Chapter 1: Typography and language: a selective literature review

In this chapter I shall review some of the typographic literature to give an impression of the 'story so far'. The review is necessarily selective, and leaves out a great deal of valid and useful information about particular typographic problems. The purpose is not to list all that is known, but rather to sketch a background to the theoretical problems addressed in this study. By 'typographic literature' I mean writings that have explicitly set out to discuss some aspect of typography, rather than writings on other topics that might conceivably be relevant to typography (although I introduce quite a number of these in later chapters).

It is appropriate to start by looking at what typographers themselves have written, before considering the approaches taken by those psychologists and linguists who have addressed typographic issues.

Typographers on typography

British typography is still heavily influenced by 'the great and the good' book typographers of the Anglo-American pre-war tradition, (for example Rogers 1943, Morison 1951, and Updike 1937). While they contributed a great deal of intelligent and scholarly writing on typography, it was mostly of a historical or technical rather than a theoretical character. Above all, they were concerned with the revival and creation of beautiful and effective letterforms, and with the design of readable prose, mainly for books but also newspapers. We should remember that the concept of 'typography' as an abstract entity was relatively new, as was the profession of 'typographer'. On the written evidence, it seems that they did not view typography as part of language so much as a channel for its transmission. Beatrice Warde's 'crystal goblet' metaphor (1955) encapsulates the idea of typography as a transparent vessel adding no colour of its own to the author's meaning.⁷ In order that typography could be completely natural and unobtrusive, letterforms must be perfectly formed and free from mannerisms, lines and columns of type must be arranged to carry the eye smoothly along free from distraction or fatigue. This ideal was not original: the best printers have always been conscious of their responsibility as a channel for clear communication. Perhaps no one has expressed the ideal better than Joseph Moxon (1683/1962: 211):

'A good Compositer is ambitious as well to make the meaning of his Author intelligent to the Reader, as to make his Work shew graceful to the Eye, and pleasant in Reading.'

While we do not normally associate this school of typography with 'functionalism', the crystal goblet tradition established two valuable characteristics in the evolution of today's 'information designers'. Firstly, the designer's role is, on the whole, seen as a facilitative one in which the function of the book as a channel of communication between the author and reader takes priority over its status as an art-object or as a monument to its designer.

Secondly, the traditionalists exhibited a finely-tuned sense of appropriateness—alongside legibility, they have a concern for what typographic researchers were later to call 'atmosphere value'. Works of literature, in particular, were best set in a typeface of their period, and conversely 'If the subject matter be of a serious or scientific nature the severest style is the most suitable' (Rogers 1943). And because he recognized a distinctive 'eye-catching' function for publicity material, Stanley Morison was prepared to break all of the normal rules of elegant typography in his Gollancz book jackets and other items intended to catch the eye (cf Morison 1928).

⁷ Models and metaphors for communication are discussed further in Chapter 5.

Taken literally, pure crystal-goblet typography might lead us to find a 'correct' way of arranging type and stick to it, whatever the task in hand just as some typographers of the Swiss school (discussed below) might use only a single sans serif throughout their careers. 'Correct' might mean the most ergonomically effective type, or the type most consistent with the 'spirit of the age'. Indeed, this was usually the case for the first four hundred years of printing, when at any one place and time there was a strictly limited range of 'normal' typefaces available to individual printers. Although taken for granted by present-day typographers, it is largely a nineteenth and twentieth century opportunity to select the most appropriate typeface from a range with different historical or expressive associations. The idea that typography should be in harmony with the genre of the text was a distinctive concern of these printers and typographers.

Bruce Rogers (1943: 22) expressed it this way:

'Making an "allusive" format for a book—that is, casting it in the style of the period of the original text—is in a small way something like planning the stage setting for a play. An up-to-date style for an ancient text would compare with staging Hamlet in modern dress. However novel and effective in its own way, you feel it to be strange, and this sense of strangeness is an annoying distraction; you are forced to think of the setting and the designer rather than of the text.'

While this might be disputed (it is arguable that modern dress, or modern (small 'm') typography, is more neutral and so less distracting than 'fancy dress') the metaphor is an interesting albeit an old one.⁸ Rogers does not elaborate it, but it bears extension: while the script and plot are provided by the author, who can also control the movement of arguments from background to foreground and from one episode to another, typography can contribute the costumes (letterforms, ornaments, symbols, rules, etc) and the set (the format, layout or grid); typography may also announce or

 $^{^{\}rm 8}$ The metaphor of language as the dress of thought can be found in Quintilian (Book VIII, introduction, 20).

signal the progression of the plot. It is interesting to see that the 'staging' metaphor has recently surfaced in the literature of discourse analysis (Grimes 1975; Clements 1979) to describe the ways in which speakers and writers use linguistic signalling to 'place' parts of a narrative in the foreground or background.



Figure 1.1 Two 'allusive' Bruce Rogers title pages, both reproduced in *Paragraphs on printing* (Rogers 1943). Strangely, neither the dimensions nor the margins of the originals are indicated, but they are much reduced in size.

To inject a personal note: although this interpretation seems to allow the typographer considerable scope for making a creative contribution to the texts for which he or she is responsible, it represents, in part, my own attempt to be positive about a school of typography that I find somewhat prefectorial. Morison, in his last work, Politics and script (1972), sees typographic style in terms of the conferring of authority on a work. Most of the book is an intricate intertwining of church and typographic history of a fairly obscure kind, but it concludes with Morison's view that there is a:

'universal consensus upon the principles that should govern the shapes and uses of the Graeco-Roman alphabet in all works addressed to the intelligence of mankind.' (p. 339)

The modern guardians of this consensus, which Morison saw as the culmination of 'a twenty-five-century evolution...under the authority of emperors, popes, and patriarchs or abbots or masters of guilds' are the university presses. The consensus is said to be

'a reconciliation of authority and freedom...which is the best guarantee against experiment or innovation or irresponsibility. By irresponsibility is meant any reduction in the authority proper to the style of permanent literature addressed to the intelligence of man in favour of the freedom proper to ephemeral matter addressed to the emotions of man.' (p. 339)

This exaggerated divide between intelligence and emotion, authority and freedom may not be representative of anyone's view other than Morison's, but it may nevertheless be symptomatic of what Moran (1978: 14) calls '...an odd world, full of caste and class sympathies'. The context of this remark is a discussion of the obvious bitterness that marred the relationship of the Double Crown Club (a select, and male only, diningclub of leading book typographers) and the largely advertising-oriented British Typographers Guild.

Quite apart from the risk of excommunication by popes or patriarchs, it is hard for those trained in this tradition to summon up the courage to be critical, such is the standard of detailed technical know-how represented by such as Williamson (1966), and Simon (1945), whose treatment of drama, poetry and indexes demonstrates immensely good sense and a considerable virtuosity in the setting of complex matter. However, the problem remains that standards are mainly passed on in the form of examples to imitate rather than principles that are adaptable to different technical circumstances or texts other than novels and poems. And while scholars and designers of the historical tradition discuss the display of fine literature for continuous reading in by no means unfunctional terms, they are less reliable when away from their home ground.





For example, Stanley Morison's 1935 redesign of the Post Office telegram form (Figure 1.2) benefits from fewer words, but otherwise it is not a great advance on its predecessor: one can imagine his European contemporaries making a much more adventurous attempt.¹⁰

 $^{^9}$ Moran attributes the design to Morison. However, Beatrice Warde (1936) also reproduces the form but, strangely, does not name the designer.

At the end of MH Black's (1961) detailed account of sixteenth-century developments in Bible printing (by Robert Estienne and his contemporaries), he effectively accuses Bruce Rogers of placing visual form before function in his 'allusive' approach.¹¹ The printers described by Black, Estienne in particular, did set visual standards that are worth reviving, but their functional innovations are equally significant. These included chapter headings, summaries, running heads and versification (see also Black, 1963).¹²

The age of Morison was one in which typographic opinion-leaders were considerably more literate, culturally aware and prominent on the intellectual scene than had previously been the case (or has been since, probably). But although conscious of the central cultural role of printing and typography, the fuller implications of that role are often missed. For example, although Beatrice Warde wrote eloquently of the 'three great privileges' of printing in her foreword to Steinberg's Five hundred years of printing (1974)—they are, essentially, the privileges to turn back, to look forward, and to stop and think—it is not made clear that typography and layout might be deployed so as to support such activities.¹³

¹¹ Black's comment reads:

¹⁰ A further example is found in Ruari McLean's Manual of typography (1980), which although written in the late 1970s draws most of its examples from the 40s and 50s. Having talked sensitively, perceptively and at some length about book design (using title-pages rather than text pages as illustrations), McLean's discussion of 'jobbing printing', a rather archaic and dismissive term, is extremely short and includes a before-and-after exercise in table design in which the after is more elegant but rather less effective than the before.

The Doves is unreadable, and is plainly a piece of fifteenth-century revivalism based on a confused analysis. Bruce Rogers is impressive, but this article will have sufficiently indicated where most of his ideas came from—Estienne. Could it be that a twentieth-century printer might be moved by such examples to provide a worthy competitor that paid the necessary respect to tradition without dwindling into eclecticism and pastiche?' (p. 203)

¹² Twyman (1986: 189) comments that 'oddly enough, specialist historians, whom we might expect to have been interested in the development of graphic configurations have, almost without exception, shunned approaches that deal with their specialty in functional terms as a branch of graphic language'.

 $^{^{13}}$ Morison (1936: 1) talks similarly of 'the inherent courtesy of print: that it can be skipped or skimmed ...'.

Modern typography

It is usual to contrast this historically inspired, symmetrical style with the asymmetry of 'modern typography' (variously called New, Asymmetric, Functionalist, International or Modern Typography), whose origins go back to the Bauhaus and earlier. However, both movements have similar motivations: to reform the allegedly 'enfeebled' typography of the nineteenth century. Tschichold (1935/1967), who was responsible for the fullest exposition of the principles of the New Typography, summarized the different approaches when, after praising William Morris, he said

'He was right...to go back to the incunabula but wrong in copying their externals instead of their spirit. They were in their own day a step forward, a bold seizing of new opportunities. Morris's copying of them was a backward step...a shirking of reality.' (p. 16)

In the usual 'fog in channel—continent isolated' manner, there appears to have been considerable ignorance in Britain about the graphic arts revolution happening in Europe. Modern typography harnessed the visual idioms of new art movements (Futurism, de Stijl, Dada, Constructivism) to printing, using visual tension, contrast and rhythm to manipulate the reader's attention. Laszlo Moholy-Nagy, a major figure in the New Typography and a teacher at the Bauhaus, explained the method thus:

'In contrast to the centuries-old static-concentric equilibrium, one seeks today to produce a dynamic-eccentric equilibrium. In the first case the typographical object is captured at a glance, with all the centrally focused elements—including the peripheral ones; in the second case, the eye is led step by step from point to point, whereby [the awareness of] the mutual relationships of the individual elements must not suffer.' (Quoted by Kostelanetz, 1970: 80)



Figure 1.3 Herbert Bayer's 1925 design for a catalogue of Bauhaus products (from Spencer, 1969a); original 210mm x 296mm.

