

## CHAPTER 25 TYPOGRAPHY AND THE PRINTED ENGLISH TEXT

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From the inception of the printed word, typography has both driven and reflected the development and formal conventions of language use. Writing systems have informed the development of type, and patterns of typographic usage have in turn influenced the practice of writing.

### EARLY PRINTING

Gutenberg's first printed books from 1455 onward, represent the most significant development in the history of the written word, a transition from forms created in the act of writing, to the assembly of standardized letters for print.

Though he is popularly described as the inventor of printing, the press itself was the less innovative of Gutenberg's achievements. Presses had been widely used for the stamping of metals, and for the printing of engravings and rudimentary 'block books' in which a page of text was engraved into a single block. The most significant innovation of the early printers, whether attributable to Gutenberg or his immediate successors, was the concept of a mould from which multiple copies of each letter could be identically cast for subsequent assembly into text.

The details of Gutenberg's working methods are unknown and widely contested, but studies of the printed outcomes indicate that he made a far greater number of variant letter shapes than were to occur in later phases of printing. His character-set incorporated differing forms of certain letters and many special letter pairings (ligatures) necessitated by the characteristics of two adjacent letters. These variants were a natural consequence of an apparently simple aim: to replicate as closely as possible upon the printed page, the appearance of the manuscript hand which preceded it.

Popular reading of type history assumes a chronological progression away from the imitation of 'autographic' (or handwritten) letters toward the stylistic autonomy of wholly 'typographic' designs. Considered in detail however, the relationships between writing and type over their shared 600 year history reflect a more nuanced and complex dialogue which continues into current practice.

During the first phase of printing, letter design followed the scribal model of the Germanic Textura: the earliest form of Blackletter. This style of letter was the norm

#### Blackletter

Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.

Robert Bringhurst

for the making of manuscripts, and involved some stylistic variation according to the size of letter and page.

As printing spread from the German-speaking countries into southern Europe in the later part of the fifteenth century, Blackletter was supplanted by the idiom that was to become known as ‘Roman’ type. The Roman letter drew upon the inscriptional traditions of the imperial Roman capital and a compatible lower case from the humanist roundhand, – itself a revived form of the Carolingian miniscule – used by humanist scholars in Italy for the copying of classical Latin manuscripts in the early fifteenth century.

The change from Blackletter to Roman took various forms. Günther Zainer of Augsburg designed types in 1472 and 1473 which incorporate Gothic influences into Roman letters (Carter 1969: 49-50). The types cast by Sweynheim and Pannhartz at Subiaco from 1465 retain gothic characteristics alongside the imitation of miniscule writing into the development of an emerging typographic style.

This development was consolidated in the Roman letters of Venetian typefounders, initially in the work of Johann and Wendelin de Spira and then most notably by their main successor Nicholas Jenson. These illustrate a transition from the ‘imitative’ phase of early type design, toward the emergence of typographic form as an idiom in its own right,

## **TYPE PRODUCTION**

To understand the developments in the design of types for print, it is necessary to consider the means by which they were manufactured, and in particular the cutting of the punches – the original master components from which the moulds were made.

Each letter was engraved in relief, in reverse, out of the end of an annealed steel rod, which was then hardened and used to make an impression into a block of softer metal (usually copper) called a strike. This ‘right-reading’ impression was trimmed to the desired width to form the matrix, which was inserted into a hand-held mould to receive the molten type-metal to cast a ‘sort’ – a single piece of printers type comprising a raised, reversed letter on a body of standardized depth. Fig 1a, 1b

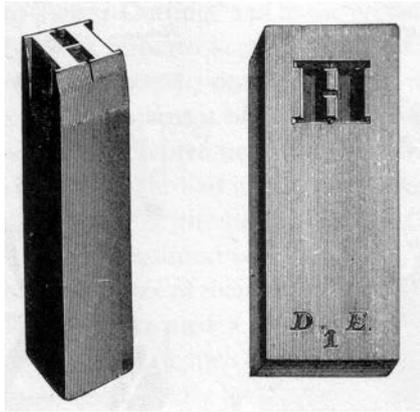


Figure 25.1a

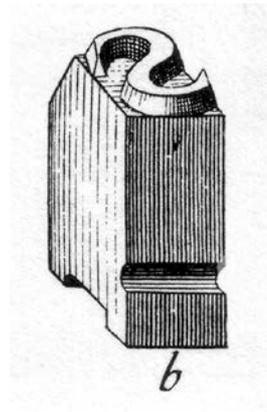


Figure 25.1b

While it is not possible to determine exactly how far this sequence of processes had been formalized by Gutenberg or his immediate successors, – and the extent to which it was used in the production of the 42-line and Mainz bibles remains contentious – the principle of casting metal letters from matrices struck from punches provided the means by which the new technology of printing spread across Europe. The punch and matrix were the media through which type design was realized, stored and disseminated.

In view of the scale at which the punchcutter was working (frequently cutting letters less than three millimetres in height), it can be argued that punch cutting was also the context within which a significant part of the design process occurred. The face of a punch of text size is too small for pre-drawn letter shapes to provide any more than a general guideline, and the punchcutter's craft remained a mediating factor in the design of type until the technological developments of the late nineteenth century.

The chronology of type design reflects the influence of this process upon the evolution of typographic style, informing a development away from the replication of written form and toward the idiom that Carter (1969: 41) describes as the 'Printer's letter'.

A punch is a sculptural object, the reversed letterform created by the removal of excess steel. Unlike the written, engraved or incised letter, it is subtractive, cut in relief. Its relationship to a letter-shape determined by an autographic stroke is at best a secondary one.

This system required punches to be cut for each size of type, and the design of early types was specific to individual sizes, described using terms such as Brevier and Primer that indicate context and function as well as style. The idea of a unit-based system for describing the size of type was first proposed by Pierre-Simon Fournier in 1737 and further formalized by Francoise-Ambroise Didot, while the idea of applying a single design across a range of sizes was not fully established until the advent of mechanized matrix-cutting in the following century.

Variations between different point systems (caused by national differences in the inch from which the point was derived) persisted until 1982 when the development of Postscript established a standard ‘desktop publishing point’ of 1/72 of an Anglo-Saxon inch, corresponding to the pixel grid (Phinney 2011).

