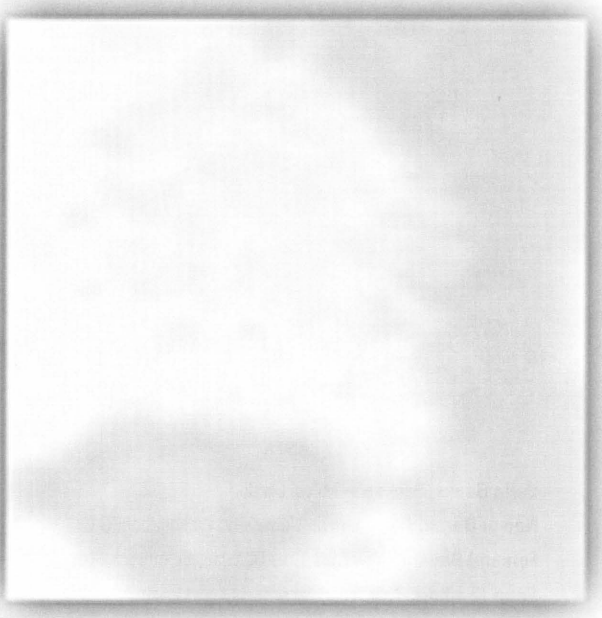
Visible Language is concerned with research and ideas that help define the unique role and properties of written language. It is a basic premise of the journal that writing/reading form an autonomous system of language expression which must be defined and developed on its own terms. Published since 1967, Visible Language maintains its policy of having no formal editorial affiliation with any professional organization — which requires the continuing, active cooperation of key investigators and practitioners in all of the disciplines which impinge on the journal's development of the visible language concept.

Postmaster:
send address changes to

Visible Language
Rhode Island
School of Design
Graphic Design Department
2 College Street
Providence
RI 02903

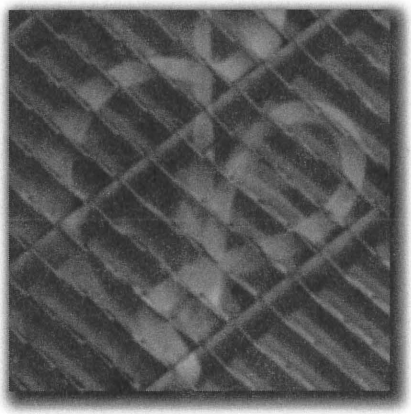
Published tri-annually in
January, May
and September



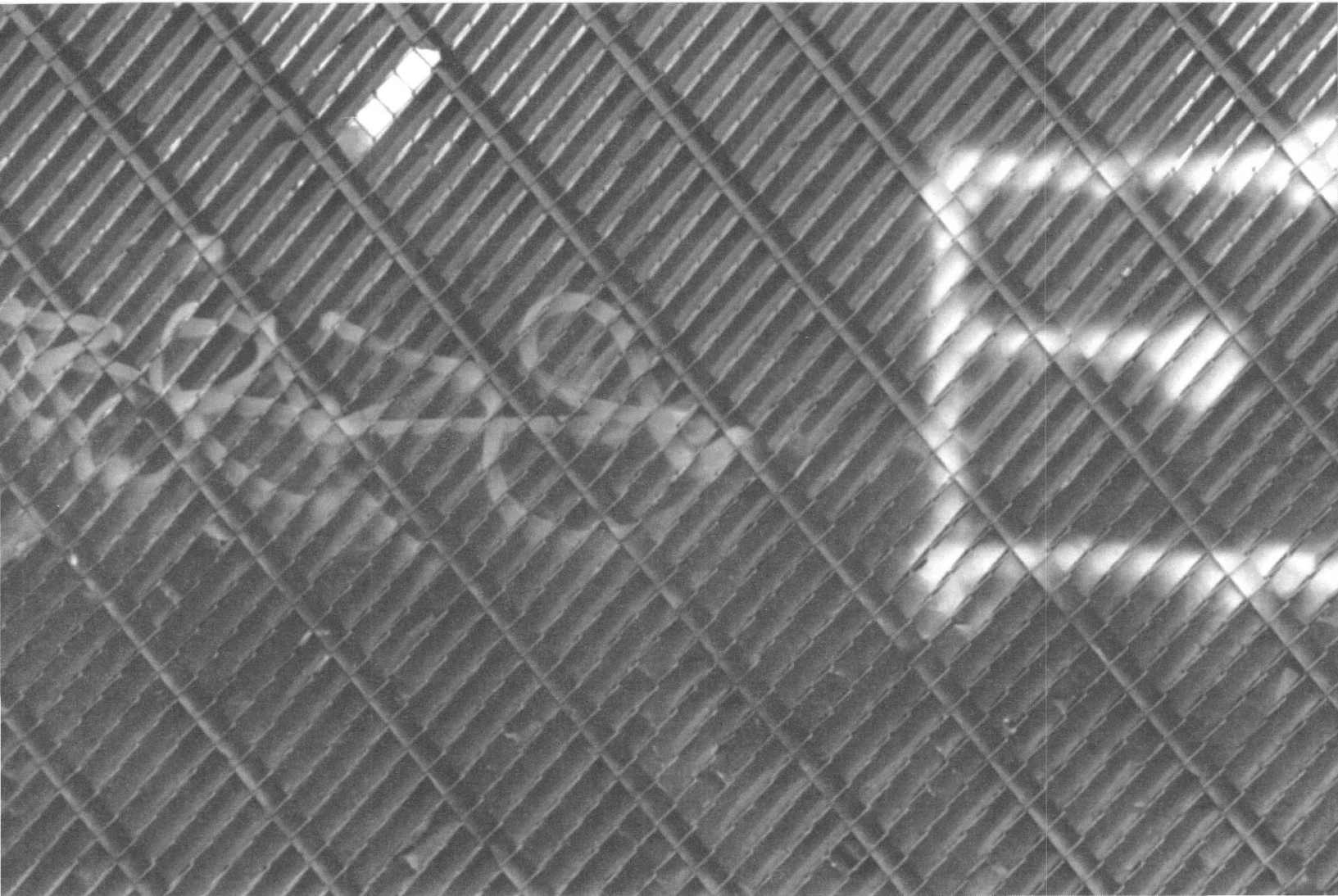
Visible Language 30:1

Volume 30
Number 1
Winter 1996

The journal concerned with all
that is involved with being literate.



Visible Language 30:1



John DeFrancis

How Efficient is the Chinese Writing System?

To help resolve disagreement regarding the relative efficiency of the Chinese system of writing, it is useful to take a close look at some of its specific applications. A good starting point is the arrangement of characters in dictionaries and the lookup procedures involved in locating entries. A closely related matter is composing text and reproducing it, processes which include typesetting, typewriting and digital composition. Composing text brings up the peculiarly difficult problem of segmenting text, which is rendered all the more acute by lack of agreement on how to standardize the orthography of the Pinyin alphabetic system that is acquiring new importance as an adjunct to handling characters on computers. Reformers increasingly emphasize the need for a policy of digraphia, the coexistence of two writing systems, Pinyin and the traditional characters, each to be used in the areas to which it is best suited. This trend throws further light on the efficiency of Chinese characters by bringing to the fore how they relate to reading and writing and where they fit into the classification of writing systems.

John DeFrancis, after a long and productive career as a Chinese language scholar teaching at notable American universities, continues to contribute to knowledge in this field with his recent publication of In the Footsteps of Jenghis Khan *(University of Hawaii Press, 1993). His next major publication, expected in spring 1996, is a compilation for the* ABC Dictionary *(short for Alphabetically Based Computerized Chinese-English Dictionary) on which he has been working with colleagues in the United States and China.*

Center for Chinese Studies
University of Hawaii at Manoa

Honolulu
Hawaii 96822

Visible Language, 30:1
John DeFrancis,
6-44

Rhode Island
School of Design

Providence
Rhode Island 02903

Chinese characters occupy the least amount of space. Their sound, shape and meaning are all concentrated within a square; the characters can be read and understood at a glance. This makes them distinctively superior to other writing systems in efficiency for reading and comprehension.

Li Youren 1991:69.[1]

CHARACTERS 'EASIER THAN ABC TO READ'

Headline in *China Daily 11/15/1984.*[2]

Many Chinese continue to hold opinions similar to those quoted above despite reformist efforts, now over one hundred years old, to advance a contrary view of the Chinese character system as excessively difficult, hopelessly inefficient and urgently needing to be supplemented, if not replaced, by an alphabetic system of writing. These disparate views touch upon everything from the actual use of characters in everyday life to the academic question of their classification among the writing systems of the world.

A decade and a half ago a leading Chinese linguist noted that attempts to determine optimal orthography for languages have generally suffered from a dearth of scientific investigation (Wang, 1981:234). Although some progress has been made since then, it remains true that the pertinent research that might help determine optimal orthography and facilitate comparisons between writing systems remains scanty. Nevertheless, it may still be possible to say something useful about the subject, particularly if we eschew facile generalizations and speculations in favor of the more arduous task of examining some concrete instances of graphic usage. It is only, I believe, by actually working through the details (here much simplified) of some specific applications that one can begin to acquire a firm basis for evaluating the efficiency of the Chinese script.

We can begin with Li's assertion that "the characters can be read and understood at a glance." Let us test this assertion by inviting some visiting Martians, equally unfamiliar with Chinese characters or latin scripts such as German and English, to glance at the expressions 欢迎 and *Willkomen!* and *Welcome!* Such a test would no doubt provide irrefutable proof that graphic symbols cannot be read and understood at a glance unless one has learned them beforehand or has gained familiarity with the system to which they belong.

1
Li Youren teaches at Dezhou Teacher' College in Shandong province.

2
The headline is based on an article by Zeng Xingchu of the Psychology Department of East China Normal University in Shanghai (Zeng Xingchu, 1983–1984).

Of course Li assumed possession of such familiarity, a blithe assumption that dodges the issue of efficiency by neglecting to consider how much time and effort is needed to acquire the knowledge, or, more broadly stated, what it takes to learn to read and write any script.

We are confronted here with the cat's–cradle problem of literacy. It appears hopeless to think that scientific tests can be devised which would make possible overall comparison across scripts of something that it has proved impossible even to define, much less measure, with any significant degree of agreement. We cannot do much better than to cite the frequently expressed belief that it takes at least two years more for Chinese to become literate in their script than it does for Westerners to achieve an equivalent level of literacy in theirs.

Although most Chinese would probably agree that their characters are indeed more difficult, without necessarily concurring in the precise degree of difference, there are others whose views are reflected in the headline quoted above reporting the claim of a Chinese psychologist that "children aged 2 to 4 can easily learn 3,000 characters." Advocates of writing reform have sharply criticized as scientifically unacceptable the methods used in arriving at such claims and they reject this and similar claims of simplicity as chauvinistic twaddle (Zheng, 1983; DeFrancis, 1989, 120–121).

In further pursuit of a common–sense evaluation of some specific applications of writing in everyday life, let us assume a basic knowledge of how the Chinese and Western systems work and then apply this knowledge to looking up some terms, among them those we presented to our Martian visitors, in dictionaries compiled for native speakers of the three languages. Although perhaps not entirely certain how the German and English words are to be pronounced (does *come* in *Welcome* rhyme with *some* or *dome*?), by mechanically following the sequence of letters we succeed, in a matter of seconds, in locating the terms and finding how they are pronounced and what they mean.

The spelling of the Chinese characters is an even less reliable guide to their actual pronunciation than in the case of the notorious English orthography, especially since the mid–fifties, when the People's Republic of China (PRC) introduced simplified forms for about a third of the older complicated characters. For example, if we look at the two characters that comprise the expression 欢迎, namely 欢 and 迎, we note that 欢 used to be

written as 歡 (and still is in Taiwan and Hong Kong). The phonetic component 雚 located on the left hand side of character 歡 spells *guàn,* whereas the whole character 歡 has the pronunciation *huān.* The phonetic component 卬 located at the top right of the second character (i.e., 迎) in欢迎 represents the sound *áng,* which has the same final as the sound *yíng* of the whole character 迎. So the spelling *guàn'áng* suggested by the two pre–simplification phonetic elements 雚 and 卬 actually represents the pronunciation *huānyíng* for the expression欢迎, a disparity comparable to that between *psalm* and its actual pronunciation. However, simplification of the old phonetic element 雚 to the new element 又, which has the unhelpful pronunciation *yòu,* has eliminated the similarity that used to exist between *guàn:huān* for 雚 and 歡.

The Dictionary Problem

The introduction of simplified characters has complicated the problem of dictionary lookups. We first have to decide whether a character dates from before or after the PRC reform. If it is a simplified character, such as the first character 欢 in expression 欢迎, we have to consult a mainland dictionary or a conventional dictionary produced elsewhere that has a conversion table. If it is an original non–simplified form of a simplified character, such as 歡, we have to look it up in a Taiwan or other non–PRC dictionary, or check with a PRC dictionary that provides a conversion. If it is a non–simplified form of a traditional character, such as both characters in 激光, namely 激 and 光, we can look it up in any dictionary. It is often not readily apparent whether a particular character is a simplified or non–simplified graph, in which case we may have to try elsewhere after an initial failure to locate it.

It turns out, however, that even if we knew at first glance, or learned by consulting a dictionary, that the characters in 欢迎in both their simplified and unsimplified form combine to make a term that is pronounced and transcribed as *huānyíng,* this knowledge would not enable us to emulate the German and English lookup procedures, for the Chinese have not produced a single dictionary in which the entries are arranged in simple alphabetic order. Instead they have contrived a host of other schemes all based on the shape of the characters.

Some dictionaries arrange the characters by total number of strokes. Most dictionaries based on some other arrangement include a stroke–order index, if not for all entries then at least for characters not easily found by other arrangements — generally about ten percent. The stroke–order arrangement involves a tedious counting of the number of strokes in the character (in the case of 歡, we count 1, 2, 3,...22 strokes) and checking in the general neighborhood of the supposed number in the numerous instances where the exact number is not clear; one can therefore easily make a mistake in arriving at the right total. As a result this is not a popular approach, but it remains useful, especially as a last resort when other approaches fail for one reason or another to lead to the item being searched.

The most popular arrangement is the so–called 'radical system' or 'radical–stroke system' initiated by the first Chinese dictionary, of the second century A.D., which arranged its 9,353 characters under 540 semantic keys, popularly but misleadingly called radicals, such as water, insect, vegetation. The number was later reduced to 214, which remained the standard until the PRC introduction of simplified forms for some of the traditional graphs. Since then PRC lexicography has been in a state of almost complete chaos, with dictionary–makers going their own way by variously arranging the characters under 186, 187, 188, 191, 201, 225, 226, 227, 242 and 250 keys. This is as if OED, Webster, and other dictionaries disagreed as to whether to retain the old A to Z order or change it by, say, placing the digraph *ph* after *f* rather than with *p* and grouping all words beginning with the *in* of direction separate from all those beginning with the *in* of negation and from another group containing *indigo* and *inkle.*

Leaving detailed differences aside, all Chinese dictionaries based on this arrangement order the keys by the number of strokes they contain; the number ranges from 1 to 17. Traditionally the keys with the same number of strokes used to be arranged in a fixed order, so that the 'water radical,' for example, was always the 85th out of 214. Dictionaries aimed at foreign users attached the appropriate sequential number to each key. Native dictionaries, however, like ours based on the familiar alphabetic sequence, usually counted on the user's ability to locate an item by its relative position; modern dictionaries are increasingly adding the sequential numbers.

Figure 1

Radical Index of Traditional Characters

As it is often not easy to determine what part of a character might be considered its key, and hence might be used as the basis for filing it, most dictionaries use some other arrangement to lead one to these doubtful characters and note under what radical they will be found. In one such dictionary almost ten percent of its 7,773 entries are listed by the order of their total number of strokes in an appendix entitled "List of Characters having Obscure Radicals" (Mathews, 1945, 1222–1226).

The layout of this important radical–stroke method of ordering Chinese characters can be seen in the accompanying Radical Index of Traditional Characters (*figure 1*), which presents the first and last page of the radical index for 5,000 characters contained in a popular small Chinese–English dictionary (Fenn, 1926). The raised number after some characters refers to the number of additional strokes in the character apart from the key. The order of characters with the same number of residual strokes is not fixed, so that one has to run through all those grouped together before one can determine whether or not the dictionary being consulted has the desired character. The number after each

character refers to the page where its pronunciation and definition may be found — in some dictionaries, to a specific identifying number for the character.

With the PRC babelization of dictionary arrangement, the hapless user of a Chinese dictionary must now exert even greater effort to determine which component of a character is likely to be taken by a dictionary–maker as the key under which to file the character. He must then track down where that key happens to occur in the particular order favored by the lexicographer, and finally must locate the character among those that share the same key by counting the number of additional strokes apart from the key and singling out the desired character from the random sequence of those that have the same number of residual strokes.

If we use a radical–stroke dictionary to look up, for example, the expression 激光, we are likely to guess, correctly, that the first character 激 will be filed under the left–hand key 氵 (conventionally number 85 "water") rather than the right–hand key 攵 (number 66 "to tap"). Next we count the number of additional strokes apart from the key and locate the character among the one or two dozen other characters with thirteen residual strokes under the "water" key. We are then referred to a page where we find the pronunciation rendered as *jī* in the Pinyin system and the definition "to surge; to stir up." (Note that the rest of the character apart from the water key, i.e., 敫, is the phonetic *jī*, which exactly represents, even as to tone, the pronunciation of the full character 激.)

The second character in 激光, namely 光, presents more of a problem and well illustrates some of the complications that have been introduced into the writing system by the PRC changes. As a common unsimplified character it can be found in any dictionary, all of which give its pronunciation as *guāng* and its meaning as "light." In conventional works, character 光 is to be found under 儿, which is key number 10 in the traditional list of 214; it is a variant of 亻, key number 9; both of these keys are given the pronunciation *rén* and are glossed as meaning "man." As a result of the PRC changes 儿 came to be used as the simplified form of 兒 and to acquire its pronunciation *ér* and its meaning "child." It also acquired a new place in PRC dictionaries: number 21 in one list of 189 keys, number 29 in another list of 227.

There is another fairly popular approach to ordering characters known as the Four Corner System. The creator of this system assigned a number from 0 to 9 to the different kinds of strokes that happen to occur in each of the four corners of a character, from upper left to upper right, then down to lower left and lower right corner. The resultant 4–digit number often did not uniquely identify a character, however, so that a fifth digit was added later to help resolve the ambiguity. But even this often does not suffice to solve all the difficulties (Coia, 1985, 81).

There are several versions of the system, including new ones that take account of the changes from traditional to simplified forms. In one such dictionary, a Chinese–Chinese work, after making what is likely to be several attempts to guess the right numbers, we will locate the first character in 激光, namely 激, under the number 3814 that is shared by 11 other characters. For the pronunciation and definition of the character we are referred to page 509, where we find the pronunciation *jī* and a definition that confirms the meaning we had already found in our Chinese–English dictionary (*Xiandai,* 1980).

There is still another method of serial arrangement of characters that is worth mention because of its use in an important dictionary that will be discussed later. That is the *Standard Telegraphic Code* or *S.T.C.* arrangement. In this adaptation of the "radical" ordering, Chinese telegraphy assigns a four–digit number to each of just under 10,000 characters. Referring to the code–book whenever necessary, that is for all but the numbers of frequently–occurring characters that they have memorized, dispatchers send the numbers corresponding to the characters of the message; receivers at the other end reverse the process. Thus the telegraphic code number for 激, the first character in 激光, is 3423 (*Miming*, 1946,34).

Quite a few other ways of ordering characters have been devised by lexicographers who think they have found simpler and more efficient solutions. These idiosyncratic approaches invariably turn out to be difficult to use because what may seem obvious to the compiler is seldom equally obvious to the user. That is a pity, because some of these dictionaries have considerable merit.

After we have consulted one or more dictionaries based on the approaches discussed above and have succeeded in finding that the first character in 激光 has the pronunciation *jī*, we are in a

position to search for the English equivalent of the term *jīguāng* that transcribes the two characters whose respective meanings we have found to be "surge light."

The simplest solution would be to find the term under the letter *j* in an alphabetically arranged dictionary. Here we must distinguish between two quite different kinds of dictionaries that are frequently referred to as alphabetically arranged. One is the fully alphabetic "one–sort dictionary" that arranges all entries in letter–by–letter sequence, so that we have the sequence

lìngwài in addition
línjū neighbor

with *ng* preceding *nj* despite the fact that the breakdown of the two entries by syllables corresponding to the characters is

lín jū
lìng wài

In the other kind of ostensibly "alphabetically arranged" dictionary that is actually only semi–alphabetic, the primary arrangement includes only the transcription corresponding to the head syllable, so that *lín* and its sub–entry *línjū* come before *líng* and its sub–entry *lìngwài*:

lín
—
—
línjū
—
—
lìng
—
—
lìngwài
—
—

All the character–combinations containing *lín* as head entry are grouped together, here also in alphabetic order, as is true also of *lìng* and its sub–entries. As a result the two entries are likely to be separated from each other by several pages, instead of only a few rows. What is even more serious, if one starts with a spoken expression or its Pinyin transcription, is that one must know what character is used to represent the first syllable of a term before one can even begin to look it up.

This last objection can be seen even more clearly in the case of the expressions

jīlǐ
jīlì
jìlǐ

Instead of being able to locate these items close to each other, as would be possible with a strictly alphabetic arrangement, one would have to know that the initial character of *jīlǐ* is 机, of *jīlì* 激, and of *jìlǐ* 祭 in order to track them down as much as thirteen pages apart in one well–known dictionary (Wu Jingrong, 1979, 308–321), where we find the entries

jīlǐ 机理	mechanism	[on page 308]
—		
—		
jīlì 激励	encourage	[on page 312]
—		
—		
jìlǐ 祭礼	memorial ceremony	[on page 321]

Nevertheless, among the general–use bilingual dictionaries, this combination of sound–based and shape–based order is the most favored system. It is used to some extent in Chinese–Chinese dictionaries too, though the failure of many Chinese to retain command of the alphabetic system they learned in the first grade inhibits their use of even this compromise system.

There is no general–use dictionary, either Chinese–Chinese or Chinese–English, based on the completely alphabetic ordering of the entries. However, there are three special Chinese–English dictionaries based on this arrangement. Two, both aimed at beginning students, have only a small number of entries, so of course our search there for *jīguāng* results in expected failure (Simon, 1947; Wang, 1966). The other is a mammoth work that is surrounded by much mystery.

Modern Chinese–English General and Technical Dictionary was published by McGraw–Hill in 1963 without the usual preface indicating who produced the work, and also without informing us of a matter of more than usual interest in this case, that is, precisely how it was done; the introduction merely states that it "was prepared for the greater part by semi–automatic mechanical processes." I suspect that the anonymous compiler was the CIA.

Be that as it may, the work consists of three tomes each measuring 7.5 x 10.5 inches. Volume 3, the most useful one, has 1884 pages (including a supplement of 56 pages inadvertently omitted in the original printing) and weighs an unwieldy six pounds. Here are two sample entries:

BIDANWANG 443 6699 1734 4853
grenade net

BIDANYI 441 6699 1734 5902
bullet proof vests

The first group of numbers refers to the tones of the preceding term of three syllables, for we obviously have here an electronic printout that lacks the capacity to produce tonal diacritics for the normal transcriptions of *bìdànwǎng* and *bìdànyī*. The second group consisting of three 4–digit numbers refers to the *Standard Telegraphic Code* numbers corresponding to the three preceding syllables of the transcription. These numbers provide the means to look up each individual character in Volume 1, a smaller work of 152 pages that consists chiefly of a "Radical–Stroke Index to Characters" presenting character, code number and transcription. Of less utility for the general user is Volume 2, another tome about the size of Volume 1 that presents the material in the form

3423 *ji* 1 stir up....

