

A Few

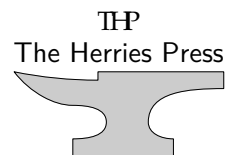
Notes on

Book Design



A Few  
Notes  
on  
Book Design

Peter Wilson



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The Herries Press, Normandy Park, WA.

Printed in the World

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First edition: August 2009





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# Preface

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Some fifteen or so years ago I started developing code for typesetting documents that would make it easy for designers to get the appearance they had in mind.

While doing this I read a lot about book design and have tried my hand at printing a variety of books and ephemera using hand set lead type and a hand operated Chandler & Price 1904 Old Style 8 by 12 platen press, pretty much as Gutenberg did some five and a half centuries ago.

These notes are partly based on my own amateur experience and feelings but the majority have been culled from the professionals.

PETER WILSON  
Seattle, WA  
July 2009





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# Introduction

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These notes briefly cover some aspects of book design and typography, independently of the means of typesetting. Among the several books on the subject listed in the Bibliography I prefer Bringhurst's *The Elements of Typographic Style* [Bri99].

The notes originally formed the first part of a user manual for the memoir class for use with the LaTeX typesetting system developed by Leslie Lamport [Lam94] based on Donald Knuth's TeX system [Knu84]. The manual was first published in 2001 and as the notes have grown in size and memoir's capabilities have been extended the manual also grew to approaching 700 pages [Wil09]. At that point seemed advantageous to separate the design notes from the technicalities, hence this document.



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# Terminology

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Like all professions and trades, typographers and printers have their specialised vocabulary.

First there is the question of pages, leaves and sheets. The trimmed sheets of paper that make up a book are called *leaves*, and I will call the untrimmed sheets the *stock* material. A leaf has two sides, and a *page* is one side of a leaf. If you think of a book being opened flat, then you can see two leaves. The front of the righthand leaf, is called the *recto* page of that leaf, and the side of the lefthand leaf that you see is called the *verso* page of that leaf. So, a leaf has a recto and a verso page. Recto pages are the odd-numbered pages and verso pages are even-numbered.

Then there is the question of folios. The typographical term for the number of a page is *folio*. This is not to be confused with the same term as used in 'Shakespeare's First Folio' where the reference is to the height and width of the book, nor to its use in the phrase '*folio* signature' where the term refers to the number of times a printed sheet is folded. Not every page in a book has a printed folio, and there may be pages that do not have a folio at all. Pages with folios, whether printed or not, form the *pagination* of the book. Pages that are not counted in the pagination have no folios.

I have not been able to find what I think is a good definition for 'type' as it seems to be used in different contexts with different meanings. It appears to be a kind of generic word; for instance there are type designers, type cutters, type setters, type foundries,... For my purposes I propose that *type* is one or more printable characters (or variations or extensions to this idea). Printers use the term *sort* to refer to one piece of lead type.

A *typeface* is a set of one or more fonts, in one or more sizes, designed as a stylistic whole.

A *font* is a set of characters. In the days of metal type and hot lead a font meant a complete alphabet and auxiliary characters in a given size. More recently it is taken to mean a complete set of characters regardless of size. A font of roman type normally consists of CAPITAL LETTERS, SMALL CAPITALS, lowercase letters, numbers, punctuation marks, ligatures (such as 'fi' and 'ffi'), and a few special symbols like &.

A *font family* is a set of fonts designed to work harmoniously together, such as a pair of roman and italic fonts.

The size of a font is expressed in points (72.27 points equals 1 inch equals 25.4 millimeters). The size is a rough indication of the height of the tallest character, but different fonts with the same size may have very different actual heights. Traditionally font sizes were referred to by names (see Table 1) but nowadays just the number of points is used.

The typographers' and printers' term for the vertical space between the lines of normal text is *leading*, which is also usually expressed in points and is usually larger than the font

Table 1: Traditional font size designations

Points	Name	Points	Name
3	Excelsior	11	Small Pica
3½	Brilliant	12	Pica
4	Diamond	14	English
5	Pearl	18	Great Primer
5½	Agate	24	Double (or Two Line) Pica
6	Nonpareil	28	Double (or Two Line) English
6½	Mignonette	36	Double (or Two Line) Great Primer
7	Minion	48	French Canon (or Four Line Pica)
8	Brevier	60	Five Line Pica
9	Bourgeois	72	Six line Pica
10	Long Primer	96	Eight Line Pica

Table 2: Printers units

Name (abbreviation)	Value
point (pt)	
pica (pc)	1pc = 12pt
inch (in)	1in = 72.27pt
centimetre (cm)	2.54cm = 1in
millimetre (mm)	10mm = 1cm
big point (bp)	72bp = 72.27pt
didot point (dd)	1157dd = 1238pt
cicero (cc)	1cc = 12dd

size. A convention for describing the font and leading is to give the font size and leading separated by a slash; for instance 10/12 for a 10pt font set with a 12pt leading, or 12/14 for a 12pt font set with a 14pt leading.

The normal length of a line of text is often called the *measure* and is normally specified in terms of picas where 1 pica equals 12 points (1pc = 12pt).

Documents may be described as being typeset with a particular font with a particular size and a particular leading on a particular measure; this is normally given in a shorthand form. A 10pt font with 11pt leading on a 20pc measure is described as 10/11 × 20, and 14/16 × 22 describes a 14pt font with 16pt leading set on a 22pc measure.

### Units of measurement

Typographers and printers use a mixed system of units, some of which we met above. The fundamental unit is the point; Table 2 lists the most common units employed.

Points and picas are the traditional printers units used in English-speaking countries. The didot point and cicero are the corresponding units used in continental Europe. In Japan 'kyus' (a quarter of a millimetre) may be used as the unit of measurement. Inches and centimetres are the units that we are all, or should be, familiar with.

The point system was invented by Pierre Fournier le jeune in 1737 with a length of 0.349mm. Later in the same century François-Ambroise Didot introduced his point system with a length of 0.3759mm. This is the value still used in Europe. Much later, in 1886, the American Type Founders Association settled on 0.013837in as the standard size for the point, and the British followed in 1898. Conveniently for those who are not entirely metric in their thinking this means that six picas are approximately equal to one inch.

The big point is somewhat of an anomaly in that it is a recent invention. It tends to be used in page markup languages, like PostScript<sup>1</sup>, in order to make calculations quicker and easier.

The above units are all constant in value. There are also some units whose value depends on the particular font being used. The *em* is the nominal height of the current font; it is used as a width measure. An *en* is half an em. The *ex* is nominally the height of the letter 'x' in the current font. You may also come across the term *quad*, often as in a phrase like 'starts with a quad space'. It is a length defined in terms of ems; a quad is 1em.

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<sup>1</sup>PostScript is a registered trademark of Adobe Systems Incorporated.



# One

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## Historical background

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### 1.1 Galloping through the millenia

The earliest known writing dates back to the Sumerians around 3300BC who used pointed sticks or reeds to impress marks into wet clay tablets that were subsequently dried. The result is what we call Cuneiform.<sup>1</sup> For the next several thousand years all texts were produced, one way or another, individually by hand.

The earliest printed book known is a 9th century Chinese woodblock printing of the *Diamond Sutra*. In this technique the complete text for a page is carved on a wooden block which is then used to impress the ink onto the paper. Once the woodblocks were available many copies of the text could be produced very quickly.

The Koreans were perhaps the first to print using moveable type where the individual characters were engraved on wood blocks so they could be reused for different texts. In his *Writings Beside the Meng Creek* the Song Dynasty essayist Shen Kuo (1031–1095) described how Bi Sheng during the reign of Chingli (1041–1048) printed from moveable type that he made from baked clay, which was rather fragile. Somewhat later Wang Zhen (c. 1290–1333) improved the process by using wooden type. These never became particularly popular methods because of the thousands of different characters that a printing house might need. By 1230 the Koreans used moveable metal type for printing. None of this was known outside Asia.

In the West books and manuscripts were hand written by scribes, although some small items, like playing cards or depictions of saints, were printed from woodblocks. Then Johannes Gutenberg (c. 1398–1468) of Mainz invented printing using moveable type around about 1440–1450.<sup>2</sup> He had to experiment to determine the formula for a suitable ink and also to develop a good metal alloy for the type itself. He came up with lead to which he added antimony for strength and hardness and tin for toughness.<sup>3</sup>

In order to be successful in the market Gutenberg had to produce books that equaled those produced by the scribes, except that they did not have to be decorated so lavishly. The scribes used many ligatures, contractions, and other techniques in order to have justified text with no raggedy edges. To compete with them his font for the famous 42-line Bible, published around 1455, consisted of some 290 characters though all the text was in Latin which requires a basic character set of only forty letters — twenty lowercase letters and

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<sup>1</sup>From the Latin *cuneus* meaning wedge.

<sup>2</sup>Others have been put forward as the inventor, notably a Dutchman named Coster, but the preponderance of opinion favours Gutenberg.

<sup>3</sup>This is still the basis for metal type today; Monotype casting machines use lead with 15–24% antimony and 6–12% tin.

twenty caps — plus some punctuation marks.

The 42-line Bible is set in two columns of 42 lines each. It is believed that about 135 copies were printed on paper and 40 on vellum. The page size was 12 by 16<sup>1</sup>/<sub>2</sub> inches and it is estimated that more than five thousand calfskins were required for the vellum copies.

The new technology spread rapidly. In 1465 Konrad Sweynheym and Arnold Pannartz set up a printing shop in the monastery at Subiaco, east of Rome. There was printing in Köln in 1466 and in 1468 in Augsburg and Rome itself. The first Venetian printer was Johann van Speyer who started work in 1469. A year later printing was established at the Sorbonne and Nicolas Jenson had his press in Venice. Printing was introduced into Spain at Valencia in 1474. William Caxton started printing in England in 1476 setting up a press at The Sign of the Red Pale in Westminster, near the Abbey; Theoderic Rood was printing in Oxford between 1478 and 1485 and John Sieberch at Cambridge in 1520.

The German printers kept with the initial gothic style of Gutenberg's type and Caxton used a cursive bastarda gothic. The Italians and other Europeans, though, moved to a roman type, based on the humanist bookhands, for their work. In 1471 Jenson produced the first full set of Greek type, which still remains one of the best. Aldus Manutius, printing in Venice, introduced the italic type in 1500.

The early printers were jack of all trades. They had to make their presses, design, make and cast their type, and print and sell the results. As time went on typemaking and printing became separate crafts. It became possible to purchase the materials and equipment for printing but the printer was still the book designer.

For four centuries setting the type for printing was done by hand until the introduction of Ottmar Mergenthaler's Linotype machine in 1886. The operator sat at a keyboard, typing the text line by line and the machine produced a corresponding solid line of type. The disadvantage was when an error needed correcting at least one whole new line of type was needed, or two or more if the correction spilled over the end of the line, or even more if it continued onto the following page. The competing Monotype machine, invented by Tolbert Lanston, was first available in 1896. This was operated via a keyboard which produced a punched paper tape which was fed to the caster which produced lines of type composed of individual pieces. Correcting typos was easier because individual characters could be added or replaced. On the other hand, Linotype output was easier to handle if complete sections had to be moved around, for example for 'quick' printing such as a daily newspaper.

Alan Bartram [Bar01] shows examples of book designs from between 1470 and 1948, not all of which he considers to be good. Examples of printed pages from the 15th to the 20th century are in the TUG 2007 San Diego Meeting keynote presentation [Wil07f].

## 1.2 Making type

This is a very brief description of how lead type is made. For a good overview see [CB99] and Fred Smeijers [Sme96] provides a detailed description of punchcutting.

Making type has been an inherently manual process. Having got a design for a font, for each character, a punchcutter makes a punch starting with a square steel bar about 2<sup>1</sup>/<sub>4</sub> inches (6cm) long with an end face large enough to encompass the character. Using files and gravers, and perhaps some specialized tools like a counterpunch, he carves out the character in relief on one end of the bar. The character is oriented so that is backwards with respect to its appearance when printed. To check the shape, the end of the punch is



Table 1.1: Broad typeface categories

Typeface	Lawson	Bringhurst	Vox
Centaur	Venetian	Renaissance	Humanist
Bembo	Aldine/French	Renaissance	Garald
Garamond	Aldine/French	Baroque	Garald
Caslon	Dutch/English	Baroque	Garald
Baskerville	Transitional	Neoclassical	Transitional
Bell	Transitional	Rationalist	Transitional
Bodoni	Modern	Romantic	Didone
<b>Clarendon</b>	<b>Square Serif</b>	<b>Realist</b>	<b>Mechanistic</b>
Futura	Sans-serif	Geometric Modernist	Lineal Geometric
Optima	Sans-serif	Neoclassical	Lineal Humanist
<b>Gill Sans</b>	<b>Sans-serif</b>	<b>Geometric Humanist</b>	<b>Lineal Humanist</b>

put into the flame of an alcohol lamp which coats it with lampblack, and it is then pressed against a chalky paper to leave a black image of the character. Once the shape is correct the punch is hardened and annealed.

The next stage is to create the matrix for the character. The punch is hammered into a softer material, usually copper, or sometimes brass which is harder but lasts longer. At this point the character is in the same orientation as printed but is a negative impression in the matrix.

The matrix is then put into a casting box and molten typemetal poured in. Once it has hardened and removed from the mould the new piece of type is dressed to the same length as all the other pieces for the font. Many, many pieces of type can be cast from one matrix, and if the punch is retained new matrices can be made. Typically one buys the lead type from a typecasting company, and a typecasting company would purchase matrices from the type design company. Of course, in the early days these were all the same organisation and only as the centuries passed did they tend to become separated.

The Linotype and Monotype machines require the matrices but cast the type only when needed. After use the type from these machines is melted down and reused time and time again.

### 1.3 Book types

Roughly speaking, there are two kinds of printing type; one, called in general *book type*, is what is used for setting longer pieces of text such as a poem or a book, or other material meant for continuous reading. The other, called *display type*, is used for pretty much everything else, such as company names, posters, advertisements, ephemera and sometimes even book titles, all of which are short pieces of text, often intended to catch your eye. There are a multitude of display types, some of them almost illegible. Here I want to say a little bit about book types.

There are several ways of categorizing typefaces, three of which are shown in Table 1.1. The listed schemes are **Lawson** from Lawson & Agner [LA90] who proposed a *Rational System* based on the historical sequence.

Bracketed serif <b>H</b> <i>Bookman</i>	Unbracketed serif <b>H</b> <i>Antiqua Turin</i>	Square serif <b>H</b> <i>Bera Serif</i>	Sans serif <b>H</b> <i>Avant Garde</i>
Inclined axis <b>O</b> <i>Antiqua Turin</i>	Vertical axis <b>O</b> <i>Times Roman</i>	Gradual contrast <b>N U</b> <i>Bookman</i>	Abrupt contrast <b>N U</b> <i>GFS Didot</i>
small counter <b>e</b> <i>Bookman</i>	large counter <b>e</b> <i>Bera Serif</i>	small counter <b>a</b> <i>Bookman</i>	large counter <b>a</b> <i>Antiqua Turin</i>
separate <b>fi fl</b> <i>Utopia</i>	ligatured <b>fi fl</b> <i>Utopia</i>	separate <b>ae oe</b> <i>GFS Bodoni</i>	ligatured <b>æ œ</b> <i>GFS Bodoni</i>

Figure 1.1: Examples of some typographical type-related terms

**Bringhurst** who categorizes according to the artistic and architectural period that a typeface can be said to represent [Bri99].

**Vox** devised a system that has been adopted as a British Standard (BS 2961: 1967). This tried to be language-neutral and get away from the more traditional descriptions such as gothic, antique, grotesque, and modern which have different, and sometimes opposite, meanings in different languages [McL80].

Later I will expand on the Lawson & Agner system and show some types corresponding to some of their categories. I have limited the examples to those types which are included in a modern LaTeX distribution, which unfortunately does not include types corresponding to all the categories.

### 1.3.1 TYPE-RELATED TERMINOLOGY

First, though, some typographical terms related to types, and illustrated in Figure 1.1.

*Serif*: The cross stroke that finishes the stems or arms of letters.

*Bracketed serif*: A serif that transitions gradually into the stem it is attached to.

*Unbracketed serif*: A serif with a sharp break between it and the stem.

*Square serif*: A rectangular serif with squared ends.

*Sans serif*: Without serifs.

*Axis*: The direction of the hypothetical line joining the thinnest parts of a letter like ‘O’. It is related to the angle that a broad nibbed pen would be held in order to replicate the inner and outer contours.<sup>4</sup>

*Contrast (also called shading)*: The difference between the thick and thin strokes.

*Counter*: The white space enclosed by a letter, whether open or closed. Sometimes used to refer to the closed part of letters such as ‘a’ or ‘e’, which may also be referred to as the *eye*.

<sup>4</sup>The axis and angle are perpendicular to each other.

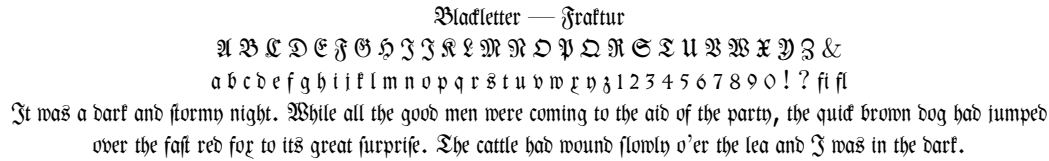


Figure 1.2: An example of the Fraktur style of Blackletter types

*Ligature*: The conjoining of two (or more) letters, usually with a change of shape.

For more detailed descriptions and further terms you may wish to consult other sources, such as [Bri99, LA90, MMc95]. If you are interested in the subtle, and the not so subtle, differences between typefaces then Karen Cheng's *Designing Type* [Che05] has a great deal to offer.

The names of typefaces can be confusing; different suppliers have a tendency to give different names to the same underlying typeface. For example Goudy's University of California Old Style can also be found as Californian, University Old Style, Berkely Old Style, and possibly under other names as well, all more or less adhering to the original design.

### 1.3.2 BLACKLETTER

The first type was *Gothic*, or *Blackletter*, used by Gutenberg which was based on the kind of script that the scribes were using at that time (c. 1455). It remained in fashion in Germany until towards the end of the last century, and is still often used for the names of newspapers. Elsewhere, starting in Italy, it was replaced by the *Roman* type.

There are several kinds of blackletter type. The first is *Textura* where the characters are squarely drawn without any curves and are the kind that Gutenberg used. In the scribal tradition from which these came the idea was that the words created a uniform texture along each line and down each page. To modern eyes it is difficult to tell one letter from another. Two modern versions are Goudy Text and Cloister Black.

Another grouping is *Rotunda* where the letters are more rounded than *Textura* and are easier to read. A modern example is Goudy Thirty.

The last subdivision is *Bastarda* which has been the common type used in Germany for many a year. The most common form is *Fraktur*, first cut in the sixteenth century, which is a lighter and more open version of *Textura* and so easier to read. Many newspapers use a *Fraktur* type for their headline. An example of a *Fraktur* is shown in Figure 1.2.

### 1.3.3 OLDSTYLE

#### *Venetian*

Early roman types, based on the humanist scribal hand, were cut by Sweynheym & Pannartz in the Rome area (c. 1467). In Venice Nicolas Jenson cut what is considered to be the first, and one of the best, romans (c. 1471). His types have been widely reproduced and copied and the style is known as *Venetian*. Some modern day Venetians include Cloister, Eusebius (originally called Nicolas Jenson) and Venezia; Bruce Rogers' Centaur is an elegant modernized Venetian.

The characteristics of the Venetian types include uneven or slightly concave serifs, there is minimal contrast between the thick and thin strokes, and an inclined axis. The crossbar

Oldstyle Aldine/French — Palatino  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
 It was a dark and stormy night. While all the good men were coming to the aid of the  
 party, the quick brown dog had jumped over the fast red fox to its great surprise. The  
 cattle had wound slowly o'er the lea and I was in the dark.

Figure 1.3: An example of an Oldstyle Aldine/French type: Palatino

of the lowercase ‘e’ is slanted upwards. On some capitals, principally ‘N’ and ‘M’, there are slab serifs that extend across the tops of the vertical strokes.

William Morris chose Jenson’s type as the model for his Golden Type, cut by Edward Prince around 1890. This started the revival of the Venetian types.

The first type generally available was Morris Benton’s Cloister Oldstyle. Other modern Venetians include Goudy’s Kennerly, Deepdene and Californian, which is now called Berkely Old Style. One, perhaps the best, is Bruce Rogers’ Centaur which he created in 1914.

#### *Aldine/French*

Another of the many printers in Venice, Aldus Manutius, wanted a type that was less related to the pen-drawn scribal characters. Aldus employed Francesco Griffo da Bologna to cut two types for him. The first, cut in 1497, was for an edition of *De Aetna* by the humanist scholar Pietro Bembo — the modern version of this is called Bembo. Griffo also cut another variation on Jenson’s roman and which soon superseded it in popularity. It was first used in the famous *Hypnerotomachia Poliphili* by Francesco Colonna which Aldus published in 1499. A modern version is available called Poliphilus.

The Aldine roman soon spread across Europe. One of the first typesetters to use it as a model was Claude Garamond in Paris (c. 1540), and his types had a wide distribution, for example being used in Antwerp by Christopher Plantin. The main basis for modern versions is a version of Garamond’s types cut by the French printer Jean Jannon about 1621.

Characteristics of these types are wide concave serifs, particularly on the capitals, which are narrower than the Venetians and may be not as high as the lowercase ascenders. The crossbar of the lowercase ‘e’ is horizontal, as opposed to the slanted crossbar of the Venetians. There is an inclined axis and a medium contrast between the thick and thin strokes.

Some modern Aldine/French Oldstyle types are Bembo, Estienne, Garamond, Gerdus, Granjon, Palatino, Poliphilus, and Sabon. An example of Palatino, which was created by Hermann Zapf in 1950, is shown in Figure 1.3.

#### *Dutch/English*

During the sixteenth century the French types were popular throughout Europe but then the pendulum swung towards types from the Low Countries. The Dutch were principally traders and their printing style became increasingly known. They produced types that were more practical for commercial printing. The contrast between thick and thin strokes increased and the serifs straightened.

Transitional — URW Antiqua  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl

It was a dark and stormy night. While all the good men were coming to the aid of the party,  
 the quick brown dog had jumped over the fast red fox to its great surprise. The cattle had  
 wound slowly o'er the lea and I was in the dark.

Figure 1.4: An example of a Transitional type: URW Antiqua

Transitional (newspaper) — New Century Schoolbook  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl

It was a dark and stormy night. While all the good men were coming to the aid of the  
 party, the quick brown dog had jumped over the fast red fox to its great surprise. The  
 cattle had wound slowly o'er the lea and I was in the dark.

Figure 1.5: An example of a Transitional newspaper type: New Century Schoolbook

The English typecutter William Caslon (1692–1766) cut a famous face of this kind that has been used ever since throughout the world; in America the first printed version of the *Declaration of Independence* was set with Caslon type.

Modern Dutch/English types include Caslon (of course), and Janson.

#### 1.3.4 TRANSITIONAL

Transitional types are those based on the Oldstyle types but with features of the style called Modern

By the end of the sixteenth century the quality of printing in Italy and France had fallen off from when Claude Garamond was working. In 1692 King Louis XIV ordered a new set of types for the Royal Printing House. In a lengthy report the Academy of Sciences recommended a roman type constructed on mathematical principles. Lucien Grandjean who cut the new Romain du Roi allowed his typecutter's eye to sometimes overrule the academicians to the betterment of the result.

Grandjean's type was copied by many others and effectively replaced Oldstyle in Europe. Pierre Simon Fournier (1712–1768) started his typecutting business in 1737, cutting over eighty types in twenty-four years. These were based on Garamond's types but influenced by Grandjean's work. The result was the first intimations of the Transitional types.

The changes on the continent had had little impact in England, but John Baskerville, about 1750, set up a printing shop in Birmingham and created the type that bears his name. Some consider this to be the real beginning of the Transitionals. Baskerville's work was disliked in England but was siezed on with alacrity on the Continent.

Some modern day Transitional types are Baskerville, Bell, Fournier, Georgian, and URW Antiqua which is shown in Figure 1.4..

Much later, around the end of the nineteenth century, another kind of Transitional type was introduced, designed for legibility for newspapers when printed on high speed presses. The counter spaces were open, the serifs were even and strongly bracketed and with a high x-height. Examples are Century designed by Linn Boyd Benton in 1895 for

Modern — GFS Didot  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
 It was a dark and stormy night. While all the good men were coming to the aid of  
 the party, the quick brown dog had jumped over the fast red fox to its great  
 surprise. The cattle had wound slowly o'er the lea and I was in the dark.

Figure 1.6: An example of a Modern type: GFS Didot

Square Serif — Bera Serif  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
 It was a dark and stormy night. While all the good men were coming to the  
 aid of the party, the quick brown dog had jumped over the fast red fox to its  
 great surprise. The cattle had wound slowly o'er the lea and I was in the dark.

Figure 1.7: An example of a Square Serif type: Bera Serif

the *Century* magazine, and Cheltenham by Betram Goodhue in 1896, which has become one of the printers' standard types. Stanley Morison's Times Roman, which he designed for *The Times* of London fits into the Transitional classification. The general characteristics include vertical, or nearly vertical axis, more pronounced contrast compared with the Old-style faces, but nowhere nearly as pronounced as the later Didot types. Some have finely, or unbracketed, serifs.

A version of one of the Century series of typefaces, New Century Schoolbook, designed by Morris Benton, is shown in Figure 1.5.

### 1.3.5 MODERN

Modern in this case means with respect to Transitional and applies to a style of type introduced in the eighteenth century.

Grandjean's Romain du Roi had started a trend in which the contrast between thick and thin strokes gradually increased. Following Baskerville's type, Giambattista Bodoni in Italy and the Didot foundry in France increased the contrast to extreme limits with the thin strokes degenerating into hairlines.

A modern type, GFS Didot, after the style of Didot is illustrated in Figure 1.6.

The general characteristics are vertical axis, exaggerated contrast, and flat, unbracketed, serifs.

### 1.3.6 SQUARE SERIF

The Victorian printers found that they needed new type forms that would work better than the traditional romans when used with the new and faster breeds of printing presses, and particularly for use in commercial printing and advertising.

The types went out of fashion during the first half of the twentieth century but have since become more popular with the Clarendon type. An example of Square Serif is shown in Figure 1.7.

Sans-serif — Bera Sans  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
 It was a dark and stormy night. While all the good men were coming to the aid  
 of the party, the quick brown dog had jumped over the fast red fox to its great  
 surprise. The cattle had wound slowly o'er the lea and I was in the dark.

Figure 1.8: An example of a Sans-serif type: Bera Sans

*Brush — Brush Script*  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
*It was a dark and stormy night. While all the good men were coming to the aid of  
 the party, the quick brown dog had jumped over the fast red fox to its great surprise.  
 The cattle had wound slowly o'er the lea and I was in the dark.*

Figure 1.9: An example of a Script/Cursive Brush type: Brush Script

*Calligraphic — Zapf Chancery*  
 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &  
 a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4 5 6 7 8 9 0 ! ? fi fl  
*It was a dark and stormy night. While all the good men were coming to the aid of the party, the quick brown dog  
 had jumped over the fast red fox to its great surprise. The cattle had wound slowly o'er the lea and I was in the  
 dark.*

Figure 1.10: An example of a Script/Cursive Calligraphic type: Zapf Chancery

### 1.3.7 SANS-SERIF

Sans-serif types were first created around 1830. In England they were called Grotesques and in America Gothics. Around 1920 there appeared artistic schools such as Expressionism, Constructivism and Cubism. These had a marked effect on typographic styles and the Sans-serif types experienced a great burst of popularity, seeming to express 'modern' ideas. They tend to be geometric in form as opposed to the curvaceous romans.

Examples of modern Sans-serifs are Helvetica, Futura, and, famously, Gill Sans. Yet another sans, Bera Sans, is shown in Figure 1.8.

### 1.3.8 SCRIPT/CURSIVE

This is a very broad category but essentially the forms are closer to handwriting rather than printing. Some are based on letter forms created by drawing with a brush while others are based on forms written using a pen. In general they have an informal presence but some of the latter kind are used in formal settings such as wedding invitations.

Figure 1.9 shows a brush-based script unimaginatively called Brush Script while a calligraphic script, Hermann Zapf's fine Zapf Chancery, is in Figure 1.10.

**Display/Decorative – Cyklop**  
**A B C D E F G H I J K L M N O P Q R S T U V W X Y Z &**  
**a b c d e f g h i j k l m n o p q r s t u v w x y z 1 2 3 4**  
**5 6 7 8 9 0 ! ? fi fl**

**It was a dark and stormy night. While all the good men were coming to the aid of the party, the quick brown dog had jumped over the fast red fox to its great surprise. The cattle had wound slowly o'er the lea and I was in the dark.**

Figure 1.11: An example of a Display/Decorative type: Cyklop

### 1.3.9 DISPLAY/DECORATIVE

This is another very broad category but all the members are designed to catch the eye. Display types tend to be used for display purposes and are not meant to be too difficult to read. The decoratives are smaller in scale but can be extremely detailed, such as alphabets based on human figures apparently performing calisthenic exercises. One of the many fonts in this category, *Cyklop*, is shown in Figure 1.11.

As far as bookwork goes the more restrained of these types may occasionally be useful for book or chapter titles.

## 1.4 Setting type

Until the last hundred years or so, type has been hand set. Today there are still a few printers who still set type by hand, called now letterpress printing, and on the odd occasion I am one of them. Again, this is a brief description of the process but Chappell [CB99] provides much more detail if you are interested. If you have a desire to set up your own small print shop, perhaps in your garage or shed in the garden, then John Ryder has lots of pertinent advice [Ryd76]. He directed the design and production of many books for The Bodley Head, and, starting in 1930, produced much interesting work on an Adana quarto press in his home. The Briar Press is another very useful resource, available via the web<sup>5</sup> — and in their words: ‘Proudly introducing the bleeding-edge world of personalized desktop publishing circa 1820’!

The type is kept in type-, or job-, cases. These are shallow wooden partitioned trays and traditionally there were two of them for each font — a lower one closer to the typesetter for the minuscule characters and the second one, arranged above the first as an ‘upper case’, for the majuscules (capitals); hence the terms lowercase and uppercase characters. The characters are not arranged in alphabetical order but follow a system that is meant to reduce the amount of movement required from the typesetter. The shop where I print uses a ‘California job case’ for type, illustrated in Figure 1.12, which combines both the lowercase and uppercase into a single case. The lowercase letters are arranged in a seemingly semi-random order while the uppercase, which are used much less frequently, are in alphabetical order. The exceptions here are ‘U’ and ‘J’ which are latecomers to the alphabet only being generally accepted in the 16th and 17th centuries, respectively — printing has strong traditions.