Jenson and his contemporaries established the humanist typeface, a model which would be revived by type designers of the late nineteenth and early twentieth century, most notably in William Morris’s Golden Type cut by Edward Prince in 1889-1890. These are letters in which the effects of the writer’s nib remain an identifiable feature in the variation of line thickness. The eminent typographer Bruce Rogers, whose 1914 Centaur was one of the most distinguished contemporary revivals in this idiom, noted that the forms of Jenson’s letters could be readily traced with a broad pen (Lawson 1990: 67).

Another key identifier of this phase of type design is the angled cross-bar of the lower case <e>, a feature which was to be rationalized to the horizontal in the next cycle of development, seen in Fig 25.2.



Fig. 25.2

While very significant in retrospect, the Venetian letter was only in use for a short period of the late fifteenth century, to be succeeded by the letters cut by Francesco Griffo for Aldus Manutius. Popularly known as Aldines, these formed the model upon which Claude Garamond and others would develop and refine the ‘Old Face’ Roman letter, which would remain the norm until the eighteenth century, and continues as the dominant style for long text setting.

The use of Blackletter however remained an important secondary idiom in English printing (Twyman 1993: 110–11), leading to the misnomer ‘Old English’ as a description for Textura that remains in type nomenclature to the present. It continued to be used alongside Roman for emphasis or differentiation until the development of ‘related bold’ fonts in the 19th Century.

## DEVELOPMENTS IN TYPE PRODUCTION

For the first European printers punchcutting, casting and printing had been aspects of one integrated process of manufacture. Types were cut for the exclusive use of specific printers, and typefounders were often closely associated with particular printers and publishers (Carter 1969: 94).

As the culture of printing developed in the sixteenth century, its component processes emerged as trades in their own right. Typefounding evolved as a distinct profession, increasingly autonomous of the printing enterprises it served. While Jenson's letters are the product of one integrated operation as both cutter and founder, and Griffo cut his Aldine letters specifically for the use of Manutius, the next generation of punchcutters were to produce punches and matrices for sale and export.

Claude Garamond (or 'Garamont') was the first independent typefounder in France. Christophe Plantin, one of the most significant printers of his time, owned matrices but had

<p>Garamond</p> <p>Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.</p> <p>Robert Bringhurst</p>
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them cast by several different founders (Carter 1969: 95). During the sixteenth and seventeenth centuries the Netherlands and Germany became a key centre for the production and distribution of types and matrices as saleable commodities, bought and sold at major European trade fairs. This served both to facilitate the spread of stylistic change and to establish and maintain norms and conventions. On the one hand, they were portable and were frequently traded across borders and adapted to the requirements of different languages, with the consequent spread of stylistic developments across Europe. On the other hand, they represented a significant investment for typefounder or printer, and would have a long working life, factors which determined the limited pace of innovation.

## EARLY ENGLISH PRINTING AND THE STANDARDIZATION OF LANGUAGE

The first English printers were largely dependent upon foreign types. Caxton set up his printing works in 1476 using type brought from Bruges, and developed rudimentary casting of his own (Reed 1887: 77–8). As printer and translator, producing the majority of his books in English, he was responsible for establishing standards of usage and adapting type to the requirements of the English language. His assistant and successor De Worde used designs from France and the Low Countries. Wolfgang Hopyl of Paris printed for the English market and probably supplied matrices to the English printers, as many of his types occur in the work of English printers in the 16th Century (Reed 1887: 84).

In many instances, foreign fonts of type were augmented by sorts from new punches cut to accommodate the requirements of English. De Worde had several forms of <w> cut to his own design (Reed 1887: 84). The books of his contemporary Richard Pynson from 1492 were influential in the standardization of English and were also among the first English books to be set in Roman type.

Reed (1887: 90) credits John Day as the first English printer to be his own letter-founder and to cast whole fonts of type from his own punches, and his work from the 1560s therefore enjoys a closer relationship to the English writing system than that of his predecessors. One of Day's earlier fonts was a Saxon, and the relationship of English to Anglo-Saxon and Old English writing was to present some defining challenges to the English printing trade and inform aspects of typographic usage.

### **LEGACIES OF OLD ENGLISH AND ANGLO-SAXON**

Several developments in written English derived from the adaptation of Old English letters to fit the constraints of the early Latin character set. The types used by Caxton and his contemporaries originated in Holland and Belgium, and did not provide for the continuing use of elements of the Old English alphabet such as *thorn* <þ>, *eth* <ð>, and *yogh* <ȝ>. The substitution of visually similar typographic forms has led to some anomalies which persist to this day in the reprinting of archaic texts and the spelling of regional words.

The widely misunderstood 'ye' occurs through a habit of printer's usage that originates in Caxton's time, when printers would substitute the <y> (often accompanied by a superscript <e>) in place of the thorn <þ> or the eth <ð>, both of which were used to denote both the voiced and non-voiced sounds, /ð/ and /θ/ (Anderson 1969: 169).

The yogh <ȝ> often represented /x/ and was sometimes replaced with the visually similar <z>, the origin of the anomalous spelling of Scots names such as *Dalziel* and *Menzies*. In other cases it was replaced by <gh> or <ch> as in *ought* and *loch*.

The letter <æ> of the Old English alphabet called *aesc* or *ash*, derived from the Anglo-Saxon variant of runic script known as Futhorc, survived this process undamaged, through its close correspondence to the ligature for the Latin letter <æ>, firmly established as a typographic form.

### **THE TYPE CASE AND THE ALPHABET**

From the late fifteenth to the eighteenth century a gradual consolidation of practice established norms across both writing and printing. During this period, as an international trade in punches and matrices helped develop consensus on the extent of the alphabet and the

additional letters for which punches should be cut, the extent of the type case became more standardized. The developing culture of printing developed practical efficiencies as well as refining aesthetic expectations. Anomalies were corrected, some letters became redundant, while other previously interchangeable allographs were differentiated and formally included in the alphabet.

Increased mass literacy and a consequent trend toward vernacular publications, required the typefounder to consider the specific typographic requirements of different European languages.

Since the advent of printing several letters have been added to the working alphabet, while others have disappeared from use.

The Roman letters originated in scripts that did not include the letter 'W' or differentiate 'V' from 'U' and 'I' from 'J'. Jenson's fount consists of 23 capital letters and 23 lower case; <W> and <J> are absent, as are the capital <U> and lower case <v>. The <W> was limited to English and areas of central western Europe, and was not used in French or Italian. Caxton's types, seen in Fig 25.3, had necessitated the cutting of special punches for the absent <W>, which first emerges as a Roman letter in its own right in the Double Pica Roman of John Day in 1574 (Reed 1887: 92).