It takes only a few seconds, less time than for any other arrangement, to look up in Volume 3 the sequence of letters that spell *jīguāng* in the position where the term should occur. Alas, it is not there. Following the second–fastest procedure, we turn to the *jī* transcription in a recently published semi–alphabetic dictionary, hunt among the almost three dozen *jī* characters to locate the one glossed "surge," run our eyes down the alphabetically arranged sub–entries, and find the entry *jīguāng* followed by 激光 and the gloss "laser," a term that apparently entered the language too late for inclusion in the 1963 McGraw–Hill dictionary.

Of course if one is confronted with an expression written only in characters, it is not possible to look it up in an alphabetically arranged dictionary unless one knows the pronunciation of the characters used to write the term. One might attempt to guess the pronunciation from the phonetic elements, which are often helpful enough to warrant an initial try at a sound–based lookup. Otherwise one must consult a radical–stroke dictionary or one based on some other approach to the shape and composition of the characters.

But most users of dictionaries, especially most Western users, have more occasion to look up terms containing characters they already know than those with characters they don't know. In a formerly popular dictionary containing 7,773 characters, a mere fifteen percent or 1,200 characters, those of highest frequency, entered into as many as seventy percent of the 104,000 multiple–character entries (DeFrancis, 1966, 13). Knowing the individual characters does not guarantee knowledge of the compounds they enter into, any more than knowing the meaning of *sweet* and *bread* guarantees knowing the meaning of *sweetbread.*

Some idea of the relative efficiency of the various dictionary arrangements can be grasped from the foregoing discussion. It is also attested by the results of dictionary lookup tests administered by Professor Victor Mair to speakers of Chinese, Japanese and Korean, all languages that still use characters in varying degrees. He states: "My personal experience and experiments with my students and colleagues have demonstrated that words can normally be found two to ten times faster in a single–sort alphabetically arranged list than in other types of arrangements" (Mair, 1986, 18–19).

The differences in efficiency that characterize the diverse schemes used in dictionaries of course carry over into other applications of serial arrangements. Telephone directories are generally based on the radical–stroke arrangement. Library catalogues also generally follow this arrangement, so that looking up a succession of characters may require several stroke–order lookups before the whole entry can be accessed or otherwise manipulated. A Chinese librarian remarked several decades ago:

> *In the absence of an alphabet, there is no system of filing Chinese characters which admits of their ready location. Those generally in use are time–consuming. They place an undue burden on the memory, and allow too many chances for error (Li, 1940, 10).*

As for indexes, these are so difficult to make and to use that most books solve the problem by simply omitting them altogether. Their absence here and in other areas is a serious lack. As one student of the subject remarks:

> *Indexing is perhaps the most common and economically important example of large–scale list making. Without indexes to serial publications, abstracts of reports and other*

> *synoptic aids, a modern researcher simply cannot cope with the flood of information in his or her field (Unger, 1987:55).*

The maintenance of office files likewise presents enormous difficulties. Hence, as has been said of Japan, memory of the individual employees still plays a much greater role than in the West, so that "using human brains as filing cabinets is accepted as normal" (Unger, 1987, 56–57).

The Typographic Composition Problem

Among the problem areas deserving our particular attention is that of composing text and reproducing it. In this area China was for centuries far in advance of the West. At a time when Europe was still laboriously producing a limited number of copies of books by the inefficient method of copying them out by hand, China had print runs of thousands of copies for works printed first from woodblocks, invented in the seventh century, and later from moveable type, invented in the eleventh century. But with the spread of printing to the West, the simple European alphabetic scripts were able to make more efficient use of the Chinese invention than was possible by the Chinese with their more complicated character system.

Although the contrast between the two could be drawn in various ways, perhaps it can be made more vivid if I detail my own direct involvement in the printing process for both Chinese and English.

In 1936 Professor George A. Kennedy prepared to initiate the Chinese language program at Yale University by acquiring a font of Chinese type from Commercial Press in Shanghai. I helped him set up a miniature replica of a Chinese printing establishment in the basement of the graduate school building.

We filled a large room measuring about 30' x 40' by closely crowding together a number of inverted V–shaped frames measuring about 5' in height and 6' in width. The sloping sides of the frames were arranged to hold several rows of open–faced trays measuring about 8" x 10." Each tray was divided into a number of compartments containing pieces of type of various sizes ranging from 10.5 to 21 points. In the basic size of 10.5 points there were 10,000 different characters. The number of pieces for each character varied — 150 for the most common characters, at least 24 for the less common, and 5 for the rare (DeFrancis, 1940).

The small number of duplicate pieces meant that composition was limited to only a few pages at a time. When the type ran out, it was necessary to print what had been set up (or make electrotype plates in anticipation of later printing), break down the type, return the pieces to their proper location and then compose another section of text.

A printshop in China would have to do the same unless it could afford to keep as many pieces of each character as it might be called upon to use for works that might contain hundreds of thousands of characters of running text. Or it could cast new type as needed, including when these wore out from overuse, by using monotype molds.

The characters in our printshop, like those in China, were arranged in the order of a radical–stroke dictionary. In my role as compositor I attached a piece of handwritten text to a composing stick held in my left hand and then, following the text character by character, searched out the corresponding pieces of type much as one would look up characters in a dictionary. In an ordinary day of typesetting this involved several miles of walking in and out among the racks, from one end of the room to the other, bending down and reaching up in search of successive pieces of type.

My perambulatory stint as compositor of Chinese contrasts with my brief sedentary experience in handsetting a small amount of type in English. For that I sat with my composing stick and text before a single rack of trays each measuring about 2' x 3' and containing type that consisted of some hundred symbols (the twenty-six letters in upper and lower case, punctuation marks, numerals, etc.) as against the 10,000 of the Chinese font. The bulk of English composition was of course done by an experienced linotype operator using equipment that, prior to the advent of expensive photocomposing machines, could not be adapted to the huge number of Chinese characters, and later only by the usual clumsy method of dictionary lookups.

That inefficient traditional arrangement of characters was also used in Chinese typewriters. These consisted of a large bed of characters measuring about 2 1/2' x 3' surmounted by a movable carriage containing roller and paper. The bed contained about 4,000 pieces of type standing upright in both radical and stroke–order arrangement. Operators ("typists" doesn't seem

quite appropriate) moved the carriage about with a handle in a horizontal plane over the bed in order to position a hammer with a square hole over each desired character. Then they pressed the hammer, which triggered a pin that pushed the character up into the square hole and also caused it to strike against the paper.

The total font of characters was 10,000. Apart from those in the bed the remaining 6000 were contained in boxes measuring about 8" x 10" each containing some 1500 of these less–used characters. There were a few empty spaces in the grid of basic characters in which operators could place rarer graphs whenever these were encountered. If there were too many of them, the operator first made a place for them in the bed by removing some of the characters already there, located the rarer characters in their separate boxes, and placed them in the vacated locations. Similar procedures were invoked to use characters of different fonts. There were usually two or three more beside the basic font, for such things as the equivalent of italics or boldface, but all of the same size, for the grid could only accommodate the generally used size of about 10.5 points.

Trained operators were able to type twenty to thirty characters per minute. Casual users could manage only two or three. If we consider that a character generally represents less than a Chinese word and roughly equate the latter with an English word, the comparison with typing speeds in English is derisory, for a teacher of typing informs me that the speed of a two–finger amateur is around forty-five words per minute, of a productive officeworker at least sixty words per minute, and of record–makers one-hundred words per minute.

The dismal performance of Chinese typewriters has now become irrelevant as the use of these Rube Goldberg contraptions approaches zero with the advent of computers.

Digital Composition

In the new information age the academic question of efficiency of scripts has assumed critical importance, especially for China in its self–proclaimed attempts at modernization and catching up with the advanced nations of the West. It does not appear, however, that the innovative means for handling data has inspired much innovative thinking about Chinese writing and its adaptation to the new technology. Instead we have the spectacle of Chinese, and foreigners too for that matter, rushing like

lemmings along familiar paths that are strewn with the same roadblocks as those we have noted in dictionary lookups.

Over 500 schemes have been advanced in China alone for handling characters on computers (Li Xiuqin, 1990, 61). Worldwide, several dozen schemes of various types have actually entered into production. Not a single one, whether created by Chinese or foreigners, comes anywhere near the efficiency of those for the alphabetic scripts of the West, though some are enough better than the handwriting alternative to win a modicum of acceptance. What they are like can be seen if we look at the schemes in the light of the previous discussion and, in a few of the more important cases, approach them by a sort of hands–on simulation of some of the steps in Chinese wordprocessing.

A number of schemes can be grouped together as based on some variation or other of the Four Corner System. This was one of the earliest approaches to the problem, but also one of the first to be discredited, for at only twenty characters per minute it was even slower than the traditional Chinese typewriter.

There is another group of schemes based on an enlarged keyboard of up to several hundred keys in which each key represented a cluster of characters. Some of these Chinese schemes were similar in approach to the Japanese "Kanji Teletypewriter" adopted by the National Diet Library in which each of the 192 character keys was used to access a display of 14 characters. With one hand the operator accessed the cluster and with the other selected the desired character from the display.

The underlying principle here is similar to the radical–stroke dictionary lookup in which one first goes to a particular cluster (e.g., a group of characters listed under a radical) and then locates a specific character within the cluster (e.g., the third character with six residual strokes under that radical). The Chinese schemes of this sort were even more complicated and cumbersome than the Japanese because of the need for a larger number of characters. The high cost of the oversized keyboards and the slow speed for both professional typists and casual users, who must constantly look at the keyboard and refer to other aids, have prevented this approach from receiving much favor.

The "Ideographic Data Processing System" developed by Wang Laboratories on the basis of a coding technique called the "Three

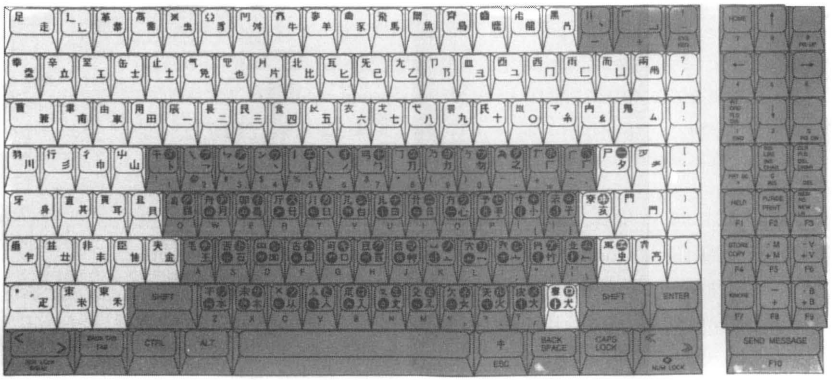


Figure 3

Enlarged Character Keyboard

Corner Coding Method" is representative of a number of schemes that identify characters by a numeric code related to their components. The Wang system analyzes each character into three components each of which is assigned a two–digit numeric code. Using only the numeric keypad, typists enter up to six digits to display on the screen all the characters corresponding to the code, in order of frequency, and then select the appropriate character. Objections that have been made to this approach center on the difficulty of learning a complex coding system. It therefore has little appeal to the casual user and in fact has had little success (Coia, 1986).

A somewhat better reception has been given to a number of schemes based on the idea of composing characters from components displayed on a greatly expanded keyboard. One of the most successful attempts to use this approach is the system developed by Transtech for the Research Libraries Information Network. Some one hundred twenty institutions with library holdings in Chinese, Japanese and Korean belong to this network.

Each of the member libraries has a multiscript workstation costing about $6,000 and pays an annual fee to RLIN. The centerpiece of the workstation is the enlarged CJK keyboard shown above. Leaving aside the simple Japanese *kana* syllabograms (shown in the top right black circles), the even simpler Korean Hangul alphabet (shown in the bottom left black circles), and the usual letters, numbers and assorted symbols, most of the space on the seven main banks of keys is given over to some 250 components of characters, usually two per key. The procedure here involves pressing the right keys, those containing the components of a character, to bring it onto the screen.

Character 欢 is simple enough. Operators will surely guess that its components are 欠 on the M key and 又 on the comma key; by pressing the appropriate keys they can call up character 欢 on the screen or present it in a printout. But 殷 is another matter. It is decomposed in a way that goes counter to how this character is built up and so requires a special effort of memorization. The ordinary sequence of strokes is: ´ 厂 戶 戶 戶 月 月 月 殷 殷. Yet the Transtech system breaks it down into 白,勹 and 殳. The last is clear enough (it is on the M key), but 白(on the Y key) is derived by an unexpected dissection of the character, as is true also of 勹(on the 7 key), which is an even more jarring distortion of the shape.

If operators fail to guess how the system decomposes a character, they can find out by looking up the character in a radical–stroke index or call it up on the screen, using either the old Wade–Giles transcription or the new Pinyin transcription to type its pronunciation. This evokes a procedure that we noted in the Wang Laboratories system and is used in a great variety of other systems. We can illustrate it with the same character 殷.

This character is transcribed as *yin* without tone, as *yīn* with its proper tone indication. If we type *yin,* without tone, the screen will present seventy-six characters to choose from; if we type *yīn,* with tone, the screen will narrow the presentation to twenty-eight homophones. In both cases each character is followed by its components. We move the cursor to the desired character to single it out for whatever way we want to handle it, for example printing it out, which can be done on either a dot–matrix or laser printer. Ironically, in this system printouts of characters look better than those of transcriptions, as indicated by *Lu Hsün* (in Wade–Giles) appearing as *Lu Hs¨un* (Lu Xun in Pinyin).

Among the shortcomings of the character–decomposition approach just described are the need to memorize a large number of components and their location on the keyboard, to guess how the system decomposes characters and to resort to other lookup procedures in those not infrequent cases where one fails to guess at the sometimes idiosyncratic decompositions. Librarians remark that without constant use they have to keep rememorizing details. Nevertheless, for special usages such as library cataloguing, where Chinese characters do not form a large body of text, the system works so much better than the old alternative of doing things by hand that computerization along these lines undoubtedly represents an advance in efficiency.[3]

3
Professor Victor H. Mair of the University of Pennsylvania informs me (personal communication 3/12/91) that his library and many other member libraries have begun to use a new generation CJK terminal which employs a standard QWERTY keyboard and relies more heavily on phonetic inputting.

For wordprocessing, however, none of the systems described so far, all of which have a shape–based approach to Chinese characters, comes anywhere near matching the efficiency of the sound–based approach that characterizes Western systems of writing. We can go further and state quite categorically that they are all deadend systems having no chance whatsoever of eliminating or even greatly reducing the inefficiency inherent in a character system of writing.

It has been pointed out that "more than ninety percent of all documents in Japan are handwritten, or rather handcrafted" (Becker, 1984). The figure is doubtless even higher in China. In a work of major importance, J. Marshall Unger has made very clear why the Japanese writing system is incompatible with the computer age and why there is no hope of salvation in so–called "artificial intelligence" or other nostrums (Unger, 1987). The same applies with even greater force to the Chinese writing system. One can only hope to mitigate, not resolve, its basic inefficiency.

The greater success achieved by the sound–based approach used in the West, and increasingly even in Japan,[4] eventually led to attempts to apply it to Chinese. Basically this involves using a sound–based system, such as Pinyin, as the input device and developing a program for automatic conversion to characters — in short, Pinyin in, characters out.

Westerners initiated the attempts. The Chinese were slow to follow. As recently as 1986 two Chinese scholars, a linguist and a computer specialist, categorically dismissed the idea by stating that "designing a Chinese input system based on Pinyin or any other phonetic spelling is not practical at al." Their main arguments in support of this conclusion were that the population of China had not achieved sufficient mastery of Standard Mandarin, and that the problem of homophones would be either insurmountable or require excessively cumbersome and costly solutions (Sung and Kuo, 1986).

Mastery of Standard Mandarin does indeed constitute a serious problem in the area of wordprocessing, though not quite in the form that Sung and Kuo seem to suggest, namely mastery of its spoken form. Desirable though that is, it is not indispensable, since what is actually needed is mastery of the Pinyin orthography. Dialect speakers of Mandarin, i.e., the seventy percent of the population that speaks some form of Northern,

4
The preferred input method in Japan appears to be via *romaji*, not *kana* as I incorrectly stated in *Visible Speech* (p. 267). Apparently, though, neither input method solves the problem of handling *kanji* well enough to make computers attractive, for despite their affluence Japanese have not taken to computers anything near as much as Americans, and neither have the Taiwanese despite their economic progress. The *Free China Journal* of September 5, 1991, stated that "Taiwan's installation rate for PCs stands at 47 units per 1,000 people, compared with Japan's 76 and 231 in the U.S."

Southwestern and Southeastern Mandarin, are roughly in the same situation as British, American and Australian speakers of English, all of whom readily handle the same form of written English on computers. Speakers of Cantonese and other non–Mandarin forms of Chinese are in the more difficult situation of Italians and Spaniards having to work in French, or Indians in English. However, as my colleague Robert Cheng points out, continuous handling of Pinyin has the by–product of helping to improve command of Mandarin.

An important difference between the Chinese and English situations is that those who handle the written form of the latter have had a lifetime of exposure to alphabetic writing. Chinese have not, differing in this respect also from the Japanese with their lifetime of dealing with two simple phonetic scripts, one syllabic, the other alphabetic. To be sure, Chinese children learn Pinyin readily enough, becoming literate in it in a matter of weeks, but Chinese educators because of the emphasis on characters allow them to lose command of the system and revert to Pinyin illiteracy in the second grade (DeFrancis, 1984a, 268–269, 283). The failure to retain control of Pinyin, coupled with a lifetime of emphasis on the semantic as against the phonetic aspect of the characters, results in a mind–set that, as Professor Cheng acutely observes (personal communication), makes it psychologically difficult for adults to deal with their language in an alphabetic script. As a result, some Chinese educators, who insist on the need for a policy of digraphia, i.e., literacy in both Pinyin and characters, have given up on all but a few of the less hide–bound adults and are pinning their hopes on at least part of the younger generation growing up with a lasting command of Pinyin thanks to their innovative changes in teaching and promoting the alphabetic script.

Another difficulty in the application of a sound–based approach to the computerization of Chinese stems from the industry concentration on hardware and software that, in the words of a British report on a symposium devoted to French on computers, were "tailored to the needs of the English language" (*The Guardian* 12/8/1985). Subsequent developments have made it possible, albeit sometimes at considerable additional expense, to increase the potential of the hardware to handle not just the problem of French diacritics but even the more complex problem of Chinese characters. This increased potential is due mainly

to advances in software. Indeed, it is generally agreed that the problem of computerizing Chinese is largely a software problem.

Efforts to produce the necessary software have been marked by piecemeal attacks on the multifarious difficulties that have to be overcome, so that only scattered bits and pieces of partial solutions have been found for some of the problems. Moreover, as noted in the previously cited article published in 1986, "all the Chinese input methods to date have been designed either by electrical engineers or computer scientists, leaving many linguistic factors out of consideration" (Sung and Kuo, 1986, 48). For their part linguistically oriented scholars have generally lacked the expertise to cope with the technical problems involved. Although there has been some improvement in this situation, there is still no full–scale cooperative effort for a comprehensive solution, notably on the part of the Chinese government, whose leadership has utterly failed to deal with this key aspect of its vaunted modernization drive. As a result, the Chinese computer scene presents the chaotic spectacle of half–baked systems rushing into the market and later trumpeting improvements that should have been made in the first place.

A case in point is the TianMa system, one of the best known and most widely used systems. Its 2.0 version produced in 1986 made the following claims for converting from Pinyin to Hanzi (Chinese characters):

> *With TianMa the text is typed in standard Pinyin Romanization on a normal English language keyboard. Because whole sentences, paragraphs and documents can be entered at once, the speed of input is limited only by the operator's typing speed....*
>
> *With most existing Chinese word processing systems, you type a Pinyin syllable and then select the correct Hanzi from a display of up to 200 characters. You continue to enter Pinyin, one syllable at a time, and selecting the correct Hanzi until the whole document is transcribed.*
>
> *The process is slow and tedious. Even a fast operator can enter no more than 15–20 characters per minute.*
>
> *In contrast, TianMa lets you transcribe at a rate of 100 or more characters per minute (TianMa, 1986).*

To test these claims I thought to start by handling some text from a poem dedicated to the celebrated writer Lu Xun (1886–1986) that is written in everyday spoken style, thus avoiding the problems posed by the Hybrid Vernacular style that dominates present-day Chinese writing. The first stanza of the poem, which appears both in its Pinyin and character versions (Yin and Felley, 1990, 524–528), reads as follows:

Yǒude rén huózhe	*Someone living on*
Tā yǐjing sǐ le;	*May already be dead;*
Yǒude rén sǐ le	*Someone dead*
Tā hái huózhe.	*May still live on.*

TianMa lacked the ability to indicate tones, so I typed the first two lines without tone marks and pressed a key to convert to characters. The screen showed the following characters (my translation on the right):

Someone perhaps	有的人或者
May already be silk;	他已经丝了

The fact that our first test produced gibberish out of a toneless Pinyin text that is perfectly intelligible to the human brain suggests, as later experience confirmed, that the TianMa claim of producing accurate text at the rate of one-hundred characters per minute was merely hype, such as pervades the Chinese as well as general wordprocessing scene.

TianMa made a fundamental error in limiting the discriminatory power of the system by attempting to handle characters without regard to the tones that must be part of their accurate transcription. Handling tones on computers has encountered such difficulties that many systems have been rushed into production, to get on the market ahead of competitors, before the development of acceptable solutions. In the advertisings for its upgraded version called New TianMa, tonal diacritics were promised by June, 1991, but it is only now, in 1995, that the system has acquired the capacity to handle tones. Tone indication had been provided earlier by some other systems, however, such as the Chinese Wordprocessing system of mainland China in the CW.3 version.[5]

Also involved here is a more general problem of tone indication. While the huge volume of publication of Chinese written alphabetically without tones, such as by the Dungans and others

5
This Pinyin–based system was initiated in 1987 as a joint project of the Electronics Instrument Works at Beijing University and the State Language Commission. Despite some good features, the system is of quite limited utility.

(Mair, 1990; DeFrancis, 1950), shows the feasibility of such an orthography for most purposes, the sometimes absolute necessity of tone indication, as in dictionaries and wordprocessing, runs up against resistance in Chinese that contrasts sharply with the situation in Vietnamese.

The French, who take their own diacritics as a given, in promoting the romanized system called Quoc Ngu with its fussy system of six superscripts and one subscript also passed on to the Vietnamese the habit of always adding these symbols, even in informal situations of writing their tonal language. In contrast, most transcription systems for Chinese, such as the long–dominant Wade–Giles romanization, which represented tones only under duress, were created under the influence of diacritic–less speakers of English, who apparently passed on to the Chinese a distaste for these pesky symbols. The literature is full of complaints of the added work involved in tone indication.

If we take tones into account, as we must in Chinese wordprocessing, the characters 或者 representing the word *huòzhě* "perhaps" will not be evoked if we correctly indicate tone 2 of the first syllable by typing *huózhe* for "live on." But we were unable do this on TianMa, since it was incapable of dealing with diacritics. The CW.3 system is able to, however, and does so in a simple fashion. One types *huo2zhe* to evoke *huózhe* on the screen and bring up the characters 活着 for "live on." Similarly by adding tone 3 to *si* and typing *si3,* we evoke *sǐ* on the screen and bring up the character 死 meaning "to die"; it turns out that this is the only character that matches this transcription. Thus by its use of tone indication CW.3 avoids both the errors generated by TianMa and outputs an accurate character version of the two lines of Pinyin.