While the 'crystal goblet' idea relies entirely on the author to make his or her meaning clear, modern typography was thus prepared to offer the reader additional support. In Tschichold's words,

'modern man must read quickly and exactly. Every effort must be directed to transferring the words smoothly to the reader. This can be achieved by correct groupings to express the sense of the words' (p 46).

Display type was bold and large, text type was clear and simple (often sans serif), the 'bullet' was introduced, thick rules abounded, and 'white

space' was used to group information. Such features, startlingly new and even shocking at the time, have become absorbed into the general typographic repertoire.

In their day, such devices made considerable demands on printers and their equipment: from the technical point of view, functionalist typography was often rather less functional than the style it replaced. Instead, the 'functional' label (originally, at least) indicated a concern for typography which articulated the meaning or structure of the information, and which made the printed document function better for the reader.

This functional concern is expressed nowhere better than by Tschichold (1935/1967). For example, sans serif type was preferred by more formalist designers because it lacks extraneous or decorative embellishments, but by Tschichold because 'its wide range of weights (light, medium, bold, extra bold, italic) gives every colour in the black-and-white scale'. And while others are nervous about indented paragraphs because they spoil the neat blocking of information and strict alignment of everything to the margin, Tschichold thinks the issue through from the reader's viewpoint. He points out that when the last line of a paragraph is a full one, the start of the next paragraph is hard to see; even if line spaces are used, the reader is confused when they fall at the page break.¹⁴

Like other writings by busy practising typographers, Asymmetric typography is an uneven mixture of substantial argument and brusquely delivered, though immensely sound, rules, and of concern for both functional and technical excellence as well as beauty. But although he has much to say about the clarity of information as a criterion for good design, elsewhere Tschichold wrote:

'We must ask ourselves...whether the result is pleasing, whether we

¹⁴ Interestingly, a similar point is made by De Vinne (1901:193), who refers to 'a new school of typography [which] disapproves of the old-fashioned method of indenting paragraphs'. In the layout of this thesis I have set the paragraphs full out in order to reserve the use of indention for the considerable number of quotations. An alternative strategy might have been to reduce the type size of the latter, but this would have been time-consuming and might have had the effect of diminishing their status.

have achieved a balance. Provided the work is all right technically, there is no other criterion for typographical design.' (Tschichold 1934/1975: 124)

In this two-fold standard of technical and aesthetic excellence, the information structuring function seems to have been lost. In the absence of a critical tradition, it is easy for typographers to lose sight of the needs and reactions of distant readers and concentrate on the problems that lie close at hand: the technical problems of the printing process, and their aesthetic problems as visual artists. This certainly seems to have been the way that the functionalist ideal developed among the 'Swiss School' of typographers who emerged in the 1950s as the most thorough exponents of the modern typography. For example, in their textbook Basic typography, Ruëgg and Fröhlich (1972) divide their attention between technical matters (typesetting systems, for example) and aesthetic aspects of visual form (contrast, proportion, rhythm, colour etc).

Emil Ruder's Typography (1967; see also the review by Kinross 1984) provides further examples of this aesthetic revisionism. While warning of the 'standing temptation for the typographer to use his type primarily as a tone of grey and thus to allot it a purely aesthetic and decorative role', in another chapter we find him asking:

'What is the relationship between the colour value and quality and the grey of the type matter? How do the various tones of grey compare? The proper observation of these principles is crucial for the beauty of a printed work, and for its formal and functional qualities.'

Functional Swiss typography of the most tightly-argued and informed kind is represented by Karl Gerstner (1959, 1974). His concept of 'integral typography' reaffirms the ideals of Tschichold:

'a marriage of language and type resulting in a new unity, a superior whole. Text and typography are not so much two consecutive processes on different levels as interpenetrating elements.' (Gerstner 1959: 66) Gerstner's Compendium for literates (1974) represents an attempt to make the connection, and it is something of a tour de force of systematic analysis. Indeed, it is so systematic that where most of us would be content to list the theoretical possibilities of writing as 'embossed', 'punched out' and so on, Gerstner's printer is obliged to actually emboss and punch out examples. Among the rather tedious but magnificently thorough exemplification (large writing, small writing, upside-down writing, black writing, white writing...and so on) are well chosen references to major figures in other disciplines—including linguistics and psychology—and a systematic view of the expressive properties of type.

Gerstner's Compendium deals mostly with the display of words and sentences, but perhaps the most influential and lasting contribution of Swiss typography is the grid system of page layout. From the earliest days, most books have been designed with standard text areas and margins—simple grids. But Swiss typographers, responding to the needs of technical and information publishing in a multi-lingual country, developed the grid as a system for complex multi-column page layout. Their distinctive contribution was not the multi-column layout, also common in medieval manuscripts and modern newspapers, but the addition of horizontal grid lines, resulting in a modular layout system. The immediate practical problem this solved was the parallel display of different languages. The three main languages of Switzerland (German, French and Italian) could hang side by side from a horizontal line; although of different lengths the alignment could be restored at the next heading down (Figure 1.4). Such pages have some of the characteristics of tables.

The grid system was also found useful for the design of illustrated books and magazines, whether multi-lingual or not. Its modularity restricted the number of possible column widths and simplified the specification of type. More controversially, though, grids were found to solve aesthetic 'problems'. By following the modular principle, a visual unity could be imposed on complex material. Illustrations could be restricted to certain shapes; tiresome bits and pieces, such as folios, captions, headings and even paragraph indention, could be aligned on the grid. Eventually the grid achieved a cult status, which it still enjoys in some circles.



Figure 1.4 A typical three-language, three-column page for which the Swiss grid system is ideal. Source: Rüegg & Frohlich 1972. Dimensions: 250mm x 250mm.

An example of the degree to which good design was equated with adherence to the inviolate grid can be identified in a paper by Bonsiepe (1968). He proposed an index of the orderliness of a page, analogous to those used to predict the readability of prose. The main measures were to be the numbers of horizontal and vertical points at which components were aligned. But whereas readability formulas are routinely subjected to extremely thorough empirical testing, in which the index scores are related to the performance or preferences of users,¹⁵ the grid principle seems to have been so self-evidently right that Bonsiepe apparently saw no need to justify his proposal further.

¹⁵ Although subject to recent criticism, and consequently somewhat out of fashion now, readability formulas can still provide a reasonably accurate index of the difficulty of prose, but can neither pinpoint specific problems nor be used as a prescriptive guide for writers. Klare (1984) has recently published a comprehensive and intelligent account of their history, use and current status.

Bonsiepe's mistake is to confuse orderliness with tidiness. I discovered the difference as a child. If my clothes and toys were scattered around the bedroom they could be located easily but the room was deemed to be untidy. On the other hand, if they were stuffed into drawers or arranged in straight lines, the room passed my mother's inspection but I could never find anything. In effect, Bonsiepe is insisting that all the information on a page is fitted into equal size boxes.

This high value placed on visual tidiness is symptomatic of a more general minimalism, in which simplicity of materials and form is valued for its own sake. At its best it can result in sober typography of the highest integrity, but its adherents sometimes make the mistake of assuming that all typographic contributions to a text are content-free adornments.¹⁶ In the wrong hands, grid typography tempts designers to seek visual alignments wherever possible, regardless of a real connection existing between the things aligned. When coupled with a minimalist style that restricts the number of type variations, grids have sometimes resulted in extremely cryptic layouts that are hard work to interpret. The problem is that by the time the reader encounters the page, the designer's grid has disappeared. The reader must impute imaginary grid lines to the page and use them to make decisions about the relationships intended by the designer.

In spite of such problems—and every system can be abused—grid

¹⁶ Minimalism is not the exclusive preserve of the New Typography. The American printer Theodore De Vinne (1901) appears to have thought the printer's job would be much simpler if authors could rely on words alone:

^{&#}x27;The desire to make written language clear to the reader is to be respected, but some of the methods now in general use are unsatisfactory and will not stand critical examination. A hundred years ago it was the duty of the printer to begin every noun with a capital letter and to compose in italic every word that needed or seemed to need emphasis. It was hoped that capitals and italic would help the reader to a better comprehension of the subject ... Experience has proved that readers do not need these crutches, and that ordinary matter can be made readable and intelligible without them. It is probable that the next generation will put greater restrictions on the use of quotation-marks...'

This evolutionary view that readers can learn to handle ever simpler arrangements, which anticipates the attempted lower-case-only alphabet reform of the Bauhaus school (Spencer 1969a, 1969b), is also reflected in De Vinne's discussion of hyphenation (see Chapter 7).

typography is too important to dismiss. It has become absorbed into every designer's working methods and so must be an essential part of any systematic overview of typography. It should also be said that most typographers qualify their advocacy of grids carefully (eg Hurlburt 1978). Moreover, it is a thoroughly two-dimensional and typographic idea which is impossible to integrate in a theoretical framework derived only from a (linear) linguistic model. Grids are discussed further in Chapter 7 where they are seen in the context of other 'artefact structures' in text.

In summary, I have briefly introduced three related but distinct strands among twentieth-century typographic writers: related in their effort to identify a role for the professional designer and establish high standards for the design of printed matter; distinct in their systems of visual logic. Stripped of their various aesthetic dogmas, all three seem to make good sense as constituents of a typographic criticism. The historical revival contributes a sensitivity to genre, the New Typography introduces an enlarged repertoire of graphic techniques with which to display the structure of a message, and Swiss typography contributes the grid system and its emphasis on the flexible and ordered page.

It is not a realistic or desirable aim for a typographic theory, in the manner of spelling reformers, to seek to replace existing standards with some revolutionary new system that claims to be uniquely rational.¹⁷ Instead, the model that will be presented in Chapter 5, together with the discussion of typographic genres in Chapter 9, can be seen as an articulation of the eclectic blend of these three schools of typography that characterizes current practice.

Gestalt theory

Many of the techniques of the New Typography (and subsequently the

 $^{^{17}\,\}mathrm{As}$ Venezky (1970) has shown, English spelling is considerably more rational than is usually thought.

