

The anatomy of the letter

The skill of a type designer lies in the art of subtlety. A smidgen extra stroke thickness can result in a completely different impression of the heaviness of a body of text. Poorly designed letters can appear as blemishes in the text. Letter shapes that have been used for centuries cannot simply be altered without it having a result on the complete picture. And we have not yet mentioned the habituation – or actually the conditioning – of the letter. In the past, radical changes in typography (in newspapers, for example) provoked some very serious reactions from the readers. The designer of typefaces intended for use as body types should be aware of this and should design right down to the finest details in form and counter form, in the black letter and the white space around it.

The design process In this chapter we will investigate the margins available to the designer and study the form of the letter in detail. The number of Latin typefaces currently available is thought to be around 50,000 to 60,000. Is it then really necessary to design even more new types? Well, the same question could also be asked about the design of a new chair or a new musical composition. The times in which we live will always play a part in this process by applying different demands and awakening new expectations. The desire for innovation and change is always present.

The first steps towards creating a new typeface are the first characters to be designed. These letters can be tested using a nonsense word such as 'Hamburgefonstiv' which helps to define cap height, x-height, ascender & descender heights as well as relative character widths and the construction of key lowercase characters or by using a pangram, a sentence which contains all 26 characters of the alphabet. When the first word has been formed, the mutual relationships have been assessed and the characters altered where necessary, all the characters of the alphabet can then be made. This includes not only the alphabetic letters but also the figures, punctuation marks, symbols, ligatures and, if required, small capitals.

The text below is a standard sentence which includes all the characters of the alphabet. The type manufacturer Berthold had its own version beginning with its name. The text here is set at 16 pt in ATF Copperplate Gothic, Adobe Garamond and Berthold Akzidenz Grotesk.

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG
The quick brown fox jumps over the lazy dog
Berthold's quick brown fox jumps over the lazy dog

at

Example of the gre text. The font size the line spacing is meant as a readin tone of the text ca to the other exam. used is the TheSar 2-ExtraLight style.

The first c capital or l Empire'), h these char on the sto This can cl in Rome.



E

The Adobe Tr which was dr Twombly and inscriptions shows the g tion method some before

ter

abc abc abc abc

Example of the grey tone of a body of text. The font size in this case is 5 pt and the line spacing is 7 pt. It is, of course, not meant as a reading text but the grey tone of the text can be easily compared to the other examples. The typeface used is the TheSans, and in this case the 2-ExtraLight style.

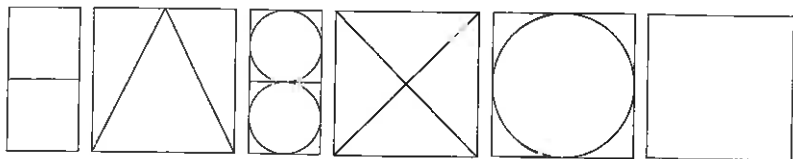
Example of the grey tone of a body of text. The font size in this case is 5 pt and the line spacing is 7 pt. It is, of course, not meant as a reading text but the grey tone of the text can be easily compared to the other examples. The typeface used is the TheSans, and in this case the 3-Light style.

Example of the grey tone of a body of text. The font size in this case is 5 pt and the line spacing is 7 pt. It is, of course, not meant as a reading text but the grey tone of the text can be easily compared to the other examples. The typeface used is the TheSans, and in this case the 4-SemiLight style.

Example of the grey tone of a body of text. The font size in this case is 5 pt and the line spacing is 7 pt. It is, of course, not meant as a reading text but the grey tone of the text can be easily compared to the other examples. The typeface used is the TheSans, and in this case the 5-Regular style.

The first capitals The Roman inscriptional capitals, the mother of all western capital or majuscule scripts (see also the chapter 'The Roman and the Roman Empire'), have a geometric construction with a square base. This is logical as these characters were originally carved in stone. The shapes were first painted on the stone. Compasses, triangle and ruler were probably the tools used. This can clearly be seen in the construction of the letters on Trajan's Column in Rome.

The examples shown above illustrate that a slight variation in the thickness of the line can have a great impact on the grey tone of a body of text. These examples also show that the TheSans has the same width in all styles.



E A S X Q D

The Adobe Trajan shown above, which was designed by Carol Twombly and is based on the inscriptions on Trajan's Column, shows the geometrical construction method used to draw on the stone before the cutting began.

