Spelling Reform Anthology edited by Newell W. Tune

§15. Spelling and Electronics, Photo-typesetting

Contents

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1. Automation for Libraries, by Ivor Darreg

So much has been written about the "Information Explosion" that it is unnecessary for us to belabor the point in this article, but we should mention this acute problem since it is the main motive for introducing the paraphenalia and instrumentalities of the Computer Age into our libraries. Briefly stated, the output of new books and magazines has been increasing far beyond the abilities of existing methods to cope with it. In consequence, wasteful duplication of research and studies already done has become a most urgent financial and human-resources problem.

Also, there is now so much more for the average student to learn that teachers and students alike are being strained to the breaking-point; furthermore, adults must now go back to school in one way or another to up-date their knowledge and skills - and in very many cases, the only practical and economically feasible way for adults to go back to school is to use libraries.

The overcrowding of library facilities can be seen by anybody who visits a nearby library, and many buildings are practically bursting at the seams.

There are many ways in which current and future automation techniques could help libraries:

1) charging and returning of books,
2) cataloging, and catalog searching,
3) information storage and retrieval,
4) handling machine-readable materials, such as micro-film, microfiche, microcard, etc,
5) facsimile transmission of printing and drawings,
6) facilitating interlibrary loans,
7) setting up union catalogs, such as regional, national, or even world-wide catalogs,
8) facilitating the ordering of new books,
9) coordinating and keeping track of divers audio-visual materials for schools, etc.,
10) compiling indexes, abstracts, and specialized reading lists,
11) applying Dewey Decimal and other classification schemes to books and articles,
12) assisting librarians handling desk or telephoned inquiries for information,
13) searching out unpublished or rare documents on a given subject (e.g., doctorate theses, archives, correspondence among specialists),
14) continual updating of records and files,
15) assisting in most of the financial aspects of maintaining a library.

Actually, the list is almost endless; it is being augmented every day. Some of the "far-out" possibilities have been played up too much in the press, such as the home video screen on which a book page from some distant country will be displayed by simply dialing the proper number - and perhaps this has taken needed attention away from more immediately practical and more prosaic applications of automation such as eliminating the library typist's hour-long drudgery.

When writing about libraries, it is all too easy to forget that with the help of magazines, paperback books, and some newspapers it is quite possible for private individuals to build up their own libraries, often of impressive size; and that high-school and college students, besides their piles of textbooks and study materials, are accumulating photocopied book pages, tape recordings, and "canned" notes and outlines pertinent to their classes. Thus the problems of automating libraries will exist outside of library buildings proper, and information storage and retrieval and cataloging will be important to many average persons.

Also, it may not be obvious to everyone that there are many *special libraries* - company libraries, special collections for research engineers and scientists at a division of a company, school libraries, collections belonging to a specific department of a university, institutional and club libraries, and so on. These usually have peculiar and difficult cataloging problems. Indeed, the producers and users of data-processing equipment have their own special library needs and have spent much time and thought trying to solve the associated problems.

Before going into the matter further, we must not forget the human side, of this: our eyes were designed for distant vision, for primeval woods and fields and the outdoor world. Keeping children in school for hours - and chaining adults to office desks imposes a severe and unnatural burden on the human eyesight, and nature exacts a price for this. Now that the volume of reading material is increasing so enormously, intensive effort has to be made to take some of this eyestrain off human beings, and some of the automation techniques may assist in this respect.

Humans have a limited *attention span;* the computer and its peripheral accessories are tirelessly alert. The tired reader may fail to see an important word or sentence and miss some urgent item of information; but the automated scanner will read the 2000th page as carefully as it did the first page.

This ability to scan page after page tirelessly, all by itself, has provided potent ammunition for the advocates of library automation - so much so that a wave of over-optimism swept the field in the 1950's and naturally enuf led to an over-pessimistic letdown in the 1960's, from which latter slough of despondency we are just recovering. Parenthetically, it is most fortunate that so many of the science-fiction extrapolations and fantasies about libraries and their successors in the year 2000 or 2050 were taken too seriously. There is nothing wrong with extrapolation, *if* it is well based. But too many of the science-fiction stories and blown-up popularization articles were written without an adequate survey of the problems involved.

And they are legion. Let us begin with a truly nagging problem: how much is all this automation going to cost? In *Datamation* for Feb. 1970, "Computer Costs for Large Libraries" by Dr. W. N. Locke, sets forth some of these not always obvious costs. Consider, for instance, the 1968 output of printed matter: some 450,000 books, 200,000 periodicals, and 200,000 technical reports. And this is going up by 8% to 10% a year. This makes it unrealistic to think of putting all this information onto tape or other storage media at present. Books are still the most efficient method, he claims.

It was estimated in 1964 that some 200 million titles existed, so that a big library with a million

volumes had only ½% of the possible titles. This does not take into account a wealth of unpublished material that, given such forms as access as microfilm, might well assume greater importance in libraries of the future. There have been many stories about transmitting information instantaneously from one library to another in a distant city, to alleviate this situation (that no one library can afford all the books worth reading) but usually the authors of such articles neglect to inquire into the stupendous costs involved. Facsimile transmission equipment, for instance, can send an average typed business letter in a few minutes over a telephone line, so a 3-minute long-distance connection would not ordinarily take care of more than one book page.

Dr. Locke figures a cost roughly 375 times as great for storing a given amount of information on a reel of computer tape as compared with the cost of storing a library book in the stacks. This does not take into account the cost of running the computer's associated equipment long enough to find the needed portion of the tape and print it out.

However, there is hope: Realize, for instance, how the experiences of many decades can be stored in a small space within the human brain, and how frequently new breakthrus in getting more information into less space are being announced. Computer tape is not the most concentrated electronic storage known at present, and substantial progress is being made.

Of more importance to us is the possibility of automating a library catalog. In bygone days, a library might have nothing more than an accession register, that is, a numerically ordered list of the books as they were added to the collection, with no means of locating a book or books on a particular subject save by painstakingly going thru the entire list however long it might be.

During the 18th and 19th centuries, a favorite indoor sport of philosophers and gentlemen of leisure was the attempt to systematize and classify knowledge. Indeed, this activity often went so far as the creation of an a priori or "philosophical" artificial language to make such knowledge-classification visible as wel as audible.

Many impressive lists and charts have been published, professing to encompass the whole of human knowledge, actual or potential, within one or another such system. Obviously, it is not sufficient to own a book and put it on a library shelf somewhere; it must be retrievable when wanted for use. Thus this classification problem becomes vital to the functioning of any library, large or small.

In American libraries, two systems are in principal use, the Dewey Decimal and the Library of Congress system. The latter uses letters as well as numerals; the Dewey Decimal system uses numerals as far as possible. Both allow room for expansion and subdivision for future growth, and this necessitates revisions and supplements. Special libraries often have to invent or improvise their own systems, since they have no need for the entire field covered by the ordinary systems, but yet they must subdivide their own systems minutely which would require too many extra decimal places in the Dewey system. Figures to the fourth decimal place are commonly in use. A good example of a special system is the classification scheme of the U.S. Patent Office, where over 400 main classes are each broken down into subclasses, and occasionally these are sub-divided with the aid of a decimal place.