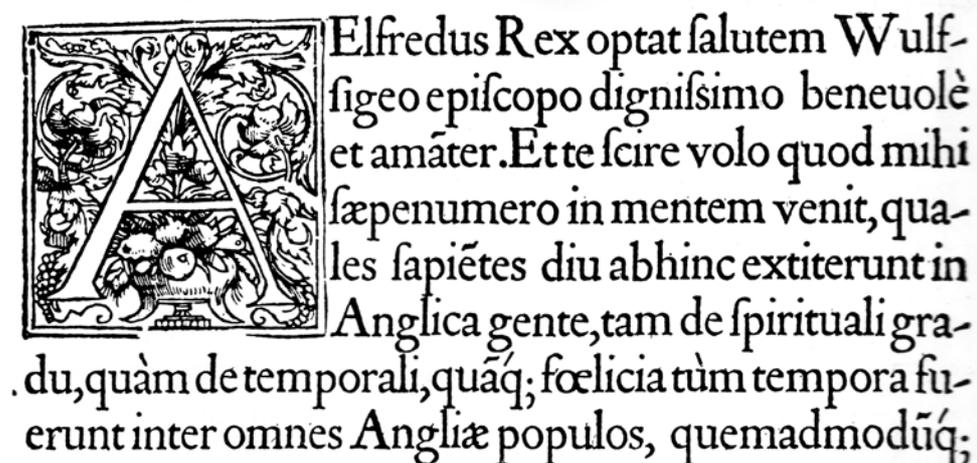


Fig 25.3

<u> and <v> were originally used to denote the same sound. In the scribal practices of the middle ages, the <v> form was used at the beginning of a word and <u> in the middle or end. This convention is reflected in the type cases of early printers. Key examples from Jenson and Garamond show the <V> form as exclusive to the upper case and the <u> as limited to lower case (Updike 1922: 22, 278-9). The lower case <v> is differentiated from the <u> in the roman faces cut by Hopyl and Estienne in the 1490s, but the differentiation of the

capitals was not used until the seventeenth century, when it occurs in the work of Lazarus Zetzner of Strasburg.

The humanist grammarian Trissino is credited with first differentiating <I> and <J> as representing different sounds. The letter ‘J’ was originally a contextual swash variant of the ‘I’ used in Roman numerals, and from the eleventh to the sixteenth century <I> was used for both consonant and vowel sounds. The earliest instance of a distinction by pronunciation between <i> and <j>, and <u> and <v>, occurs in the English edition of *Dyalogues between Salomon and Marcolphus* printed at Antwerp by Leeu around 1492 (Updike 1922: 278-9), and this entered established practice through the work of Louis Elzevir, who printed at Leyden from 1595 to 1616. In England, individual attempts to differentiate <i> and <j> were made during the 16th Century, in the work of Richard Day and George Bishop, who published in 1586 a translation of La Primaudaye's *French Academie*, in which <i j u v> are differentiated as in modern use, but without the use of a capital <J> or <U>, which were introduced by Zetzner in 1619.

The long ‘s’ <Ç> continued in widespread use up to the end of the eighteenth century. An allograph rather than a different letter altogether, this was used in addition to the familiar shorter form <s>. Mosley (2008) notes that the early printers generally followed the established practice of an initial and medial long ‘s’ and final short ‘s’, but in some instances a short ‘s’ was substituted in letter pairs that would otherwise have caused kerning difficulties. The upright Roman form of the long ‘s’ <Ç> resembles a lower case <f> with the right-side crossbar, while the italic form <ç> dispenses with the crossbar altogether.

The decline of the long ‘s’ coincides closely with the emergence of the Modern or Didone letter in the eighteenth century. Though used in Bodoni’s earlier work, it is absent from *Manuale Typografico* of 1788, and was not used by Francois-Ambroise Didot in the types he cut in the 1780s (Mosley 2008).

In England, the printer John Bell argued against its continued use. It was not included in the types cut for him by Richard Austin in 1788, or used in his newspaper *The World* from 1787. Absent from British ‘Modern’ faces of the late eighteenth century, its use after this date was generally limited to deliberate historical effect or pastiche.

The linked forms <æ> and <œ>, as in *mediaeval* and *encyclopaedia*, originated in Latin and were retained in English printing as typographic entities in their own right. The modern practice of substituting either one of the two letters did not occur until the late

nineteenth century. The <œ> form also occurs in some French words (*oeuf*, *oeuvre*, while the <æ> was used to denote the old English aesc or ash.

## LIGATURES

While the first century of printing rationalized language use in line with emerging typographic standards, some calligraphic practices were absorbed to become components of typography. This assimilation of habits and patterns of writing into printed form is reflected in the development of the typographic ligature. A ligature is the linking stroke connecting two letters, but the term is used in a more general sense to describe those compound forms in which two letters have been linked to form a single unit. The resulting letter-shape would be cast upon a single body to create a distinct ‘sort’ (and in current digital technology would occupy a distinct glyph window).

While handwriting does not distinguish ligatures from the flow of a linked writing style, for the typesetter the question is an absolute one. Adapting the sequential medium of writing into materially separate units of type had required Gutenberg and his successors to consider the relational characteristics of letters and letter pairs. In these first instances, accurate mimicry of manuscript pages required the casting of very large numbers of letter variants and ligatures (linked groups of letters cast as a single piece of type) (Updike, 1922: 8). Over time however, typographic letter relationships would be rationalized to a limited set of ligature pairs.

Ligatures may be divided into three categories. The first, which we might term ‘lexical’ or ‘phonetic’ ligatures, comprises those letter-pairs that denote a specific phonetic value: <œ> and <æ> are typical examples within English typography. Recognized as distinct typographic entities throughout the first three centuries of printing, their place within the typographic alphabet was only challenged by mechanical advances in the nineteenth century.

The second are often distinguished as ‘typographic’ or ‘stylistic’ ligatures. They provide aesthetic solutions to mechanical problems, notably those caused by the overhanging features of letters such as the lower case <f>. The tendency for this letter to conflict with succeeding letters has led to the established ‘standard’ ligatures <fi, fl, ff, ffi, ffl>, in which the tittle (dot) of the <i> is replaced by the terminal of the overhanging <f>, and the <fl> and <ff> pairs are joined into a single form

Larger sets were in use in many fonts, particularly italics, up to the late nineteenth century, and have seen widespread revival in the digital era.

