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Designing a Typeface

by Margaret Luise von Koschembahr

A thesis project submitted in partial fulfillment
of the requirements for the degree of **Master of Science**
in the **School of Printing Management and Sciences**
in the **College of Imaging Arts and Sciences**
of the **Rochester Institute of Technology**

November 1994

Project Advisor: Professor Archie D. Provan

School of Printing Management and Sciences
Rochester Institute of Technology
Rochester, New York

Certificate of Approval Master's Thesis

This is to Certify that the Master's Thesis of

Margaret Luise von Koschembahr
name of student

With a major in *Graphic Arts Publishing*
has been approved by the Thesis Committee as satisfactory
for the thesis requirement for the Master of Science degree
at the convocation of

December 1994
date

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Designing a Typeface

November 8, 1994

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For his invaluable advice regarding proportion, character spacing, kerning, proofing, and general typographic considerations, my thanks to Tom Rickner of Monotype Typography. Steve Matteson, also of Monotype Typography, is to be thanked as well for his counsel from afar.

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Abstract

The purpose of this project was to design a typeface, using digital methods, and in so doing to explore the use of current type design software.

In this project, letterforms that were originally produced by hand with a pen were translated into electronic data, taking the final form of a digital typeface.

Photographic images of manuscript letterforms were enlarged; from the enlarged letterforms hand-rendered outlines were created. These outlines were scanned electronically and imported into a type design software program. Digital outlines of each character were created, from which a PostScript™ typeface was generated and printed.

The result of the project is a digitally produced and generated PostScript™ typeface, which can be output at any size or resolution. Although the typeface was generated with a *machine*, it nonetheless maintains the character of *hand*-rendered calligraphic letterforms, as can be seen when comparing the type to its original historical source.

Chapter 1: Introduction

The design and creation of a typeface was once an activity carried out by only a relative few highly skilled craftsmen/designers. Some 500 years after the invention of the adjustable mold and typecasting, modern technology has advanced to such a degree that at present virtually anyone who has access to a computer has the potential to be a type designer.

The physical aspect of creating type has most certainly changed. Initially, such tools as files, punches and steel matrices were used to create metal type, which occupies *real* space.

The modern type designer manipulates points, lines, and curves of character outlines on a computer screen, ultimately creating a product (type) that exists in *abstract* space in the form of a digitized typeface, whose existence, storage and reproduction depend wholly on computer technology.

The purpose of this project was to design a typeface, recreating letterforms from a manuscript hand, using digital font creation technology, and in so doing to explore the use of current type design technology in conjunction with historical, hand-rendered models of letterforms. What is involved in the process of designing a typeface, with today's tools? How does digital technology affect the type design process? Furthermore, what is involved in transforming a historical, hand-rendered model into a digital typeface? How effectively can the character and nuances of hand-written letterforms be translated or captured into digital letterforms?

The thesis project involved using an historical source as the typeface design model, identifying a typeface design creation program with which to execute the design, determining the process to be used to transfer the original design source to the typeface design creation program, learning to use the program, and designing the typeface. The design process included professional critical reviews of the typeface at various stages of development. The goal of the project was not only to design a typeface, but also to answer the questions raised in the introduction.

Chapter 2: Methodology

The Decameron Manuscript

The source for the typeface design was a manuscript housed in the Melbert B. Cary, Jr. Graphic Arts Collection at the Rochester Institute of Technology. The manuscript, a nearly complete written text of Boccaccio's *Decameron*, is a leather-bound book measuring about 9" x 14," whose 150 or so vellum pages contain manuscript text on both sides (see figures 1, 2).

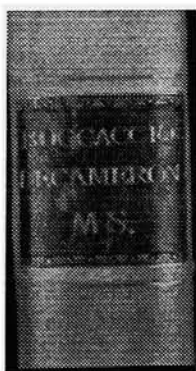


Figure 1
The Decameron manuscript,
detail of spine

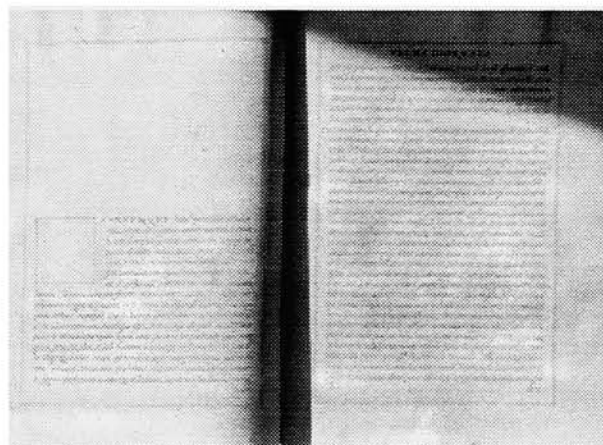


Figure 2
The Decameron manuscript, full page spread

The text is written in an italic hand, in a size roughly equivalent to a printed text of 14 point type with 20 points of leading (see figure 3). On some pages, the calligrapher used Roman display characters—characters which could serve as a model for a digital roman typeface to accompany the italic typeface designed in this project (see figure 4). The calligrapher made underdrawings for the initial caps used throughout the manuscript. They are enclosed within double-ruled boxes, and perhaps would have been illuminated in a rich red or blue.

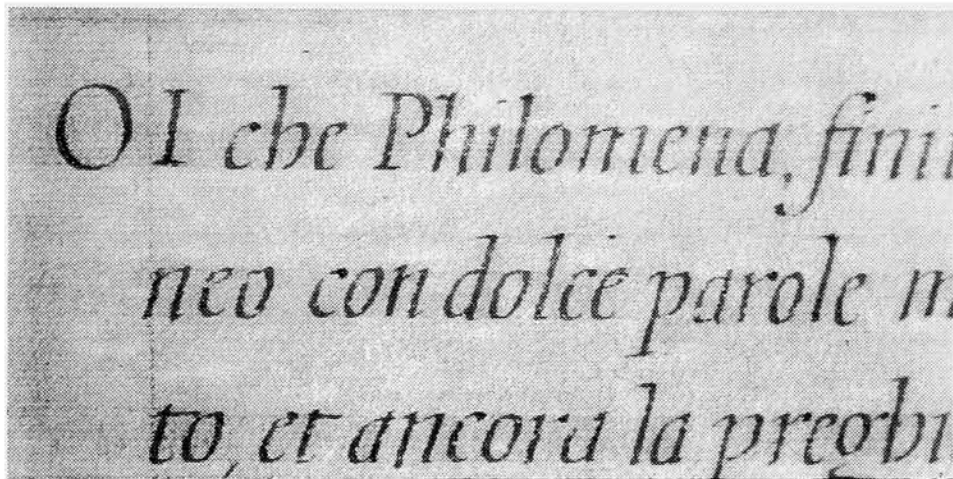


Figure 3
The Decameron manuscript, detail of text

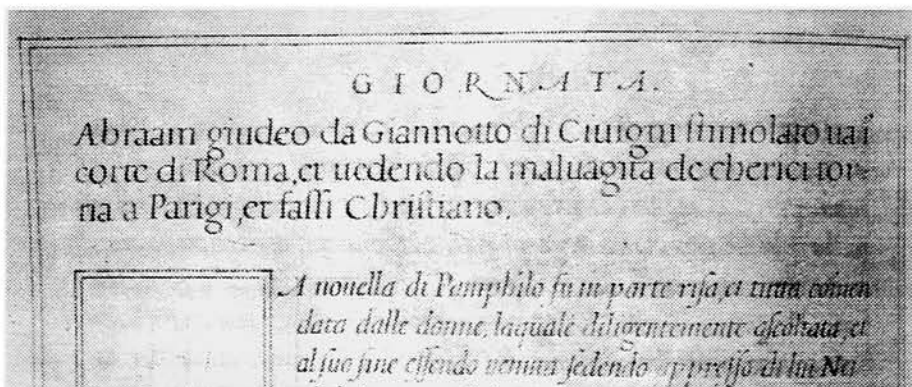


Figure 4
The Decameron manuscript, detail of text, showing roman display characters

The ink, most probably originally black, has changed to varying shades of sepia. While on some pages the ink has faded considerably, on most, the ink has adhered well to the vellum and the letterforms have retained remarkable clarity. The pages of text, each framed by a simple double rule, are in themselves beautiful—one can only imagine what splendid pages would have been realized had the initial caps and illumination been completed.

The manuscript was created in ca. 1550.¹ The style of italic letterform found in the *Decameron* manuscript can be generally classified as chancery italic. Chancery letters were so named (*littera cancellarescha*) by Renaissance writing master Ludovico Arrighi Vincentino in 1522 to describe a writing style that had been adopted by papal scribes during the middle of the 1400's. The chancery was a records office for ecclesiastical proceedings.

