

7

Type for text sizes

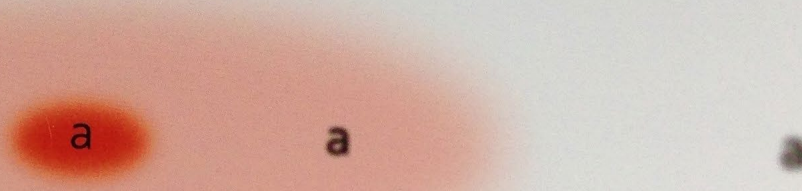
In continuous reading, the eyes move along the line in rapid saccadic motions. Between the saccades, the eyes stop and pause in fixations. As we know, the Latin alphabet is read horizontally from left to right; nonetheless, several of the letters have a structure based on vertical strokes. Many type designers have tried to address this problem by introducing features that make it easier for the eyes to stay on the same line when moving from one fixation to the next. Some of these typefaces have serifs that are longer on the right side of the stems than on the left, letters that lean forward slightly, or a stroke contrast designed to motivate a horizontal direction. Whether this is in fact effective is yet to be determined.

The retina has two types of receptors – rods and cones. They serve very different purposes. The fovea at the centre of the retina consists almost entirely of cones. Moving away from the fovea, the number of cones decreases, while the number of rods increases. While rods can detect movement and are sensitive in low illumination situations, cones process details and register sharpness.

This means that the further away from the fovea an object is, the more difficult it is to identify, as we lose retinal resolution. The fovea is obviously essential to the perception of letters, but research shows that the area just outside the fovea – the parafoveal area – is also very important. In fact, the length of the next word in a sentence influences the length of the next saccade: Long words lead to longer saccades, while shorter words produce shorter saccades. If a word presented on a screen is changed as soon as a saccade moves toward the word, the greater the similarity between the visual patterns of the original word and the replacement word (changing 'home' to 'borne'),

↓ **Figure 7.1. Foveal, parafoveal and peripheral vision.** The fovea covers about 2 degrees around the fixation point; outside the fixation point lies the parafoveal area, which covers about 10 degrees. Everything outside this is referred to as peripheral vision.

● foveal ● parafoveal ○ peripheral



↓ **Figure 7.2. Regularity in text type.** When reading a typeface in small point sizes, the eye sees more irregular features than when the same font is viewed in larger sizes at the same distance. The letters of the text version (top) of the typeface FF Info by Spiekermann and Schäfer have a higher regularity than the signage version of the typeface (bottom).

FF InfoText

love jogging

FF InfoDisplay

love jogging

the sooner the reader identifies the word¹. Findings like these show that when we read running text, we not only see what is in the focus of our attention, we also use the parafoveal area to gain helpful hints about what to expect further down the line.

When we read small text sizes, we perceive a large number of letters simultaneously in the centre of our field of vision. If a typeface has a high degree of internal irregularity, this diversity will be very prominent in small sizes since many of these elements will be presented to the reader at once. As a result of this, a high degree of internal variation is not very suitable for typefaces designed for blocks of text. As explained in 1900 by typographic scholar and printer Theodore Low De Vinne: *"The beauty of text-types is in their precision. That freedom of drawing which is permitted, and sometimes approved, in the letters of a good penman, or in engraving, or in the types of job printer, is not tolerated in the text-types of books, which must be precise"*².

→ **Figure 7.3. Adapting the restlessness of the early type in Kingfisher.** Based on the idea that the early punchcutters incorporated a certain level of irregularity in their fonts to improve the reading experience and interest the eye, Jeremy Tankard built in an illusion of a slope to the verticals, and added a form of movement in several of the lowercase letters by varying the angle of the axis.



naeht



fni ears

Expert craftsmen magically produce
a wonderful instrument, which reveals almost incredible
IMPROVEMENT OVER EVERYDAY MUSIC PRODUCING MACHINES

↑ **Figure 7.4. The horizontal focus of the typeface Swift.** With large serifs and horizontal termination of the round strokes, Gerard Unger creates a strong horizontal emphasis in the typeface Swift. Pictured above is Neue Swift, a revised version of Swift with a larger character set. Published by Linotype in 2009.

Beautiful printing is an educator,
the same as is any art.

THE THOUGHTS OF AN AUTHOR TAKE ON ADDED
VALUES BY REASON OF IT.

The mind is always receptive in proportion
AS IT IS HELPED TO
comprehend the real meaning of the writer.

↑ **Figure 7.5. FF Quadraat and the horizontal focus.** A different way of emphasising the direction of reading is demonstrated in the regular styles of Quadraat by Fred Smeijers. Inspired by early manuscript letters, the characters have a subtle slant in the reading direction.