Swiss school) owe something to the contemporary Gestalt psychologists, who were working in Germany in the 1920s and 1930s (for example, Koffka 1935). Although the connection may not be always explicitly declared (at least in those publications most easily available in the English language) the influence is undoubtedly there. Gerstner, for example, does not cite Gestalt psychology in his Compendium for literates, although he frequently uses Gestaltist terms, like closure, figure and ground. Rivlin (1987), who has recently published a detailed application of Gestalt principles to typography, appears to have found few prior publications making the explicit connection.

Gestalt theory is best summed up by the catch-phrase often associated with it: 'the whole is greater than the sum of its parts'. Gestalt psychologists identified a range of principles which together provide evidence of an overall Law of Prägnanz, which, to avoid the theoretical commitment implied by that term, we might call the simplicity principle. It is a natural instance of Occam's razor: if several alternative structures are possible, the simplest and most stable will be selected. Figures 1.5 to 1.7 illustrate the three principles most relevant to typography.



Figure 1.5 Grouping by proximity

Proximity: Things which are close together are seen as groups. While we see Figure 1.5a as a matrix of equally spaced dots, Figures 1.5b and 1.5c are visually organised into rows and columns. When typographers use space to group components, they employ the proximity principle.



Figure 1.6 Grouping by similarity

Figure 1.7 The closure principle: it is possible to see this as a square

Similarity: In Figure 1.6, it is the similarity of elements that creates the grouping, not the use of space. When typographers use a consistent typeface to signal a particular kind of, say, heading, they are grouping by similarity.

Closure: Figure 1.7 demonstrates the tendency to 'close' gaps between graphic elements and see stable shapes wherever possible. Typographic grids are based on the closure principle, together with the similar 'good continuation' principle.

The Gestaltists' observations and demonstrations of how we perceive visual structure are too compelling for easy denial but not easily explained psychologically; their explanation that perceptual principles correspond to in-built 'brain field forces' has given way to more verifiable cognitive explanations (Marr 1982).¹⁸ The basic principles of Gestalt psychology or, at least, the observations on which they are based—have become absorbed into the art school curriculum and, now largely divorced from their theoretical origins, form a basic part of the designer's craft knowledge. They might be seen as relatively inflexible perceptual rules that act as a fundamental constraint for the typographer alongside such conventional rules as the left-to-right direction of the writing system.¹⁹

¹⁸ Marr's explanation is that the Gestalt illusions correspond to characteristics of normal physical objects and thus they are learned, not innate: many natural objects are symmetrical, have smooth contours, contrast in various ways with their background and so on. Bruce and Green (1985) provide an up-to-date review of current perceptual theory.



Figure 1.8 illustrates some gestalt problems in an illustrated book.²⁰

Figure 1.8 This page from *The pocket camera handbook* by Michael Langford (Ebury Press) shows some of the perceptual rules that typographers must anticipate. For example, because the small illustration at the bottom right ('Batteries') has been aligned with stages 3 and 4 of 'Loading the film', we tend to see it as part of the same sequence (proximity/good continuation principles). The vertical rule between is too weak to counteract the effect.

Applied psychologists and typographic research

Over the years a great many studies have been published by psychologists (of various specialisms) who have examined the effect of typography on readers. Educational theorists (for example, Rowntree 1982) traditionally divide the outcomes of education into three 'domains': the psycho-motor (physical skills), the affective (aesthetic and moral appreciation) and the

 20 Hereafter I shall use an anglicized version of the word 'gestalt'. Thus it is not capitalized and the plural is 'gestalts'.

¹⁹ Rivlin (1987) has argued cogently for a central role for Gestalt principles in typographic theory, but he may be pushing on an open door—the standard Gestalt demonstrations are too convincing to deny, and applications to typography are not hard to identify. The real problem, surely, is to relate these two-dimensional graphic phenomena to language and communication.

cognitive (intellectual skills). The distinction provides a convenient framework for discussing the applied psychology of typography. Literacy involves the attainment of skills in all three domains, and all three have been addressed by typographic researchers using the methodologies of applied psychology.

Legibility: the psycho-motor domain

Early typographic research (reviewed by Pyke 1926) was closely integrated with the more general investigation of the reading process. While Pyke lists instances of eighteenth- and early nineteenth-century work (eg, by Babbage in 1827), Javal (1878) is generally credited as the first to apply the scientific method to typography, and a considerable number of studies of 'reading hygiene', as the field was then called, were published in the first half of this century. The typographic variables listed by Legros (1922) typify the scope of much of the legibility research that still appears from time to time today (Table 1.1).

Size of character thickness of strokes white space between strokes dissimilarity of characters leading line length frequency of kerns similarity of figures width of figures separation of lines from adjacent matter unnecessary marks in or near characters vulgar fractions variations in type height quality of paper colour of paper light-reflectance of paper colour of ink illumination irradiation

Table 1.1.Typographic variables listed by Legros (1922).

It is interesting that typography was regarded as just one contribution to reading hygiene, alongside such things as lighting, paper colour, reflectance, the angle and curvature of the page and even posture. With the introduction of electronic displays, similar factors have again become the focus of research attention.

The most prolific legibility researcher was Miles Tinker of the University of Minnesota, who with his colleague Donald Paterson²¹ published several dozen legibility experiments between 1929 and the publication of his books The legibility of print (1963) and Bases for effective reading (1965), now standard sources. Reactions to Tinker differ, generally between those with practical experience in printing or typography and those without. Among the latter, Tinker's research is still widely cited.

A number of general criticisms of legibility research, typical of those with first-hand knowledge of typography, were first voiced by Buckingham (1931)—although his own experiment was fairly unconvincing. In particular he criticizes the univariate research model, in which experimenters try to vary a single factor while holding all others constant. Buckingham comments:

'This is good experimental technique. It is an article of faith among investigators. Yet it won't work in the way it has been applied to typography unless one is prepared to go to very unusual lengths with it.' (p. 104)

He goes on to note that (mostly paraphrased):

• 'several of those who have given out standards have simply used their imagination' (that is, the recommendations do not always relate to the data).

• typographic variables interact: recommendations about line length, for example, 'are valid only for the interlinear spacing employed, and the investigators do not tell us what that is. Widen the spacing and the probability is that a longer line may be employed to advantage.'

²¹ Paterson & Tinker (1940)

 \bullet investigators often refer to, say, '10pt type' without reporting the typeface used or the interline space.^{22}

 \bullet printers perceive the investigators' ignorance of typographical matters and ignore the results anyway. 23

• to do a full study of even a modest range of typefaces, sizes, line lengths and line spacings would require more effort than anyone is prepared to put in (he outlines a simple study that would have required 1,792,000 returns).

In addition to Buckingham's criticisms, others have noted that:

• technical research papers are ignored because they are difficult for printers and designers to understand (Rehe 1974). This may be a rather more patronizing version of Buckingham's similar point. Rehe's own book is itself clearly written, although somewhat uncritical. Spencer's (1969b) review is a model of both clarity and discrimination.

• 'the classical research literature in this field has concerned themselves with molecular issues (ie with tiny details) rather than with molar ones (ie broad scale issues).' (Hartley & Burnhill 1977a: 223)

• the research tends to be 'divorced from the questions which are actually asked by practitioners when a choice of typeface has to be made.' (Hartley and Burnhill 1977a: 224). Designers would like more details of the performance characteristics of individual typefaces: for example, can they be reduced or photocopied?

 $^{^{22}}$ Although, according to Spencer (1969b), the need to measure the visual rather than the body size of type was first pointed out by German researchers in 1903, this single fault mars much of Tinker's work and that of his contemporaries.

²³ Later critics suggested that psychologists should take advice from designers in formulating their hypotheses (Spencer 1969b; Burnhill & Hartley 1975; Macdonald-Ross & Waller 1975)

In spite of the problems, Tinker and others are still frequently cited where scientific evidence is thought necessary to make design recommendations more convincing. And there are those who regret the passing of this style of research. Rehe (1974) concludes his review of legibility research by calling for more of the same:

'Univariate research, that is, investigation of individual typographic variables, should be increased and broadened. These individual research findings are the particles of the mosaic that make for better legibility.' (p. 61)

Scientific evidence is also attractive to those who apparently regard all intuitive judgements, whether by novices or experienced practitioners, as equally unreliable. In this regard we may recall Tinker's comment that

'Before scientific research, printers and type designers were concerned mainly with the esthetic appearance of the printed page. This preoccupation with esthetics, together with considerations of economy and tradition, dominated all typography until about 1920. As a result of these obstructive emphases, a scientific typography has been slow in developing. Indeed, the printing industry continues to resist procedural changes suggested by experimental findings.' (Tinker 1965: 115)

Elsewhere Tinker does acknowledge that, on the whole, printers often make good decisions without the benefit of research. Together with the fact that many experiments reveal only small differences, if any, this has led most typographic researchers to the opinion that it is not worth investing in traditional legibility research. Since the late sixties, research on simple matters of legibility has tended to be undertaken only in special circumstances. New display technologies are of obvious interest and ergonomists continue to publish numerous studies of the 'human factors' of CRT displays (eg, Reynolds 1979; Bouma 1980; Shurtleff 1980). In addition, new type designs and page layouts are sometimes evaluated by their designers without the results being published. Foster (1980) has reviewed recent legibility research. Herbert Spencer, Linda Reynolds and other colleagues formed the Readability of Print Research Unit at the Royal College of Art from which a number of publications on legibility emerged in the late sixties and seventies. With the exception of Sir Cyril Burt (Burt, Cooper & Martin 1955; Burt 1959/1974), who consulted with Stanley Morison, Beatrice Warde and other leading typographic pundits of the day, the RCA team was perhaps the first to combine the skills of psychologists and designers, thus overcoming at least one of the criticisms of the earlier research. Although initially the emphasis was on legibility, they also looked at aspects of typographic and spatial signalling—for example, the layout of bibliographies (Spencer, Reynolds & Coe 1975). These studies had relatively modest and realistic goals. Essentially they were comparisons of a range of solutions to easily identified and frequently recurring psychomotor problems of scanning or searching. Searching for a name in an index or bibliography, for example, is an easily-defined and common task. It is therefore valid to apply the findings directly to practical situations.

Developments at the RCA were paralleled by another prolific psychologisttypographer team, James Hartley and Peter Burnhill, who similarly moved from legibility research to structured information, including the design of academic journals (Hartley, Burnhill & Fraser 1974), textbooks (Burnhill and Hartley 1975), indexes (Burnhill, Hartley & Davies 1977), and bibliographic references (Hartley, Trueman and Burnhill 1979). Where other researchers were usually content to investigate simple issues and report the data, Hartley and Burnhill proposed a conceptual framework for their own work which, since it goes beyond psychological issues, I shall return to shortly.

