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

Blokland, F.E.

Author: Blokland, F.E.
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CHAPTER 9

The overall hypothesis that this dissertation aims to support is that the creation of roman type was largely influenced by technical rather than æsthetic considerations. The first eight chapters delved into the technical aspects of roman type. This final chapter will supply evidence to support my second hypothesis: that æsthetic preferences in roman type were and continue to be conditioned by the initial standardisation of the Renaissance type production. To this end, the chapter will first discuss changes in the production of movable type that appear after the Renaissance. It then investigates the origins of these changes and their effects on the casting process.

This chapter also tries to find an answer to the question why later roman type designs show a greater diversity in proportions and details than can be found in the archetypal models. Did the declining need for standardisation in type production made it possible that later punchcutters could place a greater emphasis on the eye, this way providing more freedom and turning the punchcutter more and more into the role of the present-day type designer? And if so, is it possible that due to conditioning optical judgment took for granted the underlying patterns, almost without consciousness, because it was simply the framework in which things were done? The latter would imply that the initial standardisation forms the basis for the æsthetic conventions in type production and hence for the conditioning of the type designer, typographer, and reader. Without the technical requirement of the initial patterning, roman type can be reproduced as a collection of images –as long as these images apply to the conventions.

Finally, this chapter will discuss the use of archetypal patterning in the digital type production and it will demonstrate how this allows greater control over the harmonic and rhythmic aspects in type design today, irrespective of whether the proportions of the characters were optically or measurably determined. After all, it is inevitable that the eye reproduces the initial patterning if Renaissance movable Latin type has set the rules for conditioning.

9.1 Increased freedom in type design

Especially after the Renaissance the proportions and details of roman type started to deviate more from those of Jenson's archetypal model. Figure 9.1 shows Adobe Jenson at the top followed by DTL VandenKeere, a digital revival based on Van den Keere's Parangon Romain I made more than twenty years ago. Both Italian- and

French-Renaissance typefaces show essentially the same proportions. The third typeface from the top is DTL Elzevir, a revival based on typefaces from the Baroque, mainly attributed to the Dutch punchcutter Christoffel van Dijck (1606/07–1669). In comparison to its Renaissance counterparts, this type is narrower and has a larger x-height. Even more condensed is DTL Fleischmann at the bottom, a revival based on the work of the famous eighteenth-century German punchcutter Johann Michael Fleischmann (1707–1768), who worked most of his life in the Netherlands. The ascenders and descenders are shorter in Fleischmann's roman type than in any of its precursors.

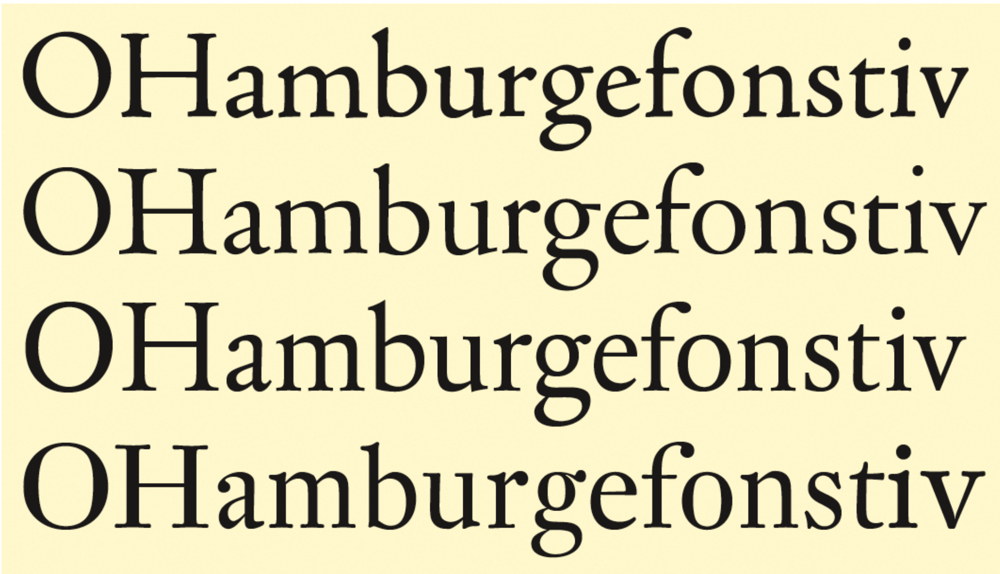

Figure 9.1 Development of proportions is the fifteenth (top) to the eighteenth century.

