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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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minium noſtrum.

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V X Y Z

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III. INTRODUCTION

Yet any attempt to dissuade 'experts' away from this entrenched thinking about letters, serifs etc., by the usual means, would undeniably be difficult.[81]
Edward M. Catich

Over the past twenty-nine years as Lecturer and Senior Lecturer in the fields of writing and type design at the Royal Academy of Art in The Hague (KABK), I developed an educational program initially targeted at the first-year students of the Graphic Design department, and later expanded to the requirements of the second- and third-year students. The program especially focuses on the origin of letterforms and how they harmonically and rhythmically form patterns (words). This requires a detailed description of the harmonics, patterns, and dynamics in writing, lettering, type design, and typography. The students are guided during their investigation and exploration of the underlying structures of type and typography with the help of theoretical models and related software, which I created in the course of time.

In line with my predecessor and tutor at the KABK, the Dutch type designer, calligrapher, and author on typography Gerrit Noordzij (1931), and his illustrious precursor, the British calligrapher and author on calligraphy Edward Johnston (1872–1944), I consider writing with broad nib, flat brush, and flexible-pointed pen a good starting point for exploring matters like construction, contrast, contrast sort, and contrast flow. Chirographic practice has proven to be a solid basis for designing type and for gaining insight into the basics of typography. Particularly for the development of a refined and sophisticated 'hand', writing remains an important factor today. Famous type designers *and* calligraphers like Jan van Krimpen (1892–1958), Hermann Zapf (1918–2015), and Noordzij have convincingly provided evidence for this with their typefaces. The American typographer and type designer Bruce Rogers (1870–1957) underlined the importance of writing when he noted in a letter to Van Krimpen that the italic of Lutetia could hardly have been produced by any other than an accomplished calligrapher.[82] However, I do not think that writing is a prerequisite for designing type, nor for a thorough understanding of the basics of typography.

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[81] Edward M. Catich, *The Origin of the Serif: Brush Writing & Roman Letters* (Davenport: Catich Gallery, 1991), p.5.

[82] Bruce Rogers, *Pi: a Hodge-Podge of Letters, Papers, Addresses Written During a Period of 60 Years* (Cleveland: World Publishing Co., 1953), p.49.

Translating handwriting into type is not very straightforward. My experience is that, despite the fact that one can emphatically train students to purely work directly from their own writings, they often start to define grids with rulers before drawing letters. Many have the tendency to look at existing typefaces to find the 'correct' proportions, irrespective of the fact that they were supposed to find these proportions via writing. Meticulous patterning is a requirement for designing type; it is therefore difficult to distil these patterns from handwriting, especially if one is not an experienced calligrapher.

If type and patterning are inextricably connected, however, could it be possible that type also finds its origin in a form of patterning that does not find its direct origin in handwriting, and that such patterning even influenced and standardised the hands that postdate the invention of movable type? If so, would it also be possible to distil the origins of this supposed patterning from early Renaissance movable type? These questions alone were enough for me to start – more than nine years ago– research on possible standardisation, systematisation, and unitisation of textura and roman type.

Note on perception and interpretation

In *Early Typefounders' Moulds at the Plantin-Moretus Museum* Mike Parker notes that little is known of very early typefounders' moulds.[83] In fact, there is no documentation on the production of type dating from the early days of typography at all. Everything written on Renaissance type production so far is a projection of seventeenth- and eighteenth-century descriptions of type-foundry practices. These sources put a lot of emphasis on the role of the eye. Is it perhaps possible that later punchcutters could mostly rely on the eye because for them optical judgment took for granted the underlying patterns, almost unconciously? Was it simply the framework in which things were done?

In comparison to punchcutters, present-day digital type designers have the almost unlimited freedom to define the proportions and widths of characters. This also makes it possible to emphasise optical matters. As I aim to prove, this freedom was not available in the early days of typography and should therefore not be used to explain the proportions of typographic letterforms that have been an

[83] Mike Parker, 'Early Typefounders' Moulds at the Plantin-Moretus Museum', *The Library*, Fifth Series, Volume xxix, No.1, (Oxford: Oxford University Press, 1974), pp.93–102 (p.93).

intrinsic and salient characteristic of typography since the second half of the fifteenth century.

