renaissance type production, the matrices of the Ascendonica Romain in Figure 7.5 depict how in Granjon's roman type the widths were standardised according to a pattern generated with the geometric letter model.[189] The letters that find their origins in the capitals, the k, s, v–z, are placed on the widths of the letters that can be generated with the letter

[187] Plantin, *Calligraphy & Printing in the Sixteenth Century*, p.42.
[188] Voet, *The Golden Compasses*, Vol.2, p.106.
[189] The Ascendonica Romain is also known as Gros Parangon and Double Pica Roman.

model. The s shares its width with the f, r, long s, t, 3, and 5. The k and the v–z range all fit on the width of the n. At that time the w was not yet in use.

Figure 7.5 Ranges of characters that share widths in Granjon's Ascendonica Romain.[190]

Given the fact that Granjon's high level of skill was for instance equaled by Garamont, it is likely that if he made use of standardised processes in type production, so too did Garamont. Also housed at the Museum Plantin-Moretus, the matrices of the Gros Canon Romain are attributed to Garamont:

> In 1563 Plantin had 143 matrices for the 'Gros Canon Rom[m]ain de Garamont' acquired since 1561 […]. […] They are attributed to Garamond in the Frankfurt 1590, [the] 1572 and 1581 Inventories. The 1590 Frankfurt Inventory gives the number of matrices as 156, no doubt including the Moyen Canon shortened letters.[191]

[190] Photo's by Nicolas Portnoï, made with a digital microscope.

[191] Voet, *Inventory of the Plantin-Moretus Museum*, p.14.

Figure 7.6 Matrices of Garamont's Gros Canon Romain.

Considering the spotless refinement of these matrices (Figure 7.6), it seems likely that the French master produced them. As discussed in the previous section, I already measured the Gros Canon Romain type cast from these matrices. In order to further investigate the use of standardised widths in Renaissance type production, I subsequently measured the matrices.

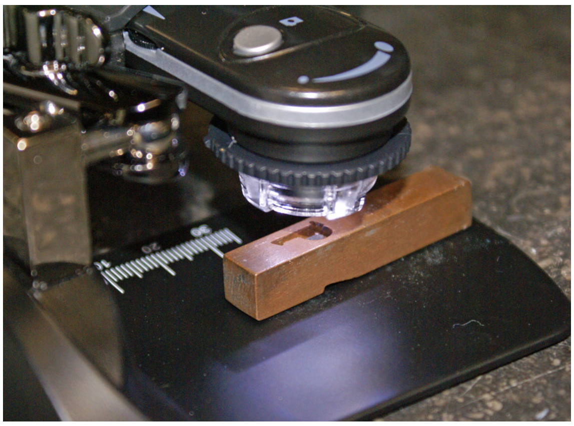

Figure 7.7 Digital microscope camera and a matrix of the Gros Canon Romain.

With a digital microscope camera (Figure 7.7), which is meant for checking computer-circuit boards, I investigated the matrices. I also used it to take the detailed photographs shown below. The high quality of the Gros Canon Romain matrices is evident: the strikes of the punches are placed exactly and perfectly perpendicularly in their visual centres, as can be seen in Figure 7.8.

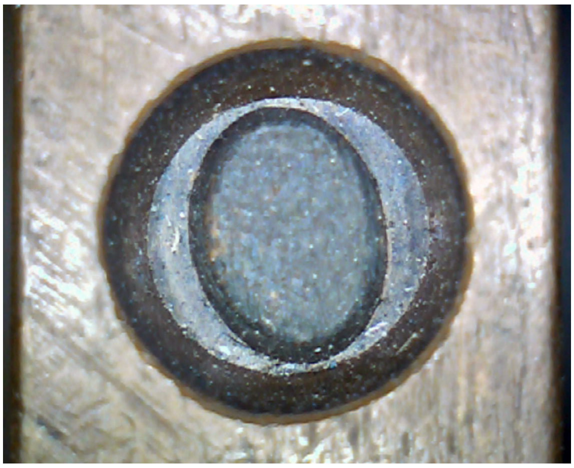

Figure 7.8 Digital-microscope photo of the Gros Canon Romain matrix for the lowercase o.