Why don't we just pick one of these systems and automate it? Then anybody pressing the right button can find all the books on any given subject. Unfortunately it isn't that simple. Many books and articles, and even more journals and magazines, straddle several subjects at once. One library may put a given book in the Mathematics department, whereas another library will put the same

book under Banking. Often the line between Science (Dewey number 500) and Useful Acts including Engineering (600) is paper-thin. As for the Patent Office classification system, even with all those inventors and experts to help them, they haven't solved their own automation and information retrieval problem!

In their monumental work of the 1950's, James W. Perry and Allen Kent of Western Reserve University in Ohio devised an elaborate and unusual classification and information retrieval system which deserves mention here because of the way in which it attempted to come to grips with the storage and retrieval problem. As described in their book *Machine Literature Searching,* it was applied to technical fields such as metallurgy. Concepts were broken down into semantic factors, to each of which a four-letter combination was assigned, e.g., M-TL stood for "metal" and then by inserting certain letters in place of the dash, the meaning changed systematically, as MATL, a metal, but MXTL, without metal or non-metallic. In effect they created a new language, but this could not be spoken, only written; in compensation, it was machine-readable so that an automatic scanner could go thru a long file and stop only where the asked-for semantic factors were found. Their hope was that this new language would facilitate the printing out of translations of an abstract as well as of the original language text. Also, they strove to alleviate some of the cross-referencing problems in the regular systems. Form the descriptions, searches would have cost more than those now made by human librarians!

It must be remembered that the computer and its associated equipment cannot think and does not make cross-associations as humans do; therefore an information storage and retrieval system, or an automated library catalog, cannot do any better than the classification system which human beings, in all their fallibility and fickleness, have devised for it and applied to it.

That is to say, a search for relevant books and documents can be completely frustrated if a classification system has been improperly *applied,* no matter how good the system in itself. This applies even more forcibly to key-words and subject-headings. Even tho the author of an article may be very prosaic and dully matter-of-fact, the title he gives the article can be highly misleading and cause requests from people who actually have no concern with his subject.

"Battery charge" means one thing to a police officer, and quite another to a service-station attendant! And both of these words have still other meanings to a soldier. "Evolution" is one thing to a biologist and something very remote from this to a mathematician. The terms "classify" and "classification" have recently taken on ominous, forbidding implications of military secrecy and fearful legal penalties, to the point that the Classified Telephone Directory has had to be renamed the Yellow Pages, and newspaper Classified Advertising has had to be renamed Want Ads or some other innocent term. Perhaps we shall have to adopt similar euphemisms for the librarians' tasks of classification.

Apart from such unusual semantic accidents, subject headings and keywords become obsolete without warning. For instance, a certain electronic part formerly called a *condenser* is now known as a *capacitor.* Therefore someone searching a card index under condensers would not encounter recent literature about them; and conversely someone searching under capacitors would probably miss relevant older material on this subject. True, skilled persons would know enuf to search under both headings but a machine would not. Usually, a library catalog will contain cross-references, but many people will not take the time to search them. And the implementation of many cross-references needed in an automated catalog for machine-searching is going to be a most expensive and tricky item.

During the optimistic period of the 1950's much hope was expressed for the possibility of *automatic abstracting.* For example, it was proposed that a machine count all the words in an article, list them in frequence of occurence, and then use the words of medium frequency of occurence to help index the article for retrieval, and at the same time, pick out the sentences in which these words occurred and print them out as the abstract of that article. Then all this tedious clerical work involved in preparing abstracts and summaries for busy scientists and scholars would be mechanized and lift a great burden from over- worked librarians and assistants. Alas! it is not that easy. The use of the phrase "information *retrieval*" has unfortunately directed attention away from the extreme care that must be given the act of storing and filing the information in the first place.

A given field of endeavor takes on a very different coloration as seen from the viewpoint of the Patent Office classification system, the Dewey Decimal system, the Library of Congress system, or one of the various special codings used in company libraries, and all of these are different from the viewpoint given in English-language keywords or keywords in German or Russian. In particular, the coinage of a new word such as *laser* divorces a subject from its historical background and relevant antecedents. We selected this example to show how many diverse and seemingly unrelated disciplines had to be brought together and butted against each other to make such a new development as the laser possible: optics, chemistry, crystallography, mathematics, electronics, the list is endless.

That is, to apply knowledge usefully and obtain new results, the knowledge stored in a library has to be animated and cross-fertilized and related. It cannot remain in the useless curiosity state of the miscellany displayed on some quiz-contest show.

As one comedian said about the New York Telephone Directory., "What a marvelous cast of characters - but no plot!" If the librarians try to turn the entire task of cataloging books over to the computer, the result will not make much sense either.

The customary alphabetical arrangement puts Animals and Zoology at opposite ends of the catalog, while it forces Elections and Electricity to be all-too-close neighbors. This has inspired many workers in the field to invent some manner of classification scheme, but in solving one problem, a bigger one is created. Witness how Roger's *Thesaurus* with its elaborate system of categories of ideas is also published in conventional alphabetical order.

The plain fact is that most subjects change with time and the classification that served best in 1920 will not do in 1970. (Indeed, Roget's *Thesaurus* has been revised, reworked, added to, abridged, and rearranged till its author would want to disown it.) As our *laser* example above shows, a cross-reference (or rather, whole family of cross-references) that would have been useless and ridiculous in 1950 is now highly relevant and highly productive. What the librarians and their assistants do when cataloging determines in large measure the success or failure of many important research projects. Thus they are no longer isolated monastic recluses in ivory towers; they are part of the contemporary scene.

In turn, it becomes important that the librarians do not let the paraphernalia of automation run them or tell them what to do. The phrase "a good servant but a bad master" was never more apropos. Once an automatic system is installed, it becomes too easy to do certain things (i.e., to stay in a narrow rut of formalized procedures) and too difficult to do certain others (often, essential operations not foreseen by the computer programmers).

Along with this, it becomes impracticable to change the programming and the general setup, since

what is now called "software" (the cards and materials a computer uses) is just as expensive as the electronic and mechanical equipment involved. Indeed, it may be unfortunate for a system to be finalized too soon; for then it will cost too much to change it to incorporate new features. It may even be that "canned" or prepared program "packages" will be offered to libraries, and they may not be suitable for a different type of book-collection or clientele.

Another problem is that of propagation of errors. If a misspelling or incorrect date or other error is accidentally entered into an automated system, it may be printed out and stored in so many different places that it will be next to impossible to run it down and correct every such recurrence of the mistake.

