VISIBLE LANGUAGE

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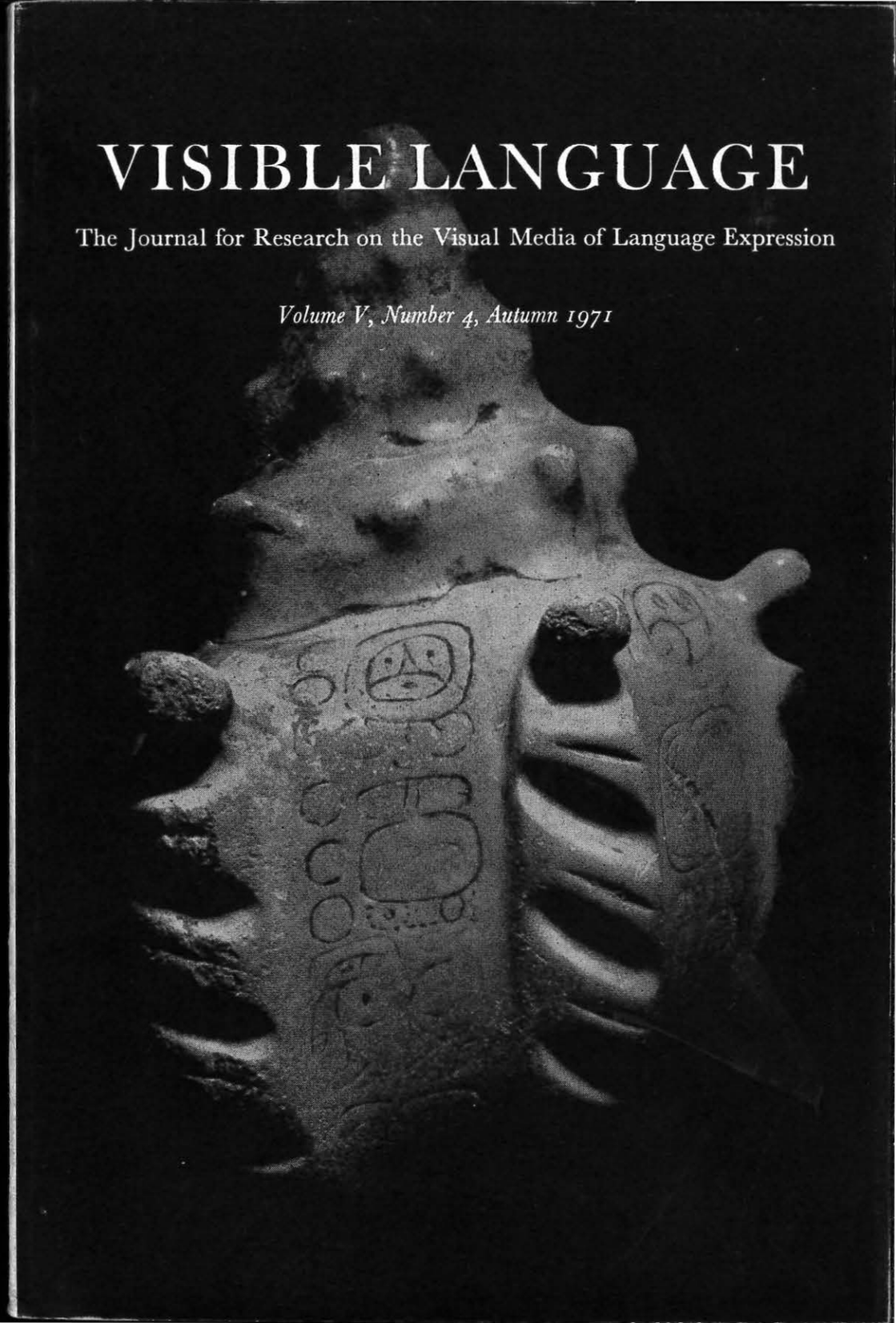

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COVER: An inscribed conch shell from the island of Jaina, Campeche, Mexico. The glyphs include the Maya date I Ahau 3 Zip, corresponding to March 17, 761. Courtesy Princeton University Library. Photograph by Justin Kerr. See Michael Coe's article on ancient Maya writing and calligraphy, beginning on page 293.

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Ancient Maya Writing and Calligraphy

Michael D. Coe

Maya hieroglyphic writing was carved on stone monuments, written in bark-paper codices, and painted or carved upon funerary pottery. The stone incriptions, formerly thought to record only calendrical information, have been found to contain dynastic histories. The codices treat exclusively of ritual matters, while the texts and pictures on the pottery are concerned with the perilous voyage of the soul to the underworld. The script evolved from a highly pictographic system into one that had a strong phonetic-syllabic component. As calligraphy, Maya writing was a basically painterly art.