FF Balance

TYPOGRAPHY SENDS
knowledge abroad as heaven
sends the rain. One fructifies
the soil, the other man's intelligence.

← **Figure 7.6. FF Balance and the horizontal focus.** Designed by Evert Bloemsma and inspired by the typeface Antique Olive, this typeface applies an inverted stress to the characters, with the horizontal parts being heavier than the vertical parts. According to Bloemsma, the inverted stress helps lead the eye along and compensates for the absence of serifs.

hamburgefontsviv

Antique Olive by Roger Excoffon

→ **Figure 7.7. The x-height of Mrs Eaves.** The highly popular typeface Mrs Eaves, designed by Zuzana Licko in 1996, is inspired by the work of John Baskerville. To enhance the openness and lightness of the Baskerville fonts, Licko gave the lowercase letters wider proportions; she then made the x-height smaller to prevent the type from taking up too much space. These proportions make the type highly functional for shorter paragraphs of text in larger sizes but less functional for longer type settings. As a consequence, in 2009 Licko released the larger x-height typeface Mrs Eaves XL.

Mrs Eaves Roman
Mrs Eaves XL Regular
Aaa Bbb Ccc Nnn

Hhamburgerfontsiiv

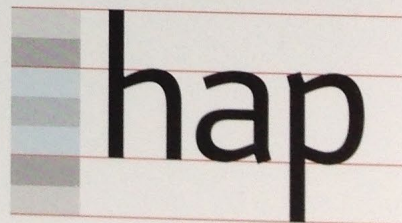
Hhamburgerfontsiiv

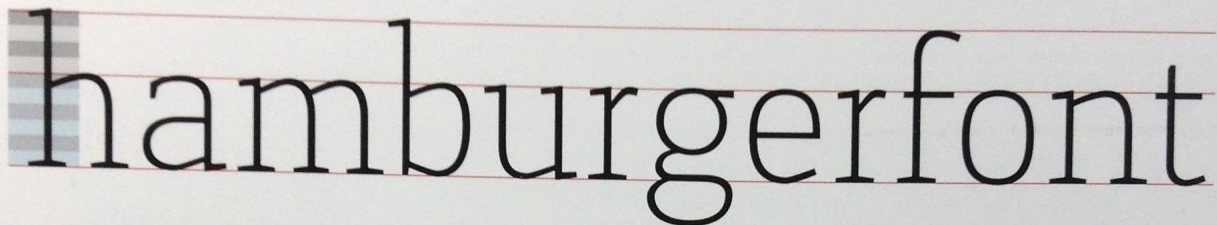
Proportions

Typesetter Pierre Simon Fournier (1712–1768) had an eye for systems, and in his *Manuel Typographique* from 1764 he suggested a relationship of lowercase proportions where the x-height is 3 units (about 43%) and the ascender and descender 2 units each³ (Fig. 7.9). In a similar line of thought, more recently the type designer Sumner Stone⁴ has advocated a relatively low x-height, arguing that tall ascenders tend to emphasise the distinctness of letter and word shapes and thus enhance legibility. Referring to the phenomenon that the upper half of lowercase letters is read more easily than the lower half, the type historian Harry Carter (1901–1982)⁵ suggested a solution where descending elements were kept short, and ascending elements long. Walter Tracy also emphasised that if the x-height becomes too big, the extenders vanish and the individuality of characters is reduced⁶. However, typefaces created either

↑ **Figure 7.8. The different proportions of Lexicon.** The typeface Lexicon by Bram de Does has two versions with different extending lengths: one with exceptionally short extenders, designed for the setting of small text in dictionaries, and one with more conventional length.

↓ **Figure 7.9. Fournier and letter proportions** Pierre Simon Fournier (1712–1768) recommended an x-height of 3 units and extenders that are 2 units each.





hamburgerfont

↑ *Figure 7.10. Walter Tracy and his ideas on proportions.* Walter Tracy advocates an internal relationship where the x-height is in a ratio of about six to ten compared with the ascending characters. According to Tracy, it is more important to keep the ascending characters ('b', 'd', 'h', 'k' and 'l') long than it is for the descending characters ('g', 'j', 'p', 'q' and 'y').

