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Typography for graphic communication

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Abstract

The consequences of an aesthetic bias in the literature of typography are considered and two misleading assumptions about textbooks are identified: that print processes are inflexible and finite and that textbooks are continuous prose. The need to de-mystify the printing process is discussed and evidence for selectivity as a strategy of efficient readers is reviewed. The designer's attention is thus focussed more on the needs of the reader and less on the needs of the printer and the author. The word 'transforming' is suggested to reflect the role of the designer as a mediator in the communication process and the inseparable relationship between what is said and how it is said. The transforming ethos, it is concluded, could redirect the attention of both typographic theory and practice towards a more functional approach.

*The designer's
role as reflected
in the literature*

The Tschichold quotation in Fig. 1 is one of the most explicit statements of a view on typography that is implied by numerous books on the subject. It is a view that is reinforced by the way many books on typography are illustrated. Traditional writers on book design often showed only title pages, implying or saying that if you could design that all right, you would have no trouble with the rest of the book. It is interesting to reflect that, although we are to judge a book on its title page, that is the only page in most books which tells the reader absolutely nothing he does not already know. A book is a three-dimensional object, and so it follows that to represent it in two dimensions is to isolate it from its context; this leaves only two criteria by which to judge it - Tschichold's criteria of compatibility with the technical demands of the printing process, and the visual effect.

Tschichold's layout technique is very much like hanging a picture on a wall. Spencer (Fig. 2), in contrast, is hinting at a more sophisticated functional typography. Early proponents of functionalism appear to have viewed technical excellence as a means to an aesthetic end. In my view really functional typography is in fact invisible; that is, it can be judged not by its visual appearance, but only in relation to objectives. Rather than use new means to the same end, the end itself is dependent on the individual circumstances of a particular job, while the same means are at the designer's disposal.

Spencer points to the idea of making the structure of the information contained in a text visible to the reader. Alsleben (Fig. 3) amplifies the point. It is significant that Tschichold is writing about book design, and Spencer about business printing; Alsleben is described as an information theorist. So these quotations, although admittedly out of context, reflect two different approaches to typography - the first largely based on the continuous prose of book publishing, the other on structured information. We shall come back to these later.

*An aesthetic
bias*

These two approaches are reflected in two ways in which the word 'design' is used by typographers. Design in many people's minds means applied or decorative art. Historically, the job description 'Graphic designer' is descended from 'commercial

artist'. When we talk about design for information printing, though, we are using the other sense. Clifford Burke in his marvellous little book 'Printing It' has said "Design, in the sense that I use the word, is like the designs you have on your girl or boyfriend ... I don't intend to use the word in the sense of creative art, but in the more mundane sense of planning."

But it seems to me that the greater number of books about typography restrict the planning part of design to the planning of a printing operation. The planning of book production in this context, though, is just a means to an end - that is, design as creative art. Design as planning can mean so much more - the planning of an information display, the planning of a reading activity and so on.

*Consequences of
an inadequate
literature*

To come straight to the point, it does appear that the "knowledge-base" from which typographic designers are trained is derived from an approach to design that is not adequate for the demands of information printing in the 1970s. This rather arrogant declaration is not, of course, intended to mean that all design education is substandard. Design education is saved by its heavy reliance on project work and tutorials; ideas and skills are thus transferred experientially rather than through books. Nevertheless, there is no doubt that too many books and magazines on design reflect a formalist or decorative approach as distinct from a truly functional one. The examples in Fig. 4-7 contrast the formalist approach to design, with some of the problems of modern information publishing.

Of course, if good design is taught experientially, an inadequate literature will not have very much effect on the quality of design as it is practised - sensitive and skilled individuals will have few problems in producing excellent work. But the problem of quality arises when the organisational structure in which individuals work prevents them from exercising their personal skills to the best effect. Unfortunately this is a trend of the modern world - the world of large institutions and bureaucracies. When almost any function is taken over by a large organisation the tendency is to rely less and less on the judgement and skill of individuals and more and more on standard procedures and routines. We all know the result of local government reorganisation in 1974, for example. The point is that to routinise jobs normally done

by skilled individuals you need a first class analysis of the particular task or process, first class operational procedures and adequate provision for feedback, evaluation and improvement. It is in these situations that an inadequate literature will have serious consequences. It is from the literature of a subject area that we form a framework with which to conceptualise and analyse problems. Paul Rand has said "The absence in art of a well-formulated and systematized body of literature makes the problem of teaching a perplexing one."

