Typographic design is a complex area of human activity, requiring a broad background for informed practice. This chapter explores the basic language of typography. Letterforms, the fundamental components of all typographic communications, are carefully examined. Nomenclature, measurement, and the nature of typographic font and family are presented.

The alphabet is a series of elemental visual signs in a fixed sequence, representing spoken sounds. Each letter signifies only one thing: its elementary sound or name. The twenty-six characters of our alphabet can be combined into thousands of words, creating a visual record of the spoken language. This is the magic of writing and typography, which have been called “thoughts-made-visible” and “frozen sounds.”
Proportions of the letterform
The proportions of the individual letterform are an important consideration in typography. Four major variables control letterform proportion and have considerable impact upon the visual appearance of a typeface: the ratio of letterform height to stroke width; the variation between the thickest and thinnest strokes of the letterform; the width of the letters; and the relationship of the x-height to the height of capitals, ascenders, and descenders.

The stroke-to-height ratio. The roman letterform, left, has the stroke-width-to-capital-height proportion found on Roman inscriptions (Fig. 5). Superimposition on a grid demonstrates that the height of the letter is ten times the stroke width. In the adjacent rectangles, the center letter is reduced to one-half the normal stroke width, and the letter on the right has its stroke width expanded to twice the normal width. In both cases, pronounced change in the weight and appearance of the letterform occurs.

Contrast in stroke weight. A change in the contrast between thick and thin strokes can alter the optical qualities of letterforms. The series of Os in Figure 6, shown with the date of each specimen, demonstrates how the development of technology and printing has enabled typeface designers to make thinner strokes.

In the Old Style typography of the Renaissance, designers attempted to capture some of the visual properties of pen writing. Since the writing pens of the period had a flat edge, they created thick and thin strokes. Stress is the term to define this thickening of the strokes, which is particularly pronounced on curves. Note how the placement of weight within the Old Style O creates a diagonal axis. As time has passed, type designers have been less influenced by writing.

By the late 1700s, the impact of writing declined, and this axis became completely vertical in many typefaces of that period. In many of the earliest sans-serif typefaces, stress disappeared completely. Some of these typefaces have a monoline stroke that is completely even in weight.

Expanded and condensed styles. The design qualities of the typographic font change dramatically when the widths of the letterforms are expanded or condensed. The word proportion, set in two sans-serif typefaces, demonstrates extreme expansion and condensation (Fig. 7). In the top example, set in Aurora Condensed, the stroke-to-height ratio is one to nine. In the bottom example, set in Information, the stroke-to-height ratio is one to two. Although both words are exactly the same height, the condensed typeface takes up far less area on the page.

X-height and proportion. The proportional relationship between the x-height and capital, ascender, and descender heights influences the optical qualities of typography in a significant way. The same characters are set in seventy-two-point type using three typefaces with widely varying x-heights (Fig. 8). This example demonstrates how these proportional relationships change the appearance of type. The impact of x-height upon legibility will be discussed in chapter four.

On the same-size body (72 point), the x-height variation between three typefaces — Garamond 3, Bodoni, and Univers — is shown. The proportion of the x-height to the point size significantly affects the appearance of type.
Optical relationships within a font
Mechanical and mathematical letterform construction can result in serious spatial problems, because diverse forms within an alphabet appear optically incorrect. These letterform combinations show the optical adjustment necessary to achieve visual harmony within a font.

Pointed and curved letters (Fig. 10) have little weight at the top and/or bottom guidelines; this can make them appear too short. To make them appear the same height as letters that terminate squarely with the guidelines, the apexes of pointed letters extend beyond the baseline and capital. Curved letterforms are drawn slightly above and below these lines to prevent them from appearing too small.

In two-storied capitals and figures (Fig. 11), the top half appears too large if the form is divided in the mathematical center. To balance these letters optically, the center is slightly above the mathematical center, and the top halves are drawn slightly narrower than the bottom half.

Horizontal strokes (Fig. 12) are drawn slightly thinner than vertical strokes in both curved and straight letterforms. Otherwise, the horizontal would appear too thick.

Tight junctions where strokes meet (Fig. 13) are often opened slightly to prevent the appearance of thickening at the joint.

Letters combining diagonal and vertical strokes (Fig. 14) must be designed to achieve a balance between the top and bottom counterforms. Strokes can be tapered slightly to open up the spaces, and adjustments in the amount of stroke overlap can achieve a harmony of parts. Letters whose vertical strokes determine their height (Fig. 15) are drawn slightly taller than letters whose height is determined by a horizontal stroke. Optically, they will appear to be the same height.

The stroke weight of compact letterforms (Fig. 16), such as those with closed counterforms, are drawn slightly smaller than the stroke weight of letterforms having open counterforms. This optically balances the weight.

Curved strokes are usually thicker at their midsection than the vertical strokes, to achieve an even appearance (Fig. 17).