The long ‘s’ had an identical overhang and necessitated a similar ligature set, but one based upon a different set of letter-pairs. The Roman and italic types imported from Holland

by John Fell for the Oxford University Press in the late seventeenth century include long ‘sh’ and long ‘st’ (Morison 1967: 1981, 135), as in Fig 25.4

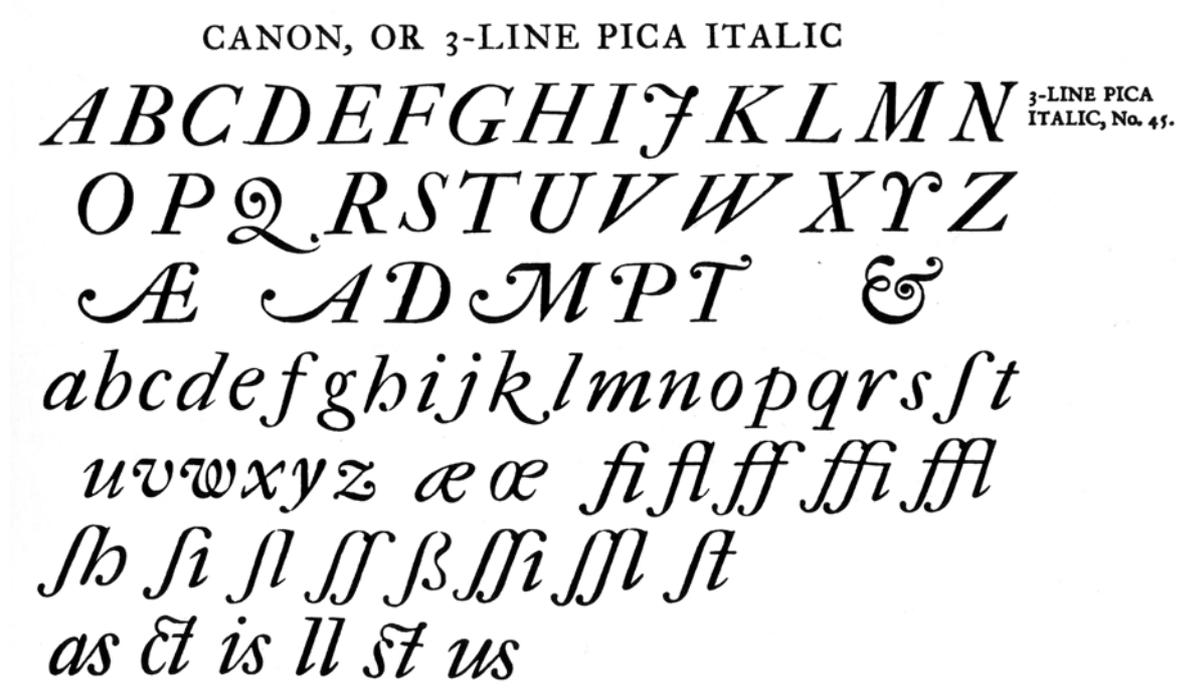


Fig 25.4

The third category includes those forms termed ‘archaic’ ligatures (often designated ‘discretionary’ in current typographic software). The most common surviving examples are the linked <ct> and <st>, which remained in widespread use through the eighteenth century. They are neither prompted by the practical/aesthetic considerations which necessitated the <f> and long-s <Ç> ligatures, nor the specific linguistic purpose of the <æ> and <œ> digraphs. They are orthographic rather than typographic; a survival from scribal practice as the elision of frequently occurring letter-pairs into a single stroke. Their survival may be due in part to the revival in 1844 of Caslon Old Face by the Whittingham Press for *The Diary of Lady Willoughby*, a novel set in the seventeenth century, which also made deliberate use of the long ‘s’ and other archaic mannerisms. The inclusion of these ligatures in one of the first significant typographic revivals may have served to ensure their place in the ‘classic’ character set, surviving the absorption of Caslon foundry in the 1930s by Stephenson Blake. While they were absent from most adaptations of old face types for mechanical setting, and from most photsetting systems, they have been reintroduced in the most recent phases of digital design, notably in Carol Twombly’s Adobe Caslon, seen in Figs 5a and 5b.



Fig 25.5a    Fig 25.5b

Mechanical composition served to reinforce the distinction of ‘standard’ ligatures, consolidating the status of the five f-ligatures while marginalizing others.

The practical limitations of the Monotype and Linotype systems informed the design of new types, and some traditional features were moderated by the requirements of industrial typesetting. Line casting systems such as Linotype and Intertype did not allow for the casting of kerns (the overhanging features used to accommodate the overhanging stroke of the lower case <f>) and required a ‘non-kerning <f>’ that would not overhang the following letter.

Times New Roman, as designed for Monotype setting, has an <f> loop that necessitates only an <fi> and an <fl> ligature; it is restrained enough that the <ff> pair does not cause problems. Adapted for linotype setting as Times, however, the free-standing <f> is abbreviated so severely as to not require any kerning.

Though the emergent technology of phototypesetting might have offered greater flexibility, types adapted to this medium from machine-composition tended already to have suffered a standardization of ligature provision.

Early digital type design, constrained by limits of memory, tended to reinforce this rationalizing tendency; ligatures were limited, and those reductions of character set that had occurred in the transition from metal were retained or indeed taken further.

The more recent phases of the digital era have seen a proliferation of revived ligatures and indeed the invention of new ones. The most widespread example is the introduction of a new ‘standard’ ligature, the <th>, developed by Robert Slimbach for many of the Adobe pro fonts series, seen in Fig 25.6.

**MISSING**

### Contractions

The ampersand, seen in Fig 25.7 – abbreviated from *and per se and* – is sometimes described as a ligature, since it originates in the fusion of the letters <e> and <t>.



Fig 25.7

The elision of the two letters however involves such modification as to render them unrecognizable in most cases, and the compound form has become an established and distinct logogram in its own right.

The writing system at this time also included the use of sigla; abbreviations of Latin words or word-parts retained from scribal practice which survived into typographic form. These were extensively used by Jenson and can be seen in the types of Garamond and Le Bé.