Of all the native peoples of the New World before the arrival of the Spaniards, the Maya of southern Mexico and Central America were alone in being fully literate. Many of these records have survived more than a thousand years to tell of a way of life that has vanished forever. Archaeologists, who are usually left with little more than the pots, pans, weapons, and other material goods of ancient cultures, assure us that the dead do not speak, and thus assume that the mental life that has gone without trace played little or no part in that culture. In the case of the Maya, like that of the Egyptians, the dead most certainly *do* speak, but they tell us of a mental world that is often completely alien to our own. It is this unique glimpse into the minds of a gifted people that makes the study of the ancient Maya so fascinating to the scholar.

The Maya civilization flourished in the midst of a tropical forest between the end of the third century after Christ and the Spanish conquest, but its greatest period, the Classic, was over by about 900. At that point in time, some enormous and as yet little understood catastrophe overwhelmed the Maya of the southern lowlands, although during the next six centuries the northern lowlands—that is, Yucatán—remained prosperous even though under sporadic domination from the Mexican highlands.

Let us consider the Classic, since it was during that period that all of the Maya inscriptions were carved. It was the Classic that saw the greatest flowering of Maya art and architecture. The word "city" has often been used in talking about the largest Maya sites—such as Tikal, Palenque, Copán, and Piedras Negras—yet these agglomerations of towering temple-pyramids, palaces, and courtyards show little signs of planning, and there are no streets. Instead, houses were scattered helter-skelter across the landscape, although there are more of them the closer one gets to the center of a site. Most archaeologists, then, prefer to think of these as ceremonial centers, inhabited by politicians and priests and their retinues, with the bulk of the Maya peasantry living in rural hamlets not much different from those one sees today in the Yucatán countryside.

There are probably hundreds of such centers of varying degrees of size and importance across the Maya lowlands, most of them lost from sight under the jungle canopy that covers the area. What really were these centers, so reminiscent of Angkor and the Khmer civilization of Southeast Asia? So poor is our information that we are not even sure that the so-called "palaces" were actually used as dwellings. On the other hand, the temple-pyramids have begun to reveal some of their secrets. These are stucco-covered structures of limestone rubble faced with dressed blocks. The pyramid itself is stepped, with a frontal stairway giving access to a vaulted temple on the summit. In recent years, some extraordinary discoveries of richly stocked tombs have been made at the base of the substructure, making it certain that these were funerary temples built by a ruler to house his own remains upon death.

Who, then, might have been worshipped in a Maya temple? A god or the dead ruler for whom it was raised? Here we have an example of the false use of categories derived from our own culture, for in pre-hispanic Mexico and Central America these might have been one and the same. The rulers were descended from the gods, and a king probably became identified with his lineage god after death. By paying homage to the man, you were also paying homage to the god. Finely made masonry tombs lavishly equipped with grave goods have often been found beneath the floors of the palaces as well. In other words, an ancient Maya center might have been as much a necropolis for rulers and nobles as a seat for the Maya administration. This

peculiar ambiguity between life and death can be seen elsewhere in Maya culture.

The writing of the ancient Maya has given us our most valuable clues to their social, political, and religious life. Like their art, this writing is at the same time elegant, baroque, complex, and fundamentally weird. Maya texts were lavishly applied to stone, pottery, bone, shell, jade, and many other substances, but probably most importantly to folding-screen books manufactured from bark-paper and covered with stucco as a writing surface. There must have been thousands of such books in Classic times, but the only ones that we have today are a tiny handful of Post-Classic codices.

Maya hieroglyphs are obviously highly pictorial. At any rate, they must have begun their evolution, like our own alphabet, as pictures of real things. Very frequent among them appear the heads of humans and animals, shown in profile facing left. These and even more stylized signs are essentially rounded in form, rather like a compromise between an oval and a parallelogram. Because of these factors, the Maya calligrapher was basically a painter, and probably both professions were joined in the same man. This is reminiscent of China, of course. As in China, brush pens of various sizes were used. It is likely that for the relief carving of a text, the master calligrapher would first brush on the characters, the rest of the job being finished by the sculptor; in the case of carved pottery, the calligrapher himself may have incised the still-damp clay.

Just as in Oriental or Western manuscripts, there are schools of writing and even individual hands which can be detected. Some Maya calligraphers were amazingly sophisticated, employing at times a "running hand" which is not easy to read. Others, who generally seem to have been confined to pottery painting, were less adept.

What do these texts say? How are they to be read? In the last century, it was discovered that Maya writing is to be read from left to right, and top to bottom, usually in pairs of glyphs. It was also found that numbers were expressed by bars and dots, a dot having the value of one and a bar the value of five. Thus, "seven" would be written by a bar and two dots. A third symbol sufficed for zero. With this knowledge, and with information coming to us from the sixteenth-century Franciscan Bishop of Yucatán, Diego de Landa, the intricacies of the Maya calendar were worked out.

Figure 1. Sandstone stela from Quiriguá, Guatemala, representing a Maya ruler of the eighth century. On its sides is carved a text containing dynastic history. Courtesy of the Peabody Museum, Harvard University.

Figure 2. Stone lintel from Yaxchilán, Mexico. The Yaxchilán ruler "Shield Jaguar" faces a robed woman, perhaps his principal wife. The hieroglyphs between their heads record his name and titles.

