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### How to look at a reading font

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# How to look at a reading font

ANDREW CROMPTON

<sup>1</sup> – David Diringer, *The Alphabet* (London: Hutchinson, 1948, 1968), frontispiece.

<sup>2</sup> – ‘It is evident that in considering the face of a fount of type we are in a world of art, styles, difficulty of saying what styles, inherited forms, human hands; a humble art it may be, but not a mechanical proceeding or anything susceptible of scientific treatment’. Harry Carter, *A View of Early Typography up to About 1600* (Oxford: Oxford University Press, 1969), 24.

<sup>3</sup> – ‘Each instance of the “A” spirit reveals something new about the spirit without ever exhausting it.’ Douglas Hofstadter, ‘Metafont, Metamathematics and Metaphysics,’ *Visible Language* 16, no. 4 (1982): 309–38.

<sup>4</sup> – Eleanor Gibson and Harry Levin, *The Psychology of Reading* (Cambridge MA: MIT Press, 1975), 165–66.

Every alphabet in the world evolved from a single original that appeared in the Middle East about three and a half thousand years ago. In his history of the alphabet Diringer illustrated this fact with a drawing of a tree whose branches are different alphabets and whose leaves are languages, with English the top leaf (figure 1)<sup>1</sup>. It implies that something continues from one alphabet to another. What could that something be?

This germ, if it exists, is hard to locate. It does not play a part in the development of writing and printing as it is described art historically.<sup>2</sup> Nor can it be seen in individual fonts. Normally they are described by extension, that is, by showing all their letters, so avoiding having to give an explicit description of what binds them together. What connects them cannot be something they all share. Letters in an efficient font should not have anything in common; if they did, being always present, it would not communicate anything. Nor does there seem to be any thread linking instances of particular letters. By comparing many different versions of the letter ‘A’, Hofstadter concluded that nobody could possess the secret recipe from which they could all be generated.<sup>3</sup> He called letterforms open sets.

Even so, there is something about writing we can recognise as being writing even if we cannot read it. From whatever culture it comes, it will nearly always be a pattern made from a finite inventory of basic units with gaps, in lines, unidirectional, with a fixed orientation. Yet even this hand-waving description can be undermined. For the vast number of scripts an exception can be found to any characteristic.<sup>4</sup> Being difficult to define seems to be a universal feature of writing. Let us then consider the possibility that it is not something positive that letterforms share but something negative.

What follows deals only with Latin alphabet fonts of the sort known as reading fonts and does not necessarily apply to calligraphy or to the decorative and fancy fonts used in titles and advertising. Reading fonts are used for the body text of library books. They have serifs and are suited to fast reading measured in words per minute. Furthermore, let us only be concerned with how ordinary readers perceive them. To observe that few people could describe the font in the book they had just read is not to deny that a typographer might be able to do it.

What do we see when we look at a reading font? During reading we are conscious of words, not letters. Unless a spelling mistake or a letter in the wrong font interrupts us, we will be unaware of them. Anything we notice about letters, other than the words they make, is information we do not need, that is to say, noise. If even a single letter from another font is introduced into a line of text it will be noisy in just this sense. Figure 2 shows some examples. Entire words in an alien font are even more conspicuous.