These adjustments are very subtle and are often imperceptible to the reader. However, their overall effect is a more ordered and harmonious visual appearance.

Unity of design in the type font
Tremendous diversity of form exists in the typographic font. Twenty-six capitals, twenty-six lowercase letters, ten numerals, punctuation, and other graphic elements must be integrated into a system that can be successfully combined into innumerable words.

Letterform combinations from the Times Roman Bold font (Fig. 18) demonstrate visual similarities that bring wholeness to typography. Letterforms share similar parts. A repetition of curves, verticals, horizontals, and serifs are combined to bring variety and unity to typographic designs using this typeface. All well-designed fonts of type display this principle of repetition with the variety that is found in Times Roman Bold.
Curved capitals share a common round stroke.

The diagonal strokes of the A are repeated in V W M.

Lowercase letters have common serifs.

FEB demonstrates that the more similar letters are, the more common parts they share.

Repetition of the same stroke in m n h u creates unity.

Likewise, the letters b d p q share parts.

Capital serifs recur in similar characters.

Subtle optical adjustments can be seen. For example, the bottom strokes of the capital Z and L have longer serifs than the bottom stroke of the E. This change in detail compensates for the larger counterform on the right side of the first two letters.
An infinite variety of type styles is available today. Digital typography, with its simple and economical introduction of new typefaces, has made the entire array of typefaces developed over the centuries available for contemporary use. Numerous efforts have been made to classify typefaces, with most falling into the following major categories. Some classification systems add a decorative, stylized, or novelty category for the wide range of fanciful type styles that defy categorization.

Old Style type began with designs of the punchcutter Francesco Griffo, who worked for the famous Venetian scholar-printer Aldus Manutius during the 1490s. Griffo's designs evolved from earlier Italian type designs. His Old Style capitals were influenced by carved Roman capitals; lowercase letters were inspired by fifteenth-century humanistic writing styles, based on earlier Carolingian minuscules. Old Style letterforms have the weight stress of rounded forms at an angle, as in handwriting. The serifs are bracketed (that is, unified with the stroke by a tapered, curved line). Also, the top serifs on the lowercase letters are at an angle.

Italic letterforms slant to the right. Today, we use them primarily for emphasis and differentiation. When the first italic appeared in the earliest "pocket book," printed by Aldus Manutius in 1501, it was used as an independent typestyle. The first italic characters were close-set and condensed; therefore, Manutius was able to get more words on each line. Some italic styles are based on handwriting with connected strokes and are called scripts.

During the 1700s, typestyles gradually evolved from Old Style to Modern. Typefaces from the middle of the eighteenth century, including those by John Baskerville, are called Transitional. The contrast between thick and thin strokes is greater than in Old Style faces. Lowercase serifs are more horizontal, and the stress within the rounded forms shifts to a less diagonal axis. Transitional characters are usually wider than Old Style characters.
Late in the 1700s, typefaces termed Modern evolved from Transitional styles. These typefaces have extreme contrasts between thick and thin strokes. Thin strokes are reduced to hairlines. The weight stress of rounded characters is vertical. Serifs are horizontal hairlines that join the stems at a right angle without bracketing. The uppercase width is regularized; wide letters such as M and N are condensed and other letters, including P and T, are expanded. Modern-style typefaces have a strong geometric quality projected by rigorous horizontal, vertical, and circular forms.

In 1815, the English typefounder Vincent Figgins introduced slab-serif typestyles under the name Antique. At the time, there was a mania for ancient Egyptian artifacts, and other typefounders adopted the name Egyptian for their slab-serif designs. These typestyles have heavy square or rectangular serifs that are usually unbracketed. The stress of curved strokes is often minimal. In some slab-serif typefaces, all strokes are the same weight.

The first sans serif typestyle appeared in an 1816 specimen book of the English typefounder William Caslon IV. The most obvious characteristic of these styles is, as the name implies, the absence of serifs. In many sans serif typefaces, strokes are uniform, with little or no contrast between thick and thin strokes. Stress is almost always vertical. Many sans serif typefaces are geometric in their construction; others combine both organic and geometric qualities.
The development of photo and digital technology has stimulated the design and production of countless new typefaces whose visual characteristics defy standard classification. The visual traits of these “hybrid” forms may fall into more than one of the historical classifications presented on the preceding two pages. The following is a classification system derived from the visual features common to letters throughout the typeface kingdom. It may be used for comparative purposes to pinpoint the most dominant traits of specific typefaces. Type designers use these variations to create a family of typefaces. The type family is discussed on pages 41–44.

**Serifs:**
Serifs provide some of the most identifiable features of typefaces, and in some cases they reveal clues about their historical evolution. The serifs shown are those that appear most frequently in typefaces.