It may appear that the problem of formulating operational procedures and the world of typographic design are unrelated. Most of the design we hear about, after all, is done by independent practitioners or design groups. It is, however, in the design activity that we don't hear about that the problem lies. Information is big business now but only a tiny proportion of information communicated on paper receives the attention of a designer. The fact that the graphic design profession has publicly projected itself as having a role more cosmetic than functional means that most of the printed information we use to further science and technology, display rules and regulations, communicate information for the administration of government, industry and our personal lives, is, the voice of my training insists, less efficient than it might be if typographers were involved.

*Two misleading
assumptions*

The Open University is the institution I know best, and it is probably not untypical of many large bureaucracies employing designers. Although we have a large studio - about 30 designers in all, not including photographers and picture researchers - typography plays a relatively minor role in the production of our educational texts. Design activity is confined mainly to illustration and cover design, and it is difficult for designers to consult with authors. I will not go into the complex reasons for this now, but a quick look at the guidelines available to our designers for making decisions about the layout of texts will be useful. It shows that their relatively poor placing in our organisational structure is due very much to the poverty of our vision of the potential contribution design could make to the educational process.

Decisions about Open University typography seem to be based on three considerations. There is a house style, much like house styles used by other publishers. There are technical and economic constraints imposed

by the printing processes we use. Then there are precedents - unwritten but nevertheless real rules that deter innovation with the "It was good enough for your father" style of argument.

The limitations of the latter consideration are self-evident. Fig. 8 shows an example of what I mean. We have to continually watch, though, that this sort of blind conservatism is not present in over-large amounts when we think about house style and printing technology. It is in fact present in both at the Open University, and probably elsewhere, although in different ways. We make two assumptions that, in my view, interfere with the quality of our communication: we regard printing processes as inflexible, finite, and unchangeable; and our house style seems to assume that we are in the business of ordinary book publishing.

*Demystifying
printing*

Rank Xerox publicity sometimes includes a photo of an electrostatically printed fried egg - a symbol of the boast of modern print technology to print anything on anything. Book design, though, is still based largely on nineteenth century and earlier technology. I am not, of course, saying that Open University courses should be delivered by the milkman, but I am suggesting that typographers and those who use the services of typographers should demand a breakdown of the elaborate mystification of the printing process that now exists. The lack of standard terms and measurements systems for the specification of print is one manifestation of this; another is the complicated demarcation in the printing industry. It is interesting to see how frustration with the mystifying business of dealing with printers is now the force behind the latest developments in the printing industry. "In-house" printing is the fastest growing area in the industry. The simplification of previously complex processes has brought the originator of a communication closer to the reader. Simpler techniques of composition, correction, plate-making, machining and finishing are now being used by professional printers as well as the less-skilled in-plant operators.

This mystification affects the quality of design in a number of ways. Laying out a page becomes a needlessly complicated job when you have to tell someone else how to do it, using an inadequate

specification system that is not standardised. 'Leading' is old-fashioned, and so not strictly accurate, but how many printers understand 'line-feed'. 'Unjustified', 'ragged edge' and 'ranged left' all mean the same thing; so does 'flush left' and it's not a bad idea. Lack of information about technological options can also result in inappropriate policy decisions by managers. At the Open University, for example, texts can be set in one type style only - i.e. the seven founts on a Monotype keyboard. This decision, which prevents the use of a smaller size for footnotes for instance, or a sans-serif for subheadings, saves a minute proportion of our print budget, but severely limits the typographer's range of graphic devices. The decision was taken on the basis of the long time it takes for a Monotype operator to change his machine to a different face; it was apparently never considered that most large printers have more than one composing machine, or that new systems are available that allow the designer a far greater number of founts than the Monotype.

In theory at least printing technology no longer imposes such rigid constraints on the designer. It can do most things we ask of it; and if print buying and specification can now be made easier, then designers are freed to pay more attention to the business of communication.

Fig. 3 quoted Alsleben as saying that the strongest contribution typography can make to the effectiveness of a communication is to make its structure visible. Do all communications have such a structure?

