Chapter 7: Artefact structure

This chapter examines some influences of the technicalities of text production on what may be expressed. First I shall discuss problems associated with the segmentation of language—how artefactual units such as the line and page influence the display of semantic or linguistic segments. I shall go on to consider some broader influences of communication technology on what is or may be expressed.

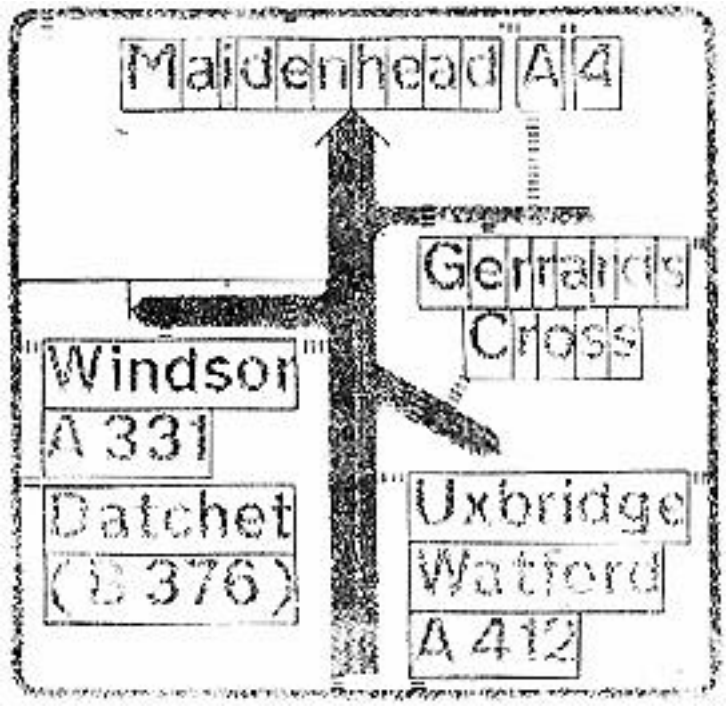

Figure 7.1 Diagram from Kinneir (1984: 348) explaining the layout system for British road signs.

In certain special circumstances, there is no predetermined limit to the size of the page or frame. In British traffic signs, for example, the size is determined by the content. Kinneir (1984: 347), the designer of the system, describes how 'with the layouts there was a fundamental difference of approach from the usual typographic practice'. British road

signs are laid out as a diagram of the road ahead as viewed by the driver. Text is placed at a minimum distance from lines representing roads, and only when the layout is completed is the outside frame determined—again, by a minimum distance. Figure 7.1 illustrates the principle. In book illustration, the opposite is sometimes the case, since illustrations can, within reason, be reduced or enlarged to fit a given area. But where both the page size and the image size are inflexible, the artefact makes itself known.

Levels of graphic segmentation

A child learning to read must come to realize that while some breaks in the string of letters to be deciphered are meaningful, others are almost completely arbitrary. Spaces between letters indicate a word break, and in some early reading materials a new line indicates a new sentence, and a new page announces a new topic. But not always, of course. At some point we learn that some, and eventually most, line breaks have no meaning—we have simply come to the edge of the column.

Writing in columns originally developed, not because of the effect of page size, since papyrus rolls offered an unlimited page width, but for other functional reasons. According to Thompson (1912), column widths varied greatly among Greek papyrus rolls. Apart from considerations of legibility, the maximum column width was presumably dictated by the amount of the writing surface to view as the papyrus was unrolled with one hand and rolled up with the other. However, legibility does seem to have been a factor quite early on, since columns 'were generally narrow in texts written for the market by skilled scribes' (p. 46). Moreover, after the development of the codex, when the page width might otherwise have dictated the column width, 'continuing the practice observed in the papyrus rolls, the arrangement in [two, three or four] columns was usual' (p. 55). This is confirmed by Turner's (1977) extensive survey of early codices.

According to Thompson, even though word separation was rare in Greek and Roman manuscripts, line breaks were made much as they are today—between words where possible, and otherwise between syllables (although the hyphen was not introduced until the eleventh century).[139] O'Hara (1971: 113) supports this view, but suggests that 'with the implementation of printing, both the rigorous employment of the hyphen where it was called for and the "correct" division of words into syllables in turnovers fell into disuse', a fact he ascribes to commercial pressures.

In recent years a number of people have suggested reforms to the convention by which we end lines according to what Twyman (1979) calls quasi-semantic rules ('with the lines broken only between words or within words according to etymology'). Twyman distinguishes 'quasi-semantic' from 'semantic', 'partially semantic' and 'mechanical' word breaks. Semantic word breaks are common in the case of unjustified type (with a ragged right-hand edge). Partially semantic breaks are those 'with the lines broken between words or within words either phonetically or arbitrarily'. In mechanical word breaks lines are broken at the most convenient point regardless of meaning. There might be a case for merging the quasi- and partially semantic categories, since in practice the choice of etymological or phonetic grounds for breaking words is not always consistent and is largely a matter of taste.

In the discussion that follows I shall use the term 'arbitrary' to mean any break in lines, columns or pages that is prompted solely by the edge of the type area. Since the word-break system employed is not generally varied within a particular document, it does not form part of the system of contrasts through which writers can create meanings,[140] and so can be

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[139] Saenger (1982: 371) notes contemporary evidence that
> 'Caesar Augustus, in his autograph letter, had the peculiar habit of connecting with a long loop the last syllable of one line to the first syllable of the next line when the two syllables formed part of the same word, a practice illustrating the idiosyncratic attempt of one author to overcome difficulties facing all Romans when writing in a script lacking word division'.

This use of lines to connect the end of one textual unit to the beginning of the next is also manifested in some recent government forms where respondents must follow different routes depending on their response to an earlier question. The alternative paths are indicated by lines, reminiscent of those painted on hospital floors to help people navigate complex routes.

bracketed with other global stylistic choices such as the page size.

De Vinne (1901) considered the hyphenation of words at line-endings to be a waste of time and a needless source of difficulty to the printer, who cannot reasonably be expected to have the expertise to make etymologically correct word-breaks. While modern typographers would solve the problem by abandoning the justification (alignment) of the right hand edge of the column, this is rejected by De Vinne, who prefers the more radical method of arbitrary word breaks, inserted wherever the line-ending happens to fall. He is able to cite a precedent in the work of the eminent eighteenth century printer John Baskerville, in whose edition of *Paradise Lost* he found such unorthodox word-breaks as 'e–specially' and 'o–therwise'. Figure 7.2 illustrates a modern example of truly arbitrary word-breaks.

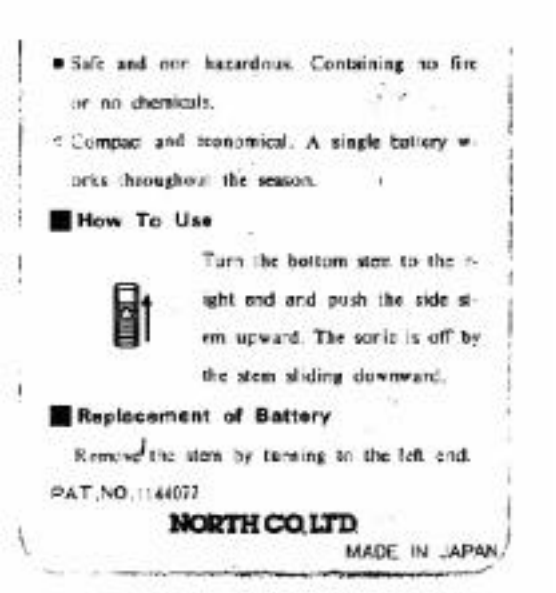

Figure 7.2 Instructions to a gadget bought by a friend in Singapore

However, De Vinne does not employ such a system himself, regarding it as an 'ideal' rather than a recommended practice. He explains that

'It is not probable that this innovation will find favor with the critical,

[140] A relatively minor exception to this is where unjustified type, which some typographers prefer without word-breaks, is used as part of a stylistic distinction between text components. However such a distinction would normally involve additional variations in typeface and size, since justification is not a prominent enough cue on its own.

> but it may be mentioned as an exhibit of increasing restiveness at grammatical and typographical shackles which annoy the reader and do not help and do hinder the proper rendering of printed words.' (De Vinne, 1901: 143)

He goes on to argue that, just as readers have learned to do without catch-words to help them over page breaks, they can equally easily learn to deal with arbitrary hyphenation.

Most other would-be-reformers have gone the other way and suggested that line endings should be made more meaningful not less. That is, that they should mark significant breaks between linguistic or semantic units. While this is a normal and uncontroversial practice commonly recommended when breaking display headings and titles (Dowding 1966), a number of experimental studies have tested the application of this and even more radical related principles to continuous prose.[141]

Andrews (1949) proposed what he termed 'square span' typography, in which phrases were grouped in small stacks, but his experimental results were inconclusive:

Andrews (1949) proposed	what he termed 'square span' typography	in which phrases were grouped in small stacks.