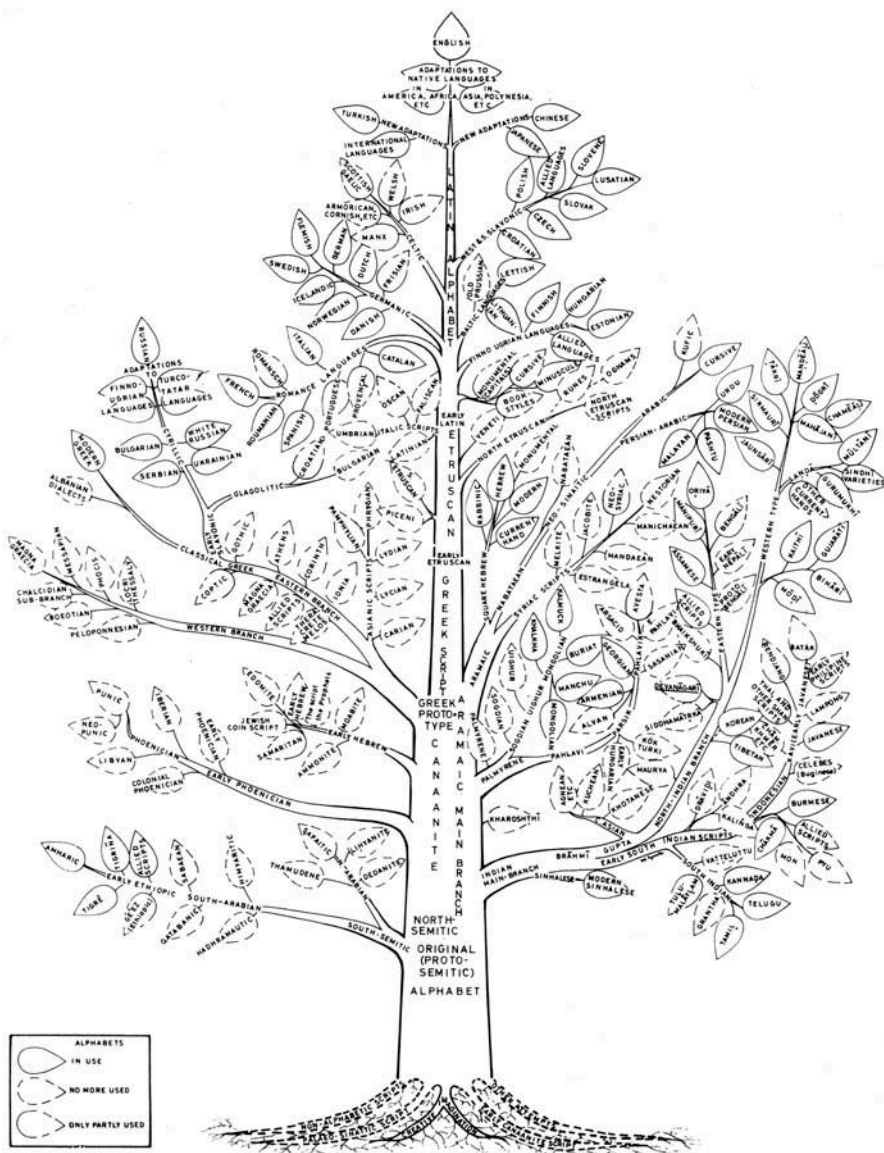


Figure 1. Diringer's tree of alphabets, from *The Alphabet* (see note 1).

The fact that we know immediately that a letter is wrong suggests the following rule for membership of a font: a letter belongs to a font if it does not stand out when mixed with the others. This rule defines letters locally. Whether a letter belongs or not depends only on its neighbours and not on its conformity to some rule about how ideal letters should be formed. Alien letters are perfectly good in the right company. This rule is too weak to generate a font from scratch because we can only test each letter in turn, supposing the others already exist. Nonetheless, each letter is reciprocally defined by the others. We could replace a missing letter in the same way a missing piece of a jigsaw can be reconstructed, approximately, from those that remain. To this extent fonts are self-describing. Letters are camouflaged

Suppose, then, that we set out to investigate excuses,  
 Suppose, then, that we set out to investigate excuses,  
 Suppose, then, that we set out to investigate excuses,

Figure 2. In each of the three lines in figure 2 occurrences of a particular letter have been substituted for one from a different book, and can be seen to be out of place.<sup>5</sup>

5 – p, a, s

in their own font in the way a jigsaw piece is hidden in a broken-up jigsaw. A font is thus a self-camouflaged, self-describing set of shapes that are otherwise as different as possible.

6 – George Lakoff, *Women, Fire, and Dangerous Things* (Chicago: University of Chicago Press, 1987), 157–84.

7 – Eleanor Gibson, *Principles of Perceptual Learning and Development* (New York: Meredith Corp, 1969), 88.

Let us compare this definition with the standard scientific description of letters. Science treats letters as entities with fixed properties that are either atomic or consist of logical combinations of atomic properties. This is an example of what cognitive linguists call the objectivist paradigm.<sup>6</sup> An early objectivist description of the alphabet was made by Eleanor Gibson who treated letters as bundles of simple features such as horizontal, vertical or diagonal lines. Her distinctive feature matrix for generic Roman capitals is reproduced in figure 3.<sup>7</sup> In it we see that letters never differ in just one feature, but in several, as if trying to be as different as possible. Notice that the columns of her matrix are not in alphabetical order. She reordered them to try to fit the letters into a pattern but could not make one emerge. All we ever see is a family resemblance between letters.