Atmosphere value: the affective domain

I have noted that typographers are often aware of the expressive properties of the typefaces they use. Following the lead of Berliner (1920), a number of psychologists have enquired whether this awareness is shared by readers. Early studies required subjects to choose typefaces appropriate for particular products (hers were fish, pancake flour, pork and beans, and marmalade). One of most thorough series of studies of this kind was reported by Ovink (1938) whose subjects rated the suitability of typefaces for different text topics (literary styles, ideas, and commodities). Unfortunately, as with many typographic studies, his results were obtained with typefaces that are now mostly obsolete. Ovink does, however, provide a means for the 'translation' of his results to other typefaces, since he analyses their characteristics using a scheme originally designed to describe personality differences in handwriting. The same scheme could presumably be applied to modern typefaces to identify equivalents.

More recent studies (reviewed by Rowe 1982) attempt to overcome this problem by using the semantic differential technique, considered more respectable by modern psychologists than handwriting analysis. Typefaces are related to topics indirectly, via general dimensions such as 'hard/soft', 'active/passive' and so on. The suggestion is that a typeface with particular qualities could be used to imbue a message with the same qualities. Walker, Smith and Livingstone (1986) have also published data demonstrating that typefaces considered by subjects to be suitable for advertising different professions, turn out to have similar connotations to those professions when tested separately.

Zachrisson (1965) has noted about his own and other studies of atmosphere that researchers have failed to take account of the artistic or literary education of subjects: that is, their ability to discriminate between typefaces which, in the case of book faces, can look very similar to the lay person. Moreover, descriptive terms thought up by experimenters may not be meaningful or relevant to subjects. Bartram (1982) tried to overcome this last objection by eliciting descriptive dimensions from subjects themselves. His purpose was also to provide designers with a means to test their intuitions against the perceptions of their audience (following Sless 1980).²⁴ He therefore supplied a procedure and a simple statistical technique for designers to conduct their own research when necessary. This goes some way towards meeting an objection raised by Spencer (1969b: 29):

'a review of press advertisements, in which typographic allusion is often a vital ingredient, published over the last half century suggests that findings on congeniality may have little temporal stability'.

A reasonable assessment of this work is that, while studies of atmosphere value do not provide direct guidance about typeface choice, as some authors claim, they do substantiate the common sense view that typographic style is noticed by readers and that their interpretations are not random. Although there is some disputed evidence that reader preferences affect reading speed (Burt, Cooper & Martin 1955),²⁵ it is reasonable to suppose that anything about a text which is discernible to readers may affect their perception of the status of a document and thus their expectations, critical stance, reading strategies, goals and outcomes. It is hard to see applied psychologists going much beyond the present findings. Laboratory-style experimentation is rather a clumsy instrument to probe subtle issues—for example, how texts, through their use of stylistic nuances, may be seen to be 'quoting' other texts.

Typographic cuing: the cognitive domain

Some psychologists have looked at the effect of 'typographic cuing' on

²⁴ Sless devised an exercise to encourage graphic design students to be more objective. Each had to make a random ink-blot and identify an object that it resembled. Having done so, they asked others to identify it also. Inevitably there was considerable disagreement. Students then had to make the minimum modification that they considered necessary to make the ink-blot look unmistakedly like the intended object, before testing it again. The cycle was repeated until the image was reliably identified by all observers. Some students found it very hard to accept that others could not interpret the image in the same way as themselves—it usually takes several cycles more than the student believes possible at the outset. The exercise has become a regular first-year project in some art schools.

²⁵ The evidence is disputed, in part, because of the general discrediting of Burt—a leading psychologist of his day—who is alleged to have 'cooked' the data from his experiments on intelligence, and 'invented' co-workers. Hartley & Rooum (1983) have re-examined Burt's typographic work in the light of this scandal and expressed doubts.

learning (reviewed by Glynn, Britton & Tillman, 1985). The term generally refers to the use of typography (bold or italic type, or underlining) to signal the important ideas in a text. In most studies, importance is assessed not by the author of the prose passage used, but by the experimenter or a group of independent judges. It is therefore a separate system of signalling overlaid onto the signalling already implicit in the author's prose structure. In this respect typographic cuing is similar to other devices, sometimes known as 'adjunct aids', proposed and tested by educational researchers. These include advance organizers (Ausubel 1963), behavioural objectives (cf Davies 1976), and inserted questions (Rothkopf 1970), although these devices are more genuinely rooted in pedagogical theories.

There is little doubt that cuing does work in drawing attention to the cued material. The consensus is that people are more likely to remember cued ideas. Some researchers, though, (for example, Glynn & Di Vesta 1979) have found that this is achieved at the expense of uncued ideas. It should also be noted that most studies of typographic cuing improve immediate recall, but do not improve delayed recall. Quite apart from methodological objections raised by Hartley, Bartlett & Branthwaite (1980),²⁶ these conclusions are not altogether unexpected, since the cuing is effectively giving subjects the answer to the recall questions beforehand. Indeed, Coles & Foster (1975: 105) suggest that the failure of typographic cuing to improve test scores in the first part of their own study might have been because 'not having been informed that cued material would subsequently be tested, the students may have found cueing confusing or even distracting rather than helpful'.

Some studies have tested more innovative and unusual typographic formats. A number of these were published in a special issue of Visible Language by Hartley & Burnhill (1981). Since they followed the

²⁶ Hartley, Bartlett & Branthwaite (1980) criticized the experimental rigour of some of the studies they reviewed, in particular the failure of some researchers to test the comprehension of uncued as well as cued items, and the failure to equate the time taken by subjects in the experimental and control groups.

admirable practice of that journal in requiring contributors to practice what they preach, readers may judge the effectiveness of the new formats for themselves.



Figure 1.9 A page from Jewett (1981) illustrating his proposal for 'multi-level writing'. Dimensions: 228mm x 152mm

Jewett (1981) uses different levels of indention to indicate hierarchical levels of argument (Figure 1.9). His article is printed sideways, presumably to allow the generous indention that he uses for his three levels of importance. There seems no reason why it should not have been printed conventionally, though, since the resulting line length is excessively long: ironically, this hinders quick scanning, although the hierarchical system is meant to facilitate it. Furthermore, it is not possible, as might be thought, to scan the article while ignoring lower levels of the hierarchy. Higher level paragraphs sometimes make reference to information contained in the lower level ones they follow. Although Jewett claims that his format makes writing quicker by absolving the writer from the responsibility of verbalizing the hierarchical structure, it seems to have been impossible to shake off the habit.



Figure 1.10 A page from Shebilske & Rotondo (1981) showing their use of typographic cues. Dimensions: 152mm x 228mm.

Shebilske & Rotondo (1981) distinguish between three kinds of 'content': in addition to uncued text, bold type indicates 'important' ideas, and square brackets indicate the 'gist' of each idea. For this reader at least, Shebilske & Rotondo's article proved almost impossible to read in the sense in which it was intended (Figure 1.10). While their bold type (the gist of important ideas) corresponds roughly to its conventional usage, the use of parentheses was a major obstacle. Their use of parentheses to signal the gist of an idea is directly counter to their normal meaning, which is to interpolate unimportant (parenthetical, in fact) material. Moreover, we normally think of the 'gist' as the essence of an idea that particular explanations allude to; we may expect to see it eventually realized in the form of a summary or catch-phrase, but we do not expect to see each sentence or paragraph contain a kernel of words which can be set apart typographically as the 'gist'.

Although Shebilske & Rotondo substantiated their proposals with improved comprehension and favourable reader reactions, they did not directly compare their rather complex system with simple cuing: readers might have been only paying attention to the capitalized ideas. In fact, the favourable reader comments quoted in the report seem to be referring to the highlighting of important ideas rather than the bracketing of gists. It is possible that subjects simply ignored the brackets. Indeed, an earlier study by Hershberger & Terry (1965) did compare various levels of complexity for cuing (up to five levels of importance were cued), and found no advantage in distinguishing between more than two levels.

Researchers working within this tradition see themselves as extending a line of inquiry initiated by Klare, Mabry & Gustafson (1955) and Hershberger & Terry (1965). Writers and researchers outside educational psychology circles are not cited and probably not known about. Apart from this insularity, a view of text as simply containing gist and some unimportant stuff between, is somewhat unsubtle; as is a view of reading in which the task of the reader is limited to rote recall—to remember and repeat certain instructor-designated ideas.

These studies of innovative typographic cuing reflect two wider trends in the typographic literature. Firstly, researchers sometimes give an unfortunate impression of naïvety, both typographically and linguistically. Special functions are assigned to devices such as indention, bold type, line spaces, and parentheses as if they they have no pre-existing function. Also ignored is the rich and diverse system of linguistic signalling which can be used by skilled readers to perceive the author's deployment of ideas. Secondly, they exemplify a tendency to want to reform a system which is seen as fundamentally irrational. With the exception of historians describing past practice, comparatively few people have attempted simple descriptions of typographic systems without prescriptive overtones. The reformist tendency is seen most clearly in studies of English spelling (cf Venezky 1970), suggestions to change the direction of writing or to present words in visual stacks (Huey 1898, Andrews 1949)²⁷ and in attempts to design phonetic alphabets or simplify the existing one (cf Spencer 1969b).

Hartley and Burnhill

Since Tinker's retirement, the most active and widely-cited producers of psychological research on typography have been James Hartley and Peter Burnhill. Partly in response to criticisms levelled at Tinker's generation that psychologists should collaborate with designers—Hartley, a psychologist, and Burnhill, a teacher of typography, have pooled their skills to produce research that addresses the realities of typographic decision-making. While their earlier publications addressed 'traditional' legibility issues, later papers have tackled a wider range of typographic issues. I have already cited some of their work on structured information. In addition, Hartley has published a number of papers on other aspects of instructional text and the reading process.

Some of the earlier research on 'reading hygiene' is conceptually rather barren. It has been briefly reviewed here because it forms a considerable part of the typographic literature and because of the methodological issues that emerged. Hartley & Burnhill, though, command special attention because, unlike many of their colleagues and predecessors, they set out a coherent framework for their empirical research. Hartley and Burnhill claim justifiably that most earlier researchers appear not to have felt the need for any theoretical underpinning:

²⁷ There have been a considerable number of experiments. Huey's is the first I have found; Andrews prompted a rash of studies in the 1950s, discussed further in Chapter 7.