<sup>5</sup><http://www.briarpress.org>



ffi	fl	5 to an em	4 to an em	'	k		1	2	3	4	5	6	7	8	\$	-	—	(	)	[	]
j						e							ff	9	A	B	C	D	E	F	G
?	b	c		d			i	s	f	g			fi	0							
!															H	I	K	L	M	N	O
z	l	m		n		h	o	y	p	w	,	ense	ems								
x											;	:			P	Q	R	S	T	V	W
q	v	u		t		3 to an em	a	r					quads								
											.	-			X	Y	Z	J	U	&	ffl

Figure 1.12: The California job case layout

A line of type is set, or composed, in a hand-held composing stick, which has an adjustable stop which is set to the required line length. Since the letters read in reverse, right to left, they are assembled upside down, allowing working from left to right by the compositor. The characters for a word are put into the stick, then a space, the next word, a space and on until the line is almost full when it can be justified by inserting small extra spaces between the words. A lead may be put separating this line from the next, which is then built up as before. When several lines have been assembled they are slid from the composing stick onto the composing table, which is a large, smooth and flat marble slab.

When sufficient type has been assembled for printing one sheet of paper it is put into a chase which is a rectangular cast-iron frame, rather like a picture frame. The chase is placed round the type on the composing table and rectangular blocks of wood, called furniture, are placed between the type and the chase to hold the type in position, then expandable metal wedges, called quoins, are inserted to lock the type within the chase. This is essential as the chase and contents will be lifted up and transferred to the press itself — there is nothing like the joy of picking up and sorting out several hundred small pieces of type that have scattered themselves all over the floor, and then putting them all back in the chase in the correct order! The assembled and locked up type, furniture, and chase are called a forme.

There are two basic types of hand press. In the flat-bed type, as used from Gutenberg's day onwards, the forme is fixed on a horizontal bed which is mounted on horizontal rails,

the type is inked (usually by hand), a sheet of paper is positioned over the forme, and the bed slid under the platen — a large flat plate — which is then pressed down hard by a screw mechanism to force the paper against the type. The platen is raised, the bed slid out and the printed sheet removed, ready for the next sheet to be positioned. Originally the presses were made of oak but nowadays are steel and cast iron. Typical of the flat-bed presses are the Albion in England and the Washington in America.

The other type is a platen press exemplified by the Excelsior in England and the Chandler & Price, which is the one I use, in America. Here the bed — a rectangular steel plate — is vertical and fixed and the forme is locked onto the bed. Above the bed is a circular disc on which the ink is spread. As the press operates rollers come down over the disc picking up a thin film of ink, then over the forme — thus inking the type — and back up again; while the rollers are inking the type the disc is rotated a few degrees so that the rollers will run over a different section of the disc each time thus improving the uniformity of the ink pickup. A sheet of paper is clipped to the platen which, as the rollers go over the disc, swings up to press the paper against the inked type and then down again so the sheet can be removed and the next one inserted.

You can see pictures of the presses mentioned above, and many other as well, on the Briar Press website (see page 10).

At the end, the forme is put back on the composing table and any ink is cleaned off the type, which is then taken from the chase and ‘distributed’ back into the correct places in the typesets(s). The furniture and leads are also put back into the proper places in their respective storage areas.

If the text is to be printed in multiple colours, the type for the first colour is set with spaces left for the second coloured type, and then printed. The type for the second colour is set in the spaces left for it, and the first set of type removed and replaced by spaces. The press is cleaned and the first colour ink replaced by the second colour ink. The original partially printed pages are then printed with the next colour. If all is well the differently coloured printed characters will all be aligned. Understandably, it is rare that more than two colours are used.

## 1.5 Today

Today the great majority of printed works are produced with offset printer presses, the first of which was invented by Ira Washington Rubel in 1903.<sup>6</sup>

In the offset lithography process the original work image is put onto metal foils which are wrapped around a cylinder on the press; ink is picked up by the foil and is transferred to a ‘blanket’ or ‘offset’ cylinder that is in contact with the first one. In turn, the ink from the offset cylinder is transferred to the paper which is pressed against it.

Nowadays the original image is created on a computer and the foils produced automatically. The system is excellent for coloured work — one foil is produced for each colour, following the CMYK (Cyan, Magenta, Yellow, Key (black)) subtractive colour system (television and computer monitors use the RGB (Red, Green, Blue) additive colour system). In the lowest capital cost situation only a single station press is used which can print a single colour. To get full colour the paper must be run through the press four times in all, once for each colour (and black) and if both sides are to be printed, then another four times for

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<sup>6</sup>Rubel was an American; with a name like that he certainly couldn't be English.

the second side. Moving up the scale there are two stand presses that can do two colours in one run, four stand presses that will do all four in one run.<sup>7</sup> In most smaller printing shops single sheets of paper are used which have to be put through the pres(ses) at least twice, once for each side. Newspapers are also printed using offset lithography. In their case, though, web offset printers are used where the paper is fed in continuously from a large roll and is printed on both sides on its journey through the press.

Up and coming are digital presses operating directly from the computer.<sup>8</sup> These are approaching the cost and quality tradeoffs of offset printers and are increasingly being used for on-demand small quantity printing.

Apart from the time and effort involved the principal difference between traditional letterpress printing and the modern methods is the way the ink is put onto the paper. In the traditional method the type is inked and then pressed *into* the paper (think typewriters), while in modern methods the ink is effectively laid *onto* the paper (think inkjet printers). You can sometimes tell if something has been printed by letterpress methods by running a finger lightly over the page; if the lines are 'bumpy' then it has been printed letterpress. Printers using letterpress actually face a dichotomy. In order to obtain the finest detail from the type then it should be pressed as lightly as possible into the paper, but to indicate clearly that it has been letterpress printed, then it is advisable to impress hard enough to leave permanent indentations, no matter how slight. As is common, tradeoffs seem inevitable.

## 1.6 Setting maths

I had always wondered how maths was typeset before TeX was available and I eventually found an answer in an article by David Wishart [Wis03]. The following is based upon his descriptions.

As described above, before the advent of typesetting machines compositors picked pieces of type from a double typecase, typically just containing the upper and lower case roman characters, the numerals and punctuation marks, assembled some lines in a composing stick, and transferred them to a chase, which when full was locked up and then put into the press to print onto the paper. When setting text this is straightforward as each 'line' in the composing stick is a line of text. This is not the case with maths, such as this formula

$$P_{N_1+m} = \frac{C}{N_1 + m} \binom{N_2 - N_1}{m} \alpha^m \beta^{(N_2 - N_1) - m} \quad (1.1)$$

For setting math the compositor will have two double typecases (roman and italic), a case of mathematical sorts containing signs, superscripts and subscripts, etc., and a case of unaccented Greek characters. In order to set maths such as shown as formula 1.1, in an assumed 11pt font with 24pt spacing, the widest elements, properly spaced and centered within the measure, are set in the composing stick as

$$P_{N_1+m} = N_1 + m \binom{N_2 - N_1}{m} \alpha^m \beta^{(N_2 - N_1) - m}$$

<sup>7</sup>The press shop where I occasionally go to do traditional hand set printing has all of these.

<sup>8</sup>Think sophisticated inkjet or colour laser printers.

The terms to the right of the = sign are then removed and stored where hopefully they won't be disturbed. A lead of 6.5pt is then inserted above and below the first terms. The  $N_1 + m$  term is taken from the storage, and a piece of 2pt rule is cut to the exact length of the term and the  $C$  centered above it. Then the opening parenthesis is added, so the contents of the composing stick look like:

$$P_{N_1+m} = \frac{C}{N_1 + m} \left($$

Moving on, the  $N_2 - N_1$  term is put in the composing stick and a 2pt lead put below it with the  $m$  centered underneath, then the closing parenthesis is added, so the formula now appears as:

$$P_{N_1+m} = \frac{C}{N_1 + m} \binom{N_2 - N_1}{m}$$

Finally the Greek terms are added, with 6.5pt leads above and below, resulting in:

$$P_{N_1+m} = \frac{C}{N_1 + m} \binom{N_2 - N_1}{m} \alpha^m \beta^{(N_2 - N_1) - m}$$

Even if an automatic caster, such as a Linotype or Monotype, was being used the process was certainly not automatic. With a Monotype caster the operator would produce

$$P_{N_1+m} = N_1 + m \times N_2 - N_1 \times \alpha^m \beta^{(N_2 - N_1) - m} C m$$

This would then go to the 'marker-up' who would turn it into

$$P_{N_1+m} = \frac{C}{N_1 + m} \binom{N_2 - N_1}{m} \alpha^m \beta^{(N_2 - N_1) - m}$$

After 1958 it was slightly easier when Monotype had introduced the '4-line' system but there was still a lot of handwork required. It is, however, much easier using LaTeX where formula 1.1 above was specified as:

```
\begin{equation}
P_{N_1 + m} = \frac{C}{N_1 + m} \binom{N_2 - N_1}{m}
\alpha^m \beta^{(N_2 - N_1) - m}
\end{equation}
```

# Two

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## The Parts of a Book

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This chapter describes the various parts of a book, the ordering of the parts, and the typical page numbering scheme used in books.

### 2.1 Front matter

There are three major divisions in a book: the front matter or preliminaries, the main matter or text, and the back matter or references. The main differences as far as appearance goes is that in the front matter the folios are expressed as roman numerals and sectional divisions are not numbered. The folios are expressed as arabic numerals in the main matter and back matter. Sectional divisions are numbered in the main matter but not in the back matter.

The front matter consists of such elements as the title of the book, a table of contents, and similar items. All pages are paginated — that is they are counted — but the first few pages in the front matter, the title pages and such, do not usually have folios. The remainder of the pages in the front matter do have folios which are usually expressed as roman numerals. Not all books have all the elements described below.

The first page is a recto *half-title*, or *bastard title*, page with no folio. The page is very simple and displays just the main title of the book — no subtitle, author, or other information. One purported purpose of this page is to protect the main title page.

The first verso page, the back of the half-title page, may contain the series title, if the book is one in a series, a list of contributors, a frontispiece, or may be blank. The series title may instead be put on the half-title page or on the copyright page.

The *title page* is recto and contains the full title of the work, the names of the author(s) or editor(s), and often at the bottom of the page the name of the publisher, together with the publisher's logo if it has one.

The title page(s) may be laid out in a simple manner or can have various fol-de-rols, depending on the impression the designer wants to give. In any event the style of this page should give an indication of the style used in the main body of the work.

The verso of the title page is the copyright page. This contains the copyright notice, the publishing/printing history, the country where printed, ISBN and/or CIP information. The page is usually typeset in a smaller font than the normal text.

Following the copyright page may come a dedication or an epigraph, on a recto page, with the following verso page blank.

This essentially completes the unfolioed pages.

The headings and textual forms for the paginated pages should be the same as those for the main matter, except that headings are usually unnumbered.

The first folioed page, usually with roman numerals (e.g., this is folio iii), is recto with

Table 2.1: Front matter

Element	Page	Folio	Leaf
Half-title page	recto	no	1
Frontispiece, etc., or blank	verso	no	1
Title page	recto	no	2
Copyright page	verso	no	2
Dedication	recto	no	3
Blank	verso	no	3
Table of Contents	recto	yes	3 or 4
List of Figures	recto or verso	yes	3 or 4
List of Tables	recto or verso	yes	etc.
Foreword	recto or verso	yes	etc.
Preface	recto or verso	yes	etc.
Acknowledgements	recto or verso	yes	etc.
Introduction	recto or verso	yes	etc.
Abbreviations, etc	recto or verso	yes	etc.

the Table of Contents (ToC). If the book contains figures (illustrations) and/or tables, the List of Figures (LoF) and/or List of Tables (LoT) come after the ToC, with no blank pages separating them. The ToC should contain an entry for each following major element. If there is a LoT, say, this should be listed in the ToC. The main chapters must be listed, of course, and so should elements like a preface, bibliography or an index.

There may be a foreword after the listings, with no blank separator. A foreword is usually written by someone other than the author, preferably an eminent person whose name will help increase the sales potential, and is signed by the writer. The writer's signature is often typeset in small caps after the end of the piece.

A preface is normally written by the author, in which he includes reasons why he wrote the work in the first place, and perhaps to provide some more personal comments than would be justified in the body. A preface starts on the page immediately following a foreword, or the lists.

If any acknowledgements are required that have not already appeared in the preface, these may come next in sequence.

Following may be an introduction if this is not part of the main text. The last elements in the front material may be a list of abbreviations, list of symbols, a chronology of events, a family tree, or other information of a like sort depending on the particular work.

Table 2.1 summarises the potential elements in the front matter.

Note that the titles Foreword, Preface and Introduction are somewhat interchangeable. In some books the title Introduction may be used for what is described here as the preface, and similar changes may be made among the other terms and titles in other books.

### 2.1.1 COPYRIGHT PAGE

Most people are familiar with titles, ToC, prefaces, etc., but like me are probably less familiar with the contents of the copyright page. In any event this is usually laid out by the publishing house, but some authors may like to be, or are forced into being, their own publisher.

The main point of the copyright page is to display the copyright notice. The Berne Convention does not require that published works carry a copyright notice in order to secure copyright protection but most play it on the safe side and include a copyright notice. This usually comes in three parts: the word *Copyright* or more usually the symbol ©, the year of publication, and the name of the copyright owner. The copyright symbol matches the requirements of the Universal Copyright Convention to which the USA, the majority of European and many Asian countries belong. The phrase ‘All rights reserved’ is often added to ensure protection under the Buenos Aires Convention, to which most of the Americas belong. A typical copyright notice may look like:

© 2035 by Frederick Jones. All rights reserved.

Somewhere on the page, but often near the copyright notice, is the name and location(s) of the publisher.

Also on the copyright page is the publishing history, denoting the edition or editions<sup>1</sup> and their dates, and often where the book has been printed. One thing that has puzzled me in the past is the mysterious row of numbers you often see, looking like:

02 01 00 99 98 97      10 9 8 7 6 5

The set on the left, reading from right to left, are the last two digits of years starting with the original year of publication. The set on the right, and again reading from right to left, represents the potential number of new impressions (print runs). The lowest number in each group indicates the edition date and the current impression. So, the example indicates the fifth impression of a book first published in 1997.

In the USA, the page often includes the Library of Congress Cataloging-in-Publication (CIP) data, which has to be obtained from the Library of Congress. This provides some keywords about the book.

The copyright page is also the place for the ISBN (International Standard Book Number) number. This uniquely identifies the book. For example: ISBN 0-NNN-NNNN-2. The initial 0 means that the book was published in an English-speaking country, the next group of digits identify the publisher, the third group identifies the particular book by the publisher, and the final digit, 2 in the example, is a check digit.

It is left as an exercise for the reader to garner more information about obtaining CIP and ISBN data.

## 2.2 Main matter

The main matter forms the heart of the book.

Just as in all the other parts of a book the pages within the main matter are included in the pagination, even though some folios may not be expressed. The folios are normally presented as arabic numerals, with the numbering starting at 1 on the first recto page of the main matter.

The main matter is at least divided into *chapters*, unless it is something like a young child’s book which consists of a single short story. When the material may be logically divided into sections larger than chapters, the chapters may be grouped into *parts* which would then be the highest level of division within the book. Frederic Connes has told me that in French typography there is often a division above the part level. This is also sometimes the case with English typography where it is typically called a *book* — the *Chicago*

<sup>1</sup>A second edition should be more valuable than a first edition as there are many fewer of them.

*Manual of Style* [Chi93, p. 21] shows an example. A single physical book may thus be divided into levels from *book* through *part* and *chapter* to further refinements. Typically all of books, parts and chapters are numbered. Obviously, part numbering should be continuous throughout the book, but even with parts the chapter numbering is also continuous throughout the book.

The title of a part is usually on a recto page which just contains the part title, and number if there is one. Book titles are usually treated the same way. Chapters also start on recto pages but in this case the text of the chapter starts on the same page as the chapter title.

Where chapters are long, or when the material is complicated, they may be divided into sections, each introduced by a subhead, either numbered or unnumbered, with the numbering scheme starting afresh within each chapter. Similarly sections may be partitioned into subsections by inserting sub-subheads, but except for more technical works this is usually as fine as the subdivisions need go to. Normally there are no required page breaks before the start of any subhead within a chapter.

The title page of a part or chapter need not have the folio expressed, nor a possibly textless verso page before the start of a chapter, but all other pages should display their folios.

There may be a final chapter in the main matter called Conclusions, or similar, which may be a lengthy summary of the work presented, untouched areas, ideas for future work, and so on.

If there are any numbered appendices they logically come at the end of the main matter. Appendices are often 'numbered' alphabetically rather than numerically, so the first might be Appendix A, the second Appendix B, and so on.

An epilogue or an afterword is a relatively short piece that the author may include. These are not normally treated as prominently as the preceding chapters, and may well be put into the back matter if they are unnumbered.

### 2.3 Back matter

The back matter is optional but if present conveys information ancilliary to that in the main matter. The elements are not normally numbered, so an unnumbered appendix would normally come in the back matter.

Other elements include Notes, a Glossary and/or lists of symbols or abbreviations, which could be in the front matter instead. These elements are normally unnumbered, as is any list of contributors, Bibliography or Index.

In some instances appendices and notes may be given at the end of each chapter instead of being lumped at the back.

The first element in the back matter starts on a recto page but the remainder may start on either recto or verso pages.

In older books it was often the custom to have a colophon as the final element in a book. This is an inscription which includes information about the production and design of the book and nearly always indicates which fonts were used.



Table 2.2: Common signatures

Name	Folds	Size	Sheets	Leaves	Pages
Broadside	0	$a \times b$	1	1	2
Folio	1	$b/2 \times a$	1	2	4
Quarto, <i>4to</i>	2	$a/2 \times b/2$	2	4	8
Octavo, <i>8vo</i>	3	$b/4 \times a/2$	4	8	16
<i>16mo</i>	4	$a/4 \times b/4$	8	16	32
<i>32mo</i>	5	$b/8 \times a/4$	16	32	64
<i>64mo</i>	6	$a/8 \times b/8$	32	64	128

Table 2.3: Some American paper sizes (in inches)

'Dollar bill'	$7 \times 3$	Used for origami, not bills
Statement	$8.5 \times 5.5$	
Executive	$10.5 \times 7.25$	
Letter	$11 \times 8.5$	Also in double, half or quarter size
Old (untrimmed)	$12 \times 9$	Also called Architectural-A
Legal	$14 \times 8.5$	
Ledger	$17 \times 11$	Also called Tabloid
Broadsheet	$22 \times 17$	As used in newsprint

## 2.4 Signatures and casting off

Professionally printed books have many pages printed per sheet of (large) paper, which is then folded and cut where necessary to produce a *gathering* or *signature* of several smaller sheets. An unfolded sheet is called a *broadside*. Folding a sheet in half produces a one sheet *folio* signature with two leaves and four pages. Folding it in half again and cutting along the original fold gives a two sheet *quarto* signature with four leaves and eight pages. Folding in half again, results in a four sheet *octavo* signature with eight leaves and 16 pages, and so on as listed in Table 2.2.

In Table 2.2 the Size column is the untrimmed size of a leaf in the signature with respect to the size of the broadside. When made up into a book the leaves will be trimmed to a slightly smaller size, at the discretion of the designer and publisher; typically a minimum of 1/8 inch or 3 millimetres would be cut from the top, bottom and fore-edge of a leaf.

Other folds can produce other signatures. For example a *sexto*, obtained by folding in thirds and then folding in half, is a three sheet signature with six leaves and 12 pages.

Paper has always been made in a wide range of sizes for a myriad of uses. Table 2.3 lists some common American paper sizes.

Traditionally the sizes are denoted by name but manufacturers did not necessarily make paper of the size that matched the name they gave it. Some common names and trimmed sizes for British book work are given in Table 2.4.

The metric sizes, given in Table 2.5, are those now recommended for book production where the metric system holds sway, which includes the UK [McL80, p. 104].

In making up the book, the pages in each signature are first fastened together, usually

Table 2.4: Some traditional British book paper sizes (in inches)

Name	Quarto	Octavo
pott	$8 \times 6.5$	$6.25 \times 4\text{in}$
foolscap	$8.5 \times 6.75$	$6.75 \times 4.25$
crown	$10 \times 7.5$	$7.5 \times 5$
post	$10 \times 8$	$8 \times 5$
large crown	$10.5 \times 8$	$8 \times 5.25$
large post	$10.25 \times 8.25$	$8.25 \times 5.25$
small demy	$11.25 \times 8.5$	$8.5 \times 5.675$
demy	$11.25 \times 8.75$	$8.75 \times 5.675$
medium	$11.5 \times 9$	$9 \times 5.75$
small royal	$12.25 \times 9.25$	$9.25 \times 6.175$
royal	$12.5 \times 10$	$10 \times 6.25$
super royal	$13.5 \times 10.25$	$10.25 \times 6.75$
imperial	$15 \times 11$	$11 \times 7.5$

Table 2.5: Metric book paper sizes (in mm)

	untrimmed	trimmed
metric crown octavo	$192 \times 126$	$186 \times 123$
metric large crown octavo	$205 \times 132$	$198 \times 129$
metric demy octavo	$222 \times 141$	$216 \times 138$
metric small royal octavo	$240 \times 158$	$234 \times 156$
A5		$210 \times 148$

Table 2.6: Common American commercial paper sizes (in inches)

Sheet size	Book trim size	Common use	Pages per sheet (max)
$45 \times 35$	$8.5 \times 5.5$	scholarly works	32 pages
$50 \times 38$	$9.25 \times 6.125$	major nonfiction	32 pages
$66 \times 44$	$8 \times 5.375$	fiction & minor fiction	64 pages
$68 \times 45$	$8.25 \times 5.5$	major fiction & nonfiction	64 pages
$45 \times 35$	$11 \times 8.5$	children's books, manuals	16 pages
$50 \times 38$	$12.125 \times 9.25$	art monographs, children's books	16 pages

by sewing through the folds. The signatures are then bound together and the covers, end papers and spine are attached to form the completed whole.

Commercial printers use paper larger than shown in the previous tables; they print several (final) pages on a single sheet, then fold it and trim it down to the finished page size. Table 2.6 is from [Wil93, p. 59]. He also says that other common trimmed sizes are  $9.25 \times 6.125$  in out of  $50 \times 38$  in sheets,  $10.25 \times 8.25$  in out of  $45 \times 35$  in sheets, and so on.

Publishers like the final typeset book to be of a length that just fits within an integral number of signatures, with few if any blank pages required to make up the final signature.

Casting off is the process of determining how many lines a given text will make in a given size of type, and hence how many pages will be required.

To cast off you need to know how many characters there will be in a line, and how many characters there are, or will be, in the text. For the purposes of casting off, 'characters' includes punctuation as well as letters and digits. The first number can be easily obtained, either from copy fitting tables or by measurement; this is described in more detail in §3.3. The second is more problematic, especially when the manuscript has yet to be written. A useful rule of thumb is that words in an English text average five letters plus one space (i.e., six characters); word length in technical texts might be greater than this.

To determine the number of words it is probably easiest to type a representative portion of the manuscript, hand count the words and then divide that result by the proportion of the complete text that you have typed. For example, if you have typed 1/20th of the whole, then divide by 1/20, which is equivalent to multiplying by 20. To fully estimate the number of pages required it is also necessary to make allowance for chapter titles, illustrations, and so forth.

If it turns out, say, that your work will require 3 signatures plus 2 pages then it will be more convenient to make it fit into 3 signatures, or 4 signatures minus a page or two. This can be done by expanding or cutting the text and/or by changing the font and/or by changing the number or width of lines on a page.

When I was editing a technical journal the authors were given a word limit. The primary reason was not that we were interested in the actual word count but rather so that we could estimate, and possibly limit, the number of pages allotted to each article; we used *octavo* signatures and no blank pages. I suspect that it is the same with most publishers — it is the page count not the word count that is important to them.

In some special cases, extra pages may be 'tipped in' to the body of the book. This is most likely to occur for illustrations which require special paper for printing and it would be too costly to use that paper for the whole work. Another example is for a fold-out of some sort, a large map, say, or a triple spread illustration. The tipped in pages are glued into place in the book and may or may not be paginated. For tipped in illustrations, a List of Illustrations may well start with a phrase like: 'Between pages 52 and 53'.

## 2.5 Paper

Paper, on which I assume your work will be printed, can be thought of in seven categories, six of which are used in the making of books. The categories are:

**Special** is not used for books. It includes 'wet strength tissues' and other sanitary, cosmetic and industrial papers.

**Wrapping** papers are for protective purposes. Of these kraft paper is made from unbleached chemical wood fibre sized with resin. The fibres are long and strong, hence the name 'kraft' from the German word for 'strength'. The usual colour is brown. Kraft paper is used in bookbinding for reinforcing endpapers and, strengthening and shaping spines.

**Printing** paper covers a wide range, from economical to expensive, in surface finish from rough to highly polished (for fine art four colour printing), and in colour.

**Writing** paper is suitable for all stationery requirements. Ledger paper is made from rag fibre, or a mixture of rag and wood pulp, and is strong, opaque and durable, with a smooth surface. It is used for visitor's and account books and registers, and for

fine printing. Bank and bond papers are of good quality, strong, durable and nearly Ph neutral; they are made from fibres of chemical wood sized with resin. In books they are mainly used for strengthening damaged signatures. Artists' and designers' drawing papers usually have a rough surface — cartridge paper, made from well sized chemical wood fibres, is often used for tipped on endpapers.

**Decorative** papers used for the endpapers and sides of books are of an extensive variety of colours, textures, patterns, and quality. Any decorative paper used in a book should be strong with a good firm surface.

**Ingres** and similar papers are mould-made from linen and/or cotton with a little wood pulp. They come from Europe in a variety of quiet colours and are used in fine bindings for sides and endpapers.

**Japanese** papers and tissues are mould-made from good quality rag fibre. They are fine but strong and are extensively used for repairing documents, mending leaves, and replacing damaged or missing areas. I find Kozo paper very useful for repairing documents and, for example, as hinges when bookbinding. Although not paper, there are some wonderful Japanese bookcloths for binding covers.

Machine-made paper, which is the commonest, comes in a number of sometimes overlapping categories, of which the main ones are:

**Antique** papers are soft textured papers originally made for letterpress printing, but there are now surface sized ones for offset lithography.

**Machine finish** papers have varying degrees of surface smoothness. They are also known as super-calendered or English.

**Coated** paper has been flooded with fine clay and adhesive to make them particularly good for halftones. Finishes range from dull through matte to glossy.

**Impregnated** papers are also known as pigmented. They are surface sized, lightly coated and calendered and can take halftones, especially by lithography.

**Text** papers are textured and coloured and are useful for limited editions, book jackets and end papers. They often have a deckle edge on the two long sides.

**Cover** papers are heavier varieties of text and other papers and are typically used for pamphlet binding and paperback covers.

**Moldmade** papers are made by machine to resemble handmade papers, with deckle edges. They come in a wide range of textures, colours, and weights. The available range includes papers suitable for binding sides, endpapers, book jackets, or the text block.

Handmade paper comes as single sheets but machine made paper can be obtained in either rolls or sheets. For some letterpress printing I recently bought some Strathmore 400 Drawing Paper as 3 × 30 feet rolls at about 1/3 the price of the same quantity of paper in sheet form; the downside was that I had to slice it up into the sheet size I wanted to use, but in this case the upside was that I tore rather than cut and obtained sheets with deckle edges on all four sides so that at the end it looked rather like handmade paper.

Paper for printing comes in different grades according to the intended use. The common ones, together with their manufactured size in inches, are [PP07]:

**Bond** (17 × 22) Commonly used for letters and business forms. They have surfaces acceptable for both pen and pencil.

**Coated** (25 × 38) For high quality printed work because of their surface smoothness and uniform ink receptivity.

**Text** (25 × 38) These often have interesting textures and a range of colours and are used for notices, brochures and booklets. There are often treated with a special sizing making them more resistant to water penetration and easy to print.

**Book** (25 × 38) Are used for book and trade printing. They are less expensive than text papers but come in a wider range of weights and bulk.

**Offset** (25 × 38) Are similar to the coated and uncoated book paper used for letterpress printing but with sizing added to enhance offset printing.

**Cover** (20 × 26) Complement coated and text papers in matching colours and heavier weights for booklet covers, etc. It is a handy rule of thumb that cover paper has about twice the thickness of text paper of the same weight. If being used for post-cards check that your choice is acceptable to the postal services.

**Index** (22.5 × 35 and 25.5 × 30.5) Is stiff and easy to write on with a pen.

**Tag** (24 × 36) A strong utility paper for making tags

**Bristol** (22.5 × 28.5) One of the board grades but softer than index or tag and easier to fold.

**Newsprint**(24 × 36) The paper newspapers are printed on.

**Lightweight** Covers a wide range of specialty papers such as onion skin or Bible paper.

**Digital** Specialty paper for use with digital printers. Each technology (e.g., inkjet, laser) and often the particular printer tends to have its own requirements.

It is not often that books include information about the paper on which they are printed. If they do they are likely to be fine press books or limited editions, but even then most I have seen are silent on the matter. A few trade books do include details. Among the more popular papers<sup>2</sup> I have come across are: Arches, of various kinds; Curtis Rag; Fabriano; Glatfelter; Linweave Early American, which has been used by the University of California press; Mohawk Superfine; Warren's Old Style, which has been used for several books published by the University of California; and Strathmore of several kinds.

At the time of writing I have finished hand letterpress printing a small book of 35 printed pages on Strathmore 400 Drawing Paper and an accordion book on Chinese Scholars on Southworth 32lb cotton paper. I am in the process of letterpress printing a collection of poems as individual broadsides and for these I am using a variety of papers from my local retail paper suppliers, all in letterpaper size — the regular US paper size for most non-commercial printing (in most of the world this would be the A4 size). These include: Wausau Royal Silk 24lb (90g/m<sup>2</sup>); Construction 70lb text; Exact Opaque Colors 24/60lb text; Wausau Exact Vellum Bristol 67lb (145g/m<sup>2</sup>); Curious Lightspecs 70lb text; Eames Furniture Weave 80lb text; Speckleton Kraft 70lb text; and various Southworth papers. Thus, in different weights (thicknesses), colours and surface finishes.