- **b** straight
- **b** oblique
- **b** bracketed
- **b** unbracketed
- **b** squared
- **b** rounded
- **b** wedged
- **b** concave
- **b** pointed
- **b** hairline
- **b** sans serif
- **b** hybrid stroke terminals

**Weight:**
This is a feature defined by the ratio between the relative width of the strokes of letterforms and their height. On the average, a letter of normal weight possesses a stroke width of approximately 15% of its height, whereas bold is 20% and light is 10%.

- **A** ultra bold
- **A** extra bold
- **A** bold
- **A** normal
- **A** light
- **A** extra light
- **A** ultra light

**Width:**
Width is an expression of the ratio between the black vertical strokes of the letterforms and the intervals of white between them. When white intervals appear larger, letters appear wider. A letter whose width is approximately 80% of its height is considered normal. A condensed letter is 60%, and an expanded letter is 100% of its height.

- **A** ultra expanded
- **A** extra expanded
- **A** expanded
- **A** normal
- **A** condensed
- **A** extra condensed
- **A** ultra condensed

**Posture:**
Roman letters that slant to the right but are structurally the same as upright roman letters are referred to as oblique. Italic letters, which are based on handwriting, are structurally different from roman letters of the same type family. Italic letters with connecting strokes are called scripts. The angle of posture varies from typeface to typeface; however, a slant of approximately 12% is considered to be normal.

- **h** italic
- **h** oblique
- **h** script
Thick/thin contrast:
This visual feature refers to the relationship between the thinnest parts of the strokes in letters and the thickest parts. The varying ratios between these parts produce a wide range of visual textures in text type.

x-height:
This proportional characteristic can vary immensely in different typefaces of the same size. Typically, x-heights are considered to be “tall” when they are at least two-thirds the height of capital letters. They are “short” when they measure one-half the height of capital letters.

Ascenders/descenders:
Ascenders and descenders may appear longer in some typefaces and shorter in others, depending on the relative size of the x-height. Descenders are generally slightly longer than ascenders among letters of the same typeface.

Stress:
The stress of letters, which is a prominent visual axis resulting from the relationships between thick and thin strokes, may be left-angled, vertical, or right-angled in appearance.
Thick/thin contrast:
This visual feature refers to the relationship between the thinnest parts of the strokes in letters and the thickest parts. The varying ratios between these parts produce a wide range of visual textures in text type.

\[
\begin{array}{cccc}
\text{A} & \text{A} & \text{A} & \text{A} \\
\text{high contrast} & \text{medium contrast} & \text{low contrast} & \text{no contrast}
\end{array}
\]

x-height:
This proportional characteristic can vary immensely in different typefaces of the same size. Typically, x-heights are considered to be “tall” when they are at least two-thirds the height of capital letters. They are “short” when they measure one-half the height of capital letters.

\[
\begin{array}{cccccc}
d & d & d & d & d & d \\
\text{extra tall} & \text{tall} & \text{medium} & \text{short} & \text{extra short}
\end{array}
\]

Ascenders/descenders:
Ascenders and descenders may appear longer in some typefaces and shorter in others, depending on the relative size of the x-height. Descenders are generally slightly longer than ascenders among letters of the same typeface.

\[
\begin{array}{cccccc}
\text{dp} & \text{dp} & \text{dp} & \text{dp} & \text{dp} & \text{dp} \\
\text{extra long} & \text{long} & \text{medium} & \text{short} & \text{extra short}
\end{array}
\]

Stress:
The stress of letters, which is a prominent visual axis resulting from the relationships between thick and thin strokes, may be left-angled, vertical, or right-angled in appearance.

\[
\begin{array}{cccc}
\text{O} & \text{O} & \text{O} \\
\text{left-angled} & \text{vertical} & \text{right-angled}
\end{array}
\]
Our measurement system for typography was originally developed for the handset metal type invented by Johann Gutenberg around A.D. 1450. The rectangular metal block of type (Fig. 19) has a raised letterform on top, which was inked to print the image.

**Metal type measurement**

The small sizes of text type necessitated the development of a measuring system with extremely fine increments. There were no standards for typographic measurements until the French type designer and founder Pierre Simon Fournier le Jeune introduced his point system of measurement in 1737. The contemporary American measurement system, which was adopted during the 1870s, has two basic units: the point and the pica (Fig. 20). There are approximately 72 points in an inch (each point is 0.138 inches) and 12 points in a pica. There are about six picas in an inch.

Metal type exists in three dimensions, and an understanding of typographic measurement begins with this early technology. The depth of the type (Fig. 19, caption 9) is measured in points and is called the point size or body size. All metal type must be the exact same height (Fig. 19, caption 9), which is called type-high (.918 inch). This uniform height enabled all types to print a uniform impression upon the paper. The width of a piece of type is called the set width (Fig. 19, caption 10) and varies with the design of each individual letter. The letters M and W have the widest set width; i and I have the narrowest. The length of a line of type is the sum of the set width of all the characters and spaces in the line. It is measured in picas.

