

**Visible Language 28:1**

a general issue  
from the quarterly  
concerned with all that is  
involved in our being  
literate

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## **Visible Language 28:1**

- 4 **The Future of the English Sentence**  
Brock Haussamen
- 26 **Problems that Face Research  
in the Design of Spelling**  
Valerie Yule
- 48 **The Unconsidered Ballot:  
How Design Effects Voting Behavior**  
Susan King Roth
- 68 **Blind Eyes, Innuendo  
and the Politics of Design**  
A Reply to Clive Chizlett  
Robin Kinross
- Book Reviews**
- 80 *Spirals*
- 83 *Black Riders, the Visible Language  
of Modernism*
- 86 *Stop Stealing Sheep and Find Out  
How Type Works*
- 89 *Letters*
- 92 *Books Received*

Raritan Valley Community College  
PO Box 3300  
Somerville, New Jersey 08876

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Rhode Island School of Design  
Providence, Rhode Island 02903

This essay is about past and future changes in the predominant features of the written English sentence.

Based on a survey of turn-of-the-century works from the last four

## **T**he Future of the English Sentence.

hundred years, the author describes the general changes in sentence length, typical clause and modifier patterns, connectedness and structural explicitness. The printed sentence has become shorter, the flow of information more direct, the connections between nominalizations more implicit. The changes have their roots in patterns of spoken English, in the printing press and the widening of literacy and in the structure of scientific rhetoric. Over the coming two centuries, the printed sentence will probably continue to develop in a similar direction. The major variable is whether electronic technology will in the long run bring the printed sentence closer to the oral one or whether the sentence of electronic prose will develop its own distinguishing characteristics. In any case, the shorter sentence of the future will probably be rigorously and tightly constructed and more reliant on phrases than on subordinate clauses. Taking a long view that includes such speculation refreshes our perspective on the state of written English prose.

**Brock Haussamen**

Changes in the syntax of the written English sentence are one of the foundations of our literate culture. Judgments about the character and quality of a piece of written English have been and are a result of not only the prose standards of the moment but also, and just as fundamentally, the direction of the movement of the written sentence in general. As a reliably stable element of standardized English (certainly more stable than the lexicon, almost as stable as modern spelling) written syntax changes slowly and slightly. But change it does. In every era, writers of sentences are gradually leaving some stylistic features behind and moving toward others. As they do, the great compass that is the dominant style or styles of the period shifts, with far-reaching effects.

This essay will try to describe that shift by considering not only the predecessors of the current written sentence but also by predicting what the written English sentence may look like two centuries from now. Two hundred years may seem like a large and arbitrary piece of the future to work with. But in selecting it I have followed Barbara Strang, who divided her *History of English* into two-hundred year intervals on the theory that each generation is aware of about one century's worth of gradual linguistic change and that twice that period is probably the smallest span in which change is reasonably clear-cut.<sup>1</sup> Strang was tracing the history of spoken English primarily, so from the point of view of the printed sentence and the guidelines of its standardization, both of which change more slowly in the long run, two hundred years is just around the corner.

I will look first at how the written English sentence has evolved over the last four centuries, during the period when the language has become stable enough to be considered standardized; then I will comment on the reasons for the changes and, finally, extrapolate the changes into the future.

This 50-word sentence from 1605 is typical in its length and full-bodied character, the result of its many subordinate clauses, pronouns and conjunctions.

For I am well assured that this which I shall say is no amplification at all, but a positive and measured truth, which is that there hath not been since Christ's time any king or temporal monarch which hath been so learned in all literature and erudition, divine and human. For let a man seriously and diligently revolve and pursue the succession of the emperors of Rome, of which Caesar the dictator, who lived some years before Christ, and Marcus Antoninus were the best learned, and so descend to the emperors of Graecia or of the West, and then to the lines of France, Spain, England, Scotland, and the rest; and **he shall** **find** this judgement is truly made.

Sentences are more explicitly connected to each other than today's sentences are — often opening with conjunctions.

17th century readers did not mind sentences that ambled along and postponed the main elements until the end.

Francis Bacon. 1605.  
*Advancement of Learning.*

## **Samples of the past**

The first step—a history of the prominent characteristics of the sentence—would seem to be almost as full of pitfalls as an attempt at prediction. There have been in each century a wide range of registers—from the basic narrative sentence that is as old as the language to the involutions of legal and philosophical discourse—and there are also regional considerations, such as the influences of Latin and French syntax and the contrasts between American and British English. Moreover, inclusion in the literary canon is no longer considered a reliable guide to a work's actual influence or representative character. All of these are reasons to squirm over any broad generalizations about the English sentence. And yet the printing press, the cultural unity of the English-speaking world, and the spread of literacy have all helped steady the language sufficiently so that the syntax of the written sentence has, since the 1700s especially, shown remarkable stability. Indeed, it is because the changes have been relatively small that it is inviting to try to chart them.

For such a chart, I have analyzed passages of five hundred words in about ten works written around each centennial year—within a decade on either side of 1600, 1700, 1800 and 1900—and also within the last few years. A complete list of the works that were surveyed will be found in the endnotes. The works are mostly but not entirely non-fiction, and for the last two dates, mostly by American instead of English writers. Within each twenty-year period, I have looked for a variety of discourse types, and for at least one unfamiliar name to include with the familiar authors. Some of the great writers of the language, such as John Milton and Samuel Johnson, are not here because they lived and wrote within the centuries instead of across them. The five-hundred-word passages from each work were chosen at random except that I avoided sections containing discourse structures with atypical syntax, such as long lists or dialogue. Samples are shown on these opening pages; they are just that—samples of the syntactic characteristics observed in many other excerpts—and they will be cited as examples in the discussion; they are not offered as definitive illustrations of the style of each period.

## **The direction of change**

The general direction of change has been towards sentences that are shorter and more sharply separated from each other and whose internal sequence of subject-verb-object/complement is more prominent. Most sentences written around 1600 and 1700 range between forty and seventy words in length, though examples both shorter and longer are plentiful. The length is from one terminal punctuation mark to the next. Writers in this period often used a semicolon where we would use a period, but their terminal punctuation indicates what *they* considered to be the dimensions of completeness for their sentences, dimensions which allowed for greater mass and greater momentum than ours do. Some-

Adding to the fullness of early modern prose is the introductory absolute, a combination of a participle and its own subject.

The main Body of the will (as the Reader cannot easily have forgot) consisted in certain admirable Rules about the wearing of their Coats; in the Perusal **whereof**, the two Brothers at every Period duly comparing the Doctrine with the Practice, there was never seen a wider Difference between two Things; horrible downright Transgressions of every Point. **Upon which**, they both resolved without further Delay, to fall immediately upon reducing the Whole, exactly after their Father's model.

In 1700 the sentence remains long and clauses are still explicitly connected, often by combinations of pronoun and preposition.

Jonathan Swift. 1704.  
*A Tale of a Tub.*

times the structure is periodic, the main subject and verb suspended until the end, as in Bacon's second sentence; but even when the order is more straightforward, such massive sentences weave phrases and clauses into a closely-knit web whose smoothness and connectedness is insistent. Modern readers are not accustomed to being held so tightly in a long train of thought, for such rhetoric was derived from an oratorical tradition that was designed to hold the attention of audiences more practiced than we at hearing sermons, epic recitations and oral arguments.

The style is characterized by hypotaxis, the use of explicit syntactic devices to show the hierarchical relationship between clauses. Conjunctions abound, not only within sentences but at the beginnings as well, as in the two sentences by Bacon ("For I am . . . For let a man"). Conjunctive *for*, which has since become rare, is common. Also conspicuous is the combination of relative pronoun and preposition that functions as conjunction; Swift's sentence beginning with "Upon which" is a frequent construction. *Whereby*, *whereof* and *whereon* were ordinary enough to be written as one word.

Another device that gives these sentences their full-bodied character is the introductory absolute construction, in which an opening participle is accompanied by its own subject, as in Swift's "the two brothers . . . comparing . . ." Today, absolute constructions usually follow the main verb instead of preceding it (*She left this morning, her husband having gone back yesterday*), and the introductory absolute has been replaced by the opening participle alone.

Since the 1700s, sentences have become steadily shorter. The average length in 1800 and 1900 was between thirty and forty words, and today it is in the twenties. My figures agree broadly with those of L. A. Sherman, who in 1893 based his statistical study of the sentence on much longer selections by fewer authors. He found the average sentence length in works by the sixteenth-century writers Edmund Spenser and Thomas Hooker to be 49.82 and 41.4 words per sentence respectively. In contrast, sentences by the nineteenth-century writers Thomas DeQuincey and William Channing measured 33.25 and 25.73 words respectively.<sup>2</sup> As for the length of the current American written sentence, Nelson Francis and Henry Kucera, in their analysis of the Brown University corpus, reported mean sentence lengths in the mid to low twenties for nonfiction, and in the teens for fiction.<sup>3</sup>

The shortened sentence was in the air in the eighteenth century. Responding to the reading public's taste for colloquial prose, rhetoricians

This 38-word sentence from 1803 is characteristic of the somewhat more compact phrasing that was in the air in the late 18th century.

The beginning of the shift from clause to phrase in sentences that are still long leads to heavy use of nouns.

What would probably have been expressed as a clause (“...who reside...”) a century before is now more likely to be a phrase.

The Indian tribes residing within the limits of the United States have, for a considerable time, been growing more and more uneasy at the constant diminution of the territory they occupy, although effected by their own voluntary sales. And the policy has long been gaining strength with them of refusing absolutely all further sale, on any conditions; insomuch that, at this time, it hazards their friendship, and excites dangerous jealousies and perturbations in their minds to make any overture for the purchase of the smallest portions of their land.

Thomas Jefferson. 1803.  
*Message to Congress proposing the Lewis and Clark Expedition.*

recommended quicker sentences and fewer conjunctions. George Campbell in 1776 reminded writers that “Brevity is the soul of wit” and urged a reduction in the use of such “drawling conjunctions” as *whereby* and *therewith*.<sup>4</sup> His contemporary Hugh Blair pointed out the “peculiarity” that “the omission of a connecting participle should sometimes serve to make objects appear more closely connected . . . [and] is used to denote rapidity.”<sup>5</sup> Blair was describing one of the effects of parataxis, the placing of sentence elements next to each other without an expression of subordinate relationship. Parataxis has steadily replaced hypotaxis, with its explicit conjunctions at every turn, as the relational style of our written sentences.

Not only conjunctions but relative pronouns as well become less frequent over the centuries; *that* and *which* as relative pronouns appear, in my five-hundred-word samples, usually about seven or eight times in the 1600 and 1700 passages, from four to six times in 1800 and 1900, and three or four times in current writing. In place of such explicit connecting devices, modern writers prefer more succinct juxtapositions. Rather than extend a clause, they will start a new one sooner. They may compress an explicit dependent clause into a less explicit phrase—Adams’ “the wants of man, beyond a mere roof cover,” instead of, for instance, “those wants of man which extended beyond the need for a roof-cover.” They freely insert an appositive, as Dillard does with “in certainties, in data which anyone anywhere could verify.” Or they use the dash to shift the emphasis to an added comment without a wordy transition.

The flow of information in the sentence has become more direct, the arrangement of items more compact. Sherman, noting the decline in the number of clauses and conjunctions, described the modern sentence as lighter, more intuitive and organic.<sup>6</sup> Recent sentences are less likely to be inverted; even Richard Hooker, a terse stylist for 1600, characteristically wrote “That mere natural men do neither know nor acknowledge the things of God, we do not marvel.” Such a sentence was periodic, but even in those early sentences which were not strictly periodic, there was a leisurely, ambling arrangement, a sense that phrases and clauses might be tucked in before, after and within the core of the sentence with equal comfort. Modern sentences, by contrast, are less likely to spread a net of modifiers in all directions. For the last couple of centuries, independent clauses have started more quickly. Three of Dillard’s five sentences begin with the subject phrase. According to one study, fully three quarters of the sentences in current American prose open with the main subject itself and no sentence modifiers or other word groups in front of it.<sup>7</sup>

Antithesis — contrastive parallel phrasing — is trim compared to the elaborate constructions of prior centuries. The sentence combines the old formality with a new quickness.

As far as one can see into the spirit of the builders, Chartres was exclusively intended for the Virgin, as the Temple of Abydos was intended for Osiris. **T**he wants of man, beyond a mere roof-cover, and perhaps space to some degree, enter to no very great extent into the problem of Chartres. **M**an came to render homage or to ask favors. **T**he Queen received him in her palace, where she alone was at home, and alone gave commands.

Although the average sentence of 1900 is still over 30 words long, the explicit connections of the past have given way to juxtapositions that are swifter. There are fewer conjunctions and fewer relative pronouns.

Henry Adams. 1905.  
*Mont-Saint-Michel and Chartres.*

The modifying elements in recent sentences have been steered into two locations in the clause. The primary one, which is not new, is after the sentence core, where it has always been a simple matter to link a chain of modifiers; from Adams, "The Queen received him in her palace, where she alone was at home, and alone gave commands." But the other slot for modification has come into frequent use more recently, and that is the position immediately after the subject. Post-modifiers bound to the subject noun—as in Jefferson's "The Indian tribes residing within the limits of the United States"—are infrequent in early sentences, and even non-restrictive modifiers (Bacon's "Caesar the dictator, who lived some years before Christ") and sentence modifiers in this position (Swift's "The main Body of the Will (as the Reader cannot easily have forgot)") do not appear often. Today, however, such constructions are ordinary, as in Dillard's "Science, that product of skepticism . . ." The frequency of such modification (either by a phrase of at least three words or by a clause) has increased slowly and steadily since 1600, usually ranging from two to four examples within five hundred words in 1600, to around four to six in 1800, to between six and ten today.

Antithesis—contrastive parallel phrasing—has been toned down as the sentence has become streamlined. From Cotton Mather in 1702 (*Magnolia Christi Americana: Winthrop*): "This made him the terror of the wicked, and the delight of the sober." So and *as* were pivotal words in early modern syntax, where clauses often seemed ready to burst into effusive comparison. Bacon's clause is on the verge: "there hath not been since Christ's time any king or temporal monarch which hath been so learned in all literature and erudition, divine and human." Comparisons and parallelism have continued, of course, as in Adams' "Chartres was exclusively intended for the Virgin, as the Temple of Abydos was intended for Osiris," but this is, characteristically for the modern sentence, very trim. The earlier Ciceronian taste for elaborate contrast has been diluted to compound clauses pivoting on *but* and pairs of brief parallel phrases, as in Dillard's "I think science works the way a tightrope walker works."

The straightforward style has also made a very recent casualty of the passive voice. The use of the passive has always varied widely among different types of discourse and among individual writers. And until this century no stigma attached to it; neither grammarians nor rhetoricians prior to 1900, even as they expounded the importance of vigorous verbs, criticized passive inversions. So while the passive often appeared about half a dozen times within five hundred words in the past—as in Swift's "there was never seen a wider Difference"—its number has been reduced to about half of that in this century.

Today, the average sentence length is in the low 20s, and flow of information from subject to verb to object or complement is quite direct.

Elliptical phrasing and the use of appositives help keep the modern sentence compact.

**Science, that product of skepticism  
born of cultural diversity, is meant  
to deal in certainties, in data which  
anyone anywhere could verify.  
And for the most part it has. Our  
self-referential mathematics and  
wiggly yardsticks got us to the  
moon. I **think** science **works** the  
way a tightrope walker **works**: by  
not **looking** at its feet. As soon as it  
**looks** at its feet, it **realizes** it is  
**operating** in midair.**

Verbs and verbals have replaced the heavy nominalizations of the previous two centuries, allowing the sentence to become shorter.

Annie Dillard. 1982.  
*Living by Fiction*.

Another type of sentence inversion, however, has not changed noticeably. Sentence openings such as *There are* or *It is*, sometimes seem conspicuous in modern writing, but they have always been around in about the same proportions as they are today; Bacon's "there hath not been" and Swift's "there was never seen" are examples. (Another nil change: I wondered whether simple doublets such as Jefferson's "jealousies and pertubations" have been on the increase. Such phrases, often annoyingly redundant, impose a strong rhythm on a sentence. Overall their frequency has not changed but has always varied among writers; see the profusion in the passage by Bacon.)

Recent English leans heavily on its nouns. *Nominalization* refers to the replacement of clauses by noun phrases in which the part of the verb has been taken by a noun. For example, Jefferson's phrase "the constant diminution of the territory" is a nominalization of the clause "the territory is constantly diminishing." Nominalizations were thick in the non-fiction of 1800 and 1900 especially. Their rise is reflected in a decline in the numbers of finite verbs. The early sentences often comprised several brief clauses, each with its finite verb accompanied by simple nominals. In my survey, finite verbs and verb phrases dropped steadily from a high range of forty to sixty per five-hundred words in 1600 to a low of thirty-five to forty-five in 1900, when nominalization was at its peak. In the samples of current writing, however, verbs are back up to their 1700 level, averaging about forty-five (but often ranging ten above or below that), the reversal probably the result of the combination of the colloquial style (with its reduced nominalization and preference for active verbs) and the reduced size of the twentieth-century sentence.

Another sign of nominalization has been the tendency since the eighteenth century to put more modifiers in front of nouns. In the samples from 1600 and 1700, common nouns preceded by two or more modifiers (other than articles, demonstratives or possessive pronouns), as in Bacon's "a positive and measured truth," rarely numbered more than half a dozen in five hundred words. Today the frequency has roughly doubled, so that premodification with two elements is common; its components have branched out from ordinary adjectives to include nouns-as-adjectives, as in Dillard's "tightrope walker."

These collective changes could be summed up in a number of ways, by calling attention to one pattern or another, but the most revealing pattern for the purpose here, I think, is the continuum between the implicit and the explicit. In one crucial respect the sentence has become more explicit; the expression of the information contained in the main

subject, verb and object/complement has become less obstructed and more prominent. But in many other respects, written sentences have moved in the opposite direction, toward abbreviated forms and implied instead of stated meanings. The connection between sentences is a conspicuous example. Today's readers don't require the links between sentences that earlier readers were accustomed to, and in much the same way that we have learned to see the continuity across the quick cuts in film and television, so we can also see the connection between the closing of one sentence and the opening of the next without the need for *where upon's*. The decreasing use of subordinate clauses and the drift towards both prepositional phrases and premodification is likewise a movement towards more implicit writing. "Caesar the dictator, who lived some years before Christ" is more explicit than "The Indian tribes residing within the limits of the United States," which is more explicit than "a tightrope walker"; each succeeding form relies more and more on the reader's ability to interpret it correctly in order to avoid ambiguity (does "residing" refer to the past or the present? What is the relation of the "tightrope" to the "walker"?) and each is more compact.

Finally, the decline of inversions, including the passive inversion, and the muting of antithesis and comparisons have the same effect: within the sentence, continuity and compactness are greater, but the reader may have to make prominent in his or her mind what is not necessarily up front and most prominent in the sentence. Adams' last sentence—"The Queen received him in her palace, where she alone was at home, and alone gave commands"—is focused on the Virgin, but it is the contrast to the "wants of man" that the reader must keep in mind for the sentence to be meaningful. Two or three hundred years earlier, the comparison would most likely have been restated in the sentence: "Chartres was not intended for the comfort of man, who was there only to be received by the Queen in her palace, where she alone was at home, and alone gave commands." Adams' actual sentence of 1905 is shorter, more direct and less complete.

### **Sources of change**

The written sentence has been shaped by a number of forces that must be considered before trying to project it into the future.

One of the forces has been the evolution of the spoken language itself. Certain evolving constructions characteristic of spoken Modern English have influenced the shape of the written sentence. Verbs in conversational English have more and more often come in tightly wrapped packages of verb-and-preposition, as in Dillard's "*look at its feet,*" and verb-and-

object, as in “got us to the moon.” The effect of such phrasal packages, in print as in speech, is to discourage interruptions between verb and complement. Also, of the verb forms and auxiliary verbs that have found their way from spoken to printed English, *do* has been multiplying its functions to become an integral part of questions, negations and emphatic constructions. The standardization of the negative construction with *do*—“Do not enter”—has discouraged the old inverted style of negative that is echoed in Adams’ “enter to no very great extent” and that has, like the phrasal verb, helped create the expectation that auxiliaries and adverbs will fall into a certain order around the verb and will not too lightly be inverted or interrupted.

As with verbs, some written configurations of nouns have roots in changes in spoken English. In conversation as well as on paper, more modifiers of different kinds have been placed in front of nouns more often, and with more varied connections implicit between them. In the past some adjectives could follow a noun—*soldiers three*—but now almost all adjectives precede. Past participles more frequently refer to a characteristic as well as a past action or state of being; a *learned lesson* (past action) became, as in the passage by Bacon, rulers who were “learned in all literature” and “best learned,” which became shortly after, a *learned person* (an attribute).