The measurements of these matrices revealed the same standardisation of widths as the ones I found in the sixteenth- or seventeenth-century cast type: rows can be made of letters sharing the same widths (Figure 7.9).

Figure 7.9 Matrices of the Gros Canon Romain showing groups of equal widths.

Before striking the punches had to be positioned as exactly as possible on the matrices. In his *Manuel Typographique* Fournier explains that, after polishing the matrix, the place where the punch should be struck is marked. The exact place of the strike is empirically and gradually found.[192] In *Mechanick Exercises*, Moxon describes the vertical positioning of the punch on the matrix in relation to the mould: '[…] Then if the punch to be sunck be an ascending Letter, He with a fine point Needle, makes a small Race by the upper side of the Carriage upon the Face

[192] Carter, *Fournier on Typefounding*, pp.82,83.

of the Matrice […].'[193] The related annotations by Davis and Carter note that Moxon used a particular mould as a gauge for alignment.

The depth of the strike is the result of beating the punch with a hammer: '[…] as perpendicularly as possible until it has gone in as much as a twelfth of an inch or thereabouts—more for big letters and rather less for small ones.'[194] Carter comments that striking by hand is very difficult 'because the punch must be held (1) perpendicular; (2) quite still so that it may not shift between the blows.'[195]

Figure 7.10 Word typeset in Gros Canon Romain matrices.

A way to check standardised widths of matrices is to use them to typeset a word (Figure 7.10). The distances between the letters should automatically result in an even distribution of white space between the letters, although the spacing will be too wide in relation with the space in the letters. Because the matrices include the offset for the registers, in order to obtain a spacing that is based on a repetition of the stem interval of the n, a reduction of the matrices' widths with a constant factor is required. This is what the mould's registers are used for.

As can be seen in Figure 7.8, the matrices of the Gros Canon Romain are very refined. Van den Keere's additional matrices for the Moyen Canon Romain (Figure 7.11) are slightly rougher: the surface is less polished and the angle of strike-taluses less steep. However, the widths of the matrices and the positions of the strikes follow those of Garamont's type. Therefore, the same fixed setting for the registers can be used for Van den Keere's Moyen Canon Romain as for the related matrices from the French master, as I proved empirically.

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193 Moxon, *Mechanick Exercises*, p.153.
194 Carter, *Fournier on Typefounding*, pp.83,84.
195 Ibid., p.84.

Figure 7.11 Digital microscope photo of the Moyen Canon Romain matrix for the lowercase g.

In the collection of the Museum Plantin-Moretus, other matrices attributed to, for instance, Granjon and Van den Keere show the same limited ranges of widths. Van den Keere's textura types as shown in Figure 7.12 can be placed in rows as those of Garamont's Gros Canon Romain.

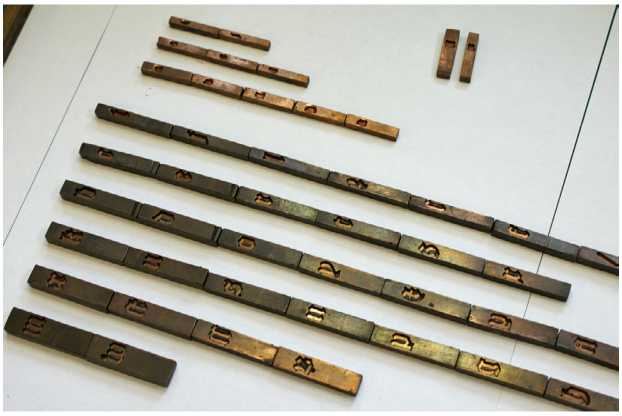

Figure 7.12 Van den Keere's matrices for Canon Flamande and Parangonne Flamande in rows.

7.3 Unitisation of matrices

As described in Section 5.2, Jenson's roman seems to fit on a simple unit-arrangement system. Jenson's archetypal model was used by Griffo as the basis for his roman, and Garamont used Griffo's type as the basis for his own type. Hence, one would expect that Garamont's type, and consequently his matrices, would also reveal the same unitisation as Jenson's. This section presents evidence to support this idea.