Before the development of the point and pica system, various sizes of type were identified by names, such as brevier, long primer, and pica; these became 8-point, 10-point, and 12-point type. The chart in Figure 21, reproduced from a nineteenth-century printers’ magazine, shows the major point sizes of type with their old names.

Type that is 12 point and under is called text type and is primarily used for body copy. Sizes above 12 point are called display type, and they are used for titles, headlines, signage, and the like.

Traditional metal type had a range of text and display sizes in increments from 5 point to 72 point (Fig. 22). The measurement of point size is a measurement of the metal block of type including space above and below the letters; therefore, one cannot measure the point size from printed letters themselves. This is sometimes confusing. Refer to the labels for x-height, cap height, and point size on Figure 22 and observe that the point size includes the cap height plus a spatial interval above and below the letters.

Spatial measurement
In addition to measuring type, the designer also measures and specifies the spatial intervals between typographic elements. These intervals are: interletter spacing (traditionally called letterspacing), which is the interval between letters; interword spacing, also called wordspacing, which is the interval between words; and interline spacing, which is the interval between two lines of type. Traditionally, interline space is called leading, because thin strips of lead are placed between lines of metal type to increase the spatial interval between them.

In traditional metal typography, interletter and interword spacing are achieved by inserting metal blocks called quads between the pieces of type. Because these are not as high as the type itself, they do not print. A quad that is a square of the point size is called an em. One that is one-half an em quad is called an en. In metal type, other smaller divisions of space are fractions of the em (Fig. 23). These metal spacers are used for letter- and wordspacing, paragraph indentations, and centering or justifying lines of type.
For design considerations, the em of a condensed type style can be narrower than a square, and the em of an expanded type size can be wider than a square. This is demonstrated by the em quads from four styles in the Univers family of typefaces (Fig. 24).

While em and en are still used as typographic terms, spacing in digital typesetting and desktop publishing is controlled by a computer, using a unit system. The unit is a relative measurement determined by dividing the em (that is, the square of the type size) into equal vertical divisions. Different typesetting systems use different numbers of units; sixteen, thirty-two, and sixty-four are common. Some desktop publishing software even permits adjustments as small as twenty-thousandths of an em. The width of each character (Fig. 25) is measured by its unit value. During typesetting, the character is generated, then the typesetting machine advances the number of units assigned to that character before generating the next character. The unit value includes space on each side of the letter for normal interletter spacing. Adding or subtracting units to expand or contract the space between letters is called tracking. Changing the tracking changes the tone of the typography (Fig. 26). As will be discussed later, tracking influences the aesthetics and legibility of typesetting.

Some letter combinations, such as TA, have awkward spatial relationships. An adjustment in the interletter space to make the interval more consistent with other letter combinations is called kerning. In metal type, kerning was achieved by sawing notches in the types. Contemporary typesetting software can contain automatic kerning pairs, and the designer can manually change the kerning between characters when these awkward combinations appear.

This line is set with plus ten units of interletter spacing. This line is set with normal, unaltered interletter spacing. This line is set with minus five units of interletter spacing. This line is set with minus ten units of interletter spacing. This line is set with minus twenty units of interletter spacing.
A type family consists of a group of related typefaces, unified by a set of similar design characteristics. Each face in the family is an individual one that has been created by changing visual aspects of the parent font. Early type families consisted of three fonts: the regular roman face, a bolder version, and an italic. The roman, bold, and italic fonts of the Baskerville family (Fig. 27) demonstrate that a change in stroke weight produces the bold version, and a change in stroke angle creates the italic. The bold font expands typographic possibilities by bringing impact to titles, headings, and display settings. Today, italics are primarily used for emphasis as a variation of roman. In addition to weight and angle changes, additional members of a type family are created by changing proportions or by design elaboration.

**Weight changes.** By simply changing the stroke width relative to the height of the letters, a whole series of alphabets, ranging from extremely light to very bold, can be produced. In England, a classification standard has been developed that contains eight weights: extralight, light, semilight, medium, semibold, bold, extrabold, and ultrabold. Most type families do not, however, consist of eight weights. Four weights – light, regular or book, medium, and bold – are often sufficient for most purposes. In the Avant Garde family (Fig. 28), stroke weight is the only aspect that changes in these five fonts.

**Proportion.** Changing the proportions of a type style by making letterforms wider (expanded) or narrower (condensed), as discussed earlier, is another method for adding typefaces to a type family. Terms used to express changes in proportion include: ultraexpanded, extraexpanded, expanded, regular, condensed, extracondensed, and ultracondensed.