It was found that many Maya hieroglyphs were, in fact, calendrical. On a typical Maya stela, for instance, or a wall panel, there is usually an initial date. Interspersed in the text are often several other dates, to be calculated forward, or sometimes backwards, from the initial date. Among the majority of scholars working on the problem, a very odd notion took hold, one that, if verified, would have made the Maya completely different from every other human civilization of which we have knowledge. According to this idea, the Maya worshipped time itself, each time period being deified. The content of the non-calendrical glyphs would have been little more than a kind of commentary upon this chronological religion, with possible astrological phenomena like eclipses thrown in for good measure.

The inscriptions on stone are usually accompanied by scenes of persons engaged in various activities. Although many of them are clearly in battle dress and are trampling and otherwise mistreating captives, it was said that these were figures of the priests who were supposed to have ruled the Maya. There are also figures wearing skirts or robes, and these also were supposed to have been priests. The usual conclusion was that the Maya were a theocracy dedicated to the worship of chronology.

This hypothetical edifice began crumbling in 1958, when Heinrich Berlin published a study showing that each important Maya center had its own "emblem glyph," a special symbol which was peculiar to it and which he suggested might be its name or the name of the reigning dynasty. He further hazarded that the Maya inscriptions might not be talking primarily of theological matters, but rather that they were recording history. This, of course, was a heresy.

The Berlin heresy was compounded two years later, when a now-classic paper by Tatiana Proskouriakoff appeared in the pages of *American Antiquity*. Proskouriakoff, who many years before had been artist on the University of Pennsylvania expedition to Piedras Negras, on the Usumacinta River in Guatemala, took as her subject matter a large number of stelae from that major center. She was able to show by an analysis of the dates and other glyphs carved on them, that these reliefs grouped themselves into twelve series. The interval from the first date in any one series to the last date was no longer than the normal range of a human lifetime. Her conclusion was that each series recorded not chronological hocus-pocus, but the reign of a

particular ruler, including references to his birth, accession, and death, and containing information on his marriage and the birth of heirs. In other papers Proskouriakoff demonstrated that the robed figures in Classic Maya art were, in fact, women, and worked out the dynastic history of two extremely violent rulers of Yaxchilán.

All subsequent work on the inscriptions has reinforced the Berlin-Proskouriakoff approach; namely, that the subject matter of the Maya reliefs and the texts which accompany them are historical records having to do not with occult, theocratic matters, but with the everyday, hurly-burly politics of primitive states with warlike rulers hellbent on including other Maya states within their sphere of influence. This is the secular point of view, and it cannot be denied that most Maya texts treat of such matters, which throw an entirely new light on ancient Maya society and politics. As an excellent example of the insights which have come from this great breakthrough, it can be shown that the giant among Maya centers, Tikal in northern Guatemala, had some degree of control over many other centers, since the Tikal emblem glyph is spread over a wide area. The most probable explanation is that through a combination of military might and judicious marrying-off of younger daughters to lesser leaders, the Tikal kings were able to control most if not all of the southern Maya lowlands.

Now, this secular theory makes the Maya, heretofore buried in a world of mumbo-jumbo, much more believable. They sound very much like other early civilizations in the world, with their stories of conquests, humbling of captives, royal marriages, and royal descent. Certainly, the chronological hypothesis cannot be further entertained.

Yet, puzzles do remain. It is certain that the Classic Maya were lunar astrologers, since several glyphs describing the phase of the moon and other selenine matters follow the initial date on a monument, so that whatever the matter described, the influence of the moon upon it was extremely important. And not all Maya initial dates can be ascribed to temporal rulers. Heinrich Berlin and David Kelley have separately demonstrated that at Palenque, the most beautiful of all Maya sites, the texts fall into three groups. The latest group obviously deals with contemporary rulers and their actions. An earlier group refers to ancestral kings who seem to have been historical. But the earliest group of all falls at the end of the last

Figure 3. Stone panel from Bonampak, a small center under the domination of Yaxchilán. The seated ruler is receiving the homage of his wives. The delicately carved inscription gives female names and titles, and is an excellent example of the painterly character of Classic Maya calligraphy.

creation, when the gods themselves appeared; three of the Palenque temples have been identified by their texts with the birth of highly significant Maya deities.

There was a single, unified, body of thought in Mesoamerica—Mexico and Central America—which we would call a Mesoamerican religion. This religion, which almost certainly goes back to the Olmec civilization of 3,000 years ago, has many features which it shares with the early mental systems of eastern Asia. Basic to it is the idea of a universe oriented to seven directions. The surface of our own world has four of these directions, the cardinal points, at each of which stands a world tree. On top of each tree is a particular species of bird, and there is a definite color associated with the tree and direction; at the center is the green tree of abundance, standing for the fifth direction. Above the world is the "above" itself, a stratified realm of thirteen layers, each with its own god. Below the world are nine layered hells, each with its own god.