Due to the organic morphologic relationship between textura and Humanistic minuscule, it was logical to use the textura production method for Jenson's roman type. Curves in Jenson's type were overshoots of the stems, as can be explained with the geometric letter model. Hence the bowls of the b, c, d, e, o, p, and q preserve the stem interval throughout a text. This stem interval can be divided into a certain number of units. If one wants to define a unit-arrangement system for standardising the width of matrices as well, then it makes sense to use the stem interval as a starting point.

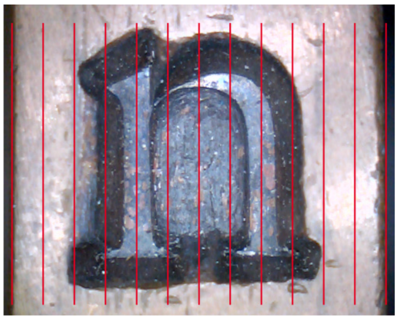

Figure 7.13 Lowercase n of the Gros Canon Romain on a character width of eight units.

In Figure 7.13 I divided the stem interval of the n from the Gros Canon Romain into four units. This resulted in eight units for the character width, in line with what I used for the research into the unitisation of Jenson's roman as described in Section 5.2. The complete width of the matrix is 12 units. Furthermore the letters that share the width of the n (and hence the width of its matrix), like o and p, can be placed on the same number of units. I could then use these units to change the spacing of the matrices (Figure 7.14).

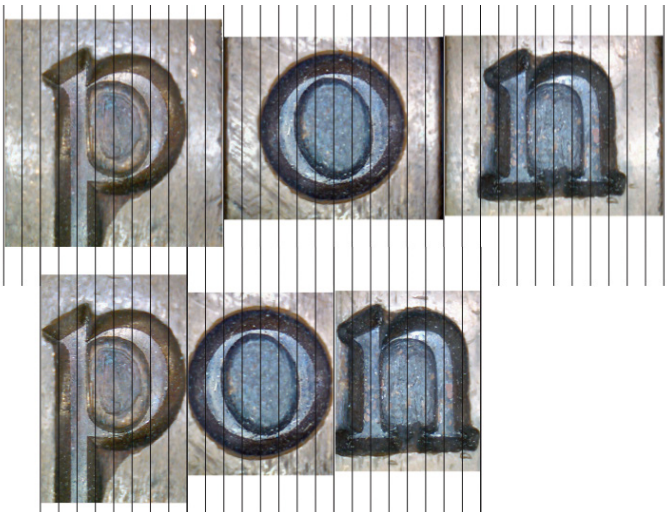

Figure 7.14 Tightening the spacing of matrices of Garamont's Gros Canon Romain using unitisation.

If units were used to define character widths, the proportions of the characters should then be related to the units. If the punchcutter wanted to further refine the type, an option could be to subdivide the existing units into smaller units. This could be done by bisecting the units a certain number of times. In Figure 7.15 the number of units has been doubled in comparison to Figure 7.14.

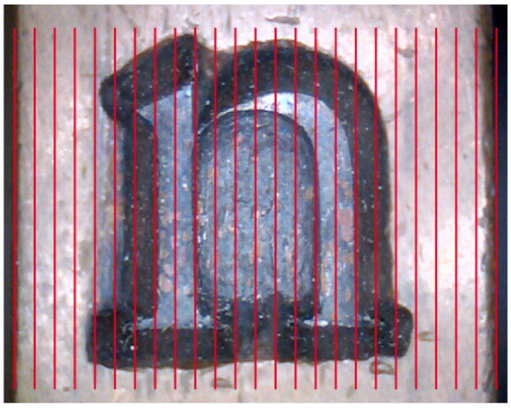

Figure 7.15 The n-matrix of the Gros Canon Romain with refined units.

In my measurements the division of the stem interval into four units, which resulted in eight units for the width of the n of the Gros Canon Romain, was not refined enough for all matrices. The more refined units seem to fit exactly on a selected range of other matrices, which also represent groups of letters with identical widths, such as [e, a, c], [s, r, t] and [I, j, l] (Figure 7.16).