Fleischmann's types represent the 'Dutch style', better known as 'Goût Hollandais', which were designed in accordance with economic principles.[224] Obviously in the course of time punchcutters encountered an increased freedom when it comes to the proportions and details of roman type. Clearly the overall patterning remained but technical changes made tolerances to Jenson's standardised patterns possible.

The following section will focus on the alterations in the roman type production in the eighteenth century.

[224] Morison, *Letter Forms*, p.33.

9.2 Set patterns

Section 3 of Chapter 6 discussed the casting from matrices that are justified for fixed mould's registers. This section discusses casting from matrices that are not as such justified, which means that the matrices are adjusted and refined after the punches are struck but that their widths have not been standardised. It then introduces an alternative method for setting the characters' widths in case matrices are not justified for fixed registers.

Figure 9.2 Ascendonica Romain matrices of the MA7 set showing standardised widths.[225]

Figure 9.2 shows the matrices of Granjon's Ascendonica Romain that are justified for fixed registers.[226] This set, cataloged as 'MA7' probably has been justified in 1601.[227] Nicolas Portnoï, a student of mine from the Expert class Type design course in Antwerp, discovered while measuring that the MA7 set was justified for fixed registers, but that an older set of justified matrices of Granjon's Ascendonica Romain was not prepared for casting with fixed registers.

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[225] Photo by Nicolas Portnoï, as are the ones used for Figure 9.3, 9.4, and 9.5.

[226] The type is indexed at the Museum Plantin-Moretus as 'Ascendonica Romaine'. In 1572 it was mentioned as 'La Romaine de Granjon' (see also: Voet, *Inventory of the Plantin-Moretus Museum*, p.21). The matrix case shown in Figure 9.2 is labelled 'Ascendonica Romeyn'; based on the details of the applied type I conclude that the label dates from the second half of the eighteenth century.

[227] Voet, *Inventory of the Plantin-Moretus Museum*, p.22.

Figure 9.3 The MA8 set containing the Ascendonica Romain matrices justified by Van den Keere.

This set, indexed as 'MA8' (Figure 9.3), was justified by Van den Keere in 1569–1570 for Plantin.[228] It does not show standardised widths for, for example, the lowercase n, o, p, and q (Figure 9.4). Hence by definition all offsets differ, otherwise the MA7 set, which shows standardised widths, cannot be used for casting with fixed registers.

Figure 9.4 Ascendonica Romain matrices of the MA8 set showing different widths.

Interestingly, Van den Keere made an additonal and more condensed lowercase m for the MA8 set. Figure 9.5 shows the original m from Granjon on the left and the more condensed one by Van den Keere on the right. The condensed m may have been made especially with spacing in mind. In that case it was the first

[228] Ibid., p.21.

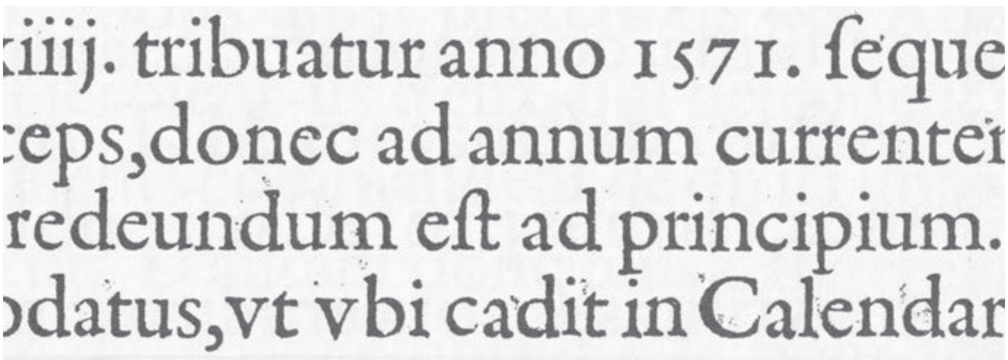
letter to be cast and used as reference for the positioning of the other letters between the side bearings, which are controlled with the mould's registers.