North & Jenkins (1951) moderated the proposal by suggesting that it was the spacing of phrases, not the stacking, that was important. They reported small increases in both speed and comprehension with their 'spaced typography':

In spaced typography,	extra space is added	between 'thought units'

However, although a number of others have investigated these options, most fail to prove their advantages or admit that the evidence to support them, if any, is very slim (for example, Klare, Nichols & Shuford 1957; Coleman & Kim 1961; Carver 1970; Wendt 1979). The principles for dividing lines into phrases or clauses are mostly intuitive, although Klare

[141] Perhaps I should just say 'prose' since the suggestion under consideration is, in effect, 'discontinuous prose'.

et al articulated some rules followed in their study. All of the studies illustrate just 'one line' of the square span format, and it is not clear how multiple lines would be spaced.

Semantic or syntactic line breaks offer rather more hope of acceptance by readers, since they do not look startlingly unusual. Coleman & Kim (1961), inspired by children's books which employed this system,[142] did not obtain a significant result from their pilot study, but others seem to have been sufficiently encouraged to pursue the idea. Frase & Schwartz (1979) reported an impressively faster (14–18%) response time for a task which required subjects to verify the answer to a question from the experimental text; this represents a typical use of a technical manual but does not resemble the reading of ordinary prose where fluency is rather more important. In fact Raban (1982), who studied the effect of such line-endings on children's reading, found that syntactic breaks were mistaken for the ends of sentences. It also seems strange to suggest that a particular punctuation technique (for that is what line-breaks would become) should be distributed evenly throughout a text, and thus be determined by line length as well as sense.[143] Hartley (1980) criticized Frase & Schwartz's methodology and failed to replicate their findings under different conditions.

Figure 7.3 shows a rare instance of the system in use. Gerstner (1974) uses it as a component of his 'integral typography', some aspects of which which he defines on the pages illustrated (p. 136-137).

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[142] The books in question were published in the 1940s by Lillian Lieber. Burt (1959) also recommends this practice but does not cite any precedents or research evidence.

[143] There is an eighteenth-century precedent for this suggestion. Robertson (1785: 75) cites Walker's Elements of Elocution thus:

> 'An ingenious writer has observed, that not half the pauses are found in printing, which are heard in the pronunciation of a good reader or speaker; and that, if we would read or speak well, we must pause, upon an average, at every fifth or sixth word'.

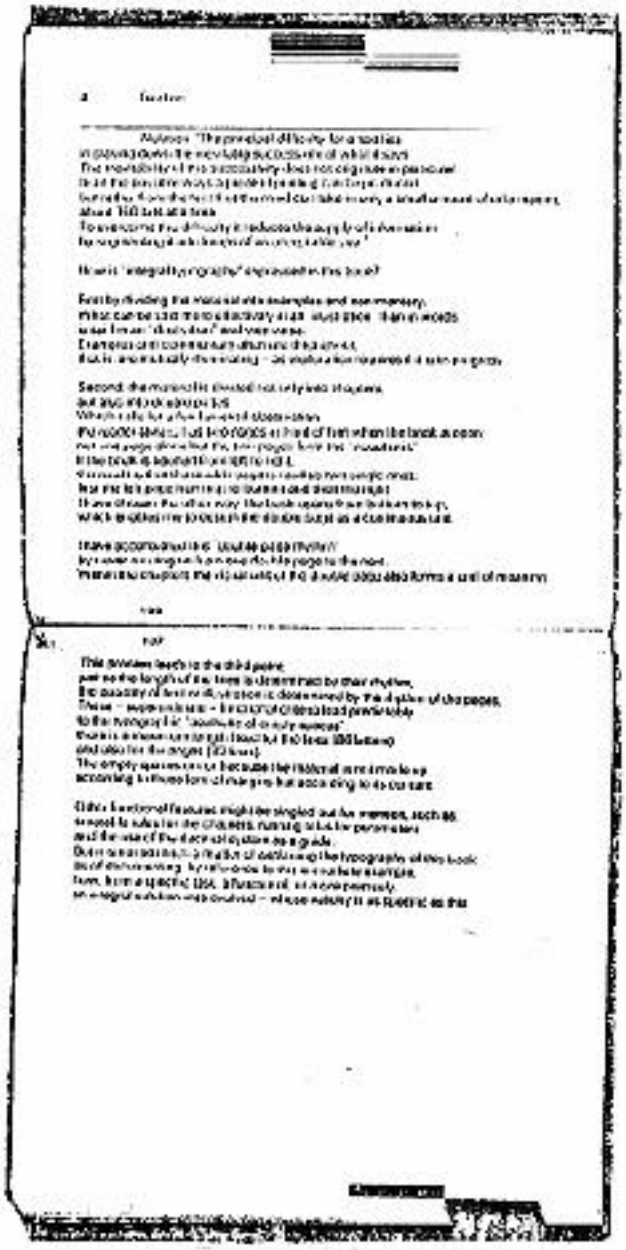

Figure 7.3 Gerstner's integral typography' includes semantic line breaks

Each reader can decide for himself or herself whether their own reaction corresponds to my own: that the poem-like quality of the system draws attention to Gerstner's language and, paradoxically, away from his sense. Poets, of course, have long been aware of the typographic dimensions to language, which include the shape of stanzas (even to the extent of Herbert's shaped poems) and visual rhymes as well as line breaks.

Crystal (1979) also reviews the idea of semantic line breaks and discusses the issue of line endings in the context of his fourteen levels of graphological organization in text (described in Chapter 1, Table 1.13). He correlates each level of graphological organization with other linguistic levels of analysis—phonology, grammar and semantics. Below the level of the line various correlations with phonology are identified, as well as two with grammar, and two with semantics. Above the line all correlations are with 'a statable information structure in semantics', while the line itself is the only level at which Crystal finds no correlations (with the single phonological exception of metrical lines in poetry). His analysis effectively concludes that, in continuous prose at least, graphological units below the line level can be considered invariant aspects of the writing system and therefore not really questionable for practical purposes. At and above the line level, though, there is more room for debate, particularly since the line emerges from this analysis as the only graphological unit with no linguistic or semantic status.

This is a surprising conclusion for two reasons. Firstly, it seems to ignore instances where lines do have an independent semantic status—such as in lists or examples of block language (signs, headings etc). Secondly, if line breaks can be arbitrarily determined by the printing process, so can page breaks, which in this analysis are accorded semantic status. But in conventional printed prose, line breaks are actually determined with a *greater* measure of semantic consideration than page breaks. Lines can only be ended at word or syllable breaks, whereas it is rarer for page breaks to be manipulated for equivalent reasons (to prevent a widow, for example).

The problem highlighted here is that line-breaks, page-breaks and, in the case of multi-column layouts, column-breaks can be *either* arbitrary or meaningful. Table 7.1 suggests some of the semantic implications of meaningful breaks.[144]

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[144] Harris' terms, 'structurally superimposed' and 'structurally necessary' (Harris 1986: 137), might be substituted for 'arbitrary' and 'meaningful'.

	Arbitrary	Meaningful	
		Single break	Successive breaks
Line	Prose	New paragraph	List Verse
Column	Prose	New topic	Table Parallel text
Page	Prose	New topic New chapter	Topic frame

Table 7.1 Some semantic implications of meaningful breaks in the language string.

At the *line* level, an arbitrary break is clearly just one of the conventions of the writing system that we take in our stride. Line breaks within paragraphs are generally not specified by authors, although they may object to awkward word breaks when they read their proofs. If a new sentence starts on an unforced new line, though, we regard it as the beginning of a new paragraph. If a succession of sentences, words or phrases begin on new lines we are likely to regard them as forming a list.

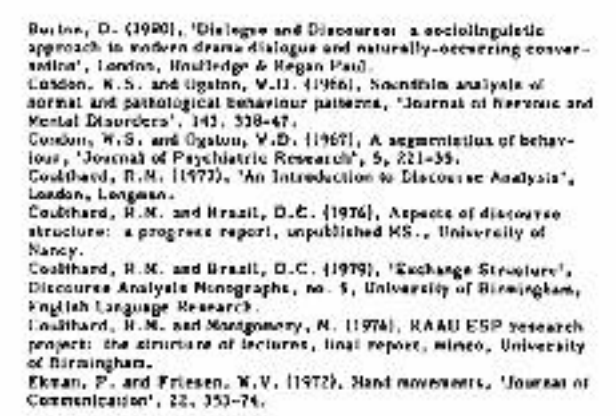
Burton, D. (1980), 'Dialogue and Discourse: a sociolinguistic approach to modern drama dialogue and naturally-occurring conversation', London, Routledge & Kegan Paul.
Gibson, H.B. and Ogston, W.D. (1966), Some film analysis of normal and pathological behaviour patterns, 'Journal of Nervous and Mental Disorders', 143, 328-47.
Gibson, W.S. and Ogston, W.D. (1967), A segmentation of behaviour, 'Journal of Psychiatric Research', 5, 221-35.
Coulthard, R.M. (1977), 'An Introduction to Discourse Analysis', London, Longman.
Coulthard, R.M. and Brazil, D.C. (1976), Aspects of discourse structure: a progress report, unpublished MS., University of Nancy.
Coulthard, R.M. and Brazil, D.C. (1979), 'Exchange Structure', Discourse Analysis Monographs, no. 5, University of Birmingham, English Language Research.
Coulthard, R.M. and Montgomery, M. (1978), RAAU ESP research project: the structure of lectures, final report, mimeo, University of Birmingham.
Ekman, P. and Friesen, W.V. (1972), Hand movements, 'Journal of Communication', 22, 353-74.