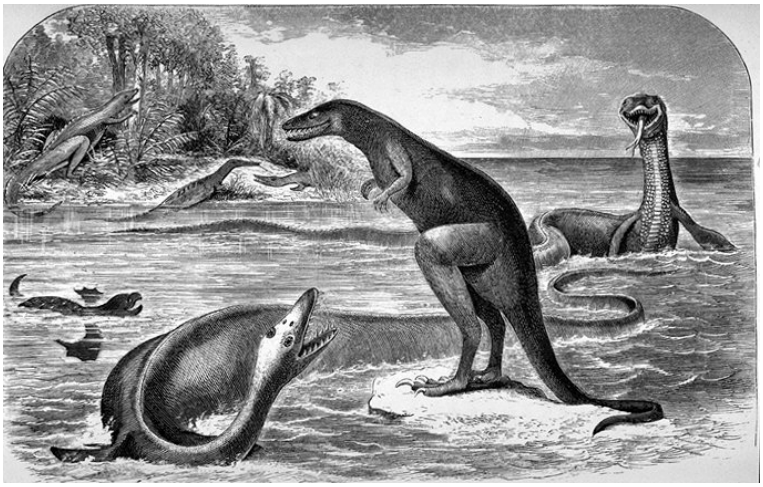

Figure III.2 Nineteenth-century engraving showing the Elasmosaurus (left) with the head on the tail.

What does the present-day type designer actually see? I like to metaphorically illustrate the perceptual aspect of type patterns with the image of the Elasmosaurus in Figure III.2 (bottom left). In the nineteenth century the palaeontologist Edward Drinker Cope reconstructed the skeleton of an Elasmosaurus platyurus, and he erroneously mounted the head on the tail. Roughly two decades later a colleague discovered the mistake: the tail turned out to be shorter than the neck. Obviously for Cope this was an unexpected proportional relationship between the two body parts. Cope (inadvertently?) manipulated the drawing of Figure III.3 by not including the back paddles, which were actually front paddles that simply did not support his theory.[84]

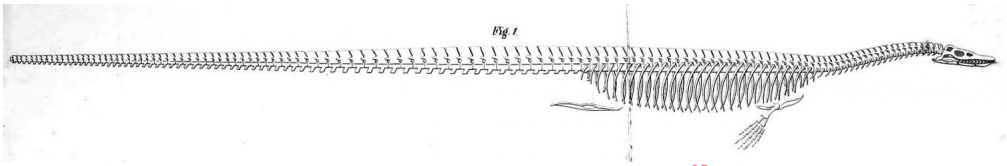

Figure III.3 Part of the 'head-on-the-wrong-end' Elasmosaurus platyurus.[85]

The story of Cope's mistake illustrates the fact that the power of the human eye is purely relative to the anatomy of the things perceived. In *Art and Illusion* art historian Ernst Gombrich, in a passage about this phenomenon, notes that the

[84] <http://en.wikipedia.org/wiki/Elasmosaurus>

[85] <http://www.archive.org/download/synopsisofextincoocope/page/n112_w742>

stimulus patterns on the retina are not alone in determining our picture of the visual world, and that its messages are modified by what we know about the 'real' shape of objects.[86] Letter carver and type designer David Kindersley defined the matter more simply as: 'It is a commonplace that we see only what we know […].'[87]

Figure III.4 Han van Meegeren in front of one of his 'Vermeers'.

Kinderley's statement was supported by the forgeries that were painted by Han van Meegeren (1889–1947) in the style of Johannes Vermeer during the first half of the twentieth century (Figure III.4). Van Meegeren cleverly took revenge on experts, who in his opinion did not take his œuvre seriously enough. According to these experts it was likely that in his younger years Vermeer had painted in Caravaggio's style. However, there was no proof to support this theory. Van Meegeren provided what experts wanted to see, in this way underlining their expertise and essentially dazzling them in such a way that they did not see through his forgeries.

If we look at Van Meegeren's forgeries nowadays, it is difficult to recognise Vermeer in them. What one sees is also influenced by the *zeitgeist*, and, of course, today we know more about Vermeer and his practice than the experts did roughly 100 years ago. One's perception is influenced by many factors. For example, if one looks at type applied in incunabula with the eye of a calligrapher it is possible that certain details, like the positioning of diacritics or the shape of serifs, can be

86 Ernst Hans Josef Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation* (Oxford: Phaidon, 1987), p.255.

87 David Kindersley, *Optical Letter Spacing: for New Printing Systems* (London: The Wynkyn de Worde Society, 1976), p.35.

explained by the way in which a calligrapher would write driacritics and stroke endings. Such an explanation could differ from one that takes the technical aspects of Renaissance movable type into account. After all, one cannot see more than one knows. In the following chapter I provide some examples of this fact.