*Designing for
the active reader*

In some written texts the structure is contained entirely in the prose - a logical sequence of events, concepts or arguments. In other words, there is only one entry point to the text - the beginning - and only one way through. The reader relies entirely on the author's use of language and logic. Examples of such single-track discourse are novels, programmed-learning texts, and other carefully-sequenced instructions such as knitting patterns. In these cases - where there is no visible structure for the typography to display - the designer is free to do as he likes, within the bounds of particular production techniques, his budget, and the limits of the reader's perceptual processes. It is, incidentally, in this last area that most legibility research has been concentrated.

It is texts that do not come into this category that are most in need of the designer's attention - texts where the visual structure is important for the understanding of the content, texts that are to be used in ways other than straight continuous reading. Almost all textbooks come into this category, and yet the traditional practices of book design and editing do not make this important distinction - between texts that assume a passive reader (externally, at least) and texts that require an active, selective reader.

*Efficient readers
are selective*

Selectivity is coming to be seen as a vital component of reading to learn. There are a number of reasons why. Studies of the reading process used to look almost exclusively at the letter, word and sentence level, but researchers are beginning to look at the way people learn from complete books; they have found that the most efficient readers of textbooks do not simply read through the text in a steady linear fashion (even when it is written in that way). Efficient readers scan for the overall structure of the argument, go back to check on things they have not fully understood, and so on. This is, of course, exactly what the speed-reading people have been saying for years - the most efficient readers read for a definite purpose and with a conscious strategy. This model of the reading process makes it quite clear that a visible structure makes this kind of reading easier. This visual structure is the readers' access to the teacher's discourse.

Linked to this is the evidence of researchers into learning styles. Again they are telling us what many people knew - that students prefer to adopt learning strategies suited to their own temperaments, situation and previous knowledge. Their preferred style may not match the teaching style of the textbook - the reader, for instance, may prefer to have an overview of the conceptual structure of a subject area before proceeding to details and examples, whereas the author of a textbook may start with many seemingly unrelated details in order to tie them together into an overview at the end. More pragmatic causes of reading problems come when students have far more reading to do than they have time available - when revising, or when falling behind. Once more, the provision of a visual structure will enable students to access any part of the text that suits them. It is the only way to solve the problems of many non-fiction texts, caused by the inherent linearity of prose.

How to improve!

To summarise, the traditional design and editing of textbooks, has often been based on inappropriate assumptions about printing techniques and about the way textbooks are read. But what would more appropriate design and editing procedures look like? How can designers and editors improve the quality of textbooks as instruments of learning? This important notion of quality is essentially related to standards; and standards are determined in two main ways: by empirical observation (research) and by the conceptual framework and values of the observer.

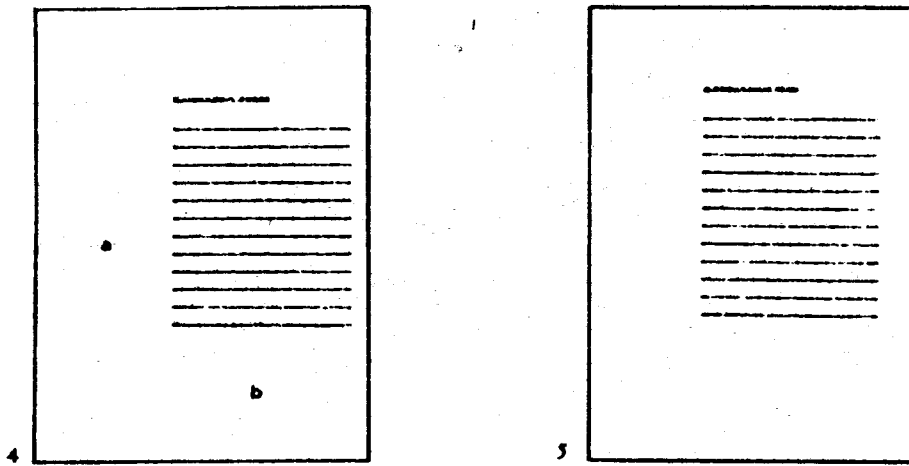
To identify the designer's 'options for quality' is still a major research task and there is currently a lively debate about the way to do it. Typographic researchers have investigated many detailed aspects of text layout, but their results have never been regarded as useful sources of advice by practising designers. Research has not yet told us even in general terms what sort of things make what sort of differences to what sort of people. Until researchers come up with some realistic performance standards for design to add to the aesthetic standards, design will continue to be generally regarded as peripheral to the communication process.