Many variant designs of the *littera cancellarescha* evolved, reflecting a variety of serif treatments, for instance. In general, chancery letters are slightly slanted (7 or 8 degrees) from the perpendicular. They are not necessarily joined, but they reflect rapid movement of the pen in their upward strokes and serif treatment. The letters are based on an oval shape, and although they typically reflect rapid writing, they are at the same time graceful and elegant (see figures 5–7).

¹The manuscript is part of a large bequest of Paul Standard, an author, calligrapher, man of letters, and the pre-eminent 20th century reviver of the chancery italic hand. A letter accompanying the manuscript, from Bruce Barker-Benfield of the Bodleian Library to Paul Standard, estimates a date of ca. 1550.

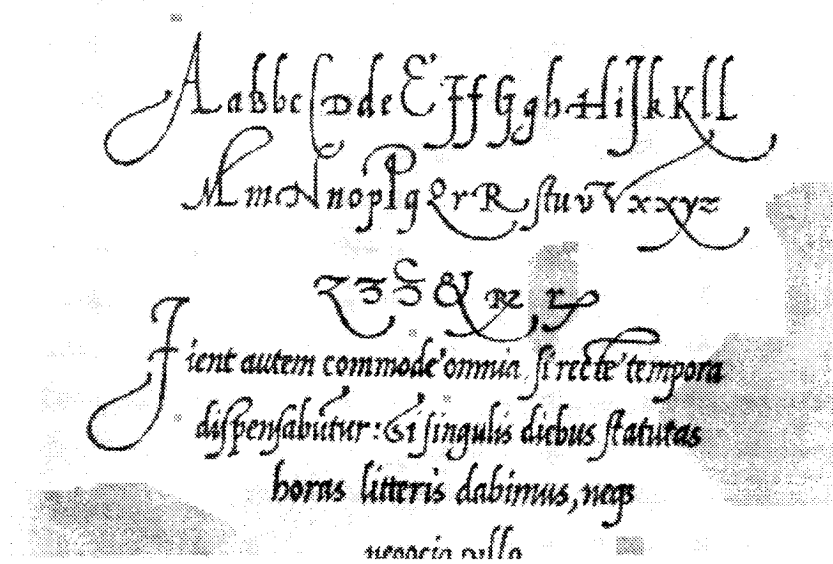


Figure 5
The chancery italic of Ludovico Arrighi Vincentino, 1522

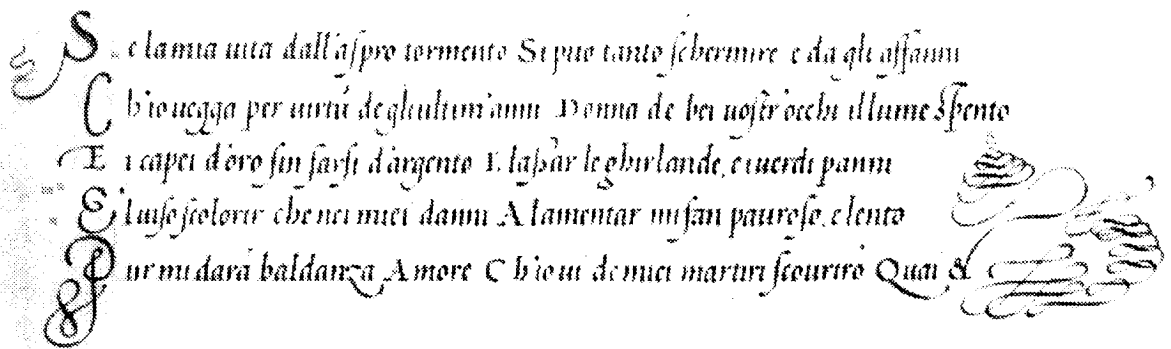


Figure 6
The chancery italic of Bernadino Cataneo, 1545

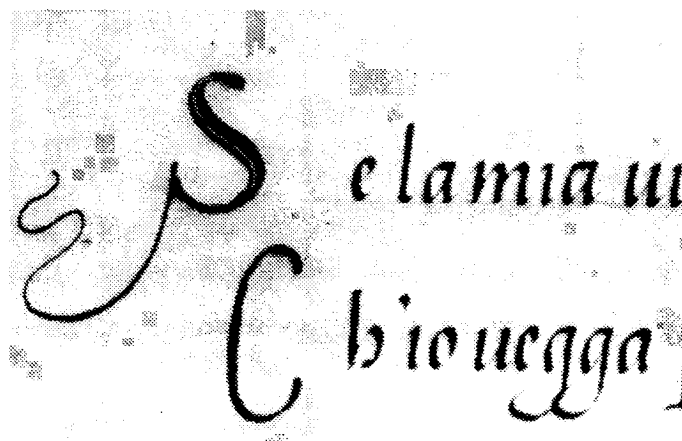


Figure 7
The chancery italic
of Bernadino Cataneo,
1545, detail

The Design Process

From Manuscript to TIFF

The manuscript was carefully and methodically examined to find the most aesthetically pleasing examples of letterforms for the upper and lower case alphabet. One of the most beautiful of the letterforms was a particular upper case 'P' (see figure 8), which will be used throughout the course of this text as an illustrative model in explaining the design process.

After identifying the particular characters to be used, slides of them were shot, using a 35 mm camera attached to a copy stand. This operation involved some fast footwork. The manuscript leaves are vellum, which responds very quickly to changes in temperature, drying and curling with extreme heat. In order to get close-up shots of the letters, even with the help of magnifying lenses the camera and the copy stand lights needed to be very close to the vellum. The process of focusing, shooting, turning on the lights, and turning off the lights needed to be accomplished adeptly, and in record time.

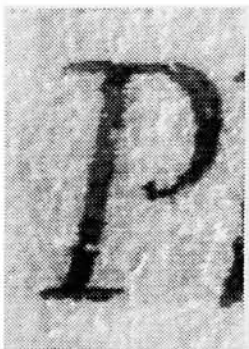


Figure 8
Detail of letter 'P' from
Decameron manuscript

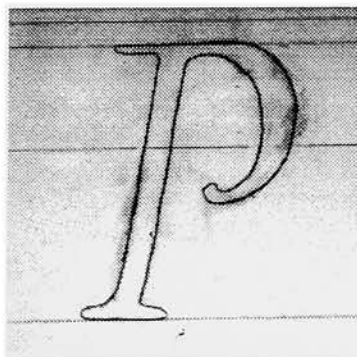


Figure 9
Pencil outline drawing of letter 'P'
from Decameron manuscript letterform

Slide images of the letterforms were projected on a wall, each image being adjusted so that the particular character fit into a grid which was affixed to the wall.

The grid consisted of a baseline, x-height, ascender, descender, and cap height lines, based on an x-height of about 130 points, or approximately 2 inches, as this was a comfortable size to work with. The overall height, from base line to ascender line, was about 336 points, approximately 4 5/8.”

After the slide image of a given character was fitted within the grid, an outline drawing of it was traced on translucent paper mounted on the grid (see figure 9). This process was carried out for all upper and lower case letters; as many of the 26 as were found in the manuscript² as well as some accents, ligatures, and punctuation marks. Numerals³ and other ‘missing’ characters were created with a calligraphy pen, and outline drawings were made from these forms. The complete set of outline drawings were scanned, using an Agfa Focus scanner, and each scanned character was saved as a TIFF (Tagged Image File Format) image.

From TIFF to Outlines

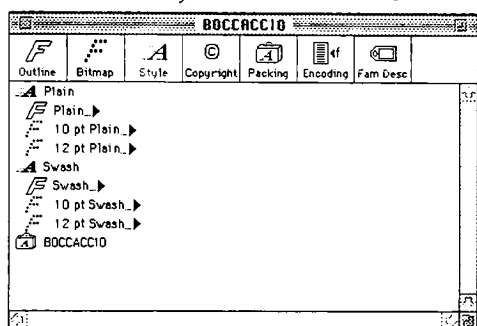
Letraset FontStudio™, a Mac-based type design software program, was chosen for the project, which was executed on a Macintosh IIcx computer. Many professional type designers use either FontStudio™ or Altsys Fontographer™—both offer similar features. Tutorials in both programs were completed, and FontStudio™ was the more user friendly of the two, hence the decision to use it.

²There were no models for the letters j, k, w, v, and y, and U, J, K, W, and Y.

³No Arabic numerals were used in the manuscript.

FontStudio™ allows the user to import scanned artwork and use it as a template for creating outlines. Outline fonts are the core of the program; from these outline fonts PostScript™ or TrueType™ font files can be created, which can be downloaded into a PostScript™ or TrueType™ printer or typesetter and which ultimately can produce high quality printed fonts.