A factor that makes perception matters even more complex is the *willingness* to adapt one's viewpoint to new scientific insights. A famous case, although not related to type and typography, is Afred Wegener's 'supercontinent' Pangea, in which, like in the case of the Elasmosoraus, fossils also played a role. This German geologist and meteorologist claimed that about 300 million years ago the continents formed one mass of land.[88] One of Wegener's arguments was that fossils of specific prehistoric species were discovered in both Western Africa and South America.[89] Only the continents drifting apart could explain this (although some scientists proposed the existence of land bridges between the continents as alternative). In 1915 he described his theory in the book *On the Origin of Continents and Oceans.*

Wegener's theories were basically ridiculed by the established scientists. Colleagues even warned him that his heretical ideas would befog the minds of students. Wegener's radical viewpoint clearly threatened the authority of fellow scientists, and they just could not, or did not, want to believe that the foundation of their points of view was incorrect. The argumentation against Wegener's model was sometimes hilarious; for example, the geologist R. Thomas Chamberlain remarked: 'If we are to believe in Wegener's hypothesis we must forget everything which has been learned in the past 70 years and start all over again.'[90]

In the 1960s when the old generation of geologists had disappeared from the scene, Wegener's theories were proven to be right, and they are now commonly accepted. It was Wegener's intention to have his theories openly discussed. Inspired by this, I set up a blog dedicated to my research a couple of years ago.[91] I also started discussions on type-related forums like Typophile and TypeDrawers. Of course, the exchange of thoughts and opinions was not always on an academic level, but from time to time it helped me to sharpen my arguments.

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88 Greg Young, *Alfred Wegener: Pioneer of Plate Tectonics* (Mankato: Compass Point Books, 2009), p.16.

89 <http://www.scientus.org/Wegener-Continental-Drift.html>

90 Ibid.

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

IV. THEORETICAL CONTEXT, HYPOTHESES, METHODOLOGY, AND DISSERTATION STRUCTURE

This chapter will first introduce the theoretical context in which my research is situated, and will then outline the problems in this context that led me to formulate my thesis. Next, my research hypotheses will be presented and will followed by my research methodology.

Theoretical context

In eighteenth-century France, during the reign of Louis XIV, a committee formed by the Académie des Sciences developed geometric patterns for the construction of a new series of types for the exclusive use by the Imprimerie Royale, known under the name 'Romain du Roi'. This attempt to rationalise, standardise, and unitise the design and the production of type with the use of geometry and grids is generally considered a deviation from the earlier development of type. The theory is that this new type broke away from a tradition evolved under the influence of punchcutters such as Nicolas Jenson (ca.1404–1480), Claude Garamont (ca.1510–1561), and Robert Granjon (1513–ca.1590).[92] According to the literature, until the creation of the Romain du Roi the production of type was merely a mechanised and disciplined form of calligraphy without any form of systematisation.[93] This puts the emphasis on the eye of the punchcutter and disregards the possibility that systematisation may be an intrinsic part of font production. However, this emphasis on æsthetics is not grounded in any historic evidence. In this dissertation I bring this belief into question by making use of historical artefacts; my hypotheses are the result of questioning commonly embraced assumptions such as this one about the origins of roman and italic type. The following section illustrates the problems with the generally accepted belief that roman type was largely influenced by æsthetic rather than technical considerations.

Putting the dot on the i

If a letter is presented as an image, isolated from other letters and also dissociated from the requirements for its production, the way we look at it is affected. I once read on Wikipedia that Jenson's 'carefully modified' serifs follow an 'artful logic of asymmetry.' The idea that the shapes of serifs are the result of 'artful logic' is

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92 André Jammes, 'Académisme et Typographie, The Making of the Romain du Roi', *Journal of the Printing Historical Society*, Number 1, (London, 1965), pp. 71–95 (p.71).

93 Morison, *Letter Forms*, p.30.

perhaps obvious if one looks at these letters as isolated images. If one realises that letters are meant to form words, and measurably centres Jenson's lowercase n between side bearings, the weight, or 'blackness', on the left side of the letter has to be reduced and on the right side increased in order to optically balance the letter in its width (Figure IV.1).[94] This can be achieved by shortening the serifs on the left, and lengthening the ones on the right. Increasing the thickness of the right-hand serifs will also help to optically centre the n.