### **TYPE AND WRITING: THE ITALIC**

The interaction between writing and type design is a complex and recurrent dialogue that continues throughout the history of the printed word. This is particularly evident in the complementary idiom of the italic letter, which has continued to draw upon the outside influences

*Italic Times New Roman  
Typography is the craft of endowing  
human language with a durable visual  
form, and thus with an independent  
existence.*

*Robert Bringhurst*

of calligraphy at each stage in its development. The italic is a typographic genre in which writing styles exercise quite different influences upon design than in Roman type, and has informed by several stylistic developments in writing quite distinct from the roundhand. The first italic types were cut by Griffo for Aldus and first printed in 1501, and were lower case only. They were used in combination with small Roman capitals, and were intended for the setting of entire texts.

The Aldine italic resembles the copying hand used by de Niccoli in the 1420s. It was widely imitated in France and Germany and was adopted by the Parisian typefounder Simon de Collines in 1528. In the same year an italic from Antwerp was first used in England by de Worde (Reed 1987: 86).

The second stylistic tendency in cursive type also originated in Italy, and reflects the influence of the contemporary chancery hand used by Vatican scribes. The cancelleresca corsiva was exemplified by the writing-master Ludovico degli Arrighi in his 1522 writing manual *la Operina* and then developed as type for the first of his printed books in 1524. His contemporary Giovanantonio Tagliente was also instrumental in the spread of the Italian chancery type (Carter 1969: 120)

De Colines used types in both the cancelleresca and Aldine modes. Garamond's Great Primer Italic of 1539 marks the introduction of sloped capitals, and a blend of Aldine and cancelleresca qualities (Carter 1969: 122). Guyot of Antwerp had noted the need to pair Roman and italic fonts in the 1540s, and it would appear that he cut his types with this purpose in mind (Carter 1969: 125). The design of 'companion' italics is also associated with Robert Granjon, who cut a range of italics across a range of sizes between 1540 and 1589, which were widely used across Europe. His St Augustin Premiere, in use by 1543, was among the last to be envisaged as type for main text rather than as an auxiliary to Roman, and whose subsequent work was to establish the role of the italic as secondary companion font.

Carter (1969: 125) attributes this development to the practice of alternating Roman and italic for decorative effect on title pages. He notes that the role of italic as a secondary face had been established by the end of the sixteenth century, but its use had not been standardized. It was used for heading, prefaces, or for Latin passages occurring in vernacular texts. Conventions of practice in the use of italics developed gradually and inconsistently to the nineteenth century.

The stylistic correspondence between the Roman and the companion italic varies widely from one typeface to another. Reed (1887: 47) notes that Caslon made uniform series of italics 'having due relation ... to the size and proportions of the corresponding Roman'.

### **INNOVATION: THE MODERN LETTER**

From Aldus in the late fifteenth century to Garamond and Caslon, stylistic changes in typeface design were largely incremental refinements of an established model. In the eighteenth century however the types of Simon-Pierre Fournier in France and John Baskerville in England initiated a stylistic change which led to the 'Modern' faces of Firmin Didot in France, Giovanbattista Bodoni in Italy and Justus Erich Walbaum in Germany.

<p><b>Baskerville</b>          Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.</p> <p style="text-align: right;">Robert Bringhurst</p>
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Fournier and Baskerville's typefaces, along with those cut by Richard Austin for John Bell, are described for this reason as Transitional, and are characterized by a greater symmetry of construction and higher contrast of stroke width than the Old Face types. The Modern types, to which these designs were to lead, are thought to mark the complete autonomy of the typographic letter as an idiom independent of any reference to the writer's hand. In the work of Bodoni, Didot and Walbaum the calligraphic modulation and inclined stress that were a legacy of Jenson's types are replaced by an engineered rationality in letters

that appear designed and constructed rather than written. The symmetry around a vertical axis embodies the spirit of the enlightenment, suggesting a reasoned and scientific methodology.

The Modern letter is however also aligned to the penmanship of the Romantic period, and informed by developments in both writing and engraving. The change from a square nib to a pointed quill, introduced by Cresci and his contemporaries in the late sixteenth century, determines the stroke modulation by pen pressure rather than nib angle. In this, the action of the pen corresponds closely to that of the engraver's burin, and Anderson (1969: 171) takes the view that the enhanced contrasts of the Modern letter are attributable to influences from engraving, which combined with improvements in print technology and presswork to enable the printing of finer and more highly contrasted type.

The idea that the letters of Didot, Bodoni and Walbaum represent the enlightenment in a wholly autonomous approach to typographic design, owes much to the persuasive rhetoric of the *Romain du Roi*. Described by Mosley (2010) as 'the first known type for which a separate "design" was made', the letters of the *romain du roi* were supervised by a committee of the Académie des Sciences in an attempt to rationalise type design according to scientific principles.

Tracy (2004: 62) quotes Johnson's description of Grandjean's *romain du roi* italics as 'the first example of a true secondary italic', derived from the Roman as part of an integrated design, an idea later promoted by Stanley Morison in his preference for the 'sloped Roman' (Tracy 2004: 63-5).

Purportedly designed upon a uniform grid and determined according to scientific principles, some of the italic letters cut by Phillipe Grandjean may in fact owe more to the calligrapher Jean-Baptiste Allais than to the rationale imposed upon them (Mosley 2010). The nature and scale of punchcutting at text size required a great deal of mediation through the skill of the punchcutter, and the letters must therefore have been determined largely by his hand and eye rather than the formulae proposed by the committee. The grid engravings may be more usefully viewed as the expression of an ideal than as functional working drawings for the letters (Kinross 1994: 18).

Writing in this period, as formalized in the early 18th century by English writing masters such as Snell and Bickham had reached such a level of order and uniformity as nearly to resemble printed type. This tendency reflects the influence of the printed word upon writing, which was in turn to influence type design. Baskerville had moved to printing and typesetting from his earlier profession as a writing master, and this determined the values

and preoccupations he brought to type design, to inform some of the most significant stylistic developments for several centuries.

While the nature of the printed word has tended to formalize usage, the parallel traditions of writing, engraving and inscriptional lettercutting are not constrained by the systematic limitations of the printers type case or the baseline. Evidence of a more fluid interaction of writing and typography can be found in signwriting and lettering. <Ye> survives in contexts outside of printed type, notably in headstones in which the <e> is often nested as a superscript, as seen in Fig 25.8; the substitution of <V> for <U> continued in architectural lettering as a conscious archaism for some time after it had ceased to be used in print.