Figure 10
Boccaccio™ family window in FontStudio™



The initial processes in designing the typeface⁴ involved opening a new family, selecting the style to be created within the family, and naming the family. Although the style of the typeface is italic, it had to be designated as a 'plain' style (as opposed

to an 'italic' style) because of the Macintosh font architecture (see **figure 10**). The name given to the typeface was '*Boccaccio™*,' a name well-suited to the character of the typeface.

The roman display characters referred to earlier in the text, if digitized, could be the *Boccaccio™* roman within the *Boccaccio™* family, with a suggested name of '*Decameron*.'

After opening a new family window in FontStudio™, the next step was to open the outline font window, a grid which displays the entire character set for a given font, within 256 boxes. If the character outline has not yet been created, the box appears gray, if it has been created, the box is white (see **figure 11**). This is the main control panel for the font, from which the user gains access to any of the given characters. Opening an individual box (by double-clicking on it)

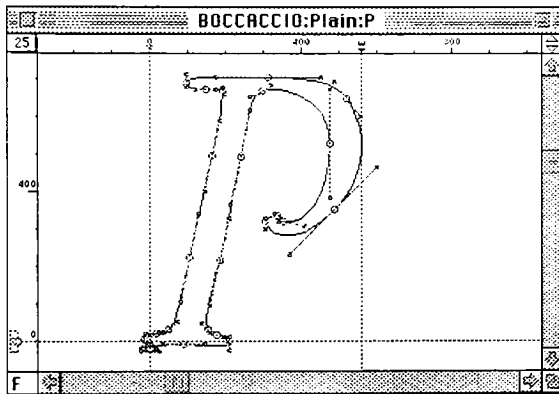
⁴It should be noted that this text will describe only the most essential steps in the type design project, without attempting to cover *all* details, especially those of a technical nature.

brings the the outline character window to the screen. The outline character window is the 'drawing board' where outlines are created and modified with various outline editing tools.

The outline character window has three layers: template, background, and foreground.

Scanned artwork, stored in the TIFF file format, is imported into the template layer, and

Figure 11
Boccaccio™ outline character window, letter 'P,' in
FontStudio™, showing points and endpoints



appears in gray. Similarly, character

outlines or other artwork may be pasted into the background layer, for reference in designing the character outline in the foreground layer.

The scanned outline drawings of the

manuscript letterforms were imported into their respective character outline window template layers, and these templates were used as guides to create the character outlines for Boccaccio™ (see figure 11).

Creating a character outline involves using the pen tool to build a series of paths which are based on the straight lines and curved segments of a character's contours. The character outline for the letter 'P,' for instance, has two paths: an inner path describing the inside or bowl of the letter, and an outer path describing the outermost contours of the letter. The straight and curved segments that make up a path are joined by endpoints. Manipulating the

endpoints and their corresponding tangent points changes the contours of the outlines.

The areas enclosed by the outlines fill in when printed, producing a solid character. Clicking on the bucket tool after creating a character outline causes the outline to fill in and appear as a solid character, which serves as a proofing aid throughout the design process. There is an optional sample text/character window within the outline character window, which is also a useful proofing tool. While these screen proofing features are helpful, they only reflect the relatively low resolution of the screen. Proofing with printed samples is a vital and ongoing activity throughout the design process. The characters should be proofed using an output device of the same resolution as that for which the type is being designed. Higher or lower resolution output devices would produce entirely different printed results, depending upon the device's interpretation of the character outline information. Initially, proofs of *Boccaccio*[™] were made of the characters and text on both an Agfa 300 dots per inch (dpi) laser printer and a Varsity 600 dpi laser printer, to test the quality of the letters within a range of low to mid-high-end output. The letterforms were sharper and more easily discernable at the higher rather than the lower resolution. All subsequent proofing was done at 600 dpi.

Throughout the character outline editing process proofs were made, in a variety of formats representing the character alone and in text. FontStudio[™] offers other proofing options, including printing character data, showing the filled-in character, as well as character data showing a character's points and endpoints, accompanied by a report of their respective x-y coordinates, if desired (see figures 12, 13). Printing a font layout enables the user to view the



Figure 12
Boccaccio™ character data, letter 'P,' filled in

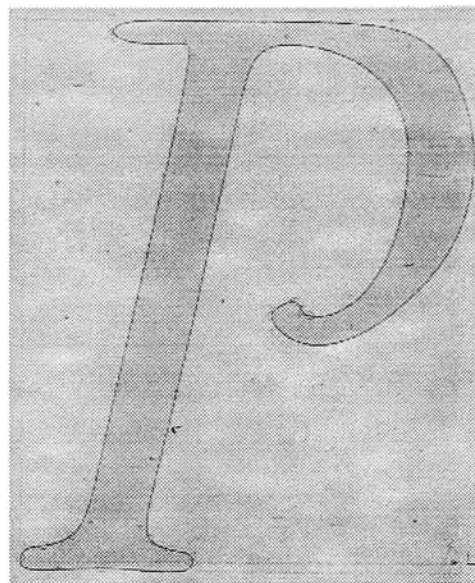


Figure 13
Boccaccio™ character data, letter 'P,' outline

Style: Italic		Font Layout						Document: BOCCACCIO-o	
Em Size: 1000								Point Size: 36	
								Sun, Oct 9, 1994 6:04 PM (Type 1)	

flipping, rotating, and skewing tools, outlines were created for all of the characters. One of the most valuable FontStudio™ tools is a library tool, which allows the user to store a library of parts—serifs, for instance—which can be retrieved and added to a character as desired.

For typefaces in which serif consistency is desired, this is an extremely useful and time-saving tool. In the making of *Boccaccio*™ the goal was to preserve the natural, hand-rendered look of the manuscript letterforms—in which all serifs were certainly not the same—so the library tool was not used; instead, the natural contours of the templates were followed in creating the character outlines.

When creating the outlines for each character, previously-made character outlines were used as references, to ensure consistency of stem thickness, amount of swelling in curved areas, x-height, and overall character height. A simple copy and paste routine enabled the importing of the outline of the lower case ‘i,’ for instance, into the reference layer of the character outline window of the lower case ‘t,’ so that after the initial outline for the ‘t’ was made, minor adjustments could be made, if necessary, to the stem thickness of the ‘t.’ Although the outline template drawings were a few generations removed from the original manuscript source, with the exception of the upper case characters very few adjustments were made in stem thickness after the fact. It should be noted that this part of the project—the actual creation of the outline characters—involved an extensive amount of proofing and revision, and represented the most time-consuming and energy-intensive aspect of the type design process.

Style: Italic	Text Sample	Document: BOCCACCIO-o
Em Size: 400		Point Size: 16 on 22, kerned
		Fri, Sep 16, 1994 3:01 PM (Type 1)

abcdefghijklmnopqrstuvwxyz&Z
ABCDEFGHIJKLMNOPQRSTUVWXYZXY&Z
1234567890.!?"'β

New typefaces have been designed in vast numbers in the twentieth century, and many old ones have been resuscitated. From 1960 to 1980, most new types and revivals

Figure 15

Boccaccio™ character showing, upper and lower case, before weight change in upper case

Style: Italic	Text Sample	Document: BOCCACCIO-o
Em Size: 1000		Point Size: 16 on 22
		Thu, Oct 27, 1994 3:30 PM (Type 1)

abcdefghijklmnopqrstuvwxyz&Z
ABCDEFGHIJKLMNOPQRSTUVWXYZXY&Z
1234567890.!?"'β::

§

§New typefaces have been designed in vast numbers in the twentieth century, and many old ones have been resuscitated. From 1960 to 1980, most new types and revivals

Figure 16

Boccaccio™ character showing, upper and lower case, after weight change in upper case


When type designer Tom Rickner, the project's primary technical consultant, critically reviewed the weight of the typeface after the outlines had been completed, he suggested increasing the stem weight of the upper case (which, in type, should appear darker in color than the lower case—a commonly held belief in design circles) (see **figures 15, 16**). The tool used to create the original manuscript—most probably a quill pen—produced letterforms, upper and lower case, of a uniform stem thickness. Changing the weight of the upper case was not a task

that could be performed with a universal key command. The weight needed to be increased without affecting the general character, proportions, or contours of each upper case character. After the weight of a few upper case characters had been changed they were proofed with lowercase characters until a visually successful balance was achieved. Subsequently the weight for all upper case characters was changed, an activity which was not unlike plastic surgery.