Figure 9.5 The lowercase m from Granjon (left) and the condensed one by Van den Keere.

The usage of the lowercase m as basis for a tighter spacing ('set') is described by Fournier:

> Certain printers occasionally ask for type thinner in set than the normal, to get in more letters to a line. This is perhaps prompted less by taste than by economy. In these circumstances it is necessary to make the m as thin as the extremities of the strokes will permit, so that no shoulder remains, and to regulate the set of the other letters in relation to it.[229]

Fournier describes here the use of the 'standard' m with the positioning of the side bearings as close as possible to the serifs ('extremities'). He points out that in case of condensed roman type 'after the manner of the Dutch ones' the letters should have an interval between them equal to those between the strokes of the m but he does not mention the creation of a separate, more condensed, m as reference.



iiij. tribuatur anno 1571. ſeque
eps,donec ad annum currente
redeundum eſt ad principium.
datus,vt vbi cadit in Calendar

Figure 9.6 Detail from *Psalterium* (1571) showing a relatively tight spacing.

[229] Carter, *Fournier on Typefounding*, p.162.

The *Psalterium* that Plantin published in 1571 (Figure 9.6) shows a spacing between two n's which is narrower than the distance between the two stems of the n. The spacing is tight and consequently some serifs almost collide. The interval between the strokes seem to follow the pattern in Van den Keere's additional m. This condensed m is not used in the text, which makes it plausible that it was only cut to be used by the caster for determining the spacing of the type.

Although Van den Keere's lowercase m must have eased the spacing process, the matrices of the MA8 set must undoubtedly have required a highly trained eye of the caster because the registers had to be adjusted per character. It is likely that the production of justified but not standardised matrices was less expensive but it made casting more complex. However, the optical part of the production process does not have to be repeated when recasting from matrices that are not justified for fixed registers. All letters can first be cast by optically positioning the registers, and the cast type can subsequently be used for the fitting of the registers. For this the precast type has to be put into the matrix, and the registers have to be moved until the position of the type is fixed horizontally. Next the precast type can be removed from the matrix and new type can be cast. The downside of this process is that it has to be repeated for each letter: it is without doubt more time consuming than casting with fixed registers. However, for setting the registers with precast type no training of the eye is required, just like in case of casting with matrices justified for fixed registers.

Figure 9.7 Eighteenth-century set patterns from the inventory of the Museum Plantin-Moretus.

A collection of such precast letters that can be used for positioning the matrices is called a 'set pattern'. During my research at the Museum Plantin-Moretus, Hutsebaut showed me cardboard boxes with collections of set patterns wrapped in mainly eighteenth-century printed sheets (Figures 9.7 and 9.8). Originally these set patterns were delivered together with the related matrices.

Figure 9.8 Eighteenth-century set patterns.

The collections of set patterns are identified by Dutch and French names as 'pas letters' and 'Lettre de la justificasion' respectively, with additional information about the type in question. Although some of the packages are numbered, they do not seem to be catalogued.[230]

The matrices of Garamonde Romaine, which the punchcutter Jacques-François Rosart (1714–1777) produced around 1750, do not show any standardisation of widths (Figure 9.9). As a result, casting from these matrices cannot be done with fixed registers and hence set patterns were required to make casting easier. The strikes of Rosart's Garamonde Romaine are clearly surrounded by a significant amount of extra copper. A factor that may have made standardisation of matrices less important, is the increase of copper mining in the eighteenth century that resulted in a lower price for this precious metal.[231]

Figure 9.9 Matrices of Rosart's Garamonde Romaine from ca.1750.