Figure 7.4 This bibliography is undercoded: meaningful and arbitrary line breaks are hard to distinguish. Source: Coulthard & Montgomery (1981).

In practice, meaningful line, column or page breaks are often given extra coding to prevent ambiguity. Ambiguity is particularly acute when arbitrary line-breaks occur in a list—where line endings would normally be seen as significant (Figure 7.4). In such cases a second coding—numbers, bullets, space between items, or indented turnovers—is normally added to clarify the structure.

Paragraph breaks are almost always given a double coding—new line plus indention, or new line plus blank line—in view of the frequency with which sentence-breaks within paragraphs happen to coincide with line-breaks. Figure 7.5 shows an example.

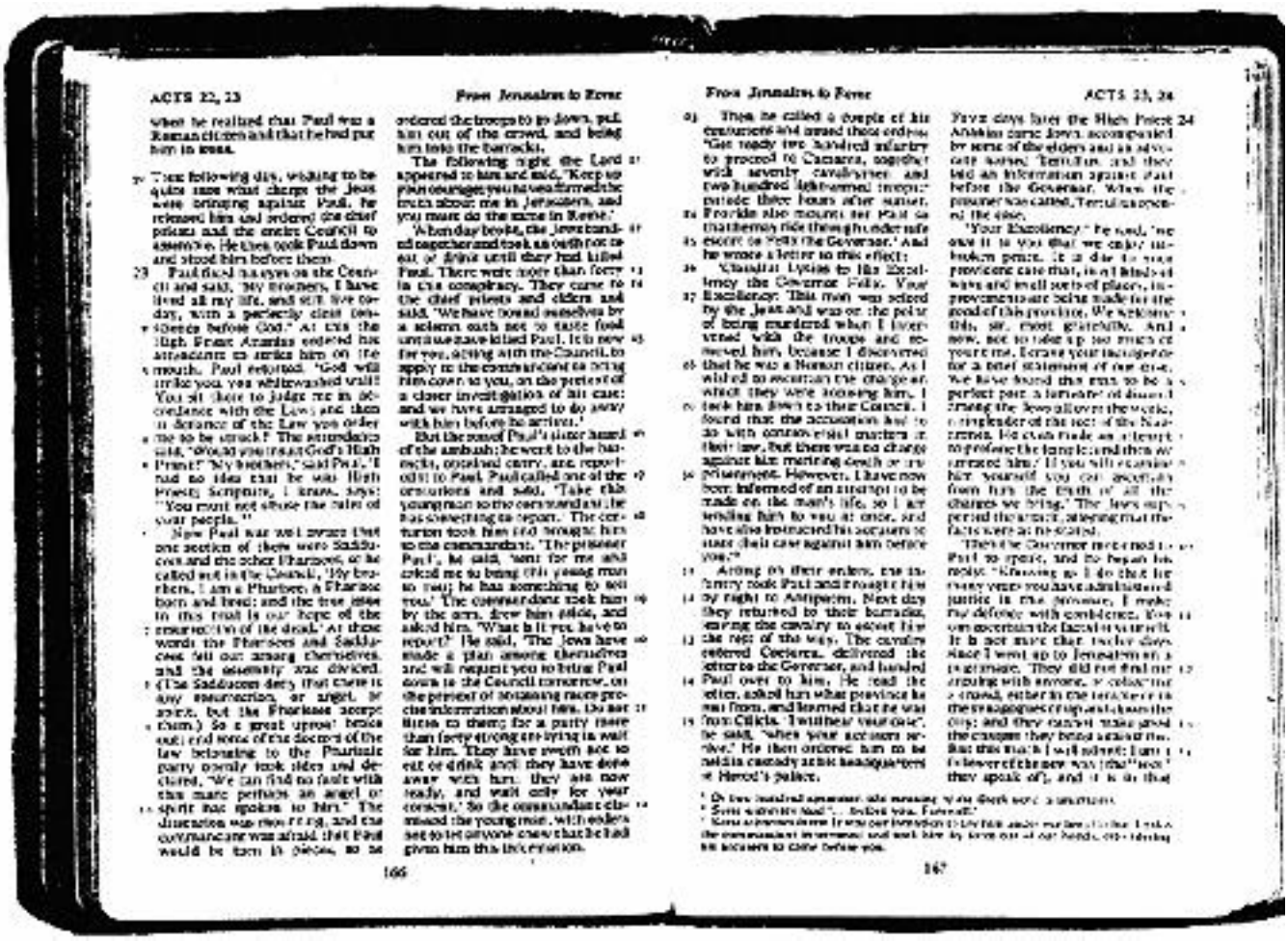

Figure 7.5 As can be seen on the left hand page, a line space is used here to indicate a major break in the text (after Chapter 22, verse 29). However, small capitals are also used for the first word of the new section, in case the line break coincides with a column break. This happens on the right-hand page at the start of Chapter 24 (modern versions of the Bible follow the breaks in original sources, not the later, inappropriate chapter divisions). Source: *New English Bible*. Dimensions: 116mm x 176mm.

An arbitrary break at the foot of a *column* is also a convention of continuous prose, while a column break not forced by the foot of the type area would generally imply the beginning of a new topic (usually additionally signalled by a heading). A succession of column breaks

(particularly when reinforced by some connection among the column headings) may imply a parallel structure. When each parallel column is broken into parallel lists, a table may result.

At the *page* level, an unforced break (again usually reinforced by a heading) signals a new topic—in practice, a new chapter, section or article. Successive meaningful page breaks, though, form double-page spreads and so define a complete 'topic frame' which bounds the discussion of a single topic. It is notable that publications using many graphic effects frequently opt for the treatment of pages as topic frames—not only popular handbooks such as the *Handbook of sailing* but also technical manuals. For example, Smillie (1985) describes the use of the page as topic frame in US Army documentation.

Unlike columns, which can vary in height and width as their content dictates, pages are invariable in size. There is therefore a trade-off between this inflexibility and the ability of page-organized texts to use two-dimensional diagram-like graphic effects to indicate topic structures. One point we may make in defence of the practice of writing and designing by spreads is that continuous prose is virtually the only format for discourse that does not place limits on its length. Spoken addresses, such as speeches, lectures and sermons, are ultimately bounded by the conventions of the occasion or the attention span of the audience.[145] The fixed time of the school lesson is perhaps the most direct parallel to the treatment of a page or double-page spread as a topic frame.[146] In the educational context, Duchastel (1982) has suggested larger page sizes for textbooks to enable them to make better use of graphic techniques—fold-out posters that he terms 'unbounded text'.

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[145] According to Hunt (1970), the division of the Bible into chapters was determined largely by the length required for a church lesson. As Figure 7.4 shows, the sense points identified by modern translators do not always coincide with Authorized Version chapter divisions.

[146] Saenger (1982) suggests that instances of medieval sermon texts organized as double spreads may have resulted from the practice of transcribing sermons on to wax tablets, which effectively limit the writer to a double spread. Margaret Smith (personal communication, University of Reading, January 1987) tells me that she has found several fifteenth century texts organized in pages, and mentions Sebastian Brant's *Ship of fools* in this connection.