Character Spacing

After final revisions had been made for all outlines of the upper and lower case, as well as numerals, punctuation marks, and some accent marks, the all-important process of character spacing began. Noted British type designer and typographic journalist Walter Tracy has written that:

The type designer should be as concerned about the texture of his type *en masse* as about the shapes of the individual characters, and he or she ought to regard the fitting of them as an inescapable part of the design task.⁵

BOCCACCIO: Kerning: Plain									
Character Metrics			Kern As		Kerning Pairs		Parameters		
	Width	Left Side	Right	1st	2nd	Amount		Value	
M	990	-57	8			-100			0
N	810	-47	-38			-60			
O	670	31	31			-16			
P	560	-7	-10			24			
Q	749	35	-1244			-50			
R	637	-21	-177			-28			
S	510	0	50			-40			
100	Left: P -7						Kerning Pairs		Enabled Disabled
									

The fitting that Walter Tracy is referring to involves the balancing of white space on either side of the character—this space affects the look of the type, when the

Figure 17
Character width, side bearings, body width for Boccaccio™ upper case 'P.'

⁵Walter Tracy, *Letters of Credit, A View of Type Design* (Boston: David R. Godine, Publisher, 1986), p. 71.

characters are strung together as words. The spaces on either side of a character are referred to as left and right side bearings. The side bearings, together with the body width, make up the total character width (see figure 17). There is no one formula, per se, for fitting or character spacing. Noted type designers, including Tracy, have written, in varying degrees of detail, about their preferred methods for accomplishing the task. Walter Tracy writes that the fitting process is 'a combination of formula and optical judgement—though I have never seen such a system described in print.'⁶ In his *Letters of Credit, A View of Type Design* Tracy offers a very thorough description of his preferred method of spacing. The spacing of *Boccaccio*TM was based on Tom Rickner's advice, which was based on similar methods and principles as those of Walter Tracy. Because all letterforms have varying contours of straight, curved, and diagonal strokes, in spacing the characters one has to consider the variety of possible combinations of straight with curved, curved with curved, and so on. Tracy groups the letterforms as follows:

letters with a straight upward stroke: B D E F H I J K L M N P R U b d h i j k l m n p q r u

letters with a round stroke: C D G O P Q b c d e o p q

triangular letters: A V W X Y v w x y

the odd ones: S T Z a f g s t z⁷

The first step in the spacing process is to determine the best spacing of the letter 'H,' as the 'H' represents a bilaterally symmetrical, vertically stroked character. The spacing of the 'H' will determine the spacing of all upper case characters. FontStudioTM contains a kerning window, in which all character spacing is done. The side bearings and character widths can be

⁶Tracy, *Letters of Credit, A View of Type Design* (Boston: David R. Godine, Publisher, 1986), p. 72.

⁷Idem.

adjusted in this window either by highlighting the character in text, and moving it accordingly, or by changing the measurements numerically with the cursor. This is a very important and valuable feature of FontStudio™, because it allows one to see immediately the effect of changes in spacing.

To determine the correct spacing for the 'H,' a row of 'H's was entered in the kerning window, The side bearings and character width of the 'H' were manipulated until a good balance of white space was achieved inside and outside the row of 'H's. The process of spacing is largely based on visual judgement. While one may follow a system as the basis for spacing, the eye is the final judge. Furthermore, the spacing of characters is a building process—one should build the spacing of all other characters on the established spacing for the 'foundation' characters of 'H,' 'D,' and 'O,' for instance.

The left and right side bearings for the 'H' should be equal. With italic typefaces, it is not unusual for side bearings to have negative value, meaning that the character extends either to the left of the origin or to the right of the character width. Once having established the spacing for the 'H,' the same process was executed for the 'D,' testing the 'D' between 'H's, as follows: 'HHDHH.' The 'D' represents a combination of vertical and curved strokes. To set the left side bearing for the 'D,' a reference of the 'H' was pasted in the background of the 'D' character outline editing window, and the 'D' was moved accordingly to give it the same left side bearing as that of the 'H.' To set the right side bearing of the 'D,' the 'D' was set within the

test string of 'HHDHH' and the side bearing of the 'D' was moved until a good balance of white space had been achieved in the string of letterform shapes.

It should be noted that, as in the creating of outlines, in character spacing, the kerning window is an important and valuable proofing aid, but it needs to be supplemented by actual printed samples, not only of the test strings, but also of actual text. In addition, the proofing should be done at the point size and resolution at which the type is most likely to be read.⁸

The 'O,' a bilaterally symmetrical, *round* shape, was the next character to be spaced. The right side bearing of the 'D' was used as a reference for that of the 'O,' and for the left side bearing, the 'O' was tested between 'H's and 'D's, in a string of 'HHDHODOO. The spacing for the 'O' was adjusted accordingly until the string of curved and straight character combinations was well balanced. The remaining upper case characters were spaced, depending on their character shape grouping, using the 'H,' 'D,' and 'O' as reference characters. To test the letters in combination with other curved and straight forms, the 'HHDHODOO' string, was used, the variable letter being inserted in the 'D' position, for instance, 'HHAHOAOO,' and so on.

Spacing of the lower case as well was based on Tom Rickner's advice. A procedure was followed similar to that used for the upper case spacing, with the 'n' as the control character for the lower case—the 'n' being the most symmetrical vertically stroked lower case character.

⁸FontStudio™ User's Guide (Paramus, New Jersey: Letraset, 1991), p. 2–13.

To determine the left side bearing for the 'n', the left side bearing of the 'H' was used as a starting point, and the measurement was decreased somewhat (as apparently is usual) after testing a string of 'n's.

After the spacing for the 'n' was set, the 'p' was spaced. The 'p' represents a combination of curved and straight forms for the lower case, as does the 'D' for the upper case. The 'p' was tested between 'n's, in the string of 'nnpnn.' After spacing the 'p,' the 'o' (the lower case bilaterally symmetrical curved character) was spaced. The test string was as follows: 'nnpnopoo.' From these three lower case characters, 'n,' 'p,' and 'o,' the remaining lower case characters were spaced, by inserting the variable character in the test string in the 'p' slot, for instance 'nnfnopoo,' where 'f' was the character being spaced.

The spacing of numbers followed a formula similar to that used for the letterforms. First the spacing for the number '0' was set, using a test string of four '0's. Next the number '1' was spaced, using a test string of '00100.' The number '4' was spaced next, using a test string of '00401411.' The remaining numerals were spaced based on the '0,' '1,' and '4,' testing the number within the '00401411' string, inserting the variable number in the '4' slot, for instance '00701711,' where '7' was the character being spaced.

A set of accent marks was designed for the typeface, following Tom Rickner's advice. Creating accented characters, the 'ä' for example, involved yet another spacing process, (and one which

is more challenging with an italic typeface than with a roman one), which was the most complicated of all the spacing processes yet endeavored in the project. Tom Rickner's written treatise, 'Theories on Accent Placement,' (unpublished) served to clarify the process and greatly aided in its execution. The following account is based on the theories and instructions as set forth in this treatise.

In creating accented characters, the preferred approach is to use the same spacing and shape as the parent character (for the 'ä,' the 'a' is the parent character) and so should not be made until the shapes and spacing for the parent characters are complete.⁹

The first step was to determine the optimum spacing for a symmetrical accent mark, the umlaut (¨), by centering it over its own body and setting it in the kerning window among a string of 'n's until the optimum side bearings were determined. Next all other accent marks were given the same character width as the umlaut. Then the proper height was determined for the accents over the lower case characters, by using an 'o' as reference, and adjusting all accents until they were set at a visually pleasing distance above the 'o.' The next step was to move the umlaut to right or left so that it was visually centered over the 'o.' Moving the umlaut character to left or right creates an offset in the x coordinate, i.e. 100 units to the right.

The same offset was then applied to the other accent marks, moving them each 100 units in creating the other 'o'-accented characters.

⁹Similarly, ligatures should be created *after* the character spacing is complete. I realized the validity of this statement when I looked at the ligatures which I had made *before* I completed the spacing—they were noticeably too tightly spaced when seen in context with the spaced characters (see figures 18, 19).

financial official affections
financial official affections

Figure 18

Boccaccio™ ligatures made before character spacing, in context with spaced characters.

financial official affections
financial official affections

Figure 19

Boccaccio™ ligatures made after character spacing, in context with spaced characters.

The goal in creating this first set of accented characters (the 'o'-accented characters) was not only to create the characters, but also to center each accent (remember that all accents have the same character width, established by that of the umlaut) relative to the umlaut. During this initial process as described in the previous paragraph, the offsets were being applied to accents *within* the 'o'-accented character outline windows, not within the individual accent mark outline windows (the accent marks within the accented characters are copies of the individual accent marks, and moving copies of them does not affect the original individual accent marks). The next step was to go into the actual individual accent mark outline window, and move the actual accent mark, while simultaneously looking at a window of the accented character, to visually center the accent over the character. Moving the original accent mark effects the same change in the copy of the accent in the accented character outline window. Moving the *original* accent mark ensured that it was centered *relative to the umlaut*. For the other lower case accented characters, the umlaut was centered over the parent character, i. e. the 'a,' and the offset was determined for the other 'a'-accented characters. A similar process was used for making the upper case accented characters.

