further thoughts on a schema for describing graphic language

Michael Twyman

In this short paper I aim to stress something we all know though sometimes forget: that typography is not just a matter of choosing typefaces and arranging them harmoniously on a page, but that at the deepest level of decision making it has to do with organizing language. I use the word language in this context, others may choose to refer to information. But whichever word is used, my concern here is with the arrangement of segments or components of a message in relation to one another.

I am arguing here that there are many ways of making such arrangements –some of them confirmed by practice over the centuries– and that we need to be aware of the range of possibilities at our disposal. When addressing a group of typographic specialists I hope it is understood, without labouring the point, that such primary decisions about the organization of segments of language need to be reinforced by a sensitive choice of type and other refined visual judgements.

The basis for what I have to say is a schema [fig.1], which I devised some twenty-five years ago and have used in relation to teaching at the University of Reading since then.[1] It will be boringly familiar to some in the audience, and I apologize for this. It would take an age to describe the schema in full, so I shall merely outline very quickly what I hope it reveals, and then go on to suggest ways in which I believe it could be extended and interpreted.

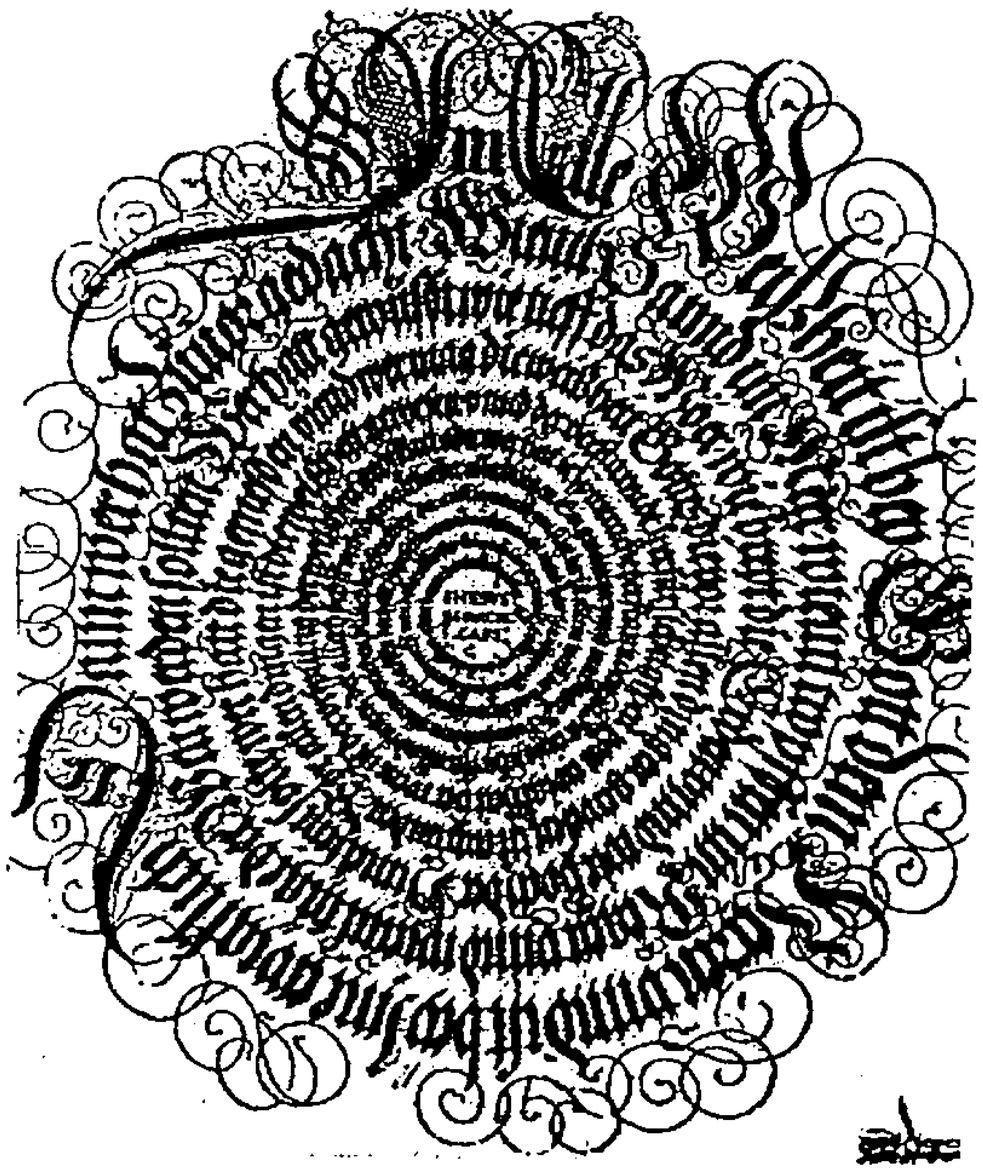
It aims to embrace the whole of graphic language: whether verbal or pictorial, and whether made by hand, machine, or electronically. On one axis are shown the principal modes of graphic language, and on the other its principal configurations. The modes

1. See Twyman, M., "A schema for the study of graphic language", in Kolers, P.A., Wrolstadt, M.E., & Bouma, H., *Processing of visible language*, no.1, New York and London, Plenum Press, 1979, pp.117-50. The paper was published in a shorter, revised form in Boyd-Barrett, O., & Braham, P., *Media, knowledge and power*, London and Sydney, Croom Helm, 1986, pp.201-25.

Method of configuration

Mode of symbolization	Pure linear	Linear interrupted	List	Linear branching	Matrix	Non-linear directed viewing	Non-linear most options open
Verbal, numerical	1	2	3	4	5	6	7
Pictorial & verbal-numerical	8	9	10	11	12	13	14
Pictorial	15	16	17	18	19	20	21
Schematic	22	23	24	25	26	27	28

fig.1 A schema for discussing graphic language, devised in this form for the first Conference on the Processing of Visual Language, Eindhoven, 1977.



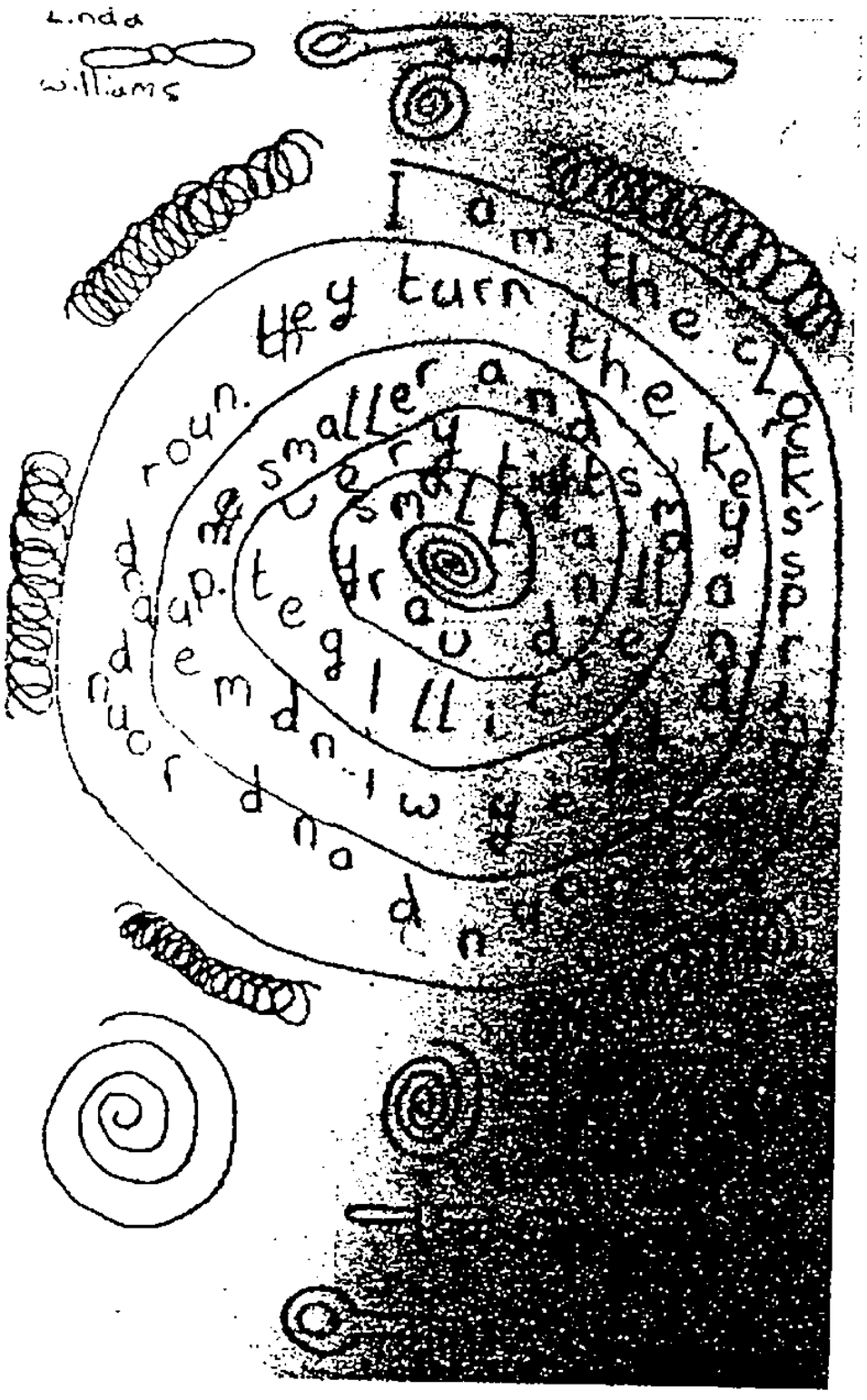


fig.2 An eighteenth-century example of a **pure linear** configuration. It reflects reading conventions by starting at the top, but then spirals into the centre of the sheet in a continuous flow of language.

fig.3 A piece of schoolwork, no doubt influenced by a teacher, that uses the same **pure linear** approach seen in fig.2.

(which comprise numbers, words, pictures and schematic images) could be extended to include, for example, numbers on their own and numbers combined with schematic images; but to do this would have led to unnecessary complication with very little gain. The particular modes I have defined in the schema are therefore meant to be exemplary or indicative rather than comprehensive.

My main concern today is with configurations, by which I mean the ways in which segments of language can be arranged spatially in relation to one another. Though driven by typography and verbal language, they have also had a substantial influence on the ways in which we organize some kinds of pictures and schematic language (a point I shall return to later). The number of possible configurations appears to be finite, though there are a few more than are accounted for in my diagram.

But however many there are, I believe them to be central to the effective use of graphic language. I should therefore like to add configuration to the seven graphic variables defined by Bertin in

his seminal book *Sémiologie graphique*: his seven being shape, scale, value (tone), texture, colour, orientation, and location.[2]

That is enough by way of introduction. Let me now address the schema in greater detail and consider some of its cells. I shall concentrate on row one and illustrate the configurations of verbal and numerical graphic language first, and then briefly show a couple of configurations in different modes to demonstrate how the schema works as a whole. Underpinning the sequence of configurations I have defined is the notion that verbal language carries with it a notion of linearity, which reflects to some degree the linearity of speech in real time. The configurations have therefore been ordered from left to right in relation to the perceived degree of linearity they reveal: on the left we have the greatest degree of linearity and on the right the least.

The starting point is the **pure linear** configuration, which I suggest is as close as static graphic language can get to the linearity of speech in relation to time. As we are in the Hellenic world, it seems appropriate to start by referring to the Phaistos disc of around the seventeenth century BC, which shows, on both sides, language spiralling inwards from the outer edge to the centre in a limited, but purely linear manner. A similar approach is seen in this eighteenth-century German example [fig.2] and, more recently, in this piece by a school child [fig.3]. It is no accident that these examples all take a spiral form, since purely linear messages when presented in a straight line pose problems of a practical kind.

We can surmise that graphic language came to be divided into arbitrary hunks for two reasons: convenience of production (writing and printing) and ease of reading (both handling a document and visually scanning it). Significantly, this development took place in relation to the rotulus or scroll long before the invention of the codex, so was not directly determined by the physical constraints of the latter. What has emerged throughout the world, almost regardless of language group and direction of reading, is essentially a compromise solution to the problem of achieving graphic linearity, what I am calling the **linear-interrupted** configuration.

In this configuration the linearity of language is interrupted, usually arbitrarily at the end of what we now call lines. The interruption rarely coincides with a segment of information larger than a word, and often occurs within a word (when present-day conventions require that we use a hyphen to indicate the continuity of the linear message). So the linear-interrupted configuration is a compromise, even in its detailed treatment, between pure linearity on the one hand, and the practical needs of producers and users on the other.

As any thoughtful teacher of young children knows, anticipating line endings in writing and surmounting line breaks in reading are hard-won skills. They conflict with the linearity of speech and the thinking that has been partially conditioned by it. Despite this,

2. Bertin, J., *Sémiologie graphique: les diagrammes, les réseaux, les cartes*, Paris and the Hague: Mouton and Gauthier-Villars, 1967.

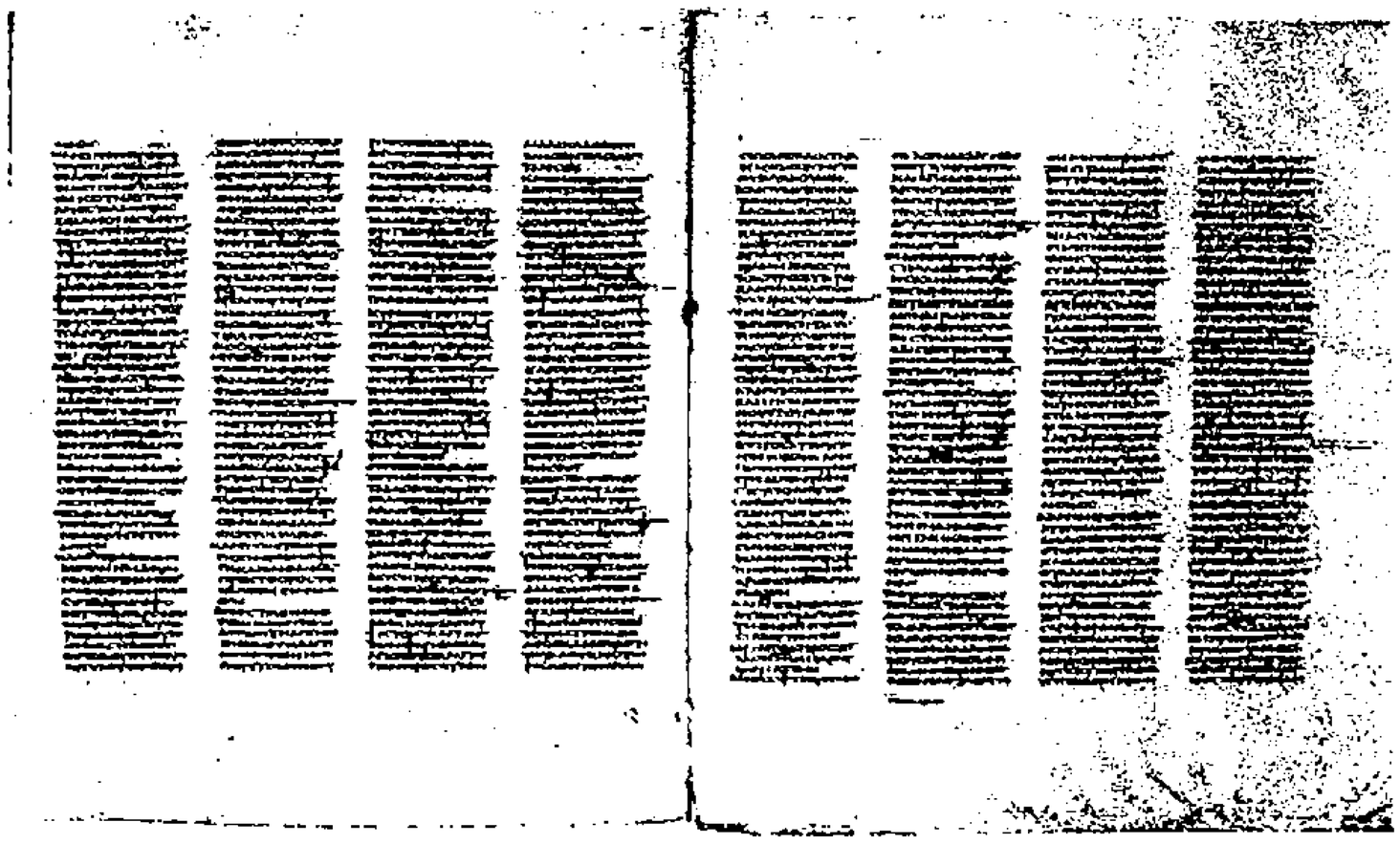


fig.4 In the *Codex Sinaiticus*, a fourth-century manuscript, the conventional **linear interrupted** configuration is used in multiple columns as it is in newspapers and some magazines today.

the linear-interrupted configuration and the conventions that have evolved with it are found throughout the world, regardless of the technology used.

