VISIBLE LANGUAGE

The quarterly concerned with all that is involved in our being literate
Volume XVII Number 4 Autumn 1983 ISSN 0022-2224

VISIBLE LANGUAGE, Volume XVII, Number 4, Autumn 1983. Published quarterly in January, April, July, and October. Postmaster: send address changes to Visible Language, Box 1972, CMA, Cleveland, OH 44106. Second-class postage paid at Cleveland, Ohio, and at additional mailing offices.

Merald E. Wrolstad, Ph.D., Editor and Publisher
P. O. Box 1972 CMA, Cleveland, OH 44106

General Information

Visible Language is concerned with research and ideas that help define the unique role and properties of written language. It is a basic premise of the Journal that writing/reading form a distinct system of language expression which must be defined and developed on its own terms. Published quarterly since 1967, *Visible Language* has no formal organizational affiliation. All communications should be addressed to

Visible Language
Box 1972 CMA
Cleveland, OH 44106 USA

Telephone 216/421-7340

Subscription Rates.

	One Year	*Two Years*	*Three Years*
Individual subscription	$15.00	$28.00	$39.00
Institutional subscription	25.00	47.00	66.00

Foreign subscribers: add $2.00 for postage to each year's subscription. All orders must be prepaid. To be honored free of charge, claims for missing issues must be made immediately upon the receipt of the next published issue.

Back Copies and Reprints. A limited quantity of all back numbers is available at a per issue cost of $4.00 to individuals and $5.00 to institutions. A booklet listing the contents of all past Journal issues is available on request. Individual reprints are not available.

Manuscripts. Manuscripts, inquiries about research articles, and other contributions to the Journal should be addressed to the Editor. A guide for the organization, preparation, and submission of manuscripts is available. Three copies of a manuscript should be accompanied by an abstract typed on a separate sheet of paper.

Letters to the Editor. Comments on articles and letters that have appeared in the Journal are welcome and should be addressed to the Editor. The Editor will also relay to the author questions or comments on any article. Your response — and the author's comment in reply — will not be published without your permission and your approval of any editing.

Advertising. Detailed information is available upon request.

Cover: "visible language" has been put together out of Stepping Stones, a system of modular letter shapes developed by David Murray of the Swinburne Institute of Technology, Australia, and recently awarded the Mayor's Prize at the International Design Competition, Osaka, Japan. Made of die-cut magnetic material bonded to colored PVC film the 14 interrelated shapes are designed for creative play. They are large enough to be confidently manipulated by small hands as an aid and encouragement for understanding the fundamental structure of the alphabet as well as the forms of other writing systems and graphic images. Inquiries should be sent to: Swinburne Applied Research and Development Division, P.O. Box 218, Hawthorn, Australia 3122.

Prue Wallis Myers

Handwriting in English Education

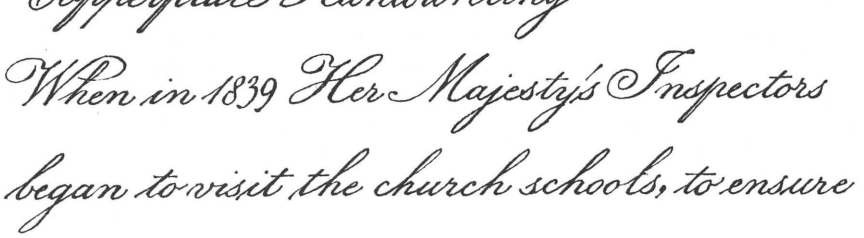
Presented here are some significant questions concerning the state of handwriting in infant and primary schools in England, and some possible answers to these questions. The ramifications may apply not only to English schools but schools of other countries as well. During the 1960s and 1970s in particular, handwriting became a forgotten craft in the schools, but improving the standards for both teachers and children is an important task that deserves attention and continuing concern in our fast-moving world.

Why is it that the standard of handwriting today is so poor? Why has the subject lost favour in the schools? It does not take a great deal of intelligence to master the skill of handwriting, but perhaps the knowledge of *how* to do it is missing. Can we retrieve this know-how before it is too late?

These questions represent some of the main concerns of this article. It begins by looking back to the mid-nineteenth century when children were given instruction in writing rather than taught how to write. Then it traces the changes that have taken place in English schools since that time—changes not only in the style of handwriting but also in the ways of teaching it, influenced by educational pioneers like Marion Richardson.

Perhaps the greatest change in the attitude toward the teaching of handwriting was the introduction of creative writing. When this filtered down to the infant schools, the story the child wrote in his own words became so important that the mechanics of writing were almost overlooked. Obviously, too little consideration was given to the basic teaching and practice of handwriting itself.

The latter part of this article describes briefly what needs to be done in the early stages of handwriting education to improve present standards.



Copperplate handwriting.

Visible Language, XVII 4 (Autumn 1983), pp. 333-356.
Author's address: 4 Greenbank House, Albert Square, Bowdon, Cheshire WA14 2ND, England.

wise expenditure of the early state grants, they would have seen children using the handwriting style known as Copperplate

This style was naturally extended into the elementary board schools, erected after the Education Act of 1870. We may imagine those teachers writing copy on the blackboard while rows of pupils sat silently and watched with open-mouthed awe. The teacher wrote flowingly with never a squeak from the chalk, which was lifted off the board only at the end of the word. At other times, the children laboured over their copybooks, filling in on the dotted line the letters, each beginning from the base with a hairline. First they used chalk and slates; then they progressed to the spluttering steel nibs, which either tamed the pupils to their ways or spoiled their attitude towards craftsmanship. Meanwhile, the teacher strode up and down between the rows, correcting the tool-hold as well as the posture and the angle of the pen, which had to point towards the right shoulder and which was always held in the right hand—left-handers were forbidden. Firm pressure on the downstroke broadened the line of a letter, and light pressure on the upstroke reduced the nib to its original point. The teacher knew how to instruct in penmanship, and in spite of threats, fears, and tears, many children learned Copperplate handwriting thoroughly and took pride in their achievement. A great deal of skill was passed on until concern for speed carried the competence away.

Civil Service Round Hand

The Civil Service Round Hand, a direct descendant of Copperplate, became popular in English schools about 1900 through the use of Vere-Foster copybooks. This writing sloped less to the right than did the original Copperplate; it had shorter descenders but retained the loops (Figure 1). Much of the written work achieved in schools was either copied from handwriting on the board or dictated by the teacher. There was plenty of time for daily concentration on the acquisition of handwriting skill. The main subjects in most of the schools were the three Rs, and writing was an easily recognised yardstick of standards.

Mrs. Bridges' Handwriting Manual

Publication of *A New Handwriting for Teachers* in 1898 by Mrs. M. M. Bridges, wife of the poet laureate, included examples of her own italic hand (Figure 2) as well as those of Michelangelo. The manual was influential in reviving interest in Medieval and Renaissance hands, which were later to rival the Copperplate style.

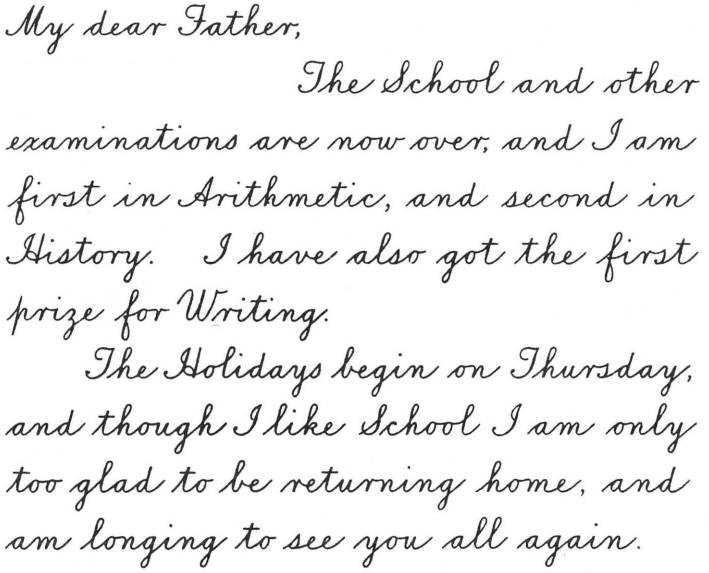


Figure 1. Civil Service Round Hand (Fairbank, 1949).

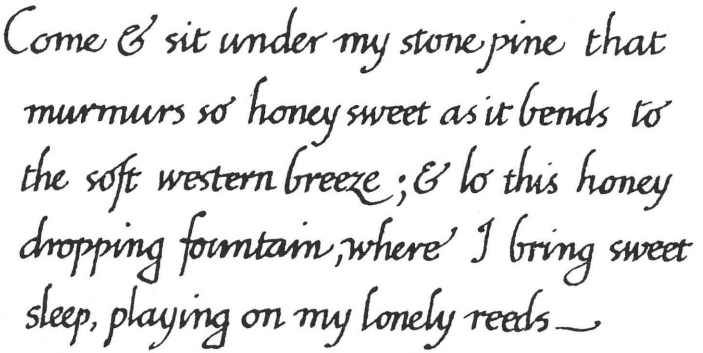
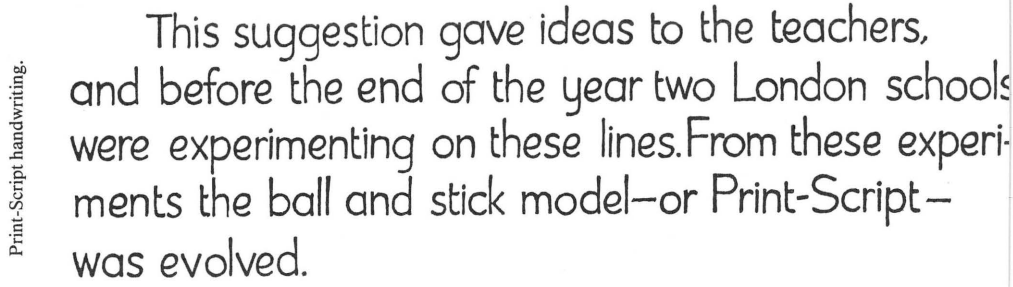


Figure 2. Mrs. Bridges' hand. Part of a page of *A New Handwriting for Teachers* by Mrs. M. M. Bridges (Fairbank, 1949).

Print-Script Writing

By the end of the century, with the spread of infant education, there seems to have been concern among teachers that the initial pencil-and-slate alphabet should resemble more closely the printed model from which children learned to read. In 1913 Edward Johnston gave an address on penmanship at the London County Council Teachers annual conference. In making suggestions for an ideal course on the teaching of handwriting, he stated that his Foundational Hand would make a good model and that it would develop into a fluent hand.* The Foundational Hand was Johnston's version of the Roman alphabet as used in the ninth and tenth centuries with its later italic developments (Figure 3).



Print-Script handwriting.

Johnston, however, did not wish it to be thought that he was directly responsible for the Print-Script characters, since he was not consulted in the experiments. He referred to these letters as "rather formless skeletons of Roman lower case." What he did advocate, however, was the use of the broad nib as soon as children were able to use it. (Robin Tanner was later to encourage the use of the broad nib in English schools.)

Robin Tanner—Educationalist and Craftsman

Robin Tanner, as a very successful 32-year-old teacher, was invited to join His Majesty's Inspectorate in 1935. The recently published Hadow Reports had welcomed the new approach to art and craft education, but it was Tanner as an inspector with enthusiasm for these subjects and belief in their educational value who was largely responsible for raising standards in handwriting craft. In *Lettering for Children* he advocated adapting infants' school script to form a simple running hand (Figure 4). He believed that "the stiff pen with the broad end is the only possible tool with which to make true lettering,"

*Extract from Johnston's address as reproduced in *Tributes to Edward Johnston Calligrapher,* privately printed by permission of the Society of Scribes and Illuminators at Maidstone College of Art in 1984 and quoted by Alfred Fairbank.

and that "every child has control of two forms of writing: (a) a cursive hand, based on traditional writing, for general use; (b) a parallel formal book hand, in which both capitals and lower-case letters are more finely finished." Examples of Tanner's pupils' writing make clear that these are based on a rounded letter proportion, no doubt reflecting the influence of Johnston's Foundational Hand.

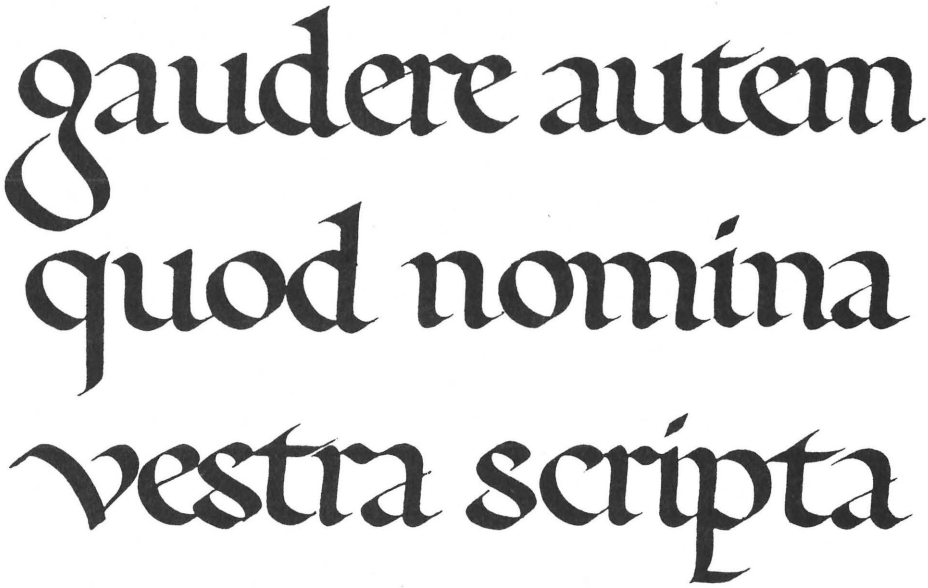


Figure 3. Foundation Hand of Edward Johnston, which he adapted from the tenth-century Winchester hand (Fairbank, 1949).

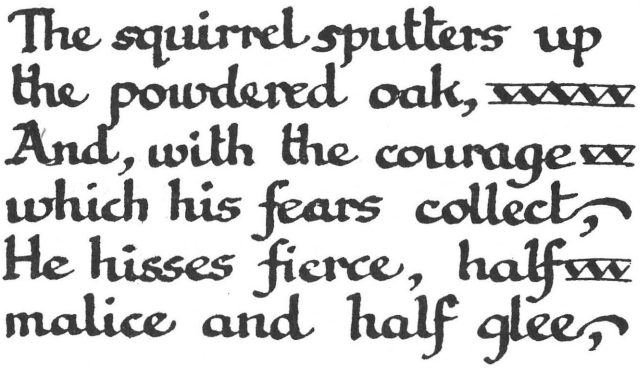


Figure 4. Writing by a 12-year-old student of Robin Tanner (Tanner, 1969).

Marion Richardson Writing

It was left, however, to another educational pioneer to develop the cursive element in handwriting and to introduce a method of teaching it that was deliberately child-centered—a method that was to influence the whole attitude toward the teaching of such skills as handwriting. This breakthrough came to England after the First World War from pioneers like Friedrich Froebel and Maria Montessori, through whose influence the pupil was to be released from imposed instruction and, instead, introduced to child-centered teaching. In 1930 Marion Richardson became a London County Council Inspector, and in 1935 published *Writing and Writing Patterns*, a series of books which soon became popular throughout the country. She was herself taught manuscript writing by a pupil of Edward Johnston after first learning to write a joined Copperplate hand. The greatest influence on her new method came through watching the children's spontaneous movements when drawing and making patterns that she had introduced into the schools. She says that it was the children themselves who gave her the new way of teaching handwriting.

She based her alphabet model upon the natural movements of the child. This involved the zigzag, the looped line, the bouncing arch, the downstroke and left-to-right horizontal line, the continuous figure of eight with its clockwise and anti-clockwise loops, and so on (Figure 5). But she did not include the controlled scribble line that is the hand's most natural flow line and from which the cursive form of Roman lower-case letters have been traditionally written and joined together (Figure 6). Instead, she based some of her letter forms on the Copperplate hand of her childhood. Her alphabet developed as shown in Figure 7. She meant her writing to be a foundation from which a mature style could develop. But looking back, we see adults retaining her somewhat sprawling, round English hand—so different from the forward-sloping handwriting on the Continent or that of the United States, for example.

Many of Marion Richardson's practical points on teaching handwriting could well be applied today, so advanced was she for her time. For example: she said that handwriting should try to keep pace in some measure with the child's flow of thought. She stressed the importance of giving the child a running hand for ordinary, everyday writing. (Did she realise then what need there would be for speedy communication in the future?) She anticipated the creative element, which was to become so strong a force in education, and she encouraged children to invent their own patterns. Children were no longer confined to desks; whole classes could stand at easels to paint patterns on large sheets of paper. Creative writing had not yet emerged—only creative patterns. There were still sentences to be copied from the board, so the children were able to watch the teacher's writing performance, and they carefully imitated it. She recommended that the child write at a sloping board of

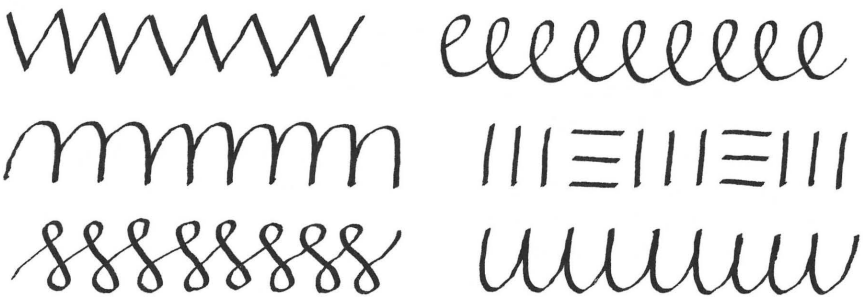
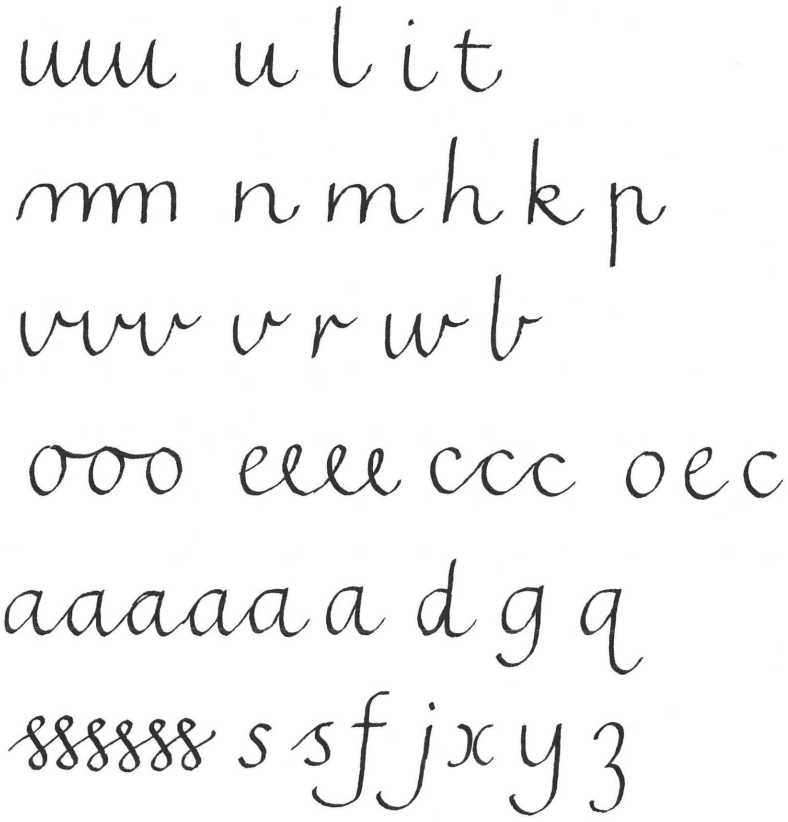


Figure 5. Marion Richardson's patterns based on the natural movements of the child's hand.

Figure 6. The controlled scribble line, the hand's most natural flow line, and the basis for the cursive form of traditional Roman lowercase letters.

Figure 7. Letter forms of Marion Richardson some of which were based upon Copperplate handwriting.

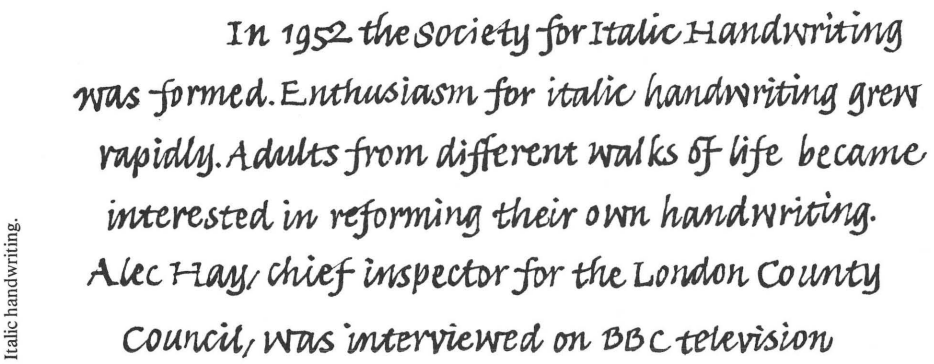


about 30°. Teachers welcomed this approach; it was sufficiently child-centered, and it was authentic. The Marion Richardson pattern books are still being used in schools today, nearly half a century later.

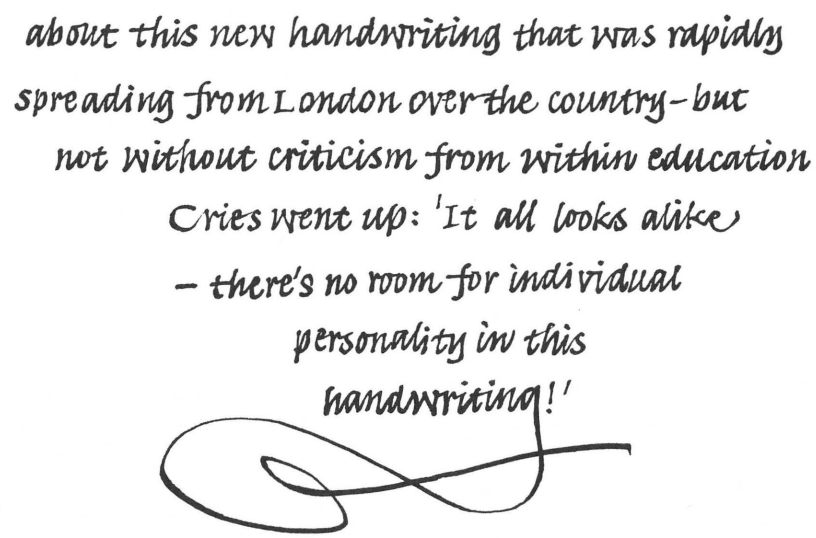
There was only one element wrong with her scheme, but it was a crucial one. It concerned the model itself—a hybrid. Some of the letter forms were poor adaptations of the Roman alphabet. These were linked by a wide curve to which these letters were rhythmically related. The wide curve, however, is something the scribe avoids in a cursive hand. He knows to compress his letters and to steepen his ligatures at speed so that the tops of letter shapes—from which legibility comes—are preserved. Only in this way can the anti-clockwise pull of the hand and the clockwise up-and-over push (which makes arch-shaped letters) be described without the thumb-pulled line dominating. Then the manipulation is likely to be taken over by the thumb instead of the steering first finger. But Marion Richardson was a painter and designer rather than a scribe. If she had watched the coordinated movements of the scribe more closely, as well as the natural movements of the child, she would have known how to adapt her pattern scheme to fit the needs of handwriting, and she might have chosen the Alfred Fairbank model instead.