Capitolium News

POLITENESS MAY BE everyday life

Gulliver

With Gulliver, Unger manages to strike a successful balance between the *large counters and the space-saving horizontal proportions*. **The typeface further has a large x-height, which enables it to be set in smaller point sizes, and still be readable in newspapers.**

↑ ↑ *Figure 7.11. Designed to save space.* Fitting many words into a single line of text is often a priority of newspapers. The typeface Capitolium News by Gerard Unger is designed to meet this requirement in headline setting. For text sizes, Unger designed the typeface Gulliver.

for setting small text sizes or for saving space on the printed page often have a large x-height and short extenders, the argument in favour of the large x-height suggests that most of the essential letter features are to be found in this area anyway, and therefore an enlargement of these features would enhance letter legibility. This view is supported by an informal reading test carried out by the designer Hermann Zapf⁷ in connection with the development of the typeface Edison. In a comparison of different typefaces on poorly inked newspaper, the study found that types with a large x-height delivered the best performance.

The M-formula

Among other things, William Addison Dwiggins enjoyed creating marionettes. In 1937, while carving a head for a new puppet, he made an interesting discovery. Dwiggins found that to successfully carry the facial expressions of a young girl to observers at the back of the room, the otherwise soft features should be carved as sharp edges (Fig. 7.12). At a distance, these exaggerated features would appear just as gentle as they were originally intended. Dwiggins later transferred this knowledge to his text typefaces by sharpening the character edges. For him, the discovery was a way of tricking the eye into seeing nonexistent curves in objects of reduced sizes while enhancing the character's features. Named after the marionettes, he called this observation his M-formula. In a discussion of Dwiggins' theory, type designer Gerard Unger supports the idea that the influence of distance and light on marionettes can be transferred to small text sizes, yet he emphasises that the technique will be most effective in newsprint at point sizes of seven or less⁸.

Based on the notion that text in small sizes and text viewed at a distance have a similar visual angle, and since the M-formula originates in a situation involving distance, one can assume that the approach would be useful when applied to type designed for distance reading as well.



A.



B.

← Figure 7.12. **Dwiggins' M-formula in marionettes.** William Addison Dwiggins' illustration of the puppet, with the soft features to the left and the sharp features to the right.

↔ Figure 7.13. Dwiggin's M-formula in type. William Addison Dwiggins implemented his ideas of sharp forms in his type design, as seen here in his typeface Caledonia (below), calling the abrupt change in the counter a 'calligraphic flick'. This sharpness of the inner curve of the 'h' inspired Kent Lew in his design of the typeface Whitman published by the Font Bureau (right).



RED-EYED VIREO

Incessant chattering

THAT BIRD HAS BEEN AT IT FOR AT LEAST 164 HOURS STRAIGHT

Exaggeration

Question of semantics

My definition of a word may differ from yours

DICTIONARY

ALWAYS COMES IN HANDY WHEN BOARD GAMES ARE INVOLVED

Convenient pocket size

Tiny, unreadable text leaves ample room for interpretation

LAS AVENTURAS DE ALICIA

Beauty

Everything is Illuminated

Fifty Kings

BEAUTY & THE BEAST

Rashōmon

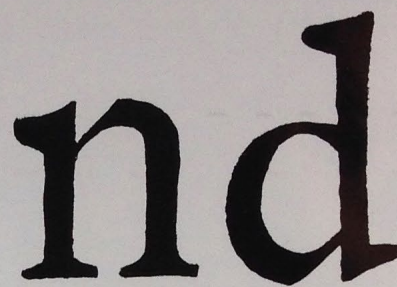
↔ Figure 7.14. Sharp serifs and stroke endings.

By sharpening omnipresent features like serifs and stroke endings, Thomas Gabriel implemented the M-formula ideas in his typeface Premiéra, designed for small text sizes.

Ink and printing

One way of preventing ink from blurring the letterforms in smaller sizes is to open up the junctions in ink traps. An early example of this, where the outside of the stroke is cut off at a straight angle, is demonstrated in the work of the German punchcutter Johann Michael Fleischman, who was employed by Enschedé from 1743 to 1768 (Fig. 7.15).

The typeface Bell Centennial (Fig. 7.16) is famous for its ink traps. Created in 1978 by Matthew Carter and designed for the phone directories of AT&T, these ink traps differ from Fleischman's, as the edge of the strokes bends inwards instead of being cut off at the side. The unusual shape originate in trial pages printed under production conditions, which allowed Carter to study the ink spread and make changes to the letterforms accordingly. As Carter explains: "Taking weight out of the intersections of strokes enhanced the clarity of complex forms. The fact that these compensations were more drastic than usual was really a function of the way the type was set and printed"⁹.



↑ Figure 7.15. **Johann Michael Fleischman.** Ink traps in an 8-point type from the 18th century.