So the written sentence has been feeling the effects of word patterns taking shape in spoken English. But, especially in its dimensions, it has been feeling the effects of the printing press even more. Print encourages literature—and the sentences of which it is composed—to become compact. The rambling constructions in Bacon and Swift were descendants of the tradition of recitation. Whether modeled on ornate Latin oratory or on strung-together narratives of the medieval epic, the massive sentence was a hold-over from the days of performance before an audience of rapt listeners.<sup>8</sup> But as Walter Ong argued in *Orality and Literacy*, the physical qualities of the line of type—regular, justified, fixed and locked—promoted a sentence with similar features.<sup>9</sup> The spread of literacy in the eighteenth century encouraged regularity of another kind as well: In *Understanding Media*, Marshall McLuhan credited Addison and Steele with creating prose that held a single “tone and attitude to the reader throughout the composition”—in place of the variation in tone that had characterized the spoken and even handwritten sentence.<sup>10</sup> The novel and the newspaper, commodities themselves, packaged the sentence as a commodity; critics accused Samuel Richardson and Daniel Defoe of writing easy, flowing sentences in order to churn out works quickly and make more money—a charge with some degree of truth, according to Ian

Watt.<sup>11</sup> The printed sentence could become casual, implicit and compact partly because the tastes of the reader/consumer were uniform and well understood. This reader was often a lady, with the enforced leisure to read novels and to further mold the written sentence through what Watt called the “cult” of personal letter writing. Thus the men and women of eighteenth-century London, in their different roles, helped create the more familiar and straightforward written sentence.

Some of these eighteenth-century developments deepened in the nineteenth and twentieth centuries. The expansion of literacy turned into the movement for mass education. The style of *The Spectator* gave way to that of *The New Yorker*, and more remotely to the zippy sentences of the daily newspaper and *Time*. In the second half of the last century, magazine advertisements became less likely to be written only in complete sentences and more likely instead to display the phrases and catchwords that have characterized ads ever since. The conventional punctuation of the sentence was put on the defensive and fragments and comma splices became schoolbook errors for the first time.

But other twentieth-century developments would have been unimaginable in the eighteenth. At that time, language intended for public consumption was printed. In our century, in the “secondary orality” (Ong’s term) of radio, film and television, public language has become oral as well. The written sentence, besieged by the advertising slogan, the headline, the sound bite and the jump cut, has become ever quicker.

Of the many prose styles that have threaded their way through these changes, one strand calls for further comment. In his essay “On the Language of Physical Science,” the English linguist M.A.K. Halliday has traced the features of nominalization, implicitness and simplified clause structure to the rhetorical requirements of scientists writing over the last four centuries.<sup>12</sup> According to Halliday, scientists, in recording and publishing their experiments, drew on those aspects of English discourse that best suited their purposes, and, as science has become prestigious, those stylistic elements have become widely imitated. A principal requirement of scientific exposition is its suitability for carrying over complex information from one sentence to the next; what is new data in one sentence—a stage in an experiment, or a result—becomes background information in the next one. The easiest way to package a statement in reduced form so that it can then become a piece of a later statement is to make it a noun phrase. A description of how two bodies repel each other is later referred to as *the repulsion*; an explanation of how quickly solids crack becomes *the rate of crack growth*, or even *the crack growth rate*. The

explicit clause that first presents a piece of information is reduced to an implicit phrase when the information is recapitulated. But within the sentence, Halliday pointed out, a different tendency is at work. As events and processes are turned into nouns, verbs often become expressions not of action but of relationships between processes. One process *causes* or *is caused by* another; an event *supports* a theory. Such statements of relationship are by nature explicit and precise; they tend therefore to take the form of simple independent clauses. These characteristics of simple clause structure and nominalized, compact phrase are not invariable characteristics of scientific writing and were not conspicuous until the eighteenth century, but they have been taking shape and exercising their influence on other prose styles (such as bureaucratic writing) gradually. Halliday, in other words, has seen in the rhetoric of empirical explanation precisely those tendencies that have marked the changing generic sentence.

To recapitulate: The evolution of the written sentence over the last four centuries has been the work in part of changes in spoken English, in larger part of the growth of printing, and in particular of the form of discourse amenable to empiricism. Shifts in the explicitness and implicitness of the sentence have been linked to the rise of the printing press, to widening literacy and to the age of science. Of these three influences, two especially—the expansion of readership and the pervasiveness of scientific thinking—will continue to be felt for the next two centuries. This alone is perhaps reason enough to predict that the sentence will change in the next two hundred years about as much as it has since Jefferson's time, and in the same direction. But before I explore more specifically where that change may lead, let me discuss two cultural variables that might bend this line of development in unpredictable directions.

### **Some uncertainties**

The first is the uncertain fortune of the English-speaking world. For the past four centuries, the steady development of the sentence has been made possible in part by the uninterrupted growth of first the British and then the American cultural empires. That expansion will probably cease soon—if it has not done so already—and might be drastically reversed during the next two centuries. Robert Burchfield, chief editor of the *Oxford English Dictionary Supplement*, predicted in a 1978 article in *Encounter* that English would, in the future, follow the course of Latin in the Middle Ages: After spreading over most of the known world and serving as both an official language and an alternate second language at the local level, English would gradually break up into a variety of new languages.<sup>13</sup> The scenario seems very probable in the long run—all

languages evolve or die—but how far along in the process English may be in the twenty-second century is hard to know. The future will be more centralized and media-dominated than the Latin-unified Middle Ages were, and consequently standard English will probably persist as the language of privilege that transcends national borders. But economic, military or ecological events that curtail the influence of the English-speaking world could quickly change the direction in which the English sentence has been moving. The perception that the English language is in retreat on the world stage, that it has become inadequate or decadent, would intensify the forces of innovation and reaction that are always pulling at writing style.

Another question is the long-range effect of electronic technology on the relation between spoken and written discourse. So far, our printed language remains the creature of the mechanical printing press; that is, our rules of written discourse are still founded on the separation between writing and speech that was widened by the mechanical press. Electronic communication has begun to close that gap, and yet the electronic media, overwhelmed by them as we may sometimes feel, are only in their adolescence. If the full effects of such technology on the language still lie ahead of us, then by 2200 the sentence may have headed down one of two roads.

The first possibility is that the sentence that is read and the sentence that is spoken will remain two distinct types. Even though it has become briefer and more colloquial in some respects, the written sentence has never actually been a reproduction of actual speech as much as it has been a visual artifact derived from it. (One illustration of this difference is the frequency of use of the prepositional phrase; seemingly colloquial in its simplicity and brevity, the prepositional phrase is nonetheless forty percent more frequent in writing than in speech.<sup>14</sup>) In the future, while the written sentence will probably approach the spoken one in length, it may also remain remote from it in the character of its internal phrasing. Word processors make experimentation and refinement so easy technically that written style may acquire an expanding array of traits that distinguish it from oral style. In a study of the impact of computer conferencing on language, linguist Naomi Baron has predicted that writing would be changed in the directions of both greater logical coherence and reduced stylistic richness.<sup>15</sup> A similar result has been forecast by those who have considered the influence on language of structuralist thinking, including the structuralism of computer programming itself.<sup>16</sup> The divergence between the written and the spoken might be unwitting, as computer-influenced language finds its own syntax, or it might be delib-

erate as well, as writers in various fields begin to shun the simple sentence and pursue a new ornateness in their prose. As George A. Kennedy commented in his history of rhetoric, "The history of prose style is largely the history of a series of reactions."<sup>17</sup>

The other possibility is that as electronics finds its place in the relation between the oral and the written, it may bring them closer together. As electronics tends to replace every mechanical process with invisible, nerve-like circuitry, the differences between spoken and visible discourse may shrink. A pivotal change will occur soon—it has begun already—when word processors record and respond to speech. When today's young children reach their middle age, they will probably be talking into their word processor instead of typing into it. As the electronic transformation of speech directly into print becomes a common procedure for creating text, the hand will lose its ancient place as the indispensable writing implement. Meanwhile, the book will be replaced by the portable screen with replaceable chip. Futurists debate the advantages and disadvantages of the book versus the screen,<sup>18</sup> but such changes will be driven unstoppably by the general rise of electronic over mechanical technology. And after the screen has long replaced paper and page, after a few generations of students have been raised on voicewriters, then even scholarship may be communicated through combinations of writing (will it be called that?), electronic speech and graphics in an interactive format. By then, sentences printed on paper may have become nostalgia, intriguing in their immobility and fineness, like daguerreotypes. But what shape the electronically-recorded sentence will have taken at that point is impossible to know.

### **The sentence of the future**

For now, let us return to the more manageable job of predicting where past changes might take the sentence if we project them into a future that, while different, is at least familiar.

The most certain change is the continuing simplification and unification of the sentence. The average sentence will get shorter. This change will be driven by the continuing preference for the proposition that is both colloquially and precisely expressed. Sentences will not become shorter as rapidly as they have in the past in terms of absolute numbers, but when the average length is down in the teens, gradual decreases of just one or two words will be consistent with the long-term trend.

An accompanying change will be that punctuation will become lighter, and some of our correct punctuation rules will look as excessive in the

year 2200 as some eighteenth-century punctuation rules do to us now. The shrinking sentence has already had an impact on sentence boundary punctuation; the preference for the short, catchy word cluster—in advertising, among other genres—has encouraged the fragment, the run-on and the comma splice. As formal errors, these mistakes are new to the twentieth century, and the strain they indicate between theory and practice in marking off sentences will certainly be growing worse. There will be increasing pressure to accept the joining of two related independent clauses with a comma instead of a semicolon, and to accept increasing numbers of elliptical structures as sentences. My guess is that the result of the tension will be a compromise. More exceptions will be allowed—commas splicing clauses of slightly greater length than the very short ones that they are permitted to splice now, certain kinds of fragments finding acceptance as colloquial sentences. Otherwise though, the very fastidiousness with which the concise sentence is arranged will insure that the boundaries of the independent clause are vigilantly watched.

The reduction of subordinate clauses and the expansion of noun phrases will produce sentences that are easy to take in at a glance but that are also thick with modifiers and prepositional phrases. A glimpse of the future from *The New Yorker's* "Notes and Comment" (Jan. 14, 1991): "Whether these weapons would be used in the event of war is impossible to know without access to highly classified information." Of the two halves of this sentence, the future probably lies in the types of phrases and modifiers found in the second half, while clause structures like that of the first half will become rarer. I think that much of Francis Christensen's analysis in *Notes Toward A New Rhetoric* of the contemporary cumulative sentence will hold even truer in the future than it does today. Phrases and adverbial clauses conspicuously inserted at the opening of sentences will become less common, and today's grammar-book advice to use such openings for the sake of variety will appear in retrospect to have been fairly useless. To counterbalance the simplification of the clause, writers will rely increasingly on chains of phrases—modifiers, verbals, prepositional phrases—after the verb to channel the flow of information and move it quickly down to its fine points.

As most sentences become more direct and concise, unusual kinds of sentence structure will not disappear; instead, they will carry new stylistic significance. An exception here is the type of sentence that opens with *There is, It is*, and similar introducers; these have a long and stable history in the language that will probably continue unchanged. But other types of inversions or rearrangements in statements that we now accept as

stylistic whims may carry more specific connotations in the future. Placing the main subject and verb in an unusual position (*The deficit is growing, we believe*) or reversing their order (*Says the attorney,...*) may well signify a more formal or a more slangy style than such arrangements do today. Inversions of the type *Not until they finished dinner did they talk about it* will still be around but will probably feel more highly flavored—perhaps more bombastic, perhaps more archaic.

The inversions created by the passive voice will probably continue to be regarded as inconsistent with the direct and compact style and thus will remain out of favor. But the future of the passive voice is difficult to judge because its recent past may come to appear stilted. Our stricture against the passive voice is only about a century old, and criticisms of it have overlooked its usefulness for placing first in a sentence the primary item under discussion. Some current college handbooks are already more judicious about condemning the passive than those of a couple of decades ago, and two centuries from now severe criticisms of it will probably be regarded as a gripe peculiar to our century.

As sentences become shorter and their different parts are separated by fewer intervening words than in the past, skilled writers will find new refinements in the coordination and agreement among sentence elements, while inexperienced writers will feel that such precision is unnecessary. The dangling modifier rule is probably a good example of the type of proscription we will see more of. Currently, dangling modifiers that are clear in the context of not only the clause that follows but the sentence that precedes (*We walked along the path. Coming to a field, the moon was rising through the trees*) are not particularly troubling to many people; although classified as errors, they can be found in reputable writing. For this reason, it is conceivable that in time the dangling modifier will go the way of other syntactic patterns such as the final preposition and be reduced from a grammatical error to a stylistic preference. But what is more likely, I think, is that because the sentence of the future, although short, will be rigorously constructed, dangling elements will become a more rather than a less serious matter in the judgment of future grammarians.

For the same reasons, pronoun agreement will continue to be held to standards at least as rigorous as today's. As sentences become shorter and pronouns and antecedents become separated by fewer words, the potential for vagueness in certain pronouns will become greater. The proscriptive rule (less than a century old) about avoiding different uses of *it* within the same sentence (*When the fruit loses its crispness, it's time to*

*throw it out*) is probably typical of coming rules designed to prevent the pieces of the compact sentence from getting mixed up. The pronoun *this* is likely to be viewed as a demon pronoun in the future, not only because of its frequently hazy reference (... *but this was not enough*) but also because of its colloquial anticipatory use as well (*I saw this man who ...*). And finally, the dilemma of whether to use *he*, *he/she*, or *they* with singular indefinite antecedents will probably fail to move much closer to a satisfying grammatical resolution, since each alternative conflicts with an established notion of sentence structure or readability; instead, by 2200, the best we may be able to do with the pronoun gender issue is to establish different options as stylistic norms in different types of discourse.

Speculating on the future of the written sentence, as long as we keep the hazards in mind, can be a useful exercise. It requires that we consider how closely the history of our visible language presses on us, and that we remind ourselves that much of the structure of our current sentences is only a moment in the evolution of style. For grammarians and for teachers of writing, it never hurts to have one's perspective refreshed. As I see it, written English is moving in the direction of sentences composed of fewer clauses and more phrases, cleverly and thickly packed. If this is so, then pedagogical rules about dependent clauses may become less important than they are now, and rules concerning internal structure—explicit agreement, implicitly related but carefully organized modifiers and phrases—may become more so.

**Brock Haussamen** is a professor of English at Raritan Valley Community College, where he teaches English and linguistics. His book *Revising the Rules: Traditional Grammar and Modern Linguistics* is published by Kendall/Hunt. He has also published articles about reading.

## Chronology of works surveyed

Early works are all available in reprints.

**1600:** Richard Mulcaster, *The First Part of the Elementary*, 1582; Richard Hooker, *Of the Laws of Ecclesiastical Polity*, 1593; Thomas Nashe, *The Unfortunate Traveller*, 1594; Richard Hakluyt, *Voyages*, 1598; John Stow, *Survey of London*, 1603; Francis Bacon, *Advancement of Learning*, 1605; King James Bible, "Exodus" and "Luke," 1611; Thomas Dekker, *Preface to Troia-Nova Triumphans*, 1612.

**1700:** Christopher Cooper, *The English Teacher*, 1687; John Locke, *Concerning Human Understanding*, 1690; John Dryden, *A Discourse Concerning Satire*, 1693; Anthony, Earl of Shaftesbury, *Concerning Virtue or Merit*, 1699; Daniel Defoe, *The Shortest-Way With The Dissenters*, 1702; Cotton Mather, *Magnalia Christi Americana: Winthrop*, 1702; Jonathan Swift, *A Tale of a Tub*, 1704; Joseph Addison, *The Spectator*, 1711; Richard Steele, *The Spectator*, 1711; Jane Barker, *Exilius*, 1715.

**1800:** Jeremy Bentham, *Principles of Morals and Legislation*, 1789; William Bartram, *Travels*, 1791; James Boswell, *Life of Johnson*, 1791; Lindley Murray, *English Grammar*, 1795; Joanna Baillie, *Introductory Discourse to A Series of Plays*, 1798; Edmund Burke, *Reflections on the Revolution in France*, 1800; Samuel Coleridge, *On the Principles of Political Knowledge*, 1800; William Blake, *Letters*, 1803; Thomas Jefferson, *Message to Congress*, 1803; Jane Austen, *Sense and Sensibility*, 1811.

**1900:** Robert Louis Stevenson, *Open Letter to the Reverend Dr. Hyde of Honolulu*, 1890; Thomas Hardy, *Tess of the d'Urbervilles*, 1891; William James, *The Knowing of Things Together*, 1895; William McKinley, *Annual Message to Congress*, 1897; John Dewey, *The School and Social Progress*, 1899; John Genung, *The Working Principles of Rhetoric*, 1900; Mary Ward, *Eleanor*, 1900; Edith Wharton, *The Other Two*, 1904; Henry Adams, *Mont-Saint-Michel and Chartres*, 1905.

**1982—:** Annie Dillard, *Living by Fiction*, 1982; Judith Viorst, *Necessary Losses*, 1986; Ellen Bass and Laura Davis, *The Courage to Heal*, 1988; Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History*, 1989; John McPhee, *The Control of Nature*, 1989; articles from 1990 issues of *The New York Times Magazine*, *The New Yorker*, and *Journal of the History of Ideas*; Albert Hourani, *A History of the Arab Peoples*, 1991.

## Endnotes

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Valerie Yule

# **Problems**                      **Research** **Problems that Face Research in the** **Design of English Spelling** **Design**                      **Spelling**

Writing systems are an essential element of modern communications technology, English spelling is therefore a legitimate subject for research and development to improve it. Setting up such research faces problems including: the definition of an 'optimum' spelling, issues of models, methodology and experimental design. Barriers include unawareness of the importance of spelling for literacy and ignorance of how improvements have been made in the writing systems of other modern languages. Empirical exploration has been prevented by the historic unquestioned assumptions of spelling reformers and their antagonists, such as that one-to-one sound-symbol correspondence is the only possible

alternative and that the preferred method of armchair argument renders research unnecessary. Spelling design remains a field for pioneering research and for re-analysis of existing research which would benefit cognitive and reading theories and be of practical benefit for international use of the English language. We do not yet have a user-friendly English spelling for experienced readers and writers, learners of English as a second language, the educationally disadvantaged and handicapped and for computer transliteration and cross-lingual communication.

English spelling is part of the technology of visible language as much as the characters, the typeface, the layout and the linguistic conventions of writing. Therefore, like all other inventions in the technology of communication, it is legitimately subject to research and further development. Language planning for many other modern languages includes active concern for improvement of their writing systems. English will soon be the only major modern language that has not made drastic or minor improvements to its orthography within the last hundred years, since even in France, some minor changes are currently on the way.

The underlying rationale of all research and development in the modern age is that anything can be improved. That is, regardless of how efficient English spelling is now, research may be able to improve it, to make it even more user-friendly. Many would claim that it is not efficient. There is strong evidence that conventional spelling is not learner-friendly for most English-speakers when they are learning to read and write.<sup>1</sup> There is abundant proof that its unpredictable deviations from a basically consistent system make learning to read and write even more difficult for the handicapped, socially disadvantaged and learning-disabled in the community. It makes reading more difficult to teach than it need be. It is unnecessarily difficult for learners of English as a second language to learn both the spoken and written forms. It is still controversial whether the features of English spelling which handicap other users and learners are actually valuable for skilled readers—research has yet to demonstrate whether this is so, or whether on the contrary they have some responsibility for the low proportion of skilled readers in our society. International comparisons show that the great Anglo-Saxon financial investment in literacy should be far more effective in reducing our severe problems of literacy and semi-literacy. The average length of time to reach

independence in reading is three years instead of eighteen months. Fashions in teaching reading change continually because none is effective enough—a ‘phonics’ approach that can be set out in a quarter page in Italian requires 218 pages in English—and many other countries have no need of ‘spelling lessons’ and well-thumbed dictionaries or spellcheckers to correct adults’ spelling in offices. As a teacher, my commitment to spelling improvement began when I gave a backward ten-year-old a page of text with ‘no spelling traps.’ He began, stumbling, shifted to a gallop and at the end cried in surprise, “But I could read that!”