As you can see, paper comes in various weights. In most of the world this is simply specified as grams per square meter (g/m<sup>2</sup>, sometimes designated as *gsm*). This quantity is properly called *grammage* but English speaking countries often use *weight* instead. Typical office paper is about 80g/m<sup>2</sup>, so an A4 sheet (1/16m<sup>2</sup>) weighs about 5gm.

In the US and a few other places it is much more complicated. The weight is expressed in terms of *basis weight* in pounds (lbs) for a known quantity of the paper. The 'known quantity' is a ream of paper of given dimensions. However, the 'given dimensions' and the 'ream' varies according to the type of paper. The dimensions are usually not those of the finished product, but of the paper as made before being cut into the final sizes. The

<sup>2</sup>Meaning that I know that they have been used in more than one book.

Table 2.7: US basis size of various papers

Paper type	Size (inches)	Ream (sheets)
Bond, writing, ledger	17 × 22	500
Coated, book, offset, text	25 × 28	500
Cover	20 × 26	500 or 1000
Index	25 1/2 × 30 1/2	500
Tag	24 × 36	500
Bristol	22 1/2 × 28 1/2	500
Newsprint	24 × 36	500
Tissue	24 × 36	480
Paperboard	12 × 12	1000

Table 2.8: Approximate paper weight equivalents

Paper grade	Grammage g/m <sup>2</sup>	Thickness inches	Caliper mm
16 lb bond, 40 lb text	59	0.0032	0.081
45 lb text	67	0.0036	0.092
20 lb bond	75	0.0038	0.097
24 lb bond, 60 lb text	89	0.0048	0.120
70 lb text	104	0.0058	0.147
80 lb text	118	0.0061	0.155
67 lb bristol, 100 lb text	148	0.0073	0.185
60 lb cover, 90 lb index	162	0.0074	0.188
65 lb cover, 80 lb bristol	176	0.0078	0.198
110 lb index	199	0.0085	0.216
80 lb cover	216	0.0092	0.234

advertised weight on a package of paper is no measure of the actual weight of the package that is being presented for sale. In some cases, though, an ‘M weight’ is also given, which is the weight (in pounds) of 1000 cut sheets. Suppliers will often charge by the M weight as it is always consistent for a given paper size and it also makes the shipping weight easy to calculate. Some basis weights are listed in Table 2.7.

Sheets 17 × 22 in can be cut into four 8 1/2 × 11 in letterpaper sized sheets, the regular size used by business. Similarly sheets 25 × 38 in can be cut into sixteen 6 × 9 in book-sized sheets with little wastage. These two ream sizes are among the most common ones.

Paper thickness, or *caliper*, is a common measurement used for some printing applications. This is usually measured directly because it can only be estimated as the density of the paper is not known. However reasonable estimates can be made for different weights of the same kind of paper.

Approximate paper weight equivalents are shown in Table 2.8. These are approximate because there are trade-offs between the characteristics within the same basic weight which vary between manufactures.

# Three

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## The page

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Authors usually want their works to be read by others than themselves, and this implies that their manuscript will be reproduced in some manner. It is to be hoped that the published version of their work will attract readers and there are two aspects to this. The major is the actual content of the work — the thoughts of the author couched in an interesting manner — if something is boring, then there are too many other interesting things for the reader to do than to plow on until the bitter end, assuming that he even started to read seriously after an initial scan. The other aspect is the manner in which the content is displayed. Or, in other words, the *typography* of the book, which is the subject of this chapter.

The essence of good typography is that it is not noticeable at first, or even second or later, glances to any without a trained eye. If your initial reaction when glancing through a book is to exclaim about its layout then it is most probably badly designed, if it was designed at all. Good typography is subtle, not strident.

With the advent of desktop publishing many authors are tempted to design their own books. It is seemingly all too easy to do. Just pick a few of the thousands of fonts that are available, use this one for headings, that one for the main text, another one for captions, decide how big the typeblock is to be, and there you are.

However, just as writing is a skill that has to be learned, typography is also an art that has to be learned and practised. There are hundreds of years of experience embodied in the good design of a book. These are not to be cast aside lightly and many authors who design their own books do not know what some of the hard-earned lessons are, let alone that what they are doing may be the very antithesis of these. An expert can break the rules, but then he is aware that he has good reasons for breaking them.

The author supplies the message and the typographer supplies the medium. Contrary to Marshall McLuhan, the medium is *not* the message, and the typographer's job is not to intrude between the message and the audience, but to subtly increase the reader's enjoyment and involvement. If a book shouts 'look at me!' then it is an advertisement, and a bad one at that, for the designer.

### 3.1 The shape of a book

Books come in many shapes and sizes, but over the centuries certain shapes have been found to be more pleasurable and convenient than others. Thus books, except for a very very few, are rectangular in shape. The exceptions on the whole are books for young children, although I do have a book edited by Fritz Spiegl and published by Pan Books entitled *A Small Book of Grave Humour*, which is in the shape of a tombstone — this is an anthology

of epitaphs. Normally the height of a book, when closed, is greater than the width. Apart from any aesthetic reasons, a book of this shape is physically more comfortable to hold than one which is wider than it is high.

It might appear that the designer has great freedom in choosing the size of the work, but for economic reasons this is not normally the case. Much typographical design is based upon the availability of certain standard industrial sizes of sheets of paper. A page size of  $12 \times 8$  inches will be much more expensive than one which fits on a standard US letter sheet of  $11 \times 8 \frac{1}{2}$  inches. Similarly, one of the standard sizes for a business envelope is  $4 \frac{1}{8} \times 9 \frac{1}{2}$  inches. Brochures for mailing should be designed so that they can be inserted into the envelope with minimal folding. Thus a brochure size of  $5 \times 10$  inches will be highly inconvenient, no matter how good it looks visually.

Over the years books have been produced in an almost infinite variety of proportions, where by *proportion* I mean the ratio of the height to the width of a rectangle. However, certain proportions occur time after time throughout the centuries and across many different countries and civilizations. This is because some proportions are inherently more pleasing to the eye than others are. These pleasing proportions are also commonly found in nature — in physical, biological, and chemical systems and constructs.

Some examples of pleasing proportions can be seen in Japanese wood block prints, such as the *Hoso-ye* size ( $2 : 1$ ) which is a double square, the *Oban* ( $3 : 2$ ), the *Chuban* ( $11 : 8$ ) and the *Koban* size ( $\sqrt{2} : 1$ ). Sometimes these prints were made up into books, but were often published as stand-alone art work. Similarly Indian paintings, at least in the 16th to the 18th century, often come in the range  $1.701 : 1$  to  $13 : 9$ , thus being around  $3 : 2$  in proportion.

In medieval Europe page proportions were generally in the range  $1.25 : 1$  to  $1.5 : 1$ . Sheets of paper were typically produced in the proportion  $4 : 3$  ( $1.33 : 1$ ) or  $3 : 2$  ( $1.5 : 1$ ). All sheet proportions have the property that they are reproduced with each alternate folding of the sheet. For example, if a sheet starts at a size of  $60 \times 40$  (i.e.,  $3 : 2$ ), then the first fold will make a double sheet of size  $30 \times 40$  (i.e.,  $3 : 4$ ). The next fold will produce a quadrupled sheet of size  $30 \times 20$ , which is again  $3 : 2$ , and so on. The Renaissance typographers tended to like taller books, and their proportions would go up to  $1.87 : 1$  or so. The style nowadays has tended to go back towards the medieval proportions.

The standard ISO page proportions are  $\sqrt{2} : 1$  ( $1.414 : 1$ ). These have a similar folding property to the other proportions, except in this case each fold reproduces the original page proportion. Thus halving an A0 sheet (size  $1189 \times 841$  mm) produces an A1 size sheet ( $594 \times 841$ ), which in turn being halved produces the A2 sheet ( $420 \times 594$ ), down through the A3, A4 ( $210 \times 297$  mm), A5, ... sheets.

For many years it was thought that it was impossible to fold a sheet of paper, no matter how large and thin, more than six times altogether. This is not so as in 2002 a high school student, Britney Gallivan, managed to fold a sheet of paper in half twelve times (see, for example, <http://mathworld.wolfram.com/Folding.html>).

There is no one perfect proportion for a page, although some are clearly better than others. For ordinary books both publishers and readers tend to prefer books whose proportions range from the light  $9 : 5$  ( $1.8 : 1$ ) to the heavy  $5 : 4$  ( $1.25 : 1$ ). Some examples are shown in Figure 3.1. Wider pages, those with proportions less than  $\sqrt{2} : 1$  ( $1.414 : 1$ ), are principally useful for documents that need extra width for tables, marginal notes, or where multi-column printing is preferred.

In books where the illustrations are the primary concern, the shape of the illustrations is



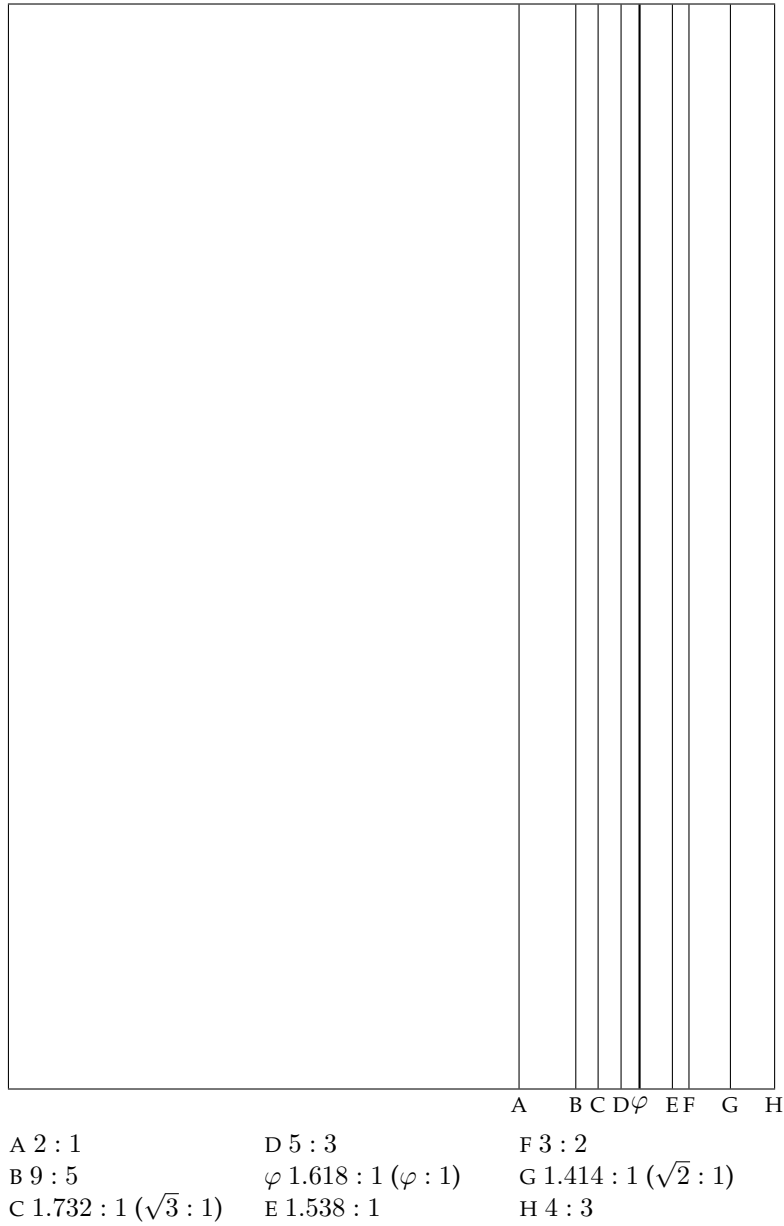


Figure 3.1: Some page proportions

generally the major influence on the page proportion. The page size should be somewhat higher than that of the average illustration. The extra height is required for the insertion of captions describing the illustration. A proportion of  $\pi : e$  (1.156 : 1), which is slightly higher than a perfect square, is good for square illustrations.<sup>1</sup> The  $e : \pi$  (0.864 : 1) proportion is useful for landscape photographs taken with a  $4 \times 5$  format camera, while those from a 35mm camera (which produces a negative with a  $2 : 3$  proportion) are better accommodated on an  $0.83 : 1$  page.

### 3.1.1 THE GOLDEN SECTION AND FIBONACCI SERIES

Typographers need a modicum of mathematical ability, but no more than an average teenager can do — basically simple arithmetic. You can skip this section if you wish as it just provides some background mathematical material which might be of interest.

Since ancient Greek times or even before, the golden section, which is denoted by the Greek letter  $\varphi$  (phi), has been considered to be a particularly harmonious proportion. It should come as no surprise, then, that this also has applications in typography.

The Greeks were interested in geometry (think of Euclid). They discovered that if you divide a straight line into two unequal parts then a certain division appeared to have an especially appealing aesthetic quality about it. Call the length of the line  $l$  and the length of the two parts  $a$  and  $b$ , where  $a$  is the smaller and  $b$  is the larger. The division in question is when the ratio of the larger to the smaller division ( $b/a$ ) is the same as the ratio of the whole line to the larger division ( $l/b$ ). More formally, two elements embody the golden section, symbolised by  $\varphi$ , when the ratio of the larger to the smaller is the same as the ratio of the sum of the two to the larger. If the two elements are  $a$  and  $b$ , with  $a < b$ , then

$$\varphi = \frac{b}{a} = \frac{a+b}{b} = (1 + \sqrt{5})/2 \quad (3.1)$$

The golden section has been called by a number of different names during its history. Euclid called it the 'extreme and mean ratio' while Renaissance writers called it the 'divine proportion'; now it is called either the 'golden section' or the 'golden ratio'. The symbol  $\varphi$  is said to come from the name of the Greek artist Phidias (C5th BC) who often used the golden section in his sculpture. A rectangle whose sides are in the same proportion as the golden section is often called a 'golden rectangle'. The front of the Parthenon on the Acropolis in Athens is a golden rectangle, and such rectangles appear often in Greek architecture. The symbol of the Pythagorean school was the star pentagram, where each line is divided in the golden section.

The approximate decimal value for  $\varphi$  is 1.61803. The number has some unusual properties. If you add one to  $\varphi$  you get its square, while subtracting one from  $\varphi$  gives its reciprocal.

$$\varphi + 1 = \varphi^2 \quad (3.2)$$

$$\varphi - 1 = 1/\varphi \quad (3.3)$$

---

<sup>1</sup>Both  $e$  and  $\pi$  are well known mathematical numbers.  $e$  ( $= 2.718 \dots$ ) is the base of natural logarithms and  $\pi$  ( $= 3.141 \dots$ ) is the ratio of the circumference of a circle to its diameter.

It also has a very simple definition as the continued fraction

$$\varphi = 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}}} \quad (3.4)$$

In 1202 Leonardo Pisano, also known as Leonardo Fibonacci, wrote a book called *Liber Abaci*.<sup>2</sup> One of the topics he was interested in was population growth. The book included this exercise:

How many pairs of rabbits can be produced from a single pair in a year? Assume that each pair produces a new pair of offspring every month, a rabbit becomes fertile at age one month, and no rabbits die during the year.

After a month there will be two pairs. At the end of the next month the first pair will have produced another pair, so now there are three pairs. At the end of the following month the original pair will have produced a third pair of offspring and their firstborn will also have produced a pair, to make five pairs in all. And so on. If, like the rabbits, you are not too exhausted to continue, you can get the following series of numbers<sup>3</sup>:

$$0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 \dots$$

After the first two terms, each term in the series is the sum of the two preceding terms. Also, as one progresses along the series, the ratio of any adjacent pair of terms oscillates around  $\varphi$  ( $= 1.618 \dots$ ), approaching it ever more closely.

$$\begin{aligned} 8/5 &= 1.6 \\ 13/8 &= 1.625 \\ 21/13 &= 1.615 \\ 34/21 &= 1.619 \\ 55/34 &= 1.6176 \\ 89/55 &= 1.6182 \end{aligned}$$

For the mathematically inclined there is another, to me, typographically striking relationship between  $\varphi$  and the Fibonacci series. Define the Fibonacci numbers as  $F_n$ , where

$$F_0 = 0; \quad F_1 = 1; \quad F_{n+2} = F_{n+1} + F_n, \quad n \geq 0. \quad (3.5)$$

Then

$$F_n = \frac{1}{\sqrt{5}}(\varphi^n - (-\varphi)^{-n}) \quad (3.6)$$

Both the Fibonacci series and the golden section appear in nature. The arrangement of seeds in a sunflower, the pattern on the surface of a pinecone, and the spacing of leaves around a stalk all exhibit Fibonacci patterns (for example see [CG96]). Martin Gardner [Gar66] reports on a study of 65 women that claimed that the average ratio of a

<sup>2</sup>Book of the Abacus.

<sup>3</sup>The numbers at the start of the series depend on whether you consider the initial pair of rabbits to be adults or babies.

person's height to the height of the navel is 1.618+ — suspiciously close to  $\varphi$ . According to Dan Brown, the author of *The Da Vinci Code*, Mario Livio's *The Golden Ratio* [Liv02] '... unveils the history and mystery of the remarkable number phi in such a way that ... you will never again look at a pyramid, pinecone, or Picasso in the same light'.

### 3.2 The spread

The typeblock is that part of the page which is normally covered with type. The same proportions that are useful for the shape of a page are also useful for the shape of the typeblock. This does not mean, though, that the proportions of the page and the typeblock should be the same. For instance, a square typeblock on a square page is inherently dull.

When we first start to learn to read we scan horizontally along each line of text. As our skills improve we tend to scan vertically rather than horizontally. A tall column of text helps in this process, provided that the column is not too wide.

A page in a book will typically contain several elements. Principal among these is the typeblock, but there are also items like the folio (that is, the page number), a running header and/or footer which carries the chapter and/or book title, and possibly marginalia and footnotes. These latter elements, although essential to the content of the book, are minor visual elements compared to the typeblock. But even minor decoration can obscure or kill an otherwise good design.

The major concern is the positioning of the typeblock on the page. The mere fact of positioning the typeblock also has the result of producing margins onto the page. Page design is a question of balancing the page proportions with the proportions of the typeblock and the proportions of the margins to create an interesting yet harmonious composition. A single page, except for a title page, is never the subject of a design but rather the design is in terms of the two pages that are on view when a book is opened — the left and right hand pages are considered as a whole. More technically, the design is in terms of a *double spread*.

Table 3.1 gives some examples of page designs. These are arranged in increasing order of fatness. In this table, and afterwards, I have just used a single number to represent the ratio of the page height to the width; that is, for example, 1.5 instead of 1.5 : 1 or 12/7 instead of 12 : 7. The following symbols are used in the table:

**Proportions :**

$P$  = page proportion =  $h/w$

$T$  = typeblock proportion =  $d/m$

**Page size :**

$w$  = width of page

$h$  = height of page

**Typeblock :**

$m$  = measure (i.e., width) of primary typeblock

$d$  = depth (excluding folios, running heads, etc.)

**Margins :**

$s$  = spine margin (back margin)

$t$  = top margin (head margin)

$e$  = fore-edge (front margin)

$f$  = foot margin (bottom margin)

$g$  = internal gutter (on a multi-column page)

Table 3.1: Some page designs

$P$	$T$	Margins & Columns					Figure
		$s$	$t$	$e$	$f$	$g$	
$\sqrt{3}$	2	$w/13$	$8s/5$	$16s/5$	$16s/5$		3.2 left
$\sqrt{3}$	$e/\varphi$	$w/10$	$2s$	$2s$	$3s$		3.2 right
$12/7$	1.701	$w/7$	$8s/5$	$8s/5$	$14s/5$		3.3 left
$e/\varphi$	$7/4$	$w/10$	$5s/4$	$5s/3$	$11s/8$		3.3 right
$\varphi$	1.866	$w/9$	$s$	$2s$	$7s/3$		3.4 left
$\varphi$	$\varphi$	$w/12$	$2s$	$5s/2$	$4s$		3.4 right
$8/5$	1.634	$2w/15$	$7s/5$	$9s/5$	$13s/5$		3.5 left
$19/12$	$7/4$	$2w/15$	$s$	$9s/8$	$11s/8$		3.5 right
$19/12$	$\sqrt{3}$	$w/7$	$s$	$5s/4$	$1.84s$		3.6 left
$19/12$	$8/5$	$w/12$	$7s/5$	$8s/5$	$2s$		3.6 right
$\pi/2$	$9/5$	$w/9$	$3s/2$	$5s/2$	$3s$		3.7 left
$e/\sqrt{3}$	1.71	$w/10$	$11s/8$	$24s/11$	$8s/3$		3.7 right
1.553	1.658	$w/11$	$\varphi s$	$\varphi s$	$\varphi s$		3.8 left
1.538	$\sqrt{7}$	$w/10$	$s$	$23s/6$	$3s/2$		3.8 right
$3/2$	2	$w/5$	$s/2$	$s$	$s$		3.10 left
$3/2$	1.701	$w/9$	$s$	$2s$	$7s/3$		3.10 right
$3/2$	$\pi/2$	$w/13$	$2s$	$10s/3$	$30s/7$		3.11 left
$3/2$	$3/2$	$w/9$	$3s/2$	$2s$	$3s$		3.11 right
$3/2$	1.68	$w/23$	$2s$	$5s$	$2s$		3.12 left
$3/2$	$3/2$	$w/10$	$2s$	$5s/2$	$2.85s$		3.12 right
1.48	1.376	$w/12$	$7s/4$	$2s$	$7s/2$		3.13 left
$13/9$	$\sqrt{2}$	$w/30$	$2s$	$9s/2$	$4s$	$s/2$	3.13 right
$\sqrt{2}$	$\varphi$	$w/9$	$s$	$2s$	$2s$		3.14 left
$\sqrt{2}$	$\varphi$	$w/8$	$s$	$5s/3$	$5s/3$		3.14 right
$7/5$	1.641	$w/7$	$s$	$8s/5$	$8s/5$		3.15 left
$17/22$	1.594	$0.176w$	$1.21s$	$1.47s$	$1.05s$		3.15 right
1.294	$13/9$	$w/12$	$s$	$2s$	$10s/7$	$s/2$	3.16 left
$9/7$	$19/9$	$2w/5$	$5s/8$	$5s/8$	$5s/6$		3.16 right
$5/4$	$13/11$	$w/10$	$3s/2$	$2s$	$8s/3$		3.18 left
$7/6$	$55/48$	$w/10$	$9s/10$	$8s/10$	$13s/10$	$1.05s$	3.18 right
$e/\pi$	0.951	$w/9$	$s$	$2s$	$3s/2$		3.19 left
$5/7$	$2/3$	$w/9$	$s/2$	$2s/3$	$s$	$s/3$	3.19 right

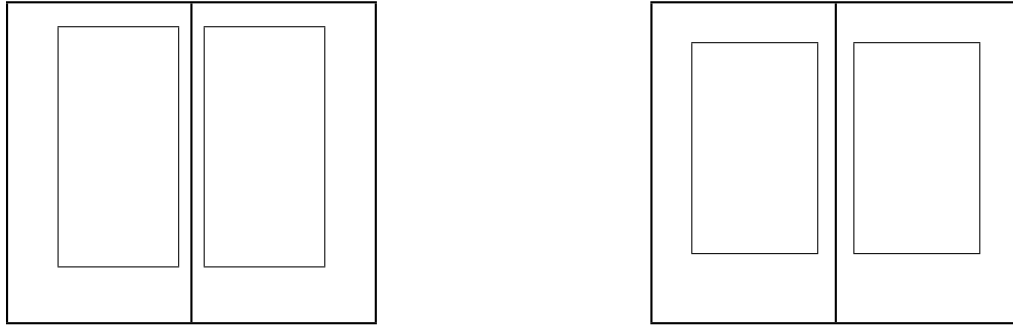


Figure 3.2: Two spreads: (Left) Canada, 1992. (Right) England, 1970.

Theoretically the following relationship holds among the several variables:

$$f + t - T(s + e) = w(P - T)$$

However, due to measurement and other difficulties, the numbers given in the table do not always obey this rule but they are close enough to give a good idea of the relative values. In any event, page design is not a simple arithmetic exercise but requires aesthetic judgement.

The designs are also shown in Figures 3.2 to 3.19. Each of these shows a double page spread; the page width has been kept constant throughout the series to enable easier visual comparison — it is the relative proportions, not the absolute size, that are important. I have only shown the pages and the typeblocks to avoid confusing the diagrams with headers, footers or folios.

Shown in Figure 3.2 are two modern books. On the left is the layout for Robert Bringhurst's *The Elements of Typographical Style* published by Hartley & Marks in 1992, and designed by Bringhurst [Bri99]. The text face is Minion set with 12pt leading on a 21pc measure. The captions are set in Scala Sans. The original size is 227 × 132 mm and is printed on Glatfelter laid paper. I highly recommend this book if you are interested in typography.

The layout on the right is The Folio Society's 1970 edition of *The Prince* by Niccolò Machiavelli. The original size is 216 × 125 mm and is set in 12/13 × 22 Centaur. Chapter titles are set as raggedright block paragraphs using Roman numbers and small caps for the text; not all chapters start a new page. There are no running headers and the folios are set at the center of the footer. The ToC is typeset like the standard LaTeX ToC but with the chapter titles in small caps.

Figure 3.3 (left) illustrates a small book by Wilfred T. Grenfell entitled *Adrift on an Ice-Pan* published in 1909 by the Riverside Press of Boston. The text is set with a leading of 16pt on a 16pc measure. The large leading and small measure combine to give a very open appearance. The original size is 184 × 107 mm. The half-title is set in bold uppercase about 1/3 of the way down the page. Uppercase is used for chapter headings which are centered. Captions for the photographs are also uppercase and are listed on an illustrations page. The folios are centered in the footer and enclosed in square brackets (e.g., [17]), and the headers contain the book title, centered, and in uppercase.

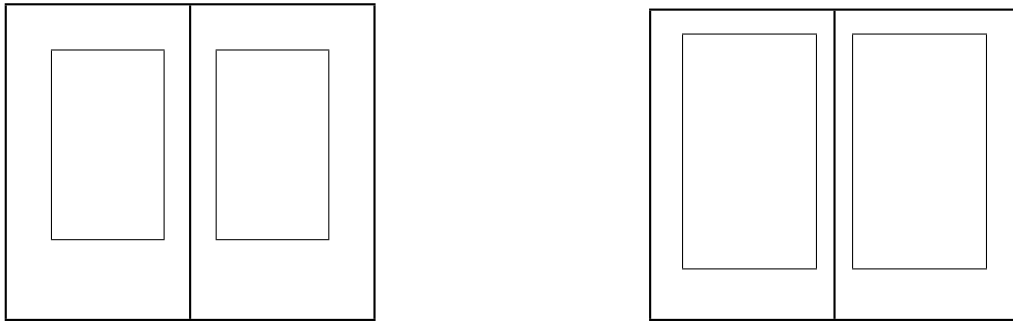


Figure 3.3: Two spreads: (Left) USA, 1909. (Right) England, 1964.

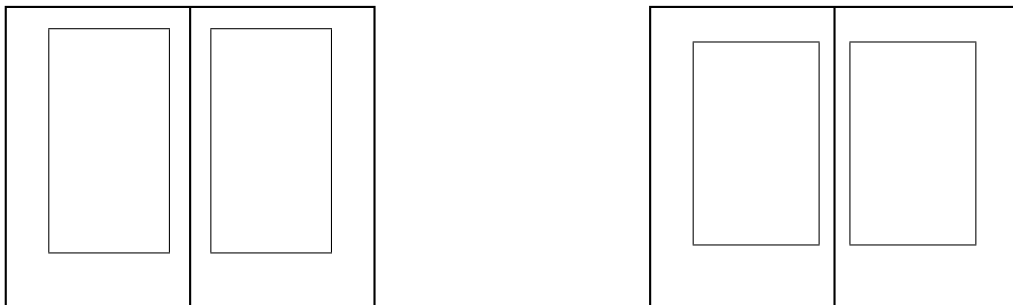


Figure 3.4: Two spreads: (Left) France, 1559. (Right) Canada, 1995.

On the right is another book from the Folio Society — *Three Men in a Boat* by Jerome K. Jerome printed in 1964. The original size is  $215 \times 128$  mm and is typeset with Ehrhardt at  $11/12 \times 22$ . Chapter titles are centered and simply consist of the word ‘CHAPTER’ followed by the number. There are no headers and the folio is set between square brackets (like [27]) in the center of the footer. The ToC title is centered, and the chapter entries are like standard LaTeX except that the numbers are set in a roman font while the texts, which give a summary of the chapter contents, are typeset in italic.

Jean de Tourmes, a Parisian publisher, printed *Histoire et Chronique* by Jean Froissart in 1559. This is a history book with the main text in roman and sidenotes in italic at roughly 80% of the size of the main text. The layout is shown in Figure 3.4 (left). The gutter (not shown) between the main text and the sidenote column is very small, but the change in fonts and sizes enables the book to be read with no confusion.

Another Hartley & Marks typography book — *Finer Points in the Spacing & Arrangement of Type* by Geoffrey Dowding — is shown at the right of Figure 3.4. This is typeset in Ehrhardt at  $10.5/14 \times 23$  on a page size of  $231 \times 143$  mm on Glatfelter Laid Offset paper. The half-title is uppcased, centered, and in the upper quarter of the page. On the title page the title is typeset with a large bold italic font while the author’s is set using normal uppcase and the publisher is set in small caps. Dowding uses ‘part’ instead of ‘chapter’. Chapter heads are centered with the number written out, like ‘PART ONE’, and below this is the title set in large italics. Section heads are in uppcase and subsection heads in small

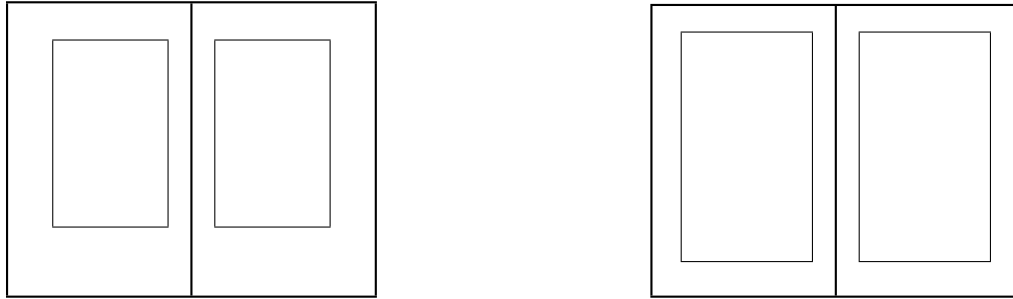


Figure 3.5: Two spreads: (Left) USA, 1949. (Right) USA, 1990.

caps, both centered. Folios are in the center of the footer; verso running heads consist of the book title in small caps and centered, and recto heads contain the chapter title in italics and centered. On the contents page the part (chapter) numbers and titles are centered, using small caps and large italics respectively (and no page numbers). Section titles are in small caps, left justified with the page numbers right justified. Titles from the front matter and back matter, for example the Foreword and Bibliography, are typeset in italics.