Fig 25.8

In headstone lettering up to the late eighteenth century, we see the interaction of a vernacular writing style with influences derived from printed sources; frequently within the same stone and even the same sentence. Unconstrained by the fixed baseline of movable type, letters are cut to contrasting alignments in a variety of styles. Inscriptional and engraving sources were clearly influential upon the types of Caslon and Baskerville and these would in turn become influential upon later developments in letter-cutting, engraving and calligraphy. In nineteenth century letter cutting, vernacular variations are less evident and the model of the printed letter is increasingly dominant.

#### **TYPE IN THE 19TH CENTURY: POPULISM AND TECHNOLOGY:**

Type design in the nineteenth century is noted for two contrasting qualities: extravagant innovation in display typefaces and a decline in standards of text typography. This stereotype reflects the economic conditions of a printing trade in transition from a connoisseur market to a mass readership, but also underplays some valuable developments, notably the high quality of the types produced by Alexander Wilson in Edinburgh, later to become known as ‘Scotch Roman’.

Developments in this period also anticipated the modern concept of the typeface as a ‘family’ of fonts. The Clarendon type of the Besley foundry in 1845 is the first type marketed as a ‘related bold’ intended to align with Roman types and provide contrasting emphasis, for which printers had previously used small capitals, Blackletter or other unrelated styles (Twyman 1993: 110).

The late nineteenth century brought two significant changes to the technologies of type production, which had continued with only minor refinements over the preceding 400 years. Linked but not interdependent, these were to influence not only the development of typographic style but the nature of print culture.

The first was the invention in 1885 by Linn Boyd Benton of the Benton matrix engraving machine, a pantographic apparatus which enabled the mechanical cutting of punches or matrices at different sizes, from a single large-scale pattern derived from a drawing.

While adjustments were still made for different sizes, these were implemented in a more controlled and systematic manner than by hand punch-cutters (Southall 2005: 34).

This opened up the design of types to a wider variety of trades, allowing production typefaces to be transcribed from letters drawn by graphic artists, architects and designers, without the mediating interpretation of the punch-cutter.

These developments supported the development from the ‘related bold’ proposed by Besley’s Clarendon, toward the 20th century conception of a type ‘family’ comprising several fonts of consistent design in multiple weights. This principle was to be developed by Boyd Benton’s son Morris Fuller Benton (MacGrew 1993: 76–81), and is fully realised in the Century family released by American Type Founders between 1900 and 1910, and also by Theodore Low DeVinne, whose Cheltenham developed a wide range of variants on the original book weight designed by Bertram Goodhue (Lawson 1990: 259).

Boyd Benton’s invention coincided closely with the introduction of mechanized type-casting by Monotype and Linotype machines. Both systems provided for letters to be cast in sequence from a keyboard, replacing the hand-composition of sorts from the type-case. The Monotype utilised a movable matrix case to cast a sequence of individual sorts, while the Linotype and Intertype machines set a sequence of matrices, from which an entire line of type could be cast as a single solid ‘slug’.

Both of these technologies introduced new mechanical constraints which were reflected both in the design of new types and the adaptation of existing ones. The Monotype matrix case standardized type to a limited number of body widths, while in linecasting systems the custom of ‘duplexing’ (casting Roman and italic, or differing weights, from different parts of a single matrix) required both to share a common width, with consequent effects on the design of the letters.

Linotype setting did not allow for the use of kerns (parts of the letter that would overhang the body, most typically the over-stroke of the lower case <f>). Many new sans

serif faces were designed with a narrower ‘non-kerning’ <f>, in which the overhanging stroke is severely shortened, making the f-ligatures unnecessary. Monotype and Linotype machines dedicated specific keys for the ‘standard’ ligatures, creating a distinction between these and the larger sets of ‘historic’ ligatures. The system diminished the scope for the printer to augment the type case, and prompted a tendency to further rationalization which was to continue through successive technologies. The problems of including extended ligature sets in mechanical casting prompted designers to avoid or constrain those features of the design which had made them necessary, and it is during this period that we see the emergence of the non-kerning <f>. Southall (2005: 45) notes that non-kerning type actually predates the Linotype system and was a characteristic of the Wicks Typecasting machine from 1886.

With the introduction of new casting systems, type design became increasingly ‘device-specific’, as each system required the recutting and modification of existing typefaces to meet the constraints of the new matrices.

### **THE TYPEWRITER**

The invention of the typewriter by Sholes in 1866 reduced the distinction between the domestic ubiquity of everyday writing and the arcane specialism of print. For the first time, everyday ‘writing’ took typographic form, using standardized letters and mechanically determined letter spacing and line structure.

This narrowed the margin of interpretation necessary when transferring authorial texts into typographic form. It also imposed limitations upon the letters and related forms available to the writer, prompting a corresponding simplification in the practices of compositors and printers. The absence of certain keys from the typewriter for example, prompted the writer to replace <œ> either by <e> or an o-e digraph. This in turn contributed to the decline in use of the compound <œ> ligature in machine composition, though the system provided for this and similar refinements.

Sholes’ QWERTY keyboard layout was eventually adopted for Monotype machines which had previously used a keyboard layout that replicated the matrix case (Southall 2005: 39). Linotype and Intertype used the unique ETAOIN layout, but both systems reflect a common tendency to rationalization.

### **HISTORY AND TYPOGRAPHIC REVIVAL IN THE MACHINE AGE.**

Machine-composed metal type was the dominant method of type production for less than a century, but marks a period of accelerated change. New typefaces, and high-quality adaptations of old ones, were an important incentive in persuading printers and publishers to

adopt the cost-intensive new machinery. This provided the commercial imperative for significant reforms of type design.

While the earlier phases of type history had followed a linear pattern of steady incremental development, the twentieth century was also a period of simultaneous revival, in which a wide variety of historically established styles were revisited.

Caslon's Old Face types had been reinstated by the Whittingham press for conscious period effect, and while this can be seen as the first 'revival' of a pre-existing style, it was limited to pre-existing types cast from extant matrices (Reed 1887: 249). The first instances of new type designs based upon a historical model occurred later in the nineteenth century, and are characteristic of the Arts and Crafts movement. William Morris designed types in the gothic and medieval idioms, but his most significant contribution to type history was the adoption of Jenson's Venetian humanist letter as an ideal model for Roman type. Morris's Golden Type, cast for the exclusive use of his own press, inspired more widely distributed faces such as Bruce Rogers' Centaur, adapted to machine composition by Monotype. Other typefaces based upon the humanist model included Ernst Dettner and Robert Hunter Middleton's Eusebius, designed for the Ludlow system.