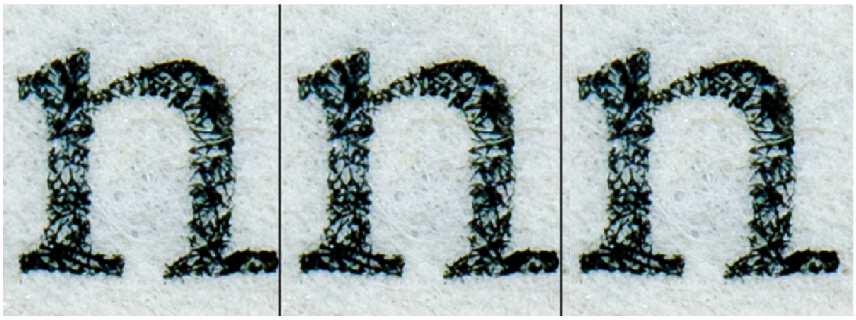

Figure IV.1 Jenson's original lowercase n centred between side bearings.

This approach is out of the scope of the work of present-day type designers, who mostly *optically* centre the letters *after* these have been designed. They adapt the space to the prefixed design instead of adapting the design to the prefixed width. Based on my research, I can only conclude that the latter was common practice during the Renaissance.

Figure IV.2 Jenson's lowercase n (left) and Griffo's lowercase n from *De Aetna*.

The 'artful logic of asymmetry' was not unique for Jenson's roman type. Also the Italian punchcutter Francesco Griffo (1450–1518) used the same structure in

[94] Measurably in the meaning that the distances from both stems to the side bearings are identical. This is in contrast to centering optically, in which case the positioning of the letter is based on an even distribution of the black shape within its character width. See section 9.2 *Optical spacing*.

the typeface he cut for *De Aetna*, a book published by Aldus Manutius (1449–1515), the Renaissance printer who founded the famous Aldine Press at Venice, in 1495 (Figure IV.2). This structuring of the serifs was the result of a standardisation of the spacing process, which was directly related to the way Renaissance roman type was produced, as I will try to prove in this dissertation.

One cannot see more than one knows or wants to believe. The interpretation of prints from the Renaissance with the theory in mind that roman type is purely a direct translation of handwritten models could well differ from an interpretation that takes the technical aspects of the Renaissance type production more into account (without ignoring or denying the fact that there is a direct relationship between roman type and the predating handwritten models).

An example of how the interpretation of historic prints can be influenced by the adaptation of the theory that handwriting formed the direct basis for roman type can be found in the highly informative *Reading Letters, designing for legibility*. In this book, Danish type designer and author on typography Sofie Beier shows two details from Jenson's 'Eusebius' type from 1470 and Griffo's roman type used for the *Hypnerotomachia Poliphili* (1499), respectively (Figure IV.3). In the caption Beier states that the positioning to the right of the dot on the lowercase i was a common adaptation from the calligraphic hand.[95] The position of the dot on the i is apparently a minor detail, but extrapolated it can be of great importance to the way one looks at roman type.

[95] Sofie Beier, *Reading Letters, Designing for Legibility* (Amsterdam: BIS Publishers, 2012), p.53.