Alfred Fairbank—The Italic Hand

Alfred Fairbank and Marion Richardson's paths did cross, but they did not overlap sufficiently for them to cooperate on an alphabet model. Fairbank produced his first handwriting copybooks in 1926. He sold these to friends in the Society of Scribes and Illuminators for six pence each. Later he became secretary of the Society and read his paper, The Teaching of Handwriting, at a meeting of educationalists at the Royal Society of Arts. In 1932 his *Handwriting Manual* and *Woodside Writing Cards* were published. Then followed the *Dryad Writing Cards* as a model for a group of schools in Barking, Essex, where the director of education himself, Joseph Compton, sat in the classes to give lessons in Italic.



Italic handwriting.



In response, Will Carter, the printer and type designer, and Wilfred Blunt, teacher and author, gathered samples of italic handwriting from scribes and friends and produced *Examples of Everyday Cursive*. This together with Blunt's *Sweet Roman Hand*, did a great deal to show the wide variety of hand that might develop, once away from Copperplate. One of the most beautiful of these examples is by Irene Wellington, whose copybooks were brought out in 1957 and quickly sold out.

Ministry of Education Handbook

Handwriting appeared to be in a healthy state in the schools according to the Ministry's 1959 *Handbook on Primary Education*, chapter XIV, written by Robin Tanner. The chapter decries Print-Script, since it required a child to learn to write all over again after the infant stage. Tanner points out (p. 252) that: "any fears the teacher may have that the children's ability to read the printed word might be hindered, because they do not 'print' but 'write,' are groundless. It would certainly seem that children's power to recognize, within the range of accepted variations, the essential shapes of the Roman alphabet is far greater than was once recognised."

Many of the points presented in the *Handbook* remain good advice today: the need for good examples of handwriting to show children, the need for handwriting to be fluent to keep pace with the child's flow of thought, the

need for a light grip on the tool and the angle which it should be held. There is also technical advice for teachers about helping left-handers. An oversight is evident where the teacher is decribed as writing simple sentences beneath the child's drawing that the child may copy. The report does not explain what went on previously to enable the child to copy the correct direction of each letter form. Was it taken for granted in those days that Marion Richardson patterns would painlessly produce the letters of the alphabet? This omission was to become more serious in the pressurized days to come.

Beacon Writing

Charlotte Stone, art lecturer at Froebel Educational Institute, worked with Fairbank and Winifred Hooper, a primary head, to produce the *Beacon Writing Scheme* (which accompanied Beacon Readers). This course began with an oval skeleton model without ligatures (Figure 8) that teachers could use when they wrote the first sentences under the child's own drawing. It was a great improvement on the ball and stick letters, but there was still the difficulty of changing the drawn skeleton letters into the cursive written ones with their ligatures added. Could they be added without changing the rhythmic movement in the letter? And where did the letter end and the ligature begin? Clearly, Beacon writing necessitated a slowing up and relearning process at the very time when the child needed to be gaining fluency. Although the Beacon skeleton model had a forward slope and might be considered cursive, it failed to become a standard infant model—partly because Marion Richardson writing had preceded it and partly because the scheme went unnoticed in the rush of events in the late fifties and early sixties.

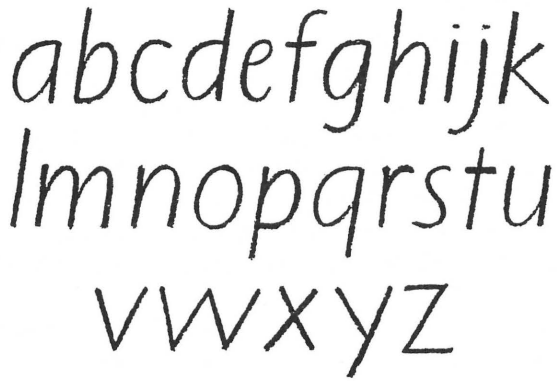


Figure 8. Beacon alphabet (Fairbank, 1949).

Nelson Handwriting

In the early 1960s Thomas Nelson and Sons brought out their schemes for teaching handwriting in primary and infant schools. The Nelson handwriting model for infants based on the oval proportion, was an improvement on the ball and stick Print-Script, but its static, drawn letters even when joined leave a model that lacks easy flow (Figure 9). The ovals seem unrelated to the pointed zigzags that form the basic movement. Fairbank's Beacon model, also based on oval proportions, is superior to the Nelson model in that it retains the cursive element of letter forms based on hand movements—though many thought the two styles identical. The Nelson method, fully researched, was produced not by teachers or scribes but by an educationalist, a scientist, and a consultant. Their aim was to help teachers to become knowledgeable about the mechanics and psychological and pedagogical principles of handwriting. But when all was said and done (and not enough was done because of the overcrowded curriculum), handwriting is described in the Nelson series as a "tool subject [whose] prime function [is] to meet the needs of other subjects."

Shifts in Teaching Reading and Writing

In the 1960s everything seemed to be happening at once in the educational world. There were more children to teach, more teachers to train, more schools and colleges to be built and at the same time more and more knowledge was pouring into the schools making every subject expand beyond containable proportions. The specialists could not even keep pace with the changing horizons of their own specialisms, let alone primary teachers con-

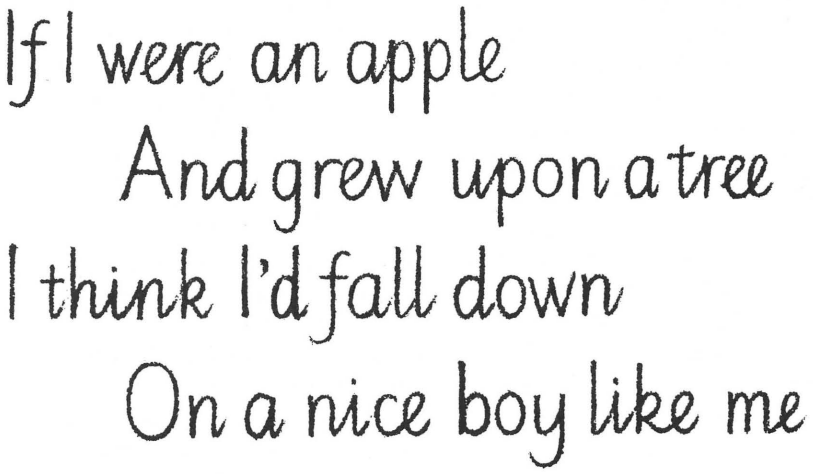


Figure 9. Nelson method (Inglis & Connell, 1962).

cerned with every subject. It was a time of tremendous growth, development and change in the curricular but also in methods of teaching and learning. Psychology was changing the whole attitude of how the child learns. The emphasis was on children learning rather than teachers teaching, and this tended to produce a situation where children found out more for themselves. In many cases they more or less taught themselves to write.

With all these changes it was no wonder that the three Rs came under fire. Reading schemes were reviewed and revised. The Look and Say method emphasised visualising the general shape of the whole word and even of the sentence as the most effective way of learning to read. Charlotte Stone's 1962 article in the *Journal of the Society for Italic Handwriting*, "Teaching Infants to Write," made a clear case for delaying the teaching of writing until the teaching of reading was well under way—that is, until the child has broken down sentences into words, and words into letters, and is then equipped for word-building. We now know that the child is ready to write by imitation and repetition *before* the word-building stage in reading and that the two skills are not necessarily closely correlated. The delay in teaching writing was disastrous: it meant children wrote letters, often in their own unorthodox ways, before they were taught the right way—a practice difficult to alter at a later stage.

We read in the *Nelson Infant Teachers' Manual* (1964): "It is now commonly accepted that instruction in writing should begin with the writing of whole words, phrases, or sentences rather than letters or elements of letters." But how can sentences be written until the child has learnt how to make letter shapes? (It seems like starting back to front!)

Handwriting was thought of at the early infant stage as the clue which relates talking with reading. The young child watched his teacher "write his talk." She does this in his drawing book under his picture, which he describes to her. Then, while she attends to the next child, he takes the book away, sits down and tries to imitate the peculiar thing he saw his teacher doing—those queer marks he saw her making. But he cannot remember how the symbols were made, for she went too quickly and made too many at once. So first he uses his eyes to register a mark, then he uses his pencil to try to represent it, by pulling the pencil round and about, sometimes making lines grow up from the bottom. He plays a kind of matching game as he copies, but something else happens. As the letter shapes recur, he finds himself repeating certain gymnastics with his pencil, until the eye dictates directly through the mind to the hand how to respond when he sees a certain letter to copy. Thus, writing habits are being acquired by eye, mind, and hand, before the child has been directly taught how to make letters. This is the wrong way round, for it is the movements that make the letter-shapes. When the teacher comes round later to inspect the child's work, the marks representing the let-

ters are hardly legible, but she points to her copy and says "Can you read what it says?" The child either remembers what he said or he is actually reading, or he remains dumb, or he makes up something to please the teacher. She continues to play the role of interpreter, translating spoken works into written symbols until the day when he realises that there is a visual form of communication to match his verbal one. In this way, handwriting is being used to help the child to write his talk. This new "subject" was developing at the same time and was called Creative Writing.

Adults were now accepting "child art" as a visual expression in its own right, with symbols appropriate to different stages of development awareness. So why not start "child writing" as a valid form of expression at a much earlier age? The child begins to be able to convert his own thinking into symbols, writing down his own words instead of copying those made by his teacher. But here there is trouble: not only is the child having to clarify and collect his thoughts into a limited vocabulary, but he is also having to grapple with a newly learnt code of communication—the making of letters that combine to spell words. All but impossible demands were being placed on both teachers and children.

The marvelous thing was, however, that children were making up their own stories and producing pages of "writing" at top infant stage (seven years). As soon as they wanted to write, they made letters higgledy-piggledy all along, since they had not yet learnt alignment (Figure 10). Surprisingly teachers became used to deciphering their efforts, for legibility is concerned with ex-

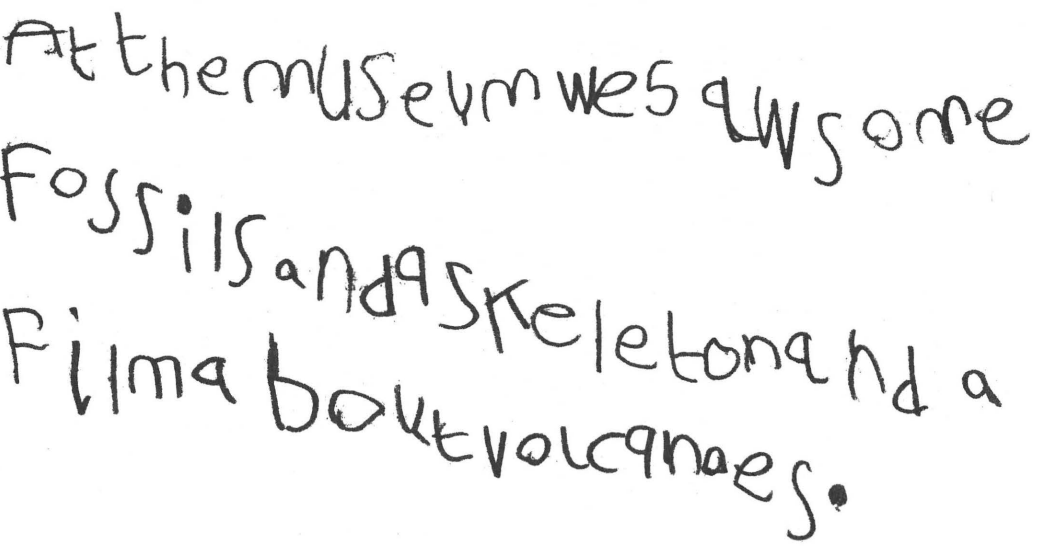


Figure 10. Creative writing (6 year old).

pectancy and familiarity. With so many language needs to be met, there was little time here for correcting letter formation or spacing. And even the least successful examples might be displayed as a means of encouraging the individual child.

The Plowden Report

In 1963 the Plowden Committee was formed to look into the changing patterns of primary education. The Society for Italic Handwriting seized this chance and, with Lady Plowden's agreement, a memorandum on the teaching of handwriting and the advantages of the Italic style was prepared. It stated that Italic does not deteriorate with speed as do other styles, provided it has been well taught and the right movements have become habitual. It suggested that teachers' training colleges should include lessons on handwriting, given by properly trained teachers. It recommended research into the teaching of handwriting in schools.

The section on children's writing finds little space for handwriting but a great deal of space for writing content. It includes the statement: "Schools which make a feature of good handwriting, often in the Italic mode and sometimes in other styles, lose nothing in the freedom and imaginative quality of children's writing and can gain in other ways." This suggests, at least, that the good advice given in the 1959 Ministry of Education Report was being carried out in some schools. The Plowden Report infers that children learn the difficult process of writing by dictating to teachers, gradually copying their writing, and then expanding a vocabulary and word-building system so as to be able to write for themselves. The method describing how children would initially be taught to make their letters is omitted. Handwriting as a subject does not appear in the index.

The Forgotten Craft in the 1960s and 1970s

The ergonomics of writing were forgotten in the effort to change the image of the school as a formal institution into an informal community centre. The old sloping desks had been replaced by flat formica-topped tables round which children sat in groups to work, often with too little individual space (Figure 11). They needed sloping support for their arms, suitable surfaces on which to write, and the best tools for developing manipulation—needs that were largely ignored. In some schools there were no blackboards, and in others only white boards with slippery surfaces, which of course undervalued any demonstration of handwriting. Yet in other craft subjects, efforts were made to provide children with the special equipment and tools they needed. In some primary schools writing corners with pens and ink and original examples of calligraphy helped to give children a standard towards which to work. But these corners tended to be identified only as areas for a display in connection with topic work.

The Bullock Report

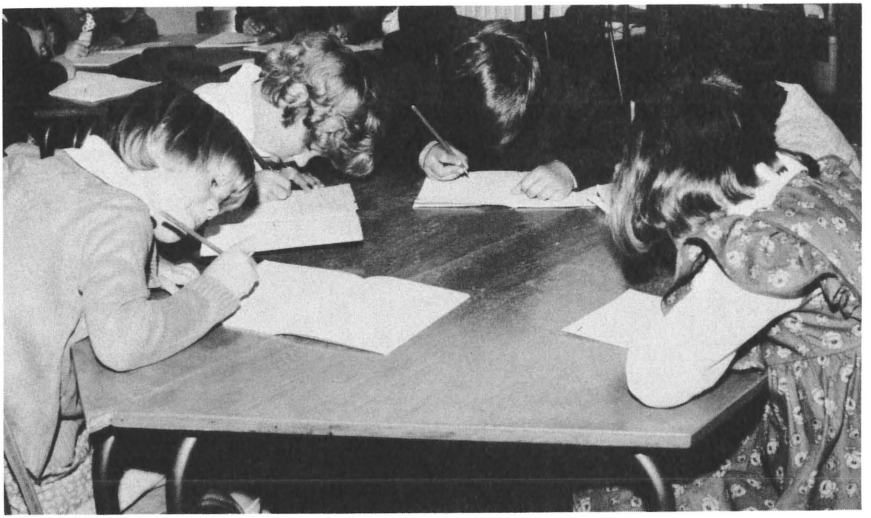
The Society for Italic Handwriting again tried to influence the Bullock Report published by the Department of Education and Science in 1975. However, in the two pages of the report that deal with handwriting (out of six hundred pages) we read of the same recurring problems: first use of Print-Script and later confusion of cursive styles at the junior stage where the child is required to change habits of movement instead of developing fluency in one particular style. Unfortunately, the report leaves it to each school to choose; but in fact schools could not implement one particular style, in view of the variety of the teachers' handwriting.

The report did, however, offer an important clue about relating handwriting practice with certain groups of letters commonly used in the English language: "The child can progress to letter groups with a variety of ligatures again in common use, such as 'tion,' 'ous,' 'ttle,' 'ough.' Practice with these not only helps to develop speed but has the advantage of reinforcing common spelling patterns. In the course of all this, children should also be made aware of the rhythmic stresses of writing patterns and the affinity of letter forms which lead to a harmony of style."

The 1980s

The low standard in handwriting generally and the difficulty that children find in learning to manipulate the tools they use are evidence enough to show the need for strengthening handwriting as a subject in the curriculum. But how can we justify the time? And where do we begin?

Figure 11. The old sloping desks were replaced by flat Formica-topped tables.



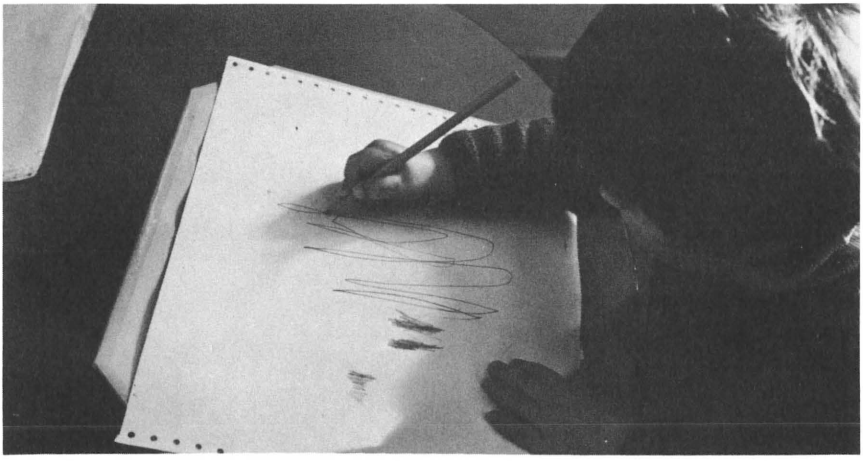
We now know what happens if we plunge children in at the deep end and expect them to write properly with a minimal amount of direct tuition. Most rise to the occasion and find a way to do it, but it is usually an awkward way, and this alone prevents their writing legibly at speed later on. Handwriting has become an unnecessarily difficult skill because of the lack of informed teaching at the appropriate time. It does not just come right as the child develops, because certain neuromechanisms are set up that need changing and are difficult to change without willing cooperation, time, and practice. So often the conscientious teacher has to concentrate on remedial help to alter bad habits instead of developing good ones. It is this that makes the subject of handwriting so unrewarding for teachers.

The final section of this article suggests a new approach to the teaching of handwriting, founded on more than five years' study of children's handwriting movements based on their manipulative development in relation to equipment and tools. This research has also been deliberately related to language demands, particularly in the early, formative stages of education.

Techniques of Writing: The Solution

In the last analysis the difficulty of choosing which style to follow is no longer the crucial problem. It is, rather, a matter of teachers realising the fundamental rhythms of hand movements that produce handwriting. The hand moves rapidly from left to right in a slightly forward down-up movement. With rhythm, the movement develops curves at top or bottom (Figure 12) from which most letters can be constructed on a kind of grid, which helps the onward flow of writing. This is the easiest way as well as the traditional

Figure 12. A nursery child making the down-up movement freely, with the whole arm from the shoulder. Notice the elongated curves.



way of adapting Roman letters to fit natural hand movements (Figure 13). With skilful manipulation, the right-hander's first finger eventually steers the down-up movement, helped by the upward swivel of the wrist, with the forearm relaxed and supportive behind it (Figure 14). The left-hander does not have the helping wrist movement, and must rely on finger manipulation; but

Figure 13. Roman letters adapted to fit natural hand movements.

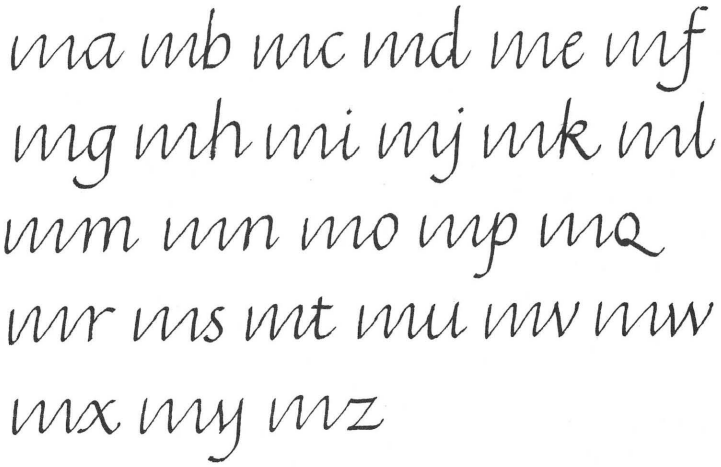
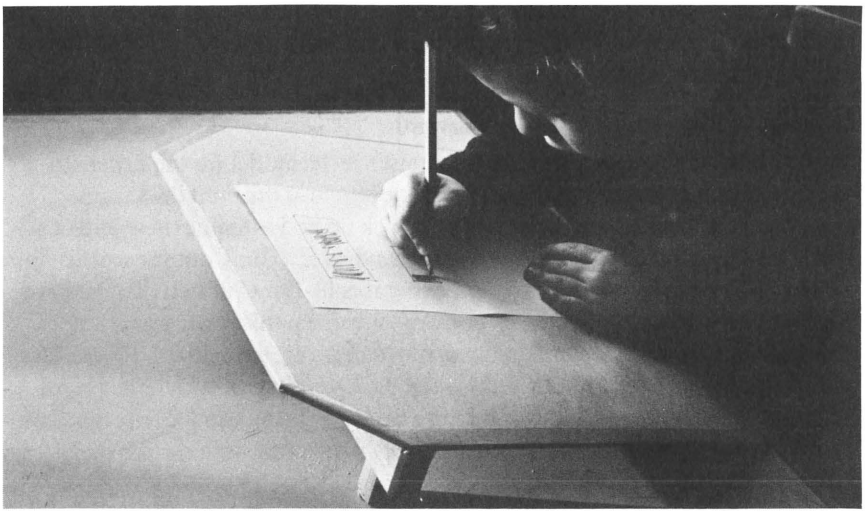


Figure 14. A reception child trying to control the down-up movement within a space. Notice the steering finger in front of the thumb, and the sloping board supporting hand and arm at an angle of about 45° to the horizontal.



the end of the pen, pointing towards the elbow, acts as a rudder that coordinates hand and arm (Figure 15). In both cases the writing tool can function like an extended finger in complete coordination with hand and arm.

Many people, however, write on a looped grid, producing a wide, pulled curve at the base of the letters (Figure 16). This could be associated with the Marion Richardson type of writing. It is often made by a dominant pulling in and releasing of the thumb, with the first finger bent back. The thumb moves independently from the fingers, hand, wrist, and arm, so it can control movement without support of other members. This means that it can write when the hand is in tension, or when the arm and hand lie on a flat surface, or where there is restricted space. But this way of writing deteriorates with speed: it becomes impossible to describe the tops of letters adequately because of this wide pull around at the base. Since legibility depends on identifying the tops of letters, this is a serious loss—the n must become a u, for example. When the pulled movement dominates, the writer cannot change direction without breaking the flow, and this slows up the general movement from left to right. The writing is therefore less legible, more jerky, and, encouraged by modern tools, the loop tends to run through the bottom of letters that begin from the right top, thus confusing identity even more (Figure 17). It can be seen that a model based on a compressed oval proportion adapts to hand movements better than one based on rounded proportions.