Various subsets of the linear-interrupted configuration can be defined. One such early version of it was a multiple column arrangement, as in the Codex Sinaiticus [fig.4], a fourth-century text of the Bible in the British Library. Magazines and newspapers follow almost identical conventions, even today. Lines of text can be interrupted for all kinds of reasons. Sometimes designers decide

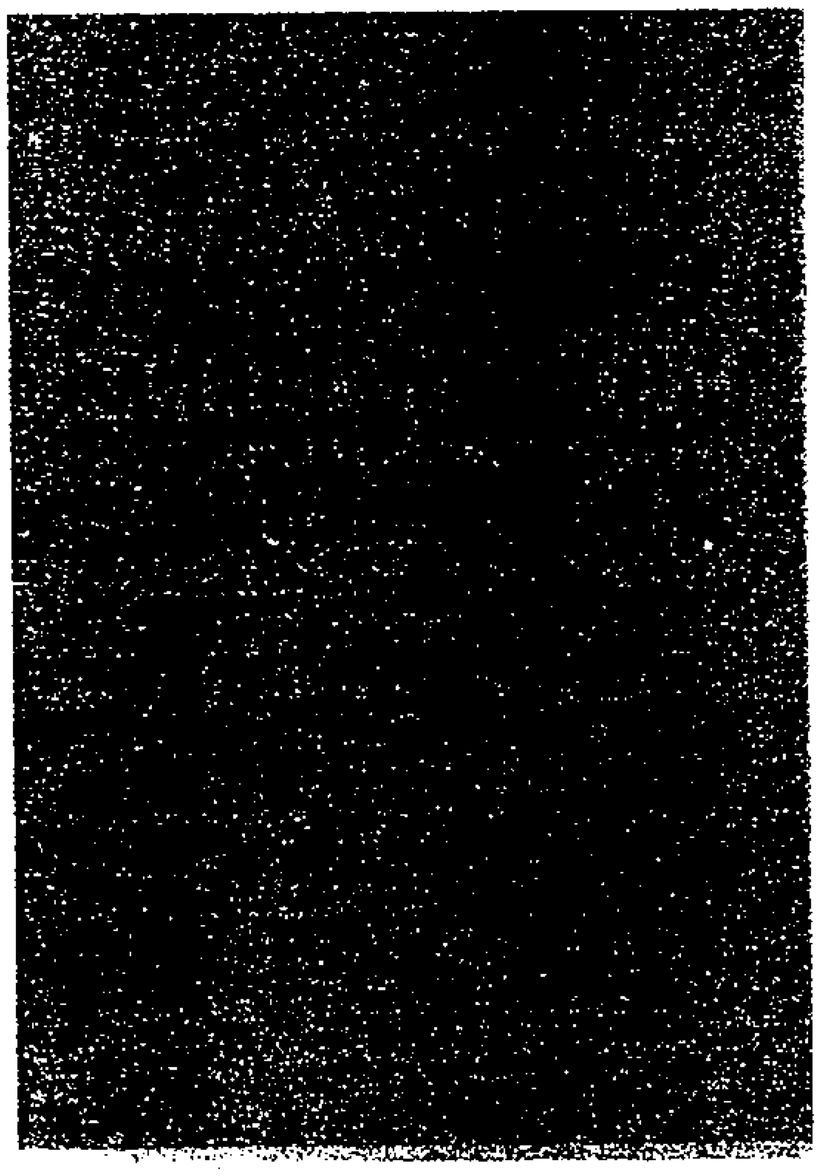
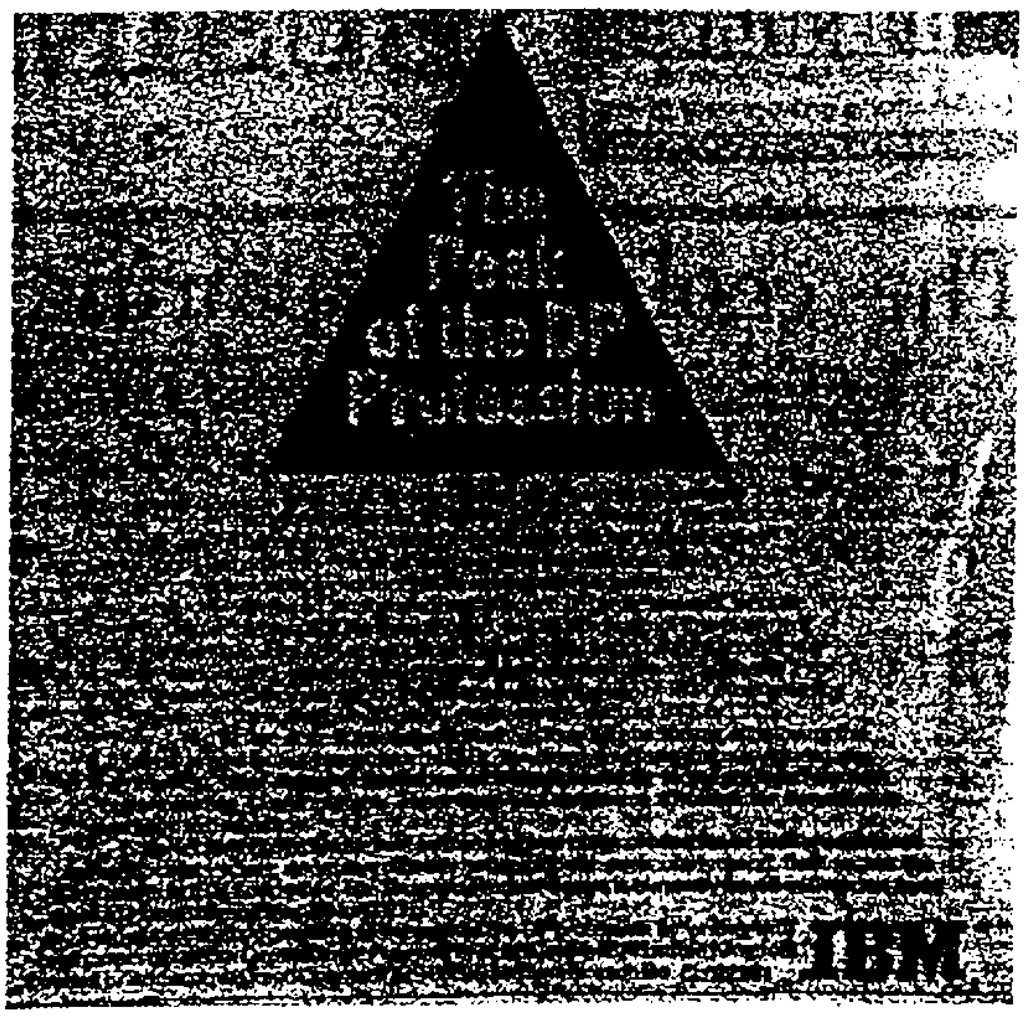
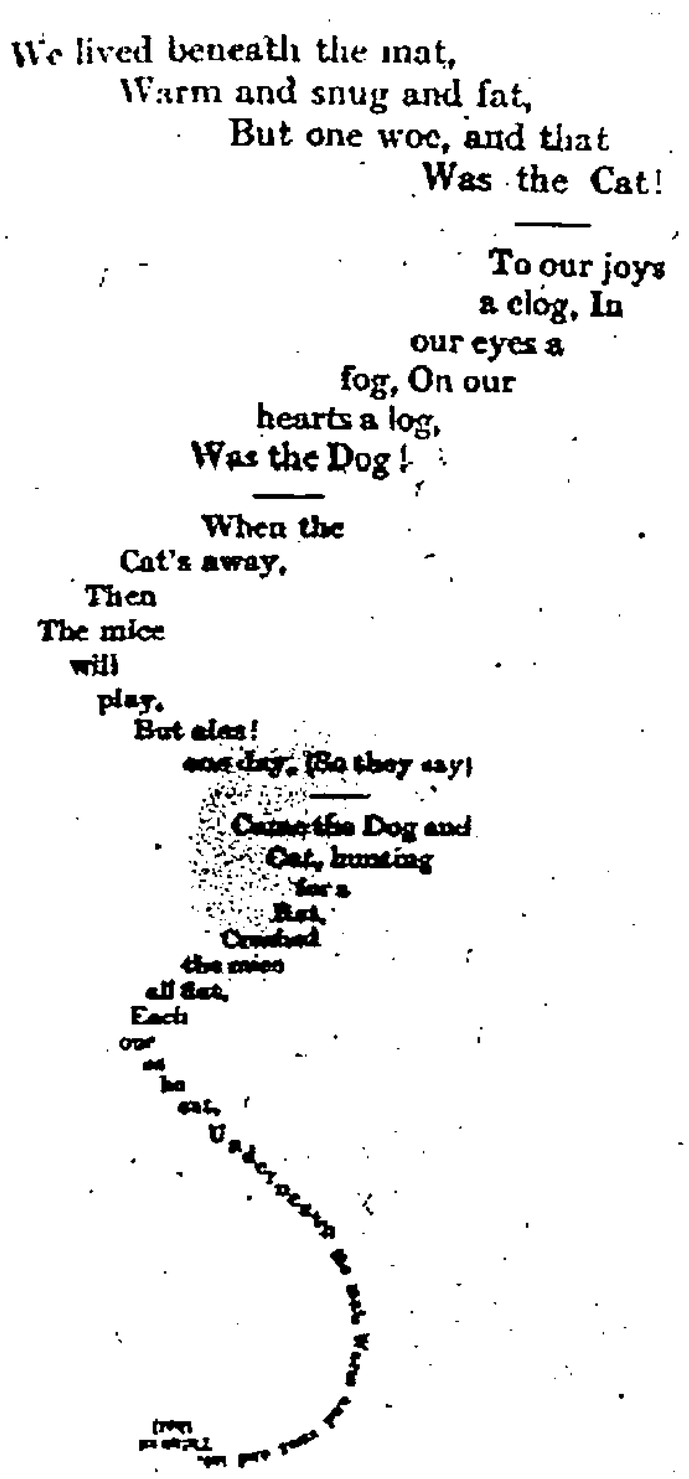


fig.5 This page from an encyclopedia of 1983, shows one of the many variants of the **linear interrupted** configuration, a centred arrangement of lines without word breaks.