There is also another difference between TianMa 2.0 and CW.3 that relates to one of the major problems in wordprocessing and one of the major factors in the inefficiency of the Chinese script. That is the question of parsing or segmentation of text.

Text Segmentation

Chinese texts consist of a succession of characters, which invariably represent syllables, with no segmentation of text except that provided by punctuation, which is a fairly recent addition in its present Westernized form. They therefore resemble European scripts before the introduction of word–division, which was

developed late by the Greeks and did not become general in Europe until about the year 1000 (DeFrancis, 1989:256).

In English a word is in effect defined as the unit surrounded by white space on the printed page. It is the thing that gets listed in dictionaries and is bandied about in all sorts of situations, including wordprocessing, as the basic unit in the orthography. The treatment accorded characters is comparable to that of words in English, but the two are by no means linguistically equivalent. While all words in English have meaning and are considered free forms, in the case of Chinese characters, by my calculation based on a classification made by the eminent Chinese linguist Y.R. Chao, only some forty-four percent are free forms, forty-five are bound morphemes of the type *er* in *teacher* and eleven percent are meaningless syllables of the type *cor* and *al* in "coral" (DeFrancis, 1984a, 184–185).

Although careful scholars with enough linguistic sophistication to know the difference between word and morpheme label characters essentially as morphemes, most Chinese, and others as well, look upon them as words. To them a character *(zì* in Chinese) is thought of as a "word," but linguists properly distinguish *zi* "character" from *cí* "word," a new term that did not come into usage until this century and is still not widely known by the general public. Add to this a general inability to distinguish between speech and writing, an inability of course shared with many Westerners as well, and we get confusion much compounded in the case of Chinese.

The results of this confusion are far–reaching. The belief that every character is a word leads to the belief that the uniqueness of each character, which typically has a phonetic element combined with a distinguishing semantic element such as 氵 "water," would degenerate into insupportable ambiguity if the character was replaced by its transcription. The folklore of Chinese characters, and even at times scholarly studies of the script, are replete with such horror stories as "the ninety words pronounced *li."* All too often homographobia reaches the extreme of citing Y.R. Chao's playful presentation of an intelligible, if rather bizarre, stringing together of twenty-four different characters, all tonal variations on the syllable *xi,* as proving that Chinese cannot be written in an alphabetic script (DeFrancis, 1984a, 192, 196–197; 1985). This is like proving that English and French cannot be written phonemically because in English *what*

wood a wood chuck do if a wood chuck wood chuck wood cannot replace *what would a woodchuck do if a woodchuck would chuck wood* and in French *si si sã si si si si sã si siprɛ* cannot replace *si six cents six scies scient six cents six cyprès* "if six hundred six saws saw six hundred six cypresses."

Yet this obdurate silliness does point in the direction of a real problem, one that is comparable to converting phonemic English or French into their respective orthographies. The problem of choosing among the five graphic realizations of the syllable *si* is similar to the task of inputting a Pinyin syllable and converting it to a desired character.

In French, all except the last occurrence of *si* do present difficulties, though perhaps not excessively apart from made–up games. The problem of converting *si* to *cy* is a non–problem since its close combination with a succeeding syllable results in a unique succession of phonemes that can easily be matched with the conventional orthography.

This sort of solution is not so easy for Chinese to apply because of their belief in the autonomy of characters and their lack of experience in segmenting text and discriminating words. If asked to think about the Pinyin transcription for either spoken or written material, most Chinese (the literate minority, of course), would think of the characters involved and would then envisage either a succession of Pinyin syllables separated by white space or a succession of Pinyin letters like European writing before the introduction of word–division. Exasperated writing reformers constantly cite shop signs and building names written in the fashion of either ZHONG HUA REN MIN GONG HE GUO or ZHONGHUARENMINGONGHEGUO for Zhonghua Renmin Gongheguo "Chinese People's Republic" (Zhou Youguang, 1990).

In English and French we have had centuries of experience processing text using word–division, capitalization and other orthographic conventions that have evolved over the centuries in a rather haphazard fashion. Only occasionally do we have to refer to such authorities as the *Chicago Manual of Style* to determine whether to hyphenate, separate, join things together or adhere to other conventions.

The Problem of Orthography

Besides lacking the Westerners' experience with word–division and text segmentation, the Chinese, despite the official adoption of Pinyin in 1958, have not been taught how the system might function as an orthography. Indeed there has been continuing opposition to the use of Pinyin for anything more than the transcription of individual characters.

A breakthrough occurred in July 1988 with the official promulgation of rules for Pinyin orthography by the State Education Commission and the State Language Commission, the latter the successor of the Language Reform Commission, the renaming of which reflected the official downgrading of writing reform. For foreigners, and for Chinese who can read English, another advance was made in 1990 with the publication in the PRC of *Chinese Romanization: Pronunciation & Orthography*, which expands on the previously published rules by presenting detailed explanations of the rules and copious examples of how to write connected text in Pinyin (Yin and Felley, 1990). Although these works have the potential of accomplishing instant codification that took centuries to evolve in the West, disagreement within China concerning some of the rules has blocked their full acceptance as the official standard orthography for Chinese. Nevertheless, even as a first step toward the important goal of standardization, they offer the possibility of greatly increasing the efficiency of handling characters on computers for those users who prefer input systems based on Pinyin. Contrary to earlier predictions, such users now include virtually all Chinese and non–Chinese outside of China, and eighty to ninety percent of individual users of computers within the country. Shape–based inputting, which has received heavy government support despite outraged objections from many computer specialists, is now largely confined to specially trained professional typists.

But for improvements to become consolidated and generalized it will be necessary for producers of software to follow a standardized orthography and for those involved in wordprocessing to acquire familiarity with the system to at least some degree approximating the command by Westerners of their own orthographies.

This will be difficult to achieve in a situation where Taiwan objects to the Communist transcription system (along with the simplified characters), the PRC emphasizes simplified over tradi-

tional characters, Westerners don't bother with tone marks, Chinese are hobbled by mental blocks, and no one is strong enough to carry the day in any area, including the basic problem of orthography that was settled long ago in the West.

Standardization of orthography, if its need is accepted, may require considerable revamping of current software. For example, TianMa would have to change the Pinyin for the number "twenty–seven" from *èrshí qī* to the CR system's *èrshíqī*. It would also have to adopt the CR rule of attaching verb suffixes, as in *huózhe*, which uniquely brings up the characters 活 for "living," in place of its practice of separating *huo* and *zhe,* which requires a further selection of the desired graphs from among the two groups of homographs displayed on the TianMa screen.

Also needed are alphabetically–arranged aids of various kinds, such as dictionaries and thesauruses. At present, thanks to the yeoman efforts of writing reformers like Zhou Youguang and other members of the now defunct Writing Reform Commission, and with little thanks to the paltry government support, a word–list called *Hanyu Pinyin Cihu,* containing 60,400 entries, has been produced with a strictly alphabetic arrangement of Pinyin followed by characters (*HPC,* 1989).

A useful but neglected feature of this important but little–known work is its flagging of homographs by single–asterisking those due to non–indication of tones and double–asterisking those which occur even with tone indication. While there is much wasteful duplication of effort to produce marginally better dictionaries in one or another of the old inefficient arrangements, it has not been possible to gain sufficient support from scholars or the government to turn the *HPC* word–list into the sort of alphabetized dictionary that is desperately needed to help standardize Chinese orthography and make it more adaptable to computers and other modern information processing devices.

A project is close to completion, however, to produce a Chinese–English dictionary along these lines based on the Pinyin orthography as spelled out in *Chinese Romanization.* Initiated by Professor Victor H. Mair of the University of Pennsylvania and joined by several PRC colleagues and volunteers in the United States, including myself, the project has produced an *ABC (Alphabetically Based Computerized) Chinese–English Dictionary* of over 71,300 entries that will go far toward meeting an urgent need of scholars of Chinese and all those concerned

with the computerization of the language and its system of writing. In addition to its strict alphabetical arrangement, the *ABC Dictionary* is also unique in making use of *HPC* and frequency data to distinguish monosyllabic homographs and the much less frequent polysyllabic homographs by utilizing raised numbers before the transcription in the fashion of English dictionaries, thereby producing such distinctive transcriptions as ^{1}ba ^{2}ba ^{3}ba ^{4}ba ^{5}ba for 罢 霸 坝 耙 爸 respectively.

While this dictionary is aimed primarily at Westerners, among them those concerned with the computerization of Chinese, it will doubtless also be of help to the Chinese themselves, especially to those reformers who have long been battling to push Chinese lexicography in this direction and to develop other tools based on the alphabetic principle. Such forward–looking reformers are in the forefront of the wordprocessing advances that have already been made, including research on the use of contextual clues in order to seek solutions to the problems that currently defy automatic conversion based on single characters and combinations of characters.

Eventually the efficiency of computerized handling of characters can be maximized only if there is a change in writing style in the direction of bringing it closer to actual speech. As Y.R. Chao pointed out years ago, intelligible romanized writing can be produced only if it is based on intelligible speech, speech that is "clear and full in sound" (Chao, 1934). And only writing in characters that is intelligible when read aloud can be converted into intelligible romanized writing for inputting into computers. This means exorcising the bugaboo of homography by writing polysyllabically to reflect the polysyllabicity of speech. So long as Chinese insist on writing in a Hybrid Vernacular, showing off their knowledge of the "unspeakable" classical style and their ability to play games with characters, a character–by–character transcription of text will continue to make for excessive homography and hence for inefficient use of computers. The more classical the style, the more inefficient the inputting, so that for fully classical texts there can be no hope of even a modicum of efficiency on computers.

For those Chinese who do succeed in writing more or less as they speak, the possibility is presented of their being able to employ Pinyin with maximum efficiency by touch–typing a whole text, whether article or even book, whether copied from a

handwritten manuscript or composed in their head as they type along, and then converting the whole thing by pressing one or two conversion keys. This is unachievable by convoluted shape–based approaches which may make do for mechanical copying of text by professional typists but are incompatible with fluent touch–typing by ordinary users of computers who must concentrate on content. (The prominent Chinese reformer Zhou Youguang makes an important contrast between "copy–typing" and "think–typing.") And it is not too far–fetched to envisage that some Chinese, perhaps some current first–graders growing up digraphic, may eventually discover that for certain purposes they can dispense with characters altogether, in which case their efficiency with a Pinyin–in–Pinyin–out approach may well exceed that of Westerners working with English, French, Russian and other alphabetic scripts.[6]

6
For further discussion of input techniques and other matters involved in handling Chinese characters on computers, see Unger, 1987. Unger's discussion centers on Japanese, but much of what he has to say applies also to Chinese.

Writing and . . . Reading

Yet if this sort of emphasis on Pinyin may make it possible to computerize the Chinese language with maximum efficiency, it may have the opposite result, if we accept the claim cited at the beginning of this paper, of losing the greater efficiency allegedly enjoyed by characters for reading and comprehension. The view is widely held not only by Chinese but also by many Westerners, including students of the reading process, that although a simple phonemic system of writing may be easier to learn, in the long run it may not serve experienced readers as well as a more complex orthography. In a conclusion based on arguments that they admit are "speculative," two reading researchers state that

> *the ideal orthography for spelling is incompatible with the ideal orthography for reading. Any useful orthography must be a compromise between these two requirements (Frith and Frith, 1980,295).*

Another scholar, in a context dealing specifically with Chinese, states that

> *there is no evidence to suggest that a writing system which is efficient in terms of grapheme–phoneme correspondence is superior to other systems and is easier to read. Kyöstiö's (1980) study on the Finnish language, which is considered to have one of the more efficient writing systems in this respect, indicates that it is only the mechanical aspect of*

> *reading that is easy for Finnish children to master at an early age (King, 1985, 111).*

In these remarks King has conflated and confused several aspects of the reading process which are related but should be clearly distinguished. One is "reading" in the sense of being able to sound out graphic text. (Of course I do not mean that we always verbalize in reading, but that we must have the ability to use phonetic clues to the extent needed to identify a piece of text.) We might give this a dictionary listing as "[1]read *verbalize text*." Another is "reading" in the sense of deriving meaning from text. Dictionaries might list this as "[2]read *understand text*." Still another aspect is "reading" in either sense as a subject of comparative study.

For the first of these aspects the evidence is overwhelming that a close grapheme–phoneme correspondence makes for a writing system that is easier to [1]read, though this accomplishment is devalued by Kyöstiö and King as merely "mechanical." Kyöstiö states that "the answer to the question of easiness in reading the Finnish language is affirmative as far as mechanical reading is concerned." Then he adds: "But if by reading we mean a higher level skill, the answer *might* [emphasis added] be the same as in other languages" (Kyöstiö, 1980, 89).

However, leaving aside the obviously identical difficulty in all languages due to content (ordinary people might be able to [1]read but not [2]read scientific treatises), the answer is clearly not the same in Finnish as in other languages. From Kyöstiö's own account it is apparent that the problems he cited for Finnish children are largely related to auditory, visual, psychological and other disabilities. Their problems cannot be treated as comparable to those of otherwise perfectly normal American and Chinese children who are still unable to [1]read well enough to [2]read with comparable efficiency long after their normal Finnish counterparts or Chinese first–graders literate in Pinyin (DeFrancis, 1984a, 168, 283).

For normal readers reading in their native orthography and at their cognitive level, given their command over a huge vocabulary and a complex linguistic structure, [1]read = [2]read. It is precisely because of this equation that reform–minded Chinese teachers are insisting that school children must retain command of Pinyin so they can be provided with mind–stretching content years before they can handle it in characters.

This equation is true, of course, only for native speakers and readers. While non–natives commanding one latin–based script, if confronted by a similarly based foreign script, can in just a few hours learn to [1]read it aloud well enough to be understood by native listeners of that language, in attempting to [2]read in that script they would experience difficulty proportionate to their lack of command of its spoken form. For them it would doubtless be helpful to have non–phonetic supplements, such as capitalization in German, which as broadly applied in that language is not needed by native speakers and is considered by many to be a nuisance that should be circumscribed.

But the views regarding the efficiency of Chinese writing, the system most extensively endowed with non–phonetic supplements, as expressed by King, Li Youren and others, and of writing in general by students of the subject, are usually concerned less with the acquisition of "mechanical" reading by children and other novices than with the act of reading by adults skilled in the art. In their view writing systems like Chinese and English make up for any weaknesses that may exist in the sound–symbol relationship by the greater efficiency supposedly provided by spelling distinctions and semantic embellishments.

These unproven claims are made all the more suspect by the fact that they are most often advanced by persons who compare their greater facility in handling a complex orthography, which they most likely learned first and became habituated to by a lifetime of practice, with their lesser facility in handling a less complex orthography. Chinese born and raised with their traditional script, if they know English but have had only the usual minimal exposure to Pinyin, or none at all, say they can read characters faster than English or other alphabet–based scripts. Americans habituated to their traditional orthography insist that its vagaries are actually essential for enabling them to read faster as compared to a purely phonemic rendering of the language. Their claims are probably right, for the same reason that trained athletes can out–perform untrained amateurs, but as scientific proof for the superiority of one or another script such subjective observations and assumptions are virtually worthless except to confirm what I have facetiously called "The Law of the First Script"; this law states that the first script learned is generally considered the most satisfactory, if not most perfect, of all possible systems (DeFrancis, 1950, 200).

In opposition to these views and to the claim that the ideal orthography for reading must be different from an ideal orthography for spelling, and leaving aside the practical question of social acceptance, I should like to propose the counter theory that, given the phenomenal verbal resources possessed by normal native speakers, the optimal orthography in any language for readers at any level is one which maximally capitalizes on this capacity by matching written symbols with spoken utterances in the simplest possible way, either phonemic or syllabic depending on the language, with no contamination whatsoever by non–phonetic accretions.

I don't know how to set up scientific tests for any of these theories related to optimum orthography. Robert Cheng (personal communication) suggests a cross–systems test involving three groups each consisting of one or two dozen matched individuals who are accomplished monolingual readers of Finnish, English and Chinese. But how can the individuals be truly matched? My wife, like me a native reader of English, could read novels two or three times faster than I could, and retained far more details than I did.

But such testing, even if perfected and showing, say, that Americans read fifty percent faster than Finns and Chinese read twice as fast as Americans, is not the end of the story. Those who claim that complex scripts are superior for reading concentrate on this one aspect and hardly ever mention the many areas where they are obviously inferior to simple scripts, as in dictionary lookups and wordprocessing, not to mention basic acquisition of literacy. A leading Chinese psycholinguist, Ovid J.L. Tzeng, has shown the enormous complexity of any cross–script comparisons and the need to factor in many things. Arguing against scholars claiming superiority of *kanji* over *kana* for initial reading instruction in Japanese, which is similar to the claim of superiority of Chinese characters over Pinyin and English, he states that

> *in a real life situation, learning to write is almost an integral part of learning to read. Thus, it may not be very realistic to compare the ease of learning to read* kanji *with that of learning to read* kana *without also considering the difficulty of writing associated with these two types of scripts (Tzeng and Singer, 1978–1979, 664).*

Again, with respect to the idea that unique features in the Chinese script lead to its being processed by the brain differently from alphabetic scripts, he forcefully asserts that

> *words written in an alphabetic script require the dominant left–hemisphere's verbal awareness for their perception and production. So do words written in a logographic script. We think it is time for scientists to base their judgments on empirical data such as we have presented here, rather than on wild speculations and on naive views of orthographic structures (Tzeng et al, 1986, 372).*

And finally, in a review of my own classification of writing systems that rejects Chinese as a meaning–based category and classifies it as morphosyllabic, he states that

> *under such a conceptualization, the Chinese writing system is very much sound–based and accordingly, its reading comprehension depends on the success of recovering its morphosyllabic representation. Indeed, experimental results of recent psycholinguistic and neurolingistic studies on reading Chinese are very much consistent with DeFrancis' analysis (Tzeng, 1991).*

Classification of the Chinese Writing System

The question of the classification of the Chinese writing system is central to understanding its structure and evaluating its efficiency. In their arguments for the superiority of Chinese characters, Li Youren and others of like mind classify Chinese as a unique semantically based system. This view of Chinese as an ideographic (if not indeed a pictographic) system is not very far removed from the more academic classification of Chinese writing as a logographic or morphemic system that is uniquely well adapted to the peculiarities of the Chinese language.

Now while Chinese characters per se may possibly be considered logographic or morphemic, they are not, contrary to widespread misconception, the same thing as the *writing system*, any more than words are the basis for classifying alphabetic systems. The characters, I have argued, comprise frames, that is lexemes or dictionary items akin to our words and morphemes, and they are based on graphemes consisting of phonetic elements representing syllables, in contrast to our graphemes consisting of letters representing phonemes. The so–called "radical" component of charac-

ters is a relatively late addition to the phonetic element, whose vitally important role has been minimized owing to the infatuation with the more striking but less useful semantic accretion (DeFrancis, 1984a, 1989).

While avoiding the general mistake of taking the characters rather than the phonetic elements as the basis for classifying the Chinese writing system, William Boltz, a student of early Chinese writing, presents a more sophisticated, but to my mind, still incorrect defense of classifying Chinese as a morphemic rather than morphosyllabic script on the grounds that "non–morphemic syllables...do not exist" and that the phonetic elements stand for both a syllable and a morpheme (Boltz, 1989). Nevertheless, to the extent that that is true (I do not accept the non–existence of non–morphemic syllables), the phonetic aspect, in my view, remains the more basic aspect. As my colleague Y.C. Li has noted (personal communication), while syllables have always been limited, morphemes were not, and in adding morphemes to the language Chinese based them on pre–existing syllables.

It is my basic contention that Chinese writing is primarily sound–based and only secondarily semantically oriented, and that the inefficiency of the system stems precisely from its clumsy method of sound representation and the added complication of an even more clumsy system of semantic determinatives. The greater inadequacy of the semantic elements, those unique features which have so captivated many people, can be seen in a study comparing semantic and phonetic predictability in Chinese.

Useful semantic clues are to be found in less than half of the characters. In not a single case do they unequivocally pinpoint a precise meaning, and at best they point only to broad thesaurus–like areas of meaning. At their far too frequent worst, the semantic elements can be downright misleading. To give one typical example, the "insect" radical is the misleading determinative in characters with such non–insect meanings as clam, egg, snake, frog, jellyfish, hedgehog, rainbow, barbarian, stupid and melt (DeFrancis, 1984b).

As to the phonetic elements, bad as they are, they provide more precise information than do the semantic determinatives. No less than twenty-five percent of the phonetics accurately predict the pronunciation, even as to tone, of the full characters of which they form part, and another seventeen percent precisely indicate

the segmental phonemes but not the tones (DeFrancis, 1984, 1989). But they accomplish all this in an exceedingly cumbersome fashion.

How the phonetic elements contribute to the inefficiency of Chinese characters can be seen if we look at the roughly parallel ways in which Chinese and English represent a more or less common syllable, chosen at random, that we can transcribe as /piy/ in English and as *pi* in Pinyin orthography. I present first the fourteen ways (1.0–14.0) in which the syllable is spelled in English, together with one or two words (1.1–14.2) that illustrate their usage:

1.	***-pe***	**5.**	***-pea***	**8.**	***-pie***	**12.**	***-ppy***
	***pe**nal*		***pea**cock*		*shar**pie***		*ha**ppy***
	***pe**ony*		***pea**nut*		***Pie**gan*		*slo**ppy***
2.	***-pae***	**6.**	***-pee***	**9.**	***-py***	**13.**	***-ppi***
	***pae**an*		***pee**wee*		*skim**py***		*ha**ppi**ness*
	***pae**diatrics*		***pee**vish*		*ras**py***		*slo**ppi**ness*
3.	***-poe***	**7.**	***-pi***	**10.**	***-pey***	**14.**	***-ppie***
	*sub**poe**na*		***pi**ano*		*do**pey***		*pre**ppie***
	*onomato**poe**ia*		*Ho**pi***		*Pom**pey***		*yu**ppie***
4.	***-peo***			**11.**	***-pei***		
	***peo**ple*				*Pom**pei**an*		

Below I present a list of phonetic elements and their derivatives (characters derived from the phonetics) that show the ten ways in which the syllable is spelled in Chinese.[7]

1.	*pi*	辟	**3.**	*pi*	皮	**6.**	*pi*	匹	**9.**	*bi*	鼻
	pi	噼		*pi*	披		*pi*	鴄		*pi*	貔
	pi	霹		*pi*	狉	**7.**	*pi*	罷		*pi*	媲
	pi	劈		*pi*	鈹		*pi*	犤	**10.**	*bei*	卑
	pi	擗		*pi*	疲	**8.**	*pi*	比		*pi*	椑
	pi	癖		*pi*	魮		*pi*	批		*pi*	啤
	pi	譬		*pi*	陂		*pi*	紕		*pi*	脾
	pi	鷿		*pi*	詖		*pi*	砒		*pi*	裨
	pi	僻		*pi*	被		*pi*	枇		*pi*	蜱
	pi	闢	**4.**	*pi*	丕		*pi*	毗		*pi*	鼙
	pi	澼		*pi*	坯		*pi*	琵		*pi*	埤
	pi	嬖		*pi*	狉		*pi*	蚍		*pi*	陴
	pi	甓	**5.**	*pi*	否		*pi*	仳		*pi*	郫
2.	*pi*	圮		*pi*	痞		*pi*	阰		*pi*	睥

Note the partial parallels with the English syllables: in English,

7
The list has as its base all the characters listed under *pi* in a fairly comprehensive modern dictionary of 6,000 single-character entries (Wu, 1979), together with a few additional derivatives from other dictionaries formed with the same phonetic elements. A more extensive search, especially among rarer characters, would doubtless turn up more phonetic elements and many more derivatives having the pronunciation *pi*. To maintain uniformity of presentation, I have converted Wu's simplified characters into the traditional forms. Note also that in addition to the deviant pronunciations of the phonetics numbered 8.0, 9.0, and 10.0, number 1.0 is also pronounced as bi and 4.0 as *fou*.

the syllables are combined with other letters to form distinctive words of various lengths (e.g., combining *peo* with *ple* to form *people*); in Chinese, the phonetics are combined with "radicals" to form distinctive morphemes, always of one syllable. Note also that Chinese 8.0 *bi,* 9.0 *bi,* and 10.0 *bei* are like English *pie* in having one pronunciation when alone, another (or several) in combination, as in *piebald* and *Piegan.*

A major difference between the two systems is that of phonemic representation of syllables versus integral representation of that unit. While some English graphemes, especially those representing vowels, may display considerable complexity, others may be fairly simple, as in the case of *p* and *pp* in our English sample. This facilitates guessing the pronunciation of the whole syllable. But if whole syllables are represented by integral graphemes, these are necessarily more numerous and hence more complex than phonemic graphemes. Unless standardized as a simple syllabary like *kana,* any system of syllabic graphemes is inevitably far more complex and hence far less efficient than even a complex phonemic system. In the case of Chinese, its phonetic graphemes are both unstandardized and saddled with the addition of semantic determinatives that would be superfluous in a writing style truly based on speech. All this enormously increases the difficulty of the system.