But any research that seeks to find the best possible spelling for reading in the English language faces problems which need to be set out clearly. There are competing assumptions and models in relevant theories, problems of measurement which must be overcome in critical investigations, and there are the problems of attitudes which must be considered in all human engineering to design and implement innovations. International comparisons are needed, but face the problems of multiple factors to consider. For example, are there features in Japanese orthography that English could learn from, or are social and educational factors the main reasons for high Japanese literacy rates and the competitive efficiency in reading and writing that many Japanese can reach in a writing system that seems so difficult for foreigners?

Criteria for an ‘optimum’ spelling for the English language are that it must be a best fit to the nature of the language itself and to the needs and abilities of many types of users and learners—native speakers and second-language learners, readers and writers, those literate in current spelling and those learning the new, the able and the handicapped, humans and computers. It is desirable that English spelling reform should be backward-compatible with our heritage of print—although this may not be essential, since up to ninety percent of what we read will have been printed or reprinted within the past ten years. It is also possible that at some time there may be a breakthrough to an international symbol system that can cross languages, like Chinese but without its disadvantages.

### **Spelling design and the target for literacy**

Options in spelling design depend upon decisions about where to set the cut-off point for educability in literacy. Our Western education policy is that all educable children must be taught to read. Politically, literacy is a universal right. Yet most adult readers are in many

respects still continuing learners, not expert readers, so that mass print media tend to be pitched for a reading level around nine years old. There are now claims that only a small elite need to be literate for society to function adequately,<sup>2</sup> and that it may be a waste of funds and energy to try to teach or to 'remediate' the large proportion of adults and children in the population who at present appear incapable of full print literacy. Indeed, as the word 'literacy' is extended to cover visual comprehension of electronic and film media, print may seem less necessary even in schools. A critical question, then, is whether it is more important that an orthography should be optimum for use by the skilled elite although possibly complex to learn, or learner-friendly and simple enough so that the mass of the people can be at least functionally literate. To be universally accessible, a spelling system must also suit the great range and variety of individual differences. Is a successful compromise possible, or could 'one size fit all'?'<sup>3</sup>

### **The answer is not simply sound-symbol correspondence**

Ironically, the four-hundred-year old history of attempts at English spelling reform has created barriers to research. Because this history has typically consisted of speculation, argument and promotion of hundreds of hopefully ideal systems with limited empirical research and many unquestioned assumptions, plans for scientific research on spelling design have tended to be too quickly dismissed as equally forlorn and ill-judged. There has been an assumption shared by reformers and anti-reformers alike that the only possible way to improve English spelling is to return to the original alphabetic principle of one-sound/one symbol with 'spelling as you speak.' This is attractive in its apparent simplicity but it would be daunting in its real complexity, since the English language is both morphemic in nature and multi-dialect in its worldwide extent. Yet some reformers, convinced that they have the answers without requiring objective testing, have regarded proposals for empirical research as a deliberate delaying tactic to ensure a diversion of effort that will have no practical outcome.

Opponents have also argued against research on the ground that the failure of hundreds of past reform attempts proves the futility of any further investigation. However, a history of frustration and often ridicule has marked many other human endeavors—such as the centuries of attempts at human flight and even the recent experience of the introduction of metrication. More ironically, it used to be said—up until the fifties—that spelling reform had about the same chance

as a man going to the moon. Such arguments have shown ignorance about the number, extent and nature of successful recent reforms of the writing systems of other languages.

### **Research methods and models**

The usual dilemmas of experimentalists apply to spelling design research. The more rigorous and unexceptionable the experimental techniques, the greater the risk of trivial and irrelevant findings. The more important the issues that are tackled directly, the more vulnerable to criticism the methods are likely to be.

Research must check that an orthography is linguistically suited to represent a particular language. It must consider the abilities and needs of people who must learn and use the system. Directions that are based on the capacities that are found to be required for reading in standard English spelling may be misleading if applied to the design of reading a system that differs in consistency, relationship to the spoken language or other features. Naturally, skilled readers in English today will be found to use the strategies that they have developed to cope with or avoid standard English spelling as it is now—and those strategies may be less efficient than might be possible if the orthographic medium set fewer problems.

The design of optimum spelling requires an understanding of *how* people read. One problem is that our theories of reading processes have tended to assume that all findings of English-literacy research are universals, rather than perhaps only applicable to readers of contemporary English spelling, who have had to devise their own stratagems to cope with it. This is one reason why, although there is some agreement, cognitive psychologists still disagree on whether reading processes may be diagrammed in boxes with arrows and described in terms of direct routes and parallel processing, or whether a more organic network model is required with concepts of intensity, range and transformations of information. The first is understandably easier to conceptualize in detail, to simulate in computer modeling, and to test in straightforward experiments on recognition of single words. Such experiments can be carried out in laboratories with rigor, control and sophisticated technology. However, this narrow focus is open to criticisms of neglecting crucial aspects of reading continuous text. Findings from looking at words in laboratories cannot be simply extrapolated to the reading that most matters in every day life, because this involves different reading materials and different purposes and strategies and processes, over and above the elements

that reading words and reading text have in common. There are basic questions here which psychoneurological research can be expected to illuminate.

The essential task of reading is to comprehend meaning and the most efficient spelling system would facilitate readers' competency in this task. However, comprehension of the meaning of texts goes beyond mere input encoding or output decoding of single words, and so it is harder to measure than simple speed or accuracy of word identification. Assessment is difficult, since the reader's purpose may not match the questions set by an experimenter. The reader who wants to find out why an expedition went to Antarctica may not notice or recall the color of the tent-pegs. Even in 'objective' experiments subjects can vary in the degree to which they make trade-offs between speed, accuracy and understanding.

The effects of practice may be delayed, and not immediately available as findings of experiments. These effects may also not appear in the original categories of responses set out by the experimenter, but at another level of learning.<sup>4</sup> Unexpected or generalized outcomes may be overlooked in post-test assessments.

Findings can be a function of the method of measurement — particularly in studies of attitude. It may be invidious to select what factors should be controlled for, and it may prove difficult to match subjects on more than a few variables, or to control a set of test items on all factors. Explanations for results may be multiple and even conflicting. For example, a reader may read fast because she is fluent and has reached automaticity, or because she is bored, uncomprehending and skimming or skipping. Findings in research on levels of skill in reading novel spellings may be contaminated by subjects' interest or irritation aroused by the novelty or by preference for what is the more familiar.

Reading processes are affected by word-familiarity, length, syllabic composition, abstractness/concreteness, readers' background knowledge, socio-cultural factors, individual differences and age of acquisition, as well as by the writing system under investigation. Reading the gestalts of compact Chinese logographs with their multiple semantic, pictorial and phonetic clues is rather different from even 'whole-word' recognition of linear strings of letters that are a 'linguistic guessing game' of their own, to use Goodman's description of reading in English.<sup>5</sup> Other factors in the text itself include content, context,

typeface and layout. Studies often assume that all subjects will use the same strategies, but this can be mistaken. Exactly what is being measured may be uncertain or there may be false assumptions about it. For example, a subject in an experiment may insist on rejecting a string of letters as a word because the spelling is wrong even though the instructions have been to reject it only if it cannot be identified. Some 'misspelling' may be more acceptable than others. Some experimenters' classifications of spellings may not match with others—so that to assess any experiment it is essential to see the letter-strings actually used in an experiment. For example, one experimenter classified "government" as a word in the same category of variation as "frait" and "fruat." In experiments on deletion of letters surplus to the representation of meaning or pronunciation of words, the identification of the 'surplus' letters must at first necessarily be ad hoc, based on principles, for lack of evidence. In later research, the word lists can be greatly improved, based on the findings made earlier.<sup>6</sup>

Control for other factors related to literacy may appear difficult—such as cultural and educational differences, problematic 'culture-free' common tests, shifting criteria for literacy and the need for common baselines. There can be unexpected problems in comparison of bilingual students studying in two orthographies; American Hispanic students may do poorly in tests in their native Spanish because of feelings that it is culturally inferior.<sup>7</sup> However, as interest extends in this field of research, problems of methodology are being overcome, as in the careful studies of Stevenson et al comparing the reading achievements of Japanese, Taiwanese and American.<sup>8</sup>

Once experimenters have clarified their assumptions and decided on a particular line of investigation, many experimental topics and research paradigms come quickly to mind.<sup>9</sup> They need not all be sophisticated and expensive. In 1908 Huey published his classic on the psychology of reading, with interpretations which still in general stand today, showing how much was already gained from single-case and small group studies, introspections, pocket-watch measurements, acute observation and clear thinking—that is, simple studies can still be very useful.<sup>10</sup> And today increasing sophistication of computer-driven research methods makes many problems of research in spelling that were once methodologically formidable now within the scope of even undergraduate experiment. Classroom as well as laboratory experiments can test which orthographic distinctions for homophones are necessary, and the value of con-

sistently spelled morphemes or grammatical markers. Designs such as masked priming can investigate whether sequencing and other habitual errors of poor spellers extend to the mental representation of the word that will prime the conventional spelling. Computer simulation is developing fast as a method of exploring mental processes, although computers still do not match the human brain in its particular weaknesses and strengths, such as slower learning, greater tolerance and capacity for error and more flexible pattern recognition.<sup>11</sup>

I am particularly interested in longitudinal studies—of how quickly established readers as well as dyslexics could adapt and improve reading skills, of the more efficient teaching methods that could be utilized if English spelling were not unpredictable for learners, and of the more efficient reading strategies that could be acquired. Video and television now make possible cheap mass testing for the value and acceptability of modified spellings—for example, whether modified subtitles can be read faster and by a wider audience—and this would be my method of choice.

The objective research required to test current assumptions and arguments needs to be multidisciplinary, and to integrate specialist investigations—although cross-disciplinarians who attempt overviews may still risk forfeiting the respect of those very specialists whose assistance is most necessary to prevent oversimplification or overgeneralization through insufficient expertise. The evidence that comes out of psychological laboratories and classrooms could eventually be validated by neuropsychological reductionism on the one hand and the demonstrated efficiency of an optimum spelling on the other.

Research on spelling-modified English has on occasion been faced with the ethical objection that subjects, particularly children, will be stressed by experiments that ask them to play with spellings on a computer. This would be an ironic comment on how educators perceive the intellectual delights of English spelling, but it is possible that it reflects the anxiety of the assessing committees, who may be feeling consciously or unconsciously the English spellings are icons to reverence, not to touch.

### **Issues to address in research**

Exploration of different possibilities for English spelling modification must have sound bases in theory and existing research. Novel

Riting systms ar an esential elemnt of  
 modrn communications tecnolojy, and  
 english spelng is therfor a lejitmat  
 subject for reserch and developmnt  
 to improve it. Setng up such reserch  
 faces problms. These include the  
 definition of an 'optmm' spelng, and  
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 as that one-to-one sound-symbll  
 corespondnce . . .

The article abstract is transliterated into  
 Upwards' Cut Spelling<sup>1</sup> which takes the  
 removal of surplus letters as far as  
 possible. Like Yule's original version of  
 1981, it removes letters irrelevant to  
 pronunciation, but takes as far as  
 possible the removal of letters represent-  
 ing post-accentual schwa, substitutes <y>  
 for <ig> when pronounced as long <y>,  
 and uses <f> and <j> consistently for the  
 sounds they normally represent.

alphabets would have little practical chance in today's world of the international use of the roman alphabet, and simple phonemic spelling systems fail to meet the needs. Failing a brilliant international breakthrough to represent visual language, modifications to clean up the present system may be the most pragmatic approach, for example, deletions of surplus letters in words (but on what principles?), increasing consistency of a modified alphabetic principle and 'making English spelling more like Chomsky says it is, particularly by clearer morphemic relationships.<sup>12</sup> (See figures 1 and 2.) Improvements of the present roman-arabic alphanumeric system are also desirable to reduce confusability and increase legibility.

An essential task for research in spelling design is to find out how readers respond when they first meet novel spelling modes. Easy and rapid adjustment is important for practical reasons, so this must be ascertained before the introduction of any backwards-compatible modification of existing spelling, to avoid disruption of habits for those already literate. Yule and Greentree (1986) have compared readers' immediate responses to four possible types of spelling change.<sup>13</sup>

### **Predicting benefits of change**

There would certainly be benefits for writers and young learners if the spelling system bore a more consistent relationship to the spoken language, but it would be speculating to quantify these benefits in advance of the research to find this out. Such research might weigh the many factors involved and make informed guesses of the financial advantages. These would certainly far outweigh the costs of introduction of a modification such as, say Surplus-Cut spelling (*figure 2*), which could be brought in through dictionary acceptance as alternative spellings and through the technology of computerized printing. Hundred of words today already have alternative spellings and the simpler are winning out.

It is also important to investigate what long-term benefits there may be for the skilled reader, although efficiency developed over time is difficult to measure. At first, and for a period, skilled readers are likely to recognize faster whatever they have been reading since childhood rather than what is novel. That is, immediate reader-response is not sufficient evidence about whether a novel or modified spelling will be more efficient in the long run. Skilled readers may be slow to respond to even the most potentially beneficial change since their standard spelling repertoire has had thousands if not millions of presentations.

Writing systems are an essential element of modern communications technology, and English spelling is therefore a legitimate subject for research and development to improve it. Setting up such research faces problems. These include the definition of an 'optimum' spelling, and issues of models, methodology and experimental design. Barriers include unawareness of the importance of spelling for literacy, and ignorance of how improvements have been made in the writing systems of other modern languages. Empirical exploration has been prevented by the historic unquestioned assumptions of spelling reformers and their antagonists, such as that one-to-one sound-symbol correspondence . . .

The article abstract is transliterated into 'Surplus-Cut' spelling which omits letters surplus to representation of meaning or pronunciation. <qu> → <q> (=kw/), <ph> → <f>, soft <g> → <j>. The text undergoes a five percent reduction. Modifications could be extended to take account of considerations such as morphemic relationships, grammatical markers and the needs of international communication.

They have developed strategies to cope with faults in the present system. The majority of the population, who are less skilled readers, may show benefit more quickly because they have had less practice in that system. However, the skilled readers are also likely to have more versatile reading strategies and greater natural language skills that will enable them to also take advantage of improvements in the written representation of the language without any significant disruption.

The period of adjustment may be shorter than pessimists predict, although for some aspects longer than experiments can easily cover. Overseas examples of international reform and of other major orthographic changes this century demonstrate this. We can also observe how quickly new vocabulary enters a skilled repertoire and how rapidly it is possible to adapt to reading in unfamiliar languages and writing systems. We can observe the features of foreign spelling systems that English-speakers find most easy to comprehend for use in reading and speaking. And in spelling-modification experiments it can be seen what practice effects from experiments may be still operating in follow-up (e.g., Kolers, 1975).<sup>14</sup>

Another issue is the relationship of initial learning strategies to final skilled reading and writing. Most of the extensive existing research on the development of children's reading strategies assumes conventional English spelling and existing methods of teaching reading. Children learn to recognize logos before they can actually read the words in the sense of being able to recognize them in different print, so this stage is not an argument for believing that logographic recognition is how children can learn to read with linear letter-strings, since these soon become confusable without other means of differentiation. Research is now demonstrating not only that children with phonological skills learn to read sooner, but that other children can be shown how to develop those skills in pre-school language play. It is also clear that movement to automatic visual recognition takes place with reading practice, as words become familiar, regardless of initial strategies. But some understanding of the spelling system is still required for accurate reading of new vocabulary; and phonology is still involved in the short-term memory processes that enable us to retain in mind what we are reading long enough to follow its meaning from the beginning to the end of a sentence. The ideal spelling system would facilitate this flexibility in processing.

Methods of learning to read an alphabetic writing system have been influenced internationally by English-language methods of teaching

that have had to take unpredictable spelling into account.<sup>15</sup> Hence the unnecessary dreariness and distaste built up for phonics-based teaching and the attempts to use whole-word and guessing-by-context strategies instead. John Henry Martin's adaptation for American children of Paulo Freire's technique for teaching peasants to read is a forerunner of future possibilities for the teaching of reading with a more consistent spelling system.<sup>16</sup>

An orthography to meet all the different needs that have been labeled as 'dyslexia' would need to be proved against a range of perceptual and linguistic disabilities. There is growing evidence that the specific difficulties of dyslexics are a continuation of the difficulties of all beginners, which other learners in time overcome.<sup>17</sup> Long-term dyslexic status can result simply from unresolved initial confusions. This could be prevented by an initial spelling most suitable for learners that would merge into the orthography most suitable for skilled adults, along the lines pioneered by Martin's *Writing to read* program.

Fears are sometimes expressed that subjects who read modified spellings will become disadvantaged in their own conventional spelling—with examples cited of children who learned to read in the Initial Teaching Alphabet and then tended to spell phonetically because this continued to come more naturally. Research is needed to test whether, contrary to this fear, improved initial spelling might be of advantage to poor learners in enabling them to read conventionally when otherwise they might fail, because the initial spelling can lead directly into the underlying system for traditional spelling that they at present fail to comprehend. The Yule and MacKay experiment<sup>4</sup> suggested, though replication is required, that practice in reading Surplus-Cut spelling did help poor readers to read conventional spelling more easily.

Research is needed to follow-up learners of initial learning spellings beyond schooling into adulthood, to find whether their easier introduction to reading has facilitated their reading as adults. It is also plausible, but needs confirmation, that literate adults can 'switch spellings' in the same way they can switch to changes of font, lettercase or language. Research is required to establish whether Serbo-Croatians are really untroubled by their extreme form of diglossia. Certainly veteran spelling reformers have no difficulty in switching from everyday reading to reading in their own schemes; it has become an automatic process for them.

### **Existing sources of research evidence**

Findings of existing reading research could be applied and data re-analyzed from the new perspective of orthographic design. Yule's cross-disciplinary review of relevant research<sup>5</sup> indicates the extent of these untapped resources. More detailed studies are also needed of the effects of orthographies and orthographic reforms in other countries. In modern Korea, widespread illiteracy in the 1940s has given way to a claimed ninety-nine percent literacy rate, contemporary with the transition from Chinese script to a remarkably ingenious and original Korean orthography. How great was the contribution of this orthography to the dramatic improvement in literacy? Script reforms have also accompanied other dramatically successful literacy campaigns in other countries, such as Turkey, 1920s Russia and Indonesia, and their specific contributions to facilitating literacy should be assessed.

### **Problems of attitudes**

Some literate people feel that as far as they are concerned, spelling reform is undesirable, unnecessary and impossible. Some feel what the British Prime Minister, Harold Macmillan, said to the reforming journalist William Barkley, "You convince my head but not my heart. But you are surely right." I find that the less literate are usually enthusiastic—but they do not have a voice because they cannot read or write well enough.

Meddling in spelling can be regarded as risky by those who do not understand how it works. Our spelling is taken for granted like the air that is breathed once was, but most people are as ignorant about its nature and structure as they have been about the atmosphere. Spelling is often confused with the language itself, rather than recognized to be simply a tool to express language. Deliberate change is therefore expected to be deplorable and unsuccessful, since to meddle with the natural flowering of a living language is vain and impudent.<sup>18</sup>

A common belief is that the historical development of English spelling has been a natural phenomenon untouched by deliberate or accidental human agency. "Nature knows best" means that English spelling must have developed naturally to be the best possible. So-called natural forces in human affairs do not necessarily maximize what is most beneficial, or get rid of disadvantages without human aid. The most common forms in spelling and grammar are the most irregular, not because irregularity has been a progressive and helpful development, but because their constant use maintains their obsolete forms.

**I**n Nescioubia, 'a good many mathematicians admitted in theory the superiority of the Arabic system, but denied the possibility of its application to Nescioubian problems. Others, more independent, thought the change might very conceivably be advantageous, but declared that it should come about spontaneously, without concerted pressure from any self-constituted body. The Arabic numbers, apparently, were to silently steal in without anybody noticing them. Others still conceded that the substitution might perhaps be assisted by conscious effort on somebody's part (not their own) but stoutly maintained that it should be effected, if at all, very gradually, by the adoption, let us say, of one Arabic figure in a generation. The number nine, they thought, might be a good one to begin with, as it is written in two ways, IX and VIII, neither of them wholly convenient in complex computation.

Not all mathematicians, however, were so revolutionary. Some were convinced that the introduction would destroy at one blow the philo- sophic spirit of their science. How, they asked, could one speculate on the fourth dimension unless four were written IV? What impression would their beautifully elaborated deductions make if they were associated in the students' mind with a horrid Arabic 4? . . .

The conservatives began to be alarmed, especially the manufacturers of those ponderous tomes of numerical reference tables which the Roman notation renders indispensable. In self-defence they enlisted the services of an eminent pedagogue, who proved by a series of psychological experiments that children can perform long division more rapidly, more correctly, with less mental strain by the use of Roman numbers than by the use of Arabic . . .'