We should have moved beyond selecting a style to teach children in school. What we have to do is to teach them to write legibly and fast in order to communicate in the best possible way. For this to work, there must be one way of writing that is introduced from the beginning—a model that stands up to speed and will develop into a mature personal style. We have this model: it is the compressed Roman alphabet made with the broad pen, joined through the natural down-up movement of hand and arm with the steering first finger in command.

Teaching Handwriting: The Way Forward

From the teaching angle, little children must see the model we want them to write. They must feel round these pen-made letters in the right directions, trace them and draw them in the salt tray, pick up and examine these letters made on a large scale, learn to match them and later to look out for words written with these letters as appropriate (Figures 18-19). Children then become familiar with the written model by copying only from this version and not from printed letter forms, until habitual movements are established (Figure 20). At first they will have a generalised idea of the letter shapes, which they learn to make through movement; but with the well-shaped pen-made letters before them, they will gradually learn their specific shapes. Research reveals that children between three and six years are more aware of letter shapes than at

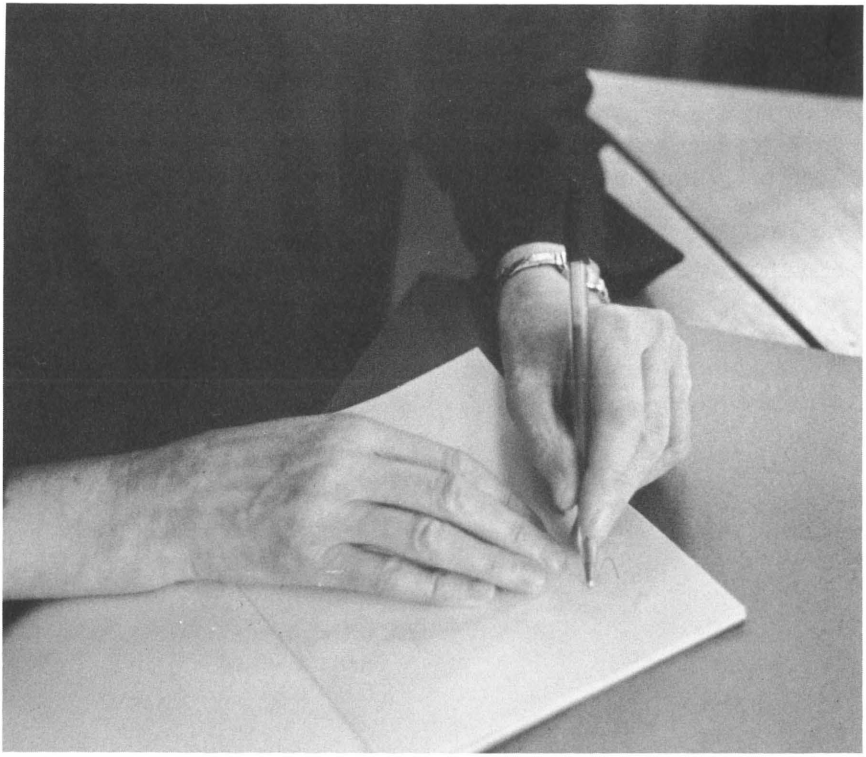


Figure 15. The left-hander writing.

Figure 16. A looped "grid" makes a wide, pulled curve at the base of letters.

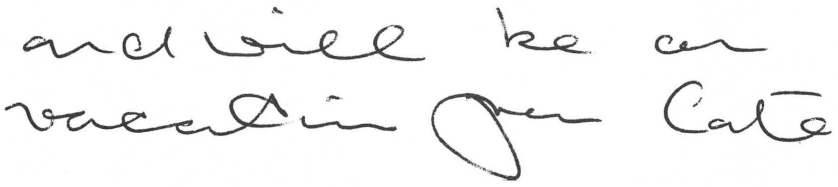
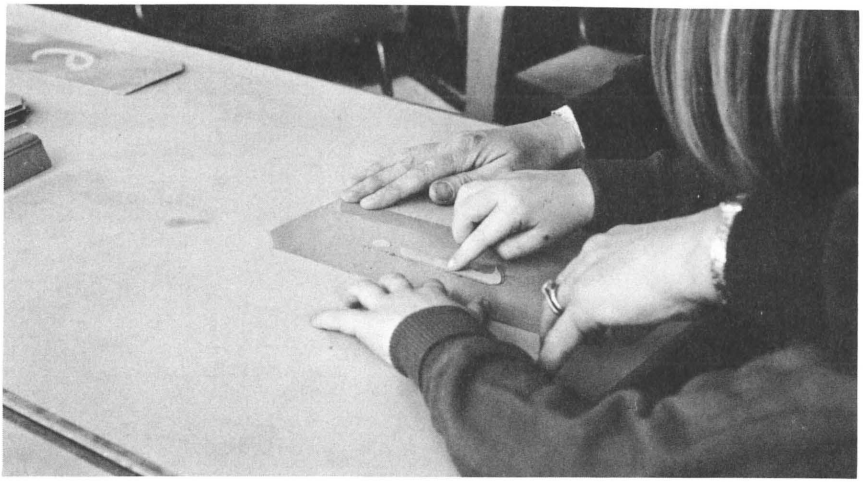


Figure 17. Loops running throughout the bottom of the letters make this writing difficult to read.

a later stage. At this age they are identifying letters for the first time, looking at their shapes for their own sakes; later they will be mainly seeing them associated with meaning. We should not change the model to suit the child; he or she gradually adapts to it.

The teacher should make letter shapes very slowly before the children. She should incorporate handwriting lessons and handwriting practice with

Figure 18. Feeling around pen-made letter forms in the right direction.



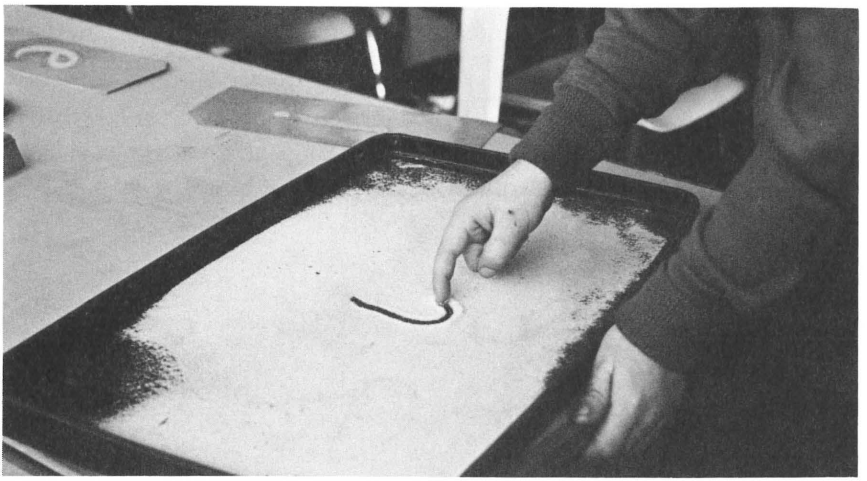
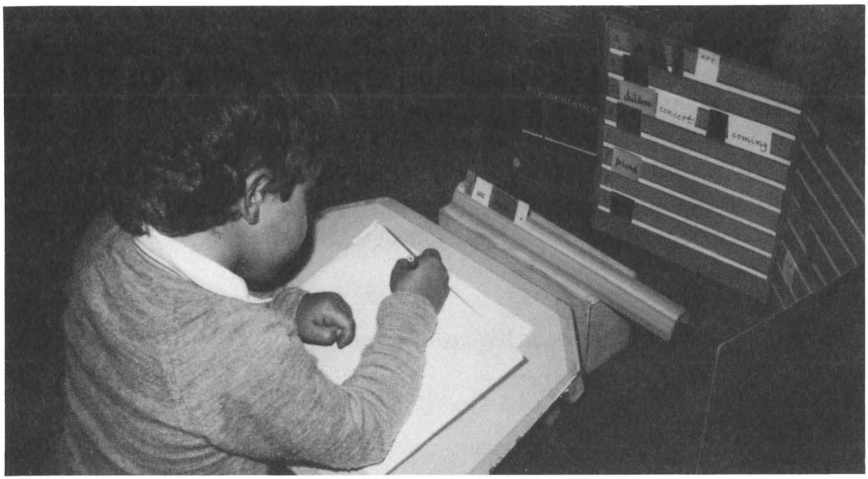


Figure 19. A first-term reception child, with little previous experience at mark making, drawing letter forms in the salt tray.

the learning of new vocabulary and spelling patterns. Developing knowledge of spelling patterns will gradually give children the means of organizing ideas for themselves and thus relieving the demands of the teacher. The child learns to adapt to a joined hand in a meaningful way rather than suddenly doing joined writing at a certain stage of schooling. This has proved successful, for example, at Sandilands Infant School, Manchester (Figure 21),

Figure 20. The reception child building his own sentence from handwritten words in his vocabulary folder, which he will then copy into his writing book.



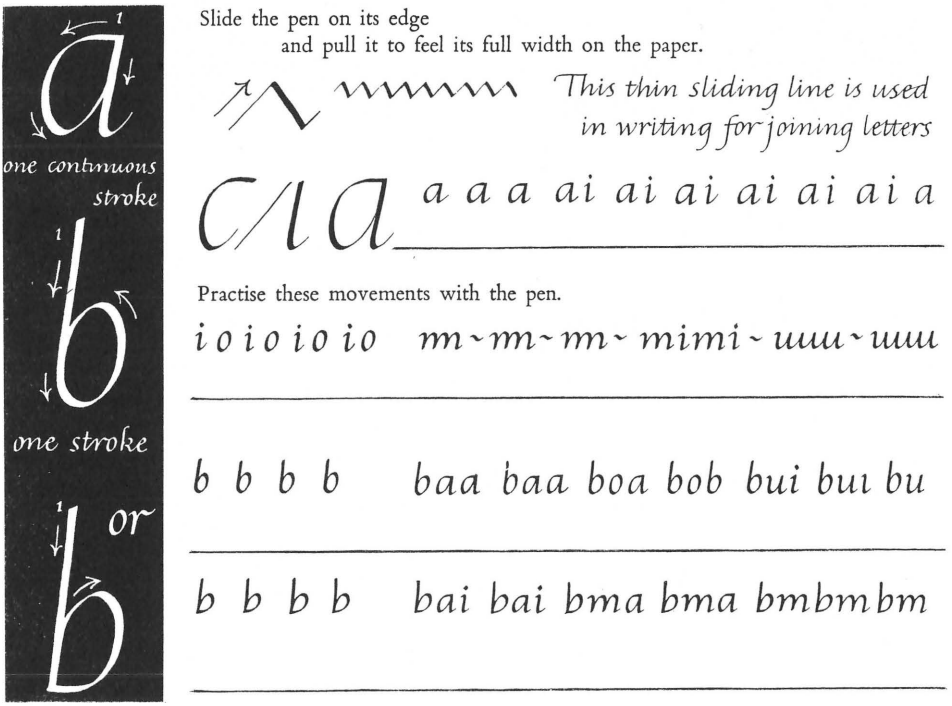
the houses had flat roofs and steps up to the roofs mary was on a journey she was on a donkey mary was going to have a bady They came to an inn but it was

Figure 21. A seven-year-old's "free" writing from Sandilands Infant School, Manchester. There still seems to be a confusion between the letters *b* and *d*.

where Mrs. M. McCulloch and her staff have been gradually working out the scheme, with the Irene Wellington copybooks as a model (Figure 22). It has also proved successful at St. John's Wood County Primary School, Longridge, Knutsford, Cheshire, where Mr. P. Ansell and his staff have been putting the scheme into practice in a similar way. Thus, we have practical proof that handwriting lessons can play a vital part in the language development programme (as the Bullock Report suggests).

At a later period this same handwriting model could become a satisfying craft when the child is introduced to the pen—particularly, at first, to the chisel-edged pen which must be held at a certain angle. This model will reinforce the proper manipulation, once the child's hand has developed. It will allow him to hold the pen up on the knuckle of the first finger instead of down along the thumb. The pen produces thick and thin lines, adding in terest to letter forms and stimulating a new approach to handwriting itself. The same model also lends itself to speedy note-taking or to the carefully written job application letter. But first the writer must learn control through pen-made letter forms. No other instrument teaches the hand to discipline itself like the pen.

Figure 22. Sample from the *Irene Wellington Copy Book*.



The use of one model throughout the learning stages need not preclude the pupil's developing their own hand later. Indeed, with so many machines about we tend to respect individual characteristics in the adult's hand more so than neatly made copies of a particular style. It is, in fact, at the late primary and early secondary stages that pupils like to imitate aspects of adult hands in the search for their own individual style, and this is a natural development. A variety of well-formed handwriting samples could be displayed with advantage for these middle-year pupils. This is quite different from teaching another system of habit movements through planting one style upon another and trying to alter a pupil's way of writing at a stage when a great deal of handwriting is being demanded.

These proposals suggest establishing a way of moving to write initially and then developing this without interruption, so that the pupils are better able to introduce their own individual preferences without disturbing basic movement rhythms. This new scheme provides a way forward. The results may take time, but they will ensure that the teaching of handwriting is kept in the curriculum, where it will be more rewarding to teach and more satisfying to perform.

References

Barnard, T. (n.d.) *Instruction Copy Books.* Stevenage, U.K.: Platignum House.

Barry, P. (1954) *Handwriting Sheets.* London: James Barry.

Biggs, J.R. (1961) *The Craft of the Pen.* London: Blandford Press.

Blackie, J. (1974) *Changing the Primary School.* London: Macmillan.

Blunt, W. (1952) *Sweet Roman Hand.* London: James Barry.

The Bullock Report (1975) *A Language for Life.* London: H. M. Stationery Office.

Burgoyne, P. A. (1955) *Cursive Handwriting.* Leicester: Dryad Press.

Cartner, W. C. (1969) *The Young Calligrapher.* London: Kaye & Ward.

Child, H. (1976) *Calligraphy Today* (2d rev. ed.). London: Studio Vista.

Child, H., ed. (1971) *Edward Johnston: Formal Penmanship and Other Papers.* London: Lund Humphries.

Dumpleton, J. (1952) "Why Italic?" *Athene,* VI: 1.

Fagg, R. (1962) *Everyday Writing.* London: Univ. of London Press.

Fairbank, Alfred (1957) *Beacon Writing.* London: Ginn & Co.

———(1949, 1968) *A Book of Scripts.* London: Penguin; Faber & Faber (1977).

———(1937) *Dryad Writing Cards.* Leicester: Dryad Press.

———(1954) *A Handwriting Manual.* London: Faber & Faber.

———(1970) *The Story of Handwriting.* London: Faber & Faber.

Fletcher, D., R. Bakewell, & N. K. Robertson (1960) *Quick and Legible Handwriting.* Edinburgh: Oliver & Boyd.

Gordan, V.E.C., and R. Mock (1960) *Twentieth-Century Handwriting.* London: Metheun.

Gourdie, T. (1955) *Italic Handwriting.* London: Studio.
———(1975) *The Simple Modern Hand.* London: Collins.
Gray, N. (1971) *Lettering as Drawing.* London: Oxford Univ. Press.
The Hadow Report (1933) *Infant and Nursery Schools.* London: H. M. Stationery Office.
Hewitt, K. G. (1930) *Lettering.* London: Seeley Service.
Inglis, A., and E. Connell (1962, 1964) *The Teaching of Handwriting. Infant Teacher's Manual & Primary Teacher's Manual.* London: Nelson & Sons. (Revised edition 1984, Inglis & P. Smith)
Jackson, D. (1981) *The Story of Writing.* London: Studio Vista.
Jarman, C. (1979) *The Development of Handwriting Skills.* London: Blackwell.
Johnston, E. (1948) *Writing, Illuminating, and Lettering.* London: Pitman.
Mahoney, D. (1981) *The Craft of Calligraphy.* London: Pelham.
Montessori, M. (1920) *The Montessori Method.* London: Heinemann Educational Books.
Osley, A. S. (1965) *Calligraphy and Palaeography.* London: Faber & Faber.
———(1980) *Scribes and Their Sources.* Boston, Massachusetts: David R. Godine.
Pearce, C. (1982) *The Little Manual of Calligraphy.* London: Collins. New York: Taplinger (1981).
Phillips, R. C. (1976) *The Skills of Handwriting.* London: R. C. Phillips Ltd.
Piggott, R. (1958) *Handwriting: A National Survey.* London: Allen & Unwin.
The Plowden Report (1967) *Children and Their Primary Schools.* London: H. M. Stationery Office.
Primary Education. Ministry of Education Handbook (1959) London: H. M. Stationery Office.
Richardson, M. (1948) *Art and the Child.* London: Univ. of London Press.
———(1947) Special issue of *Athene,* IV: 1.
———(1935) *Writing and Writing Patterns.* London: Hodder & Stoughton.
Sassoon, R. (1982) *Calligraphy.* London: Thames & Hudson.
———(1983) *A Practical Guide to Children's Handwriting.* London: Thames & Hudson.
Smith, P. (1977) *Developing Handwriting.* London: Macmillan Educational Books.
Tanner, R. (1969) *Lettering for Children.* Leicester: Dryad Press.
Thompson, G. (1954) *Better Handwriting.* London: Puffin Picture Books.
———(1978) *Scribe.* Edinburgh: Canongate. New York: Pentalic Taplinger.
Van de Eyken, W., and B. Turner (1979) *Adventures in Education.* London: Allen Lane.
Wellington, I. (1957) *Irene Wellington Copy Book.* London: Heinemann Educational Books. New York: Pentalic Corp. (1977)
Worthy, W. (1954) *Renaissance Italic Handwriting Books.* London: Chatto & Windus.
Yates-Smith Handwriting Scheme (n.d.) Unpublished, but obtainable through The Society of Italic Handwriting (4 Knifton Court, London EN6 3DA, England).

The examples of Copperplate, Print-Script, and Italic handwriting are from the hand of Gunnlaugur S E Briem.

Yao-Chung Tsao & Tsai-Guey Wang

Information Distribution in Chinese Characters

Chinese passages were mutilated either in the right, left, upper, or lower halves and presented to native speakers to read. In Experiment 1 passages were read from left to right; while in Experiment 2 from top to bottom. Time taken to read them and errors made were analyzed. Both measures showed that in both experiments the upper halves of characters are easier to read than the lower half, and right halves easier than left. Regression analysis method was used to examine effects of seven independent variables on reading accuracy of the characters. Among them, phonetic cue, symmetry, and number of strokes in the presented half were found to be significant factors.

In this study we are interested in the relative speed and accuracy when reading different halves of Chinese logographs. As early as 1879 Javal, based on the eye's fixation points during reading, concluded that it is advantageous to read the upper half of a line of alphabetic printing (Huey, 1980/1968, pp. 99). However, Huey did not think the Javal's experiments were definitive. With an experimentally sound approach, Kolers (1969) found that the right halves of text written in Roman letters were easier to read. He concluded that the right halves must also carry more information. However, the results with texts written in Hebrew letters are different. Shimron and Navon (1980) presented mutilated English or Hebrew paragraphs to native English readers or native Hebrew readers, respectively. They found that for English the upper half was easier to read than the lower; the reverse was true for Hebrew. They concluded that the lower half of Hebrew letters is more informative. Using seven-character sentences from Chinese poetry as test materials, Chou (1930) conducted a similar study and found the left half and the upper half are easier to read. However, his reported data do not provide an adequate basis for the statistical evaluation of differences between conditions.

Three factors intrigued us and prompted this study. Chinese logographs occupy roughly an equal square space, with the number of strokes[1] appearing in that space ranging from 1 to 33 (we found the mean to be 10 based on our informal observations of samples of non-simplified characters). This imposes a wide range of stroke densities among different characters. First, we wanted to know how the number of strokes in half of a character affects the inference made about an entire character. Secondly, of the six categories of the Chinese characters, only phonograms contain information about pronunciation (see Wang, 1981, for more information). Typically, a phonogram consists

Visible Language, XVII 4 (Autumn 1983), pp. 357-364.
Yao-chung Tsao's address: Dept. of Psychology, Rensselaer Polytechnic Institute, Troy, NY 12181.

of two or more components. From the components contained in a phonogram, a reader gets *a hint* as to which semantic category a phonogram may be related to as well as *a hint* as to how it sounds. For example, the left portion of the phonogram for the word *river*  (pronounced /her/) signifies *water*, while the right portion provides a phonetic hint, namely, a word which rhymes with /ker/. Although phonograms account for approximately 80% of the Chinese characters, we have observed (based on a random sample of 240 characters from the text material used in the present study) that only 20% of the characters in these passages of modern Chinese carry useful phonological information for reading in Mandarin. These components appear predominantly on the right side of the characters. The fact that the phonetic component appears predominantly on the right side of some, but not all characters, makes it tempting to believe that the right half of a Chinese character should be easier to read than the left half. Thirdly, modern Chinese texts are printed in two typical orientations: one is in vertical columns, the other in horizontal lines. In the former, readers read downward then leftward; in the latter, from left to right and downward line by line in a manner similar to that of English. A contemporary Chinese reader, especially with a college education, usually has experience in reading text in both orientations. We thought it would be interesting to see whether the reading direction would influence the pattern of experimental results. For this reason two experiments were conducted. In Experiment 1 the materials were printed horizontally; while in Experiment 2 they were printed vertically. To study these, we used connected Chinese discourse rather than poetry which was used by Chou. We adopted the rationale and procedures used by Kolers (1969) and Shimron & Navon (1980).

Experiment 1

Method

Subjects. Twenty Chinese readers, with an undergraduate degree completed in Taiwan, served as subjects. Their ages ranged from 25 to 30 years. They had normal or corrected-to-normal vision. Five were women.

Materials. Five passages of 300 characters each were selected from a book on music composition (Lee, 1978) printed in left to right orientation. The content of these passages was believed to be unfamiliar to the subjects. Under Condition W, the characters were presented in their entirety; under Condition R, only the right halves of the lines of characters were presented; while under Condition L only the left halves could be seen. Similarly under Condition U, only the upper halves were visible, and under Condition D,

only the lower halves were visible. See Appendix A. Five other passages of 100 characters each were chosen from the same book. A different one of each of these served as practice material for each of the five experimental conditions.

Design. Each subject was tested individually under all five conditions. All subjects took the W Condition test first, then the other four. The sequence of the latter four tests was counterbalanced among subjects.

Procedures. Each subject was first informed of the nature of the task, namely to read the test material aloud in Chinese as rapidly and as accurately as possible. Before each test, the practice material of 100 characters was first presented in order to familiarize the subjects with the task. The subjects were encouraged to guess at any mutilated characters whose reading they were not sure of, or to skip them, if no guess was possible. A tape recorder was used to make a permanent record of the responses for later analyses. When the subject's testing was ended, the purpose of the study was explained in greater detail.

Results

The total reading time in seconds and number of errors per section of material were measured and counted. Total reading time was taken to be the interval between the first and last utterances. The number of characters skipped *and* misread combined constituted the number of errors. Table I shows a parallel effect for reading time and number of errors. Condition W is the easiest condition, followed by Conditions U, R, L, and D, in that order. Thus, the right halves of Chinese characters are read more rapidly and with fewer errors than the left. Similarly the upper halves are more easily and correctly read than the lower.

Table I. Means and Standard Deviations of Reading Times and Error Rates in Experiment 1*

	Conditions				
	W	U	R	L	D
Reading Times (sec)					
Mean	74.4	119.8	145.2	214.5	221.8
SD	9.3	30.5	41.3	109.6	105.6
Error Rates					
Mean	.01	.09	.13	.25	.51
SD	--	.03	.07	.07	.11

*300 Characters per passage.