8 – Stanislas Dehaene, *Reading in the Brain* (New York: Viking, 2009), 54–119.

9 – Ibid., 12–18.

Our visual system recognises letters using neural networks to identify their features before deducing which one it must be of a range of known possibilities.<sup>8</sup> This process culminates in the left occipito-temporal cortex which will register a letter 0.15 seconds after image onset, whether we like it or not.<sup>9</sup> This description of the letter recognition process, working like a scanner with optical character recognition software, may be a more or less complete description of how machines read letters, but for humans, as will be seen, there are other factors to take into account.

Matrices like the one in figure 3 cannot be the basis of a universal description of letters because every font has slightly different features. This variety hampers letter recognition by machines. They are only reliable if

Figure 3. A distinctive feature matrix for generic Roman capitals.  
 Source: From Gibson, *Principle of Perceptual Learning and Development* (see note 7).

| Features             | A | E | F | H | I | L | T | K | M | N | V | W | X | Y | Z | B | C | D | G | J | O | P | R | Q | S | U |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>Straight</b>      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| horizontal           | + | + | + | + |   | + | + |   |   |   |   |   |   |   | + |   |   |   | + |   |   |   |   |   |   |   |
| vertical             |   | + | + | + | + | + | + | + | + | + |   |   |   |   | + | + |   |   |   |   |   | + | + |   |   |   |
| diagonal /           | + |   |   |   |   |   |   | + | + |   | + | + | + | + | + |   |   |   |   |   |   |   |   | + | + |   |
| diagonal \           | + |   |   |   |   |   |   | + | + | + | + | + | + | + |   |   |   |   |   |   |   |   |   | + | + |   |
| <b>Curve</b>         |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| closed               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | + | + |   |   |   | + | + | + | + |   |
| open V               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | + |   |   |   |   | + |
| open H               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | + |   | + | + |   |   |   |   |   | + |
| Intersection         | + | + | + | + |   |   | + | + |   |   |   |   | + |   |   | + |   |   |   |   |   |   | + | + | + |   |
| <b>Redundancy</b>    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| cyclic change        |   | + |   |   |   |   |   |   | + |   |   | + |   |   |   | + |   |   |   |   |   |   |   |   |   | + |
| symmetry             | + | + |   | + | + |   | + | + | + |   | + | + | + | + | + | + | + | + |   |   | + |   |   |   |   | + |
| <b>Discontinuity</b> |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| vertical             | + |   | + | + | + |   | + | + | + | + |   |   |   | + |   |   |   |   |   |   |   |   | + | + |   |   |
| horizontal           |   | + | + |   |   | + | + |   |   |   |   |   |   |   | + |   |   |   |   |   |   |   |   |   |   |   |

they have previously been trained with a font. On the other hand, we can read an unfamiliar font because we use words to recognise letters, something we can glimpse ourselves doing with bad handwriting when we guess a word before working out how it was penned. Machines cannot do this because recognising words is computationally far more difficult than identifying shapes. In consequence, reading handwriting and random library books is a shibboleth for being human.

It would be better for machines if there were only one font in the world. Why are there so many of them? Printing is sometimes given as an example of the mass production of identical objects, but that is to look at it from the printer's point of view. The reader's experience is that every book is in a fresh font. If we read one a week for fifty years a stream of around a billion letters will pass before our eyes, and every few days those letters will change their shape in small and unpredictable ways. All this variation deserves an explanation. Its purpose, I suggest, is camouflage. It prevents us noticing anything about letters over and above the words they make. Letters need a symmetrical description that treats them positively, as a set of distinct objects that are easy to recognise, and negatively, as nondescript camouflaged objects. It bears emphasizing that these requirements are not incompatible. Indeed it is not far from the standard view in typography that letters which are too similar fail because it is difficult to pick out individual letters, but if they are too individualistic we lose the thread of reading.

Far from imposing themselves upon us as shapes that are easy to recognise, many letters escape us completely. Only rarely does meaning hinge on a single glyph; normally words are sufficiently redundant for us to guess which they are, without having to examine every letter. Eye-tracking experiments show that our fovea skips along taking them in four or five at a time.<sup>10</sup> One is amazed to learn that our glance is so cursory that every so often it needs to go backwards to check something, yet we are unaware of these reverses.