[230] I hope to find time to do this in the future.

[231] <http://www.geevor.com/index.php?object=138>

When there is a standardised pattern as can be found in the roman types by Jenson, Griffo, and Garamont, the proportions of the letters are consequently fixed. Jenson invented the archetypal model for roman type; a standardisation of letter proportions helped him to keep the production process controllable. In Rosart's time proportions could be copied from other type and strict standardisation was not longer a prerequisite if set patterns were supplied. It is technically plausible that it was easier for the later punchcutters to vary more on the roman-type theme, because they were not restricted to standardised widths anymore.

It is possible that later punchcutters placed a greater emphasis on the eye because knowledge of earlier standardisation was simply lost; after all, there is no documentation of the Renaissance type production. Optical judgment took for granted the underlying patterns in type, almost without awareness. The consequently changing production methods provided the punchcutters with more freedom to diversify from the archetypal pattern.

9.3 Technical and æsthetical considerations

As I have illustrated in this dissertation, the production of the first roman type required extensive technical considerations. In the course of time production methods changed and later punchcutters could place a greater emphasis on the eye. Still, although proportions and details of later roman type show a greater diversity, overall the later punchcutters made variants within an established structure. The initial technical considerations determined the æsthetic conventions, because the proportions and details of the archetypal models were reproduced, for either technical and/or optical reasons. The roman type of Jenson formed the basis for the conditioning of later punchcutters, type designers, and readers up to our time.

The conventions that are firmly entrenched in Jenson's technical constraints continue to influence our view on type today, although the versatility of digital technology makes it possible to put the emphasis largely on the eye. By extrapolating the current situation and without in-depth insight in the constraints of the Renaissance type production, we tend to think of early punchcutters like Jenson, Griffo, Garamont, and Granjon merely as type designers. Details found in their types are considered the result of particular optical preferences.

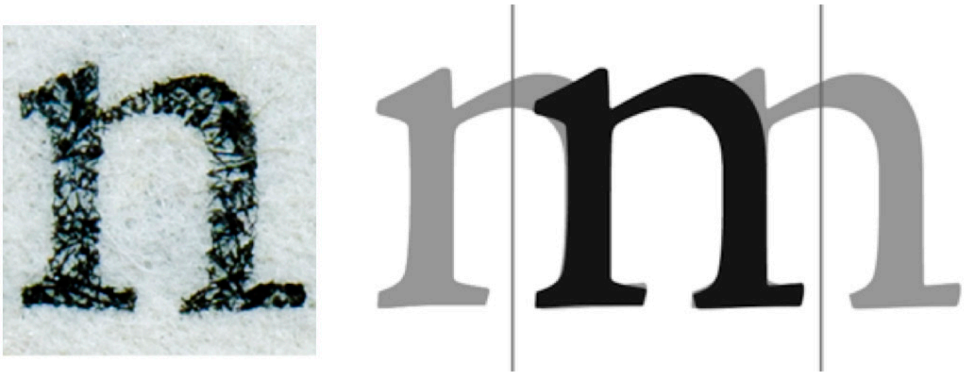


Figure 9.10 Jenson's lowercase n (left) and Adobe Jenson's n centred between side bearings.

This emphasis of the role of the eye also influences the way we interpret historical type. After all, one cannot see more than one knows. Figure 9.10 shows that Jenson's archetypal lowercase n has longer serifs on the right sides of the stems than the digital revival of Jenson's type that Slimbach made for Adobe. The digital version actually shows the present-day approach because Slimbach made the serifs at both sides of the stems of the lowercase n more equal. The fitting of Adobe Jenson indicates that this was done in the 'modern' way, which means optically and not measurably. If the lowercase of Adobe Jenson is centred in its width, as shown in Figure 9.10, then the serifs at the right are too short.