Bruce Rogers (1870–1957) described how he came to design his Centaur typeface in *Centaur Types*, a privately published book by his studio October House in 1949. The layout of this book, which of course was typeset in Centaur, is shown at the left of Figure 3.5. Centaur is an upright seriffed type based on Nicolas Jenson’s type as used in *Eusebius* published in 1470. *Centaur Types* demonstrates typefaces other than Centaur, and also includes exact size reproductions of the engraver’s patterns. It is set at  $14/16 \times 22$  on a page size of  $240 \times 150$  mm.

Figure 3.5 (right) is the layout of another book on typefaces. It is *The Anatomy of a Typeface* by Alexander Lawson published by David R. Godine in 1990 [Law90]. This is set in Galliard with 13pt leading and a measure of 24pc on a page size of  $227.5 \times 150$  mm on Glatfelter Offset Smooth Eggshell paper. The half-title is set in uppercase in the upper quarter of the page. On the title page the title is in uppercase in a large outline font, with a double rule above and a short single rule below. The author is set in small caps (both upper- and lowercase like LAWSON) and the publisher is in regular lowercase small caps. Chapter heads are centered with the number set between a pair of fleurons, followed by the title in large uppercase, and with a short rule between the title and the start of the text. The folios are in the center of the footer with a short rule above them; there are no running headers. The contents page is set with the body type; chapter numbers are flushleft with a following period and the page numbers are flushright.

*Microcosmographica Academia* by F. M. Cornford is shown in Figure 3.6. Despite its title, it is written in English and was published by Bowes & Bowes, London, in 1908. It is a dryly humorous look at academic politics as practised in Cambridge University at the turn of the nineteenth century (probably in the twentieth and twenty-first as well). It is set with 14pt leading on 22pc. The original page size is  $216 \times 136$  mm. The half-title is in normal uppercase in the upper sixth of the page; the title page is all uppercase in various sizes. Chapter heads are centered with first the number in Roman numerals and below the title in uppercase. Folios are centered in the footer and there are no running heads. There is no



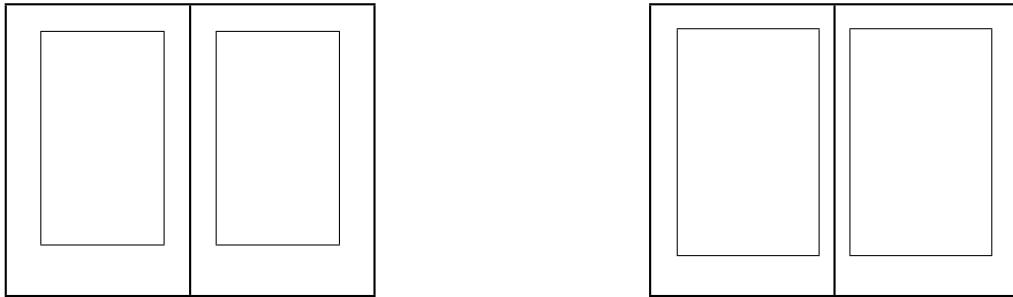


Figure 3.6: Two spreads: (Left) England, 1908. (Right) USA, 1993.

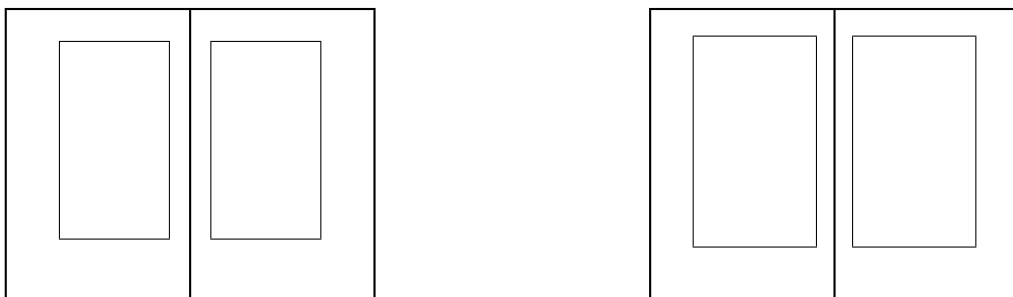


Figure 3.7: Two spreads: (Left) USA, 1931. (Right) England, 1968.

table of contents.

The right of this figure illustrates a book with another unusual title — *The Alphabet Abecedarium* by Richard A. Firmage and published by David R. Godine in 1993. It is set in Adobe Garamond on a 27pc measure with 14pt leading. The original page size is  $227.5 \times 150$  mm. The book gives a history of each letter of the Latin alphabet. Chapter heads are centered and consist of an ornamental version of the letter in question. One unusual feature is that there is a deep footer on each page showing many examples of typefaces of the letter being described. Verso running headers consist of the book title in mixed small caps and centered with the folio flushleft. Recto headers have the folio flushright, and centered is the alphabet, typeset in small caps except for the current letter which is enlarged.

W. A. Dwiggins was, among many other things, an American book designer. Figure 3.7 (left) shows his layout of H. G. Wells' *The Time Machine* for Random House in 1931. The page size is  $231 \times 147$ mm.

The right of the figure illustrates the layout of a book called *Two Men — Walter Lewis and Stanley Morrison at Cambridge* by Brooke Crutchley and published by Cambridge University Press in 1968. This is typeset in Monotype Barbon with 17.5 leading on a 26pc measure on a  $253 \times 162$  mm page. Crutchley was the Cambridge University Printer and each year would produce a limited edition of a book about Cambridge or typography, and preferably both together, for presentation to friends of the Press. The tradition of the Printer's Christmas Book was started by Stanley Morison in 1930 and continued until 1974. The

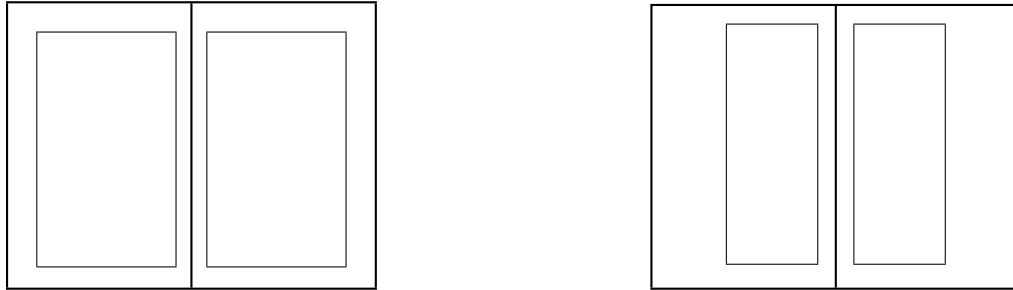


Figure 3.8: Two spreads: (Left) USA, 1994. (Right) England 1988.

books usually consisted of a short essay on a particular topic, so they did not have chapter heads, tables of contents, or other appurtenances, apart from a Preface.

A modern technical book layout is given in Figure 3.8. The book is *Information Modeling the EXPRESS Way* by Douglas Schenck and Peter Wilson, published by Oxford University Press (New York) in 1994. This is set in Computer Modern Roman at  $10/12 \times 27$  on a page  $233 \times 150$  mm. It has the typical LaTeX appearance with perhaps the exception of the epigraphs after each chapter heading.

Ruari McLean's *The Thames and Hudson Manual of Typography* (1988) is at the right in Figure 3.8. This is typeset in  $10/11 \times 20$  Monophoto Garamond on a  $240 \times 156$  mm page. The wide fore-edge is used for small illustrations. Notes are also set in this margin rather than at the foot of the page. The half-title is in a bold font, flushright, in the upper quarter of the page; there is a wood engraving of a galleon at the bottom, also flushright. The title uses a mixture of fonts and is set flushright; an example title page based on this design is shown in Figure 3.9. Chapter are on recto pages and consist of the number and title in a bold font, flushleft and near the top of the page, and an engraving of some kind is at the bottom right of the page; there is no other text on this page, the body of the chapter starting at the top of the following verso page. Folios are in the footers at the outer edge of the page. Running headers contain the chapter title in small caps flushright in the outer margin.

Many page layouts in earlier days were constructed by drawing with compass and ruler, usually based on regular geometric figures; the use of squares, pentagons and hexagons being particularly prevalent. Unusually, the typeblock in Figure 3.10 (left) is centered on the page. The typeblock is based on a square, the depth being twice the measure. The book, *Canzone* by Giangiorgio Trissino, is a volume of poems and was published in Rome about 1523 by Ludovico degli Arrighi. Prose works from the same typographer followed the normal style of having the fore-edge wider than the spine margin.

The page proportion in Figure 3.10 (right) is also a simple  $3 : 2$  ratio. The proportions of the typeblock, being  $1.7 : 1$ , are based upon a pentagon. The book is *Hypnerotomachia Poliphili* by Francesco Colonna and was published by Aldus Manutius in Venice in 1499. The story of this, including some reproductions from the original, is told by Helen Barolini [Bar92].

In 1519 the Portugese explorer Ferdinand Magellan set sail from Sanlúcar de Barrameda, near Cádiz in Spain, with five ships and about 270 men. Three years later one ship and 18 men returned, having made the first circumnavigation. Among the few survivors

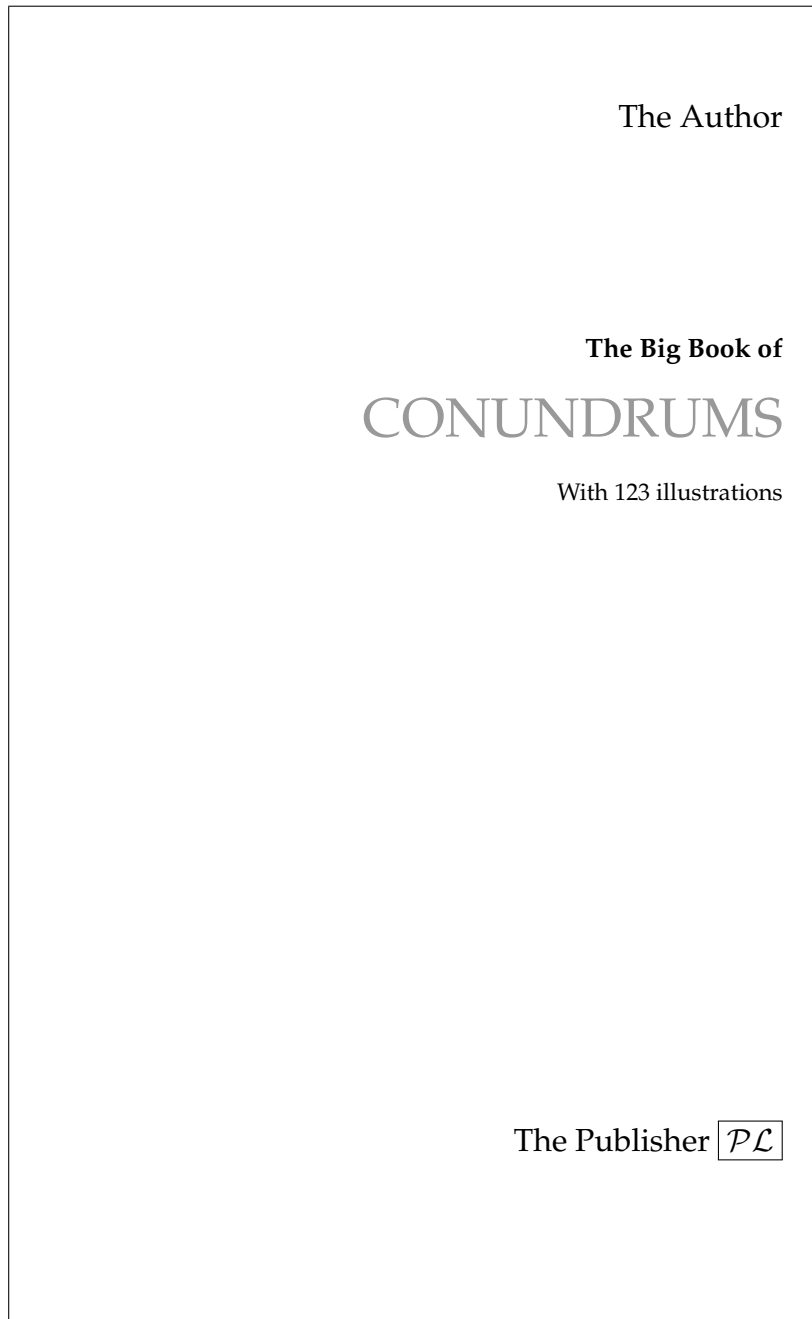


Figure 3.9: Title page design based on *The Thames and Hudson Manual of Typography* (1988)



Figure 3.10: Two spreads: (Left) Italy, 1523. (Right) Italy 1499.



Figure 3.11: Two spreads: (Left) France/Portugal, 1530. (Right) Gutenberg, C15th.

was Antonio Pigafetta who recorded the adventure. A very few manuscripts of his report are in existence. The layout of one of these manuscripts which is in the Beinecke Rare Book and Manuscript Library at Yale is shown at the left of Figure 3.11. The manuscript, which is written in French, is called *Navigation et descouurement de la Inde superieure et isles de Malueque ou naissent les cloux de Girofle* (Navigation and discovery of Upper India and the Isles of Molucca where the cloves grow) is written in a beautiful humanistic minuscule. There are 27 lines to a page, which is  $286 \times 190$  mm and made of vellum. The text measure is 29.5 and the 'leading' is 21pt. The wide outer (fore-edge) margin is used for sidenotes indicating highlights of the story. The manuscript was probably prepared soon before 1530; the scribe and where he worked is unknown.

Many of the books produced by Johannes Gutenberg (1398–1468) and his early successors followed the form shown in Figure 3.11 (right). This set of proportions was also often used in medieval incunabula<sup>4</sup> and manuscripts. The page and typeblock proportions are the same (3 : 2). The margins are in the proportions 2 : 3 : 4 : 6. A graphical method for constructing this, and similar designs, is shown later in Figure 3.20.

Two versions of the same publication are shown in Figure 3.12. On the left is a Persian manuscript *Khamsch of Nizami* written about 1525. The page size is about  $324 \times 216$  mm. The illustrations and the typeblock are inextricably mixed. On the right is a translation of some of the manuscript published as *Tales from the Khamsch of Nizami* by the Metropolitan Museum of Art, New York, in 1975. The modern version has a page size of  $300 \times 200$  mm,

<sup>4</sup>Early books, especially those printed before 1500.



Figure 3.12: Two spreads: (Left) Persia, 1525. (Right) USA, 1975.



Figure 3.13: Two spreads: (Left) USA, 1952. (Right) England, 1087.

slightly smaller than the original but in the same proportions. The typeblock is 32pc wide and the type is set with a 15pt leading.

Frederic Goudy was a prolific American type designer. Shown at the left of Figure 3.13 is the layout of his book *The Alphabet and Elements of Lettering* published by the University of California Press in 1952. This is typeset in his University of California Old Style, which has interesting ct and st ligatures. The measure is 36pc and the leading is 18pt. The first half of the book gives a short history of the development of writing and fonts. The second half consists of 27 plates, one for each letter of the alphabet, and the last one for the ampersand character. These show the evolution of each letter from Roman times to the mid-twentieth century.

Figure 3.13 (right) shows the layout of the English *Domesday Book* which is a manuscript book written in 1087. It records all the domains won by William the Conqueror in 1066. The book is written in a Carolingian minuscule in two columns, with 44 lines per column ragged right. The two columns have slightly different widths. The first part of the book is more meticulously written than the later parts, where the scribe appears to be in haste to finish.

Figure 3.14 shows two different layouts for a page corresponding to the ISO international standard proportion of  $\sqrt{2}$ . In each case the typeblock is the same and proportioned in the golden section, but the margins are different. The layout on the left provides adequate room for marginal notes in the fore-edge.

Another of the Cambridge University Printer's Christmas books is at the left of Figure 3.15. In this case it is *Emery Walker — Some Light on his Theories of Printing and on*



Figure 3.14: Two spreads: (Left) ISO (1). (Right) ISO (2).



Figure 3.15: Two spreads: (Left) England, 1973. (Right) LaTeX 10pt book style.



Figure 3.16: Two spreads: (Left) USA, 1967. (Right) England, 1982.

*his Relations with William Morris and Cobden-Sanderson* by Colin Franklin and published in 1973. The page size is  $295 \times 210$  mm with a measure of 31pc set with 15pt leading. Unusually for this series it has chapter heads which are simply the number centered above the title in a large font. It also has illustrations which are listed on an Illustrations page where the caption titles are set flushleft and page numbers flushright. The page is divided into two lists. The first has a heading (centered) in italics of *'In text'* with *'page'* flushright above the page numbers. The second has the centered heading *'In pocket at end'* and there are no page numbers in this list as the corresponding illustrations are not bound into the book, instead they are loosely inserted in a pocket at the end of the book.

On the right is the default layout provided by the LaTeX 10pt book class on US letter-paper.

Adrian Wilson, who died in 1988, was an acclaimed American book designer. His

work on book design, *The Design of Books*, out of print since 1988 but reissued in 1993 by Chronicle Books, is outlined at the left of Figure 3.16. This is in two columns, with many illustrations, on letterpaper size pages. It is typeset in Palatino and Linotype Aldus with 12pt leading. Each column is 18pc wide. The title page is a simple design and an example based on it is shown in Figure 3.17. Chapter heads are flushright in a large italic, preceded by the number. Section heads are flushleft in uppercase and subsection heads are also flushleft but in normal sized italics. The Contents list is in the left hand column, typeset using the normal font with titles flushleft and page numbers flushright; there is an engraving in the bottom half of the right hand column. There are no running headers. Verso footers have the chapter title flushleft in small caps with the folio to the left of this (i.e., in the margin); recto footers similarly have the chapter title flushright and the folio to the right in the margin.

The other layout in this figure is B. W. Robinson's *Kuniyoshi: The Warrior Prints* published by Phaidon, Oxford in 1982. The page size is 310 × 242 mm with a measure of 28.5pc. The type is set with 13pt leading. The wide spine margin is used for some small reproductions of Japanese woodblock prints, some of which extend across the binding itself. The majority of the book has no text apart from captioning the many reproduced prints which take up full pages.

*The Waterways of the Fens* by Peter Eden with drawings by Warwick Hutton is another of the Cambridge Printer's Christmas books. This is set with 17pt leading on a measure of 27pc. The original page size is 195 × 150 mm and is illustrated on the left of Figure 3.18. The amount of text on a page varies and there are many line drawings, some of which take a double spread. Folios are in the outer margin level with the top line of text.

On the right of this figure is another art book, namely *Dürer* by Fedja Anzelewsky published by Chartwell Books in 1980. This is set in two columns with 14pt leading on a 23.5pc measure, although there are more illustrations than text. The page size is 280 × 240 mm, considerably larger than its companion in the figure, yet with much smaller margins. Roman numerals are used for chapter heads which are set flushleft in a large font. Immediately below the chapter head is a line of 'section' titles, flushleft, in a font size intermediate between the chapter head and the body. A centered dot is used to separate the section titles. Folios are set in the foot flush with the outside of the typeblock; there are no running heads. The Table of Contents title matches the chapter heads. Chapter title entries are set flushleft with their page numbers flushright. The section titles are set in a line below the chapter entry, again separated by centered dots. In the text, references to illustrations are placed in the outside margins in a small font.

Two more layouts for illustrated books are given in Figure 3.19. In this case the illustrations are drawings in landscape mode (i.e., they are wider than they are high); the shape of the drawings has had a major effect on the page proportions. In the case on the left the page proportion is in the ratio  $\pi : e$ . The measure is longer than usual at 37pc and to compensate for this the leading of 17pt is also larger than customary. It is typeset in Centaur. The book is *Hammer and Hand* by Raymond Lister with drawings by Richard Bawden. It was published in 1969 by Cambridge University Press and is another of the University Printer's Christmas books. Folios are in a large font at the outside edge of the page and level with the top text line.

Shown on the right of Figure 3.19 is *Hokusai — One Hundred Poets* by Peter Morse and published by George Braziller in 1989. The introductory text is set in two columns as shown. The body consists of illustrations of Japanese wood block prints, originally in

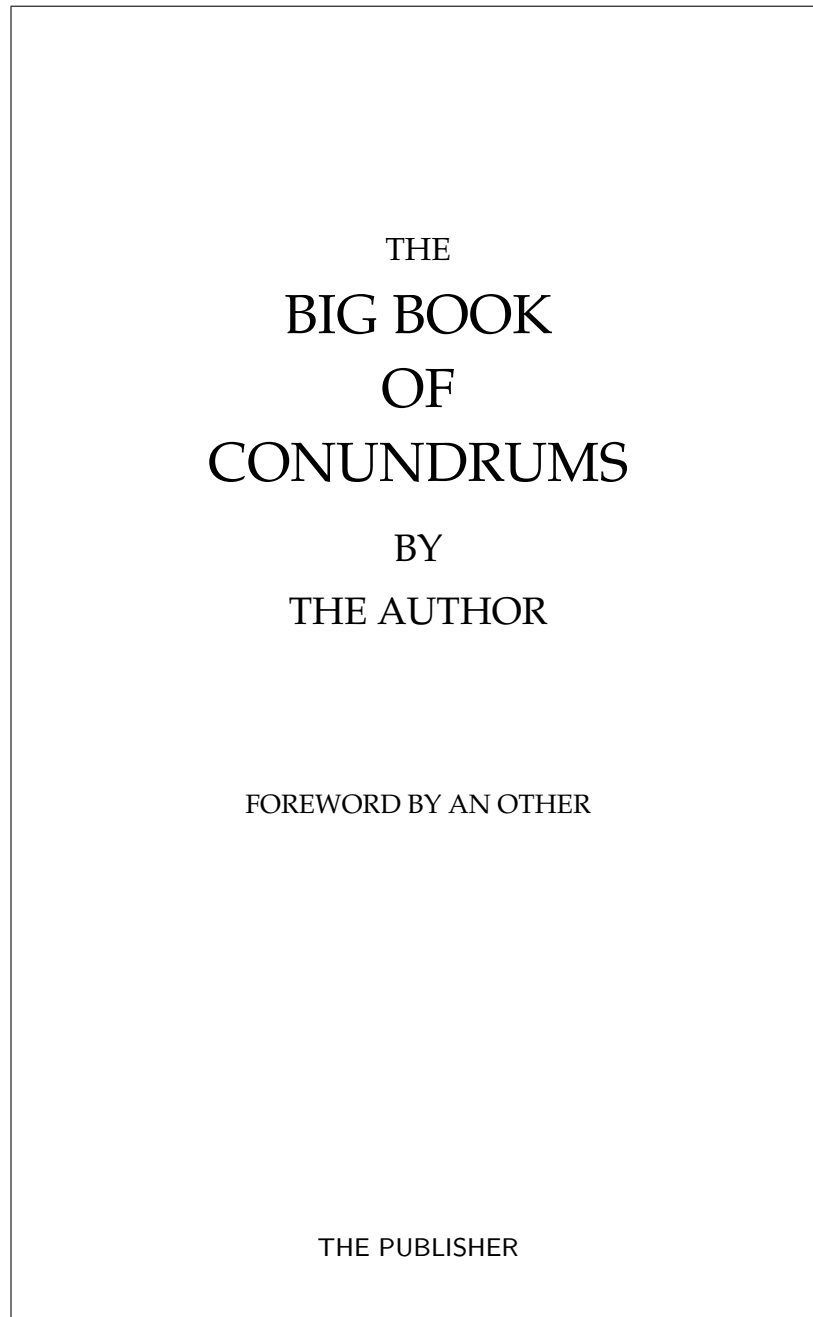


Figure 3.17: Title page design based on Adrian Wilson's *The Design of Books*





Figure 3.18: Two spreads: (Left) England, 1972. (Right) Switzerland, 1980.



Figure 3.19: Two spreads: (Left) England, 1969. (Right) USA, 1989.

the large *oban* size of about  $250 \times 380$  mm. The half-title is set in a large font in the top right hand corner of the page, but the text on the title page is centered. The main body is organised with a wood block print on each recto page and the commentary on the facing verso page. At the top of each commentary page, centered, is the number of the print, a short rule, the title of the print in a large italic font, a longer rule, and then side by side the poem in Japanese and an English translation. The commentary itself is underneath, set in three raggedright columns; minor heading in the commentary are flushleft in small caps. The folio is at the center of the foot. At the end of the book is a commentary on those poems where there are no known illustrations; this is typeset raggedright in four columns.

### 3.2.1 A GEOMETRIC CONSTRUCTION

Nowadays it is easy to pick and calculate any kind of page proportion that takes your fancy, but how did the early printers do it? They certainly did not have the use of calculators and I suspect that they had only enough arithmetic to keep their accounts. Printing was a craft and craftsmen did not release their trade secrets lightly. I believe that most of the designs were based on simple geometric figures, which required nothing more than a ruler and a pair of compasses.

Jan Tschichold gives a simple construction for the layout of many of the books based on Gutenberg's work [Tsc91, pages 44–57], which is shown in Figure 3.20. The construction actually divides the page up into ninths (the point P in the diagram, which is at the intersection of the main and half diagonal construction lines, is one third of the way down and across both the page and the typeblock). This construction can be used no matter what the page proportions and will give the same relative result.

## 3.3 The typeblock

The typeblock is not just a rectangular block of text. If the typeblock does consist of text, then this will normally be broken up into paragraphs; it is not good authorial style to

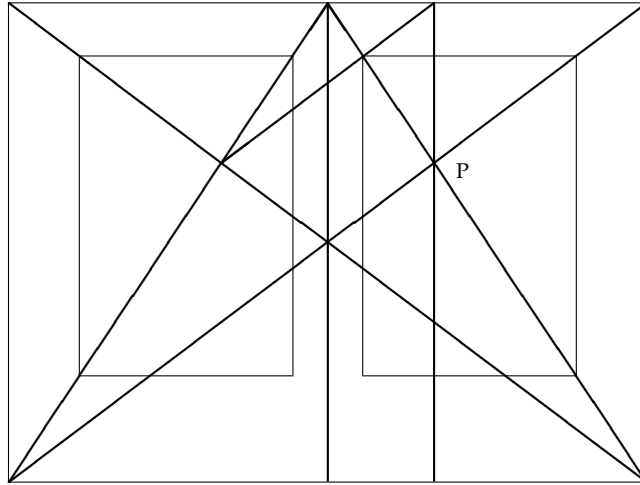


Figure 3.20: The construction of the Gutenberg page design

have paragraphs that are longer than a page. Also, the typeblock may include tables and illustrations which provide relief from straight text. Some pages may have chapter or section headings on them which will also break the run of the text. In general the typeblock will be a mixture of text, white space, and possibly non-text items.

Consider a typeblock that includes no illustrations or tables. The lines of text must be laid out so that they are easy to read. Common practice, and more recently psychological testing, has shown that long lines of text are difficult to read. Thus, there is a physiological upper limit to the width of the typeblock. From a practical viewpoint, a line should not be too short because then there is difficulty in justifying the text.

Experiments have shown that the number of characters in a line of single column text on a page should be in the range 60 to 70 for ease of reading. The range may be as much as 45 to 75 characters but 66 characters is often considered to be the ideal number. Much shorter and the eye is dashing back and forth between each line. Much longer and it is hard to pick up the start of the next line if the eye has to jump back too far — the same line may be read twice or the following line may be inadvertently jumped over. For double column text the ideal number of characters is around 45, give or take 5 or so.

Bringhurst [Bri99] gives a method for determining the number of characters in a line for any font: measure the length of the lowercase alphabet and use a copyfitting table that shows for a given alphabet length and line length, the average number of characters in that line. Table 3.2 is an abridged version of Bringhurst's copyfitting table. For example, it suggests that a font with a length of 130pt should be set on a measure of about 26pc for a single column or in an 18pc wide column if there are multiple columns.

Morten Høgholm has done some curve fitting to the data. He determined that the expressions

$$L_{65} = 2.042\alpha + 33.41 \quad (3.7)$$

and

$$L_{45} = 1.415\alpha + 23.03 \quad (3.8)$$

Table 3.2: Average characters per line

Pts.	Line length in picas							
	10	14	18	22	26	30	35	40
80	40	<b>56</b>	<b>72</b>	88	104			
85	38	53	<b>68</b>	83	98	113		
90	36	50	<b>64</b>	79	86	107		
95	34	48	<b>62</b>	75	89	103		
100	33	46	<b>59</b>	<b>73</b>	86	99	116	
105	32	44	57	<b>70</b>	82	95	111	
110	30	43	55	<b>67</b>	79	92	107	
115	29	41	53	<b>64</b>	76	88	103	
120	28	39	50	<b>62</b>	73	84	98	112
125	27	38	48	<b>59</b>	<b>70</b>	81	94	108
130	26	36	47	57	<b>67</b>	78	91	104
135	25	35	45	55	<b>65</b>	75	88	100
140	24	34	44	53	<b>63</b>	73	85	97
145	23	33	42	51	<b>61</b>	<b>70</b>	82	94
150	23	32	41	51	<b>60</b>	<b>69</b>	81	92
155	22	31	39	49	58	<b>67</b>	79	90
160	22	30	39	48	56	<b>65</b>	76	87
165	21	30	38	46	55	<b>63</b>	74	84
170	21	29	37	45	53	<b>62</b>	72	82
175	20	28	36	44	52	<b>60</b>	<b>70</b>	80
180	20	27	35	43	51	59	<b>68</b>	78
185	19	27	34	42	49	57	<b>67</b>	76
190	19	26	33	41	48	56	<b>65</b>	74
195	18	25	32	40	47	54	<b>63</b>	72
200	18	25	32	39	46	53	<b>62</b>	<b>70</b>
220	16	22	29	35	41	48	56	<b>64</b>
240	15	20	26	32	38	44	51	58
260	14	19	24	30	35	41	48	54
280	13	18	23	28	33	38	44	50
300	12	17	21	26	31	35	41	47
320	11	16	20	25	29	34	39	45
340	10	15	19	23	27	32	37	42

fitted aspects of the data, where  $\alpha$  is the length of the alphabet in points, and  $L_i$  is the suggested width in points, for a line with  $i$  characters (remember that 1pc = 12pt).