'...we would maintain [that] most typographical research has no theoretical base; that is, experimental work has been conducted without reference to a coherent view of the principles entailed in typographical decision-making.' (Hartley & Burnhill, 1977a: 224)

They go on to explain the principles of typographic decision-making on which their own research is based. These principles have frequently been restated in a number of books and articles, are widely cited and so deserve critical attention. The three main principles are:

The use of standard page-sizes Hartley & Burnhill are strong advocates of international standard paper sizes, and all their experimental materials are printed on A4 paper. Indeed, they argue that:

'recognition of standard page-sizes by research workers is a necessary condition for further development in the design and evaluation of instructional materials.' (Hartley & Burnhill 1977a: 227)

On the face of it, the recommendation of a standard page size for research is a curious requirement. The same overall pattern may be created with, say 8pt type on an A5 page as with 12pt type on an A4 page, yet there is no suggestion that type size, line spacing or margins should also be standardized. Moreover, it is not clear whether we are discouraged from applying results obtained with one page size to another. Nevertheless, it is perceptive and entirely reasonable to argue that size is a fundamental constraint on what may be displayed on a page using space to structure information, and I will return to this issue in Chapter 7.

The use of grids for pre-planning of pages. A second principle is the use of typographic grids to ensure that space is used consistently and that the printed page can 'provide a reliable frame of reference from which the learner can move away and to which he can return without confusion' (Hartley & Burnhill 1977a: 233). Grids are intended to improve upon traditional practice in which it is claimed that:

'the absence of consistency in the positioning of related parts indicates

that layout decisions have been made during the process of physically assembling the image (type and illustrations) prior to the process of its multiplication by printing' (Hartley & Burnhill 1977a: 228; their emphasis)

The consistent use of space to convey information structureThis principle follows on from the last. It states that the hierarchical structure found in much information printing can be conveyed by the systematic use of space. Thus a single line might separate paragraphs, two lines a subsection, and four lines a new section.²⁸ Various corollaries follow from this principle: the practice of centering headings is strongly condemned; and the excessive use of indention is discouraged, as is an excessive variety of sizes, styles and weights of typeface for headings.

The use of typography to convey information structure must be an unobjectionable, indeed valuable aspect of typographic theory. Consistency, too, is an uncontroversial and traditional aim. But the insistence on the use of space rather than typographic signalling is harder to justify. While it corrects the amateur's tendency to overcomplexity, elevated to a general principle it seems to represent an artificial restriction of a writing system which has developed in response to functional requirements over many years. Moreover, no psychological reason is given for this restriction: no explanation in terms of perception, cognitive processes, working memory or any other psychological model.

²⁸ This is somewhat reminiscent of elocutionary theories of punctuation, in which different punctuation marks represent pauses of different length. Lowth (1775/1842: 47) put it this way:

The Period is a pause in quantity or duration double of the Colon; the Colon is double of the Semicolon; and the Semicolon is double of the Comma. So they are in the same proportion to one another as the Semibref, the Minim, the Crotchet, and the Quaver, in Music.'

We may also recall the obsolete practice of following different levels of punctuation by varying amounts of space, reported by Walker (1983) from her survey of early typing manuals (a comma is followed by one word-space, a colon by two, and a full stop by three). The difference is that the early typists were using space as a redundant signal, reinforcing the graphically distinctive punctuation mark; Hartley recommends the sole use of space.



Figure 1.11 Demonstration of the principle of using space to articulate content structure. Source: Hartley & Burnhill (1977a). The right-hand version uses space to group the main stages of the task.

The small scale demonstration in Figure 1.11 is convincing enough, but its application in a large scale complex text, such as Hartley's own book Designing instructional text (1985) is more questionable. In a single page demonstration, all the space that surrounds a text unit is visible—the space before and after a section thus gives it shape and distinguishes it from other units in the page or hierarchy. But when interrupted by one or more page breaks, this effect is diluted and often lost altogether. Rather than contributing to a gestalt effect working at a relatively subconscious perceptual level, the space must be consciously interpreted by the reader, who cannot be expected to locate the last or next space of equivalent status in order to complete the gestalt.

This aspect of Hartley & Burnhill's principles reflects a style of minimalist typography that is firmly in the Bauhaus and Swiss tradition. Although they do not share the Swiss pursuit of elegant visual form for its own sake, similar arguments have been reworked to emphasize Hartley and Burnhill's concern for communication clarity. However, whereas printing technology was relatively stable when they started their research in the early 1970s, modern page make-up terminals, and even the cheaper desktop publishing systems, allow all sorts of facilities which could previously be viewed as unfunctional or uneconomic because of their technical difficulty. Presumably in response to anticipated customer demand, printing machinery manufacturers have devoted great ingenuity to making 'irrational' practices easy and economical.

The disappearance of so many technical constraints does not remove the arguments for a functional approach. Rather it changes its emphasis, since typographic decision-making has more than one facet. Not only must the originators of a printed message make decisions about the placement of components on a page, but so must the users make decisions on the basis of the resulting layout—decisions about the order in which to read the page, decisions about the nature, topic and genre of the text. Designers also need theories about this kind of typographic decision-making. Their own decision-making structure will be comparatively clear to them, enforced by very obvious constraints of equipment, budget and so on. The rationale with which their readers will approach the text is rather less obvious.

Hartley & Burnhill's achievement is to have moved typographic research, as practised by applied psychologists, from the mundanities of 'reading hygiene' towards the altogether trickier area of semantics. Here, the issue is how the appearance of printed material affects not just how much is understood, or how fast, but what is understood from it. However, questions like this cannot be answered in a vacuum. Unless we can describe the characteristics of a typographic display within a fairly standardized descriptive framework, we cannot generalize from results obtained with it. To generalize from an applied psychologist's experiment to a problem in hand, we need to know what the two situations have in common. But whereas psychologists can experiment with sentence comprehension secure in the knowledge that the concepts such as 'sentence' and 'verb' will be generally understood (if not agreed upon by all linguistic scientists), no such agreement exists about variations in page layout.

The 'language element' in graphic communication

Twyman (1982) has directly addressed this relationship between typography and 'content'. Using a similar example to Hartley's (a structured list rather than a set of instructions), he goes on to illustrate the effect of different technologies on the ways that graphic structuring is realized in practice.



Figure 1.12 The same work in manuscript (left) and printed (right). The comment on the new section which is in colour in the manuscript (just above the large initial) is signalled by space in the printed version. Both reproduced from W Hellinga, *Copy and print in The Netherlands*, Amsterdam, 1962.

A particularly telling example is reproduced in Figure 1.12, which shows a printed version of a manuscript original, both dating from around 1473.

Where the manuscript, with its easily adjusted character widths, is able to achieve a justified right-hand edge within a two-column layout, the printer needs a wider single column. Again (and closer to Hartley's concerns), whereas the manuscript signals a major text division using coloured ink, it was less convenient for the printer, who instead introduced extra space.

The conclusion from such examples is that there is a 'language element' of graphic communication that underlies such equivalences, and that should be studied seriously 'in much the same way as linguistic scientists have studied spoken language'. The paper was originally addressed to an audience interested in the technology of printing: its purpose is therefore to show that whereas, historically, the opportunities for graphic expression have been constrained by technology, the design of future technologies might be better informed by a proper specification of the requirements of graphic language.

Graphetics and graphology: the place of graphics in linguistics

The obvious place to investigate the language element underlying typography is linguistics, and some textbooks do indeed mention the terms 'graphetics' and 'graphological' in symmetrical opposition to 'phonetics' and 'phonology'. (While phonetics describes simple characteristics of vocal sounds in speech, phonology describes systems and patterns of sounds.) However, this definitional symmetry should not be taken to imply that graphic and phonic factors enjoy an equal status within linguistics.

In practice, graphetic and graphological factors have not received anything like the detailed attention that linguists give to phonology. Moreover, judging by the relevant entries in dictionaries of linguistics, there is evidence of considerable terminological confusion.

• Pei and Gaynor (1954) list only graphemics as 'the study of systems of writing and their relationship to linguistic systems', a fairly broad and

inclusive definition.

• Hartmann and Stork (1972) list graphology as equivalent to graphemics. To them, though, graphemics is limited to 'the study of the graphic signs used in a particular language'. The separate term, graphetics, is introduced to describe

'the study of the graphic substance and the shapes of written signs without regard to a particular language or writing system' (my emphasis).

• Crystal (1980) agrees with Hartmann and Stork's definition of graphemics and, like them, equates it with graphology. He clarifies Hartmann and Stork's conception of graphetics (which sounds rather atheoretical and pointless) by including properties of the written medium such as colour, type size and spacing.²⁹

• In addition, graphonomy has been defined by Hartmann and Stork as the same as graphetics, but by Pei and Gaynor as the same as graphemics. Hartmann and Stork also list graphics and grammatology as synonyms for graphetics.

• Grammatology is given further prominence from its use by Gelb (1963) to denote the study of writing systems in general (eg, ideographs, pictographs, alphabets, syllabaries etc). The French deconstructionist philosopher Derrida (1967/1976) also uses the term; to him writing is not so much a physical act or product as a complex metaphor at the root of all philosophy and science (following Freud's metaphor of the psyche as a 'mystic writing pad'). After the usual time lag, Derrida's ideas are gaining currency in the English-speaking world, and will possibly be the next major influence on future typographic theory.

²⁹ The graphetic/graphemic distinction follows a general use of the emic/etic suffixes within linguistics. Crystal (1980) explains the difference in this way:

^{&#}x27;An "etic" approach is one where the physical patterns of language are described with a minimum of reference to their function within the language system. An "emic" approach [or "-ological"], by contrast, takes full account of functional relationships'.

For our purposes it is probably best to disregard all these terms except graphetics and graphology. Crystal and Davy (1969) explain the difference as follows:

'at [the graphological] level, we are laying stress on the contrasts that can be made within the linguistic system, rather than on the system itself, which was studied at the [graphetic] level'.

This, however, implies that graphetics is the study of systems of marks (that is, rules for their combination), whereas the dictionary definitions quoted above give the impression that it is simply the marks themselves that are studied.

We could clarify the graphetic/graphological distinction in the following way: taken individually, visual techniques such as the design of letterforms, symbols, rules, tints and boxes might be seen as graphetic; but when they are used together to structure a whole text, we see a graphological system at work. The origin of the serif, the design of more legible type, the choice between the open and closed bowl 'g' are examples of graphetic issues, interesting in themselves but not contributing to our understanding of how graphic factors are used in the display of textual arguments. For example, two editions of Shelley's poems, the one set in Bodoni and the other set in Univers, may differ from each other and the original manuscript at the graphetic level (being set in different types) but both are expected to follow the author's original graphology—his use of indention, capitalization, punctuation and spacing.³⁰

This is not to say that typeface selection is a trivial graphetic matter. As Twyman (1982) pointed out, the same structure can often be signalled equally well by either spatial or stylistic variation, and the actual method used is often a function of the production system. Returning to my poetry example, typeface selection would thus become a graphological matter if the context allowed a choice: for example, if the poems appeared in a book

³⁰ The question of the extent of the author's responsibility for these matters is the subject of some controversy among bibliographers. The issue is discussed further in Chapter 7.

where different typefaces were used for each poet.