Excerpt from  
Charles Grandgent.  
1964. *Numeric  
Reform in  
Nescioubia.*  
Recreated from  
*Spelling Progress  
Bulletin*. 4:3, 5-6.

Grandgent's conservatives waxed even more eloquent on the threats to continuity of mathematical thought, and how, if we lost sight of the fact that four presented itself to the Roman mind as five minus one, we should be cut off from all contact with our ancestors . . .

## Reactions to innovation

Adults who have grown up accustomed to the appearance of English in print find any change at first either disturbing and irritating or a charming novelty. The human desire to preserve forms has a cementing effect in society that is generally positive, but sometimes stultifying. The fact that almost everything else in our society is changing rapidly makes it understandable but ironic that such a surface manifestation of our culture should remain so highly valued because it is visible, while deeper realms of a humane and rich civilization are being abandoned and even forgotten. Similar resistance, with varying degrees of success and persistence, occurs in almost every country with an established orthography when changes are mooted. For example, Indians reject the roman alphabet as an alternative, supplementary script for the many scripts now in use for Indian languages, although its use would solve many serious internal problems and facilitate international communication. There was a 500-year rearguard battle in the West to retain roman numerals in the face of the advantages of the innovation of arabic numbering. Yet the importance of efficient symbol systems is shown in the tremendous advances that only have been made possible in mathematics and industry by the adoption of arabic numerals instead of the clumsy classical roman system. Thinking may be blocked if graphemic symbols require too much central processing to operate on them.<sup>19</sup> While the satirical parable, Numerical Reform in Nescioubia,<sup>20</sup> imagines a society still dedicated to retaining the roman numerals (*figure 3*), Mark Twain's account of Spelling Reform in Ancient Egypt<sup>21</sup> (*figure 4*) extends the parable further into spelling.

Fear of the consequences of change may be justified. There has hardly been any invention intended to benefit mankind this century that has not been abused and even worsened the human condition in unexpected ways—explosives, nuclear power, pesticides, television, computers, modern drugs, the gasoline engine, irrigation, the green revolution—an endless list. What unforeseen consequences may result from the apparently harmless intention to promote international English and national literacy? The old scientific Luddites are not entirely to be dismissed. As a result of these attitudes and fears, while research and development of all other tools of modern communications technology thrive and are never labeled 'reform,' this quasi-political label has been applied to all research and development approaches to English spelling. While estimates of the amount of writing on reading in English this century ranges from 50,000 - 100,000 books and articles, the ERIC

**U**ncle Cadmus went to a fresh blackboard and wrote upon it in hieroglyphics: At this time the King possessed of cavalry 214,580 men and 222,631 horses for their use; of infantry 16,341 squadrons together with an emergency reserve of all arms, consisting of 84,946 men, 321 elephants, 37,264 transportation carts, and 28,954 camels and dromedaries.

It filled the board and cost him twenty-six minutes of time and labor. Then he repeated it on another blackboard in Italian script and Arabic numerals and did it in two minutes and a quarter . . .

Uncle Cadmus sat down, and the Opposition rose and combated his reasonings in the usual way. Those people said that they had always been used to the hieroglyphics, that the hieroglyphics had dear and sacred associations for them; that they loved to sit on a barrel under an umbrella in the brilliant sun of Egypt and spell out the owls and eagles and alligators and saw-teeth . . . and weep with romantic emotion at the thought that they had at most but eight or ten years between themselves and the grave for the enjoyment of this ecstasy.

Excerpt from Twain, Mark (Samuel Clemens). *Simplified Spelling in Ancient Egypt*. Recreated from *Spelling Progress Bulletin*, 15:3, 1975.

databases for 1976-1988 listed only eight items under 'spelling reform,' and these mostly dismissive. Some areas of reading research are now so heavily trodden that current books with hundreds of references each may share few in common dated after 1970—yet even large tomes on reading or literacy or even on reading problems often have no reference to spelling, orthography or writing system in their indexes.

The major practical difficulty in carrying out applied research in the past has been lack of colleagues and support. Because the necessity for human engineering in the design of all tools for communication is still not widely recognized, it has been difficult to find friendly facilities and access to volunteer subjects. Theoretical and experimental work in cognitive psychology and linguistics is now converging towards interest in the design of spelling. Foundations for more state-of-the-art research have already been laid in existing knowledge from these fields, as well as from education and the experiences of orthographic change in other languages. The problems of implementing improvements recommended by research are not insuperable since technology can now change over easily to using any new writing system, but it will require international cooperation, dictionary acceptance of alternative spellings, continued access to our heritage of print, retraining those already literate—although 'retraining' is possibly a chimera—finance and authorization for changes and the achievement of public acceptance. The major questions of political and social conditions for orthographic change also need to be understood.

If research into an efficient spelling system is a legitimate part of research and development of all tools for modern communication technology and international literacy, it will in turn offer a point of entry towards solving many of the puzzles still tantalizing scholars in the cognitive psychology of reading. None of these problems is insoluble, but some problems are easier than others. Yet repeatedly in science, breakthroughs at an impasse have been made by challenging and testing assumptions that appeared unassailable or were even invisible. Visionary pursuits have been an essential part of scientific method historically even if not in philosophical principle. And to rephrase Thurstone and other mountain-climbers, 'if a thing exists, someone will want to measure it, to evaluate it—and to improve it.' Orthographic improvement is now a lively area in discussion of language planning in other modern languages—even in French. International English spelling may not remain immune much longer.

The arguments to retain conventional spelling have changed over time, but their dynamic is still the psychological need to keep the appearance of what is familiar. As overseas experience shows, once a useful change has proved itself, it then becomes accepted and is the popular new fashion. Trends for change are accumulating. The precedents of overseas reforms predict that eventually a critical mass for reform will result from economic and political forces as the need for wider and more efficient communication and rationalization becomes overwhelming, or from the impetus of social change that is fueled by optimism for the future.

Even research that is conclusive may have no impact if the time is not ripe, but it is not always obvious when ripeness has arrived. Today power in communication is so concentrated that researchers may only be able to prepare what needs to be done and wait for economic or political pragmatism to lead events.

**Valerie Yule** is an honorary research associate and member of the faculty of education at Monash University. Formerly a clinical child psychologist, research psychologist and author working and teaching in Australian and British children's hospitals, disadvantaged schools and Aberdeen, Monash and Melbourne Universities, her special interests are the development of children's imagination, learning difficulties and the extension of literacy.

## Endnotes

1 For examples of research on the handicap of English spelling for beginning readers, see Thorstad, Gwenllian. 1991. The Effect of Orthography on the Acquisition of Literacy Skills. *British Journal of Psychology*, 82: 527-37, Thackray, D. 1980. Readiness to Read with i.t.a. and TO, London: Chapman. The International Association for the Evaluation of Educational Achievement is currently conducting a comparative investigation across 32 countries which should help to settle the issue. The present state of research findings is discussed in Upward's unpublished paper, Writing systems as a factor affecting literacy standards, from the International Reading Conference at Lancaster, September 1993.

2 See, for example, Postman, Neil. 1970. The Politics of Reading. *Harvard Educational Review*, 40:2, 244-252.

3 Miller, George. 1988. The Challenge of Universal Literacy. *Science*, 9 Sept. 1293-1259.

4 Yule, Valerie and MacKay, Ken. Practice Effects for Adults and Poor Readers Reading Text in a Modified Spelling. (Unpublished manuscript)

5 For further background to these and other issues discussed in this paper, see Sampson, Geoffrey. 1985. *Writing Systems*. London: Hutchinson. Also Yule, Valerie. 1986. The Design of Spelling to Match Needs and Abilities. *Harvard Educational Review*, 56:378-297.

6 There are further problems for experiments:

- The modality in which stimuli are presented is not necessarily the modality from which subjects will take information that is relevant for their task. Carr, T.H. 1986. Perceiving Visual Language, in K.R. Boff, L. Kaufman and J.P. Thoma, editors. *Handbook of Perception and Human Performance*. vol II. *Cognitive Processes and Performance*. New York: J. Wiley and Sons.
- Subjects in short-term memory tasks frequently give verbal labels to visual stimuli so that they could rehearse them. Conrad, R. 1964. Acoustic Confusion in Immediate Memory. *British Journal of Psychology*, 55: 75-84.
- Verbal reasoning tasks can be transformed into visual images in order to solve them. Huttenlocher. 1968. Constructing Spatial Image: A Strategy in Reasoning. *Psychological Review*, 75: 550-560.

Both verbal descriptions and visual pictures in sentence-picture verification tasks may be transformed to 'relatively abstract-semantic-propositional representations' so that they can be compared. Carpenter, P.A. and Just, M.A. 1975. Sentence Comprehension: A Psycholinguistic Model of Sentence Verification. *Psychological Review*, 82: 45-73.

- It is necessary but difficult to be sure that if subjects are set to decide questions of visual representations of stimuli, they do not resort to phonological or semantic recodings to do it, or vice versa. A lexical decision about whether a letter-string is a word is unlikely to use the same reading processes as a semantic response giving the meaning of the word presented which is closer to reading for meaning. A needed experiment is to use in text for silent reading the word-changes that can prime target words in masked-priming experiments, since it is possible that what is being taken as information about the nature of the mental lexicon may in some respects resemble what is grasped in skimming rather than noted in reading.

7 Elías-Oliveres, L. and Valdés. G. 1982. Language Diversity in Hispanic Speech Communities. In J.A. Fishman and G.D. Keller, editors. 1982. *Bilingual Education for Hispanic Students in the United States*. New York: Teachers College, Columbia University.

8 Stevenson, H.W., Stigler, J.W., Lucker, G.W., Lee, S-Y, Hsu, C-C. and Kitamura, S. 1982. Reading Disabilities: The Case of Chinese, Japanese and English. *Child Development*, 53: 1164-1181.

Stevenson, H.W. 1984. Orthography and Reading Disabilities. *Journal of Reading Disabilities*, 17: 296-301.

Stevenson, H.W., Stigler, J.W., Lucker, G.W., Lee, S-Y., Hsu, C-C. and Kitamura, S. 1985. Cognitive Performance and Academic Achievement of Japanese, Chinese and American children. *Child Development*, 56:718-734.

9 For examples of research paradigms used in a series of experiments in modified spellings and the range of relevant cross-disciplinary research that is relevant, see chapters 5, 6 and 9 in Yule, V. 1991. *Orthography and Reading: Spelling and Society*, doctoral thesis, Faculty of Education, Monash University, Australia. For examples of useful experimental designs in published research see Yule, Valerie and Greentree, Stephen. 1986b. Readers' Adaptation to

Spelling Change. *Human Learning*, 5: 229-241, which adapted John Beech's original method, and Upward, Christopher. 1992. Is Traditional English Spelling More Difficult Than German? *Journal of Research in Reading*, 15: 82-94.

10 Huey, E.B. 1908/1968. *The Psychology and Pedagogy of Reading*. Cambridge, Massachusetts: MIT Press. Kolers introduced the reprinting of Huey's work in 1968 with the admission that even after sixty years of further research in reading, there was "remarkably little empirical information added to what Huey knew."

11 Hitzenberger provides an example of how research in artificial intelligence may stimulate lateral thinking by suggesting ways in which reading could be done in his algorithm for phonological access to a telephone information system. Names are translated into a fairly narrow phonological representation, and from this form, all possible orthographic representations are generated — e.g., MAKE can generate MacKay, Mackie, McKay, Mackay, MacKie and McKie. This type of phonological grammar gives a very economic basis to generate codes, often deleting vowels and even consonants when they have a low functional load, and it suggests analogies for human coding in reading.

Hitzenberger's scheme involves indexes for words in data bases including the concrete orthographic string, the phonological string, a code and a further 'hash' code which can generate a key element when an algorithm is specified. Hitzenberger, L. 1987. Phonological Access to Data Bases in Luelsdorff, P.A., editor. 1987. *Orthography and Phonology*. Philadelphia: John Benjamins.

12 Yule, Valerie. 1978. Is There Evidence for Chomsky's Interpretation of English Spelling? *Spelling Progress Bulletin*, 18.4.10-12.

13 Yule, Valerie and Greentree, Stephen. 1986. Readers' Adaptation to Spelling Change. *Human Learning*, 5, 229-241.

14 For example, Kolers, Paul. 1975. Memorial Consequences of Automated Encoding. *Journal of Experimental Psychology*, HMM, 1 (6):689-701.

15 See, for example, Feitelson, Dina. 1988. *Facts and Fads in Beginning Reading: A Cross-language Perspective*. Norwood, New Jersey: Ablex Publishing Corp.

16 Freire, Paulo. 1974. *Education in the Practice of Freedom*. London: Writers and Readers Co-operative, and Martin, John Henry and Friedberg, A. 1986. *Writing to Read*. New York: Warner Books.

17 See Beech, John and Colley, Anne, editors. 1987. *Cognitive Approaches to Reading*. New York: Wiley.

18 These criticisms and those following are taken from a large collection of personal correspondence, 1968-1991.

19 Miller, George. 1956. The Magical Number Seven Plus or Minus Two: Some Limits on Capacity for Processing Information. *Psychological Review*, 63: 81-89. Another example of tenacity in clinging to symbol systems is the many years that British mathematicians lagged in progress behind Continental mathematicians who were using Leibnitz' calculus symbols, until the British finally and reluctantly changed over from Newton's older method.

20 Grandgent, C.H. 1964. Numeric Reform in Nesciubia. *Spelling Progress Bulletin*, 4:3, 5-6.

21 Twain, Mark (Samuel Clemens). Simplified Spelling in Ancient Egypt. reprinted in *Spelling Progress Bulletin*, 15:3, 1975.

#### Notes on Figures

Figure 1 Upward, Christopher. 1992. *Cut Spelling: A Handbook to the Simplification of Written English by Omission of Redundant Letters*. London: Simplified Spelling Society.

Figure 2 For details of theory and experimental investigations, see Yule, Valerie. 1991 *Orthography and Reading: Spelling and Society*, doctoral thesis, Faculty of Education, Monash University, Australia.



Department of Industrial Design  
The Ohio State University  
380 Hopkins Hall  
Columbus, Ohio 43210

*Visible Language*, 28:1  
Susan King Roth, 48-67  
©*Visible Language* 1994  
Rhode Island School of Design  
Providence, Rhode Island 02903



## **The Unconsidered Ballot:** How Design Effects Voting Behavior

Susan King Roth

The voting ballot forms the visual interface between the voter and the political system. It must quickly and clearly communicate information to a diverse public engaged in decision-making activities. Given the importance of voting to a democratic system of government and the need for equal access to information displayed on the ballot, it is interesting that more research in this area has not been conducted. While a search of the literature and government documents reveals some studies on voting system standards related to performance and security, very little is available on ballot design or the interaction between the voter and various systems.

A preliminary study on the effect of ballot interface design on voting behavior, supported by a grant from The Ohio State University, was conducted in February of 1993 in cooperation with appropriate election officials. Subjects were videotaped while voting on either a mechanical lever or electronic voting machine displaying a ballot from the 1992 presidential election in an experimental situation approximating that found in the polling place. Significant problems related to human factors and the organization of information on the ballot have been identified that merit further examination.

## **Background**

The right to vote is extended to all United States citizens eighteen years of age or older by the Constitution and its amendments. The voting age population is large and diverse, including all educational and economic levels and various ethnic groups. The design of voting systems requires careful consideration of the capabilities, characteristics and needs of the voting age public.

There are several different voting systems currently in use, ranging from punch cards to electronic voting machines. The ballot is the component of any voting system that displays information on candidates and issues and represents the visual interface between the election process and the voter. Information displayed must be legible, readable and easily understood in order to insure equal access to the political process and facilitate participation. In spite of the importance of voting system design, there is a lack of published research on the effect of ballot design on voting behavior or the interaction of voters with various systems.

A number of factors may contribute to this lack of research. Elections are held infrequently, and both equipment and ballot type (party-column vs. office-group ballot, for example) differ between states. Although federal law guarantees the right to vote, state and local election officials have control over the election process. Each state is divided into election districts or precincts and each district has a designated polling place. According to a 1990 Election Data Services summary report on voting equipment, there were 180,406 precincts in the United States within which approximately 121,000,000 people were registered to vote.<sup>1</sup>

Voting equipment is developed and marketed competitively by private contractors who deal directly with state and/or local election officials responsible for selecting machines for purchase. The purchase of voting

equipment is especially competitive in metropolitan areas with large numbers of voters. While state and local officials may be thorough and responsible in their evaluation of alternate systems, they must choose from systems made available by contractors.

The federal government has published recommended engineering and performance standards for some voting systems, but detailed federal standards regarding ballot layout and equipment design are not mandated. A feasibility report generated in 1984 by a panel of the National Clearinghouse of the Federal Election Commission identified the “. . . need to look at related human engineering standards, panelists stated that neither the manufacturer of voting systems nor most state and local election offices pay much attention to how the voter interacts with the various voting devices. . . Panelists stressed that standards should encompass such matters with an emphasis on ballot design and format.”<sup>2</sup> In 1990 the Federal Election Commission published *Voting Systems Standards for Punchcard, Marksense and Direct Recording Electronic Voting Systems* as a result of an extensive project authorized by Congress to develop performance and security standards for these newer systems. Compliance with the standards is voluntary, however, and they contain general rather than specific information on ballot design and human engineering. In the section entitled “Ballot Printing or Display,” the document states “. . . the allocation of space and the type fonts used for each office, candidate and contest shall be uniform, and that no active voting position shall be perceived by the voter to be preferred to any other.”<sup>3</sup> The document recommends that voting systems provide the maximum number of voting positions (at least 500) and consider requirements of the local jurisdiction, such as ballot rotation, state party voting, etc.

Details of the display of information on the ballot are the responsibility of state and local election officials. State codes may mandate minimum type size for candidate names or specify the width of ruled lines separating sections of the ballot, for example, but many state codes related to ballot format are based on the paper ballot system.<sup>4</sup> Paper ballots are used primarily in smaller districts where counting ballots can still be done by hand; less than ten percent, or approximately 17,400 voting precincts nationwide, used paper ballots as of 1990.<sup>5</sup>

In the area of human engineering, Voting System Standards recommends reference to military standards found in the 1981 document *ML-STD-1472: Human Engineering Criteria for Military Systems, Equipment and Facilities*.<sup>6</sup> This document contains anthropometric data listing human dimensions such as standing height, eye height, weight, etc.

## Description of the study

A study on the effect of ballot design on voting behavior was conducted in cooperation with the Franklin County Board of Elections and the Elections Administration of the Ohio Secretary of State's Office, supported by a grant from The Ohio State University. Information gathered from this preliminary study is relevant to the voting process in other states and indicates the need for further research on the interaction between the voter and voting systems to insure equal access to the political process.

Nineteen subjects were videotaped while voting on either a mechanical lever or electronic voting machine displaying a ballot from the last presidential election (November 1992) in an experimental situation approximating that found in the polling place on voting machines provided by the Franklin County Board of Elections.

## Voting equipment

The mechanical lever machine is operated by turning small metal levers positioned above or below selected candidates or issues. The ballot is printed on strips and inserted between metal brackets or frames in the appropriate position. (Ohio and about twenty-four other states<sup>7</sup> require ballot rotation to insure that no candidate is favored by position.) Selections can be changed on mechanical lever machines by moving levers back into place before the final vote is recorded. All selections made for each area of the ballot on election day are displayed as small numbers on "candidate and question counters" at the back of the machine, which are later read aloud and recorded by hand by election officers at the polling place. Mechanical lever machines are common in metropolitan districts with large numbers of voters (*see figure 1*).

The electronic voting machine, also described as a Direct Recording Electronic (DRE) vote recorder, is a device that ". . . records votes by means of a ballot display provided with mechanical or electro-optical devices that can be actuated by the voter, that processes the data by means of a computer program and that records voting data and ballot images in internal memory devices."<sup>8</sup> Votes are recorded for selected candidates and issues by "pressing touch-sensitive switches that are arrayed in 504 voting positions under the translucent ballot face."<sup>9</sup> Selections made by voters may be changed by pressing the same button again to deactivate it and making a new selection. Final selections are recorded by pressing a large "Vote" button at the bottom of the machine. The electronic machines are gradually replacing mechanical lever machines in large election districts. They are smaller and lighter in weight than mechanical machines and are easily lowered for wheelchair-bound

Figure 1

The mechanical lever machine used in the study.