If a typographical error is repeated often enough and, can manage to remain around long enough, it may get legitimized and take on an existence of its own. Two cases in point from music history: There is so much copying and re-copying from one book to another, that a misspelling (probably in the 17th century) of *clavichord* as *clarichord* got copied several times down the decades, and much more than a century went by before this non-existent ghost instrument, the clarichord, was laid to rest. In the 19th century, a European musical-instrument maker brought out the *Heckelclarina,* a wind-instrument named after this firm; but someone setting type for a textbook on orchestration misspelt the name as *Heckelclarind,* and again this ghost-instrument has been seen in the pages of many books, but not in any orchestra. The point here is, that with the increased speed of computer equipment, and the capability of producing many copies of an entry, and even getting these copies printed in many different places, an error that would have been quite trivial and excusable in the old days may in the future become very serious, since it is so hard to track down and correct its many appearances.

Anyone who has tried to copy the cards of a library catalog to build up his own list of books in case he should need them again, will have some idea of the sheer drudgery involved in this kind of clerical work. By the time one becomes busy and successful, one can no longer spare the hours for such efforts. As the need to be kept abreast of recent developments and new writings on one's subject increases, the time available for consulting the library catalog, or indeed for going to the library at all, decreases. To alleviate this situation, *automated preparation of reading lists* is being developed.

In Datamation for Feb. 1970, John R. Jordan describes the Ames SDI-KWOC index system. (This is an acronym for Selective Dissemination of Information-KeyWord Out of Context.) 4000 current titles are scanned weekly. Quarterly, an index of those titles pertaining to categories the user has selected as being of interest to him, is prepared automatically and sent to him.

The user fills out a form in such a way that it becomes his "interest profile" for the system. These interest profiles can then be encoded and stored in the system's equipment, so that as new catalog entries are made, they are matched against the user's interests, and thus only the proper parties are notified.

It should be obvious from this and other such applications that the act of automating library cataloging will serve other useful purposes, hitherto impracticable, or too expensive or too time-consuming to be considered and implemented. How near or far in the future will these time-saving improvements be available? Our next issue will give some practical answers. Automation, in some situations is breathing down our neck.

Why is it there is *never* enuf time to do it *right* - yet *always* enuf time to do it *over?*

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2. Automation for Libraries, part 2, by Ivor Darreg.

According to the article by John C. Kountz and Robert E. Norton in the Feb, issue of *Datamation,* automation is already in use in the Orange County (Calif.) Public Library System, which consists of 26 separate branches and a central headquarters.

In Jan. of 1966, there was a partial automation of centralized acquisition of books, called BPP for Book Procurement Program. It is even possible to transfer the automation system from one computer to another by re-compiling it, and then in a third step transfer it to a third machine.

In Mar. 1967, upon reevaluation of the library system's goals, these were stated to be:

An aquisitions program
Book catalog
Circulation control system
Public information retrieval system

Judging the initial automation effort in this new light, one became conscious of the inadequacies, from a library's point of view, of the contemporary systems for use with computers, which were, of course, *business*-oriented. Obviously, some way of re-orienting the available or known systems to meet library requirements had to be found.

In mid-1968, a private software firm was engaged to form a project team to create a modular system for the Library. The system is designated by the acronym BIBLIOS, for Book Inventory Building and Library Information Oriented System.

Kountz and Norton's article goes on to describe details of this system, reproducing a typical form, and showing also a sample of the computer printout. We have space only for some highlights here.

For instance, there is a special *subsystem* which interfaces with the Machine-Readable Cataloging File produced weekly by the Library of Congress. This procedure has certain advantages: It standardizes subject-headings, which have been assigned by the Library of Congress. It eliminates the manual searching effort usually associated with determining and verifying data about the books. It provides an additional and quicker book-selection tool. When coupled with a circulating record computer, it will tell if the book is out or in.

Another aspect of the BIBLIOS system takes some of the manual clerical tedium out of the process of ordering books. It can well be imagined that for a library system of any size, the issuing of purchasing orders and all the numerous record forms that have to be made out for the files can become an enormous, repetitive task.

One of the further advantages of an automated system of this kind, is that special reports and abstracts can be compiled, once the necessary data has been stored. It increases the use of stored information, by being able to reprocess it and issue it in forms which would have been impractical under a manual clerical-work system.

Future plans of the Orange County Public Library include an automated catalog. Perhaps information on this will be available later on.

(For the benefit of readers outside Southern California it should be pointed out that Orange County, which lies immediately south of Los Angeles County, is one of the fastest-growing areas in our nation and forms a continuous Megalopolis with Los Angeles and its environs. Thus what the Orange County Public Library accomplishes may ultimately affect a very large number of people, and be copied and adopted with necessary modifications by other library systems and educational institutions in Calif.)

Let us now turn our attention to the Library of Congress, a truly tremendous respository of knowledge and information, and certainly a challenge to the constructors of any automation system. Paul Reimers and Henriette Avram, writing in the June, 1970 *Dalamation,* report on the 1970 status of automation in the Library of Congress.

As a gradual process of sharing, the Library of Congress has become in effect the National Library of the American People. It thus sets the pace for many other libraries, large and small.

When the future need for automating libraries became apparent, an in-house committee was formed within the Library of Congress, and in turn this requested funds for a feasibility study from the Council of Library Resources, Inc. This resulted in the publication in 1963, of a report entitled, "Automation and the Library of Congress" by Gilbert W. King and others.

This report concludes that the automation of cataloging, searching, indexing, and document retrieval is technically and economically feasible, even tho the intellectual content of a large collection cannot now be retrieved. It set a target date of 1972 for implementation of the system, but unfortunately it now seems this will be delayed awhile.

From other reports and work done on the subject, it appears that only some 25% of library activity is devoted to reference and search - there are many other activities usually not taken into consideration which would have to be automated in order to improve the functioning of the library system as a whole. This explains why progress in actually implementing tire recommended automation programs has been slow.

There are upwards of 60 million different items in the Library of Congress, and the official Catalog contains some 16½ million records. About 1260 different files are used in the Library's operations. 20 distinct alphabets are used to write some 125 different languages in which the incoming materials are printed.

The cataloging during fiscal year 1969, to choose a typical example, took care of some 200,000 items.

Because of its unparalleled scope and comprehensiveness the Library of Congress has taken on many activities which assist other libraries. Since the United States, unlike most other countries, does not have a National Bibliography of some kind, the Library of Congress has had to assume this function. It has a most extensive card-printing service which furnishes catalog cards to other libraries. The Library also maintains the National Union Catalog which has nearly 13 million titles, each entry telling libraries have this title.

Project MARC (Machine-Readable Catalog) has also been implemented by the Library of Congress. This is a weekly service, and its second, revised version was started in March, 1969, for the benefit of other libraries having suitable data-processing facilities to make use of it. A 300-foot minireel of magnetic tape containing some 1000 items, recorded in a digital code, is sent to each subscriber weekly.

Because of the magnitude of the card-printing operation just mentioned, it is hoped to automate this also. Photo-composing machines and offset printing will be used to produce the cards, and automatic, highly sophisticated methods will take care of the addressing and mailing. 50,000 orders a day are received from 25,000 subscribers for cards, which added up to 63,000,000 cards sold during the fiscal year 1969.

The U.S. Copyright Office is connected with the Library of Congress, so the Herculean task of automating copyright procedures must also be kept in mind by the Library of Congress officials.