The vertical height of the typeblock should be constant from page to page. The lines of text on facing pages should be aligned horizontally across the spine, which also means that they will be at the same place on both sides of a leaf. Alignment across the spine means that the eye is not distracted by an irregularity at the centre of a spread, and leaf alignment stops ghosting of text through a thin page, giving a crisper look to the work. So, the spacing between lines should be constant. This implies that the depth of the typeblock should be an integral multiple of the space required for each line; that is, be specified as a multiple of the leading. A ten point type, for example, will normally have two points between lines, to give a leading of 12 points. This can be written as 10/12. Usefully, one pica is 12 points so with a 12pt leading vertical distances can be conveniently expressed in picas (one pica per line). Another implication of this is that any space left for illustrations or tables, or the amount of space taken by chapter and section headings should also be an integer multiple of the leading.

A ten point type set solid is described as 10/10. The theoretical face of the type is ten points high, from the top of a  $d$  to the bottom of a  $p$ , and the distance of the baseline of one row of text to the next row of text is also ten points. Note that if a  $p$  is vertically above a  $b$  then the ascender of the  $b$  will meet the descender of the  $p$ . To avoid this, the vertical separation between baselines is increased above the type size. Adding two extra points of vertical space allows the text to breathe, and gives a leading of 12 points. Few fonts read well when set solid. Typical settings are 9/11, 10/12, 11/13 and 12/15. Longer measures require more leading than shorter ones, as do darker and larger fonts compared with lighter and smaller fonts. More leading is also useful if the text contains many super- or sub-scripts, or many uppercase letters.

### 3.3.1 PAGE COLOR

One of the aims of the typographer is to produce pages that are uniform in 'color'. By this they mean that the typeblock has a reasonably constant grayness, not being broken up by too much white space which is a distraction to the reader. There will be white space around headings, which is acceptable as a heading is meant to attract attention. There may be white space between paragraphs, and this is usually under the control of the designer. But there may be vertical rivulets, or even rivers, of white space when the interword spaces on adjacent lines coincide; fixing this usually requires some handwork, either by the author changing his wording so as to alter the location of the spaces, or by the typesetter tweaking a little bit.

Another form of distraction is if too many lines end with hyphens, or several adjacent lines start or end with the same text; not only does this cause a stack of identical characters but will make it harder for the reader to reliably jump to the next line.

The main font used controls the depth of the color of a page. To see what color is produced by a particular font it is necessary to look at a fairly long, preferably a page, piece of normal text. Fonts from different families produce different colors, and so may mixed fonts from the same family. You can try this yourself by typesetting the same page in, say, Computer Modern Roman, Italic, and Sans-serif fonts. The books by Rogers [Rog43], Lawson [Law90], Dowding [Dow98], and Morison [Mor99] all show pages set in many different fonts.

### 3.3.2 LEGIBILITY

One of the principle requirements on the typography of a document is that the document is *legible*. Legibility means that the document is designed to be easily read under a certain set of circumstances. The criteria for legibility on a poster that is placed on the side of a bus, for example, are different from those that apply to a book to be read while sitting in an easy chair. Essentially, the viewer should be able to read the document with no physical strain caused by the appearance, but the contents, of course, may lead to anything ranging from acute mental strain to extreme boredom.

Typefaces and the layout of the typeblock must be chosen to optimise between legibility and 'artistic' presentation. The design of the document should be almost invisible, giving full compliments to the author's communication. However, if you are a master, like Hermann Zapf [Zap00], you can break the rules.

#### *Typefaces*

The first European letter forms that have survived are Greek inscriptions carved into stone. These were freehand carvings with thin strokes. In time, the lettering became thicker and serifs started to appear. The Romans picked up on this later style of letter form. In carving inscriptions, they first wrote the inscription on the stone using a broad, flat brush. This naturally led to serifs and differing thicknesses of the letter strokes, depending on the angle of the stroke with respect to the movement and orientation of the brush. Similarly the written letterforms included serifs.

Between the Roman times and Gutenberg there were many changes and experiments in European letterforms. The scribes used different scripts for titles, subheads, continuous text, illuminated initial letters, and so on. In time, two families of letterforms evolved, called *majuscules* and *minuscules*. The former were larger and more formal, while the latter were smaller and less formal. We now call these two divisions upper case and lower case. The upper case derives from Roman times, while the lower case acquired its fundamental form during the reign of the Holy Roman Emperor Charlemagne a thousand years later. In order to promote communication throughout his wide flung empire the Anglo Saxon Benedictine monk Alcuin, at the behest of Charlemagne, established a common script to be used; this is now called Carolingian minuscule. A further division also appeared, between black letter (what is commonly referred to as Gothic or Old English) type and the roman type.

These types were all upright. Italic letterforms were cut in Italy in the early sixteenth century, as a more cursive style. Initially these were lower case only, used in conjunction with upper case roman. By the end of the century, sloped roman capitals were also in use with italic.

The late nineteenth century saw the appearance again of Sans-serif typefaces.

Looking carefully at seriffed and sans fonts it is apparent that the serifs have three main functions:

1. They help to keep letters apart.
2. At the same time, they help to keep letters in a word together. This helps with legibility as research has shown that we tend to recognize words by the shape of the word rather than by individual characters.
3. They help to differentiate between individual but similar letters.

Long experience has shown that a seriffed font is easier to read<sup>5</sup> than a Sans-serif font, particularly if part of the text is obscured. You can try an experiment yourself to verify this. Try writing a phrase, once using a Sans-serif font and then with a seriffed font. Cover up the top halves of the two phrases and try to make out what they say. Then repeat this, except this time cover up the bottom halves of the phrase. Which is easier to read? Here are some example characters, firstly in san-serif:

a c l m n p q o

and then in roman:

a c l m n p q o

Sans-serif fonts often require context to decipher the word. For example [McL80], seeing this in isolation

III

does it stand for ‘III’, ‘one hundred and eleven’, ‘three’, or something completely different like a dingbat or a set of cricket stumps?

There are three generally agreed legibility principles for setting text for continuous reading.

1. *Sans-serif type is intrinsically less legible than seriffed type* [Whe95].

We have already seen that this is the case — there is more variety among seriffed letters than among sans-serif letters. Further, serifs perform other functions as well, such as binding letters together within a word.

This is not to say that a sans-serif letterform is always more illegible than a roman one. A poor seriffed form can be much more illegible than a well used good sans-serif. In general, there is an illegibility factor associated with sans-serif that must be borne in mind; for general *continuous* reading, a good seriffed form is more likely to be easy on the eye than a good sans form.

2. *Well designed upper and lower case roman type is easier to read than any of its variants.*

This is a guiding principle with many exceptions. Among the variants can be considered to be italic and bold types. These have usually been designed for a special purpose, like emphasizing certain pieces of text, rather than for general legibility. Some italic types, though, are as legible as their roman counterparts. In the seventeenth century many books were set entirely in italic, but we have become accustomed to the roman type.

3. *Words should be set closer together than the space between lines.*

All text is a mixture of ink and white space. The eye, when reading, tends to jump over the white spaces. Given a choice between two spaces, it will tend to jump over the smaller of the two. If the word spacing is greater than the line spacing, then you can find yourself skipping from one line to the next before finishing the first one.

Further, if the lines are too long, then when the eye jumps back from the end of one line to the start of the next, it may have difficulty in picking up the correct one.

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<sup>5</sup>This is actually somewhat contentious as some take the view that with enough practice, Sans-serif is just as easy to read.

Text lines are justified by altering the inter-word spacing, and possibly by hyphenating the last word on the line if the spacing would be too bad otherwise. Sans-serif fonts often look best if set ragged right, as this will keep the inter-word spacing constant. Text set in narrow columns also often looks best when set ragged right.

#### *Seriffed versus Sans-serifred fonts*

As noted earlier there seems to be a permanent debate over the use of seriffed and sans fonts. You will have to make up your own mind as to what is best for any particular work, but here are a few general comments from some of the literature on the subject.

Bohle [Boh90] notes: Readers prefer a roman typeface for body type because they are most used to seeing that face [Reh72]. Roman type may well also be more readable than sans serif faces because the serifs help connect the letters to form the word shape when we read [Reh72].

Craig [Cra92] says: You will find that the serifs on a typeface facilitate the horizontal flow necessary to comfortable reading.

Degani [Deg92] in a study of pilots reading checklists in emergency cockpit situations decided that sans serif faces were better than serif faces.

Schrivier [Sch97] notes: Serif and sans serif typefaces are likely to be equally preferred by readers [HR83, Tin63] and read equally quickly [Gou87, HR83, Zac69]. Serif faces may be easier to read in continuous text than sans serif faces [Bur59, HK75, RAE71, Whe95].

Wheildon [Whe95] did a series of studies with around 250 readers in Sydney, Australia, asking them to rate serif and sans fonts in a variety of uses. Among the many results he reported:

- More than five times as many readers are likely to show good comprehension when a serif body type is used instead of a sans serif body type.
- The top half of [upper case] letters is more recognizable than the bottom half.
- There is little difference in legibility between headlines [section titles] set in serif and sans serif typefaces, or between roman and italic.
- Headlines set in capital letters are significantly less legible than those set in lower case.

The consensus, such as it is, seems to lean towards seriffed typefaces for continuous reading, but for titling the choice is wide open.

To finish off in a lighter vein, Daniel Luecking had this to say on the subject in a posting to CTT in January 2002.

It is often conjectured that seriffed fonts are easier to read because the serifs contribute more points of difference between words. This is often countered with the conjecture that they are easier to read because that is what we are used to reading. But no one can doubt that words like Ill, Iliad and Illinois in a sans-serif font [e.g., Ill, Iliad and Illinois] are going to cause the eye/brain system at last momentary confusion while it sorts out which plain vertical lines are uppercase i's and which lowercase L's.

I don't know if this contributes anything, but I can say unequivocally that serif fonts are somewhat easier to read upside down than sans-serif, but sans-serif is far easier to read mirrored than serif. (I spent much of my time as a child reading comics on the floor with my brother. As he hated reading any way but

straight on, we faced in different directions and I saw the page upside down. I tried mirror reading just to see if I could do that as easily. Serif fonts were almost impossible, sans-serif actually quite easy.)

He later expanded on the mirror reading to me as follows.

Here's an interesting (to me) anecdote about mirror reading: I was waiting in line at an airport lunch counter, reading the menu posted on the wall, when it suddenly struck me as odd that the menu was on the wall opposite (so that one had to turn away from the counter to read it). Then I realized in a sort of flash that I was reading it from a mirror. I turned to look at the real menu and was momentarily disoriented (while my brain turned itself around I guess) before I could read the actual menu. That was when I first ran some tests to see why that was so easy to read and other mirror writing was not. It seemed to be serif vs sans-serif, but it might also be the typical letter forms: the typical serif lower case 'a', the one with the 'flag' above the bowl [e.g., a], is particularly difficult to recognize compared to the simple 'circle plus stick' [e.g., a] form.

Some sort of dyslexia (or eulexia), no doubt, when backwards words are nearly as easy to read as normal ones.

### 3.3.3 WIDOWS AND ORPHANS

Inconvenient page breaks can also cause a hiatus in the reader's perusal of a work. These happen when a page break occurs near the start or end of a paragraph.

A *widow* is where the last line of a paragraph is the first line on the page. The term is sometimes also used to refer to when the last word in a paragraph is on a line by itself. A widow looks forlorn. In German they are called *Hurenkinder* — whores' children — which seems rather cruel to me. As Robert Bringhurst said, 'A widow has a past but no future'. Typographically, widows should be avoided as they are a weak start to a page and may optically destroy the page and type rectangle. However, a single widow is not too troubling if the header includes a rule across the width of the typeblock. Especially to be avoided are widows that are the only line on a page, for example at the end of a chapter. Five lines on the last page of a chapter is a reasonable minimum. Jan Tschichold [Tsc91] claims that *Hurenkinder* can always be avoided by even if a recto (verso) page must be made a line shorter or longer than the corresponding verso (recto) page, which he considers to be less of an affront than widows.

An orphan is not nearly so troubling to typographers as a widow. An *orphan* is where the first one or two lines of a paragraph are at the bottom of a page. In German they are called *Schusterjungen* — cobbler's apprentices. Bringhurst's memory trick for orphans is, 'An orphan has a future but no past'.

### 3.3.4 PARAGRAPHS AND VERSALS

Early books did not have paragraphs as we know them nowadays; the text was written continuously, except for a break at a major division like the start of a new book in a bible. Instead the scribes used a symbol like ¶ (the pilcrow) to mark the beginning of paragraphs. This symbol is derived from the Greek Π, for *parágraphos*. Mind you, they often did not use any punctuation at all and were sparing in their use of uppercase letters, so you might have seen something like this<sup>6</sup>

<sup>6</sup>But probably not. The two 'paragraphs' are Latin abecedarian sentences.



usque ¶ te canit adcelebratque polus rex gazifier hymnis ¶ transzephyrique  
globum scandunt tua facta per axem

Often the ¶ was colored red by the rubricators and the scribe, or printer, would leave a blank space for the rubricator to add the ¶. This did not always happen and the start of a paragraph eventually became marked by a space rather than a symbol.

Nowadays paragraphs are ended by stopping the line of text at the end of the paragraph, and then starting the next paragraph on a new line. The question then becomes: how do you indicate a new paragraph when the last line of the previous paragraph fills up the measure? There are two solutions, which unfortunately you sometimes see combined. Either indent the beginning of the first line of each paragraph, or put additional vertical space between the last and first lines of paragraphs.

The traditional technique, which has served well for centuries, is to indent the first line of a paragraph. The indentation need not be large, about an em will be enough, but more will be required if the typeblock is wide.

The other method is used mainly in business letters and is a recent invention. The first lines of paragraphs are not indented and typically one blank line is left between paragraphs. This may perhaps be acceptable when using a typewriter, but seems to have no real justification aesthetically. There is also the problem when a paragraph both ends with a full line and ends a page. As the next paragraph then starts at the top of the next page, the blank line separating the two paragraphs has effectively dissappeared, thus leaving the reader in a possible state of uncertainty as to whether the paragraph continues across the page break or not.

If the paragraph is the first one after a heading, then there is no need to indicate that it is a new paragraph — it is obvious from its position. So, the first paragraph after a heading need not be indented, and for some centuries now the tradition is not to indent after a heading. In some novels only chapters are headed yet each chapter is broken into sections by putting additional vertical blank space between the sections. Like nonindented paragraphs, this can cause problems where a section division coincides with a page break. In this case, typographers sometimes use a decoration to separate sections (for example, a short centered row of a few asterisks).

SOME TYPOGRAPHERS like to start the first paragraph in a chapter with a versal. A *versal* is a large initial letter, either raised or dropped. This comes from the scribal tradition of illuminating the first letter of a manuscript. The versal may be raised or dropped, as already noted, or it may be placed in the margin, or otherwise treated in a special manner.

SOME VERSALS, especially dropped versals, are very difficult to typeset correctly. Many attempts of this kind are abject failures, so be warned. For example, compare the dropped versals at the start of these first two paragraphs. They are both of the same letter and font, yet the first one is horrible compared to the one starting this paragraph.

A RAISED VERSAL is often easier to use to start a paragraph than a dropped versal. However, a raised versal should only be used where there is naturally some vertical space above it. As you can see, extra spacing has had to be inserted before this paragraph to accommodate the versal. There are still problems with typesetting a raised versal but as these tend to be subtler than with a dropped versal, readers are less likely to notice problems.

Typically, small caps are used for a little while following a versal to provide a transition between the large versal font and the normal body font. These should not continue throughout the first line as this tends to divorce it from the remainder of the paragraph. ANOTHER WAY OF STARTING a paragraph is to use small caps for the first few words. The font difference highlights the start of the paragraph but in a much quieter manner than a versal does. Using normal sized upper-case instead of the small caps is too much of a contrast with the lower-case.

### 3.3.5 FOOTNOTES

Footnotes are considered to be part of the typeblock. They are typeset in the space allocated for the typeblock, in contrast to footers which are typeset below the typeblock.

Footnotes are normally set in the same type style as the typeblock. That is, if an upright serifed font is used for the typeblock, it is also used for the footnote. The type size is smaller to distinguish the note from the body text and often the leading in the footnote is also reduced from that in the main text body. The bottom footnote line should be at the same height as the bottom line of the typeblock. This usually requires some adjustment of the vertical space before the footnotes.

A vertical blank space is often used to set off the footnotes from the main text, and sometimes a short horizontal line is also used as demarcation.

## 3.4 Folios

The word *folio* is a homonym. It can mean a leaf (two back-to-back pages) in a book, the size of a book or a book of folded sheets (as in Shakespeare's first folio), or the printed page number in a book. Here I use folio in this last sense.

Documents should have folios, at a minimum to help the reader know where he is. Occasionally books have their folios placed near the spine but this positioning is unhelpful for navigation. The more usual positions are either centered with respect to the typeblock or aligned with the outside of the typeblock, and sometimes even in the outside margin. The folios can be either at the top or bottom of the page but at least on pages with chapter openings are normally placed at the bottom of the page so that they do not distract from the title text.

Every page in a book is numbered, even if the page does not have a folio. In books, the folios for the front material are often in roman numerals. The main matter and back matter folios are arabic numerals, with the sequence starting from 1 after the front matter. In certain technical documents, folios may be in the form of chapter number and page number, with the page number starting from 1 in each new chapter. Other folio schemes are possible but unusual.

Folios should be placed harmoniously with respect to the typeblock and page margins. The font used for the folios need not be the same as that for the typeblock but must at least be complementary and non-intrusive.

## 3.5 Headers and footers

Headers and footers are repetitive material that is placed at either the head or the foot of the page. Typically, folios are headers or footers, but not always as sometimes they are placed in the margin at or below the first line in the typeblock.

For the time being I will not distinguish between headers and footers and just use the word header. Sometimes the header is purely decorative (apart from a folio) like a horizontal line or some other non-textual marking. Normally, though, they have a functional use in helping the reader locate himself in the document.

The most ubiquitous header is one which gives the title of the document. If this is the only header, then I consider this to be decorative rather than functional. As a reader I know what document I am reading and do not need to be reminded every time I turn a page. More useful are headers that identify the current part of the document, like a chapter title or number. When you put the document down and pick it up later to continue reading, these help you find your place, or if you need to refer back to a previous chapter for some reason, then it is a boon to have a chapter heading on each spread. The minimally functional headers are where the document title is on one page and the chapter heading is on the facing page. In more technical documents it may be more useful to have headers of chapter and section titles on alternate pages.

Occasionally both headers and footers are used, in which case one normally has constant text, like a copyright notice. I have the feeling that using the latter is only functional for the publishers of the document when they fear photocopying or some such.

The header text is usually aligned with the spine side of the typeblock, but may be centered on top of the typeblock. In any event, it should not interfere with the folio. The type style need not be the same as the style for the typeblock. For example, headers could be set in italic or small caps, which, however, must blend with the style used for the typeblock.

### 3.6 Electronic books

For want of a better term I am calling electronic books, or Ebooks, those documents intended to be read on a computer screen. The vast bulk of Ebooks are in the form of email but I'm more interested here in publications that are akin to hardcopy reports and books that require more time than a few minutes to read.

Unlike real books which have been available for hundreds of years there is virtually no experience to act as a guide in suggesting how Ebooks should appear. However, I offer some suggestions for the layout of Ebooks, based on my experience of such works. Not considered are internal navigation aids (e.g., hyperlinks) within and between Ebooks, nor HTML documents where the visual appearance is meant to set by the viewing software and not by the publisher.

The publication medium is obviously very different — a TV-style screen with limited resolution and pretty much fixed in position versus foldable and markable paper held where the reader finds it best. These differences lead to the following suggestions.

A book can be held at whatever distance is comfortable for reading, even when standing up. The computer user is normally either sitting in a chair with the monitor on a desk or table, or is trying to read from a laptop, which may be lighter but nobody would want to hold one for any length of time. To try and alleviate the physical constraints on the Ebook reader the font size should be larger than normal for a similar printed book. This will provide a wider viewing range. A larger font will also tend to increase the sharpness of the print as more pixels will be available for displaying each character. The font size should not be less than 12pt. The font may have to be more robust than you would normally use for printing, as fine hairlines or small serifs will not display well unless on a high resolution screen.

I find it extremely annoying if I have to keep scrolling up and down to read a page. Each page should fit within the screen, which means that Ebook pages will be shorter than traditional pages. A suggested size for an Ebook page, in round numbers, is about 9 by 6 inches [Ado01] or 23 by 15 centimetres overall.

The page design for printed books is based on a double spread. For Ebooks the design should be based on a single page. The typeblock must be centered on the page otherwise it gets tiring, not to mention aggravating, if your eyes have to flip from side to side when moving from one page to the next. Likewise any header and the top of the typeblock must be at a constant height on the screen. A constant position for the bottom of the text is not nearly so critical.

It is more difficult with an Ebook than with a paper book to flip through it to find a particular place. Navigation aids — headers and footers — are therefore more critical. Each page should have both a chapter (perhaps also a section) header title and a page number. Note that I'm not considering HTML publications.

Many viewers for Ebooks let you jump to a particular page. The page numbers that they use, though, are often based on the sequence number from the first page, not the displayed folio. In such cases it can be helpful to arrange for a continuous sequence of page numbers, even if the folios are printed using different styles. For example, if the front matter uses roman numerals and the main matter arabic numerals and the last page of the front matter is page xi, then make the first page of the main matter page 12.

I see no point in Ebooks having any blank pages — effectively the concept of recto and verso pages is irrelevant.

Some printed books have illustrations that are tipped in, and the tipped in pages are sometimes excluded from the pagination. In an Ebook the illustrations have to be 'electronically tipped in' in some fashion, either by including the electronic source of the illustrations or by providing some navigation link to them. Especially in the former case, the tipped in elements should be included in the pagination.

Don't forget that a significant percentage of the population is color-blind. The most common form is a reduced ability to distinguish between red and green; for example some shades of pink may be perceived as being a shade of blue, or lemons, oranges and limes may all appear to be the same color. Along with color-blindness there may be a reduced capacity to remember colors.

I have seen Ebooks where color has been liberally used to indicate, say, different revisions of the text or different sources for the data in a graph. Unless the colors used are really distinctive 10% or more of the potential readership will be lost or confused. Further, Ebooks may be printed for reading off-line and if a non-color printer is used then any colors will appear as shades of grey; these must be such that they are both readily distinguishable and legible. Yellow on white is almost as difficult to read as off-white on white or navy blue on black, all of which I have seen on web sites but rarely have I seen the text after I have tried to print the page.

# Four

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## Styling the elements

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A book should present a consistent typographic style throughout, although some elements, principally those in the front matter and back matter may be treated slightly differently than the main body.

Much of this chapter is based on my interpretation of my namesake's work [Wil93] and the *Chicago Manual of Style* [Chi93].

### 4.1 Front matter

#### 4.1.1 TITLE PAGES

The main and half-title pages are the gatekeepers to the book. As such, they need to be welcoming and give an indication of the 'look and feel' of the contents. You don't want to scare off potential readers before they have even cursorily scanned the contents.

The half-title, or bastard title, page contains just the title of the work, which is traditionally set high on the page — perhaps about as high as the chapter openings. The title page itself presents the title in full, the author and maybe the illustrator or other names likely to attract the reader, and perhaps the publisher and date. Both the title pages are recto but the full title may be a double spread. The full title layout in particular must be both attractive and informative.

Quoting from Ruari McLean [McL80, p. 148] in reference to the title page he says:

The title-page states, in words, the actual title (and sub-title, if there is one) of the book and the name of the author and publisher, and sometimes also the number of illustrations, but it should do more than that. From the designer's point of view, it is the most important page in the book: it sets the style. It is the page which opens communication with the reader. . .

If illustrations play a large part in the book, the title-page opening should, or may, express this visually. If any form of decoration is used inside the book, e.g., for chapter openings, one would expect this to be repeated or echoed on the title-page.

Whatever the style of the book, the title-page should give a foretaste of it. If the book consists of plain text, the title-page should at least be in harmony with it. The title itself should not exceed the width of the type area, and will normally be narrower. . .

#### *Advertising*

If the book is one of a series, or the author has been prolific, then details of associated works may be provided. Titles by the same author are usually set in italic, and a series

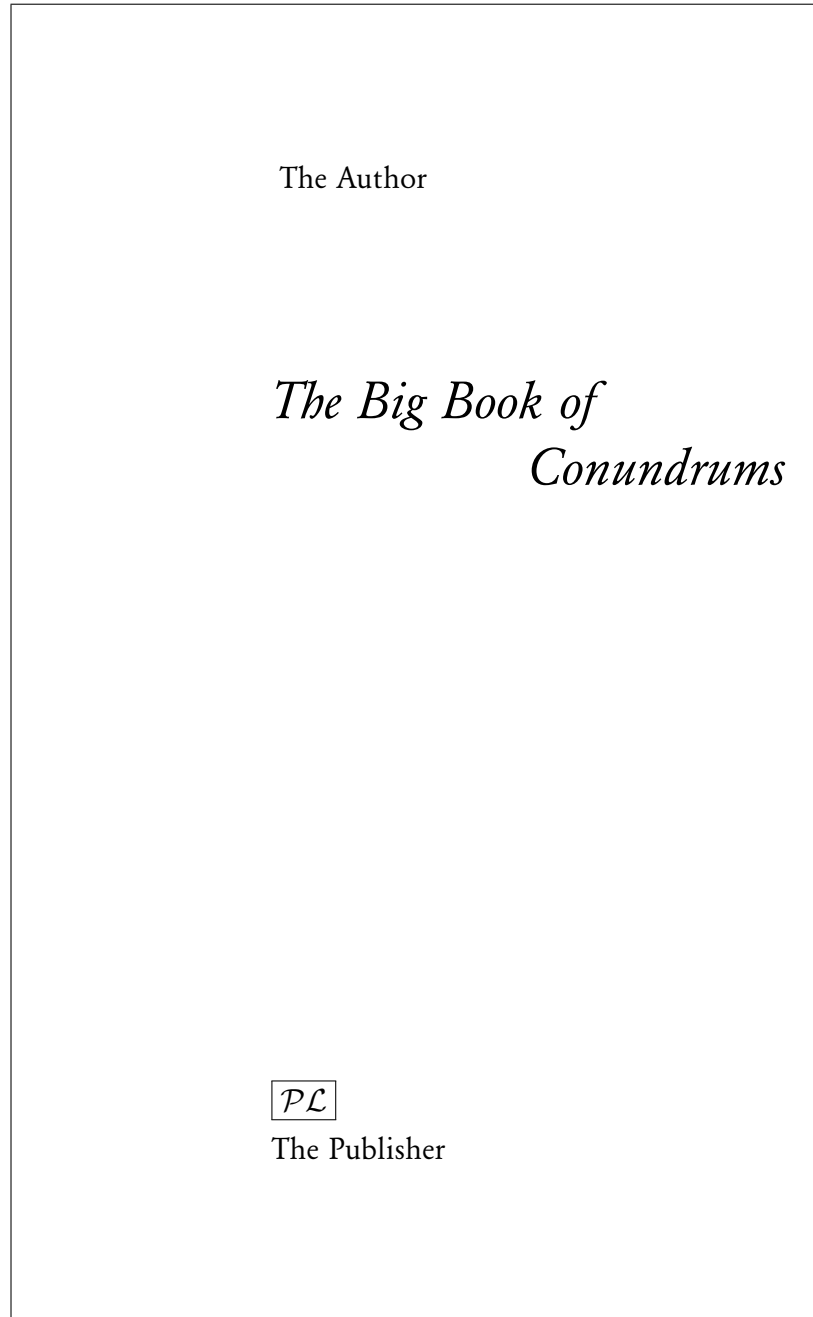


Figure 4.1: Title page design based on Ruari McLean's *Jan Tschichold: Typographer*

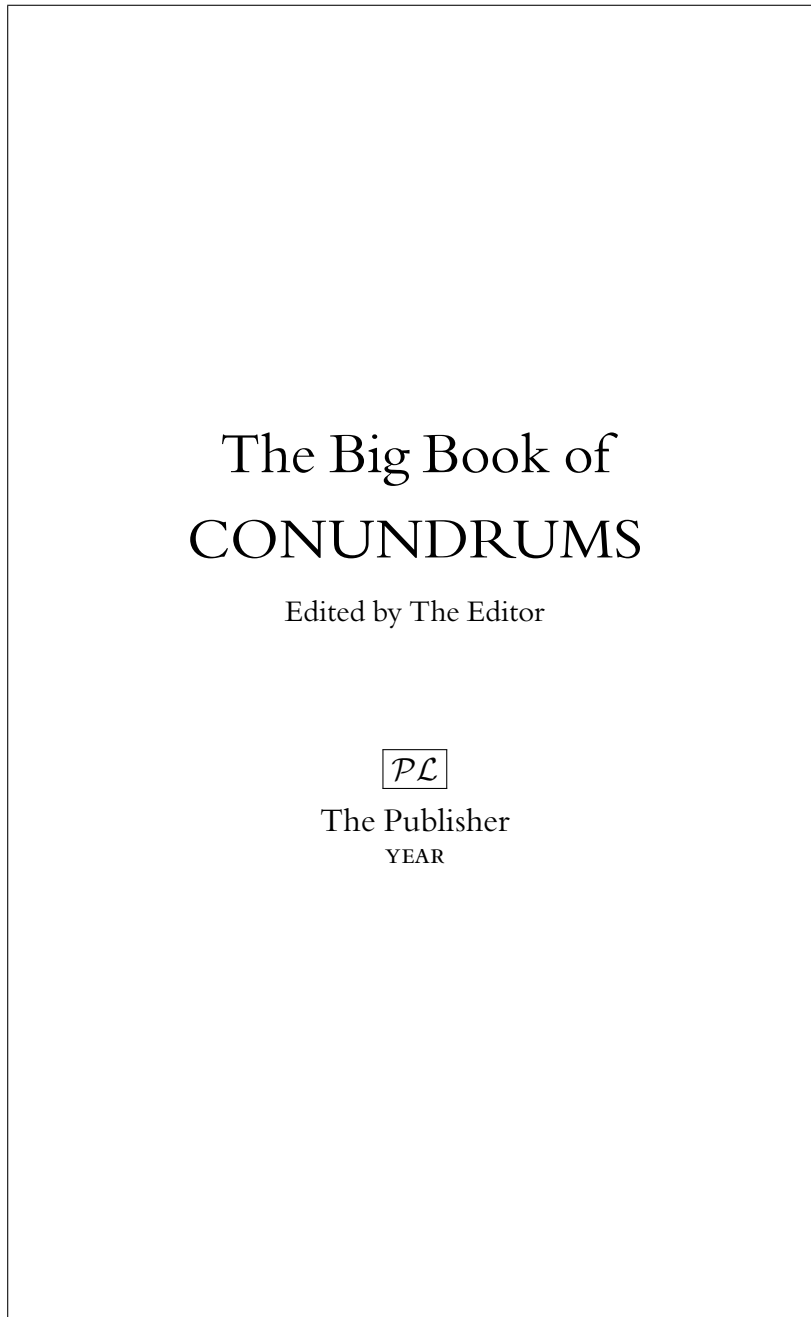


Figure 4.2: Title page based on a design by Rudolph Ruzicka for a book of Robert Frost's poetry