By defining a model for roman type, Jenson set the rules for future conditioning of the eye, i.e., optical preferences, of the later punchcutters, type designers, typographers and readers. Our present-day perception of roman type is the result of cultural habituation. Hence, what is considered to be harmonic, rhythmic, and æsthetical in type is largely the result of conditioning.

9.4 Conventions

Type representing the scripts from all over the world differ. Cultural habituation is preserved by the conditioning of type designers, typographers, and readers; the basis for this conditioning is formed by generally accepted standards: conventions. Conventions differ per script; if harmony and rhythm were absolute matters, there would not be so many disparities among the letter forms from the different parts of the world.

The term convention in relation to typography is often used as synonym of tradition: 'Tradition, [...], is another word for unanimity about fundamentals which has been brought into being by the trials, errors and corrections of many centuries. Experientia docet.'[232] The rules for typography are fixed, as Morison made clear: '[…] the infinity and complexity of the reading public today […] makes our alphabet as rigid and irreformable as the very gold standard.'[233]

Some experts suggest that the reason that letterforms have undergone very little change since Jenson and Griffo is probably because these had already largely crystallised and were adapted to 'the ergonomic needs of the readers'.[234] Considering the facts that Jenson's roman distinctively deviates from the Humanistic minuscule and that the type was developed in a relatively short period of time, it seems just as plausible that this archetypal model largely defined the ergonomic needs of the reader.

The nature of conventions and their relation to conditioning is further discussed in Appendix 1, *Typographic conventions and conditioning*.

9.5 Pictures of things

The roman type by, for example, Fleischmann and Rosart shows that it is possible to produce type without directly applying archetypal patterns. If one is not familiar with the origins of the framework in which things are done, letters will merely become images. This means that one can create shapes that are recognisable as letters without having much knowledge of their underlying patterns: as long as the reader recognises the collection of images as words there is no problem. However, the collection of shapes that form a typeface will never be optimally coherent without a clear –deliberately applied– patterning.

Knowledge of the initial systematisation and standardisation of movable type will enhance insight into the basics of the type design process and will help to improve the rhythmic and harmonic aspects of a typeface. Of course, it is possible to circumvent this problem by largely copying existing typefaces that have proven to be functional. This has likely been done by punchcutters for centuries (see also Section 3 of Appendix 5:*Tricks and trade secrets*), thereby preserving Jenson's conventions for roman type.

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232 Moran, *Stanley Morison*, p.32.
233 Morison, *Type Designs of the Past and Present*, p.62.
234 Gerard Unger, *While You're Reading* (New York: Mark Batty Publisher, 2007), p.93.

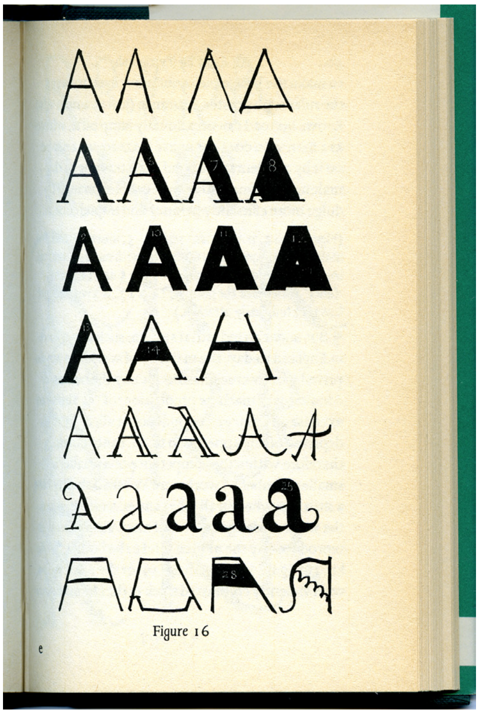

Figure 9.11 Page from Eric Gill's *An Essay on Typography*.