Instead words seem to flow before our eyes accompanied by a voice, or at least some kind of presence. This may be an illusion we construct for ourselves, yet it is normal behaviour and what we teach children to do. I suggest that reading fonts help us stage-manage this performance by being easy to overlook. In the sense that Michael Polanyi used the term, letters are transparent.<sup>11</sup> In the language of experimental psychology, they can be both target and non-target. Particular letters can be missing and we do not notice. We detect lipograms not by observing that such-and-such a letter is absent but because stilted writing alerts us that something is afoot.

Letters vanish despite the fact that, unlike machines, we are creative, pattern-making, coincidence-perceiving creatures. The significant and remarkable fact is that when we look at a line of letters we do not at the same time see patterns or relationships between them, nor any style or history, nor are we aware of them belonging to a font as a thing we can name. These otherwise unwanted objects of perception are simply not there. Typographer F. W. Goudy put it this way: 'The perfect type would be completely invisible'.<sup>12</sup> Let us take him at his word and see just how far letterforms go to avoid appearing to us as physical, cultural, or historical objects.<sup>13</sup>

10 – Ibid., 25–31.

11 – Michael Polanyi, *Personal Knowledge* (Chicago: University of Chicago Press, 1958), 49–57.

12 – Quoted in Andrew R. Boone, 'Type by Goudy', *Popular Science*, April 1942, 114.

13 – Although not good book fonts, Palatino and Times will be used as examples because the reader can check them for him-/herself.

<sup>14</sup> – This dialogue with human perception has been dated to 1557 when Hautlin produced a tiny six-point face. Henceforth the lower limit for detail was what could be read rather than what could be made. Fred Smeijers, *Counterpunch* (London: Hyphen Press, 1996), 64–65.

### **Letters do not have fixed forms**

Not only do they change with every book, each letter also appears in several sizes, in italic, in upper and lowercase, and altered to accommodate their companion in ligatures. Contrary to what letter recognition would seem to require, letters are not fixed shapes but vary according to their situation. This changeability is not troublesome to us, because we can always recognise letters from the words they make.

### **Letters have details that go beyond what can be seen with the naked eye**

Visual depth undermines what you can know about a letter because whether they possess features or not becomes ambiguous when all their complexities are taken into account. What we can say about them depends on their size and our eyesight.<sup>14</sup> Gibson marks ‘A’ as symmetrical in her matrix, but in most fonts one leg is thicker than the other so whether it really is symmetrical is arguable. Only to a first approximation are letters made of straight and curved lines: except for the minute vertical part of some serifs, every edge in Palatino is curved when seen at sufficient magnification. The letter ‘P’ usually has a closed bowl, but in Palatino it is open, if you look closely enough.

### **No letter is an odd one out**

In Gibson’s matrix every feature occurs in several letters. Unique features are hard to find; the most prominent is probably the tail on a ‘Q’ (if it is not like the tail on the ‘R’), and the lowercase ‘g’ (if it has a double bowl and an ear). Exceptions like these are more conspicuous to a typographer than an ordinary reader. You cannot make a particular letter pop out of a page by searching for the feature that it alone contains. Notice how difficult it is to count instances of letters on a page, they vanish in the midst of their companions like animals in a herd.

### **It is surprisingly difficult to make a statement based on relationships between letter shapes**

Letters do not enter into relationships with each other. No letters are opposites or form a natural pair. Nor is there any redundancy in features; in other words it is never true that ‘all letters that are — are also —’, (where — stands for some feature). This can be deduced from Gibson’s matrix in which no row is a subset of another. Nor is it easy to place a letter in this or that half of the alphabet using some property they share because fonts vary in their details. You cannot separate letters into those with and without serifs because of the fuzzy boundary between a serif, something like a serif, then no serif at all. Similarly, although letters can be divided into upper and lower case, the uppercase letter is sometimes a larger version of the lowercase ones so an isolated letter may not be easy to classify.

### **Letters cannot be ranked according to any property they possess**

Letters form a heterarchy, not a hierarchy. There is no centre to a font, no prototypical letter in relation to which the others can be situated. There are no extreme letters that catch our eye. It would be a defect in a font if the biggest or smallest letter were obvious, and in practice it is impossible to order them by size.