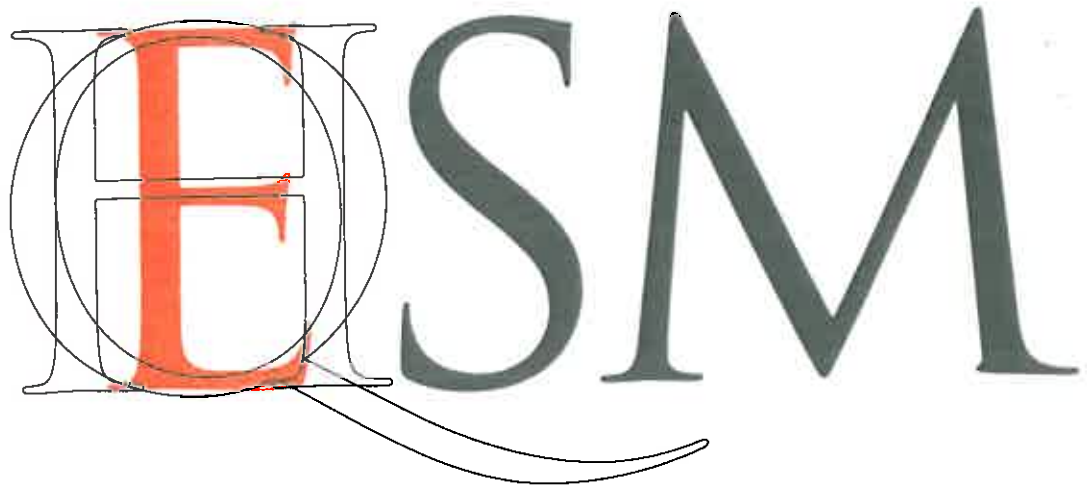
This simple geometric grid used by the stonemasons formed the basis for fourteen square-shaped characters: A, C, D, G, H, K, N, O, Q, T, V, X, Y and Z. Seven characters were based on the width of half a square: B, E, F, L, P, R and S. The letters 'I' and 'M' fall outside this system, but the 'M' is actually formed from a 'V' with added stems and the 'I' is a stem with serifs. The letters 'J', 'U' and 'W' were added to our alphabet later and as such there are no Roman examples of these. When used in text, the narrower letters appear heavier than the wider ones. The wider characters require more letter spacing. There are therefore a number of practical drawbacks to using the Roman inscriptional capitals as body text letters. Its square-based construction makes it impossible to create a narrower or wider version of the letters. These limited possibilities for extending the typeface were the reason that other typefaces were gradually designed in which the width of different characters became more uniform.

the margins available... and 50,000 to 60,000. Is... Well, the same ques-... air or a new musical... ay a part in this process... eptations. The desire for

the first characters to be... can be done using a word... cial characters, or by... he lazy dog' which... irst word has been... and the characters... abet can then be made... he figures, punctuation... als.

LAZY DOG

zy dog



Three letters are left. This illustrates a quick reference of western settings of Imperial Roi (Trajan), via Bodoni Classico by Frank to Linotype Comi journey spanning years of (serif)

C
C
C

Three letters are shown to the left. This illustration functions as a quick reference from the beginnings of western type design, with Imperial Roman capitals (Trajan), via Bodoni (here the *Classico* by Franko Luin) and then to Linotype Compatil Exquisite; a journey spanning almost 2000 years of (seriffed) type design.

L'histoire se répète With the invention of printing presses and the subsequent growth in the production of printed material, a uniform grey tone for the text block on the page and optimal legibility became more and more important. Type designers as well as printers – who certainly in the early days were responsible for good typography – became more aware of the details of type. There followed a centuries-long continual stream of new typefaces onto the market. The turning point in this development came in the 1950's with the arrival of the sans-serif Helvetica, stamped as cold and business-like, in which the width of the characters is relatively uniform. The text is greyer than grey and designers, with a common feeling of uneasiness, began searching for more expression in form and counter form between the white of the page and the black of the letter. The more specific uses of type also became more important, such as signage – for which Helvetica, with its uniform characters, was less suited. Adrian Frutiger's design for the signage at Roissy airport (the airport was later named Charles de Gaulle; the typeface was later named Frutiger for commercial release by Linotype), as well as Hans Eduard Meier's Syntax and Eric Gill's Gill Sans, are considered textbook examples for young designers. As such, a great many humanistic sans-serifs have been made that contain many similarities in form with the Imperial Roman capitals.