Congress itself uses the Legislative Reference Service, which was the first service selected for on-line input and access. 2741 terminals were installed for this purpose. By means of the machine-stored information, a *Digest of Public Bills* is compiled and printed.

If the Library had waited for the Perfect System before proceeding, little if any progress would have resulted. Instead, they went ahead, with careful planning, even tho it was fully realized that so large an enterprize way never get completely automated.

At the Los Angeles (City) Public Library, computer printouts of new book titles have been made available for readers to consult. There has been little publicity about this new service, nor about other plans, but perhaps something will be written about it later on.

Like many other libraries thruout the country, the Los Angeles Public Library uses a partially-automated micro-photographic system for charging books. The reader's card is photographed together with a due-date-and-transaction-number card and a title card kept in the book pocket. Thus who borrowed what book when can be traced, and since the due-date cards are punched in the standard IBM fashion, the circulation statistics and the fines that should be collected can be automatically tallied.

Various inventions have been suggested for automating the detection of book thefts from libraries, which has become a most serious problem. It deserves the public's concern, since most libraries are tax-supported and can ill afford to lose books. Often certain titles are irreplaceable.

Appendix - Concerning Spelling Reform

A standard, classical objection to reforming English spelling, has been the stupendous problems involved in the transition or changeover, and with the co-existence of two orthographies. To support this kind of argument, it has become customary to appeal to all kinds of economic and financial obstacles, such as the tremendous cost of reprinting all the books, or of scrapping all typewriters and Linotype machines.

In connection with the subject we have been discussing, the automation of libraries and their various procedures and functions, the impact of any reform in English orthography would obviously be far-reaching. If there is even the slightest chance that such a reform would go through, even partially, within the next century, any plans to automate certain procedures in libraries will have to take it into account by providing for it.

For instance, let us take the problems in cataloging. Suppose, for the sake of argument, that an often-proposed form of "simplified spelling" went through: dropping of most silent letters, reduction of most doubled letters to single, and the substitution of *f* for *ph* and *gh* when these digraphs are pronounced *f.* Many librarians and their assistants refuse even to think of such a "frightful" possibility: it would mean that all entries under *Philosophy* and *Philology* would go back in the alphabet under *f*, and that *Psychology* cards would have to be refiled under *s* - which might involve thousands of cards. Usually the mere mention of this possibility and its consequences is

administered by a stern, unanswerable rebuke, and the innovator or reformer is expected to retire in meek cringing silence and forever after hold his peace - or else be considered an idle dreamer.

Inevitably, there would have to be a transition period, during which both orthographies would be in use: this entails extensive cross-references, such that the old alphabetical places of the subject-headings could not be neatly abolished; they would have to be retained or cross-referenced for a time - perhaps for years, e.g. *Philosophy,* see *Filosoli.* Indeed, this is no new *problem - economics* was once *oeconomics,* and *aesthetics* and *esthetics* are still fighting it out now. Some of the earlier accounts of the Dewey Decimal classification system for libraries carry a half-simplified spelling, *Philosofy,* which hedges on this very thorny point to avoid relocating these words under f.

Different libraries which must have some communication with each other would not change their files at the same time, and it is unrealistic to expect that the entire English-speaking world would ever agree to the *same* spelling reform at the *same* time - unless by international conference. One has only to consider the numerous gradual reforms in Portuguese orthography, which were not synchronized in Brazil and Portugal. In the case of the new Russian orthography altho many words were changed very few *initial* letters had to be changed, so that the effect on directories, catalogs, and such was quite small.

However, there are compensating factors. So long as maintaining a library catalog was a manual, clerical task, the job of implementing any spelling reform would have been most formidable. But with the new problem, how to automate library cataloging, also comes the solution: the transcription or transliteration between the old and new alphabets can be handled automatically, with only a minimum of human editing. Thus the serious, threatening problem of 1900 or 1935 becomes a pseudo-problem, a mere ghost or shadow of itself. It would even become feasible to create duplicate catalogs, one in each orthography. This might be desirable in order to alleviate the "uncontrolled feedback" or "merry-go-round" situation that would result from certain spelling-reform schemes - for instance, if the letter *i* is given its European sound in the new orthography, then our present *seat* becomes *sit*, while *heat* becomes *hit,* which means that 99% of the words with the long-*e* could be confused with regularly spelt words with short-*i*. This would not be right even if no old-orthography cards or cross-references remain in the old spelling, but intolerably confusing if both old and new entries were to be merged into one alphabetical sequence in the existing catalog drawers. Not only would human catalog-users be confused, but all machine-readable records would have to contain built-in indicators to show whether such a word as *sit* or *hit* were in the old or new spelling. If this were not done, these words would get re-transliterated into whatever the new spelling for the short-*i* sound was. The merry-go-round effect - automatically re-transliterated by the mindless computer. And complete with pseudo-cross-references also generated automatically. Consequently any reform using the continental sound values for *i* (as in machine) and *e* (as in *fete)* is unthinkable for English. Also let all spelling reformers beware of creating a monster - a system that, for instance, spells *full* as: *fool.*

Almost since the first proposals for a reform of English spelling, most reformers have conceded without any argument or struggle or hesitation that they would not touch any proper names. But how is such a proper-name taboo to be implemented in terms of automation programs? It could be very costly indeed. The argument for preserving the traditional spelling of all proper names has a certain persuasiveness to it - until you consider the new possibility on the horizon of automatic speech recognition and automatic reading-out-loud machines. When these new developments become feasible, a proper name-taboo instantly will become impractical. But we recognize that changing proper names must be done through the courts, to be legal and maintain correlation. Until that time, the taboo seems quite necessary.

Actually, the wall has already been circumvented - with a filing scheme called *Soundex.* This is a

method for bringing together similar-sounding names even those that differ slightly but not materially, such as Andersen and Anderson, or Shafer, Schafer, Schaefer, and Schaeffer, etc. Many business firms which maintain enormous mailing lists or personnel files find this system very useful in preventing loss of data due to misspelt names or names misunderstood over the telephone. Similarly, it could be useful in libraries where titles or author's names have to be searched for when one is *not sure of the spelling.*

With certain modifications, it might be extended to foreign language variants of common names and to homophones and certain words which occur frequently in book titles.

Some of the new codes for alphanumeric data provide for additional characters. In library work especially, the total of diacritically-marked letters in the principal Roman-alphabet languages, such as French, German, Polish, Czech, Swedish, Spanish, Portuguese, etc., runs almost to a hundred, plus the Greek letters needed in mathematics. And then there are a number of scientific and technical symbols which must be accomodated. In some of these codes, there are blank or spare positions, so that introducing new letters into the English alphabet will be possible. In other codes, such as the 5-unit Baudot Code, most of the punch-card alphanumeric codings, and the like, there is no room for additional characters, and desperate expedients have been resorted to for expressing diacritics: for instance, French é, è, ê, and ë may get tendered as: El, E2, E3, and E4 respectively. This in its turn introduces a very serious problem of transliterating from one code to another. Incidentally, many of the so-called computer programming languages look like cryptograms because symbols like * and $ have to serve very strange, unusual purposes in the Fortran system: * is multiplication sign, **exponentiation (the following character is an exponent), $ various (in Russian, it is the soft sign, Ь.