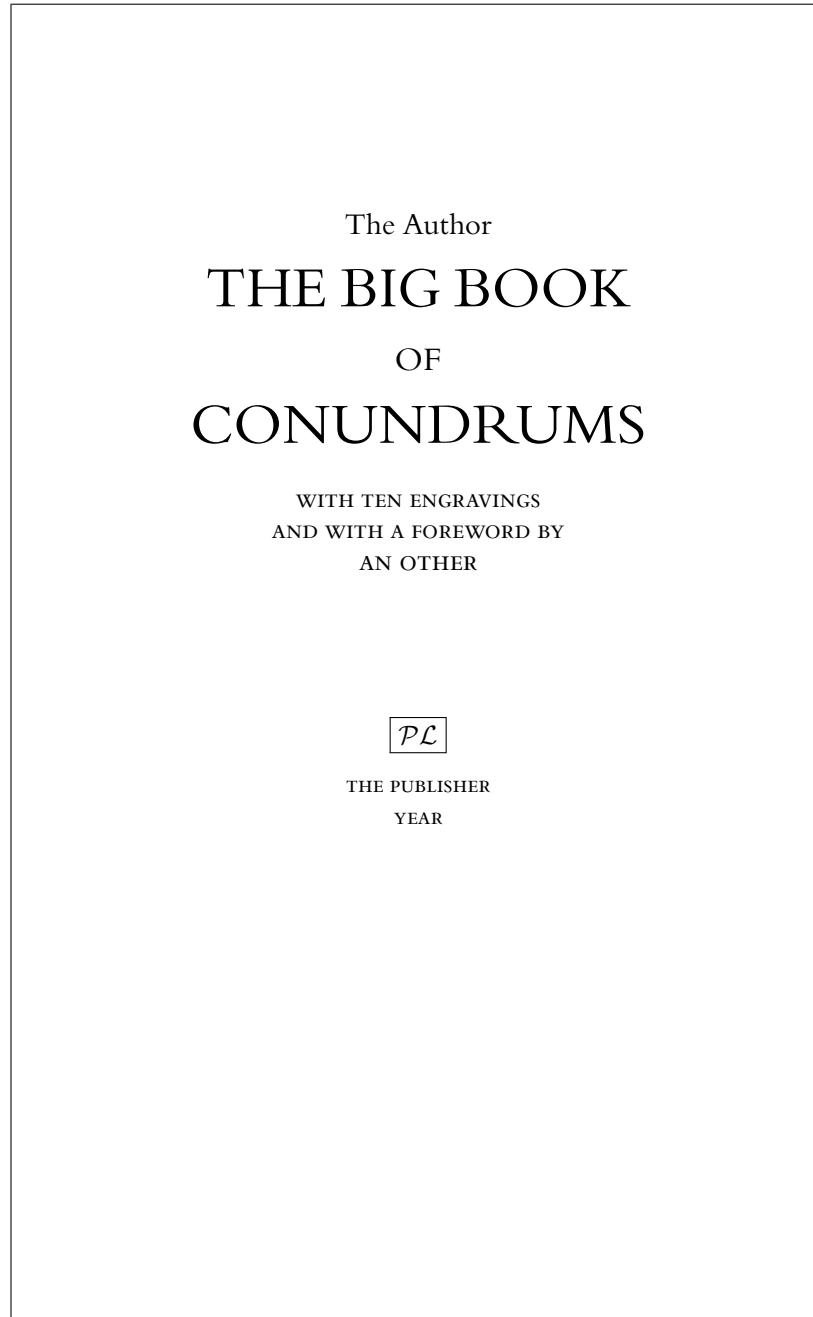


Figure 4.3: Title page based on a design by Will Carter for *The Rime of the Ancient Mariner*



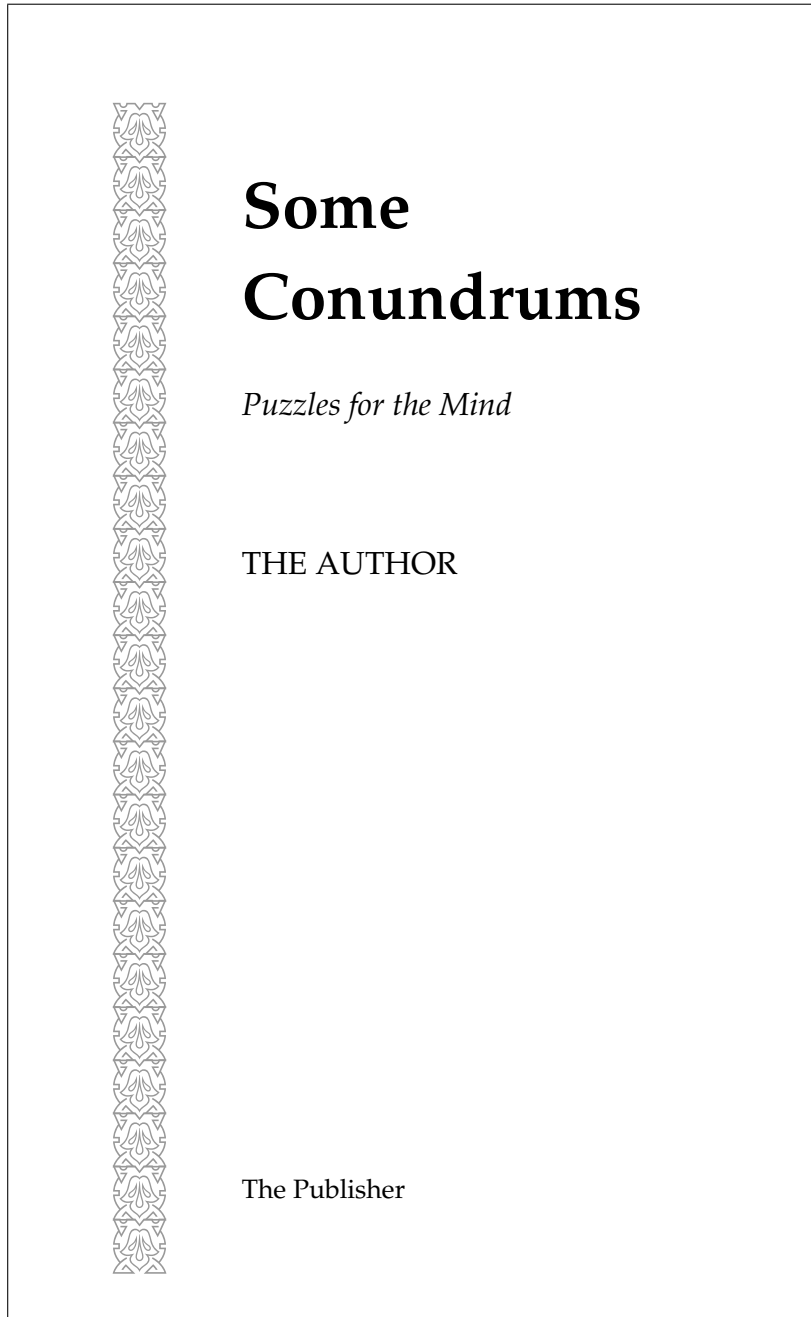


Figure 4.4: Title page design based on Nicholas Basbanes' *Gentle Madness*

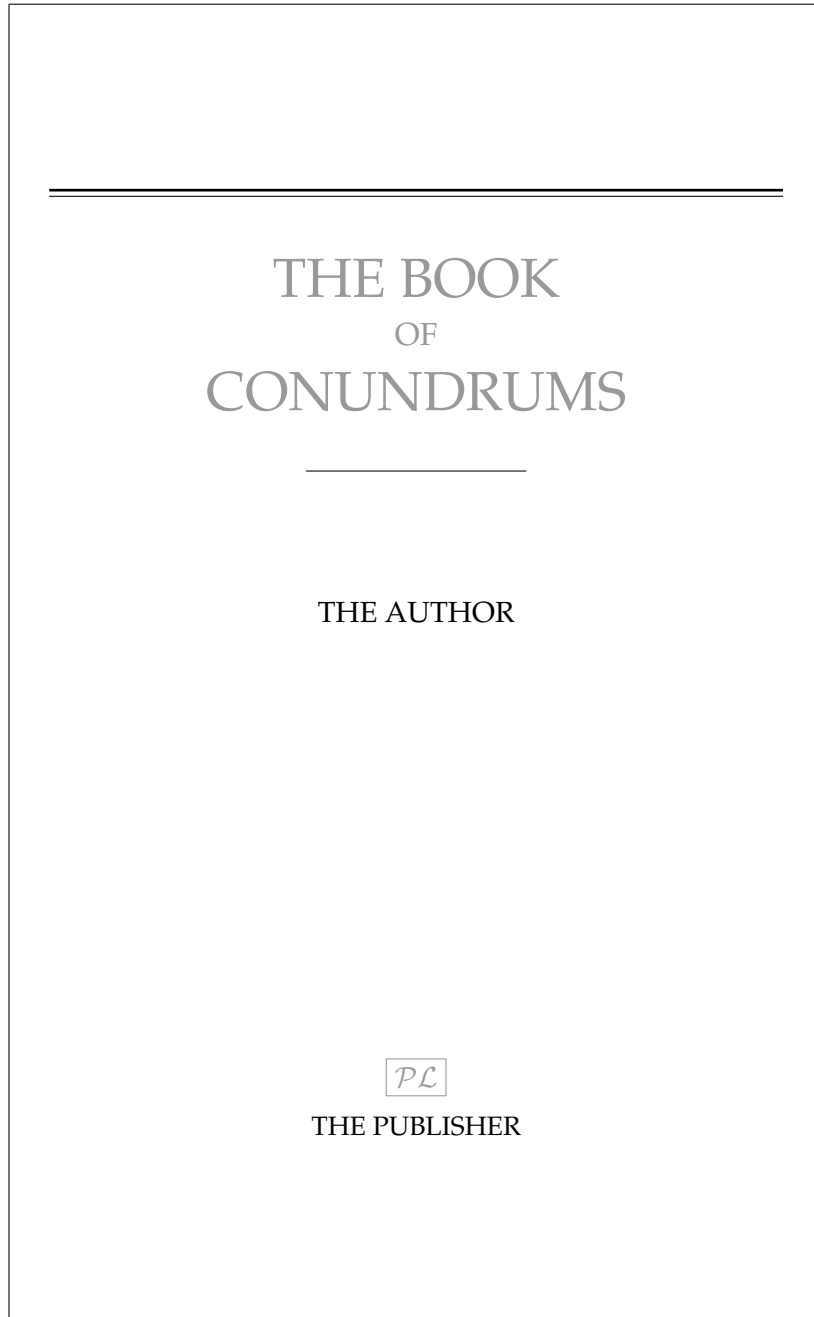


Figure 4.5: Title page based on the design for *Anatomy of a Typeface*

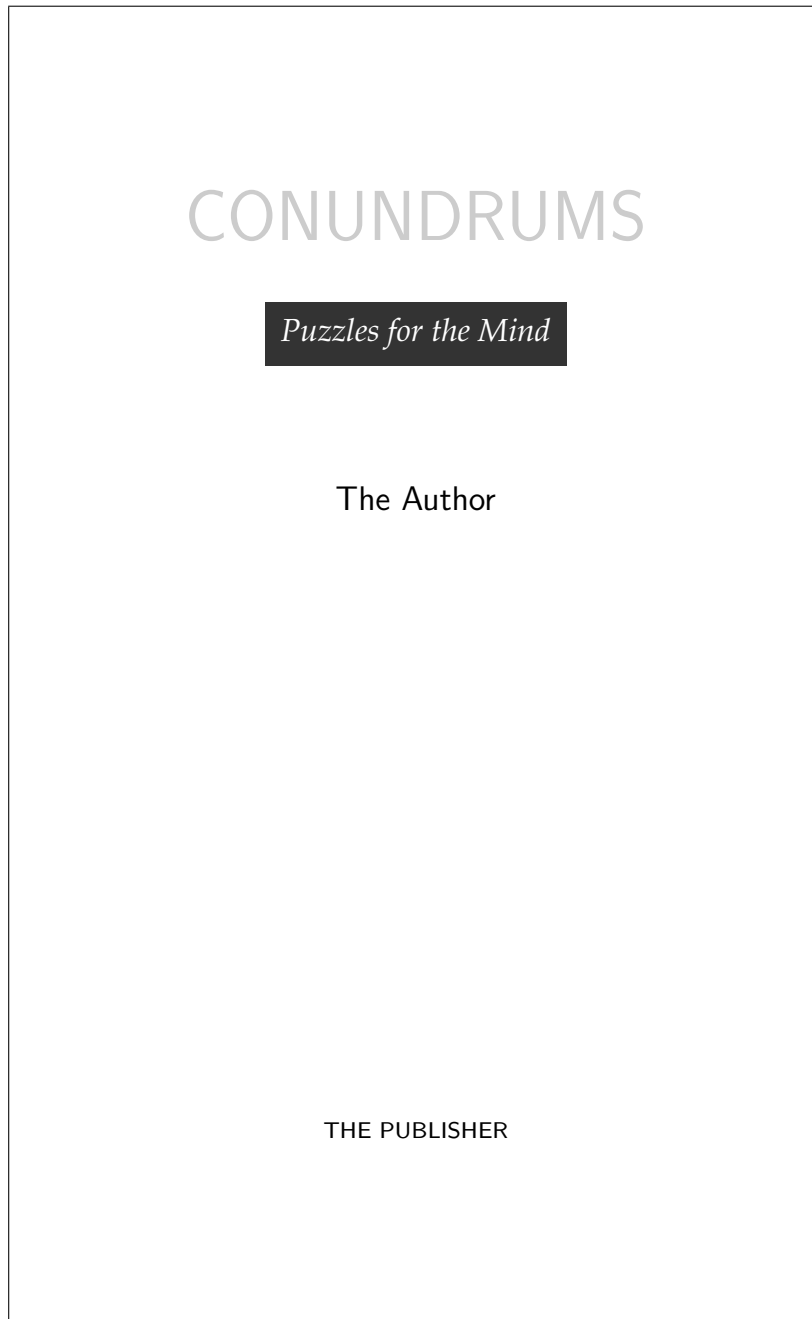


Figure 4.6: Title page based on the design for *Lost Languages*

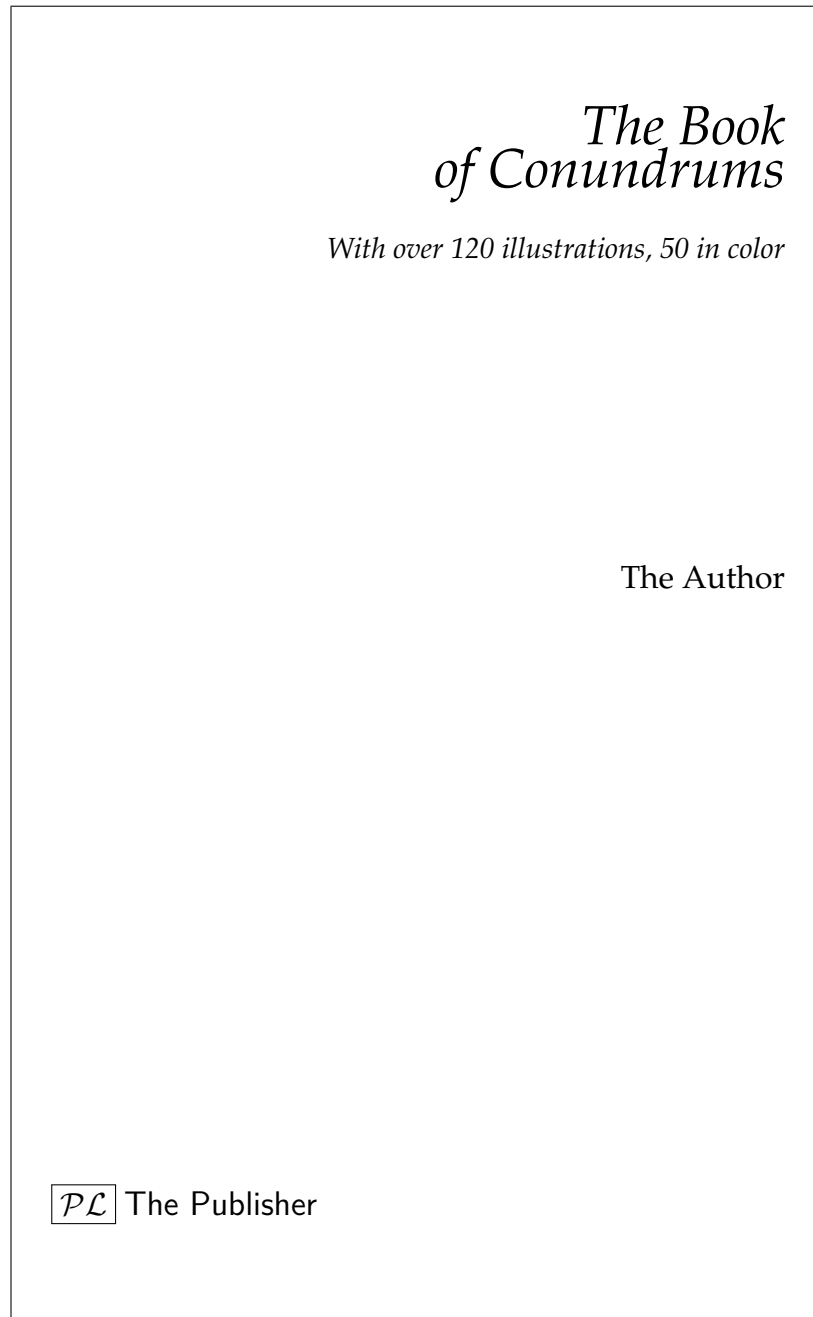


Figure 4.7: Title page based on the design for *The Story of Writing*

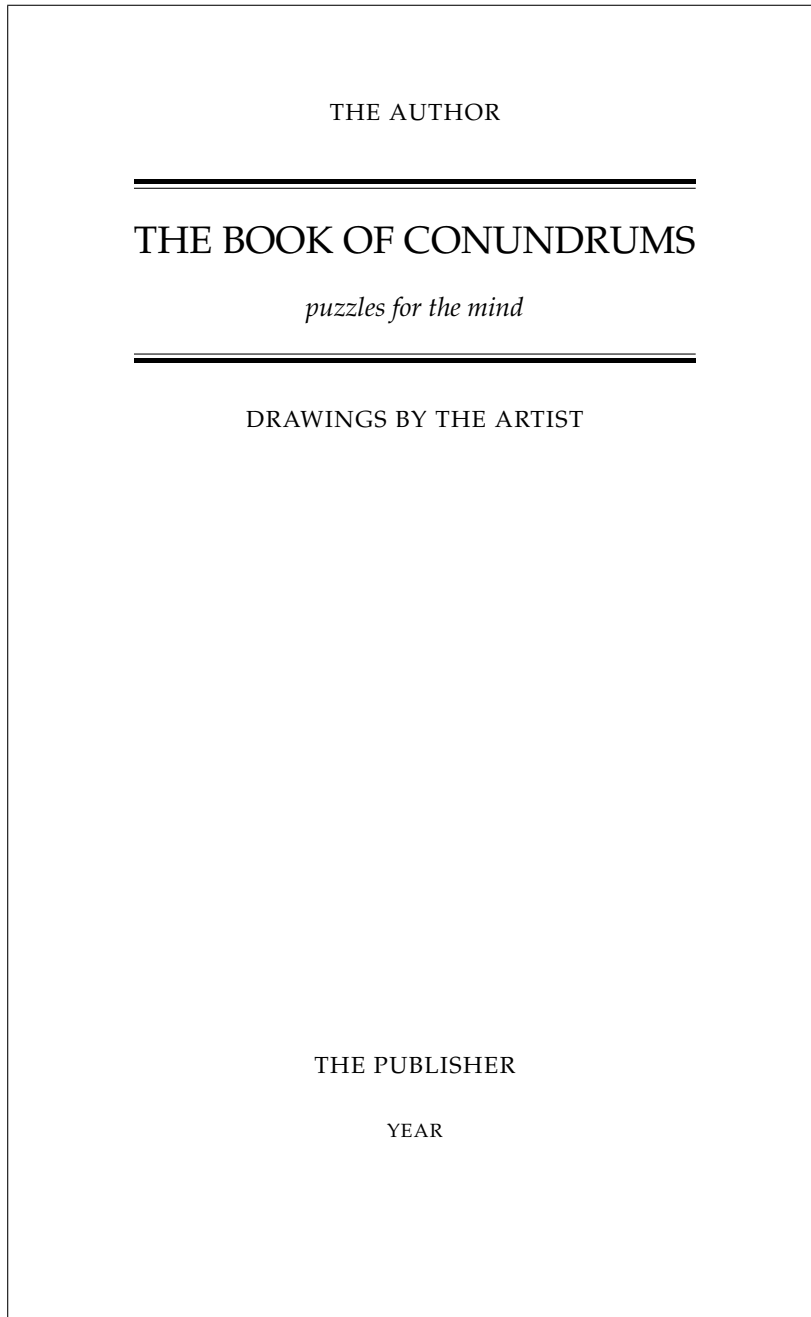


Figure 4.8: Title page based on a design for the Folio Society's edition of *Three Men in a Boat* (first published in 1889)

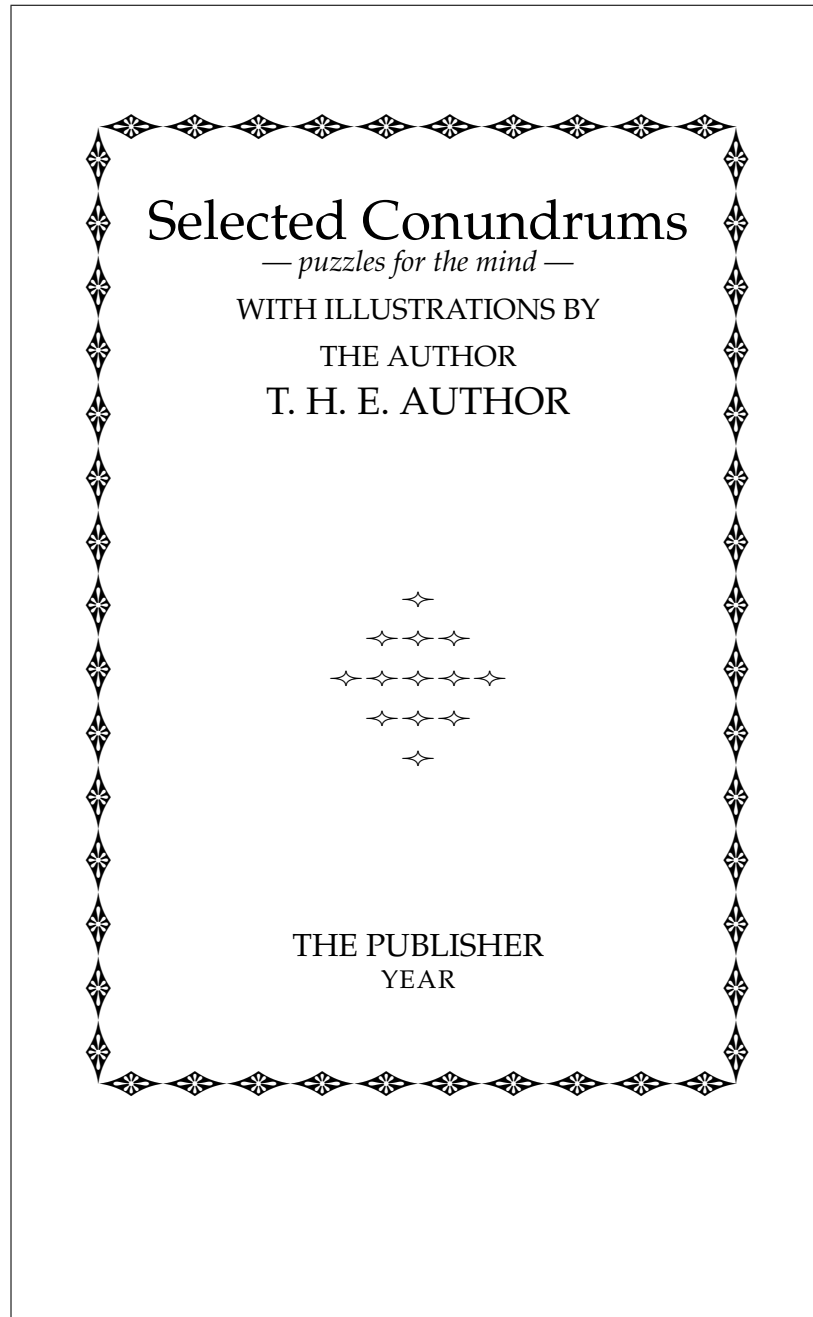


Figure 4.9: Title page based on a design for the Folio Society's edition of *Zuleika Dobson* (first published in 1911)

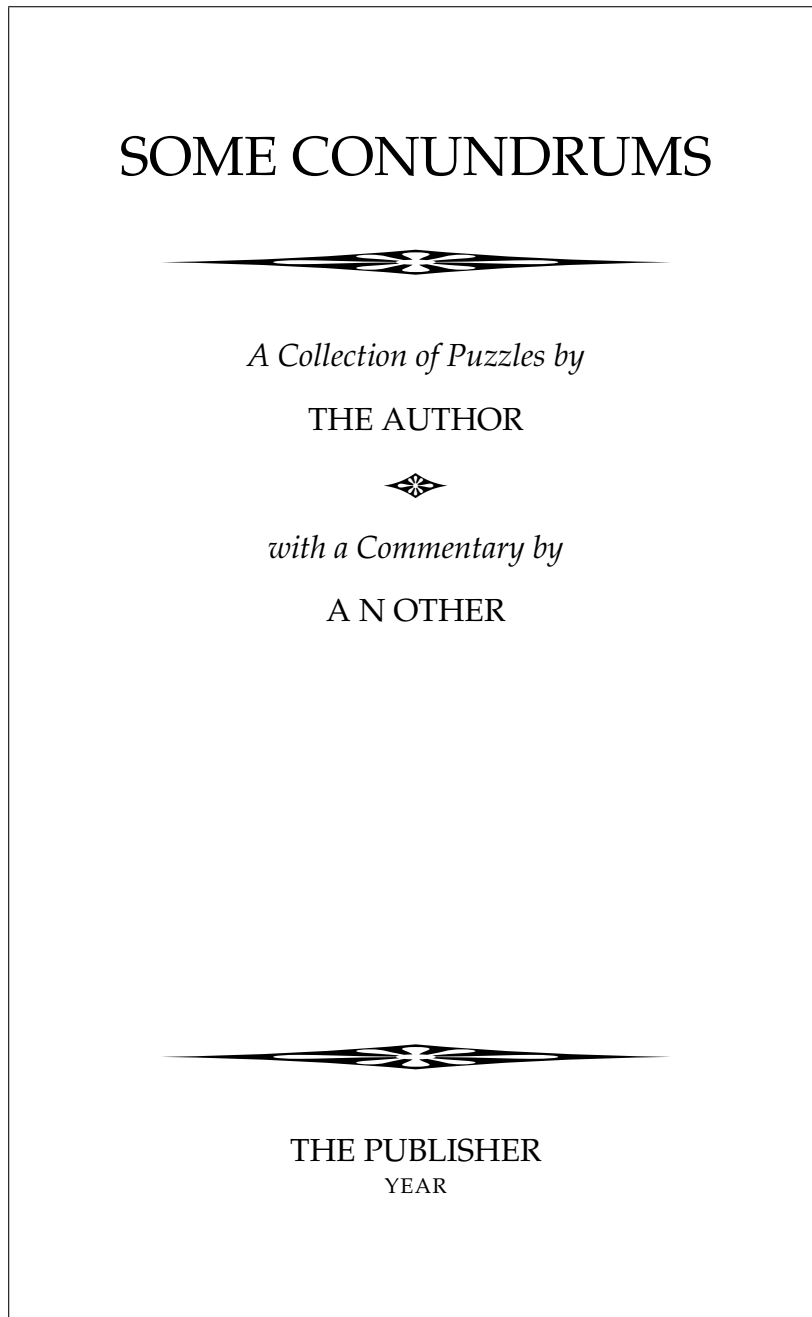


Figure 4.10: Title page based on a design for the Cambridge University Printer's Christmas book *Words in Their Hands*