The heights and areas of TrueType letters can be measured very accurately: Palatino letters, upper and lowercase, to one per cent accuracy, come in eight different heights, but all we really observe is that they are different.<sup>15</sup> Is it obvious that ‘j’, with its dot, is the tallest or that ‘z’ the shortest, or that by area of ink the order begins ‘M, Q, W’ and ends ‘y, r, i’? For other fonts, the letters are ranked differently. In Times, ‘s’ has the smallest area. The only constant order letters have is the arbitrary alphabetical order. Here we see an advantage of there being so many fonts: we cannot form any consistent idea of which letters are the biggest or smallest, or identify any necessary feature. In the flickering stream of a billion letters every fact about them is undermined eventually.

### Letters avoid nameable geometrical shapes

The primitive shapes we learn as children — squares, circles, crosses, triangles, and the like — are the very ones that we do not afterwards encounter in books. They do appear in decorative alphabets with a geometrical theme, Bauhaus designs for example, but these are unsuitable for fast reading precisely because they impose on us a series of objects we can name. To read them we must habituate ourselves to a stream of information we do not need. The essence of ‘A’-ness is not geometrical, says Hofstadter.<sup>16</sup> ‘O’ is never a circle in a reading font.

### Letters avoid regularity

The letter ‘E’ in figure 4 has its middle bar slightly above halfway and slightly shorter than the top and bottom bars. Compared with a real letter the rectified letterform on the right with everything on grid looks a little wooden. Deviations from mathematical purity like this are sometimes justified as being optical corrections.<sup>17</sup> Be that as it may, avoiding simple relationships between their parts has another advantage: when the bar is in the centre you can say and know something definite about the letter; when it is off-centre you cannot be quite so sure. To be inconspicuous, well-formed letters avoid structure and order.

### Fonts are hard to name

An ordinary reader will be unable to name a font in a random library book, or even say if they have seen it before. When fonts such as Times or Palatino eventually become familiar they become passé. If a font is to be easy to read it must be fresh.

### Letters lack well-formed names

In English there is no clear mapping of letters to sounds. Their phonetic value, which of course might be none for a silent letter, depends on context so cannot be used as a unique signifier. This is probably good for reading, since it is one fewer thing to be said about letters, a little less information we



15 – Measured to three sig. fig. they come in twenty-four different heights.

16 – Hofstadter, *Visible Language*.

17 – Jost Hochuli, *Detail in Typography*, trans Charles Whitehouse (London: Hyphen Press, 2008), 15–19.

Figure 4. Univers E and a geometrically regular shape like a letter E.

18 – English orthography may be optimal for reading. Noam Chomsky and Morris Halle, *The Sound Pattern of English* (New York: Harper & Row, 1968), 176–77.

19 – From ‘Confessions’, by Robert Browning, *Dramatis Personae* (Boston: Ticknor & Fields, 1864), 149.

20 – Letters are started with a hole made with a counterpunch, then the shape is made by subtraction around the hole. Smeijers, *Counterpunch*, 128, 132.

21 – M. A. Changizi, Q. Zhang, H. Ye, and S. Shimojo, ‘The Structures of Letters and Symbols Throughout Human History are Selected to Match Those Found in Objects in Natural Scenes’, *American Naturalist* 167 (2006): 117–39.

22 – Frances A. Yates, *The Art of Memory* (London: Routledge and Kegan Paul, 1966).

23 – *Oeuvres postumes de Victor Hugo: Alpes et Pyrénées* (1839) (Paris: J. Hetzel & Co. 1903), 50–51.

do not need.<sup>18</sup> While glyphs for numerals and punctuation have names we can write, such as one, two, comma, and so on, the ways we name letters are a little clumsy. Either we show them as images separated from the text by quotation marks, like so: the letter ‘a’, or we spell how they sound in alphabetical order: a, bee, cee, and so on. These are not proper names since they are translated in other languages and not always dignified with a capital letter. They seem puzzling when they appear in print:

—their eyes might strain  
And stretch themselves to Oes,<sup>19</sup>

Letter names such as ‘Oes’ carry a taint of being non-words. They are in the OED but do not appear in spell-checking dictionaries, since they are more likely to be a spelling mistake than a word.

### Letters are not made of lines

This may be true of handwriting with a ballpoint, but with reading fonts the black parts can be seen either as edges in their own right or as regions of black with two edges. The inner areas are as carefully designed as the surrounding black parts so we cannot always say what is figure and what is ground, or even, therefore, whether letters are white or black.<sup>20</sup>

### Letters are hard to describe metaphorically

To be truly ineffable letters must avoid looking like other objects. The letter ‘A’ may resemble a roof in a sans serif font but in a reading font one rafter is thicker than the other and there are feet. Parts of letters perhaps resemble bones, chair legs, or classical columns, but only a themed display font would make this obvious. Letters are visually isolated; their varying stroke and peculiar details separate them, metaphorically, from the world of things.