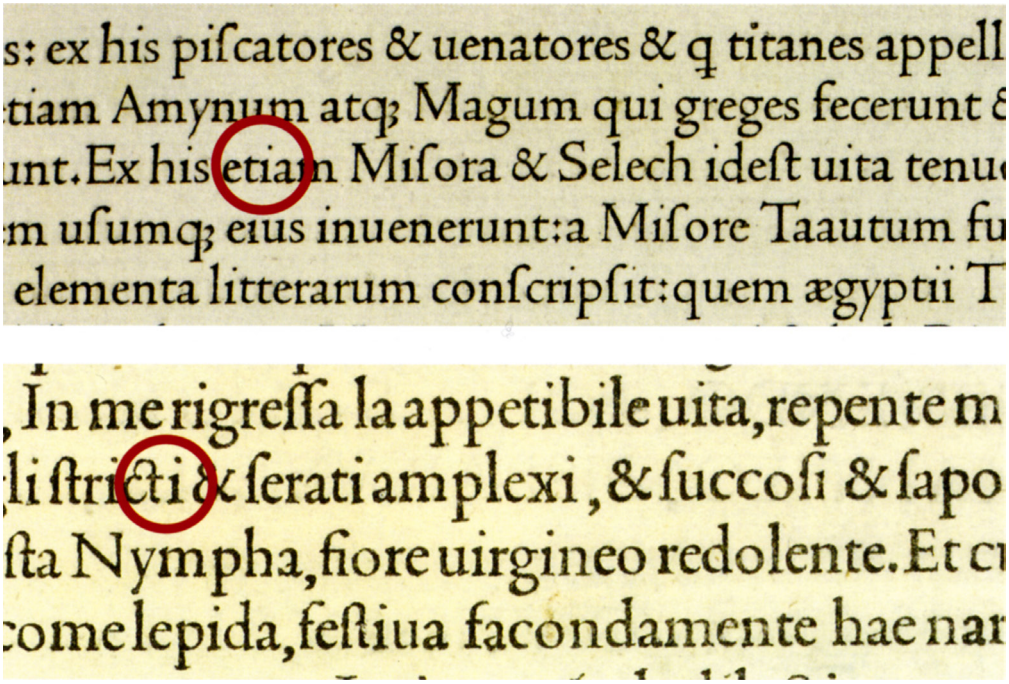

Figure IV.3 Positioning of the i's dot by Jenson (top) and Griffo.

If one isolates the i from the rest of the letters, like what is done with Jenson's lowercase n in Figure IV.3, then Beier's explanation is plausible. However, if one takes other surrounding letters into account, like the f and the long s, then the conclusion could differ. If one looks at the lengths of the terminals of the aforenamed letters from Jenson's and Griffo's roman types, then it is obvious that the offset of the i's dot is required to prevent collisions with the letters' terminals. These surpass the character widths, which is called 'kerning' (Figure IV.4), and they are hence highly vulnerable parts. If a terminal were to collide with the i's dot, it would rest on the latter and subsequently break off as soon as any pressure was put on it.

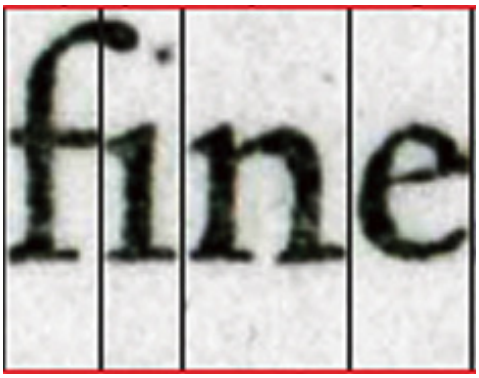

Figure IV.4 Part of the terminal of de f from Jenson's roman (left) is 'kerned'.

In Jenson's roman type all diacritics are positioned relatively far above the top of the x-height and are in line with the i's dot (Figure IV.5). Hence he also used the same offset for the diacritics to prevent collisions with the terminals of f and long s.

Figure IV.5 The positioning of diacritics in Jenson's roman type from *De Evangelica Præparatione*.

In Griffo's roman for the *Hypnerotomachia Poliphili* all diacritics, including the i's dot, are lowered slightly. In addition, the dot is bolder. This is something the present-day typographer is accustomed to. Adobe Jenson shows that its i has obviously been adapted to this later standard. The terminal of the f has also clearly been shortened slightly (Figure IV.6).

Figure IV.6 The positioning of diacritics in Adobe Jenson.

The offset of the i's dot in Griffo's roman for the *Hypnerotomachia Poliphili* is much less to the right than in Jenson's. Figure IV.7 shows that this is the case with all diacritics in Griffo's type from 1499. Not surprisingly, the terminals of Griffo's f and related long s are also much shorter than those of Jenson's.

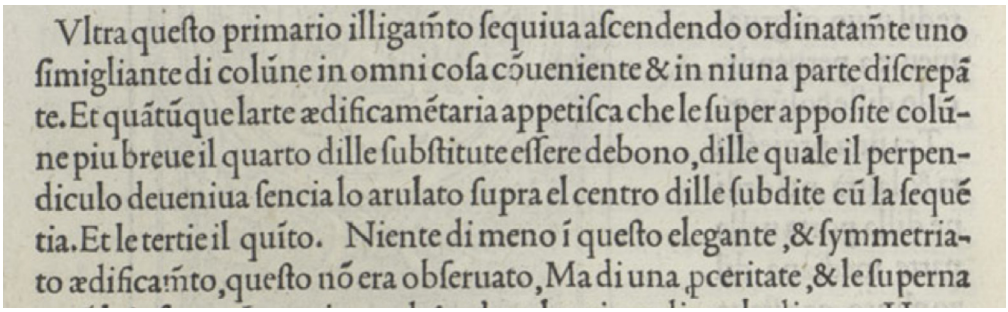
Vltra queſto primario illigam̃to ſequiua aſcendendo ordinatam̃te uno
ſimigliante di colũne in omni coſa cõueniente & in niuna parte diſcrepã
te. Et quãtũque larte ædificamẽtaria appetiſca che le ſuper appoſite colũ-
ne piu breue il quarto dille ſubſtitute eſſere debono, dille quale il perpen-
diculo deueniua ſencia lo arulato ſupra el centro dille ſubdite cũ la ſequẽ
tia. Et le tertie il quíto. Niente di meno í queſto elegante, & ſymmetria-
to ædificam̃to, queſto nõ era obſeruato, Ma di una ꝑceritate, & le ſuperna