The inefficiency that the more complex character system brings to many areas of Chinese life, some of which have been noted above, would seem to entail a price tag of staggering proportions. A number of years ago, prompted by the discussion of a cost–benefit approach in *Can Language be Planned?* (Rubin and Jernudd, 1971), I asked a specialist in the economy of China whether that approach could be applied to estimating the comparative costs of the traditional script and an alphabetic system. The reply was negative.

However, the inability to carry out a full–scale cost–benefit analysis does not prevent us from reaching some commonsense conclusions about the inefficiency of the Chinese system of writing and the need to mitigate that inefficiency by a policy of digraphia.

Acknowledgement

I am grateful to Robert Cheng, Susie Cheng, Y.C. Li, Victor H. Mair and J. Marshall Unger for helpful information and critical readings of this paper. The Chinese characters were adapted and created by Chao-jen Wang, a graduate student at the Institute of Design from Taiwan.

References

Anon. 1963. *Modern Chinese–English Technical and General Dictionary.* 3 vols. New York: McGraw–Hill.

Becker, Joseph. 1984. Multilingual Word Processing. *Scientific American*, 251, 96–107.

Boltz, William G. 1989. Review of *Visible Speech: The Diverse Oneness of Writing Systems,* by John DeFrancis. Honolulu: University of Hawaii Press, 1989. In *Sino–Platonic Papers*, 14, A1–A9.

Chao, Y.R. 1934. The Idea of a System of Basic Chinese. *Quarterly Bulletin of Chinese Bibliography,* 1:4, 171–183.

Coia, David A. 1985. The Chinese Language and Computers: An Introduction. *Journal of the Chinese Language Teachers Association,* 20:3, 79–92.

DeFrancis, John. 1940. Far Eastern Type for American Scholarly Publications. *Notes on Far Eastern Studies in America*, No. 7. Washington, DC: American Council of Learned Societies,1–8.

——. 1950. *Nationalism and Language Reform in China.* Princeton: Princeton University Press.

——. 1966. Why Johnny Can't Read Chinese. *Journal of the Chinese Language Teachers Association*, 1:1,1–20.

——. 1984a. *The Chinese Language: Fact and Fantasy.* Honolulu: University of Hawaii Press.

——. 1984b. Phonetic Versus Semantic Predictability in Chinese Characters. *Journal of the Chinese Language Teachers Association*, 1:.1,1–21.

——. 1985. Homographobia. *Xin Tang*, 6 (November), 2–17.

——. 1989. *Visible Speech: The Diverse Oneness of Writing Systems.* Honolulu: University of Hawaii Press.

——, editor. (in press). *ABC (Alphabetically Based Computerized) Chinese–English Dictionary.* Honolulu: University of Hawaii Press.

Frith, Uta and Christopher Frith. 1980. Relationships Between Reading and Spelling. In *Orthography, Reading and Dyslexia*, by James F. Kavanagh and Richard L. Venezky, editors, 287–317. Baltimore: University Park Press.

HPC. 1989. *Hanyu Pinyin Cihui [Chinese Pinyin Wordlist].* Revised edition. Beijing: Yuwen chubanshe.

Kyöstiö, O.K. 1980. Is Learning to Read Easy in a Language in which the Grapheme–Phoneme Correspondences are Regular? In *Orthography, Reading and Dyslexia*, by James F. Kavanagh and Richard L. Venezky, editors, 35–49. Baltimore: University Park Press.

Li, Augustine. 1940. An Experiment in Cataloguing Chinese Books. *Notes on Far Eastern Studies in America*, No. 7. Washington, DC: American Council of Learned Societies, 10–19.

Li Xiuqin. 1990. *Evolution de l'écriture chinoise.* Beijing: Shangwu yinshuguan.

Li Youren. 1991. Tan Hanyu Hanzi de tedian [On the Distinctive Features of the Chinese Language and Chinese Characters]. *Yuwen jianshe tongxun*, 33, 68–70.

Mair, Victor H. 1986. *The Need for an Alphabetically Arranged General Usage Dictionary of Mandarin Chinese: A Review Article of Some Recent Dictionaries and Current Lexicographic Projects = Sino–Platonic Papers*, No. 1. Philadelphia: University of Pennsylvania.

——. 1990. *Two Non–Tetragraphic Northern Sinitic Languages = Sino–Platonic Papers*, No. 19. Philadelphia: University of Pennsylvania.

Mathews, R.H. 1945. *Mathew's Chinese–English Dictionary.* Revised American edition. Cambridge: Harvard University Press.

Miming. 1946. *Miming ma dianbao shu [Covert and Open Telegraphic Code].* Shanghai: Shangwu yinshuguan.

Rubin, Joan and Björn H. Jernudd. 1971. *Can Language be Planned?* Honolulu: University Press of Hawaii.

Simon, Walter. 1947. *A Beginner's Chinese–English Dictionary of the National Language (Gwoyeu).* London: Lund Humphries.

Sung, Margaret and Alex Kuo. 1986. A Linguistic Evaluation of Chinese Computer Input Systems. *Journal of the Chinese Language Teachers Association,* 21:2, 43–57.

TianMa. 1986. *TianMa Handbook* Version 2.0. Vancouver: International Geosystems Corporation.

Tzeng, Ovid J.L. 1991. Review of *Visible Speech: The Diverse Oneness of Writing Systems,* by John DeFrancis. Honolulu: University of Hawaii Press. In *Contemporary Psychology,* 36:11. 982.

——, Daisy L. Hung, Sylvia Chen, Jori Wu, and Mao–Song Hsi. 1986. Processing Chinese Logographs by Chinese Brain Damaged Patients. In *Graphonomics,* by H.S.R. Kao et al, editors. Amsterdam: North Holland, 357–374.

—— and Harry Singer. 1979. Failure of Steinberg and Yamada to Demonstrate Superiority of *Kanji* over *Kana* for Initial Reading Instruction in Japan. *Reading Research Quarterly,* 14:4, 661–667.

Unger, J. Marshall. 1987. *The Fifth Generation Fallacy. Why Japan is Betting its Future on Artificial Intelligence.* New York and Oxford: Oxford University Press.

Wang, Fred Fangyu. 1966. *Mandarin Chinese Dictionary. Chinese–English.* South Orange, New Jersey: Seton Hall University Press.

Wang, William S.–Y. 1981. Language Structure and Optimal Orthography. In *Perception of Print: Reading Research in Experimental Psychology,* by Ovid J.L. Tzeng and Harry Singer, 223–36. Hillside, New Jersey: Lawrence Erlbaum Associates.

Wu Jingrong. 1979. *The Pinyin Chinese–English Dictionary.* Hong Kong: Commercial Press.

Xiandai. 1980. *Xiandai Hanyu Cidian [Contemporary Chinese Dictionary].* Beijing: Shangwu yinshuguan.

Yin Binyong and Mary Felley. 1990. *Chinese Romanization: Pronunciation & Orthography.* Beijing: Sinolingua.

Zeng Xingchu. 1983–1984. An Appeal for Justice for Characters. *Chinese Education,* 16:4, 50–81. This is a translation of Zeng's 1983 article "Hanzi hao xue hao yong zheng [Proof that Chinese Characters are Easy to Learn and Easy to Use]." *Jiaoyu yanjiu,* 1, 73–79; 2, 58–63.

Zheng Linxi. 1983. *"Hanzi hao xue hao yong zheng" de yixie lunju bu he shishi* [Some of the Arguments for "Proof that Chinese Characters are Easy to Learn and Easy to Use" do not accord with the Facts].*Jiaoyu yanjiu,* 11, 53–57,72.

Zhou Youguang. 1990. Foreword. In Yin Binyong and Mary Felley. *Chinese Romanization: Pronunciation & Orthography.* Beijing: Sinolingua


10R
WBA J・バンタム級9位
鬼塚勝也
13戦13勝(12KO)
方も最先端のインズ
入会した方にもれ
フリー
タイヤル
対決
新鋭
'46

Janet S. (Shibamoto) Smith
and
David L. Schmidt

Variability in Written Japanese: Towards a Sociolinguistics of Script Choice

Literate Japanese today use a writing system comprising four script types, a plurality which affords a rich flexibility of orthographic choice. Japanese have come to stereotype script types and proportions with extralingistic features of texts and their inscribers. Hence, women and men, the young and old, and the parochial and the sophisticated are understood distinctly to signal self-identity, audience identity and genre features through script choice. In this study, widely-held associations between script types, genres, writers and target readers are tested via statistical analyses of script use in popular Japanese fiction. Texts are also subjected to lexical analysis to see whether choice of vocabulary alone can account for variability in script selection. Results indicate that, at least in the domain of modern, public texts, Japanese writers fashion their script type choices to specific contexts, as the writing system allows, for sociolinguistic and stylistic ends. By utilizing a micro-level, correlational approach, this project is intended to expand our understanding of writing systems and practices as independent channels for expressions of creativity, social self-identity and cultural forms.

Janet S. (Shibamoto) Smith is a professor of Anthropology at the University of California, Davis. She has published extensively on linguistic variation and gender in Japanese, and is the author of Japanese Women's Language.

David L. Schmidt is a doctoral candidate in Anthropology, University of California, Davis. His research concerns writing and reading practices in non-western cultures, and he is currently completing a linguistic and ethnohistical analysis of Micmac hieroglyphic literacy. Currently, he is teaching in the Mi'kmaq Studies Program at the University College of Cape Breton, Sydney, Nova Scotia.

Department of Anthropology
University of California, Davis

Davis, California 95616-8522

Visible Language, 30:1
Janet S. (Shibamoto) Smith,
46-71

Rhode Island
School of Design

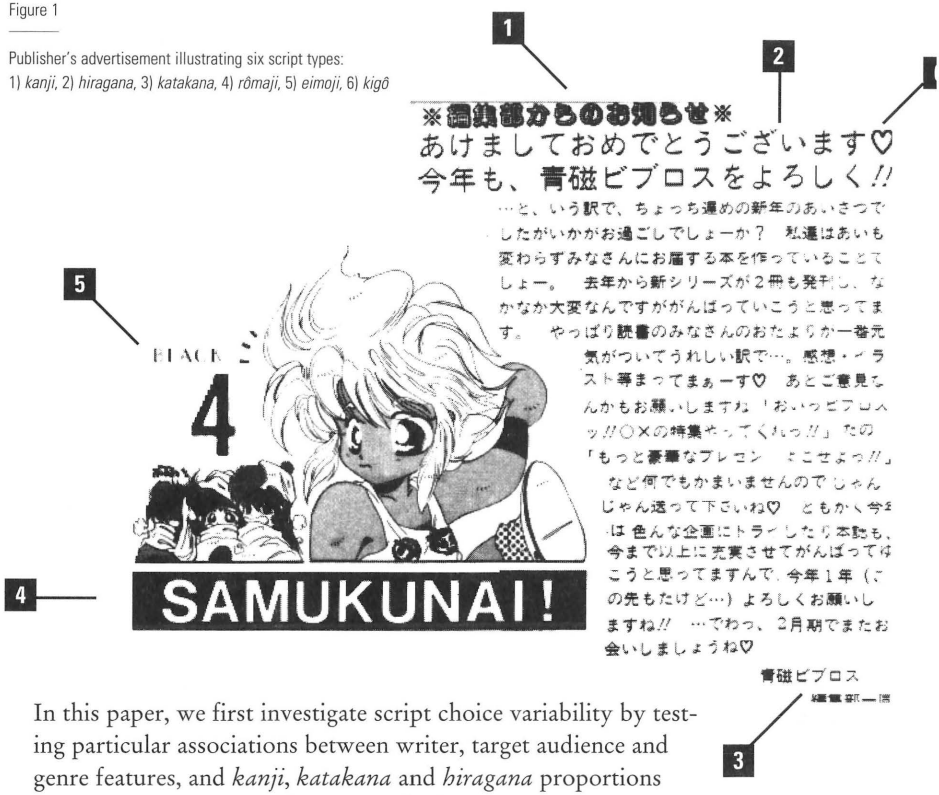
Providence
Rhode Island 02903

Literate Japanese today use a writing system of four script types: Sino-Japanese characters (*kanji*), two syllabaries (*hiragana*, *katakana*), and alphanumeric characters (*rômaji*) (*figure 1*). The first of these, *kanji*, is the script borrowed from China around the fifth century. The process of its adaptation to the writing of Japanese,[1] the development of the two syllabaries to facilitate the inscription of Japanese as Japanese (Komatsu, 1968), and the introduction of Arabic numerals and alphabetic elements to Japanese texts are well documented (Kabashima, 1979; Miller 1967; Seeley 1991). So also is the claim that the Japanese writing system is unique —whether it be uniquely difficult (Sansom, 1928; Miller, 1967, 1982; Sampson, 1985; Coulmas, 1989; DeFrancis, 1989) or uniquely easy to read (Suzuki, 1975, 1977). What remains largely unanalyzed is the flexibility inherent to written Japanese, which, while normally combining the three basic scripts (*kanji* and the two syllabaries) plus, often, a sprinkling of the fourth, *rômaji*, can theoretically be written purely in *kana* or as *rômaji*, but not exclusively in *kanji*. We do not wish to suggest that script choice is free of lexical constraints; any knowledgeable reader of Japanese will be aware of the very powerful lexical constraints that obtain: recent loanwords (*gairaigo*) are written in *katakana* and have no *kanji* counterparts; verbs, which can be written with a *kanji* stem plus *hiragana* inflectional markers, are often written entirely in *hiragana*. We do suggest, however, that while the association of script type with lexical choice has been relatively well-studied (Kokuritsu Kokugo Kenkûjo, 1983), the sociolinguistic and/or stylistic implications of the remaining flexibility have been virtually ignored. It has been observed, for example, that different classes of writers use more of one script than another, and that script flexibility is exploited in various degrees in different written genres (Backhouse, 1984:220). As anthropologists of literacy, we are particularly interested in the implications for Japanese script use suggested by these observations.

1
Here we refer not to the practice of writing Chinese text in *kanji* and Japanese text in a *kana* syllabary, as was the Heian (794-1185) practice (detailed in Seeley 1991:96-98), but to the later practice of mixing the scripts in a single Japanese text.

Figure 1

Publisher's advertisement illustrating six script types:
1) *kanji*, 2) *hiragana*, 3) *katakana*, 4) *rômaji*, 5) *eimoji*, 6) *kigô*



In this paper, we first investigate script choice variability by testing particular associations between writer, target audience and genre features, and *kanji*, *katakana* and *hiragana* proportions through quantitative analysis. We calculate the distribution of the three scripts across a variety of texts, explore plausible sociolinguistic and stylistic factors influencing script use in each, and suggest potential areas for future research. A full-fledged investigation of all aspects of script variation lies beyond the scope of this preliminary study. Here we attempt to enhance the understanding of how Japanese writers, unwittingly or not, link social and stylistic meanings with the scripts available to them. In doing so, we are responding to Basso's call for a revitalization of writing system scholarship by focusing on the extralinguistic factors influencing vernacular writing practices, and by placing his "ethnography of writing" within the methodological context of quantitative sociolinguistics (Basso, 1974). Our research is also intended to complement recent historical and ethnographic trends in literacy studies (for example Boyarin, 1993; Street, 1993) as well as formal linguistic approaches to written language (Tannen, 1984; Chafe, 1986).

From Identity and Style to Script

Although extensive work on the function of script types in the Japanese system has been reported (Kokuritsu Kokugo Kenkyûjo, 1983; Miyajima, 1977; see Backhouse 1984 for a summary of this work in English), the functions studied have generally been narrowly linguistic — for example, what type of words or parts of speech tend to be encoded in one script or another. Much of this work has been aimed at restricting or providing guidelines for the number of *kanji* used and their readings and at regularizing spelling in the syllabaries to produce a writing system suited to the needs of universal education and mass literacy. Little work has been done on how the writing system, when acquired by writers, indexes reader and/or writer identity features or operates as a "paragraphemic" component of textual style.[2]

In this study, we set out to test a series of common, stereotypical assumptions, made by Japanese, about the scripts *(table 1)*.[3] For example, *kanji* is associated with erudition, *hiragana* with softness, and *katakana* with modernity, while, historically, *hiragana* is associated with women; today, *kanji* is associated with older writers, *katakana* with young male readers (Satake, 1989), *rômaji* with young female readers (Nakamura, 1983), etc. We assume that, while links between script type and lexicon or grammatical function are generally predictable, associations between script type proportions and texts/writers/audiences are not, but that they can be tested through correlational analysis. By testing whether these associations are reflected in script proportions in real-life texts, our intention is to provide 1) data on Japanese script variability beyond that which can be accounted for by considerations of lexical choice and 2) an empirical foundation for studies of how a writing system may act as a sub-textual channel for social and stylistic meaning.

TABLE 1. SCRIPT STEREOTYPES

	Writer/Reader Features	Stylistic Features
Kanji	male, middle-aged and older	erudition
Hiragana	female, young	softness or femininity
Katakana	young, especially male	modernity; pop culture
Rômaji	young, especially female	commerciality

2
Analogous to paralinguistic components of speech (e.g., sarcastic intonation in English) (Hamp, 1959).

3
Although we review the stereotypical associations of extralinguistic factors and *rômaji*, this script was not present in sufficient numbers for statistical analysis.

We began with a number of stereotypes. First was the historical association of women writers (and readers) with *hiragana*, standing in opposition to the association of male writing with *kanji*. This historical association is, in the present day, mediated by two "socio-lexical" considerations: one is an avoidance of *kango* 'Sino-Japanese words', which is characteristic of women's speech (Mashimo, 1969; Nomoto, 1978); this avoidance arguably carries over into "women's" writing. There is also a documented trend away from encoding *wago* '"native" Japanese words' in *kanji* and toward encoding them in *kana* (Nomura, 1988).

Our second stereotype is the association of *kanji* with older writers/readers, in contrast to the association of a younger readership[4] with the *kana* scripts, especially *katakana*, and rômaji. There are some intriguing suggestions as well that gender associations exist among young readers/writers: high *katakana* use is linked to young men (Satake, 1982, 1989), while *rômaji* (and *kigô* 'non-script signs' such as ❤ and ☺) are linked to young women (Nakamura, 1983).[5]

Turning to the associations of particular script types to stylistic features, the first and most frequently attested is the association of *kanji* with erudition. This association is one of long standing; in the Tokugawa Period, "[i]t was a favorite ploy of scholars wishing to display their erudition to pad out the text of their discourse with unnecessarily complex characters in order to impart a more educated appearance and tone to their prose" (Twine, 1984:230). Today, "mastery of *kanji* provides an inescapable measure of intellectual capacity" (Crump, 1986:65). Crump also notes the existence of the *Nihon Kanji Nôryoku Kentai Kyôkai* (Japan Kanji Competence Certification Association), an institution which certifies individuals at twelve levels of *kanji* mastery; certificates are used to demonstrate particular levels of literacy in job applications, etc. "Without *kanji*, most Japanese feel they have no way to show others that they are educated and possess the knowledge which entitles them to social acceptance" (Unger, 1984:249). Brown (1985) questioned eighty lay writers/readers, who overwhelmingly reported strong associations of *kanji* with erudition:

4
Teens and young adults, into the early thirties.

5
As one reviewer notes, the use of Japanese word-processors is tending to increase *kanji* use by all writers, which may ultimately alter the long-standing association of *kanji* with older writer/readers.

Takusan tsukawarete iru baai chishiki no yutakasa ga kanjirareru.
[When many *kanji* are used, it produces the feeling of great learning.]

Kyôyô o shômei dekiru kara.
[Because it can attest to cultivation (education, refinement).]

Brown (1985:65).

The association of *hiragana* and softness (femininity?) is perhaps best exemplified by an extract from a junior high school student essay, reported in Nagano (1976). The student writes about the poem *Iki o Korose* by Yagi Jûkichi (*figure 2*).

Iki o Korose

息を殺せ

Iki o korose
Iki o korose

息をころせ
いきをころせ

Akanbo ga sora o miru
Aa sora o miru

あかんぼが　空を　みる
ああ　　空を　　みる

Hold Your Breath

Hold your breath!
Hold your breath!

The baby looks [up at] the sky.
Ah, it looks at the sky.

Figure 1

Poem '*Hold Your Breath*' by Yagi Jûkichi.

After discussing her interpretation of the poem and its impact on the reader, the student writes:

> *I have one question about this poem. That is: why is* korose *written in* kanji *in the title, but in* hiragana *in the poem itself? I thought this over. Couldn't it be that [the poet] emphasized the words* iki o korose *in the title by writing [them in]* kanji, *[assuming that] if [the reader] goes on to read the poem the feeling of the poem is unexpectedly soft, as if it were being adapted to conform to the [softness of] the "baby" — yes that's it, surely that's it. It's shaped to the "baby." As evidence, the only* kanji *in the body of the poem are [those for]* iki *and* sora. *[The poet] used the soft-*

> *ness of* hiragana, *and* kanji *were used to emphasize only the important things (*daiji na mono*) in the poem (N. Kawasaki, quoted in Nagano 1976:142; translation the authors).*

The third stylistic association is that of modernity (including western "foreignness") and pop culture with *katakana*. In part, this is due to the international qualities of urban pop culture, leading to a (dis)proportionately large number of *gairaigo* 'western loanwords' in popular writings; these are typically written in *katakana*. However, pop culture writing has played a particularly important role in the "*Shin-genbun itchi-tai*" 'New Correspondence-of Speech-and-Writing' style (Satake, 1980), and here *katakana* plays a large role in making written text "sound" (look) colloquial. Japanese words expressing feelings and subjective opinions are rife in pop culture texts. These are often written, not in the *kanji* or *hiragana* that would normally be expected on lexical grounds, but in *katakana* (Satake, 1989, 1991, 1992).