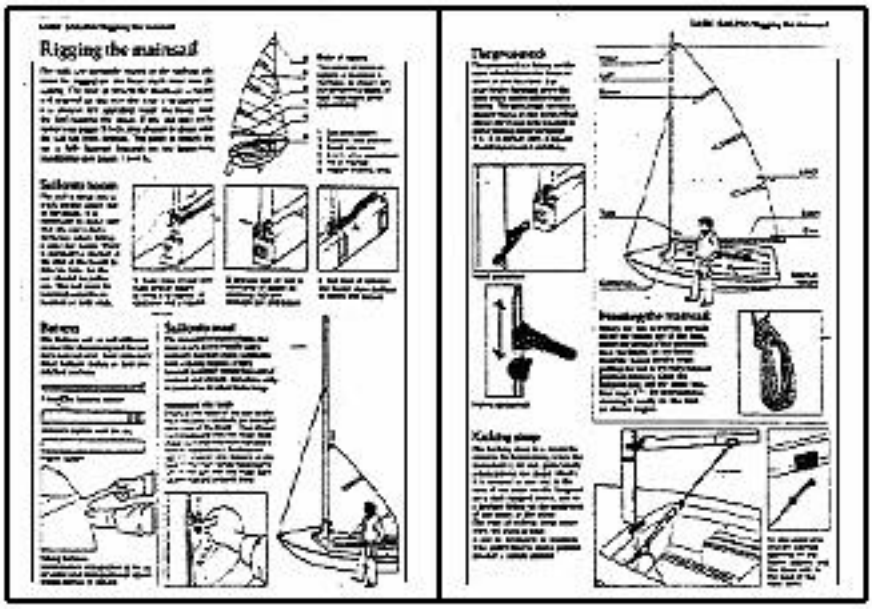

Figure 7.6

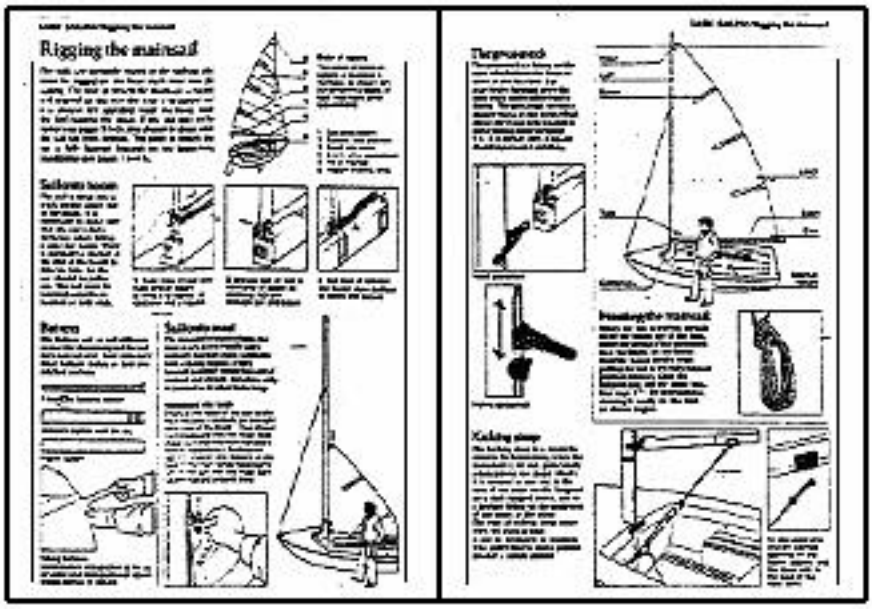

Figure 7.7

The Procrustean page

The relative inflexibility of the page as topic frame can be seen in a sequence of double page spreads from *The handbook of sailing* (Figure 7.6 and 7.7). It is slightly curious that the section entitled 'Rigging the mainsail' should precede the explanation of 'Mainsheet systems'. Although most sailors would agree that it is extremely impracticable to fit the

mainsheet after the sail is hoisted, the instructions on rigging and hoisting the mainsail make no mention of the mainsheet, which is mysteriously blanked out in the 'Hoisting the mainsail' diagram (top right of Figure 7.6). However, if the single page allocated to 'Mainsheet systems' were to precede 'Rigging the mainsail', as would seem sensible, the latter two pages would no longer form a single spread of facing pages. What appears to have happened is that the (artefactual) need to fit each topic into a single or double-page display has influenced the order of presentation. The sequence of topics no longer reflects the 'fact structure' of the task but the technicalities of the medium.While it illustrates the principle quite well, this example is perhaps somewhat marginal—the reader is presumably expected to read both sections (and more besides) before attempting to launch a boat. And the writer could easily have included at least a mention of the mainsheet in the rigging instructions. However, the overall impression of this book, and others written in the same style, is that the argument has to be continually stretched or condensed in order that it should fit into the Procrustean bed of the page.

Figure 7.8 From *The Reader's Digest book of do-it-yourself skills and techniques,* (1977)

Figure 7.8 is from another home reference manual in which the page has been subdivided into four smaller frames for three sub-topics. The subdivision is shown through the use of prominent headings and also by establishing a strong visual gestalt for each sub-topic with (in the absence of horizontal rules) clear channels of white space. Notice, though, that the white space is only as clearly defined as it is because the prose in each section divides evenly into three columns. Since this is achieved not just four times on one page, but throughout the book, it is clearly no accident. Moreover, the topic fits exactly into the page, and the space between topics is identical throughout the book. It is obvious, then, that each section, subsection and even each caption in this book has been 'written to length' and that a process of what has become known as 'cutting and filling' (Rogers 1986)[147] has taken place as the text has been typeset and made up into pages.

De Vinne (1901) sees nothing wrong with requiring authors to adapt to the constraints of the printing process, quoting Benjamin Drew (no date given):

> 'Theories are elastic,—are expandable and compressible; but types of metal have set dimensions of extension and in some circumstances will refuse to budge…Types are tyrannical, and will sometimes perpetrate solecisms under the plea of necessity' (*Pens & Types*, p. 89)

Against that we may quote Henry Fielding, who is clearly against the adjustments that must have been necessary in the Reader's Digest example we have just considered. He once likened newspapers 'which consist of just the same number of words, whether there be any news in them or not' to a stage coach 'which performs constantly the same course empty as well as full' (*Tom Jones*, Book II, chapter 1).

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[147] According to Moran (1978: 4), this was once known, rather more imaginatively, as 'soleing and heeling'.

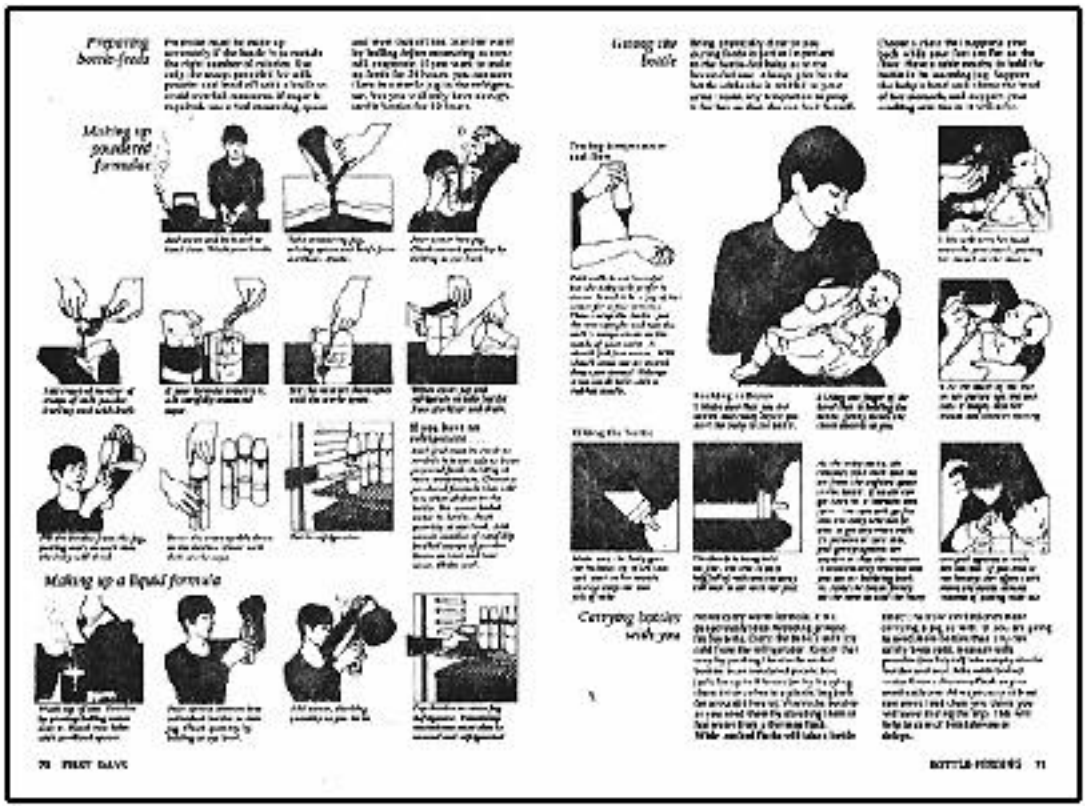

Figure 7.9 Spread from *Baby and child* by Penny Leach (1977, London: Michael Joseph)

Figure 7.10 Version of the above published in 1980 by Shogakukan, Tokyo

We can see the Procrustean effect particularly clearly in Figures 7.9 and 7.10, which represent the equivalent double-page spreads from the English and Japanese editions of the same book. The problem here is that the same content is to be fitted into approximately the same size of page, but using not only a different language but a different writing system. Besides the obvious differences in script and reading direction, the relative economy of the English writing system means that it effectively has the advantage of a larger page format. As a result we can see that the Japanese translator has had to cut a proportion of the material in order to fit the topic into its frame: five illustrations have had to be omitted. It is worth noting, though, that the ability of the Japanese to write from top to bottom as well as right to left gives them an additional technique not available to the designers of the English version.[148] It is very effectively used on the right hand page to enhance the bracketing effect of the introductory section, and, on the left hand page, to recover lost space by running around the central illustration.

We may also note that the designer of the Japanese version, by using rules and boxes, has been more successful in structuring the material, particularly on the right-hand page. This could be because the variable direction of the writing system discourages the assumption that readers will always move reliably from left to right without the cuing offered by the horizontal rules; or because the Japanese writing system, unlike the English one, has not been discouraged from using boxes and rules by five centuries of a printing process in which vertical rules, especially, were difficult to handle; or perhaps the smaller format places the alternative structuring technique, white space, at a premium.

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[148] Encouraged in part by evidence that Chinese readers read vertically slightly faster than horizontally (Tu 1930, cited by Tinker 1955), some have suggested a similar 'vertical typography' system for readers of English, in which one word appears on each line. Tinker (1955) reported that the vertical arrangement slowed readers down, but that they improved with practice. Coleman & Kim (1961) obtained promising results with vertical arrangements which Coleman & Hahn (1966) were unable to replicate. A Japanese acquaintance tells me that the vertical arrangement is more normal and is preferred, but that the horizontal system was introduced in order to be able to incorporate Roman script for western names, numerals, and certain scientific terms. This also explains the apparent anomaly that, although the page sequence in Japanese books is the reverse of the European convention (they start at what to us is the back of the book), the individual columns are read from left to right.