*Role-perceptions
and environment
of the designer
can change*

The right kind of research and the right application of its findings depend very much on the values and perceptions of the people producing textbooks, and on the way they work together to transform author's manuscripts. The word 'transform' was introduced by Otto Neurath of the Isotype Institute and is one we have been 'plugging' recently because it expresses the notion that designers, editors, print buyers and, at the Open University, educational technologists are mediators in the communication process. This means that it is impossible to consider the tasks they do as completely separate. To divide them is to take away from each individual the responsibility for the effectiveness of the whole; editorial standards thus become merely stylistic and design standards based on visual aesthetics and fashion. Transforming a text involves, among other things, balancing or reconciling positive purposes or goals and negative constraints (an example in the realm of printing might be print quality versus unit cost) - but whose purposes and whose constraints? If the people producing the textbook are responsible in some way for its effectiveness, then their purposes and constraints will derive not only from production

processes, house style and tradition, but also from the needs and limitations of the reader. Marie Neurath has described Isotype Institute transformers as 'trustees of the reader'.

The quality of typography as part of the communication process is dependent ultimately, then, on an ethos that directs the attention of designers and researchers towards the right goals and enables them to work together in the right way; the right way and the right goals will only be achieved if the activities of design and design research are seen as transforming activities.



Yet our layout can be improved even further. It looks better if it is placed a little higher (Example 6). The heading looks better if it is moved up a little, for this makes the page look less ponderous and relates the type area better to the space (Example 7). In order to avoid the rigidity of Example 5 we could (Example 8) give the heading the same indentation as the paragraphs of the text, say 12 points. Em indentations are still the best means of indicating paragraphs and are not at all 'old-fashioned'. But this makes the design rather weak. It can only be improved by an unusually strong indentation (Example 9). Let us therefore try indenting the main text the same amount as the heading (Example 10). This is better on the whole. But the heading is now very prominent and calls for a counterweight at the bottom. If we cannot make one (a page-number, for example) we must give up the idea of putting the heading in this position. However, the solutions 6, 7, 9 and 10 are not the only possibilities. We can move the type area, for example, even higher and move the heading further away. Even the smallest change gives a new look. The layout can be made to look different by further increasing the indentation, by putting more space between two paragraphs, etc.

|| We must ask ourselves each time whether the result is *pleasing*, whether we have achieved a balance. Provided the work is all right technically, there is no other criterion for typographical design.

Fig 1

Tschichold 1934 (quoted in Maclean R. Jan Tschichold: Typographer
Lund Humphries 1975)

Fig 2

Herbert Spencer in Design for Business Printing Lund Humphries
1952

and it is. I think, the growing awareness of this that is the reason why the word 'typography' is being increasingly adopted in place of 'layout'. 'Layout' seems to imply the arranging of *masses*, with type-matter considered as 'areas' and type as something to be stretched or compressed to form a pattern. But 'typography', in this connection, suggests the arranging of type considered three-dimensionally, with the overall design evolving out of the sympathetic handling of detail. 'Layout' suggests a façade; 'typography', a structure.

Alsleben: "As a rule the message of a text can be seized the more readily the easier it is to see how each part of the text relates to the context of the whole. That is, it pays to show the structure of a text. Certain typographic resources allow it to be displayed with less trouble than composition and typeface can do alone."

"One task of typography is exemplified by a table of contents: imagine a table of contents as a continuously set text, without paragraphs or indentations; it would have to be read and reread before any idea of structure came through. Imagine, too, what an effort it would cost to rectify this limitation with words of explanation. This explanatory function is taken over by typographic means."

Fig 3

Knud Alsleben,
(quoted in Gestner K. Compendium for Literates MIT Press 1974)

Fig 4

from the Universities' Superannuation Scheme Explanatory Booklet
1975

9. Pensions on Ill-health Retirement

In the event of retirement before Normal Retirement Age of a member who has become, in the opinion of his employing Institution, incapable of discharging his duties by reason of permanent ill-health or incapacity, provided the member has completed five years' Pensionable Service, a pension is payable at the rate of 1/80th of his Pensionable Salary for each Year of his Pensionable Service provided that:

- (a) if Pensionable Service exceeds 20 years it is increased to the notional number of Years of Pensionable Service the member could have completed by his Normal Retirement Age or by $6\frac{2}{3}$ years whichever is the smaller;
- (b) if Pensionable Service is less than 20 years but more than 10 years it is increased to 20 years or by $6\frac{2}{3}$ years whichever is the greater subject to a maximum equal to the notional number of Years of Pensionable Service the member could have completed by his Normal Retirement Age;
- (c) if Pensionable Service is less than 10 years but more than 5 years it is doubled subject to a maximum equal to the notional number of Years of Pensionable Service the member could have completed by his Normal Retirement Age.