The three sans-serif typefaces shown here represent different design styles. Serifed types have undergone a clear process of evolution over time. Sans-serif typefaces have developed at a quicker rate. In less than fifty years, the designers have followed the style periods of the serifed types. From the Bauhaus period comes the Futura that, just like the *Capitalis Monumentalis*, is constructed with a square basis. The curves seem more closely related to a circle. Helvetica, the middle example, dates from 1958 but is constructed by revising an earlier grotesque style from c.1900. Helvetica's balance of positive and negative space in the letterforms produces a neutral appearance and a uniform tone in a text block on the printed page. Syntax, designed in 1954 and published in 1968, is constructed according to a humanist model, and can be seen as a reaction to both the corporate look of *Akzidenz Grotesk* and the machine ethos of Futura. As a humanist sans serif, Syntax has been used as a model for many subsequent designs, perhaps including Erik Spiekermann's *Meta*, which in turn proved so popular that it was called 'the Helvetica of the '90s'.

The lowercase letter: Lowercase letters did not exist in Roman times. Therefore there are no historical models for them as there are for the capitals. The handwritten, vertical square capitals and the rustic capitals written with a slanting quill were the starting points for the development of the uncial, the half uncial and the Carolingian minuscule.

The uncial has strong resemblances to handwritten capitals but the Carolingian minuscule (see p.13) contains many similarities to our lowercase letters. From this humanist lettering style came the first Venetian printing types. Examples of digital typefaces that use these historical models as their basis are Jenson Classico by Franko Luin and Monotype Centaur by Bruce Rogers.

 **L**asciate Ogni Speranza
Monotype Centaur 34 pt (Humanistic)

 **L**asciate Ogni Speranza
Monotype Baskerville 34 pt (Transitional)

 **L**asciate Ogni Speranza
LF TheSerif 34 pt (Slab-serif)

 **L**asciate Ogni Speranza
Linotype Trade Gothic 34 pt (Benton sans-serif)

 **L**asciate Ogni Speranza
Linotype Univers 50 34 pt (Neoclassical sans-serif)

 **L**asciate Ogni Speranza
LF TheSans 34 pt (Humanistic sans-serif)

The examples shown above illustrate that capitals are mostly heavier than lowercase letters. They also show that the x-height of sans-serifs is usually larger than in serif letters. Of course there is an exception to every rule. The weight of the capitals and lowercase letters in TheSerif and the TheSans is as good as equal.

Lowercase letters are generally drawn slightly thinner than capitals. The most likely reason for this is that it results in the initial capital of a sentence being more distinct. Some are of the opinion that it is a visual correction for the slightly heavier result of metal typesetting. Lowercase letters are therefore made slightly wider by the rounder and more closed forms. The difference in boldness is greater with the Monotype Baskerville than with many other typefaces. This difference in boldness can also often be seen in sans-serif typefaces. The examples above clearly show the differences in size of the same body size of different typefaces. Univers has a much larger appearance than Trade Gothic. The Regular style of each typeface has been used. The 'standard' boldness within this style also differs greatly.

Capitals
Construct

Two-stroke

Open side

Wide

Medium

Narrow

Lowercase
Construct

With ascender

With descender

Wide

Medium

Narrow

The word most new typeface. fontastic. A nut and construct letters of the this word. Dth Macaburgfont targetpositive favorite of P. the Forchez because he p with a descen

Classification according to form and construction Depending on their form and construction, the 26 characters of the alphabet can be arranged into groups, whereby a distinction is made between a group for the capitals and a group for lowercase letters.

Capitals Construction	Shape				
	Round	Rectangular	Round-rectang.	Diagonal	Diag.-rectang.
Two-storied	GS	EFH	BPR	X	KY
Open sides	C	LT		X	KZY
Wide				W	M
Medium	OQGS	EFLHT	BPRDU	VAX	NKZY
Narrow		I	J		

Lowercase Construction	Shape				
	Round	Round-vertical	Round-diag.	Diagonal	Vertical
With ascenders		b d f t		k	h l
With descenders	g	j p q		y	
Wide				w	m
Medium	ceog	bdpq	as	vyxkz	n h u
Narrow		jft			i l r

The word most often used to test new typeface designs is *Hamburgefonstiv*. A number of basic shapes and constructions used for the 26 letters of the alphabet appear in this word. Other words used are *Hamburgefons*, *Hamburgevios*, *Hamburgefonstives*, *Handgloves* and the favourite of Frenchman Jean François Porchez: *Hampurgefonstiv* (because he prefers an extra letter with a descender).