Grid systems

Most of the examples considered so far in this chapter are instances of grid typography, introduced in Chapter 1. By subdividing the page, grids increase the range of possible topic frames. Instead of just one or two frame sizes (that is, a single or double page spread), a topic may take any combination of grid squares as its frame while retaining the standard widths that have traditionally been required for typesetting and picture processing.

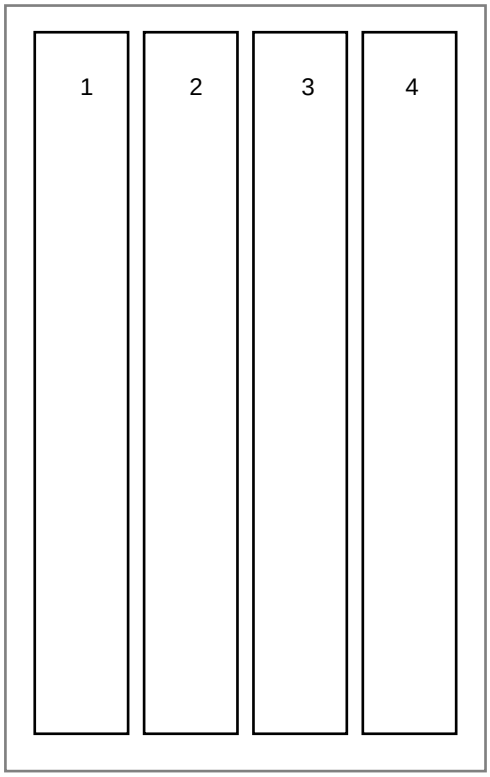

Figure 7.11 Columnar grid

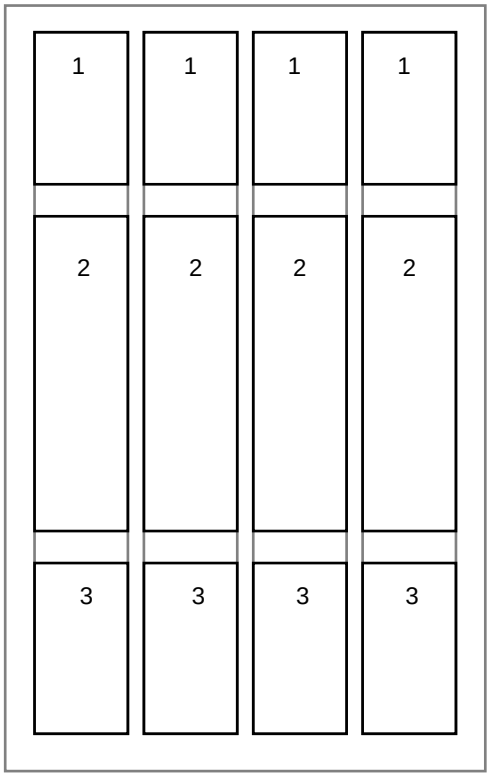

Figure 7.12 Parallel columnar grid

We can distinguish several different kinds of multi-column arrangement. Simple multi-column grids, in which text flows from one column to another as if they were pages, can be termed *columnar* grids (Figure 7.11). The telephone directory is an example of a simple columnar grid. In *parallel columnar* grids (Figure 7.12) the text still flows vertically down the page, but the content of the parallel columns is related horizontally. One column may contain headings or marginal notes related to contents of

the other column.[149] Figure 1.4 showed an example in which the parallel columns represent the same text in three languages.

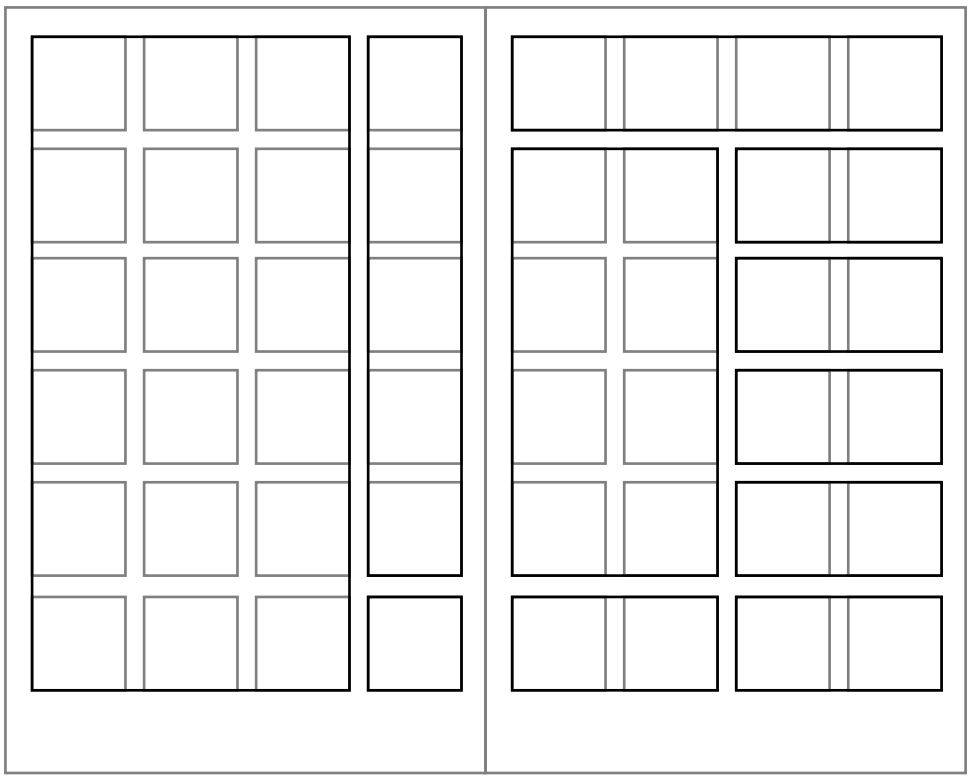

Figure 7.13 Modular grid

The classic Swiss grids, based on regular rows as well as columns, are *modular* (Figure 7.13). Topic frames may be constructed from any (usually rectangular) combination of modules. Truly modular texts are rarely found—whereas typography textbooks (for example, Rüegg & Frohlich 1972) usually illustrate strictly modular grids, their practical examples rarely make use of the standardized horizontal alignment points. Most implementations of the grid system use what might be termed *blocked* grids, which are similarly composed of rectangular frames, but only their width, not their height, is determined by the grid. The *Handbook of sailing* uses a blocked grid in which the designer can use a two, three or four column arrangement in any given horizontal strip of the page.

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[149] Duchastel (1985) discusses marginalia in some detail.

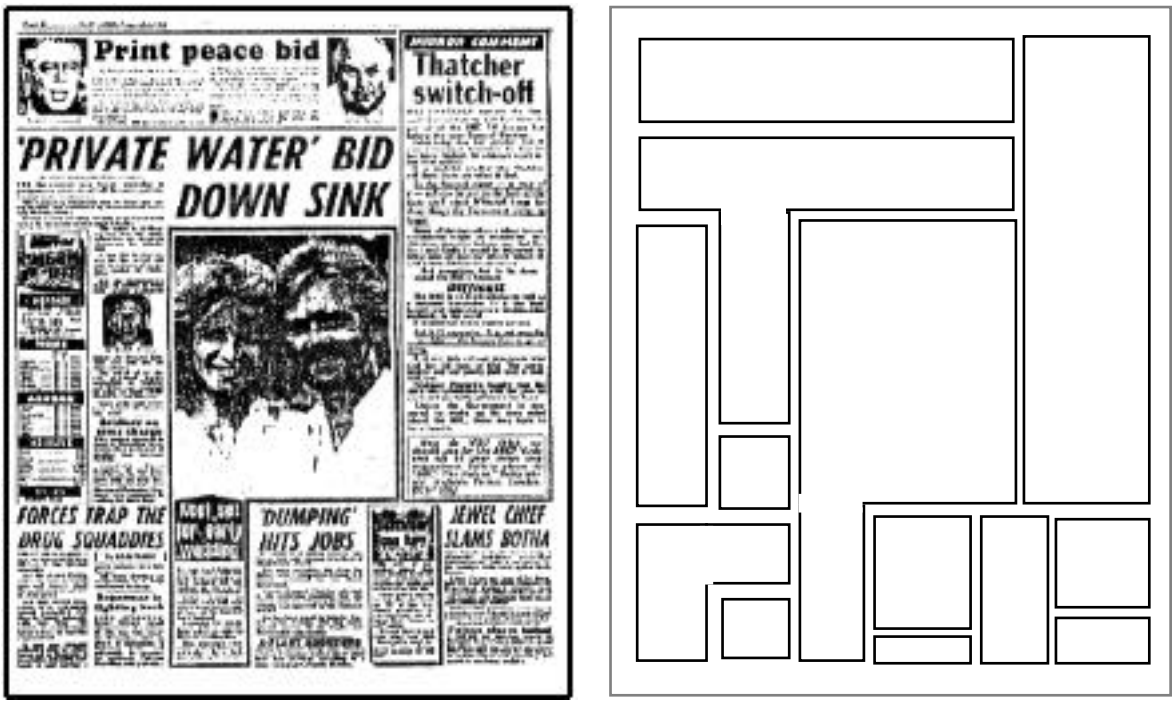

Figure 7.14 Irregular grid

Irregular grids are built up from standard column widths but topic frames are not always rectangular. Most tabloid newspapers use irregular grids[150] in which editorial and advertising items are interwoven to create an impression of variety and compete for the attention of the browsing reader (Figure 7.14). Their purpose is the very opposite of the cool impression of order found in Swiss typography—to prevent, not to create, clear visual gestalts. The disordered but compact pages of tabloids appear to give value for money—since the reader can never take the page in at one glance, there might always be something that has been missed.