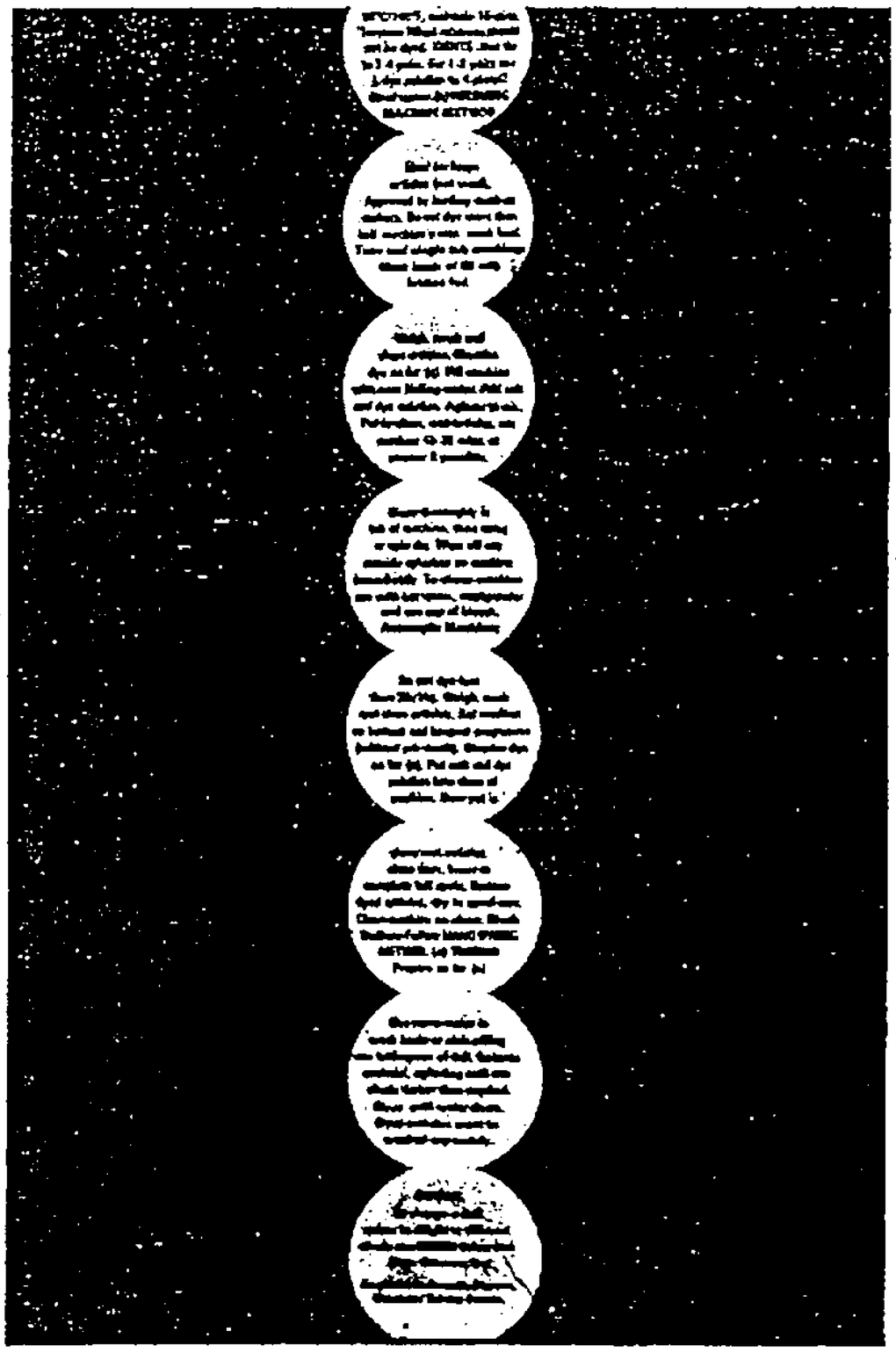


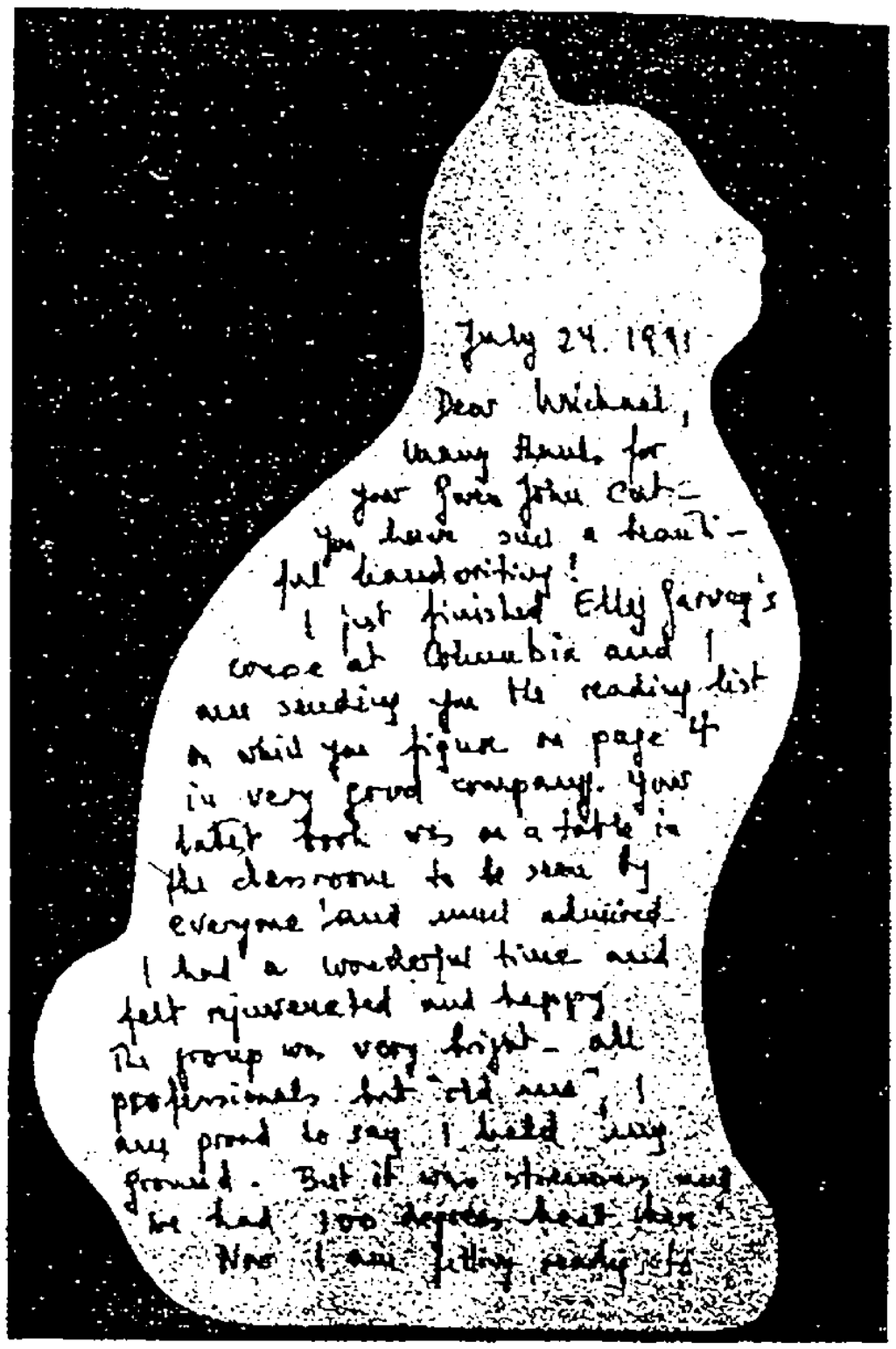
figs 6, 7 In other variants of the **linear interrupted** configuration geometric shapes or pictorial images determine where the lines of text are interrupted.



that they should form a centred arrangement, as in the page from an encyclopedia shown here, which avoids word breaks [fig.5]. Decisions about the interruption of lines can also be made so as to produce a geometrical shape [fig.6] or –as has been done in ancient, medieval and recent times– to form a picture. The Mouse's tale from *Alice in wonderland*, which ends with its words in the form of a mouse's tail, is perhaps the most widely known example of the latter [fig.7]. Alternatively, the interruption of lines can be determined by the substrate on which something is written or printed. A set of instructions for using a dye, which comes folded up in a tiny circular capsule, is an obvious example of this in printing [fig.8], as is this post-it note in the form of a cat in written language [fig.9]. There are numerous typographic devices for softening or making more elegant the visual interruptions at the ends of lines, among them splitting words, varying spaces between words, and, nowadays, compression and expansion of characters.

Further along the row in the schema is the **graphic list.** I would define such a configuration as one in which each meaningful segment of language occupies (or at least starts) a new line. Graphic lists retain elements of linearity, as the supposed reading strategy





figs 8, 9 Line breaks can also be determined by the shape of a substrate, as here on printed instructions that fit into a circular dye capsule, and a manuscript post-it note.

is one that involves scanning the segments from top to bottom. I make a distinction here between a graphic list and what in normal parlance is referred to as a 'list'. This distinction can be illustrated by showing two examples from a book on the history of surnames published in 1969. If someone were to read out loud the two passages shown here [figs 10, 11] they would seem to have precisely the same linguistic structure, but when presented in print on paper they display obvious differences. I would describe the first as an 'ordinary language list' that has been presented in the linear-interrupted configuration, and the second as a graphic list. As with other configurations, numerous subsets of graphic list can be identified. There are, for example, compound lists, in which two or more discrete elements of language occupy the same line [fig.12]; subdivided lists, in which related items are grouped, usually by leaving space between them; hierarchical lists, as in complex indexes [fig.13]; and sequentially-numbered lists.

centuries and more after 1000.

In his *Dictionary of British Surnames* P. H. Reaney has listed no less than 135 Scandinavian personal names which still survive as modern surnames though their spelling, of course, disguises them in varying degrees. Algot and Haghni are specimens, from which come our Allgood and Hagan. Other Scandinavian personal names developed into some famous surnames, though some of these surnames have other origins as well. Some surnames which are sometimes traceable to Scandinavian personal names are: Alley, Arkell, Ayloffe, Barne, Bond, Brand, Coleman, Copeman, Dring, Drummond, Farman, Farthing, Fastolf, Fathers, Foot, Gill, Goodman, Grave, Gunn, Hacon, Hake, Haldane, Harold, Hastings, Havelock, Hemming, Herrick, Howard, Knott, Langhain, Nut, Osborn, Randolph, Raven, Rolf, Sturge, Summerlad, Summerskill, Swain, Thorold, Thurgood, Turpin, Turrill, Took, Tooley, Tovee, Tubb, Turk and Uncle.

Barne and Coleman are examples of names which sometimes come from Scandinavian and sometimes from English roots.

It is an interesting reflection on the seafaring ways of the Vikings

Examples of such Old English group names are:

Billing	Munnings
Browning	Snelling
Darling	Spalding (a tribe
Dearing	mentioned in the
Downing	seventh century)
Dunning	Sweeting
Gooding	Tappin
Harling (Herela's	Tilling
people)	Tipping
Manning	Wilding

Some names of this type have slightly less obvious Collings may sometimes come from Collin, meaning

figs 10, 11 Two typographic arrangements of linguistically similar material from the same book. In fig.10 an 'ordinary language list' is presented in a linear interrupted configuration; in fig.11 the configuration is a graphic list.

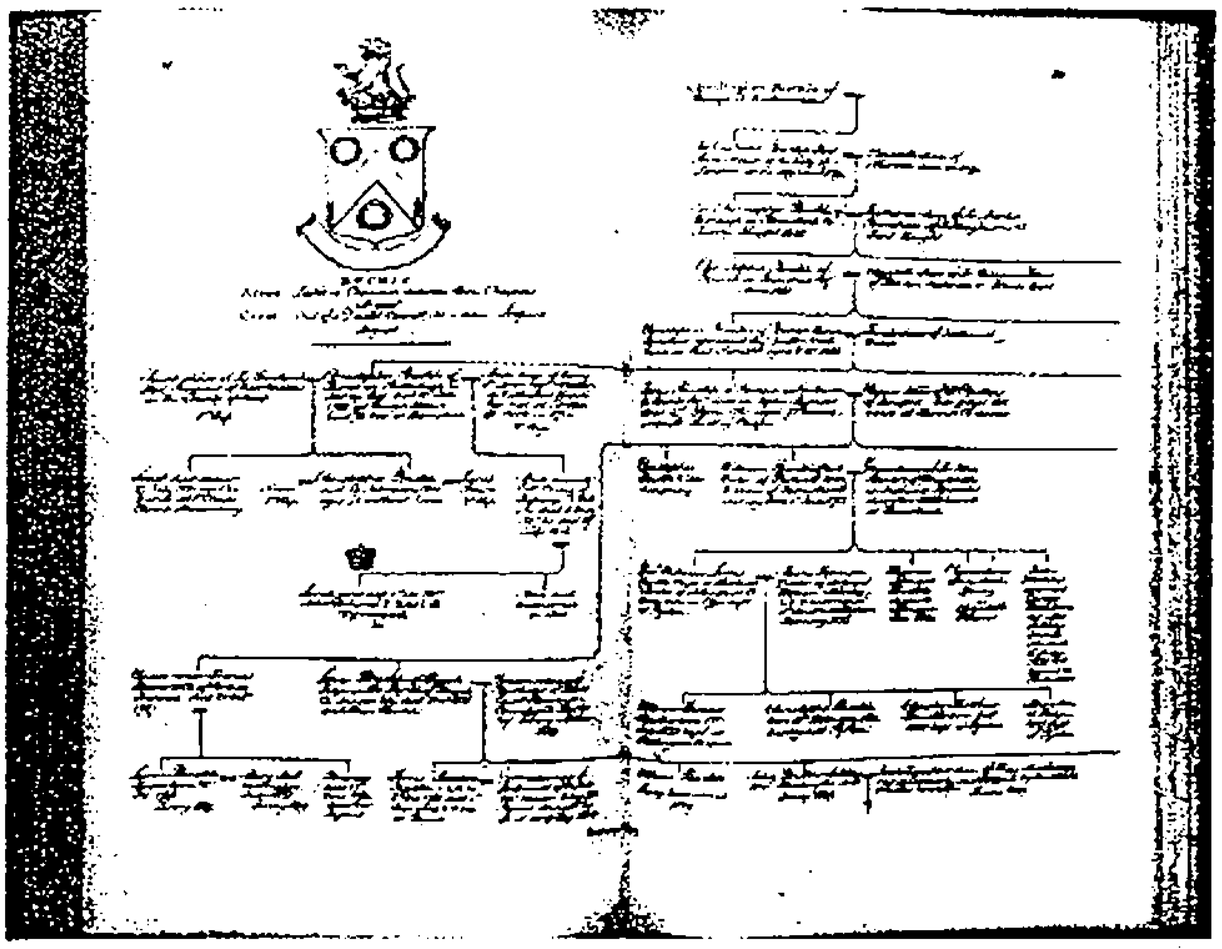
I move on to the **linear-branching** configuration, in which a user is expected to choose a route from a number of options on offer. I call it branching for obvious reasons, and linear because (once chosen) any individual path is essentially linear. I take it that no-one in their right mind would read the nineteenth-century genealogy shown here [fig.14] in its entirety, as though it were a kind of fragmented linear-interrupted text. Branching structures are probably late medieval in origin and are seen in manuscripts of this period and also in some early printed books. They were also used

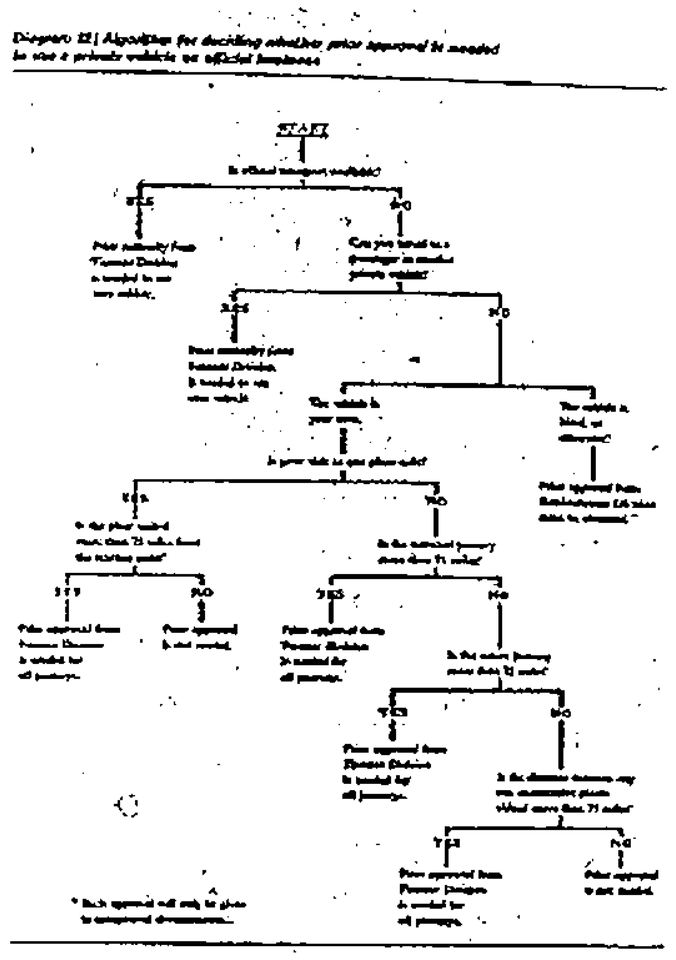
BERKSHIRE

Abingdon Queens Arms
Bracknell Thatched House Grill
Bray-on-Thames Hinds Head Hotel *
Bray-on-Thames Monkey Island Hotel
Cookham Bel and the Dragon
Cookham Kings Arms
Hurley East Arms
Hurley The Old Bell
Kintbury Dundas Arms
Knowl Hill Bird in Hand
Long Wittenham Plough Inn
Longworth Lamb and Flag
Old Windsor Bells of Ouseley
Pangbourne Swan Hotel
Reading Taj Mahal
Reading The Lion
Remenham The Angel
Stanford Dingley Boot Inn
Streatley Bull Hotel §
Swallowfield Mill House Hotel
Wargrave St. George and Dragon §
Windsor Royal Oak
Winkfield Jolly Gardener
Winkfield White Hart *
Yattendon Royal Oak

twenty-fours, *see* format, foldings
two-sheet paper mould, 63–5, 83–4, fig. 28
tympan, of the platen machine, 254, 261, fig. 110
— of the wooden hand press, 118–20, 121–3, figs. 64–5, 67
tympan cloth for the second forme, 131
tympan sheet, 128, 129
type, 9–39, 207–13, 283–8
— body (bodies), defined, 10, fig. 1 (*a*, *b*)
— — names of, Dutch, English, and French, 15
— — *see* type, sizes
— casting, hand, 10
— — — rate of, 10, 207
— — machine, 207–8
— — sand, 208
— description of, 13–16, 333–4
— evidence of in bibliographical identification, 318–19
— faces, 10, 16–33, 209–13, 283–7, fig. 1 (*a*)
— — classification of, 16–17
— — contrast in, 26 n.

figs 12, 13 Two subsets of graphic list. Fig.12 shows part of a compound list in which two related items, distinguished typographically from one another, are shown on the each line. Fig.13 shows a detail of a graphic list, an index, organized hierarchically.





figs 14, 15 Two kinds of linear branching configuration are shown here. Fig.14 is a family tree showing many possible branches. Fig.15 is an ordinary language algorithm, which offers a binary choice at each decision point.

by the sixteenth-century French scholar Petrus Ramus, to show the structure of knowledge, subject by subject.

