VISIBLE LANGUAGE
The quarterly concerned with all that is involved in our being literate.
Volume XX *Number* 4 *Autumn* 1986 *ISSN 0022-2224*

368
INSTRUCTIONAL TEXT: THE TRANSITION
from PAGE *to* SCREEN

Stephen T. Kerr

393
ITALIAN SIXTEENTH-CENTURY ITALIAN WRITING BOOKS
and the SCRIBAL REALITY *in* VERONA

Richard W. Clement

413
VARIATIONS *in* SPELLING *and the*
SPECIAL CASE *of* COLLOQUIAL CONTRACTIONS

Rose-Marie Weber

427
PROXIMITE *du* MURMURE:
DUPIN *and* UBAC COLLABORATEL

Maryann De Julio

437
DIFFERENCES *between* GOOD *and* POOR SPELLERS
in READING STYLE *and* SHORT-TERM MEMORY

Jeanne Ellis Ormrod

448
LINE LENGTHS *and* STARCH SCORES

Sandra E. Moriarty

456
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EDITORIAL CORRESPONDENCE should be addressed to the Editor, Visible Language, 2643 Eaton Road, Cleveland, OH 44118. Telephone 216/371-2576.

BUSINESS CORRESPONDENCE about subscriptions, advertising, and related matters should be addressed to Visible Language, Journals Department, Wayne State University Press, Detroit, MI 48202. Telephone 313/577-4600.

SUBSCRIPTION RATES	One year	Two years	Three years
Individual subscription	$21.00	$38.00	$52.00
Institutional subscription	$32.00	$60.00	$83.00

Non-USA subscribers: add $4.00 per year for postage.

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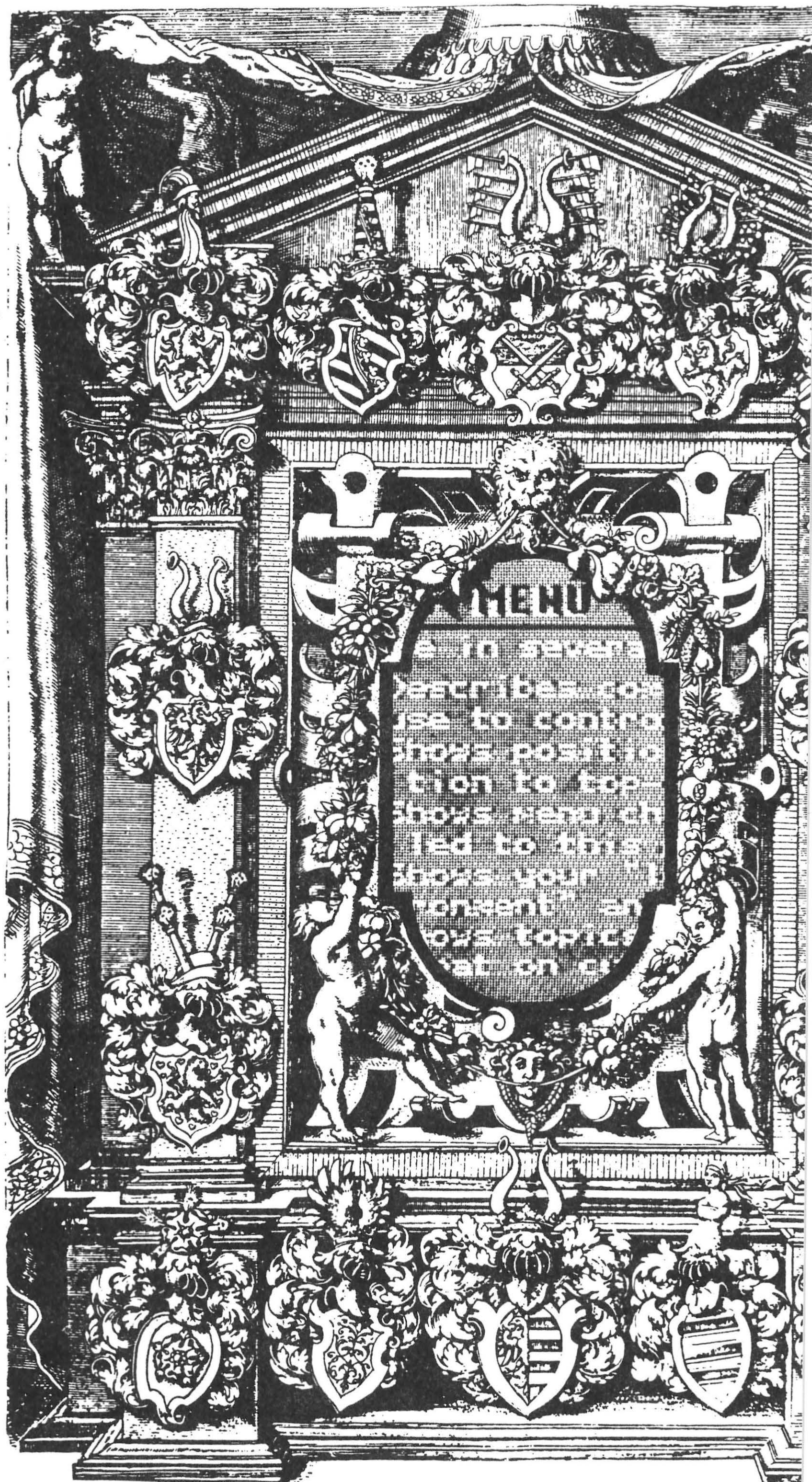
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INSTRUCTIONAL TEXT: THE TRANSITION *from* PAGE *to* SCREEN

Stephen T. Kerr
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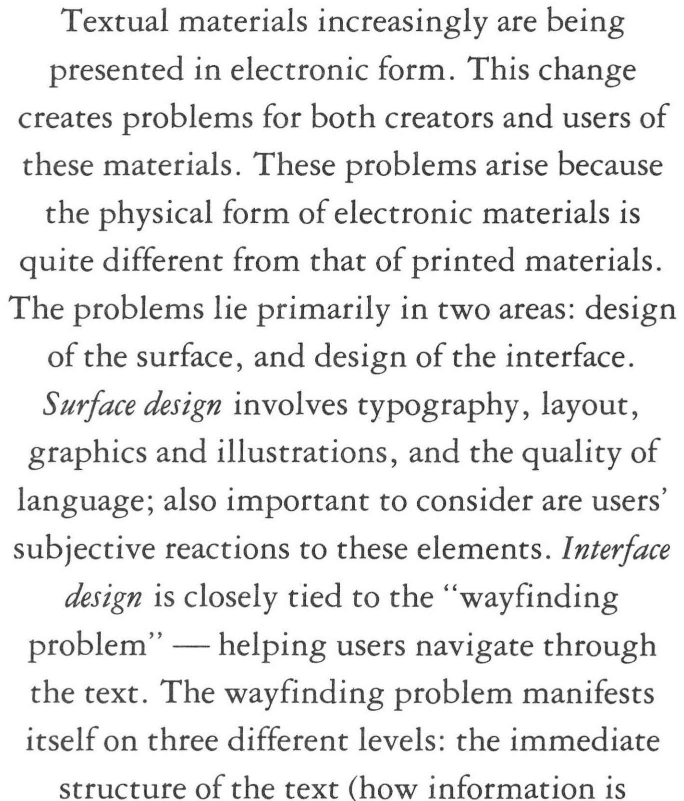

Textual materials increasingly are being presented in electronic form. This change creates problems for both creators and users of these materials. These problems arise because the physical form of electronic materials is quite different from that of printed materials. The problems lie primarily in two areas: design of the surface, and design of the interface. *Surface design* involves typography, layout, graphics and illustrations, and the quality of language; also important to consider are users' subjective reactions to these elements. *Interface design* is closely tied to the "wayfinding problem" — helping users navigate through the text. The wayfinding problem manifests itself on three different levels: the immediate structure of the text (how information is

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Visible Language, XX 4 (Autumn 1986), pp. 368-392
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provided at the page level), the internal structure (how such information is provided within a given document), and the external structure (navigational aids that allow users to move from one document to another). Three directions for further research are identified: realistic studies of use and search through electronic text; studies of how users represent to themselves the structure of text; and how users might best be introduced to environments incorporating electronic text.

Scenario

The student reaches out a hand and picks up a text. In working one of the problems contained therein, the student needs to refer to a table of figures at the back of the book; to refresh memory on how to use that table, the student must also consult an earlier chapter and page in the text. Finding that point requires using the book's index. Holding a finger in the book at the point where the problem is given, and placing the thumb at the place where the table occurs, the student proceeds to use the index, checks the point where information on how to use the table is given, refers to the table, and returns to the page with the original problem. All this takes a matter of seconds.

Another student is working with similar material presented as an interactive computer program. The problem is stated on one screen, but knowing how to get to the table requires knowing a command sequence. The student refers to a small printed card to find the correct command sequence to find the table, enters the appropriate keystrokes, makes a mistake and succeeds in finding the table on the second try. On seeing the table and realizing that using it correctly will require reference to a part of the program different from that currently being used, the student checks yet another command sequence, enters keystrokes, and eventually finds the information needed to make sense of the table. Moving back and forth between the table and the material explaining it takes a series of commands on each instance; the student does this several times before feeling comfortable that the interpretation of the table is on target and the data extracted from it correct. The student then faces the task of relocating the point in the program from which he originally came. That, too, requires some keystrokes, together with a tolerance for working through several frames of information and problems that the student has already seen (some of them more than once).

The examples are hypothetical ones, but the problems portrayed in the second set are real — all too real for many learners who would use for research and learning instructional text and other materials presented electronically through computers or other electronic telecommunication systems. While not all such systems generate the kinds of difficulties shown here, many do, and even in those that are well designed and make it easier for the experienced user to find the information needed, the transfer from one system to another rarely allows that user to use what he or she knows without some modification to the particularities of the new system. The problem is one of how to navigate, how to find one's way in the information presented in order to use it easily and efficiently.

INTRODUCTION: INSTRUCTIONAL TEXT *and the* WAYFINDING PROBLEM

The agenda here will be first to define further the nature of the question, and then to compare briefly the nature of electronic and printed textual materials. Wayfinding as a practical and psychological problem is considered next. There follows a review of what we know about the design of textual surfaces and interfaces. Included here are discussions of the legacy of research on print-based text and how users learn to search for information there, as well as information from the current crop of studies on screen design and interface design for computerized systems. Finally, some proposals for further work to be done in the field are offered.

THE TRANSITION *from* PRINT *to* SCREEN

The shift from the use of printed materials for learning and instruction to the use of electronic systems is one of the most interesting aspects of the advent of computers in offices, factories, schools and homes. It may be that the most significant changes these developments bring with them are not at all the most obvious or publicly discussed ones — the high levels of motivation that seem to come with using computer-based instructional materials, the apparent improvement in test scores that follows upon regular practice with computer-based programs. Rather, the important shifts may be in the less visible habits of mind that accompany our work with information presented in textual form.

Our ways of working with printed materials are so long established — so closely interwoven into our unexamined view of what learning, teaching, searching for and using information are — that it is very difficult to step back and see clearly just how many things we take for granted. Even between cultures, for example, we generally know what a book or a journal "looks like," what conventions will be followed in its preparation and presentation. A book published in the USSR may have its table of contents at the back of the volume rather than at the front, but we soon adjust to those minor differences and learn to cope. We may become frustrated on delving into historical materials from the last century on finding that they typically lack indexes (though some made up for this by having elaborate and detailed tables of contents). And we also may note that some had elaborate title

pages that seemed to perform virtually the same function as today's dust jackets and inner-cover notes.

When we move further back in history toward the origins of printing, we begin to find that the look of the printed page diverges more and more from what we are used to, and that the wayfinding aids we usually take for granted are scarce. Consider, for example, the development of the conventions surrounding the title page: incunabular books typically had no separate title page. The work simply began, and often books were identified only by the first few words of the text itself. As the number of printed works grew, and as printers came to see the potential value to readers (not to mention themselves) of providing more information about the provenance of a particular work, title pages appeared and came to include a larger and larger variety of material — the title, to be sure (often supplied by the printer and not the author), but also the printer's name and location, sometimes the date, sometimes illustrations, and frequently elaborations of the title that we might today mistake for advertisements. (The best single discussion of how these features of early books developed may be found in Febvre and Martin, 1976.)

As we move yet further back we can trace in handwritten texts the development of yet other conventions that seem now so basic we have difficulty imagingin what it would have been like to read, study, or write without them. These include such basic organizing features of text as upper- and lower-case letters, punctuation marks, spacing between works, separation of sentences and paragraphs, and the direction in which words move on a page — Greek "boustrophedontic" writing prior to the fourth century BC went alternately from right to left, then from left to right. All these conventions had to be developed and did not spring complete from the mind of some original writer. (See Ong, 1982, for a treatment of pre-literate consciousness, and Bateson, 1983, for remarks on the development of punctuation.)

ELECTRONIC TEXT *as* INSTRUCTIONAL TEXT

It is important at this point to distinguish the sense in which "instructional text" is used here. First and foremost, I want to imply a broader definition than simply a "textbook" in the commonly understood meaning of that word. While the book used in a high school course is surely one species of instructional text, there are others: the manuals and diagrams that teach aircraft mechanics a new skill, the videodisc that provides auto dealers with information about new models, and the documentation and job aids that lead a novice computer user into the intricacies of a new operating system are different, but no less instructional than their bookish counterparts.

Similarly, all manner of directories, dictionaries, catalogs, and other reference materials ought rightly to be considered instructional, for they are a common source (especially for adult learners) of new information that allows a job to be performed better or of review material that permits previously learned procedures to be recalled and carried out. Indeed, Sticht (1985) makes the point

that "reading to do" (using manuals and reference aids as a supplement to memory) is much more typical of adults' reading patterns than is "reading to learn" (attempting to transfer material from the text into long-term memory) that we more commonly take as a model of the reading process.

"Reading to do" appears to involve not only knowing how to read, but also knowing how to use the instructional material itself as an aid to memory. Most research (on questions ranging from typography to text comprehension to development of reading skills) and most efforts at creating a well-founded theory of reading have been focused on the problems inherent in "reading to learn." "Reading to do," on the other hand, has suffered from less attention by researchers and theorists, although it has been the target of applied efforts by instructional designers and developers.

Most instructional text presented electronically seems to fall somewhere in between "reading to learn" and "reading to do." Good instructional programs offered via computer give the learner the opportunity to move around, to branch to a point farther on in the program when responses indicate mastery of the material currently being presented, or to branch backwards in the case of lack of mastery. Another image of electronic instructional text that links it with "reading to do" is seen in the potential use of large, remote databases of computerized information as resources for learning and teaching. In both these cases, designers of instructional materials have been handicapped by a lack of good models, a difficulty in imagining what the final electronic product should look like. It is clear that "page turning" is an inappropriate metaphor for electronic text and for most reading-to-do applications.

THE NATURE *of the* WAYFINDING PROBLEM

A significant problem in any of these applications is how to "navigate" in electronic space. Part of the reason for this is the *invisibility* of the problem: because we are so accustomed to using books and other print materials, often we fail to consider carefully enough how to translate print-derived wayfinding strategies into a format suitable for electronic text. (This in spite of the fact that 35% of the total investment in software production is spent preparing the user interface; Smith & Mosier, 1984.)

A second reason that there is no single unified approach to the wayfinding problem is that it demands an *interdisciplinary* solution. Consider the bewildering array of researchers who have a stake in wayfinding: psychologists (of various kinds), librarians, educators, computer scientists and engineers, human factors specialists, and even such farther-afield folk as graphic designers, typographers, publishers, and architects. Relevant research and reports of applied development activities appear regularly in the publications of all these groups. The problem is in trying to extract a common perspective.

A third reason that wayfinding is a distinctly difficult problem is that it involves different processes carried out at different levels of conscious activity. Finding one's way in electronic text requires

skill in problem recognition and problem solving — knowing that one has a problem that access to information might solve, knowing how to define and limit the problem, knowing where to look, and knowing what the solution might look like. It is also a matter of having requisite mechanical and search strategies — knowing the keystroke sequences necessary to shift from one part of a program to another, knowing command sequences for different databases. And it is finally a matter of context — the urgency with which the user needs the information, prior experience in using electronic materials, tolerance for delay and uncertainty (in many present-day systems), and the degree of precision required in the solution to the original problem.

THE DESIGN *of the* SURFACE *and the* INTERFACE

Two aspects of electronic text design warrant our special attention: the preparation of the surface and of the interface. By surface, I mean the part of the text that is visible at any given moment to the user. For print materials, this usually means a single page of material; for electronic materials, it means a single screen or frame of information. By interface, I mean the system or structure that gives the user access to the text at a place the user desires or in a way that the user desires. For print materials, this includes the whole system of indexes and guides to the text, as well as typographic and other cues to the user's location (some have referred to this as the metastructure of the text, to distinguish it from the primary textual structure of meaning as presented in writing); for electronic materials, it includes those parts of the text that allow the user to call up different screens, to switch back and forth from one screen to another, and to change levels within the text or database.

For both surface and interface we can refer to the body of available research results for guidance on similarities and differences between print and electronic textual materials. My aim here is not merely to review those results, but also to extract relevant differences and suggest implications these may have for those who do research on and those who design electronic text.

Surface Design

The surface that the user encounters when using printed or electronic materials includes a number of separate characteristics: typography (the shape of individual letterforms), layout (the arrangement of text and white space on the surface), the use of illustrations and graphics of various sorts, the quality of the text as language (its readability, logical structure, and so on), and finally the reaction that the surface of the text calls forth in the user (the perceived value of the material, reaction to how it is arranged, and so on). In each case, what is true for printed text may not hold true (or more often, may vary subtly) for electronic text.

Typography. The way in which letterforms themselves are displayed varies, of course, between print and electronic forms. Print typography, with a history of centuries of development, offers numerous possibilities for the designer. Varieties of style, weight,

size, and mixtures of upper- and lower-case have been studied for their contribution to comprehension and ease of use. Readers of printed text seem to have little difficulty in working with any reasonably simple and consistent type style, although they experience difficulties if forced to use type that has too many cues (e.g., old english or black letter typefaces) or too few (e.g., type that lacks serifs or ascenders/descenders; many dot matrix printers are at fault on these counts). Hartley (1978) and Jonassen (1982) have useful comments on these matters. (For an excellent annotated listing of sources on both print and electronic surface design, see McGee & Matthews, 1985.)

In electronic text there is today must less variety in the letterforms that can be physically shown, though that may change with improved displays. One phenomenon observed in several studies is a preference on the part of users of electronic text for smaller characters and more of them per line — i.e., a 70- instead of 35-character line (Kolers, Duchnicky, & Ferguson, 1981). Another survey reported that 56% of the users of a teletext service wanted to see more information on each screen, a change that would be a function of letter size as well as layout (Teletext, 1982). Whether this preference is simply a residue of users' experiences with printed text remains to be seen. As is the case with printed text, reading all upper-case material from a CRT seems to be difficult and tiring (Foster & Champness, 1982).

Layout. The arrangement of the information on the screen is another important factor in both formats. How much blank space is worked into the text plays an important role in how users perceive the material, and how easy they find it to work with. Inter-section spacing, headings of various sizes and weights, and the conventions for grouping items on page or screen (e.g., sidebars and boxes) all play a role here. Considerable work has been done in this areas recently, and it seems clear that these elements play a major role in helping users not only to understand the material being presented, but also to encode it for long-term storage and retrieval (Anderson & Armbruster, 1985; Glynn, Britton, Tillman, & Muth, 1984).

The work that has been done on electronic text shows that these layout variables are, if anything, even more important in this mode of presentation. Both Marcus (1982) and Grabinger (1984), for example, found that leading or line skipping led to improved performance. Tullis (1983) went so far as to suggest that measures of text density could provide one simple index of display quality without having to conduct empirical tests.

This apparent preference for more spacing on CRT displays conflicts with the desire for more information per screen noted above. Users have clearly not yet come to grips with the visual world of the display, and it may take the advent of more sophisticated devices that can show more material on each screen to make people feel more comfortable with reading and using electronic text.

The use of color is another aspect of layout that should not be ignored. In printed material, color is a considerable added expense and so is used sparingly. While it has been shown to be an effective cue in some situations, its use is rarely perceived as mandatory (see, e.g., Waller, Lefrere, & MacDonald-Ross, 1982). In contrast, designers of electronic text can use color freely and without expense (except to the user, who must have a color monitor). And studies have shown again and again that electronic color is an attractive nuisance — a feature that users will ask for and like, even if it adds nothing to performance (Christ, 1975).

A final point relevant to both typgraphy and layout is that humans perceive differently information that is presented via reflected light (as in print) as compared with that presented via emitted light (as on a CRT). What stands out on a white paper background (e.g., the color red) appears muddy and indistinct on a glowing black CRT background. Designers have had to learn to take a new set of luminance values into account when working with emitted light (Bruce & Foster, 1982; Reynolds, 1979).

Illustrations and graphics. How graphic enhancements are used in text is another aspect of the design of surfaces. To display information pictorially is complex for the designer but often beneficial for the user, who may find it helpful to see concepts or relationships displayed in a non-verbal way. Recent studies suggest that, while users often find these materials helpful, the designer may not simply assume that the user has all the cognitive structures needed to decode graphic information. Here, as with printed text, the conventions must be learned. But — especially for novices coming to a topic or field for the first time — graphic images may help develop new concepts rapidly (Dwyer, 1978; Easterby & Zwaga, 1984; Tufte, 1984).

The case of graphics in electronic materials is very similar — though here again, we can observe the attractive nuisance phenomenon: while users of printed texts do not automatically expect graphic materials, users of electronic text (especially databases designed for general consumer use) seem to expect them. Studies of field trials of videotex and teletext services, for example, reveal that subscribers are more likely to use, enjoy, and continue to subscribe to those systems that incorporate many graphics (Carey & Siegeltuch, 1982; Irving, Elton, & Siegeltuch, 1982; Teletext, 1982). And in other studies with more traditional computer-based learning materials, researchers discovered similar effects — users will ask for and use more readily displays that incorporate graphics (Stone, 1984; Tullis, 1981).

Language. A further important quality of the surface is the way in which language is used — the readability of the text, its complexity, and so forth. Here, we observe some distinctive differences between print and electronic forms, with considerable emphasis being placed in electronic text on short, compressed sentences and paragraph chunks. One effect of this telegraphic writing style is to allow users to scan over screens quickly, looking for relevant information, to a greater extent than would be the

case with printed materials (Siegeltuch, 1982). A related set of studies focuses on the value and use of abbreviations, thus allowing the designer to make best use of limited screen space available (Ehrenreich, 1985).

User's reactions. Finally, the reader's subjective reaction to the surface of the text should not be ignored. Performance may not be affected if the reader finds the text unpleasant to work with, but the long-term impact may be to decrease the user's enthusiasm for the subject or job being studied. And, in the case of materials that users can choose to work with or not, the result may be that the texts simply will not be consulted (Kern, 1985). In electronic text the perceived usefulness of the text to the reader has emerged as one of three key factors that describe users' reactions (Champness & DiAlberdi, 1981; the others: "attractiveness" and "clarity." Grabinger's [1984] work also supports these notions).

A way of increasing users' positive reactions to electronic text systems has been to involve them directly in design decisions. This may be done either by letting them determine the format in which material will be presented on their individual screens (Geiselman & Samet, 1982), or by giving them some control over the structure of the system itself — what the command structure is to look like, or what keywords to use in a database system.