This universe had been initiated by an old male-female creator couple, and had been alternately produced and destroyed—four times, according to the Aztec—before our own creation. All of the gods were generated by the divine pair during these great epochs. Each god was complex, since not only did he (if male) have a consort, but was quadruple in that each aspect was assigned to one of the four color-directions on the surface. Some gods were at the same time diurnal *and* deities of the night sky. The sun itself died at the close of each day as it dipped below the western horizon, and became an invisible lord of the underworld in the guise of a fearsome jaguar. It was only the continued offering of the hearts and blood of brave men captured in war that would insure the rebirth of the sun each dawn.

The existing Maya books treat exclusively of this supernatural world, geared to the strange exigencies of their calendrical system. At the heart of the system is a cycle of 260 days, based upon the permutation of 13 numerals with 20 named days. Most of the content—textual and representational—of the codices concern the rituals associated with the gods and this 260-day calendar. It is clear that the main object of these books was to tell the Maya what the auguries—good, bad, or indifferent—were for each day in the cycle. The motions of the heavenly bodies, surely to be identified with certain Maya gods, were supremely important, above all the cosmic dance of the sun and

moon which results in solar and lunar eclipses, and the apparent cycle of the planet Venus.

It has been the books which have given us the surer clues as to the nature of the Maya writing system. While these all date to the Post-Classic period—that is, to the time between the breakup of the Classic Maya civilization around 900 and the Spanish cataclysm—they must preserve features characteristic of the ritual books of the Classic. In three of the four known codices, each item of text is associated with a picture, so that we have a unique chance to link writing with events. Unfortunately, decipherment has been very slow. At the beginning, shortly after the Conquest, the controversial Bishop Landa recorded a so-called "alphabet" which was rediscovered by Abbé Brasseur de Bourbourg in the nineteenth century. For many years, this alleged "key" led exactly nowhere, leading most Maya experts to believe that there was, in fact, no real system involved, and that the Maya scribes had evolved nothing more than a thing of shreds and patches, a series of sad attempts at trying to record their own thoughts.

It is an irony of intellectural history that the breakthrough on the real decipherment of Maya writing has come not in the United States or England or Germany, which have had a near monopoly of Maya studies for the past century, but in Soviet Russia, by a scholar who claims to be inspired by Marxism-Leninism. Yuri V. Knorosov, a student of the evolution of writing systems who had specialized in the Egyptian script, re-examined the problem posed by the non-calendrical aspect of Maya writing, especially the codices. Instead of rejecting the infamous Landa "alphabet," he accepted it as a much-flawed syllabary, an example of a system much like that of the Japanese who can write their own syllables by a sign representing a consonant followed by a vowel. When the Maya word was of the consonant-vowel-consonant sort, then, reasoned Knorosov, the Maya would have written it in such a way that the final vowel was understood as silent.

Of course, again like Japanese, there must be many ideographic signs in Maya without any purely phonetic value. It is the understanding of these which takes the longest time and greatest patience, for one reading does not necessarily lead to another. But that the Maya system had a strong phonetic-syllabic component which has been, in the main, correctly interpreted by Knorosov, is not doubted by many

Figure 4. Late Classic polychrome vase from Chamá, Guatemala. Two richly garbed young men on the vessel almost certainly are the Hero Twins who descended to the underworld to conquer the Lords of Hell. The glyphic text, twice repeated, is a much truncated version of a long funerary text describing their macabre voyage. Photographs by Justin Kerr.

Figure 5. Shell pendant from Jaina. This is the personified form of the day Ahau, last day of the sacred calendar. Photograph by Justin Kerr.

students of the subject. If the history of other writing systems is relevant here, then at first one would expect Maya hieroglyphs to have been mainly ideographic, with phoneticism increasing through time, and it is certain that the codices have more syllabic signs than do the earlier Classic inscriptions.

Now we are left with the pottery. It has been written by experts that the hieroglyphic writing on these magnificent objects was the product of persons who had only a haphazard knowledge of the style and content—whatever that might be—of the Maya script. In this, the experts can be shown to be wrong.

First of all, let some facts be stated about this pottery. In the debris of archaeological excavation, pictorial pottery (whether carved or painted) is so rare as to suggest that its presence in domestic refuse must be accidental. All great pictorial vases or bowls found by archaeologists have come from burials. So, whatever the initial motive for the production of these vessels, their ultimate fate was to accompany a corpse in its final resting place.

Secondly, the iconographic content of these pictorial pots is highly circumscribed, and obviously different from that which we find on relief carvings or in wall paintings such as those of Bonampak. On the great majority of vessels, the themes are limited to the following: (1) a lord seated on a throne engaged in conversation with underlings, (2) an old god in a shell, (3) two young lords who in appearance and attire are identical, (4) bat gods covered with death symbols. There are other themes, but it is possible to show that these are part of the same story.

Thirdly, the hieroglyphic text painted or carved on pottery vessels from the Classic Maya period is virtually identical in all cases, no matter from which part of the Maya area it comes. This gives lie to the unfounded notion that the calligraphers of pottery were ignorant of the text they were writing. The text begins with a verbal glyph (also known in the codices) which roughly means "his descent." A road and death sign stands in the middle, while an epithet whose meaning is not yet understood is placed near the end. Between these are the heads of various gods, most of whom seem to be associated with death and the underworld.