↓ Figure 7.16. **Bell Centennial.** Designed for small text sizes in telephone books, Matthew Carter opens up the junctions to avoid over-inking in the typeface Bell Centennial.

the quick brown fox
jumps over a lazy
DOG 1234567890

+50 17.5 ASE Tst **Le Migliori▲ 1,93%**
MidCapA m 40.38 **+50 17.5 ASE Tst**
H 91° ♣ 10-8-3 **4rms Riv VU**
Spanoen (IBEX-35) **2 NEWS (CC) 4179**
Married 3/4 UR 1946 **CY€ 10,50 | R\$ 1,50**
5F - :59¹ ▶ RBIS **35^a 2h1'52''48⁶⁰**

↑ → Figure 7.17. The ink traps of Retina.
 The typeface Retina, designed by Hoefler
 & Frere-Jones for 5-point setting on the
Wall Street Journal stock pages, with ink
 traps designed to fill in on the press.

Millionaire (CC) 686	NEWS (CC) 570	NEWS (CC) 1781	
Judge Judy (CC) 222	Judge Judy (r/CC) 266	NEWS (CC) 2179	
Divorce Court 8624	Hatchett 4808	NEWS (CC) 4179	
Oprah Winfrey (CC) 23624		NEWS (CC) 9274	
Family Feud	Pyramid	Ricki Lake 6179	
Pokemon	Strongbad	Fresh Prince	Sabrina
Arthur	Dragon	Cyberch'e	NEWS 2860
Dragon	G. Shrinks	Sesame Street	12599
El Gordo y la Flaca		Primer Impacto	9889
Laura 96570		Rojo Vivo	
Dragon	Superpowers	Action Figure	Strongbad
Squares	Inside Edition	Dr. Phil	7421
Murder, She Wrote 342976		Murder, She Wrote 444773	
242680		★ Man in the Gray Flannel Suit (4:40) 41358421	
Rap City: The Basement 870995			
Making Of	★ Only When I Laugh (1981) (R) 333299		
Zoids	G Gundam	Dragon B.	Dragon
2000) John Cusack. (R) 441150		Comedy	Daily Show
Science	Psych	Classic Arts	81228
Sabrina	Family	Boy/World	Smart Guy
Partner	Partner	Savage Paradise	459605
Saturday Night Live 392792		True Hollywood	401889
(2:40) 50235537		Catch Me If You Can (PG) 8273402	
State...	S Club 7	Braceface	Little Time
Here to Help 5026179		Shoe Clinic	Best of Box
Shrek (2001). Mike Myers. 922402			School Ties 849
Decorating	Sensible Chic	Kitchen	Homes...
Fly Past 6591266		Fly Past 1376315	

CROWN NEW YORK TWIN (249-4200)
 Confessions of a Dangerous Mind (R) Fri. to Sun. 12, 2:15, 4:45, 7:30, 10. The Lord of the Rings: The Two Towers (PG-13) Fri. to Sun. 1, 3:45, 7, 9:45. Darkness Falls (PG-13) Fri. Sat. 11:30 am, 2:30, 5:30, 8:30, 11:30. Sun. 1, 2:30, 3, 4:30, 6, 8, 10.
CC EAST 86TH STREET (860-8686)
 About Schmidt (R) Fri. Sat. 11 am, 1:45, 4:30, 7:20, 10:05, 12:30 am. Sun. 12, 2:30, 5, 7:30, 10:10. Darkness Falls (PG-13) Fri. Sat. 12:05, 2:15, 4:45, 7:15, 9:45, 12:15 am. Sun. 12:05, 2:15, 4:45, 7:15, 9:45. The Pianist (R) Fri. Sat. 11:30 am, 2:30, 5:30, 8:30, 11:30. Sun. 1, 4, 7, 10. Confessions of a Dangerous Mind (R) Fri. Sat. 12:15, 2:45, 5:15, 7:45, 10:15, 12:30 am. Sun. 12:15, 2:45, 5:15, 7:45, 10:15.
CLEARVIEW'S 1ST & 62ND ST. (777-FILM)
 Catch Me If You Can (PG-13) Fri. Sat. 11 am, 1:45, 4:30, 7:20, 10:05, 12:30 am. Sun. 12, 2:30, 5, 7:30, 10:10. The Pianist (R) Fri. Sat. 12:05, 2:15, 4:45, 7:15, 9:45, 12:15 am. Sun. 12:05, 2:15, 4:45, 7:15, 9:45. Just Married (PG-13) Fri. Sat. 11:30 am, 2:30, 5:30, 8:30, 11:30. Sun. 1, 4, 7, 10. 25th Hour (R) Fri. Sat. 12:15, 2:45, 5:15, 7:45, 10:15, 12:30 am. Sun. 12:15, 2:45, 5:15, 7:45, 10:15. A Guy Thing (PG-13) Fri. Sat. 12:05, 2:15, 4:45, 7:15, 9:45, 12:15 am. Sun. 12:05, 2:15, 4:45, 7:15, 9:45. Darkness Falls (PG-13) Fri. Sat. 11:30 am, 2:30, 5:30, 8:30, 11:30. Sun. 1, 2:30, 3, 4:30, 6, 8, 10.
LOEWS CINEPLEX ORPHEUM (828-9738)
 The Lord of the Rings: The Two Towers (PG-13) Fri. to Sun. 1, 3:45, 7, 9:45. National Security (PG-13) Fri. Sat. 11 am, 1:45, 4:30, 7:20, 10:05, 12:30 am. Sun. 12, 2:30, 5, 7:30, 10:10. Gangs of New York (R) Fri. Sat. 12:05, 2:15, 4:45, 7:15, 9:45, 12:15 am. Sun. 12:05, 2:15, 4:45, 7:15, 9:45. Two Weeks Notice (PG-13) Fri. Sat. 11:30 am, 2:30, 5:30, 8:30, 11:30. Sun. 1, 4, 7, 10. Catch Me If You Can (PG-13) Fri. Sat. 12:15, 2:45, 5:15, 7:45, 10:15, 12:30 am. Sun. 12:15, 2:45, 5:15, 7:45, 10:15. 25th Hour (R) Fri.