Figure IV.7 The positioning of diacritics in the *Hypnerotomachia Poliphili*.[96]

Both Jenson and Griffo treated the character widths of the f and long s identically, which resulted in a lot of space trailing the long s from Jenson's roman (Figure IV.8). One can think of several technical reasons for treating the f and long s identically. First, the offset of all diacritics works for both f and long s. Second, it makes the production of the long s and all related ligatures simpler because only the crossbar at the right of the stem of the f has to be removed to make a long s. A calligrapher never has to consider such technical issues.

Figure IV.8 A large space is trailing the long s in Jenson's roman.

It cannot be excluded that Jenson was inspired by calligraphic models when he extended the terminals of the f and long s. This could then have triggered the offset of the i's dot, but, in that case, the positioning of the dot was still required to prevent a technical problem.

The roman type that Sweynheym and Pannartz applied in *Opera* from 1469 (Figure IV.9), which predates the type from *De Evangelica Præparatione*, does not show much –if any– offset of the diacritics. The terminals of the f and long s from Sweynheym and Pannartz's type are so greatly extended that, as a result, they must inevitably have collided with the diacritics. After studying other prints by Sweynheym and Pannartz I tentatively conclude that alternate variants with shorter terminals of the f and long s were used if these letters were followed by

96 <http://www.metmuseum.org/toah/works-of-art/23.73.1/>

accented characters.[97] This is in line with calligraphy because adapting letter shapes to contextual issues is exactly what a calligrapher can do so easily. As such, the absence of the offset of the i's dot in Sweynheym and Pannartz's type can also be put forward as proof for its calligraphic origin.

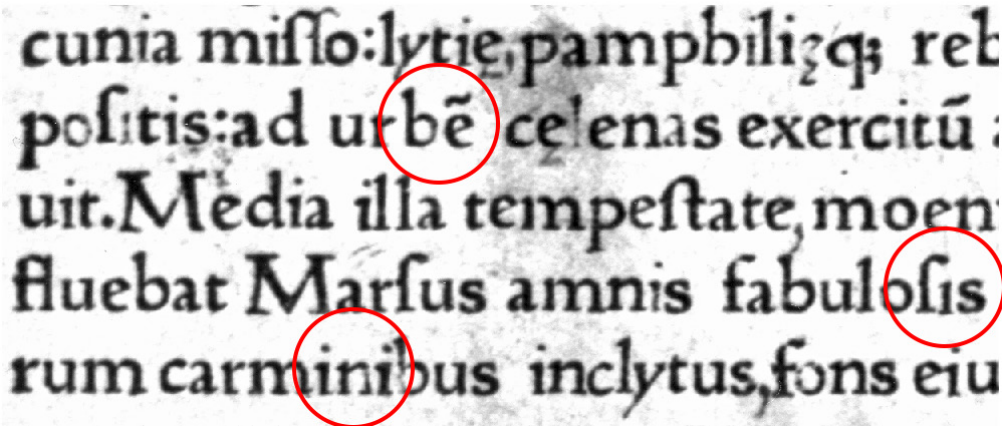

Figure IV.9 Sweynheym and Pannartz's type from *Opera* (1469).

Taking this into account, then, the conclusion that the offset of the i's dot is the result of a technical problem is at least equally plausible as the conclusion that it was an adaptation from the calligraphic hand. Although there was undeniably a direct relationship between roman type and its handwritten precursor –which is discussed in detail in Chapter 3– the Renaissance punchcutters had to deal with all kinds of technical aspects unknown to calligraphers.

This raises the question of whether certain details in roman type, other than the positioning of the i's dot, are the result of technical aspects rather than of the interpretation of calligraphic models. Taking the technical requirements for the Renaissance type production –*besides* the calligraphic aspect– into account when investigating the details of roman type, and by extension italic type, could provide more insight into the origins of the structure of roman and italic type, and especially their harmonics, patterns, and dynamics.