The orthodox view of the wonderfully depicted personages and scenes on Maya pottery is that these illustrate the "real world" of the

lords and nobles in whose tombs they were placed. That is, following the usual materialistic explanations of American archaeologists, they were merely containers of food to insure that the deceased had the proper caloric intake in the next world, and that the pictures on them would have been for his entertainment in the here-and-now.

A careful examination of many of these scenes from the supposedly "real" world will disclose some disquieting features, however. Often all personages are painted black, with ashen faces. Death symbols occur with distressing frequency. To pilasters of what one would think was the royal palace are affixed faces of the Death God himself and the awesome features of the Jaguar Sun, the dead sun as it passes through the underworld after sunset. Torture and a prolonged suffering before death are occasionally stressed.

It is my own conclusion, following a suggestion made to me some years ago by the German scholar Thomas Barthel, that all Maya pottery which has pictorial content, with or without texts, is funerary by origin. These vessels—and there must have been tens of thousands of them—would comprise the Maya equivalent of the Book of the Dead of the ancient Egyptians. The ultimate theme is that of the death and resurrection of the lords of the Maya realm.

To fully understand what we are looking at in these vessels, we must turn to the *Popol Vuh*, sacred book of the Quiché Maya who were the rulers of much of the Maya highlands when the Spanish invasion took place. This is a priceless document, for the *Popol Vuh* gives us information on Mesoamerican origin cosmology and theogony which is only alluded to in our Aztec sources (usually so complete on occult subjects). The *Popol Vuh*, written in the Quiché language but in Spanish letters after the Conquest, is most likely a transliteration of a hieroglyphic original. Probably all of the ancient Maya were aware of its content.

The story it tells begins with the first moment of creation, and continues with the multiple worlds which existed before our own. At some point, most of the gods were produced, including a pair of Hero Twins who were fabulous hunters with the blowgun and great ball players. Their own father and uncle had been drawn down to the underworld by the lords of death and there slain forever. Now, it was their own turn, but they practiced a form of one-upmanship which cost their adversaries a loss of power. Then they defeated the death

gods in a magic ball game. The underworld was a place of chambers or caves, each of which was a house of horrors: a House of Darkness, a House of Knives, a House of Cold, a House of Bats, and so forth. The twins were told by the lords of the underworld, for instance, to stay all night in the House of Darkness and to continue smoking two cigars which they were given. This, of course, was an impossibility so they affixed fireflies to the tips of the cigars and cheated their fate.

Finally, one of them was beheaded by the killer bats. But in the end they triumphed, through the will of the council of heavenly gods. They reappeared as magicians in the courts of the subterranean rulers, and performed incredible feats of legerdermain which transfixed their enemies with wonder. The performance culminated by one of the twins cutting the other into pieces and then bringing him back to life. This was too much for the incredulous lords of death. Their supreme leaders asked for the same trick to be performed on themselves. It was, and they both died forever. The twins then rose from the underworld to the sky, where they either became the sun and moon, or the Morning and Evening Stars.

The Hero Twin legend surely was the model of the death journey of the Maya elite to the underworld and beyond. The glyphic texts on funerary vases seem to deal with death and the road of the dead to the layered underworlds, with gods mentioned who played prominent roles in the *Popol Vuh*. There must have been one stock formula on these vessels, with minor variations. The Hero Twins themselves are among the most frequent depictions on this pottery, attired as young lords, the conquerors of death. The old snail god must be the principal lord of hell. In an extraordinary vase owned by Gillett Griffin, he is being drawn from his shell by a young man, surely one of the Hero Twins, who is about to slay him. The Bat Gods who achieve a Pyrrhic victory over the twins are often shown in all their sinister raiment.

In other words, these glorious creations of the great Maya artists and calligraphers are not celebrating life, but death itself. In this, the Maya are less strange than they might seem to western eyes, for many Asian and New World peoples have viewed death not as the termination of life but as rebirth and even ultimate release. This theme recalls the Tibetan Book of the Dead, recited over the dying and dead man to tell him of the journey which he is to take and the adventures which will befall him, with the intention that he may so concentrate his

immortal mind that Nirvana may be attained. Between what we call death and the end of the long road, much time may elapse, frought with dangers for the soul.

The end of the road for the Maya rulers was to be reborn as the celestial gods from whom they claimed descent, worshipped by the Maya people before the temple-pyramids which housed their mortal remains. The Maya, like the Hindu and Buddhist philosophers of the Orient, had perceived the fundamental identity of life and death, and that on the great journey on which all must go, even the most powerful kings, the starting point was the same as the destination.