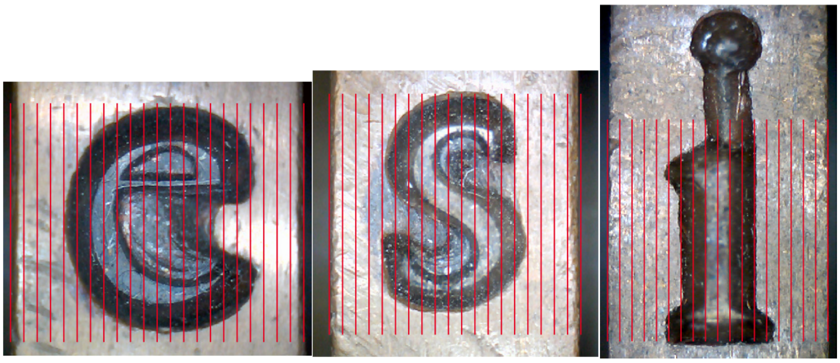

Figure 7.16 Gros Canon Romain matrices with a refined unitisation.

It should be noted that, although the units fit perfectly on the pictures of the matrices shown here, there seems to be some deviation in the size of the letters. This is the result of differences in the exact point on the matrix on which the digital microscope camera was focused. The thickness of the matrices, which is not of importance for the casting of type, sometimes differed slightly. It should also be noted that the size of the letters is quite small; the height of a cast o of the

Gros Canon Romain is 5.25 mm. Subsequently the smallest deviations in focus had a relatively large impact.

This section provided evidence of the use of standardised widths in Renaissance type production by showing standardisation of widths of matrices from Granjon and Garamont. It furthermore demonstrated the way in which the matrices for Garamont's Gros Canon Romain reveal a simple unitisation system for the width of the characters. This provides further support for my hypothesis that, like textura type, roman type production was based on the standardisation of its handwritten origins. The production of matrices in the sixteenth century as well as their related standardisation and systematisation are further discussed in Appendix 5, *Details of the Renaissance type production*.

7.4 Unitisation and optical spacing

As the next step in my investigation of unitisation in Garamont's type, I compared two different sizes of his type: the larger Gros Canon Romain and the relatively small Parangon Romain. In present-day type design fonts are optically spaced, and the generally embraced idea is that this always has been the case. Slimbach optically spaced Adobe Garamond based on Garamont's Parangon Romain, and obviously he never investigated the standardisation and possible unitisation of Garamont's type. However, if one uses a simple scheme for spacing defined in units (as discussed in the previous section) for the Parangon Romain, then the outcome very closely approaches Slimbach's optical spacing, which because of the current technology could be ultimately refined. Of course, Slimbach was conditioned with Garamont's model (which used the same standardisation patterns at Griffo's and thus Jenson's), and hence it is not surprising that he optically reproduced what could be done easily using a simple cadence-units based scheme, as presented in Chapter 5.