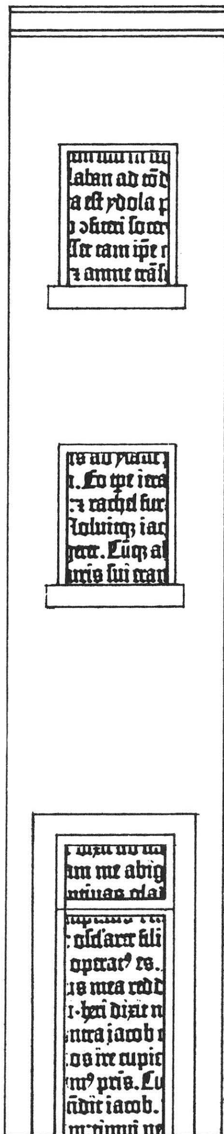
Summary. These varied findings suggest that screen design, while different in some important ways from page design, should be carried out with many of the same rules in mind that expert page designers have used for years. These include use of distinctive typefaces, carefully determined (and generous) allocation of white space and headings in text, intelligent application of graphics and color (making full use of the capabilities of the technology), and design with the user's need to have the text itself be interesting to read. If there is nothing dramatically new here, there is at least the reaffirmation that many of the design principles that hold true for print also are worth adhering to in electronic environments.

Interface Design

If the design of the surface offers few surprises, the preparation of the interface is clearly quite a different matter. There are several aspects of the interface that bear examination here: (1) the immediate structure (the directions and finding aids that are provided on the page or screen), (2) the internal structure (the helps for using the material that are part of it, but not always present on any given page or screen; an index in a book, and a help system available with one or more keystrokes in electronic text would be examples), and (3) the external structure (aids that are external to the material itself; an external index or abstract system for printed materials, documentation for a computer program). Also critical is the user's psychological context — the ability to correctly formulate questions about the nature of the task at hand, the technical skills needed to navigate, and the understanding the user has of the system, its functions, and the structure of the information it contains. In most of these areas, there are marked

differences in form and function between wayfinding systems used in print space and those employed in electronic space.

Immediate structure: Wayfinding on the page level. In printed materials there is typically not much provided in the way of an immediate structure of directions on the page. True, we take page numbers for granted now, although they were not universal for many years after the advent of printing. And footnote numbers give direction for where to find sources or further detail about a particular subject. Materials that serve a reference function may have additional on-page helps: abstract numbers or keyword designations at the top of an index page, bold-faced headings within columns, and so on. We have virtually lost the routine use of the catch word in narrative text, an aid that enjoyed popularity for several centuries into the development of printed text.



In electronic text, however, the immediate structure of navigational aids is often very obvious. Menus, icons or symbols, color coding — all these serve to help the user orient her or himself in the material at hand. In particular, the use of on-screen menus for wayfinding in electronic text has been the subject of considerable work over the past few years. Much of this has been directed as determining the appropriate level of breadth or depth to incorporate in menu systems. Since a deeper menu structure offers fewer choices to the user at any one time, we might suppose that it would be easier to use. In fact, the reverse appears to be the case: users seem to prefer and work more effectively with menus that present medium or large numbers of choices on each screen (Landauer & Nachbar, 1985; Lee & MacGregor, 1985; McFarland, 1982; Snowberry, Parkinson, & Sisson, 1983).

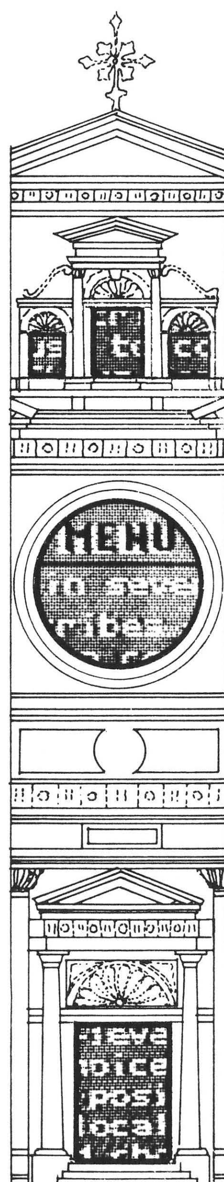
In spite of all best efforts, however, menus appear not to be a panacea for information search. Numerous problems have been reported: the fact that many errors occur at the initial menu level (where users are least likely to know what categories are subsumed under the top-level items; in one study, 18% of all search time was spent using the top-level menu [Irving, Elton, & Siegeltcuch, 1982]). Another difficulty is the tendency of users to become frustrated and distracted by working up and down through layers of menus without finding desired information, and therefore to give up even though they may know that "the information is in there somewhere" (28% of all users in one study [Latremouille, Mason, McEwen, Phillips, & Whalen, 1981]; 20% in another [Carey, 1981]).

One solution that has been proposed to the problem of complex structure of menus is the use of keywords for information searching. Several studies have shown that users can figure out keyword-based systems sufficiently well to employ them effectively (Orsnaes, 1982), that they will usually prefer to use keywords rather than menus in searching (Geller & Lesk, 1982), but that occasional users probably will not retain the structure of keywords well enough to use them over time (Shneiderman, 1982). The ways that users think about keywords and their understanding of the concepts that lie behind them may be the most

significant determinant of success or failure in locating desired information (Weyer, 1982). One study that investigated both keywords and menus concluded that there seemed to be little objective reason to prefer one approach over the other, and that users' problems seemed to lie in realms other than the mechanics of access (Van Nes & Van der Heijden, 1982).

The use of icons or other graphic way-finding aids has also been proposed as a way of helping the reader to find desired information. Some current computer operating systems (Macintosh, Lisa, Xerox Star) have been developed with icons playing a key supporting role. Icons are increasingly used for wayfinding in transit systems and in public buildings (see, e.g., AIGA, 1982, and Dreyfuss, 1972). But validating their usefulness empirically has been a problem (Mackett-Stout & Dewar, 1981; Kerr et al., 1985). Some have suggested that learning to use an icon-based system may be no easier — just different — than learning one based on text or menus (Cahill, 1975; Samet, Geiselman, & Landee, 1982). Much further work remains to be done in this area to determine how valuable iconic wayfinding systems truly are.

Internal structure: Wayfinding on the document level. The internal structure of the material also can provide users with clues as to where they are and where to go for further information. In printed materials, such aids as the table of contents, index, appendices, and footnotes may provide this sort of information. They are internal to the book itself, but they do not intrude on the user's attention unless they are specifically sought.



Internal help systems in electronic text have been harder to evaluate than on-screen aids, probably because the systems themselves vary so much in form and comprehensiveness. That users want help and look to the systems they work with to provide it is without doubt. Carey & Dozier (1985), for example, found that students offered access to electronic text systems that included both instructional and library materials frequently mentioned greater navigability of the text as a desirable feature. And a number of navigation methods that are remindful of print forms have been proposed (Benest & Jones, 1982; Benest & Potok, 1984; Engel et al., 1983; Lochovsky & Tsichritzis, 1981). Some of these use a kind of on-screen menu-plus-text system that allows the user to keep track of where he or she has been, while at the same time permitting fast retracing through previous menus to backtrack to an earlier point (Spence & Apperley, 1982).

More traditional kinds of help systems that provide information on the structure of commands in an operating system have also been evaluated. Interestingly, one such study found that a considerable number of system users (22%) saw their work with the help system as a tutorial rather than just a memory jog. Those who kept paper manuals and documentation up to date were less likely to use the system than those who did not have such materials, leading the researchers to conclude that both types of help systems would probably continue to be required (Stoddard, Berkbigler, Wheat, & Peter, 1985).

THE ON-LINE CATALOG: AN EXAMPLE *of* WAYFINDING *on the* DOCUMENT LEVEL

Another way to provide navigational aid within the structure of a document is to incorporate help in a variety of formats and allow the user to choose the approach that best matches personal needs and preferences. This method was demonstrated in a project to create a prototype hierarchically structured on-line university catalog (Kerr, 1984).

Figure 1 shows the overall structure of the database as the user encountered it; there were eight main categories of information, each of which was further divided into three to eight subcatagories (which were themselves also subdivided, occasionally to a total of six levels). This information was available on request, but served only as an overview of the system and not as a navigational aid from within the database. Figure 2 shows the varieties of help that a user could call on at any given time. These ranged from a simple description of commands to more complex graphic images of current locations and routes. The information shown in Figure 2 remained constant regardless of an individual's location within the catalog.

In "The Big Picture" (Figure 3) the user got a chance to see the present location vis à vis the other major categories of the database. This would be useful if it were important to recall top-level categories; it would likely appeal most to the very occasional user. Figure 4 shows "The Route," the path the user took to get to the present location. In contrast to "The Big Picture," it provided more detail about specific choices made at each stage in the process. (Note that labels for categories and subcategories of information were omitted in this prototype version, but including them would have presented problems given current limitations on commonly available video screen resolution. Compare the very telegraphic style of abbreviation required to fit even one level of subcategory labels in Figure 1.)

"The Neighborhood" (Figure 5) shows a very different type of wayfinding cue. In contrast to "The Big Picture" and "The

Figure 1. Overview of top two levels of information in a prototype on-line university catalog.

Route," each of which situated the user in a context of top-level categories or choices made with respect to those categories, "The Neighborhood" showed the user's position in relation to the items of information in closest proximity. The user saw in high relief items on the same branch of the database tree, rather than getting a less detailed picture of the whole tree itself. This might appeal to those wanting to browse for information in a particular part of the database.

The last of these illustrations shows "Topics Related" (Figure 6). This was a quite different approach, and assumed that the database could be accessed not only hierarchically but also through a relational structure of connections and associations. In this case all topics related to the topic at the user's present position were displayed, even though they might be from quite different parts of the database tree.

The potential advantage of this sort of system is that it offers the user a variety of display formats that may match either different needs for information or different preferred ways of representing that information internally. Providing for different individual styles of cognitively representing information structures is an especially intriguing and important possibility that we shall have occasion to return to below.

External structure: Wayfinding among documents. The design of external structures in aid of wayfinding is an even less fully researched area than those discussed above. In the case of print materials, such systems as indexes, card catalogs, and bibliographic listings obviously play a role. There is a considerable literature in the fields of library and information science dealing with search strategies and techniques (see Bates, 1981, for a particularly comprehensive review). Indeed, the advent of computer-based bibliographic retrieval systems seems to have pushed this issue much into the forefront of librarians' attention. But most of the work in this area is focused on the librarian's role in helping

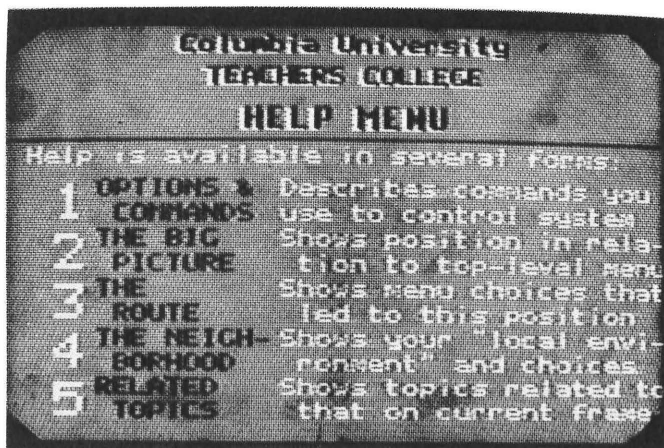


Figure 2.
Types of help available in the prototype on-line university catalog.

the user to clarify search questions and providing information on strategies (e.g., Lynch, 1983), rather than with the processes of the search itself.

For electronic text systems the external wayfinding aids are usually either minimal or nonexistent. Documentation on how to use a system or job aid cards are perhaps the most familiar forms that such external structures take. But in many cases the text and its access structure are all there together, rolled up into a single ball. This unified and non-transparent form of the materials may make them particularly difficult to deal with in that users will simply assume that whatever the computer provides is what they need (Estabrook, 1983).

Rules and guidelines for the preparation of documentation to accompany electronic textual materials haave been proposed, but these have most frequently been issued as rules of thumb; occasionally, they have been designed using instructional development or traditional print layout procedures. Little attention has been given to the ways in which users make the jump back and forth between documentation and electronic materials.

Psychological context of the user. In both types of systems the user's psychological state can make a difference in the way in which navigation is carried out. In fact, this may be the most critical part of the whole process. Certainly librarians have defined their roles for years as consummate wayfinders, and in doing so have written extensively about the need to understand the user's needs, to help him or her formulate questions, and to provide guidance on the physical aspects of the system as needed.

Vigil (1983), for example, notes that relatively few users seem to have a very precise sense of how to go about searching for information whether in print collections or on-line catalogs. Hills (1983) suggests that designers of electronic materials will need to provide built-in structures of keywords and check points that are attuned more directly to user needs — perhaps by adopting some

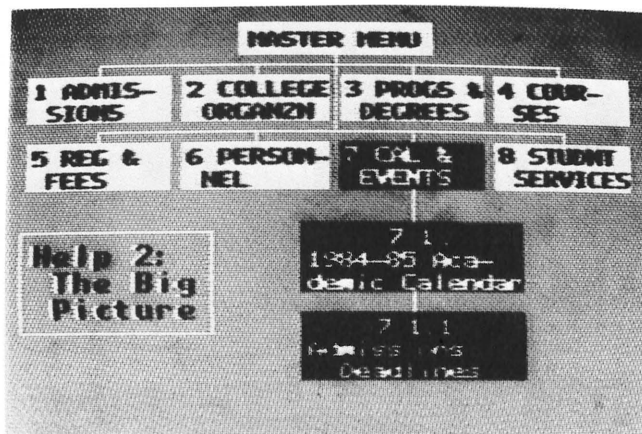


Figure 3. "The Big Picture" shows user's location vis à vis top levels of information.

sort of common thesarus of terms. And Waern and Rollenhagen (1983), on reviewing studies relating reading and video display terminals, observe that relatively few studies have tried to integrate what we know about metacognitive processes (setting goals, planning strategies to reach them, knowing when a problem has been encountered, and so forth) with the use of electronic text.

More than one researcher recently has come to the conclusion that the key decisions to make in designing electronic text are not those that have to do merely with the specification of mechanical aspects of the interface. Rather, the most critical elements seem to be to understand how the user conceptualizes the system and the material he or she is faced with — how the system works, what categories of information it contains, how it is organized, and so on. In one recent study, after finding some differences among users working with seven different operating-system interfaces, the authors nonetheless noted that "Many problems were the result of users not understanding the structure of [the conceptual space within which they had to navigate] or the rules for moving in it. These difficulties cut across all interface styles and all levels of user experience." (Whiteside, Jones, Levy, & Wixon, 1985, p. 189).

The centrality of user understanding. This shift from a concern with mechanical aspects of the interface to developing a better picture of how users understand and represent information to themselves is visible in much recent work in the field of human factors and human-computer interaction. Several distinct aspects of this work bear mention. There is a broad concern with users' understandings of how a system works, what is in it, how to make the system do what one wants ot yield the information that one needs. These understandings are often developed out of a user's familiarity with some aspect of the non-electronic world which is similar to the electronic system that the user needs to understand.

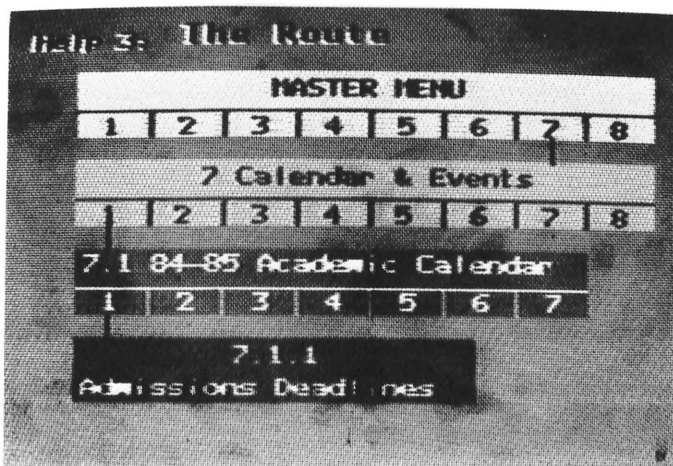


Figure 4.
"The Route" shows user's choices as they led to present position.

Related to this is an interest in how users explain the functions or operations of the system. These explanations often arise from interactions with the system and may derive from or themselves contribute to broader understandings of system operations. Another aspect of how users conceptualize electronic environments is the way they represent to themselves the structure of information the system contains. (While a good deal of work has been done on knowledge representation from the standpoint of developing expert systems, this has mostly focused on determining how an acknowledged expert in a given field represents the structure of information in that field to him or herself, rather than on the issue of how to represent for others a body of knowledge that has already been structured through practice and convention.)

Finally, all of these elements — understandings, explanations, and representations — may be seen as aspects of mental models that users must develop and bring to bear as they operate in electronic environments. (See, for example: Gentner & Stevens, 1983; Mark, 1985; Quinn & Russell, 1986; and the further works referenced below.) Several points seem clear from the work that has been done on mental models and users' understandings. First, users will construct models of how an electronic environment works and what it contains, and they will develop explanations that are rationally satisfying to them even if those explantions are flawed or plain wrong (Suchman, 1985). This seems to be necessary for continued use of the system to take place. Second, explanations and models can be functional even when they are flawed. A user may have developed a way of coping with parts of the interface that the user (from the interface designer's point of view) poorly understands, but if that way of coping allows the job to be done, it may suffice even though inefficient and time-consuming (Lewis, 1986).

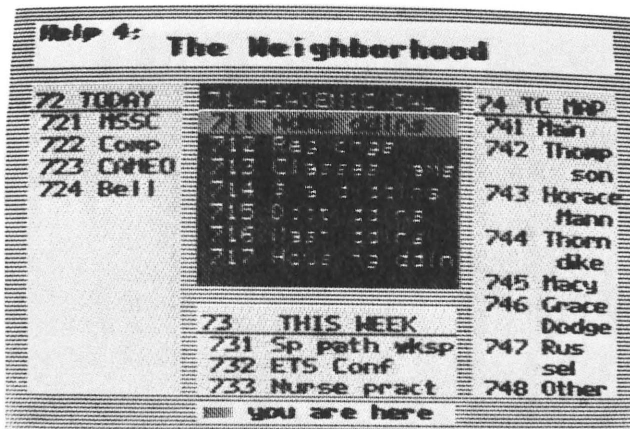


Figure 5. "The Neighborhood" shows user's location in relation to information in close proximity.

When users do develop models of electronic environments that mirror more closely the designed capabililities and functions of those environments, they probably base their initial understandings on metaphors with similar aspects of the real world. Linguistic and grammatical conventions, for example, often are incorporated into computer languages intentionally by their creators in the hope that users will continue to make assumptions electronically that they have always entertained when speaking, reading, or writing in the non-electronic world (diSessa, 1986). Designers of electronic information systems seem to capitalize on a similar set of assumptions by encouraging users to think of trees when working with hierarchically structured databases, or graphic Venn diagrams when dealing with Boolean search operations.

Users' mental models are probably most important when the user first learns how to work with a system, or when the user returns to working with it after a long hiatus (Norman, 1986). This raises a set of interesting questions, for research in related contexts suggests that while one can train people to use a particular mental model in addressing a particular task, this may not always be the best thing to do. The problem is that people differ in their abilities to figure out appropriate models for themselves, and that supplying a new model to someone who already has a satisfactory internal understanding of how to solve the problem may actually interfere with that understanding. On the other hand, supplying a model may be very efficient when the user is not capable of generating an internal model of how to proceed (Salomon, 1979).

The trade-off, then, may be between efficiency for occasional or less representationally capable users on the one hand (who presumably should have models supplied) and long-term satisfaction and effectiveness for frequent or more representationally capable users on the other. Unfortunately, we have no good measures to

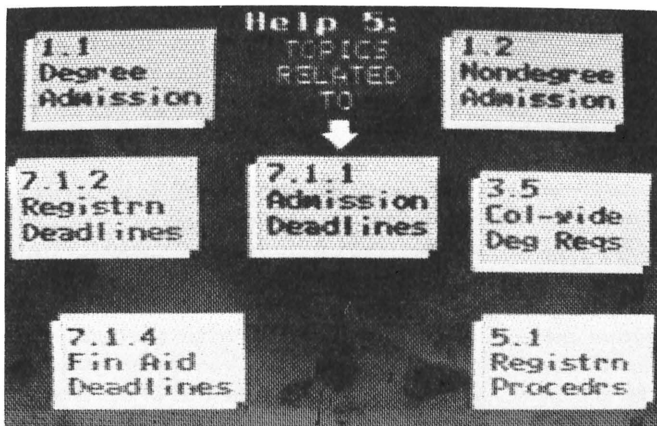


Figure 6.
"Topics Related" shows information conceptually related to topics at the user's present location.

tell us how good users are at generating their own models or building correct understandings. Further complicating matters is the apparent influence exerted on the development of these understandings not only by an individual's own internal state but also by the social context in which he or she works. For example, Brown & Newman (1985) speak of the possible "creation of distributed authoring tools for building community knowledge bases, in which knowledge sharing and a process of annotation and dialectical exchange become the vehicles for learning among community members." (p. 375). Sorting out these elements and deciding how to provide best for learning a system, constructing appropriate mental models, and using those models effectively will take a good deal of intensive research.

Summary. The key features of interface design, then, seem to include providing a collection of aids that allow the user to maneuver with as little extra effort as possible. Broad rather than deep menus, user-defined keywords or menu terms, audit trails and backtracking systems that allow mistakes to be undone quickly and paths retraced, help systems that provide tutorial information as well as remind the user, and on-screen information on basic options — all these seem to make users feel more comfortable in reading and working with text presented electronically.

Several key differences between print and electronic text were highlighted in this section, and it is worth recapitulating them here. First, with print materials we have made the structure of the interface at its various levels (immediate, internal, external) relatively small and unobtrusive. The user is not forced to come in contact with it, may become aware of it only unconsciously, and the producer probably spends relatively little time worrying about it since its form and structure are well established. For electronic text, however, the user has no choice but to learn a new approach that may be more or less generic to other systems. This must be mastered in some rudimentary way before the text may even be approached. The interface is very much in the foreground, and the amount of effort the designer must pour into its creation and refinement is correspondingly large. In print, the interface has become optional; in electronic text, it is still unavoidable.

Another central difference between navigation in print and electronic text is the way in which electronic information layers virtually all aspects of the interface within the material itself. A database system, for example, may serve as a gateway to a number of separate sub-databases, each with its own command structure or set of keywords. And the indexing structure, help system, and other user tools for each of these sub-systems may all be on-line — within the original database, but with relatively little external documentation for the user. The material is all there, but it is at the same time all invisible. It is as if the text of the books of a library were to be typed on index cards and interfiled with the title-author-subject cards and the shelf-list cards in the main card catalog.

But perhaps the most important fact that emerges from this part of the analysis is a sense that the focus may need to move away from the physical aspects of interface design — the specifics of menu choices, screen design, and graphic icons — and toward a more careful analysis of how users conceptualize the environment in which they are working and moving. Some of the implications of this conclusion are explored in the section that follows.

DIRECTIONS *for* FURTHER WORK *on the* WAYFINDING PROBLEM

What is known about the design of surfaces and interfaces for electronic and printed instructional text may be less important than what is still unknown. The foregoing analysis suggests that further work in several relatively unexamined areas could be especially productive.

1. How Do Users Search?

This question may seem overly simple, but it is basic and we seem to know little about it. What are the occasions, for example, on which users realize that they have a problem for which further or different information might provide an answer? What do users self-generated search strategies look like, and how might those be used to guide the development of interfaces? Some preliminary work in information science has already shed light on this issue, and certainly much of the work on metacognition and problem solving would also be relevant here. This problem is especially relevant if large electronic databases are going to be used in any broad way in the educational system. We need to be able to define differences in search strategy among readers as they approach electronic materials.

2. How Do Users Conceptualize the Shape of the Text?

A second important question to ask may be how users think about the shape of the data they are working with, or the shape of the problem space within which they are operating. Several recent studies (Borgman, 1983; Vigil, 1983) have pointed out the possible value of working with spatial metaphors and mental models that concentrate on developing a user's image of what electronic text is and how it may be organized. Others (Dumais & Jones, 1985), while expressing doubt about the value of spatially organized interfaces, conclude that there may be a way of designing them so that they are in fact effective.