The analysis of a small detail such as the position of the dot on the i in Renaissance prints provides a good reason to investigate to what extent movable type finds its origin in calligraphy and to what extent technical requirements forced roman type to deviate from its handwritten origins. The extrapolation of the position of the i's dot could well lead to a completely different insight into the details of type and even into the basis of typographic conventions.

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97 Contextual alternates are easy to implement in digital fonts nowadays. The replacement of the f with a shorter variant, for instance for combining it with a question mark, can be automatised. Hence this is done more and more by present-day type designers.

Hypotheses

Considering the differences between the handwritten models predating the invention of movable type, first textura and then roman type, is it possible that –at least to a certain extent– the proportions and details of roman type are the result of patterning? Later punchcutters could place a greater emphasis on the eye because for them, optical judgment took for granted the underlying patterns, almost without consciousness: it was simply the framework in which things were done. However, considering the fact that the Renaissance punchcutters were craftsmen who invented, organised and executed a complex and sophisticated production process, how likely is it that this was possible without an extensive structuring of handwritten letterforms? The question is: were the Renaissance archetypal models by Jenson, Griffo, and Garamont made with the use of patterns? And if this is the case, are harmonics and æsthetics in type, which are embedded in typographic conventions, not only the result of optical preferences predating the invention of movable type, but also of standardisation in the Renaissance type production? These questions lead to the main hypothesis of my dissertation:

– *The creation of roman type was influenced at least as much by technical as by æsthetic considerations.*

In order to support this hypothesis, I will investigate the following two sub-hypotheses:

– *Roman type is the result of the standardisation in the Renaissance of the Humanistic minuscule to the type production process. This is in analogy to the standardisation that took place when the already rather 'unitised' gothic hand was used as the basis for textura type.*

– *Æsthetic preferences in roman type continue to be conditioned by the early standardisation of roman type production.*

In support of the first sub-hypothesis, the first (and longest) part of this dissertation will closely examine the links between gothic and roman type, and between the latter and its handwritten origins. I will try to prove that the regularity of the written textura quadrata (gothic hand) made it relatively easy for the German printer and punchcutter Johann Gutenberg (ca.1398–1468) and consorts to standardise and systematise their movable gothic type, which was directly based on its written precursor. Once this was accomplished for textura type, it was natural to apply the same system to the new roman type (and decades

later to italic type) due to the relationships between the gothic hand and the Humanistic minuscule, on which roman type was based. I will explore this relationship with the use of a geometric letter model, which I developed through the course of my research. I will then also use this model to illustrate the differences between the humanistic minuscule and roman type. Then, I will try to demonstrate evidence of standardised patterns in roman type and propose a framework in which this standardisation was done.

In an attempt to support the second sub-hypothesis, I will discuss the flaws in the generally accepted theory that roman type was largely the result of æsthetic considerations. I will argue that what we find optically appealing in Latin type is –at least partly– the result of the standardisation process. My aim is to prove that our present-day eyes are conditioned by the outcomes of this standardisation, and due to this we unconsciously use the roman and italic types from the early days of typography as points of reference.

The examinations and discussions in the context of these two sub-hypotheses should provide support for my main hypothesis that the creation of roman type was largely influenced by technical rather than æsthetic considerations.

Research methodology

There is unfortunately no known documentation about the production methods of the Renaissance punchcutters. One can only speculate about the reason for this. Perhaps there were no descriptions of the processes because these were deliberately kept secret from competitors? After all, the seventeenth-century Dutch punchcutter Dirk Voskens taught Hungarian Nicholas Kis for six months, but Kis later remarked that he would not instruct a countryman for one hundred thousand florins.[98] The lack of Renaissance documentation also automatically implies that what has been written on this subject so far is not based on original sources, but merely on the projection of seventeenth- and eighteenth-century descriptions of earlier times. And if there is no documentation, the best course of action is to distil information from Renaissance artefacts –not unlike archaeologists do– and to compare this with the information from later dates.

I measured punches, matrices, foundry type, prints, and in some cases also digital revivals. When taking such measurements one inevitably has to filter the distilled information. Details like the squash, which is the halo effect around the

[98] Lawson, *Anatomy of a Typeface*, p.386.

edge of printed areas in letterpress printing, and which may play a role when interpreting the image, do not have to influence the outcome of measurements as long as one does not measure mixed sources. In order to prevent mingling of distilled information, punches have to be compared with punches, matrices with matrices, foundry type with foundry type, and prints with prints (within the boundaries of a specific publication).