Sometimes confusion results because there is no standardized terminology for discussing the variations in type families. For example, the regular face is sometimes called normal, roman, or book. Light weights are named lightline, slim, and hairline. Black, elephant, massive, heavy, and thick have been used to designate bold weights. Names given to condensed variations include narrow, contracted, elongated, and compressed. Expanded faces have been called extended, wide, and stretched.
Angle. In our discussion about the basic classification of typefaces, italics were presented as a major independent category. They were first introduced four hundred years ago as a new style. Now italics serve as a member of type families, and they are used for contrast or emphasis. Italic fonts that retain curvilinear strokes inspired by handwriting are called cursive or scripts. In geometric typefaces constructed with drafting instruments, the italic fonts created by slanting the stroke angle are called obliques. Baskerville Italic (Fig. 29) is a cursive, demonstrating a handwriting influence; Futura Italic is an oblique face; and Bodoni Italic has both cursive and oblique qualities. Although the Bodoni family was constructed with the aid of drafting instruments, details in the italic font (for example, some of the lower serifs) evidence a definite cursive quality.

Elaboration. In design an elaboration is an added complexity, fullness of detail, or ornamentation. Design elaboration can be used to add new typefaces to a type family. These might include outline fonts, three-dimensional effects, and the application of ornaments to letterforms. Some of the variations of Helvetica (Fig. 30) that are available from the German firm of Dr. Boger Photosatz GmbH include outlines, inlines, perspectives, rounded terminals, and even a chipped antique effect.

While many elaborations are gaudy and interfere with the integrity and legibility of the letterforms, others can be used successfully. Goudy Handtooled (Fig. 31) is based on Goudy Bold. A white linear element is placed on each major stroke. Dimensionality is suggested, and the face alludes to incised inscriptions for lettering.

Decorative and novelty type styles should be used with great care by the graphic designer. At best, these can express a feeling appropriate to the content and can allow for unique design solutions. Unfortunately, the use of design elaboration is often a mere straining for effect.

The Cheltenham family
One of the most extensive type families is the Cheltenham series of typefaces (Fig. 32). The first version, Cheltenham Old Style, was initially designed around the turn of the century by architect Bertram G. Goodhue in collaboration with Ingalls Kimball of the Cheltenham Press in New York City. When this typeface went into commercial production at the American Type Founders Company, designer Morris F. Benton supervised its development. Benton designed about eighteen additional typefaces for the Cheltenham family. Variations developed by other typefounders and manufacturers of typesetting equipment expanded this family to more than thirty styles. The design properties linking the Cheltenham family are short, stubby slab serifs with rounded brackets, tall ascenders and long descenders, and a moderate weight differential between thick and thin strokes.
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---

**Goudy Handtooled**

---
Of all the achievements of the human mind, the birth of the alphabet is the most momentous.

**The line**

Words are joined to form verbal sentences and typographic lines. The configuration and placement of lines of type are significant structural concerns. In its most basic form, a line of type consists of a single point size and a single weight extended horizontally over a specific line width.

Lines of type can be arranged symmetrically (Fig. 10), or asymmetrically (Fig. 11). The viewer/reader must sense a clearly established relationship between individual lines of type and the surrounding space (Fig. 12).

The smallest change in point size, weight, or line length controls the overall emphasis given to a line of type. The designer or typographer must determine when the overall effect is balanced and fully integrated. All design considerations – typeface selection, alignments, and spacing – should display connections that are apparent and distinct (Fig. 13). Jan Tschichold states, “The relationship of the sizes must in any case be clearly visible, its effect must be lively, and it must always follow the sense of the text exactly.”

The length of a group of lines of type can be equal justified (flush left/ragged right, ragged left/flush right, or centered). The examples in this section illustrate various typographic alignments. Typographic form becomes lively and harmonious through these alignments, which enhance individual lines of type and activate the surrounding space (Figs. 14 and 15).

**The placement of punctuation marks is of special significance to these alignments. In Figure 16 punctuation marks extend into the margin. Slight adjustments and subtle refinements heighten the degree of unity.**

**Typographic rules are used in conjunction with type and separate one line of type from another or one group of typographic lines from another as in Figure 12, or in footnotes. Rules are found in a variety of forms (Fig. 17) and numerous sizes and weights. (The use of visual punctuation, including typographic rules, is detailed in Visual Hierarchy.)**

Earlier, we discussed kerning and the optical spacing of letterforms. Control of these factors makes possible a judicious use of letterspacing in a line of type. The orientation of lines raises a multiplicity of other spacing concerns; for example, interword spacing, interline spacing, and line-to-page relationships, as well as the establishment of columns and margins.
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The length of a group of lines of type can be equal (justified) or unequal (flush left/ragged right, ragged left/flush right, or centered). The examples in this section illustrate various typographic alignments. Typographic form becomes lively and harmonious through these alignments, which enhance individual lines of type and activate the surrounding space (Figs. 14 and 15).

Type and rules combine to bring a sense of unity to the page. Note the recurrence of similar space intervals and the attention given to individual line breaks (the rhythmic pattern of line endings). (Designer: Cheryl Van Arnim)

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"Bauhaus Masters"
Marcel Breuer
Paul Klee
Herbert Bayer

"Bauhaus Masters"
Marcel Breuer
Paul Klee
Herbert Bayer
16.