This approach seems to tie in with other work being done on thinking and problem solving. Newell (1980), for example, discusses how thinking practices might be seen as ways of moving through a "problem space." Research in such diverse areas as learning to read maps (Thorndyke & Stasz, 1980) also deals with processing of information in spatial terms. Indeed, there is a growing consensus that many reasoning and problem solving activities may be conceptualized using spatial metaphors and models (Sternberg, 1982).

The continuing work on mental models and user understandings within the human-factors and human-computer-interaction communities also needs to be more fully integrated into work on electronic text. If, for example, metaphors and associations to

non-electronic environments are important for developing those understandings, then what is the relationship between how users think of dictionaries, encyclopedias, textbooks, or other reference materials, and how they come to think of electronic text environments? Are flaws in understanding the structure or operation of one environment transferred to the other? And, perhaps the most interesting question, how can we encourage users to develop models of electronic environments that are both accurate and productive? This last question merits special consideration.

3. How Can We Best Introduce New Users to Electronic Text Environments?

Lochovsky and Tsichritzis (1981) suggest that providing users with a paradigm for an effective search strategy may help produce better searches and more satisfied users of electronic text. Such paradigms might be especially valuable if they could be tailored explicitly for various audiences and various searching styles, as described by the research suggested above.

The problem, as we have already noted, is that simply providing a model or a paradigm for how to use electronic text may not be the best thing to do under some circumstances. For those who cannot easily develop their own understandings of how electronic text is organized, we need to use information about typical search strategies and typical ways users structure text to create models of problem definition, information search, and incorporation of new information with old that will work. On the other hand, individuals who are capable of developing a personal representation of the electronic environment should be permitted and encouraged to come up with their own models. For these latter we need ways to encourage a diversity of approaches so as to capitalize on the propensity of individuals to conceptualize structures of information in various ways — spatially, via relationships and connections, or using other metaphors. Interfaces that the user could customize so as to approach the text in these different ways would be helpful here, but we need much further work on interface design before this sort of modification by individuals can become a practical reality.

The challenge is not simply to recreate in electronic text what has been done in print, but to capitalize on what electronic text can do best — provide rapid access to lots of information, and help to organize and structure the way in which the user interacts with the text. Doing this will require us to not only reconceptualize how the text itself is structured, but also to think more deeply about how it is to be understood and used by the reader.

This paper is partly based on a project, "Empirical Tests of Videotex Wayfinding Aids," funded by the Research Division of International Business Machines Corporation (Yorktown, NY). The full text of the final report of that project is Kerr *et al.* (1985).

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ITALIAN SIXTEENTH-CENTURY WRITING BOOKS *and the* SCRIBAL REALITY *in* VERONA

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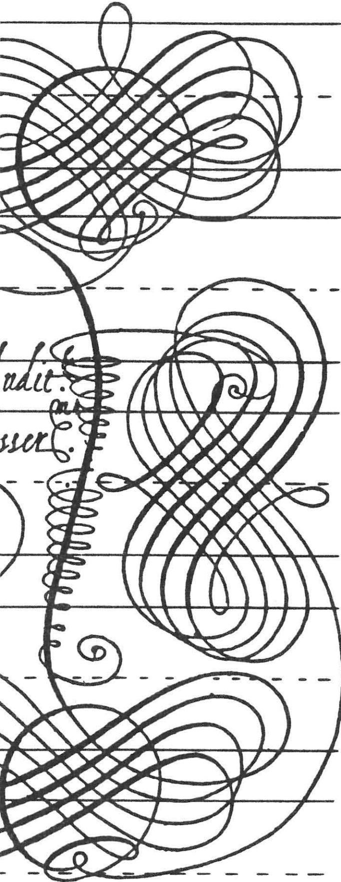

The sixteenth-century copybooks of the Italian writing masters have long been considered to be reflections of the contemporary scribal condition. The impression one gains from reading the works of Arrighi, Taglienti, Palatino, and Cresci, among others, is that *cancellaresca* was the dominant notarial script of the first half of the century, that *cancellaresca formata,* developed by Palatino at mid-century, supplanted it, and that Cresci's *cancellaresca corsiva* reigned supreme at the end. In fact, if we consider the manuscript evidence, specifically the Rosenthal Collection of North Italian Documents at the University of Chicago, we find a very different reality. In sixteenth-century Verona, at least, *cancellaresca*

Visible Language, XX 4 (Autumn 1986), pp. 393-412
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was a rather uncommon script. *Cancellaresca formata* indeed appears soon after Palatino's popularization of the script, but it never became popular in Verona. Cresci's claim to have been the inventor of *cancellaresca corsiva* is undermined by the script's appearance prior to the publication of his *Essemplara* (1560). The most common scripts used throughout the century were the italic and the mercantilist. For the common scribes of sixteenth-century Verona, the writing books seem to have had little influence.

It is well known that the invention of printing with movable type in the middle of the fifteenth century greatly disrupted the traditional scribal production of books. Certainly this transformation of the book industry was less immediate and less dramatic than has often been supposed. Book scribes were not put out of business overnight, yet within the course of several decades few scriptoria still continued in the old mode. Some became printing houses, but most simply dissolved. Likewise, some book scribes took up the printer's craft, but most no doubt attempted to continue to earn a living, if not copying books, then by rubricating and illuminating printed books (which had long been an important aspect of scriptorial practice and remained so for many decades into the sixteenth century), or by joining their brethren who worked in the chanceries and business houses, or by becoming writing masters.

We perhaps too often forget that many scribes copied not books, but wrote documents: a scribal process that was beyond the reach of the printing press. With the great increase in governmental bureaucracies on the one hand and a similar burgeoning of capitalistic mercantilism with its vast requirements for clerical and notarial documentation on the other, fifteenth- and especially sixteenth-century Italy provided manifold opportunities for scribal employment. One can almost imagine that many book scribes might have been not at all displeased to give up book production — which was after all a very tedious and demanding occupation — for the comparatively more exciting and varied life as a chancery or mercantilist scribe. The immense numbers of extant documents produced by these scribes provide immediate and incontrovertable testimony concerning the extent of this kind of scribal activity. In comparison, the smaller number

of books produced by scribes illustrates only too well the far greater efficiency of the printing press over hand produced books. It would only be in the late nineteenth century that the machine in the form of the typewriter overtook the scribal function entirely.

The actual occupational nature of a "writing master," often mentioned as a natural alternative for a displaced book scribe, is not entirely clear. Certainly there were a few writing tutors employed by the nobility and wealthy merchants who instructed their children in elegant writing, and certainly there were masters who instructed young chancery clerks, yet comparatively few real opportunities for employment existed in this quarter. A writing master might also be considered as one who had mastered his craft and was acknowledged as a master by his fellows, but this is not an occupational title but rather an indication of achievement. Certainly among the professional chancery or mercantile scribes there were many such individuals. Indeed both of these kinds of writing masters produced writing books, but it is not entirely clear how accurately these writing books reflected the real state of affairs among the great majority of common scribes. Modern calligraphers have seized upon these writing books as models, and as supposed keys to understanding scribal activity during this period. Yet to really understand scribal activity in sixteenth-century Italy it is necessary to consider the entire range of common scribal remains, not just the series of printed writing books made famous by the calligraphic revival of this century.

THE ITALIAN WRITING BOOKS[1]

It is well known that Gutenberg could never have produced his fine types had it not been for the designs provided by Peter Schoeffer, a scribe. It was only natural that the early types looked very like common *textura* and humanistic bookhands, but over the course of several decades, printed books, especially those in roman type, looked less and less like their manuscript precursors, and the Italian roman founts (at least) evolved into a more mature representation of the alphabet which emphasized simplicity and legibility. The set bookhands were thus co-opted by the type designers though the current hands remained as scribal media. Both the roman and italic founts (and the varieties of *cancellaresca,* derived from italic) had their origins in the humanistic hands of Petrarch, Collucio Salutati, Poggio Bracciolini, and Niccolò Niccoli, yet the nature of type design tended to elevate and rationalize the set humanistic bookhand into a "script" almost impossible to write, but exceptionally easy to read, and conversely the very nature of the notarial scribal habit (i.e., the need for speed) caused the cursive humanistic bookhand to be adapted to form highly current yet still legible hands suitable for the easy and quick writing necessary in the fast-paced chanceries and business houses of Italy. In the main it was this *cancellaresca* which was of most concern in the writing books, which was only appropriate as this was one of the major scripts commonly in use. In addition to the more practical aspects of cutting pens, making ink, and so

forth, the writing books contained much on fantastic scripts, the nature of constructing letters by geometrical rules, and the aesthetic qualities of scripts. Unfortunately, much of this less practical material can be highly misleading.

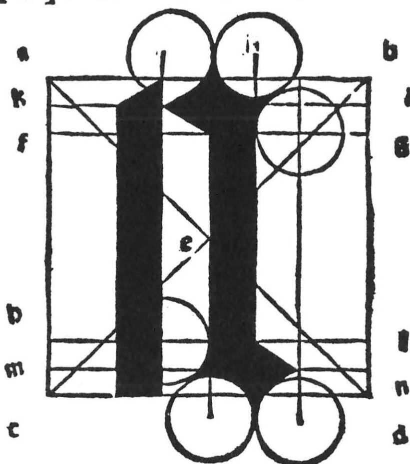
The first of the Italian writing books was produced in Venice in 1514: the *Theorica et pratica* of Sigismondo Fanti.[2] Fanti, a nobleman and professor of mathematics, was neither a scribe nor a writing master. He was certainly familiar with scribal techniques and in the "pratica" he offered much sound advice. It was, however, in the "theorica" that he lost touch with the scribal process: unfortunately it was this theoretical aspect — so attractive and so wrong — which influenced many of his successors.

Fanti's work was supposedly directed at scribes (civil and ecclesiastical), secretaries, agents, merchants, artisans, painters, sculptors, and even children. Although each of these potential users might well have found something useful in Fanti's treatise, his work was not aimed at all at the practicing scribe or anyone who had need to write often. It is an intellectual exercise which attempts to explain the shape of letters by means of the so-called divine proportions of Euclidean principles. No doubt a few scribes and perhaps a few more writing masters might have found such exercises of interest, but certainly the bulk of scribal practitioners found the practical advice no more than common knowledge and the geometric theory arcane.

The *Theorica et pratica* is divided into four books. The first contains much that is useful. Here he instructs on such basics as cutting the pen, holding the pen, making ink, and on the format of the page (e.g., the width of the page should be ⅔ the height; the text should be 40 lines of 40 letters; commentaries should be 62 lines of 32 letters). Fanti attempted a brief history of scripts, but made the incorrect assertion that rotunda is the source of all other scripts (I.iii). He then went on to expound his theories on the application of Euclidian principles to writing. Apparently he had critics, as he replied: "Ma pur parlando cum questi tali lo scientifico se piglia gran piacere de quelli; perche epsi diceno cosae che non stano al cimento. Er se tu li uolessi contradire parlaresti in uano; perche poteristi cosi praedicare al muro o uero pariete. Et bisogna lassarli andare cum il suo errore & proprio fallo. Et in la fouea cum li altri caderano. Intelligenti pauca" (sig. B6v). Fanti discussed the *cancellaresca,* but did not attempt to impose upon it any Euclidan geometry. Where there were to be woodcuts illustrating the script there were only blank spaces. Apparently sufficiently skilled engravers were not to be found who could execute the calligraphic features of the cursive *cancellaresca.*[3] Books II, III, and IV are concerned respectively with *rotunda* ("moderna"), *textura* ("Gallica"), and Roman capitals. Each of these scripts is forced to recline upon the Procrustean bed of Euclidan geometry. It is noteworthy that the only script in common use that he considered, the *cancellaresca,* is not so subjected, but that the older bookhands, no longer practiced to any great extent, were so subjected. In any case the *Theorica et pratica*

TERTIVS.

Vando la littera.n.gallica deſiderarai fabricare.Prima la linea.a.b.in ſi medeſima multiplicarai.Cauſando il quadrato.a.b.c.d.Et queſto e che adducere lineá in ſeipſam nihil aliud eſt niſi ſuper eam diligenter quadratú deſcribere.Et hoc facto deducerai læ lineæ. Cauſante li poſſamenti de la péna o uero ſexto.Et anchora li diametri:ſi come i le pcedéte habiamo a pieno dilucidato.Se adúque ſopra il poſſaméto.l.n.et.p.s.Cauſarai le Aſtæ per quello modo medeſimo:ſi come faciſti in læ doæ



aſtæ ultimæ de la præcedente littera cioe de lo. M.cum li medeſimi pui circuli ſecúdo la q̃tita de la groſeza de la aſta naturale : ſi come habiamo in la.xxxvi.cõſideratione del primo amplaméte pbato.Et maxie del pdiméto de la aſta p il primo documéto imaginato. Hauerai la lra.n.optata cũ lineæ & diametri:Supficie & circuli deſignata.Queſta littera.n.nõ e molto difficile.Hauendo intelligentia. Prima de la præcedente:& anchora de tuttæ le ſuæ præmiſſæ . Impero che tuttæ læ coſæ creatæ o uero ritrouatæ o che ſiano ſtatæ in æterno o non ſiano ſempre le infimæ hano origine da læ ſupræmæ : qđ erat dicendum.

G iii

Figure 1.
The construction of *textura* or *Gallica* from Sigismondo Fanti's *Theorica et pratica* (Venice, 1514).

provides little insight into the actual nature of scribal practice at this time; rather it gives us an interesting glimpse of the arcane theories of a mathematically minded nobleman. Unfortunately Fanti's arcane theories were quite influential in their own way: scribes could never take them seriously as a means of writing, but authors of writing books often felt constrained to delineate some similar theoretical considerations regardless of their actual relevance to writing.

The 1520s were a propitious time for the production of writing books. Ludovico degli Arrighi produced his *La operina* (Rome, 1522)[4] and *Il modo* (Venice, 1523),[5] and Giovannantonio Tagliente produced his *Lo presente libro* (Venice, 1524).[6] Both of these writing masters (Arrighi was one of the best of the Roman curial scribes and a printer as well; Tagliente was a master writing tutor

in the Venetian chancery) designed *cancellaresca* type for their books, but it was really the superb engraving abilities of Ugo da Carpi and Eustachio Celebrino which enabled the subtleties of the *cancellaresca* to be captured in the printed book. Both Arrighi and Tagliente claimed to have invented this new process of printing entirely from engraved blocks. For instance, Tagliente said, "I have invented, not without a great deal of labor and personal expense, a new way of printing every kind of letter that can be made by the living hand: not printing in the usual way but by a new method never used before in Venice or in her territory."[7] Arrighi, a more modest man, said, "le'qualitanto se'auicinano alle scritte' a mano, quanto capeua il mio ingegno, & se'puntualmente' in tutto non te rispondono, supplicoti che mi facci iscusato, conciosia che' la stampa non possa in tutto ripresentarte' la viua mano" (sig. A2r).[8] Yet the technical achievement rests with Ugo da Carpi,[9] who engraved Arrighi's *La operina,* and with Eustachio Celebrino, who engraved Arrighi's *Il modo* and Tagliente's *Lo presente libro.* Both da Carpi and Celebrino brought out their own writing books: Carpi's *Thesauro de scrittore* (Rome, 1525),[10] and Celebrino's *Il modo d'imparare de scrivere lettera merchantesca* (Venice, 1525).[11] Each of these borrowed in varying degrees from Arrighi and Tagliente.

Ludovico degli Arrighi was a well-rounded bookman. He had apparently worked in a printing house as a young man.[12] In 1510 he published what may well be his first book, the *Itinerario de Ludovico di Varthema Bolognese nello Egypto* in Rome.[13] It is possible that he may have worked as a writing master in Venice at some time between 1510 and 1517. We know that by 1517 he was working as a copyist for Vittoria Colonna, Cardinal Guilio de'Medici, Machiavelli, and Lorenzo de'Medici: certainly he was no ordinary scribe. By 1522 he was also working in the Cancelleria Apostolica copying papal briefs, but soon after he seems to have lost his position as he subsequently styled himself as a simple public notary. In 1524, under the patronage of Giorgio Tressino, Arrighi set up a printing shop. He designed his own type, which was cut by his partner Lautizio Perugino. The shop continued until Trissino withdrew his support in April, 1525, having produced 27 editions. Arrighi left Rome and sojourned in Venice until the middle of 1526. Returning to Rome, he once again began printing, using a newly designed type, and produced ten editions. He was apparently killed in the sack of Rome in May 1527 by the troops of the Emperor Charles V.

Arrighi tells us: "Pregato piu uolte', anzi constretto da molti amici benignissimo Lettore, che riguardo hauendo alla publica utilita e commodo non solamente' di questa eta, ma delli posteri anchora, volessi dar qualehe' essempio di scriuere, et regulatamente' formare' gli caratteri e note' delle' lettore' (che Cancellaresche hoggi da chiamano) uolentier pigliai questa fatica" (sig. A2r).[14] *La operina* is much as Arrighi claims it is. Here there are no theoretical digressions, but simple instructions and clear examples for writing the *cancellaresca.* Arrighi plainly rejected any

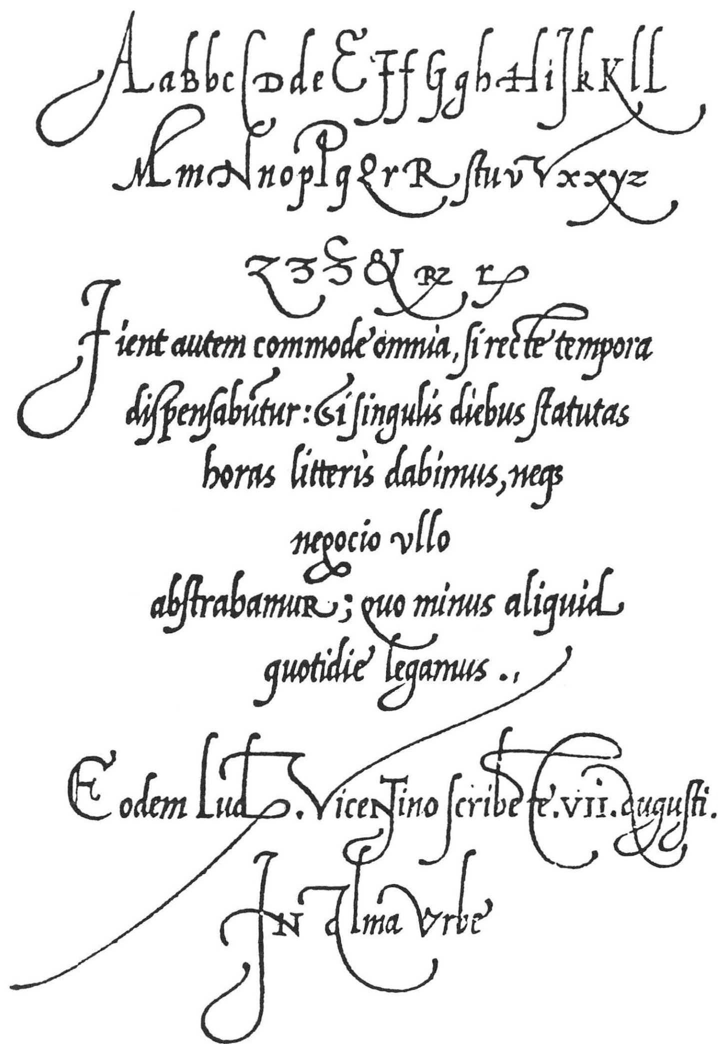


Figure 2.
Ludovico degli Arrighi, *La operina* (Rome, 1522).

geometrical notations: "te' sforzarai di consigliar li con l'occhio, et a quello satisfare', il quale' ti scusara bonissimo Compasso" (sig. A10r). This is certainly a work for those who wish to learn Arrighi's hand. He reduces the construction of letters to two strokes, broad and thin. From these strokes he develops a bowl from which the round letters derive. His capitals are straight, but his lowercase letters incline to the right. He indicated that words should be separated by the width of an *n,* letters by the space between the legs of an *n.* It is not clear, however, how many professional scribes would have profited from *La operina,* yet for the beginner, at least, here was a clear exposition of the *cancellaresca.*[15]

Arrighi's *Il modo* is more wide ranging: here he considered a variety of scripts. *Il modo* was mostly set in type, rather than being entirely engraved, as was *La operina.*[16] The work is primarily

concerned with cutting the pen: "Hauendoti io descritto, Studioso Lettor mio, l'anno passato un libretto da imparar scriuere littera Cancellaresca, laquale, a mio iudicio, tiene il primo loco, mi parea integramente non hauerti satisfatto, se ancho non ti dimostraua il modo di acconciar ti la penna, cosa in tal exercicio molto necessaria" p. [3].[17] In addition he had added — he says at the request of many people — additional specimens of other scripts, but they seem to be merely an afterthought. There is no text to accompany the plates of mercantile hands, *rotunda,* Roman capitals, Gothic capitals, etc. It is not clear that these specimens would have been of any real use to any working scribes. It may well be that they are no more than Arrighi's showing off his considerable calligraphic talents.

Figure 3. Giovannantonio Tagliente, *Lo presente libro* (Venice, 1524).

Figure 4. Giovannantonio Tagliente, *Lo presente libro* (Venice, 1524).

Giovannantonio Tagliente's *Lo presente libro* is a much more complex work.[18] On the title page, Tagliente claimed that he would teach the true art of writing by geometric rules. In fact, Tagliente seemed only to be paying lip service to Fanti; as an accomplished scribe he must have realized the uselessness of such geometrical principles. Like Arrighi's *Il modo, Lo presente libro* is a combination of etched woodblocks and set type. Tagliente experimented with having type cast on a parallelogramular, rather than the standard rectangular, body. This enabled the slanting letters to fit snugly side by side. Apparently, though, this caused endless practical problems in locking up the type.[19]

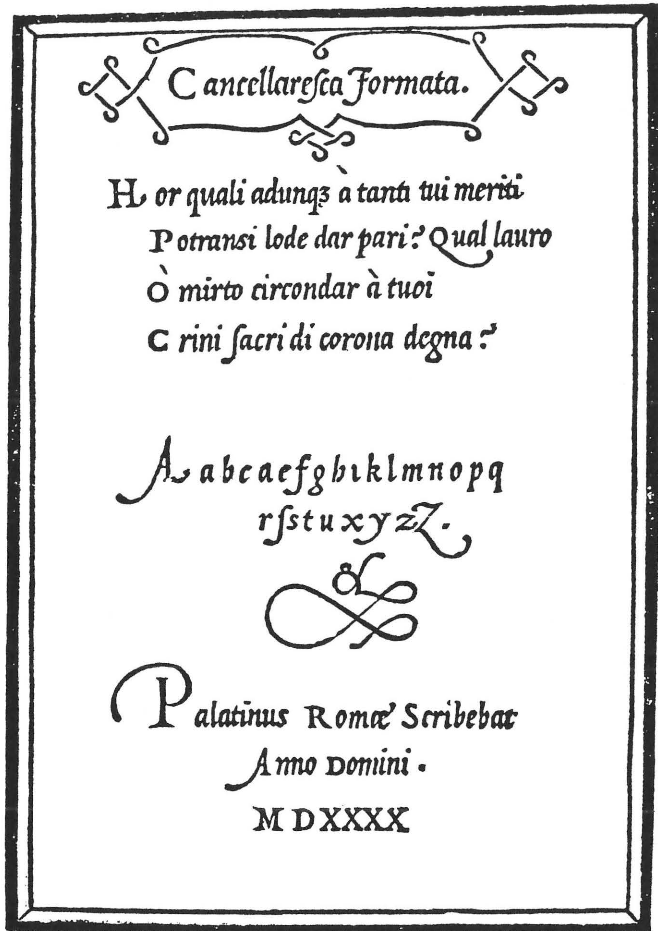
It is difficult to know exactly for whom Tagliente intended the work. He states it is for "ciascuno che si diletta de imparar a scriuere di una o di oiu qualita di lettere, lequali si fanno per geometrica ragione" (sig. A2r) and for secretaries and others. This tells us very little. If, however, we consider Tagliente's career as a teacher of writing and his other educational books, *Lo presente libro* falls into place. In 1515 Tagliente began a series of educational handbooks with the *Thesauro universale,* a treatise on arithmetic.