Finally, there is an association of *rômaji* with commerciality. The use of roman letters both for Japanese and non-Japanese words is particularly striking in advertising (Haarmann, 1989; Saint-Jacques, 1987). Sometimes the appearance of *rômaji* is related to the novelty of the product being advertised, sometimes it seems merely to be another way of emphasizing a product name, of catching the viewer's/reader's attention. Outside the field of advertising per se, businesses also make heavy use of names written alphabetically, whether those names be Japanese (*rômaji*) or made up of foreign words. This is held to provide businesses with "a new corporate identity" (Saint-Jacques, 1987: 97). The use of the alphabet in writing foreign names and acronyms, for long a minor theme in Japanese texts, is also increasing.

Data Collection

The corpus of texts used in the analysis was drawn from publicly available published works. Forty-two popular texts were selected for script proportion analysis (SPA; to be described below). The category "popular texts" is defined here as published works generally associated with casual or light reading, e.g. comic books, mysteries, etc., as opposed to literary, scientific, or official texts. Most previous script studies have focused on magazines and newspapers (Kokuritsu Kokugo Kenkyûjo, 1962-1964, 1970-1973, 1976, 1987) or major literary works (Miyajima, 1988; Yasumoto, 1963),[6] but we believed — somewhat along the lines

6 There are, however, a few works on the script choices of young people; see Nakamura (1983), Satake (1982, 1989).

of the Vernacular Principle as articulated in Labov (1972) — that popular texts, where the reader is more likely to focus his/her attention on the "escape" or relaxation functions of the text and therefore more likely to be attending to an engrossing plot or story line, to engaging (or repellent) characters, to action, adventure or romance than to the expression of an individual authorial voice, would provide the clearest publicly available demonstration of vernacular writing practices. Although a direct approach to truly vernacular writing practices must await the study of privately produced texts (journals, letters, study notes and lists, etc.), popular texts nonetheless afford a preliminary look at the code-style-identity conventions that constitute the sociolinguistics of Japanese script use.

Five genre/text types were collected and analyzed: mystery novels, science fiction novels, romance novels, business novels and comic books (*table 2*). Texts in each genre were selected with an eye to their being good, that is, relatively central or prototypical, exemplars of their genre (to minimize the possibility that results would be *unduly* muddied by problems of complex genres[7]), but otherwise were drawn from materials the authors had on hand or could readily acquire from a local bookstore simply by asking for a book of genre "X."[8] The five genres analyzed in this study are defined as follows.

TABLE 2. SAMPLE TEXTS BY GENRE AND SEX OF AUTHOR

	Sex of Author		
Genre	**M**	**F**	**Total**
Mystery	5	4	9
Comic	4	5	9
Business	5	3	8
Science fiction	4	4	8
Romances	3	5	8
TOTAL SAMPLE	**42**		

Mystery novels

Mystery novels (*suiri shôsetsu*) in Japan are roughly divided into two categories: *honkaku* 'standard, orthodox' and *henkaku* 'irregular.' *Honkaku suiri shôsetsu* involve the presentation of a puzzle or mystery, solution of the mystery using logic, and a surprise resolution. They contrast with *haado-boirudo* 'hard-

7
In Briggs and Bauman's critical examination of the concept of genre, they note the futility of views of genre as categories with "immanent, invariant feature" and argue that "generic framings of texts are...often mixed, blurred, ambiguous, contradictory" (1992:163). Authors can — and do — construct intertextual relations and intertextual gaps as they create a text, and the creation of a text sometimes aligns it with a single genre, sometimes with a number of genres. In this study, we have tried to select texts that are aligned with a single genre. Genre here is not meant to be interpreted as a set of rules to be followed, but as a "framework" that is "always there to some degree," aiding the reader in approaching a text with some norms or expectations to help assign functions to the various elements of the work (Carr, 1989).

8
Choosing the samples from each genre more, rather than less, narrowly brings with it the attendant danger that, while we would be more likely to find significant differences in our corpus, these differences would be less likely to be meaningful; that is, that they would really apply only to prototypical texts, but wouldn't necessarily apply to the genres in general. ▶

boiled' mystery novels, featuring tough, unemotional protagonists and action-oriented plots, as well as with police procedurals, spy novels and "violence" novels (*Gendai Yôgo no Kiso Chishiki,* 1982); these fall into the *henkaku* mystery category. All mysteries in the present sample center around logical puzzle-solving rather than action, violence or police procedure, placing them in the *honkaku suiri shôsetsu* category. In our sample, two texts (Kawakami, *Rokuninme no Onna*; Sôno, *Kakei no Onna*) target a male audience, one (Niki, *Akai Neko*) targets women readers and a third (Yamamura, *Murasaki Shikibu Satsujin Jiken*) a young, gender non-specific audience; but mysteries are written and read by both men and women of all ages.

We wish to emphasize that we were selective in choosing texts only to the extent that we tried to avoid gross generic mixtures–romance with business, history with action comic, pornography (yes, really) with science fiction or mystery, etc.

Comic books

In 1980, twenty-seven percent of the "books" produced in Japan were comics (Schodt, 1983: 12). Despite a fair amount of cross-over in readership, comics are targeted primarily at young people — college students are perhaps the greatest readers of comic texts — and either at young men or at young women. Adults in Japan now have their own comics; comic magazines originally targeted at young men now have readership in their forties, and it would not do to ignore the "*sararii-man*" comic genre, which appeals to a more mature audience. Adult women were dependent on comics aimed at teen-age girls until the 1980s, but they, too, now have comics of their own. Even adult comics, however, tend to be packaged as if the target audience were young people, and appeal less to a truly mature audience than other genres.

As noted above, comics are targeted specifically at either a male or a female audience. Men's comics (written by men and targeted at a male audience) deal with many themes, including sexual ones, but avoid romance. Women's comics (written by women and targeted at a female audience) were developed with romance as central; only late in this century did some women's comics begin to treat other themes (competition in sports, crime, action/adventure). The comics in this sample deal with action, romance, life in the workplace, and — in one instance only — mid-life nostalgia for the lost time and place of childhood.

Business novels

These are novels with themes centering on the people within corporations or organizations (*soshiki*) or on the organizations themselves (*Gendai Yôgo no Kiso Chishiki,* 1982: 658). The

Japanese business novel has a long pedigree; one can look back to feudal times at Saikaku's *Nippon Eitaigura* (The Japanese Storehouse, 1688) for an early example of this literary genre. The modern business novel traces its beginnings to Shiroyama Saburô's receipt of the Bungakkai New Writer Award for his story "Export" in 1957 (Mulhern, 1991). Many modern-day authors of business novels are from the generation born in the late 1920s and the 1930s, with interests both in literature and in political economy, who experienced Japan's war years and the postwar struggle toward reconstruction and economic recovery (Griswold, 1991). Authors of the business novels in this study were all born between in the 1920s or 30s, with one exception (Sugita Nozomu, b. 1943). Prindle (1991) states that business novels use more *kanji* than do the "genuine literature" group — and by extension we may speculate that they use more *kanji* than other genres of popular fiction as well; she further notes that the *kanji* used in these novels have a greater tendency to be *jôyô-kanji* than those in other genres of fiction. Most business novels are authored by men, and they attract a primarily male readership.

Science fiction novels

The typical Japanese science fiction story "takes a traditionally understood (and emotionally charged) human situation and places it in a modern technology-based setting" (Matthew, 1989:17). The genre began to be widely read in Japan in the 1920s, published at first as *henkaku tantei shôsetsu* 'irregular/anomalous detective stories' (Matthew, 1989). Science fiction may be generally divided into three types: 1) hard science fiction, based on the physical sciences and advanced technology, 2) soft science fiction, centered more on the human responses to scientific and technological advances and 3) fantasy. The present sample includes two hard science fiction texts (by male authors), four soft science fiction texts (two by male and two by female authors) and two works of fantasy (by women). We do not, at this point, hold that these sub-generic distinctions are consequential for script use. Matthew's account of Japanese science fiction makes two points about the genre however, that are relevant to this study: first, science fiction is aimed primarily at young readers[9] and second, the writers of science fiction stories are mostly men.[10]

9
Readers belong "overwhelmingly" to the younger generation (Matthew, 1989: 67).

10
Only three of the numerous authors listed in Matthew's index, for example, are women.

Romance novels

Romance novels comprise two sub-types: texts which are slightly humorous or ironic where the ending, if not always a happy one, is not tragic and texts which are (hyper-)serious where the romance ends in *hiren* 'blighted love.' Romances of the first type, of which all the texts in this study are examples, tend to be written by women (although some men write in this genre; the situation is roughly the reverse of science fiction). The target audience is female. Young and middle-aged women appreciate these romances, whereas many friends and relatives of the first author of this paper, who are in their fifties and sixties, express an emphatic preference for the more tear-jerking style of the second sub-type.

Texts written by men and texts written by women were selected in each category. Each author gender ~ target audience age/gender ~ genre complex was held to be associated with one or another of the stereotypical linkages to script choice discussed earlier. For example, the stylistic associations of erudition with *kanji*, softness (and possibly femininity) with *hiragana*, modernity and pop culture with *katakana* and commerciality with *rômaji* would suggest that business novels (and perhaps mysteries), with an older and primarily male authorship and audience, would exhibit high proportions of *kanji*. Romances and women's comics, associated with female authorship and an almost exclusively female audience, should exhibit lower proportions of *kanji* and correspondingly higher proportions of *hiragana*, with *hiragana* proportions even higher in the comics than in romance novels, by the association of kana generally with younger readers. Genres directed at a young audience — science fiction and comics — should exhibit low *kanji* and higher *kana*, in particular, higher *katakana* proportions. This would be especially likely in the comics for boys and men.

We hypothesize, then, that business, science fiction and possibly mystery novels would exhibit high proportions of *kanji*; that romance novels and romantic comics for women would exhibit high proportions of *hiragana*; and that science fiction and comics (especially boy's/men's comics) would exhibit high proportions of *katakana*. Rômaji use was not addressed statistically in this study; if anything could be hypothesized concerning *rômaji* in the popular genres analyzed here, it might be that the business novel genre would exhibit a slightly higher proportion of *rômaji* use than the other genres, at least on stylistic grounds.

Merging the social identity and stylistic characteristics to script associations, then, leads us to hypothesize that each genre will exhibit a characteristic script-mix pattern, essentially as follows: mystery novels would be closest to a "basic mix" of *kanji-hiragana* scripts — perhaps a bit high on the *kanji* proportion, with relatively little *katakana* or *rômaji* script. Comics would be characterized by a very low *kanji*-high *kana* pattern, with particularly high *katakana* use, at least in the boy's/men's comics and particularly high *hiragana* use in the girl's/women's comics. Business novels should exhibit the highest proportions of *kanji*, and possibly some *katakana* ("foreignness") and *rômaji* (commerciality). Science fiction texts were expected to exhibit high proportions of *katakana*, romance novels high proportions of *hiragana*.

Analysis

At the outset of this pilot study, we found that there were no standard methodologies available for analyzing script proportionality and related functional variation in Japanese. Thus, preliminary procedures for script proportion analysis (SPA) were developed for this project. Although refinement of these procedures will be necessary, in particular for the separate but parallel analysis of *furigana* (*kana* printed interlinearly beside or above certain *kanji* to aid reader recognition and/or to indicate a nonstandard reading of a particular term) distribution and function, SPA is a first approximation to a workable method for analyzing the proportions of all the script types in a text at once. This results in a clearer picture of script use than analyses which privilege a single script type (in general, *kanji*) in proportion to the total text.

In SPA, for each line of text, script type totals are calculated; ratios of script type to cumulative counts are then tabulated for each text, yielding script proportions. These results are subjected to statistical analysis. A multivariate analysis of variance [MANOVA] (df = 12, 92) tested whether script proportions were simultaneously the same for genre, sex of author or genre-sex combinations, a series of univariate analyses of variance [ANOVAS] analyzed each script type separately; finally, a cluster analysis looked for parallel script proportions among the genres to assess their correlation with extralinguistic factors (e.g., author sex/age).

A number of conventions for counting certain orthographic features of written Japanese were established. Japanese numeral signs are *kanji*; Arabic numeral signs were counted as *rômaji*. *Kanji* with *furigana* were counted along with the *kana* script chosen for the furigana.[11] *Kana* indicating geminate consonants were not counted, since they are predictable from the surrounding script within the word. Marginalia, most often found in comic books and usually used as advertising copy for upcoming editions or consumer products, were not included as part of the selected texts. Comic book texts, in general, posed some special challenges for SPA procedures. Script on public signs (advertising, municipal) or depictions of printed material in the comic frame were not counted. Thus only the script of narration, dialogues and monologues was included in our analysis.

In our pilot study, the first page of each text and 1500 characters drawn from the middle of the text (the inner page sample) were subjected to SPA. Because the first page is likely to be a formulaic introduction — the script type for which is fully prescribed — it seemed likely that first pages might exhibit a script-mix unrepresentative of the balance of the text. Furthermore, we conjectured that writers may tend to favor one script over others in the first pages so as to entice potential readers/purchasers into the text.[12] Both sets of characteristics, the possible special restrictions or enticements of the first page and the overall texture of script mix in the central portions of text, were of interest to our study.

Results

The results of the initial multivariate and univariate analyses of variances showed that when genre was treated as a nested factor within audience age, both audience age and genre had significant effects ($p=.0024$ and .0023, respectively, for first page data and $p=.0001$ and .0081, respectively, for the inner page data). These differences run in directions consistent with our hypothesis that younger readers will be associated with low percentages of *kanji* across genre, although there is also considerable variation within age groups. No author gender or audience gender effect was observed.

The genre effect was significant ($p<.05$).[13] For *kanji*, not unexpectedly, comic books were significantly different than all other genres for the first page data and than all genres except science fiction on the inner pages. A distinct pattern of low *kanji*-high *kana* script use (16.0:73.9 for the first pages, 15.9:83.8 for the

11
This is not an ideal resolution to the complex issue of double encoding, and *kanji-furigana* associations will be examined in more detail in future work.

12
A rejoinder to this may be that authors may also mix scripts to appeal to a wider audience.

13
The cluster analysis supported the findings of the multivariate analyses.

inner pages) is not unexpected; numerous scholars and popular social commentators have bemoaned the decline of *kanji* literacy in Japan. Usually, this is framed as a concern that young people are not acquiring full *kanji* literacy, and *manga* (comic books) along with television are frequently held responsible (Mizutani, 1979).[14] This would suggest that a low *kanji* - high *kana* ratio in comics could be attributed to the supposed youth of the target audience. However, our sample drew from comic books and magazines for adult audiences, and by no means necessarily audiences of young adults. Still, despite the wide age range of comic readers in reality, comics continue to have associations with a youthful readership, as do science fiction novels. In this regard, it is notable that — for the inner page data — comics and science fiction fall together as texts characterized by low *kanji* use.

14
"The dedicated literacy of Japan is yet another cause for admiration, but the content of the reading matter — especially on the trains, where no one knows his neighbor and in principle everyone is unobserved — is not. Some of the men are reading books, but more are reading either 'sports papers' or thick volumes of comics the size of telephone books" (Fallows, 1986: 32).

Business novels also exhibit patterns of significant difference from the other genres. The first page data show significantly higher use of *kanji* in business novels than in comics and romances, but not more than in mysteries and science fiction novels; this is most likely due to the number of place and personal names introduced at the beginnings of these genres. Business novels are significantly different ($p < .05$) from all other genres in the inner pages.

The results of the significant differences in *kanji* use by genre are summarized in table 3.

TABLE 3. PERCENTAGE DIFFERENCES IN *KANJI* USE BY GENRE

Sample	High *Kanji* Use	Mid *Kanji* Use	Low *Kanji* Use
First Page	business novels (38.2)	science fiction (28.6) mystery novels (28.5) romance novels (26.8)	comics (16.0)
Inner Page	business novels (39.2)	mystery novels (29.1) romance novels (26.3) science fiction (24.9)	comics (15.9)

Turning next to *kana* use, we see a repeat of the very divergent use of *hiragana* in comics and business novels for the first page data, and for comics and all other genres but romance novels for the inner page data. Romance novels exhibit a significantly higher proportion of *hiragana* than business novels for the inner page sample, and are the only texts not exhibiting significantly lower *hiragana* usage than comics in that same sample. A possible interpretation for the relatively high proportion of *hiragana* script elements in romance novels is that, since *kango* 'Sino-Japanese compound words' are associated with the public, official world and thus with masculinity, novels such as romances, which focus on the inner thoughts and emotions of women and on the relationships between men and women in their private worlds, would avoid the *kango* lexicon and hence use fewer *kanji* (see Nomura, 1988 for a review of the studies documenting a trend away from inscribing wago '"native" Japanese words' in *kanji*). This possibility will be addressed below. It is clear, however, that whether the high proportion of *hiragana*-encoding in romance novels is due to old associations of *hiragana* to femininity (Kabashima, 1979; Komatsu, 1968) or to the ongoing constraints on use of a "masculine" lexicon when one's audience is women and one's topic "feminine," it is distinctively higher than other non-comic genres. One may speculate that this is not entirely at the expense of *kanji*, since romances fall into the mid range in *kanji* use in both first page and inner page samples. It appears to be, rather, that romances use slightly less *katakana* and *rômaji* script than comics or science fiction and slightly less *kanji* script than business or mystery novels, thus resulting in texts using a simpler mix of *kanji* and *hiragana* — with *kanji* on the low side — than is the case for the more multiscriptal comics or science fiction. In the case of comics, of course, which also show high *hiragana* use, *kanji* use is lowest, and *katakana* use as well is significantly high for the first page sample. No other significant differences in *katakana* use emerged in this study, although some regularities in the inner page data suggest that a larger sample might produce a genre effect here as well. *Hiragana* and *katakana* patterns are summarized in table 4.

TABLE 4. PERCENTAGE DIFFERENCES IN *HIRAGANA* AND *KATAKANA* USE BY GENRE

Hiragana	**High *Hiragana* Use**	**Mid *Hiragana* Use**	**Low *Hiragana* Use**
First Page	(69.7) comics	(66.0) romance novels (65.9) mystery novels (64.0) science fiction	(54.0) business novels
Inner Page	(76.4) comics	(67.5) science fiction (67.3) mystery novels (68.5) romance novels	(56.8) business novels
Katakana	**High *Katakana* Use**	**Mid *Katakana* Use**	**Low *Katakana* Use**
First Page	(14.2) comics	(7.8) business novels (7.2) science fiction (7.1) romance novels	(5.6) mystery novels
Inner Page	(7.4) comics* (7.3) science fiction	(5.2) romance novels	(3.9) business novels (3.6) mystery novels

*The differences in *katakana* use on the inner pages were not significant at the p<.05 level; the pattern of differences, however, is consistent with our hypotheses about genre and script use.

Script differences between first and inner page samples were significant (p<.05). There was, however, no significant page-genre interaction; that is, the differences between the samples are similar for each genre. Primarily, this difference can be summarized as a higher percentage of *hiragana* script in the inner pages at the expense of all other scripts. *Katakana,* in particular, shows a significant drop from first to inner page samples. This is mostly due to the frequent use of *katakana*-encoded words, whether they be foreign place or personal names *(rondon* 'London', *kuiinzu•rôdo* 'Queen's Road', *renokkusu* 'Lenox'), foreign loan words in common use in Japan *(hoteru* 'hotel', *kauntaa* 'counter', *erebeeta-hôru* 'elevator hall'), or Japanese words *(keyaki* 'bastard sandalwood', *kashi* 'oak') in establishing setting. Business novels in this study, for example, quite frequently began at a *paatii* 'party' in a *hoteru* 'hotel'; getting there involves *takushii* 'taxi(s)' and crossing the *robii* 'lobby' to the *erebeetaa* 'elevator'.

In sum, then, popular fiction genres in Japanese do exhibit characteristic patterns of script use; those for the five genres examined in this study are displayed in table 5. Thus, the comic genre exhibits a high *kana* (both *hiragana* and *katakana*)-low *kanji* pattern, but with a higher *katakana* profile than *hiragana*. Romance novels show a slightly elevated *hiragana* use pattern

and mid-level *kanji* and *katakana* use. Mysteries are the first genre to show the higher *kanji*-low *kana* pattern that characterizes literary and non-fictional texts, and used the least *katakana*. Business novels most closely approximated (or exceeded; see, for example, Miyajima, 1988:54) serious literary texts in *kanji-kana* proportions. In fact, when the business novels were compared with four non-fiction texts, they were found to be even more markedly similar in *kanji-hiragana* proportions than they were to serious literary works.[15]

TABLE 5. OVERALL SCRIPT USE PATTERNS BY GENRE[16]

	High				Low
Hiragana	comic	romance	mystery	SF	business
Kanji	business	mystery	romance	SF	comic
Katakana	comic	SF	romance	business	mystery

Audience gender, however, is not reflected in *kana* percentages in comics as we had predicted: men's/boys' comics and women's/girls' comics did not differ in their *katakana* and *hiragana* proportions in any statistically meaningful way. Finally, our hypothesis that first page script proportions would reflect an 'enticement effect' was not supported. The greater use of *kanji* in the first page samples is readily explained by the need to introduce place and personal names — prescriptively written in *kanji* — while the greater use of *katakana* in first page samples for all genres is more likely the result of scene-setting, foreign loan word vocabulary rather than authors' attempts to render their works more orthographically attractive to potential buyers.

Script variability and the lexicon

Having found significant correlation between script stereotypes and script proportions across age of target audience, age and genre, we are left to ask whether this correlation is due to sociolinguistic and/or stylistic differences or choice of vocabulary, itself not free of topical and other constraints. An initial survey of a central portion of the corpus may tell us whether all the variability in script can be more simply accounted for by lexical and semantic constraints.[17] For this, we extracted a central section of the inner page data and subjected it to lexical analysis. Each inner page sample was coded as follows: *kanji-kango* 'Sino-Japanese compound word'/mixed vs. *kanji-wago* 'Japanese words', *hiragana*-lexical item vs. *hiragana*-grammatical morpheme (always encoded in *hiragana*, hence not subject to

15
As is evident from the following:

Business Novels

Kanji	39.2
Hiragana	56.8
Katakana	3.9
Rômaji	0.1

Scientific

Kanji	40.4
Hiragana	45.5
Katakana	10.3
Rômaji	3.8

Humanistic

Kanji	42.4
Hiragana	57.2
Katakana	0.8
Rômaji	0.1

More *katakana* and *rômaji* are used in scientific texts.

16
A final note on *rômaji*: although the numbers of *rômaji* script elements in this corpus were insufficient for statistical analysis and the texts were not specifically selected to address the stereotypical link of this script type to commerciality, ▶

writer choice), *katakana-gairaigo* 'foreign loan word' (always encoded in *katakana*, hence, not subject to writer choice) vs. *katakana*-other words. (*See table 6*). All differences found between the various sets across categories of texts were tested for significance using the Wilcoxon-Mann-Whitney U-test.