Letters, it is true, are used as the names of shapes like T-junctions, O-rings, S-bends and so on. Other letter-shaped junctions can be found at the edges of objects and where they overlap. The fact that the earliest alphabets, Phoenician and Greek, were collections of simple linear shapes like these has given rise to a theory proposing a natural origin for the alphabet.<sup>21</sup> It sees letterforms in our everyday visual field, the typographical equivalent of Laugier’s primitive hut which gathered the elements of architecture from nature. But even if it were true that ‘T’ originally made a good letter because it was easy to scratch and recognise, that is no longer the case today. Asked to describe a T-junction no one would draw a serif letter. At best these shapes live on as skeuomorphs, relics of how simple letters were once made.

Alphabetical order allows letters to be visualised in a row onto which it is easy to map objects using methods described in the Art of Memory<sup>22</sup>. Illustrated alphabets, starting A is for Apple and so on, are ways of learning letters by giving them something they lack, associations to things we can name. As children master reading these supports are discarded. Illustrated alphabets based on the actual shapes of letters are much harder to create. Victor Hugo’s alphabet beginning ‘A the roof, B the hunchback’, and ending ‘Z it’s lightning, it’s God’. is a *tour de force*, all the more remarkable for containing so many props from *Notre-Dame de Paris*.<sup>23</sup>



It follows that it is a condition of the possibility of an image appearing within printed text that any cultural signification it might have had is lost. Fleming described sixteenth-century arabesque printed flowers that were used as decorative incidents in printed books. They were believed to be destitute of natural symbolism, supported by the rumour that Islamic art had developed in response to the Koran's injunction against figural representation.<sup>24</sup> Her own explanation of the lack of significance is that 'free beauty is predicated on, and given motivation by, the historical, technological and colonial experience of sixteenth-century Europe'. To this it can be added that a lack of significance was necessary for the flowers to mingle with text in the first place.

24 – Juliet Fleming, 'How to Look at a Printed Flower', *Word & Image*, 22, no. 2 (2006): 165–87

### **Fonts are hard to describe metaphorically**

Experimental evidence of their evasiveness comes from Burt, who asked subjects to rank typefaces in order of preference, then give their reasons.<sup>25</sup> They replied that type could be 'cold, stiff, rigid', 'homely, unassuming', 'whimsical', 'aristocratic', 'like an Adam façade', and 'brings back memories'. Burt commented: 'These unself-conscious responses were so illuminating, that the whole procedure almost takes the character of a camouflaged "projective test"'. Their openness to a personal interpretation, like Rorschach inkblots, might be taken as evidence that fonts do not have anything obvious associated with them. A worse subject for ekphrasis is hard to imagine.

25 – Cyril Burt, *A Psychological Study of Typography* (Cambridge: Cambridge University Press, 1959), 18–24.

Anything that can be said about a font encumbers it. A folk taxonomy of display fonts divides them into genres: horror; futuristic; romantic; fun; science fiction, or ways of making letters: typewriter; stencil; graffiti; and so on. They all deliver information supplementary to the written message. In graphic art this may be desirable but compared with a reading font they are noisy. The only style a reading font can possess is one based on a family resemblance between the letters. This model of style, in which the individual unit exists societally in relation to the others, can be recognised but not described, except by extension.<sup>26</sup> There is little to hang a name on other than the circumstances of its creation, and we can understand why Carter might say that much the best indication of the character of a face is the name of the person who cut it.<sup>27</sup>

26 – 'Persons and styles are likewise irreducible, to which we might add, so are fonts.' Berel Lang, 'Looking for the Styleme,' in *The Concept of Style*, ed. Berel Lang (Ithaca, NY: Cornell University Press, 1979, 1987), 174–82.  
27 – Carter, *A View of Early Typography up to About 1600*, 22.