'Letters are things, not pictures of things'[235] is a famous and often quoted statement by the English sculptor, typeface designer, stonecutter, and printmaker Eric Gill (1882–1940). Nevertheless, in *An Essay on Typography* Gill provides most of the information on the shapes of letters by showing pictures with captions like '[…] normal forms; the remainder shows various exaggerations; […] common form of vulgarity; […] common misconceptions […].'[236] Any elementary information on the construction and underlying patterning of the shown letterforms is missing (Figure 9.11).

It is possible that this treatment of letters as pictures of things started as early as the Renaissance, when sixteenth-century French punchcutters copied the types from their Italian precursors. The French Renaissance roman types formed the basis for the Dutch Baroque ones, and in turn the Dutch types formed the basis for later English type. By tracing the letterforms, consecutive punchcutters also automatically copied the underlying structures and patterns, even if they were not, or not fully, aware of their existence. As described in Section 9.2, the methods for producing movable type partly altered in the course of time, and subsequently letterforms could actually evolve into pictures of things.

[235] Eric Gill, *Autobiography* (New York: Biblo & Tannen Publishers, 1968), p.120.

[236] Gill, *An Essay on Typography*, p.54.

Initial Renaissance patterning was copied –consciously or unconsciously– and fixed in conventions. It defines present-day digital roman type, irrespective of whether letterforms are treated as pictures of things. The following section will focus on how Renaissance patterns can be used in the digital type design practice and how these can be combined with a production process that merely puts the emphasis on the eye.

9.6 Software

Thanks to digital standardisation, the opportunities for type designers today are vast. Sophisticated type-design software has eased the technical part of the font-production process and supports the increasing role of the eye. Hence, many digital typefaces have been developed without deliberate (concious) patterning such as can be found in Renaissance roman type.

Section 1 of Chapter 4 discussed the optical spacing of roman type, which is very time consuming because it is a recurrent process: the designer applies changes to the type and adapts the spacing until the result is considered satisfactory. The cadence units that I introduced in Section 3 of Chapter 5 are highly suitable for automating the fitting process. The division of the stem interval into a number of units and the application of cadence-units tables, as discussed in Section 4 of Chapter 5, can be translated into a simple algorithm. The spacing of a typeface using cadence units is calculated by a computer in a split second. In combination with a visualisation of the intrinsic underlying patterning to which the design can be adapted, this definitely eases not only the spacing of type but it makes the complete design process more organic, controllable, and reproducible.[237]

During my research I was involved in the development of two applications that are based on my cadence-fitting algorithm: Kernagic and LS Cadencer.[238] A third tool named LS Cadenculator, which is directly related to LS Cadencer, distills the spacing from digital fonts and translates this into cadence units.

The development of the Kernagic application started in 2013.[239] It is an open-source (semi-) automatic spacing tool for the Unified Font Object (UFO) format.[240]

[237] A testimonial at <http://www.revolvertype.com/tools/cadencer.html> reads: 'Using LS Cadencer tools provides a refreshing alternative to my usual work flow. They enable me to work with spacing at the earliest stage of a design, and to use spacing as an integral design element. LS Cadencer's simple spacing system has added the visual rhythm of the classics to my type design toolbox.'

[238] <http://www.lettermodel.org/wordpress/?page_id=13>

Kernagic's graphical user interface (Figure 9.12) provides ways to interactively preview changes to the widths of characters and spaces.

Figure 9.12 The graphical user interface (GUI) of Kernagic.

Kernagic's development started in Madrid at the 2013 Libre Graphics Meeting. There, type designer Dave Crossland introduced the programmer Øyvind 'Pippin' Kolås to my research, of which snippets are published on my research blog.[241] The initial spacing approach that Kolås explored before we met was discarded in favour of an approach of stem-rhythm placement that is directly based on –but in the end deviates slightly from– my research and theories. Besides this stem-rhythm approach, Kernagic contains the option to apply the cadence-units.[242] Currently the development of the tool is halted especially because the open-source code seems quite inaccessible for other programmers but Kernagic is available still: versions for macOS (in a Wine-wrapper)[243] and for Windows can be downloaded for free from my research blog.[244]

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239 Kernagic has to be pronounced as 'Kemagic', because according to its programmer Øyvind Kolås the 'rn' combination can mistakenly be read as 'm', especially when typeset in sans-serif typefaces.