Elements are organized within the aural field according to the principles of rhythm, melody, and harmony which determine spatial orientation in the visual field.

14.
Complex and subtle relationships in interline spacing are achieved here by varying type size, weight, and spatial interval, which separate the statements for the reader. The overall effect is rhythmic and expressive. (Designer: Frank Armstrong)

15.
In this conversation, the placement of lines and intervals reflects the dialogue. (Designer: Warren Lehrer)

16.
In the top setting the lines are flush left, but the edge appears uneven because of the punctuation. In the bottom version, "hanging" the punctuation into the margin is an adjustment resulting in an optically aligned edge.
Six columns of type are arranged horizontally, allowing ample breathing space for the photographic image. Varying column depths make possible a clear integration of typographic and pictorial form. (Art Director: Bart Crosby; Designer: Carl Wohl)
### Lines of Business

The following information summarizes the company's lines of business, products, markets, and locations of principal domestic and international operations.

<table>
<thead>
<tr>
<th>Engineering Fasteners and Components</th>
<th>Packaging Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive and truck, appliance, business machine, construction, electrical equipment, electronics, furnaces, health care equipment, plant maintenance, telecommunication, transportation, and some Allied industries</td>
<td>Brickyards, with bricks, carpet yarn, paperboard, food, and transportation and vending machine industries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electronic Products and Components</th>
<th>Precision Tools and Gearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiovisual, avionics, broadcast, construction equipment, farm equipment, industrial equipment, military equipment, mining and coal mining equipment, and some Allied industries</td>
<td>Aircraft building, roll, cradle, mill, press, press tooling, and some Allied industries</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instruments and Systems</th>
<th>Column and margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive and industrial manufacturing, hospital, educational centers, medical supply, brewery, soft drink, sour cream and dairy foods, and some Allied industries</td>
<td>As an extension of the spatial qualities inherent in single letters, pages also possess form and counterform relationships due to the interaction of columns and their surrounding spaces. Functional clarity and visual beauty are established in the harmonious relationships of these spaces. Three specific variables related to columns govern these relationships: the proportion of column height to width, texture (the tactile appearance of the type), and tone (the lightness and darkness of type). It is through the manipulation of these contrasting variables that pages are spatially activated, optically balanced, and hierarchically ordered. Additionally, the height and width of columns (and their adjoining space intervals) should be carefully examined to ensure adequate legibility (for further discussion, see Chapter 4).</td>
</tr>
</tbody>
</table>

When organizing text columns, either horizontal or vertical movements may be emphasized. One will often dominate, as shown in Figures 18 and 19. Eye movement across the page (side to side and top to bottom) is controlled by column rhythms, typographic weights, and rules functioning as visual punctuation. By the manipulation of these elements, the designer groups information according to its role in a given layout and guides the eye methodically through the space of the page. Each of the vertical columns in Figure 20, for example, separates specific categories of information to make them easier to find. The first column, with bold-weight type, contains general information and is dominant; the two right-hand columns, with lightweight type, contain secondary information and are subordinate.

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20. Columns and margins are carefully balanced through the use of contrasting type sizes and weights and of two rule weights. (Art Director: Bart Crosby; Designer: Carl Wohlt)
The one- and two-column arrangements shown in Figures 21 and 22 illustrate some of the possibilities for text-column placement. In the twocolumn arrangement, the column depths are equal. Vitality and contrast are achieved by the placement of the adjacent photograph, its caption, and the bar rule containing the title. In both examples, the caption-column width and the text column width are of different lengths, providing sufficient contrast to indicate to the reader that the caption is not part of the text. Such contrasts in column size, shape, texture, and tone are used to distinguish between different kinds of information and to provide visually luminous pages.

Figure 23 is another example of how columns contrast with one another. Differences in the columns are produced by changing the interline spacing and the size and weight of the text type. Relative to one another, the columns can be seen as open or closed, light or dark.

The difference in tonality, which is an important design consideration, hierarchically leads the eye from one element to the next, and finally into the white of the page (for further discussion, see Visual Hierarchy). The critically determined spatial intervals create an engaging visual rhythm.

The size of type may vary from column to column (Fig. 24) or within a column (Fig. 25). As indicated in the latter diagram, type that is larger or heavier in weight appears more dense and is therefore emphasized on the page. Changes in density provide a kind of contrast that makes it possible to balance various typographic elements and add rhythmic qualities to the page.