The two examples referred to above offered multiple paths, but in the late 1950s or early 1960s (no doubt influenced by computing) binary branching structures were developed which offered a simple choice from two options at each decision point.[3] At the time they were called ordinary language algorithms, and they were used to transmit very complex messages [fig.15] that would have been too difficult to understand when presented in a linear-interrupted configuration. The effectiveness of such configurations even led to their being used in persuasive typography [fig.16].

The next configuration to be described, called here a **matrix**, is less linear than the others because it requires at least two searches in order to retrieve meaningful data. This is usually done along horizontal and vertical axes, though there are other possibilities. The most common application of the matrix configuration is in timetables of one sort or another, and in sports tables [fig.17]. Tables have a long history and were used even when the technology of the day made them difficult to produce, as was the case in letterpress printing. The early printed example illustrated here [fig.18] is from an incunable printed by Ratdolt in Venice in 1483, and shows the longitude and latitude of selected towns. This could be called a 'continuation table' since it continues with a repeat set of columns on the right. Examples of the matrix configuration are often primarily numerical, but they do not have to be. The configuration is also often used, as it is in Robert Horn's 'Information

3. Lewis, B.N., Horrabin, I.S., & Gane, C.P., *Flow charts, logical trees and algorithms for rules and regulations*, London, 1967.

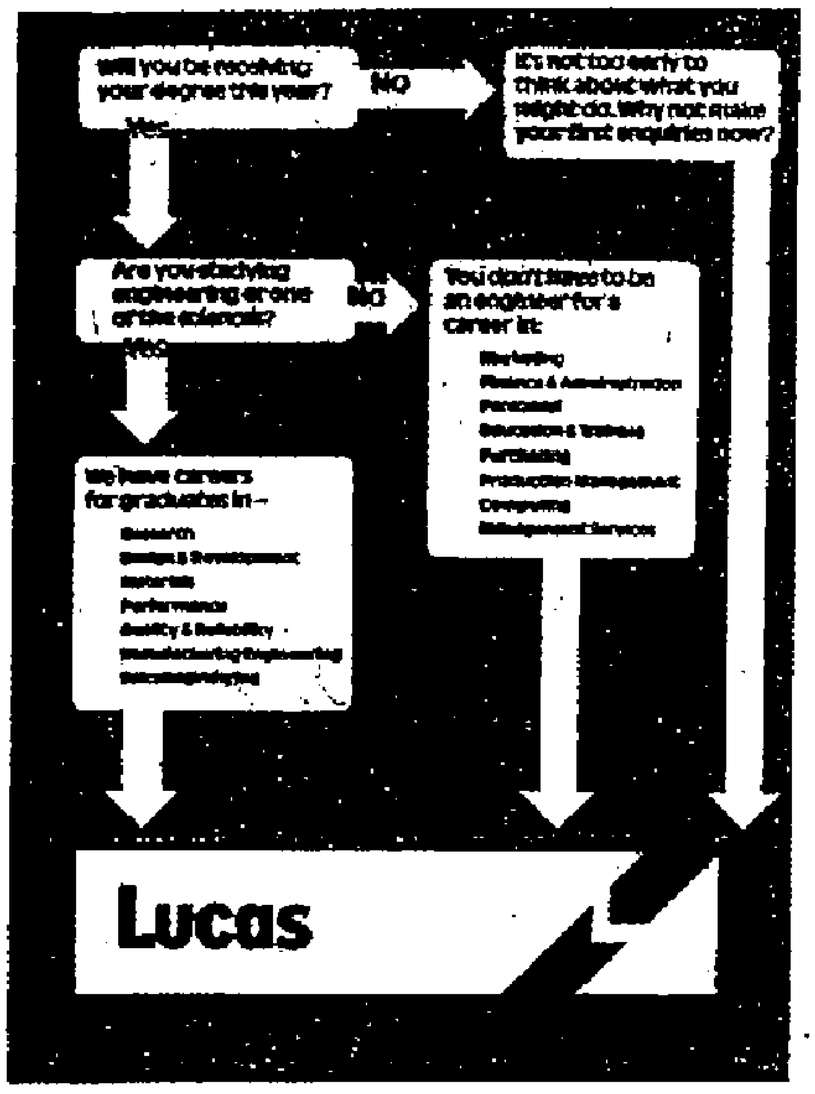


fig 16 This advertisement shows the use of the linear branching configuration in persuasive typography.

Wolves	34	15	10	9	60	36	**55**
Norwich	33	13	10	10	44	33	**49**
Ipswich	33	13	9	11	53	44	**48**
Rotherham	35	13	9	13	52	48	**48**
Gillingham	34	13	9	12	45	46	**48**
Burnley	33	13	9	11	48	56	**48**
Watford	35	13	8	14	38	51	**47**
Coventry	34	12	10	12	38	37	**46**
Wimbledon	33	12	9	12	54	55	**45**
Preston	34	11	11	12	49	52	**44**
Millwall	35	12	8	15	40	54	**44**
Crystal Palace	32	10	13	9	43	37	**43**
Derby	34	12	7	15	43	50	**43**
Walsall	35	11	7	17	46	52	**40**
Bradford	34	10	9	15	40	54	**39**
Brighton	34	7	8	19	34	54	**29**
Grimsby	35	7	8	20	39	70	**29**
Stoke	34	6	10	18	35	63	**28**
Sheff Wed	34	5	11	18	31	57	**26**

fig 17 Football league tables organize predominantly numerical data in a matrix configuration, and require the user to work along both axes.

mapping'[4] and the accompanying guide to selecting a cruise [fig.19], for substantial segments of verbal language.

4. See, for example, Horn, R., *How to write Information mapping*, Lexington, Mass., 1976.

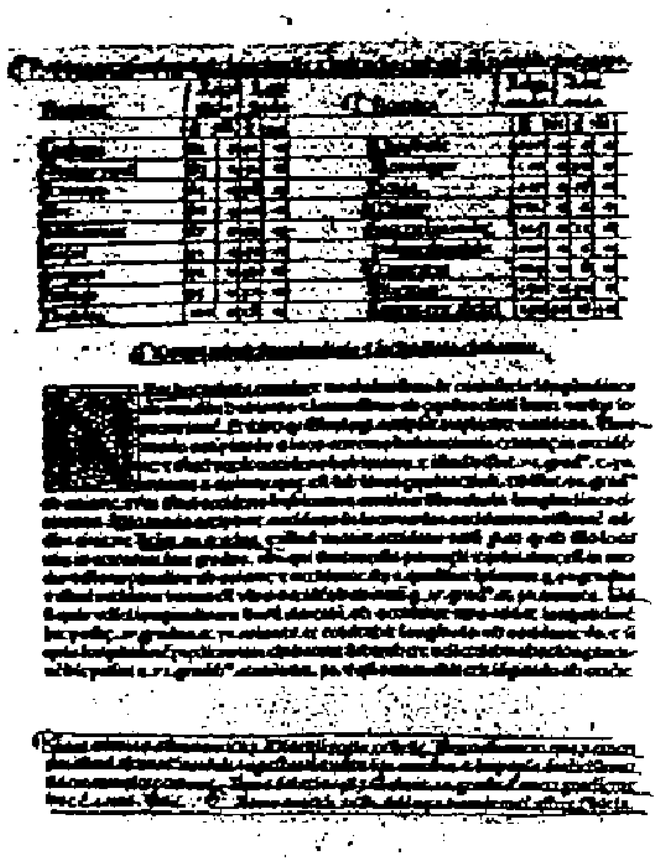


fig.18 The matrix configuration presented practical problems for early printers. This example from Ratdolt's *Tabulas astronomicae* (Venice 1483) shows an example that runs on to a second set of columns in order to fill the measure.

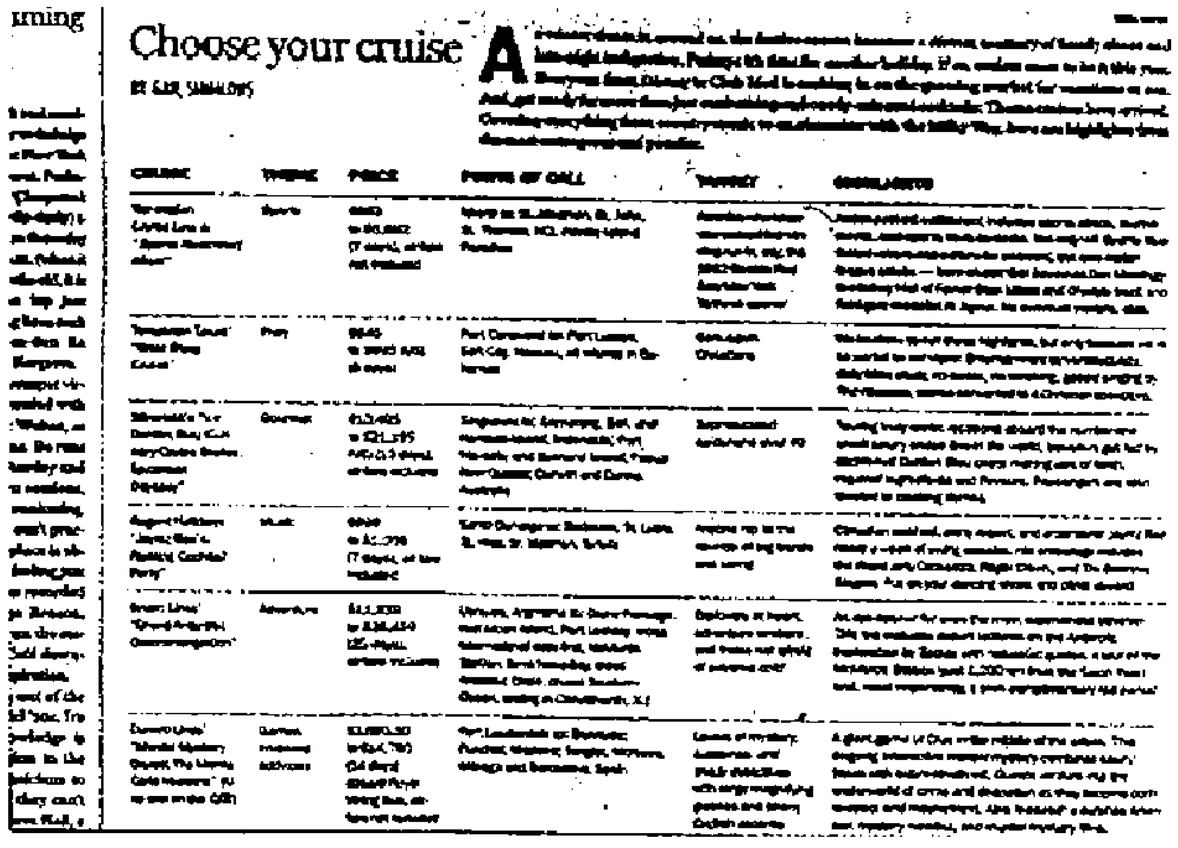
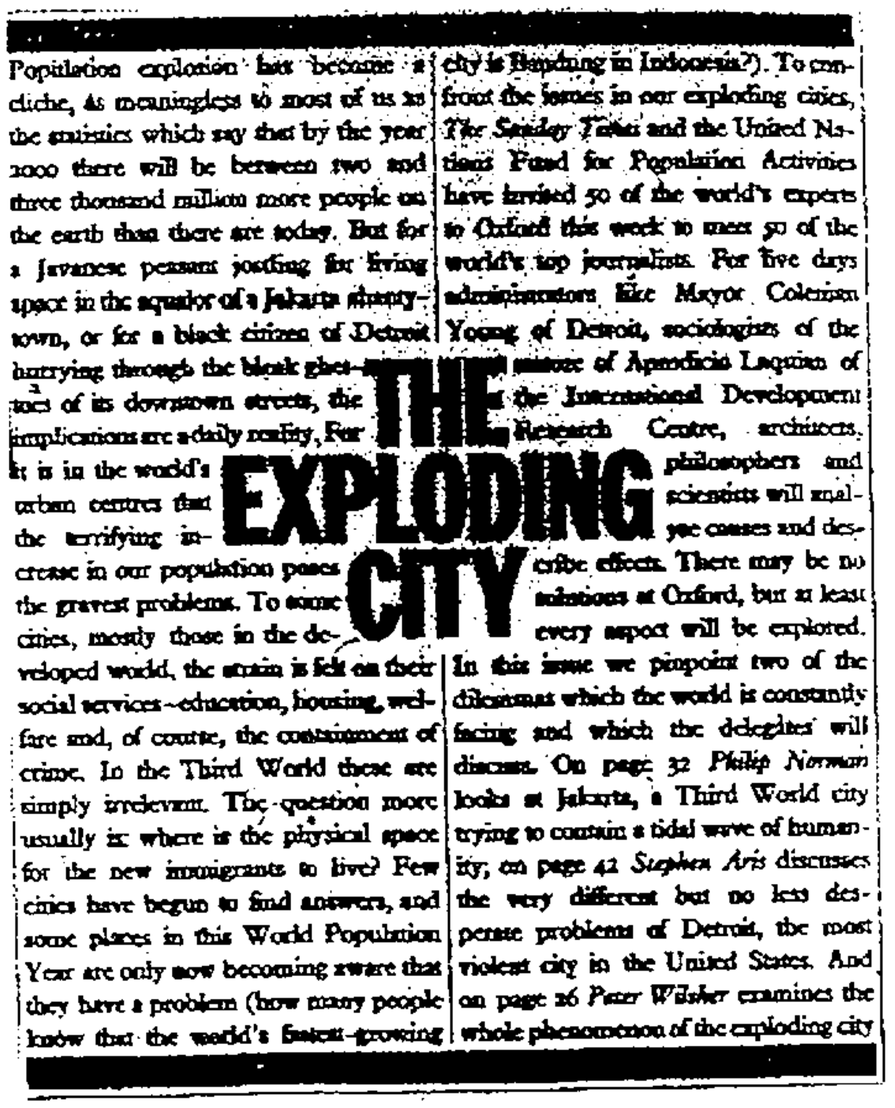


fig.19 In this guide to selecting a cruise, passages of linear interrupted text are organized within a matrix.