De Hamel (1984) has provided a detailed and fascinating account of the page layouts used for the production of twelfth-century glossed Bibles, in which the parallel texts of scripture and commentary must be laid out side by side.[151] The problem was that the proportion of scripture to commentary varied throughout the text. In the first half of the century,

[150] Hutt (1967) and Evans (1973) discuss newspaper design in detail.

[151] A recent review by Gibson (1986) is somewhat sceptical of de Hamel's claims.

parallel columnar grids were used. The vertical columns were pricked through an entire quire, although sometimes adjusted in width according to the proportion of gloss to scripture on a particular page. The scripture, in large script, would occupy the central column, while the glosses would be placed at appropriate points in the margins, sometimes forming L-shapes by extending into the head or foot margins (Figure 7.15).[152] The introduction of greatly expanded glosses, though, placed too much strain on this system, and were eventually produced as continuous texts with the scripture omitted—an arrangement which suited the more learned scholars, who would have memorized much of the relevant scriptures, but which did not suit some of the wealthier purchasers of glossed Bibles (Figure 7.16).

Figure 7.15

Figure 7.16

Figure 7.17

According to de Hamel, the problem was solved by the development of what was, in effect, a modular grid system, in which all columns shared the same horizontal alignments. The scripture column, still in larger script, used only alternate lines of the grid; and since its width could vary according to the proportion of related gloss, the individual glosses were irregular in shape (Figure 7.17). The modular system thus allowed scripture and gloss to be interleaved in a complex but easily executed way.

[152] The layout of de Hamel's own book illustrates the principle quite well. He uses a parallel grid in which footnotes, smaller illustration and references to plates appear in the margin opposite their point of reference in the text. However, occasionally a marginal item gets pushed onto the next page through lack of space. Unfortunately modern production techniques are less flexible than those of the scribes, and he is unable to vary the layout page by page to suit its content.

De Hamel argues that the layout's modularity (although he does not use this term) also made it easier to understand since each gloss could be aligned correctly and reliably with the relevant passage of scripture.

The logic of assembly

Modular grid systems exploit what, adapting Gombrich's 'geometry of assembly' (1979: 9), we might call the logic of assembly. Gombrich's argument is rather different to the present one and he does not develop the term very far. Discussing decorative art, he is simply concerned to point out that simple and predictable visual patterns are easily understood but monotonous. The pattern made by four or five flagstones explains a whole pavement and we need look no further:

> 'When the expected happens in our field of vision we cease to attend and the arrangement sinks below the threshold of our awareness.'

The term implies that methods of assembly impose their own visual logic on the things assembled, whether they are corn cobs, sea urchins or pavements (Gombrich's examples) or books. As readers, we understand that many features of typographic pages are artefactual, not linguistic—line breaks and page breaks are virtually ignored by fluent readers and not mistaken for linguistic signals. At the end of a line or page we turn automatically to the next. A consistently applied grid system might be similarly internalized by readers, and complex texts read with greater fluency and confidence. Whereas the tabloid newspaper (Figure 7.14) deliberately never allows us a sense of completion, the Reader's Digest manual (Figure 7.8) conveys its own structure at a glance.

Grids are used as an analogy by Harris (1986) to describe the relationship of the alphabet to phonemes, likening the letters of the alphabet to map reference grids imposed on speech. His purpose is to explain why alphabetic writing is not purely phonetic, not an exact point for point

transcription of every contour of the landscape of speech. Harris' analogy adapts well to the present context.

Although Harris enjoins us not to make the basic mistake of taking the grid lines on a map to represent streets, that is exactly the assumption readers may be expected to make about typographic grids and pages when they are used to delineate topic boundaries. As Figure 7.8 demonstrated, it is not hard to find pages where the writer has 'written to length'—prepared each section or paragraph to match the visual slot made available by the grid. (Presumably the problem facing anyone who wishes to translate such texts into a foreign language is not just the translation of the page's meaning, but also its design.) In terms of the relationship between maps and streets, we can think of similar cases: the boundary between the USA and Canada, for example, follows the grid line of a map projection rather than the other way around. And the planning of streets by reference to grid systems is standard practice in North America. The difference between the organic nature of the earlier glossed books discussed by de Hamel, and the later modular ones, is that between old towns and new. The archetypal typographic grid, like town-planning grids, is used for pre-planning not description.

The logic of assembly involves not only those aspects of layout that are predetermined by a grid, but the repertoire of characters and contrastive techniques that are predetermined by available technologies. Mention has already been made of the general switch from the use of colour in manuscripts to space in monochrome printed books (Twyman 1982). Elsewhere, Twyman (1970, 1986) has traced the connections between printing technology and the expressive repertoire in some detail.

Editorial intervention and artefact structure

Clearly it is not only printing technology but editorial practice that can act as a constraint on the writer's means of expression. One of the

improvements over the traditional straight-line communication model claimed for my 'dog-leg' model is that it draws attention to the mediation of industrial processes in the transmission of text from writer to reader. These processes are institutional as well as technical.[153]

House styles, policed nowadays by copy-editors, are meant to ensure clarity of expression, and to make the printer's task easier and more consistent, but authors are sometimes ambivalent about their usefulness. Most copy-editors would agree with Butcher (1975: 1) that their role is 'to remove any obstacles between the reader and what the author wishes to convey', but it is not always easy to identify the obstacles to an author's satisfaction. Certainly most would accept the concept of a spelling mistake, but the 'rules' of syntax, punctuation and especially para-graphing are rather more tenuous. Even if authors can insist on their own punctuation practice,[154] it is almost unheard of for them to be able to influence typography once it has become enshrined in a house style.[155] When highly rule-bound and institutionalized, it seems, such conventional or genre structures can take on the inflexibility of artefact structures. Bibliographers are especially mindful of intervention by editors and printers in the historical context. For most of this century bibliographers have been sensitive to the materiality of the texts they study. However, paper, type and ink mostly seem to be of interest as evidence for the dating or attribution of particular editions, and for routine description

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[153] Many media sociologists would maintain that they are political also—but issues such as censorship and press ownership would seem to be far removed from questions of typographic theory.

[154] Pullum (1984) rails against the punctuation (and other) policies of American copy-editors in an amusing but, in my experience, entirely accurate article entitled *Punctuation and human freedom*. He especially objects to their insistence on placing quotation marks outside adjacent punctuation, whatever the circumstances: anyone who has been published in the USA can confirm that it is impossible in the USA to distinguish between, say, /He said 'I'm leaving!' / and /He said 'I'm leaving'!/. As Pullum puts it, 'many advanced cultures show no sign of the superstitious awe with which we regard copy-editors'.

[155] My own experience of co-editing a volume for Academic Press in the USA was of an inability to persuade the publisher even to drop the excessive capitalization of chapter titles. After some negotiation on the exact form of words, we were able to insert the following neutral sentence into the preface:

> 'The typography of the volume conforms to the standards of The Educational Technology Series.' (Duffy & Waller 1985: xv)

(McKerrow 1928) rather than as anything constitutive of the literary work itself. A central task of bibliography is to establish critical editions of literary texts that reflect the author's original intentions and that minimize the problems of what Gaskell (1978) refers to as 'the variation of transmission'. However, although extremely detailed analyses of typographic factors are routinely used to trace the origin of particular editions, there is some controversy about the extent to which they should be considered part of the 'author's intent'. McKenzie (1981, 1986), especially, has taken issue with the bibliographic neglect of visual aspects of language.

Printed editions of literary works vary from their manuscripts not only in the obvious respects of letterforms, line-endings and page breaks, but also in such matters of spelling, spacing and punctuation as may be included in the publisher's house style. The bibliographic problem is to determine which of any changes that can be found between editions reflect the author's intention, and which are the result of unwarranted intervention by the printer or an editor. On the whole the actual words used are usually safe, but their typography, spelling, capitalization, emphasis and punctuation are not. It seems that the propensity of some authors to leave most aspects of punctuation, typography and even spelling to the printer, and of some printers to intervene even when it was not required, has led some editors to regard these matters as fair game for alteration (not only for popular but also critical editions). Sir Walter Greg (1950-1/1960) regarded the author's words as 'substantives' and the other matters as 'accidentals', but the exact borderline—indeed, the very distinction—is controversial.