The scale and proportion of columns, intervals between columns, and margins and their relationships to one another must be carefully adjusted as determined by the kinds of information they support. In Figure 21, generous, unequal margins frame a single column of quiet text type for a hospital’s annual report, while in Figure 19, narrow margins surround quickly read narrow columns for an efficient-looking publication about computers. Margins not only

21. In this annual report there are subtle spatial relationships. These include the form’s counterform of the column to the margin; the placement of the heading and subheading, which extend into the margin for emphasis; and the column mass to rules, photograph, and caption. (Designer: Frank Armstrong)

22. This magazine page exhibits the needed contrast between text and caption elements. The column width of the text is double the column width of the caption. (Art Director: Ben Day; Designer: Anne Stewart)
The experimental text composition reveals various combinations of typographic texture and tone. Variation in size, column to column. Variation in size within a column.

frame parts within pages, they also contain supportive elements (marginalia) such as running heads, folios, and captions.

The elegant margins shown in Figure 26 have proportions identical to the page. The margin ratio is two margin units to three to four to six, as indicated. In other words, the bottom margin is twice as high as the top margin. Jan Tschichold has pointed out that this complex series of column-to-margin ratios, based on the golden section, is found in numerous medieval manuscripts. (For further discussion about margins, see The Typographic grid, page 70.)

Paragraph breaks within a column greatly influence the relationship between a column of text and its surrounding margins. A break may be introduced as an indentation, as a space interval, or as a combination of both. Designers have also developed their own ways to indicate paragraphs (Fig. 27). The overall page organization will determine the most suitable method.

When columns, margins, and their interrelationships are clear and appropriate to content, the result is a printed page of distinction. Every problem demands a fresh approach, yet an ordered unity that is responsive to the meaningful blend of form and counterform is always the goal.

independence in the student.

Accordingly, Handel's solution to the problem was to move in the following manner: He first wrote the words of his essays in a large, clear, and legible handwriting, then he read them, and finally he transcribed them in his final form. Handel's method has been questioned by many scholars, but it is generally accepted that his handwriting was not always legible. He often made revisions, and his final manuscript is not always the same as the original draft. However, it is believed that his handwriting was improved through practice and study.

Hayde, Pica, and the Process

The whole duty of typography, as with calligraphy, is to communicate to the imagination, without loss by the word, the thought or image intended to be communicated by the author. And the whole duty of beautiful typography is not to substitute for the beauty of interest of the thing thought and intended to be conveyed by the symbol, a beauty or interest of its own, but...

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A visual hierarchy is an arrangement of elements in a graduated series, from the most prominent to the least prominent, in an area of typographic space. When establishing a visual hierarchy, a designer carefully considers the relative importance of each element in the message, the nature of the reader, the environment where the communication will be read, and the need to create a cohesive arrangement of forms within the typographic space.

The study of visual hierarchy is the study of the relationships of each part to the other parts and the whole. When elements have similar characteristics, they have equality in the visual hierarchy, but when they have contrasting characteristics, their differences enable them to take dominant and subordinate positions in the composition.

Contrast between elements within the space is achieved by carefully considering their visual properties. Important contrasts used to create hierarchical arrangements include size, weight, color, and spatial interval. The location of an element within the space plays an important role in establishing a visual hierarchy. The spatial relationships with other elements can also influence an element’s relative importance in the arrangement.

Principles used to achieve visual hierarchy through careful contrast between the elements are demonstrated by the nine small diagrams on this page (Figs. 38-46). The nine typographic designs on the opposite page (Figs. 38a-46a) correspond to these diagrams.

41. Changing the size and weight of the title makes it even more prominent in the visual hierarchy.

44. The diagonal position of the title increases its prominence in the space. The smaller type elements align with the diagonals of the title’s baseline and posture, uniting the composition.

42. Color or value can create another level of contrast that can be controlled by the designer to create hierarchy.

45. This composition demonstrates how extreme contrasts of type size and weight increase visual hierarchy and legibility from a distance.

43. Two sizes and three weights of type are used to create subtlety and variety within the composition.

46. Reversing the title from a black rectangle heightens contrast and increases the visual hierarchy. A ruled line separates the secondary type into two zones of information.
Modular relationships can be established without the use of the traditional typographic grid. A grid ratio, which is a mathematical relationship between two or more grid measurements, governs the size and placement of typographic elements. The ratio X:2X (one unit to two units) indicates the relative size of grid dimensions (Fig. 72). This stepped progression of X:2X establishes an underlying modular system among the parts.

The type area within a grid is comprised of vertical columns. The width of text columns and the intervals between them should promote optimum legibility when required. The size of type should be measured on the column width to achieve the ideal number of characters per line. Once these factors are considered, column widths may comprise any number of modules within the grid (Fig. 73).

Grids may consist of primary and secondary divisions of space. For example, the grid used in this book consists of two columns as the dominant structure, with an optional structure of five columns (note the visible grid lines on this page). Concurrent grids not only provide added flexibility, they also enable the designer to layer typographic elements, achieving an illusion of three-dimensionality.