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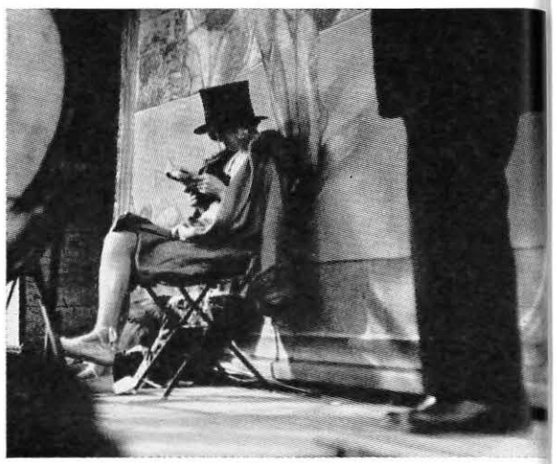
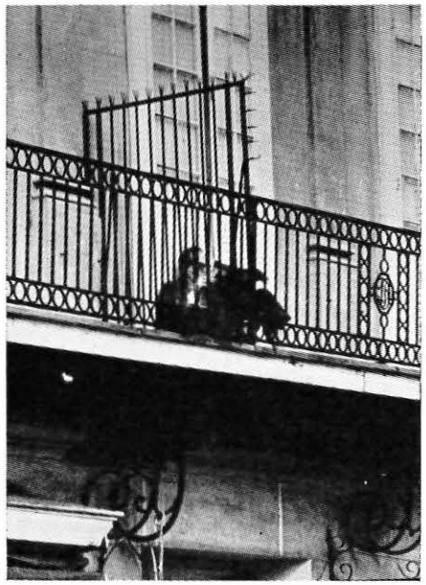
This article is based upon a talk given at the Grolier Club, New York City, on April 20, 1971, on the occasion of the exhibit "Ancient Maya Calligraphy." It will appear as part of the introductory chapter to the forthcoming catalogue of the show.

André Kertész' book, *On Reading*, includes 66 illustrations of people reading, taken throughout the world from the 1920s to the present. These four photographs are reproduced from *On Reading* ($5.95) with the permission of Grossman Publishers, © 1971 by André Kertész.





Design of a New Japanese Typeface: Typos

The Japanese language is a formidable one for those who are concerned with the design and the use of the printed word. Because the Japanese language employs the kanji, the hiragana, and the katakana for writing, the task of designing a new typeface involves the design of over 1,000 characters so that they will blend together when used interchangeably in an almost unlimited number of combinations. The theory and construction methods used to create Typos, a new Japanese typeface, are discussed and illustrated in comparison with existing characters.

Establishment of a System of Letters on a Popular Basis

Among the many questions about Japan that I receive from foreigners, the most difficult to answer concern those on Japanese characters. On most things, I can make quite clear explanations by comparison with similar Western objects. And on such things that are not found in the West—the tea ceremony, the eating of raw fish delicacies, or harakiri—I find it very easy to explain because they do not ask too many questions and frankly accept my explanations. When it comes to Japanese letters, however, they seem to have some preset ideas and ask such pointed questions as "Why do you put up with such a confusing system of letters?" As a result, I have had to tell them about all the arguments on the Japanese writing systems that have been going on in our country since the time of the Emperor Meiji in the latter part of the nineteenth century when Japan first opened her doors to the West. At times I have had to comment on how Japan imported Chinese letters during the Heian Period (800–1200), on the development of the "hiragana" syllabary, on the invention of the "katakana" syllabary, on the use of the "kana" syllabary together with the Chinese characters, etc.[1]

In any case, nowhere in the world and at no time in history has there been such a complex and voluminous writing system as in

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Figure 1. *Left*: In recent years the ordinary pen calligraphic style is the same as the brush style. *Center*: Metal movable type has been used in Japan for less than 100 years. This is Mincho, one of the two most popular contemporary type styles. *Right*: The new Typos face.

あいうえおかきくけ
こさしすせそたちつ
てとなにぬねのはひ

あいうえおかきくけ
こさしすせそたちつ
てとなにぬねのはひ

あいうえおかきくけ
こさしすせそたちつ
てとなにぬねのはひ

Figure 2. Gothic (top) and Mincho (center) have been the only two typefaces in common use in Japan; the new Typos face is at the bottom.