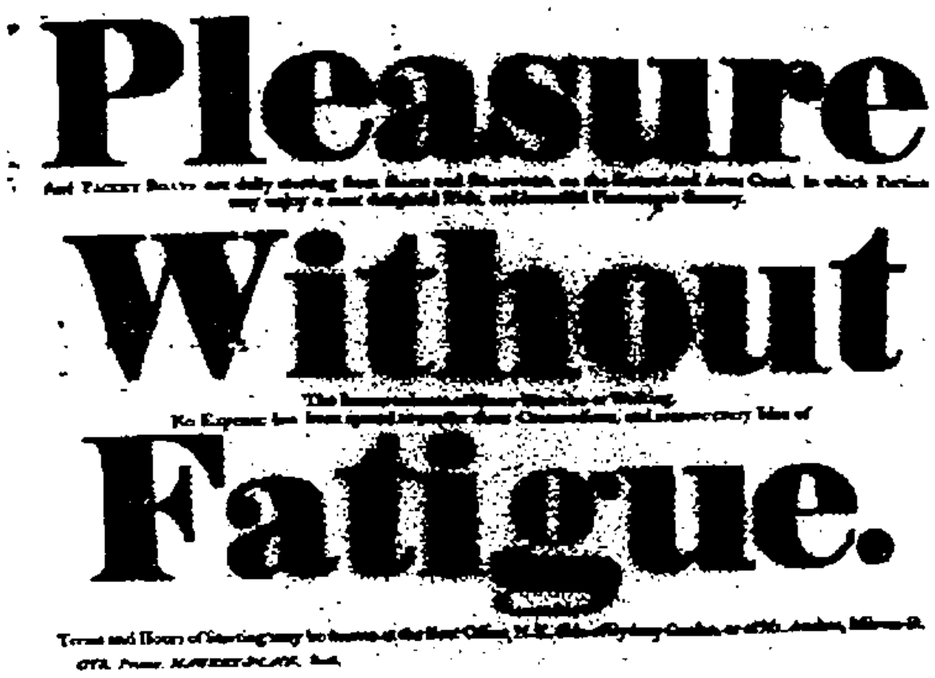


Population explosion has become a cliche, as meaningless to most of us as the statistics which say that by the year 2000 there will be between two and three thousand million more people on the earth than there are today. But for a Javanese peasant jostling for living space in the squalor of a Jakarta shanty-town, or for a black citizen of Detroit hurrying through the bleak ghetto-streets of its downtown streets, the implications are a daily reality. For it is in the world's urban centres that the terrifying increase in our population poses the gravest problems. To some cities, mostly those in the developed world, the strain is felt on their social services – education, housing, welfare and, of course, the containment of crime. In the Third World these are simply irrelevant. The question more usually is: where is the physical space for the new immigrants to live? Few cities have begun to find answers, and some places in this World Population Year are only now becoming aware that they have a problem (how many people know that the world's fastest-growing city is Bandung in Indonesia?). To confront the issues in our exploding cities, *The Sunday Times* and the United Nations Fund for Population Activities have invited 50 of the world's experts to Oxford this week to meet 50 of the world's top journalists. For five days administrators like Mayor Coleman Young of Detroit, sociologists of the stature of Aprodicio Laquian of the International Development Research Centre, architects, philosophers and scientists will analyse causes and describe effects. There may be no solutions at Oxford, but at least every aspect will be explored.

THE EXPLODING CITY

In this issue we pinpoint two of the dilemmas which the world is constantly facing and which the delegates will discuss. On page 32 *Philip Norman* looks at Jakarta, a Third World city trying to contain a tidal wave of humanity; on page 42 *Stephen Aris* discusses the very different but no less desperate problems of Detroit, the most violent city in the United States. And on page 26 *Peter Wilsher* examines the whole phenomenon of the exploding city

fig 20 Journalism and advertising commonly make use of the configuration called **non-linear directed viewing**. In this case, it is doubtful whether anyone would start by reading at the top left of the page given the emotive language and graphic presence of the words 'The exploding city'.

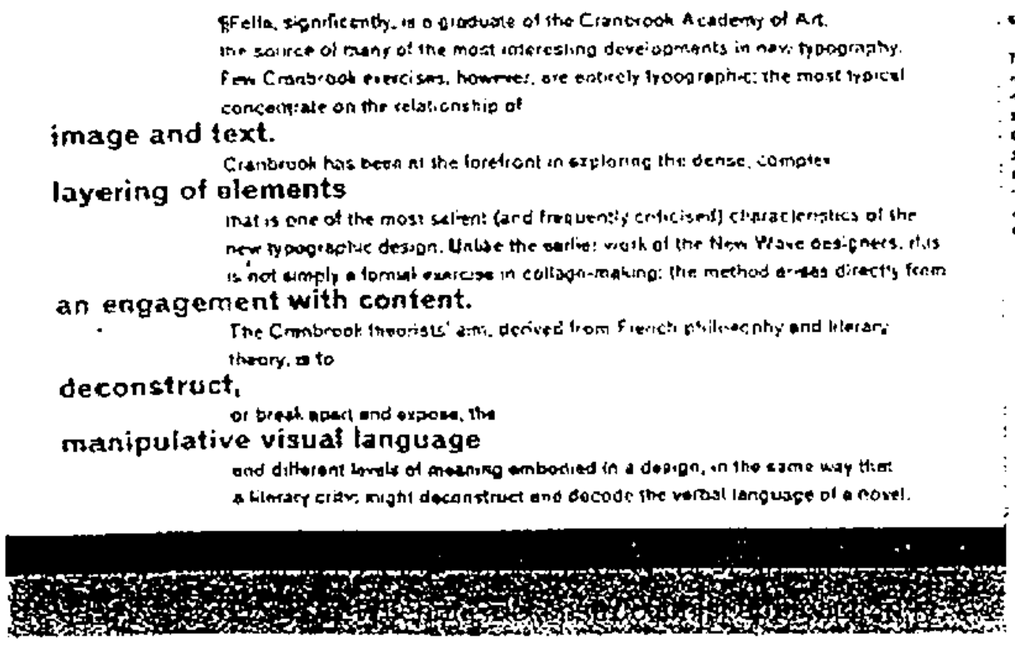


Pleasure

Without

Fatigue.

figs 21, 22 Directed viewing underpins a whole range of typographic design, from this early nineteenth-century poster of the printer Gye (fig.21, left) to a detail from Rick Poynor and Edward Booth-Cliborn (eds), *Typography now* (1991) (fig.22).



Fella, significantly, is a graduate of the Cranbrook Academy of Art, the source of many of the most interesting developments in new typography. Few Cranbrook exercises, however, are entirely typographic: the most typical concentrate on the relationship of

image and text.

Cranbrook has been at the forefront in exploring the dense, complex

layering of elements

that is one of the most salient (and frequently criticised) characteristics of the new typographic design. Unlike the earlier work of the New Wave designers, this is not simply a formal exercise in collage-making: the method arises directly from

an engagement with content.

The Cranbrook theorists' aim, derived from French philosophy and literary theory, is to

deconstruct,

or break apart and expose, the

manipulative visual language

and different levels of meaning embodied in a design, in the same way that a literary critic might deconstruct and decode the verbal language of a novel.

Even less linear than the configurations already discussed is the one I am calling, rather clumsily, **non-linear directed viewing**. It would be simpler to use the term **directed viewing,** but non-linearity (or perhaps a different kind of linearity) lies at the heart of the configuration. In the case of fig.20, I am assuming that not many people will start at the top left of the page as though it were entirely a linear-interrupted text (which of course it is also). Most of us will be tempted to read the message 'The exploding city' first of all. Our normal reading strategies are likely to be over-ridden by a combination of editorial and design decisions that led to the title of the article to be printed in large, bold type and to be arranged, somewhat emotively, in the form of a cross. This configuration is mostly associated with journalism and advertising, and it was given a significant boost with the development of large, bold display types in the early nineteenth century. A remarkable example of the way our normal reading strategies can be over-ridden in this way is provided by a poster printed in Bath in the early nineteenth century by Gye [fig.21]. Its message can be read in at least two ways, either systematically from top to bottom, or, as seems to be more likely (particularly when seen from a distance), by reading the three lines set in large type first: 'Pleasure without fatigue'. This was also the principle on which layered and similar typography worked in the 1980s and 1990s [fig.22].

Sometimes the typographic direction we are given is not sufficiently strong and we misread a message (as I imagine many of us might do with the 1930s cover to a set of lettering sheets shown in fig.23). In this case our learned conventions (of working from the top downwards) are unlikely to have been completely over-ridden by the size and boldness of the words 'Lettering and layout'. Only later, when we try to make sense of the message, do we learn how to read it as one imagines the designer intended it to be read.

Lastly, we come to the configuration that leaves **most options open.** I imagine that I am one of the few people in the world who can read the message in fig.24 (which shows the letters of a person's name printed from wood type). As I hope this example demonstrates, when linearity is abandoned communication using words and numbers breaks down, often completely. In this case we are simply left to respond to the graphic shapes of letters, either combined or singly.

If we exclude the two outer configurations of the schema –the most linear and the least linear– all those briefly described here are in common use for organizing verbal language, and most have been for hundreds of years. They are the stuff of typography.

Having briefly mapped out the main configurations used in the verbal and numerical modes of graphic language, I would now like to take a couple of vertical soundings in the schema to show how they have affected our use of pictorial and schematic language.

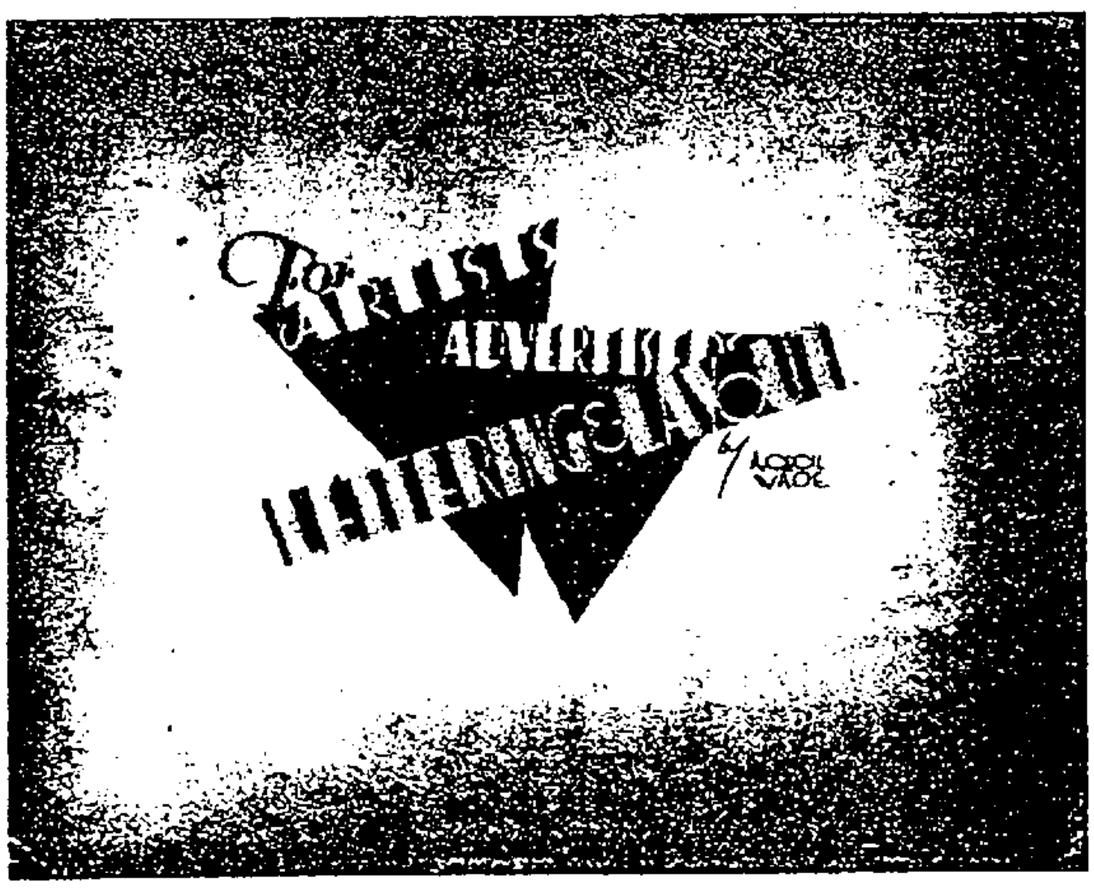
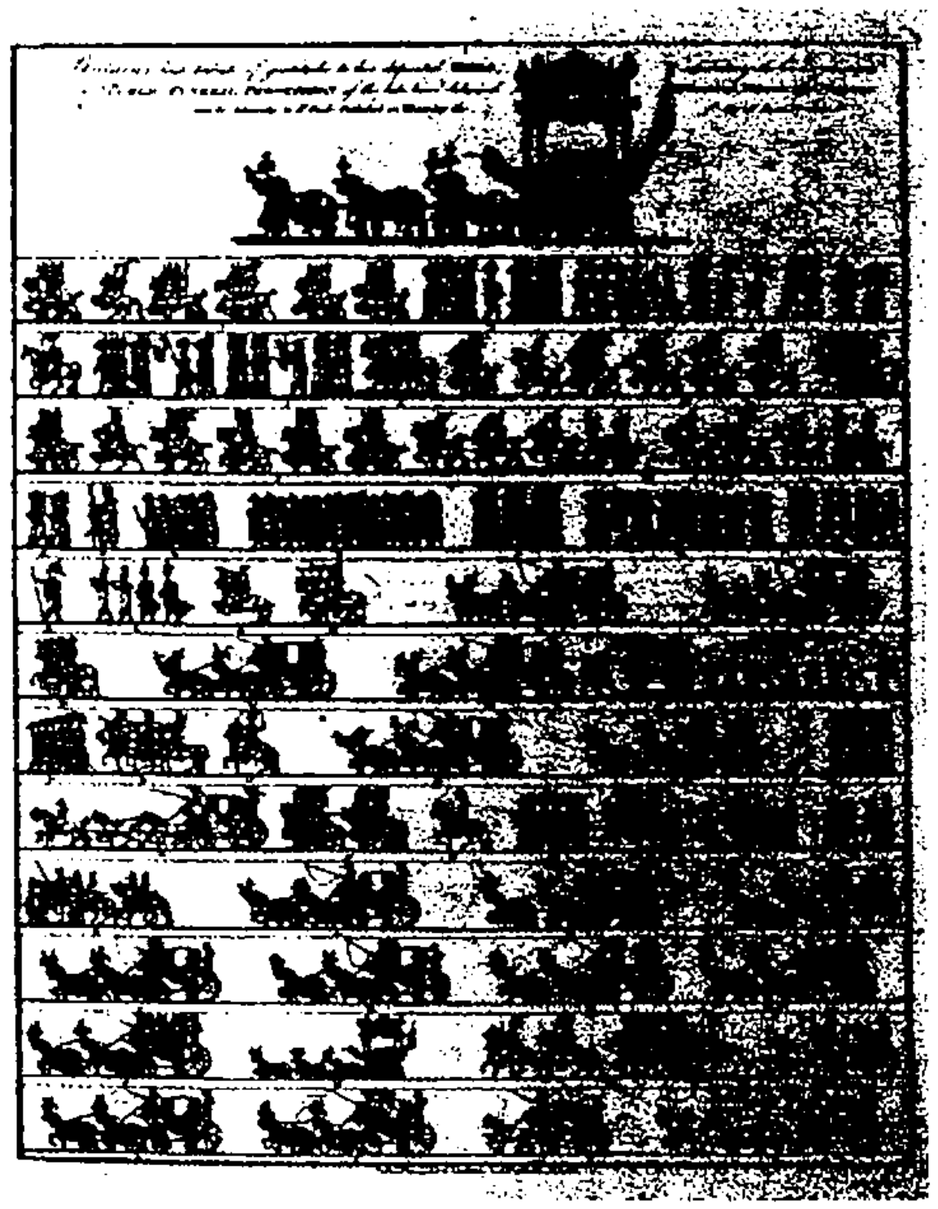