Reference has already been made in Chapter 4 to Simpson's (1911) defence of Shakespeare's printer against later editors who assumed that, because it did not correspond with their own grammatical practice, the dramatic punctuation of the first folio was incorrect. This is echoed in the introduction to PH Nidditch's critical edition of Locke's *An essay*

concerning human understanding (1975):

> 'The idea still persists that English printers in the seventeenth century took little notice of the formal features of an author's work as displayed in his manuscript.' (p. xlviii/xlix)

Nidditch cites evidence, from contemporary works by Milton and Newton for which manuscripts survive, that printers were more reliable than is generally supposed.[156] In Kuhnian terms, this may be evidence of a paradigm clash—the editors in question, applying a modern paradigm, are perhaps unable to see the reasoning behind the older system and put it down to ignorance or carelessness.

Price (1939) cites evidence to defend sixteenth- and seventeenth-century printers against the charge that they made free with an author's grammar, but in doing so reveals where he draws the line between substantive and accidental features. The compositor of Sir John Harington's translation of Ariosto in 1591 evidently modernized his spelling, a feat for whose consistency Price is full of admiration:[157]

> 'All these corrections he did of his head without any changes in the copy to guide him, and besides he was *continually altering the punctuation*. Yet his *fidelity to the text*is marvelous.' (p. 543, my emphasis)

Price's apparent acceptance of the continual alteration of punctuation as consistent with fidelity to the text presumably assumes fidelity to the sense of some true text that the manuscript only pointed toward but did not achieve. Harington was evidently happy with the changes—indeed, expected them—Gaskell (1978), who discusses the same work, tells us that Harington probably supervised revisions to the punctuation at proof stage. McKenzie (1981: 105) points out also that, from the evidence of his preface, Harington considered the needs of his readers carefully, and that the layout of the text (an extremely lengthy epic), with its marginal notes,

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[156] McKenzie (1986), who discusses some lines by Congreve with similar conclusions, suggests that subsequent editings have their own inherent interest for the critic:

> 'By reading other forms of [Congreve's prologue to *The Way of the World*], we can chart meanings that later readers made from it under different historical circumstances.' (p13)

[157] The Harington manuscript was first discussed in detail by Greg (1923/1960).

index and illustrations 'clearly demonstrates the finely planned and purposive nature of the typography'.[158]

McKenzie cites a wide range of convincing examples of authors who are clearly aware of typographic form, and deploy it along with other linguistic resources.[159] He appeals for Greg's substantive/accidental distinction to be rejected in favour of a broader 'sociology of the text'. However, the problem will presumably remain that, unless books are to be reproduced in facsimile—and some, including works by Blake, Apollinaire and the concrete poets cannot be reproduced any other way[160]—editors are forced to make choices: no one expects the modern reader to cope with the long 's', for example.[161] To the modern reader the distinction between the long and the short 's' is meaningless, and spellings that looked normal to a seventeenth-century reader just look archaic and opaque. If the past is a foreign country then perhaps the skill of editing is akin to that of translating. It would be interesting to conjecture about a wider range of such equivalences: for example, modern readers do not need and may simply not comprehend the use of braces to group the row headings in tables. Any editorial discrimination is a recognition of some kind of distinction, if not between the substantive and accidental, then between the relevant and irrelevant for some stated historical or critical purpose. A sociology of texts would presumably require editors to at least declare

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[158] It is interesting to see from the photograph of Harington's manuscript reproduced by Greg that, where a modern author would write his or her manuscript in the same hand and add instructions to set certain parts in italic, Harington actually adopts a different, cursive, hand for those parts (although this is apparently not consistent throughout the manuscript).

[159] Bronson (1968) and Barker (1981) also describes the relationship between literary style, typographic format and other contemporary arts in the eighteenth-century.

[160] There may be a case for a continuum of graphicness, analogous to Crystal's continuum of linguisticness discussed in Chapter 3. Massin (1970) reproduces an extensive range of texts—literary and otherwise—that merge graphic and linguistic features, including letters made from pictures, pictures made from letters, concrete poems, picture-letter puns and so on. None of them can be 'quoted', only pictured.

[161] Bowers (1959: 148) reports that 'McKerrow, though reluctantly, modernised the Elizabethan long [s]; and this procedure has now become standard in old-spelling critical texts'. Presumably McKerrow must have changed his mind at some stage since in *An introduction to bibliography* (1928) he implicitly recommends the retention of the long 's' in his advice on transcribing title-pages.

their position on a much wider range of text features than is traditional. Twyman's (1982) quest for the underlying 'language element' that underlies typographic arrangements is clearly as relevant to bibliography as it is to the specification of 'device independent' displays.

Moreover, so long as so many authors continue to be indifferent to the visual form of their work (or to capitulate to the forces of house style), the distinction between substantive (author's) and accidental (artefactual or editor's) features has some basis in present reality. Given that, as McKenzie (1981) suggests, 'modern books…are notorious for smoothing the text and dull our sensitivity to space as an instrument of order', it is little wonder that editors, from their modern perspective, fail to notice the full texture of literary works of the past. In addition to the historical dimension of a sociology of texts, which would presumably seek to sensitize bibliographers and literary editors to a broader range of factors than they now notice, we perhaps need to extend our modern concept of literacy to include the full range of expressive tools implied by that concept. If authors are to treat the graphic arrangement of their words as substantive, they ought to be as sensitive and fluent in that aspect of writing as with any other—especially if they use the newer desk-top publishing systems with their extensive typographic facilities.

Medium and message

This last suggestion begs an important question. Are writers—or what ever less-restricted term might be substituted for one who prepares graphic language of whatever kind— indifferent to graphic forms because they have nothing they wish to say that requires them, or is it the other way around? 'The other way around' being: do they find little to express graphically because they are unaware of (or unable to operate) the means of saying it?

This question has been debated by linguists for many years, in the form of

the 'Sapir-Whorf hypothesis', named after the American linguists Edward Sapir and Benjamin Lee Whorf , who maintained that languages determine not only the way we express our thoughts, but the way we think.[162] Gombrich (1984: 188) picks up this debate, describing how:

> 'in describing the same painting in German or English I had to take the goods which were on offer[163] and thus had to single out different aspects of the same painting...The grid or network of language we impose on the landscape of our experience will inevitably result in different maps.'

Gombrich's remarks bring to mind Harris's use of the map reference grid analogy, discussed earlier in the chapter. Indeed, the metaphor of language as a grid seems to be quite a common one. It is found in Saussurean linguistics, where words are said to relate to other words both horizontally (syntagmatically) and vertically (associatively). Ivins (1953: 53) compares both words and images to fishing nets that only catch such fish as cannot swim through or escape:

> 'in the same way words and visual images catch only the things or qualities they are adequately meshed for'.[164]

Although most scholars who discuss the relationship between language and concepts are careful to distance themselves from Whorf (for example, Gombrich 1984: 189; Goody 1977: 9), the relationship of artefact and expression, medium and message, has been discussed widely in recent years. 'The medium is the message' is a catch-phrase associated with

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[162] Many textbooks on linguistics and semantics contain summaries of the debate surrounding the hypothesis, which is also known simply as the 'Whorfian hypothesis' or as 'linguistic relativism' (eg Lyons 1977: 245; Sampson 1980: 81; Harris 1981: 131). Lyons contrasts it with functionalism—whereas relativists would claim that languages delimit thought processes, functionalists would maintain that the structure of different languages results from the expressive requirements of particular societies.

[163] Gombrich's use of the term 'goods' alludes to a sonnet by IA Richards in which he, in effect, comments on the Sapir-Whorf hypothesis:

> 'Our mother tongue, so far ahead of me, / Displays her goods, hints at each bond and link, / Provides the means, leaves it to us to think,/ ...'

[164] Elsewhere, in a variation of the metaphor, he criticizes the excessively systematized techniques of certain virtuoso engravers as 'webs spun by these spiders of the exactly repeatable pictorial statement.' (Ivins 1953: 71)

Marshall McLuhan (1962) whose *Gutenberg Galaxy* was largely responsible for bringing the study of media effects to the wider public consciousness. So many aspects of modern Western society are bound up with literacy that it is of obvious interest to contrast non-literate and literate societies, and to link the introduction of literacy to social, economic and political events in history. Some very bold claims have been made for the influence of the new communication technologies on the history of ideas—and even on the evolution of human cognitive processes.[165]

In cultures without writing—parallels are drawn between ancient pre-literate civilizations and modern non-literate tribal cultures—it is generally agreed that knowledge is heavily coded for memorization and recitation.[166] It is formulaic and rhythmic in structure, and often expressed in terms of proverbs, legends, riddles and verses. Meaning is thus not explicit, and interpretation relies instead on prior knowledge, context and 'wisdom'—a priesthood, even, qualified to interpret. Several commentators (for example, Havelock 1976, 1986; Olson 1977) regard the relative *autonomy* of written language—its ability to convey reliable and consistent meanings across differences in audience and context—as central to its cultural significance. However, considerable confusion seems to surround the part played by graphic features in these developments. Whereas Eisenstein (1979) regards the introduction of spatial features as a major contribution of the introduction of printing towards the development of modern science, Havelock—whose subject is literary rather than functional text—appears to see it as retrograde.