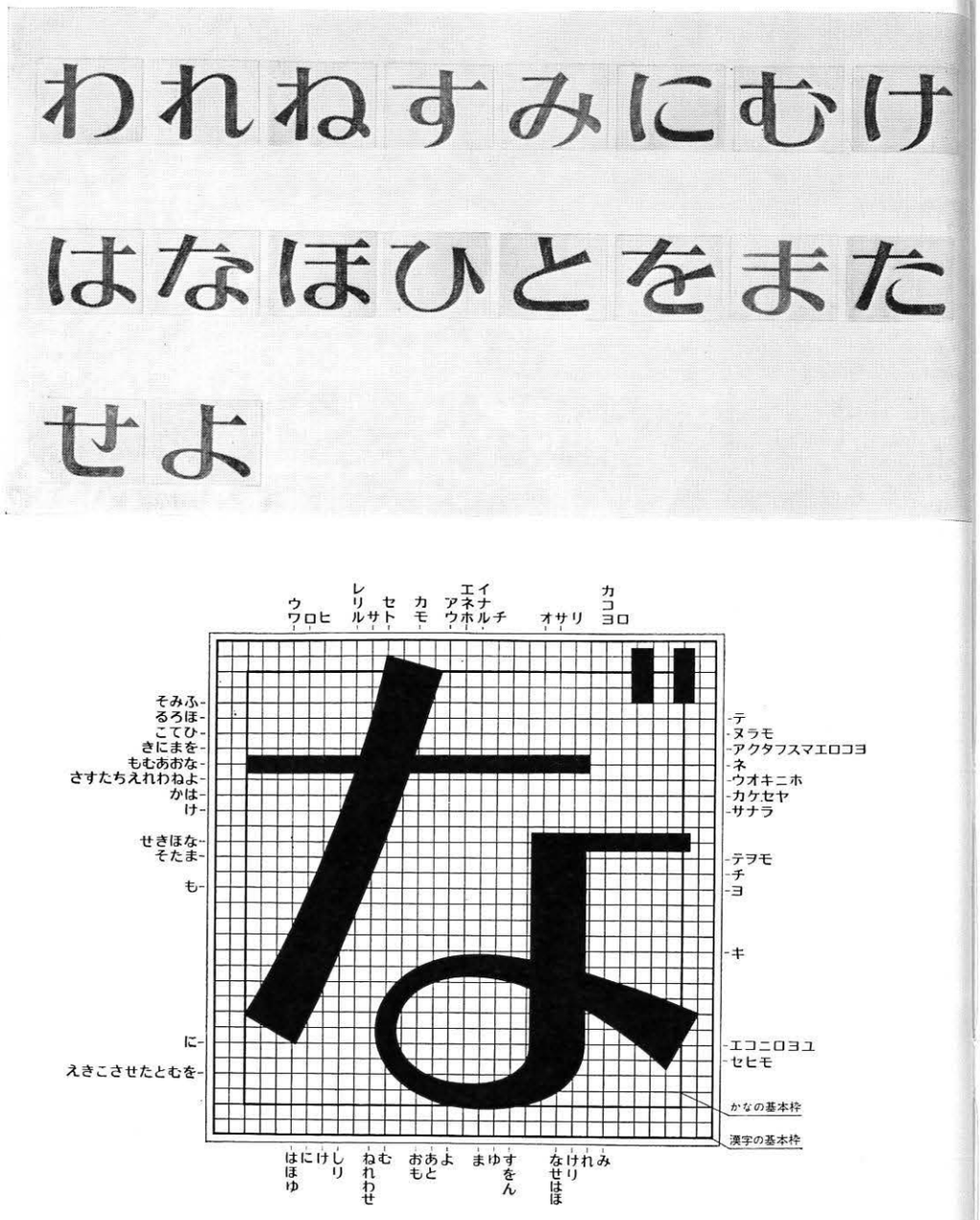


Figure 3. In the initial stages of Typos, triangular serifs were at the ends of lateral lines. This was a mistake because they made the letters resemble the Chinese Kanji characters too closely and were difficult to read.

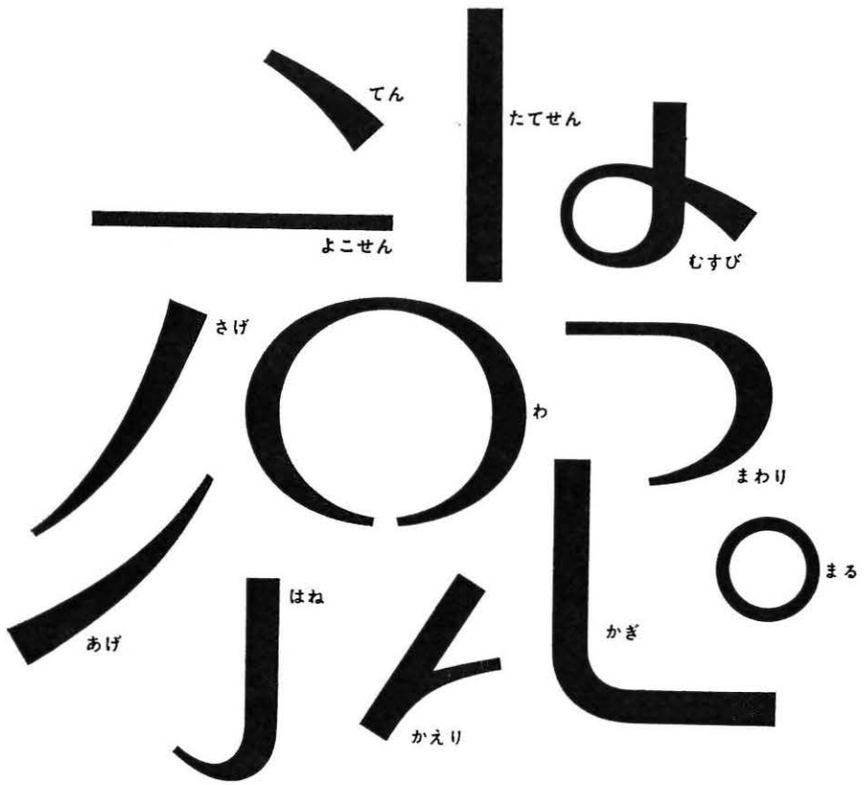
Japan. As mentioned in the tale of the Tower of Babel, there seemed to have been quite a complicated system of writing in another cultural period, but it was believed to have derived from the very complexity of the language itself. Also, there must have been considerable confusion during the switch over from the Scandinavian rune letters or the German Fraktur letters to the roman letters.