A one-way ANOVA conducted on the reading times shows that the overall effect of variation in conditions was significant, $F(4,76) = 27.92, p < .0001$. Dunnett's Test involving a control mean (Kirk, 1968) was used to compare differences between any two of the five. It was found that all the differences in reading times are significant with the exception of the differences between Conditions U and R, and between Conditions L and D. The one-way ANOVA performed on the reading errors (with Condition W excluded because the error rate for the Condition was less than 1%) shows a similar pattern to that of the reading times, $F(3,57) = 194.54, p < .0001$. Duncan's test (Kirk, 1968) was used to test the *a posteriori* paired comparisons. The results indicate that all are significant at either the $p < .01$ or the $p < .05$ level.

Regression analysis was performed to study the effect of inherent factors of the Chinese logographs on the error rate of reading the mutilated characters. Reading time was not used for analysis because information on how much time a subject spent on an individual character was not available. Seven variables were chosen for this purpose. These are: (1) number of strokes in a visible half of a character; (2) whether the visible half of the character contained the semantic cue; (3) whether the visible half contained the phonetic cue; (4) whether the visible half was symmetrical, or identical to the other half; (5) whether a character was a function word; (6) whether the character was presented in the context of a short phrase, and finally; (7) whether any stroke of a character was severed as a result of the mutilation.

For this analysis 240 characters were randomly selected from the test materials, 60 from each condition. For each of these 240 characters, the number of subjects who identified the character correctly was counted. The proportion of subjects who identified each character was then calculated and used as the dependent variable. The BMDP stepwise regression method was then applied to the data. The following regression model was obtained:

Percent correct response $= 0.656 + 0.187x + 0.110y + 0.019z$ where

x: whether there is a phonetic cue
y: whether the two halves are identical
z: the number of strokes in the half character

Thus only three independent variables of the seven examined contribute significantly to the subject's correct verbal identification of a character. The analysis showed that these three account for only 21% of the total variance.

Experiment 2

The purpose of Experiment 2 was to study the effects of reading direction on reading half-character connected passages; if the information distribution found in Experiment 1 is independent of reading direction the same effects should be found when passages are presented vertically.

Method

Subjects: Twelve subjects were tested, five of them having served in Experiment 1.

Materials: Five passages of 150 characters each, half the length of those in Experiment 1, were chosen from a book on Chinese literature studies (Watson, 1962/1969). These passages were physically mutilated in the same ways as were those of Experiment 1. Each was to be read downward and then column by column leftward. Five other passages, of 75 characters each, were also selected from the same book and served as practice material. The design and procedures were the same as in Experiment 1.

Results

Table II summarizes the average reading times and the average error rates for all conditions. Dunnett's test was again used to compare reading times between any two conditions. Generally speaking, the results were comparable to that of Experiment 1, i.e., upper halves were easier to read than lower halves ($p. < 01$) and right halves easier than left halves ($p. < 06$). Errors were also analyzed with the exclusion of Condition W. A pattern of results, similar to that found with reading times was again obtained, i.e., upper halves were easier to read than lower halves ($p. < 01$) and right halves easier than left halves ($p. < 01$). In other words, our results are qualitatively the same whether the text was printed horizontally or vertically.

General Discussion

This study indicates that the upper halves of Chinese characters are read more correctly and rapidly and hence must carry more information than the lower halves; similarly, the right halves are read better and contain more information than the left halves. These results are independent of reading direction. Although these results may appear to be similar to those of Kolers

Table II. Means and Standard Deviations of Reading Times and Error Rates in Experiment 2*

	Conditions				
	W	U	R	L	D
Reading Times (sec)					
Mean	35.0	73.3	68.9	90.3	115.3
SD	4.1	23.9	25.5	33.6	53.3
Error Rates					
Mean	.01	.07	.06	.17	.29
SD	--	.04	.05	.07	.09

*150 characters per passage.

with English text, we believe that the effects for Chinese and English arise for different reasons. For Chinese, we conclude that the phonetic cue, the symmetry of the two halves, and the number of strokes are the major factors. In the course of regression analysis in Experiment 1 we found that the average numbers of strokes in the halves of characters for Conditions U, R, L, and D are 6.20, 5.05, 5.50, and 4.35, respectively. The upper halves thus contain 42% more strokes than the lower and could therefore explain the better reading of the upper halves. Although there are fewer strokes in the right halves than in the left, the left are less informative because they are predominantly occupied by only a limited number of semantic *significs,* such as: water, tree, woman, etc. However, semantic *signific* were not found to be an important variable in our regression analysis. On the other hand, the right halves of 20% of the characters in our material provide phonetic hints and thus make the text easier to read. Our data agree with Chou's (1930) findings with respect to the upper-lower difference, but not the right-left difference.

The fact that our regression analysis showed a large value for intercept (namely, 0.656) and accounted for only 21% of the total variance suggests that there must be other important variables which are not taken into account by it. We suspect that one of these must be contextual, that is the semantic information from the context preceding the character. It should be noted that this study was done with connected discourse as the text material so that the results would be more ecologically valid. However, such material does not allow for good control of the contextual effect upon individual characters. In favor of the study is the statistical methodology. It identified the various variables related to the speed and accuracy of reading mutilated characters. It can thus serve as an aid to the further understanding of the information distribution of the Chinese writing system. The method may further provide help for the process of simplifying whole Chinese characters. Simplification of Chinese writing, namely to reduce the overall number of strokes per character, has been proposed by some researchers and policymakers in China for some years (see Wang, 1981). It would be ideal to be able to keep the more informative halves intact while simultaneously reducing the number of strokes in the remaining less informative halves with the result of a reduction in writing time.

Appendix A. Sample of Reading Materials

Condition U

Condition R

Condition L

Condition D

The authors appreciate the participation of the students from Taiwan who served as subjects.

1. Printed Chinese characters are composed of strokes. A stroke is conventionally defined as a trace on the paper as produced by pen movement. The departure of the pen from the paper surface completes a stroke. One or more strokes then constitute a radical. There are approximately 200 radicals. Radicals can be characters or components of characters.

References

Chou, S.K. Reading and legibility of Chinese characters: II. Reading half-characters. *Journal of Experimental Psychology,* 1930, *13,* 332-351.

Huey, E. B. The psychology and pedagogy of reading. Cambridge, Mass.: M.I.T. Press, 1968.

Kirk, R. E. *Experimental design: Procedures for the behavioral sciences.* CA: Brooks/Cole, 1968.

Kolers, P. A. Clues to a letter's recognition: Implications for the design of characters. *The Journal of Typographic Research* (now *Visible Language*), 1969, *3,* 145-168.

Lee, C.-B. The analyses of Chinese language from musical perspective. Taipei: Catholic Associations, 1978 (in Chinese).

Shimron, J., & Navon, D. The distribution of visual information in the vertical dimension of Roman and Hebrew letters. *Visible Language,* 1980, *14,* 5-17.

Wang, W. S.-Y. Language structure and optimal orthography. In O.J.L. Tzeng & H. Singer (Eds.) *Perception of print: Reading research in experimental psychology.* Hillsdale, N.J.: Lawrence Erlbaum Associates, 1981.

Watson, B. [*Early Chinese literature*] (C. Lo, Ed. and trans). Taipei: Hwakang Series, 1969. (Originally published, 1962.).

Zev Bar-Lev

Hebrew Hieroglyphics

This article presents a walk-through of sample mini-lessons in an innovative method for teaching foreign language, along with brief remarks on its success in trial runs. The main innovation of the method is its use of reading as starting point. The mini-lessons cover four stages: a pure hieroglyphic stage, a linearized hieroglyphic stage, a key-letter stage, and a phonetic stage. The method is directly applicable to language with different writing systems, such as Hebrew, Arabic, Japanese, or Chinese. But it also has radical implications for the teaching of foreign languages generally, since the sequencing of stages precisely reverses the accepted curricular ordering not only in all of these languages, but also in European languages and in English as a second language.

0. Background

This article presents an example of an innovative method for the teaching of foreign languages, called "ungrammar," which I have been developing over the last several years. Perhaps the most innovative aspect of ungrammar is its use of reading: where reading is widely regarded as a secondary and advanced skill, ungrammar integrates it into the very beginning of the learning process, giving it partial primacy. (A second aspect of ungrammar is the way it by-passes linguistic structure, focusing radically on lexical items (contentives) as the key to learning as well as proficiency.)

The rationale for the method is quite simple. Written language has long been recognized in foreign language teaching theory as separate from spoken language (e.g., Gelce-Murcia & McIntosh, 1979). Its practical importance is becoming recognized: it is no longer regarded as a mere visual representation of speech, but rather as a partly separate structure, drawing on separate skills. It is, for example, more directly related to meaning. Though the call has thus been out for curricular sequencing more flexible than the outdated speaking-before-reading sequence, in practice reading does remain an advanced skill in most curriculum. In particular, psycholinguistic reading skills such as skimming and scanning, or more generally the guessing (inferring) of textual details (see esp. Smith, 1973), have been relegated to advanced levels.

Psycholinguistic approaches to reading anticipate ungrammar since they regard linguistic structure as actually *interfering* with linguistic skills, as opposed to the traditional and common-sense view of structure as being a component of the skill. A similar assumption, in the medium of spoken

Visible Language, XVII 4 (Autumn 1983), pp. 365-379.
Author's address: Dept. of Linguistics, San Diego State University, San Diego, CA 92182.

language, is behind Terrell's "natural approach." The latter, at least, proclaims the harmfulness of emphasis on structural detail especially at early levels of foreign-language curriculum. It does not recognize, however, that principles of psycholinguistic reading can be taught explicitly and effectively at elementary curricular levels, and indeed that such sequencing offers a magnificent opportunity not only to broaden and deepen the learner's input, but also to give a more profound, better-rounded definition to the language skills and language-learning skills assumed. The goal, then, of ungrammar is to take full curricular advantage of the cognitive power of visual perception, as expressed in reading; to make reading a contributor to more powerful foreign-language learning, rather than a further complication.

To actualize this methodological goal my experiments have focused on various linguistic levels (orthographic, lexical, syntactic, pragmatic), using various languages (Spanish, Russian, Chinese, Arabic, Hebrew, and others). They have mostly taken the form of mini-lessons of 1/2 to 2 hours in length; some 300 subjects have done one or another mini-lesson. Hebrew happens to offer the greatest opportunity on more different structural levels, so I was able to construct and test a full curriculum based on the approach; for similar reasons it is an ideal choice for exemplifying ungrammar and its broader implications.

At one point I attempted comparative validation, and the results supported ungrammar in both expected and surprising ways. But I soon concluded that statistical approaches offer less insight than individual reports of subjects, which had already played a key role in eliminating bugs from the method. Some 30 of the subjects experienced either inability to follow the instructions of the mini-lesson, or failed to learn from it; this especially occurred in very early versions. In somewhat later versions all subjects would learn successfully, but some (interestingly enough, more linguistically sophisticated) subjects would feel uncomfortable about their knowledge. (Particularly interesting was one group of 8 in which 2 subjects had studied the language for several years, and rejected the approach; after the 2-hour mini-lesson, the others were outreading them.) For the majority of subjects, however, these major problems have been ironed out, and over 9 out of 10 subjects invariably learns successfully, and feels amazement at how easily they have learned "exotic" and "difficult" languages. After the 1/2 to 2 hours of any mini-lesson, each of these subjects is able to understand structures in a new foreign language that they would not have encountered for a semester or more in traditional approaches.

My briefest mini-lesson is a single Russian sentence (in transcription): *Professor russkoy literaturi daët novuyu gazetu moey sestre Ol'ge,* where *daët* = give , *moey* = my , *novîy* = new , . . . Sometimes when I have just translated *daët* some members of the audience are already guessing that the

sentence means: "The professor of Russian literature gives the new newspaper to my sister Ol'ga." Some do not like how irresistible this mini-lesson is: they want to know why it means this, in terms of structural detail; or they note that I have relied heavily on cognates. But the use of cognates is a useful and accepted trick of Russian teaching; more to the point, even a textbook relying on them (e.g., Levin & Haikalis) would not be able to present all the structural detail contained in this easy sentence (conjugation, accusative and dative case, adjective agreement) in less than a semester. The astounding time contrast precludes dismissing the example as a parlor trick, even though it does not in itself spell out how a whole curriculum would have to be structured.

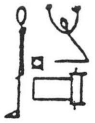
However, I will here present an extended, more elaborate example, showing the interaction of various linguistic levels. To save space, the example is a walk-through, leaving out some of the reinforcement exercises that the full mini-lesson contains. The reader, for full effect of the method, is urged to use flash cards, etc., so as to see how genuinely easy and effective it is. (If you know *any* Hebrew, you should disqualify yourself and let a friend do it—and watch the results.) I purposely postpone any further discussion of the language or the method: the reader's task at this point is simply to work through the mini-lesson; as in any learning, success depends partly on amount of learner effort.

1. Hebrew Hieroglyphics

Can you match the hieroglyphics with their meanings?

1 

3 

5 

7 

2 

4 

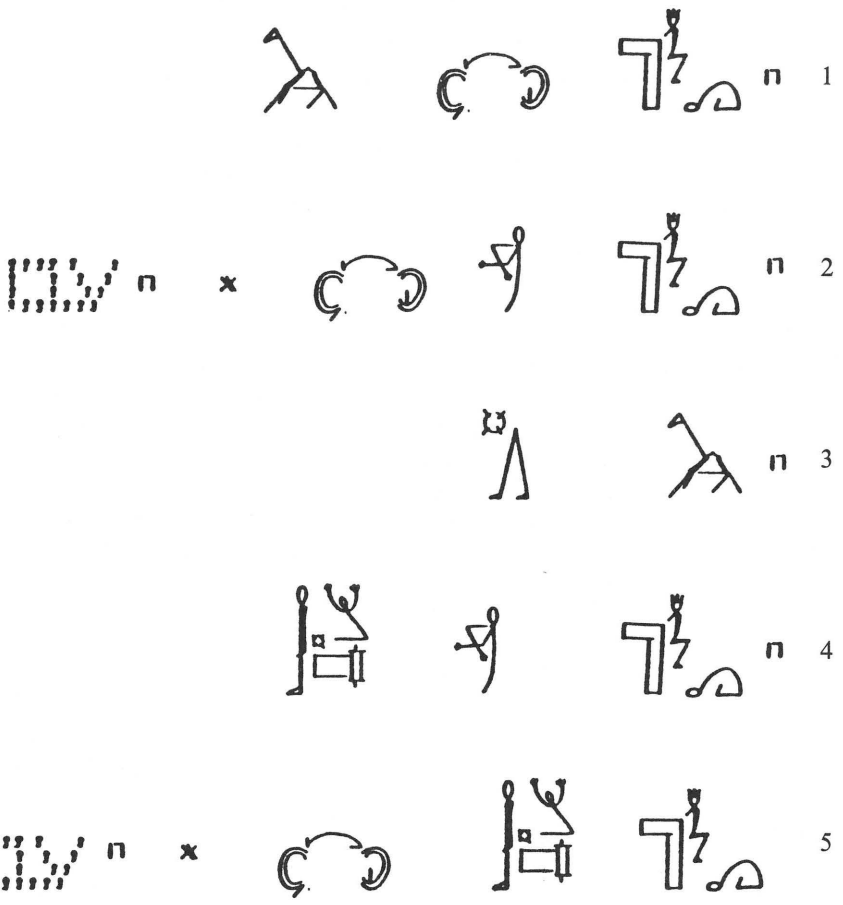
6 

Meanings for matching:

a	righteous (upright & humble, enlightened by books)	b	people	e	camel
		c	hear	f	king
		d	not	g	alive (walking under the sun)

Answer: a-5, b-3, c-7, d-2, e-1, f-6, g-4.

How many of the following sentences can you translate? (Begin at right)



You are allowed to add grammatical endings to make the translation sound natural in English: translations should always express meanings the way English does. In the same way you are allowed to add grammatical words like "is," "a," etc., and even make adjustments in word order. The following fill-in should confirm your answers:

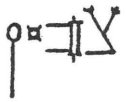
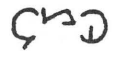
1 The ---- ----s a -----.
2 The ---- does --- --- the ------.
3 The ----- is -----.
4 The ---- is --- ---------.
5 A --------- ---- ----s the -----.

"Is" and "are" are not expressed in Hebrew; did you think to supply it even before you saw the fill-in? Did you think to change the order of the first two words to fill in in sentence 5?

Whether you say "hear" or "heard" is inconsequential; Classical Hebrew (however strange this may appear to the speaker of English) simply does not express time in the verb-form, and both answers are equally correct, if no context is provided. (Classical Hebrew is an aspect language, expressing, in its verb forms, the distribution of action in time.) Similarly for "the" and "a": Hebrew does express "the" with the particle ה , but its usage does not quite correspond between Hebrew and English. So, to the extent that it's important at all, it's best to rely on context. (This is not a problem, since many languages have no articles at all, e.g., Russian and Japanese.) You may have noticed another particle, את ; it must be ignored in translation.

Later Development of the Hieroglyphs

In the later development of the writing system the parts of the hieroglyphs become linearized; later still they become stylized and simplified so that, like modern Chinese characters, they are no longer recognizable as pictures at all. Can you: (a) match middle-period forms in column 1 with the modern forms in column 2, and (b) fill in the translations for the modern forms in column 3? Try not to look back, and write in the translations only in column 3.

1 linearized	2 modern	3 meaning
	גמל	_____
	חי	_____
	עם	_____
	צדיק	_____
	מלך	_____
	לא	_____
	שמע	_____
		

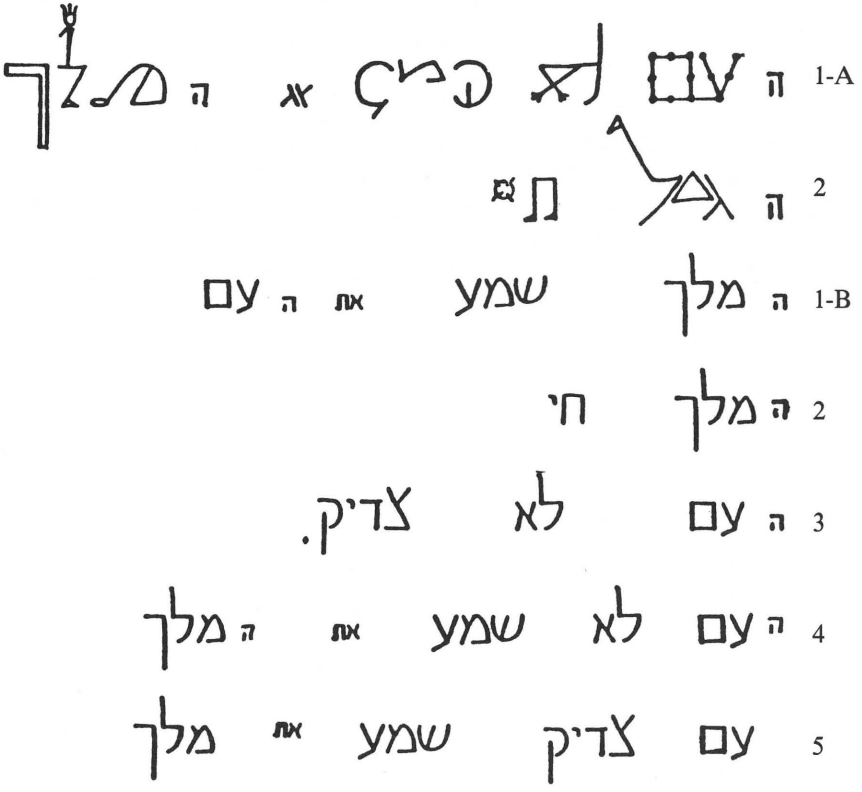
Answer: first letters of answers, in order, are: c-a-p-r-k-n-h.

How many of the following words can you identify in their modern form?

1. לא	4. שמע
2. מלך	5. גמל
3. צדיק	

Answer: 1-not, 2-king, 3-righteous, 4-hear, 5-camel.

How many of the following sentences (middle period in A, modern in B) can you translate? You may have trouble as the particles become part of the linear sequence, especially in sentences 10-20.



6. המלך שמע את הגמל.
7. הגמל חי.
8. המלך לא צדיק.
9. העם לא שמע את המלך.
10. העם צדיק.
11. העם שמע את המלך.
12. המלך הצדיק שמע את העם.
13. צדיק המלך.
14. שמע המלך את העם.
15. הגמל לא שמע את המלך.
16. המלך הצדיק חי.
17. העם שמע את המלך הצדיק.
18. המלך לא צדיק.
19. הגמל שמע את המלך.
20. המלך חי.

2. Key Letters

Sentences 10-20 above represent regular Hebrew spelling, as adults confront it. You are already reading (i.e., comprehending) regular adult Hebrew; in case you are also interested in pronouncing it, this section will teach you how.

Although not widely known, Chinese "picture writing" actually contains some indications of pronunciation. So, too, the Hebrew hieroglyphs and their modern forms. Two important such indications are:


ש s (or sh)


מ m

Can you match the following names with their English equivalents? Note that Hebrew is written backwards—but don't expect a one-to-one correspondence between English and Hebrew letters.

1. מימון	a	Israel (Yisra'el)
2. ישראל	b	Semite (shemi)
3. שמשון	c	Maimon
4. שמי	d	Samson (Shimshon)
5. משה	e	Moses (Moshe)

Answer: 1-c, 2-a, 3-d, 4-b, 5-e.

Can you match words you know with their pronunciations?

1. גמל	a	shama (or shome'a)
2. מלך	b	gamal
3. שמע	c	melekh

Answer: 1-b, 2-c, 3-a.

Translate and pronounce:

המלך שמע גמל. "The ---- ----s a -----"

Ha------- ----- ----- (Ha--elekh -ha-a ga-al)

Can you match these additional names?

1. שלמה	a	Shoshana
2. ששון	b	Solomon (Shlomo)
3. שושנה	c	Sason
4. שמואל	d	Saul (Sha'ul)
5. שאול	e	Samuel (Shmu'el)

Answer: 1-b, 2-c, 3-a, 4-e, 5-d.

How many of the following sentences can you translate?

1. שאול המלך שמע את עם ישראל.
2. שמע עם ישראל את המלך שאול.
3. חי הגמל.
4. שושנה שמעה את הגמל.
5. המלך שאול לא צדיק.
6. צדיקה שושנה.
7. שלמה מלך ישראל.
8. שלמה מלך ישראל צדיק.
9. משה לא מלך ישראל.
10. עם ישראל שמע את המלך שלמה.
11. עם צדיק שמע את המלך הצדיק.
12. עם ישראל חי!

עם ישראל חי

עם ישראל חי!


The above sentence (presented in traditional and modern type-styles) is the name and main lyric of a popular Hebrew song. The last word is also used in a popular neck-ornament. You should be able to read it now, and also the name of the country on the accompanying stamps.

3. Vowel Points

Sets of diacritics are used to indicate vowels and other details of pronunciation. The following such points, placed under a letter, indicate a following vowel:

ַ or ־	*a* as in father	שָׁשׁוֹן	S__son
		שָׁאוּל	Sh__'ul
		גָּמָל	g__m__l
		שָׁמַע	sh__m__
ֶ or ֵ	*e* as in met	שְׁמוּאֵל	Shmu'__l
		יִשְׂרָאֵל	Yisr__'__l
		מֶלֶךְ	m__l__kh
In addition, שׁ	sh	מֹשֶׁה	Mo__e
		שָׁשׁוֹן	____on
		שְׁלֹמֹה	____lomo
שׂ	s	יִשְׂרָאֵל	Yi__r__'__l
		שָׁמַע	______
		שִׁמְי	____i

Note that the Hebrew pronunciation is often completely different from the Hebrew: (match)

shemi	Solomon
Shlomo	Semite
Shimshon	Moses
Moshe	Samson

Read the following sentences out loud:

1. מֹשֶׁה שָׁמַע גָּמָל.