In 1524, the same year in which *Lo presente libro* appeared, he also published the *Libro maistrevole,* a reading book, the *Componimento di parlamenti,* a letter writing book, and a revision of the *Thesauro,* now retitled *Componimento di arithmetica.* About this same time he authored *Il refugio di amanti,* a handbook of love letters, and the *Luminario,* an accounting manual. Finally in 1527 he issued the *Essempio di recammi,* a book of embroidery patterns.[20] Thus *Lo presente libro,* issued in shorter and longer versions (both in 1524), fits very well into this series of practical handbooks, this one intended perhaps especially for the sorts of students he had often tutored in the Venetian chancery.

Lo presente libro is a much more ambitious work than Arrighi's two small volumes, though the central concern in still the *cancellaresca.* Like Arrighi, Tagliente discussed the script at length and illustrated it in numerous plates, in a variety of versions. In addition he included specimens of the mercantile hand, certainly a commonly used script in mercantile Venice. However, he also included specimens of the standard bookhands and other less common scripts: *textura, rotunda,* Roman capitals, roman upper and lowercase (not a script at all), Arabic, *lettera bollatica, lettera imperiale,* Hebrew, decorated Gothic, and Chaldean. Few of these specimens could have served to instruct a student of writing. In the same vein as Arrighi's specimens at the end of *Il modo,* they are examples of a master's abilities to write fantastic and obscure scripts.

Although it is difficult to know how many students profited from these books, or how many scribes improved their hands or learned new ones, we do know that they must have been very popular as all of them went through numerous editions. Arrighi's two works, soon combined, went through about 12 editions. Taglienti's went through at least 34 editions in the sixteenth century, Da Carpi's *Thesauro* went through at least eight editions, but Celebrino's *Il modo* appears to have had only a single edition (although his was a very practical book meant for merchants and may have had other editions read into oblivion; only three copies of the one edition exist).[21] Certainly it seems likely that the need for scribes was increasing during this period, and these books may have served a need in training them. They may well have served as textbooks in the chancery schools. However, it seems more likely that most scribes, who after all were nothing more than clerks, would have served as apprentices and learned all they needed to know on the job. One cannot help but suspect that the writing books, certainly aesthetically pleasing and engaging to the more educated, were often nothing more than contemporary "coffee-table books" for many of those who bought them, perhaps with the original intention of improving their own handwriting.

With Giovambattista Palatino's *Libro nuovo d'imparare a scrivere* (Rome, 1540), the writing book attained a new level of elaboration.[22] The major focus, as was standard, was on the *cancellaresca,* but Palatino seems to have introduced a new variety, the *cancellaresca formata.* This is a more formal (hence a bastard *cancel-*


Cancellaresca Formata.

Hor quali adunqȝ à tanti tui meriti
Potransi lode dar pari? Qual lauro
Ò mirto circondar à tuoi
Crini ſacri di corona degna?

A a b c d e f g h i k l m n o p q
r ſ s t u x y z Z.
&

Palatinus Romæ Scribebat
Anno Domini.
MDXXXX

Figure 5. Giovambattista Palatino, *Libro nuovo d'imparare a scrivere* (Rome, 1540).

laresca), which is written more deliberately and distinctly. James Wardrup has argued that it was thought most appropriate for dedication copies of verse and for books of hours, and finding such a static niche continued long after the current forms had been superseded.[23]

In what we now see as a standard feature of the writing books, a repertoire of "standard" hands, Palatino excelled. He included the mercantile, *lettra da bolle, lettra da brevi,* a Neapolitan hand, a French hand, a Spanish hand, a German hand, Gothic, *cancellaresca* written backwards, a highly flourished *cancellaresca,* and Roman capitals. Following these "legitimate" scripts are a series of fantastic and obscure scripts: monograms of intertwined Roman capitals, a rebus, and the Greek, Hebrew, Chaldean, Arabic, Egyptian, Indian, Syrian, and Saracen alphabets. The revised edition of 1543 included more of these obscure alphabets: the *rognosa,* the *tagliate,* and the Illyrican and Cyrillic alphabets. Again it seems unlikely such examples could have served very much of an educational purpose; they surely represent the height of Palatino's achievements as a calligrapher, though not as a teacher.

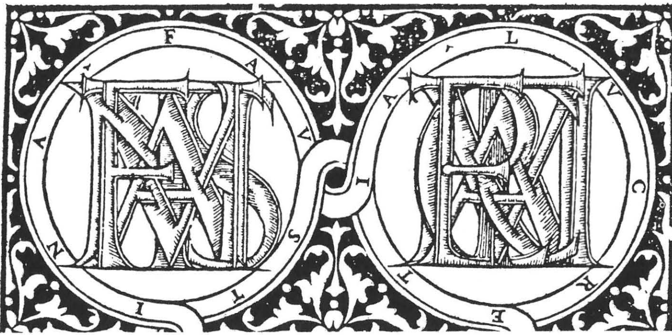


Figure 6.
Rebus from Palatino's *Libro nuovo d'imparare a scrivere* (Rome, 1540).

Laßo che' poca terra hoggi l'asconde
non la retruova 'l mondo amor si duole
ch'ardendo io chiami ogn'hor chi nó risponde.

Figure 7.
Monograms of intertwined Roman capitals from Palatino's *Libro nuovo d'imparare a scrivere* (Rome, 1540).

The work also includes an original treatise on cryptography. This might have been useful to any scribe employed by a large international business house or to one in diplomatic service, but to the great mass of scribes the subject of cryptography must have been of little interest. Palatino may well have been inspired to write this cryptographic treatise by his friend Trifone Benzi who was head of the cypher department in the Vatican. It may be that Palatino never envisioned his work as one which was broadly educational, but rather as one which was intended only for the scribal elite, and the members of the intelligensia who were interested in such things. We know that he belonged to a select group of intellectuals in Rome, the Academy of the Sdegnati, and served as their secretary, among whose members were also Francesco Maria Molza, the Modenese poet; Claudio Tolomei, a scholar, poet, and courtier; Dionisio Atanagi, a scholar and poet; Girolamo Ruscelli, a writer and linguist; Tomasso Spica degli Spinteri, Palatino's closest friend, and a poet and courtier; Cardinal Alessandro Farnese, a great connoisseur of the arts; and Trifone Benzi. Knowing the circles in which Palatino moved, it should not be surprising that his *Libro* is much more than a simple writing book. Certainly it could serve an educational function, but it seems more to be Palatino's statement concerning the great artistic dignity which he believed ought to be afforded to the master practitioners of his craft, thus raising up the writing master to an equal level with the master artist, author, or composer. No doubt there was a small coterie of such masters who deserved to be known as artists rather than scribes. For the majority of common scribes, though, the writing books became less and less relevant.

Yet not all writing books cut themselves off from their educational roots. For example, Dominico Manzoni's *Libretto molto utile* (Venice, 1546), in less than 50 pages, covered reading, writing, and arithmetic.[24] Here there is no pretense to artistic calligraphy, but rather it is a simple straight-forward educational treatise. It treats only the *cancellaresca* and the mercantile hand, obviously the latter, if not the former, would have been of great use to common scribes. Other similar books may well have been published which were used until they fell apart, and so no trace of them has survived. These were the true educational writing books, from which many common scribes may have studied. The larger number of extant copies of the more elaborate writing books may well reflect their being little used as writing books, but rather being purchased for their aesthetic qualities.

The artistic writing books continued to become more and more elaborate as each writing master attempted to outshine his predecessor. Even Vespasiano Amphiareo's *Un novo modo d'insegnar a scrivere* (Vence, 1548),[25] which was specifically designed to educate boys, included elaborate stylized alphabets of no use to a common scribe. Here we find alphabets constructed of plants, of tree trunks, of *putti* and masks, and of black strapwork letters.

Figure 8.
Tree-trunk alphabet from Vespasiano Amphiareo's *Un novo modo d'insegnar a scrivere* (Venice, 1548).

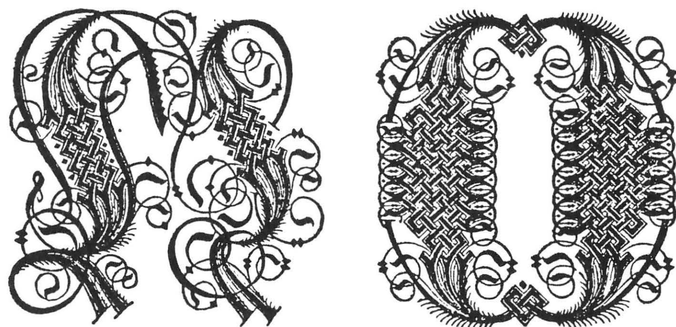


Figure 9.
Black strapwork letters from Amphiareo's *Un novo modo d'insegnar a scrivere* (Venice, 1548).

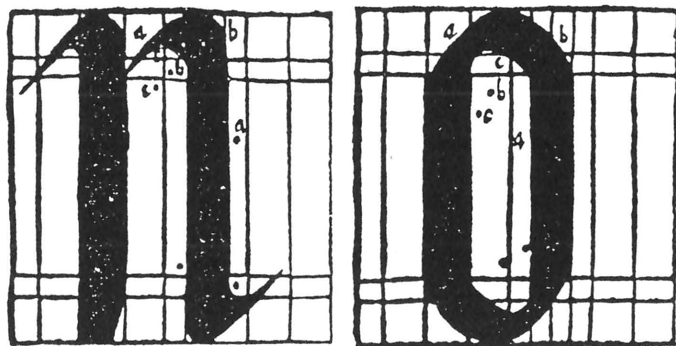


Figure 10.
Geometrical construction of upright *cancellaresca formata* from Ferdinando Ruano's *Sette Alphabeti di varie lettere* (Rome, 1554).

In Rome Ferdinando Ruano, in his *Sette alphabeti di varie lettere* (Rome, 1554),[26] not only adopted the elaborate fantastic alphabets of his predecessors, but he took one of the lesser commonly written scripts *(cancellaresca formata)* and several of the other scripts traditionally treated in writing books (Roman capitals, lowercase roman, *rotunda, lettera maiuscola bollatica* — decorated round capitals, and *lettera maiuscola Thedesca* — elaborated gothic capitals) and stretched them all on the rack of geometry. Not only did Ruano fail to consider the most commonly written scripts (*cancellaresca,* common italic, mercantile or notarial), but by forcing the letters into geometric molds, he made his work useless as a writing book. As a theoretical treatise and a work of art it may have succeeded, but as an educational book it had little value.

Gran differenza è da l'huomo, che si presume huomo senza sapere, &
da gli animali senza ragione, che sono senza comparatione piu &
utili gli animali per lauorare la terra, che gli ignoranti per ser=
uir la republica, Un semplice bue da il cuoio per calzare, la
carne p mangiare, le forze p arare, La innocente pecora da la
lana per vestire, & il latte per cibare, Ma l'huomo ignorante
à niuno gioua, nuoce à tutti, offende Iddio et mangia il pane de
Ioannes Franciscus Crescius Medio: Virtuosi .
lanen. Rome Scribeb.

Figure 11. Giovan Francesco Cresci, *Essemplare di piu sorti lettere* (Rome, 1560).

That this was so was certainly realized by the Vatican master scribe Giovan Francesco Cresci, who, in his *Essemplara di piu sorti lettere* (Rome, 1560), criticized "lettere Maiuscole antiche fatte a tronconi, Maiuscole con ma schere, & fogliami, & altre lettere fatte a cartocci, essempi di Rognosa, o Tagliata" (sig. **lr). Cresci promised to explain "vere & nuoue regole, nuoui modi, & nuoui secreti" (sig. **lv).[27] What he did was to throw out the old *cancellaresca* in favor of a highly cursive form of that script. It has been difficult to determine whether this was Cresci's innovation or was merely a statement of current practice. It is well known that all contempoarary scripts exhibit a continual pressure to become more cursive, and this is certainly what Cresci's "new" script illustrates. While we may probably credit Palatino with the codification of the *cancellaresca formata* (as it goes counter to the historical pressure of increasing cursivity), we cannot credit Cresci with much more than illustrating and defining an existing script. Yet in so doing Cresci's writing book gave this *cancellaresca corsiva* a stamp of respectability. Here, at least, was the potential to affect common scribal practice on a large scale.

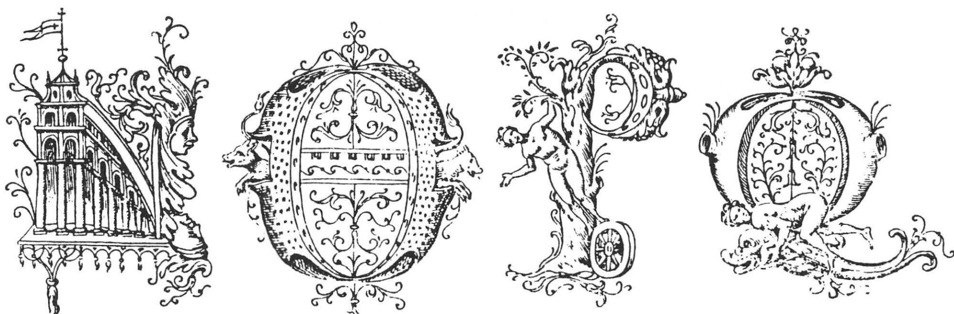


Figure 12. Giuliantonio Hercolani, *Essemplare utile* (Bologna, 1572).

Certainly Cresci affected subsequent writing books. Although works such as Augustino da Siena's *Opera . . . nella quale si insegna a scrivere* (Venice, 1565)[28] treated the *cancellaresca* and mercantile hands in a traditional manner and included exotic alphabets, the use of copper plates accelerated Cresci's cursive tendencies.

Giuliantonio Hercolani's *Essemplare utile* (Bologna, 1572)[29] was the first Italian writing book produced on copper plates. Here the old *cancellaresca* was treated for the final time, and the newer cursive form was emphasized. The medium of copper plates was especially suitable to the excesses of the *cancellaresca corsive.* Here we see an increased slope, clubbed ascenders, and a tendency to add flourishes. In addition Hercolani apparently could not resist illustrating his talent with the traditional range of exotic alphabets.

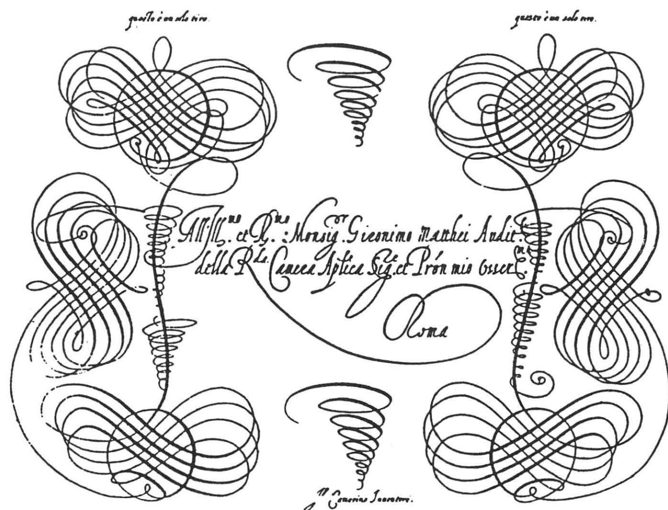


Figure 13.
Marcello Scalzini, *Il secretario* (Venice, 1581).

The writing book at the end of the sixteenth century is best exemplified by Marcello Scalzini's *Il secretario* (Venice, 1581) in which "la lettera cancellaresca corsiua Regina d'ogn'altro carattere" (p. 55), is the only script considered in detail.[30] Scalzini and his contemporaries emphasized speed, not legibility. Thus in the writing books at the end of the century we see an elaborated, stylized cursive script which has become more a calligraphic artform than a means of writing legible script. These books are a long way from the simple educational books which initiated the genre in the 1520's.

What then does this series of writing books tell us about the common scribal condition? Were we to accept the writing books *in toto,* we might suppose that *cancellaresca* was the most commonly written script up until about 1580, when *cancellaresca corsiva* replaced it. We might suppose the common varieties of italic or the common medieval cursive bookhand not to have been practised at all, and mercantile and notarial hands only practised occasionally. Further we might suppose that writing could be conducted on geometric principles, and that the many exotic and fantastic alphabets were commonly used. However, if we approach these books critically we may gain some idea of the development of *cancellaresca* at least. With the appearance of Arrighi's and Tagliente's works we see a mature *cancellaresca,* a script which had been in use in the Vatican and other chanceries for

nearly a century. Palatino seems to have developed a more formal variety, the *cancellaresca formata* by 1540, and the subsequent writing books give the impression that this was a successful innovation. Cresci claims, in 1560, to have developed the cursive form, *cancellaresca corsiva,* although it is doubtful that he actually invented it. By the 1580s it would seem that this cursive form had become dominant. Unfortunately the writing books are exceptionally misleading, and to understand what was really transpiring among the great majority of common scribes, we must turn to the scribal documents themselves.

THE COMMON SCRIBAL HANDS *of* VERONA

The Samuel R. and Marie-Louise Rosenthal Collection at the University of Chicago contains nearly 2,500 documents of North Italian origin.[31] I have considered 230 of these documents, which originated in Verona and its environs, dating from almost every year of the sixteenth century. These items are almost all common notarial documents involving civil and ecclesiastical jurisdictions. They include absolutions of debts, land sales, renewals of investitures, loans, witnessings of patrimonial and matrimonial divisions, accounts, creations of procurators, land transfers for debts, land investitures, renunciations, absolutions, testaments, codicils, arbitrated compromises, divisions of inheritances, citizenship petitions, receipts, letters, etc. In this collection are represented all the major sorts of common scribal items, with the exception of chancery documents. Nonetheless, this body of documents presents a coherent and full picture of the scribal profession — in terms of script — in Verona.

The most common script in use throughout the century was italic, which was never really considered in the writing books (26%, 61x), though of course the various forms of *cancellaresca* are stylized derivations of italic. Closely following is the notarial or mercantile hand (22%, 51x). This is perhaps not surprising, since a great many of the documents are of a notarial or business nature. What is interesting is that italic is often used for the same kind of document. Indeed a mixed form of italic and the mercantile script is the third most common type (15%, 36x). All of these scripts maintained themselves throughout the century.

Likewise *cancellaresca* was used throughout the century, although the greatest concentration is found from 1570 on. This seems to contradict the later writing books which indicate the demise of the *cancellaresca.* We can, however, see the beginnings of the *cancellaresca corsiva.* In a document written in Castagne on January 17, 1567 involving the sale of land, we can see incipient cursive qualities — such as flourishes — in what is a mixed italic and *cancellaresca.*[32] This is five years before Cresci claimed to have developed the *corsiva.* In a document written in Verona on Oct. 11, 1578, again involving a land sale, we see the *corsiva,*[33] and in a document, another land sale, written in Trent on May 1, 1587, the typical clubbed ascenders of the *corsiva* are most pronounced.[34] Likewise the *corsiva* is evident in a Veronese document, a dowry concession, of April 25, 1588.[35] Thus we see the

Figure 14.
January 17, 1567,
Castagne; MS 1756,
Rosenthal Collection.
Courtesy of the
Department of Special
Collections, University
of Chicago.

Figure 15.
May 1, 1587, Trent;
MS 1801, Rosenthal
Collection. Courtesy of
the Department of
Special Collections,
Unversity of Chicago.

Figure 16.
April 25, 1588, Verona;
MS 1808, Rosenthal
Collection. Courtesy of
the Department of
Special Collections,
University of Chicago.

Figure 17.
May 2, 1547, Verona;
MS 1721, Rosenthal
Collection. Courtesy of
the Department of
Special Collections,
University of Chicago.

corsiva's increasing use, but it remains a minority script compared to the *cancellaresca*. The *formata* is also evident. All four examples of the script were written in the 1570's, well after Palatino introduced it to wider notice in the 1540's. A mixed *formata*/italic is evident in two instances in 1545[36] and 1547,[37] perhaps directly influenced by Palatino. Finally, the most common bookhand (also used by notarial scribes) prior to the invention of printing, the cursive gothic bookhand, never considered by the writing books, is well in evidence, mostly in the beginning of the century but continuing throughout (7%, 16x). The table of Veronese scribal hands illustrates the variety and mixture of scripts in five-year segments through the course of the sixteenth century.

The actual nature of scribal activity — at least in Verona — is rather different from the impression given in the writing books. The writing books may well have had some small impact upon the evolution of hands, especially the *cancellaresca*, the *cancellaresca formata*, and the *cancellaresca corsiva*. It seems likely that Palatino's *formata* may have been a genuine development which he popularized through his books. On the other hand it seems more likely that the *corsiva* was a natural development that Cresci merely codified.

In the main it seems that the great majority of common scribes learned their trade and lived their lives in total ignorance of the writing books. By the end of the century the writing books had been transformed into minor works of art which were far more attractive to the intellegensia than to any practicing scribes. Whatever influence they had exercised on the common scribes earlier in the century was now at an end.

1. I wish to acknowledge the excellent resources of the John M. Wing Foundation of the Newberry Library, Chicago, without which this project would have been impossible. For bibliographies of the writing books see A. F. Johnson, "A Catalogue of Italian Writing Books of the Sixteenth Century," in *Selected Essays on Books and Printing,* ed. by Percy Muir (Amsterdam: Van Gendt, 1970), pp. 18-40; and Carla Marzoli, *Calligraphy 1535-1885* (Milan: La bibliofila, 1962).

2. Sigismondo Fanti, *Theorica et pratica* (Venice: Ioannes Rubens, 1514). See A. S. Osley, *Luminario: An Introduction to the Italian Writing-Books of the Sixteenth and Seventeenth Centuries* (Nieuwkoop: Miland Publishers, 1972), pp. 5-13.

3. *Cancellaresca* is commonly referred to as *cancellaresca corsiva,* but this is not to be confused with the new *corsiva* associated with Cresci later in the century.

4. Ludovico degli Arrighi, *La operina* (Rome: Arrighi, 1522).

5. Ludovico degli Arrighi, *Il modo de temperare le penne* (Venice: Arrighi and Eustachio Celebrino, 1523).

6. Giovannantonio Tagliente, *Lo presente libro insegna la vera arte* ([Venice: s.n.], 1524).

7. Translated by Osley (p. 18) from an application for a privilege to protect several of Tagliente's works.

8. Also see John Howard Benson, *The First Writing Book: An English Translation & Facsimile Text of Arrighi's Operina* (New Haven: Yale University Press, 1954), p. 3.

Sixteenth-Century Veronese Scribal Hands

Year	Cancellaresca	Cancellaresca formata	Cancellaresca formata/ Italic	Cancellaresca/ Italic	Italic	Italic/ cursive bookhand	Italic/ Gothic	Italic/ Notarial	Notarial/ Mercantile	cursive bookhand	Total
1500-1504	10½(3)			10%(3)	23%(7)		13%(4)		27%(8)	17%(5)	(30)
1505-1509	7%(1)				7%(1)				43%(6)	43%(6)	(14)
1510-1514						40%(2)	20%(1)		40%(2)		(5)
1515-1519	8%(1)			15%(2)	8%(1)	38%(5)			31%(4)		(13)
1520-1524					24%(4)	12%(2)		12%(2)	35%(6)	17%(3)	(17)
1525-1529				9%(1)	18%(2)	9%(1)		46%(5)	18%(2)		(11)
1530-1534	6%(1)			6%(1)	38%(6)			25%(4)	24%(4)		(16)
1535-1539				17%(1)	50%(3)			16%(1)		16%(1)	(6)
1540-1544	28%(2)			14%(1)	14%(1)			44%(3)			(7)
1545-1549			22%(2)	22%(2)	34%(3)			11%(1)	11%(1)		(9)
1550-1554				11%(1)	11%(1)	11%(1)		45%(4)	22%(2)		(9)
1555-1559	12%(1)				63%(5)			25%(2)			(8)
1560-1564				11%(1)	67%(6)			11%(1)	11%(1)		(9)
1565-1569				20%(2)	20%(2)			40%(4)	20%(2)		(10)
1570-1574	9%(1)	27%(3)		9%(1)	37%(4)				18%(2)		(11)
1575-1579	38%(3)	12%(1)			12%(1)				38%(3)		(8)
1580-1584	22%(2)				11%(1)			34%(3)	22%(2)	11%(1)	(9)
1585-1589	5%(1)				52%(11)			29%(6)	14%(3)		(21)
1590-1594	67%(10)				13%(2)				20%(3)		(15)
1595-1599				100%(2)							(2)
Total	11%(26)	2%(4)	1%(2)	8%(18)	26%(61)	5%(11)	3%(5)	15%(36)	22%(51)	7%(16)	(230)

Note: In each instance the percentage refers to the proportion of documents written in a five-year period; the bracketed number is the actual number of documents written in that particular script.