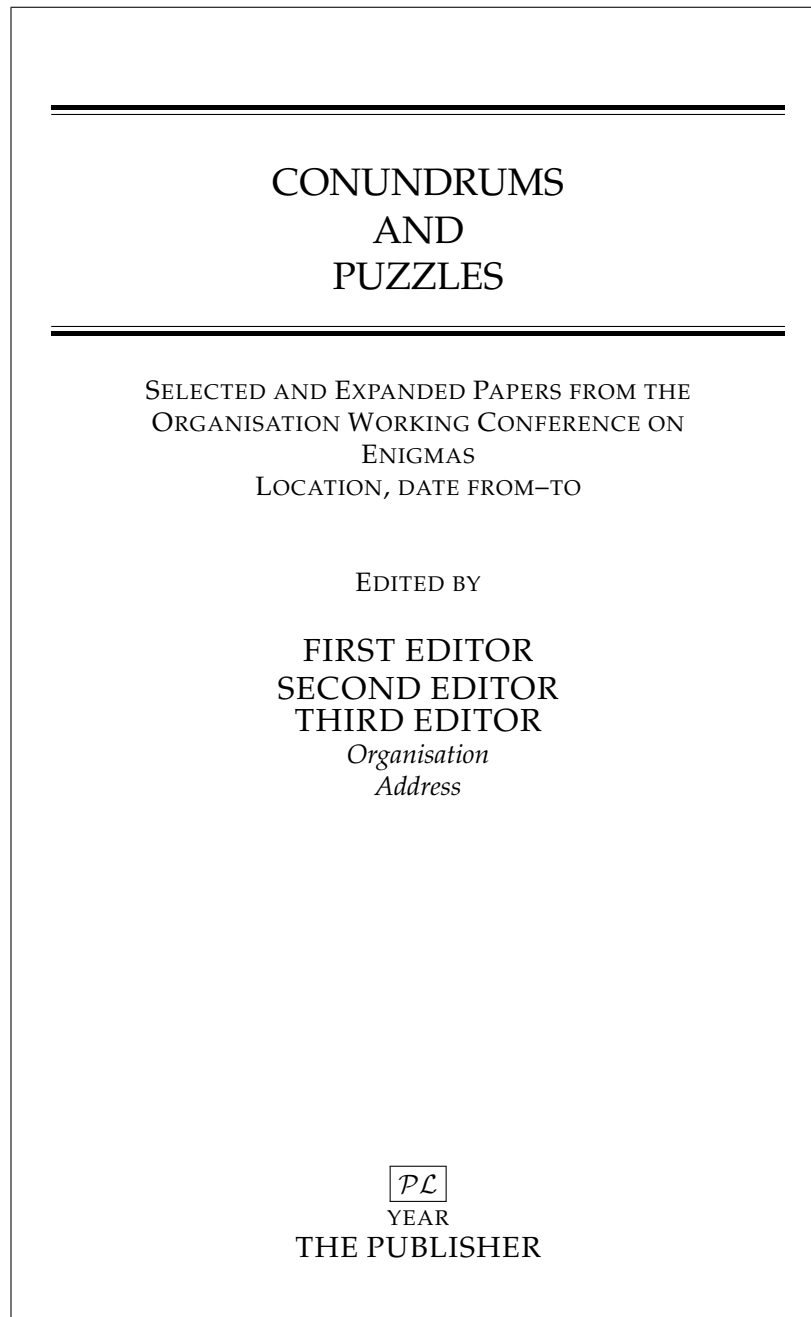


Figure 4.11: Title page design for an annual International Federation for Information Processing workshop



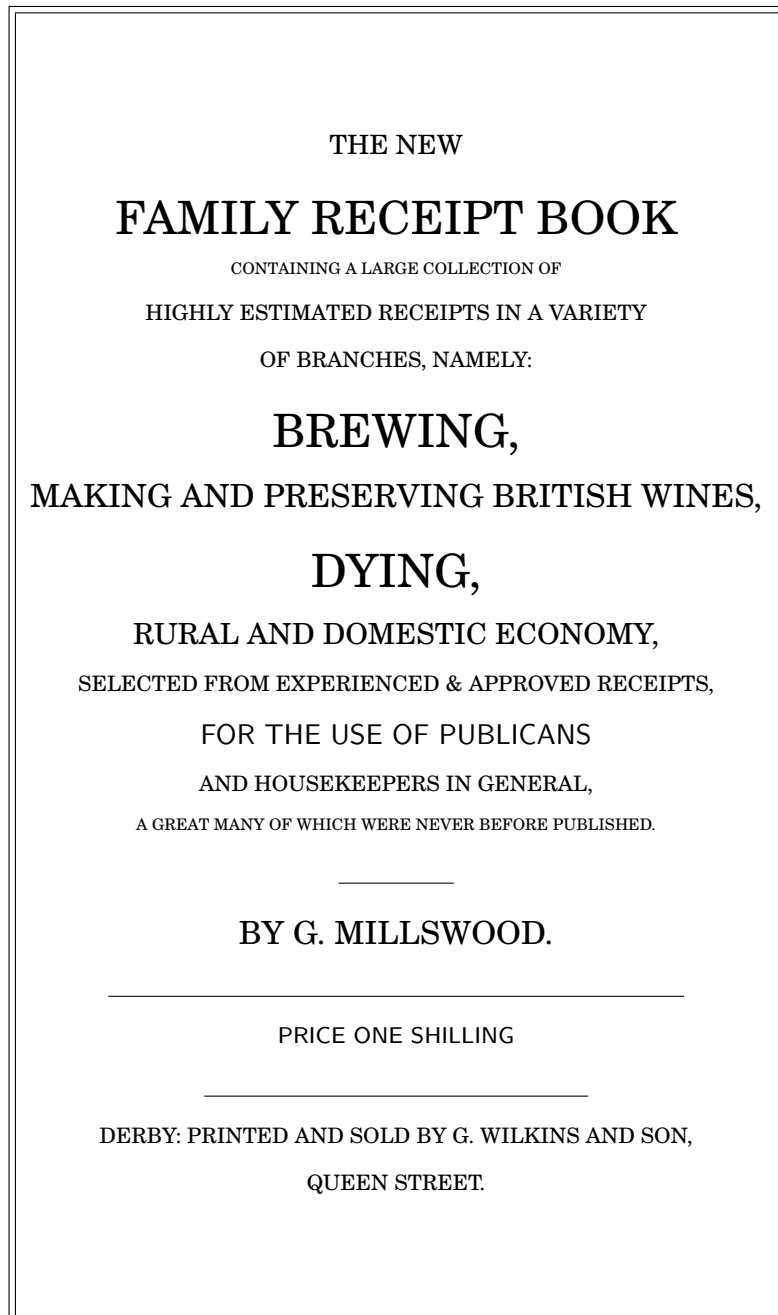


Figure 4.12: Title page of a Victorian booklet

title perhaps in small caps. The font size should be no larger than for the main text. This advertising material may be put on the copyright page but it is more often on the recto page immediately after the half-title, before the title page, or on the verso of the half-title page.

#### *Frontispiece*

The traditional place for a frontispiece, which may be the only illustration in the book, is facing the title page. Every attempt must be made to make the resulting double spread harmonious.

#### 4.1.2 COPYRIGHT PAGE

The copyright and related publishing information is set in small type on the verso of the title page. In some instances the book designer's name may be listed among the small print.

#### 4.1.3 DEDICATION

A dedication is nearly always on a recto page and simply typeset. If pages are limited it could be placed at the top of the copyright page instead.

#### 4.1.4 FOREWORD AND PREFACE

The same type size should be used for the headings 'foreword', 'preface', 'acknowledgements', etc., and the similar ones in the back matter. This may be the same size as the chapter heads, or smaller. The body type should be the same as for the main matter text. The foreword starts on a recto page. It may face the copyright page, or if there is a dedication it will face the dedication's blank verso.

The preface, which is the author's opening statement, is treated like a chapter opening, and commences on a recto page.

#### 4.1.5 ACKNOWLEDGEMENTS

If there are any acknowledgements and they require only a few sentences then they are often put at the end of the preface, if there is one. Otherwise the acknowledgements should be treated as a distinct unit, like a foreword or preface, and commence on a recto page.

#### 4.1.6 CONTENTS AND ILLUSTRATION LISTS

The table of contents is often laid out so that the page numbers are not too distant from the titles, thus reducing the need for dotted lines, even if this makes the contents block narrower than the text page width. An alternate strategy is to use more interlinear space between the entries so that there is little or no difficulty in recognising which page numbers belong to which titles. The parts of major sections should be clearly separated to aid visual navigation.

If the captions in an illustration list are short, and it follows the contents list then it should be set in the same style as the contents. If, however, the list is at the back of the book a smaller font size could be used.

#### 4.1.7 INTRODUCTION

The heading for an Introduction is an unnumbered chapter opening on a recto page. The body text is set in the same font as the main body text.



Figure 4.13: Portrait and landscape spreads: the layout on the left is preferable to the one on the right

#### 4.1.8 PART TITLE PAGE

If the book is divided into Parts then the Part One page could either precede or follow the Introduction. Ideally the layout of the title pages for the Parts should follow the layout of the book's half-title page to provide a cohesiveness throughout the work.

## 4.2 Main matter

### 4.2.1 CHAPTER OPENINGS

Normally, chapters are the major divisions of a (volume of a) book, but if it is long it may have higher divisions, such as parts, or even books. In any event, chapters are numbered consecutively throughout the volume. The numbering is usually arabic but if there are few chapters, or there are numbered subdivisions within chapters, or the work has classical allusions, then roman numerals might be appropriate.

Chapters often begin on recto pages but if there are many short chapters or reproduction cost is all important then they may begin on the page immediately following the end of the previous chapter, or, in rare cases, even on the same page if there is enough space. In any event, the first chapter should start on a recto page.

### 4.2.2 MIXED PORTRAIT AND LANDSCAPE PAGES

It is usual for all the pages in a document to be in portrait but this is not always possible if there are illustrations or tabular material that is better displayed in landscape orientation rather than portrait.

When a double spread consists of a portrait page and a landscape page, as in Figure 4.13 and 4.14, there are two choices for which way the landscape page is turned with respect to the portrait page. In each case it seems more natural to me when the document has to be turned to the right to view the landscape page.

Figure 4.15 shows double spreads where both pages are in landscape orientation. Whichever way they face, they must both face in the same direction so that the document has only to be turned once to read both of them.

The general rule for mixed landscape and portrait pages is that the document is held in one position to read the portrait pages and is turned in a consistent direction, usually to the right, to read the landscape pages. The key is consistency.



Figure 4.14: Landscape and portrait spreads: the layout on the left is preferable to the one on the right

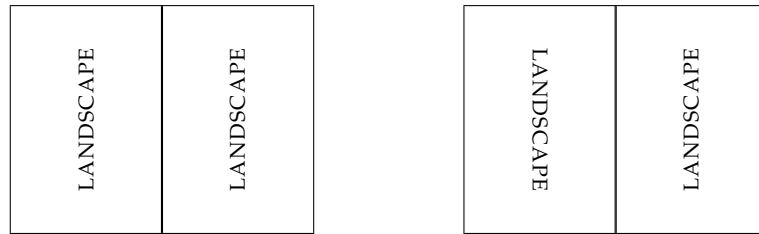


Figure 4.15: Double landscape spreads: never use the layout on the right

#### 4.2.3 EXTRACTS

Typographers use ‘extract’ as a generic term for what I would think of as a quotation. Essentially a quotation is an extract from some source. Quotations from other works, unless they are so short as to be significantly less than a line, should be set off from the main text. This could be as an indented block, or by using a different type style or size, or a combination of these. A size difference of one or two points from the body size is usually enough to be distinctive, for instance 11/13 or 10/12 point for a 12/14 point body size. In any event, extra space, at least two or three points, should be inserted and below the extract.

#### 4.2.4 FOOTNOTES AND ENDNOTES

This section is a synthesis of the views of Ruari McLean [McL80], Jan Tschichold [Tsc91] and Emerson Welling [Wul53].

Footnotes are ancillary to the main material and expand in some way upon the current theme. For instance, remarks that are too large or off the main thread, or some side comment by the author, may be sunk to a footnote at the bottom of the page. By definition, a footnote is placed at the bottom of a page but, if it is long or space is short, may run over to a second, or even a third page. A footnote should have some immediate relevance to the reader.

Endnotes, which are collected together at the end of the document, include material similar to that in footnotes, but which is not of immediate interest. If you use an endnote it is safe to assume that only a small percentage of your readers will ever correlate it with the text.

Within the text the presence of a footnote is indicated by a raised ‘reference mark’ following the word, phrase, or sentence to which it refers. The same mark is used to introduce

the footnote at the bottom of the page. The reference mark may be either a symbol or a number. For illustrative purposes I'm using symbols as markers in this section.

If there are many footnotes then it is convenient for the reader if numbers are used for the marks. The numbering may be continuous throughout the document, or start afresh with each chapter; starting anew on each page may lead to some confusion. When there is only an occasional footnote then symbols are usually preferred as reference marks.

Endnotes may or may not be marked in the main text. If they are marked then numbers should be used, not symbols. If there are both footnotes and marked endnotes then different series of marks must be used for the two classes of notes.

There is some debate as to how reference marks should relate to the marked element in the main text. For example, should the mark immediately follow the element\* or should there be a thin space<sup>†</sup> separating the two. A convenient procedure is to use a thin space between the element<sup>‡</sup> and the mark when the end of the element is tall, and none<sup>§</sup> when the end of the element is low. There is no need for any extra space between punctuation and a reference mark.<sup>¶</sup>

McLean, Tschichold, and Wulling are all agreed that there should not be a rule separating the main text from any footnotes — a space and change in font size is sufficient to distinguish the two. The font size for footnotes is usually two sizes smaller than the main font but with the same leading. For example if the main text is set 10/12 then footnotes would be set 8/10. Notes to tables, though, are often set even smaller; for instance at 6pt or 7pt in a 10pt document. Each footnote should be introduced by the appropriate reference mark in the same font size as the note itself. If it is not raised then follow it by a period if it is a number, or by a space if a symbol, in order to distinguish it from the note's text. If there are any footnotes on a short page, such as perhaps the last page of a chapter, they are placed at the bottom of the page, not immediately below the last line of the main text.

Endnotes may be set in the same font font as the main text, but usually in the same size as for footnotes.<sup>||</sup>

Endnotes may be grouped at the end of each chapter or collected together towards the end of the document. If the latter, then they should be presented in groups corresponding to the noted chapters. It is a courtesy to the reader to indicate the page which gives rise to each note so that backward reference, as well as forward reference, is facilitated; this is especially important if there is no endnote mark in the main text. Endnotes that have no reference mark in the text are usually tagged with some words from the main text that identify the idea or statement that they are referring to. In an endnote listing note numbers are usually either indented or the note is set flush-and-hang style; that is, with the first line set flushleft and any remaining lines indented.

Whether a note is presented as a footnote or an endnote, it should always finish with a period.

\*This mark immediately follows the main element.

†There is a thin space between this mark and the element it is attached to.

‡A thin space is used here.

§There is no extra space here.

¶There is no extra space here.

||That is, two sizes smaller than the main text, but with the same leading.

### 4.3 Back matter

Divisions in the back matter are not numbered.

In commercial printing, saving a page here and a page there can save the publisher money and hopefully at least some of the reduced cost will be passed on to the readers. One way of reducing the number of pages is by reducing the font size. The material in the back matter is in some sense auxiliary to the main matter, hence of less importance, and some of it may then be reasonably set in smaller type.

#### 4.3.1 APPENDICES

Appendices come immediately after the main text. Depending on their importance and interest they can be set in the same manner as the main text. If the appendices consist of long supporting documents they could be set in a type one or two points smaller than the main text.

In some instances there are appendices at the end of individual chapters, where they form the last divisions of the chapters, and are treated as any of the other divisions.

#### 4.3.2 ENDNOTES

In an endnote listing, note numbers are usually either indented or the note is set flush-and-hang style; that is, with the first line set flushleft and any remaining lines indented. There are, of course, corresponding numbers at the appropriate points in the main text.

In another style, the endnotes are identified by a phrase taken from the main text together with the relevant page number. In this case there are no numbers in the text to disturb the flow, but that often means that the notes never get read.

The notes are often set in the same sized type as used for footnotes or, if they are exceptionally interesting, in a size intermediate with the main text.

#### 4.3.3 BIBLIOGRAPHY

The list of books, etc., that the author has used as source material is usually placed at the back of the book under the title 'Bibliography'. In some works there may be a bibliography at the end of each chapter and the title 'References' is often used for these.

A font size intermediate between those for quotations and footnotes is very reasonable, and a slight extra space between entries, say two points, can improve the readability.

#### 4.3.4 GLOSSARY

The list of definitions of terms or symbols used in the text normally comes towards the end of a book, although it could as well come towards the end of the front matter, or a symbol list in the front matter and a glossary in the back matter. The terms are usually set in italics, or in textbooks in bold. Most often a flush-and-hang style is used, with perhaps one or two points extra leading between the entries.

The type size could be the same as for quotations if the glossary is short, or the size used for the bibliography for longer lists.

#### 4.3.5 INDEX

The entries in an index are usually short and most indexes are set in two, or more columns. As examples, author's names are usually relatively short so an index of names would typically be in two columns; on the other hand, verse lines are relatively long and an

Table 4.1: Some relative type sizes for elements of books

Body size	12/14	10/12
Extracts	10/12	9/10
Bibliography	9/10	8/9
Glossary	9/10	8/9
Footnotes	8/9	8/8

index of first lines is often set as a single column. In either case, the entries are usually set raggedright with the page numbers close to the corresponding item's text. In multicolumn setting the gutter between the columns must be wide enough, at least a pica, so that the eye does not jump across it when reading an entry. The entries are normally set flush-and-hang.

When there are subentries, or sub-subentries, they are typically each indented by 1em with respect to the major entry.

A change of collation, such as between entries starting with 'P' and those with 'Q' should be signalled by at least one or two blank lines. If the index is long, then a suitable character (e.g., 'Q') or word should be used as part of the break, indicating what is coming next. The index could be set in the same size type as the bibliography.

#### 4.4 Type size

As indicated above, the type size is normally related to the 'importance' of what is being set. Chapter headings are set in large type and footnotes set in small type. Of course, it is a matter of judgement as to what 'important' means in any given work. Some possible combinations of type sizes are given in Table 4.1 though these should be considered as starting points for a design rather than fixed rules.

#### 4.5 Poems and plays

In literature such as poems or plays the length of the line is determined by the author whereas in prose works the book designer establishes the measure. For this kind of work the designer should respect the author's wishes as far as possible within a maximum text width.

##### 4.5.1 POETRY

If possible the type and measure should be chosen so that the longest poetical line will fit on one printed line, so that the shape of the poem is retained.

Poems in a book of poetry will differ from one another in their width, and the best way of setting these is to optically center each poem on the page. However, blank verse and poems where the majority of the lines are long are usually indented by a constant amount from the left margin.

In some context verse lines are numbered, often every fifth or tenth line. The numbers are usually small and right justified.

#### 4.5.2 PLAYS

When presenting a play a list of characters (*Dramatis Personae*) is frequently given at the beginning of the play. It is presented between the title and the start of the play itself, either on the same page as the title, or on a page by itself, or at the top of the first page of the play. The list may be ordered alphabetically, in order of appearance, or by the character's importance. A remark about a character, if less than a sentence, follows the name, separated by a comma. If the remark is one or several sentences they are set as usual.

Act and scene names and numbers are often treated in the same manner as subheads in a prose work. A new act does not necessarily start a new page but there should be at least twelve points above and six below the number. A new scene has about eight points above and six points below the number. Either arabic or roman numerals may be used for the numbers. If roman is used for both, then uppercase for acts and lowercase for scenes.

The name of each speaker in a play must be readily identifiable and stand apart from the speech. Names are commonly set in a different font, such as small caps or italic, to the text which is usually set in roman. They may be placed on a separate line, where they are most easily identifiable, or, to save space, in the margin. The names are often abbreviated, and if so the abbreviations must be consistent throughout the work.

Stage directions have to be differentiated from the text. They are usually set in italics and enclosed in brackets, or less often, in parentheses; speakers' names in stage directions, though, are set in roman to distinguish themselves. Directions at the start of a scene, such as saying who is entering, are typically centered while in the body of the scene are set flush right, often on a line by themselves.

### 4.6 Selecting a typeface

Choosing the 'best' typeface to use is first a matter of practicalities and secondly a question of aesthetics, feel, judgement, and other imponderables.

First off, select a typeface that is both legible and readable. The classical faces, those that have withstood the test of time<sup>7</sup> are usually safe in this respect.

Regarding the practicalities, if the work is to be presented on paper then a more delicate face can be used than if it is to be displayed on a computer screen where a more robust type is necessary (e.g., no fine serifs, no thin strokes), especially if it is a low resolution device.

A work that includes many dates or dimensions needs a typeface with good numerals and fractions. A face such as Palatino that has both lining and non-lining (oldstyle) numerals is likely to be useful, or a face with numerals smaller than the capitals, like Bell for example. Mathematics of course requires mathematical symbols that do not clash with the regular text face.

Where there are many quotations, particularly of verse, or references to titles of pictures or books implies that a good italic might be used to advantage, for instance Joanna or Van Dijk.

In technical works the font, size, and weight are used to distinguish between several layers of subdivisions. Faces with good relationships between capitals, small caps, italic, and possibly boldness, should be sought out. Some sans bold types can mix with serif types; you might try Gill Sans or Futura.

<sup>7</sup>Measured in decades, if not centuries.



When to her lute Corinna sings,  
 Her voice revives the leaden strings,  
 And doth in highest notes appear  
 As any challenged echo clear;  
 But when she doth of mourning speak,  
 Ev'n with her sighs the strings do break.

Out of the day and night  
 A joy has taken flight –  
 Fresh spring and summer and winter hoar  
 Move my faint heart with grief, but with  
 delight  
 No more, O never more!

How many times do I love thee, dear?  
 Tell me how many thoughts there be  
 In the atmosphere  
 Of a new-fall'n year,  
 Whose white and sable hours appear  
 The latest flake of Eternity—  
 So many times do I love thee, dear.

When I was one-and twenty  
 I heard a wise man say,  
 'Give crowns and pounds and guineas  
 But not your heart away;  
 Give pearls away and rubies  
 But keep your fancy free.'  
 But I was one-and-twenty,  
 No use to talk to me.

Figure 4.16: Verses from four poems set with Caslon, Garamond, Bodoni and Della Robbia

After the practical aspects there are two main considerations: does the face match the 'feel' of the work and is the face consistent with the period of the work?

The latter consideration is effectively a historical one. If you are resetting a work that was originally published in the 1800's don't use a twentieth century typeface, and certainly not a Sans-serif. On the other hand using blackletter for setting a twentieth century novel, even a gothic one, is not a good idea even apart from the legibility and readability factors. The face may be chosen to match the era of the text; perhaps a Sans-serif for a book about modern art but not for one about medieval England. Using Caslon, which was created in England in the early 18th century would probably not be a good choice for a book about Italian Renaissance art whereas Centaur which is based on Jenson's 15th century Venetian roman typeface would be, but then Centaur in turn would probably not be the best choice for a physics book on the big bang and string theory.

The 'feel' question is somewhat harder, partly depending on the presumed sensibilities of the reader. If the work is about aspects of Italian life then perhaps a light and quick Italian typeface would be preferable to a stolid English face. If it is a scientific work then a clean and precise face would perhaps fit the bill. Technical works often use alphabetic symbols, such as mathematical, chemical, or astrological symbols. Try and use a face that includes those symbols that you need or, failing that, try and find complementary typefaces that cover the range you need. The same applies if the work is multilingual, and especially if it involves different scripts like, say, Latin and Greek; try and find matching faces, or at least typefaces that don't clash with each other.

I was recently letterpress printing some poems and the fonts available in the print shop were Bodoni, Caslon, Della Robbia and Garamond, all in 14pt. The poems were originally written within the period 701–2008 and my problem was to try and choose what I thought would be the most appropriate font for each poem. Caslon was created in 1720 so I decided

When to her lute Corinna sings,  
 Her voice revives the leaden strings,  
 And doth in highest notes appear  
 As any challenged echo clear;  
 But when she doth of mourning speak,  
 Ev'n with her sighs the strings do break.

Out of the day and night  
 A joy has taken flight —  
 Fresh spring and summer and winter  
 hoar  
 Move my faint heart with grief, but  
 with delight  
 No more, O never more!

How many times do I love thee, dear?  
 Tell me how many thoughts there be  
 In the atmosphere  
 Of a new-fall'n year,  
 Whose white and sable hours appear  
 The latest flake of Eternity—  
 So many times do I love thee, dear.

When I was one-and twenty  
 I heard a wise man say,  
 'Give crowns and pounds and guineas  
 But not your heart away;  
 Give pearls away and rubies  
 But keep your fancy free.'  
 But I was one-and-twenty,  
 No use to talk to me.

Figure 4.17: Verses from four poems set with Garamond, Bodoni, Della Robbia and Caslon

When to her lute Corinna sings,  
 Her voice revives the leaden strings,  
 And doth in highest notes appear  
 As any challenged echo clear;  
 But when she doth of mourning speak,  
 Ev'n with her sighs the strings do break.

Out of the day and night  
 A joy has taken flight —  
 Fresh spring and summer and winter hoar  
 Move my faint heart with grief, but with  
 delight  
 No more, O never more!

How many times do I love thee, dear?  
 Tell me how many thoughts there be  
 In the atmosphere  
 Of a new-fall'n year,  
 Whose white and sable hours appear  
 The latest flake of Eternity—  
 So many times do I love thee, dear.

When I was one-and twenty  
 I heard a wise man say,  
 'Give crowns and pounds and guineas  
 But not your heart away;  
 Give pearls away and rubies  
 But keep your fancy free.'  
 But I was one-and-twenty,  
 No use to talk to me.

Figure 4.18: Verses from four poems set with Bodoni, Della Robbia, Caslon and Garamond

When to her lute Corinna sings,  
 Her voice revives the leaden strings,  
 And doth in highest notes appear  
 As any challenged echo clear;  
 But when she doth of mourning speak,  
 Ev'n with her sighs the strings do break.

How many times do I love thee, dear?  
 Tell me how many thoughts there be  
 In the atmosphere  
 Of a new-fall'n year,  
 Whose white and sable hours appear  
 The latest flake of Eternity—  
 So many times do I love thee, dear.

Out of the day and night  
 A joy has taken flight —  
 Fresh spring and summer and winter  
 hoar  
 Move my faint heart with grief, but  
 with delight  
 No more, O never more!

When I was one-and twenty  
 I heard a wise man say,  
 'Give crowns and pounds and guineas  
 But not your heart away;  
 Give pearls away and rubies  
 But keep your fancy free.'  
 But I was one-and-twenty,  
 No use to talk to me.

Figure 4.19: Verses from four poems set with Della Robbia, Caslon, Garamond and Bodoni

that I would only use it for poems after that date. Although Garamond was created around 1550–1600 I decided to use it for the pre-Caslon poems. To me the Bodoni and Della Robbia had a very different feel to them, one being light and the other on the grim side; I used these for the occasional poem instead of the Caslon or Garamond to try and convey some of the emotional aspect of the piece. Figures 4.16 through 4.19 show verses from four of the collection of poems set with the four fonts I had available. Decide what you would have chosen as being most appropriate. As a sidenote they are set here using 12pt instead of the 10pt body text size. Poetry can, with advantage, be set with larger type and leading than prose, and in italic instead of roman.



# Five

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## Picky points

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The main elements of good typography are legibility and page color. This chapter discusses some of the smaller points related to these topics.

### 5.1 Word and line spacing

Research has shown that the competent reader recognises words by their overall shape rather than by stringing together the individual letters forming the words. A surprisingly narrow gap between words is sufficient for most to distinguish the word boundaries.

Most typographers state that the space between words in continuous text should be about the width of the letter ‘i’. Any closer and the words run together and too far apart the page looks speckled with white spots and the eye finds it difficult to move along the line rather than jumping to the next word in the next line. Figure 5.1 illustrates different values of interword spacing.

In keeping with avoiding white spots, many typographers do not recommend extra spacing after punctuation, although this does depend partly on a country’s typographic history and partly on the individual. I always found typewritten texts with double spaces after the end of sentences a particular eyesore. However, with typeset texts any extra spacing is usually not as large as that.

The spacing between lines of text should be greater than the interword spacing, otherwise there is a tendency for the eye to skip to the next line instead of the next word. The space in question is the apparent amount of whitespace between the bottom of the text on one line and the top of the text on the next line. In a rough sense it is the leading minus the actual height of the font. Figure 5.2 illustrates some text typeset with different line spacings. The normal interword spacing is used in the samples. When text is set solid there is a tendency for the descenders on one line to touch, or even overlap, the ascenders on the following line.<sup>1</sup>

### 5.2 Letterspacing

*Letterspacing* is the insertion of spaces between the letters of a word. Frederic Goudy (1865–1947), a very respected American typographer and type designer, is said to have been fond of saying, ‘A man who would letterspace lower case letters would steal sheep!’ Writing in 1999 Robert Bringhurst [Bri99, p. 31] felt that to bring this dictum to modern times it was simply necessary to add that ‘A woman who would letterspace lower case would also steal sheep.’

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<sup>1</sup>TeX has a built-in mechanism that tries hard to prevent this from happening.

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The following paragraph is typeset with double the normal interword spacing for this font.

Most typographers state that the space between words in continuous text should be about the width of the letter 'i'. Any closer and the words run together and too far apart the page looks speckled with white spots and the eye finds it difficult to move along the line rather than jumping to the next word in the next line. Extra spacing after punctuation is not necessary.

The following paragraph is typeset with the normal interword spacing for this font.

Most typographers state that the space between words in continuous text should be about the width of the letter 'i'. Any closer and the words run together and too far apart the page looks speckled with white spots and the eye finds it difficult to move along the line rather than jumping to the next word in the next line. Extra spacing after punctuation is not necessary.

The interword spacing in the following paragraph is three-quarters of the width of the letter 'i'.

Most typographers state that the space between words in continuous text should be about the width of the letter 'i'. Any closer and the words run together and too far apart the page looks speckled with white spots and the eye finds it difficult to move along the line rather than jumping to the next word in the next line. Extra spacing after punctuation is not necessary.

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Figure 5.1: Interword spacings

Letterspacing is usually restricted to titles composed of upper case letters with the intent of making the spaces between the letters visually equal. Figure 5.3 shows the word 'HISTORY' with various amounts of interletter spacings. With no extra spacing it looks cramped compared with the spaced versions. Versions with uniform spacing of thin (0.167em) and hair (0.1em) spaces are much improved. However, the spacing of the letters 'H', 'I' and 'S' leave something to be desired, and is especially noticeable in the version with thin spaces. Lastly a version with varied interletter spacing is shown which is optically balanced; the spaces in this case are 0.09em, 0.12em, 0.1em, 0.1em, 0.07em and 0.1em. The difference between this and the uniformly hair-spaced version is subtle. Different letter combinations and different fonts will require different amounts of spaces.

Figure 5.4 shows similar results for the same word set in small caps instead of regular caps. In general you might find that if you do letterspace then uniform spacing is adequate for small caps.

There can be occasions, as with emphasis with fraktur fonts, when letterspacing lower case will not get you hung for sheep stealing. These, typically, are when dealing with some sans fonts such as a bold condensed Univers. But be very careful. Italics should never be letterspaced as they come from the handwriting tradition of 'joined up letters', as my kindergarten teacher used to call them.

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This and the next paragraph are set solid — the interline spacing is the same as the font size.

The normal interword spacing is used in these paragraphs. The spacing between lines of text should be greater than the interword spacing, otherwise there is a tendency for the eye to skip to the next line instead of the next word.

This and the next paragraph are set with the normal interline spacing for the font.

The normal interword spacing is used in these paragraphs. The spacing between lines of text should be greater than the interword spacing, otherwise there is a tendency for the eye to skip to the next line instead of the next word.