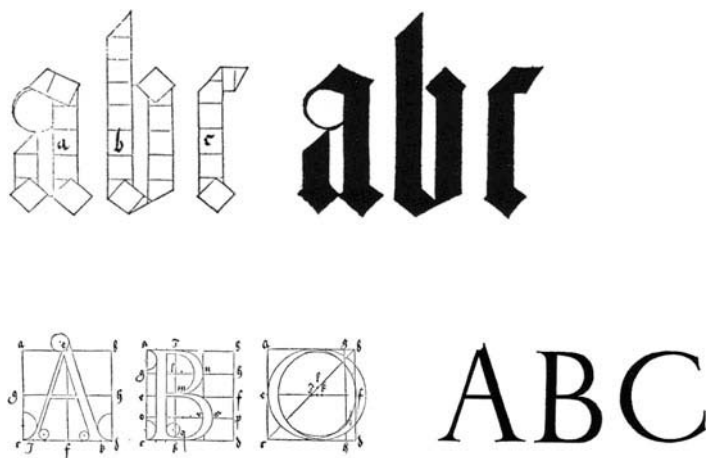
### **Letters are difficult to represent as models**

The geometrical diversity of letters is not limited to superficial differences in shape and proportion. At a deeper level they are topologically different. This causes awkward problems when letters are made as three-dimensional objects on buildings and signs. Those in two pieces, {i, j}, need an external support to connect them. Some are simply connected, {s, t}, others are multiply connected with one hole {o, b}, or two holes, {B, g}. Some stand on two feet while others fall over. Modelling letters as holes is no easier. Made as stencils, multiply connected letters must have their inner parts connected to the rest of the letter by bridges.

### **Letters are difficult to draw**

To copy a handwritten signature takes a special skill. Printed text is absurdly difficult to draw or paint. Where texts, inscriptions, and graffiti do occur in

Figure 5. Dürer reduced hand drawn and carved letter forms to combinations of simple geometrical shapes. Albrecht Dürer, 1538. Source: *The Painter's Manual*, trans. Walter L. Strauss (New York: Abaris Books, 1977), 308, 310.



28 – Svetlana Alpers, 'Looking at Words: The Representation of Texts in Dutch Art', *The Art of Describing* (London: Penguin, 1983), 169–221.

29 – 'Unlike most of his representations of writing, Rembrandt does not simply indicate the presence of the text with illegible signs that imitate the look of writing on a page ... the Hebrew characters are clearly readable, although the text is problematic or impossible.' Joseph L. Koerner, 'Rembrandt and the Epiphany of the Face,' *Representations* 12 (1986): 5–32.

30 – 'From the invention of the first roman type in 1465 until the end of the seventeenth century punchcutters depended on a calligraphic original'. Stanley Morrison, *On Type Designs Past and Present* (London: Ernest Benn, 1926, 1962), 55.

31 – In our own time Smeijers has undergone this process and describes punchcutting tacitly. Smeijers, *Counterpunch*, 132.

32 – Jan Tschichold, *Asymmetric Typography*, trans. Ruari Mclean (London, Faber & Faber, 1935, 1967), 20, 26.

paintings they are usually represented illusionistically as if the words are just out of sight.<sup>28</sup> Where, artistically, it is necessary to show the letters rather than the word and yet not be obvious nonsense, a paradoxical problem is posed. In Rembrandt's 'Moses with the Tables of the Law', the Hebrew characters are clearly readable, although the text is problematic or impossible.<sup>29</sup>

Although early punchcutters may have used pen-made text as a model, they did not work from drawings; at any rate no prior representation of the letters has survived.<sup>30</sup> Instead, they were carved in steel directly and it was in the punch that they first became visible. Artists like Dürer who drew printed letterforms were not defining shapes that would subsequently be made into letters, but analysing objects that already existed. His method, seen in figure 5, was to locate significant points on a grid, then join them with lines and curves that were either circular or nearly so. This is the same reductive strategy taken today by the Postscript language used to draw letterforms.

### Letters contain little trace of how they are made

Handwriting contains a signature as well as traces of the pen or brush used to make it. To the great benefit of readers, these possibilities of description were lost when printing was invented. I do not believe there is anything in the shape of a printed letter to suggest that they were created by carving steel punches. In any case, punchcutting was a tacit skill only ever communicated to apprentices who learned through doing, and there has never been any explicit description of its procedures.<sup>31</sup> In metal type there is both the absence of a subject and the absence of an author. Typography ought to be a humble craft and no font should be the work of a celebrity, or be known as such. Carrying no maker's mark allows what has been written to speak without accent and without noise.