Given this definition, it is hard to see why graphetics is of any potential interest to a linguist, rather than a palaeographer, since all meaningful contrasts are classed as graphological. A similar distinction, but of more use to the linguist, is made by Twyman (1982, 1986), between extrinsic and intrinsic features of verbal graphic language. By 'intrinsic', Twyman means 'the range of characters available on a given [composition] system', and stylistic variations of those characters (italic, bold etc; letterform style; letterform size). 'Extrinsic' refers to manipulations of the characters (configuration, micro- and macro-spacing, colour).

There is a superficial similarity between the graphetic/graphological and the intrinsic/extrinsic distinctions, since both graphetic and intrinsic factors involve an inventory of 'graphemes' or characters—minimal units of graphic language.³¹ The difference is that Twyman applies both his descriptors at the graphological level of analysis, pointing out that a particular semantic distinction might be made with a combination of intrinsic or extrinsic features: the status of a quotation in a textbook, for example, might be signalled by the use of a change in typeface (intrinsic to the composition system) or by the use of space (extrinsic to the composition system).³² Twyman uses the intrinsic-extrinsic distinction to illustrate differences between the typical output of four composition systems: manuscript, hot-metal, photocomposition and videotex. In this respect the model is an important tool for analysing artefactual influences on graphology.

³¹ A recent paper by Henderson (1985) discusses the range of uses of the term 'grapheme'. An even smaller unit, the 'allograph' is sometimes also referred to; an allograph is a graphic feature which may appear in a number of different graphemes—for example, a near-identical allograph is usually used for the ascender of the lower-case 'h', 'k', 'b', 'd' and 'l'

 $^{^{32}}$ A further linguistic parallel with Twyman's intrinsic/extrinsic distinction is that between inflected and positional languages. Inflected languages (such as Latin) rely on word endings and other inflections to establish grammatical relations, and, unlike positional languages (such as English), are relatively indifferent to word order.

A broader treatment of graphology is by Mountford (1969). Owing to the context of his paper (an encyclopaedia entry), he confines himself to matters of definition and classification rather than the analysis of examples. He proposes and discusses ten 'groups of features' with which to describe 'the graphological structure of traditional orthography (in its printed prose variety)' (Table 1.2).

Category	Example from typical printed prose
1 Colour contrast	black on white
2 Orientation	left to right
3 Disposition	page layout, paragraphing
4 Graphological layering	punctuation hierarchies
5 Graphemic composition	sets of letters, figures, punctuation marks
6 Graphomorphemic typology	syllables
7 Differentiation resources	italics, bold
8 Capitalization	proper names
9 Graphetics	actual letters etc (as distinct from 'paradigm' letters described in 5)
10 Flexibility	open-ended (as distinct from less flexible ideographic writing systems)

Table 1.2 Ten groups of graphological features (Mountford 1969).

It should be remembered that terms like these are intended to to describe writing systems rather than examples of writing. The relevance of some of the distinctions made becomes more apparent when applied to non-roman or innovatory writing systems (eg, Chinese, shorthand, etc). In later papers, Mountford (1980, 1982) developed further ideas on the analysis of written language, which I shall return to shortly.

In practice, the discussion of definitions is rather academic: a search of Language and Language Behavior Abstracts revealed only a handful of papers on any of these topics between 1973 and 1985, and few were relevant to this review. Many of the 86 papers using 'graphemes' as a key word were about detailed matters of grapheme-phoneme relations, in the context of spelling reform, palaeography or reading instruction. Some papers on 'graphology' turned out to be on personality assessment from handwriting. Other papers were about non-Roman scripts. Indeed, Crystal (1980) remarks in his dictionary entry for 'graphetics':

'So far little analysis of texts in these terms has taken place, and the relationship between graphetics and graphology remains unclear.' (p. 169)

Why have graphic factors received so little attention from modern linguists? Compared with other, weightier, matters that preoccupy the relatively young discipline of linguistics (such as 'what is language?'), they are presumably seen as relatively trivial,³³ although necessary to mention when the existence of writing is to be acknowledged. It is not always acknowledged as a proper subject for linguists to study. This view stems directly from de Saussure, usually regarded as the founder of modern linguistics and semiology, who placed writing outside the linguistic domain:

'Language and writing are two distinct systems of signs; the second exists for the sole purpose of representing the first.' (de Saussure 1916/1974: 23)

So the terminological problem reflects not so much a major debate on fundamental issues as the largely peripheral status of graphic factors within linguistics. This is, for the most part, a necessary restriction: illustrations, to take an extreme example, are part of 'the text' as it is viewed by an ordinary reader, but they are clearly non-linguistic. But while graphic factors may at present be at the periphery of the linguistic field, at least two major boundaries of that field have come under pressure

³³ As Wilson (1844: 4), speaking of punctuation, puts it:

The mental philosopher and the philologist seem to regard it as too trifling for attention, amid their grander researches into the internal operations of mind, and its external workings by means of language.'

in recent years. One is the primacy of speech; the second is the restriction of the sentence boundary.

The primacy of speech

Vachek (1973) documents much of the debate concerning the status of writing in linguistics. In addition to de Saussure, Vachek cites the opposition of many of the most influential twentieth century linguists to the view that writing is something more than the transcription of speech. Bloomfield (1935: 21), for example, considered that 'writing is not language, but merely a way of recording language by means of visible marks'. Vachek quotes similar remarks from influential linguists from both earlier (eg Sapir 1921) and later generations (eg Hockett 1958).

The tone of the primacy of speech advocates is emphatic, even intemperate at times. Thus de Saussure (1916/1974) speaks of the 'tyranny of writing', of its 'usurping' role, of 'abuses', of the 'annoying' tendency of grammarians who 'never fail to draw attention to the written form'. The title of one section of his Course in general linguistics though, may explain the tone: 'Influence of writing; reasons for its ascendance over the spoken form'. At the time (the Course is based on lectures given between 1906 and 1911), de Saussure's purpose was to replace prescriptive grammars based on literary forms³⁴ with a more fundamental description of natural language. Bloomfield's remarks were made in the context of the development of techniques for the description of unwritten native American languages.

The influence of de Saussure and Bloomfield was such that Bolinger (1975: 476) could refer, in his linguistics textbook Aspects of language, to the

³⁴ Cohen (1977: 50) remarks on the relatively detailed attention given to graphic factors by early linguists:

^{&#}x27;The language texts of the period [1640–1785], reflecting an effort to represent the obvious sense of the written language, include sections on punctuation, capitalization, and often, handwriting and type styles. These sections are significantly prominent.'

'old-fashioned' relationship between writing and speech, in which the only level of equivalence is that of grapheme and phoneme. His alternative approach is to view writing and speech as 'more or less independent systems that tend to run parallel but converge more and more and finally intertwine'. The two systems, he suggests, are related at various levels (grapheme to phoneme, morphographeme to morphophoneme etc) but are not dependent on one another. Instead the listener or reader can usually interpret speech or writing without reference to the other mode. Indeed, each mode can use elements that have direct meanings without the need for 'arbitrary' units such as phonemes and graphemes: speakers may use gestures, writers may use pictures or symbols.

Although linguistic scientists have claimed to study spoken, not written language, it is ironic that transcriptions of actual speech show that 'grammatical' sentences are rare (cf Tannen 1982). When linguists discuss syntax, they generally use idealized examples which conform to the norms of written language (in which gesture, feedback and a shared context is absent). Taylor (1984) and de Beaugrande (1984) have identified some of the tacit rules by which linguists commonly edit language samples into a form they can analyse.

The sentence level

The preoccupation of linguistics with speech was accompanied for many years by Bloomfield's additional restriction of linguistic enquiry to the level of the sentence. De Saussure had earlier made the important distinction between langue and parole, sometimes translated as 'language system' and 'language behaviour'. The task of linguistics has generally been to reveal the language system or grammar that underlies language behaviour. Since the sentence seems to be the highest level at which concepts of grammaticality are intuitively agreed by language users, the proper study of linguists is restricted to sentences. The construction of larger units, such as paragraphs, is more a matter of rhetorical choice than the application of grammatical rules.

In view of this restriction, it is not surprising that graphic factors have featured so little in linguistics. Indeed, we may wonder why graphetics and graphology should ever have been posited by linguists in the first place. The sentence is a level at which few complex graphological events occur. Graphology becomes more interesting in non-sentences (such as bibliographic lists or equations) or in texts with headings, tables, footnotes, and other components which lie outside the scope of sentence grammar and which have received relatively little attention from linguists. They have received some attention, though, and it is noticeable that all of the linguists who have written about or acknowledged graphic factors (other than for the limited purpose of comparing writing systems) have moved away from the restriction to sentence level linguistics. Such linguists are few enough to be able to list here.

Crystal

David Crystal and Derek Davy's Investigating English style(1969) describes their approach to the study of stylistics, a branch of linguistics that tries to describe and account for variations in the language of, for example, religion, sports journalism or advertising. Since they divide their examples equally between spoken and written language, Crystal and Davy are clearly sensitive to the differences between them. Indeed, they preserve the typography of their examples of written language, and comment on it in their discussion.

Crystal and Davy's descriptive method is hierarchical, using five levels of description. While the three higher levels—grammar, syntax and semantics—are common to both speech and writing, parallels are identified at the two lower levels between phonetics & graphetics and phonology & graphology. However, although the two graphic terms are apparently to be given equal weight to their phonic equivalents, in practice most attention is given to speech. As they acknowledge, 'there is no agreed terminology for the discussion of graphetic and graphological contrasts' (p 23).

This is borne out in Crystal and Davy's commentary on the written examples. It is of a lay person's commonsense sort, and is not phrased in a particularly technical manner or in a specifically linguistic sense. They refer, for instance, to 'eye-catching' features or 'places for the eye to rest'. This may not be a problem in itself—there are good reasons why we should resist the cloaking of typographic study in scientific mystique—but in the context of linguistics, where such cloaking is the norm, it is symptomatic of theoretical neglect. Two reasons for the dearth of terminology might be suggested.

First, graphological samples do not present the same problem of transcription as phonology: they are already in written form and available for inspection and analysis. Crystal and Davy's examples of spoken language are transcribed using an essentially selective notation which includes such things as pitch, timing and emphasis but ignores other paralinguistic or contextual features such as the vocal timbre, sex, age and appearance of the speaker. So the problem of transcribing speech is bound up with its analysis-with the selection of its salient features and the identification of relevant units and boundaries. Since written language does not need transcription, it does not receive the corresponding analysis. For example, while their transcriptions of speech show evidence of detailed thinking about the relative importance and the role of each feature, Crystal and Davy's examples of written language are presented in an unmediated form. Their comments about graphological aspects of the written examples do not give the impression that they are the result of a careful sorting of linguistic from non-linguistic features.