Kerning

After character spacing and composite characters were completed, kerned pairs were created. Kerning refers to removing space between two characters which, when set together with their standard side bearings, do not look visually well spaced, for instance 'Ty,' 'AV,' 'Wa.'

The FontStudio™ kerning window allows the type designer to create any desired kerned pair, by using the kern tool to adjusting the given letter combination, or by inserting numerical values in the parameters section. The 'kern as' function enables the designer to specify a kern amount for one character and then to use the character as a reference in determining kern amounts for others of similar design. The window contains a kerning pairs list, which displays all of the defined kerned pairs and their kern amounts (see figure 20).

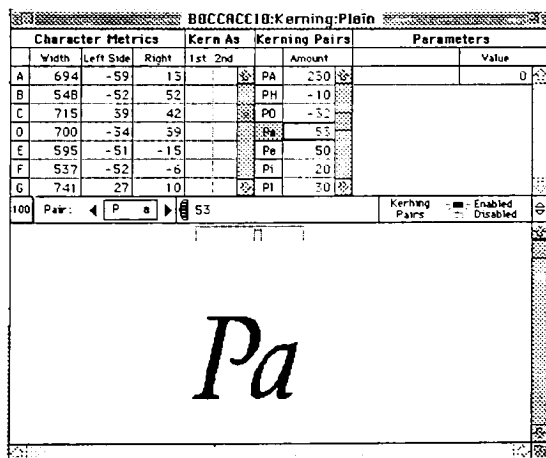


Figure 20
FontStudio™ kerning window, with kerning enabled,
showing kerning information

Tom Rickner recommended a process with which to create kerned pairs. The first step was to kern the upper case characters to themselves, starting with 'AAA,' the 'ABA,' and so on, continuing with 'BBB,' 'BAB,' 'BCB,' and so on, throughout the alphabet.

Next this process was repeated with the

lower case alphabet, and finally, the process was repeated kerning the upper case to the lower case, with 'Aa,' 'Ba,' and so on for all the possible upper and lower case combinations.

In addition, kerned pairs of punctuation marks combined with letterforms were created, for instance the open quotes with an upper case 'A' ("A), or a comma following a 'y' (y,, for instance.

Creating a Useable Font

After all of the refining touches were completed, the process of creating a useable font was initiated. FontStudio™ allows the designer to choose between creating a PostScript™ Type 1™ font, or a TrueType™ font; *Boccaccio*™ was created as a PostScript™ Type 1™ font. In order to create a PostScript™ Type 1™ font, a bitmap (screen) font of *Boccaccio*™ needed to be made to accompany the outline fonts. Making a bitmap font is a function that FontStudio™ can perform automatically. If perfecting the bitmap font had been a concern, extensive editing of the *Boccaccio*™ bitmap font may have been necessary, which would have been another project in and of itself. The primary objective was to create a useable (printer) typeface for printed medium, so the *Boccaccio*™ bitmap created by FontStudio™ was adequate for the project, and served only as a necessary step towards the making of a useable font.

A packing list was created, containing the names of styles to be packed in a font suitcase—in this case the packing list simply was *Boccaccio*™ 'Plain' (see figure 18). Next, in the pack suitcase window, the PostScript™ font file format and the Type 1™ format were specified, as

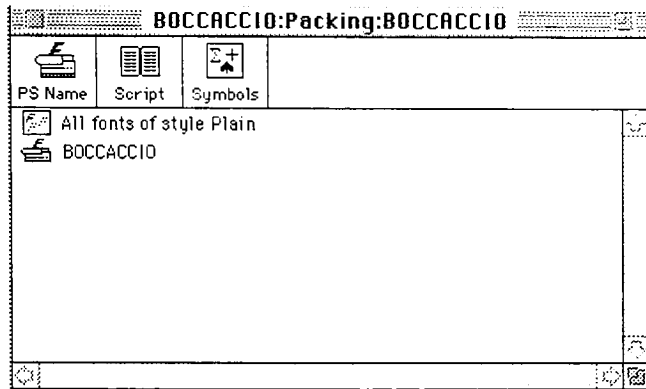


Figure 21
FontStudio™ packing window

well as the family number, a unique identification (id) number which is assigned to a font to ensure that it does not conflict with the unique id numbers assigned to any other fonts installed in the system. The next step was to specify the folder within

the computer hard drive in which to store *Boccaccio*™, in this case the System Folder, and install the font into the hard drive.

Marketing the Font

If *Boccaccio*™ were to be marketed, an appropriate font distributor(s) would be chosen to distribute and advertise the font, and the distributor would be provided with sets of proofs of the font. Potential font distributors would include foundries, such as Monotype, mail order type distributors, such as Precision Type, or software or hardware (i.e. printer) manufacturers, such as Adobe or Hewlett-Packard, who would sell the font as part of a software package or as a printer font, for instance.

Because *Boccaccio*™ is a conservative typeface, and would be used primarily for text as opposed to display, it would be best to choose a foundry or font distributor whose types are generally of this character, such as Monotype or ITC (International Typeface Corporation).

A contract would be negotiated between designer and font distributor. The contract would cover such details as royalty, which in most cases averages at 15%, according to Tom Rickner. If *Boccaccio*[™] is sold to Agfa, for example, the typeface, per se, is not sold, but rather the *rights to licence* the typeface. Agfa would be licenced to sell fonts of *Boccaccio*[™] and unless they had an exclusive licence to sell the fonts, they might sublicense the fonts to other distributors such as ITC or Monotype.

For every font sold by Agfa, the royalty would be 15% of the revenue, and for every copy sold through a sublicenced (through Agfa) distributor, the royalty would be 15% of Agfa's percentage of profit from the sublicenced distributor's revenue. Some font distributors use exclusive licencing, which means that they buy exclusive rights to licence the fonts, and do not sublicense to any other distributor. This alternative is advantageous because the royalty percentage tends to be higher, sometimes as high as 50%. In addition, licencing the font exclusively to one font distributor would ensure consistency of design of the typeface. If for instance *Boccaccio*[™] is sold to Agfa, and they sublicense the font to Monotype, the character metrics, encoding, kerned pairs and other information will very likely be changed according to the sublicensee's particular character digitization preferences. If *Boccaccio*[™] is sold to a printer manufacturer or software manufacturer, they cannot sublicense the font, except to the end user—when the end user buys a font, they are not buying the typeface or font, but rather they are buying a licencing agreement to use the font. The font distributor would offer standard sizes of 9, 10, 12, 14, 18, and 24 point fonts of the type.

In terms of typeface protection, *Boccaccio*TM can immediately be given a commonlaw trademark, simply by adding the trademark symbol to the name. While this does not provide legal protection to the typeface, it may serve as a deterrent to any would-be font pirates.

If *Boccaccio*TM is marketed to font distributors and it sells well, then it would be a wise decision to register the typeface name as a trademark, which legally protects the name. A successful typeface on the market, without a trademark, would be fair game for anyone to copy, and even to sell under the same name. Unfortunately, in the United States a designer can protect a typeface in name only, with a trademark, but the *design* of the typeface cannot be copyrighted. The designer can apply for a patent on the design to protect the design rights, but this is a relatively costly process. Because the designs of most marketed typefaces are not protected, unscrupulous 'font manufacturers' too often issue fonts with designs, often poorly digitized, that are blatant copies or bastardizations of existing, legitimate fonts.

*Boccaccio*TM: *Characters*

The completed character set for *Boccaccio*TM includes upper and lower case, oldstyle figures, punctuation, accented characters, pi characters, and ornaments. Following (see figure 22) is a character showing, displayed at 16 point.