### The layout of text should not be easy to describe

Principles of layout such as not repeating words one under the other, not having rivers, rules about breaking words at the end of lines, etc., can be understood as avoiding relationships and events to which the eye could be drawn. Book designer Jan Tschichold thought that the idea of symmetry stood in the way of all true solutions to typographic problems.<sup>32</sup> Modern

styles of layout like his have no regular structure that can be pointed out; every margin is a different size. Well-designed books do not have grids like telephone directories.

To sum up, here is a sketch of what little we know positively about reading fonts. A given font will have its own set of distinctive features to which we become quickly habituated and which we cannot remember. For obvious reasons, letters are black, but not always. An 'A' is the only letter with an apex pointing upwards, except possibly for the 'W', which is like two 'V's in many fonts. The 'o' is always closed in a reading font. Letters at the end of the alphabet are more angular than those at the start. There are more distinctive features in the top half of a line than in its bottom half.<sup>33</sup> Italic letters with serifs resemble the slanting figures and whizz lines used to signify speed in cartoons. And so on: these facts are a poor description; they are best seen as weaknesses in camouflage.

Compare this with what we know negatively about fonts. They do not form a classical set based on accident and essence, nor are they governed by a prototype, but are a self-camouflaged, self-describing set of different objects. Letters do not refer to, or resemble, objects or ideas outside their font which are closed and unified sets. There is no hidden unity to be grasped, no font to rule them all. They come and go without any order or structure. Presented with a sample of text there should be nothing you can say about it; you can and should merely read it.

Yet the lure of an underlying unity, even a mystical unity, is strong. What joins letters together in a font Hofstadter called spirit. Avid for essences, we can pretend that what binds letters in a font is something mysterious, but in reality there is nothing there, and it is necessary for an efficient font that this be so. Wittgenstein describes the paradox of absence in family resemblance sets as follows:

But if someone wished to say: 'There is something common to all these constructions — namely the disjunction of all their common properties; — I should reply: Now you are only playing with words. One might as well say: 'Something runs through the whole thread — namely the continuous overlapping of those fibres'.<sup>34</sup>

Let us compare a line of letters with this thread and ask what passes along it. With a reading font there will be no theme or style linking the letters. We cannot pick out the irregular rhythm made by a particular letter because the instances of it are camouflaged along the line. We do not notice when sequences of letters sharing a feature occur together by chance. The longest word that can be made with short letters, which happens to be 'necromancers', does not stand out for that reason. In display fonts and some sans serif fonts hints of patterns can emerge. For example pairs of 'OO's can look like eyes or holes in text. Sequences of round letters can become noticeable in broad sans serif fonts like ITC Avant Garde Gothic. Sans serif 'i' and 'l' can merge confusingly in words like 'dill'. Professional typographers, being attuned to seeing letters, will be more sensitive to these issues than an ordinary reader. For most of us a page of a library book presents a blank field devoid of pattern or feature. So easy is it to project a field of letters into the background that any mark, even a fly, stands out almost as clearly as on white paper. What we cannot speak about we must pass over in silence. What is this but a description of reading?

33 – Strange to say, we read more of the top of a line. Eleanor Gibson and Harry Levin, *The Psychology of Reading*, 170.

34 – Ludwig Wittgenstein, *Philosophical Investigations*, trans. G. E. M. Anscombe (Oxford: Basil Blackwell 1968), 32.

The idea that fonts are a self-camouflaged set has a corollary. As depicted here, letters straddle the threshold of what we can perceive or describe. Where this occurs exactly will depend on a reader's eyesight and powers of perception. It follows that if a font is adapted to a particular level of acuity it might raise difficulties for both very dull and very observant readers. Let us, for the sake of argument, imagine someone who could instantly distinguish different serifs and recognise letters by them, or perhaps who was a strong systemiser and could see groups and relationships between letters. Such unusual abilities are found in people on the autism spectrum. Useful though these skills might be in other circumstances, these people might in consequence have difficulties making letters vanish and be word-blind through seeing them too clearly. Oddly, being able to read easily may depend on our powers of observation being a little weak.

It is easy to suppose that what distinguishes us from other apes is something we possess that they do not. That something is surely not athletic ability, patience, physical strength, or acute senses. In all these matters the advantage lies with a gorilla. They could be just as good as we are at recognising letter shapes, but still be no more able to read than a machine. Reading begins when letters vanish. It was by a darkening of our senses, by precisely no longer being able to know or see everything, that the word became visible.

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