A very important point is that any spelling reform (with no new letters) the cost would not be insignificant. In an alphabet reform, however slight or however drastic, it would cost about the same to implement, so far as data-processing equipment is concerned. We are no longer in the hardware age, when changes of this kind were a matter of scrapping existing machinery (typewriters, type for hand-setting, typesetting machines, etc.) or refitting or remodeling it some way. We are now in the *software* era, as the computer people put it, where the "programs" count as much or more than the apparatus on which these programs are executed. To put it another way, the coding is now given a very high price. There are first-, second-, third-, and higher-order codes involved, and the construction and corrections of these schemes requires many man-hours of highly skilled preparation.

In the case of spelling reform, this means that using accent marks over letters would not be cheaper than inventing new letters. Since such letters as theta, delta, sigma, etc. are already provided for use as mathematical signs, they might as well be put to work in an enlarged alphabet. As for digraphs, if the digraph has a different value than the two letters taken separately, it will become very costly or nearly impossible to have the machines and their coding schemes interpret digraphs in the easy way in which human readers can.

To summarize, the cost of any and all changes has itself been radically changed. Unless spelling reformers consult with data-processing experts, all their efforts will be useless. The conditions and parameters have been so gravely altered that any pre-computer-age schemes will have to be thoroly re-examined and re-evaluated.

[Spelling Reform Anthology §15 p214 in the printed version]
[Spelling Progress Bulletin Winter1979 p5, as part of another artice, in the printed version]

3. Modern Technology & Spelling Reform, by Helen B Bisgard.

By whose standard of pronunciation shall the computer spelling be established? By the same standard now used by a dictionary when it indicates the generally accepted punctuation. For example: *pheasant* is shown as (fez'-ənt). The pronunciation in parenthesis is a broad transcription and does not represent regional or individual practice. If, perchance, an Alabaman says (faz'-ənt), a Polynesian (fiz'-ant), or a lisper (feth'-nt), each of these speakers will nevertheless use the machine' s standard spelling. He will unconsciously assign a modified sound just as he does now to the examples shown in the dictionary's pronunciation key. His pronunciation is not so different from the standard that he cannot read standard spelling, or conversely, that he cannot understand speech as presented in Voice of America broadcasts. Listeners throughout the world now tune into these newscasts. Travelers comprehend English whether spoken by native people in Asia, Europe, Africa, Ireland, Texas, or the Bronx. After the change which was triggered by computer technologists has been effectuated, the opposition of historical linguists and the man in the street will be forgotten. Economic urgency will determine what course is followed by technologists. It will determine whether they use a reformed spelling system or continue to be restrained in accomplishments by our discouraging spelling.

The foregoing speculative prediction about future developments makes the process sound predetermined, leaving little for us to do but complacently watch as our dream of sensible spelling comes true. However, as you have likely noted, there are IF's in the prognostication: *If* the inventor decides to market his computer regardless of its inability to spelling in the customary manner, and *if* the public adjusts to these unusual word forms. Then there's a possibility which I should like to only whisper. I am a bit worried that we may alredy be too late. A computer programmer tells me that simpler spelling will not be necessary because the machine will soon be able to handle traditional orthography.

Consider the phrase *to be*. Although there are six possibilities, three for the word *to*: (t-o, t-w-o, t-o-o) and two for the word *be*: (b-e, b-e-e), t-o-o can be eliminated since it is not good English, neither is *t-w-o b-e,* because after *two,* only the plural *bees* would be correct, not the singular *b-e-e*: so the machine can be programmed to write *t-o b-e* as the only correct spelling.

The task of organisations such as the Simplified Spelling Society and the Phonemic Spelling Council is to ensure the certainty of success in the use of a reformed spelling. They must recommend the most practicable improved system not only for the computer but also for the general public, and not forgetting that an initial learning medium will be useful for a long time. We must also present effective procedures for showing the desirability to business, education, and government.

We must immediately develop our strategy for becoming experts on computer linguistics.

-o0o-

o-u-g-h

A farmhand who set out to plough,
Once harnessed an ox with a cough;
But the farmer came out,
With a furious shout,
And told him he didn't know hough.

In a manner exceedingly rough
He proceeded to bluster and blough;
He scolded and scowled,
He raved and he howled,
And declared he'd have none of such stough.

At length with a growl and a cough,
He dragged the poor boy to the trough,
And plunging him in
Clear up to his chin,
Discharged him and ordered him ough.

(From *Rimes without reason*)

[Spelling Reform Anthology §15.4 p216 in the printed version]
[Spelling Progress Bulletin Fall 1977 p15 in the printed version]

4. A Saen Balans Between Tradishun and Lojik, by Edward Rondthaler*

**Co-inventor of the first photolettering machine in the early 1930s, Edward Rondthaler is chairman of the board of International Typeface Corp. He lives in Croton-on-Hudson, N.Y.*

*Reprinted from *Los Angeles Times,* Aug. 12, 1977.

In America, those of us who can read and write English have built a society that depends on widespred literacy. We offer broad educational opportunities to all - to all, that is, who can read and write. Those who cannot are left out. We've provided no role for illiterates and have done nothing to make reading and writing simple.

What's basically wrong is this: English words are made up of 43 different sounds, but we have only 26 letters. If we had used certain letters in regular pairs to represent the additional 17 sounds, reading and writing would be easy. But we haphazardly spell our sounds in several hundred different ways - it's all very iffy. Juggling the different spellings and struggling to learn which one goes with which sound in which word makes spelling much more difficult than it should be.

In spite of this, most American adults can read and write - but 20 million cannot. Their frustrations show up in greater-than-average inclination to throw sand into society's gears. They're not the docile illiterates of yesterday. Unable to master our prerequisite to education, deprived of a significant role in society, many first become dropouts, then juvenile delinquents and ultimately full-fledged criminals. The alternative fate awaiting them: constant unemployment and poverty.

Commenting on a report that more than half of U.S. prison inmates lack functional literacy, Chief Justice Warren E. Burger called the number staggering, and added. "The figures on literacy alone are enough to make one wish that every sentence imposed could include a provision that would grant release when the prisoner had learned to read and write."

How can we get out of this pickle? We can go straight to the root of the problem and develop a painless way to make our spelling *reliably phonetic*, as it is in other Western languages. With 25% of our schoolchildren - the rising generation - facing life with serious reading and writing deficiencies, it's time for a frontal attack on what is, without doubt, the major barrier to education for all: erratic English spelling.

Simplifying our spelling has been a scholarly pastime, for centuries - a sort of parlor game not taken too seriously (except by a few cranks like Bernard Shaw and Bertie McCormick) because even the stupidity of our traditional spelling is no more absurd than hoping that hundreds of millions who read and write English will go back to school and learn to spell all over agen. But, thanks to recent typographical developments, we can simplify our reading matter *first* - before we change our writing habits.