The English Monotype office under the direction of Stanley Morison, instigated an ambitious reforming programme of type production, encompassing both the adaptation of canonical styles to the constraints of the new technology, and the commissioning of new faces from leading designers.

This included the adaptation of Baskerville for machine composition in 1923 and the Aldine typeface Bembo in 1925, and new designs including Gill Sans and Perpetua.

This project was to set a standard that characterized type design in the twentieth

century, as successive technologies of type production were to prompt both the revival of established types and the development of original designs.

## **THE SANS-SERIF LETTER**

### **The Grotesque**

The Caslon foundry's 2-line English Egyptian of 1816 is recognized as the first sans serif printing type, but as Mosley (1999) confirms, earlier examples in architectural lettering suggest that it may be better understood as an expression of classical revival than as a modernistic innovation. '2-line English' simply denotes the size, while the use of term

<p><b>Gill Sans</b></p> <p>Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.</p> <p style="text-align: right;">Robert Bringhurst</p>
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‘Egyptian’, later applied instead to unbracketed slab serif, had previously been used by Coate in his 1812 alphabet collection *Poikilographia* and is probably best understood as suggesting a pre-classical order of antiquity rather than a specific origin (Mosley 1999: 38). Subsequent use of the terms ‘Grotesque’ in Europe and ‘Gothic’ in the US both serve to differentiate the sans serif from the classical ideal of the imperial Roman letter.

The Dutch type designer Martin Majoor has identified a close correlation of structure and proportion between the eighteenth century serif faces of Walbaum and the ubiquitous Akzidenz Grotesk, a sans serif first released by the Berthold Type Foundry in 1896, which was to be the precursor to the postwar Neo-grotesque Helvetica (Majoor 2014).

Futura

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Originally conceived for headline use among the proliferating novelty of display typography, the sans serif was not widely applied to text setting until the early twentieth century.

### Humanist and Geometric sans serifs

The early Grotesques were followed in the early 20th century by two distinct tendencies in sans serif type: the humanist sans serif and the geometric. The humanist sans is characterized by a structure and proportion that correspond to the Imperial Roman capital and the humanist writing hand; the models that informed the first Roman types. Modulation of stroke width has also been suggested as a defining feature of the genre, but this would exclude two of the most significant examples; the ‘Railway letters’ designed by Edward Johnston for the London Underground in 1916, and their closely related successor, Eric Gill’s Gill Sans. Hans Edouard Meier’s Syntax is another distinguished example.

Johnston’s Tube

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The geometric sans serif by comparison embodies a modernist rejection of historical precedent, proposing instead a set of letters based wholly upon geometric principles. This rather simplistic approach tends to prioritise proportion and efficiency, and the only geometric sans serifs to have gained lasting merit as text faces are those in which this rigour is moderated by such subtle humanist nuances as can be found in Paul Renner’s 1927 Futura. Futura is also notable for being conceived and designed in three weights (to which more were later added). Jakob Erbar’s

Erbar-Grotesk was the earliest example, produced in three display variants between 1922 and 1930 (Kinross 1994: 93).

Like the Romain du Roi, these typefaces embody a philosophical position, substituting a faith in geometric rationalization in place of any historical reference or precedent.

### **Neo-grotesques**

The term Neo-grotesque is applied to those faces designed after the second world war to reflect the modernist typography of the Basel and Zurich schools, and the affinity of the Neue Typographie for jobbing grotesques such as Akzidenz Grotesk. Foremost among these was the update of AG designed in 1957–1958 by Max Miedinger and Eduard Hoffmann as Neue Haas Grotesk, released by the Haas foundry under the name Helvetica to highlight its association with the values of Swiss typography. Other notable examples from the same period include Adrian Frutiger's Univers series, a systematic family of weights and widths.

### **PHOTO-TYPESETTING**

From the mid twentieth century, hot-metal composition for letterpress printing was superseded by phototypesetting for offset lithography. Phototypesetting was an optical system by which light was projected through a succession of letter-negatives onto photosensitive paper. Different mechanical systems aligned the letters to the light source, using a moving disc or film containing all the glyphs of the font. The exposed photographic paper would then be developed to provide a galley print-out, which would be pasted into position to provide the original from which a lithographic plate would be created.

While photocomposition remained a specialist skill using very capital intensive machinery, the move from metal type to film created major economies of storage and distribution and this enabled a proliferation of innovative display types in the 1970s.

Later developments in this technology mark the first instances of digitization, as the optical lens system was replaced by the cathode ray tube. This required the letter to be scanned and transmitted as a digital pattern of electrical impulses. Letter designs could then be stored not as negative shapes but as a grid pattern of pixels (Southall 2005: 152).

Different photosetting systems offered increasing levels of sophistication and an increasing level of 'setting to page' which anticipated the subsequent development of 'desktop design' for the personal computer.

While it was to attain very high technical quality in its final phases, earlier forms of photosetting had served to further diminish typographic refinements in the interests of expediency. In many cases ligatures were abandoned, and the technology allowed the

typesetter considerable scope for cost-cutting by using a single master for a range of sizes. Similar critical observations were to be made of the early phases of digital type production, introduced at a time when photosetting was at its most highly developed while considerations of resolution and memory placed serious limitations on the quality of digital type.

### **DIGITAL TYPE DESIGN**

The first types to be stored and transmitted as digital code were designed in the late 1960s for the Digiset typesetting system. Outline fonts, in which digital data was converted to vector form, were first introduced in 1974.

As the personal computer gained in scope and ubiquity, the font formats Postscript and TrueType offered different approaches to coordinating the data for screen display and printer output.

Digital types for the personal computer reflected the constraints of the emerging technology. Memory capacity limited the character-set of early digital types and favoured the use of simplified forms which did not require large amounts of computer memory.

During this period the design of digital types was also constrained by the quality of output resolution. The typefaces designed from 1985 by Zuzana Licko using FontEditor software, were initially designed for low-resolution technology and then later converted to companion high-resolution versions. These faces are notable for the fact that their design explicitly reflects the technology used in their production, making its limitations a defining feature of their aesthetic.

Following advances in available computer memory, storage capacity, and developments of later postscript systems, digital type design proliferated, developing from its beginnings as a distinct phenomenon to become the medium through which almost all functional type design takes place, regardless of style or idiom.