In 1993, when Martin Majoor tested a new typeface for the Dutch telephone books, he established that the spikes and ink traps of Bell Centennial were no longer necessary due to the new printing techniques. A similar finding is reported by Bruno Maag¹⁰ when designing the typeface for the BT directories using both coldset and hotset printing (Fig. 7.18). This reported quality improvement does not appear to be equally strong in all printing scenarios. Thus, when designing the typeface Retina for the stock page of the *Wall Street Journal*, Hoefler & Frere-Jones found that small types in newsprint still need strong ink traps.

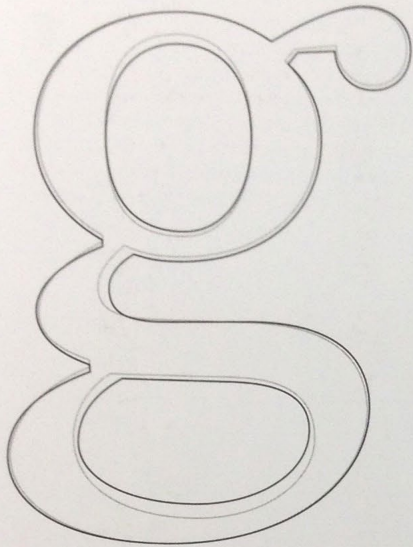
↓ **Figure 7.18. Different printing techniques of the BT directories.** The typeface developed for the BT directories by Bruno Maag is designed for printing under two different techniques (shown here in development trials). In hotset printing (left) the pages are dried immediately after printing, while the coldset printing (right) dries on its own. This results in the ink of coldset printing bleeding slightly more than the other, and so the type has a heavier appearance.

Carter P

CARTER P, 6 Broadley Clo,Pellon
P., 7 Hill Park Av
P, 10 Prospect Vw,Queensbury
P.J, 22 Shelf Moor Road,Bradford
R, 5 Arnold Royd,Brighouse
R, 1041 Manchester Rd,Linthwaite
R, 9 St. Pauls Gro,BD6
R, 10 Varley Rd,Slaithwaite
R, 156 Wilson Rd,Wyke
Robert, 1 Wood St,Slaithwaite
R.A, 2 Cheriton Dv,Queensbury
R.A, 5 Dirker Dv,Marsden
R.B,
 Dirker Bank Cott,Plains,Marsden
R.C, 16 Holts La,Clayton
R.D, 46 Stones Lane,Linthwaite.....
R.W, 37 Laburnum Gro,Cross Roads..
S, 160 Bacup Rd,Todmorden
S, 35 Markfield Av,Bradford
S.P, 9 Brambling Dv,Queensbury
T., 22b Albert Vw,Pellon
T. 13 Industrial Rd,Sowerby Bdqe

Carter P

CARTER P, 6 Broadley Clo,Pellon
P., 7 Hill Park Av
P, 10 Prospect Vw,Queensbury
P.J, 22 Shelf Moor Road,Bradford ..
R, 5 Arnold Royd,Brighouse
R, 1041 Manchester Rd,Linthwaite..
R, 9 St. Pauls Gro,BD6
R, 10 Varley Rd,Slaithwaite
R, 156 Wilson Rd,Wyke
Robert, 1 Wood St,Slaithwaite
R.A, 2 Cheriton Dv,Queensbury.....
R.A, 5 Dirker Dv,Marsden.....
R.B,
 Dirker Bank Cott,Plains,Marsden..
R.C, 16 Holts La,Clayton.....
R.D, 46 Stones Lane,Linthwaite
R.W,
 37 Laburnum Gro,Cross Roads..
S, 160 Bacup Rd,Todmorden.....
S, 35 Markfield Av,Bradford.....
S.P, 9 Brambling Dv,Queensbury