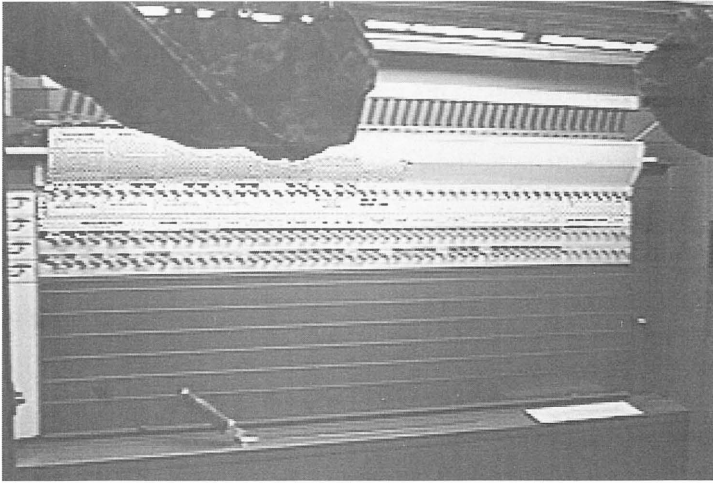
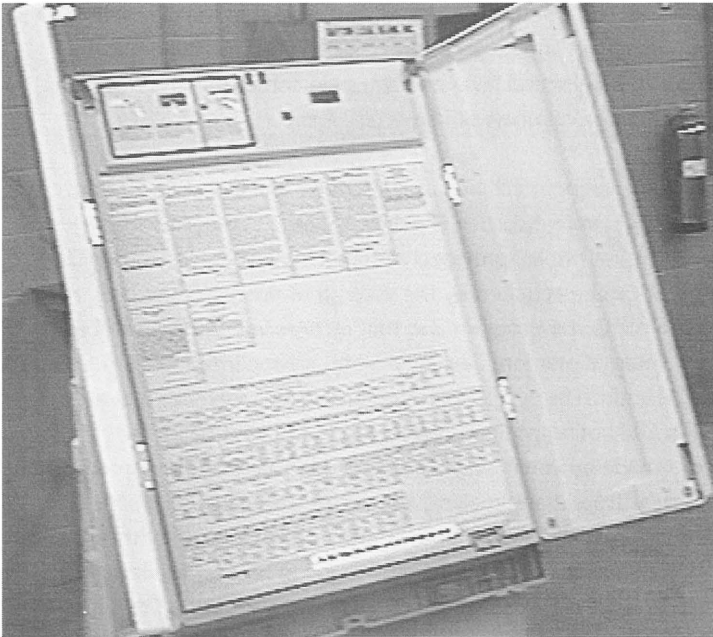


Figure 2

The electronic voting machine used in the study.



voters. Votes recorded on election day are tallied quickly and automatically by computer software programs. Electronic machines display an unobstructed ballot interface on a single sheet of paper—unlike the mechanical lever machine, there are no metal frames to hold ballot strips and no levers. The ballot for the electronic machine used in the study is generated by proprietary computer software and printed on a plotter (see figure 2).

### **Subjects**

Nineteen subjects ranging from 18 to over 75 years of age were selected at random. Nine, or 47 percent, were over age 65. They included members of minority (African-American) and ethnic groups (Vietnamese and Indian) and a large percentage of female subjects. Older subjects were located through a metropolitan senior center with a diverse population of daytime visitors. Educational levels ranged from less than twelve years to over two years of college education. Nine of nineteen subjects (47 percent) reported an educational level at or below 12th grade.

### **Research procedure**

Subjects were instructed to vote as they would normally and were limited to five minutes due to the Ohio state regulation that restricts voting to five minutes when lines are long at the polling place. (Ballots created for the general election in November of 1992 contained several presidential/vice presidential candidates including Bush/Quayle, Clinton/Gore and Perot/Stockdale, as well as numerous state and local issues.)

Voting activities were recorded by a stationary camcorder positioned behind the subject and directed at the ballot. It was explained to subjects at the outset that selections made on the ballot were not relevant to the study and would remain confidential, as would the identity of participants. The camcorder was relatively unobtrusive since it operated automatically in the background. Research assistants were available to answer questions about use of the equipment, as would be the case with poll workers in the polling place. This environment was intended to duplicate the natural situation as much as possible and avoid inhibiting subject activities.

Written questionnaires were administered in a separate room after voting was completed to gather information on age, sex, previous voting experience and other data such as whether subjects wore glasses (for close or distant vision). Specific questions were included to gather information pertaining to legibility and comprehension and open-ended questions included to solicit subject opinion on the voting process just

completed. An informal group discussion afterwards with all subjects present elicited additional comments.

### **Ballot design, legibility and readability**

Legibility is a term that appears often in the psychology, design and engineering literature. Reynolds uses the term to “encompass all factors in typography and layout which may influence the ease, speed and accuracy with which information can be read.”<sup>10</sup> According to McCormick and Sanders it is defined as “The attribute of alphanumeric characters that makes it possible for each one to be identifiable from the others. This depends on such features as stroke width, form of characters, contrast and illumination.”<sup>11</sup> Readability, a related concept, is the quality that describes the “recognition of the information content of material”<sup>12</sup> when the individual letters are arranged in words and sentences. Legibility and readability are greatly effected by spacing between lines, characters and words, width of margins, etc. Because the communication of written information also depends on the perceptual abilities of the viewer, visual acuity effects legibility. Visual acuity is the term used to describe the “ability of the eyes to differentiate between the detailed features of what we see, such as reading the fine print in an insurance contract . . .”<sup>13</sup> Tests of visual acuity include measurements of the smallest feature that the eye can detect. Visual acuity declines naturally with age. “Aging affects many aspects of visual function but the changes are primarily physiological and anatomical . . . in any of these changes there is a loss of sensory function that results in a decrement in performance as a person ages.”<sup>14</sup>

Type size affects legibility. Type size is primarily measured in points, and the point system is based on the measure of the type “body,” which is the block supporting the raised letterform in metal type. Because the point system is based on body size rather than size of the actual letter, various type styles of the same point size appear to be different. This is due to the “x-height” or height of the lowercase “x” used as a standard of measurement (*see figure 3*).

As Zachrisson states “The x-height of a letter varies considerably. There are some types which have a larger design in 10 point than others in 12 point, etc. It follows that the typographic measurement is not an exact one as far as the design goes . . .”<sup>15</sup>

Appropriate type size is related to viewing distance and the perceptual abilities of the reader. With older voters, the need for greater illumination and larger type size is increased. The American Association of Retired Persons notes in *Truth About Aging: Guidelines for Accurate Communications*

Figure 3

Text set in 10 point Helvetica type. Helvetica has a larger x-height and therefore appears larger.

Text set in 10 point Times type. Times has a smaller x-height and therefore appears smaller.

An example of 10 point text set in two type styles with differing x-heights.

---

“By age 65, virtually every person will suffer some loss in ability to focus, to resolve images, to discern colors and to adapt to light. Over sixty percent of those considered visually impaired are older persons.”<sup>16</sup> Sorg states that older subjects prefer text type set in either 14 point capital letters or 12 point upper and lower case type.<sup>17</sup>

Type size in Ohio is mandated at 12 points for candidate names listed on the ballot. This is within the range of legible type sizes for adults as determined by a number of research studies.<sup>18</sup> Type size in other areas, including the “Questions and Issues” section containing the greatest amount of text, is not mandated and in practice type may be reduced to fit the space available. In the ballot study, one subject over 65 years of age who voted for very few items on the ballot stated during the informal discussion that the type was “too small and some people may have difficulty reading it.” Other subjects mentioned the size of type and their need to get “really close” to read it. Whether this was due to type size or to a lack of visual acuity attributable to age or uncorrected vision is not known. It should be noted that thirteen out of nineteen subjects (68 percent) wore glasses and eight of the thirteen needed glasses for “close” vision according to answers they provided on the questionnaire.

A comparison of “Issues” text displayed on the electronic and mechanical voting machines (*figures 4.1 and 4.2*) reveals that text on the electronic ballot is set with more space between lines, making it somewhat easier to read than text on the mechanical lever ballot that is set with no extra line space. Design of the mechanical lever machine restricts the depth of space available for Issues text due to the position of metal frames that hold the ballot strips in place, while the electronic ballot permits Issues text to occupy more space. There is also greater letterspacing on the electronic ballot, reflecting the method of production (a plotter). Text in

Figure 4.1

Ballot Issue #2 as it appeared on the electronic voting machine during the November 1992 presidential election. Shown actual size.

**# 2 PROPOSED CONSTITUTIONAL AMENDMENT**  
**To amend Article V of the Ohio Constitution by the**  
**addition of new sections 8 and 9 as follows:**

Section 8: No person shall hold the office of United States Senator from Ohio for a period longer than two successive terms of six years. No person shall hold the office of United States Representative from Ohio for a period longer than four successive terms of two years. Terms shall be considered successive unless separated by a period of four or more years. Only terms beginning on or after January 1, 1993 shall be considered in determining an individual's eligibility to hold office.

Section 9: In determining the eligibility of an individual to hold an office in accordance with this article, (A) Time spent in an office in fulfillment of a term to which another person was first elected shall not be considered provided that a period of at least four years passed between the time, if any, in which the individual previously held that office, and the time the individual is elected or appointed to fulfill the unexpired term; and (B) A person who is elected to an office in a regularly scheduled general election and resigns prior to the completion of the term for which he or she was elected, shall be considered to have served the full term in that office.

If adopted by a majority of electors voting on this amendment, each provision of this amendment shall be deemed severable from the others, and a finding that a provision is invalid shall not affect the other provisions.

(Proposed by initiative petition)

A majority yes vote is necessary for passage.

**SHALL THE PROPOSED AMENDMENT BE ADOPTED?**

YES ----->

YES

NO ----->

NO

## **2**

### **PROPOSED CONSTITUTIONAL AMENDMENT**

To amend Article V of the Ohio Constitution by the addition of new sections 8 and 9 as follows:

**Section 8: No person shall hold the office of United States Senator from Ohio for a period longer than two successive terms of six years. No person shall hold the office of United States Representative from Ohio for a period longer than four successive terms of two years. Terms shall be considered successive unless separated by a period of four or more years. Only terms beginning on or after January 1, 1993 shall be considered in determining an individual's eligibility to hold office.**

**Section 9: In determining the eligibility of an individual to hold an office in accordance with this article. (A) Time spent in an office in fulfillment of a term to which another person was first elected shall not be considered provided that a period of at least four years passed between the time, if any, in which the individual previously held that office, and the time the individual is elected or appointed to fulfill the unexpired term; and (B) A person who is elected to an office in a regularly scheduled general election and resigns prior to the completion of the term for which he or she was elected, shall be considered to have served the full term in that office.**

**If adopted by a majority of electors voting on this amendment, each provision of this amendment shall be deemed severable from the others, and a finding that a provision is invalid shall not affect the other provisions.**

**(Proposed By Initiative Petition)**

Figure 5

Section of the electronic voting machine ballot used in the study (actual size of text area: 26 x 24 inches).

<p><b>#1 PROPOSED CONSTITUTIONAL AMENDMENT</b></p> <p><b>A AMENDMENT PROPOSED IN ARTICLE 16, SECTION 3 OF THE CONSTITUTION OF THE STATE OF OHIO, TO BE SUBMITTED TO THE ELECTORS IN THE GENERAL ELECTION OF NOVEMBER 3, 1993.</b></p> <p>Article 16, Section 3 of the Constitution of the State of Ohio, reads as follows:</p> <p>"At the general election to be held in the year one thousand nine hundred and thirty-two and in each twentieth year thereafter, the question: 'Shall there be a convention to revise, alter, or amend the constitution,' shall be submitted to the electors of the state; and in case a majority of the electors, voting for and against the calling of a convention, shall decide in favor of a convention, the general assembly, at its next session, shall provide, by law, for the election of delegates, and the assembling of such convention, as is provided in the preceding section; but no amendment of this constitution, agreed upon by any convention assembled in pursuance of this article, shall take effect until the same shall have been submitted to the electors of the state, and adopted by a majority of those voting thereon."</p> <p>A majority yes vote is necessary for passage.</p> <p><b>SHALL THERE BE A CONVENTION TO REVISE, ALTER, OR AMEND THE CONSTITUTION OF THE STATE OF OHIO?</b></p> <p>YES -----&gt; <input type="checkbox"/> YES</p> <p>NO -----&gt; <input type="checkbox"/> NO</p>	<p><b>#2 PROPOSED CONSTITUTIONAL AMENDMENT</b></p> <p>To amend Article V of the Ohio Constitution by the addition of new sections 8 and 9 as follows:</p> <p>Section 8: No person shall hold the office of United States Senator from Ohio for a period longer than two successive terms of six years. No person shall hold the office of United States Representative from Ohio for a period longer than four successive terms of two years. Terms shall be considered successive unless separated by a period of four or more years. Only terms beginning on or after January 1, 1993 shall be considered in determining an individual's eligibility to hold office.</p> <p>Section 9: In determining the eligibility of an individual to hold an office in accordance with this article, (A) Time spent in an office in fulfillment of a term to which another person was first elected shall not be considered provided that a period of at least four years passed between the time, if any, in which the individual previously held that office, and the time the individual is elected or appointed to fulfill the unexpired term, and (B) A person who is elected to an office in a regularly scheduled general election and resigns prior to the completion of the term for which he or she was elected, shall be considered to have served the full term in that office.</p> <p>If adopted by a majority of electors voting on this amendment, each provision of this amendment shall be deemed severable from the others, and a finding that a provision is invalid shall not affect the other provisions.</p> <p>(Proposed by Initiative petition)</p> <p>A majority yes vote is necessary for passage.</p> <p><b>SHALL THE PROPOSED AMENDMENT BE ADOPTED?</b></p> <p>YES -----&gt; <input type="checkbox"/> YES</p> <p>NO -----&gt; <input type="checkbox"/> NO</p>	<p><b>#3 PROPOSED CONSTITUTIONAL AMENDMENT</b></p> <p>To amend Article II, Section 2 of the Ohio Constitution by the addition of the following paragraph:</p> <p>No person shall hold the office of State Senator for a period longer than two successive terms of four years. No person shall hold the office of State Representative for a period longer than four successive terms of two years. Terms shall be considered successive unless separated by a period of four or more years. Only terms beginning on or after January 1, 1993 shall be considered in determining an individual's eligibility to hold office.</p> <p>In determining the eligibility of an individual to hold an office in accordance with this article, (A) Time spent in an office in fulfillment of a term to which another person was first elected shall not be considered provided that a period of at least four years passed between the time, if any, in which the individual previously held that office, and the time the individual is elected or appointed to fulfill the unexpired term, and (B) A person who is elected to an office in a regularly scheduled general election and resigns prior to the completion of the term for which he or she was elected, shall be considered to have served the full term in that office.</p> <p>If adopted by a majority of electors voting on this amendment, each provision of this amendment shall be deemed severable from the others, and a finding that a provision is invalid shall not affect the other provisions.</p> <p>(Proposed by Initiative petition)</p> <p>A majority yes vote is necessary for passage.</p> <p><b>SHALL THE PROPOSED AMENDMENT BE ADOPTED?</b></p> <p>YES -----&gt; <input type="checkbox"/> YES</p> <p>NO -----&gt; <input type="checkbox"/> NO</p>								
<p><b>#51 PROPOSED TAX LEVY</b></p> <p><b>HILLIARD CITY SCHOOL DISTRICT</b></p> <p>A Majority Affirmative Vote is Necessary for Passage</p> <p>An additional tax for the benefit of the Hilliard City School District for the purpose of <b>CURRENT EXPENSES</b></p> <p>at a rate not exceeding four and nine-tenths (4.9) mills for each one dollar of valuation, which amounts to forty-nine cents (49¢) for each one hundred dollars of valuation, for a continuing period of time.</p> <p>FOR The Tax Levy -----&gt; <input type="checkbox"/> YES</p> <p>AGAINST The Tax Levy -----&gt; <input type="checkbox"/> NO</p>										
<p><b>PRESIDENT AND VICE PRESIDENT OF THE UNITED STATES</b></p> <p>A Vote for President is a vote for Vice President and the presidential electors representing each.</p> <p>(Vote not more than ONE)</p> <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>GEORGE BUSH</b> and <b>DAN QUAYLE</b>  <small>Republican</small> </td> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>BILL CLINTON</b> and <b>AL GORE</b>  <small>Democratic</small> </td> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>LINDA B. FULANI</b> and <b>MARIA ELIZABETH MUNOZ</b> </td> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>JOHN HAGELIN</b> and <b>VINTON TOMPKINS</b> </td> </tr> <tr> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>LYNDON H. LAROUCHE, JR.</b> and <b>JAMES L. BEVEL</b> </td> <td style="width:25%; border: 1px solid black; padding: 2px;">                 President and Vice President  <b>ANDRE MARROU</b> and <b>NANCY LORD</b> </td> <td colspan="2"></td> </tr> </table>			President and Vice President <b>GEORGE BUSH</b> and <b>DAN QUAYLE</b> <small>Republican</small>	President and Vice President <b>BILL CLINTON</b> and <b>AL GORE</b> <small>Democratic</small>	President and Vice President <b>LINDA B. FULANI</b> and <b>MARIA ELIZABETH MUNOZ</b>	President and Vice President <b>JOHN HAGELIN</b> and <b>VINTON TOMPKINS</b>	President and Vice President <b>LYNDON H. LAROUCHE, JR.</b> and <b>JAMES L. BEVEL</b>	President and Vice President <b>ANDRE MARROU</b> and <b>NANCY LORD</b>		
President and Vice President <b>GEORGE BUSH</b> and <b>DAN QUAYLE</b> <small>Republican</small>	President and Vice President <b>BILL CLINTON</b> and <b>AL GORE</b> <small>Democratic</small>	President and Vice President <b>LINDA B. FULANI</b> and <b>MARIA ELIZABETH MUNOZ</b>	President and Vice President <b>JOHN HAGELIN</b> and <b>VINTON TOMPKINS</b>							
President and Vice President <b>LYNDON H. LAROUCHE, JR.</b> and <b>JAMES L. BEVEL</b>	President and Vice President <b>ANDRE MARROU</b> and <b>NANCY LORD</b>									
<p><b>REPRESENTATIVE TO CONGRESS</b> (15th District)</p> <p>(Vote for not more than ONE)</p>	<p><b>STATE SENATOR</b> (16th District)</p> <p>(Vote for not more than ONE)</p>	<p><b>STATE REPRESENTATIVE</b> (29th District)</p> <p>(Vote for not more than ONE)</p>	<p><b>COUNTY COMMISSIONER</b> (Full Term Commencing 1-2-93)</p> <p>(Vote for not more than ONE)</p>	<p><b>COUNTY COMMISSIONER</b> (Full Term Commencing 1-3-93)</p> <p>(Vote for not more than ONE)</p>						
<p><b>DEBORAH PRYCE</b> <input type="checkbox"/> <b>LINDA REIDELBACH</b> <input checked="" type="checkbox"/></p> <p><small>Republican</small> <small>Democrat</small></p> <p><b>RICHARD CORDRAY</b> <input checked="" type="checkbox"/> <b>WRITE-IN</b> <input type="checkbox"/></p> <p><small>Democrat</small></p>	<p><b>BONNIE MICHAEL</b> <input type="checkbox"/> <b>KEVIN L. SHOEMAKER</b> <input checked="" type="checkbox"/></p> <p><small>Democrat</small> <small>Democrat</small></p> <p><b>EUGENE WATTS</b> <input type="checkbox"/> <b>WILLIAM SCHUCK</b> <input checked="" type="checkbox"/></p> <p><small>Republican</small> <small>Republican</small></p>	<p><b>HUGH DEMOSS</b> <input checked="" type="checkbox"/> <b>MARYELLEN O'SHAUGHNESSY</b> <input checked="" type="checkbox"/></p> <p><small>Democrat</small> <small>Democrat</small></p> <p><b>ARLENE SHOEMAKER</b> <input checked="" type="checkbox"/> <b>DOROTHY TEATER</b> <input checked="" type="checkbox"/></p> <p><small>Republican</small> <small>Republican</small></p>								
<p><b>COUNTY ENGINEER</b> (Vote for ONE)</p>	<p><b>CORONER</b> (Vote for not more than ONE)</p>	<p><b>STATE BOARD OF EDUCATION</b> (6th District)</p> <p>(Vote for not more than ONE)</p>	<p><b>CHIEF JUSTICE OF THE SUPREME COURT</b> (Full Term Commencing 1-1-93)</p> <p>(Vote for not more than ONE)</p>							
<p><b>JOHN CIRIOLE</b> <input checked="" type="checkbox"/></p> <p><small>Republican</small></p>	<p><b>WILLIAM R. ADRIEN</b> <input checked="" type="checkbox"/> <b>PATRICIA SMITH</b> <input checked="" type="checkbox"/> <b>SUE ANN NORTON</b> <input checked="" type="checkbox"/></p> <p><small>Republican</small> <small>Democrat</small> <small>Democrat</small></p> <p><b>MICHAEL M. ALEXANDER</b> <input checked="" type="checkbox"/> <b>MARIE S. PFEIFFER</b> <input checked="" type="checkbox"/></p> <p><small>Democrat</small></p>	<p><b>THOMAS J. MOYER</b> <input checked="" type="checkbox"/> <b>ROBERT H. GORMAN</b> <input checked="" type="checkbox"/></p> <p><small>Democrat</small> <small>Democrat</small></p> <p><b>J. ROSS HAFFEY</b> <input checked="" type="checkbox"/></p> <p><small>Democrat</small></p>								

both cases is smaller than that used for candidate names elsewhere on the ballot.