Impossible? Consider this:

Typesetting methods are currently undergoing their greatest change in 500 years. This revolution is shaking the printing industry from top to bottom. Typesetting is turning itself inside out as it changes from a three-dimensional mechanical process to a two-dimensional photocomputerized process. Most of the printing you read today is a product of this revolution, this newspaper included. No layman looking at the printed page can notice a difference, but what goes on behind

the scenes is another matter.

Today's new typesetter taps out words on a computer-compatible keyboard linked by magnetic or punched tape to a computerized phototypesetting machine. As the computer receives words from this tape, it combines them with coded signals that control the typesetting mechanism.

Now comes the connection with spelling reform: If the computer were a little larger, it could easily be programmed to accept traditionally spelled words from the tape, instantly simplify the spelling and combine the newly spelled words with the typesetting signals. Thus a keyboard operator would continue to spell traditionally, but the final product would be simplified - automatically.

There's nothing novel about this concept except its application: For years computers have unscambled coded messages of far greater complexity. What's new is that the typesetting revolution makes it possible for computers to take over the hitherto impossible job of simplifying the spelling of English, and to do so as a routine - automatically, accurately, uncomplainingly.

So, without eny adult being urged to change his writing habits, without eny reschooling of authors, editors, copywriters, reporters or typesetters, we have arrived at the point where printed English can be simplified with just the flip of a switch.

We could make this charge in one big leap, but computerized typesetting lends itself equally well to a more comfortable step-by-step shift. Step 1 would be to spell with an "e" all words that have the clear "short-e" vowel sound: *eny*, *hed, frend, sed, redy, heven, brekfast*, and so on.

Throughout this article this first step is being demonstrated - and you can judge for yourself how painless it is. (As an adult, you need never change your own spelling unless, of course, you choose to follow some of the simplifications that show up in print. Computers will do the hard work - they will spearhed the change. You follow along if and when you want to.)

Step 2 might use "f" to replace "ph," or "k" for "ch" in words like *kemistry* and *skool.* There would be 50 or more steps taken gradually over as long a time as required. Unlike adopting the metric system, spelling reform could be ended at eny point - and leave us with a better spelling system than before.

If we jump ahed to the fiftyeth step, az printed heer, it mae seem a bit aukward and perhaps a litl dificult to reed, but it must be remembered that this step wil not cum until yeerz after th furst step haz bin taeken, and bi that tiem our reeding habits wil hav had ampl oportuenity to ajust to a lojical patern ov speling - simplified sound-speling.

The means for carrying out experiments, with this 26-letter "Soundspel" system are at hand. A computer at New Jersey's Ocean County College in Toms River is now programmed with 44,000 most-used English words paired in traditional and simplified spellings for automatic transliteration.

Serious attention to reform is growing as more and more of us realize its social implications at home, and its importance to the spred of English abroad as an international "second language." Thus an urgent need arises for those willing to accept even a small measure of reform to speak up for it, to talk about it, to build public awareness in the same way that environmentalists hammered home the air- and water-pollution story. Only when voters demand it will Congress require manufacturers to build typesetting machines that produce rational spelling - just as auto makers are required to build pollution -free exhausts.

This is a crusade that must be pressed. It iz th furst step tord spelling reform.

[Spelling Reform Anthology §15.5 pp216-220 in the printed version]
[Spelling Progress Bulletin Fall 1977 pp15-19 in the printed version]

5. LIGHT AT THE END OF THE TUNNEL, by Edward Rondthaler

TINKERING with English spelling - simplifying it to make it easier - has been a scholarly pastime for centuries: a sort of parlor game not taken too seriously by anybody because even the stupidity of our traditional spelling is no more absurd than expecting the hundreds of millions who now read and write English to go back to school and learn how to spell all over again - or hoping that children with a brief exposure to phonetics will some day rise up en masse and demand spelling reform.

Such hopes, such utopian dreams do not square with the facts. Our human nature is not easily changed - even for so worthy a cause as better spelling. The big writing reform in Turkey fifty years ago did not spring from public demand. It came as a dictatorial decree rammed down the throats of millions. Where, in an English speaking democracy, will you find a leader powerful enough to issue such an unpopular edict, and make it stick?

Dr. Godfrey Dewey calls our erratic spelling the Roadblock to Reading. Let's put it more bluntly: the real roadblock to reading is the impossibility of persuading millions to change their writing habits. Were it not for this we'd have had spelling reform long long ago.

No amount of wishful thinking will push this roadblock aside, but thanks to recent typographical developments we can detour around it and simplify our reading matter *before* we change our writing habits!

Impossible? Consider this:

Traditional typesetting methods are undergoing their greatest change in 500 years. It is a revolution of giant proportions, shaking the printing industry from top to bottom. Typesetting is now turning itself inside out as it changes from a 3-dimensional mechanical process to a 2-dimensional photo-computerized process. Most of the printed matter you read today is a product of this revolution. No layman casually looking at the printed page can see any difference; but what goes on behind the scene is quite another matter.

Today's newly trained typesetter taps out words on a computer-compatible keyboard connected by punched or magnetic tape to a computerized photo-typesetting machine. As the computer receives words from the tape it digests them, relates them to pre-coded technical instructions, and sends amended signals to the photo-composing mechanism telling it what words to set and precisely how to set them. If, for example, the operator taps out the letters a-n-y, the computer will signal the composing machine to set a-n-y in a specific type style, size, width and spacing. It will also precalculate the justification, quadding, centering or indentation, and when a full word fails to fit on the end of a line it checks back into memory and finds out where the word should be divided! This sleight of hand takes place at astronomical speeds.

Now comes the key that unlocks the door to spelling reform. If the machine's computer were a little larger it could do even more. It could receive words in traditional spelling, simplify the spelling automatically, and pass them along for typesetting in the new simplified form! There is nothing particularly novel about this concept except its application: for years computers have been unscrambling secret coded messages of far greater complexity. What is new is that the typesetting revolution makes it possible for computers to take over the hitherto impossible job of simplifying the spelling of printed English - to do it as a routine - automatically, consistently and uncomplainingly. Every time a keyboard operator taps out the letters a-n-y the computer will send out the signal e-n-

y - or even e-n-i, depending on the system of simplification finally agreed upon.

And so, without any change in our writing habits, without any re-schooling of authors, editor, copywriters, reporters, or typesetters, we are on the threshold of being able to simplify the spelling of printed English with an instant flip of the switch. If spelling reform is ever achieved, automatic transliteration will spearhead the change. Indeed from this day forward we should look to the computers of the typesetting industry to solve a problem for humanity that will never be solved otherwise.

Computerized transliteration lends itself equally well to an instant change, or to a gradual "step-by-step" shift as currently proposed by Harry Lindgren of Australia. With automatic transliteration leading the way, the "50 steps of change" that Mr. Lindgren suggests could probably be covered in far less time than the fifty years he foresees. Fifty steps in 50 or 100 months might be a better estimate. If after taking a few of these steps we found it advisable to go no further we could end reform at that point and be considerably better off than we were before. Which, incidentally, is one of the reasons why spelling reform is less of an all-or-nothing commitment than the change to Metric.