240 The advantage of the UFO format is that it can act as a superset of other formats, and currently several font tools can be used for converting to and from it. See also: <http://unifiedfontobject.org/>.

241 <http://www.lettermodel.org>

242 The cadence-units support is functional, but the program unfortunately contains a small number of bugs.

243 Wine (which stands for 'Wine Is Not an Emulator') is a free implementation of Windows on Unix

244 For macOS: <http://www.lettermodel.org/downloads/Kernagic/Kernagic_b2.dmg.zip> and for Windows: <http://www.lettermodel.org/downloads/Kernagic/Kernagic_b2_WIN.zip>.

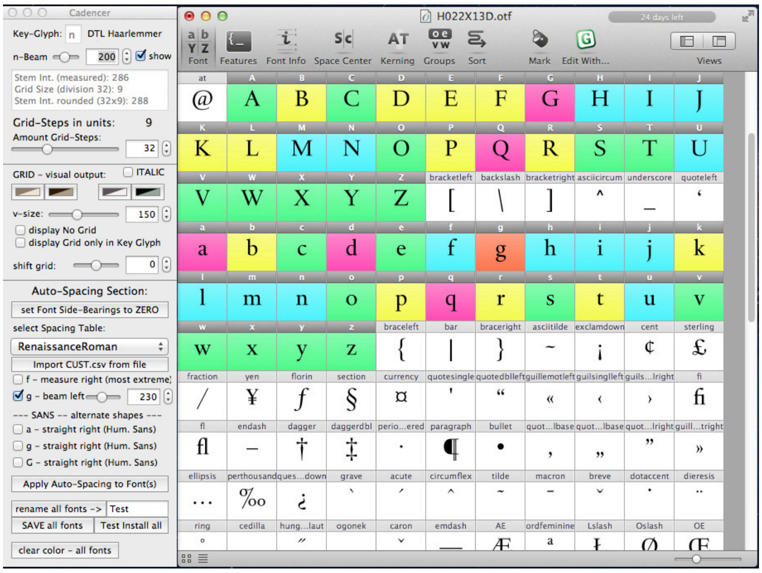

Figure 9.13 The graphical user interface (GUI) of RoboFont with the LS Cadencer extension on the left.

The LS Cadencer (Figure 9.13) and the related LS Cadenculator are (batch) fitting/auto-spacing tools written in Python that can be used as extensions in the Glyphs and RoboFont font-development programs.[245] Type designer Lukas Schneider programs and distributes the tools for which I developed the underlying principle and the algorithm. As in Kernagic, the basis for the unitisation in the LS Cadencer tool is the stem interval (Figure 9.14).

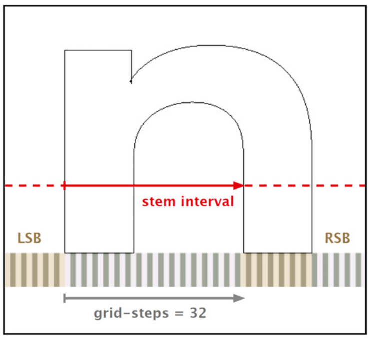

Figure 9.14 In the LS Cadencer the unitisation is based on the stem interval.

The LS Cadenculator (Figure 9.15) is a batch tool for measuring, analysing, and distilling cadence patterns from OpenType CFF fonts and Unified Font Object files.[246] It works on OpenType CFF and UFO files that are opened in Glyphs and RoboFont or directly on folders containing such fonts or files.

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245 Python is a dynamic and extensible programming language. See also: <https://www.python.org/>.

246 OpenType CFF fonts are a variant of the OpenType format developed by Adobe and contain outlines stored in the Bézier format. OpenType CFF fonts have '.otf' as suffix.