Second, our alphabetic writing system enforces a simple segmentation on language and so seems to exclude 'non-segmental' or 'suprasegmental' effects. In speech, pauses and 'tone unit' boundaries do not always occur at points where a writer would punctuate, and not necessarily at word breaks. To cope with this, notations for transcribing speech normally embody a technique for indicating 'prosodic features'—changes in speed, tone of voice, and pitch. Musical notation is an obvious parallel: notes are grouped on the basis of timing, loudness and expression—three systems that are fairly independent of each other and may not share the same segment boundaries. It may be that the relatively simple segmentation of written language makes graphology appear theoretically less interesting than phonology to linguists. This certainly appears to be the case for Crystal and Davy who devote much space to the problem of describing non-segmental phonology (also termed 'prosody'); their discussion of grammar, too, is effectively weighted towards spoken language with its problems of vague sentence boundaries and frequent 'ungrammatical' constructions.



Figure 1.13 Crystal's levels of graphic organization

Crystal considers written language in more detail in a later paper (Crystal 1979), identifying fourteen levels at which graphological units could be distinguished (Figure 1.13). In this exploratory paper, originally read at conference of the UK Reading Association, Crystal addresses the question: what levels of response might be expected from readers to different levels of organization? He applies each of fourteen levels of graphic organization

to three aspects of language, semantics, grammar and mode of transmission (writing and speech).

The main point Crystal wishes to make with this framework has to do with the status of the line, the only feature which, being entirely an artefact of the printing process, has 'no statable correlation with any other level'. He goes on to review research on semantically-controlled line endings for beginning readers (who can be observed to have problems coping with line breaks). This particular issue is discussed in more detail in Chapter 7. In relation to the present review, though, two other notable points emerge from Crystal's analysis. Firstly, above the level of the line, all links with phonology and grammar break down, while below that level the links are fairly trivial. From a traditional linguistic point of view this suggests that there is little interesting that can be gained from written data that cannot be equally well gained from spoken data.

Secondly, at and above the level of the line, the links are solely semantic, and consist of rather vaguely-indicated correlations with 'information structures'. This suggests, again from a strictly linguistic point view, that graphology above the level of the line is outside the domain of the most central and exclusively linguistic concern of linguistics—syntax. As we review the work of other treatments of typography by linguists we will find further evidence of the importance of the communication context and purpose—rhetorical factors that 'pure' linguistic science has often been happier to ignore.

Vachek

Josef Vachek (1948/1967, 1959, 1973) is an old campaigner for the recognition of written language as autonomous from spoken. A member of the Prague School of linguists, he follows two practices associated with that school.

Firstly, Vachek defines speech and writing from a functionalist perspective. Functionalism, in the linguistic context, refers to the idea that language features stem from the function of language in the community of language users. For example, since asking questions, making statements and giving orders are universal uses for language, grammarians can expect to find interrogative, declarative and imperative forms in most languages. Better known examples concern vocabulary: one doesn't expect tropical dwellers to have a word for snow, since they would never have a function for such a word.³⁵ The Prague School's functionalism reflects their rejection of Saussure's distinction between langue and parole.

Vachek's functional analysis of writing and speech is as follows:

'The spoken norm of language is a system of phonically manifestable language elements whose function is to react to a given stimulus (which, as a rule, is an urgent one) in a dynamic way, i.e. in a ready and immediate manner, duly expressing not only the purely communicative but also the emotional aspect of the approach of the reacting language user.

The written norm of language is a system of graphically manifestable language elements whose function is to react to a given stimulus (which, as a rule, is not an urgent one) in a static way, i.e. in a preservable and easily surveyable manner, concentrating particularly on the purely communicative aspect of the approach of the reacting language user.' (Vachek 1973: 15-16)

This analysis suggests that, since speech and writing are distinct in function as well as in mode, we should not expect to find exact parallels between phonology and graphology. For example, the static, surveyable nature of writing suggests a role for typography quite distinct from the emotional and immediate role of 'equivalent' features in speech, such as tone of voice.

 $^{^{35}}$ One is reminded of President Reagan's famous gaffe when he asserted that there is no word for 'peace' in Russian.

Secondly, Vachek makes frequent use of binary opposites. Applied to lexical structure, for example, pairs of opposites such as 'lion' and 'lioness' are said to contain a marked and unmarked member. In this example, 'lion' is unmarked and 'lioness' is marked. The marked can be distinguished from the unmarked not only by the formal addition of, in this case, the suffix '-ess', but also by their asymmetrical functions: thus the two terms can be defined as 'male lion' and 'female lion', but not as 'male lioness' and 'female lioness' (the one is contradictory, the other tautological).³⁶ Applied to such examples as actor/actress, or waiter/waitress, this analysis amply illustrates the feminist case.

Vachek (1973) identifies the 'written norm as the marked member of an opposition whose unmarked member is the corresponding spoken form'. The distinction is made on functionalist grounds:

'that the situations for which the use of the written norm appears specifically indicated have always something specialized about them, and very frequently such use serves higher cultural and/or civilizational purposes and functions (use in literature, research work, state administration, etc.).' (p. 16)

In a later paper, Vachek (1979) discusses typographic signalling in some detail, listing a range of functions for which marked sets of graphic symbols (for example, italics) might be used to distinguish text features requiring emphasis or stylization from the unmarked norm (for example, roman type).

A particularly significant point that emerges from Vachek's discussion is that he appears to consider markedness to be a matter of distributional frequency within a linguistic community rather than just within a particular document. Referring to the Czech and German practice of printing extended passages such as prefaces in italics, he points out that in such circumstances printers have to reverse normal practice by using

³⁶ This example is borrowed from Lyons (1977) who goes on to distinguish between different kinds of marking, but for present purposes this simple illustration should suffice.

roman type, an unmarked form, for emphasis instead of italic. Although providing only anecdotal evidence, Vachek maintains that such signalling fails to convince the reader, and that such signalling in an italic context can only be achieved with some other marked set such as bold italic or small capitals. My own observations as a reader convince me of the probable accuracy of Vachek's position (Figure 1.14 shows an example).

And now, in order that the reader may leave this disquisition sick to death, as he should be, of the fused participle, a few miscellaneous specimens are offered: We cannot reckon on the unrest ceasing with the end of one strike, or on its not being renewed in the case of other trades (Compare unrest with its). | It may be that this is part of the meaning and instinctive motive of fish such as the perch, going in shoals at all. | Developments have occurred in consequence of the action of one of the accused, a man 31 years of age, and an ex-student of several colleges, having turned approver. | The holiday habit is

Figure 1.14 This reversal of the normal roman/italic markedness relationship is not very convincing, and is aggravated by the switching of roles in the eighth line down. This example is from the second edition of Fowler (1926). Actual size.

This is in contrast to a commonly held view, possibly originating with experiments on the psychology of perception, that figure-ground contrasts are largely a matter of proportion, and that therefore one might expect markedness to be a relative to the proportion of two forms within a particular text. The well known vase-faces illusion (Figure 1.15) illustrates how we are able to switch between seeing the white and the black areas as the figure and the ground. The effect is symmetrical in that if either the black (faces) or the white (vase) occupies too high a proportion of space, we are no longer able to switch between images.



Figure 1.15 The faces/vase illusion

What Vachek describes as 'the inability of italics to figure as the unmarked member of the opposition 'italic type—roman type' suggests that, as with 'lion' & 'lioness', italic type can be defined as 'not roman type' but not vice versa. Further, it could be argued that graphic conventions such as the italic-roman distinction³⁷ can develop, through frequent usage or reasons of historical development, something approaching the comparatively immutable status of natural language (such a status being confined, as with natural language, to a particular language community at a particular time).

This brings us back to the debate about the linguistic status of written language. Although the primacy-of-speech advocates argued that spoken language is universal while written language is dispensable since it only exists in a proportion of language communities, Vachek's response is that 'the goal to which language development has been directed in any community is the highest possible efficiency of lingual communication and the maximum development of its functional range', and furthermore that 'language "optimals" should not rank lower in importance than language universals.' (Vachek 1973: 17)

The choice of an optimal language form is, of course, a pragmatic one, dependent on the communication context, the means available, and the purposes and limitations of both speaker/writer and listener/reader. Thus theoretical advances in written language, and especially typography, are not to be expected from a view of language which is confined to explaining how words are combined into sentences.

Werlich

In recent years there has been a significant move away from an exclusive concern with the sentence towards whole texts. Egon Werlich's A text

³⁷ The history of this particular development is chronicled by Carter (1969).

grammar of English (1976) has not been widely cited (perhaps not widely noticed) by Anglo-American linguists. Theoretically (at least it appears so to this non-linguist author) it is rather sparsely argued, leaving numerous issues raised but unsettled; however, this brings the accompanying benefit that Werlich (and the reader) does not lose sight of the broader issues by concentrating overmuch on precise details of linguistic form. It is a descriptive exercise, considering an unusually wide range of texts—from advertisements to committee minutes—and describing their typical components and characteristics. In the present context, Werlich deserves mention because he notices typography and, like Crystal and Davy whom he cites, he is usually meticulous in his preservation of the typographic form of his examples, even where no special conclusion is drawn from it. For instance, examples which originated as newspaper articles are printed in narrow columns with rules between.

Although Werlich is clearly aware of graphic and spatial factors in text, he presumably regards them as unproblematic or outside the scope of his grammar. There is no special section on typography, and it does not appear in the index. Where he does mention typography or layout, it is generally accorded the role of text type identifier. Thus we recognize a leading article by its conspicuous position and the newspaper's emblem at its head. I shall look in more detail at Werlich's classification of text types in Chapter 9.

Bernhardt

One of the broadest and most impressive studies of typography from a linguistic viewpoint was recently published by Steven Bernhardt (1985). His paper 'Text structure and graphic design: the visible design' was published in the proceedings of a conference on 'Systemic perspectives on discourse', a field much influenced by the work of MAK Halliday and his co-worker (and wife) Ruqaiya Hasan, whose taxonomy of cohesive relationships lists a wide range of techniques used by writers to link text components (but no graphic ones).³⁸

A question apparently not answered by Halliday & Hasan is: what leads a speaker or writer to choose a particular texture (their term for a set of cohesive techniques in actual use) over another? They point to social and contextual influences such as the nature of the audience and the purpose of the communication. Bernhardt set out to investigate this question by comparing four texts on the same subject written for different purposes. They are a research report, a legal statute, a brochure and a 'fact-sheet', each addressing the topic of a wetland area of the Great Lakes. Bernhardt comments that:

'In my attempt to explain patterns of rhetorical strategy and the consequent realizations of cohesion with regard to context of situation, it soon became apparent that graphic design must figure prominently in the analysis of patterns of cohesive structuring' (p. 18).