↔ ↓ **Figure 7.19. The different grades of the typeface Mercury Text.** Ink acts differently depending on the absorption of the paper on which it is printed. Designed to accommodate different reproduction technologies, the text fonts from the Mercury typeface family by Hoefler & Frere-Jones each have four grades available. These offer lighter and darker versions of a same master design, within the same horizontal size.

The idea is to provide designers with sufficient options to avoid letter shapes from dissolving in low-quality printing and to further ensure the right relationship between Regular and Bold weights.

Grade 1

Grade 2

Grade 3

Grade 4

mer·cury 1. *Symbol Hg* A silvery-white, poisonous metallic element, liquid at room temperature and used in thermometers, barometers, vapor lamps, and batteries in the preparation of chemical pesticides. Atomic number 80; atomic weight 200.59; melting point -33.87°C ; boiling point 356.58°C ; specific gravity 13.546 (at 20°C); valence 2. Also called *quicksilver*. 2. *Temperature* The mercury had fallen rapidly by morning.

brum

← **Figure 7.20. Lightening the heavy weights of Trilogy Egyptian.** Inspired by the Victorian-era Egyptian typefaces, Jeremy Tankard was interested in making the style less geometrical than what is seen in many earlier revivals. His approach was to open up the junctions, a solution that not only provides ink traps but also gives the heavy Egyptian style a lighter feeling without reducing the weight.

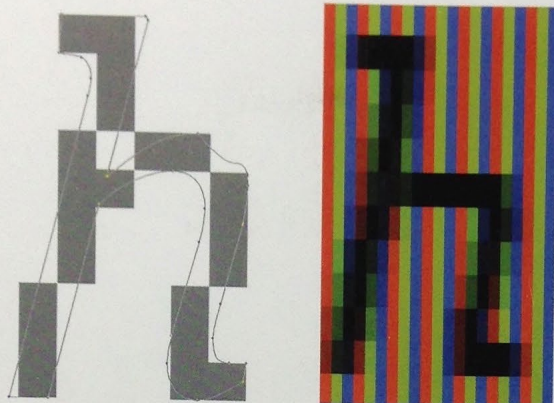
JELLY BEANS
truffle shuffle

↑ **Figure 7.21. Ink traps for personality.**

The ink traps of the typeface FS Rufus by Fontsmith not only improve legibility in small point sizes but also extenuate the soft and mild personality in the larger sizes.

→ **Figure 7.22. Opal and ink traps.** In the typeface Opal by Hannes von Döhren, the ink traps act as an outline cutting into the letter shape in the junctions.

You can do
what you want
— — —
if you want what
you can do.



← ← **Figure 7.23. Before ClearType.** Hinting of a small-size italic 'h' letter, from the typeface Georgia designed by Matthew Carter¹¹.

← **Figure 7.24. The ClearType Technology.** A small-size italic letter 'h' from the typeface Constantia by John Hudson. The image shows the subpixels that make up the letter on the screen at this size. Constantia has been outfitted with ClearType hinting instructions to take advantage of this subpixel grid¹¹.

Type for screen

The resolution of the screen controls the presentation of the font. Large sizes will have more pixels per em (ppem), while small sizes will have fewer. Consequently, screen types at small text sizes have to conform to a grid consisting of a limited number of pixels.

In a look at what has been done to meet the requirements of small text size screen presentation, the work carried out by Matthew Carter in the 1990s is famous for the reversed process. Instead of designing the outline of the fonts first and then placing the pixels within the outline, Carter designed the computer screen fonts for the Verdana, Tahoma, Nina and Georgia series the other way around. After first creating a bitmap version of a particular target size, he then designed the outline shape of the characters around the bitmaps (Fig. 7.23). The method is similar to that applied today by David Berlow of Font Bureau¹² when developing new web fonts for the Reading Edge series. Here the fonts are designed on a 512 UPM grid further divided into a 16 unit em-square, which allows Berlow to ensure that all RE fonts regardless of hinting,

↓ **Figure 7.25. The Reading Edge fonts by Font Bureau.** The Reading Edge typeface PoynterSerif RE has a larger x-height and wider characters than the print version of the typeface, Poynter Oldstyle.