The Trustee Company has power to withdraw, suspend or reduce an ill-health pension if the member's health improves or if he becomes able to carry on remunerative employment.

If ill-health retirement takes place after less than five years' Pensionable Service have been completed the member is only entitled to benefit as if he had withdrawn from service as outlined in paragraph 21 below.

10. Early Retirement Pensions

A member who has attained age 50 and completed five years' Pensionable Service and who retires before Normal Retirement Age at the request of his employing Institution (or a member who retires on account of redundancy) or a member who has attained age 60 and completed five years' Pensionable Service and who retires with the consent of his employing Institution receives a pension calculated at the rate of 1/80th of his Pensionable Salary for each Year of Pensionable Service up to the date of retirement. If retirement is after age 60 but before Normal Retirement Age but is without the consent of the member's employing Institution then, provided five years' Pensionable Service have been completed, an immediate pension may be granted calculated at the rate of 1/80th of Pensionable Salary for each Year of Pensionable Service but subject to an appropriate actuarial reduction.

11. Late Retirement Pensions

In the event of a member continuing in service after Normal Retirement Age with his employing Institution's consent and then retiring, a pension becomes payable equal to the pension that would have been payable if retirement had been at Normal Retirement Age but actuarially increased to allow for the member's age at retirement.

Such actuarial increases depend to some extent on the financial conditions prevailing at the time but would normally be 1 per cent for each complete month between attainment of Normal Retirement Age and the date of actual retirement.

If the member has contributed to the Superannuation Scheme after his Normal Retirement Age, subject to Inland Revenue limits, a further amount of pension becomes payable related actuarially to the extra contributions paid by the member.

Expo Montreal 67, Czechoslovakian pavilion, synchronous projection screen 11 x 7 yds, with 15 000 slide projections in black-and-white and colour / Tschechoslowakischer Pavillon, Synchron-Projektions-Wand 10 x 6 m, mit 15 000 schwarz-weißen und farbigen Dias-Projektionen / Pavillon tchécoslovaque, écran synchrone 10 x 6 m, avec 15 000 images projetées en noir, blanc et couleur, Josef Svoboda, Prague / Prag, 1967

Fig 5

Two extracts from Müller-Brockmann J.
A History of Visual Communication

Tiranti 1971

Figures 4 and 5 show complex information laid out formally, with no attempt to use typography to make the structure clear.

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GENERAL RULES FOR CONDUCT. 37

73. If any Train or Engine be discovered at a stand on the opposite Line, not at a Station, the Engineman must sound his Whistle, and reduce his speed so as to be able to stop, if necessary, before reaching the other Train or Engine. During a fog or snow-storm, the Whistle must be sounded frequently during the whole journey; and when approaching any Station or Level Crossing, more than usual precaution must be used; and if the Signals, from fog or any other cause, be not clearly seen, the driver must bring his train to a stand before entering the station, and afterwards proceed with great caution until he knows the line is clear.

Driver to reduce speed if he sees Train or Engine standing on Line.

To sound Whistle frequently in a Fog, &c.

To stop, and afterwards proceed cautiously if Signals cannot be seen.

74. Should an Engine with a Passenger Train become disabled, the Driver of any passing Goods, Cattle or Coal Train must render all the assistance in his power; and, if called upon to do so, must leave his own Train in a place of safety, and take on the Passenger Train. In like manner, the Driver of a Coal Train must assist or take on a

Assistance to disabled Trains.

Fig 6

from the Great
Northern Railway's
Rules and Regulations,
April 1855

Section H. Working of Trains**12. Duties of Station Managers, Supervisors, Shunters and Persons in Charge of Stations, Platforms or Yards (cont'd)**

12.9.3 If a vehicle which requires repairs (other than repairs to the brake) is fit to travel, the C. & W./Maintenance staff will label it with a green "For Repairs" label on each side and the vehicle must be directed for repairs immediately upon discharge of the load.