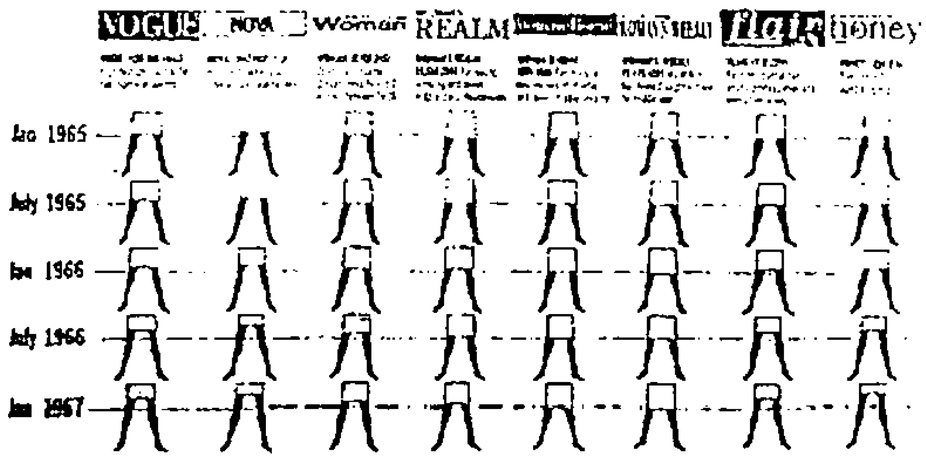


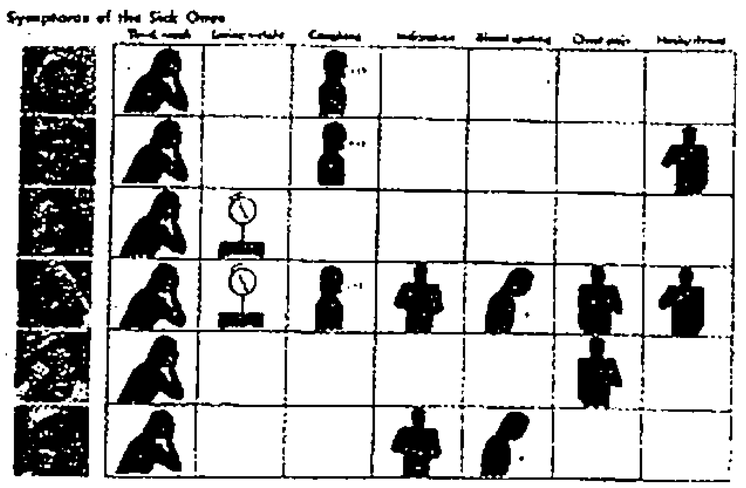
fig.23 In this example our viewing is probably not directed strongly enough to override the convention of reading from top to bottom. The intention must surely have been that we should read the title of this 1930 publication as 'Lettering & layout for artists & advertisers'.
fig.24 When the **most options open** configuration is used, linearity is lost and communication using words and numbers breaks down.





figs 25, 26 There is a long tradition of showing picture stories in the **linear interrupted** configuration, notably (with words) in comics (fig.25, left), and also (without words) in this record of Lord Nelson's funeral procession of 1806 (fig.26, right).





figs 27, 28 The matrix configuration is sometimes used to present information pictorially. Fig.27, designed for the *Sunday Times*, shows the rise of the mini skirt in the 1960s; fig.28, an Isotype chart designed in the late 1930s, shows the progressive symptoms of tuberculosis.

This was done for all the configurations in my original presentations of the schema,[1] but I shall limit myself to two in this paper.

If we take the **linear-interrupted** configuration commonly used for text matter, we can see that it has had a bearing on the presentation of picture stories. An obvious example is provided by comics [fig.25] which, traditionally, have told stories through rows of graphic segments, each consisting of a combination of pictures and words. The linear-interrupted configuration is also used from time to time when pictures are shown on their own, as they were for this record of the funeral procession of Lord Nelson in 1806 [fig.26]. In both cases the rows of pictures line up to the right in the manner of justified text. In the case of the Nelson funeral procession, the equivalent of word spacing has been put between each pictorial group in the procession, in just the same way that words are arranged to achieve even line endings. The linear-interrupted configuration is also found in one widely used category of graphic language that adopts the schematic mode of representation: music printing. Almost without exception, music is presented so that the ends of bars coincide with line or row endings. The skill of the music writer or engraver (and now software engineer) lies in subtly adjusting the spacing of the notation to achieve straight right-hand margins.

The **matrix** configuration is, likewise, found in examples of graphic work in modes other than the verbal/numerical. A diagram drawn for the *Sunday Times* in the 1960s [fig.27] shows effectively the rise of the mini skirt, as documented in some of the leading women's magazines of the period. Here the designer has used a combination of pictures and words, though it could be argued that the mastheads of the magazines have almost become pictures. In the case of an Isotype chart of the late 1930s [fig.28], which draws attention to the symptoms of tuberculosis, the data in the cells of the matrix are also presented by means of pictures. The use of the

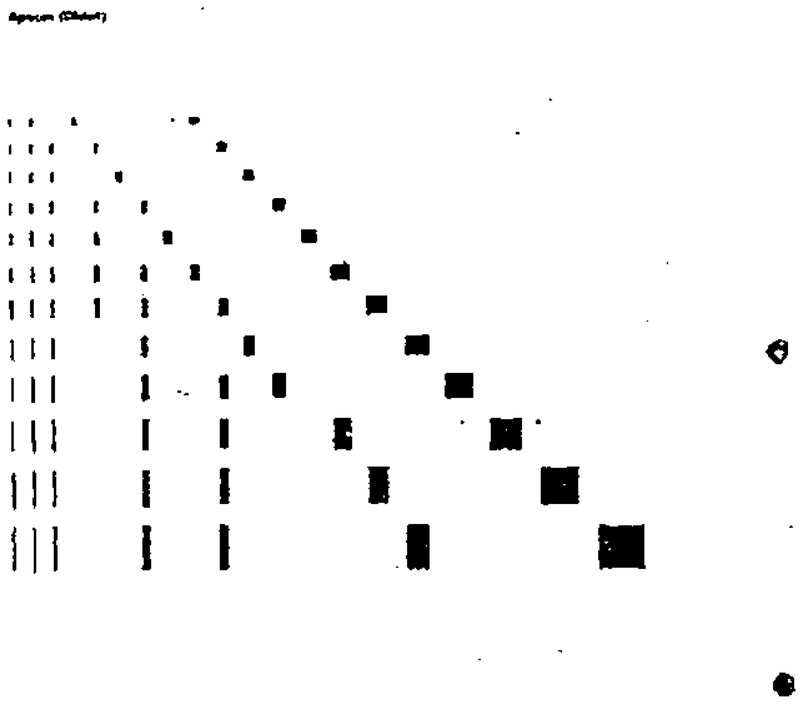


fig.29 This chart, showing the range of spacing material available in letterpress printing when using the Didot system, is an unusual example of information being presented schematically in the **matrix** configuration. It was designed by Anthony Froshaug for his publication *Typographic norms* (1964).

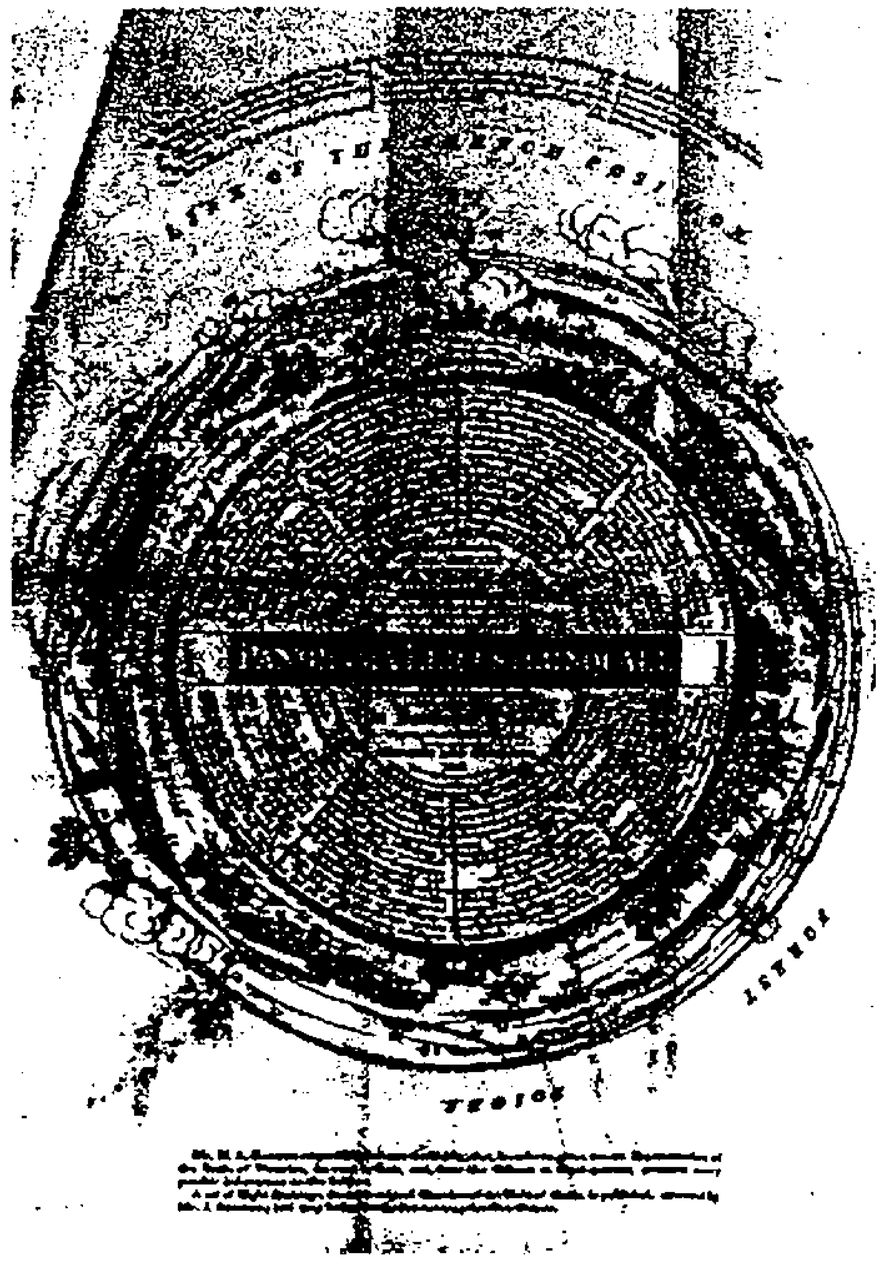
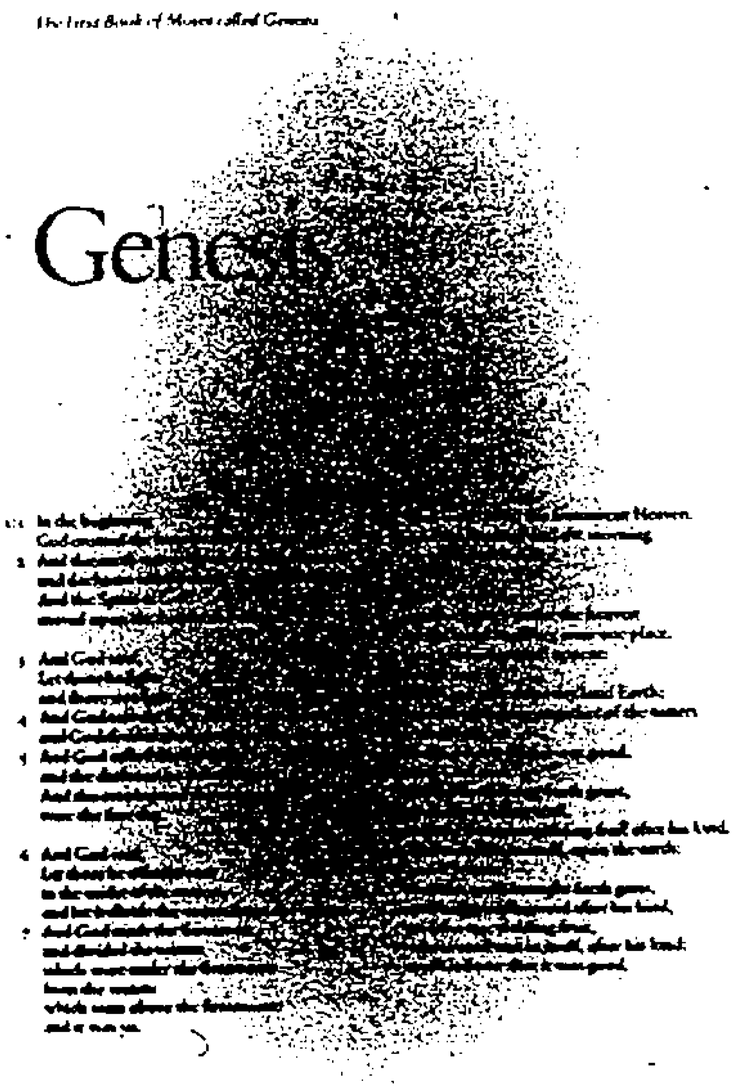


fig.30 A subset of the **pure linear** configuration that might be called **linear continuous** is seen in this wood-engraving of the Battle of Waterloo from a catalogue issued by the Panorama Leicester Square, 1816.

schematic mode in matrix configurations is much rarer, and is illustrated here [fig.29] with one of a set of diagrams by Anthony Froshaug showing the system of spacing units used with metal type.

Up to this point I have illustrated the cells of the schema with reasonably clear-cut examples, but that is simply the starting point for interpreting the schema as a whole. One of its initial purposes was to demonstrate the immense diversity of graphic language. I now find, with the experience of having used it over the years, that I need to emphasize –even more than I thought I had done originally– that it is simply a tool for thinking about and discussing graphic language. It is certainly not meant to constrain it. To start with, it needs to be said that many everyday examples of graphic design reveal characteristics of several cells of the matrix, and that there are fuzzy areas as between different modes and different configurations (the most common of which are indicated with a dotted line on the schema). The best analogy I can think of is with a palette of colours, which can be combined in countless ways to produce infinite gradations of hue and tone.