TABLE 6. LEXICAL CONSTRAINTS ON SCRIPT CHOICE

obligatory	optional
kanji-kango	***kanji-wago***
Sino-Japanese words	'Japanese words'
hiragana	***hiragana***
lexical item	grammatical morpheme
katakana	***katakana***
foreign loan word	other word

The first question we asked was whether the use of *kanji* in a text was simply linked to the presence of more or fewer *kango*. Nomura (1988) and others have detailed the trend for *wago* 'Japanese words' to be encoded in *hiragana* while *kango* continue to be written, to a greater degree, in *kanji*. Our texts are clearly affected by this trend. Table 7 shows the percentages of *kango* per total *kanji* in our sample. Significantly more *kanji* in business novels encode Sino-Japanese compound nouns than is the case in the other genres (68.0%, $p < .01$); here, it seems to be the case that the lexicon "drives" the script, since it is less likely for *kango* to be encoded in *kana* script than in *kanji*. The picture is more complex, however, for the other genres. Recall that in terms of high, mid and low proportions of *kanji* in text samples, mysteries and romances fell into the mid-use category. One would expect, then, that they would also have higher proportions of *kango* per sample than science fiction and comics. Instead, the situation is reversed: mystery novels and romances in our samples had a significantly ($p < .01$) higher proportion of *wago* '"native" Japanese words' written in *kanji* than did the other genres. The relationship of *kanji* per sample to the proportion of *kango* in the lexical script portion of each sample is given in table 8.

we did speculate that, if this link were to be instantiated in our texts, we would expect to find a relatively higher number of *rômaji* script elements in the business novels in the corpus. This, however, was not the case. The two genres that exhibited the highest percentages of *rômaji* were, comics (0.31%) and science fiction (0.32%) versus 0.02-0.09% for the other genres (inner page data). It would be rash to attempt an interpretation based on such small numbers; neither case, however, falls entirely outside what is known about the use of *rômaji* in scientific formulae, etc., which are found in some science fiction novels, and the use of *rômaji* as an "anti-standard" script (Nakamura, 1983, quoted in Satake, 1989: 67).

17
Our null hypothesis, then, was that the lexicon can account for all variability in script proportion.

TABLE 7. PERCENTAGES OF *KANGO* PER TOTAL *KANJI* AND PER TOTAL LEXICAL SCRIPT BY GENRE

Genre	*Kango/Kanji*	*Kango*/All Lexical Script
Mystery novels	39.3	25.3
Comics	48.0	22.5
Business novels	68.0	46.7
Science fiction	47.4	24.8
Romance novels	32.4	20.6

TABLE 8. PERCENTAGE OF *KANJI* TO TOTAL NUMBER SCRIPT ELEMENTS AND PERCENTAGE OF *KANGO* TO TOTAL NUMBER OF LEXICAL SCRIPT ELEMENTS BY GENRE

Genre	*Kango*	*Kanji*
Mystery novels	25.3	28.3
Comics	22.5	16.3
Business novels	46.7	37.7
Science fiction	24.8	24.7
Romance novels	20.6	25.3

A second question was whether the use of *hiragana* in our texts was linked simply to differences in proportions of script elements encoding grammatical morphemes (which can only be encoded in *kana*, most normatively *hiragana*) in the texts or rather linked to more or less lexical material encoded in *hiragana* across texts. The latter case, of course, would suggest more authorial choice. We found that comics and science fiction novels displayed significantly more *hiragana* encoding lexical vs. grammatical items ($p < .05$), whereas romances — which exhibited high proportions of *hiragana* — have the lowest proportion of *hiragana* script elements encoding lexical items of any genre in our corpus. (*See table 9.*) The structure of the lexical material

TABLE 9. PERCENTAGES OF *HIRAGANA* ENCODING LEXICON AND OF *KATAKANA* ENCODING NON-*GAIRAIGO*, BY GENRE

Genre	*Hiragana*LEXICAL	*Katakana*NON-GAIRAIGO
Mystery novels	29.2	26.7
Comics	39.8	45.4
Business novels	27.3	7.5
Science fiction	34.6	13.9
Romance novels	25.9	37.9

encoded in *hiragana* relative to the structure of the lexical material encoded in *kanji* and *katakana* must await further study; it is clear, however, that grammatical elements alone cannot account for the *hiragana* proportions.

Finally, we asked whether the use of *katakana* was accounted for by the lexically predictable presence or absence of *gairaigo* 'foreign loan words' in a particular kind of text. We found this not to be the case. Comic books and romances used *katakana* significantly less for *gairaigo* ($p < .01$) and significantly more for encoding other features such as emotional or evaluative elements ($p < .01$). In the first example (*figure 3*), drawn from a comic text, family members in a (cheap) Japanese inn are watching a coin-operated television. They decide to go swimming before their 100 time is up on the t.v. and, as they leave the room, the wife tells the husband to pull the plug on the television so that they will be able to continue watching upon their return and their money will not be wasted. In the final panel of the comic, the husband is looking at the frayed cord of the television, its condition attesting to the many other television viewers who preceded him in this small — and in today's affluent Japan — somewhat sad, thrifty act. In sarcastic commentary on his own and his predecessors *mijimesa* 'pitiableness, wretchedness', the husband's words "*naruhodo*" 'I see' and "*na*" 'you know', both Japanese forms and thus typically written in *hiragana*, or in the case of *naruhodo*, either *hiragana* or *kanji*, are rendered in

ナルホド みんな やってる らしい ナ。
naruhodo minna yatte ru rashii na.
I see everyone do- PROG it seems you know
Well, I see everyone does it.
(T202:109)

読んで みたら ビックリ する から....
yonde mi- tara bikkuri suru kara
read see if surprise do because
If you try reading it, you'll be surprised, so...
(T514:142)

Figure 3

Emotional and evaluative elements in *Katakana* encoding

katakana, giving the sentence the summary evaluative overtone (by indicating that, if spoken, the utterance would have a marked sentence intonation pattern) that is the source of its rather dark humor. The second example is taken from a romance novel. A former lover of the narrator is trying to persuade her to read a manuscript he has written; she doesn't want to, but he persists. He assures her that , if she reads it she will be surprised (*bikkuri suru*). Again, *bikkuri* is a Japanese term generally rendered in *hiragana* or *kanji*; in this text, however, the former lover "speaks" of the narrator's projected emotional state (after reading the manuscript) in *katakana*. Both comic and romance novel texts exhibited relatively high frequencies of *katakana* used in this way. Again, for a summary of *katakana* use, refer to table 9.

Conclusion

SPA confirmed that the majority of stereotypical associations made by Japanese between script type and features of social identity and style are rooted in observable patterns of script use in popular fiction genres.[18] Thus, as we originally hypothesized, comics and science fiction novels (young readership, linked to modernity and pop culture) exhibit high *katakana* proportions; both also exhibit low *kanji* proportions.[19] Business novels and *honkaku* mysteries (older male readership, associated with erudition and logic) exhibit mid to high *kanji* and mid to low *katakana* use; and romance novels (female readership, with connotations of 'softness' and femininity) exhibit high proportions of *hiragana*. Furthermore, our analysis of script variability demonstrated that these observed patterns cannot be explained on the basis of grammatical or lexical constraints alone.

What can we make of the results of this preliminary study? First, that the script variability observed in Japanese vernacular writing practices and stereotyped in popular discourse is motivated, in part, by extralinguistic factors; this study confirmed that genre, audience age and stylistic effect (e.g., erudition, emotion) are three important ones. Second, despite claims that paralinguistic information is restricted to the lexical level in written communication (Tannen, 1981), this study and others attest to the presence of such information at the sub-textual level of script (Bledsoe and Robey, 1993; Schmidt 1991). Our results, in particular, suggest that much sociolinguistic and stylistic[20] information can be conveyed via script-mix patterns. Whether these

18. Interestingly, the stereotypes derive from asssumptions about lexical differences, with the resultant script mix held to constitute a simple artifact of those differences; in this study, however, these lexical differences could not fully account for the script differences observed.

19. We had originally hypothesized that science fiction, due to the links between scientific lexicon, high levels of education, and hence, erudition, would exhibit relatively high proportions of kanji; this did not, as we see, prove to be the case, providing yet another demonstration that lexical considerations fail fully to account for script use. Here, a sociolinguistic characteristic of the readership (young people) appears to be more influential in determining script-mix than the lexical characteristics of the text.

20. Including indications of marked intonation pattern.

patterns are intentionally embedded by authors in texts is a question for future research. Differential distributions of script types and orthographic practices in the Japanese case raise 'socioliterate' questions to which sociolinguistic concepts and methodologies (matched-guise tests, variable rules, etc.) could be applied. Our findings offer support for incorporating considerations of script choice into the analysis of style, and we concur with Satake's notion that there is still room for development (*kaitaku no yochi ga aroo*) of methods for the quantitative analysis of style from the perspective of script choice (Satake, 1991:14).

References

Backhouse, A. E. 1984. Aspects of the graphological structure of Japanese. *Visible Language,* 18:3, 220-228.

Basso, Keith. 1974. The ethnography of writing. Bauman, Richard and Joel Sherzer, editors. *Explorations in the Ethnography of Speaking.* Cambridge: Cambridge University Press.

Bledsoe, Caroline H. and Kenneth M. Robey. 1993. Arabic literacy and secrecy among the Mende of Sierra Leone. Street, Brian, editor. *Cross-cultural Approaches to Literacy.* Cambridge: Cambridge University Press.

Boyarin, Jonathan, editor. 1993. *The Ethnography of Reading.* Berkeley: University of California Press.

Briggs, Charles L. and Richard Bauman. 1992. Genre, intertextuality, and social power. *Journal of Linguistic Anthropology,* 2:2, 131-172.

Brown, Robert S. 1985. Orthography in Contemporary Japan: Reality and Illusion. Ph.D. dissertation, University of Texas at Austin.

Carr, Helen, editor. 1989. *From My Guy to Sci-Fi: Genre & Women's Writing in Postmodern World.* London: Pandora Press.

Chafe, Wallace. 1986. Writing in the perspective of speaking. Cooper, Charles and Stanley Greenbaum, editors. *Studying Writing: Linguistic Approaches.* Beverly Hills, California: Sage Publications.

Coulmas, Florian. 1989. *The Writing Systems of the World.* Oxford/Cambridge, Massachusetts: Basil Blackwell.

Crump, Thomas. 1986. Literacy and hierarchy in modern Japan. *Sociolinguistics,* 16:1, 56-71.

DeFrancis, John. 1989. *Visible Speech: The Diverse Oneness of Writing Systems.* Honolulu: University of Hawaii Press.

Fallows, James. 1986. "The Japanese are different from you and me." *The Atlantic,* 258:3, 35-41.

Gendai Yôgo no Kiso Chishiki. 1982. Tokyo: Jiyû Kokuminsha.

Griswold, Susan. 1991. Review of Made in Japan and Other Japanese "Business Novels" translated by Tamae K. Prindle. *JATJ,* 25:1,154-156.

Haarmann, Harald. 1989. *Symbolic Values of Foreign Language Use: From the Japanese Case to a General Sociolinguistic Perspective.* Berlin: Mouton de Gruyter.

Hamp, Eric. 1959. Graphemics and paragraphemics. *Studies in Linguistics,* 14:1/2, 1-5.

Kabashima, Tadao. 1979. *Nihon no Moji: Hyôki Taikei o Kangaeru.* Tokyo: Iwanami Shinsho.

Kokuritsu Kokugo Kenkyûjo. 1962-4. *Hôkoku 21.22.25: Gendai Zasshi Kyûjusshu no Yôgo Yôji - I-III.* Tokyo: Shûei Shuppan.

— 1970-73. *Hôkoku 37.38.42.48: Denshi Keisanki ni yoru Shinbun no Goi Chôsa - I-IV.* Tokyo: Shûei Shuppan.

— 1976. *Hôkoku 56: Gendai Shinbun no Kanji.* Tokyo: Shûei Shuppan.

— 1983. *Gendai Hyôki no Yure.* Tokyo: Shûei Shuppan.

— 1987. Hôkoku 89: Zasshi Yôgo no Hensen. Tokyo: Shûei Shuppan.

Komatsu, Shigemi. 1968. *Kana: Sono Seiritsu to Hensen.* Tokyo: Iwanami Shoten.

Labov, William. 1972. Some principles of linguistic methodology. *Language in Society,* 1: 97-120.
Mashimo, Saburô. 1969. *Fujingo no Kenkyû.* Tokyo: Tôkyôdô Shuppan.
Matthew, Robert. 1989. *Japanese Science Fiction: A View of Changing Society.* London/New York: Routledge and Oxford Nissan Institute of Japanese Studies.
Miller, Roy Andrew. 1967. *The Japanese Language.* Chicago: University of Chicago Press.
— 1982. *Japan's Modern Myth: The Language and Beyond.* New York/Tokyo: Weatherhill.
Miyajima, Tatsuo. 1977. *Wago no kanji hyôki.* Suzuki, S., editor. *Kokugo Kokuji Mondai no Riron.* Tokyo: Mugi Shobô.
— 1988. *"Kanji no shôrai" sono go. Gengo Seikatsu* 436:3, 50-58.
Mizutani, Osamu. 1979. *Nihongo no Seitai.* Tokyo: OnTaimu Shuppan.
Mulhern, Chieko. 1991. Introduction: The Japanese Business Novel. Arai, Shinya. Shoshaman: A Tale of Corporate Japan (Chieko Mulhern, translator). Berkeley: University of California Press.
Nagano, Masaru. 1976. *Nihongo no moji hyôki.* Kindaichi, Haruhiko, editor. *Nihongo no Sugata.* Tokyo: Taishûkan Shoten.
Nakamura, Kumiko. 1983. *Joshi kôsei no tegamibun - sono eigo shikô to hyôkijô no tokuchô. Gengo Seikatsu* 380:8, 88-96.
Nomoto, Kikuo. 1978. *Nihonjin to Nihongo.* Tokyo: Chikuma Shobô.
Nomura, Masaaki. 1988. *Kanji no Mirai.* Tokyo: Chikuma Shobô.
Prindle, Tamae. 1991. The Japanese Business Novel as a Language Textbook. Paper presented at the ATJ Seminar, New Orleans, Louisiana.
Saint-Jacques, Bernard. 1987. The Roman alphabet in the Japanese writing system. *Visible Language,* 21:1, 88-105.
Sampson, Geoffrey. 1985. *Writing Systems: A Linguistic Introduction.* Stanford: Stanford University Press.
Sansom, George B. 1928. *An Historical Grammar of Japanese.* Oxford: Clarendon Press.
Satake, Hideo. 1980. *Wakamono zasshi no kotoba - shin•genbun-itchitai —. Gengo Seikatsu* 343:46-53.
— 1982. *Wakai sedai no bunshô. Gobun* 40:36-43.
— 1989. Statistical method to analyze the writing form variation of Japanese words. Mizutani, Shizuo, editor. *Japanese Quantitative Linguistics. Quantitative Linguistics* 39, 119-129. Bochum: Studienverlag Dr. N. Brockmeyer.
— 1991. *Shin-genbun-ittchitai no keiryôteki bunseki. Mukogawa Joshi Daigaku Gengo Bunka Kenkyûjo Nenpô,* 3, 1-14.
— 1992. *Shôwa keihakutai to shin-genbun-ittchitai. Mukogawa Joshi Daigaku Gengo Bunka Kenkyûjo Nenpô* 4, 1-14.
Schodt, Frederik L. 1983. *Manga! Manga! The World of Japanese Comics.* Tokyo: Kodansha International.
Schmidt, David L. 1991. Some implications of alphabetolatry for writing system analysis. — and Smith, Janet S., editors. *Literacies: Writing Systems and Literate Practices. Davis Working Papers in Linguistics No. 4.* Davis: University of California, Davis, Linguistics Program.
Seeley, Christopher. 1991. *A History of Writing in Japan. Leiden/New York: E.J. Brill.*

Street, Brian, editor. 1993. *Cross-cultural Approaches to Literacy.* Cambridge: Cambridge University Press.

Suzuki, Takao. 1975. On the twofold phonetic realization of basic concepts: in defense of Chinese characters in Japanese. Peng, F.C.C., editor. *Language in Japanese Society.* Tokyo: University of Tokyo Press.

— 1977. Writing is not language, or is it? *Journal of Pragmatics, 1:4,* 407-420.

Tannen, Deborah. 1981. The myth of orality and literacy. Frawley, William, editor. *Linguistics and Literacy.* New York: Plenum Press.

Tannen, Deborah, editor. 1984. *Coherence in Spoken and Written Discourse.* Norwood, New Jersey: Ablex Publishing Corporation.

Twine, Nanette. 1984. The adoption of punctuation in Japanese script. *Visible Language, 18:3, 229-237.*

Unger, J. Marshall. 1984. Japanese orthography in the computer age. *Visible Language,* 18:3, 238-252.

Yasumoto, Minoru. 1963. *Kanji no shôrai. Gengo Seikatsu* 137:2,4.

James Elkins

Between Picture and Proposition: Torturing Paintings in Wittgenstein's *Tractatus*

Art history is currently mining a number of disciplines to find adequate accounts of the differences between pictures, writing and other graphic marks. Anthropology, archaeology, semiotics, linguistics, speech act theory, various strains of psychoanalysis, structuralism, poststructuralism and literary criticism have all been pressed into service. In this chorus of ideas and contributors Wittgenstein's name is largely missing. One reason for that omission is his emphasis on simple schemata, "games" and logical relations at the expense of pictures. Even though the entire system of the *Tractatus* is based on Wittgenstein's "picture theory," it has seemed that he meant principally "proposition" instead of "picture," thus excluding the very nonpropositional elements that are of interest in actual pictures. Here I argue that the "picture theory" actually *is* about pictures in several important senses, and that it offers a more rigorous and logical model of graphic meaning than many later theories.

James Elkins is associate professor of Art History, Theory and Criticism at the School of the Art Institute of Chicago. His books include The Poetics of Perspective *(Cornell, 1994) and* The Object Stares Back *(Simon and Schuster, forthcoming). He has written on word–image issues in* Res, Word & Image, Meaning *and* Qui parle. *Essays arguing against aspects of visual semiotics are forthcoming in* Critical Inquiry *and* The Art Bulletin.

Department of Art History,
Theory and Criticism
School of the Art Institute of Chicago

Chicago, Illinois 60603

Visible Language, 30:1
James Elkins
72-95

Rhode Island
School of Design

Providence
Rhode Island 02903

Of the various nineteenth and twentieth-century theories concerning words and images, the account Wittgenstein gives in the *Tractatus* stands out by implicitly denying that it is necessary to distinguish between "pictures" and "propositions" or "sentences" in the logical sense. At first it may seem that this position has little to say to the humanities: after all, Wittgenstein was interested in the logical structure of the world, and not in paintings, and even if he did mean something like paintings when he said "picture," it still would not make much sense to equate pictures and propositions. In addition, resurrecting the *Tractatus* as a viable source instead of an historical document seems like a dubious endeavor. Since the 1930s, the *Tractatus* has generally been left to historians of philosophy, as the living issues have tended to come from the philosopher's later work. Whatever the picture theory became in Wittgenstein's later thought—and debate on this topic comprises the bulk of philosophic writing on the subject—it was an ancillary "view," showing "how things looked from one angle" rather than a model with foundational status.[1]

But there may be good reason to reconsider the "picture theory," and the *Tractatus logico-philosophicus*, in light of contemporary visual theory. It is at least intriguing that Wittgenstein's use of "proposition" belongs in a direct line that runs from positivism through current semiotic theories of pictures. Semiotic art history posits signs, structures, lexemes, syntax and other linguistic elements in pictures, and those entail the logical elements Wittgenstein was concerned about.[2] Wittgenstein's position is much stronger, and more thorough, than contemporary semiotic models of pictures, since it demands not just essential fragments of linguistic forms, but total identity between logical grammar and pictures—or so it seems.[3] In art history, those propositional or linguistic aspects of pictures are balanced by awareness of nonlinguistic, "purely visual" elements that cannot be well described in language. Much of current art history is polarized by the difference, since there seems to be no intuitively acceptable way of creating a single picture of "picture" that includes both traits. The "word-image" distinction has grown into a generative opposition that tends to crowd out nuances and alternate formulations: pictures are seen to be uncertain mixtures of linguistic forms—or in this journal's title, *language*—and unnameable, inenarrable, almost inconceivable elements—the *visual*.

1
For the view that the picture theory continues beyond the *Tractatus*, see A. J. P. Kenny, *Wittgenstein* (London: Penguin, 1973); for the contrary view, see P. M. S. Hacker, "The Rise and Fall of the Picture Theory," in Irving Block, editor, *Perspectives on the Philosophy of Wittgenstein* (Cambridge, Massachusetts: MIT Press, 1981), 85 109. For the idea that Wittgenstein's later theory widens so that "pictures need not be images," see Ronald Burr, "Wittgenstein's Non-Representational [i.e., linguistic] Religious Pictures," in Werner Leinfellner and Franz M. Wuketits, editors, *Die Aufgaben der Philosophie in der Gegenwart / The Tasks of Contemporary Philosophy*, Proceedings of the 10th International Wittgenstein Symposium, Kirchberg am Wechsel, Austria (Vienna: Hölder-Pichler-Tempsky, 1986), 352-54.

The phrase in quotation marks is from E. Stenius, "The Picture Theory and Wittgenstein's Later Attitude to It," in *ibid.*, 110-39, esp. 135.

2
See my "Marks, Traces, *Traits*, Contours, *Orli*, and *Splendores*: Nonsemiotic Elements in Pictures," forthcoming in *Critical Inquiry*.

Normally, when art historians want to work their way out of the word-image debate they either critique its apparent harshness by finding subtle connections between "words" and "images," or else they try to redefine the problem by adopting alternate terms to stand in place of "word" or "image." These are, I think, mostly cosmetic alterations, and they leave the dichotomy untouched. Even trichotomies such as Charles Peirce's division of signs into symbolic, iconic and indexical, tend to reduce to the familiar dichotomy when the third term, in this case the "indexical," begins to appear as an attribute of the more commonly noticed symbolic and iconic.[4] To some extent the stubborn split has been beneficial, since it has allowed a wide latitude of historical and critical projects to find purchase, to set themselves problems and solve them within the terms of the dichotomy; but in another sense, it has been profoundly limiting since it prevents effective engagement with the huge variety of images that do not lend themselves to polar schemata.[5] The picture theory, if it has anything to say outside the rarefied, sometimes artificial and often ambiguous world of the *Tractatus*, may offer a unique way out of the polarized critical climate that now bears down on visual theory in the humanities. It may, in short, offer the most powerful possible critique of the word image dichotomy, since it proposes a concept of picture that is undecidably both "visual" and "verbal"—or in Wittgenstein's more clear and honest language, "pictorial" and "propositional."

The picture theory is exposited in two places in the *Tractatus*, in 2.1-3.01, and again in 4.01 ff., and Wittgenstein's commentators have mostly focused on those parts of the picture theory that are most relevant for what Wittgenstein then goes on to develop, namely his theory of propositions and logical forms. What I would like to do here is look at those passages again, with the eye of an interested outsider—someone concerned with what the picture theory might have to do with ordinary pictures and the words that are associated with them as captions, as superimposed texts, as historical and critical paraphrases and narrative commentaries and especially as denotata. The kinds of questions that I want to ask will have meaning within Wittgenstein studies as attempts to understand the dynamics and vicissitudes of the concept of "picture," but I mostly want to find out whether his way of conceiving, developing and applying the word "picture" has any residual meaning for the late twentieth century. Can Wittgenstein's odd usage be of help to a discourse that is aimed

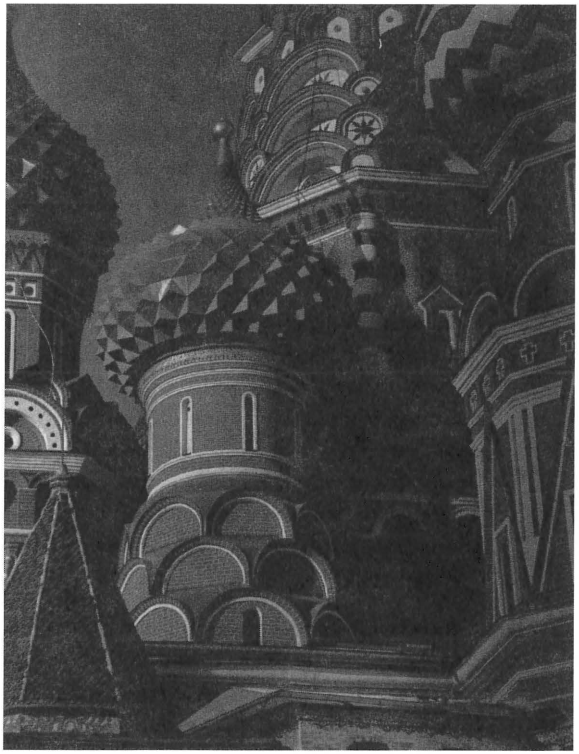
3
A parallel case is Nelson Goodman, with his strict analytic exposition of notation; see my "What Really Happens in Pictures? Misreading with Nelson Goodman," in *Word & Image* 9 no. 4 (1993): 349 62.