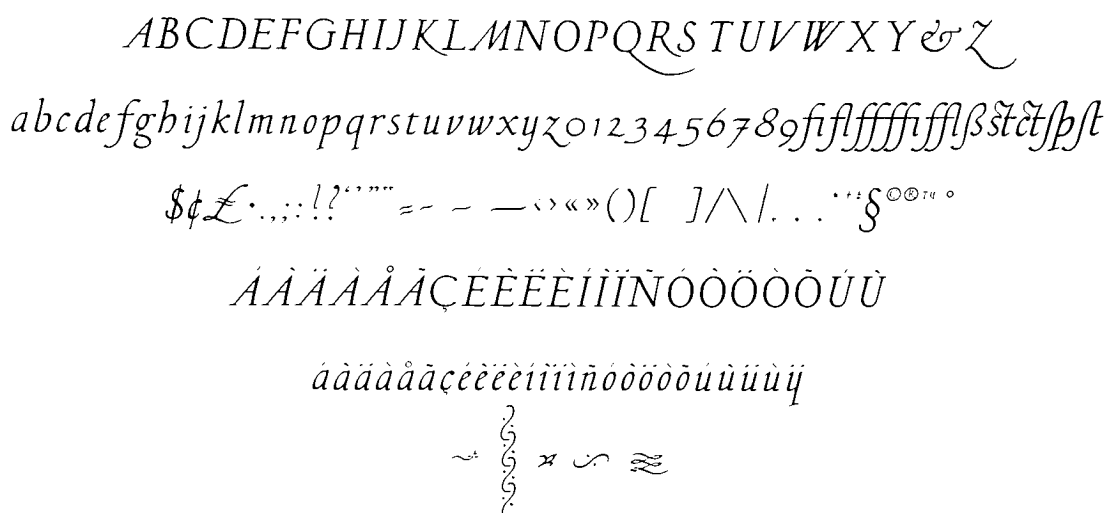


Figure 22
Boccaccio™, character showing, 16 point

Boccaccio™ in Use

Boccaccio™ is typeface that can be used for setting text, for instance poetry. It would not be appropriate for some kinds of text, for instance a math textbook or a legal document. As with any typeface, one should consider the nature of the words to be communicated in choosing an appropriate typeface. *Boccaccio™* might be used to set the text of a book of poems, perhaps a short story, or a period piece. *Boccaccio™* can certainly be used for formal text, such as invitations, or for certain product packaging, for instance on a wine label. As with many italic typefaces, *Boccaccio™* can be used for captions, in combination with a roman text face. The following examples are specimens of the type in use. If *Boccaccio™* were to be characterized, one could say that although it has formal qualities, at the same time it has a fluid, warm quality, giving it friendly character, within its formality (see figures 23–25).

Figure 23
Boccaccio™ in use: an invitation

CELEBRATE

*The opening of the exhibit of JMW Turner
English Landscapes
in the Special Exhibitions East Gallery*



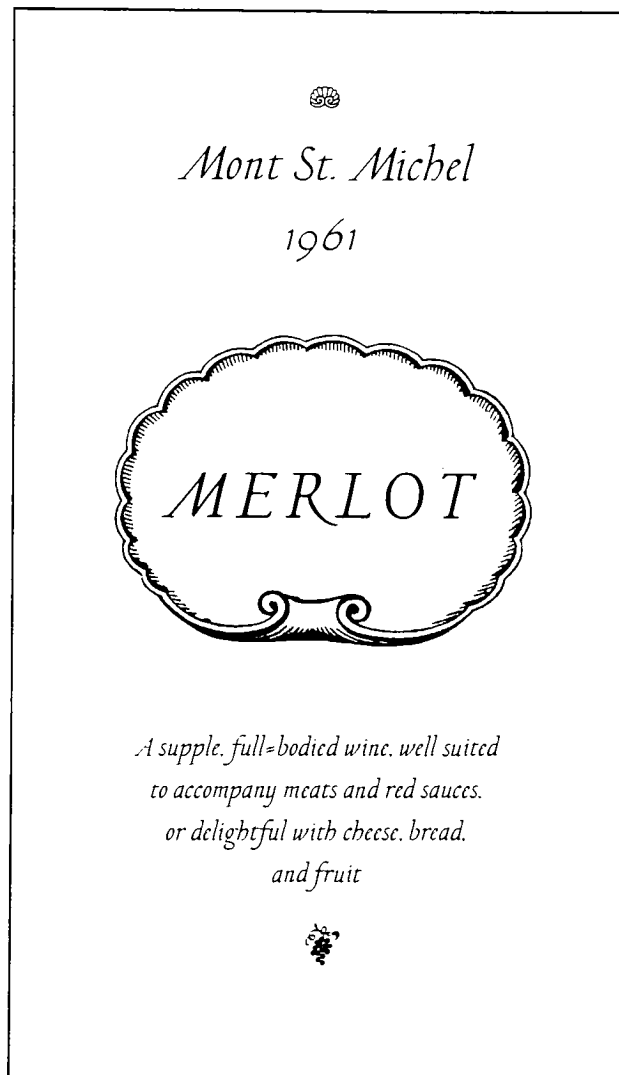
*Tuesday, 6 December 1994
6 - 9 pm*

*THE CLEVELAND MUSEUM OF ART
1150 East Boulevard
Cleveland, Ohio*



Please send the enclosed RSVP by 15 November

Figure 24
Boccaccio™ in use: a wine label



Sea Fever
John Masefield

*I must go down to the seas again, to the lonely sea and the sky,
And all I ask is a tall ship and a star to steer her by,
And the wheel's kick and the wind's song and the white sail's shaking:
And a gray mist on the sea's face, and a gray dawn breaking.*

*I must go down to the seas again, for the call of the running tide
Is a wild call and a clear call that may not be denied:
And all I ask is a windy day with the white clouds flying,
And the flung spray and the blown spume, and the sea gulls crying.*

*I must go down to the seas again, to the vagrant gypsy life,
To the gull's way and the whale's way where the wind's like a
whetted knife:
And all I ask is a merry yarn from a laughing fellow-rover,
And quiet sleep and a sweet dream when the long trick's over.*



The Sea Gypsy
Richard Hovey

*I am fevered with the sunset,
I am fretful with the bay
For the wander thirst is on me
And my soul is in Cathay.*

*There's a schooner in the offing,
With her top=sails shot with fire,
And my heart has gone aboard her
For the Islands of Desire.*

*I must forth again tomorrow!
With the sunset I must be,
Hull down on the trail of rapture
In the wonder of the Sea.*

Chapter 3: Summary and Conclusions

The purpose of this project was to create a digital typeface, based on an historical, hand-rendered model, to explore the process of using digital technology to create a typeface with the character and nuances of hand-written letterforms.

The project was a successful one—a digital font was created, and much was learned about the process of designing and creating type, with today's tools. The media of type, and the tools used to create it certainly have changed. Rather than sculpting the characters out of metal, the modern type designer crafts the characters with curves, points, and lines, manipulating character outlines on the computer screen. Instead of testing the design by making a smoke proof from a punch, as did metal type designers, today's type designer produces the proofs with a laser printer, at any size, and at a variety of possible resolutions.

Creating the letterforms out of curves and points, and working with outlines was in effect *sculpting* the characters, despite the fact that template forms were used as guides. Creating the contours of a letter—studying the shapes, the stem width, the relationship of one part to another part—gave the author a very real sense of the form and structure of each character, and increased her appreciation for letterforms. She discovered that the process of type designing, regardless of the medium or tools used, is very much a matter of visual judgement and painstaking attention to detail. In designing the characters, one must constantly strive not

only for harmony of form within the character itself, but also harmony of form within the context of all of the other characters of the typeface.

The digital typeface *Boccaccio*TM does, in fact, retain the quality of the original hand-rendered form. It is useful to compare a page of text from the manuscript to a page of text produced in the digitized typeface (see figures 26, 27). The spacing of the digitized typeface is slightly looser than that of the manuscript. This relatively loose spacing was necessary in order to avoid colliding characters. The calligrapher, having complete control over the pen and the letterforms, was able to space the letters closely, adjusting the individual letterforms accordingly to create a harmonious fit.

The method used to translate the original letterforms into the digital medium—photographing the original and creating outline drawings—was successful. Some distortion may have been introduced by the curvature of the manuscript during the photographing procedure; likewise some distortion may have occurred during the procedure of making outline drawings from the projected slide images. Any potential distortion, however, was minor, and did not significantly affect the final result. If a similar project is undertaken in future, a slightly different technique might be used, by taking photographs (as opposed to slides) of the characters, and by using a camera with special lenses to correct for distortion, similar to the procedure used by type designers Janice Prescott Fishman and Allan Haley, in the creation of the ITC Bodoni typeface, part of which process the author had the opportunity to watch here

S E C O N D A .