9. See Luigi Servolini, "Il Maestro della xilografia a chiaroscuro: Ugo da Carpi," *Gutenberg Jahrbuch* 12 (1937): 107-114.

10. Ugo da Carpi, *Thesauro de Scrittori* (Rome: A. Blado, 1525).

11. Eustachio Celebrino, *Il modo d'imparare di scrivere lettera merchantescha* ([Venice: s.n.], 1525).

12. See James Wardrup, "Arrighi Revived," *Signature* O.S. 12 (1939): 26-46.

13. See Stanley Morison, "The Earliest Known Work of Arrighi," *Fleuron* 7 (1930): 167-68.

14. Also see Benson, p. 3.

15. Also see Stanley Morison, *The Calligraphic Models of Ludovico Arrighi* (Paris: Frederic Warde, 1926).

16. On Arrighi's types see the following studies by Stanley Morison: "Toward an Ideal Type," *Fleuron* 2 (1924): 57-75; with A. F. Johnson, "The Chancery Types of Italy and France," *Fleuron* 3 (1924): 23-51 (reprinted in Johnson, *Selected Essays,* pp. 83-109); "On Script Types," *Fleuron* 4 (1925): 1-42; "Towards an Ideal Italic," *Fleuron* 5 (1926): 93-129; "The Italic Types of Antonio Blado & Ludovico Arrighi," *Monotype Recorder* 26 (1927): 3-23.

17. Also see Osley, p. 32.

18. See James Wardrup, "A Note on Giovannantonio Tagliente," *Signature,* N.S. 8 (1949): 57-61.

19. Osley, p. 18.

20. Ibid., p. 15.

21. See Johnson, "A Catalogue."

22. Giovambattista Palatino, *Libro nuovo d'imparare a scivere* (Rome: Baldassare di Francesco Cartolari, 1540). See James Wardrup, "Civus Romanus Sum: Giovanbattista Palatino and his Circle," *Signature,* N.S. 14 (1952): 3-39.

23. Ibid., p. 21.

24. Domenico Manzoni, *Libretto molto utile per imparar a leggere, scrivere & abaco* (Venice: Comin de Trino, 1546).

25. Vespasiano Amphiareo, *Uno novo modo d'insegnar a scrivere* (Venice: Curtio Troiano, 1548).

26. Ferdinando Ruano, *Sette alphabeti di varie lettere* (Rome: Valerio and Luigi Dorico, 1554).

27. Giovan Francesco Cresci, *Essemplare de piu sorte lettere* (Rome: A. Blado, 1560); facsimile ed. by A. S. Osley (London: Nattali & Maurice, 1968). Also see James Wardrup, "The Vatican Scriptors," *Signature,* N.S. 5 (1948): 3-28.

28. Augustino da Siena, *Opera . . . nella quale si insegna a scrivere* (Venice: Francesco de Tomaso di Salo, 1565).

29. Guiliantonio Hercolani, *Essemplare utile* ([Bologna?: s.n.], 1572).

30. Marcello Scalzini, *Il secretario* (Venice: Domenico Nicolini, 1581); the quotation is from the 1587 edition. See C. Pasero, "Marcello Scalini e la calligrafia del XVI secolo," *La bibliofilia* 35 (1933): 430-39.

31. James S. Grubb, *Historical Documents from Northern Italy: A Guide to the Samuel R. and Marie-Louise Rosenthal Collection* (Chicago: University of Chicago Library, 1984).

32. MS 1756.

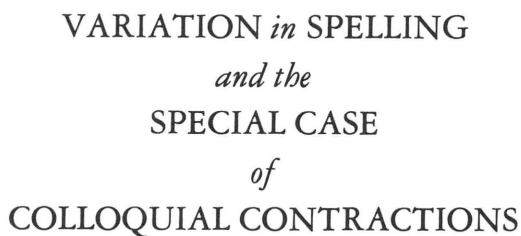
33. MS 1778.

34. MS 1801.

35. MS 1808.

36. MS 1718.

37. MS 1721.



VARIATION *in* SPELLING *and the* SPECIAL CASE *of* COLLOQUIAL CONTRACTIONS

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Colloquial contractions — spelling variants such as *kinda, hafta,* and *ya* — are widely used to represent informal speech. They are examined here against a background of other sorts of variation in our writing system. Variation in spelling that is independent of variation in speech includes abbreviations, regional spellings, the adaptation of loanwords, brand names, and eye dialect. Variation tied to speech includes forms marked for region, social identity, and colloquial style. Colloquial contractions are described here with respect to their morphological identity, their characteristic spelling patterns, and their significance in print.

Visible Language, XX 4 (Autumn 1986), pp. 413-426
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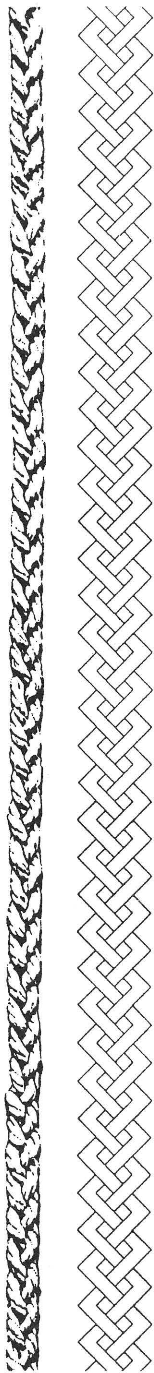


The present-day system for spelling English is remarkable for its stability and consistency. All over the English-speaking world, in spite of differences in pronunciation, educational systems, and traditions in publication, English is spelled the same way — except for a handful of items and rules. This stability has been secured and maintained through the authority accorded dictionaries, schools, and publishers, whose practice and standards have converged. With this standardization has come the consistency with which individual forms are spelled.

Given that the history of English has created a range of possibilities for representing the same sound sequences in our alphabetic system, consistency is not inevitable. The system allows for choices, e.g., in the representation of [o] as *o* or *oe* or *oa* or *ow*. In colonial America spelling rules were "beautifully vague," to use Mencken's phrase (1937, 379), and writers could choose one or another form with inventiveness and impunity. It was in the nineteenth century that consistency and correctness, especially in writing (Traugott 1981), become predominant in attitudes about American English; they remain so today. In these times of unrelenting print and widespread literacy, deviation from the standard is hardly tolerated. Having been set, the spelling of a particular word stands. It will not do to spell *broke* as *broak* or *stow* as *stoe*. Nor will it do to interchange *Rome* and *roam, flow* and *floe, show* and *shoe*. The principle that a given word has a single representation in letters is reinforced by the general tendency for a morpheme to have a single representation within words, in spite of alternating forms in speech, e.g., *feroc-* in *ferocity/ferocious, geograph-* in *geography/geographical,* and *-ed* in *walked/jogged/strutted* (Francis 1958; Venezky 1970; Chomsky 1970).

Consistent forms in writing may be difficult to learn. Writers must master a great deal of detail in learning to spell, and sorting out by morpheme identity as well as by graphical patterning and sound-letter correspondence may be especially burdensome. But consistent forms are important for readers. Given that a word has a single representation, readers can apprehend meaning directly under many circumstances and so bypass an internal phonological representation (Henderson 1982). We can sense how much we ordinarily use the orthographic identity of a word when we try to work through a text that abandons one conventional set of spellings for another. For instance, Frank Smith's sentence: "The none tolled hymn she had scene a pare of bear feat inn hour rheum" (1973, 72) forces us to slow down and deliberately pronounce the words, although not necessarily aloud, in order to identify them and determine their place in the meaning of the sentence. It may be that the consistency of English spelling contributes enormously to the efficiency with which skilled readers can survey unending pages of print for work and pleasure.

At the same time, variation in the spelling of words in written English is a common enough matter. Although only a relatively small proportion of English words have conventionalized variants, many of these occur frequently in print. Graphic variants may take forms independent of speech, such as *September/Sept.,* or may reflect variation in speech, such as *sort of/sorta.* From the perspective of the reader, being able to identify forms as variants of one another is an important part of being literate. Of course, learning and dealing with this variation is a relatively minor task, given the complexity of the entire writing system and our preparedness for variation from our experience with speech.

This paper will present an overview of the variation found in English spelling, giving special attention to variants that have not received recognition in dictionaries and the American school curriculum. First, variation in spelling that is independent of variation in speech, including abbreviations, regional variants, the adaptation of loanword, brand names, and eye dialect will be briefly surveyed. Then the variation that is tied to variation in speech will be considered, not only established contractions but spellings that have come to represent forms marked for region, social identity, and colloquial style. In particular, the spelling patterns that are regularly used to represent reduced, colloquial speech will be analyzed in detail.

VARIATION INDEPENDENT *of* SPEECH

Written English, as far removed as it often is from sound, also includes forms that have developed independent of spoken forms. Given the special purposes that written language may serve, especially in organizing and keeping information, the existence of its own conventions such as abbreviations is to be expected. But the potential that written language has for representing values such as national identity, American know-how, receptivity to foreign patterns, and humor is also apparent in the types of variant spellings that have become widespread and conventionalized.

Abbreviations

The distinctiveness of written English shows itself in abbreviations, the shortening of the written form of a word or words without concomitant shortening of pronunciation. Typically, an abbreviation includes several letters from the full word and ends with a period, as in *Sept., km., doz.;* British convention does not require the period when the abbreviation and the full word end with the same letter, as in *Dr, ft,* and others. In many circumstances, such as on signs or tables, the period is omitted. The letters of some abbreviations such as *lb., cwt.,* and *i.e.,* do not relate directly to sounds in the full spoken word, in this case *pound, hundredweight,* and *that is,* and so they approach the status of visual morphemes, as Bolinger (1946) termed numerals and other conventional signs in our written language.

Other shortenings traditionally classified as abbreviations involve phrases and, after all, implicate speech. The spelling of the abbreviation corresponds to a shortening in pronunciation of the original phrase. But the spoken shortening is based on the written abbreviation. One type is the pronunciation of initial letter names, such as *MLA* for *Modern Language Association* and *MIA* for *missing in action.* It is a frequent and favorite device, especially for proper names. Another type is the pronunciation of the abbreviated set of letters as a word. Such acronyms, for instance, *NATO* for *North Atlantic Treaty Organization* and *AIDS* for *acquired immunodeficiency syndrome,* are not so favored in English, but are hardly rare. These abbreviations for phrases have come to outnumber the prototypical shortened spellings. As names for modern institutions and technical matters like *MLA* and *AIDS,* they are proliferating, while the numbers of shortened spellings like *Sept.* and *doz.* are holding steady.

It is notable that these shortened spellings occur in only restricted contexts. *The Britannica Book of English Usage* (Timmons and Gibney, 1980), for example, recommends that it is best to avoid all abbreviations in formal writing, except for some standard forms such as courtesy titles. This practice is rarely violated. Names of states, days, months, and units of measure, for instance, are fully spelled out in both formal and informal printed text, and usually appear abbreviated only on tables, in reference works, and generally in material where space is limited and information tightly packed. The regular, modern use of only full forms in extended texts contrasts with practice in handwritten manuscripts and inscriptions through European history. As Bradley (1919) remarked, many medieval manuscripts had nearly every word abbreviated.

Regional Variation in Spelling

The well-known differences between British and American spelling are notable in that they do not follow differences in pronunciation between British and American speech. The spellings *cheque, civilise, defence, neighbour,* preserve conventions that have changed in the United States. In Canada, where American pronunciation generally holds and American spellings often appear, such British spellings remain. It is worth noting that some American variants have not entirely displaced traditional British forms, which suggest a more refined tone here, e.g., *theater/theatre; catalog/catalogue.*

The large majority of spelling differences apply to morphologically complex words, as observed in the doubling of *l* with the addition of suffixes, as in *grovelled* and *jeweller,* and as seen especially in the representation of endings such as *-ize/-ise, -or/-our,* and *-er/-re.* The differences, when examined closely, sometimes reveal that the spelling patterns encode unexpected morphological information. Aronoff (1978) has pointed out that the *-our* in British spelling occurs by and large in inanimate nonagentive nouns without lexical stems, as in *vigour, colour,* and *odour.*

Brand Names

Many names for products and services are familiar words whose spellings depart from the standard by a letter or two, taking advantage of the choices that English offers to represent sounds. In this way spelling can attract the eye without disrupting pronunciation, as in *Kleenex, Troy-Bilt, Sunkist, Gleem,* and *Playskool.* As Jaquith (1976) notes, the majority of such names are made up of a shorter sequence of letters than their conventionally spelled counterparts, since the names frequently involve the reduction of vowel digraphs and consonant blends, e.g., *view/vu* and *block/blok;* a favorite reduction is erasing *gh,* as in *delite* and *lite.* Many other such names involve the substitution of one letter for another; a favorite is *k* for *c,* as in *kool* and *krazy.* Jaquith points out that such spellings tend to be chosen for products and services that attract for their high volume, quick turnover, and expendability, for example, fast foods, household cleaning and maintenance products, and automobile supplies. In contrast, there are spellings which suggest bygone days and traditional values, such as *Publick House* or *Ye Olde Inne.*

Loanwords

A rather significant aspect of variation in our spelling stems from the diversity of loanwords in English. For many loanwords there may be a choice between a spelling that accords with the spelling in the source language and an English adaptation that accords with English spelling patterns and pronunciation. Thus we find *spumone/spumoni* from Italian, *aficionado/afficionado* from Spanish, *omelette/omelet* from French, *fjord/fiord* from Norwegian. Although we might expect a loanword to settle into a single, standard spelling with time, it is worth noting that variants may exist over a long period of time. *Omelette* and *fjord,* for example, entered English in the seventeenth century. The details of subpatterns sometimes reveal analogies based on English notions as to how loanwords from a particular language should be spelled. English has borrowed *macaroni, spaghetti, pep(p)eroni* from Italian, and has shaped *spumoni* to that pattern. In the case of languages with no written tradition, the patterns of an intermediate language may intervene, as shown by the French-based variant *Esquimau* next to Danish *Eskimo.* In the case of languages that use a script other than Roman, differing traditions of transcription into Roman script have influenced their appearance in English. Thus we find *tsar/csar/tzar* from Russian, *sumac/sumach* from Arabic, and *maharajah/maharaja* from Hindi.

Competing forms for loanwords make up a significant proportion of variant spellings. An estimate of that proportion was made by examining a sample from the approximately 2700 words with variant forms given in Emery's *Variant Spellings in Modern American Dictionaries* (1973). In this compilation of the variant spellings from five dictionaries published around 1970, the tenth word of each tenth page was identified and checked for the source of variation. Of the 101 words, 25 had variants that reflected the spelling of their source language, ranging from Afrikaans to

Sanskrit. Other, more casual estimates of word lists showing variant spellings confirm as well that about a quarter of the variant spellings that we meet present choices related to the source language of a loanword.

Eye Dialect

Another type of variation that the resources of English writing make possible is what has traditionally been called eye dialect (e.g., Bowdre, 1982). This is the spelling of a familiar word in a nonstandard form, while maintaining the standard pronunciation. Recurrent examples include *wimmin, sez, bisness,* and *enuf.* The words that are susceptible to eye-dialect spellings are those whose standard spellings are irregular, as common words so often are. The writer usually substitutes a letter that more regularly corresponds to a given sound than does the standard spelling, e.g., *u* in *frum, cum, tu, yu,* and *ur.*

Such eye-dialect spellings are generally restricted to invented speech, as in regional humor. They serve to hint that the overall tone of speech should be interpreted as different from the tone of conventional speech, usually in the direction of rustic and uneducated, often jocular and even grotesque. As Ives (1971) remarks, eye dialect spellings deliberately overstate the ignorance or illiteracy of a character. Even though they themselves do not represent a particular pronunciation, they often appear in texts next to dialect spellings that do.

VARIATION *as a* REFLECTION *of* SPEECH

Spelling variation in English sometimes serves to reflect differences in pronunciation that are regionally, socially, or stylistically marked in the spoken language. Such forms appear, for the most part, in direct representations of speech in fiction, nonfiction, and especially one-liners such as cartoons and advertisements. In general, our standard, largely invariant orthography ignores differences in speech. Spellings are sufficiently abstract to accommodate linguistically and stylistically conditioned variation as well as regional and social differences, so that variation in speech is rarely represented. When a pronunciation is indicated in writing, given the broad-gauged neutrality of standard spelling, it must have special significance to the writer.

Although speech can be seen to vary by region, by the social status of the speaker, and the immediate situation, many variables in pronunciation do not fall neatly into these domains. A single feature which is regional may also vary by social group and with the context of the situation. In his detailed studies of variation, Labov (1972) verified this multiplicity of roles that a variable may play when he described the patterning of r-lessness in New York City speech. This feature, characteristic of the area, appears with greater frequency in the speech of lower and working classes than in the upper middle, but it also appears more frequently in the casual style than the careful or reading styles of the upper middle class. Other possible examples come to mind quickly, such as the alternation between [ŋ] and [ŋ] for *-ing* and between *going to* and *gonna.* When it comes to representing such differences in texts,

regional variants represented in spelling as a rule entail social differences, usually suggesting inferior social status and education, since regional features in the speech of educated persons is not ordinarily represented in dialectal spelling (Ives 1971). In the same way, casual variants in writing, when set in relatively formal contexts, often imply the social distinctiveness of the speaker. Interviews with rock musicians in the magazine *Rolling Stone,* for instance, often show colloquial speech forms in quotations, suggesting that such entertainers set themselves apart by speaking in an informal style when others would tighten up.

In the sections below, variant forms in writing that correspond to variant forms in speech will be reviewed, first with a brief comment on standard contractions. Then, in the light of the overlap between regional, social, and stylistic variation, a somewhat artificial distinction will be drawn between variant spellings as they have appeared in literature, usually to represent regional and closely associated social differences, and stylistic variants as they appear in everyday print, usually to indicate colloquial style.

Standard Contractions

Standard contractions are taken for granted in our common practice and are recognized in dictionaries, handbooks on usage, and the school curriculum. They involve the combining of two words into one with an apostrophe, *let's; not* attached to auxiliary verbs, as in *can't,* and *didn't;* and forms of *be* and the auxiliaries *have, will,* and *would* attached to pronouns, as in *they're, we've, she'll* and *who'd.* They comprise a limited set and result, curiously enough, in doublets such as *they aren't/they're not, we haven't/we've not.* The set also includes ambiguous forms, such as *he's* and *he'd,* which as in speech are resolved in their syntactic context, as in *he's singing/he's sung.* The standard contractions have come to be conventionalized since they first appeared in texts during the Elizabethan period, along with many other forms that did not survive (Partridge 1964; Jespersen 1961). Their spelling hardly represents the range of their variation in speech nowadays, which is subject to further rules of deletion and reduction.

The apostrophe appears in the place of the letters corresponding to a vowel or consonant + vowel sequence. In the negative forms, the apostrophe appears medially in *not* and the *n't* is attached directly to the auxiliary verb, which itself shows some irregularities, not only in sound *(*willn't),* but spelling *(*cann't).* In the other cases, the apostrophe appears at the morpheme boundary.

There is a small group of contractions that are not in common written usage: *'tis, 'twas, e'en, e'er, ne'er, o'er.* They are considered archaic or poetic in the OED (see, for example, entry under letter *v*) and mock-poetic today. They have the curious history of having been dialectal forms adopted in verse to fit meter, but not conventionalized in standard speech; rather, they have lost their rustic and familiar tone and become associated with literary language of the past (Partridge 1964, 11).

Linguistic and stylistic constraints on contraction in speech are complex and remain to be thoroughly examined (Labov 1969). In writing contraction is generally chosen less frequently than in speech, although this observation might be undermined by systematic quantitative analysis that would take the different functions of written and spoken language into account. It is generally well-received by commentators on usage. Evans and Evans (1957), for example, remark that uncontracted forms make for a somewhat didactic or quarrelsome tone.

Regional and Social Variation in Literary Dialect

In their attempts to create small worlds with words on a page, writers sometimes chose to represent speech in a way that marks it socially or regionally. Along with touches of nonstandard syntax, uncommon vocabulary, and local turns of phrase, they may introduce deviations from standard spelling. Mark Twain, Edgar Allan Poe, and Hart Crane are among the American writers who, through special orthographic gestures, give their characters accented speech that contributes to their identity and their part in the action. Some writers set great store in the value of their characters' speech, making the style much of the story, especially the humorists such as George Washington Harris, Finley Peter Dunne and, closer to our own days, Robert Glover.

Those who have studied literary dialect with care point out that its representation is deliberately incomplete (Ives 1971; Page 1973; Traugott 1981). Not only must it be comprehensible to a wide spectrum of readers, it must be comprehensible at a glance. A faithful, detailed representation of speech can prove to be tedious, even for skilled readers. The special touches may present a page that deviates too sharply from what they are used to seeing, both in graphic form or frequency. With this in mind, effective writers decide on the peculiarities that they can use to suggest speech rather than transcribe it.

There are few definite rules for suggesting dialect through spelling, however. Among recurrent strategies apart from outright substitution of letters close to pronunciation, writers insert apostrophes to indicate omitted sounds, as in *some'ers* for *somewheres,* or to indicate a shift in pronunciation, as in *mout'* for *mouth.* They also may use *h* to indicate r-lessness, as in *caht* for *cart,* or to mark the quality of the preceding vowel, as in *mah* for *my.* Individual writers have experimented in their own ways within the framework of the English writing system.

Colloquial Contractions

There are also contracted or shortened forms in writing that reflect colloquial or rapid pronunciations. Even though they occur commonly in print, they do not enjoy formal recognition. These include, for instance, *hafta* for *have to, sorta* for *sort of,* and *ya* for *you.* As a general rule they do not figure in the English curriculum

of our schools. Furthermore, they do not appear in our dictionaries, even though the dictionaries may give reduced pronunciations that they represent. For example, *Webster's Ninth New Collegiate Dictionary* (1984) notes "in 'have to' meaning 'must' usually haf," under the entry *have,* but it does not mention the spelling *hafta.*

By and large, such variant spellings have become conventional for a limited set of words and phrases that occur very frequently in the language. They appear almost exclusively in written discourse representing direct speech. They can be found, for example, in comic strips, jokes, interviews representing direct quotation, transcriptions of extended speech, and dialogue in prose fiction and plays. Writers apparently choose them to reflect the informal or casual quality of the speaker's style in a given situation, suggesting affection, insouciance, anger, and the like. The marked spellings help to set the tone of the moment. As might be expected, they also serve to indicate and even create a speaker's social identity, reflecting the pronunciation of individuals who are uneducated, provincial, generally defiant of authority, or studiously casual. It is reasonable to suppose that in extended texts the frequency of such colloquial forms contributes to our social judgment of a speaker as it does in speech (Labov, 1972).

These forms can conveniently be called colloquial contractions in that they represent shortenings from standard spellings and, like the pronunciations that they represent, function to mark texts as relatively informal or socially charged. They differ from standard contractions, however, in that some are written without apostrophes and some are shortenings of only one word.