4
This is discussed in my essay "Peirce's Wider Semiotic," *Encyclopedia of Aesthetics*, edited by Michael Kelly, forthcoming.

5
The possibility of other schemata that are not binarisms is promised in Mieke Bal, *Reading "Rembrandt": Beyond the Word Image Opposition* (Cambridge: Cambridge University Press, 1991).

at actual, individual pictures? In the end I will not argue for a revival of the *Tractatus* itself (there are too many problems with the structure that supports the picture theory for that to be a sensible option), but for what it can tell us about what we want pictures to be. My essential claim is this: Wittgenstein's exposition tortures the concept of picture in just the ways we tend to torture it, but he does it better, pushing the concept until it is nearly illegible. I would say we are not happy with "picture" as the word is given to us, and our semiotic and other structural theories are aimed at forcing "picture" into certain molds that help us write about pictorial structures, but that also give rise to unacceptably harsh polarities between "word" and "image" or the "visual" and "language."

To my mind the most careful commentary is still Max Black's *Companion to Wittgenstein's Tractatus*, and I will be commenting on Black's glosses as much as on the original. For my purposes it is especially significant that Black takes the vernacular meaning of "picture" seriously, and one effect of that decision is that he keeps trying to pull the concept back toward its ordinary uses—a tendency that I think he may have felt the later Wittgenstein would have approved. Still, he doesn't succeed in placing our "picture" in Wittgenstein's "picture," and I will be paying special attention to the limits of his project of renormalizing "picture" as a sign of the potential problems in importing anything resembling the *Tractatus*'s "picture" into contemporary discourse on art.



The Cathedral of the Intercession of the Moat (St. Basil's). Moscow, 16th c. Wittgenstein once mused that the onion domes of St. Basil's are sufficiently different from one another that they look very much like language—as if they must mean something.[37] It might be better to say that the feeling of meaning, or propositional content, is strong, but so is the feeling that such a picture cannot be a proposition. Photo from William Craft Brumfield, *A History of Russian Architecture* (Cambridge: Cambridge University Press, 1993).

Section I

The first statement about the picture theory is § 2.1, "We picture facts to ourselves." Black stresses that from the outset, Wittgenstein is taking "picture" as a nontechnical term, and that he is not using it "in some figurative sense." Instead

> *his remarks should be taken as intended to apply literally to all representational paintings, photographs, or diagrams such as maps, that can be "read" as depicting how things stand in reality.*[6]

It is not correct to assume, as some commentators have, that Wittgenstein's "picture" is a neologism *ab ovo*, detached from its vernacular meanings. The "picture theory" is built on the premise that the concept "picture" can be used to describe what happens in "an electrical circuit, a map, a printed record of a game of chess," a sentence, a proposition, musical notation, logical sigla such as "aRb," and—perhaps most fundamentally—everyday pictures (90).[7] As Guido Küng puts it, Wittgenstein

> *calls a sentence a picture* (Bild) *because he wants to compare it with a broad spectrum of other examples of*

6
Black (1964), 74. Further references to this will be included in the text.

7
For the sigla, see Wittgenstein (1961), 4.012.

> *pictures, ranging from a* tableau vivant *(*lebendes Bild: *a silent and motionless group of persons, etc., arranged to represent a scene) to a mathematical projection (*Abbildung*).*[8]

The part of Wittgenstein's word *Bild* that means, essentially, "painting" or "drawing" is not at all irrelevant to Wittgenstein's purpose. Since *Bild*, as Wittgenstein knew the word, took its meanings from specific kinds of pictures, projections and so forth, no common association is necessarily irrelevant: *tableaux vivants* for example, as they are described in Goethe and elsewhere, were motionless assemblages intended to mimic *paintings*, and so they are deeply engaged with fine art senses of the word "picture" (4.0311).

But there are immediately problems. While I agree with Black that there is no reason to assume, without having been told otherwise, that "picture" means anything other than representational images, making this explicit also sets up the dynamic that haunts the succeeding pages of both the *Companion* and the *Tractatus*.[9] It turns "picture" into a term that is about to be sorely tested, rather than a philosopheme that might merely need some adjustment (as Black adjusts *abbilden, darstellen, bedeuten* and so forth, on the page immediately following this quotation). Even if we allow that Wittgenstein is following mathematical protocol by letting "picture" function as an undefined term, it remains to be answered why he would choose such a nonphilosophic, ordinary word that has none of the benefits of definitional rigor and none of the advantages of well-worn but abstract vernacular usages. He could have tried *danstellung* or *vorstellung,* with their echoes of Hegel and Schopenhauer. But he chose the more ordinary, and much more slippery, *Bild.*

It is certainly the case that part of what Wittgenstein wants to conjure with his word is the idea of projection, especially in the mathematical sense, but also in its perspectival and optical meanings.[10] But he does not specify projection until 3.11, in part because he wants to leave the exact relation to the world undefined for the moment. Later he mentions "feelers" or "antennae" between picture and world, and evokes the idea of "reaching right out to the world" and "actually" touching it. They are odd images, reminiscent of the visual rays and lines of projections, but also of insect communication and wordless tactile experience in general.[11] Throughout the *Tractatus* the mechanism of repre-

8
Guido Küng, *Ontology and the Logistic Analysis of Language: An Enquiry into the Contempoary Views on Universals* (Dordrecht: D. Reidel, 1967), 51.

9
It also provides the limits to accounts that stress logical relations over pictorial ones, such as Suzanne K. Langer, *Philosophy in a New Key* (Cambridge, Massachusetts: Harvard University Press, 1978).

10
This is discussed in Elkins, *The Poetics of Perspective* (Ithaca, New York: Cornell University Press, 1994).

11
2.1515, 2.1511, 2.15121 respectively.

sentation is left to vacillate between the most rigorous mathematical mappings and the most intuitive "feelings."[12] (And this is why graphical depictions of his "projection," and class terminological symbolizations of the picture theory, seem to me misguided.[13]) But "projection" is also omitted at the beginning because he wants to have "picture" function as "model" as well as two-dimensional painting or photograph (74-75): "A picture is a model of reality," he asserts (2.12). This also follows the German *Bild*, which means both "picture" and "model," and it is likely Wittgenstein intended those uses from the first.[14]

Three numbered paragraphs after he has first mentioned pictures, Wittgenstein gives the first description of the properties that allow pictures to model states of affairs. "In a picture," he writes, "objects have the elements of the picture corresponding to them" (2.13). All Wittgenstein says here is that pictures have "elements," so they are not necessarily atomic, and that they have "correspondence" with objects. But it seems that something more is needed to make sense of this in light of what is about to transpire in the *Tractatus*. Black expands the word "element" into a tripartite theory of picturing (78-79). First, he says that the "elements" in a picture (he suggests the example of Frith's *Derby Day*, a distinctly odd choice, since it fits neither the taste of Wittgenstein's milieu nor that of mid-twentieth century American academia) can be separated into "blobs of paint, black and white patches," and that we will cease differentiating such patches when we come to the smallest units that have denotational significance. He proposes we call these *graphemes*, on the model of linguists' use of "morphemes" to denote the smallest meaningful units of language.[15] Using this definition of "element," he proposes three features of pictures that will have special resonance in the later development of Wittgenstein's thought. First, the elements must somehow resemble their denotata. He names Peirce and suggests that "graphemes stand for their objects iconically," no matter what exact "principle of element-thing coordination" is involved. Second, the arrangement of the graphemes in the painting—Black adds that they must be "suitably defined so as to exclude irrelevancies"—must be parallel to the arrangement of objects in the world. "The principle of representation of spatial structure is, broadly, speaking, identity of arrangement." And third, since pictures represent by virtue of conventions, "every representational picture belongs to an enveloping system of pictures governed by the same princi-

12
G. L. Hagberg points this out in *Art as Language, Wittgenstein, Meaning, and Aesthetic Theory* (Ithaca, New York: Cornell University Press, forthcoming), p. 11 n. 7.

13
As in G. Küng, *Ontology and the Linguistic Analysis of Language*, 53.

14
This is stressed by P. M. S. Hacker, "The Rise and Fall of the Picture Theory," 107 n. 1.

This idea, that a root of the concept "picture" is to be found in three dimensional "proxies," "models" and "tokens," is one that has wide resonance in twentieth century visual theory, from Freud's description of the origin of language in the "Fort / Da" game, to the art historian David Summers's theory of visual objects as "real metaphors," to the archaeologist Denise Schmandt-Besserat's theory of the origin of counting in Mesopotamian clay "tokens" that later became pictographs. Without pursuing any of these leads, I would take note of a peculiar extension of the concept of picture into the realm of three-dimensional "proxies."

See Freud, *Beyond the Pleasure Principle*, in J. Strachey and A. Freud, editors, *Standard Edition*, vol. 18 (London: Hogarth Press, 1955); D. Summers, ▶

ples of representation." As H. O. Mounce puts it, "the structure which is common between the proposition and the world is revealed... only if we understand the rules for their use"; but still, this third requirement may sound more like later Wittgenstein, with its emphasis on interpretation, than the more contextless analysis in the *Tractatus*.[16]

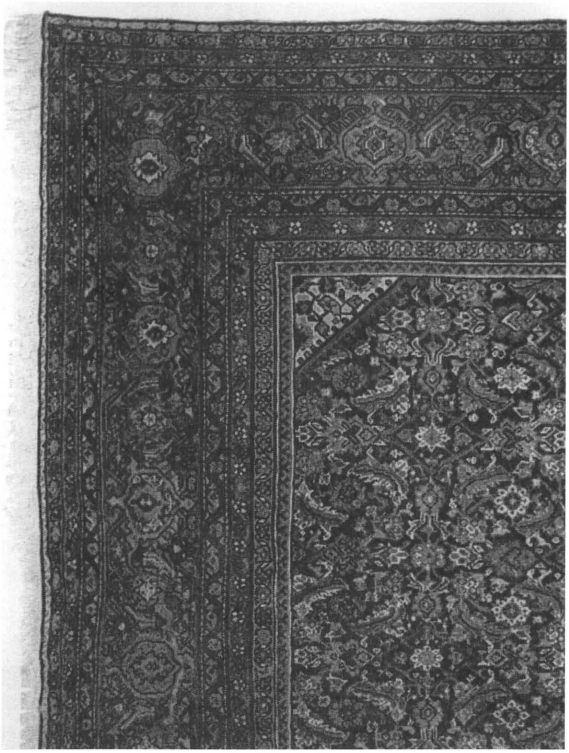
Each of these three criteria is strongly qualified. Spatial relations have to be adjusted "so as to exclude irrelevancies" before they can be correlated with the arrangements of objects in the world, and graphemes only resemble real world objects by "sophisticated" routes. But given that the criteria are not intended to represent Black's sense of the structure of pictures, we may still wonder if they represent Wittgenstein's sense. Because Wittgenstein says he was led to question the *Tractatus* when Pietro Sraffa asked him to explain how a certain gesture—a rude flick of the hand under the chin—could have a "structural correspondence with the state of affairs that it represents," we know Wittgenstein must have assumed some more articulated, if fragile, account of representation. (The power of Sraffa's question comes from the fact that such a gesture "can easily communicate just as much as a fully articulate proposition," so it casts doubt on the idea that the meaning of a sign depends "on its own internal structure."[17]) From the present point of view, the question this episode raises is why it took a "certain Neapolitan gesture" to establish the shakiness of the picture theory. Determinate, symbolic gestures have been integral to Western painting and sculpture from Roman times, and so we might say Wittgenstein had never clearly imagined a narrative picture as he wrote. But is this enough of an explanation? It could easily be argued that all the inchoate ordinary senses of pictures involve "elements" that are "fully articulate" and yet do not "correlate" to the world. What understanding of "picture" could take so much for granted?

"Real Metaphor," in Norman Bryson, Michael Holly, and Kieth Moxey, editors, *Visual Theory* (New York: Harper Collins Icon Editions, 1991); Denise Schmandt-Besserat, *Before Writing: From Counting to Cuneiform* (Austin: University of Texas Press, 1992).

15
Black's usage is a little eccentric here, since "morpheme" normally denotes the smallest meaningful unit of writing, such as "con " in "construction," and "grapheme" means the smallest disjoint unit of writing, such as the "c" in "construction". "Lexeme," a related term, denotes a "minimal unit of the mental lexicon" used in building words, such as the "-struc-" in "construction." The closest to Black's meaning is "morpheme," not "grapheme"; but all three terms could be used to widen the discussion at this point.

16
H. O. Mounce, *Wittgenstein's* Tactatus*: An Introduction* (Chicago: University of Chicago Press, 1981), 29.

17
Karlheinz Lüdeking, "Pictures and Gestures," *British Journal of Aesthetics* 30 no. 3 (1990): 219 20. Lüdeking suggests that Sraffa's Marxist sympathies may account for his relative absence from the Wittgenstein literature (*ibid.*, 230 n. 6).



A corner of a Feraghan rug. The nearly linguistic quality of some rugs has been remarked by a number of authors, from Alois Riegl to E. H. Gombrich. Wittgenstein once dreamed about a rug that he thought had some hidden significance, as if it had a message it could not quite communicate: but in accord with his critique of Freud's dream analyses, he declined to pursue the dream by breaking its enigmatic code. Photo from Rosa Belle Holt, *Oriental and Occidental Rugs, Antique and Modern* (Garden City, New York: Garden City Publishing, 1937).

Section II

In Black's gloss, "picture" is a strongly logical concept. It has definable "elements" that resemble objects in describable ways and that combine into "structures" that also occur in the world.[18] The tripartite description of "elements," despite Black's qualified exposition—and his is by far the most nuanced of any commentary on this passage—is already beyond the pale of "pictures" as many people in the visual arts understand them. For a reader in art history or art criticism, all this may seem to belong to the realm of logic or linguistics, so that the only places Wittgenstein crosses the "word-image" gap and evokes the visual are when he talks later in the *Tractatus* about the non-verbal "mystical" that has to do with the fact "that" something exists instead of "how" it exists (6.44), and when he enjoins silence over whatever is nonsensical or senseless (7). But it seems to me that these earlier moments in the *Tractatus* capture a significant amount of the anti-rational, nonverbal glamour of the "purely" visual, and it is premature to say that Wittgenstein's "picture" has already left the fold of ordinary pictures and become a tool of rationality. And that is so because "picture" is not yet something that is firmly enough chained to its rational prison of

18 H. O. Mounce, *Wittgenstein's Tactatus,*

"element," "correspondence," "grapheme," "identity" and "arrangement" to be sure that nothing remains free, unsaid or unsayable.

Wittgenstein next asserts that the elements of a picture are "related to one another in a determinate way," otherwise the object is not a picture (2.14). Black sees this partly as an injunction against vagueness: "a smudged or blurred picture is not a picture at all; the sense of the picture must be precise, even if the picture depicts a non-atomic situation and thereby leaves much unspecified" (80). Black cites a Turner painting of a foggy sunset as an acceptably "precise representation of what it purports to depict"; what Wittgenstein wants to exclude are vague, indeterminate or indefinite organizations in pictures. To those who work with visual images, this may seem like the last straw, the stifling requirement that breaks the connection between Wittgenstein's "picture" and ordinary pictures. But Black also suggests a more lenient, and I think more accurate, alternate: "'determinate' can also be opposed to 'indefinite,'" so that "the blobs of paint of which a picture is made must be organized in a single, definite way, out of the many that are possible... in order to constitute a determinate picture" (80). In this reading, when Wittgenstein says a picture's elements "are related to one another in a determinate way," he means "in a way that can be determined," or "in a way that is the case," rather than "in a distinct or precise way."

Two propositions later, Wittgenstein says more about determinateness:

> *The fact that the elements of a picture are related to one another in a determinate way represents that things are related to one another in the same way [2.151]*

What is happening here is that the still largely undefined concept of "picture" is being stretched away from its vernacular and critical senses, so that it can accommodate the incipient theory of propositions. The stretching is nearing a breaking point with this kind of atomic correspondence theory, though it is again released just a little by the comment that Black appends. In response to 2.14, he had said that "a determinate picture" must possess a definite organization, leaving it open that there might be other kinds of pictures that Wittgenstein does not mention. I do not agree with that reading, since Wittgenstein says clearly "What constitutes a picture is that its elements are related to one

another in a determinate way," not "What constitutes a determinate picture is that its elements are related to one another in a definite way."[19] Black comments on 2.15I by setting out a "picture" (he puts the word in quotation marks, as if in token of its increasing oddity):

The "picture" is identified by the asterisk in parentheses, instead of the marginal number that is usual in mathematics and logic. (It is interesting that Black chooses an affectless mathematical picture, in contrast to Wittgenstein's first picture of the two dueling stick figures in the *Notebooks 1914-1916*, or the boxer invoked in the *Philosophical Investigations*. If this were a *psychological* inquiry into Wittgenstein's sense of "picture," I might want to claim that his philosophic sense of "picture" may be linked to belligerence. And if that is so, it is a meaning Black transforms into friendly admiration.[20])

This "picture," Black says, has a meaning defined by several stipulations:

(i) the circle stands for Russell;

(ii) the cross stands for Frege;

(iii) that the circle is immediately to the left of the cross means that whatever the former sign stands for admires whatever the latter sign stands for. (The whole picture therefore means that Russell admires Frege.)

Black thinks that given just this picture, without the stipulations, we would be inclined to speak directly about "the fact (*)," as if "putting a circle and a cross side by side on paper uniquely generated a certain fact, which could then be identified without ambiguity or misunderstanding" (80). But the figure could "yield any number of facts" depending on how we read it. We might see it as a circle, a vertical line and a horizontal line, and I would add that we also inevitably see it as a circle, a cross, two parentheses, and an asterisk. So understanding a picture as a fact, or as an object with a "definite sense," or as a fact that depicts something, or—in the terminology that is about to make its first appearance—as a proposition, entails "the selection of a definite

19
Later Wittgenstein does say things that allow that not all pictures are determinate, though he never does so as fully, or explicitly, as Black implies by his commentary. See for example *Tractatus* 2.201, *Companion* p. 90.

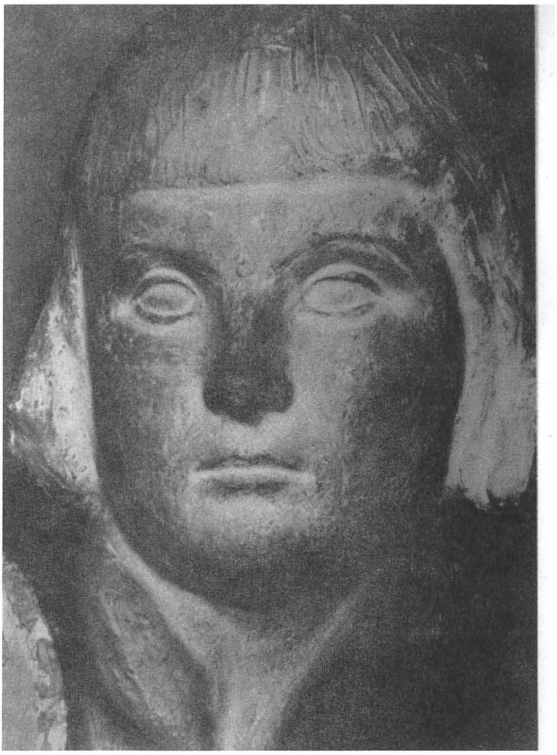
20
See the *Notebooks 1914-1916* entry for September 9, 1914, and *Philosophical Investigations* I.22 n.; I would also note that G. E. M. Anscombe, *An Intro-duction to Wittgenstein's* Tractatus (Philadelphia: University of Pennsylvania Press, 1971), makes the duelists actually touch swords.

articulation of the picture elements" and a definition of their relations.[21] Black does that for his indeterminate "picture" with his three stipulations. A little later Wittgenstein says "The pictorial relationship consists of the correlations of the picture's elements with things" (2.1514), and Black asks, "What features of a picture are to be counted as elements?" (85).

21
Elsewhere the "referents of [the picture's] constituents" are said to be sufficient. See 4.01, and Black (1964), 164.

In a literal reading of the text to this point, a picture is determinate, but in Black's reading, pictures are issued a reprieve and allowed to be sometimes indeterminate. (Black may be rescuing "picture" when it does not need to be, since Wittgenstein only says that arrangement in any picture is its determinateness, and every picture, no matter how "non-verbal" or "iconic" it seems, has an arrangement.) Now this accords very well with a prevalent model of painting, according to which it is inherently indeterminate and structurally vague, but susceptible to "stipulative" reductive readings. But it does nothing significant to alter or erase the word-image dichotomy, and so I would like to stress the literal reading over the more familiar-sounding interpretation that Black offers. "Picture" as it emerges in 2.1-2.15I is a potentially powerful reworking of our usual "picture," because of the way it places these nascent logical forms in the heart of pictures rather than imagining them as a pole toward which pictures might incline, or from which they need to be rescued.

Two further issues will move this reading toward its conclusion: first there is the difficult relation of showing and saying, and then there is the curious way that Wittgenstein stretches, blurs and distorts "picture" without always being aware of doing so.



Wittgenstein, *Portrait Bust.* Wittgenstein remarked that he had only good manners (*gute Manieren*) when he made art. There is a tempting parallel to be made between the simplified forms that he borrowed from contemporary sculptors and the propositional, schematic nature of pictures in the picture theory. Everything is simple and orderly: *gute Manieren* are also logical. Photo from Michael Nedo and Michele Ranchetti, *Ludwig Wittgenstein, Sein Leben in Bildern und Texten* (Frankfurt am Main: Suhrkamp, 1983), pl. 306.

Section III

The picture theory reveals its strength unexpectedly when it takes its most counter-intuitive form, in the assertion that a statement is a picture. That leads Wittgenstein to several deeper connections between pictures and statements that follow from the distinction between showing and saying. Proposition 2.15, which I began earlier, concludes:

> *Let us call this connexion of its elements the structure of the picture, and let us call the possibility of this structure the pictorial form of the picture. [2.15II]*

Black draws out the nascent distinction here between the "picture as a fact in its own right (an arrangement of blobs of paint on canvas, without any associated meaning) and the picture *as a picture* (a fact that *depicts* something, a possible state of affairs) (81). His paraphrase of 2.15II ends this way: "...let the structure of the fact be called the structure of the picture, and the form of the fact be called the form or the form of representation of the picture" (82). "Picture" is bifurcated into something with internal structure and external form. He calls the "picture as a fact in its own right" the "picture-fact" and "the picture *as a picture*" the "picture in the full sense" (81).