na fuggire, quanto la paura di non fare per la fragilità della mia giouan-
 za, se allui maritata fossi, cosa, che fosse contra le diuine leggi, et contra l'honore
 del Real sangue del padre mio, et cose disposte uoluntà d'Iddio, il quale sola-
 otimamente conosce cio, che fu mestiere a ciascuno, et per la sua misericordia
 colui, che allui piaceua, che mio marito fosse, mi puote auanti a gli occhi, et quel
 fu questo giouane, et mostro Alessandro, il quale uoi qui appresso di me uedete,
 gli cui costumi, et il cui ualore son degni di qualunque gran donna, quantunque
 forse la nobiltà del suo sangue non sia così chiara, come è la reale. Lui ho adun-
 preso, et lui uoglio, ne mai alcuno altro n'habito, che che se ne debba parere al pa-
 dre mio, o ad altrui, perche la principal cagione per la quale mi mossi, et colta ui
 ma piacque mi di fornire il mio camino, si per uisitare gli sani luoghi, et reue-
 rendi, de quali questa città è piena, et la uostra Sancta, et si perche ancora il con-
 tratto Matrimonio tra Alessandro, et me solamente nella presenza d'Iddio io fa-
 cessi aperto nella uostra, et per consequente de gli altri buomini, perche humilmy
 ui predo, che quella, che a Iddio, et a me è piaciuto sia a grado a uoi, et la uostra
 benedictione ne domate, acciò con quella, si come con più certezza del piacere
 di colui delquale uoi siete Vicario, noi possiamo insieme all'honore di Iddio, et del
 uostro uiuere, et ultimamente nutrire. Marauigliossi Alessandro udendo la moglie
 essere figliuola del Re d'Inghilterra, et di mirabile allegrezza occulta fu ripieno.
 Ma più si marauigliarono gli due cavalieri, et si siurarono, che se in altra parte,
 che dauanti al Papa stati fossero haberebbono ad Alessandro, et forse alla donna
 fatta uillania. D'altra parte il Papa si marauiglio assai, et dell'habito della donna
 et della sua electione, ma conoscendo, che indietro tornare non si potea, la uolle del
 suo prego sodisfare, et primieramente racconsolati i cavalieri, liquali turbati cono-
 sceua, et in buona pace con la donna, et con Alessandro rimessi gli diede ordine a quello
 che da fare fosse, et il giorno posto dallui, essendo uenuto dauanti a tutti i Cardina-
 li, et a molti altri gran ualenti buomini, liquali inuitati, ad una grandissima fe-
 sta dallui apparecchiata eran uenuti, et fece uenire la donna realmente uestita,
 laquale tanto bella, et si piaceuole pareua, che meritamente da tutti era commenda-
 ta, et simigliantemente Alessandro splendidamente uestito, in apparenza, et in co-
 stumi no

S E C O N D A .

na fuggire. quanto la paura di non fare per la fragilità della mia giouanezza se allui maritata fossi cosa. che. fosse contra le diuine leggi. et contra l'honore del Real sangue del padre mio. et cosi disposta uenendo. Iddio. ilquale solo. ottimamente conosce ciò. che fa mestiere a ciascuno credo per la sua misericordia colui. che allui piaceua. che miomarito fosse. ini puose auanti a gliocchi. et quel fu questo giouane et mostrò Alessandro ilquale uoi qui appresso di me uedete. gli cui costumi. et il cui ualore son degni di qualunque gran donna. quantunque forse la nobilità del suo sangue non sia cosi chiara. come è la reale. Lui ho adunq; preso. et lui ouglìo. ne mai alcuno altro n'haurò che che se ne debba parere al padre mio. o ad altrui. perche la principal cagione per la quale mi mossi è tolta uia ma piacquemì di fornire il mio camino. sì per uisitare gli sanu luoghi. et reuerendi. dequali questa città è piena. et la uostra Santità. et sì perche ancora il contratto Matrimonio tra Alessandro. et me solamente nella presenza d'Iddio io facessi aperto nella uostra et per conseguente de gli altri huomini. perche humilm; ui predo. che quello. che a Iddio. et a me è piaciuto sia a grado a uoi. et la uostra beneditione ne domate. accioche con quella. sì come con più certezza del piacere di colui delquale uoi siete Vicario. noi possiamo insieme all'honore di Iddio. et del uostro uiuere. et ultimamente morire. Marauigliossi Alessandro udendo la moglie essere figliuola del Re d'Inghilterra. et di mirabile allegrezza occulta fu ripieno. Ma più si marauigliarono gli due cauallieri. et si turarono. che se in altra parte. che dauanti al Papa stati fossero haurebbono ad Alessandro. et forse alla donna fatta uillania. D'altra parte il Papa si marauiglio assai. et delhabito della donna et della sua elettione. ma conoscendo. che indietro tornare non si potea. la uolle del suo prego sodisfare. et premieramente racconsolati i cauallieri. liquali turbati conoseca. et in buona pace con la donna. et con Alessandro rimesigli diede ordine a quello che da fare fosse. et il giorno posto dallui. essendo uenuto dauanti a tutti i Cardinali. et à molti altri gran ualenti huomini. liquali. ✽

at RIT in the Melbert B. Cary, Jr. Graphic Arts Collection. Type designer Kris Holmes, during a recent visit to RIT, told the author that when creating a typeface design on screen from an historical source, she keeps either the original source (i.e. a manuscript) or photographic images of the letterforms close at hand, so that she can periodically study the forms through a 600x magnifying lens, as she is working on screen with templates of outline drawings of the original letterforms.

The author would advise anyone who wishes to learn about type design to undertake the project of designing a typeface. The student or interested person should realize, however, that undertaking a project of this nature represents a significant commitment of time, if it is to be done with serious intent. One should also realize that learning a type design program is a project in and of itself. Also, the student should be especially aware of equipment needed to successfully complete the project—a computer, a scanner, and a printer, with plenty of paper for making a seemingly unlimited number of proofs throughout the process. The student should keep all proofs, original drawings, and other documentation, as a record of the design process, not only for the student's personal reference, but also for a potential use in a specimen book or archive, should the student decide to market the typeface.

The author recommends that for the initial type design project, the student should choose a roman face, as opposed to an italic one. Because of the angled nature of italic letterforms, they are more challenging forms to work with, digitally, than roman forms, which tend to be

relatively regular, with typically vertical and horizontal strokes. If the author designs any typefaces in the future, her next typeface will be a roman typeface to accompany *Boccaccio*TM, based on the roman display characters (referred to earlier in the text) used in the manuscript.

The novice type designer should approach the project realizing that simply having the tools available does not mean that the skills of type design will come automatically, or will be a built-in feature of the type design software program. Developing a critical typographic eye and a keen sense of detail, acquiring a solid understanding of the technical and aesthetic aspects of the making of type—these are skills that are developed with experience, over time, as with any discipline. There is no definitive manual on how to design type—only bits of information in texts written by various type designers, or found in technical specification manuals for type design software architecture. To learn about the myriad of details involved in type design, one needs to seek out a professional type designer, and to listen, watch, and learn from their experience. Today's type design tools make the *process* of type design more accessible than ever before—the *expertise* needed to utilize these tools to their fullest potential is still a learned, acquired skill, and one which requires practice and discipline.

Type designer Jan van Krimpen wrote:

I have formed the opinion that the best thing to do when a young or youngish designer seems 'to have it' is to let him have his own way with his first design and in producing a fount of type after it. This may seem 'uncanonical,'... a similar proceeding will give the unexperienced designer an opportunity to do everything he perhaps ought not to do, to learn from having done it he

should not do it again, cure him from his errors, and, it is hoped, complete his sense for discipline in a craft which needs discipline as hardly any other.¹⁰

The making of *Boccaccio*TM represents a first attempt at type design. The author can certainly appreciate the years of experience that are represented in some of the world's most successful (technically and aesthetically) typefaces. What was learned even from this initial experience was invaluable to the author's continuing (and, she hopes, lifelong) education in and understanding of letterforms and the art and science of graphic communications.

¹⁰Jan van Krimpen, "On Designing and Devising Type," *Chap Book*, Number 32. (New York: The Typophiles, 1932) : 47–48.

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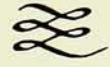
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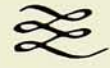
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Appendix A



BOCCACCIO



Boccaccio was designed from a manuscript of the 'Decameron,' dating from the mid-16th century, housed in the Melbert B. Cary, Jr. Graphic Arts Collection. The typeface was designed as a thesis project by Margaret Luise von Koschembahr. ∞

This keepsake, modelled after a page from the manuscript, represents the first public showing of Boccaccio, and was presented on 8 November 1994, at the defense of the thesis, in the School of Printing Management and Sciences, College of Imaging Arts and Sciences, Rochester Institute of Technology, Rochester, New York. ∞ ∞ ∞ ∞

S E C O N D A .

na fuggire, quanto la paura di non fare per la fragilità della mia giouanezza se allui maritata fossi cosa, che, fosse contra le diuine leggi, et contra l'honore del Real sangue del padre mio, et così disposta uenendo, Iddio, ilquale solo, ottimamente conosce ciò, che fa mestiere a ciascuno credo per la sua misericordia colui, che allui piaceva, che miomarito fosse, ini puose auanti a gliocchi, et quel fu questo giouane et mostrò Aleßandro ilquale uoi qui appresso di me uedete, gli cui costumi, et il cui ualore son degni di qualunque gran donna, quantunque forse la nobiltà del suo sangue non sia così chiara, come è la reale. Lui ho adunq; preso, et lui ouoglio, ne mai alcuno altro n'haurò che che se ne debba parere al padre mio, o ad altrui, perche la principal cagione per la quale mi mossi è tolta uia ma piacquemi di fornire il mio camino, si per uisitare gli sanu luoghi, et reuerendi, dequali questa città è piena, et la uostra Santità, et si perche ancora il contratto Matrimonio tra Aleßandro, et me solamente nella presenza d'Iddio io faceßi aperto nella uostra et per conseguente de gli altri huomini, perche humilm; ui predo, che quello, che a Iddio, et a me è piaciuto sia a grado a uoi, et la uostra beneditione ne domate, accioche con quella, si come con più certezza del piacere di colui delquale uoi siete Vicario, noi possiamo insieme all'honore di Iddio, et del uostro uiuere, et ultimamente morire. Marauigliosi Aleßandro udendo la moglie essere figliuola del Re d'Inghilterra, et di mirabile allegrezza occulta fu ripieno.