The list of forms given below is intended to present the most frequently occurring in contemporary everyday English. They were collected from various sources during the latter half of 1984. Three sources were regularly examined during this period and consistently yielded examples, specifically, the syndicated comic strips appearing in a daily newspaper, the *Knickerbocker News* of Albany, New York, including *Conrad, Doonesbury, Crock,* and *Wizard of Id;* stories and interviews in *Rolling Stone* magazine, recognized for its efforts to write well about entertainers bent on defying traditional values; and anecdotes in *Reader's Digest* that include quotations from people facing outlandish situations. Many other written materials were more casually scanned, such as humorous greeting cards, the lyrics of popular songs, and innumerable magazine and newspaper advertisements. The forms of colloquial contractions noted in these sources were confirmed by checking still others, such as the interviews in Studs Terkel's *Working* (1972), a book edited to reflect the voices of people in various occupations speaking plainly about their work.

The forms are given below by their syntactic and morphological identity. An alternative might have been to consider only the pronunciation that the spelling is intended to represent. Such an approach, however, would have bypassed the important fact that our writing system is morphologically as well as phonologically based.

Progressive Verb Forms

-ing/-in'. The shortening *-in'* is a common marker of colloquial style. In extended texts it varies a good deal with *-ing,* even within sentences, as in *One guy's layin' on the floor and I'm crawlin', feeling along the hose.*

going to/gonna. The spelling *gonna* is an especially frequent marker of informal style, as in *They're gonna demolish a lotta homes.* The shortening *goin' to* with the same meaning is scarce. Just as *be going to* is a touch less formal than *will* when either is possible, *gonna* is less formal than *'ll,* as in *It's gonna happen/It'll happen.*

Auxiliary Verbs

does, did, do/-'s,-'d, -da. Although forms of *do* occur in standard contractions with the negative, it is only the negative that is reduced, e.g., *doesn't.* In colloquial contractions, *does* and *did* are shortened to their final consonants and attached to *Wh-* forms, as in *What's that mean? What's shortening look like?* and *How'd it go, handsome? What'd he say?* It is noteworthy that *-'s* for *does* falls together with the standard contractions for *is* and *has,* and *-'d* with the contractions for *had* and *would.* Yet the standard contractions do not fit with ease in comparable sentences such as **How'd it gone, *How'd he have done it,* either in speech or writing.

In construction with *What* and *you,* as in *What do you want?, do* is sometimes attached to the *what* or to both *what* and *you.* The spelling of the phrase has not been fixed, however, so that examples occur such as *Whatta'ya have to do to beat this guy? Whattya want from me? Whadda ya call a Nicaraguan MIG?*

have/-a. In verb phrases made up of "past" forms of the modal auxiliaries followed by *have* + past participle, *have* can be contracted to *-'ve,* as in *could've.* But colloquially it can be shortened further to bound *-a* corresponding to [ə] in *coulda, shoulda, woulda, mighta, musta,* as in *He coulda been hit.*

Catenative Verbs

got to, have to, want to/gotta, hafta, wanna. In these cases of a catenative verb followed by *to,* the *to* is attached and written as *-a,* representing unstressed [ə], as in *I gotta make a pit stop* and *Wanna see my baby picture?* The assimilation of [v] to [f] in *have* is represented in the colloquial spelling *hafta.* The deletion of the *t's* in *wanna* reflects a regular informal pronunciation rule [VntV] —> [VnV] as in *winter* and *bounty;* now and then *want to* is represented as *wanta.*

Personal Pronouns

him, her, them/'im, 'er, 'em. These forms reflect the regular deletion of [h] preceding unstressed vowels in rapid and informal speech and, in the case of *them,* the very old variant without the spirant, as in *Stick 'em up.*

you/ya, yuh, y', -cha. The most frequent colloquial spelling is *ya,* as in *I'm tellin' ya, kid.* Sometimes *yuh* appears in comparable environments, as in *See yuh,* but seems to be favored by only a minority of writers. *Y'* appears as the subject in conversational expressions such as *y'know* and *y'see.*

-cha is the attached form that reflects the assimilation of the [y] after [t] in *gotcha* for *(I've got you; doncha* for *don't you,* as in *Doncha know, I love you so;* and *watcha* for what you, derived from *what are you* through deletion of the auxiliary *are,* an established colloquial rule in *wh-* questions with *you (When you going? How you doing?)* Unlike the other forms for *you, -cha* goes far toward representing the pronunciation and erases the letter that represents the identity of the pronoun in the standard spelling and other variant forms. A voiced counterpart of *-cha* is heard in speech, for instance, [wʌdʒə] in *What did you eat?* and now and then will appear with *j,* as in *Whaja eat?*

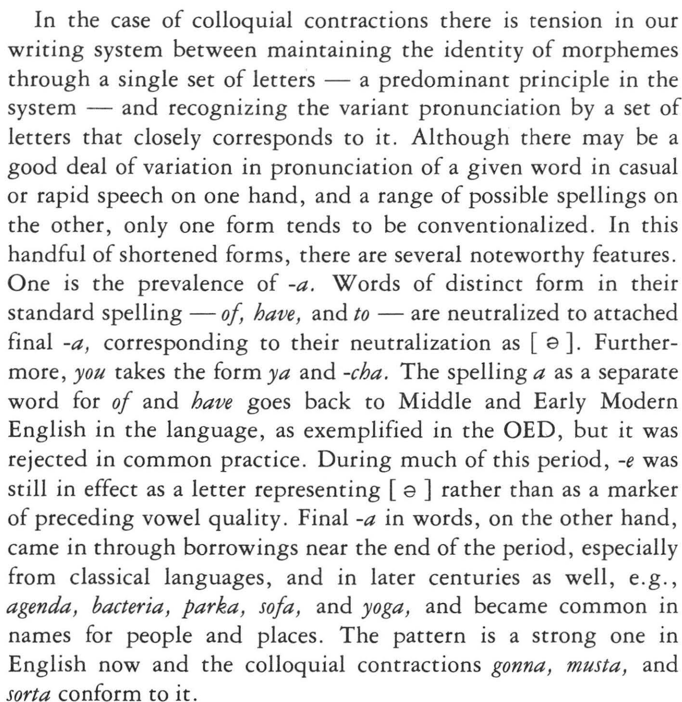
Others

of/-a. Informal *of* is often spelled attached *-a,* reflecting [ə] in speech. It appears in noun quantifiers such as *lot of/lotta; couple of/coupla; bunch of/buncha. Sort of* and *kind of* are likewise written *sorta* and *kinda,* especially when they occur adverbially as hedges, as in *sorta rearranges things; kinda yellow.* Similarly, the phrase *out of* is written *outta* (sometimes *outa),* as in *outta sight. Of* also occurs unattached as *o',* as in *He's afraid o' the dark.* This is a long-standing written form, as in *will-o'-the-wisp,* but appears relatively seldom. It tends to occur in contexts intended to reflect regional or rustic dialect rather than colloquial.

give me, let me/gimme, lemme. The objective form *me* is attached to these verbs in the imperative. In pronunciation the final consonants of the verbs are deleted, while in the written form the *m* of *me* is doubled by the rule that serves to indicate that the preceding vowel is lax.

There are still other contracted forms that appear with regularity in written representations of informal speech. These include *ol'* and *an',* which show the common deletion of [d] after homorganic [l] and [n] in speech. *'Cause* and *'bout* show the frequent aphaerisis of *because* and *about. C'mon* for *come on* is unique in its written shape, as is *li'l* for *little.* Words other than verbs that end in *-ing,* such as the indefinites that end in *-thing,* especially *something* and *nothing,* and nouns such as *building* and *footing,* occur with *-in'.*

Such colloquial written forms that reflect variation in pronunciation appear beside examples of so-called eye dialect that, as mentioned above, do not reflect a change of pronunciation as such, but suggest uneducated or rustic speech. Such eye-appealing forms occur in the representation of colloquial forms, too, and include *helluva, dammit, sez,* and *wuz.*



In the case of colloquial contractions there is tension in our writing system between maintaining the identity of morphemes through a single set of letters — a predominant principle in the system — and recognizing the variant pronunciation by a set of letters that closely corresponds to it. Although there may be a good deal of variation in pronunciation of a given word in casual or rapid speech on one hand, and a range of possible spellings on the other, only one form tends to be conventionalized. In this handful of shortened forms, there are several noteworthy features. One is the prevalence of *-a*. Words of distinct form in their standard spelling — *of, have,* and *to* — are neutralized to attached final *-a,* corresponding to their neutralization as [ə]. Furthermore, *you* takes the form *ya* and *-cha*. The spelling *a* as a separate word for *of* and *have* goes back to Middle and Early Modern English in the language, as exemplified in the OED, but it was rejected in common practice. During much of this period, *-e* was still in effect as a letter representing [ə] rather than as a marker of preceding vowel quality. Final *-a* in words, on the other hand, came in through borrowings near the end of the period, especially from classical languages, and in later centuries as well, e.g., *agenda, bacteria, parka, sofa,* and *yoga,* and became common in names for people and places. The pattern is a strong one in English now and the colloquial contractions *gonna, musta,* and *sorta* conform to it.

Another notable feature is the use of the apostrophe, a long-established device (Partridge 1964) for indicating the omission of a letter corresponding to a sound or sound sequence deleted in speech. The apostrophe is required in standard contractions and occurs in similar colloquial contractions, namely, *-'s* and *-'d* for *does* and *did*. In other colloquial forms, it occurs chiefly in the shortening of single words, such as *ol'* and *'cause*. But in most colloquial contractions of two words or more, the forms are bound without the apostrophe and the contract takes the shape of a plain word, e.g., *kinda* and *gotcha*.

A third notable feature is that the written shapes of these new combined forms, many of them CVCV in speech, conform to familiar spelling patterns. Not only does final *-a* correspond to spoken [ə], but the intervocalic consonant letters, if not a cluster, are doubled and so mark the preceding vowel not tense, as in *gonna, wanna,* and *gotta*. Perhaps it is by this pattern that the doubling appears even in *outta,* where the tense vowel remains. *Gimme* and *lemme* follow the pattern but are unusual in that they retain the morphological representation of *me,* instead of shifting to the regular representation of the final vowel with *-y*.

As we might expect from our knowledge of variation in speech and in literary dialect, the incidence of colloquial forms in continuous discourse varies. There is no reason to expect that the social and linguistic factors that influence variation in speech do not enter into variation in writing. However, writing itself is an important factor; it is not at all clear how strongly the eye rules the ear in selecting one form over another. For the moment, examples rather than analysis will have to suffice. This paragraph is from an interview of a utility man at an automobile plant in Terkel's *Working,* where *might have/might've/mighta* alternate and *-ing/in'* vary in *working, grubbing* and *stumblin'.*

I might've been working in some small factory down south or I might have gone to Detroit where I worked before or I might have gone to Kalamazoo where I worked before. Or else I mighta stuck on a farm somewheres, just grubbing off a farm somewhere. You never know what you woulda did. You can't plan too far in advance, 'cause there's always a stumblin' block (1972, 33).

In addition, a quick count of colloquial forms in four other interviews in the book showed that *gonna* appeared instead of *going to* as a form for future time in all cases, while verbal *-ing* appeared in relation to *-in'* roughly 30 to 1 (woman felter); 2 to 1 (policeman); 1 to 2 (freight elevator operator); 1 to 3 (fireman). Note that the interviews were transcribed and edited to as to cut "the lean from the fat" (ix), but the principles the transcribers followed are not clear.

Colloquial contractions are now an integral part of American written English, conventionalized by common practice. They offer writers the possibility beyond standard contractions for making speech in print informal and charging it with emotional tones such as toughness, confidentiality, or ease. In extended prose texts it is possible to indicate such tones by setting the context and describing the manner of speaking — to mutter, speak low, drawl, and the like. But in the brief words that we meet in jokes, advertisements, and greeting cards, spelling can serve the function of suggesting the tone directly. Colloquial contractions number only a few, although they are certainly not a closed set, and are generally spelled consistently. They provide variation, yet hardly budge the fundamental stability and consistency of our writing system.

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PROXIMITE *du* MURMURE: DUPIN *and* UBAC COLLABORATE

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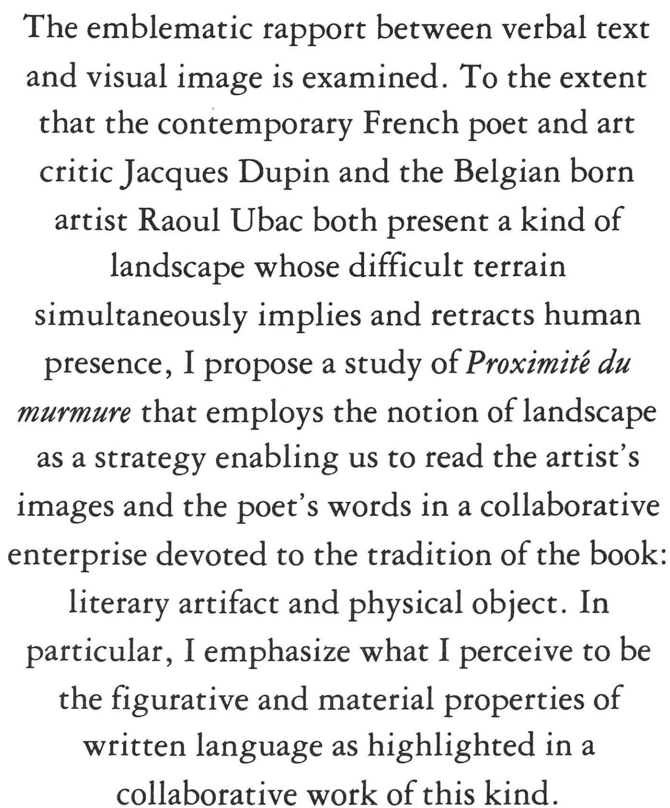

The emblematic rapport between verbal text and visual image is examined. To the extent that the contemporary French poet and art critic Jacques Dupin and the Belgian born artist Raoul Ubac both present a kind of landscape whose difficult terrain simultaneously implies and retracts human presence, I propose a study of *Proximité du murmure* that employs the notion of landscape as a strategy enabling us to read the artist's images and the poet's words in a collaborative enterprise devoted to the tradition of the book: literary artifact and physical object. In particular, I emphasize what I perceive to be the figurative and material properties of written language as highlighted in a collaborative work of this kind.

Visible Language, XX 4 (Autumn 1986), pp. 427-436
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The interplay of poetry and the arts has long been a topic of interest to both artists and poets and, of course, to critics whose variety of approaches to the phenomenon has been provocative, albeit controversial. Comparisons have been undertaken on the basis of the artist's intentions and theories, on the common social and cultural background shared by the works themselves, and on the analysis of the actual objects of art, and thus of their structural relationships. In France, in particular, writers' fascination with the visual arts has a long tradition. Extremely popular during the Cubist period in painting, the *livre d'artiste* — in which original graphics accompany verbal text — establishes a more intimate complementary rapport between painter and poet. Graphics mediate between like discourses, illuminating the figurative and material aspects of written language.[1]

The point of departure for my study is precisely the intimate complementary rapport between poet and painter. Close examination of the *livre d'artiste* collection *Proximité du murmure (Proximity of Murmure)* executed by the contemporary French poet and art critic Jacques Dupin and the Belgian born artist Raoul Ubac,[2] reveals the emblematic rapport between verbal text and visual image with emphasis on the unique role and properties of written language as highlighted in a collaborative work of this kind.

Whether Dupin assumes a poetic voice in his own texts or a critical one observant of another artist, he repeats in essence the same images and themes, and takes the same positions. Violence and eroticism are thematic constants. Likewise, land and body imagery prevail and are employed to explore the problem of creative destruction that fascinates him.[3]

Similarly, Ubac's work concerns human desire and resistance as inscribed in a rugged terrain. The tree, the stone, the land, the human body, and the occasional utensil appear in his designs. Intentionally metaphoric, Ubac's forms support multiple interpretations.[4]

To the extent that Dupin and Ubac both present a kind of landscape whose difficult terrain simultaneously implies and retracts human presence, I should like to propose a study of *Proximité du murmure* that employs the notion of landscape as a strategy enabling us to read the artist's images and the poet's words in a collaborative enterprise devoted to the tradition of the book: literary artifact and physical object.

Proximité du murmure can be read with respect to two simultaneous movements. In a first and figurative movement, human presence is set in a landscape. Dupin moves the reader from darkness to light, from enclosure to exposure, from land to sea (1. 1-14). Reread in the tradition of the Echo myth — vocal repetition and dispersal of body parts among the landscape — the first movement comprises a loss of voice and generates a context that is both language and text. Corporeal imagery grammatically marks off presence (c'est un corps de femme [it is a woman's body]) and models the reader's changing point of view through a series of

object pronouns that announce the subject: speech itself (qu'elle se montre nue dans sa parole même [she bares herself in her very word]):

Comme il est appelé au soir en un lieu tel
que les portes battant sans fin
facilitent ou dénouent le tête-à-tête

hors de la crypte forestière il la traîne
au grand jour, ou plutôt il lui parle
il la dénude parmi les rafales de vent
ou plutôt il commence à se taire
avec une telle fureur dans les rayons
de la lumière verticale une telle émission de silence comme un jet de sang

qu'elle se montre nue dans sa parole même
et c'est un corps de femme qui se fend

As he is called in the evening into such a place
that doors beating endlessly
ease or undo the tête-à-tête

out of the forest crypt he drags her
in broad daylight, or rather he speaks to her

he strips her among the gusts of wind
or rather he begins to fall silent
with such a fury in the rays
of vertical light
such an emission of silence like a gush of blood

that she bares herself in her very word
and it is a woman's body that is rent

In a second movement, the poet refers specifically to the work as physical object, intermittently returning to figurative concerns introduced earlier. Juxtaposing land and body imagery with the technical vocabulary of the poet as craftsman — signe tracé, l'enveloppe, l'écriture, etc. (traced sign, envelope, writing, etc.) — Dupin explores signs traced in books and the steps involved in the production of both.

Similarly, the series of eight black and white etchings done by Ubac on Japon Hosho and mounted in the text can be seen as physical and figurative entites with respect to landscape notions. The black angularly curved lines in the first etching conflate both the female torso and the topographic markings on geological area maps (Figure 1). The image, inserted after the first two texts, highlights their last lines indicative of figure (et c'est un corps de femme qui se fend [and it is a woman's body that is rent]) — erotic in its pose — and ground (un pays qui reprend souffle et feu [a land that recovers breath and fire]) — violent in its upheaval.

The second etching (Figure 2), ambiguous in its rendition of land/body imagery, emphasizes materiality through its own con-

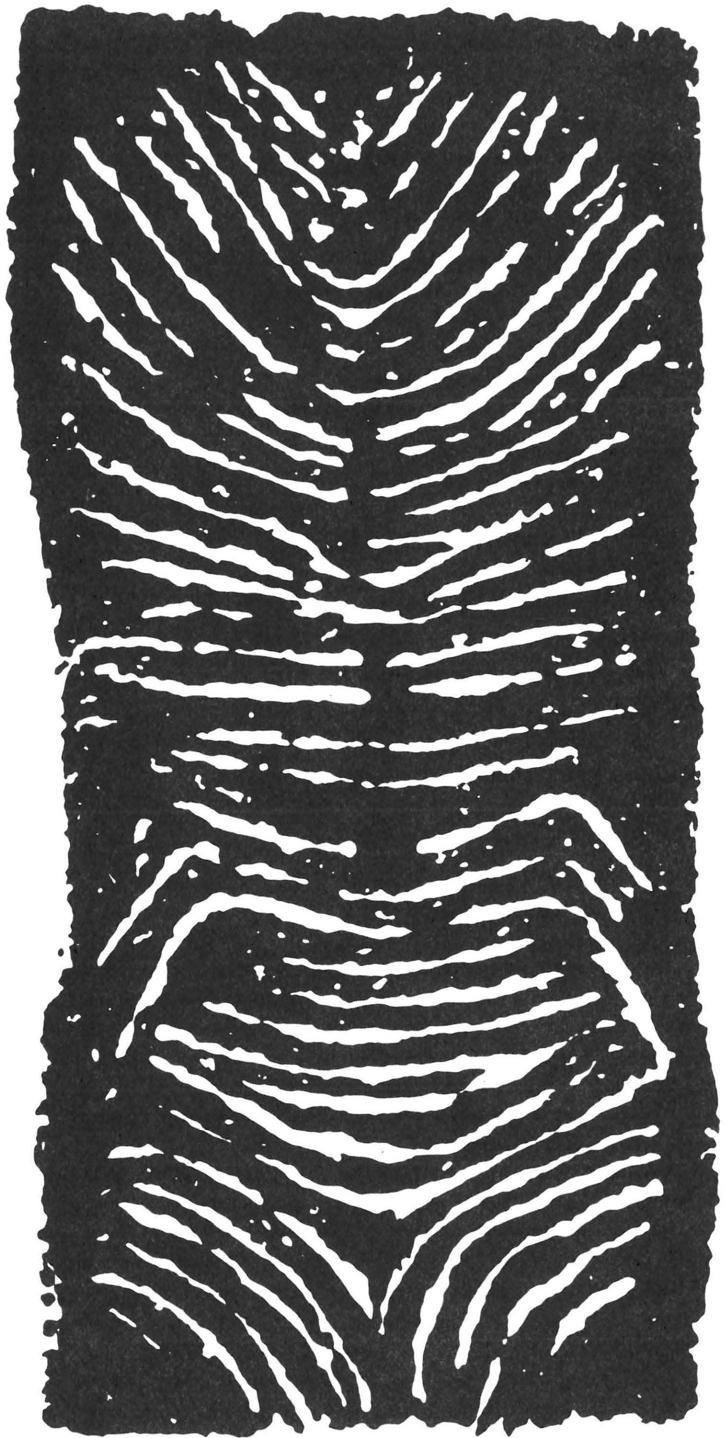

Figure 1.
Note:
all figures are by
Raoul Ubac. Etching
(*Proximité du murmure*,
Paris: Maeght [1971]).
Courtesy of Maeght.

Figure 2.

Figure 3.

tent and its placement in the work. Opposite the first text that mentions writing — oscillations of sign and meaning — the lined image on the page recalls the physical aspects of the book. Generally concentric and elongated, the curved lines achieve depth or volume, delimiting both horizontal and vertical space. Images 3, 4, and 5 in the text have a horizontal emphasis and serve as legends for the subject and direction of Dupin's words: stops and starts, silence and voice, stasis and movement (Figures 3 & 4). Images 6, 7, and 8 in the text have a vertical format and parallel the direction that informs the writing (Figure 5). Insofar as Dupin returns to a language that marks human presence, Ubac returns to shapes more suggestive of the human body. Evocation of violent scenes and large expanses is interpreted by the artist in an etching reminiscent of a death mask. The final lines that advance towards a threshold and closure for the entire work, return the reader to the image of a landscape equivocally animal and mineral.

The title *Proximité du murmure* alludes to the posture of both the artist and the poet to the extent that their presence must be encountered at a distance. The deceptively well-defined etchings by Raoul Ubac and the incessant tête-à-tête presented in Jacques Dupin's text, invite the reader to entertain presence limned by a continuum of words and a series of images bound within the dimensions of the book.

The singular voice of the poet Jacques Dupin can be heard in the initial word of the text: *Comme* (As, like). As a causal conjunction that implies a logical relationship between propositions and events, *comme* is, however, the very poetic gesture that refers us to other voices in different works. *Comme* is an earlier collection of poems by Marcelin Pleynet (Editions du Seuil, 1965). Denotative of a likeness or representation, we locate *comme* elsewhere in time and space. Throughout *Proximité du murmure* Dupin's immediate

words elude us as he inscribes antecedence into the text, drawing upon previous writing by the likes of La Fontaine, Baudelaire, Char, Ponge, and even by himself at earlier and later moments. Thus surrounded by other voices, the poet immerses the reader in them and makes him understand fluencey, i.e., the ebb and flow of syntax via alternate patterns of speech. Silence becomes audible in the material gesture of turning the white pages of the book, as well as in the figurative one of hearing the natural sounds emitted from the images on these pages: parmi les rafales de vent . . . il commence à se taire . . . une telle émission de silence comme un jet de sang (among the gusts of wind . . . he begins to fall silent . . . such an emission of silence like a gush of blood).