Wittgenstein's own way of developing this thought is to place the truth-function of a picture in its external relation, and its "sense" in its internal relation (92).[22] A picture's sense, which is contained in its internal structure, is not dependent on its truth-value, which is expressed in its "form of depiction." Black reads 2.221 as "What a picture shows is its sense," rather than "What a picture represents is its sense" as Pears and McGuinness have it, and that allows him to see an anticipation of the central doctrine that will be made explicit only in 4.022: that a picture "*shows* its sense," but it "says" its truth-content (92-93). Later,

> *Wittgenstein insists strongly that the logical form can only be displayed* (aufgeweisen)*, mirrored or reflected* (gespiegelt)*, shown* (gezeigt)*, and that it cannot be depicted* (abgebildet)*, represented* (dargestellt)*, [or] said* (gesagt)*.*[23]

This concept, and the entire impetus to employ the word "picture," probably came from Frege. At one point Frege writes "it would be desirable to have a special term for signs having only sense. If we name them, say pictures (*Bilder*), the words of an actor on the stage would be pictures; indeed the actor himself would be a picture."[24] It is important that this idea of silent pictures may be at the origin of Wittgenstein's "picture," but in the *Tractatus* it is not clear if a picture's internal structure cannot also be "asserted," "claimed," "said" or couched as any sort of proposition. By itself, a picture's sense agrees or disagrees with reality and can be true or false (2.222). The internal structure of the foggy sunset painting might be incoherent, and therefore false, without any reference to other foggy sunsets, painted or real. Because that is the case, it is not obvious what can say and show, or only do one or the other.

There are some particularly elliptic passages here, with widely varying readings.[25] Since a picture's sense is already a truth statement, showing seems to be ubiquitous and prior to saying, and saying begins to look a little superfluous. As Black asks, "what function is left over for *saying*?" To G. E. M. Anscombe, the showing / saying distinction names the difference between a picture and a proposition; the former shows, the latter says:

> *[W]hile a picture may be said to* shew *how things are, if there is something it is a correct representation of, it certainly does not say that is how things are; the most that one could grant would be that we could* use *the picture* in

22
See further Bernard Harrison, "Frege and the Picture Theory: A Reply to Guy Stock," *Philosophical Investigations* 9 no. 2 (1986): 134 39.

23
Guido Küng, *Ontology and the Logistic Analysis of Language,* 54 55.

24
Frege, cited in Guido Küng, *Ontology and the Logistic Analysis of Language,* 51 n. 2.

25
Problems have arisen over the wording of 4.022II ("A proposition *shows* how things stand if it is true. And it *says that* they are so"), where Wittgenstein seems to be saying that true propositions both say and show. It leaves open the question of what happens to negative propositions (Stenius [1960], 148), and it has even seemed to be a "mistake." (J. W. T. Wisdom, "Logical Con-structions," 205, cited in *Companion*, 165.)

Carmap mounted an attack on the concept that a picture cannot depict its form of depiction. He argues, in Küng's words, that "although we cannot step *outside* any logical form... we can, nevertheless, make statements *about* the formal system of any language within the system of a metalanguage." Guido Küng, *Ontology and the Logistic Analysis of Language,* 55.

> *saying how things are: we could hold the picture up and ourselves say: "This is how things are."*[26]

It seems to me this is too stark, and it gives away the complexity of the preceding analysis. Why would Wittgenstein have expended so much thought to bring "picture" closer to "proposition," if he had meant to make picturing so clearly not a matter of asserting?

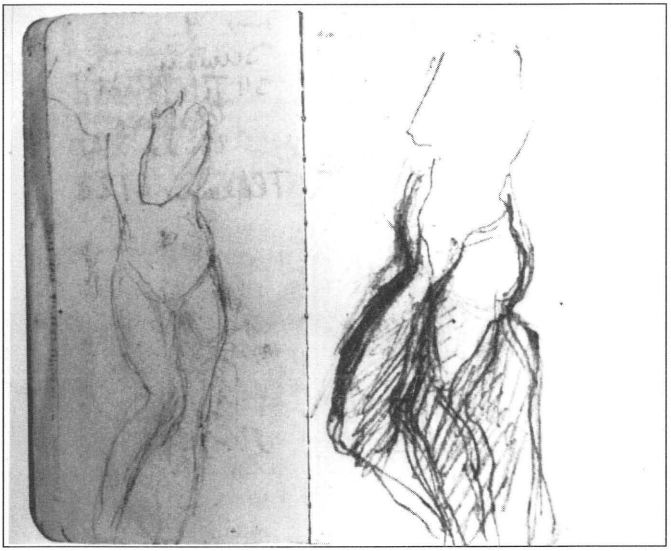
It is better, I think, to try to put showing and saying together in the composite concept that is the "picture." Erik Stenius does this when he says pictures show both internal structure and external states of affairs.[27] He develops the idea of "internal showing," which only happens when what is shown cannot also be said, and concludes that "the internal structure of reality can only be shown or exhibited by language, not described in sentences."[28] For "language," we might substitute "pictures" in the ordinary sense. This is a more modulated interaction of showing and saying, though it still confines the "internal relations" of a picture to exhibiting sense.

Like Wittgenstein's "picture," showing and saying are partly propositional and partly not, or to put it another way, propositions are always both shown and said. For Black, "saying" is "an aspect of" the sense, rather than a second function that is "superadded to it" (165). "Propositions show what they say," Wittgenstein claims, so that "tautologies and contradictions show that they say nothing" (4.461I). Showing, it seems, is something that is done by merely existing, and by possessing internal structure; and it can also be the only mode of meaning for statements that are void, contradictory or tautological. Pictures are often that way.

26
G. E. M. Anscombe, *An Introduction to Wittgenstein's* Tractatus, 65.

27
Stenius (1960), 179.

28
Stenius (1960), 181.



Wittgenstein, *Sketches after Michelangelo's Slaves.* This most typical art student's subject has rarely yielded interesting work (Tintoretto's drawings are amoung the best exceptions), but it is strong in propositional content: here it declares a range of aspirations typical of a certain period and a certain social class. The nonlinguistic aspect of such drawings is almost incidental: they merely need to denote their subject and they have fulfilled their function. From Michael Nedo and Michele Ranchetti, *Ludwig Wittgenstein,* pl. 406.

Section IV

Showing and saying are intriguing concepts for contemporary visual theory, especially if they are linked in the way I have suggested. They are the signs of a true fusion of the intuitive and beleaguered nonverbal nonlinguistic "picture" and the counter-intuitive and relentless "determinateness" of readings that insist on pictures' propositional logic: a fusion, that is, of "image" and "word." That is the moral I would like to draw from this reading, and the central claim of this essay. Although these are powerful and promising ideas, it is not likely that the *Tractatus* itself could ever become a foundation for contemporary visual theory: the picture theory is too much based on the logical atomism that Wittgenstein, and the majority of writers after him, have long since rejected. But I have pressed the point in order to indicate how a more rigorous understanding of what we want to mean by "picture" is commensurate with Wittgenstein's formulations. He was, in this respect, one of the major art critics of the century: he took desires we still have in regard to pictures and made them more orderly and clear than most writers since his time have managed.

That is the doctrinal portion of the reading I want to make; but in order to pursue our own notion of "picture" it is necessary to

leave off expositing the picture theory itself and consider instead a kind of side-effect of the reading. What I have in mind is the violence that is done to "picture" throughout the text. It begins slowly, since "picture" enters the text as an undefined term, but it builds until the word has only the most improbable connections to its original meanings. I would like to close by examining that process, and positing that the distortion of meaning is itself both significant and thematic: it expresses the strangeness of the *Tractatus's* aims in this respect, and it exemplifies the oddity of trying to compose a sense of combined "picture" and "proposition."

As Black says, if I look at a picture of a red ball on a white kitchen tablecloth, I can pick out any number of formal resemblances between the picture and the actual state of affairs it depicts. The sentence "The red ball is on the white cloth" seems quite different, and in order to understand it as a picture I have to take special note of the fact that the ball, the cloth and the relation between them are all "united in the sentence-fact" in the way that the physical denotata are united. Black seems fairly reconciled to this notion (89): "Since concatenation of elements in the sentence-fact means concatenation of the co-ordinated elements in the represented state of affairs, it is not far-fetched to detect a residual 'iconicity' even in a sentence"—or is it? Do we really want a "residual" property to be the strongest link between our rather attenuated concept of "picture" and the sentences that we wish it to exemplify? And why isn't Wittgenstein more concerned about this—at least as concerned as Black is when he finds himself inventing this dubious example? Why doesn't he notice that he is left with "rather unexciting" correspondences when it comes to sentences?[29]

Wittgenstein might have replied that the "determinate" picture, with its strict "elements" and "pictorial form," is very much like a sentence, and that Black's example takes "picture" too much as something that resembles and not enough as something that has structure. But what is at stake in the reading I am pursuing here is the concept of "picture" itself, which is sorely tried by this development. What is left of "picture," aside from its potentially "determined," well-articulated structure of pseudo-linguistic elements and its various "forms of depiction"?

Wittgenstein knew he was being vague about pictures. G. E. Moore records some of his thoughts about that, in lectures given in the early 1930s:

29
J. W. T. Wisdom, "Logical Constructions,' *Mind* 40 (1931): 205, cited in *Companion*, 163.

> *In connection with the* Tractatus *statement that propositions... are "pictures," he said that he had not at that time noticed that "picture" was vague; but he still... thought it "useful to say 'A proposition is a picture* or something like one'" *although... he was willing to admit that to call a proposition a "picture" was misleading; that propositions are not pictures "in any ordinary sense"; and that to say they are, "merely stresses a certain aspect of the grammar of the word 'proposition'- merely stresses that our uses of the words 'proposition' and 'picture' follow similar rules."*[30]

Stenius remarks that "one often has the impression that when [Wittgenstein] later speaks of themes related to the picture theory he, as it were, asks himself 'What did I really mean?' and does not find an answer to this question." In this regard the *Tractatus* is "vague," and so it stands to reason that Wittgenstein might have a hard time recalling what "picture" had once meant.[31] Yet despite his memory that he had not noticed the vagueness when he was writing the *Tractatus*, there is some evidence he did know some aspects of the theory were vague. In 4.011, he says that sign languages are pictures, "even in the ordinary sense, of what they represent," which Black calls an "important remark" that "can hardly be defended." "In this passage," he thinks, "Wittgenstein seems to be aware that he has stretched the ordinary meaning of 'picture.'"[32]

The vagueness and the stretching go hand in hand throughout the *Tractatus*. At times the operations that would be required to revive the flagging "picture" are so extensive that they seem rather hopeless. Black makes a list of the "modifications" that are needed in Wittgenstein's doctrine to make the form and structure of pictures "fit the most general case of a representation" (90). First, we can no longer insist that elements in a picture resemble their denotata, so that iconicity needs to be replaced by some more general "abstract notion of one-to-one correspondence." And there can no longer be an identity between arrangements of elements in pictures and in real-world denotata; instead we have to speak about "*homology* of arrangements." The spatial arrangements in a musical score are homologous, but not identical, with the temporal relations in a performance. And third,

> *homomorphic structures may still be held to have something "in common," namely a pattern of relationships, indifferently exemplified by each member of a class of*

30
G. E. Moore, "Wittgenstein's Lectures in 1930 33," in *Philosophical Papers* (London, 1959), 252 324, esp. 263, quoted in Black, *Companion*, 162 63.

31
E. Stenius, "The Picture Theory and Wittgenstein's Later Attitude to It," 134.

32
Proposition 4.013 notes that the "essence" of "pictorial character" of propositions is "*not* impaired by *apparent irregularities* (such as the use of [sharp] and [flat] in musical notation)," and 4.0141 observes that "There is a general rule by means of which the musician can obtain the symphony from the score"—a statement that I would imagine has entertained Nelson Goodman, since the bulk of *Languages of Art* is given over to specifying that what might mean.

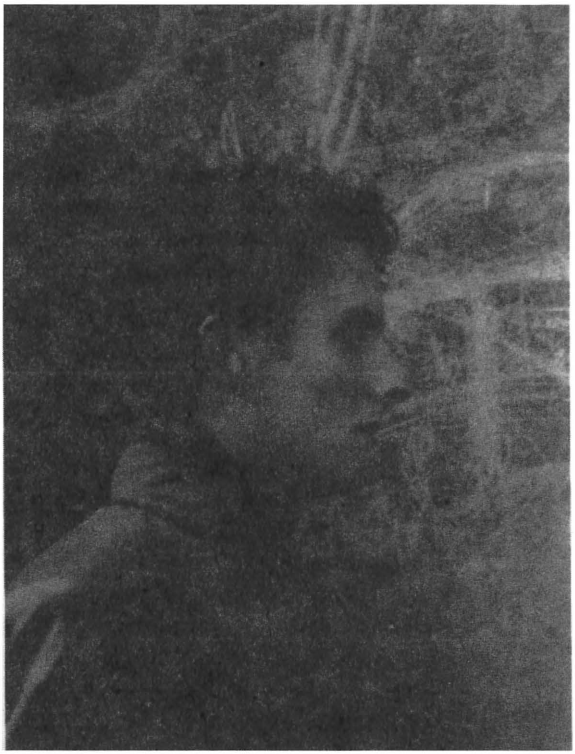
> *mutually homomorphic structures. So, in a* very *abstract sense of "same form," we might still say that representation and what it represents have the same form (in my terminology, are homomorphic). [91]*

This is "*very* abstract" indeed. Is there any reason not to abandon the word "picture" altogether, in favor of some neologism that would express its non-visual meanings a little more accurately—something like "determinate depiction-vehicle"?

The most compelling thing about the picture theory is this very abuse of the concept "picture." No matter how much it is distorted, its vernacular meaning remains indispensable. It is saved from disappearing into a non-visual proposition by the vagueness that cloaks it, but it also repeatedly calls out for the kind of clarity that would ultimately destroy it. In terms of the philosophic claims of the *Tractatus*, this is a crucial elision on Wittgenstein's part, though we might also describe it as a calculated decision since it allows the picture theory to remain afloat. In terms of my own agenda, and the potential meaning of the *Tractatus* for visual art, the thematic significance would have to be put something like this: any attempt to escape from the word-image opposition by fusing "word" and "image" will involve doing some violence to the vernacular meanings of "picture," and that violence may be expressed most powerfully in the *Tractatus*.

A harried sense of "picture" may be the inescapable sign, condition and constitutive state of any such attempt. The fact that postmodern visual theory harasses the notion of "picture" so consistently and resourcefully may be part of the desire to collapse the word-image dichotomy—to know and not know pictures, to have them as analytic "propositions" and wordless objects.

In Wittgenstein's hands "picture" nearly becomes—to use a word that plays a central role in sections 6 and 7 of the *Tractatus*—"nonsensical," *unsinnig* (376, 380). In literary terms, the picture theory can be read as the result of an intense desire to have exactness of concepts together with "mysticism," not only in the realm of "silence" but in the most immediate, familiar, unanalytic, unphilosophic interpretation. "Picture" is familiar and unfamiliar, "shown" and "said," defined and undefined, a term from the fine arts and from philosophy. Perhaps—to strike a somewhat extravagant note—it may even be that the true *object* of attempting to escape from the word-image dichotomy is to harass the concept of "picture."



Wittgenstein, *Photograph of Ben Richards.* One of the ways a picture can show and say at the same time is by presenting itself as a declaration—in this case, perhaps, as a declaration of love. The photograph is an almost forensic document of its subject's essential features: even though it says nothing about them, it is clearly propositional. From Michael Nedo and Michele Ranchetti, *Ludwig Wittgenstein,* pl. 460.

Section V

A helpful concept for analyzing that object is "hypericon," coined by W. J. T. Mitchell in *Iconology*. Though he only mentions the word twice, he gives at least five examples: Wittgenstein's comparison of propositions and hieroglyphics, "Plato's cave, Aristotle's wax tablet, Locke's dark room," and a simple diagram showing a man's head, looking at a candle, which projects through his eye and reforms as a mental image inside his mind.[33] There are at least three senses in which we might understand these as "hypericons." First, they are images that seem to tell us about how the mind forms images, figures that "figure the practice of figuration" (5). In David Summers's phrase, they are "metaphors in terms of which the mind itself is characterized."[34] Thus the perspective diagram "displays a whole matrix of analogies... that govern representational theories of the mind;" as I have argued elsewhere, it tells us how to think about point of view by providing structures generated from perspective, which itself gave rise to the concept of point of view.[35] In this first definition, hypericons are sources of a *mise en abyme* of reflection, in which we think with the aid of images, but also through images, about images and because of images. It would be inter-

33
Mitchell (1986), 16, 158. For Wittgenstein's hieroglyphic see Wittgenstein (1961), 4.106, cited in Mitchell (1986), 6, 20.

34
Summers (1991), 192.

35
Mitchell (1986), 16, and Elkins, *Poetics of Perspective* (Ithaca, New York: Cornell University Press, 1994).

esting to make a study of hypericons in this sense: hypericonicity would have to be regarded as an inalienable property of all thinking about (and through) images.

That thought leads to a second definition, which is nascent in the first. Hypericons can be examples of a property of our concept of idea, because the very word "idea" is itself an image, and names an image. The opening lines of *Iconology* are an exemplary introduction to this issue:

> *Any attempt to grasp "the idea of imagery" is fated to wrestle with the problem of recursive thinking, for the very idea of an "idea" is bound up with the notion of imagery. "Idea" comes from the Greek verb "to see," and is frequently linked with the notion of the "eidolon," the "visible image" that is fundamental to ancient optics and theories of perception. A sensible way to avoid the temptation of thinking about images in terms of images would be to replace the word "idea" in discussions of imagery with some other term like "concept" or "notion," or to stipulate at the outset that the term "idea" is to be understood as something quite different from imagery or pictures. This is the strategy of the Platonic tradition, which distinguishes the* eidos *from the* eidolon *by conceiving of the former as a "suprasensible reality" of "forms, types, or species," the latter as a sensible impression that provides a mere "likeness" (*eikon*) or "semblance" (*phantasma*) of the* eidos.

In place of this "strategy," which is presented as a kind of analytically conceived grammatical imposition on something more unruly, Mitchell opts for a "less prudent," but "more imaginative and productive, way of dealing with the problem": he disallows the artificial, and by implication ultimately ineffective, Platonic distinctions, and allows the "recursive problem full play."

> *This involves attention to the way in which images (and ideas) double themselves: the way we depict the act of picturing, imagine the activity of imagination, figure the practice of figuration. These doubled pictures, images, and figures (what I will refer to—as rarely as possible—as "hypericons") are strategies for both giving in to and resisting the temptation to see ideas as images. [5-6]*

I would distinguish this definition from the first because it is not so much concerned with the regression *ad infinitum*, as the helplessness of thought to distinguish itself from images. As the phrase "both giving in to and resisting" shows, it is a deconstructive strategy, aimed at the Platonic conceptual apparatus and at any similar theory that entails a rigorous and untenable separation of word and image.

An example is Plato's cave, which presents itself as a philosophic analogy, an "attack on the illusory knowledge of 'pure' images and appearances." (92) But the allegory "is an image in two senses:"

(1) it involves an elaborate scene or picture that the reader must construct mentally;

(2) this scene must be interpreted by a series of likenesses or analogies that compare the scene of the cave to the human condition. [93]

Therefore the Allegory of the Cave argues about images by means of images, producing an indeterminate chain of receding responsibilities (the first definition of hypericon), and it does so by both managing images and being managed by them, both "resisting" the figural and "giving in" to it (the second definition).

The hypericon is an unavoidable obstacle to any interpretive program that would distinguish ideas from images, and it is also—particularly in its second definition—a siren for those who are attracted by the conceptual difficulties posed by the mingling of the two. Hypericons are beautiful traps, places where it is a pleasure to be caught, and for that reason I would propose them, along with the entire Platonic heritage of the ambiguously imagistic "idea," as the locus classicus for the desire I have been tracing in Wittgenstein's *Tractatus*. In both *Iconology* and the picture theory, something that is undecidably or fundamentally both image and concept, or picture and proposition, is also something beautiful.

There is also a third definition entangled with these, and it comes out in the introduction to the last part of the book, where Mitchell proposes that hypericons "have their analogues in the realm of graphic images." He names "Wittgenstein's duck-rabbit, Foucault's *Las Meniñas*, Lessing's Laocöon (the image, not the text)," which "all serve, like the philosophers' images," as

"figures of figuration, pictures that reflect on the nature of images" (158). It doesn't matter in this context whether what Wittgenstein or Foucault or Lessing say about their images is true: what counts is that they become exemplary of certain issues of figuration. *Las Meniñas* has attracted a large literature in the past twenty years, and virtually all of it concerns the painting's intellectual puzzles, its optical and epistemological properties. Virtually nothing has been written in that period about its color, its formal properties, or its *facture*—a sign that it has ceased to be a painting that might sometimes be used to think about intellectual conundra, and has become instead transparently equal to them. We can no longer think about certain problems of depiction, reflection and beholding without *Las Meniñas*, and we can no longer see *Las Meniñas* without those concepts.

Mitchell calls these "analogues in the realm of graphic images," but I would say instead that they are *examples*. They are hypericons in a third sense, since they are what we make when we invest these desires in existing images. They are a new kind of picture, or else a pathological instance of a universal quality of images for our culture; and this brings me back to the idea of torturing the concept of picture. *Las Meniñas*, the Laocöon, and other works of visual art—I would add, for example, Manet's *Maid at the Folies-Bergère*, Seurat's *Grand Jatte*, Leonardo's *Mona Lisa*, and Botticelli's *Primavera*, for various reasons and in various contexts—have been curiously stretched and distorted by their attendant discourses.[36] *Las Meniñas* has become the sum total of a sometimes bizarre literature claming the painting embodies everything from a graphic equivalent to modern fragmented subjectivity to a hidden phallus and a hidden portrait of Lenin, so that it can only speak to us in shrill, contentious and analytic voices. "Picture" has become distorted, almost—but not quite—beyond recognition, if by "recognition" we mean the now—almost-invisible modes of seeing that took place before the psychic investment, the philosophic cathexis, of recent writing.

But these are only the extreme cases. Not all pictures become entangled in these ways, so that it might make sense to call them hypericons. Yet our concept of "picture" is everywhere susceptible to this violence or harassment, and when part of what we want a picture to be is a proposition, "picture" is likely to become incoherent or unlikely in these ways. Wittgenstein, I think, offers the most poweful account of what we can expect from our desire to torture paintings.

36
For an historiographic inquiry into these same issues, see my essay "On Monstrously Ambiguous Paintings," *History and Theory* 32 no. 3 (1993): 227 47.

37
Wittgenstein, *Lectures and Conversations on Aesthetics, Psychology, and Religious Belief*, edited by Cyril Barrett (Berkeley: University of California Press, 1967), 45.

Editorial Correspondence:

Manuscripts, inquiries about research and other contributions to the journal should be addressed to the editor. Letters to the editor are welcome. The editor will also relay to the author questions or comments on any article. Your response — and the author's reply — will not be published without your permission and your approval of any editing. If you are interested in submitting an article to the journal and would like a copy of our Notes on the Preparation of a Manuscript, please request this information from the editor. Editorial correspondence should be addressed to:

Prof. Sharon Helmer Poggenpohl
Editor, Visible Language
Institute of Design, IIT
10 West 35th Street
Chicago, Illinois 60616
Telephone 312.808.5317
Fax 312.808.5322
E-mail idpoggenpohl@id.iit.edu

If you are interested in serving as guest editor for a special issue devoted to your specific research interest, write to the editor, outlining the general ideas you have in mind and listing a half dozen or so topics and possible authors. If you would rather discuss the idea first, call the editor at: 312.808.5317.

Business Correspondence:

Subscriptions, advertising and related matters should be addressed to:

Visible Language
Rhode Island
School of Design
Graphic Design Departrnent
2 College Street
Providence, RI 02903
Telephone 401.454.6171