(הַ- ha-)
(אֶת et)

2. שלמה הַמֶּלֶךְ שָׁמַע אֶת יִשְׂרָאֵל.

3. גָּמָל שָׁמַע אֶת שָׁאוּל.

4. הַמֶּלֶךְ שלמה שָׁמַע אֶת שָׁשׁוֹן.

("Sarah sings there." 'sing' = ____ra) 5. שָׂרָה שָׁרָה שָׁמָּה.

("The sun serves as sexton.") 6. שֶׁמֶשׁ מְשַׁמֵּשׁ שַׁמָּשׁ.

3. Implications

I will now summarize the reactions of the 100 or so subjects who have learned Hebrew through this mini-lesson (in one or another version). It is recommended that the reader jot down any reactions before proceeding: What do you feel you know? What can you do? Were the three sections of the mini-lesson equally difficult? (This last question is specially interesting.)

The most important single result is that regular adult text in a foreign language can be read (i.e., comprehended) after short study: this is proved within section 0. This is a dramatic result in itself, especially since such text is not encountered in regular curriculum for several years of study. (The reason for this will be mentioned below.) Even in languages using the Roman alphabet, meaningful sentences are not always encountered within the first half-hour of study.

Section 1 merely proves additionally that a whole-word approach can be structured so as to incorporate later shift to partial (i.e., highly selective) phonics. The key-letter system exemplified in section 1 makes word-recognition open-ended, and indeed supportive of oral learning, in a way that traditional whole-word teaching cannot be.

The main conclusion to be drawn, then, is that elementary language teaching can by-pass structural detail, especially if it takes full advantage of the cognitive power of reading process. Students who have begun with this kind of reading-based approach can be expected to make, with ease, the transition to fluent reading that few current students make at all. Students who have studied my full semester's curriculum retain their ability to comprehend, and also pronounce.

Indeed, the very act of learning is more enjoyable from the beginning because it is meaning-oriented; there need be no excuses about sharpening grammatical tools that can be used only in the distant future (or more likely, not at all).

Further details of the mini-lesson carry this point further: although based in specific consideration of structures unique to Hebrew, they are directly applicable to any other foreign language (including English as a foreign language).

The overwhelming majority of my subjects report that section 2 is substantially more difficult than 1-2. Indeed, they mostly feel that whatever success they have in understanding the explanations and doing the exercises in section 2 derives completely from the proficiency acquired in sections 0-1. (Thus, in particular, sentences 6-7 in the final exercise are especially difficult, although actually simpler orthographically.)

This is a curious conclusion, as one can see by noting that section 2 represents the first step in a traditional Hebrew curriculum! Indeed my whole mini-lesson is a precise reversal of the traditional curricular order: (a) vowel-points and phonetics, (b) words as sounds, (c) words as meanings, and (d) sentences. (The accepted curriculum for English as a second language is parallel: phonics, words as sounds, etc.)

Note that regular adult Hebrew is what appears at the end of section 0 (and in section 1): the vowel-points are used in children's books, and native speakers are notoriously weak in them. They are nevertheless inflicted on non-native learners, as an aid (with the exception of native-language illiterates, oddly enough). In most curricula learners are protected from the regular adult consonantal text till the third year of study or later.

Because of its system of vowel-points, Hebrew allows us to explicitly consider an issue that is relevant to English and other languages as well, although difficult to consider within them. Consider the plight of the Vietnamese learner of English, confronting *take* and *took*. What does it avail to know the phonetic values of the vowels, when these are an irregular representation of a grammatical category (verb tense) that does not even exist in Vietnamese? The obvious solution to this three-story torture chamber is for words to be presented without vowels at elementary stages: *w tk yr bk*. This compact orthography evades various structural complexities of English (written or spoken), even while giving learners practice in high-level psycholinguistic reading (Cf. Smith, 1971, 1973.) After all, adult native-speakers can read vowelless text with increased, not reduced fluency: #f y## #r# #xp#r##cn#ng d#ff#c#lt# #n #tt#mpt#ng t# d#c#ph#r th#s m#ss#g#, th#n y## #r# h#ld#ng th# p#g# T## D#RN CL#S#!

What the modified orthography does is bring the learner immediately to the adult native speaker's mode of visual processing, by-passing linguistic childhood. Of course for English this orthography is terribly contrived, but for Hebrew it is the norm, affording this interesting test-case for ungrammar. (In pedagogical contexts, it too generates resistance among traditionalists, but that is a separate question.)

The hieroglyphic orthography of section 1 is completely imaginary: the hieroglyphs are simply iconic characters that I designed off the regular Hebrew spelling. They seem to serve as a useful way to force whole-word, semantic reading from the beginning. Even in the full-semester course, they were found to be helpful, although introduced along with orthographic spelling in later lessons. More abstractly, of course, they are a direct representation of lexical meaning, and in this sense represent fully adult reading process.

My subjects' results suggest that the traditional curricular ordering is in error. This conclusion would apply to curriculum in any foreign language, including English, albeit with changes in detail. The crucial point is that psycholinguistic reading principles can be translated into the terms of elementary foreign-language curriculum: the most important linguistic skills can also be the easiest.

I confess that the innovative ordering requires considerable contrivance: making up hieroglyphics can be difficult. Quite unlike Natural Approach (Terrell, Krashen, etc.), considerable care must be taken to sequence the material correctly, and explain in the right way. To recall the most dramatic example: in the earliest versions, heavy psycholinguistic ideology was followed by a command to translate. Some subjects simply refused to believe the ideology, and could not translate. When I eliminated the ideology, and instead innocently asked, "How many of the following sentences can you translate?" this type of resistance simply disappeared, and average results shot up from 15% to 85%. More generally, it is easy to overshoot a given learner, and thereby frustrate him: I know this well enough from teaching psycholinguistic reading to advanced ESL students and native speakers.

But, whether subtly and successfully,or with great futile waving of ideological swords, I often find myself battling a cognitive linearity that is as widely appealing as it is illusory: the misconception that any knowledge or skill can be broken down into tiny discrete pieces (increments) that can then be absorbed one by one. Aesop's tortoise is the hero of this myth. Its most harmful assumption is that all the little pebbles in the road must be stepped on along the way, i.e., that it is useful, if only psychologically, to achieve complete command of details in a limited domain, before attempting development of mature skills. The thought that these skills might actually be *easier* to achieve directly is met with widespread disbelief.

But reading, like visual perception generally, proves the cognitive power of holistic thinking. Ungrammar, with its basis in reading process, merely feeds this power back into the process of foreign-language learning. Detailed work is needed to make the method work; in this sense it is not a natural approach, although it does—when successfully contrived—easily elicit the natural language skills of learners.

Bibliography

Bar-Lev, Zev (1979). "Ungrammar." L2 Research Forum, Los Angeles (available from ERIC).

———(1980). "Exolexia." CLAC Annual Conference, Long Beach (available from ERIC).

———(forthcoming). "Arabic ungrammar." *Teaching Language through Literature* 23:2.

Bower, G., J. Black, & T. Turner (1979). "Scripts in text comprehension and memory." *Cognitive Psychology* 11: 177-220.

Burling, Robbins (1968). "Some outlandish proposals for the teaching of foreign languages." *Language Learning* 18:1-2.

———(1978). "An introductory course in reading French." *Language Learning* 28:1.

Celce-Murcia, M., & L. McIntosh (eds.) (1979). *Teaching English as a Second or Foreign Language.* Rowley, MA: Newbury.

Collins, A., J. S. Brown, & Kathy Larkin (1977). "Inference in text understanding." Center for Study of Reading 2240, Univ. of Illinois.

Cherry, Colin (1957). *On Human Communication.* NY: Wiley.

Clarke, Mark, & S. Silberstein (1977). "Toward a realization of psycholinguistic principles in the ESL reading class." *Language Learning* 27:1.

Cooper, Charles, & Anthony Petrosky (1976). "A psycholinguistic view of the fluent reading process." *Journal of Reading* 20:3.

Corder, S. Pit (1979). "'Simple codes' and the source of the second language." *Studies in Second Language Acquisition* 1:1 (Indiana University Ling. Club).

Dulay, Heidi, Marina Burt, & Stephen Krashen (1982). *Language Two.* NY: Oxford U. Press.

Egasse, Jeanne, & Tracy Terrell (1978). "A natural approach to second language teaching." *On TESOL,* 1978.

Goldin, M. (1977). "Who wouldn't want to use natural approach?" *Modern Language Journal* 61.

Gretz, Ernest, Richard Anderson, & Diane Schallert (1981). "The representation of sentences in memory." *Journal of Verbal Learning and Verbal Behavior* 20.

Haramati, Shlomo (no date). *Yesodot haQri'ah.* Tel-Aviv: Amihhai Publ.

Hatch, Evelyn (1974). "Research on reading a second language." *Journal of Reading Behavior* 6:1.

Hood, Joyce (1977). "Sight words are not going out of style." *The Reading Teacher* 30:4.

Krashen, S. D. (1976). "Formal and informal environments in language acquisition and language learning." *Tesol Quarterly* 10.

———(1981). *Second Language Acquisition and Second Language Learning.* Elmsford, NY: Pergamon.

——— & Tracy D. Terrell (1983). *The Natural Approach.* Oxford: Pergamon.

Levin, Jules, & Peter Haikalis (1979). *Reading Modern Russian.* Columbus: Slavica.

Levy, Betty Ann (1977). "Reading: speech & meaning processes." *Journal of Verbal Learning and Verbal Behavior* 16.

Mackay, R., B. Barkman, & R. R. Jordan (1979). *Reading in a Second Language.* Rowley, Mass.: Newbury.
Marschark, A. & A. Paivio (1977). "Integrative processing of concrete & abstract sentences." *Journal of Verbal Learning and Verbal Behavior* 16.
McKoon, Gail (1977). "Organization of information in text memory." *Journal of Verbal Learning and Verbal Behavior* 16.
Miller, James (1981). "Constructive processing of sentences." *Journal of Verbal Learning and Verbal Behavior* 20.
Perkins, Kyle (1983). "Semantic constructivity in ESL reading comprehension." *Tesol Quarterly* 17:1.
Rigg, Pat (1976). "Reading in ESL." *On TESOL* 1976.
———(1977). "The miscue-ESL project." *On TESOL* 1977.
Rumelhart, D.E. (1977). "Toward an interactive model of reading." in: S. Dornic (ed.), *Attention and Performance.* Hillsdale, NJ: Erlbaum.
———(1980). "Schemata: the building blocks of cognition." in: R. Spiro, B. Bruce, & W. Brewer (eds.), *Theoretical Issues in Reading Comprehension.* Hillsdale, NJ: Erlbaum.
Schlesinger, I.M. (1968). *Sentence Structure and the Reading Process.* The Hague: Mouton.
Smith, Frank (1971). *Understanding Reading.* NY: Holt Rinehart Winston.
———ed. (1973). *Psycholinguistics and Reading.* NY: Holt Rinehart Winston.
Terrell, Tracy (1977). "A natural approach to second language acquisition." *Modern Language Journal* 61.

Gary Perlman & Thomas D. Erickson

Graphical Abstractions of Technical Documents

Good technical writing demands clear and concise communication that allows readers to skim documents for efficient access to information. To aid technical writers many computer programs have been written to analyze writing style in the hopes of improving writing standards. These programs have tended to be of a numerical statistical nature, summarizing a document or predicting its "goodness." We feel such programs hide more information than is advisable to help writers understand where and why their documents may have difficulties. After introducing the general concept of an abstraction of a document, we describe the other side of the text analysis coin: graphical displays of text that enhance structural components of a document. We describe two programs for graphical textual analysis: one generates displays of the logical structure of sections of a document; the other generates graphs of the complexity of individual sentences. While these programs are not the final statement of abstract text analysis, they point a new direction in which we think writing aids should be going.

1. Good Technical Writing

When we say a document should be well-written we really mean that it should be easy to read. This includes having well structured sections, smoothly flowing prose, and well written sentences. But well-written documentation is something more than just well-written prose.

People rarely sit down and read a document through. They usually approach a document wanting to know something in particular (Wright, 1983). They have a goal in mind. Some of a reader's more common goals are to:

Determine if the document contains the information being sought.
Determine if the document is of sufficient interest/use to be read more thoroughly.
Find information about a particular topic (e.g., how to use a program).
Use the document as a reminder of information once learned.

In addition to the information-oriented goals, there is probably the single most common and constraining of all the goals that readers bring to their task: Get this done in a hurry so I can do something important.

Documentation must be easy to understand not only when it is read, but also when it is skimmed. It is more important that technical documentation be skimmable than that it be readable. Sections should be used to separate distinct ideas, and their headings should give the reader an overview of a document. The first paragraph of a section should introduce the main idea of the section, and the first sentence of a paragraph should give the topic for the paragraph.

Visible Language, XVII 4 (Autumn 1983), pp. 380-389.
Gary Perlman's address: AT&T Bell Laboratories, Murray Hill, NJ 07974.

Both these devices help smooth the flow of ideas in a document and make it easier to get the gist of the document in a minimal amount of time. The key to making a document skimmable is to give it a rich internal structure.

At a more microscopic level it is important to have the parts of a document well written. Once readers are within a section of text, such as a paragraph, they must find the individual sentences easy to read. Sentences must be of reasonable length and of limited grammatical complexity.

In the rest of this document we briefly summarize some of the more traditional approaches to computer aids to good writing. We point out some of their deficiencies and suggest new directions. We conclude with two exemplary programs that graphically summarize document and sentence structure.

2. Traditional Aids: Summary/Predictive Statistics

Traditional document analysis primarily employs summary and predictive statistics. After submitting a document to an analysis program, an author may be given a table of statistics like the output of the style program (Cherry, 1980) shown in Figure 1.

Figure 1. Summary statistics for this document. The printout of the STYLE program for a draft of this document provides a large variety of numerical statistics. The readability grades are predictors of the number of years of formal education needed to understand the text and are based on integrating summary statistics like sentence length and word length.

```
Readability Grades:
   Kincaid 11.9 auto 12.4 Coleman-Liau 13.2 Flesch 14.0 (43.2)
Sentence Information:
   no. sent 150 no. wds 2798
   av sent leng 18.7 av word leng 5.19
   no. questions 2 no. imperatives 0
   no. content wds 1687 60.3% av leng 6.79
   short sent (<14) 29% (43) long sent (>29) 9% (13)
   long sent 69 wds at sent 70; short sent 3 wds at sent 114
Sentence Types:
   simple 51% (77) complex 29% (43)
   compound 10% (15) compound-complex 10% (15)
Word Usage:
   verb types as % of total verbs
   tobe 37% (112) aux 23% (70) inf 20% (59)
   passives as % of non-inf verbs 16% (39)
   types as % of total
   prep 10.8% (302) conj 2.7% (76) adv 3.6% (100)
   noun 29.2% (816) adj 19.0% (531) pron 4.3% (119)
   nominalizations 2 % (69)
Sentence Beginnings:
   subject opener: noun 22 pron 22 pos 1 adj 32 art 31 tot 72%
   prep 13% (20) adv 5% (8)
   verb 3% (4) sub_conj 2% (3) conj 1% (2)
   expletives 3% (5)
```

Many people do not understand most of these summary statistics and have trouble interpreting their significance. The difficulty with interpreting summary statistics is partly solved by the use of predictive statistics such as a readability index, an integration of a set of summary statistics shown to be statistically correlated with ease of reading (speed, comprehension, etc.).

There are problems with predictive statistics too. For example, although average sentence length is positively correlated with readability, this does not mean that a long sentence will necessarily be more difficult to understand than a short one. Often a longer complex sentence can express an idea more clearly than several short sentences, especially if relationships between ideas are presented. Predictive statistics ignore semantics and gloss over individual cases, making them of dubious validity and of questionable utility. We have observed inexperienced writers splitting up perfectly good sentences to make them shorter to get a better readability score. There are also problems for passages and for documents for which readability standards have not been set. These and other problems with statistics are summarized by Coke (1982).

Most statistics are global measures and as such offer little information about the source or solution of problems. Trouble areas need to be confined to a particular section of the paper, and the type of problem and its solution should be made easy to identify.

3. A More General Approach: Abstractions

Before outlining our approach to a solution to the problems of traditional text analysis programs, we will introduce our notion of text abstraction. An abstraction of a document is a summary of a part of it that focuses a writer's attention on a particular aspect of that document, for example, section structure or sentence complexity. An abstraction strips away irrelevant or redundant information which may hinder analysis. The traditional approach to text analysis (statistics) is a subset of the abstraction view. The main difference is that part of our generalization is the notion of a graphical summary display of a document.

A graphical display of some text has the property that some physical attribute of the display corresponds to some property of the text. This allows a person to see the logical structure of sections in a document or the complexity of a sentence. Graphical displays offer a richer source of information than numerical summaries. They almost literally demonstrate that a picture is worth 1000 words.

The generalization of traditional statistics on text to abstractions is analogous to the generalization of statistics to data analysis. We are treating text as a special type of data to be analyzed. Just as graphical displays of data offer more information about data in a way people often more readily understand, graphical displays of text can present a more clear and concise summary. And just as graphs of data are less judgmental than predictive statistics, so are graphs of text. They allow people to make their own conclusions based on more information than statistics alone.

4. Two Graphical Abstraction Programs

The programs described here run on the UNIX (trademark of AT&T Bell Laboratories) operating system (Richie & Thompson, 1978) and are designed for use with the troff text formatting system, although the PUNC program can be used with any UNIX text processing system. The programs are simple enough that they can be implemented on any system with minimal programmer effort.

We do not think these are ideal tools for textual analysis, but we do think they give a new direction for text analysis. Over the years they have been in use, people at our computer facility have found them useful. Experienced writers prefer them to the more traditional programs because the programs *help* with the analysis rather than *do* the analysis.

4.1 HEADINGS: Extract Section Headings

On our computer system at the University of California at San Diego (UCSD), we use a text processing system that prints documents in a format defined by a set of macros (text commands) that define document units like sections and paragraphs. The macros that define the beginnings of sections take a heading argument that is the name of the section. In the Cognitive Science Laboratory at UCSD we use section macros based on the American Psychological Association publication guidelines (APA 1975). These have macros for high headings, main headings, left headings, and paragraph headings, each being logically nested in preceding ones. In other documents a numerical argument to the section macro indicates the level or depth of the section. Such a scheme is used in this document. A heading outline for a document is a graphical abstraction in which: each section heading occupies one line, headings are indented proportional to their depth, and all other text is removed. Numeric indices might be included, as might other information about the section headings. Optionally, paragraph beginnings can be indicated. For example, the heading outline for a draft of this document is:

1 Good Technical Writing
2 Traditional Aids: Summary/Predictive Statistics
3 A More General Approach: Abstractions
4 Two Graphical Abstraction Programs
    4.1 HEADINGS: Extract Section Headings
    4.2 PUNC: Punctuation Graphs of Sentences
    4.3 ABSTRACT: Combining the Two Programs
5 Conclusions
6 Acknowledgements
7 References

The headings outline allows a writer to see the overall organization of a document. By skimming the outline vertically, the number of sections at any level is apparent. It is possible to observe the variation in section length by the appro-

priate selection of options. Writing techniques like parallel development, where the same topics are expanded under each section, can be verified.

4.2 PUNC: Punctuation Graphs of Sentences

A punctuation graph of a sentence is a graphical abstraction in which: sentences are displayed one per line, each word is replaced by an underscore, and punctuation is maintained verbatim. Optionally, certain classes of words can be highlighted with something other than the underscore. For example, capitalized words, pronouns, prepositions, etc. can be represented by other characters, or word length can be represented. For example, the punctuation graph of the first sentence of this section is show below.

_____:_____,_____,_____.

Punctuation and sentence length are retained, and everything else is discarded.

The punctuation graph for a sentence shows sentence length and complexity in a way that is easy to grasp. Long sentences literally stand out from the rest, and complex sentences, often heavily punctuated, stand out because they look "busy" compared to the rest. Parenthetical remarks (like in this sentence), lists, "quotes," and the like, are easy to distinguish; see the punctuation graph for this sentence.

__(_____),_,"_,"____,_____;_____.

Decisions about sentence acceptability can be made quickly and based on more information than a readability score. A writer might decide a sentence is acceptable because it is a list. By examining the punctuation graphs for a document writers can observe the change of sentence structure over the length of a document. To help writers find problematic sentences the program can be directed to print the document line numbers of sentences longer than some criterion.

4.3 ABSTRACT: Combining the Two Programs

The UNIX system makes it easy to combine programs to do novel tasks. The HEADINGS and PUNC programs can work together to provide a more sophisticated abstraction of a document. The ABSTRACT program combines the two by showing section headings with sentences replaced by their punctuation graphs. ABSTRACT shows all information of its component programs, but also gives better information about section length, and where sentences are located. The combination is simple: both programs can print input file line numbers with their outputs so all ABSTRACT does is call the UNIX sort facility on their combined outputs. An abstraction of a draft of this document is shown in Figure 2.

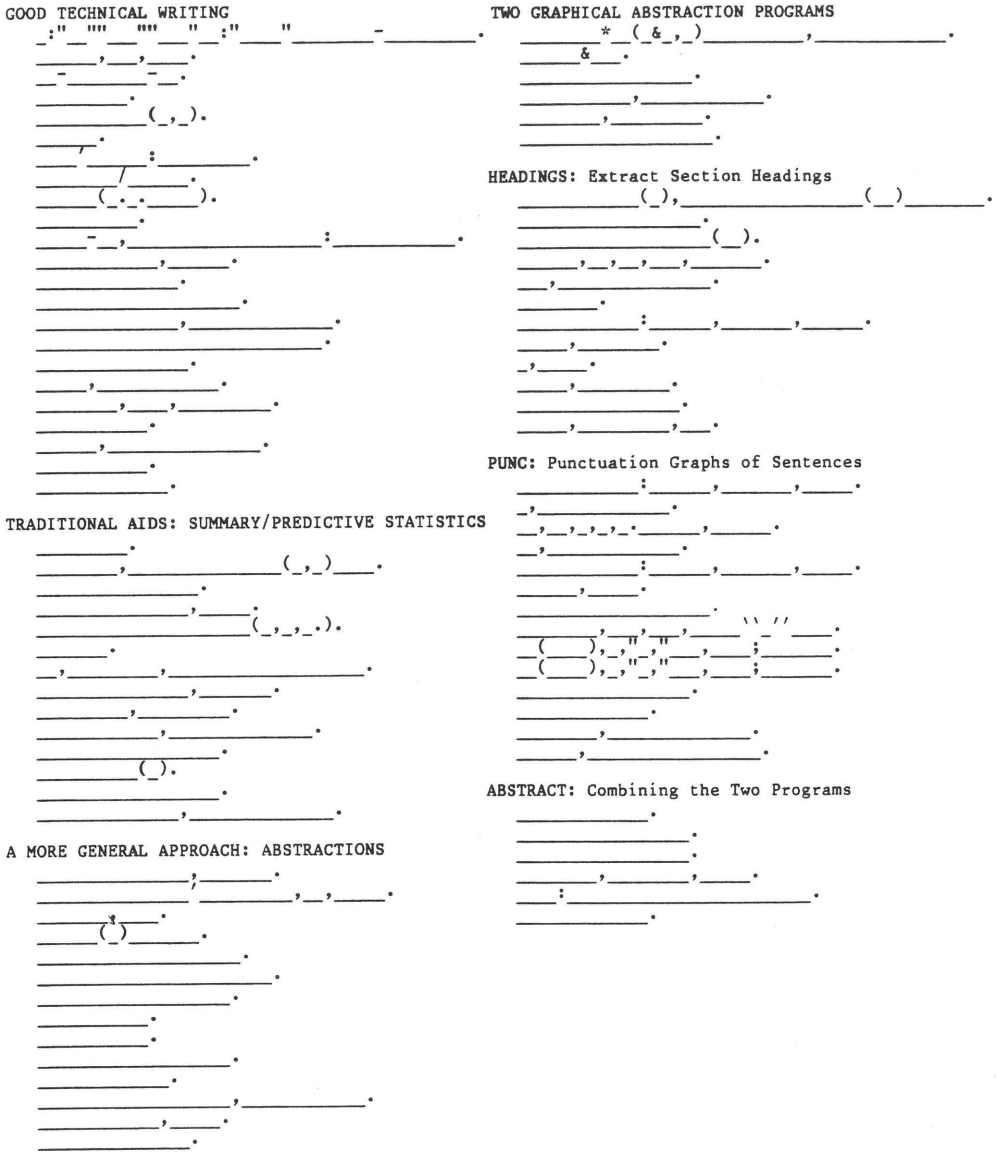


Figure 2. Abstraction of this document. The combined interleaved outputs of the HEADINGS and PUNC programs for a draft of this document. Note how combining the two programs allows the writer to estimate section length.