Figure IV.10 Granjon's *Ascendonica Cursive* as (left to right) punch, matrix, print, and digital.

Figure IV.10 shows enlargements of punch, matrix, and print of Granjon's Ascendonica Cursive and the derived italic of ITC Galliard, respectively. The digital interpretation by Matthew Carter is obviously freely based on Granjon's cursive and would not be suitable for researching the proportions in Renaissance type. For this reason I only used (photos of) historical prints and digital revivals that accurately resemble the original historical type. For illustrating some specific relationships only, like those between vertical and horizontal proportions in type, in some cases I used faithfully produced digital revivals, like Adobe Jenson or Adobe Garamond.

Due to the fact that much of the measured historical type was made for small point sizes, and the fact that letterpress results in the aforementioned squashes, there will always, to some extent, be tolerances when proportions are captured in models. These tolerances will also be part of a revival, such as Adobe Jenson and Adobe Garamond, because in general digital type designers distil the proportions from enlarged prints –if only because, in many cases, the punches and matrices have not been preserved over time. Nevertheless, in the measurements I make and present in this dissertation, the tolerances in the proportional relationships are remarkably small.

To illustrate the morphologic relationship between textura handwriting and the Humanistic minuscule I developed a geometric letter model. The model maps the construction of letters written with a broad nib and supports the idea that

handwritten letters contain an intrinsic standardisation. I also use it to demonstrate the inherent differences between roman type and its handwritten origins. The geometric letter model formed the basis for software to digitally reproduce the standardisation of the handwritten textura and the Humanistic minuscule for type fitting. The patterning generated with this software can also be used as basis for present-day type design. In addition, to illustrate the similarities in widths in gothic and Renaissance prints I developed a horizontal grid system to measure width standardisation related to this patterning. The grid system formed the basis for software to distil, analyse, and reproduce the unitisation that is at the root of Renaissance type, as I aim to prove. This software can be used to automatically space digital typefaces and hence it directly connects the Renaissance archetypal standardisation and systematisation with today's type design practice.

Dissertation structure

Chapter 1 focuses on the importance placed on handwriting and calligraphy in teaching typography today; it aims in particular to illustrate the ways in which handwriting and type differ, and to question the general use of the Foundational hand model as evidence for the direct link between the Humanistic minuscule and roman type.

Chapter 2 focuses on the relationship between the Humanistic minuscule and textura handwriting, on which the first movable type was based, in order to examine the possibilities for the use of this relationship by the first Renaissance punchcutters in the roman type production process.

Chapter 3 examines the standardisation of the Humanistic minuscule in greater detail. The aim is to begin to answer the question of how handwritten models were standardised for roman type. It makes use of the software that I developed to digitally reproduce the standardisation of the Humanistic minuscule for type fitting.

Chapter 4 focuses on the standardisation of widths both in textura and roman type production. The chapter first describes the process of optically spacing type before discussing the advantages of using standardised widths instead. It then discusses the similarities in widths in gothic and Renaissance prints using a horizontal grid system that I developed to measure width standardisation. The aim is to draw further parallels between textura and roman type production.

Chapter 5 examines standardisation of character widths in greater detail. To this end, a unit-arrangement system is introduced and distilled from examples of both textura and roman type, in an attempt to provide further evidence that roman type, much like textura type, was the result of the standardisation of its handwritten origins to the type production process. The chapter then compares optical and grid fitting to illustrate the extent to which seemingly æsthetic preferences can be obtained systematically.

Chapter 6 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 for simplified type casting.

Chapter 7 presents the distilled evidence of a unit-arrangement system from various Renaissance artefacts housed at the Museum Plantin-Moretus, thereby demonstrating that the early punchcutters standardised widths in the production of roman type.

Chapter 8 discusses the possible standardisation of vertical proportions in Renaissance type and investigates these in relation to the horizontal standardisation as the last piece of evidence to support my hypothesis that the Renaissance punchcutters made use of standardised handwriting in the production of roman type in a process analogous to the more obvious standardisation of textura handwriting for textura type. To this end, the chapter presents dynamic frameworks that may have been used in this process.

Chapter 9 aims to answer the question of why later roman type designs show a greater diversity in proportions and details than can be found in the archetypal models. It discusses the decline in the need for standardisation in the post-Renaissance type production process. Is it possible that this decline caused later punchcutters to place a greater emphasis on the eye? Finally, the chapter discusses the use of archetypal patterning in digital type production and demonstrates how this allows greater control of the harmonic and rythmic aspects in type design today.