Poynter Oldstyle

ihop

PoynterSerif RE

ihop

will render as intended, at least at this size. The RE fonts are furthermore designed so that variations in overshoot and stem width are simplified out, as these are features that would otherwise disappear when rendered below 16 ppem (*Fig. 7.25*).

In 2004 Microsoft introduced the series of ClearType fonts designed for the newly developed technology of subpixel rendering, which controls the red, green, and blue (RGB) elements of each pixel (*Fig. 7.24*). In doing so, the aim was to optically enhance the resolution of the screen by controlling even smaller units within the pixel. Unfortunately, this effect only works on the vertical strokes; Microsoft therefore mixes subpixel rendering of the vertical strokes with anti-aliasing (shades of grey) for all strokes. Based on this mix of techniques, and to minimise the jagged diagonals, several of the designers behind the ClearType fonts enhanced the square feeling of the types by emphasising horizontal and vertical lines (*Fig. 7.26*)¹³.

A visual inspection of various other fonts for the computer screen demonstrates a general tendency toward generously spaced letters, high x-height and a low stroke contrast. Furthermore, many current screen devices are not sensitive to kerning. To keep an even flow in the word pattern, type designers can benefit from revisiting some of the techniques applied by early 20th century designers who were compelled to create kernless typefaces for the Linotype line-caster machine.

hamburgefontshiv

↕↔ **Figure 7.26. Enhancing the horizontals and verticals.** Because subpixel rendering only works on the vertical strokes the ClearType team focused on minimising the area of transition between verticals and horizontals. The team further found that ClearType hinting and rendering motivates triangular serifs. Illustrated with *Constantia* by John Hudson (top), and *Calibri* by Lucas de Groot (right).



»» **Digital &
Dynamic →
{on-off screen}
branded energy.**

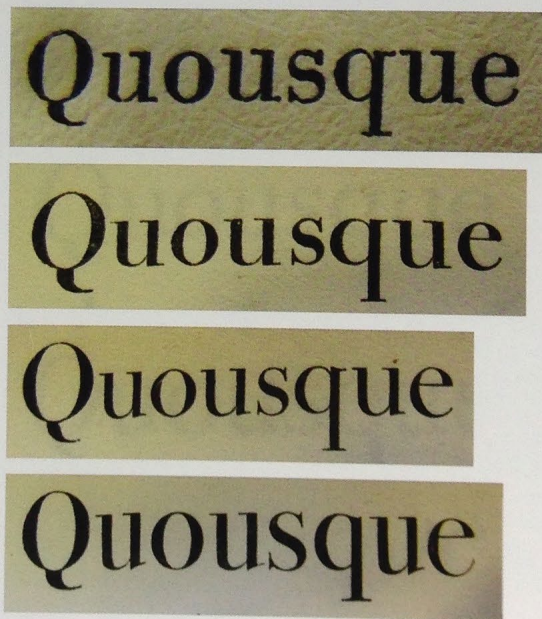
← **Figure 7.27. FS Joey by Fontsmith.** The constructed typeface FS Joey was originally created for a video-on-demand online service. It is designed to function both onscreen and in print.

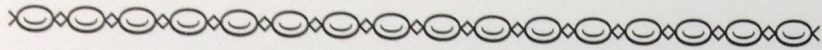
Scaling

In the early 19th century, the printing process was more or less similar to the methods applied at the time of Gutenberg some 350 years earlier. This changed drastically with the advances of the Industrial Revolution. By the end of the 19th century, nearly all stages of printing could be power-driven. The influence of the general increase in the speed of printing was substantial. Of all the new inventions, the most remarkable is the Benton pantograph engraving machine, developed in 1885. This machine finally eliminated the necessity for punchcutting in type design. It suddenly became possible to scale type based on one master drawing alone.

In small print sizes and especially in low-quality printing, the letterforms tend to melt away on paper. With manual punchcutting, each point size is cut individually, which gives the gifted punchcutter the option of optically scaling the fonts to suit the requirements of the paper, the ink, and the human eye. To optically compensate type for small sizes, Walter Tracy¹⁴ suggested a general widening of the characters and moving the baseline a little lower on the body; this results in shorter descenders and larger x-height characters. Harry Carter¹⁵ also advocated short ascenders, slightly heavier weights, low contrast, and magnified strong serifs. He further stressed the importance of generous white space inside the letters, which was his reason for recommending broader characters to preserve the balance between black and white.

→ **Figure 7.28. Optical scaling by Bodoni.** Fonts from Bodoni's *Manuale Typografico* of 1818; for this purpose the letters have been scaled to the same size, with the smallest fonts at the top.