The presentation of information on the ballot appeared to influence voting order, which is the sequence or pattern of selections made. The electronic ballot (*see figure 5*) produced greater voter response and a more orderly pattern of voting than the mechanical lever ballot.

When using the electronic ballot, the majority of subjects started at the upper left corner and voted across each row before moving down and proceeding again from left to right in a regular pattern, ending at the lower right corner. This produced a sequence that began with Issue 1 and ended with candidates for Judge of the Court of Common Pleas. The electronic voting machine used in the study displayed flashing red lights which appeared in each area on the ballot containing candidates or issues. Making a selection terminated the light's flashing, leaving a steady red light indicating that activity in the area had been completed. One subject mentioned that the flashing lights prompted her to continue voting and kept her from "getting lost." Another felt the flashing red lights contributed to the tension and pressure to vote quickly, but seven out of ten subjects (70 percent) using this machine found the flashing lights "very useful" or "useful" as recorded on the questionnaire.

In terms of voting order, eight of ten subjects (80 percent) using the electronic machine began with the Issues section, one initiated activity in the candidate section and one appeared to vote randomly. By contrast, only three out of nine subjects (33.3 percent) using the mechanical lever machine began with the Issues section and 44 percent initiated voting with the presidential candidate position below the Issues section and the remaining subjects voted in a random pattern. In terms of voting speed, subjects spent about one minute less (an average of 2 minutes, 54 seconds) voting on the mechanical lever machine than those using the electronic machine (3 minutes, 59 seconds).

### **Visibility and human factors**

While type size and ballot layout were identified at the outset as factors to be examined in the preliminary study, equal access to information was an unexpected but significant problem on the mechanical lever machine. The Issues section of the ballot was positioned far above eye level for some subjects.

Some female subjects were observed to stand several inches below the Issues text on the ballot. The height of the top of the Issues insert was 67

Figure 6

Subject who commented, "I did not see any issues." Black arrow indicates the display height of Issues text on the mechanical lever ballot and white arrow indicates eye level of the subject.



Figure 7

A second subject relative to display height of Issues text on the mechanical lever ballot. Black arrow indicates the display height of text and white arrow indicates eye level of the subject.



inches. A review of published anthropometric data obtained by measuring and recording human dimensions provides a context for examining this finding. Anthropometric data are often organized into the 5th, 50th and 95th percentiles, with the majority of the population falling within the 50th percentile. The five percent at the bottom and top represent smaller and larger dimensions respectively. According to Woodson, Tillman and Tillman, male eye height in the 50th percentile is 64.7 inches and female eye height is 60.3 inches.<sup>19</sup> The eye height of adult males in the 5th percentile is 60.8 inches, while females in this percentile have an eye height of 57.3 inches. Eye height is even lower for females over 70 years of age — only 50.8 inches. This is significantly less than the display height of the Issues text on the mechanical lever machine.

In addition to gender and age, ethnic group also influences height. Woodson, Tillman and Tillman cite studies of Chinese, Filipino, Thai and Vietnamese males that produced an average standing height of 63.14 to 65.51 inches.<sup>20</sup> Given the “rule of thumb” for determining eye height when only standing height is known (e.g., eye height is approximately 5.2 inches lower than standing height for males) the eye height for men in these groups would range from 57.94 to 60.31 inches—similar to the range for US females and males in the 5th percentile. It can be assumed that the eye height of females from these ethnic groups would be less than that of males due to gender differences. In the ballot study a young female subject of Asian origin (who was observed on tape to be at the low end of the height range) was asked to describe the first four ballot issues in her own words on the questionnaire. She responded: “I did not notice any ‘questions and issues.’ I only vote for candidates . . .” Figure 6 is a single frame taken from the videotape of this subject engaged in voting activities, and demonstrates the difference between eye level and the display height of the “Issues” section on the ballot. Figure 7, a single frame taken from the videotape of another subject, demonstrates that the problem of display height is not unique. In fact, of the four subjects who did not vote on the Issues, every one was at the low end of the range for height. All four subjects were female; one was of Asian heritage and a member of the youngest age group while three were elderly African-Americans.

Women outnumber men in the elderly population and many have a lower standing height. Metropolitan districts with large numbers of voters (districts that often use mechanical lever machines) may also contain members of various ethnic groups. These two groups—elderly women and voters of ethnic origin—may be represented disproportionately in the 5th percentile for height. According to Kroemer, “If one designs, for

example, to fit persons between the 5th and 95th percentile, one knows that this design will fit the central ninety percent, but it is too large for five percent and too small for another five percent of the intended user population.”<sup>21</sup>

Interestingly, subjects of lower height as determined by viewing the tapes did not mention any problem related to display height when responding to open questions on the questionnaire. Informally, a few mentioned in a follow-up conversation that the Issues were “too high” on the mechanical lever machine. The reason this relevant information was not mentioned on the questionnaire is unknown. It is possible that subjects did not consider display height to be a problem with design of the ballot but a personal problem. Donald Norman makes the observation that people who have been studied while making errors with the operation of machinery, word processors or other designed objects “. . . feel guilty and either try to hide the error or blame themselves for ‘stupidity’ or ‘clumsiness’. . . I point out that the design is faulty and that others make the same mistake . . . Still, if the task appears simple or trivial, then people blame themselves.”<sup>22</sup>

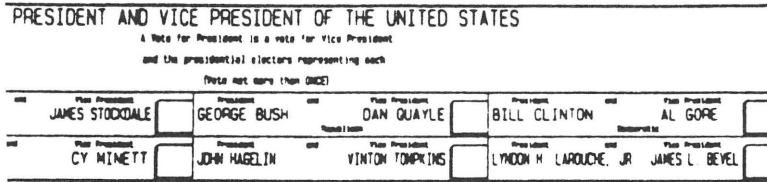
As stated before, four out of nine subjects (44 percent) assigned to the mechanical lever machine in the ballot study did not vote at all in the Issues section of the ballot, while only one of ten subjects (10 percent) using the electronic voting machine, which displays text at a lower height, did not vote in this section. This suggests that information displayed on the mechanical lever machine at a height above eye level for some subjects may decrease response.

### **Ambiguity and the display of information**

Another significant finding in the study was the fact that information displayed on the “Presidential/Vice Presidential Candidate” section of the ballot on the electronic voting machine was ambiguous so that it was not always clear which name was associated with the corresponding button. Such ambiguity could be avoided by reorganizing the display of information on this section of the ballot based on a consideration of principles of visual perception and effective information design.

For example, the paper ballot on the electronic machine contains areas of text divided by lines of varying width, with drawn square “buttons” placed over the 504 voting positions on the underlying electronic grid. Buttons on the electronic ballot were ambiguously positioned relative to candidate names. In one ballot rotation, the name of George Bush was positioned in close proximity to the right of one button and the name of

Figure 8



Partial view of the Presidential/Vice Presidential Candidate section from the electronic voting machine ballot in one of its rotations (November 1992). Note the position of drawn buttons equidistant between the names of opposing presidential/vice presidential candidates.

James Stockdale (Vice Presidential Candidate for H. Ross Perot) was located equally close to the same button on the left side with a thin line separating candidate boxes. A similar situation applied to the positioning of Presidential Candidate “Bill Clinton” and “Dan Quale” (George Bush’s Vice Presidential Candidate) and H. Ross Perot and Nancy Lord (Andre Marrou’s Vice Presidential Candidate).

This ambiguous presentation of visual information probably did not favor any particular candidate in this case, but the potential for confusion and error exists (*see figure 8*). Three of the subjects participating in the ballot study mentioned this on the written questionnaire. One stated, “The square next to Clinton’s name was for the other candidate to the left. The square for Clinton was to the right.” Another responded “It seemed that the buttons were closer to the adjoining candidate. I tend to vote by president’s name, but the correct button was closer to the vice president’s name.” Perceptually, there is a tendency to group visual elements that appear close together or in proximity. One of the rules of visual perception established by the Gestalt school of psychology concerns grouping by proximity. “The Law of Proximity states that the relative closeness of some units to each other as compared to others at a greater distance will cause the closer elements to be seen together as a new entity.”<sup>23</sup>

### Comprehension and “plain English”

Issues appearing on the ballot may be written in language that is unfamiliar or confusing to voters. Suggestions for the use of “plain English” in government documents have been made in the past. For example, in 1978 President Carter signed an executive order requiring that contracts generated by executive agencies must be “as simple and clear as possible, written in plain English and understandable to those who must comply

with it.”<sup>24</sup> Some effort in this area was continued by the Reagan administration. Broadbent<sup>25</sup> indicates that informational materials may be most effectively posed in the active, affirmative mode, while the passive, negative mode, should be avoided. Some subjects stated that issues were hard to understand or confusing. One subject felt a need to be sure when voting for or against an issue, stating that in the area of ballot issues, the “wording has a lot of negatives.” The use of “plain English” on the ballot is especially important for voters with lower literacy or education levels and for those for whom English is a second language.

### **Significance of the study**

Approximately one-half to three-quarters of the total voting age population votes in presidential elections. The ballot provides the visual interface between the voting system and the voter. It would not be an overstatement to suggest that factors that interfere with reading or comprehension of information on the ballot could have a significant impact on the voting process, perhaps leading to inaccurate election results or discouraging voter participation.

According to *Vital Statistics on American Politics*, 68 percent of the voting age population over 65 reported voting, compared to 33 percent of the 18-20 year old population,<sup>26</sup> making clear the need to present information with consideration of the special characteristics of older voters. As the elderly population grows in the future, design that includes this segment of the public will become even more important. Koncelik, examining the changing composition of the population and the impact this will have on design practice, notes: “In America, our current proportion of those over 65 is at 12.5 percent and is estimated to increase to 20 percent to 25 percent between 2030 and 2050.”<sup>27</sup>

### **Summary observations**

Factors related to characteristics of the entire voting age population, including the elderly, women and certain ethnic groups, needs careful consideration during the design and evaluation of voting systems.

Effective visual organization and the clarity of information displayed on the ballot are important criteria for any voting system and design guidelines for election officials should address these concerns beyond the generalized recommendations that now exist. Attention to type size, type style and text setting that is legible and easily read by all members of the voting age population is important. Rules addressing the appropriate placement of candidate names with corresponding buttons and the correct display height of ballot text should be included in these guide-

lines. If necessary, state codes that mandate ballot format should be updated to include newer voting systems and a sensitivity to the needs of special populations. And there should be a renewed effort to further simplify and standardize ballot language at the national level, to insure use of written language that is comprehensible and familiar to the greatest number of voters.

Local and state election officials responsible for purchasing voting systems and creating ballots for each election are forced to work within constraints dictated by available equipment. The Federal Election Commission's 1990 *Voting System Standards* addresses this issue by suggesting that designers of newer systems follow recommended standards found in *ML-STD-1472: Human Engineering Design Criteria for Military Systems, Equipment and Facilities* with reference to visual displays, anthropometric data, etc. However, since anthropometric data in *ML-STD-1472* is derived from U.S. Army, Marine, Navy and Airforce men and Army and Airforce women, it is possible that men and women over age 65 and many of those within the 5th percentile in the general population may not be included in this select group (no age was specified in the data). Data found in *ML-STD-1472* lists the standing eye height of three groups in the 5th percentile of those measured as 59.5 inches and 59.9 inches for male "ground troupes" and "aviators," respectively, and 55.5 inches for "women" with no occupation specified.<sup>28</sup>

The authors of *Voting System Standards* further suggest that designers of voting systems extend the criteria found in this military source to accommodate special users and conform with the spirit of the Voting Accessibility for the Elderly and Handicapped Act of 1984.<sup>29</sup> The intent of this act as written is to "improve access for handicapped and elderly individuals to registration facilities and polling places for Federal elections."<sup>30</sup> In addition to physical access, members of these groups are to be given *access to instructions printed in large type* that are conspicuously displayed at each facility and provided with information on absentee voting. Although the intent of the Act is to improve access to the voting process for the handicapped and the elderly (those 65 years of age or older), it does not specifically address accessibility to printed information displayed on the voting ballot.<sup>30</sup>

More complete information on the human use of voting systems based on a large representative sample of the voting age population, including those in the 5th percentile for height and those over 65 years of age, would provide a strong foundation for designing and evaluating voting systems that insure equal access to the democratic process for all voters.

Considering the significance of issues raised, it is hoped that this preliminary study will encourage further research. As Landgraf notes "The first step toward creating products that provide a valuable benefit to users is understanding performance needs from the users' perspective. Until we understand what the user considers valuable in a product, we will only be speculating . . . what needs exist."<sup>31</sup> An article titled Inclusion by Design in a recent issue of *I.D. Magazine*, part of a report submitted to President Clinton by a team of leading designers, called for a review of design in government with consideration of the diversity of the US population. "Government can take the lead by using inclusive design principles to promote and encourage civic and political participation. The materials government uses to interact with the people should not be hard for the ordinary citizen to read, use or understand."<sup>32</sup> One specific suggestion was that designers and government work together to "apply a new initiative in public information design to such projects as . . . modernizing and redesigning voting machines." There is a clear need to do so, and it is hoped that issues raised by this preliminary study will be addressed by any future effort in this direction.

**Susan King Roth** is associate professor of visual communication design in the Department of Industrial Design at The Ohio State University. She has a BFA from The Cooper Union for the Advancement of Science and Art and an MA from The Ohio State University. Formerly Director of Graphics for the New York City Parks, Recreation and Cultural Affairs Administration, she practiced design and taught at The School of the Art Institute of Chicago before joining the design faculty at The Ohio State University. She has been involved in design research since 1988. She is co-founder and co-director of the Center for Interdisciplinary Studies in Art and Design at OSU and is a consulting editor of the *Journal of Visual Literacy*.

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# Blind Eyes, Innuendo and the Politics of Design

A Reply to Clive Chizlett

Robin Kinross

The foundations of Clive Chizlett's arguments in his article, *Damned Lies*, are contested. Against the notion that Otto Neurath was a communist and an agent of Soviet propaganda, the facts of Neurath's political commitment are set out. In his life and work, Neurath was a democratic socialist, committed to the ideals of open discussion. Much of Chizlett's case rests on W.W. Bartley's book, *Wittgenstein*, which is shown to be a flawed source. The claim that Neurath borrowed ideas from Willard Brinton is shown to be trivial and equally without foundation. Chizlett's view of graphic information rests on the view that it is either hard science or pure art. This dichotomy prevents an understanding of his subject.

In his article *Damned Lies* (*Visible Language*, 26: 3/4) Clive Chizlett makes some grave claims about the work of Otto Neurath and his associates. These require a detailed response.

First, one can observe that Chizlett relies almost exclusively on second- or third-hand sources for his evidence. Extensive selections of the writings of Otto Neurath are in print and an archive of Isotype work exists and can be consulted.<sup>1</sup> I am surprised that an article which so resolutely turns a blind eye to evidence could come to be published in a serious journal. Chizlett's essay is so riddled with wild claims—and with tough assertions extrapolated from these claims—that it is hard to know where to begin with a response. I will start with a set of accusations drawn from one source.

### **William Warren Bartley III and rumor**

Chizlett makes three claims on the basis of remarks in William Warren Bartley's biographical essay, *Wittgenstein*. These are: that "Neurath was, for a short time, an active member of the revolutionary Spartacist Party which governed Munich for a few months during the year 1919" (page 301); that Neurath "visited Moscow in 1930-31 to try to persuade Stalin to adopt physicalism (Neurath's personal variant of logical-positivism) as the official form of scientific, materialist, analytical philosophy to be followed by all straight-thinking Marxist-Leninists" (page 305); that Neurath "purported to believe that the picture-theory of thought proposed in Wittgenstein's book, *Tractatus*, endorsed the picture-based internationality of the Isotype system" (page 315).

Bartley provides no sources or evidence for these statements. Given the controversy that Bartley's book has provoked in its description of Wittgenstein's sexual life, Chizlett would have done well to treat these assertions with caution. A calm dissection of Bartley's use of evidence has been

written by Ray Monk, Wittgenstein's most recent biographer.<sup>2</sup> But the discussion that follows here is based on published sources and on notes that I made on an exchange of letters between Bartley and Marie Neurath in 1974.<sup>3</sup>

In the years under discussion, Otto Neurath was a democratic socialist; before this time one might characterize him as a liberal. I do not know of any good evidence to suggest that he was ever a member of any communist party. His commitment to democratic-socialist ideas was so public and so prolonged that no one, apart from a few badly informed commentators, has ever suggested anything else. Let me quote from a letter that Marie Neurath wrote to the *Times Literary Supplement* (18 January 1980) in reply to a reviewer's suggestion (evidently derived from Bartley's book) that Neurath had been a Spartacist: "Otto Neurath belonged to no political group at all when he was young. He was never a Spartacist. He joined the Social Democratic Party when he was in his mid-thirties [around 1918]. He never became a member of any other party."

At the end of the First World War and in the months of revolution in Russia and in Eastern and Central Europe, Neurath joined the Social Democratic Party in Germany.<sup>4</sup> He went to Munich as a civil servant, working in the Central Planning Office for the Social Democratic government in Bavaria. When a "soviet republic" was declared there, he stayed on, to try to carry through the project of "socialization."<sup>5</sup> After the brief civil war in Bavaria and the victory of conservative forces, Neurath was arrested, tried and sent back to Austria.

In Neurath's own writings and in accounts of him by those who knew him, one encounters an independent thinker, outside any orthodoxy and not ashamed or afraid to adopt untimely ideas. He was a utopian thinker, but also a pragmatist who wanted to be involved in practical projects. So he was drawn to difficult and dangerous adventures, as in Munich and the Soviet Union. In his chilly prosecuting-counsel manner, Chizlett insinuates that Neurath was a party-member, a straight-thinking Marxist-Leninist and an agent of the Comintern. This is a delusion.<sup>6</sup>

Now, turning to the story about Stalin: Marie Neurath, who worked with Neurath from 1925 onwards, contested it in her correspondence with Bartley. She wrote: "he would never have wished or attempted to see Stalin; he would never have wished or attempted to introduce something like 'physicalism' by political means." Bartley replied that the story came from Karl Popper and may have been a joke, and that Popper may have taken it seriously. Chizlett uncritically swallows a possible joke, which

Popper may have taken seriously and which Bartley used to spice his narrative.

Marie Neurath did not contest the third story from Bartley about Otto Neurath's invocation of Wittgenstein. There is nothing in print to support Bartley's assertion, and given Neurath's distance from and reservations about Wittgenstein's ideas, there is no reason to suppose that he should have claimed that they supported his Isotype work.

Having mentioned Karl Popper, this is the point at which to dispose of another of Chizlett's fancies. Popper had no "colleagues in the Vienna Circle" (page 313). When he came to write his memories of Neurath, Popper wrote: "I myself was never a member of the Circle, though Neurath used to describe me as the Circle's 'official opposition'."<sup>7</sup> Popper ended these memories of Otto Neurath thus: "Yet though we had disagreed so deeply about so many and so important matters, I shall always feel that he was one of the strongest personalities I ever met; a real original thinker and an undaunted fighter who dreamt of a better and more humane world."<sup>8</sup> As to the "bitterness and hostility" (page 313) with which Neurath reacted to Popper's theory of falsification, one can notice that Chizlett's source is the book that seems to have provided much of his knowledge of philosophy: John Passmore's *A Hundred Years of Philosophy*. If he had read Neurath's main discussion of Popper, Chizlett might have been persuaded to take off his blinkers and see that it is an open disagreement, without bitterness or hostility and largely sticking to philosophical issues.<sup>9</sup> Marxism-Leninism is not mentioned. I don't think it is even there to be decoded by prosecuting counsels.