The development of affordable type design software has rendered the process of type design 'device-independent' and provided scope for the re-examination of every phase of past styles, as well as a proliferation of new designs.

### **OpenType**

In 1996 Adobe and Microsoft developed OpenType, a font format utilizing the Unicode encryption system. This had the dual benefits of extending the glyph capacity to over 65,000 while simplifying storage and transfer, allowing for advanced text support for multiple scripts and languages, and the simplification of the previous unwieldy font formats.

The very generous capacity of Open Type has prompted a reversal of many of the rationalizing tendencies of the previous century. It is now customary for professional quality

text faces to offer within a single font features that would previously have required the so-called ‘expert set’, such as small capitals <OPEN HOUSE> and non-lining ‘old style’ figures <123456789>, but also an extended range of diacritical support to meet the needs of different languages, and in many cases further scripts such as Greek and Cyrillic.

Extravagant arrays of ligatures and letter variants have come to signify ‘added value’ in quality typefaces, often reinstating historic features abandoned in earlier adaptations.

The variations of design by size, characteristic of all hand-cut punches and eroded by the successive efficiencies of metal composition, phototyping and the first phases of digital type design, are now re-introduced in the form of optical scaling, by which type manufacturers offer each weight of a typeface in several optical variants stylistically modified for use in small text (caption), text, subhead and display contexts.

Open Type has also enabled the introduction of sophisticated typographic features such as the automated substitution of alternate forms (contextual alternates) extended ligature sets, and further ‘intelligent’ characteristics.

## **TYPE FOR THE SCREEN**

Type’s transition from the page to the screen is not a sudden manifestation of the desktop era. As noted, the later phototyping systems had digitized letters for CRT output, and screen displays had been used to monitor phototyped copy in increasing detail and later to organise the page layout.

This however occurred within a specialized field of practice using capital-intensive machinery and the expertise of skilled operators.

Early personal computers were by comparison typographically limited and did not offer ‘WYSIWYG’ display (‘what you see is what you get’) until the release of LisaWrite for the Apple Lisa in 1983 and MacWrite for the Apple Macintosh in 1984.

These were significant in developing the screen as a tool, preparing material either for low resolution dot matrix print or for commercial reproduction at higher resolutions. The second phase of the digital revolution was the emergence of the screen as a medium, no longer limited to facilitating the design of a printed outcome, but providing the environment in which communication material was received. Designers using the screen to develop and review design for print now needed to make informed allowance for discrepancies between screen and output, but the development of interactive media redefined the screen as a viewing and reading tool, and the quality of on-screen typography became a concern for a wider community of non-specialist users.

Type had normally been designed not for the 72–96 dpi resolution of computer screens, but for the much higher 1,200 dpi resolution of commercial print media. Letters conceived and stored in outline form became seriously distorted when converted into groups of pixels at small sizes.

A number of strategies were applied to resolve these difficulties:

Hinting is the term given to a post-production phase of type design which optimises the alignment of the letter to the pixel grid. It is essential for the even weighting of strokes in screen display at small sizes (Bil'ak 2010).

Anti-aliasing is a screen display feature which optically compensates for the irregular jagged edge of the bitmap by introducing intermediate tones to adjacent

**Georgia**  
**Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.**  
**Robert Bringhurst**

pixels, giving the appearance of a more smooth curve. ClearType technology, introduced by Microsoft in 1998, advances this principle to a greater degree of refinement, improving legibility on color LCD screens by individually adjusting the 3 RGB subpixels that make up each pixel (Berry 2004).

While the quality of display resolution has improved considerably in the development of screen technology, the choice of type for the screen is still determined by the constraints of digital display and the limited resolution of the pixel grid, to which the letter-shape has to conform at every size.

For text sizes, these conditions favour robust sans serif or slab serif typefaces in which there is least risk of fine detail being lost. Optimal features include a limited contrast of stroke width and well-defined counterforms (the enclosed spaces within o, d, e etc.).

While some pre-existing typefaces have been successfully adapted to this use, the most effective solutions have been those typefaces designed with the screen in mind, that integrate the pixel as a key element of the design.

### **Screen fonts**

A screen font is a font that has been designed specifically with screen display in mind. In the early phases of personal computer technology, these were bitmap fonts, and it remains the case that any font designed for screen use will be developed with close reference to the pixel grid.

**Verdana**  
**Typography is the craft of endowing human language with a durable visual form, and thus with an independent existence.**  
**Robert Bringhurst**

Notable current examples would include Matthew Carter's Verdana and Georgia, and the faces introduced by Microsoft to launch the ClearType project.

### **Web font**

A web font traditionally meant a font that was installed upon the viewer's browser. The Microsoft Core fonts for the Web project was set up in 1996 to create a standard set of fonts for internet use. These included types designed specifically for screen use, such as Ariel (designed by Robin Nicholas and Patricia Saunders for use in an early IBM laser printer), Georgia and Verdana, Vincent Connare's Trebuchet, and Steve Matteson's Andale Mono. These were accompanied by digital adaptations of robust metal types such as Impact and Times New Roman, and the typewriter font Courier.

The scope for the viewer to access a wider range of fonts used by the designer involves the user's system downloading the font and has therefore been constrained by complex questions over font licensing.

### **Typefaces for new media**

Typographic display in new devices such as tablets, e-readers and smartphones have raised new questions over type design and its role in user experience, and about the nature of the digital page as an adaptive or responsive structure. The provision of types for e-readers reflects a variety of approaches to the user's involvement, and redefine the final authority of choice traditionally accorded to the designer. In many instances the user is invited to 'personalize' the document or device by choosing the typeface and making adjustments to type size; well-intentioned features which may not be expected to yield the same quality of overall visual experience as a professionally-determined design.

While the Kindle is exceptional in the use of a single high-quality typeface – Peter Matthias Noordzij's PMN Caecilia, designed in the digital era and exceptionally well-suited to screen use – the majority of fonts available to users of other devices were designed for print. Smartphone users are able to select from a plethora of pre-existing typefaces, few of which were originally conceived for the limitations of this medium (Phinney 2010).

The working relationship between the reader and the designers of the digital page layout and the typeface is becoming increasingly fluid and interactive.

The act of reading is determined by user expectation and cultural norms, which are both reflected and shaped by the characteristics of the current technology. Whether in the replication of a scribal Textura blackletter or the optimization of a letter design to the pixel grid of a smart-phone, type design both enables and embodies a dialogue between the reader and the culture they inhabit.

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