Hamburgefonstiv
Monotype Gill Sans (Eric Gill)

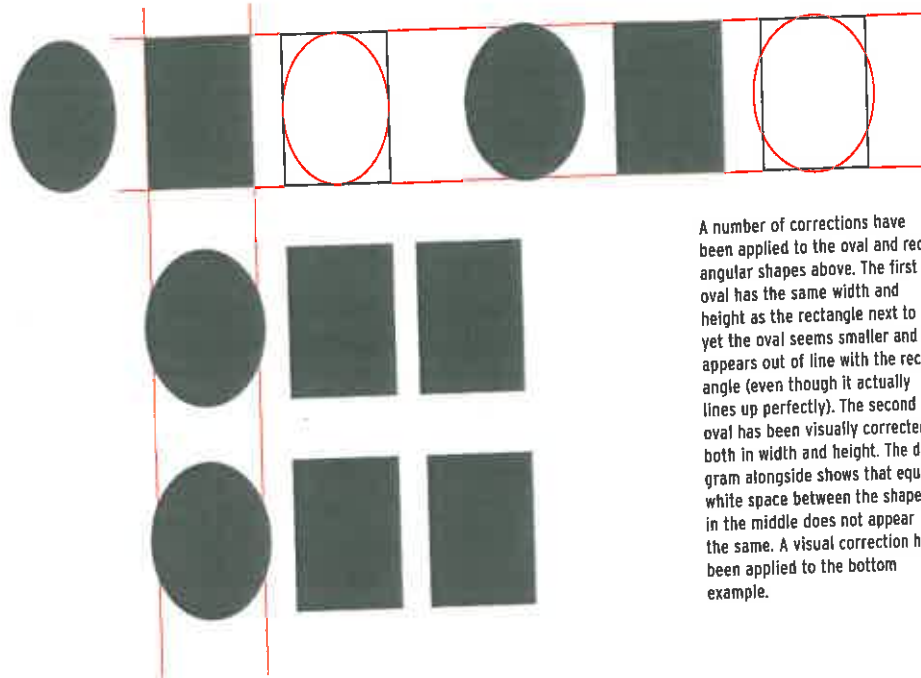
Hampurgefonstiv
FontFont Angle (J.F. Porchez)

Handgloves
Dolly (Underware)

HHH

The left hand 'H' has the cross-bar placed under the mid-line, with the middle 'H' it is placed exactly in the middle and on the right it is placed slightly above the middle. The right hand version is visually correct.

What you measure is not what you see As can be seen on the previous page, many different forms and constructions must be taken into account when designing a new type. As a result of the great many different characters that should work in harmony together on a text page, several rules have been developed over hundreds of years, which can be seen back in almost every typeface. An important visual correction is the extrusion of curved (and protruding) forms past the baseline and top line. This also applies to vertical alignment between curved and straight forms.



A number of corrections have been applied to the oval and rectangular shapes above. The first oval has the same width and height as the rectangle next to it, yet the oval seems smaller and appears out of line with the rectangle (even though it actually lines up perfectly). The second oval has been visually corrected, both in width and height. The diagram alongside shows that equal white space between the shapes in the middle does not appear the same. A visual correction has been applied to the bottom example.

A visual correction is also needed for the distance between letters. It is not possible to simply place letters next to each other with equal spacing between them. The letters must be altered to a uniform 'visual' white space. This means that the white space between the letters should appear the same. The form of the letter plays a role here. The test word 'minimum', which contains only straight elements on the sides, is a good starting point. Words should have a fluid formation and not look like a collection of separate letters. The letters must also not be placed too close together. On the next pages it will become clear that the white space in and around the letter is just as important as the letter itself. Or, as Dutch type designer Fred Smeijers wrote in his book *Counterpunch*: 'The white shapes form the background, the black the foreground. The background determines the foreground and vice versa. Change one and the other also changes. It is a balance between black and white.'