5. Comparison of Graphical and Numerical Techniques

We think a direct comparison of graphical and numerical representations for text is important for deciding their relative merits. To do this we keep in mind one basic question: What information can one technique represent that the other cannot?

5.1 Graphical Representations of Readability

First we will consider whether graphical techniques can visually represent information integrated into readability scores.

Sentence Length: This is encoded as the length of a punctuation graph because each word is represented by an underscore.

Word Length: This is encoded as a digit representing the word length, but can also be represented by vertical or horizontal bars with lengths proportional to word length.

Sentence Complexity: Compound, complex, and compound-complex sentences can be highlighted in many ways, perhaps the easiest being a single character attached to a sentence graph, or some sort of brightness manipulation possible on most CRT terminals. Difficulty of reading would be represented visually as unusually dim or bright documents.

Sentence Beginnings: Sentence beginnings, as well as words of different classes in any sentence position can be highlighted with color or special characters. For example, expletives could be highlighted in one color while verbs could be in another.

One important point is that the graphical displays are extensible, and that even with simple terminals, they can represent statistics.

5.2 Deficiencies of Numerical Techniques

Now we will point out cases where statistics fail to distinguish sentences and even whole documents that vary greatly in their readability. Numerical statistics do not attend to structural information that help readers visually parse sentences and documents.

5.2.1 Sentential Analysis: Parenthetical Remarks

At the sentence level, the statistics do not discern when parenthetical remarks are used. As an extreme example, the following sentence is likely to be mistaken for a difficult one:

> The need for good nutrition is widely acknowledged (Jones, 1822; Filbert, Able, & Swine, 1924; Feeble & White, 1942).

By parsing the information in the parentheses, readability score based programs can miss by several grade levels. The following PUNC graph of the sentence shows citations in a pattern familiar to PUNC users.

```
_____(_,#;_,_,&_,#;_&_,#).
```

It lets people decide that the parenthetical part of the sentence is acceptable and can be ignored. More common cases are when PUNC graphs show a sentence to be broken up by parenthetical remarks. Two PUNC graphs shown below indicate two sentences of equal length, equal average word length, and so on, that a readability score program will not distinguish.

```
_____#_____&_____.
_____#__(_____)_____(_____)&_____.
```

The first graph shows a sentence about fifty words long (which is commonly thought to be a bad idea) while the second shows a sentence with the same words broken up by parenthetical remarks (which can be ignored somewhat) and this can help a reader with a sentence. The sentence graphs are for the previous sentence. The important point is that both look like they can cause readers problems, but that a writer can decide based on the PUNC graph that the parenthesized sentence is more acceptable, or that the parenthetical remarks should be removed. A readability score does not distinguish between the two, and for good reason; how could the text inside the parentheses be weighted in the readability score?

5.2.2 Sentential Analysis: Lists

Another case where readability grades do not fare well are in processing lists. Lists add to sentence length, substantially when list items are phrases rather than individual words, and this in turn adds to a readability score. This is contrary to research that has found lists easy to read, especially when displayed in a tabular format (Horn, 1983). Lists are discernible in PUNC graphs by the presence of repeated commas or semi-colons, often preceded by a colon. Some examples are

```
_____:_,_,_,_,&_.
_____(_,_,_,_,_)____(_,_,_,_,&_).
__,_____:_____;_____;_____;&___.
```

Again, this is a case where punctuation inserted to help readers is made apparent with a graphical display. Although the last PUNC graph represents a long sentence, the writer might decide it was acceptable because it is obviously a list.

5.2.3 Document Analysis: Headings and Paragraphs

Kirk and Spock search for the crucial information.

Spock: Here it is, the complete knowledge of the Fibrini.

Spock pulls out a huge tome.

Kirk: Is it indexed?

Spock: Yes . . .

Spock finds the information and saves the planet.

As this excerpt from an episode of Star Trek illustrates, the readability of a document can have little to do with readability of individual sentences. It may be more efficient to read small sections of poorly written text than large sections of well written text. Sections and paragraphs greatly add to the skimability of documents. The combination of the HEADINGS and PUNC programs shows the structure and relative sizes of sections in a form convenient for fast verification. Traditional statistics do not discriminate between documents with good or bad or even no structural information. Adding weighted measures of paragraph and section size and structure is an obvious solution, but the measuring and weighting of these factors into readability is not straightforward. We prefer to allow writers to *see* unusually short or long sentences or sections.

6. Conclusions

These programs are useful for document analysis for the main reason that we, as writers, do the evaluative analysis. Abstraction facilitates our analyses by stripping away irrelevant information, allowing us to focus our attention on particular aspects of the text. Large amounts of information can be summarized in simple graphical displays. Abstraction can also help us find specific problem areas: the punctuation of the fourth sentence in the second section; the headings of the third section. Graphical summaries are not sensitive to text length as are statistical ones, and do not depend on a writer's understanding of numerical metrics.

The programs here are not a complete set of text analysis programs. They are a sample of the sorts of analyses we would like to be able to do. More sophisticated graphics might allow better representations of text, but we think new, not only better, graphical displays are needed. More sophisticated programming and integration with text editor programs might allow programs like these to be used actively *during* the writing process, rather than a *post hoc* analysis. Our programs are fast enough to allow interactive use with existing software, a criterion we consider necessary to motivate people to use them. We hope our examples can point the way for more novel abstraction programs, especially those with a graphical flavor.

Acknowledgements

Bob Glushko has stirred up many of the objections we now have for traditional writer's aids. Don Norman wrote the original version of the HEADINGS program. It was re-written to add greater functionality and make it more efficient.

References

The APA Publication Manual (3rd Edition), The American Psychological Association, Washington, D.C., 1975.

Cherry, L. L., & Vesterman, W. Writing Tools—The STYLE and DICTION Programs (Computing Science Technical Report #91). Murray Hill, NJ: Bell Laboratories, 1980.

Coke, E. U. Computer Aids for Writing Text, in *The Technology of Text: Principles for Structuring, Designing, and Displaying Text,* D. H. Jonassen (Ed.). Englewood Cliffs, New Jersey: Educational Technology Publications, 1982.

Horn, R. E. Structured Writing and Text Design, in *The Technology of Text: Principles for Structuring, Designing, and Displaying Text,* D. H. Jonassen (Ed.). Englewood Cliffs, New Jersey: Educational Technology Publications, 1982.

Richie, D. M. and Thompson, K. The UNIX Time-Sharing System. Bell System Technical Journal, 57, 1974, 1905-1929.

Wright, P. Manual Dexterity: A User-Oriented Approach to Creating Computer Documentation. Proceedings of the CHI '83 conference on human factors in computing systems. December, 1983. Published by the Association for Computing Machinery.

Rose-Marie Weber

Behind the Slash

The slash is appearing with increasing frequency in constructions like *listener/speaker* and *memory/motor skills.* It sometimes joins coordinate words that are alternatives in a sentence, but more often joins coordinates additively, especially nouns and noun compounds. Constructions with a slash are useful in providing lexical cohesion over extended passages. Like other devices in written English, they contribute to making information more integrated in writing than in speech.

In becoming literate, readers must learn to interpret those aspects of a language that are peculiar to its written form as well as those that relate directly to its spoken form. Punctuation plays a part in both aspects, following conventions both independent of the grammatical structures of the language and congruent to them. The period indicates an abbreviation of a written form on the one hand and marks off syntactic boundaries on the other; the hyphen at the end of a line indicates that there is more of a word to come and also serves to join words grammatically, as in *clear-eyed* and *late-blooming.* The slash (or slant, virgule, shilling, diagonal, or solidus) is a punctuation mark whose place in the English writing system is not so well-fixed. But it is eye-catching because its use seems to be expanding in expository and technical writing, not only in frequency, but in functions that are not given attention in standard handbooks. These are our guides to written usage, but writers outpace them in current use of the slash. How we are to interpret it and the structures it appears in is my small question here.

Dictionaries, college handbooks, and guides for writers such as the Chicago *Manual of Style* (1982) and the *Britannica Book of English Usage* (Timmons and Gibney 1980) note the use of the slash in several specialized ways. It directly represents *per*, as in expressions like *ft/sec*^{2}. It serves to separate entities, setting off phonemic symbols and marking off lines of poetry when they are printed continuously. The slash also serves to join entities as it separates them. For instance, it joins numerals into a fraction while separating the numerator from the denominator, as in *3/4*, and it joins numerals into a date, as in *3/4/43*.

Furthermore, the slash joins words in discourse, the dictionaries and handbooks point out, separating alternatives so that either word can be used to interpret a sentence, for instance, *his/her* in *Every writer needs to know at least something about his/her audience.* But the examples offered show that

Visible Language, XVII 4 (Autumn 1983), pp. 390-395.
Author's address: Reading Department, State University of New York, Albany, NY 12222.

the slash is not at all limited to alternatives that are mutually exclusive. Even *and/or,* the prototypical example of the slash, requires that both *and* and *or* be used to interpret sentences like *Judge Sirica could have sentenced the burglar to five years in jail and/or a $50,000 fine.* In such cases readers cannot choose one of the words on either side of the slash and then move on. Rather, both words apply. After all, the slash not only joins alternatives, as the handbooks say, but more often joins coordinates in an additive relation.

The slash is prospering, especially in academic writing, feature writing in popular magazines, and the technical prose of the corporate world. By and large, it occurs in coordinate constructions, usually joining nouns, noun compounds, and less frequently adjectives and other classes. Thus,

(1) listener/speaker
reading/language arts achievement
background knowledge/text relationship
African/Afro-American studies
regionally/socially different

The frequent appearance of the slash in discourse is paralleled by the growing use of the slash in proper names and headings, particularly titles of books, category headings in indices, catalogs, and programs, occupational titles, and institutional names:

(2) *Notebooks/Memoirs/Archives: Reading and Rereading Doris Lessing*
Speeches/Meetings
folk singer/composer/story teller
Doubleday/Britannica Books.

It is in such cases, especially in academic settings, that the slash now and then appears in constructions whose constituents are not coordinate. In such cases, it is the second constituent that limits the first, e.g.,

(3) UC/Berkeley
Vice President/Academic Affairs
Psychology/Physiological

The use of the slash in titles and institutional names corresponds to its popularity in the typographic design of brochures, reference books, newspaper advertizing, and the like. In many such cases the relationship between the entities joined by the slash is not interpretable grammatically but rather pragmatically. For instance, *Television / 2-12* appears on the cover of a Sunday newspaper supplement, *Television Week / C. Gerald Fraser* appears on page 3, *Sunday / May 22* appears on page 4, and *Sunday / continued* on page 5. In each case we interpret the relationship by virtue of our knowledge of the content and form of such a supplement, such as the title of a regular column and a by-line.

In discourse, however, a grammatical relationship usually binds the constituents joined by a slash and that relationship is usually a coordinate one. It is tempting to suggest that such coordinate constructions derive simply from extending the application of the optional conjunct erasure rule (Keyser and Postal 1976), so that while in speech we have *Dick or Jane or Sally* and *Dick, Jane or Sally,* in writing we can have *Dick/Jane/Sally.* The conjuncts *and, or,* and *nor* are erased and the slash appears in their places. But there are various restrictions on this possibility. It turns out that the slash resists appearance in constructions realized as surface subject and object, thriving rather in complexly derived constructions such as the *Dick/Jane distinction* or the *institutionalization of Dick/Jane/Sally,* but seldom in something like *Dick/Jane/Sally now rest in peace.* The slash does not occur at all in constructions that would seem congenial, such as **either Dick/Jane; *neither Dick/Jane; both Dick/Jane* and hardly appears in negative contexts. It also turns out that, unlike its closest lexical counterparts, *and* and *or,* the slash generally does not join verbs, verb phrases, noun phrases other than compounds, or, in particular, sentences. Conjoined sentences such as *Dick can run and Jane can play* are not be be found as *Dick can run/Jane can play,* unless as an attributive constituent of a noun phrase such as *the Dick can run/Jane can play style.* By and large, the slash joins lexical items, usually nouns and noun compounds, rather than larger entities.

The lexical items so joined usually stand in an additive relation. In addition to (1) and (2) above, here are various examples with their apparent meaning as clear from their place in context:

(4)	the author/illustrator	the referent of the coordinates is the same person
	Brazilians/Portuguese	the two referents are combined into a single group
	a rural/suburban area	both characteristics apply
	linguistic/cultural background	both attributes apply

In joining items in an alternative relation, the slash corresponds to *or.* This is the case in the pairs *he/she* (and its orthographically condensed version *s/he*), *his/her* and *her/him*, as in *Each student must pay his/her share.* Alternatives joined by *or* may be mutually exclusive, as in *She studied Sinhala or Tamil, I can't remember which.* But it is frequently the case that *or* joins coordinates with the additive meaning of *and.* So-called inclusive *or* can be easily seen in the negative, as in *He couldn't speak Sinhala or Tamil,* where not speaking either language means not speaking both. It is because *or* is so often inclusive that the usefulness of *and/or* is questioned in the usage handbooks (e.g., Evans and Evans 1957). An announcement calling for papers on

theoretical and/or clinical questions on child language could have simply read *theoretical or clinical questions*; the *or* alone would have included the possibility for papers on both. Given this inclusive meaning, it is not surprising that the slash, the sometime counterpart of *or*, serves to join coordinates in an inclusive, additive relation, as the examples in (4) illustrate.

Or also serves to join synonymous or nearly synonymous terms, the second giving an alternative form, a definition, or a restatement of the first, such as *darning needle or dragon fly* and *hypnophobia or fear of sleep*. Likewise, the slash appears in this role. For example, in an essay assuring us that Malay and Indonesian are one and the same language, the author uses *Malay or Indonesian*, then *Malay/Indonesian*, and then simply *Malay*. In some cases writers who use the slash in this way seem reluctant to choose one term over another, as though they want to avoid losing a subtle shade of meaning or taking an undesirable point of view, thus *Tagalog/Pilipino; miscue/error; gender/sex; garlic/onions*.

The slash is a device in written English that contributes to its distinctive quality. Like other characteristics of written language, constructions with the slash generally serve to integrate meaning in discourse, to use Chafe's (1982) term, making the presentation of information more compressed, complex, and deeply-layered than it usually is in speech. As Chafe points out, among the structures that appear in writing with greater frequency than in speech are nominalizations (*differential treatment of children* in contrast to *they treated the children differently*), conjoined phrases (*The traders are greedy and gullible*) and attributive rather than predicate adjectives (*the old house* in contrast to *the house was old*). These are the sorts of structures that are packed together even more tightly in a favorite type of slash construction illustrated by:

(5) spoken/written classification
speed/accuracy tradeoff
assistantship/fellowship allocation
scholarship/research requirements.

Here *classification* and the other nominalizations have conjoined direct objects (loosely speaking) that are preposed to attributive position and joined by the slash, making for tightly compressed phrases.

Constructions like these and others, if considered in isolation may seem to be difficult to interpret, unclear, and ambiguous. It is easy to trip on *language gender/sex interactions, chance/skill folk theories, speaker/listener rights and duties,* since the potential for ambiguity grows with the number or coordinates. In fact, many instances like these can be interpreted unambiguously in context because they partly derive their meaning from it, often serving to refer back to previously mentioned material. As a topic is unfolded, more and more information is laid out by the writer, bits and pieces related to one

another, previously mentioned characters, events, facts, constructs, and categories mentioned again and worked into the expression. There are various devices in English available to establish such ties (Halliday and Hasan 1976), especially in adjoining nearby sentences, such as the use of pronouns, ellipsis, and repetition of lexical items. Constructions with a slash add to the possibilities of lexical cohesion through extended passages in written English. For example, in mentioning a list of books including *Our Bodies, Our Selves,* a magazine writer referred back to it as *Bodies/Selves.* Similarly, to summarize the findings of a study, a researcher drew together the strands of an experiment, reporting that *good and poor readers' same/different responses to word/word or picture/word pairs do not differ.* Likewise, in an article analyzing children's first attempts at writing and putting down language in visible form, the author says, "Two predominant bases for segmentation were found in these data: a syntactic basis and a phonological or morphological one" (Edelsky 1983:138). In the next few pages of the article we find various references back to these analytic categories through the use of the slash, for instance:

(6) The two ways phonologically/morphologically-based segmentation was realized (141)

flagrant violations of either syntactic or phonological/morphological categories (142)

among syntactic and phonological/morphological types (149).

The slash construction is not necessary here, of course. A single, inclusive term such as *segmental* or an abbreviation such as *PM* could have done the same job. Or the sentences might have been recast in a more discursive style, e.g., "among the types based on syntax and phonology or morphology."

In fact, full extended phrases in some types of discourse may be tedious to the practiced reader of technical material. Constructions with the slash may be lacking in grace, especially to the nonspecialist reader, but efficient and economical for particular purposes. Describing the stack-up nouns such as *attitude control system* and *separation and destruct ordinance equipment* in the jargon of space scientists, McNeill (1966) pointed out that these constructions in writing serve the scientists' real need for an accessible technical vocabulary. They are, by the way, more frequently used in writing than in speech. McNeill also pointed out, however, that magazine writers reporting on space use these nominal compounds more frequently than scientists themselves, perhaps pretending that they have a greater degree of scientific understanding than they really have. At times the slash may reveal similar pretentions to precision, comprehensiveness, or modishness. Its effect may be tiresome, as in

Under such circumstances dialects/sociolects that are common in other parts of the country/region/district may be generally unmastered and non-functional *within* particular administrative units

or remarkably gratuitous, as in *rewards too numerous to count in our love/marriage/family relationship.*

It is worth noting that the slash may be competing with other punctuation in coordinate constructions, sometimes the comma, sometimes the hyphen. The comma separates coordinates in a series, but sometimes the slash appears instead, as in *words/syllables/blends/letters.* In particular, it may join doublets in a series, as in *warden/guardian; warranty/guarantee; reward/regard.* Sometimes it is used instead of a comma to stave off ambiguity by pairing coordinates against a contrasting third, as in *gender/sex and language systems.* The hyphen, on the other hand, often joins coordinates when the coordinate construction is itself attributive, as in

(7) the oral-written dichotomy
the Chomsky-Jackendoff position
the cardinal-goldfinch-bluebird division.

It is in such cases that the slash often appears instead of a hyphen, as in *oral/written dichotomy,* and so on. The examples in (7) appeared in their respective texts first one way, then the other, demonstrating that the use of the slash is far from established.

Like other punctuation marks, the slash has come to play several roles in written English. Its place on the standard typewriter keyboard was probably gained by its conventional uses with numerals and measures. Its current typographic favor, not to say its functions in widely used computer languages, complements its current use to join grammatical coordinates in discourse. The slash extends the distinctiveness of English in its visible form.

References

Chafe, Wallace L. 1982. Integration and involvement in speaking, writing, and oral literature. *Spoken and written language: exploring orality and literacy,* ed. by Deborah Tannen, 35-53. Norwood, NJ: Ablex.

Edelsky, Carole. 1983. Segmentation and punctuation: developmental data from young writers in a bilingual program. *Research in the Teaching of English,* 17.135-56.

Evans, Bergen, and Cornelia Evans. 1957. *A dictionary of contemporary American usage.* New York: Random House.

Halliday, M.A.K., and Ruqaiya Hasan. 1976. *Cohesion in English.* London: Longman.

Keyser, Samuel Jay, and Paul M. Postal. 1976. *Beginning English grammar.* New York: Harper and Row.

Manual of style, 13th ed. 1982. Chicago: University of Chicago Press.

McNeill, David. 1966. Speaking of space. *Science,* 152.875-80.

Timmons, Christine, and Frank Gibney, eds. 1980. *Britannica book of English usage.* Garden City, NY: Doubleday/Britannica.

Patrick Groff

The Significance of Word Length

Despite the lack of direct empirical evidence on the issue, much comment from teacher educators has been made about the effect of word length on word recognition. A report of this relationship as found with fourth-grade children is reported here. The results of three tests of this relationship are reported: the percentages of these children's correct reading of words of varying syllabic lengths; the correlation between these correct readings of words and their syllabic counts; and the correlation between these correct readings of words and their letter counts. None of these statistics supports the conclusion that there is a significant relationship between word length and word recognition.

The controversy over whether the length of words in syllables or letters has a critical effect on pupils' learning to read them continues to the present. Without offering any direct evidence as to whether the lengths of words actually have any influence on the rate or effectiveness of children's learning to read them, some educational experts have taken strongly-held yet diametrically opposed positions on this issue.

On the one hand, some teacher educators insist that the syllabic or letter count of a word should not be given any consideration in the determination of the words presented for pupils in reading programs (Aukerman & Aukerman, 1981; Dauzat & Dauzat, 1981). To the contrary, other reading instruction experts maintain that shorter words are usually easier for children to learn to recognize than are longer ones (Carnine & Silbert, 1979).

At present, however, there appears to be no available findings from investigations made of this issue. That is, no researcher so far has tried to determine if, in fact, monosyllabic words, or ones with a relatively few number of letters, are less difficult for pupils to learn to read than are polysyllabic words or ones with relatively greater numbers of letters.

The Present Study

Although there appears at present to be no reports of primary evidence on the relationship of the syllabic or letter count of words to children's abilities to read them, information regarding this relationship can be gained through a secondary source. Dale and Eichholz' (1960) study of written word recognition abilities of fourth-grade pupils offers a source from which to determine if children at this grade level find polysyllabic words more difficult to recognize than single-syllable ones.

Visible Language, XVII 4 (Autumn 1983), pp. 396-398.
Author's address: School of Education, San Diego State University, San Diego, CA 92182.

The Dale-Eichholz study presents the percentages of "200 or more" fourth-grade children in selected schools throughout the U.S. who correctly responded to a three-item, multiple-choice written test of 1302 words. These pupils were asked to read and decide which of three choices best identified a given key word. For example:

bear----- (A) to laugh (B) drinking glass (C) to carry

The goal of this testing was to identify words that fourth-grade children read with not less than 50 percent and not more than 85 percent accuracy, on the average. The study actually reports on all words within the range of 51 to 99 percent accuracy. I calculated that the average score on these 1302 words was 76.4 percent, with a standard deviation of 9.9 percent.