Visually informative lists forms pamphlets directions legal texts textbooks articles novels Non-visually informative

Figure 1.16 Bernhardt's continuum of visual organization.

Bernhardt proposes a continuum of visual organization (Figure 1.15) in which various kinds of text are ranged from the visually informative to the non-visually informative. His choice of terms is interesting, since it enables him to confine his analysis to verbal language (that is, to exclude pictures) while admitting spatial and graphic features. Through an analysis of examples, he arrives at a more elaborated schema (Figure 1.16) which characterizes the poles of the continuum at various levels of 'rhetorical control'. The characteristics described look like useful ways of describing particular texts, given Bernhardt's qualification that not all texts will evidence all features.

³⁸ Halliday & Hasan's (1976) theory of linguistic cohesion is described in Chapter 6.

Visually	Infe	armat !	we .
and the local data	-	and the second se	-

Sen-Visually Informative

	eterical Control	
varied surface offers seather tic possibilities; can attract or repel reader through the shape of the text; laws of equilibrius, good continua- tion, good figure, chosure, similarity.	Viewel Gestelt	 tonogenous surfare offers little rossibility of conveying infer- mation; dense, indistinguished black of print; every test pre- ments the same face; foraddable appearance assumes willing reader;
localized: each section is its own locals with its own pattern of development; wi- rests reader's attention.	Development	 progressive: each section leads sectibly to the next; projects reader forward through discourse- level previouting and hockwards through reviewing.
iconic: spacing, headings reveal explicit, highly visible divisions; reader can jump apound, process the test in a son-linear fachion, access informative canity, read aslactively	Partitioning	 -integrated: indentations give even indication of boundaries, but sections frequently rostain several paragraphs and constinues divisions occur within paragraphs, reader must vead or s on isensity to find divisions
emphasis santralled by visual stress of legent, type size, specing, headings.	implault -	-amphasis controlled hemantically through inconsifiers, conjunctive tiss; now unphasis achieved by placement of information in initial of final slots in conteness and peragraphs.
subordinato relations signalied through type size, headings, indenting.	Sabordinate Belations	-controlled semantically within linear sequence of peragraphs and sentences.
signalled through listing subsctures, asponded senten- ces, perallel structures, councer- and or iconically signalled by specing, bullets, we other graphic derives.	Coordinate Relations	 -controlled semantically through justaposition, parablel structures, and cohecius time, especially additive time.
linhage controlled visually; little or no use of semantic ties between contences and sec- tions; reliance on conversive sequences or topicalization of section.	Linking/ Transitional/ Intermentential Relations	-liberal use of cohesive ties, especially conjunctives and deleties; frequent inter- paragraph ties or transitional phrases.
marinty in wood and syntactic patterning; much use of Q/A sequences, importives; frog- works and minor format; formase used in isolation.	Sentence Petterne	-complete sentences with little variation in modi sentences typically declarative with full syntax.

Figure 1.17 Bernhardt's list of rhetorical techniques related to visual informativeness.

For some linguists, Bernhardt's introduction of 'visually informative' texts is problematic, since arbitrariness has traditionally been one of the distinguishing features of language, as distinct from other sign systems (Saussure 1916/1974: 67). While an arbitrary sign bears a purely conventional or denotative relationship with its referent, an iconic one resembles or connotes it in some way. Being visually informative, a list (Bernhardt's example of a visually informative text) provides iconic information about the number, order and grouping of its constituent parts. I shall return to the problem of iconicity in Chapter 3.

On the evidence of his citations, Bernhardt appears to be unaware of the graphic design literature, and design features are described in a non-

technical manner. Much of the paper restates familiar ideas (familiar, that is, to most typographers) within Halliday's theoretical framework. This, though, is a major contribution in itself, since Halliday's framework is important but rather difficult for non-linguists to understand (and to be sure that they have understood). In a sense Bernhardt's analysis benefits from his lack of typographic baggage. Unencumbered by typographic dogma, he is able to report things as he finds them, reflecting also the linguist's commitment to the synchronic study of systems at a fixed point in time rather than the diachronic study of systems developing in a historical context.

It is significant that Bernhardt's interest in graphic design arose out of an interest in rhetorical strategy and in the influence of context, rather than in primary message-making. That is, graphic design is placed in his scheme at a metalinguistic level, describing or structuring a message within a social framework rather than contributing to its propositional content. For Bernhardt, the presence of graphic structuring seems to represent a prediction by the writer about the need to attract readers and allow them a choice of pathways through the message. His analysis is an attractive one, and he has moved apparently effortlessly to an integration of linguistic and typographic ideas that typographers have been struggling with for some time. His paper is perhaps the most significant theoretical work on graphic design in recent years.

Mountford

In a series of papers, John Mountford (1969, 1980, 1982) has addressed the place of the written medium within linguistics. Central to his position is his concept of 'writing-system' which he contrasts with 'system of writing'. The latter term is a broad concept, applied to systems such as the Roman alphabet, the Cyrillic system or the Chinese system. Writing systems (unhyphenated) have been extensively documented by Diringer (1962), Gelb (1963) and Trager (1974). Mountford uses 'writing-system' to describe particular systems which are 'predicated upon a particular language...the relationship between a language and its writing-system is (or can be) one-to-many' (1980: 224). As an example, he cites four special-purpose writing systems for English which supplement the general-purpose system: stenographies (shorthands), cryptographies (private or secret systems), paedographies (eg the Initial Teaching Alphabet), and technographies (which include special phonetic alphabets).

Spelling Abbreviatory devices Punctuation Serialization devices Differential resources Identifying devices Numeric resources Referral devices Symbolic resources Continuity devices Diacritic resources Script features Distinguishing devices Layout

Table 1.3 Mountford's (1980) list of writing-system components

Mountford (somewhat tentatively) breaks down writing-systems into functional components (Table 1.3), which he uses to classify a great many common graphic techniques. This is a great deal broader in scope than his 1969 classification of graphological factors (cited earlier), which appear mainly to be grouped under 'script features'.

Compared with Crystal's levels of graphic organization, Mountford's scheme accounts for a great many more dimensions of graphic language. It does not seem to be very satisfactory, though, to conflate features that Crystal analysed into fourteen levels of graphological organization under a single heading: 'punctuation (or some wider term to embrace the whole hierarchy of units-within-units from, say, 'book' down to sentences and below'. Whereas Crystal relates his levels to semantic and syntactic aspects of the text, Mountford's functionalism does not extend very far beyond his distinction between writing-systems on the basis of their broad purposes. As a result, the table (which, it should be said, is not the main focus of Mountford's paper, although the only place where he deals with the specifics of writing) is somewhat unbalanced, combining highly inclusive categories (such as 'punctuation' and 'script features', already mentioned, or 'layout') with categories containing only a few members (diacritical resources, numeric resources). The problem seems to be that Mountford, in this particular paper, still seems restricted by the linguist's traditional concept of data: that is, by what may be intuitively deduced from language samples. Any further ordering of the rather arbitrary Table 1.3 would have to be based on a consideration of the semantics and pragmatics of the text. Table 1.4 shows one way in which the various components could be grouped:

Abbreviatory devices1Punctuation2Serialization devices2/3Differential resources2Identifying devices2/3Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2	Spelling	1
Punctuation2Serialization devices2/3Differential resources2Identifying devices2/3Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2	Abbreviatory devices	1
Serialization devices2/3Differential resources2Identifying devices2/3Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Lourent2/2	Punctuation	2
Differential resources2Identifying devices2/3Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Lourent2/2	Serialization devices	2/3
Identifying devices2/3Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Lourent2/2	Differential resources	2
Numeric resources1Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Lowout2/2	Identifying devices	2/3
Referral devices3Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Levent2/2	Numeric resources	1
Symbolic resources1Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Lowoutt2/2	Referral devices	3
Continuity devices3Diacritic resources1Script features1Distinguishing devices1/2Levent2/2	Symbolic resources	1
Diacritic resources1Script features1Distinguishing devices1/2Lougeut2/2	Continuity devices	3
Script features1Distinguishing devices1/2Lowoutt2/2	Diacritic resources	1
Distinguishing devices 1/2	Script features	1
Lovout 2/2	Distinguishing devices	1/2
Layout 2/3	Layout	2/3

where: 1 = ways of symbolizing verbal language; 2 = ways of displaying the organization of content ; 3 = ways of helping readers to negotiate a course through the text

Table 1.4 Functions of Mountford's writing-system components.

In spite of these reservations, the concept of 'writing-system' is a useful one, although the purpose for which Mountford's scheme was designed is rather specialized (the comparison of shorthand and other orthographies). This present study is only concerned with one of his systems, the general purpose 'Standard English Orthography'. Within that single system, though, there may be a number of distinctive sub-systems or genres. It may be possible to find a range of common functions for which different techniques and conventions are used within different genres of text. To do so will require further analysis of, firstly, the techniques and conventions that are intrinsic to typographic genres and, secondly, the functions typographic text is expected to perform within different genres.

Conclusion

Prompted by the failure of applied psychologists to adequately specify the nature of their stimulus materials in a generalizable way, I turned to linguistics. However, it emerges that, although linguists sometimes refer in passing to graphic aspects of language, the study of such things is very far from the centre of a discipline concerned centrally with words, their meaning and their rule-bound combination. If we are to find a place for typography within linguistics it will be within that departure from the mainstream that is sometimes called 'text linguistics' or, particularly where interdisciplinary links are made, 'discourse processes'.

This last term reflects two significant departures from the traditional ways in which language has been studied: firstly, the objects of study are whole, purposeful discourses rather than isolated sentences; secondly, those discourses are seen in relation to processes of construction and interpretation. Typical contributions to the journal Discourse Processesor to the series of volumes Advances in Discourse Processes(published by Ablex) include contributions from cognitive psychologists, socio- and psycho-linguists, ethnomethodologists, and rhetoricians. In their effort to reach out from language to its context, then, links are made with other disciplines, and some of this work will be reviewed in the course of the following chapters.

Before moving on to consider the relationship between typography and language in more detail (in Chapter 3), it is worthwhile to consider further some of the methodological problems raised by this review of the literature. Typographers, psychologists and linguists clearly have different approaches to similar issues. In the next chapter, therefore, I will review some problems associated with the interdisciplinary study of practical problems, in order to refine the goals of this study.