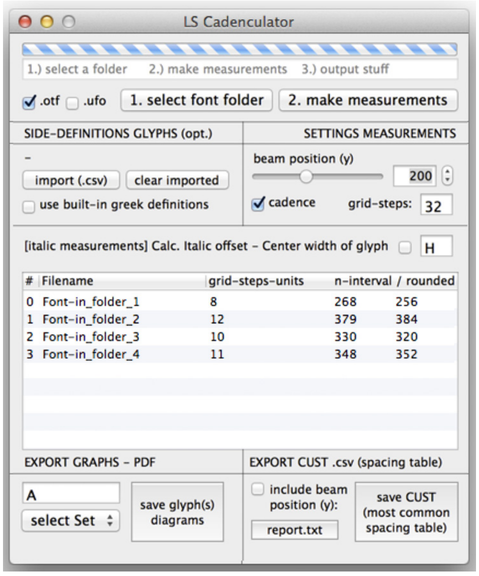

Figure 9.15 With the LS Cadenculator, fonts can be analysed and CUST files generated.

LS Cadenculator can be used to analyse existing spacing in digital fonts and for generating spacing tables that can be used for the fitting of fonts that are morphologically related. The analysis of the existing spacing across multiple fonts is simplified by the use of a common denominator: the cadence unit.

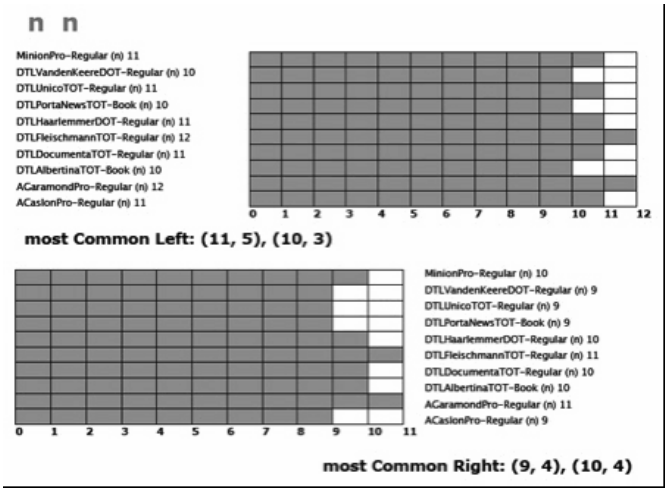

Figure 9.16 LS Cadenculator can report common values across fonts translated into cadence units.

Auto spacing using the Kernagic or LS Cadencer tools can be used to replace optical spacing completely or it can be used supplementally to spacing by eye. In the latter case it can form the bases for the spacing process or provide a second opinion. Together with the option to adapt a type design to its intrinsic underlying patterning, which is based on the stem interval, Kernagic and LS Cadencer provide greater control over the harmonic and rhythmic aspects in type design today.

The cadence-units spacing is based on the archetypal patterning, which also forms the basis for the conditioning of the type designer's eye. Hence, the results of auto spacing using cadence units and optical spacing will by definition be close. Outcomes of the parameterised fitting of ranges of serifed and sans-serif typefaces, which were generated with LS Cadencer, as well as outcomes of measurements with LS Cadenculator can be found in Appendix II, *Parameterised fitting results*.

This chapter discussed the decline in the need for standardisation in the post-Renaissance type production process. It explored how this declining need resulted in more design freedom for the later punchcutters. The discussion then focused on conventions and the conditioning of our æsthetic preferences in roman type and how having fewer technical constraints culminated in the reproduction of letter forms as images. Despite the technical changes, however, the origins of æsthetic preferences are firmly entrenched in Jenson's archetypal patterns due to conventions. Finally this chapter discussed the application of the cadence-units arrangement system that I distilled from archetypal patterns in present-day digital type design, which aided in the process of reducing the role of the eye in the spacing process. The aim of the chapter was to support my hypothesis that, contrary to the widely accepted belief that roman type was solely the result of æsthetic considerations, our æsthetic preferences were and continue to be conditioned by Jenson's roman type patterns, which are for a large part the result of the adaptation of the Humanistic minuscule to the Renaissance movable-type production process.