Departing from the conventions of the traditional grid, which is characterized by horizontal and vertical relationships, it may be desirable to employ dynamic structural divisions based upon the diagonal and the circle, or hybrid combinations of spatial divisions (Fig. 74). Again, the designer should be aware of the appropriateness of such approaches in light of the context of the problem.

Grids allow for the distribution of typographic elements into a clearly intelligible order. Within the internal structure created, headlines, text, captions, images, and other parts of the message are integrated. The areas occupied, which correspond to specific modules or groups of modules, are referred to as spatial zones. After identifying all the parts of a message, the designer assigns them to specific zones. The result is a logical hierarchy of parts and information that is more accessible to the reader.

The book American Graphic Design Timelines features a highly flexible grid that makes it possible for readers to compare and contrast timelines of several design and related themes, including major events in world and U.S. history, cultural events, American graphic designers, companies, organizations, and publications (Figs. 75–77). In addition to the timelines, each section contains a number of other informational components that are accommodated by the grid. The American graphic designers section, for example, includes a headline (the designer’s name), quotation, reproductions of characteristic work, captions describing the work, a narrative reviewing significant contributions to the field,

74.
Dynamic spatial forces are generated by diagonal grid divisions. (Designer: Eric Cruz)

72.
This exploratory composition exhibits modular relationships among elements. (Designer: Debra Thompson)

73.
The layout, characterized by a rhythmic tension of typographic and photographic elements, demonstrates legible text settings on columns of single and triple module width. (Designer: John Kane)
and a biographical timeline. Timelines in all sections are organized in a nine-column grid, with each column corresponding to a decade in the twentieth century. As readers turn the pages, this time-oriented structure remains constant from section to section, making it possible for information to be studied in context. Events on the timeline related to topics elsewhere in the book are keyed by a page number printed on a color-coded square. Depending upon need, several pathways through the book may be taken by readers. It may be read traditionally as a linear narrative from section to section, or it may be used as a reference book where readers make specific connections by comparing the information found on the timelines.

Flow lines are boundaries that divide pages or spreads into major zones. When applied consistently throughout a publication, these boundaries unify pages and promote visual flow. In American Graphic Design Timelines, flow lines establish essential boundaries for the major zones of the book. As a result, the information flows naturally through the publication, and readers confidently move from one section to another without getting lost.

In the tradition of modern design, the spatial zones within a typographic grid are not violated. The designer works within the grid framework to objectively present information, while utilizing the principles of ABA form to establish relationships between the parts and to imbue the composition with rhythmic and textural variety. But rules can be broken and risks are possible; skilled designers are capable of violating the grid to optimize clarity and maximize visual effect.
The typographic message

The typographic message is verbal, visual, and vocal. While typography is read and interpreted verbally, it may also be viewed and interpreted visually, heard and interpreted audibly. It is a dynamic communication medium. In this sense, early twentieth-century typography became a revolutionary form of communication, bringing new expressive power to the written word. Consider the concrete poem "ping pong" (Fig. 78). The geometric structure of this poem is composed of a repetition of the words ping and pong. As these words are repeated, they signify the sound of a bouncing ping-pong ball, and the circular letters p, o, and g reflect the shape of the ball. The full impact of this poem is achieved when it is read aloud. By hearing the sounds and viewing the typographic forms, the typographic message is strengthened.

Significant departures from the use of conventional typographic forms occurred in Europe at the beginning of the twentieth century. During this activist period, experimentation in all the visual and performing arts was affected by potent social and philosophical changes, industrial and technological developments, and new attitudes about aesthetics and modern civilization. Typographic design was pulled into this artistic revolution as poets and visual artists realized that both meaning and form could be intensified in typographic communications.

The Futurist manifesto, written by the Italian poet Filippo Marinetti in 1909, profoundly influenced thinking in Europe and Russia. Futurism praised technology, violence, danger, movement, and speed. Futurist typography, known as "free typography," demonstrated these ideas in a highly expressive manner (Fig. 79; and see Chapter 1, Fig. 125). The chill of a scream was expressed in bold type, and quick impressions were intensified through italics. Letters and words raced across the page in dynamic motion.

Among the movements affected by Futurism were Dadaism in France, Switzerland, and Germany; de Stijl in Holland; and Constructivism in Russia. Each of these historical movements has had a penetrating effect upon typography. Artists and designers associated with these movements saw typography as a powerful means of conveying information relating to the realities of industrialized society (Figs. 80-82; also see Chapter 1, Figs. 129-35). They disdained what typography had become: a decorative art form far removed from the realities of the time. The architect Otto Wagner further emphasized that "all modern forms must be in harmony with the new requirements of our time. Nothing that is not practical can be beautiful." Written in 1920, the second de Stijl manifesto clearly demonstrated the concern for a new, expressive typography (Fig. 83). With dramatic changes taking place in the form and content of typography, the typographic message became a multifaceted and expressive form of communication. Typography needs to be read, seen, heard, felt, and experienced.