12.9.4 If a vehicle has a defective brake but is otherwise fit to travel, the C. & W./Maintenance staff will label it on each side with a green "For Repairs" label with the appropriate red and white tab, as follows:—

- (i) Automatic brake defective—(pipe operative)—vehicles so labelled must be regarded as "piped only" and may be marshalled in fitted trains or fitted portions of trains.
 - (ii) Automatic brake and pipe defective—vehicles so labelled must be regarded as unfitted.
 - (iii) Hand brake defective
 - (iv) Automatic and hand brake defective
- } —the brake levers on each side will be secured and vehicles so labelled must not be loose shunted.

13. Additional Duties of Station Managers, Supervisors, Shunters and Persons in Charge of Stations, Platforms or Yards**Applicable to Passenger, Empty Coaching Stock and Parcels Trains****13.1 Starting of passenger trains**

13.1.1 A passenger train must not be permitted to leave any station before the advertised time. Station clocks must be checked daily.

13.1.2 The person in charge of the platform must give a signal to the Guard of the train to indicate when station work is complete, that the doors of all vehicles are properly closed and secured, and that the train is ready to leave. By day this signal must be given by raising one arm above the head, and at night, if the use of a handlamp is necessary, by a white light held steadily above the head.

13.1.3 When it is impossible for the Guard's "Ready to Start" signal to be seen by the Driver, the person in charge of the platform must, after satisfying himself that the signal has been given by the Guard, signal to the Driver accordingly.

13.2 Passenger trains not to stop where not booked to call

A passenger train must not be stopped to take up or set down passengers at stations at which it is not booked to call, unless specially authorised.

H.31

Fig 7

From the British Rail Rule Book, October 1972

Over the last century the information needed by people operating industrial systems such as railways has increased in complexity and quantity. It has also changed its purpose — the information in the 1972 Rule Book is not just intended to help railwaymen run trains, but it also represents trades union agreements, legal requirements, insurance conditions and so forth.

Table A

List of Scientific Terms, Concepts and Principles used in Unit 1

Taken as prerequisites			Introduced in this Unit			
1 Assumed from general knowledge	2 Introduced in previous Unit	Unit No.	3 Developed in this Unit or in its set book	Page No.	4 Developed in a later Unit	Unit No.
		S100¹		Unit		
	radioisotope	6	electrophoresis	12	active site	2
	molecular weight (MW)	8	gel filtration	10	mitochondrion	3
	electrodes	9	specific activity	9		
	ions	9	criteria of purity	13		
	pH	9	unusual bases	20		
	amino acid	10	endopeptidase	15		
	apolar	10	exopeptidase	16		
	chiral	10	β-sheet	23		
	conformation	10	optical rotatory dispersion (ORD)	27		
	hydrogen bonding	10	base stacking	26		
	isomer	10	hypochromism	26		
	polar	10	side-groups	29		
	cellulose	13	apolar forces	29		
	cross-linking	13	polar side-groups	29		
	glucose	13	apolar side-groups	29		
	glycogen	13	ionic bonding	29		
	hydrolysis	13	random chains	29		
	macromolecule	13	active conformation	30		
	monomer	13	quaternary structure	30		
	peptide bond	13	subunit	30		
	polymer	13	sedimentation equilibrium method	14		
	polysaccharide	13	sedimentation velocity method	14		
	protein	13*				
	α-helix	14*				
	C-terminus	14*	subunit interactions	CS&F ² 223		
	disulphide bond	14*	self-assembly	268		
	membrane	14	aided assembly	268		
	N-terminus	14*	directed assembly	268		
	organelles	14				
	primary structure	14*				
	secondary structure	14*				
	tertiary structure	14*				
	substrate	14				
	ultracentrifuge	14				
	enzymic activity	15				
	nucleic acid	17				
	nucleotide	17				
	DNA	17				
	RNA	17				
	mRNA	17				
	tRNA	17				
	X-ray crystallography	28				

*The terms marked with an asterisk in column 2, which were introduced in S100, Units 13 and 14, have also been developed in this Unit.

¹The Open University (1971) S100 Science: A Foundation Course The Open University Press.

²A. G. Loewy and P. Siekevitz (1969) Cell Structure and Function (2nd ed.) Holt, Rinehart and Winston.

Fig 8

Although this is called 'Table A'; there is no Table B or C! It appears by habit in every Open University Science text. Why number the columns? Why does column 1 appear at all? It is not really a table at all - there is no reading across to be done between columns. Presented as a list in three sections, it would take up less space and would not strain our sense of logic. This information has been structured inappropriately.