Inherent in the inarticulate murmurings that accompany the presentation of the word inscribed in this text is the inevitable break between voice and body. Corporeal imagery measures the distance between the speaker and his idiom: le cercle de tes bras ne s'entrouvre que pour mieux ne rien dire (the circle of your arms gapes open only better to say nothing); between the interlocutor and the exchange: N'être plus avec toi dès que tu balbuties la sécheresse nous déborde (No longer to be with you as soon as you stammer drought overwhelms us). At the climax of the poetic act, however, persona do embrace in a union of opposites: body and voice. Hence the value of the resulting image that overcomes distance might be measured as André Breton first suggested in *Manifestes du surréalisme* (1924), by its luminosity or the ardor of its composition:

notre buisson quotidien
les balafres de la lumière

our daily thicket
slashes of light

Figure 4.

The writing derives its erotic tone from the notion of nudity that Dupin has ascribed to corporeal imagery. Resistant figures, alternately opaque and transparent, are attractive in their vacillation between appearance and disappearance. Silence in the face of such reserve proves seductive: woman yields; words part. Similarly erotic is the apparent choice of the verb *extraire* (to extract): the poet prepares a text — part of a longer book (extrait [excerpt]) — that is a passionate exploration of its sources (j'extrais [I extract]).

In a text whose existence depends on a writing that stems from an absent source where spelling and etymon undergo continual change, the poet must repeatedly gauge distance and adjust perspective. Reiteration of the initial word and causal conjunction of the text: *comme* provides a series of likenesses that swerve away from exact resemblance. Surveyor who articulates the approximate, the poet takes a position reminiscent of Michel Deguy (*Fragment du cadastre* [*Surveyor's Fragment*]), Gallimard: 1960). In order to balance the contradictions in his text and the contrasts in its images, Dupin assumes a self-conscious point of view that highlights the constant plane of language: the horizon of a landscape. Lines that shift vantage points, undermine figures that allude to depth. Both poet and reader cannot transcend the surface of the text and continually return to the material constants of the book: the superficies, the borders, the limits assigned by characters and edges.

To read the text, is, in a sense, to violate the book. Although we need not cut the pages of this particular edition in order to turn and read them, we must remove the volume from its pale yellow folding case, careful not to break the binding, and look long and hard at the words in our attempt to uncover meaning. In these gestures we as readers are reminded of the violence in Dupin's images: ce livre je le casse en vous regardant choses nues (this book I break while looking at you, naked things); and of the wound in French texts since Mallarmé as described by Mary Ann Caws.[5]

Representative of the modern *livre d'artiste* in France, the rapport between word and image in *Proximité du murmure* goes beyond illustration. The eroticism and violence implicit in Dupin's point of view are reflected in the line and contour of Ubac's perspective. Divided by white space and punctuated with ellipses, the disposition of the words on the page suggests the emblematic rapport between verbal text and visual image. Likewise, allusions to figure and ground in the artist's etchings coexist in the arrangement of land and body imagery in the poet's text. Lines cut along the vertical and horizontal axes in the graphics materialize like movements conveyed by poetry that attempts transcendence and intentionally fails. Literally, object that contains its own tradition of poetry sensitive to the notions of origin and loss, the *livre d'artiste* collection *Proximité du murmure* truly merits the label *oeuvre d'art*.

Figure 5.

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3. For further reading on the poetry of Jacques Dupin, see Jean-Pierre Richard, *Onze études sur la poésie moderne* (Paris: Seuil, 1964), pp. 277-95, and Robert W. Greene, *Six French Poets of Our Time* (Princeton: Princeton University Press, 1979), pp. 140-58.

4. See also *Derrière le Miroir,* nos. 105-106 (Paris: Maeght, 1958): nine original lithographs by Raoul Ubac to illustrate poems by Yves Bonnefoy.

5. Mary Ann Caws. *The Eye in the Text* (Princeton: Princeton University Press, 1981).

DIFFERENCES *between* GOOD *and* POOR SPELLERS *in* READING STYLE *and* SHORT-TERM MEMORY

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Three experiments were conducted to test Frith's (1980) hypothesis that good spellers read by full cues while poor spellers read by partial cues; a fourth experiment was conducted to investigate short-term memory differences between the two groups. Subjects for all four experiments were ten pairs of 9th- and 10th-grade students matched for sex and intelligence but differing in spelling ability. Good spellers were found to be faster readers than poor spellers (Experiment 1), contrary to Frith's prediction that poor spellers should read faster. Good spellers were found to be more accurate in identifying matches and mismatches in similarly spelled pairs of nonsense words (Experiment 2) and in spelling

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Visible Language, XX 4 (Autumn 1986), pp. 437-447
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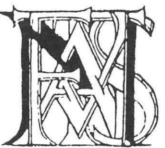
nonsense words they had just seen (Experiment 3). Experiments 2 and 3 both lend support to Frith's hypothesis regarding different reading styles in good and poor spellers; however, an alternative explanation, that of differences in short-term memory, must also be considered. Experiment 4 involved the comparison of good and poor spellers in short-term visual memory for digits, consonant-vowel strings, and consonants, under both simultaneous and sequential presentation methods. Good spellers were found to have better short-term memory for all three content types and both presentation methods.

In the process of learning to read it is logical to assume that one would also learn to spell (Ehri, 1980; Frith, 1980). In order to recognize a word one must have some sort of mental representation of that word, a representation which can then be employed in writing the word at a later time. Nevertheless, in a group of individuals of equal intelligence and/or reading ability, one will find wide variability in their spelling ability (Frith, 1978, 1980).

To account for the differences in the spelling ability of otherwise equally capable individuals, Frith (1980) has proposed that poor spellers and good spellers of equal reading ability differ in their reading style. More specifically, she has hypothesized that poor spellers take greater advantage of a passage's redundancy and overlook many letters in the process of reading for comprehension (i.e., they read by partial cues). Good spellers, on the other hand, attend to most, if not all, of the letters they see while reading (i.e., they read by full cues). Actually seeing the letters of the words one reads, rather than skipping over many letters not necessary for comprehension of what is read, should lead to greater knowledge of correct word spellings.



Frith has presented some evidence to support the partial cues hypothesis. For example, in two studies of 12-year-olds equated for reading achievement, poor spellers had greater difficulty than good spellers in reading aloud misspelled words, including their own misspellings (Frith, 1978, Experiments 1 and 2). This finding is consistent with the partial cues hypothesis, in that someone sampling only a portion of the letters of a word while reading (the poor speller) would be more easily misled by an incorrect letter than would someone looking at all the letters (the good speller).

In a third study (Frith, 1978, Experiment 3) good spellers performed better on a proofreading task; again, this would be expected if only the good spellers were attending to all the letters of the passage.

While the results of the above studies can be interpreted as supporting Frith's partial cues hypothesis, other interpretations of the results are also possible. For example, the poor speller's lower performance in reading misspelled words may simply have been due to weaker word attack skills. The poor performance of poor spellers in the proofreading task may have been due to other factors such as their lower spelling ability per se or possible differences in reading time used in completing the task. (In a study by Ormrod [1978], poor spellers were found to be inferior even in a proofreading task where highly familiar words such as *the* and *and* were misspelled; however, neither general ability nor reading time was controlled in that study.)

The studies described below were designed to investigate possible differences in the reading styles of good and poor spellers, particularly within the context of Frith's partial cues hypothesis. For reasons to be presented below, short-term memory spans of good and poor spellers were also assessed.

EXPERIMENT 1

One prediction that Frith (1980) has made is that good spellers, if they are attending to greater detail of what they read, should be slower readers. Poor spellers, in skipping many of the details of the written page, should be faster readers. While the personal testimonies of many of my own undergraduate students support Frith's prediction, a relationship between reading speed and spelling ability has not been systematically determined.

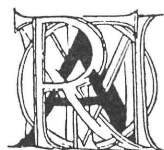
Experiment 1 was designed to measure the reading speed of good and poor spellers in reading passages of different degrees of predictability. According to psycholinguistic approaches to reading (e.g., Smith, 1971), the more predictable a reading passage is, the more an individual can use the redundancy inherent in the passage's predictability to skip letters and even words in the process of reading; thus, the individual can read very quickly. Conversely, in less predictable passages the reader needs to rely more heavily on the cues provided by the printed page and therefore has to slow down the reading rate. Since good spellers are hypothesized to depend heavily on the printed page in any case, they should not be greatly affected by a decrease in passage predictability. Poor spellers, who are taking advantage of the passage's redundancy, should slow down as predictability is decreased.

Method

Subjects. Subjects were selected from 9th- and 10th-grade students enrolled in art and humanities classes at a university laboratory school. The Otis-Lennon Mental Ability Test and the first 30 items of the Level II spelling test of the Wide Range Achievement Test (WRAT) were administered to 121 students by their classroom teachers. From these students ten matched pairs were selected, all consisting of students of average intelligence (Otis-

Lennon deviation-IQs ranged from 99 to 114). One student in each pair had high spelling ability (WRAT spelling score) > = 25, M =27.5), and the other student had low spelling ability (WRAT score < = 17, M = 15.2). Pairs were matched for sex and for intelligence (Otis-Lennon scores differed by 4 points or less, with the mean IQs of the good spellers and the poor spellers being 106.1 and 106.0, respectively). Nine of the pairs were matched for grade; the tenth was composed of a 9th-grade good speller and a 10th-grade poor speller.

Materials. Two passages were taken from Norton Juster's *The Phantom Tollbooth* (1972) and were chosen for their apparent differences in predictability. The passages were estimated from Fry's (1977) readability graph as being at the 6th- to 7th-grade reading level. The first passage, 315 words taken from the beginning of the book, described the difficulties of a boy named Milo in understanding the worth of school and academic tasks. The second, a 304-word passage taken from the middle of the book, described a situation in which Milo attempted to restore sound to the world by dropping a small whisper into a cannon and shooting it toward a fortress containing all the world's sounds. This passage, when taken out of context, was judged to be more difficult to predict, as the events described seemed almost nonsensical without knowledge of the circumstances preceding them. The difference in predictability of the passages was confirmed with the use of the cloze procedure (e.g., Jongsma, 1980). The first sentence of each passage was kept intact; every fifth word of the following 275 words was replaced with a blank (55 blanks total for each passage). Four volunteers from an undergraduate class in developmental psychology read the passages and filled in their best guesses as to what words should be in the blanks. Mean predictability scores, consisting of the mean number of words correctly predicted, were 37.8 (69%) and 30.0 (55%) for Passages 1 and 2, respectively ($t[6] = 2.88, p < .05$).



Procedure. The passages were presented with the use of the WISE authoring program of the World Institute for Computer Assisted Teaching (WICAT) System 300. This system consists of a minicomputer with five megabytes in main memory and 474 megabytes in hard disc, plus 30 terminals on which lessons can be run independently.

Subjects were first given brief instructions in how to use the computer keyboard. Instructions regarding the task and a short practice passage were administered by means of the computer. Subjects were informed that the test would "measure your ability to read passages of text and learn from what you are reading," and that they would be given a short multiple-choice test over the passages after they had read both of them. In order to ascertain typical reading speed, subjects were not told that their reading speed would be measured.

After receiving feedback regarding their performance on the multiple-choice question for the practice passage, subjects read the test passages (identified as Part I and Part II). Both passages

were divided into eight sections, with each section ending at a natural break (e.g., a period) in the passage. Sections of each passage were presented as successive frames; a subject who finished reading one frame pressed the return button on the keyboard to see the next frame. Reading speed for each passage was measured by the computer (to the nearest second) from the beginning of presentation of the first frame until the subject pressed the return button after completing the eighth frame. Following Passage 2, a six-item multiple-choice test was presented, with three items testing comprehension of each passage.

Results and Discussion

A three-way analysis of variance was conducted for the reading speed measures, with subject pairs and spelling ability as between-subjects variables and reading passage as the within-subject variable. The effect of spelling ability was significant ($F[1,9] = 14.71$, $p<.001$). However, the means were in the opposite direction from what was predicted: good spellers (M = 114.6 seconds) were faster readers than were poor spellers (M = 153.5 seconds). The effect due to reading passage ($F[1,9]$ = 0.73) and the interaction between spelling ability and passage ($F[1,9] = 0.19$) were not significant at the .05 level. The hypotheses that subjects should read Passage 2 more slowly than Passage 1 because of Passage 2's lower predictability, and that spelling ability should interact with the predictability of the passage were not supported. Possibly the difference in predictability between the two passages was not great enough, or the confounding of passage and presentation order may have eliminated any effects.

Although the comprehension test was not central to the hypotheses, it should be pointed out that a parallel analysis of the comprehension test scores revealed no significant effects due to spelling ability ($F[1,9] = 0.07$, $p > .05$), passage ($F[1,9]$ = 0.69, $p > .05$), or their interaction ($F[1,9] = 3.77$, $p > .05$). The mean comprehension score for the six items was 5.4.

Contrary to Frith's (1980) prediction, good spellers were actually found to be faster readers than poor spellers. One possible explanation for this unexpected finding is that, while Frith contrasted good and poor spellers of equal reading ability, the present study compared good and poor spellers of equal intelligence. While the similarity of comprehension scores for the two groups indicated similar reading abilities for the good and poor spellers, actual equivalence of the groups in this respect cannot be assured.

In any event, the faster reading speed of the good spellers does not rule out the partial cues hypothesis. It is possible that good spellers are more likely to attend to every letter despite their faster reading rate. Such a proposition would suggest a relatively inefficient reading style on the part of the poor spellers.

EXPERIMENT 2

If good spellers are more likely to attend to every letter of a word they read while poor spellers do not, then good spellers should perform better on a matching task where two words are spelled

very similarly. Experiment 2 was designed to test this hypothesis. Pairs of nonsense words were presented on a computer screen, with the second word presented after the first had been erased. Half of the word pairs were spelled identically; the other half differed by one letter. The subject's task was to determine whether or not the words in each pair were spelled in the same way or differently.

Method

Subjects. The subjects from Experiment 1 also participated in Experiment 2.

Materials. A total of 40 nine-letter consonant-vowel strings (CVCVCVCVC) were constructed by a random selection of letters. For each of these nonsense words an alternate spelling was created by replacing one of the middle five letters with another letter.

Procedure. The instructions and stimulus words were presented with the use of the WICAT system described in Experiment 1. Instructions describing the task, two example items, and feedback were presented by the computer. These were followed by the test items.

The order of the test items was randomly determined and was the same for all subjects. For half of the items (randomly selected) the same word was presented both times (a "match"); for the other half the word and its alternate spelling were each presented once (a "mismatch").

All words were presented in lower-case letters. For presentation of the word pairs two boxes appeared on the screen, one box directly below the other. The first word of each pair was presented inside the upper box for one second, then disappeared. Following a one-second delay, the second word of the pair (either the same word as before or its similarly spelled alternate) was presented inside the lower box for one second. After the second word was erased, the subject was asked to indicate whether or not the two words were the same ("S") or different ("D"). Scores, the number of items correctly identified as being a match or a mismatch, were tabulated by the computer.

Results and Discussion

A two-way analysis of variance was conducted on the total scores, with subject pairs and spelling ability as the independent variables. A significant F-ratio ($F[1,9] = 5.61, p < .05$) indicated that good spellers ($M = 32.7$) performed better than did poor spellers ($M = 28.9$).

This finding does support the partial cues hypothesis: the better performance of the good spellers may be attributable to their attention to more letters. However, an alternative explanation must also be considered: the success of the good spellers may simply be due to differences in short-term memory capabilities. The latter possibility will be investigated in Experiment 4.

EXPERIMENT 3

Ultimately, good spelling involves the ability to reproduce a word one has previously seen in print. If learning to spell follows directly from learning to read, as Ehri (1980) and Frith (1980) have suggested, and if good spellers attend to more of the letters they see while reading, then good spellers should be more accurate in their reproductions of words they have read. Experiment 3 was designed to assess good and poor spellers' abilities to reproduce the letters of a word they had seen for a period of time similar to the time they might look at a word within the context of reading a passage.

Method

Subjects. Subjects were the ten pairs used in the previous experiments.

Materials. A total of 30 nonsense words were constructed, 6 each with four, five, six, seven, and eight letters. All words were constructed by a randon selection of consonants (Cs) and vowels (Vs), with the following formats for the different word lengths, respectively: CVCV, CVCVC, CVCVCC, CVCVCVC, and CVCVCCVC. Constraints on letters chosen were that none of the "words" be real English words, that all words be pronounceable, and that no letter be repeated within a given word. The order of presentation of the words was random, with each consecutive group of five words containing one word of each length. The word order was the same for all subjects.

Procedure. The task was presented by means of the WICAT system described in Experiment 1. Instructions and two examples were presented as part of the computer administration. Each example or test word was presented on the screen for approximately 400 milliseconds. Because of the time involved in displaying the word on the screen, with the display beginning on the left-hand side and moving right, the beginning of each word was presented for a longer period of time than was the end of the word; furthermore, this effect was more pronounced for longer words. Immediately after the word was erased from the screen, the subject was asked to type the word presented. Scores, consisting of the number of words correctly typed, were tabulated by the computer separately for each word length.

Results and Discussion

A three-way analysis of variance was conducted, with subject pairs and spelling ability as between-subjects variables and word length as a within-subjects variable. The effect of spelling ability was significant ($F[1,9] = 21.60$, $p < .0001$), with good spellers ($M = 4.52$) performing better than poor spellers ($M = 2.62$). The effect of word length was also significant ($F[4,9] = 48.65$, $p < .0001$), with mean number correct being 5.6, 5.0, 3.7, 2.2, and 1.5, for 4-, 5-, 6-, 7-, and 8-letter words, respectively.

Of greatest interest here is the interaction between spelling ability and word length ($F[4,9] = 5.59$, $p < .001$). Cell means for this interaction are displayed in Figure 1. As can be seen from this figure, both groups were able to recall 4-letter words with an equally high degree of accuracy. For words of 5 letters or more,

good spellers performed significantly more accurately ($p < .05$) than did poor spellers. For 8-letter words, good spellers recalled about half of the words correctly ($M = 2.8$), while poor spellers recalled almost none of them ($M = 0.2$).

It appears, then, that good spellers are able to reproduce words they have just seen more accurately than poor spellers. This difference was observed for words as short as five letters in length. As was true for the results of Experiment 2, the results of Experiment 3 may be interpreted as indicating either that good spellers attend to more of the letters they see, or that they are able to remember those letters better over a short time period.

EXPERIMENT 4

The superiority of good spellers' performance in Experiments 2 and 3 may have been due to better short-term memory rather than to great attention to detail. Experiment 4 was designed to compare good and poor spellers as to their short-term memory spans for visual material.

Three types of content were used in the memory tasks. First, digit strings, being the most commonly employed content in tests of general intelligence and specific abilities, were used. Second, consonant-vowel strings (CVCV. . .) were used, as they more closely resembled a real-word memory situation. However, differences between the two ability groups for this type of content could be due to other factors aside from memory span. For example, good spellers might be more likely to convert these strings to auditorially coded "words," just as they appear to do for real words (Frith, 1978; Perin, 1983). Therefore, consonant strings, being non-pronounceable letter strings, were additionally employed.

Two presentation methods were used. A simultaneous presentation was used, where all elements of the string were presented at the same time. This presentation method was chosen because it is analogous to the way in which one sees a word on the printed page (i.e., all letters at once, side by side). However, with this presentation mode it is difficult to separate the two factors of short-term memory span for the items, on the one hand, from attention to all the items presented (full vs. partial cues), on the other. Therefore, a second presentation method was also employed, that of sequential presentation. With this method each item in a string was presented separately in order to increase the probability that attention would be directed toward all items.

Method

Subjects. Subjects were the same 10 pairs who participated in the previous three experiments.

Materials. Digit, consonant-vowel, and consonant strings were constructed by random selection of digits and letters. For each content type, six strings (three for each presentation method) were constructed for each of these string lengths: 3, 4, 5, 6, 7, 8, and 9 digits or letters ("items"). In addition, 10- and 11-item consonant-vowel strings were constructed, as this content was predicted to be easier due to its pronounceability.

Six tests were constructed from the strings, two presentation methods for each of the three content types. Each test included three strings of each length from 3 to 9 items, with consonant-vowel tests also including strings of 10 and 11 items.

Procedure. The tasks were presented with the use of the WICAT computer system described in Experiment 1. Each subject was administered all three tests of one presentation method on one day, and the three tests of the other presentation method on the following day. The order of the presentation methods and the order of the content types within presentation methods were random, and were different for each subject.

Each test was preceded by instructions and two three-item examples presented by the computer. Presentation times for the example and test strings were equal to one second for each item in the string. Strings in the simultaneous condition were presented as a unit for the full presentation time. In the sequential condition each item of a string was presented for one second, then erased; the succeeding item immediately appeared to the right of its antecedent. Individual digits or letters in the sequential condition appeared in positions identical to their equivalents in the simultaneous condition.

Subjects typed their responses on the computer keyboard. If a response was correct, the first string on the next length was presented. If a response was incorrect, the next string of the same length was presented. If responses to all three strings of a given length were incorrect, that task was terminated. Scores were tabulated directly by the computer and were equivalent to the length of the longest string that a subject was able to recall correctly.

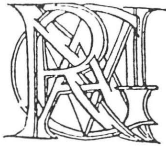
Results and Discussion

A four-way analysis of variance was performed on recall scores, with two between-subjects variables (pairs and spelling ability) and two within-subjects variables (presentation method and type of content). The effect due to spelling ability was significant ($F[1,9] = 22.37, p < .0001$), with good spellers ($M = 7.72$) recalling longer strings than poor spellers ($M = 6.53$). The effect due to presentation method was also significant ($F[1,9] = 18.75, p < .0001$), with simultaneous presention ($M = 7.67$) leading to greater recall than sequential presentation ($M = 6.58$). Finally, the effect of content was significant ($F[2,9] = 30.05, p < .0001$), with consonant-vowel strings being easiest ($M = 8.30$), followed by digits ($M = 7.15$) and consonants ($M = 5.92$). No interactions among these factors were significant at the .05 level.

Based on these results it appears that good spellers do in fact have a better visual memory than poor spellers. Their superior performance under the sequential presentation method as well as under the simultaneous method rules out the possibility that differences in attentional strategies account for the better memory. Their superior performance on digit and consonant strings as well as on CVC strings reduces the possibility that their better performance is due to an auditory recoding of the strings into "words" rather than being due to visual memory per se.

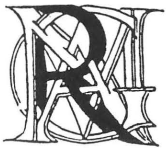
GENERAL DISCUSSION

The results of Experiments 2 and 3 can be interpreted as supporting Frith's hypothesis that good spellers read by full cues while poor spellers read by partial cues. Good spellers are more accurate in identifying whether or not two very similarly spelled words are spelled differently (Experiment 2). They are also more accurate in reproducing new "words" seen a few seconds before (Experiment 3). However, an alternative explanation for these results is that good and poor spellers differ in short-term memory capabilities rather than in their initial attention to the letters. The results of Experiment 4, while not ruling out differences in attentional processes, indicate that good and poor spellers do indeed differ in their short-term memory abilities for visual material. This difference exists even when elements of a string are presented sequentially, so that attention to all items of the string is facilitated. Poor spellers, in recalling fewer letters from what they see, will undoubtedly be handicapped in forming accurate mental representations of the words they read.