But what about personal or business letters and handwritten notes that never get into print? What about Aunt Sophia, and Grandmother, and Uncle Amos? What about all the retraining? Lose no sleep over such matters. When computers lead the way the rest of us can follow at our own pace - if we want to. Many of us will pick up the new spelling from the printed page. If it makes sense we'll adopt it, as fast or as slowly as we wish. Others will continue to write traditionally. No matter. We need no drive for converts. No one should ever be urged to update his spelling. Those who from childhood have spelled traditionally will always be able to read both ways and to write traditionally - until our quaint orthography dies a natural death. That's how it's been in Holland, Germany, Norway, Denmark, Russia, France, Turkey, Korea and other countries where improvements in spelling have taken place.

So much for spelling and writing. How about reading? Readers cannot be computerized.

Here we come face-to-face with long established habits, and we may meet big resistance. We won't know how much until we try, but since we can end the reform steps at any point we have nothing to lose by making a start. To minimize reading resistance we must do everything possible to make reformed reading easy. The changeover must be so gradual, so inconspicuous, so natural, so logical and sensible, so comfortable for the reader, and introduced so subtly that he is hardly aware of being wooed away from his childhood spelling. And this is precisely where computers rise to the occasion. They can slowly but surely feed new spellings into the mainstream of printed matter, feeding them in so gently that the man-in-the-street should have little reason to be upset. He should be given every chance to adjust comfortably. Month by month we will monitor public acceptance through a series of opinion polls, enabling us to introduce each new step from coast to coast or worldwide with the very best of timing.

There is, of course, a good chance that acceptance will come much faster than we anticipate. Graphic change is now quite commonplace. You can test this for yourself by comparing typical posters, magazines and advertising today with a similar sampling from a decade or two ago. You'll be impressed at how quickly we've adjusted to new visual presentations without even knowing it. Or look back at the late '20s when printers introduced a rash of typefaces with newly designed g's and a's based on a single circle. The new shapes of these two upright lowercase letters changed about 40% of our "word-pictures" as traditionally printed and read by successive generations. Yet the change brought no whimper of public protest. It is worth noting that typesetters of the '20s willingly accepted the newly shaped letters because, as far as they were concerned, the shift was

purely mechanical - as it will be with computerized transliteration. These examples of graphic change are not as formidable as those of spelling reform. Nevertheless the public may take it in stride and surprise us.

But before any of this can come to pass the ball must be started rolling. That will take a big push from a big giant. Who is the most likely giant?

We're told that reading and writing failure is the chief cause of school dropout. We're told that youthful dropouts are, to a large extent, the fuel of our anti-social problems: juvenile delinquency, crime-in-the-streets, hard core unemployment, poverty and, to some extent, drug abuse. Yet nobody with a big voice is saying that we should attack these titanic social evils by reforming our haphazard, frustrating spelling - the major cause of dropout. Why not? Why aren't our social agencies, our police, our prisons, reform schools, "Head Start" programs, BOCES, our welfare workers, and our schools - why aren't they out in front fighting for simplification? A good guess is that up to now they've regarded the task as far too formidable. And up to now they were probably right.

But no longer. Our Federal and State social agencies could easily take the lead. Their problems are enormous, their work load is growing heavier every day, and in the long run they stand to gain a great deal from reform. Commenting on the fact that over half of the country's prisoners cannot write, Chief Justice Berger of the Supreme Court says! "The percentage of inmates in all institutions who cannot read or write is staggering . . . figures on literacy alone are enough to make one wish that every sentence imposed could include a provision that would grant release when the prisoner had learned to read and write."

When our social agencies begin to see how transliterating computers can be used to spearhead spelling change - so "we the people" can just fall in behind - they may speak up for reform. Their voice is big. It is big enough to get the job done. Their giant push could start the ball rolling.

Another big push might come from those engaged in areas where English has become a "second language": foreign trade and commerce, international communication, and negotiations between nations. A simpler spelling of English has much to offer here.

And finally we have the parents of our school children, 25% of whom are two to six years behind grade in reading and writing; the mothers and fathers of 700,000 dropouts each year, and the friends of 20,000,000 functionally illiterate U.S. adults.

While we're wooing concerned parents, social agencies, international business men, the U.N. diplomats and others, we should not overlook the importance of winning the printing industry to our side. Printers - particularly graphic designers, type directors, and typographers - have spent their lives studying the legibility, and artistry, the graphics and mechanics of the printed page. They, better than anyone else, know what makes a page easy to read, what interferes with reading, what gives a page warmth, what makes it cold. They are experienced at cushioning the impact of change and know quite a bit, in a very practical way about reader psychology. If they cannot be won to reform, reform is not likely to be won without them.

What then, will the first transliterating computer be able to do, and when will it be doing it?

An experimental transliterating computer is now programmed with the 44,000 most-used words in written contemporary English. This collection of words comes largely from a study completed in 1961 by Dr. W. N. Francis of Brown University's Department of Linguistics. It covers a million-word sampling of running text selected from a wide variety of subjects: news, editorials, the arts,

hobbies, skills, religion, science, biography, memoirs, general fiction, science fiction, humor, romance, mysteries, mathematics, humanities, natural sciences, annual reports, government documents, etc. Proper names and unusual technical terms have, for the present, been deleted from this list, but for each deletion a word has been added from the Merriam-Webster list of 35,000 most-used words or from the McGraw-Hill list of 20,000. The total is substantially a composite of all three lists. These 44,000 words have been transliterated into Soundspel, placed on magnetic tape (with traditional and simplified spellings in parallel) and programmed so that traditionally spelled input tape will generate a matching output tape in simplified spelling. The output tape is compatible with photo-typesetting machines. Complete typeset pages may now be produced without individual transliterating or manual re-keyboarding.

The Soundspel phonetic system used for the transliterating program is a merger of Ripman-Archer "New Spelling," Godfrey Dewey's "World English Spelling," and certain modifications suggested by the Typographic Council for Spelling Reform. The pronunciation standard is the broadcasting industries "NBC Handbook of Pronunciation," the "Random House Dictionary of the English Language." or "Webster's New International Dictionary," whichever sanctions the least deviation from traditional spelling.

As soon as the first series of tests is completed the Council will, if the need arises, make its program available for experimentation with other systems of English orthography. Such systems need not be limited to the conventional Roman alphabet since the program and typesetting facilities have enough flexibility to accommodate unique letters.

The project's computer facility is located at Ocean County College in Toms River, New Jersey. The phototypesetting and design facility is the combined equipment and resources of Photo-Lettering Inc. and the International Typeface Corporation in New York. Ed Lias is in charge of the former, Edward Rondthaler of the latter. The Council enjoys the confidence and support of the institutions just mentioned, it seeks to broaden its contacts with all who see the need for spelling reform or can in any way be influential in stimulating progress toward that end, and it hopes that the project will serve as the typographic industry's contribution to wider use of written English for the enlightenment and benefit of mankind.