Ma più si marauigliarono gli due caualieri, et si turarono, che se in altra parte, che dauanti al Papa stati fossero haurebbono ad Aleßandro, et forse alla donna fatta uillania. D'altra parte il Papa si marauiglio assai, et delhabito della donna et della sua elettione, ma conoscendo, che indietro tornare non si potea, la uolle del suo prego sodisfare, et premieramente racconsolati i caualieri, liquali turbati conoseca, et in buona pace con la donna, et con Aleßandro rimesigli diede ordine a quello che da fare fosse, et il giorno posto dallui, essendo uenuto dauanti a tutti i Cardinali, et à molti altri gran ualenti huomini, liquali. ✱

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Appendix B

Appendix B: Glossary of Terms

Adjustable mold A mechanism, invented by Johann Gutenberg in the mid 15th century, and used in the process of metal type. The type matrix is fitted inside the mold, which has an aperture that can be adjusted to the width of the letter desired. Molten metal is poured inside the mold to form the type.

Ascender Vertical character stems projecting above the mean line. Lowercase characters b, d, h, and k have ascenders.

Baseline The invisible horizontal line on which typeset or hand written characters align.

Bitmap A digital image made up of rectangular dots, or pixels.

Bitmap font A font made up of bitmap characters, used for screen display of a font.

Bowl Curved stroke of a character, projecting from a stem, for instance, 'P,' 'B,' 'R.'

Cap height The distance from the baseline to the top of the capital or upper case line.

Color, typographic The blackness or denseness of a character, or of text.

Cursor The vertical blinking bar displayed on the screen, in text areas of computer software programs, indicating to the user the space in which to enter a character or characters of text.

Descender Vertical character stems projecting below the baseline. Lowercase characters 'p,' 'j,' 'q,' and 'y' have descenders.

Display In reference to type size, any size over 14 point. In reference to type design, any type which is not considered traditional text type, usually of a highly individual design. Types used for advertising are generally considered display types.

Dots per inch (dpi) In digital typography and laser printing, output resolution is measured in terms of dots per inch.

Em-square In digital typography, the reference square within which a character in a font exists. The em square is made up of relative units.

Family Fonts with a common design, differing in style variation only. Times Roman Bold and Times Roman Italic are part of the Times Roman family, for instance.

Glossary of Terms, continued

File In metal type-making, the instrument used to carve away the metal in fashioning metal type punches.

Fit A term used to describe the visual appearance of one character relative to another.

Font 1. A character set. In metal type, characters of the same design in one particular size.
2. In digital type, the font is the digital information encoding the characters of a given design.

Font Identification Number A unique number assigned to each font installed in a computer system.

Font suitcase A Macintosh system icon name for a file used to store outline and bitmap information for a digital font.

Italic A style of letterform, generally slanted in posture, as distinguished from Roman (upright) letterforms.

Kerning Adjusting the spacing, or fit, of a character to compensate for undesirable visual effects in spacing when combined with another character.

Ligature Two or more letters combined to form one character. The ffl ligature is formed by joining together (into a new design) two 'f' characters and an 'l' character. The ligature character shape is generally different from the individual component characters, for instance 'fi' as opposed to 'f i.'

Matrix In metal type composition, a piece of metal into which a character has been stamped by a punch or engraved, and into which molten metal is poured to form metal type.

Mean line The invisible horizontal line which measures the top of the height of the lower case characters that do not have ascenders.

Packing list In FontStudio,[™] the list of styles in a family which are incorporated into a suitcase and used to generate bitmap, PostScript[™], or TrueType[™] font formats.

Pi character Extra Characters not normally supplied as part of a normal character set.

Pica A unit of typographic measure, equal to 12 points, or 0.166 inches, and used to express line length and text page depth.

Glossary of Terms, continued

Point A unit of typographic measure. In the American-British system 1 point is equivalent to 0.01383 inches (0.01388 inches in desktop software applications) or 0.35 millimeters.

PostScript™ A programming language, developed by Adobe Systems, for description of text and images. PostScript compatible output devices (i.e. laser printers) receive page description data from the computer in PostScript format.

Posture A term used to describe the angle of a character, relative to the baseline.

Punch In metal type-making, a bar of steel at the end of which is the character, in relief. The punch is driven into a piece of brass or copper to form the matrix, a negative image of the character.

Quill pen An instrument for writing, fashioned from a feather. The writing tip or nib of the quill pen is created by whittling the end of the quill into a sharp, angled point. The angle at which the point is held creates variations in thickness of stroke, and, in the hands of a skilled calligrapher, the quill pen can create beautiful calligraphic characters.

Recto The right-hand page of a book or manuscript.

Relative unit In digital type, a fraction of the em-square of a font.

Resolution The number of dots or pixels per inch. The higher the number of dots per inch, the more information the image contains.

Roman A descriptive style term for typefaces, used relative to other styles being used. For example: Bodoni Roman as opposed to Bodoni Italic to differentiate between the Roman (upright) and the italic (slanted) postures; or if identifying a type as having a seriffed (Roman) as opposed to a sans-serif style.

Serif Cross strokes at the ends or beginnings of a character's main stems.

Side bearings The left and right sidebearings of a character refer to the white space on either side of the character. The set width, combined with the character body make up the total character width.

Glossary of Terms, continued

Smoke proof In metal type-making, throughout the punchcutting process, smoke proofs are made of the character. The punch is held in the flame of a candle, and a layer of soot blackens the surface. The punch is then pressed into paper to produce a right reading image of the character which can be analyzed and compared to other characters.

Stem The main strokes of a character.

Style Variation in weight or posture.

Text In reference to type size, 6–12 point type is considered to be text size. In reference to type design, type which is designed for use in continuous text.

TIFF Tagged Image File Format. A digital format in which to store scanned images.

TrueType™ A digital coded font format co-developed by Apple and Microsoft, one of the scalable font technologies which enable generation of different sizes of the same design from one master typeface outline file.

Type 1™ A digital coded font format, developed by Adobe, part of the PostScript™ language. Type 1 is one of the scalable font technologies which enable generation of different sizes of the same design from one master typeface outline file.

Typesetting In metal type-making, the process of making type by pouring molten metal into a matrix within a mold, producing solid metal type.

Typeface The name of all variations and all sizes of a design.

Verso The left-hand page of a book or manuscript.

Weight The thickness of stem.

x-height The distance between the baseline and the meanline measuring the height of the lower case 'x,' used to describe the relative height of the lowercase non-ascending and descending characters.

Appendix C

Appendix C: Illustration Sources

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5. Hayes, James. <i>The Roman Letter</i> . Chicago: Lakeside Press Galleries, 1951–52. p. 40. (scanned image)	5
6. Atkins, Kathryn A. <i>Masters of the Italic Letter: Twenty-Two Exemplars from the Sixteenth Century</i> . Boston: David R. Godine Publisher, Incorporated, 1988. p. 40. (scanned image)	5
7. Atkins, Kathryn A. <i>Masters of the Italic Letter: Twenty-Two Exemplars from the Sixteenth Century</i> . Boston: David R. Godine Publisher, Incorporated, 1988. p. 41. (scanned image)	5
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Colophon

This thesis was generated in QuarkXPress® version 3.3 on a Macintosh Ilcx. Typeset in Adobe Multiple Master Myriad™ and Myriad™ Italic; 400 Regular-600 Normal weight for text, and 565 Semibold-600 Normal weight for headings. Images were scanned in Adobe Photoshop™ version 2.5. Reflective images were scanned on an Agfa Focus Scanner; transparent images were scanned on an Agfa Horizon scanner. PICT files of FontStudio™ windows were generated with Exposure Pro™ version 1.0.2.

Originals were output on a Varityper 600 dpi laser printer, and reproduced on a Xerox 1065 copier, on Weyerhaeuser Jaguar 70 pound text, vellum finish white paper.