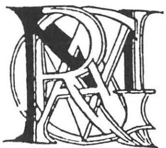


Good spellers are not slower readers, as Frith (1980) has predicted; in Experiment 1 their reading speed was found to be significantly faster than that of poor spellers. It appears that good spellers may simply be more efficient readers, able to remember more physical detail of the printed page (or computer screen) in a given amount of time. Poor spellers, on the other hand, appear to be relatively inefficient at the reading task, taking longer to read a passage while remembering (or possibly even attending to) fewer of the details of what they see.

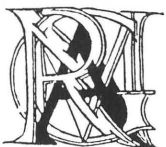
Two weaknesses of the studies described here must be pointed out. First, as indicated earlier, good and poor spellers were equated for intelligence but may have differed in reading ability. Reading comprehension scores for the two groups were not significantly different, indicating probable similarity in reading ability. However, subject pairs were not specifically matched for reading achievement, so differences observed between the two groups may have been partly a function of differences in reading ability.



Second, a possible confounding factor in Experiments 3 and 4 must be considered. Experimental tasks in both experiments required the typing of a series of letters or numbers on the computer keyboard. Differences in familiarity with the keyboard between the good and poor spellers may have been present, affecting the facility with which letter and number series could be accurately typed.



Despite these limitations the studies described here do provide evidence for differences between good and poor spellers in cognitive processing strategies and abilities (e.g., reading style, attention, short-term memory). The question as to which of these factors are most centrally involved in spelling ability must be addressed in future research.



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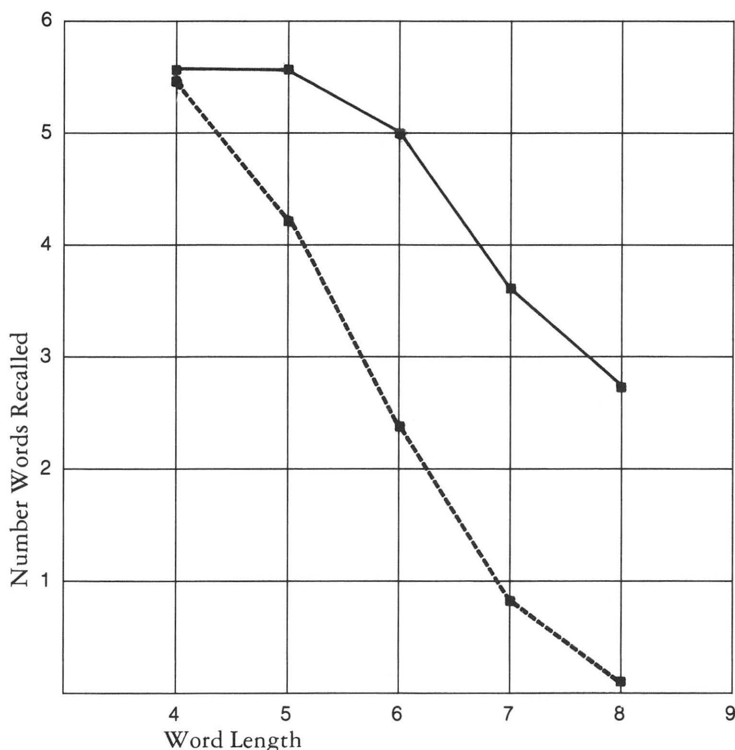
The author wishes to thank Sue Swaim, James Hawkins, Robert Longwell, and Diane Rochester for their kind assistance in conducting these studies.



GOOD SPELLERS

POOR SPELLERS

LINE LENGTHS *and* STARCH SCORES

Sandra E. Moriarty
University of Colorado, Boulder

There is a wide range of confusing and often contradictory recommendations for the length of typeset lines. This study investigates the lengths of lines used in advertising body copy. It compared length in terms of character counts and pica widths on the basis of adjusted Starch "read most" scores. The study hypothesized a normal curve with lower scores for the shorter and longer lines and scores above the mean for the lines in the middle of the distribution. The study found support for lower scores for short lines. It also found some evidence of two optimum line lengths rather than one. There is still confusion about the reading ease of the longer lines.

Visible Language, XX 4 (Autumn 1986), pp. 448-455
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In the graphics literature there are a variety of often contradictory recommendations regarding optimum line lengths as well as minimum and maximum acceptable lengths. David Yarnold, a well-respected newspaper designer, critiqued a number of newspapers at a recent conference for having lines that exceed 17 to 18 picas which he recommended as the maximum.[1] However Tinker and Patterson in their classic book on legibility, recommended a line length range of from 18 to 24 picas with 19 as an optimum.[2]

Most of the recommendations are based on the number of characters in a line and that depends upon the alphabet size of the particular typeface being used. Arnold recommends 1½ times the lower-case alphabet (39 characters) as an optimum line length. For an acceptable range he suggests using 75% of that optimum (30 characters) as a minimum and 150% (60 characters) as a maximum.[3] In contrast Craig recommends 2½ alphabets (65 characters) as the optimum and 50 to 70 characters as the ideal range.[4]

These conflicting recommendations could reflect differences in reading patterns with books, newsletters, magazine articles, newspaper articles and print advertising all having different needs. No study has been found that compares the different reading patterns of the various media audiences.

One recent experimental study of magazine article formats investigated the legibility of lines with 29, 39, 49, 59, 69, and 79 characters.[5] The study found consistently lower reading scores for short lines (up to 39 characters or 14 picas) but could find no identifiable optimum line length. Furthermore the longer lines tended to get higher reading scores.

THE STUDY

This study investigates advertising line lengths using the "read most" scores provided by the Starch Readership Service as the independent variable. Six years of the Starched magazines sent to educators (1980-1985) provided a total sample of 153 advertisements. The body copy in these advertisements was measured in picas, the average number of characters per line was computed, and these two dependent variables were recorded along with the Starch score.

Because product category is a serious confounding variable, the Starch score was adjusted to compensate for the relative interest of the various product categories. This was done by computing a mean value for the overall "read most" score for all advertisements used in the study. Then an index was computed for the 15 primary product categories that appeared in these magazines. The index was used to increase the weight of the score in those categories where there is little interest, such as insurance, and to decrease the score in the high-interest categories, such as food and automobiles. The categories and their compensating indexed values are as follows:

Category	Index
Financial	1.16
Office	1.03
Insurance	1.33
Automotive	.88
Liquor	1.09
Cigarettes	1.21
Lodging	.88
Health/Fitness	1.14
Information/Media	.98
Institutional/Corporate	1.07
Apparel	.95
Electronics	.86
Transportation/Travel	1.12
Home/Crafts	.72
Food	.70
Personal Care	.98

The objective of this study was to determine the common line lengths used in these advertisements in terms of both character counts and pica widths and then compare the line lengths on the basis of the Starch scores. The study attempted to find out if the Starch scores for these advertisements followed a hypothesized normal curve with the longer and shorter lines having lower Starch scores. The average lengths in the middle of the distribution were hypothesized to have higher scores than the mean. Specifically is there any observable pattern that would suggest an optimum line length and a minimum and maximum range?

FINDINGS

One finding of this study is that while the line lengths in characters do generally follow a normal curve, the curve is dramatically skewed to the left. The range for the number of characters per line is from 19 to 102 with a mean of 48. However the frequency count aggregates between 31 and 45 as can be seen in the frequency distribution depicted in Table I.

This first analysis of number of characters used 18 equal interval cells of five characters. In order to compare the average Starch scores by groups these 18 cells were collapsed to nine. This grouping is seen in Table II. The overall Starch scores range from 0 to 34 and the mean score was 9.8

Table I. Characters-per-line Frequency Distribution

Characters	N	Distribution
15-20	1	X
21-25	6	XXXXXX
26-30	14	XXXXXXXXXXXXXX
31-35	19	XXXXXXXXXXXXXXXXXXX
36-40	20	XXXXXXXXXXXXXXXXXXXX
41-45	25	XXXXXXXXXXXXXXXXXXXXXXXXX
46-50	12	XXXXXXXXXXXX
51-55	12	XXXXXXXXXXXX
56-60	9	XXXXXXXXX
61-65	9	XXXXXXXXX
66-70	10	XXXXXXXXXX
71-75	5	XXXXX
76-80	4	XXXX
81-85	0	—
86-90	3	XXX
91-95	0	—
96-100	3	XXX
101-105	1	X

Table II. Starch Scores by Character Count (Equal Interval Cells)

Characters	N	Starch X
16-25	7	6.6
26-35	33	9.6
36-45	45	9.5
46-55	24	12.3
56-65	18	8.1
66-75	15	11.2
76-85	4	5.5
86-95	3	5.0
96-105	4	9.8
Total/Mean	153	9.8

Table II generally exhibits the hypothesized pattern. The shorter lines with from 15 to 25 characters have a lower average Starch score of 6.6. The scores begin to increase as the number of characters increases. The mean character count of 48 is included in the group that has the highest Starch score of 12.3. The middle of the range drops below the mean to 8.1 but in the 66-75 category the score bounces back up to 11.2. Then it begins to fall as the character counts increase beyond the mean or the middle of the distribution with scores of 5.5 and 5.0 for the 76-85 and 86-95 categories. The final group with the longest lines (96-105) jumps back up to the overall mean score of 9.8.

There are two surprises. First is the observation of two potentially optimum character counts. These are the only two groups that are clearly above the mean. Second is the increase in scores in the tail end of the distribution where the averaged Starch scores reach the overall mean. Of course, all of these means in the three categories in the right tail of the distribution are based upon very small cell numbers.

Given the unequal cell sizes, statistical tests of significance are problematic. A one-way analysis of variance test of these categories, however, finds the difference in the scores to be significant at $p. < .05$. ($F = 2.66$, d.f. = 8, 144).

When the data is redistributed using categories determined by the cell width of the widest group (16), then the pattern of significance continues to be seen. Table III displays the data broken into ten cells where the intention was to come as close as possible to an N of 16 per cell. Obviously this can not be exact because of the natural breaks in the cell distributions.

Table III. Starch scores by character count (equivalent cell sizes)

Characters	N	Starch X
19-26	10	6.2
27-32	16	9.4
33-36	17	10.2
37-40	17	9.4
41-42	16	9.7
43-48	16	9.7
49-55	17	13.3
56-64	15	8.0
65-73	16	12.0
74-102	13	6.8

In Table III the lower scores for the shorter (19 to 26) and longer (74 to 102) lines are even more apparent. There are also two cells (49 to 55 and 65 to 73) with very high scores above the mean. The group of 33 to 36 characters is also slightly above the mean. One-way analysis of variance finds these sets of scores to be significantly different from one another at $p < .05$. ($F = 2.47$, d.f. = 9, 143).

The Starch scores can also be compared on the basis of line length in picas. There is a correlation, of course, between number of characters in a line and the length of the line in picas. Therefore the same skewed distribution is apparent. The range was from 8 to 44 picas and the mean was 20. Table IV displays a frequency distribution for the line length in picas.

What is of interest in Table IV is the identification of the most commonly specified line lengths. From the frequency distribution it can be seen that there are two groups of line lengths that are most often used. They are 13-14 picas and 21-22 picas. As can be seen in Table V these same two groups also have the highest Starch scores.

Table IV. Frequency Distribution for Line Length in Picas

Picas	Frequency	
7-8	1	X
9-10	9	XXXXXXXXX
11-12	18	XXXXXXXXXXXXXXXXXX
13-14	30	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
15-16	8	XXXXXXXX
17-18	14	XXXXXXXXXXXXXX
19-20	15	XXXXXXXXXXXXXXX
21-22	23	XXXXXXXXXXXXXXXXXXXXXXX
23-24	4	XXXX
25-26	1	X
27-28	3	XXX
29-30	3	XXX
31-32	5	XXXXX
33-34	3	XXX
35-36	3	XXX
37-38	5	XXXXX
39-40	2	XX
41-42	6	XXXXXX
43-44	2	XX

Table V displays the data grouped as much as possible into natural cells. This display also makes it a little more clear where those longest lines fall.

Table V. Starch Scores by Pica Lengths

Column Width	N	Starch X	
7-11	15	8.6	
12	13	10.5	
13	17	10.5	Average
14	13	10.8	= 10.6
15-17	13	9.0	
18	9	11.2	
19	6	11.5	
20	9	10.3	Average
21	16	10.4	= 10.7
22-28	13	9.2	
29-33	10	9.4	
34-39	10	7.5	Average
40-44	9	8.7	= 9.0

While these scores are not statistically different (F = .47, d.f. = 9, 137) the pattern is observable and probably not a function of chance. In other words, the line lengths that are used the most often are line lengths that seem consistently to get higher Starch scores. The shorter and longer lines, as well as the middle or the distribution, consistently score lower Starch scores.

CONCLUSIONS

This study of advertising line lengths did not provide clear support for the hypothesized normal curve. There is support for the hypothesis that shorter line lengths (up to 11 picas and 26 characters) receive lower reading scores.

Surprisingly the concept of optimum was supported but in an unpredicted way. There seems to be two optimum line lengths as evidenced in both the character counts and the pica measures (Table VI). These two optimum lengths are roughly equivalent to the standard two-column and three-column formats for an 8½ x 11 page size. Further research might investigate whether we use these line lengths because they are easier to read or are they easier to read because we are used to seeing them?

Table VI. Optimum Line Lengths

Characters	Picas
49 to 55	13 to 14
65 to 73	18 to 22

The longer line lengths are still in question. In the analysis by character counts, scores decreased after line lengths of 76 characters until reaching the longest group (96-105) where the scores jumped back up to the mean. In the analysis by pica lengths the groups on the longer end of the distribution were generally below the mean. The analysis of this data is hampered by the long tail in the distribution and the small number. There definitely needs to be more research conducted to try to determine what is happening to reading scores typeset on these longer line lengths.

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5. Sandra E. Moriarty, "A Search for the Optimum Line Length," *Journalism Quarterly,* (Summer, 1986) 63:2 (1986) 337-340.

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Index to Volume XX

AUTHOR INDEX

Adler, Jeremy, Pastoral typography: Sigmund von Birken and the "picture rhymes" of Johann Helwig 121

Agnew, G. Reed, Writing backwards: the use of visual models in writing 233

Bowen, Betsy (with Duffy & Steinberg), Analyzing the various approaches of plain language laws 155

Clement, Richard, Italian 16th-century writing-books and the scribal reality in Verona 393

Curtin, Elizabeth (with Huckin & Graham), Prescriptive linguistics and plain English: case of "whiz-deletions" 174

De Julio, Maryann, *Proximité du Murmure:* Dupin and Ubac collaborate 427

De Kerckhove, Derrick, Alphabetic literacy and brain processes 274

De Kerckhove, Derrick (with Olson), guest editor of special issue: Origins and functions of literacy (Summer)

Di Norcia, Vincent, Of stone, books, and freedom 344

Duffy, Thomas (with Bowen & Steinberg), Analyzing the various approaches of plain language laws 155

Ernst, Ulrich, The figured poem: towards a definition of genre 8

Franke, Herbert, Chinese patterned texts 96

Goody, Jack, Writing, religion, and revolt in Bahia 318

Graham, Debra (with Huckin & Curtin), Prescriptive linguistics and plain English: case of "whiz-deletions" 174

Hatherly, Ana, Reading paths in Spanish and Portuguese baroque labyrinths 52

Higgins, Dick, The corpus of British and other English-language pattern poetry 28

Higgins, Dick, guest editor of special issue: Pattern poetry: a symposium (Winter)

Huckin, Thomas (with Curtin & Graham), Prescriptive linguistics and plain English: case of "whiz-deletions" 174

Jareb, Barry, Plain English on the plant floor 219

Jhā, Kalānāth, Sanskrit Citrakāvyas and the western pattern poem: a critical appraisal 109

Kerr, Stephen, Instructional text, transition from page to screen 369

Marvin, Carolyn, Innis, McLuhan, and Marx 355

Miller, Lance, Computers for composition: a stage model approach to helping 188

Moriarty, Sandra, Line lengths and Starch scores 448

Olson, David, Interpreting texts and interpreting nature: the effects of literacy on hermeneutics and nature 302

Olson, David (with de Kerckhove), guest editor of special issue: Origins and functions of literacy (Summer)

Ormrod, Jeanne E., Differences between good and poor spellers 437

Otto, Karl, George Weber's *Lebens-Früchte* 136

Rypson, Piort, The labyrinth poem 65

Schmandt-Besserat, Denise, Tokens: facts & interpretations 250

Steinberg, Erwin, A program for improving documentation 226

Steinberg, Erwin, guest editor of special issue: Promoting plain English (Spring)

Steinberg, Erwin (with Bowen & Duffy), Analyzing the various approaches of plain language laws 155

Stock, Brian, Texts, readers, and enacted narratives 294

Weber, Rose-Marie, Variations in spelling and the special case of colloquial contractions 413

Williams, Joseph, Plain English: the remaining problems 166

TITLE INDEX

Alphabetic literacy and brain processes, Derrick de Kerckhove 274
Analyzing the various approaches of plain language laws, Betsy Bowen, Thomas Duffy & Erwin Steinberg 155
Chinese patterned texts, Herbert Franke 96
Computers for Composition: a stage model approach to helping, Lance Miller 188
The corpus of British and other English-language pattern poetry, Dick Higgins 28
Differences between good and poor spellers, Jeanne Ormrod 437
The figured poem: towards a definition of genre, Ulrich Ernst 8
Georg Weber's *Lebens-Früchte,* Karl Otto 136
Innis, McLuhan, and Marx, Carolyn Marvin 355
Instructional text: transition from page to screen, Stephen Kerr 369
Interpreting texts and interpreting nature: effects of literacy on hermeneutics and nature, David Olson 302
Italian 16th-century writing-books and the scribal reality in Verona, Richard Clement 393
The Labyrinth Poem, Piort Rypson 65
Line lengths and Starch scores, Sandra Moriarty 448
Of stone, books, and freedom, Vincent di Norcia 344
Origins and functions of literacy. Special issue (Summer)
Pastoral typography: Sigmund von Birken and the "picture rhymes" of Johann Helwig, Jeremy Adler 121
Pattern poetry: a symposium. Special issue (Winter)
Plain English: the remaining problems, Joseph Williams 166
Plain English on the plant floor, Barry Jereb 219
Prescriptive linguistics and plain English: the case of "whiz-deletions", Thomas N. Huckin, Elizabeth Curtin & Debra Graham 174
A program for improving documentation, Erwin Steinberg 226
Promoting plain English. Special issue (Spring)
Proximité du Murmure: Dupin and Ubac collaborate, Maryann De Julio 427
Reading paths in Spanish and Portuguese baroque labyrinths, Ana Hatherly 52
Sanskrit Citrakāvyas and the western pattern poem: a critical appraisal, Kalānāth Jhā 109
Texts, readers, and enacted narratives, Brian Stock 294
Tokens: facts and interpretations, Denise Schmandt-Besserat 250
Variations in spelling and the special case of colloquial contractions, Rose-Marie Weber 413
Writing backwards: the use of visual models in writing, G. Reed Agnew 233
Writing, religion, and revolt in Bahia, Jack Goody 318

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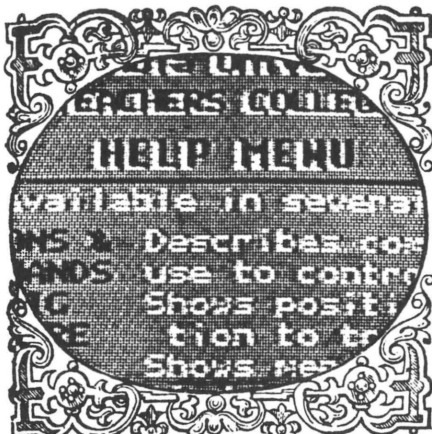
10. EXTENT AND NATURE OF CIRCULATION (See instructions on reverse side)	AVERAGE NO. COPIES EACH ISSUE DURING PRECEDING 12 MONTHS	ACTUAL NO. COPIES OF SINGLE ISSUE PUBLISHED NEAREST TO FILING DATE
A. TOTAL NO. COPIES (Net Press Run)	1953	2085
B. PAID AND/OR REQUESTED CIRCULATION 1. Sales through dealers and carriers, street vendors and counter sales	-0-	-0-
2. Mail Subscription (Paid and/or requested)	1079	967
C. TOTAL PAID AND/OR REQUESTED CIRCULATION (Sum of 10B1 and 10B2)	1079	967
D. FREE DISTRIBUTION BY MAIL, CARRIER OR OTHER MEANS SAMPLES, COMPLIMENTARY, AND OTHER FREE COPIES	563	686
E. TOTAL DISTRIBUTION (Sum of C and D)	1642	1753
F. COPIES NOT DISTRIBUTED 1. Office use, left over, unaccounted, spoiled after printing	311	332
2. Return from News Agents	-0-	-0-
G. TOTAL (Sum of E, F1 and 2—should equal net press run shown in A)	1953	2085

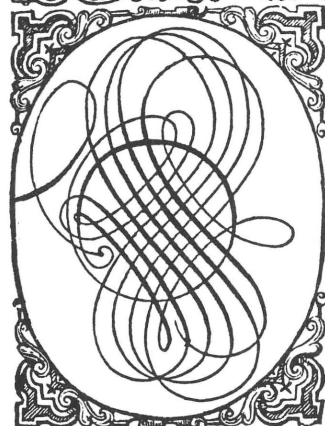
11. I certify that the statements made by me above are correct and complete

SIGNATURE AND TITLE OF EDITOR, PUBLISHER, BUSINESS MANAGER, OR OWNER

[signature]
Editor

PS Form 3526, July 1984 (See instruction on reverse)





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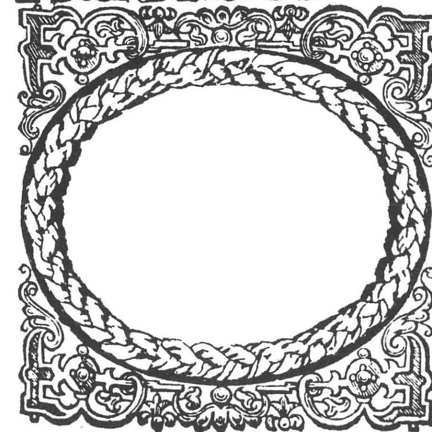

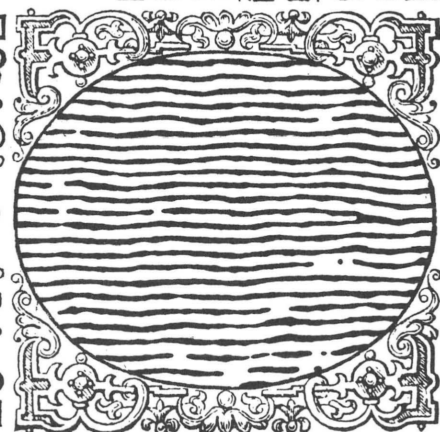

"From Page to Screen"
Interface gives the reader access to a text. In print the interface (footnote, index, title page) has become so familiar it is nearly invisible. The interface of electronic text is foregrounded: its design is baroque. [Virgil Solis, 1558]

"Dupin and Ubac"
The notion of the landscape is a strategy for reading the artist's images and the poet's words in a collaborative enterprise devoted to the tradition of the book: the text is at once a literary artifact and a physical object.

"Scribal Reality"
The ornate scripts featured in the copy books of 16th century Italian writing masters had little influence on common scribal activity; they were dubious models for typical students. [M. Scalzini, 1581].

Design writing research.
J. Abbott Miller and Ellen Lupton
A partnership centered on the relationship between pictorial and textual writing

36 East 7 Street
New York, NY 10003

"Reading Style"
Good spellers read by full cues; poor spellers read by partial cues. The glance of the hasty reader tangles sequence into a single figure. [Monogram, Juan de Yciar, 1550]

"Variations in Spelling"
The 19th century architect Gottfried Semper theorized the origin of classical ornament in utilitarian crafts. The borders of this article compare the relation of speech and writing to the translation of textile braid into geometric ornament.

"Line Lengths"
Starch 'read most' scores were the basis for this study of line lengths in advertising body copy. In the margins of this article, illustrations by Gustave Dore [1832-83] for *Paradise Lost* are similarly analysed.