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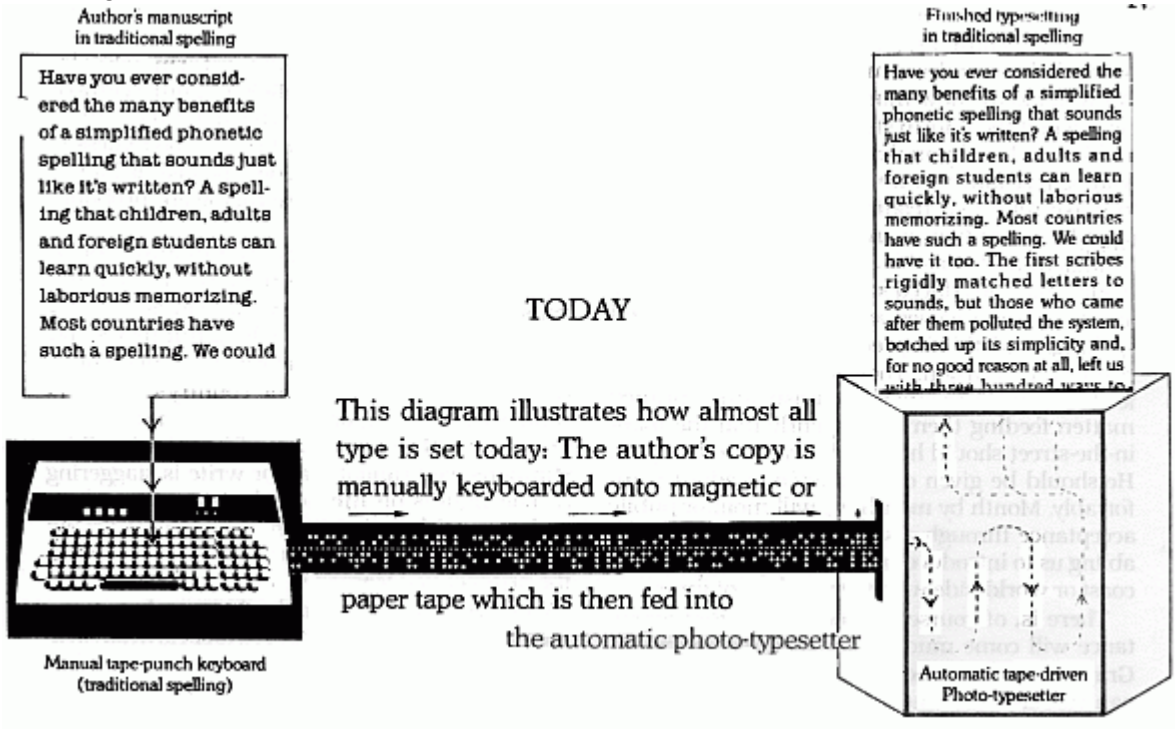
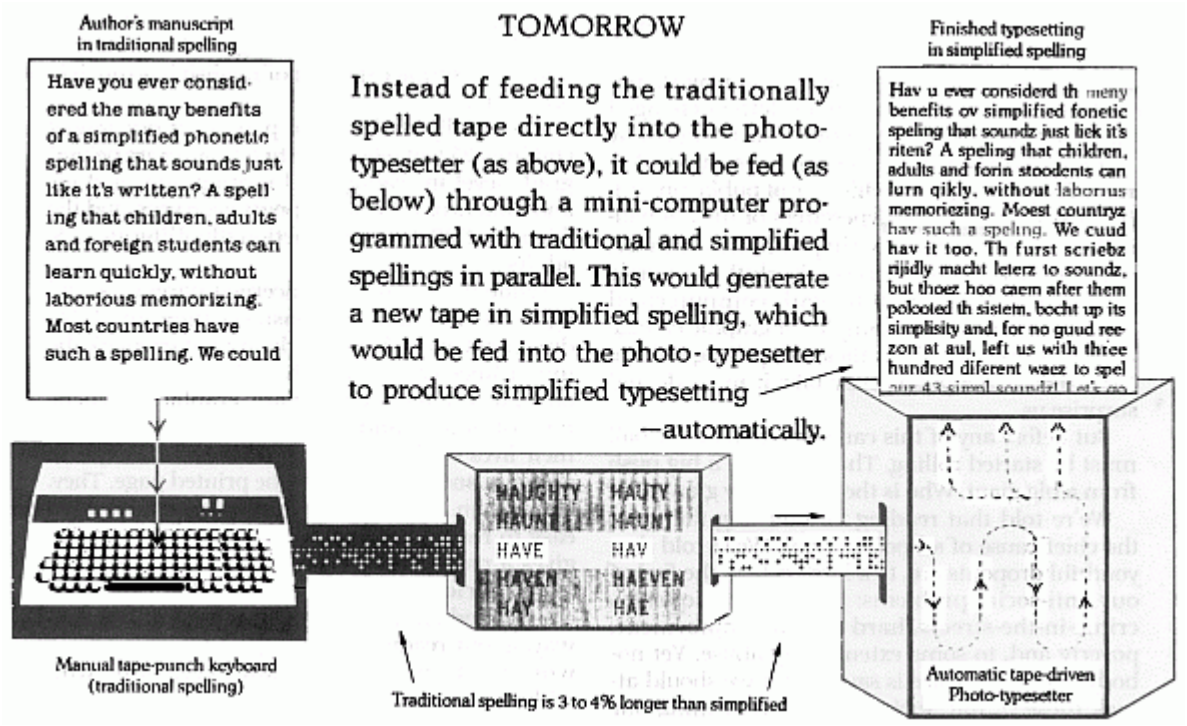
See diagrams below:




Author's manuscript
in traditional spelling
Have you ever consid-
ered the many benefits
of a simplified phonetic
spelling that sounds just
like it's written? A spell-
ing that children, adults
and foreign students can
learn quickly, without
laborious memorizing.
Most countries have
such a spelling. We could
TOMORROW
Instead of feeding the traditionally spelled tape directly into the photo-typesetter (as above), it could be fed (as below) through a mini-computer programmed with traditional and simplified spellings in parallel. This would generate a new tape in simplified spelling, which would be fed into the photo-typesetter to produce simplified typesetting —automatically.
Finished typesetting
in simplified spelling
Hav u ever considerd th meny
benefits ov simplified fonetic
speling that soundz just liek it's
riten? A speling that children,
adults and forin stoodents can
lurn qikly, without laborius
memoriezing. Moest countryz
hav such a speling. We cuud
hav it too. Th furst scriebz
rijidly macht leterz to soundz,
but thoez hoo caem after them
polooted th sistem, bocht up its
simplisity and, for no guud ree-
zon at aul, left us with three
hundred diferent waez to spel
NAUGHTY
HAUTY
HAUNT
HAVE
HAV
HAVEN
HAEVEN
HAV
HAE
Manual tape-punch keyboard
(traditional spelling)
Traditional spelling is 3 to 4% longer than simplified
Automatic tape-driven
Photo-typesetter