Then John saw
Mum's garden frog.
It was in bits!
"You bad dog," said John.
"You've been chasing
cats again, haven't you?"
Boy looked so sad.

"Come on, then."
John gave Boy the basket.
"Just try to be good."
Boy wagged his tail.
He was happy now.



figs 31, 32 The two examples shown here belong to a sub-set of the linear interrupted configuration in which line breaks are not normally determined by physical or graphic factors. In fig. 31, a page from the *Washburn College Bible*, line breaks are determined where possible by prosody; in fig.32, a children's reader, they relate to syntax.

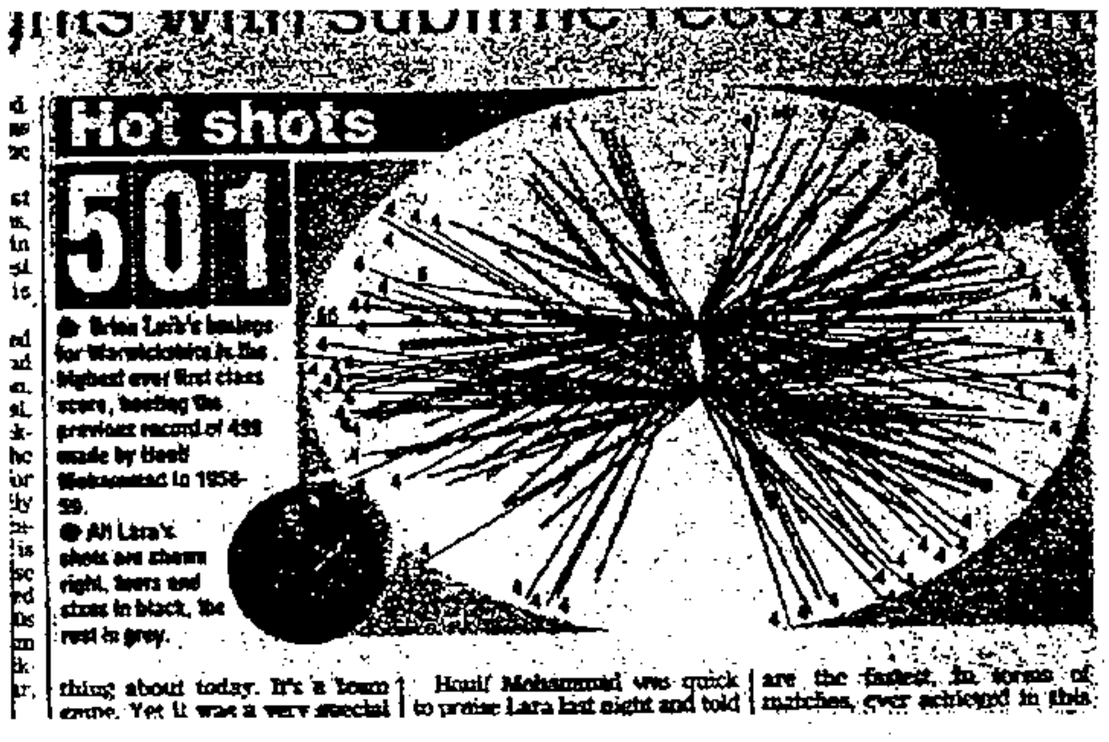
I have also come to identify two or three further configurations, which I would like to introduce now. I shall take them in sequence and slot them into what might be an appropriate place in my original schema. I have referred to some of them in the past, but for the sake of simplicity have not modified the original matrix. There seems little point in producing diagrams for teaching purposes that are so complicated that they cannot easily be understood and remembered.

The first of these new configurations might be called **linear continuous** (and could perhaps be seen as a subset of the pure linear category). We might take the numbering of an analogue clock or watch as the most common use of such a configuration. The massive mosaic inscription that runs around the whole of St Peters in Rome is a rarer example. In the pictorial mode there are the dioramas and panoramas that were painted all round the internal walls of drum-shaped buildings, and, in the early nineteenth century, printed catalogues that show two-dimensional renderings of such continuous pictures [fig.30].

Over the last few decades we have seen widespread use of a subset of the linear-interrupted configuration that had hitherto only been used in relation to poetry. I am referring to the practice of breaking lines in a text to coincide with meaningful segments of language in response to syntax, information content, or prosody. Two examples make this point. The first is from Bradbury Thompson's *Washburn College Bible* (in an edition published by



33



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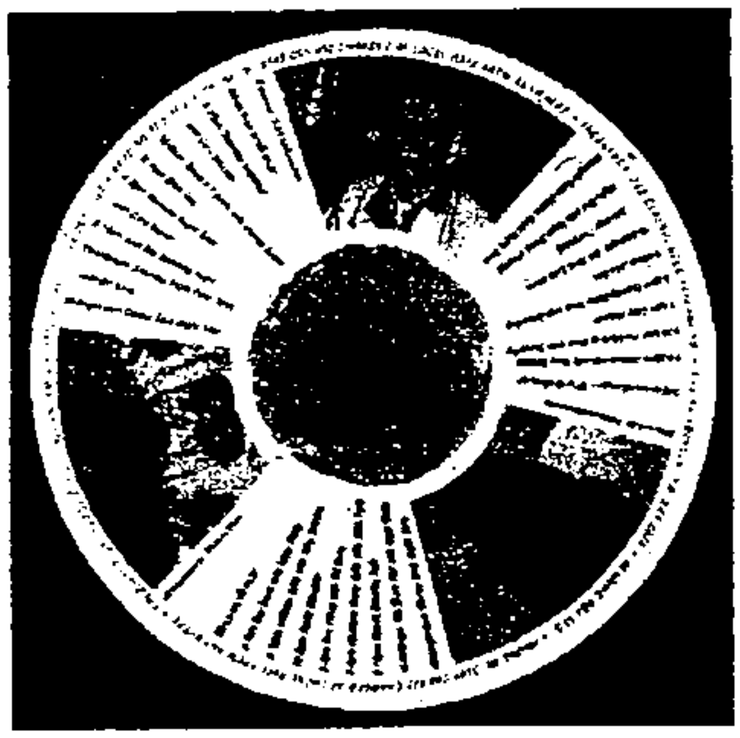
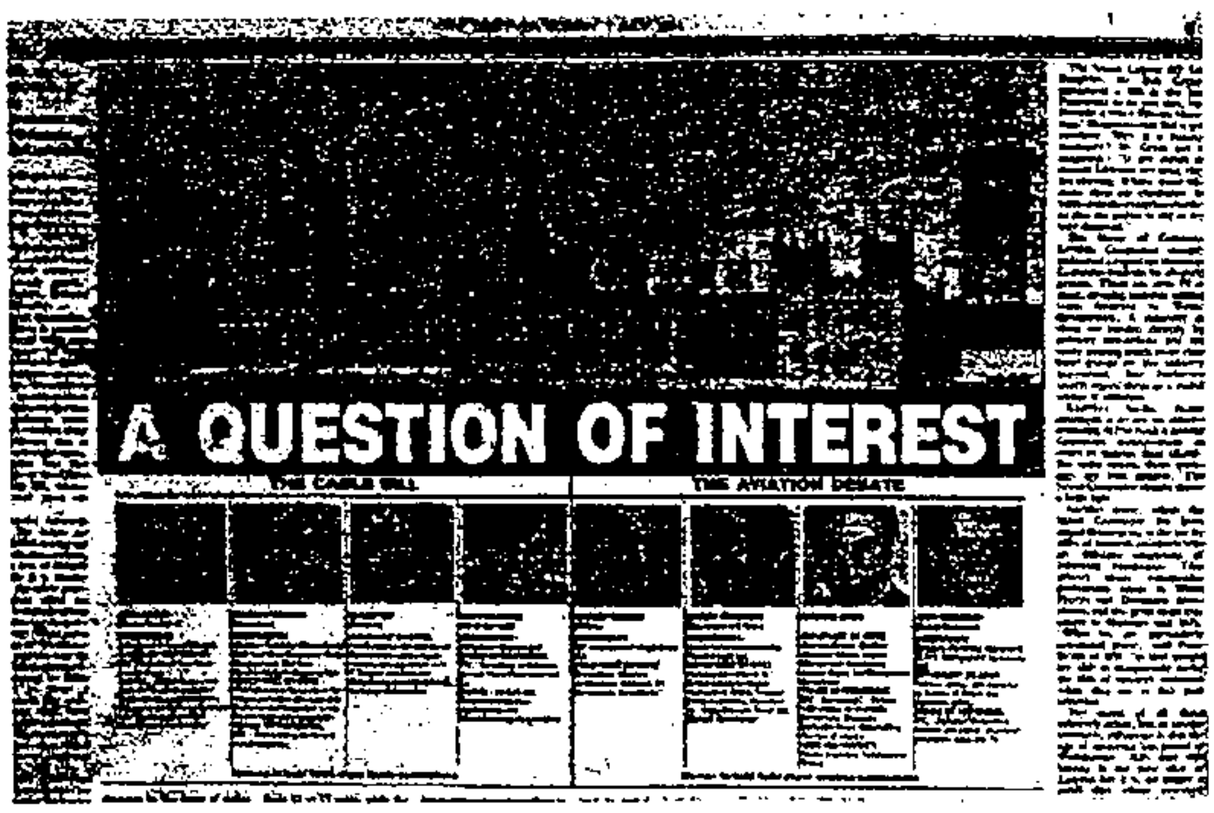


35

figs 33, 34, 35 The **radiating** configuration is most commonly seen in diagrams that use the schematic mode (fig.34). It is also occasionally to be found in the verbal mode where discrete items of information are displayed in a form of list (figs 33, 35).





figs 36, 37 Many examples of graphic language employ several modes and configurations, as in this diagram showing house prices (fig.36), and this graphic feature in the *Observer* in 1984 (fig.37).

Oxford University Press in 1980), in which the line breaks were made on the basis of prosody in so far as this was possible when using a short measure [fig.31]. The second is taken from a children's reader of 1980 [fig.32], where the breaks are determined more on the basis of syntax, a practice now often followed in such books. I am inclined to place this configuration just after 'linear interrupted' in the schema, since in some applications (as commonly in information design) breaking lines by sense leads to something that approaches a graphic list.

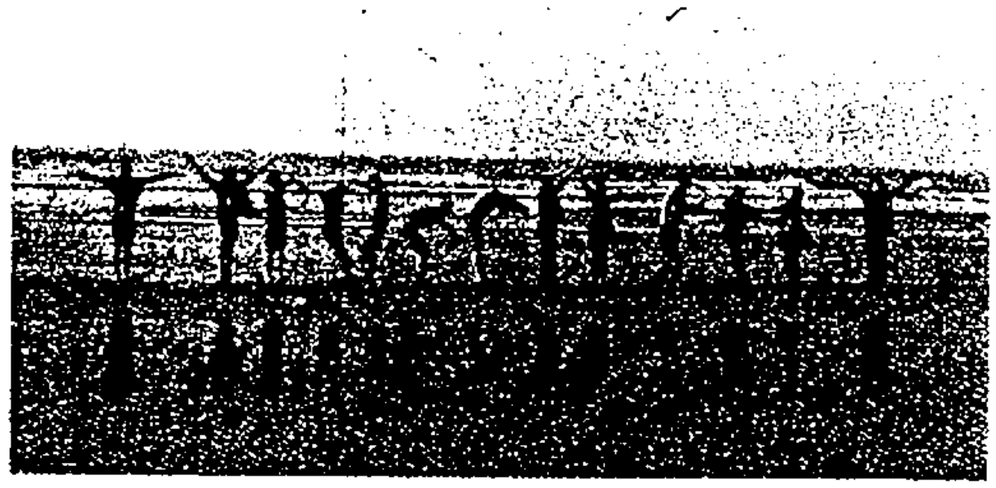
Another configuration that I had not recognized twenty-five years ago is what I am calling **radiating**. The term is self-explanatory, and I have to confess that it is by no means common. I suspect it is probably the last of the fundamentally different possibilities we have at our disposal when organizing segments of language in a systematic and meaningful way. It is illustrated here by the cover of a music publication of 1831 [fig.33], which shows its application to verbal language. However, it is most commonly applied in the schematic mode, in particular in ray diagrams, such as this analysis of a record score in cricket [fig.34]. The radiating idea is picked up in advertising too, as in fig.35, where the radiating words also form a list. On the spectrum of linearity that forms the basis of the schema, I would probably place 'radiating' between 'list' and 'matrix'.

Those modest additions bring up to date my thinking about configurations, though whether they are significant enough to complicate the schema is a matter of judgement. It is simply a teaching tool: as I have pointed out many times before, it is not set in stone, or for that matter –as far as I am aware– in metal type.

My other observations today all have to do with interpretation of the schema. I feel I need to do this because it has been seen by some as ignoring content, and by others as a constraint on our thinking. As to the accusation that it ignores content, I take it as axiomatic that content and purpose are implied in any discussion one has about graphic language, which for practitioners is simply a means to an end. As to the view that the schema is constraining, I would merely point out that it was designed to emphasize the essentially graphic variables of language which –at least at the time– had been ignored. Over the years I have tried to show students examples of graphic language that stretch to breaking point how the schema can be used, and in the last part of this paper I shall show a few examples of this kind.

First, I think it is important to recognize that many examples of graphic language make use of several modes and configurations. In a relatively simple newspaper diagram about house prices [fig.36] several configurations (directed viewing, matrix, a vestigial list) and all the modes of symbolization are used. The same is true of this more complex newspaper article [fig.37]: in it the roles played by





figs 38, 39 Whether we interpret these two examples as picture or words may depend on our cultural background and knowledge, and also on the context in which they are seen.



fig.40 As with figs. 39 & 40, the interpretation of this example (deliberately cropped to show only part of the context) may depend on a variety of factors. For some, the major feature is a letter 'L' (part of the word LIBER); for others it is a picture of a kneeling figure (an evangelist).



fig.41 The same kind of letter/picture ambiguity as seen in fig.40 is evident in this 'Météo des vacances' heading for a French newspaper, in which a life-belt serves as the letter 'O'.

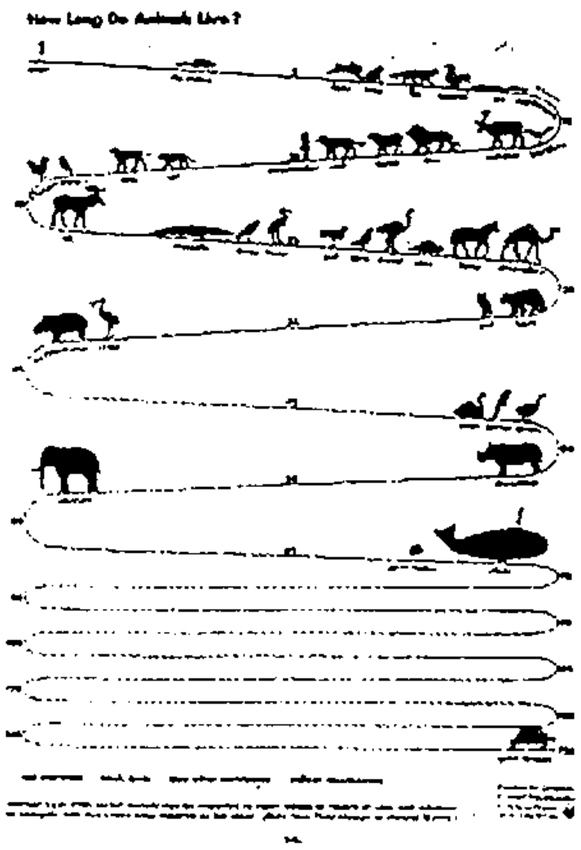


fig.42 Even configurations are open to different interpretations. Should this Isotype chart be considered pure linear or linear interrupted in its configuration?

fig.43 J.Millington, a nineteenth-century ophthalmologist, proposed this method of making reading more efficient in *Are we to read backwards?* in 1883. It could be seen as the verbal equivalent of the configuration shown in fig.42.