### **Willard C. Brinton and precedence**

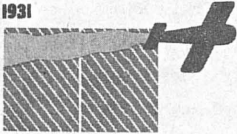
Before coming to the leading story of Clive Chizlett's article — the work in the USSR — I want to examine another of his insinuations: the relation of Neurath's Isotype to the work of Willard Brinton. This is a story that has surfaced several times in print in recent years and Chizlett at least does us the service of allowing some fresh observations to be made. But first, here are the steps of Chizlett's argument (page 309). It goes like this: 1) Neurath knew an American, Charles Morris, who "may have" introduced him to the work of the American philosopher C.S. Peirce; 2) "it is also possible that" Morris "may have" drawn Neurath's attention to the work of Brinton, another American; 3) Brinton's work preceded Isotype and "may well have" provided inspiration and example. Well, so what? Even if one believes in a history-of-ideas lineage-tracing approach that discounts individual initiative, I think that this story doesn't sound very convincing. Didn't Neurath know any other Americans? Why should it be Morris who

Picture of the growth and the planned growth in the combating of pests in agriculture. Each block represents 60,000 hectares of land. The vermin to be exterminated is represented at top right in a simple, recognizable outline form.

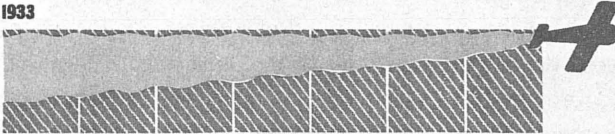
From: *Aviacija i vozduchoplavanie*, Moscow, 1934. See also, Gerd Arntz and Kees Broos. 1979. *Symbols for Education and Statistics*. The Hague: Mart Spruijt, introductory essay.

### САМОЛЕТЫ В БОРЬБЕ С ВРЕДИТЕЛЯМИ СЕЛЬСКОГО ХОЗЯЙСТВА В СССР

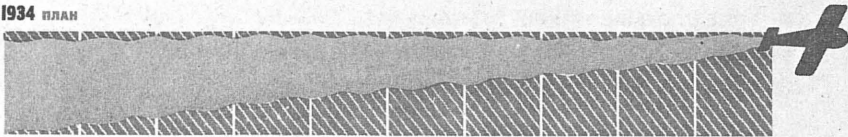
1931



1933



1934 план



Каждый прямоугольник обозначает 60 тысяч гектаров опыляемой площади

was the virus-carrier? Presumably because Morris is the only American friend of Neurath known to Clive Chizlett.

But let us look at Brinton's book, *Graphic Methods for Presenting Facts*. As usual, Chizlett has not made the effort to go to the source, but relies rather on a recently published compendium (Nigel Holmes, *Designing Pictorial Symbols*). If one reads chapter 3 of Brinton's book, Simple Comparisons Involving Time, it is clear that: Brinton is in favor of representing quantities by bars rather than by forms such as circles that cannot be simply read off; that he thinks pictorial representation has advantages; that he advocates putting exact figures by the side of a chart.<sup>10</sup> He has no concept of the unit symbol to represent a precise quantity. This idea is at the heart of Isotype practice. Furthermore, Brinton recommends his pictorialized bars as just one good method among several and he provides no sustained exploration of this method of showing quantities.

If one does want to find precursors of Isotype, I think that a trawl of the newspapers, magazines, pamphlets and ephemera published in Europe and America between, say, 1880 and 1925, would throw up relevant material. For example, I could cite a booklet, *Zur Geschichte und Statistik des Volksschulwesens im In- und Auslande*, which shows several Isotype-like charts, using rows of pictorial symbols. This was published in Vienna in 1898.<sup>11</sup> One doesn't need to posit any "Chicago connection" to find precursors of Isotype. But the point I would want to make is that Isotype work has to be judged for what it is, not by what its ancestry might have been.

### **The USSR and guilt by association**

As Clive Chizlett recounts, Neurath and his associates worked in the USSR, as consultants to a Soviet body, the Institut Isostat. A pool of five people from the Social- and Economic Museum of Vienna worked there in shifts. According to Marie Neurath, the invitation to work in the USSR came from the Soviet embassy in Vienna and the arrangement started late in 1931. Towards the end of 1934, their contract was terminated without explanation and without honoring payments due.

The Soviet chart that Chizlett discusses on page 307, but doesn't reproduce, was certainly done under the influence of the team from Vienna. However, it is not signed "Institut Isostat." It uses a unit symbol, but also introduces a confusing element of visual distortion in the expanding spray-trail left behind by the airplane. The quantity of this spray cannot be read off: it becomes a rather vague decorative element of the kind that the Isotype team refused. I doubt that it is the work of an Isotype trans-

former. Chizlett is not bothered by this weakness, but thinks he finds other ones. He says that the symbol showing area of land sprayed is not quantified and then makes fun of this: "as small as a tennis court or as large as a whole region." But at the bottom of the chart, the land symbol is quantified: each rectangle represents 60,000 hectares. Here again our prosecuting counsel seems to be blind.

Clive Chizlett's one other actually-existing Soviet chart, which he does reproduce (page 318), was made earlier and is signed "Institut Isostat." It follows Isotype principles more closely. Chizlett can find nothing to say against it, except that it is "very pretty." Then, in a passage worthy of a Stalinist show-trial prosecutor or of Senator Joseph McCarthy, he postulates an Isotype chart about the famine years in the USSR. In the absence of evidence, Chizlett resorts to this slur, imagined in cool detail. For a better sense of how the Isotype work in the USSR was conducted, I would like to quote from Marie Neurath's memories of visits there. Her account exemplifies the precision with which she could remember events of years ago. It also suggests the realism and lack of illusion in her and Otto Neurath's perceptions of life in the Soviet Union then.

"We travelled to Moscow by train: the journey took three days and two nights. On the first occasion (1931) I went with Arntz and Scheer, taking cases full of material as luggage; duty had to be paid at every border; Jodlbauer had calculated it exactly, and my money was just enough. The entrance gate, on which had been placed the inscription 'workers of all lands unite,' was actually rather miserable in appearance; but the atmosphere of something like festivity was touching. I stretched out my hand to a Red Army soldier standing there, hand on cap. What should he do? He took it. In Moscow we stayed in the Grand Hotel. For an office, we were given first a room in the state publishing house. Otto had his table in a niche separated off by a glass wall. I sat with the others at a long table and could hardly move my elbows. When I began to teach transformation to Maria Alexandrovna Orlova (who later married Bauermeister), I was able to do this in Otto's room, and he listened with half an ear, smiling. Ivan Petrovich Ivanitsky was a scientific collaborator; he had made pictorial statistics in the USSR before we arrived, but then had to acknowledge that ours were better, and he worked with us quite happily. We were once invited with him to visit Orlova; there was a photograph of her father—a general in Tsarist times—hanging on the wall. Once at the opera she pointed out her husband to us; life in a single room together had become unbearable and they had split up. Apart from an administrative director, the Institut Isostat had a 'red director.' The first of these was called Asmus, an attractive educated man, still young, who spoke perfect

German. Rather against his will, Otto was once taken by him to see Bukharin, then still tolerated; but I remember nothing of what impressed Otto there. The next red director was an older man, who also made a very good impression and could speak German well: Komarovski. The activity grew markedly in his time; we had more space and seventy-five co-workers. We suggested to Komarovski that our teaching could succeed better if we divided this mass up into several parallel groups, each of which could then learn every phase of the work and how to operate as a team. A gathering was called at the end of the day, to explain this and to discuss it; then a vote was to be taken. I protested. But Komarovski, standing by the wall on the other side of the room, said in German: 'just leave it to us, we know what we have to do.' But I was glad when the vote supported our view. I came across this Komarovski in the book by Alexander Weissburg, *Conspiracy of Silence*. Weissburg met him in prison in 1937 and asked him, as with all the others, 'what did Stalin really intend?' Komarovski was profoundly sad. The number on his Communist Party membership card was said to be less than ten. Asmus was ambassador to Sweden or Finland. One day he was recalled and shot. We learned this from the newspaper. He told us he had been with the revolution as a sixteen-year-old. He told of a lecture at which it had been discussed who should be killed first, when they reached Berlin: the Social Democrats or the National Socialists. 'The problems they have!', he said laughing. We Social Democrats were called 'Social Fascists' in Moscow. One of the women in our group from Vienna left the Social Democrats and became a Communist Party member. The architect Grete Schütte-Lihotsky, Otto's old friend and colleague in the Siedlerverband [estate-housing association], underwent a similar change: surprising and disappointing. She had gone from Vienna to Frankfurt in order to work with the architect Ernst May, and then she and her husband went with May and several of his group to Moscow. We spent many lively evenings together with various colleagues of hers, in her apartment, drinking tea, eating apples. They talked about how little they could feel at home in Moscow, with the change to neo-classicism. Now they stuck many extra columns into their plans, so that as many as possible would be done away with again. Other stories, too, could fill one with sadness or scepticism: the starving people who came to the trains; the loss of material through uncontrolled unloading, and so on. Like all foreigners, Grete Schütte-Lihotsky had to leave the USSR after the show trials. She read the reports inside the country, while we read them from outside—which may have made all the difference. She came to visit us in The Hague. After a long conversation with Otto, she came crying to me. The disappointment was obviously mutual. I could not really be of comfort to her."<sup>12</sup>

### **Miscellaneous mistakes**

"A superficial outline of Neurath's career reveals he was a professional philosopher, political revolutionary, museum-director and descriptive statistician." (page 299) "Superficial" is right, but "misleading" would be more accurate. Neurath was certainly not a "professional" philosopher, and I would not call him a philosopher at all (neither would he have wanted to be called one). "Political revolutionary" is a dull and inaccurate term for someone who wanted radical political change; but who believed in dialogue, socialist democracy and who was not a communist. "Descriptive statistician" hardly seems the right term for someone who neither gathered nor computed statistics. Yes, Neurath was a museum director. But if one wants a single label, I think that "encyclopedist" would do.

"Thematic museums with an ideological mission and a propagandist function are phenomena which are unique to Austro-German cultural life and history." (page 301) One would like some evidence for this extraordinary assertion. As it stands, one doesn't know whether to start contesting Chizlett's notion of "ideology" and "propaganda" or to point out that, within his own world-view, Austro-German culture cannot be "unique" in this, because there is the example of museums in the USSR.

"The museum was developed by Neurath as a medium of political propaganda rather than public education." (page 301) Here one should point out to Clive Chizlett that Neurath's "Gesellschafts- und Wirtschaftsmuseum in Wien"—to give its full title (Social- and Economic Museum of Vienna)—was an integral part of the city of Vienna from 1925 to 1934. It was one of the network of organizations supported by, working with and for the Social-Democratic city government. Vienna in these years was the setting for one of the more remarkable episodes in the history of European socialism: a genuinely popular and democratic experiment in city government. This museum was one of public education, in support of the Social-Democratic municipal policies. Chizlett's fervid accusations ("totalitarian ideologist") and lumbering statements ("The semantic distinction between a political museum and a museum of politics is subtle but very important to distinguish") suggest ignorance of history, as well as of how to make an argument.

For all his air of exact and total description, Chizlett manages to muddle the simplest point of Isotype. Reading Chizlett, I doubt that anyone would understand that the first and founding principle of Isotype is this: a pictorial symbol is taken to represent a number of things; then it is repeated. The wish was always to stick to things, rather than abstractions, and to what could be easily and comfortably comprehended. Chizlett writes that

“individual pictographs may have a value such as a percentage” (page 303), but Isotype work avoids this more abstracted level of data. Isotype work uses equal-area projections for maps. The particular projection used was drawn by the cartographer Karl Peucker. Mollweide’s equal-area projection was not “normally used” (page 302).

### **In conclusion**

Otto Neurath’s Isotype work is certainly open to criticism and discussion, but I do not think that Clive Chizlett’s piece makes a serious contribution to the debate. A crux of Chizlett’s misunderstanding of Isotype lies in this passage: “. . . the charts are unscientific. It is no use generating descriptive statistics as *objects d’art*. The only purpose of descriptive statistics is to provide a useful and useable basis for inferential statistics. It follows that many of the charts published by Neurath and his associates in the 1920s and 1930s are either inept or their purpose is merely to function as *objets d’art* or propaganda.” (page 303)

The either/or dogmatism here—as throughout Chizlett’s piece—cannot account for what he attempts to describe. Isotype work was self-evidently something other than the hard notion of “science” that Chizlett seems to want. It was not simply propaganda, nor was it simply art. Isotype was an approach to treating and graphically configuring material: an approach to design. The best Isotype charts show a system, a logic, an honesty of thinking that is remarkable. In this work, some principles are discovered and are seen to inform the configuration of material, which then finds its own form. This logic is there in the rules of arrangement and (less precisely) in the way in which the graphic elements are drawn. It is this approach, or way of thinking, that is the enduring value of Isotype—for any kind of design.<sup>13</sup>

The typical Isotype products were large charts in a public space. This place was a municipal institution, open in the evenings, free of charge and accessible to anyone. Groups of people gathered around the charts and argued over the issues they presented. People learned about the life of their city, about their place in the world; they learned to think and to argue, to get on with each other. This was Neurath’s ideal. It was a democratic and a socialist ideal. This vision began to be realized—in fits and starts, inconsistently, but sometimes truly—above all in Vienna between 1925 and 1934.

**Robin Kinross** is a typographer, writer and publisher, working in London. He studied typography at the University of Reading, and then went on to write an MPhil thesis on Otto Neurath's Contribution to Visual Communication (University of Reading, 1979). He has worked as an editorial typographer and written extensively on typography: its practice, theory and history. His book *Modern Typography* was published in 1992. He is now working on a book with the Dutch type designer Fred Smeijers and on a documentary monograph about the typographer Anthony Froshaug.

## Endnotes

1 The best single English-language source remains: Otto Neurath. 1973. *Empiricism and Sociology*. Dordrecht & Boston: Reidel. This is an anthology, edited by Marie Neurath and R.S.Cohen, comprising biographical memories by contemporaries, a wide range of texts by Neurath and an extensive if incomplete bibliography of his writings (277 items). It was published as the first volume of a Vienna Circle Collection. The second Neurath work in this series was his *Philosophical Papers 1913-1946*, edited by Marie Neurath and R.S.Cohen (Dordrecht & Boston: Reidel, 1983). Much of Neurath's writing is now available in German in a projected complete works published by Hölder-Pichler-Tempsky in Vienna: *Gesammelte philosophische und methodologische Schriften* (2 volumes), edited by Rudolf Haller and Heiner Rutte, 1981; and *Gesammelte bildpädagogische Schriften*, edited by Rudolf Haller and Robin Kinross, 1991.

The Otto and Marie Neurath Isotype Collection was given to the University of Reading in 1971 and is now housed in the Department of Typography & Graphic Communication at Reading. In 1975, an exhibition was made at the University from this material. The accompanying catalogue, *Graphic communication through Isotype* (University of Reading, 1975) was revised and reprinted in 1981. In 1980, the Department of Typography at Reading published an edition of Otto Neurath's *International Picture Language*. These two documents are still available. Much can also be gleaned from a critical reading of a work that accompanied another exhibition: *Arbeiterbildung in der Zwischenkriegszeit*, edited by Friedrich Stadler, Vienna: Löcker, 1982.

I should add that my own involvement in Isotype stems from work with the group that made the 1975 Reading exhibition, from postgraduate research resulting in an MPhil thesis at Reading, "Otto Neurath's contribution to visual communication (1925-45): the history, graphic language and theory of Isotype" (1979) and from ten years of editorial and translation work and friendship with Marie Neurath until her death in 1986.

2 Ray Monk. 1990. *Ludwig Wittgenstein*. London: Jonathan Cape, 581-586.

3 Marie Neurath wrote three letters to Bartley in July and August 1974, soon after his book had been published in its British edition. Bartley replied in two letters written in July 1974. I have notes on, but

not copies of these letters, which Marie Neurath showed me when I was working on my MPhil thesis. After her death, and after a dispute over her will, Marie Neurath's papers were sold to the Österreichische Nationalbibliothek in Vienna.

4 See, for example, the memories of his friend and colleague, Wolfgang Schumann, in Neurath, *Empiricism and Sociology*, 15-17.

5 Neurath wrote a vivid and detailed account of his experiences in Munich: Neurath, *Empiricism and Sociology*, 18-28.

For a full account of the episode, with some description of Neurath's role, see: Allan Mitchell. 1965. *Revolution in Bavaria 1918-19*. Princeton: Princeton University Press.

6 If Clive Chizlett is determined to go hunting for Communist users of graphic statistics, he might investigate the career of Alexander [Sandor] Radó. Obituaries of Radó in British newspapers (*The Guardian*, 21 August 1981, *The Times*, 22 August 1981) emphasized his career as a 'Soviet spy master.' Radó was the author of *Atlas für Politik, Wirtschaft, Arbeiterbewegung*. 1930. Vienna: Verlag für Literatur und Politik and *Atlas of Today and Tomorrow*. 1939. London: Gollancz. The graphic mediocrity of these works provides striking contrast to similar Isotype productions.

7 From his contribution to: Neurath, *Empiricism and Sociology*, 55.

8 In: Neurath, *Empiricism and Sociology*, 56.

9 The article of 1935 is available in English as Pseudorationality of Falsification, in Neurath, *Philosophical Papers 1913-1946*, 121-131.

10 Willard C. Brinton. 1914. *Graphic Methods for Presenting Facts*. New York and London: McGraw-Hill, see especially page 40.

11 *Zur Geschichte und Statistik des Volksschulwesens im In- und Auslande*. 1898. Vienna: Verlag des Sonderausstellungs-Commission "Jugendhalle."

12 This is taken from a long unpublished autobiographical text, written (in German) by Marie Neurath in 1980. In 1984, I made an English translation — titled "What I remember" — from which I quote here. After Marie Neurath's death and the dispute over her will, copies of the manuscript in its German and English versions would have been among the papers sold to the Österreichische Nationalbibliothek.

Among the people mentioned here: Joseph Scheer was a technician who helped construct charts; Josef Jodlbauer was the administrator of the Social and Economic Museum; Friedrich Bauermeister was a "transformer," together with Marie Neurath.

13 For attempts to draw lessons of Isotype for graphic design, see Michael Twyman's essay, The Significance of Isotype in *Graphic Communication through Isotype*, 7-17 and Robin Kinross, On the Influence of Isotype, in *Information Design Journal*, 2:2, 122-130.

***SPIRALS 91.***

Thomas Ockerse, editor.  
Providence, Rhode Island: Rhode  
Island School of Design. Large  
format, five softbound books in a  
slipcase, printed in two colors,  
many illustrations. \$125.00

One of my art history friends, when recently caught in a collegial mood, reminded me of the value of the theme “people, products and processes” as a useful way to organize content. It seems that the producers of *SPIRALS 91* were also aware of the value of this approach. The project coordinator, Thomas Ockerse, in the introduction to Book 1, states that the basic rationale for the publication is to “provide a simple and direct means to share our activities and thoughts with others.” This generosity deserves attention by all serious design professionals.

As a record of activities by faculty, students and visiting lecturers at Rhode Island School of Design, *SPIRALS 91* is impressive for its physical form as well as for its content. It comes as a boxed set of five paperback publications, called “books” and is in an A4 metric format (210 x 297 mm). The layout is unusual in that the flow of pages moves in opposing directions depending on the orientation of a given book thereby locating two books in each single physical volume. As one would expect from RISD, the entire series is beautifully designed and exquisitely printed. Progressive typographic page layouts complement the information in the articles. Black and white as well as color photographic reproductions of student work and other materials appear

crisp and detailed as presented on quality coated stock. The slipcase is cardboard which has been imprinted. This package for the books might have been of more substantial material as it initially gives one less than the qualitative feel that is so apparent when one reaches the books contained inside. The contents of *SPIRALS 91* include in Book 1 program philosophy and information about the Graphic Design Department at RISD, Book number 2 articles from lectures by RISD alumni and visiting lecturers, in Books 3, 4, 5 and 6 results from teaching, in Book 7 graduate teaching results and in Book 8 information about the Tomas Gonda Prize. It is difficult to review this publication without commenting directly on the educational program in graphic design at RISD. After reviewing the books, I was attracted to John Dewey's quote from 1929 (mistakenly attributed in *SPIRALS 91* to Siegfried Maser) "Theory without practice is empty; practice without theory is blind." Theory is at the heart of the program at RISD and my perception is that it drives the curriculum and makes it vital, fresh and innovative. I found myself pulled back again and again to the article by Thomas Ockerse titled, *Graphic Design Education: A Position Paper*. The document was developed over a number of years and articulates the ideological framework of the program at

RISD in a manner that reads like poetry. With both the practice of graphic design and education in such a current state of flux, it is a good sign to read such an eloquent statement about education and practice. Professionals involved in every facet of graphic design would benefit substantially from the solid dose of theory that is so well represented in *SPIRALS 91*.