An inspection of the Dale-Eichholz findings disclosed the following information about the relationship between the different syllabic lengths of words and the percents of fourth-graders who could correctly read words of varying syllabic lengths. Presented here are the (1) words used in the study arranged into five different categories according to their syllabic lengths, (2) the percents of the total words that each of these five categories represented, and (3) the average percents of correct readings by fourth-graders of these words of different syllabic lengths:

Word length in syllables	Percent of total words	Average reading in percents
1	19.0	76.2
2	53.0	77.8
3	23.1	76.7
4	3.8	74.7
5	1.1	74.2

A second analysis of the Dale-Eichholz findings then was made. A Pearson product-moment coefficient of correlation was obtained between the percents of these fourth-grade pupils' correct readings of these 1302 words and the syllable counts of these words. This r was −.004. This statistic indicates that there is almost no degree of observable relationship between these two variables.

A third analysis of the Dale-Eichholz findings produced the same results. Here a Pearson coefficient of correlation was obtained between the percents of these fourth-grade pupils' correct readings of 1302 words and the letter counts of these words. This r was −.023. This statistic indicates that there is almost no degree of observable relationship between the length of these words in letters and fourth-grade children's abilities to read them.

Discussion

The findings of these three tests of the relationship of the length of words and fourth-grade children's abilities to read them suggest that by the time pupils have reached to fourth grade the syllabic and letter counts of words are of no consequence in these children's efforts to read them. Syllabic and letter count factors thus should not be a significant consideration in the decisions made about which words to teach children at this grade level to read. The findings of the present study obviously support the conclusion that the length of words is not a critical matter of concern in reading instruction—at least at the fourth-grade level.

While word length in syllable or letter count does not appear to be a crucial factor in fourth-grade children's reading performance, one cannot legitimately generalize that this conclusion equally applies to the reading performance of beginning readers. Dale and Eichholz (1960) found that 87 percent of the fourth-grade children they tested could correctly read and comprehend the word *hippopotamus*. It remains to be determined, however, if long words (in syllabic and letter count) like *hippopotamus* have such striking imagery and relevancy for young children that they become relatively easy for beginning readers to learn to read. Does the fact that polysyllabic words generally have fewer connotations assist beginning readers in this aspect of reading behavior?

On the other hand, are monosyllabic words easier for beginning readers to identify because with such lexical items these children do not have to differentiate between a word and a syllable? Does the evidence that phonics rules apply more regularly and more easily to monosyllabic words, while fewer phonics rules are needed to decode them, indicate that short words are easier than long words for beginning readers to recognize?

The data examined in the present study obviously does not provide answers to these critical questions. These data suggest that word length in general appears to be of no consequence in fourth-grade children's reading behavior. It remains to be seen, however, whether this statement can legitimately be made about the reading performance of primary-grade pupils.

References

Aukerman, R. C. & Aukerman, L. R. *How do I teach reading?* New York: John Wiley, 1981.

Carnine D. & Silbert, J. *Direct instruction reading.* Columbus: Charles E. Merrill, 1979.

Dale, E. & Eichholz, G. *Children's knowledge of words.* Columbus: Bureau of Educational Research and Service, Ohio State University, 1960.

Dauzat, J. A. & Dauzat, S. V. *Reading: the teacher and the learner.* New York: John Wiley, 1981.

J. Robert Moskin

The Future for Books in the Electronic Era

A report on a seminar jointly sponsored by the Jerusalem International Book Fair and the Aspen Institute for Humanistic Studies

In the future a book may be bought as a bubble-wrapped package containing a dust jacket together with a computer chip from which the reader prints out the text at home.

Publishers may not stock inventory but print books when customers order them.

Information will be acquired rapidly from computerized databanks, but literature and poetry will remain in printed form.

The usage of language may be changing under the impact staccato TV-talk.

Although most cultural and political life has always taken place outside the home, the new electronic technology may be creating an isolating "living room culture."

These are some of the possible effects of the new electronic technology on the future of books and book publishing that were discussed by a panel of diverse experts in a two-day seminar at the Jerusalem International Book Fair in late April 1983. The major themes that dominated the seminar were:

1. Whether the new communications technology is a threat to—or an opportunity for—book publishing.
2. Distinctions in the use of the new technology for information, entertainment and art.
3. The nature and extent of the technological revolution.
4. How the role and rights of creators and writers are affected by the new technology.
5. How the new technology gives consumers new choices.
6. How conversions are made between books and the new technology and how books are adapted to the new media.

Threat or Opportunity

Eliot Minsker reviewed the various modes of electronic publishing, including computer databases, videocassettes, videodiscs, cable television, direct-broadcast satellites, game cassettes, floppy discs (for computers), flat portable TV screens and remote printing. He identified the lines of opportunity and con-

Visible Language, XVII 4 (Autumn 1983), Pp. 399-407.
Author's address: Aspen Institute, 717 Fifth Avenue, New York, NY 10022.

flict between these modes and the publishing role. Minsker asserted that the new technology is not a threat to the publisher or the author, but is, perhaps, to the traditional printer. He pointed out that the publisher still controls the information and that electronics can communicate it to a larger audience—get more information to more people. The real threat to publishers today is the increasing cost to produce and ship books. Electronics can improve the distribution system. He projected an electronic-era scenario in which the publisher will be relieved from guessing at his print run. He can print to order. Minsker even speculated on publishing a bubble package containing just a dust cover and a computer chip. Referring to marketing requirements, he said, "We are always going to need a dust cover."

Marc Jaffe asked about the effect of such an offering on the impulse buyer. He said a significant percentage of book sales comes from impulse purchases. Elihu Katz reinforced Jaffe's point in the discussion period. He said that while publishers can assume readers are highly motivated, they cannot afford to eliminate browsers who are "looking for the unknown."

Irving Lazar took issue with Minsker. He said, "The publishing world is 'the fabulous invalid.' . . . The publishers have never been in better shape—immensely profitable." He said that publishers have problems because their books are either not in the stores or are on display for too brief a time. Jaffe agreed that "publishing is healthy."

"The book shall survive," asserted Martin Levin. He pointed out that in 1982 book revenues were up and that heavy readers devote as much time as ever to books. If the new media have virtues of being updatable and accessible, so do books, he argued. Books have already survived television, but a distinction should be made between *literature* in book form and *information* in book form.

Robert Maxwell said that publishers, authors, and printers must look on electronics as an opportunity. However, Martin Keltz, a publisher who is already working in the electronic future, warned that leisure time is finite and that studies show the use of video is already expected to rise from 7.8 hours a day per household to 12 hours a day. He said the printed word is no longer the only tool for getting information; the younger generation is rapidly developing an affinity and ability to work with electronic media.

Both critic John Leonard and author Herbert Mitgang urged attention to the audience. Leonard said the problem of the new media is to find their audiences, and Mitgang emphasized the need to reach minorities of people with special interests.

Minsker interjected that, in the long run, economics and price structures will dictate whether novels, for example, remain in book form as we know it. Adam Hodgkin predicted that the key will be not what technology is available but rather how quickly people want it and get used to it. Similarly, Ernst Cramer said that the tool is irrelevant—"the brain makes the difference." He saw no worry

for the writer in the new technology. He added that books will always be in demand for an elite of serious readers. "Television," he said, "is not the enemy of the book—but a competitor." Herbert Schlosser agreed that the new electronic media will not replace the book but will supplement it. He said that radio did not eliminate the movie theater and television did not eliminate either the movies or the theater. He predicted that viewers will be exposed to more subjects; and when they want to explore them in depth, they will turn to books. John Leonard said later in the seminar, "We are talking about wonderful toys. Technology has made life more pleasing and longer." Ernst Cramer added, "There is a desire that good books survive. They will survive. We must not be afraid of the new media. They can enrich our culture if there are a lot of people who care."

Moderator Michael Rice summed up by saying that the new computer-based technologies are more like the telephone than like television—terrifying at first use, perhaps, but soon familiar and taken for granted. They will help many people communicate with each other—as opposed to broadcasting, which communicates just from the one to the many. The computer may turn out to be the most hospitable medium for such point-to-point, person-to-person communication.

Information, Entertainment, and Art

Speculating on electronic publishing's prospects, Martin Levin distinguished between the dissemination of information and literature. Robert Maxwell supported this distinction by saying that the electronic systems for handling money have developed fastest because of the need for swift and comprehensive information in the banking and investment fields. He added wryly that medical information could also be communicated instantly if people were thought to be as valuable as money. He said that electronic publishing will advance most rapidly in areas of crucial "high penalty" information. Sir Huw Wheldon agreed that information will be marketed electronically while literature, poetry, and philosophy do not have to be updated and therefore would more likely remain in book form. Martin Levin predicted that information, unlike literature, will be transferred "without paper." He discussed shopping, banking, and game-playing by electronics, also citing the LEXIS system, which makes comprehensive legal information available to lawyers. He introduced Jerome Rubin who described the LEXIS system he helped create. He said it has worked well and even increased the sale of law books.

Media change their functions over time, Professor Katz explained. He said radio in the beginning was used for point-to-point communication and only later became a broadcast medium. Photography liberated art to be non-representational. The book was originally a collective experience but is now used individually. Ernst Cramer made a similar point when he said that refer-

ence books and thrillers will be shifted to electronic databanks but literature and science will still be marketed as books. John Leonard agreed: "Most novel writing is trash"—and can now be seen on television, but electronics provide us with machines that can deliver more information faster and to more places. Adam Hodgkin pointed out that both writer and reader make an investment in literature, and he doubted that video has the same cultural value. Leonard added that McLuhan was wrong in thinking that the new media are participatory. Huw Wheldon emphasized a further distinction—between art and entertainment—and asserted that American television is based on the tradition of the movies, "not the art of truth but the art of pleasure." He added that the dramatic tradition stems from the art of the sublime and good plays belong to the world of art, not entertainment. "The enemy is mediocrity and accepting mediocrity." The new technology may crowd out the written word, Adam Hodgkin warned. It may prevent the creation of literature.

The Technological Revolution

Herbert Schlosser suggested the extent of the electronic communication revolution by pointing out that almost three million home computers have already been sold and many countries are putting satellites into place. RCA alone has five working satellites. Schlosser added that growth rates in Europe are at least as great as in the United States. Major publishers are entering the business; 65 percent of Time Inc.'s earnings now comes from its video group. Eliot Minsker noted that there are 1500 databases in the world today and most started from the book form. The market dictates that pace of change, Adam Hodgkin said. Oxford University Press is already looking into paperless publishing. It is printing fewer copies of its books and could even move into printing on demand.

Huw Wheldon and Martin Levin both expressed the feeling that the use of the new technology thus far has been mostly parasitical. Television uses reruns because new material is expensive and demanding. In Levin's view, we are spreadeagled between the old and new technologies and may actually be in a pre-revolutionary stage. We have lived with television for 30 years and most of it has been linear and story-telling, Schlosser commented. But now we are beginning to see children learning to use the personal computer in school and at home —a quite different experience. Keltz added that even video games provide a learning experience; youngsters go on to develop an interest in programming their own games and using home computers. Cramer said that television is changing the language. The newspaper *Bild Zeitung* copies its style from television usage. As people grow accustomed to this, he warned, they may lose the ability to read seriously.

The fastest growing video form at present, Scholosser said, is non-linear and non-story-telling; it is music video with wild, non-story images. He feels that this non-linear exposure is already changing the medium and may change the

viewer. Herbert Mitgang said he was horrified by the thought of children mesmerized by this music video. Professor Katz suggested that whether we use the printed page or moving images defines the nature of the content and affects how the mind works. He observed that different media favor different content. John Leonard pointed out that in books words are meant to be read and on film they are spoken; the decisive difference is the typewriter versus the camera. "I think there is no cause to mourn the destruction of literature," he added. "The book will endure." And Martin Keltz agreed that film and television offer exciting frontiers on which great works will be created. But the small screen does not yet have the capacity to satisfy the needs of the imagination, Marc Jaffe warned. Databases can contain information but they cannot tell us what we don't know and what we need to know. Michael Rice said that the word processor can help liberate even the poet by making text adjustments effortless. But Sir Huw Wheldon said he did not see much future for poetry in the electronic media; poetry, he anticipates, will be left to books and the printed page.

The key, according to Schlosser, is what we choose to put into the new machines. "The new generation will be able to operate computers and still read books." Adam Hodgkin added, "Literature preceded the printing press. We are not wedded to printing and paper." Martin Levin compared this era to the period of the Armory Show of 1913 when people were not ready to accept the new art forms. He said we shall have to wait a generation to see how the new technology will develop. He predicted that publishing will change to smaller press runs and will be able to find and segment audiences.

Writers' Roles and Rights

A number of participants discussed the role and responsibility of the author in relation to the new technology. Ernst Cramer asked whether in the future the work of good writers will be economical to publish. Irving Lazar asserted that all writers are serious, but they are at the mercy of how the publisher sells their books. Huw Wheldon asked whether in electronic publishing the author is more or less in control. Adam Hodgkin expressed the view that authors are more in control, but Martin Keltz felt that electronic technology allows the editor and publisher more participation—instantaneously.

The skills of writers and graphic designers will change for the new media, Keltz predicted, but existing talent need not be lost. In book publishing, Marc Jaffe said, despite marketing and production input, decisions are made by creative individuals and small editorial entities. He agreed with Ernst Cramer that we do not yet know the impact of the new technology on language, but he believes lieves it is already clear that training in television writing has improved storytelling skills. Huw Wheldon added that writers will provide the leadership: The content always leads—not the production.

Herbert Mitgang made the point that authors must have the protection of copyright and royalties in order to keep top talent writing for the new media. He said he has two fears: that electronic forms will detract talented writers from doing the best work they could do and that writers will not be given the protection they deserve. Irving Lazar said that in his experience novelists write movies to make money: If they don't need the money, they won't do it.

Herbert Schlosser expects that in the United States the Supreme Court will ultimately decide whether it is illegal for consumers to tape television programs off the air; he anticipates tax-and-royalty arrangements for this use in return for making it legal. Lazar agreed that authors will share in the profits. John Leonard said, "As far as real books are concerned, there has been no good television." Mitgang re-emphasized that even if just two paragraphs of non-fiction are put into a database system, the copyright must be protected.

New Choices for Consumers

Herbert Schlosser disagreed with John Leonard's comment that television is a passive medium. It is now a receiving screen for a wide array of inputs. The consumer has choices and decides how to program the TV set. Advances have been explosive in this area over the past five years, he said. In the United States in 1982, advertisers and consumers supported video to the amount of $20 billion; a large proportion of that outlay was made up of consumer payments for programs. The United States already has 5,000 separate cable systems and 29 million homes connected to cable. Consumer choice will keep growing, Schlosser predicted, as videodiscs and cassettes are produced and sold together with books.

To illustrate how the new technology expands the range of choice, Schlosser cited the expansion of the audience for opera and ballet through the sales of videotapes and discs. Many people who cannot get to opera for either geographic or economic reasons can enjoy it through the new technology. At the same time, music video is now associated with the best-selling popular music. Reinhardt Muller-Freienfels asserted, however, that television cannot replace the experience of personal presence at opera. He said that while Bayreuth's and Salzberg's festivals are sold out, the same programs on television attract only three percent of the TV audience. Martin Keltz said the movies are being captured by the 14- to 25-year-olds who want to get out of the house. Still, video expands the audience who eventually sees movies.

The experience of watching television is different from that of reading, seeing a film, or attending an opera performance, Professor Katz suggested. He feels that the experience of television as we know it may change because of the new technology; people may even dress up to watch great events on television. Ernst Cramer asked whether television programs prepare a larger percentage of the people to switch to serious programs and to books. Can more people be

interested in high-quality television and books? If so, he said, we would truly have a revolution.

The videocassette recorder is successful because it is a time-shifting device, allowing people to watch programs they want and would otherwise miss, according to Martin Keltz. Production studios, he said, were at first terrified by home video and then came to see it as a supplementary market. At the same time, it liberated the viewer from the tryanny of the networks and the advertisers. The consumer can watch what he wants to and when.

Keltz added that children have an appetite for moving-image media; and since children's programs have been replaced by soap operas on afternoon television and relegated to Saturday mornings, Scholastic saw an opportunity to find unserved audiences via the new media. It created interactive videodiscs with a variety of games that let children vary what they see. Cable systems, wanting to be deemed essential to the whole family, also offer children's programming.

From the seminar audience, book publisher Esther Margolis was troubled that bookstore chains are going heavily into video games at a time when space for books is already crowded.

Professor Katz said that, as perceived in most nations, at least 50 percent of what comes out of the television set is what someone abroad has put into it. Commenting on this observation, John Leonard said that every culture should represent its own people—they look to its substance and style for their identity. But it is often cheaper to buy culture from somewhere else—and that, Leonard said, is dangerous. In the discussion period, one commentator suggested that the new technology is pushing us toward a universal world culture. Katz noted that television causes people to stay home, while culture and politics go on outside the home. The new technology that is spreading across the world is creating "a living room culture."

Conversions and Adaptations

The largest financial opportunity created by the new technology is in mass entertainment, said Schlosser. The television mini-series tells the story of a novel in from two to 20 hours. This is an expensive form of production and recovers its investment through the use of broadcasting, cable, and home video. As millions of people acquire home video, novels and other books will appear first in that medium and then play on pay cable and finally on free television. Books and film rights are already frequently sold together.

In the making of large series, Huw Wheldon said a program should be prepared like a book with an author—and without committees. He said that when he approached Kenneth Clark for the series that became *Civilisation,* he approached him as an author. But Sir Huw warned that one cannot produce the equivalent of a book in video—the best one can do is make a translation. He said that the film or video product "is organic in its own right." Books and

video both need good creative work and are very hard to make. He added, "So far, no masterpieces have been created in the new electronic media."

In the final seminar session, devoted to Film and Television Adaptation—Dramatizing a Book, moderator Michael Rice noted that today we have film and TV-drama book adaptations, including non-fiction docu-dramas and both fiction and non-fiction mini-series. He asked whether, in the light of this diversity, we can look forward to dramatizations of other books beyond the "blockbusters." Do dramatizations increase book sales? Are there rules of fidelity to the source work? What have we learned from involving the author in adaptations? How is the integrity of the author's work protected?

Irving Lazar, whose work has involved him in such questions over 60 years, led the final discussion. "Every night is still New Year's Eve," he said buoyantly. He cited *Winds of War, Shogun, Thornbirds,* and *Roots* as great adaptation successes. *Roots,* he pointed out, actually started as a television production, and the book became a bestseller after the film was well received. *Winds of War* made its book sequel, *War and Remembrance,* a bestseller again. Lazar said it is not essential to start with a bestseller to make a television hit.

No movies have shaken people to their core and changed their perceptions, John Leoard said. Reinhardt Muller-Freienfels said his organization has been adapting books for television and the movies for many years. They have learned that the books best adaptable for television are novels with stories and suspense and not too many characters; it also helps if not too much of the story takes place in the minds of the characters. Most important, he said, is that the book, even an old book, "hits the nerve of the present time." Muller-Freienfels found that the worst adaptation merely illustrated the book. Often the integrity of the book can better be protected by a good adaptation than by exact duplication. One can be too respectful of a novel. He cited Alfred Hitchcock for converting mediocre novels into memorable films. He said German publishers seek adaptations because adaptations sell books. He believes that television brings people back to books.

The seminar at the Jerusalem International Book Fair concluded that book publishers, writers and readers are in the middle of a technological revolution that is rapidly changing cultural habits. The revolution contains both opportunities and threats, but it is a permanent part of our world and everyone is adapting to its existence. The challenge is to assemble and disseminate information effectively—and to create entertainment and works of art that will be communicated in new forms, including those still beyond today's horizon.

The seminar was suggested by Mayor Teddy Kollek of Jerusalem and Joseph E. Slater, President of the Aspen Institute, and organized by Michael Rice, Senior Fellow of the Aspen Institute, and Zev Birger, Managing Director of the Jerusalem International Book Fair, with support from the Times Mirror Company and others.

Participants

Ernst Cramer, Editorial Writer & Chief Executive, Axel Springer Publishing, Berlin
Adam Hodgkin, Senior Publishing Editor, Philosophy and Law, Oxford University Press, Oxford
Marc Jaffe, Editorial Director, Villard Books, Random House, New York
Elihu Katz, Professor of Sociology and Communications, Hebrew University, Jerusalem; and University of Southern California, Los Angeles
Martin Keltz, President, Scholastic Productions, New York
Irving Lazar, literary agent, Beverly Hills
John Leonard, television and book critic; cable television host, ABC Arts, New York
Martin Levin, President, Book Publishing, Times Mirror, New York
Robert Maxwell, Chairman, Pergamon Press, Oxford
Eliot Minsker, President, Knowledge Industry Publications, White Plains, New York
Herbert Mitgang, novelist and playwright; former President, Authors Guild of America, New York
Reinhardt Muller-Freienfels, Head, Television Drama Department, Suddeutscher Rundfunk, Stuttgart
Herbert Schlosser, Executive Vice President, RCA Corporation, New York
Sir Huw Wheldon, Chairman, London School of Economics: former Managing Director, BBC Television, London
Michael Rice (moderator), Senior Fellow, Aspen Institute; President, Michael Rice Media, Inc., New York

Floppy Discs vs. Coffee Stains

Manuscripts, those vital records of an author's creative process, are an endangered species. The advent of word processors and their relatively low cost together with increasing simplicity means that even impoverished, unpublished, would-be writers (as well as those who top the best-seller list) have turned to their Wangs, IBMs, and Apples, inserted Wordstar, Scriptsit, or Apple Writer programs and busily begun writing, editing, and revising their creative efforts. The result? A floppy disc!

We should deplore the disappearance of manuscripts. How can anyone, student or scholar, learn anything about the creative process from a floppy disc? Can this wobbly plastic reveal the endless hours, where beauty was born out of its own despair (as William Butler Yeats put it) and bleary-eyed wisdom out of midnight oil?

Manuscripts are these records of creative agony, often sweat-stained, coffee-splattered or cigarette-charred. Manuscripts tell us what went on in a writer's soul, how he or she felt during the agony of creation. Edna St. Vincent Millay may have burned the candle at both ends and wondered at its lovely light, but her first drafts are treasures for future generations. Imagine if Yeats had written those magnificent lyrics celebrating his futile love for Maud Gonne on a word processor! No floppy disc can possibly reveal the depth of his sorrow. Almost a century later his manuscripts in the National Library in Dublin still glow with the power of his passion.

Suppose Ray Bradbury had written *Fahrenheit 451* on a Wang. How appropriate, even ironic, it might have been had his various drafts gone the way of the burning books that he deplores and disappeared into a memory bank. Fortunately, any student of writing can inspect those same drafts in the Special Collections Library of California State University, Fullerton. Novices and professionals alike can examine how a brief story, "The Fireman," grew into an unpublished novelette, *Fire Burn, Fire Burn!* and then developed into another longer version, *The Hearth and the Salamander*, also unpublished.

On these pages Bradbury's own bold handwriting has substituted a vivid verb for a flabby one, switched a sentence or two around, substituted a better noun. The manuscript provides a perfect example of the artist at work. We would never see that kind of development or final polishing on any number of floppy discs. Moreover, put a lot of manuscripts together and you have an archive. Memoranda, diaries, journals, jottings, first, second, and third drafts —these archives are important to all of us. The archives of a city are often musty collections of scribbled scraps of paper, meaningful doodles about boundary lines or endless handwritten records of marriages, divorces, deeds, births, and deaths.