Both lines are of equal thickness and length, yet the horizontal bar appears thicker. A 'visual' correction is also required here in type design. A good example is the letter 'H'.

The 'H' and the Baskerville. The are lighter than 'G'. A visual correction has been applied h

mini
mini
mini
mini
minit

The word 'mir above in Aven The letter sp: cause all the defined. It is mine an acce letter spacir of a new desi sequently be clearly defin trade this is typc.

AI

This illustr heavy rom Antiqua Oe of the 'I' is the stem. I height real and descen the 'I' has to lack of

seen on the previous page, taken into account when designing different characters that several rules have been developed in almost every typeface. Overlaid (and protruding) lines to vertical alignment



A number of corrections have been applied to the oval and rectangular shapes above. The first oval has the same width and height as the rectangle next to it, yet the oval seems smaller and appears out of line with the rectangle (even though it actually lines up perfectly). The second oval has been visually corrected, both in width and height. The diagram alongside shows that equal white space between the shapes in the middle does not appear the same. A visual correction has been applied to the bottom example.

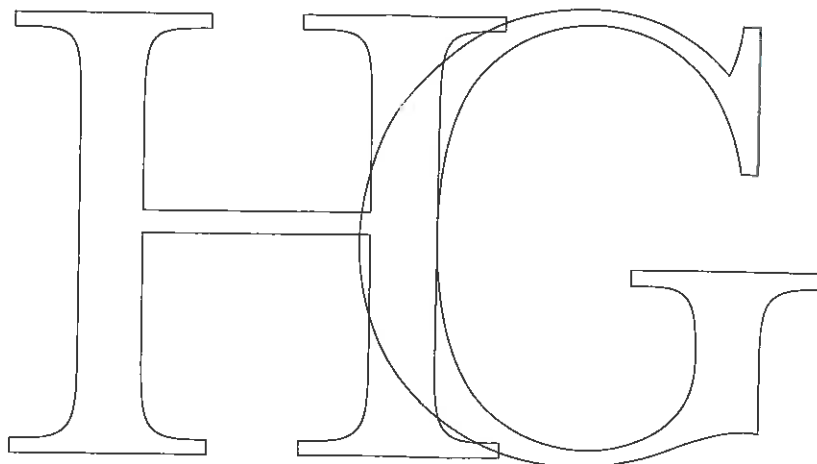


Both lines are of equal thickness and length, yet the horizontal bar appears thicker. A 'visual' correction is also required here in type design. A good example is the letter 'H'.

The 'H' and the 'G' of Monotype Baskerville. The stems of the 'H' are lighter than the curve of the 'G'. A visual correction has also been applied here.

minimum
minimum
minimum
minimum

The word 'minimum' appears above in Avenir by Adrian Frutiger. The letter spacing is uniform because all the letters are vertically defined. It is a good way to determine an acceptable amount of letter spacing in the early stages of a new design, which can subsequently be applied to the less clearly defined letters. In the trade this is called 'fitting' the type.



Important in the design of (body) type is to introduce a level of order to bring the apparent chaos of form and counter form into balance, so that the reader can focus undisturbed on the content of the text. In practice, a whole arsenal of visual corrections is applied to a typeface in order to avoid unwanted visual phenomenon.

As can be seen with Antique Olive by Roger Excoffon below, breaking the rules can also create a useable typeface. Antique Olive is a letter that is extremely legible and which in its time was very popular. It is a letter that provokes passionate reactions. You either love it or you hate it. That it has an extremely large x-height can be seen here when we set the text using the same point size but switch to Antique Olive: **Antique Olive**.

The capital 'S' has an upside-down appearance, the large x-height results in a squashed cross stroke of the 'f' and the curves of the 'o' and 'e' are somewhat top-heavy. This design challenges almost all the rules of visual correction. The Nord style was first designed around 1956 for a poster and the Air France logo. Antique Olive was subsequently extended by a commission from the typefoundry Fonderie Olive to compete with Helvetica and Univers.

Antique Olive

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890

abcdefghijklmnopqrstuvwxyz

Antique Olive Nord - AIR FRANCE

This illustration shows how top heavy some of the letters of Antique Olive are. The cross bar of the 'T' is exactly as thick as the stem. The extremely large x-height results in short ascenders and descenders. The cross bar of the 'T' has been moved down due to lack of space.