In the design professions, documenting important historical events is not unusual, but it has been erratic at best. *SPIRALS 91* joins distinguished company from the past that has shared similar purposes. For example the famous Bauhaus Books which totaled fourteen volumes and were produced through 1931, were an outstanding record of many creative people, products and processes that happened in those years in Weimar and Dessau. These books dealt with problems of art, science and technology, and for the specialist of today they attempt to furnish information about the complex problems, working methods and research results in various areas of design, thereby providing the individual with a criterion for his own studies and with progress made in other areas. Without the Bauhaus documentation, much of the detail of the significant theory of the famous German school would be lost. Between 1950 and 1968, also in Germany,

the Journals of the Institute of Design, Ulm, were initiated by Anthony Froshaug. In their way, these journals save for us a history of that school's unique work in developing a systematic theoretical approach to various design disciplines. The most profound contribution of *SPIRALS 91* is in its documentation and preservation of important visionary messages about design education. Faculty at RISD have recognized the significance of their activities in graphic design and taken the initiative to record it in time and space. They deserve our collective applause for this record. As author Wallace Stegner has said, "Every action is an idea before it is an action, and perhaps a feeling before it is an idea and every idea rests upon other ideas that have preceded it in time." It is obvious that important things happened before and they will happen after *SPIRALS 91*, but this slice of history is safely preserved for the record. If, in fact, *SPIRALS 91* is the first in what will be an annual publication, the project becomes even more valuable as it gives us all a great deal to look forward to in the future. *SPIRALS 91* hopefully will influence others to document their efforts. Having long been a respectful viewer of the excellent educational program at RISD and also one who is very committed to documentation and preservation, I am delighted that this publication exists. Other progressive schools and institutions should learn from

the example set by *SPIRALS 91*. Those involved in its creation have made a contribution by which all graphic design professionals benefit by making visible otherwise intangible aspects of the people, processes and products of Rhode Island School of Design's Graphic Design Department.

**R. Roger Remington**, the reviewer of this book, is a professor of graphic design, Rochester Institute of Technology and author of *Nine Pioneers in American Graphic Design*.

***Black Riders, The Visible  
Language of Modernism***

Jerome McGann

Princeton, New Jersey: Princeton  
University Press, 1993

\$35.00 cloth, \$12.95 paper

ISBN 0-691-01544-9

A title like *Black Riders, The Visible Language of Modernism* is guaranteed to get my attention and a review here. My interest in this title was sharpened by having recently reviewed a new typographic history by Robin Kinross *Modern Typography* (see *Visible Language*, 27:3). That these two books explore the phenomenon of modernism in language use indicates that a certain analytical distance from modernism has been achieved. Not only can we point to but we can also dissect modernism. Looking back from the future, what will appear as a unique aspect of modernism is the widespread specialism and sharp differentiation between the wordsmiths and the typographic creators and interpreters. But crossovers between language use (words as prose or poetry) and its visual form (calligraphy, typography or the word made visible) were also a modernist event. It may well be that the twentieth century brought forward the metaphor of language used as a means to explore the order, syntax and code aspects of sensory experience including visual, auditory, and kinesthetic expressions.

Jerome McGann observes on an early page (xii) that "All texts run as difference engines." He is not content to merely state this, he executes his text with an invisible interrogator who interrupts his

line of argument to query and cajole—he draws our attention to the text and its ability to state and to be contradicted. He insists on the social aspect of language. In this way he folds and refolds relationships concerning the physicality of the text and the self-referential aspects of writing and reading and the investigation of language itself.

The surface of the text is another of his modern filters. The late nineteenth century publishing renaissance of William Morris' Kelmscott Press and the Bodley Head are prominent characters in this book. But this is not a fussy, antiquarian interest—these presses signify a particular attitude. "Don't misread the aesthetic significance of the Renaissance of printing. Brecht's epic theater and Stein's writing are both part of its legacy. Self-conscious text production like that of Kelmscott and Bodley Head put a frame around romantic writing (as Brecht threw a frame around realistic drama and thereby brought important constructivist and reflexive elements to the scene of textuality." (21) The publishing activity itself signified another modern shift. The innovative approach to publishing and distribution developed at the Bodley Head went beyond audience definition by economic characteristics alone and into defining audience by their cultural or ideological points of view.

This foreshadows much of the mass marketing and segmented marketing science of this century—getting even intellectual goods to market was subject to rational analysis.

Once seen, editions from the Kelmscott Press are not easily forgotten. The boldness and authority of appearance that these volumes display insists on a physicality, a truly tangible word. Here the letterpress "kiss" is far from timid and the vigor and high contrast of the typographic design interferes with easy reading. The words do not fade into thought but state again and again "see me." In contrast, the Bodley Head approach to typography was lighter, simpler and more elegant, here the page was clear and easy to read.

From a literary point of view, McGann sidesteps Mallarmé as the usual point of departure and instead works from an American frame of reference discussing for example, Emily Dickenson, Ezra Pound, Gertrude Stein and Susan Howe. All these authors used the materiality of the text as evidenced by literary and bibliographic cues: calculated line breaks, execution by handwriting on selected paper, careful choice of publisher and exploitation of the spatial field of the page and the codex.

I am particularly indebted to the author for introducing me to Robert Carlton Brown's *The Readies*. Brown states his program upfront: "I'm for new methods of reading and writing and I believe the up-to-date reader deserves an eye-ful when he buys something to read." (*Readies*, 1) And McGann observes, "At the center of Brown's program was his half-serious half-playful invention, a "reading machine." This apparatus was supposed to provide the reader with the power to read in all directions and at any speed, to change type size and typeface at will, to leap forward or backward in the text: to browse, to speed-read, to connect any and all parts of the text in any and all ways." (*Black Riders*, 88) This brings us to a decription of hypertext, as yet unnamed in 1930, but increasing in both appearance and utility at the end of the twentieth century. Hypertext blurs the roles of reader and writer, of prose writer or poet and typographer, interpreter, annotator, diagrammer or visualizer of a text. The boundaries are fading as language expression is reconstituted in its entire set of references to language itself and its disposition on page or screen and to its particular physical appearance.

While McGann's audience is largely the literary and literary criticism community, the previously reviewed Kinross book

addresses largely a design or typographic community. That the ideas of modernism pervade both communities is obvious, but what seems increasingly strange is the separation of attention to content and form along disciplinary lines. McGann understands that connection but chose to address his own scholarly community. Personally, I am waiting for a textual celebration that brings the multi-layered heroic language picture into view with Baudelaire, Mallarmé, Pound, Stein, Dickens, Mayakovsky, E.E. Cummings, zaum, the Noigandres Group, El Lissitzky, new typography . . .

**Sharon Helmer Poggenpohl**, the reviewer of this book, is an associate professor of design, Institute of Design, IIT, and editor and publisher of this journal.

**Stop Stealing Sheep and Find Out How Type Works**

Erik Spiekermann and E.M.

Ginger. Mountain View, California: Adobe Press. \$19.50 and \$24.95 (Canadian).

ISBN 0-672-48543-5

**Herr Spiekermann, Curb that Meta-phore!**

When Edward Johnston was approached to design a new typeface for the Nonesuch Press, he said there was little point as 'There are two or even three good roman types already.' The authors (on behalf of Adobe Systems) set out to explain to the layman and to us why we need more typefaces and how we should use them.

This is Erik Spiekermann's second book and he draws on an insight into the mystery of type gained as a very successful typographic practitioner; founder of MetaDesign Berlin and designer of Meta typeface. E.M. Ginger was the editor of the sadly missed magazine *Fine Print*.

The 'Gingermann' pattern of this book is aimed to show appropriate type layout and detailing through pictorial analogies between a typographical arrangement and something more familiar.

For instance a formal page arrangement of a book is set opposite the picture of a room centered around a bed; whereas a magazine page faces a multi-functional drawing-room; a recipe book is within a spread that says 'kitchens are rooms with clearly defined purpose . . .' and shows you a picture of a kitchen.

So the book goes on, 80 or so spreads, 160 illustrations to make a useful introduction of typographical truisms to its well targeted audience, the casual reader who may use a desktop system.

The problem is that typography is not a kitchen, type is not the gear you pack for the beach, nor is there much parallel with different line measures and a marathon when compared to the 100 yard sprint. *Type is Type* and maybe that is what Gill was saying in his famous but gnomic phrase 'Letters are things, not pictures of things,' or as the authors quote Freud, 'Sometimes a cigar is just a cigar.' Kipling put it more crudely, and Michel Foucault said it again more recently in his thesis 'This is Not a Pipe.' Analogies are a distraction that conceal the truth.

About three quarters of the way through the pattern really comes to pieces for it is stated that short lines of text need reduced word and letterspacing and for long lines of text we should 'steel sheep'; this is of course Goudy's analogy with just such felons who would letterspace lower case type. This proposition is illustrated with a picture of a traffic jam and spaced out vehicles in highway lanes.

It is accepted that long lines need increased *leading* but all that

needs to be said here is what the layman can himself observe, that the eye otherwise can return to the beginning of the line it has just read. More basically than that, letters must combine well into words and then the eye and mind will take in whole groups of words at a pass. So with rare exceptions we need letters that make evenly weighted words and words that make harmonious texts.

The way of achieving this in text was set out by Edward Johnston and seems still to be unassailable: given the felicitous disparity in letter shapes, the space *between* letters should balance the largest inherent space *within* the letters. It follows that two lowercase 'oo's should have the same visible space separating them as the space represented by each counter: Words should have just enough space between them to distinguish them as whole entities without interrupting the flow of the phrase.

Very simple diagrams have often explained this. However, we all should usefully and properly re-examine all these old precepts, but it does no good to advance new ideas here to a lay audience as though they were engraved in tablets of stone. Such ideas need examination, debate and consensus before they are exposed to a wider world.

The text of this book is presented throughout, in three different ways, each in its own type style, all three on one spread. This is a well intentioned 'hyper-presentation' technique, but it is confusing. I found it difficult to settle to one thread of the argument, and the sensible thing would be to read the book three times covering up the polygraphic glosses in turn with a spare sheet of paper.

The more informative paragraphs (and there is a lot of copper-bottomed information buried in there) are sometimes printed in a yellow ink that disappears under any ordinary tungsten reading light. Maybe I should buy a blue bulb to go in my dedicated bedside reading lamp; or better, I should remove myself and this book and the masking apparatus to my multi-functional drawing-room.

For sound, proven rules of typography, I recommend Jost Hochuli's series of little books published by Agfa/Computographic. These cost no more than a phone call.

A very interesting and serious study of many typographical issues raised in *Stop Stealing Sheep*. . . is a substantial report, *In Black & White* — a research and development report on typography and legibility, just published in English by the

Graphic High School (Glentvej 67, DK-2400 Copenhagen NV, Denmark).

**Colin Banks**, the reviewer of this book, is a principle in Banks and Miles, a design consultancy in London. He is a longtime typophile and advisory board member to this journal.

Regarding Clive Chizlett's article  
Damned Lies. And Statistics.

Those who know of my connection with Isotype and notice my name on the list of members of the advisory board of this journal might well assume that I endorse the views expressed in Clive Chizlett's article, Damned Lies. And Statistics. Otto Neurath and Soviet Propaganda in the 1930s, (26:3/4). I should therefore like to disassociate myself publicly from it. I was sent a draft of it some time ago, which I responded to critically and, I had hoped, constructively. In particular, I made it clear that some of the assertions made in it could not be supported by the facts as I understood them.

In this issue Robin Kinross convincingly refutes many of the points made by Clive Chizlett, drawing on primary sources wherever possible. I would merely add that the Isotype archives at Reading University are no more than a two hour journey from Clive Chizlett's home and that, to my knowledge, he has not consulted them.

Michael Twyman  
University of Reading  
United Kingdom

Regarding the need for typographic criticism

I continue to be surprised by the plugs given by the type manufacturers for themselves in the print material that they generate in the name of good typography. They do not remind us that they are in the type business for a profit. Yet it is evident in the nuances of the speeches they give and the catalogs and newsletters they circulate.

Without going broke on the matter, I am buying up the last old books written by masters like Stanley Morison. These books force me to realize that the profession is staggering from a total industrialization of phenomenal proportions. Consequently, we apparently must undergo all that comes with total democratization: the few good faces, the many bad, the oversight of the typographer's responsibility to language, the plethora of 8th grade copy of new glitzy magazines on a hot issue that sells—type.

You have mentioned that you are very interested in figuring out how the journal can participate in a dialogue revolving around the idea of developing typographic criticism. Contemporary typography is wild and undisciplined with a proliferation of poor type design and a lack of standards for the dozens of interpretations of a single cut of one face. *Visible Language* certainly can contribute to the profession

and forge new ground by elevating a rather straggling design mentality that is all too eager to accept that which comes to them from the type manufacturers.

Now more than ever, we need type cops—to protect us from the hype of the manufacturers, to protect us from the nasty cuts in the marketplace, to compare and contrast the typographic products of various manufacturers. Further, visual communicators need to be reminded more than ever (in a climate of lightly taxing graphic design showcase literature) about our roles in society as they were seen in the 40s—as role models themselves—for careful typographic design. We need to talk about legibility and to revive authorities who have no major commercial interests to sacrifice.

Daniel Picard  
Majuscule Design  
Montréal, Canada

Bassnett-McGuire, Susan. 1991. *Translation Studies*. New York: Routledge, Chapman & Hall. ISBN 0-415-06528-3 paper, \$15.95, 168 pages

Global communication and contact give rise to a more intense interest in translation and the problem of language 'equivalence.' The author presents a clear and readable introduction to the central issues of translation, a history of translation theory from the Romans through George Steiner and ends with the particular problems of literary translation.

Bonsiepe, Gui. 1993. *Teoria e Pratica del Disegno Industriale: Elementi per una Manufattura Critica*. Milan: Feltrinelli. ISBN 88-07-42067-8 60.000 Lire, paper, 250 pages, many illustrations

Gui Bonsiepe has a long perspective on industrial design—as a teacher at Ulm, as a government consultant in Argentina and Brazil, as an interface developer in the United States and most recently as a teacher in Germany. His observations of method and pedagogy in *Theory and Practice of Industrial Design* are worth our attention. To date, the book is available only in Italian.

Broos, Kees and Paul Hefting. 1993. *Dutch Graphic Design, a Century*. Cambridge: MIT Press. ISBN 0-262-02358-X \$75.00, large format, 224 pages, extensive full color illustrations

For a small country the Dutch have had an inordinately large impact on design. When I asked a Dutch designer how he accounted for this, he said simply that because the Netherlands was so small, they had to trade—to compete in the international marketplace and attention to design gave them a competitive edge. This beautiful book covers Dutch design from 1890 to 1990. There is much to contemplate here: the evolution of a typographic sensibility, the changing of the guard from constructivism and De Stijl to a dada excursion,

through modernism to postmodernism as shown by the design of pre-eminent Dutch designers. The threads that hold the century together in this work are consummate attention to craft and attention to meaning and its relationship to form rather than to formalism alone.

Danesi, Marcel. 1993. *Vico, Metaphor and the Origin of Language*. Bloomington: Indiana University Press.  
ISBN 0-253-31607-3  
hardbound, \$35.00, 200 pages

The origin of human language remains open to debate, in fact the debate was so ill-formed that at various points (1866 in Paris and 1911 in London) the linguistic and philological societies of those cities banned the topic. Danesi reconsiders the work of the eighteenth-century philosopher Giambattista Vico. He begins by exploring glottogenic theories and research, moves on to an indepth investigation of Vico's contribution and ends with a look at Vico's ideas in terms of contemporary research in cognitive, social and biological science. It is worth noting that this is part of Thomas A. Sebeok's series for Indiana University Press: *Advances in Semiotics*.

Hefting, Paul, ed. 1992.  
*Tel Design 1962-1992*.  
Amsterdam: BIS Publishers.  
ISBN 9072007239  
hardbound, 88 pages, extensively illustrated in full color

This book celebrates one of the oldest Dutch design consultancies. (It is interesting to observe that the Dutch Ministry of Welfare, Public Health and Culture subsidized the book.) The text is in English and Dutch and covers various aspects of Tel's practice which began as an industrial design consultancy, but evolved into one that is primarily con-

cerned with communication design. While the text is brief and to the point, the work of this firm is carefully documented and sometimes presented in a photographic environment that maximizes the impact (and importance) of the work. The production values are superlative—like the glossiest of annual reports.

Heusser, Martin, ed. 1993. *Word & Image Interactions*. Basel: Wiese Verlag. ISBN 3-909158-56-0 hardbound, 272 pages, illustrated

During the summer of 1990, the University of Zürich hosted the Second International Conference on Word and Image. The contents of this book were selected from the papers presented. They are gathered into sections titled: text, illustration, the sister arts, painting, photography and film and varia. For the most part the articles owe their focus to either art history or literary criticism. It is a substantial, scholarly and well produced book.

Hodges, Matthew E. and Russell M. Sasnett, eds. 1993. *Multimedia Computing, Case Studies from MIT Project Athena*. Reading, MA: Addison-Wesley ISBN 0-201-52029-X hardbound, \$ 32.95, 304 pages, illustrated with a few in full color

Over time, multimedia applications may rival the book, but at present we are at the beginning of an evolutionary search for structure and form for this media. Hodges and Sasnett's book is a valuable resource for reflection. Part 1 provides an overview of the conceptual issues in the design of multimedia, part 2 surveys applications from Project Athena, while part 3 examines major technical issues including time, pacing, synchronization and document structure. The book moves between general concepts and specific examples with ease.

Lanham, Richard A. 1993.  
*The Electronic Word: Democracy,  
Technology and the Arts.*  
Chicago: University of Chicago  
Press.  
ISBN 0-226-46884-4  
\$19.95, two high density floppy  
disks  
ISBN 0-226-46883-6 (book  
version), \$22.50

Rand, Paul. 1993.  
*Design Form and Chaos.*  
New Haven: Yale University Press.  
ISBN 0-300-05553-6  
hardbound, \$45.00, 218 pages,  
extensively illustrated in full color

Sassoon, Rosemary, ed. 1993.  
*Computers and Typography.*  
London: Intellect Books  
ISBN 1-871516-23-4  
paper, £14.95, 208 pages,  
illustrated

The title and the form of presenta-  
tion are one. Lanham, a professor  
of English at UCLA, presents his  
essays in hypertext. While I do not  
like to read the screen, I found  
myself thoroughly engaged with  
his thoughts on the changes to  
reading and writing, creating and  
consuming, making and criticizing  
that the computer poses. The  
navigation is simple, the electronic  
book is under-designed (perhaps  
for utility), the type is boring or  
cute but the author's ideas are  
well worth pondering.

Paul Rand has become an Ameri-  
can design icon for the last half of  
the twentieth century and he is  
increasingly speaking his mind.  
Many of the essays in this book,  
while updated, appeared else-  
where. The book is a tour de force  
of book design à la Rand—its  
most important aspect is the  
documentation of his work along  
with his commonsense commen-  
tary on design process.

Typographers and designers decry  
the democratization of typogra-  
phy, nevertheless powerful typo-  
graphic tools are routinely avail-  
able on personal computers. The  
author now more fully controls  
the text. Sassoon has assembled  
papers from experts whose inten-  
tion is to raise visual awareness of  
letterform and text and to point  
to other sources of information  
rather than to provide a quick  
typographic fix for the computer  
user.

Turner, Sylvie. 1991.  
*Which Paper? A Guide to Choosing  
and Using Fine Paper.*  
New York: Design Press.  
ISBN 0-8306-3967-5  
paper, \$24.95, 144 pages,  
illustrated

Paper is a beautiful and even magical surface on which we communicate our ideas. Turner's book focuses on fine paper for book artists, printmakers and calligraphers. The qualities of paper, handmade, mouldmade or machine made are described, cultural traditions regarding paper are explored and the appendices contain paper sources, a glossary, paper sizes and a list of the papers discussed within the book. This is a fine resource.

Viscomi, Joseph. 1994.  
*Blake and the Idea of the Book.*  
Princeton: Princeton University  
Press.  
ISBN 0-691-06962-X  
hardbound, \$49.50, 424 pages,  
extensively illustrated, a few in  
color

Viscomi is both a professor of English and an accomplished printmaker. It is the later attribute that makes his investigative approach to Blake's book production unique: the author created facsimiles of Blake's work in his own studio in order to better understand the method. His conclusion is that Blake did