Manuscripts tell us how Thomas Jefferson's mind worked as he drafted the Declaration of Independence. We have learned volumes from the diaries, papers, letters, and exhortations of those who put our Constitution together. Would we know as much if they had done it all on a new floppy disc? Unthinkable!

James Joyce once wrote that the errors of an artist are the portals of discovery. Unfortunately, we will never know of those errors if clean, neat, immaculate, but errorless floppy discs replace tattered, pen-scratched, scissored, taped, yellowed, rewritten, retyped manuscripts. Libraries preserve them; students learn from them; auctioneers cry them at fabulous prices; owners cherish them. And word processors totally eliminate them. Our loss would be incalculable.

Manuscripts are our gift to our heritage, and we have no right to deprive future generations of learning how we think and feel, simply because we find word processing more convenient. Patiently corrected manuscripts, not floppy discs, can tell any notice writer or future historian that writing is hard work, that it takes vision and revision alike — and that it should be done on paper, not with electrons on a screen.

Willis E. McNelly

Willis E. McNelly is professor of English at California State University at Fullerton. Reprinted from the *Los Angeles Times* with kind permission.

Is Roman Type an Open-Ended System? A Response to Douglas Hofstadter

I believe that Douglas Hofstadter (1982) is unfair in his critique of Donald Knuth's "metafont" article (Knuth 1982). I do not dispute Hofstadter's view that the production of new examples of semantic categories such as "chair" or "waltz" is often a creative act, in a sense which implies that the extension of such categories is not recursively enumerable. This is a point of view which I have often (e.g., Sampson 1979, ch. 3) been at pains to argue myself. (It seems unhelpful to invoke Gödel's theorem in this connexion; the issue is not primarily a mathematical one, and Wittgenstein's analysis of the word *game* in the *Philosophical Investigations* [Wittgenstein 1953, §66ff.] is surely a clearer and more persuasive statement of the case than any discussion in terms of formal logic. But that is by the way.) Even if we accept the existence of many non-enumerable categories, though, we must surely accept that there are also many categories which *are* rigorously enumerable; for instance the class of *colours* has infinitely many members (because wavelength, saturation, and so on, are continuous variables), but all those members are located within a logical space which has fixed boundaries that depend on the physiology of human vision and the properties of light—no one will ever be able to create a new range of colours different in kind from the ones we know already. Human life involves both open-ended categories and closed categories, and in many cases it is very hard to say whether a given intuitively-familiar category is open-ended or closed. Is the category "sentence of the English language" closed or open-ended? Academic linguists have different views on the question. Hofstadter writes as if Knuth assumes an obviously open-ended category to be closed; but I cannot see that Hofstadter has demonstrated this.

The kernel of Hofstadter's critique relates to Knuth's throwaway remark about a hypothetical font that is "one fourth of the way between Baskerville and Helvetica." According to Hofstadter, Knuth's belief that this concept makes sense commits Knuth to the idea that one could in principle define a "metafont," a finite set of typographical variables which generates all actual Roman-alphabet fonts (in the sense that any such font would correspond to some particular choice of value for each variable) and nothing that is not a Roman font. Hofstadter suggests the implausibility of this by illustrating a very diverse range of upper-case A s (his Figure 1).

But, although Knuth's remark was so peripheral in the context of his article that it seems unreasonable of Hofstadter to lay great stress on it, it was not in fact as indefensible as Hofstadter makes it seem. Baskerville and Helvetica are

both book faces, rather than faces designed exclusively for display. On the other hand, the 56 A s of Hofstadter's Figure 1 are all drawn from display faces. (Old English, E2 in Figure 1, has not been used as a book face for several centuries, and arguably is as distinct from the Roman alphabet in the normal sense as the Greek alphabet is—we do not classify it as a separate alphabet because we use it to write our own language.) It is much less obvious that the class of book faces is open-ended than that the class of display faces is.

In the design of a display face the aim of instantiating the various Roman letters is often subordinate to the aim of creating a particular visual effect. Sometimes the designer goes so far to achieve the second aim that he fails to achieve the first. When a concept is open-ended, there will often be room for doubt about whether a given marginal instance falls within its extension or not (that is why, in the law, we have the institution of "test cases" as a mechanism for reaching society-wide agreement about whether given actions fall inside or outside the open-ended category of "illegal acts"). Hofstadter says that a metafont would need to generate all the letter-shapes in his Figure 1; but I believe that some of them are not in fact examples of the letter A. I would make that claim for D5, which is one of the variants offered for A in Cathedral; for E8, which I have not succeeded in identifying; and, less confidently, for C4 (Block Up) and A8 (Stop). Just as, being a native speaker of English, I judge that the poet E.E. Cummings's line *Anyone lived in a little how town* is not an English sentence (whatever other virtues it may have), so, as a "native reader" of the Roman alphabet, I judge that the shape D5 is not a letter A. An inscription in letters all of which were as distorted as D5 could not be read by an otherwise competent reader, unless he learned the distorted letters as one can learn the Greek or the Hebrew alphabet. (Most of the other letter-shapes in Cathedral are relatively normal, so in practice D5 would be understood from context.)

Thus the task of designing a metafont to generate all and only the possible Roman fonts might not have to cope with everything in Hofstadter's Figure 1, even if it covered display as well as book faces. Still, I guess that the range of display faces would in fact be open-ended even if pathological items like D5 were excluded. But if we restrict that task to book faces (which are the only faces discussed by Knuth) then the open-endedness of the range really does become questionable. Hofstadter (p. 323) denies that this restriction affects his point: with "more conservative letters . . . [o]ne simply has to look at a finer grain size, and all the same kinds of issues reappear." Do they?

The only argument Hofstadter gives for this is the difficulty of "parametrizing" the contrast between the round dots of Baskerville i, j and the square dots in Helvetica, and between the tails of Q in the two faces. But Hofstadter concedes that it is not "inconceivable" that these problems could be solved. Furthermore it seems to me that the number of such points, where two faces differ with respect to some property of an individual letter in a way that appears not to be

predictable on the basis of more general differences between the faces, is fairly limited. The tail of Q is an oddity in many faces; likewise the terminal of G; but on the other hand if you know what (say) P looks like in a given book face you will have a very good idea what D, or H, or T looks like.

I would suggest that it is an entirely reasonable research programme to attempt to define a finite (no doubt large) set of variables (many of which no doubt would be very subtle) which generate all Roman book faces, including faces not explicitly taken into consideration when formulating the variables, and excluding pathological letter-forms such as the Cathedral A-variant. This task is quite analogous to that of the linguist who attempts to formulate a "grammar" that generates all and only the sentences of English or another language, including sentences which the linguist has not encountered, but excluding pathological cases such as foreigners' or young children's mistakes. (Pathological letter-shapes may occur even among book faces. For instance, in the original version of Cheltenham—which was not exclusively a display face—the barb of r extended above the x-height. This quirk does not appear to relate to any more general property of Cheltenham, and is abandoned in the Letraset version of the face; arguably, the original Cheltenham r was not a legitimate r.)

If Hofstadter's view of typography is correct, the task proposed will prove impossible: every extra face considered will force the addition of yet more independent variables to the metafont. Likewise, it may be true that English-speakers' utterances do not conform to any finite set of grammatical rules. In neither case, I believe, do we have adequate reason to reach this negative conclusion *a priori.*

Geoffrey Sampson, Department of Linguistics and Modern English Language, University of Lancaster, Lancaster LA1 4YT, England.

References

Hofstadter, D. R. (1982) "Meta-Font, Metamathematics, and Metaphysics: Comments on Donald Knuth's 'The Concept of a Meta-Font'." *Visible Language* 16.309-38.

Knuth, D. E. (1982) "The Concept of a Meta-Font." *Visible Language* 16.3-27.

Sampson, G. R. (1979) *Liberty and Language,* Oxford University Press.

Wittgenstein, L. (1953) *Philosophical Investigations,* Basil Blackwell.

A Reply from Douglas Hofstadter

When I first read this letter, I must admit, I felt for a brief instant that it made sense; that I had perhaps overstated my case. Sampson's point seemed reasonable. But then I started wondering, "Just where *are* the boundary lines of 'book-face-ness'?" This issue is beautifully exemplified by a tacit assumption made by Sampson. He calls Helvetica a book face, without any qualms. In doing so, he practically kicks the ball between his own goal posts for me! Helvetica is almost always thought of as a display face, and is most often used in book titles and advertising displays. It is a sans-serif face, like Optima, Eras, Antique Olive Compact, Eurostile, and many others of a similar vintage (see Figure 1). Which of these, pray tell, are display faces, and which book faces? And among serifed faces, what about Goudy, Dynamo, Romic, Aachen, Trooper, Souvenir, Americana, Benguiat, Quadrata, Korinna, etc.? (See Figure 2.)

Treacherous waters, these. The "problem" (actually not a problem at all, but a marvelous fact) is that the same typeface designers who design our favorite book faces also design our favorite display faces. And the same sense of style and joyous creation is called upon in both tasks. The way I think of it is that each designer has a "wildness knob" with which to fiddle. When it's set low, the complexities and trickeries "retreat" into the nooks and crannies of the letterforms: how strokes terminate, swerve, change width, meet, and so on, and so the resulting typeface appears reserved and dignified, conventional yet graceful and stylish, still full of the designer's known characteristics. When wildness is set high, the desire for unusual, exuberant effects is let out of the closet, and the resulting typeface is full of bold flair and exciting, risky bravado: strokes are doubled, omitted, have extravagant shapes, flourishes, and so on. It is quite naive to think that low wildness means "the same old book-face knobs are twiddled" no matter who's doing it, whereas high wildness involves an open-ended set of concepts.

No creative designer with any pride would ever feel content creating within a pre-set formula, a predetermined set of knobs. The joy of any kind of creation is in playing at the boundaries of what has been done. Every perceptive observer has an intuitive sense of the implicosphere centered on each standard letter and each role within it — a sense of how daring various deviations will seem, and of just where they will begin veering off into unacceptability. At the blurry boundaries of an implicosphere is exactly where an artist most loves to play. With wildness set low, a designer will flirt with the boundaries largely from *within*, making most decisions on the conservative side. With wildness set high, many more risks will be taken, and the flirting

will carry the designer noticeably further from the implicosphere's center, like a satellite in a wider orbit. Norm violation is the name of the game in creation, no matter where the "wildness" knob is set. High wildness or low, it's still the same designer and the same creative forces expressing themselves. It's just a question how subtly, how subduedly, those influences will show up.

Hermann Zapf is the designer of the famous sans-serif face Optima, a typeface that some books have been printed in. Optima is deceptively simple-looking. People tend to think that given one letter of Optima, they could determine all the rest easily. Sampson says as much: "If you know what 'P' looks like in a given typeface, you will have a very good idea what 'D' or 'H' or 'T' looks like." But if that's the case, then why did it take Zapf — one of the world's foremost type designers — seven years to design it? All I can say is that there is rampant naivete about the complexity of letters, even among people who visually are otherwise very astute.

A wonderful exercise to prove this to yourself is to try to draw the Helvetica Medium 'a' by memory (Figure 3). Study it for as long as you like, and then try to reproduce it. The better an eye you have, the more errors you will see you have made. Try it a few times. I myself have attempted that 'a' several dozen times, and still I have never drawn it perfectly. This letter is one of my favorite letters of all time, and I have probably spent more time admiring it than any other letter — yet for all that, I still have not fathomed it entirely.

The case of Helvetica is interesting. What is characteristic about it? It was one of the first typefaces in which negative and positive spaces were given equal attention. It employed very simple, nearly mathematical curves. Why was it designed only in 1958? Why did it take so long for such obvious things to be done so elegantly? It's like asking why the ancient Greeks, with their love of purity and elegance, didn't discover group theory, the branch of mathematics dealing with abstract binary operations. Well, some ideas are so abstract that even though they are glimpsed through a fog centuries earlier, their full-scale arrival takes much longer. (Group theory waited patiently for 2000 years after the Greeks to be discovered!) Thus it was with the pristine qualities of Helvetica. And what *seems* remarkable, but is actually to be expected, is that in the same year as Max Miedinger designed Helvetica, Adrian Frutiger designed Univers, in many ways nearly indistinguishable from Helvetica. Some ideas are just ripe at certain times.

The ideas in Helvetica were not visible to anyone in the 1930's, even though people had thousands of book faces and display faces to look at. Likewise, the ideas in Snorple (a classic book face to be designed by Argli Snorple in 2027) are not visible to us today, even if they are in some sense implicitly defined by what is all around us. Cultural pressures, such as the development of computers and low-resolution digital typefaces, have profound impacts on

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

aabcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Figure 1. (top to bottom) Optima, Eras, Antique Olive Compact, Eurostile.

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefgghijklmnopqrstuvwxyyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
AA*A*BCDEFGHIJKLMMNOPQRSTUVWXYZ

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

abcdeefghijjklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Figure 2. (top to bottom) Goudy, Dynamo, Romic, Aachen, Trooper, Souvenir, Americana, Benguiat, Quadrata, Korinna.

Figure 3. Helvetica Medium 'a.'

Figure 4. Italia Book 'g.'

how letters are perceived. Book faces are as susceptible to those subtle pressures as are display faces. Book faces pose problems no less knotty than do display faces, Sampson notwithstanding.

So on reconsideration, I stick with my point that *all* the same issues as apply to "wild" letterforms apply to "tame" ones — that one merely needs to look at a finer grain size to see the same kinds of problems. As I said above, modern book faces play with stroke tips in incredibly creative and surprising ways. Just look at the 'g' in Italia Book (Figure 4), for example. Check out some of the other letters and then see what you think of Sampson's claim.

People tend to think that only extreme versions of things pose deep problems. That's why few people see modeling the creativity of, say, the trite television character of Archie Bunker as a difficult task. It's strange and disorienting to realize that if we could write a program that could compose Muzak or write trashy novels, we would be 99 percent of the way to mechanizing Mozart and Einstein. Even a program that could act like a mentally retarded person would be a huge advance. The commonest abilities — not the rarest ones — are still the central mental mystery.

John McCarthy, one of the founders of the field of artificial intelligence, is fond of talking of the day when we'll have "kitchen robots" to do chores for us, such as fixing a lovely shrimp creole. Such a robot would, in his view, be exploitable like a slave because it would not be conscious in the slightest. To me, this is incomprehensible. Anything that could get along in the unpredictable kitchen world would be as worthy of being considered conscious as would a robot that could survive for a week in the Rockies. To me, both worlds are incredibly subtle and potentially surprise-filled. Yet I suspect that McCarthy thinks of a kitchen as Sampson thinks of book faces: as some sort of simple and "closed" world, in contrast to "open-ended" worlds, such as the Rockies. This is just another example, in my opinion, of vastly underestimating the complexity of a world we take for granted, and thus underestimating the complexity of the beings that could get along in such a world.

Ultimately, the only way to be convinced of these kinds of things is to try to write a computer program to get along in a kitchen, or to generate book faces. That's when you finally come face to face with the extremely limiting notion of what a knob really is. People's notion of knobs has too much intuitive fluidity to it. It's hard to identify with a computer and to see things utterly and foolishly rigidly — but that's where you have to begin if you want to understand why knobbifying the alphabet is a task of vast magnitude, and is a microcosm of the task of knobbifying all of human thought.

MIT Artificial Intelligence Laboratory
545 Technology Square
Cambridge, MA 02139

Correspondence

To the editor:

Re: Douglas Hofstadter, "Meta-Font, Metamathematics, and Metaphysics: Comments on Donald Knuth's 'The Concept of a Meta-Font'," volume XVI number 4.

I never meant to imply that all typefaces could usefully be combined into one single meta-font, not even if consideration is restricted to book faces. For example, there are two major families of book faces, the Garaldes and the Didones, and I doubt the wisdom of trying to incorporate both into a single design. (See the interesting analysis by Erich Schulz-Anker in *Gebrauchsgraphik* 7/1970.) Nor do I believe that we should blindly copy the work of past masters, without trying to understand why they produced what they did.

The point I was trying to make is simply that is is desirable to incorporate variability into a design; this is, indeed, the central challenge when any manual task is adapted to computers. I believe that an emphasis on changability, as expressed by the variation of parameters, is the major challenge that a type designer now faces.

I believe that it is highly desirable to create new designs that explicitly include continuous variations; such designs should not be expected to produce acceptable results for all settings of their parameters, but they should "work" with respect to as large a parameter space as possible. I am hoping that many such meta-fonts will be created, and hence I am trying to provide tools that will facilitate a designer's task. Although it is not at all easy to design a magnificent meta-font, I think that our experiences so far point to an exciting future, as this research is pursued.

Meanwhile, I'm pleased to see that my article has stimulated people to have other ideas, even if those ideas have little or no connection with the main point I was trying to make. Misunderstandings of meta-fonts may well prove to be more important than my own simple observations in the long run.

Donald E. Knuth, Fletcher Jones Professor of Computer Science,
Stanford University, Stanford, CA 94305

To the editor:

I have just received and read (and reread parts of) *Visible Language* XVI 3—the special issue: Understanding the Symbolism of Mathematics. My congratulations to guest editor Richard Skemp and all the authors. The theme is a most important one and the first hand knowledge of the problems and clarity of the writing makes it special.

I enclose a check for two more copies. One is for my son-in-law, a math teacher who often encounters students with symbol-phobia. The other is for a colleague who has just received a grant to revise the Stanford Achievement tests or some of them for non-hearing children. I worked with him briefly some years ago, and one thing sticks in my mind: in the mathematics concepts part of the primary or pre-primary test the test makers had (and have) made all the errors Adda, Buxton, and Skemp write of. Test takers are supposed to be able to handle such capricious homonymy as the testers' calling circles in the

answer books "balloons, plates, dishes, balls, etc."; and to realize that "boxes, bricks, and blocks" are in fact nothing but small squares. I am sure most children caught in this naming game lose sight of the fact that it is the number, counting the graphic signs that will keep them out of the consulting psychologist's clutches.

I hope some day soon Skemp and company will turn on test makers and tests the same scrutiny they have focused on teachers and textbooks.

Thank you for giving me some hours of real delight.

William C. Stokoe, Director, Linguistics Research Laboratory,
Gallaudet College, Washington, DC 20002

The Authors

Prue Wallis Myers (4 Greenbank House, Albert Square, Bowdon, WA14 2ND, England) has had a varied career in the British school system — both as teacher and as consultant. She has published extensively on the role of handwriting in early education and is currently putting together for publication the teaching materials for a handwriting and literacy project.

Yao-chung Tsao is an assistant professor of psychology at Rennselaer Polytechnic Institute (Troy, NY 12181). Dr. Tsao's interests include: psychological aspects of the Chinese language, hemispheric lateralization, perception of time and human factors engineering. He has coauthored articles published in *Cognitive Psychology, Brain and Language, Perceptual and Motor Skills.*

Tsai-Guey Wang is at the Human Factors Division, IBM-Kingston (Kingston, NY 12401). He has degrees in psychology from Cheng-Chi University, Taiwan, and from Rensselaer Polytechnic Institute. His major interests are in statistics and human factors engineering. He has recently coauthored articles in *Human Factors Proceedings* and *Perceptual and Motor Skills.*

Zev Bar-Lev is an associate professor of linguistics at San Diego State University (San Diego, CA 92182), specializing in theory of ESL and foreign language teaching. Earlier publications have included articles on linguistic theory with special focus on Hebrew, Russian, and other languages. Another current article, "Arabic Ungrammar," complements the present one by using transcription, thus focusing on lexical, syntactic, and pragmatic levels. Mini-lessons are in progress on a variety of other languages.

Gary Perlman is a member of the technical staff at AT&T Bell Laboratories (Murray Hill, NJ 07974). Dr. Perlman's interests are in applied cognitive psychology and mathematics education. He is currently working on ease of learning and use of computer systems.

Tom Erickson is a doctoral student in the Department of Psychology at the University of California, San Diego (CA 92037) while working on human factors in computer systems at Software Products International in San Diego. His interests are in cognitive psychology, especially text comprehension.

Rose-Marie Weber is a linguist teaching in the Reading Department at State University of New York at Albany (Albany, NY 12222). She has published on various topics relating linguistics to reading, including oral reading errors, nonstandard dialects, and literacy education in a language with no written tradition.

Patrick Groff is professor of education in the School of Education at San Diego State University (San Diego, CA 92182). His current research has explored the utility of phonics rules—whether children can infer the correct pronunciation of words from approximate pronunciations derived from the application of phonics rules.

J. Robert Moskin is senior editor at Aspen Institute (717 Fifth Avenue, New York, NY 10022) and a senior editor of *World Press Review.* Formerly foreign editor of *Look* magazine, he is the author of *Among Lions,* the battle for Jerusalem in 1967 (Arbor House & Ballantine Books) and of *The U.S. Marine Corps Story,* the definitive history (McGraw-Hill).

At the end of my introduction to the first issue of this journal (January 1967) I wrote: "We have been blessed with the encouragement of a host of individuals and organizations . . . . Two should be given special mention: Dr. G. W. Ovink and Dr. Bror Zachrisson who, from the very beginning, have counseled and contributed almost every step of the way." Both have been members of the Advisory Board ever since. Both died in 1983: Willem in December in Amsterdam, Bror in September in Stockholm. We miss their scholarship, their counsel, and their friendship.

— Merald Wrolstad

Index to Volume XVII

AUTHOR INDEX

Contributors to the special issue on calligraphy (Winter):

Karen Ackoff
Alan Blackman
Tim Botts
Gunnlaugur Briem
Ewan Clayton
Rick Cusick
Sidney Day
Marc Drogin
Jean Evans
Peter Fraterdeus
Michael Gilbert
Georgianna Greenwood
Michael Harvey
Kris Holmes
Michael Hughey
Jerry Kelly
Karen Knorr
Jean Larcher
Brenda Larsen
Charles Lehman
Paul Maurer
Claude Mediavilla
Karina Meister
Pat Musick
Alexander Nesbitt
Mohammed Saggar
Rosemary Sassoon
Werner Schneider
Paul Shaw
Margaret Shepherd
Bonnie Spiegel
Maureen Squires
Sumner Stone
Jacqueline Svaren
Alan Swanson
Denys Taipale
Pat Topping
Cynthia Tyler
Jane Van Milligen
Mark Van Stone
Diane Von Arx
Julian Waters
Sheila Waters
Lawrence Wheeler
Joan White
Robert Williams
Allen Wong
James Wood
John Woodcock
Lili Wronker
Marilyn Zornado

Page numbers with the prefix "S" refer to the Summer issue.

TITLE INDEX

Note

Readers interested in securing copies of any of the articles listed above should send for the appropriate issue of *Visible Language:*

Pages 1 through 112 are in the Winter issue (XVII No. 1).
Pages 113 through 216 are in the Spring issue (XVII No. 2).
Pages S1 through S112 are in the Summer issue (XVII No. 3).
Pages 329 through 424 are in the Autumn issue (XVII No. 4).

A limited number of back issues of *Visible Language* are available at $4.00 to individuals and $5.00 to institutions. Copies should be ordered directly from Visible Language, Box 1972 CMA, Cleveland, OH 44106. *Payment should accompany your order.*

A folder listing the contents of all volumes of past issues of *Visible Language* is available on request.

Composition by Type Group, Cleveland, Ohio.
Printed by McNaughton & Gunn, Inc., Ann Arbor, Michigan.