But when a boy leaves school
for university or college, he learns,
if botany be a branch of his studies,
that the word tea is a corruption
of the Chinese *Tsia* or *Tcha, Cha.*
This is right enough ; but he is
also taught that there are three
distinct species of the tea plant, all
belonging to the natural family
Terastromiaceæ, namely Thea
viridis, or green tea ; *Thea Bohea,*
which yields the black tea ; and
Thea Assamensis, which gives us
the teas of India, including Assam.
At most examinations he would
run the risk of being plucked, if

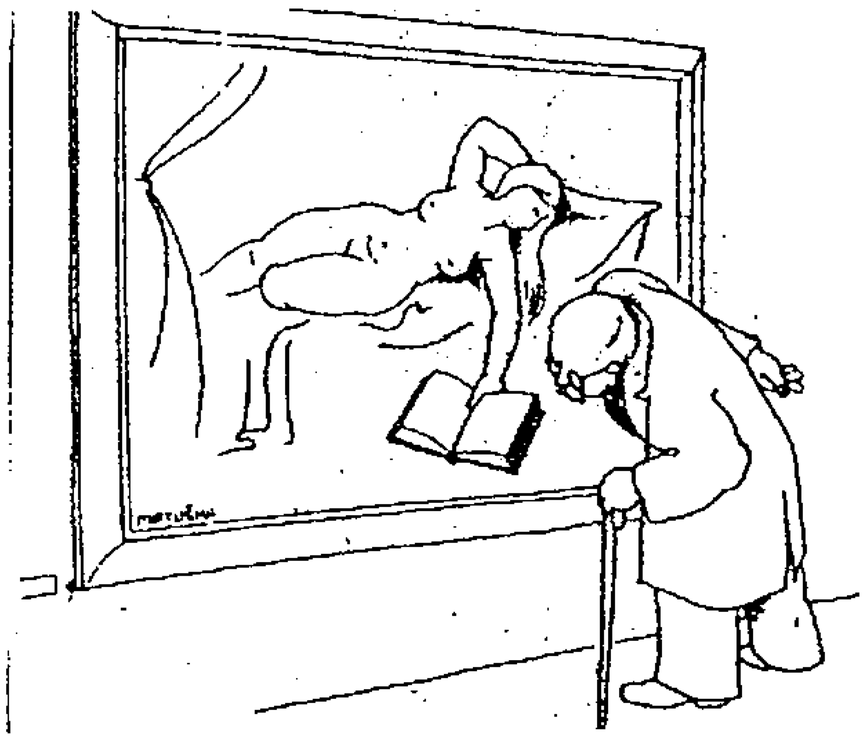
pictures and words are self-evident, but the significance of elements in the schematic mode may not be. On close examination it can be seen that rules of different thickness and length have been used with great subtlety to reveal the structure which lies at the heart of the presentation. They support the interpretation of the configuration as one that branches, though probably subliminally for most readers.

Other examples can be used to reveal how modes and configurations are open to different interpretations, or come into play in different ways during the reading process. In the case of fig.38, are we looking at a picture or reading a message? And if the people depicted in the foreground had lined up following the forms of non-latin characters, would we still have been reading them? Much the same applies in fig.39: even though we are all typographers, and have to some extent been conditioned by looking at the previous figure, we may not have read the message as a verbal one immediately.

It is this ability to mix and play with verbal and pictorial language that has intrigued those who design graphic messages – and users of them too – for centuries. A detail from a manuscript gospel book showing a kneeling evangelist [fig.40] was also intended to be read as an 'L', the first letter of the word 'Liber', part of which is revealed in the top right corner. Needless to say, there would have been a greater likelihood of the image being read as a letter when Latin was a familiar language and the whole page was visible. Much the same technique was used in fig.41. It shows the Météo heading from a summer issue of a French newspaper in 1996, where an inflated life-belt serves also as the letter 'O'.

Configurations too are open to different interpretations. Is the Isotype chart [fig.42], which compares the length of life of various animals on a time line, displayed in a pure linear or linear-interrupted configuration? I have found that people are fairly equally divided in their interpretations: those who empathize with the animals and project themselves on to the time line see it as purely linear; they follow the linear route by treading it visually or mentally. Others, the sceptics among us, say that this is a virtual image from which they are distanced in all kinds of respects. They notice that the animals change direction on alternate lines and that the time line doubles back on itself. For them, it is linear-interrupted. In fact, it is identical to a verbal arrangement (in the ancient Greek boustrophedon style of writing), which was proposed by an ophthalmologist in the late nineteenth century as a more efficient way of organizing words for reading than the one we are all used to [fig.43].

The differences in interpretation of the Isotype chart –as with other examples I have shown– lie in the different knowledge, interests, and attitudes of those who view it. And, of course, this ap-



44. This cartoon by Matuska which was published in the *Bookseller* in 1984 with a caption that reads 'Librarian in an Art Gallery', underlines the fact that our interpretation of graphic images depends to some extent on our knowledge, interests, and attitudes.



45. How should the message on this pack be read? Several interpretations are possible according to whether we 'read' the ice cream cornet as a heart, a letter 'V', or perhaps both.

plies to all typography and graphic design to some degree. The idea is nicely expressed in a cartoon, which appeared in a magazine, the *Bookseller,* in 1984 [fig.44]. The caption reads 'Librarian in an Art Gallery' (though some have suggested that it could equally read 'Elderly typographer in an art gallery'!).

Just how volatile the interpretation of graphic language can be, was demonstrated to me by an innocuous looking item I picked up in Basel a good many years ago when buying a cup of coffee [fig.45]. In the context, there was no doubt that it contained milk or



...from 10s.; gents suits from £2; gents overcoats from £1; gents raincoats from 10s.; and hundreds of other bargains at The Tradin' Post, 1a, Whiteley Street.—Reading 82972. C—26.9

TYPEWRITER, Underwood, manual, modern. Price £12 10s. — Phone Woodley Park 4960. C—26.9

CYCLE TYRES. 26 by 1¾, 26 by 1¾, 27 by 1¼, from 11s. Tubes 5s. ed. —K. Lovegrove, 161, Oxford Road, Reading. Tel. 51436. P—19.12

WEE BELLING Electric Cooker, £5; Tricycle, chain driven, age 4 to 6, £2 10s.; Cot and Mattress, £5; Boy's Sports Cycle, 3-speed, for age 12 onwards, £8 10s.; Pram Seat £1.—Reading 64297. P—28.9

HARPARTS open all day Sundays and late night Fridays. 5B—26.9

SOLID FUEL BOILER, Ideal Marquis, 25,000 b.t.u., with flue. £15. —Reading 21330. P—26.9

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GAS REFRIGERATOR recently converted. £8. View evenings after 6.30 p.m.—486, Kingfisher Drive, Woodley. C—26.9

SLOUGH CYCLE STORES.—Cycles bought and sold, part exchanges

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FUR COAT, size 16, £20 14, Kendrick Road, R Call 6 to 6.30 p.m.

FROZEN FOOD CHEST FRE top quality, 16.5 cu. ft., cash. — D.E.S., The Multi Car Park, Chatham Street ding. Tel. 582852.

PRESCOLD REFRIGERATOR, ft., overhauled and guar cream finish, bargain on — D.E.S., The Multi-Stor Park, Chatham Street, R Tel. 582852.

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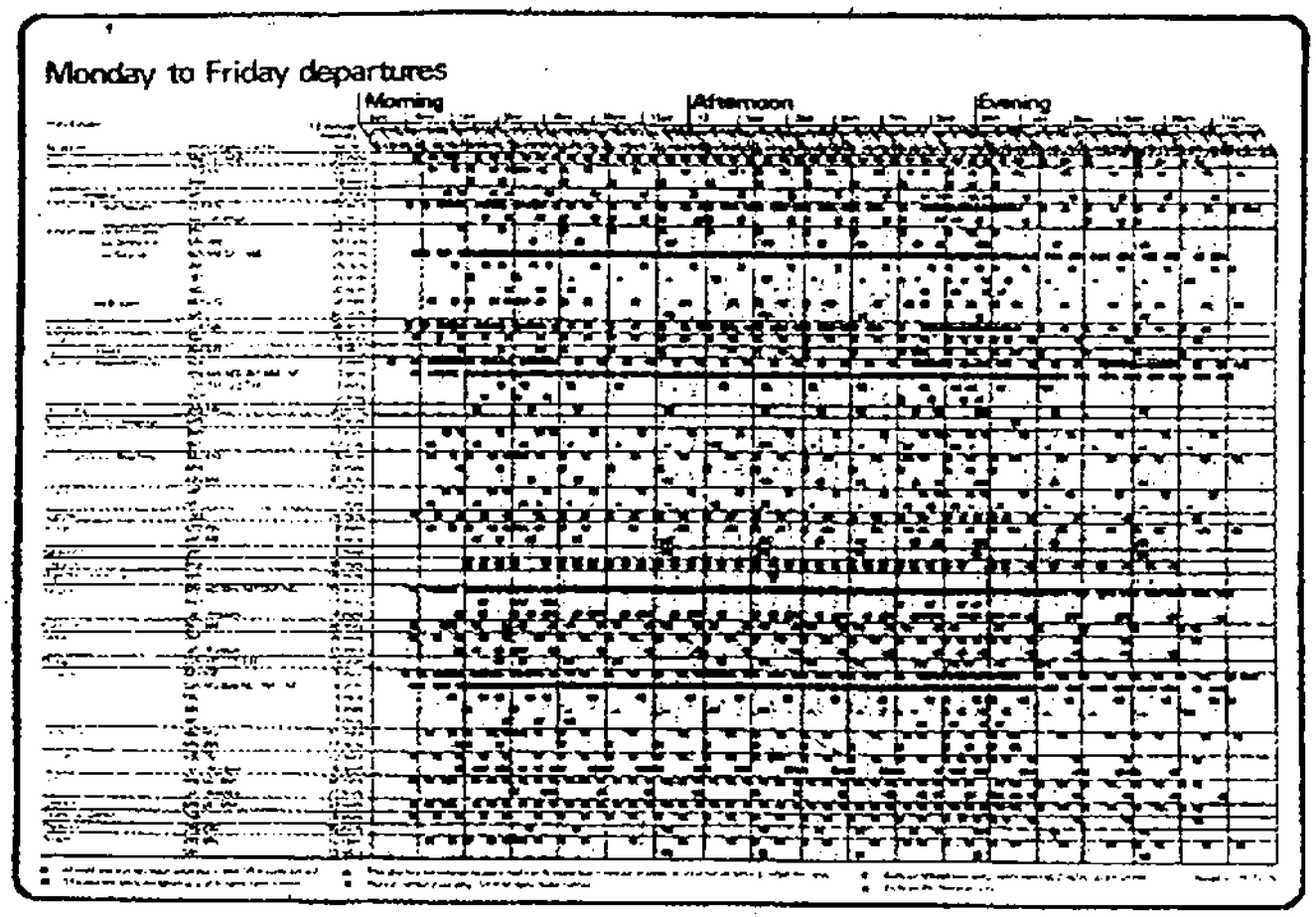
DISHWASHER, top loadin cold, overhauled and gua bargain only £35. — D.E Multi-Storey Car Park, C Street, Reading. Tel.

FIGIDARE REFRIGERATOR ft., overhauled and gua white finish, bargain, on

46. This apparently artless piece of typography, a detail from a 'small ads' page in a newspaper, makes use of several different configurations to help readers in their search tasks.





figs 47, 48 Innovation in choice of configuration and mode of symbolization can lead to successful design solutions. The pure linear configuration of the words on this beer mat seems highly appropriate to its format and message; the use of the schematic mode for the bus timetable allows for tolerances in schedules and, one might suppose, makes for easy reference.

a milk substitute, but how was the graphic message on the package intended to be read? By now we all know the significance of one interpretation of the imagery because of the 'I love New York' heart that has been widely copied (though I suppose it may mean something marginally different after 9 September 2001). But on this package we also see a picture of an ice cream. In addition, because of its position in the middle of a word, the picture can be read as a 'V' (just as the lifebelt in the word Météo in fig.41 can be read as an 'O'). We are left –some of us– with a conflict between three messages: 'I love ice', 'I love ice cream', and one that makes

no sense: 'I vice'. There is also an alternative, mischievous, interpretation stemming from a double reading of the ice cream as a heart and a 'V': 'I love vice'. The ambiguity for the user of this package, if there is one, is one of mode.

When we come to ambiguities of configuration, it is often a matter of trying to interpret reading strategies, which may vary in different situations, or even change from one stage to another in the process of reading a message. Some thoroughly artless pieces of design make clever use of several configurations. In the case of fig.46, a detail from a 'small ads' page in a newspaper, we can identify three: directed viewing (achieved by the use of bold type); a graphic list (achieved by the orderly disposition of this bold type to the left of each entry, and by the indentation of subsequent lines); and, lastly, linear-interrupted text (which provides the bulk of the information). The first two allow us to find the entry, the third to read its content.

I hope I have managed to show that the schema I have briefly introduced provides a useful framework for theoretical discussions about graphic language, which was my primary purpose when devising it. Thinking about graphic design in terms of modes and configurations has certainly helped me to identify and appreciate some unconventional solutions to design problems. Two examples might serve to illustrate this: one is a simple piece of advertising in the form of a beer mat, the other a complicated piece of information design, an experimental bus timetable. The beer mat [fig.47] uses a purely linear configuration in the verbal mode, which is appropriate to its copy-writing and format and also allows all members of a convivial group to read at least part of its message as they sit around a table. The bus timetable [fig.48] is conventional for a timetable in using a matrix configuration, but highly innovatory in turning to the schematic mode instead of numbers to represent the scheduled times of buses. It works on the reasonable assumption that buses rarely turn up exactly on time. Each black block represents a ten-minute period within which a bus should pass a given bus stop, so if buses are scheduled to do so at ten-minute intervals or more frequently, the timetable shows a solid black bar.

I would also like to suggest that the schema discussed in this paper has practical applications for anyone designing documents. Whether we like it or not, every time we design information, we are forced to make choices about the mode(s) of symbolization and method(s) of configuration we use. At the very least, a consideration of this schema forces us to question what we do as designers, and to ask whether there are alternative and better ways of presenting information than the ones we initially had in mind.

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ISBN 960-87947-8-1

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Proceedings
1st International Conference on Typography & Visual Communication
History, Theory, Education
June 2002, Thessaloniki, Greece

the contents of this volume have been arranged by Klimis Mastoridis

Orders: *University of Macedonia Press*
tel.: +30 2310 891.743, fax: +30 2310 891.731
email: uompress@uom.gr
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