This and the next paragraph are set with the interline spacing 20% greater than is normal for the font.

The normal interword spacing is used in these paragraphs. The spacing between lines of text should be greater than the interword spacing, otherwise there is a tendency for the eye to skip to the next line instead of the next word.

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Figure 5.2: Interline spacings

HISTORY	without letter spacing
HISTORY	thin space between each letter
HISTORY	hair space between each letter
HISTORY	visually spaced

Figure 5.3: Letterspacing: uppercase letters

HISTORY	without letter spacing
HISTORY	thin space between each letter
HISTORY	hair space between each letter
HISTORY	visually spaced

Figure 5.4: Letterspacing: small caps

### 5.3 Abbreviations and acronyms

The English style with abbreviations is to put a full stop (period) after the abbreviation, unless the abbreviation ends with the same letter as the full word. Thus, it is Mr for Mister, Dr for Doctor, but Prof. for Professor. No extra spacing should be used after the full stop, even if extra spacing is normally used after punctuation.

The general American, and English, trend nowadays is away from the use of periods (full stops) after abbreviations following the precept that reducing typographic fussiness increases the ease of reading. Having said that, where an abbreviation is a combination of abbreviations, such as Lt.Col for Lieutenant Colonel, often an internal period is used with a word space between the elements.

Acronyms are typeset in uppercase but the question is, which uppercase? The simple way is to use the uppercase of the normal font, like UNICEF, but if there are too many acronyms scattered around the speckled effect starts to intrude. If the font family has one, then small caps can be used, giving UNICEF. If small caps are not available, or appear undesirable, then a smaller size of the normal uppercase can be used, such as UNICEF or UNICEF; some experimentation may be required to select the appropriate size. These several versions were input as:

regular UNICEF text	regular UNICEF text
regular UNICEF text	regular <code>\textsc{unicef}</code> text
regular UNICEF text	regular <code>{\small UNICEF}</code> text
regular UNICEF text	regular <code>{\footnotesize UNICEF}</code> text

### 5.4 Dashes and ellipses

Most fonts provide at least three lengths of dashes. The shortest is the hyphen (-), then there is the en-dash (–) which is approximately the width of the letter ‘n’, and the largest is the em-dash (—) which is approximately twice the length of an en-dash. An expert font may provide more.

Unsurprisingly, the hyphen is used for hyphenation, such as in em-dash, or at the end of a line where a word had to be broken.

The en-dash is normally used between numerals to indicate a range. For example a reference may refer to pages 21–27 in some journal or book. There is no space surrounding the en-dash when used in this manner.

The em-dash, or the en-dash, is used as punctuation — often when making a side remark — as a phrase separator. When en-dashes are used as punctuation it is normal to put spaces around them but the question of spaces around an em-dash appears to be the subject of some contention. Roughly half the participants in any discussion advocate spaces while the other half view them as anathema. If you do use em-dashes be sure to be consistent in your use, or otherwise, of spaces.

Ellipses are those three, or is it four, dots indicating something is missing or continues somewhat indefinitely. In the middle of a sentence, or clause or ... they have a space on either side. At the end of a sentence the English style is to have no spaces and include the full stop, making four dots in all, like so...

Dashes are also used to indicate missing characters or a word. Missing characters in the middle of a word are indicated by a 2em-dash (a dash that is twice as long as an em-dash), as in:



---

'There's glory for you!  
 'I don't know what you mean by "glory"', Alice said.  
 Humpty Dumpty smiled contemptuously. 'Of course you don't — till I tell you. I meant "there's a nice knock-down argument for you!"'  
 'But "glory" doesn't mean "a nice knock-down argument"', Alice objected.  
 'When I use a word', Humpty Dumpty said, in a rather scornful tone, 'it means just what I choose it to mean — neither more nor less'.

---

"There's glory for you!"  
 "I don't know what you mean by 'glory,'" Alice said.  
 Humpty Dumpty smiled contemptuously. "Of course you don't — till I tell you. I meant 'there's a nice knock-down argument for you!'"  
 "But 'glory' doesn't mean 'a nice knock-down argument,'" Alice objected.  
 "When I use a word," Humpty Dumpty said, in a rather scornful tone, "it means just what I choose it to mean — neither more nor less."

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Figure 5.5: Quotation marks: top English, bottom American

**snafu**, (*U.S. slang*) *n.* chaos. — *adj.* chaotic. [situation *normal* — *all f*—d up.]  
 A 3em-dash is used to indicate a missing word. When I lived in Maryland my local small town newspaper was the *Frederick Post*. The following is from an obituary I happened to read; I have hidden the name to protect the innocent.

Although he had spent the last 92 years of his life here, Mr ——— was not a Fredericktonian.

## 5.5 Punctuation

### 5.5.1 QUOTATION MARKS

Quotation marks surrounding speech and associated punctuation are a fruitful source of confusion.

The American style is to use double quotes at the start (“) and end (”) of spoken words. If the speaker quotes in the speech then single quote marks (‘ and ’) are used to delineate the internal quotation.

The English practice is exactly the opposite. Main speech is delineated by single quotes and internal quotations by double quotes. In any event, if single and double quotes are adjacent they should be separated by a thin space in order to distinguish one from the other — a full interword space is too wide.

As there are likely to be few internal quotations it seems to me that the English practice produces a less spotty appearance than the American. Figure 5.5 shows the same text typeset in both the English and American styles. The example is from Lewis Carroll's *Through the Looking Glass and what Alice Found There* and has an unusually large number of internal quotations.

Where to put punctuation marks with quotes is vexatious. Again the English and American practice tends to differ. The American tendency is to put commas and periods inside the closing quote mark and colons and semicolons after the mark. English editors

prefer to put punctuation after the mark. In either case, it is difficult to know exactly what to do. I get the impression that for every example of the ‘correct’ form there is a counter-example. Some try and avoid the problem altogether by putting the lower marks, like commas or periods, directly below the quotation mark but that may cause problems if the resulting constructs look like question or exclamation marks. In Figure 5.5 I have tried to use the English and American punctuation styles in the respective examples but it is likely that there are misplacements in both. I think it’s basically a question of doing what you think best conveys the sense, provided there is consistency.

### 5.5.2 FOOTNOTE MARKS

Where to put a footnote marker may be another vexed question in spite of the general principal being easy to state: The mark goes immediately after the text element that the note refers to.

There is no doubt what this means<sup>2</sup> when the text element is a word in the middle of other words. Doubt raises its head when the reference is to a phrase, like this one<sup>3</sup>, which is set off within commas, or when the note refers to a complete sentence.<sup>4</sup>

Like punctuation and quotation marks, should a footnote mark come before or after the punctuation mark at the end of a phrase or a sentence? I have shown both positions<sup>5</sup> in the previous paragraph. The general rule that I have deduced is that the mark comes after the punctuation, but there are always those who like to prove a rule.

There are other marks that may be associated with a word, like (registered) trademarks. These may produce ugly gaps. Sometimes these cannot be avoided but it may be possible to change the text to minimise the hiccup. There is an example of this on page xxi. I tried various schemes in identifying ‘PostScript’ as being a registered trademark of Adobe Systems Incorporated. Among the discarded trials were:

...languages like PostScript<sup>TM</sup>, presumably ...  
 ...languages like PostScript<sup>®</sup>, presumably ...  
 ...like the PostScript<sup>®</sup> language, presumably ...

My final solution was to note the registered trademark information in a footnote:

...languages, like PostScript<sup>6</sup>, presumably ...

In this case I decided that the footnote was really tied to the word ‘PostScript’, taking the place of the registered symbol, so I put the footnote mark before the comma rather than after it.

### 5.5.3 FONT CHANGES

Sometimes a word or two may be set in a different font from the surrounding text, such as when emphasizing a word by setting it in an italic font. If the word is followed by a punctuation mark the normal practice is to set the punctuation mark using the new font instead of the normal font. In some cases the font used for the punctuation may not be particularly noticeable but sometimes it may be.

The front matter contains definitions of the word *memoir*, which is typeset using a bold font. The definitions thus commence like

---

<sup>2</sup>Except to some I know.

<sup>3</sup>I hope that this is a phrase.

<sup>4</sup>Is this mark in the correct place?

<sup>5</sup>Marks 3 and 4.

<sup>6</sup>PostScript is a registered trademark of Adobe Systems Incorporated.

No hyphenation

The LaTeX document preparation system is a special version of Donald Knuth's TeX program. TeX is a sophisticated program designed to produce high-quality typesetting, especially for mathematical works. It is extremely flexible albeit somewhat idiosyncratic. One can typeset justified, flushleft-raggedright, centered, or raggedleft-flushright.

Hyphenation (1)

The LaTeX document preparation system is a special version of Donald Knuth's TeX program. TeX is a sophisticated program designed to produce high-quality typesetting, especially for mathematical works. It is extremely flexible albeit somewhat idiosyncratic. One can typeset justified, flushleft-raggedright, centered, or raggedleft-flushright.

Hyphenation (2)

The LaTeX document preparation system is a special version of Donald Knuth's TeX program. TeX is a sophisticated program designed to produce high-quality typesetting, especially for mathematical works. It is extremely flexible albeit somewhat idiosyncratic. One can typeset justified, flushleft-raggedright, centered, or raggedleft-flushright.

Figure 5.6: Raggedright text in narrow columns

**memoir**, *n.* . . .

instead of

**memoir**, *n.* . . .

## 5.6 Narrow measures

Typesetting in a narrow column is difficult, especially if you are trying to make the text flush left and right. As the lines get shorter it becomes more and more difficult to fit the words in without an excessive amount of interword spacing or word breaking at the ends of lines. In the limit, of course, there will not be even enough room to put a syllable on a line.

The best recourse in situations like this is to forget justification and typeset raggedright. Raggedright looks far better than justified text with lots of holes in it. The question then is, to hyphenate or not to hyphenate?

With no hyphenation there is likely to be increased raggedness at the line ends when compared with permitting some hyphenation. Hyphenation can be used to reduce the raggedness but somehow short lines ending with a hyphen may look a bit odd. This is where you have to exercise your judgement and design skills.

Figure 5.6 shows a text set in a column 107.0pt wide with different raggednesses. Preventing hyphenation, as in the left column, resulted in very noticeably ragged text. Hyphenation has been allowed in the other two columns, to differing degrees. I prefer the one on the right but with different text and column widths the results might have been different.

Indexes are often typeset in double, or even triple or quadruple columns, as each entry

is typically short. Also, indexes are typically consulted for a particular entry rather than being read as continuous text. To help the eye, page numbers are normally typeset immediately after the name of the indexed topic, so indexes tend to be naturally raggedright as a matter of reader convenience.

Talking of hyphenation, each language has its own rules for allowable hyphenation points. As you might now have come to suspect, English and American rules are different even though the language is nominally the same. Broadly speaking, American English hyphenation points are typically based on the sound of the word, so the acceptable locations are between syllables. In British English the hyphenation points tend to be related to the etymology of the word, so there may be different locations depending on whether the word came from the Greek or the Latin. If you are not sure how a particular word should be hyphenated, look it up in a dictionary that indicates the potential break points.

### 5.7 Emphasis

Underlining should emphatically not be used to emphasise something in a typeset document. This is a hangover from the days when manuscripts were typewritten and there was little that could be done. The other way of emphasising something was to put extra space between the characters of the word being emphasised, as has been done twice in this sentence (for the words ‘word’ and ‘emphasised’ in case you didn’t spot them). Letterspacing is usually confined to making fine adjustments to the physical spacing between letters in a book title in order to make them appear to be optically uniformly spaced. As an aside, for me at least, that extra spacing just now produces the illusion that the characters are slightly larger than normal, which is not the case.

With the range of fonts and sizes available when typesetting there are other methods for emphasis, although German typographers have used letterspacing for emphasis with the *fraktur* and other similar font types.

There are basically three approaches: change the **size** of the font; change the **weight** of the font; or most usually, change the *shape* of the font. There is a creative tension when trying to emphasise something — there is the need to show the reader the emphasised element, but there is also the desire not to interrupt the general flow of the text. Out of the three basic options, changing the shape seems to be a reasonable compromise between the need and the desire.

### 5.8 Captions and legends

I am not entirely sure what is the difference between a caption and a legend as both terms refer to the title of an illustration or table. However, legend may also be used to refer to some explanatory material within an illustration, such as the explanation of the symbols used on a map.

In any event, captions and legends are usually typeset in a font that is smaller than the main text font, and which may also be different from the main font. For example, if the main font is roman and a sans font is used for chapter titles, then it could be appropriate to use a small size of the sans font for captions as well.

The caption for a table is normally placed above the table while captions for illustrations are placed below.

## 5.9 Tables

A table is text or numbers arranged in columns, and nearly always with a ‘legend’ above each column describing the meaning of the entries in the column. The legends and the column entries are separated from each other, perhaps by some vertical space but more often by a horizontal line.

In general typographers dislike vertical lines in a table, which may be likely to be used to separate the columns. I’m not sure why this is. There is an obvious explanation when hand setting the individual characters as, although it would be easy to set horizontal rules, it would be very difficult to get all the pieces of type with the bits of the vertical rules aligned properly — the eye is very sensitive to jags in what is meant to be a straight line. In the days of digital typography the alignment problem has gone away, so perhaps the antipathy to vertical lines is a tradition from earlier days. On the other hand Edward Tufte [Tuf83, p. 96] exhorts us to ‘Maximize the data-ink ratio’ and to ‘Erase non-data-ink’ and Bringhurst [Bri99, p. 70] says ‘There should be a minimum amount of furniture (rules, boxes, dots and other guiderails for travelling through typographic space) and a maximum amount of information’.

If you want to use vertical lines, just be aware that not everybody may appreciate your effort.

## 5.10 Number formatting

Number formatting is country- and language-dependent. Continental Europe differs from England, and in its turn the United States differs from England.

Ignoring decimal numbers we have *cardinal* and *ordinal* numbers. An ordinal number, like 3rd, indicates a position in a sequence, while a cardinal number, like 3, expresses ‘how many’. LaTeX typesets numbers as cardinals, and these can be displayed as a sequence of arabic digits or as upper- or lower-case Roman numerals.

In general text the tradition seems to be that cardinal numbers between one and ten are spelled out rather than being presented as numerals. In the United States numbers between one and ninety-nine are spelled (with twenty-one, twenty-two, etc., being hyphenated). Similar customs apply to ordinal numbers such as eighth, twenty-first. When not spelled out ordinals should be set like 378th rather than 378<sup>th</sup>.

Regarding cardinal numbers represented as arabic digits, some cultures prefer these to be presented as an unbroken string of digits (e.g 12345). Other societies prefer the digits in longer numbers to be separated, in some cases by commas (e.g., 12,345) or other punctuation marks (e.g., 12.345), and in others by small spaces (e.g., 12 345); the digits are grouped into threes, counting from the right.

When the arabic digits became generally used they, like the letters, were given both uppercase and lowercase forms. The uppercase form, like these 1 2 3 4 5 6 7 8 9 0, which is the one normally supplied as part of a font are called *titling figures*, *ranging figures*, or *lining figures* because they range or align with the uppercase. Digits in this class all have the same width so they are used in tables where numbers are meant to be aligned vertically. They are also used when typesetting mathematics.

The lowercase form, like 1 2 3 4 5 6 7 8 9 0, are called *text figures*, *hanging figures*, *lowercase figures*, or *old-style figures*. These may be used whenever the surrounding text is

set in mixed case, or small caps; I have seen them used typesetting the folios, but I must admit that they look very odd to me in that situation.

If you are typesetting mathematics, where you use lining figures, and are also using old-style figures in the text then be very careful; ‘mathematical numbers’ should always be set with lining figures even if they are in the body of the text. For example:

... from the equation the result is 42 ...

... the men of the 42nd Foot performed magnificently ....

# A

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## Some typefaces

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Most books or articles about typography at least mention some typefaces by name, and may provide examples, and in some cases many examples.

I have the the commercial FontSite fonts licensed from the SoftMaker / ATF library, supported for LaTeX through Christopher League's estimable work [Lea03]. This enables me to show a few of the typefaces displayed in some of the books mentioned in the bibliography, in particular those by Birdsall [Bir04], Bringhurst [Bri99] and and Lawson [Law90]. To make it easier to see and compare them at first there are a few characters displayed at 18pt and then text set at 12pt. I have tried to indicate the typeface category of each face, principally using those from Table 1.1.

### A.1 Baskerville

abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ *abcefg-  
hijopstuvwxyz Q ff fi fl ffi ffl &*

Baskerville, the first of the Transitional (Neoclassical) faces, was designed by John Baskerville in the 1750's and was cut by John Handy. The face was more popular on the Continent than in England where it was made. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.2 Bell

abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ *abcefg-  
hijopstuvwxyz Q ff fi fl ffi ffl &*

The original Bell type was cut in London in 1788 by Richard Austin for a publisher named Bell. It is a (Transitional, Neoclassical) face. The FontSite version shown here is called LanstonBell. (See [Bir04, Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.3 Bembo

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abcefg-  
hijopstuvwyz Q ff fi fl ffi ffl &

Bembo, produced by Monotype in 1929, is based on a roman type cut by Francesco Griffo in Venice in 1495. It is in the (Aldine/French, Renaissance, Garald) style. The FontSite version shown here is called Bergamo. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.4 Bodoni

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abce-  
fg hijopstuvwyz Q ff fi fl ffi ffl &

Giambattista Bodoni lived in Parma and designed hundreds of faces between 1765 and his death in 1813. Types in his style, now categorized as (Modern, Romantic, Didone), were revived in the first part of the twentieth century. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.5 Californian

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abce-



*fghijopstuvwxyz Q ff fi fl ffi ffl &*

Frederic Goudy cut his University of California Old Style in 1938. Since then there have been many faces more or less faithfully based on his design. The general category of these is (Venetian, Humanist, Renaissance). The FontSite version shown here is called University Old Style. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

#### A.6 Caslon

*abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ ab-  
cefg hijopstuvwxyz Q ff fi fl ffi ffl &*

William Caslon cut many faces between 1720 and his death in 1766. The first printing of the American Constitution used one of his types. It falls into the (Dutch/English, Baroque, Garald) category. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

#### A.7 Centaur

*abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ abcefg-  
hijopstuvwxyz Q ff fi fl ffi ffl &*

Centaur was designed by Bruce Rogers in 1912–14 based on Nicolas Jenson’s roman type that he cut in Venice in 1465. It is perhaps the most faithful rendition of Jenson’s typeface, and is thus categorized as (Venetian, Humanist, Renaissance). The FontSite version shown here is called Jenson Recut. (See [Bri99, Law90, Rog49])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus

propitius Huic potatori! ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum  
juventutem, Post molestam senectutem, Nos habebit humus.

### A.8 Century

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ *abcefg hijo-  
pstuvwyz Q ff fi fl ffi ffl &*

Century (Old Style) was created by Theodore De Vinne and Linn Boyd Benton of the ATF as a magazine type, named after De Vinne's *Century* magazine. It is essentially a Transitional face. (See [Biro4, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.9 Clarendon

**abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ  
*abcefg hijopstuvwyz Q ff fi fl ffi ffl &***

Clarendon is a Victorian face, one of many deriving from a font cut by Benjamin Fox for the Fann Street Foundry, London, in 1845. It is categorized as (Square Serif, Realist, Mechanistic). (See [Bir04, Bri99, Law90])

**Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.**

### A.10 Della Robbia

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ *abcefg-  
hijopstuvwyz Q ff fi fl ffi ffl &*

Della Robbia was designed in 1902 by Thomas Maitland Cleland for the New York Type Foundry. It is based on 15th century Florentine inscriptional capitals. It can be classed as a (Venetian, Renaissance, Humanist) face. (See [Con04])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.11 Garamond

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ *abcefg hijopstuvwyz Q ff fi fl ffi ffl &*

Claude Garamond (or Garamont) was one of several great typecutters working Paris in the early sixteenth century. His style was revived in the 1920’s. Modern Garamonds are categorized as (Aldine/French, Renaissance or Baroque, Garald). (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.12 Joanna

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ  
*abcefg hijopstuvwyz Q ff fi fl ffi ffl &*

Joanna was designed by Eric Gill and was first cut in 1930. The FontSite version shown here is called Jessica. (See [Bir04, Bri99])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.13 Sabon

abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ *abcefg hijopstuvwyz Q ff fi fl ffi ffl &*

Sabon was designed by Jan Tschichold and issued in 1964 and can be categorized as (Aldine/French, Renaissance, Garald). The FontSite version shown here is called Savoy. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

#### A.14 Walbaum

**abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abce-  
fg hijopstuvwyz Q ff fi fl ffi ffl &**

Walbaum types were originally cut by Justus Erich Walbaum about 1830. He was, together with Bodoni and Firmin Didot, one of the great type designers of the period. The face is categorized as (Modern, Romantic, Didone). (See [Bir04, Bri99])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

#### A.15 Futura

**abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abcefg hi-  
jopstuvwyz Q ff fi fl ffi ffl &**

Futura was designed by Paul Renner in 1924–26. It has been categorized as (Sans-serif, Geometric Lineal, Geometric Modernist). The FontSite version shown here is called Function. (See [Bir04, Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

#### A.16 Gill Sans

**abcefg hijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ abcefg hi-**

*jopstuvwxyz Q ff fi fl ffi ffl &*

Gill Sans was designed by Eric Gill in 1927. It can be classified as (Sans-serif, Geometric Modernist with Humanist hints, Humanist Lineal). The FontSite version shown here is called Chantilly. (See [Bir04, Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

**A.17 Goudy Sans***abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ abcefg hijopstuvwxyz Q ff fi fl ffi ffl &*

Goudy Sans was designed by Frederic Goudy in 1929–30. It is a Sans-serif. (See [Bri99, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

**A.18 Lydian***abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ abcefg hijopstuvwxyz Q ff fi fl ffi ffl &*

Lydian is a calligraphic Sans-serif face and was designed by Warren Chappell in the 1930s for ATF. (See [Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; ‘Sit Deus propitius Huic potatori!’ ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

**A.19 News Gothic***abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ abcefg hijopstuvwxyz Q ff fi fl ffi ffl &*

News Gothic is a Sans-serif face designed by Morris Benton for ATF. (See [Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.20 Optima

abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ abce-  
fghijopstuvwxyz Q ff fi fl ffi ffl &

Optima is a face designed by Hermann Zapf in 1952–55. It has been classified as (Sans-serif, Renaissance cum Neoclassical, Humanist Lineal). The FontSite version shown here is called Opus. (See [Brigg, Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.21 Syntax

abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ ab-  
cefg hijopstuvwxyz Q ff fi fl ffi ffl &

Syntax, designed by Hans Eduard Meier and issued in 1969 is a Neohumanist Sans-serif. The FontSite version shown here is called Struktur. (See [Bri99])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.22 Legende

abcefg hijopstuvwxyz ff fi fl ffi ffl & 1236 AVOQ ABCDEFG-  
HIJKLMNOPSTUVWXYZ

*Legende is a Script face designed by Ernst Schneider in 1937. It could be categorised as having a Baroque feel to it. (See [Bri99, Law90])*

*Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Risusque cum tigre manebat. Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.*

### A.23 Goudy Handtooled

abce fghijopstuvwyz ff fi fl ffi ffl & 1236 AVOQ ABCEFGHIJOPSTUVWYZ

Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ Ⓗ Ⓘ Ⓚ Ⓛ Ⓜ Ⓝ Ⓟ Ⓠ Ⓡ Ⓢ Ⓣ Ⓤ Ⓥ Ⓦ Ⓧ Ⓨ Ⓩ 1236 Ⓐ Ⓡ Ⓢ Ⓣ

Goudy Handtooled was designed by Frederic Goudy in 1922 as a Decorative type. (See [Law90])

Puella Rigensis ridebat Quam tigris in tergo vehebat; Externa profecta, Interna revecta, Riusque cum tigre manebat. ¶ Meum est propositum, In taberna mori, Ut sint vina proxima, Morientis ori. Tunc cantabunt laetius Angelorum chori; 'Sit Deus propitius Huic potatori!' ¶ Gaudeamus igitur, Juvenes dum sumus Post jucundum juventutem, Post molestam senectutem, Nos habebit humus.

### A.24 Decorative

Just for fun, here is a selection of some Decorative faces. Unlike Goudy Handtooled the ones shown only come in uppercase. Also, Table A.1 shows the glyphs available in the Web-O-Mints font which may be used to create borders and other decorative elements. Web-O-Mints is one of two free decorative fonts made available by the Galapagos Design Group.<sup>1</sup>
































































ALGERIAN: ABCEFGHIJOPSTUVWYZ 1236 AVOQ &

DRESDEN: ABCEFGHIJOPSTUVWYZ 1236 AVOQ &

ERBAR DECO: ABCEFGHIJOPSTUVWYZ 1236 AVOQ &

<sup>1</sup><http://www.galapagosdesign.com>

Table A.1: Glyphs in the Web-O-Mints font

32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	 47
 48	 49	 50	 51	 52	 53	 54	 55
 56	 57	58	59	60	61	62	63
64	 65	 66	 67	 68	 69	 70	 71
 72	 73	 74	 75	 76	 77	 78	 79
 80	 81	 82	 83	 84	 85	 86	 87
 88	 89	 90	 91	92	 93	94	95
96	 97	 98	 99	 100	 101	 102	 103
 104	 105	 106	 107	 108	 109	110	111
 112	 113	 114	 115	 116	 117	 118	 119
 120	 121	 122	123	124	125	126	127

GALLIA: ABCDEFGHIJOPSTU~  
 VWYZ 1236 AVOQ &



## Chapter 1 Historical background

[modern LaTeX distribution] (page 4) An example of a modern distribution is TeXlive 2008. There are many more fonts that could be used but I wanted LaTeXers to be able to run the manual's source through LaTeX themselves without having to install any extra fonts. *The LaTeX Font Catalogue* (<http://www.tug.dk/FontCatalogue>) has examples of 181 different fonts and these do not include many of the more specialized ones, such as for setting chess or for archaic languages (e.g., cuneiform, egyptian hieroglyphs, etc.), or scripts for Asian languages.

[illustrated in Figure 1.1] (page 4) The LaTeX fontfamily names for the typefaces used in the illustration are:

Antiqua Turin	<code>antt</code>	Avant Garde	<code>pag</code>
Bera Serif	<code>fve</code>	Bookman	<code>pbk</code>
GFS Bodoni	<code>bodoni</code>	GFS Didot	<code>udidot</code>
Times Roman	<code>ptm</code>	Utopia	<code>put</code>

[more or less adhering to the original design] (page 5) The final printed character depends not only on the geometric shape but also on the printing technology used, the ink, and the paper. With letterpress printing where the inked metal type is impressed into the paper, the ink tends to spread just a little bit; all other things being equal the spread depends on the type and amount of ink, the hardness of the paper, the surface finish of the paper, the amount of pressure applied, in some cases the dampness of the paper, and so on. To get a similar looking result using offset lithography where the ink stays where it is put, the geometric shape must be changed to simulate the ink spread of the letterpress process, but then the question arises as to which of the many letterpress impressions is the one to be simulated? Different designers and different manufacturers have different ideas about this.

[An example of a *Fraktur*] (page 5) The typeface was originally created by Yannis Haralambous and is accessed in LaTeX as the `yfrak` fontfamily.

[An example of Palatino] (page 6) In LaTeX the Palatino font is accessed as the `pp1` fontfamily.

[and URW Antiqua] (page 7) The URW Antiqua font in LaTeX is known as the `uaq` fontfamily.

[version of one of the Century series] (page 8) In LaTeX the New Century Schoolbook font is known as the `pnc` fontfamily.

[GFS Didot] (page 8) The LaTeX fontfamily for GFS Didot is `udidot`.

[An example of Square Serif] (page 8) The Bera Serif's fontfamily name in LaTeX is `fve`.

[Yet another sans] (page 9) `fvs` is the LaTeX fontfamily name name for the Bera Sans font.

[unimaginatively] (page 9) The Brush Script font is accessible as the `pbsi` fontfamily.

[a calligraphic script] (page 9) Zapf Chancery is called the `pzc` fontfamily in LaTeX.

[shown in Figure 1.11] (page 10) The Cyklop typeface has been given the `cyklop` fontfamily name for access with LaTeX.

## Chapter 4 Styling the elements

[First off] (page 74) Practically, though, the very first thing is to select a typeface that you already have or that you can *legally* obtain.

## Appendix A Some typefaces

[commercial FontSite fonts] (page 89) In 2002 I purchased a CD containing 512 fonts from <http://www.fontsite.com> but it appears that it is not in production any more. I understand that as of 2009/08/12 there were only 39 copies still available.

If you wish to LaTeX the source of this document yourself and do not have these fonts then you will get many error reports about missing fonts. To avoid this use the `draft` class option. The document should then process (without too many missing font errors), using the regular body typeface instead of any FontSite font.

If you do have the fonts you may find that some glyphs are replaced by others, in particular the ‘¶’.

[text set at 12pt] (page 89) The Latin texts, when suitably laid out, and their translations are as follows.

Puella Rigensis ridebat  
 Quam tigris in tergo vehebat;  
     Externa profecta,  
     Interna revecta,  
 Risusque cum tigre manebat.

There was a young lady of Riga  
 Who went for a ride on a tiger;  
     They returned from the ride  
     With the lady inside,  
 And a smile on the face of the tiger.

Meum est propositum,  
 In taberna mori,  
 Ut sint vina proxima,  
 Morientis ori.  
 Tunc cantabunt laetius  
 Angelorum chori;  
 'Sit Deus propitius  
 Huic potatori!'

The Arch Poet (fl. 1159–67)

Gaudeamus igitur,  
 Juvenes dum sumus  
 Post jucundum juventutem,  
 Post molestam senectutem,  
 Nos habebit humus.

Students' song, 1267

I desire to end my days in a tavern drink-  
 ing,  
 May some Christain hold the glass for  
 me when I am shrinking;  
 That the Cheubim may cry, when they  
 see me sinking,  
 'God be merciful to a soul of this gentle-  
 man's way of thinking.'

Translation by Leight Hunt

Let us then rejoice,  
 While we are young.  
 After the pleasures of youth  
 And the burdens of old age  
 Earth will hold us.



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CTAN is the Comprehensive TeX Archive Network. Information on how to access CTAN is available at <http://www.tug.org>.

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## Colophon

This manual was typeset using the LaTeX typesetting system created by Leslie Lamport and the memoir class.

The body text is set 10/12pt on a 33pc measure with Palatino designed by Hermann Zapf, which includes italics and small caps. Other fonts include Sans, Slanted and Typewriter from Donald Knuth's Computer Modern family.