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[165] Scribner & Cole (1981) describe this debate and, on the basis of their comparison of literates and non-literates in an African society, suggest that any improvements in performance of intellectual tasks due to literacy are confined to the individuals concerned and are task-specific:

> 'There is nothing in our findings that would lead us to speak of cognitive consequences of literacy with the notion in mind that such consequences affect intellectual performance in all tasks to which the human mind is put.' (p. 86)

[166] There is a considerable literature on orality and literacy, some of it somewhat apocalyptic in character (for example, Innis 1951, McLuhan 1962). Ong (1967, 1982), who appears at times to be gripped by a nostalgia for tribal culture, celebrates orality at some length in contrast to what he terms the 'logocentricity' of Western civilization; an influential anthropological and sociological view is argued by Goody (1977, 1986); and current linguistic and psychological interest is represented in the collections edited by Tannen (1982) and Olson, Torrance & Hildyard (1985).

Havelock (1976) has argued that, because oral culture is so ritualized, opportunities for creative expression and individual interpretation are strictly limited. The mnemonic nature of oral texts means that they act as a force for the retention of existing knowledge within a society rather than a tool for exploratory thinking and debate. In Havelock's view, early writing systems, too—pictographies and syllabaries—were not sufficiently precise to act as more than aids to memory and should therefore be considered as features of oral culture. Havelock sees the development of alphabetic writing by the Greeks as the key to the true literacy that, since it enabled the fast and accurate transcription of speech, provided the basis for texts whose meaning was autonomous and therefore potentially original. Following on from Parry (1971), who identified the formulaic structure of Homer as characteristically oral, Havelock (1986) has traced the development of Greek thought and language as the autonomous nature of written text was discovered. His main interest is in the tracing of linguistic changes after alphabeticization—the gradual replacement of what he terms the language of doing with the language of being:

> 'the linguistic symptoms of this radical shift away from oralism … occurred in a proliferation of terms, for notions and thoughts and thinking, for knowledge and knowing, for understanding, investigating, research, inquiry.' (p. 115)[167]

Interestingly, in the present context, he also suggests that 'topicalization slowly increases its presence in classic Greek' (p. 103).

Two puzzling aspects of Havelock's argument may be noted here. Firstly, his claim for such overwhelming advantages for alphabetic writing rests on the assumption that other writing systems provide little more than a mnemonic for the recital of known information, and are therefore incapable of supporting abstract or creative thought. Indeed, at one point, with breath-taking chauvinism, he suggests that

> 'a Japanese can orally express what the West has taught him.

[167] Lloyd (1966) also remarks on the development of new terms, or at least adaptations and better definitions of existing terms, for use in logic.

> Transferring the statement to his own script, he will then be able to recognize and to read what he already knows, as did the scribes of antiquity. But the free production of novel statements in his own script will remain difficult.' (Havelock 1976: 84)

Secondly, the phonetic equivalence of alphabetic writing, coupled with the normal lack of word separation (see Chapter 4), links Greek writing closely with speech. Indeed, Havelock (1976) appears to regard the Greek alphabet as a complete inventory of the phonemes in the Greek language— a view dismissed by Harris (1986: 118), not in specific relation to Havelock, it should be added, as 'simply a fourth-form howler of the most elementary order'. So, while basing much of his theory on the objectifying effect of writing that separates language from its speaker, Havelock prefers to ignore, even to exclude, visual aspects of the medium.[168] This is surely a strangely misguided purism, since the ability to manipulate ideas in space (rather than in linear acoustic form) would seem to give the logician an advantage—witness the development of symbols in logic, introduced to a limited degree by Aristotle (Lloyd 1966).[169] It is possible, then, that if progress in Greek philosophy can be linked to writing—and it seems to be generally accepted that it is[170]—it was achieved not as a direct result of their particular technology of writing but as a more general consequence of literacy—that more people could engage in dialogue and that progress could be recorded.

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[168] Elsewhere Havelock (1976: 15) is uncompromisingly opposed to any attention to the visual appearance of writing:

> 'Strictly speaking, writing should behave solely as the servant of the spoken tongue, reporting its sounds as accurately and swiftly as possible […] it is a sign of the arrival of modern scientific and socialized man that calligraphy as an art form has largely expired.'

[169] Evans (1980: 35) refers to evidence that 'Aristotle's works were almost certainly illustrated with diagrams, and while it is unlikely that the Platonic dialogues were, commentaries on them employed figures extensively'. Gardner (1958) discusses a number of instances of diagramming and modelling by logicians from the middle ages to the present day. Even when they don't actually use diagrams, philosophers frequently employ diagrammatic or spatial metaphor: for example, Toulmin (1958) entitles a chapter of *The uses of argument*,'The layout of arguments', but solely in a metaphorical sense.

[170] In *A history of western philosophy*,Bertrand Russell (1946) seems to take it for granted that the writing systems available to early civilizations had a direct bearing on their progress in philosophy.

Although they mostly build on the work of the classicists (Parry and Havelock), other scholars (Chaytor 1945; Ong 1958, 1967, 1982; McLuhan 1962), have seen the invention of printing, not of alphabetic writing, as the pivotal event that turned Western civilization from a mainly oral to a literate tradition.

Ong's account of the influence of the Ramist method has already been described (Chapter 6). Just why he should attribute spatial thinking to the technology of printing—a technology which to this day penalizes attempts to integrate word and image—is not very clear. Yates (1966: 230) takes issue with him on this point:

> 'Rather, it would seem to me, the printed Ramist epitomes are a transfer to the printed book of the visually ordered and schematized lay-outs of manuscripts.'

In part, Ong's argument is similar to that of Ivins (1953), to which reference was made in Chapter 3—that reliance on graphic forms in the manuscript age was inhibited by problems of inaccurate copying.[171] But, waxing somewhat metaphysical, he also suggests that the technology of movable type, and therefore movable letters and words, was suggestive of ideas as objects in space:

> 'Now the printer's font where types are kept comes into being—a real "place," where *elements* of discourse, reduced to a visually apprehensible and spatially maneuverable form, are stored.' (Ong 1958: 310)

Although he does at one point acknowledge that diagrams and spatial arrangements were also used in the age of manuscripts, Ong's idea of print as a newly spatial medium gains authority in his writings from frequent repetition.

Ong is rebuked for this oversimplification by Eisenstein (1979), who prefers to see print as a transition not from an oral to a literate culture,

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[171] Although, whereas Ivins refers mainly to medical and botanical studies where verisimilitude is relatively important, the Ramist charts Ong attributes to the age of print are rather more robust. In fact, Evans (1980: 35) reports that even in the manuscript age 'available evidence suggests that, compared with representational images, diagrammatic designs are transmitted with remarkably little variation'.

but from one kind of literate culture to another. Eisenstein, though, is questioned in turn by Twyman (1986: 205) who remarks on her 'repeated reference to the proliferation of charts and tables…following the invention of printing':

> 'My impression…is that one of the consequences of the invention of printing was to stifle the range of configurations of graphic language in much the same way as it manifestly changed the book from a colored artefact to a monochrome one.'

Even today any arrangement that departs from conventional linear-interrupted prose is difficult, costly and discouraged by publishers (Biderman 1980). Twyman excludes non-linear images (printed as single plates) from his comments, but even here it is clear that print enforced a separation of word from image. Eisenstein herself remarks:

> 'That the printed book made possible new forms of interplay between these diverse elements is perhaps even more significant than the change undergone by picture, number or letter alone.' (p. 55)

Elsewhere, though, she appears to contradict this:

> 'In the field of book illustration, at least, what happened in the late fifteenth century resembled a divorce rather more than a reunion. When the graceful lines that linked text to marginal decoration were severed, pictures and words were disconnected' (p. 258).[172]

This last comment is reinforced by Evans (1980) and Camille (1986), who demonstrate the pervasive use of images and diagrams, highly integrated with accompanying words, in the manuscript age. From this evidence, together with other studies of medieval 'typographic' layout, it is becoming clear that the modern genre of typographically organized book, such as the

[172] It is actually rather difficult to determine exactly what Eisenstein's position is. In a recently published essay (1985), she discusses some of the motivations underlying *The printing press as an agent of change,* suggesting that she developed her view that printing led to an increased use of iconic images in response to an earlier characterization of herself as holding the opposite view. She claims that imputed to her had been a formula that the advent of printing moved Western Europe 'from image culture to word culture'—since 'a latent iconoclasm was reinforced and the medieval justification for allowing graven images in church was weakened by print' (p. 20). Her revision of this earlier notion may account for her apparent overstatement of the opposite 'word to image' formula.

Handbook of Sailing, has more affinity with medieval books than with the typical products of the first few hundred years in which printing was dominated by the letterpress system. The 'standard book' that emerged from the first hundred years or so of printing discouraged the multi-column layouts of medieval books (Parkes 1977, de Hamel 1984), their variety of script styles (Ullmann 1932; de Hamel 1984), their use of colour as a cue (Twyman 1982) and their close integration of illustrations and text.

The model outlined in Chapter 5 suggests that any such affinity between genres (or common membership of a single genre) will be based not only on a similar set of artefactual constraints, but also on similar demands of the topic structure and similar patterns of access among readers. The next chapter discusses some aspects of what the model termed 'access structure', before going on to consider the nature of genre in more detail (Chapter 9).