FF Clifford Six Roman

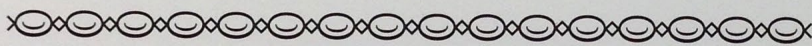
FF Clifford Six Italic

FF Clifford Nine Roman

FF Clifford Nine Italic

FF Clifford Eighteen Roman

FF Clifford Eighteen Italic



← **Figure 7.29. Optical sizes in FF Clifford.**

The typeface FF Clifford by Akira Kobayashi is inspired by Alexander Wilson's Long Primer Roman and Joseph Fry & Son's Pica Italic. The family has three optical weights, based on Kobayashi's analysis of old metal type specimens.

↓ **Figure 7.30. Optical sizes in sans serif**

and serif faces. Due to their higher stroke contrast, serif faces often benefit from optical scaling in ways that would not help sans serif faces noticeably. The super-family Freight by Joshua Darden features both sans and serif versions, yet only the serif versions contain optically adjusted fonts (note the M-formula features of the micro sizes).

HlpHlpHlpHlp

↑ **Figure 7.31. Simplification of small point sizes.** The typeface Minuscule by Thomas Huot-Marchand, has five different optical sizes. The typeface is based on the theories of French ophthalmologist Louis Émile Javal, practising in the late 19th century, who found that for very small sizes the reader tends to mainly read the difference between the letters. Huot-Marchand works with an extreme simplification and differentiation of the letters in the smaller point size fonts, aiming at a typeface readable in sizes as small as 2 points.

Freight Micro

Freight Text

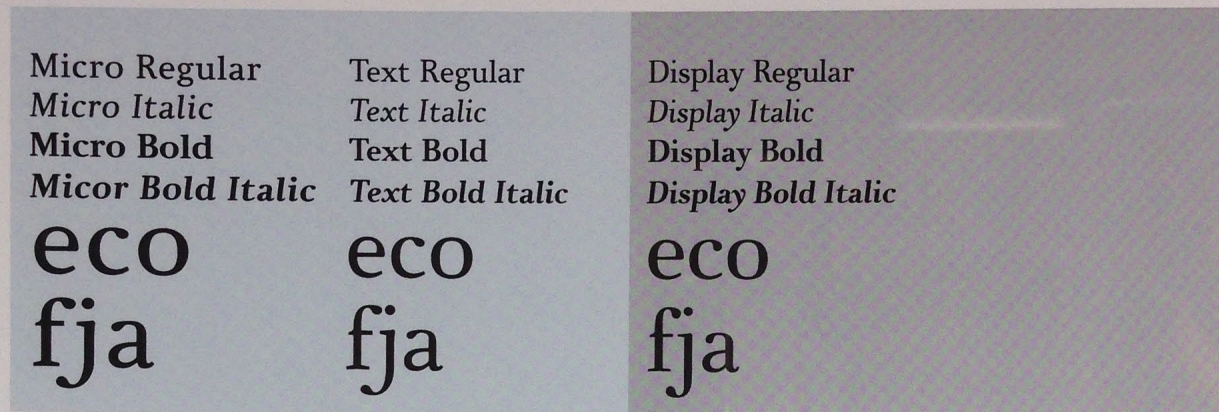
Freight Display

Freight Big

Freight Sans

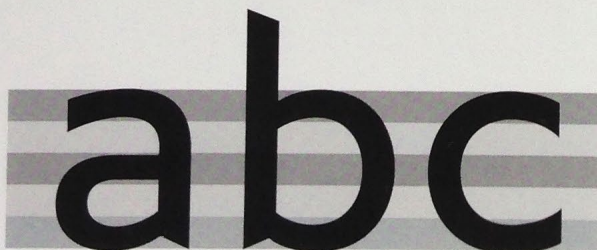
Transitional

Didone



↑ Figure 7.32. **Applying several typeface categories within one family.** The typeface Pyke by Sofie Beier is inspired by the work of Giambattista Bodoni. The small sizes are designed for running text. These sizes therefore have a horizontal emphasis, as do the early Transitional style typefaces by Bodoni. The Display sizes, on the other hand, are all designed for reading a few words at a time; therefore, the stronger Didone style features may be present without sacrificing legibility.

↓ Figure 7.33. **Weight and scale.** The stroke weight of a typeface will appear differently to the reader depending on the size in which it is presented; thus, a functional bold in 10 points is not necessarily the same as a functional bold in 300 points. Edward Johnston, with his focus on calligraphy writing, found medium weights more legible than heavier weights and defined the optimal stroke weight to be of about one fifth of the x-height¹⁶. Illustrated with the typeface London by Henrik Kubel.



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