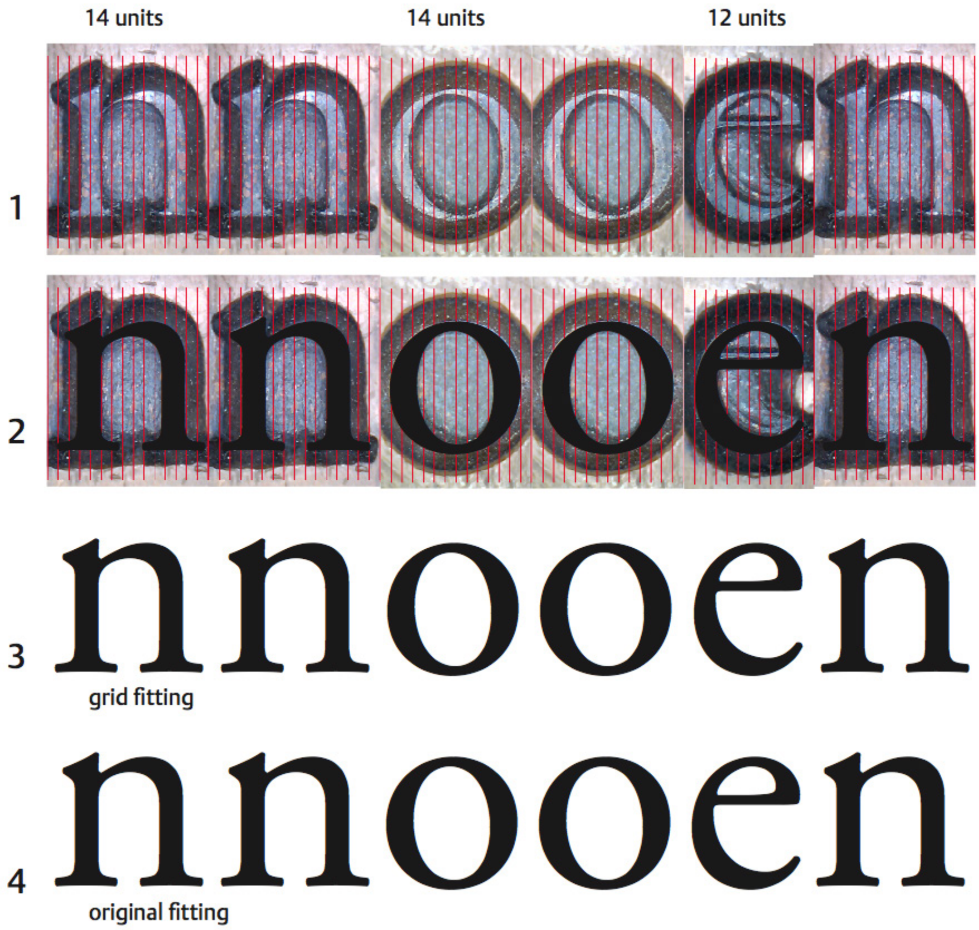

Figure 7.17 Gros Canon Romain matrices (1), Gros Canon Romain matrices with superimposed Adobe Garamond (2), Adobe Garamond with grid fitting (3), Adobe Garamond with original fitting (4).

Figure 7.17 depicts Garamont's Gros Canon Romain with the n placed on 14 units, together with Adobe Garamond. The Gros Canon Romain is a relatively large type, and requires a tighter spacing. This was clearly taken into account by Garamont, who made the serifs shorter than in his Parangon Romain (which formed the basis for Adobe Garamond), but overall maintained the same proportions as those of the Gros Canon Romain. Figure 7.17 shows that only the eye of the e was made larger for the smaller point sizes. The overall identical proportions are in direct contradiction with the generally accepted theory that every individual type size was created separately and optically by the punchcutters.

Garamont's letters for the two different sizes are much more similar than one would expect from type produced long before Benton invented his pantographic engraving machine. This device for scaling and modifying type is considered to have changed the type design métier: '[…] pantographic enlargement or reduction is with hand cutting impossible, and each size of type has to be cut as though it were a new design,' writes Eric Gill in *An Essay on Typography*.[196] The similarities in his different type sizes strongly suggest that Garamont's production methods were highly systematised, and this also makes the application of sophisticated methods like unitisation very plausible.

Adobe Garamond is slightly more tightly spaced in comparison with the Parangon Romain; this is because digital type does not have physical limitations for point sizes and can be unlimitedly scaled. Therefore, digital type requires a fitting that also functions well at larger point sizes. The original –optical– fitting of Adobe Garamond seems to come quite close to the unitised fitting of the Gros Canon Romain matrices, as shown in the second row of Figure 7.17.

In this chapter I presented the distilled evidence of a unit-arrangement system from various Renaissance artefacts housed at the Museum Plantin-Moretus, thus suggesting that the early punchcutters standardised widths in the production of roman type. This evidence served to further strengthen my hypothesis that the Renaissance punchcutters made use of standardised handwriting in the production of roman type; this was done in a process analogous to the more obvious standardisation of textura handwriting for textura type. Having thoroughly examined the evidence for the standardisation of horizontal proportions in roman type, the next chapter will present a dynamical framework for determining the relationship between the horizontal and vertical proportions of roman type analogously to textura type.

[196] Gill, *An Essay on Typography*, p.76.