It may be only fitting, therefore, to pay the greatest respect to the advocates of roman letters or kana syllabary who tried to establish a system of phonetic spelling for Japan to replace the Chinese characters. In my younger days I also emulated Dr. Torahiko Terada and wrote my diary in roman letters or wrote short Japanese poems in katakana syllabary. Even today, I believe that a system of writing with the hiragana phonetic syllabary should be taught and enforced in primary and junior high schools and the Chinese characters taught as a special subject in the higher schools of learning. In the same vein, Japanese newspapers should be divided into "soft space" and "hard space" and Chinese characters kept out of the "soft space." The system now in use in Japan of limiting the number of Chinese characters or using only certain designated characters is only a makeshift expediency—a by-product of Japan's postwar quasi-democracy.

I have explained the complexity of Japanese characters at quite some length mainly because I wished to emphasize the complexity and difficulty in Japanese type design, and that this difficulty is the result not of technical or economic factors but of the confusion prevailing in general thinking as to what Japanese characters should be like.

In his congratulatory message on the announcement of Typo, Hiroshi Hara, who is one of my most respected teachers, said, "Even before we take up the problem of style of writing, the problem of Japanese characters stands like a great forbidding wall before us." As

Figure 4. Characters are composed on a module. On a square of 32 vertical and horizontal sections characters are laid out on the module in accordance with the positioning of the elements shown surrounding the graph.



●エレメントによる文字構成

一+丨=エユコヨロキ	一+丨+丿+レ+丶=え	一+〇=ひ	丨+〇+ノ+ょ=ぬ
一+丨+ょ=はほ	一+丨+。+ノ=す	一+し=も	丨+丿+亅=ん
一+丨+ょ+ノ=み	一+丨+〇+丶=お	一+ノ+亅=カ	ノ+〇=の
一+丨+ょ+つ=るね	一+丨+亅+丶=か	丨+ノ=レ	ノ+丶=メソツハく
一+丨+丿+ㄴ=をたに	一+レ=モ	丨+〇+ノ=ゆめ	つ+丶=う

Figure 5. Katakana elements and their strokes:

Dot Vertical stroke
Horizontal stroke Closing stroke
Down stroke Circular stroke Turn stroke
Up stroke Downkick stroke Round stroke
Return stroke Locking stroke

a conservative estimate, say we complete the designs for over 1,000 letters, the task of getting the printing companies and type makers to adopt the new letter designs is, as Mr. Hara had pointed out, "hopeless." Nevertheless, I frankly believe that if there had been a little more courage in addition to the wisdom and talents of Mr. Hara, there would undoubtedly have been an improvement in Japanese characters and writing.

In this sense, it is noteworthy that Group Typo was formed by proteges of Mr. Hara and is now making significant progress in reforming Japanese characters—a task that he could not consummate in the old typographical age but which is now favored by the modern advantages of photocomposition. Mr. Hara notes that the "Language Deliberative Council is about to decide on an increase in the number of Chinese characters that are to be used." The point is that any deliberations over characters in our country is meaningless without the participation of type designers. This becomes clear if we consider the emergence of Group Typo alone.

Masaru Katsumi

Good composition in Japanese printing becomes very complicated in working with words composed from three syllabaries which are combined in writing sentences. The variety of these forms and their differences in density require very careful compositors for attractive typographic layouts.

For example, the kanji (pronounced "kan") is composed of 13 dots and lines, while "i" or "n" of kana are composed of only two lines or one dot and one line. Hiragana with its curves and dots, especially the Mincho style, does not always look well with some kanji, and the question of the size and placement of the dots, double dots,

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The elements which are appropriate to the image are drawn and then combined into a character; the design of the elements has been kept as simple as possible. Any kana character can be written using appropriate strokes from these 12 elements. In kana the relative frequency of these strokes is as follows: horizontal stroke, 81; vertical stroke, 66 including 24 down strokes; dot, 34; down stroke, 24; up stroke, 7; locking stroke, 6; down kick, 7; circular stroke, 7; round stroke, 2; closing stroke, 9; return stroke, 6 (side returning 3); and turning stroke, 21 (6 left turn and 2 up turn).

Figure 6. Characteristics of Typos. (In each group the first and third lines are Gothic characters; the second and fourth lines are Typos. Light gray areas indicate parts that have been changed.) These unnecessary parts—legacies from the time the letters were written with a brush—have been eliminated and the letters made to look simpler. Variations in the thickness and curve of lines have been reduced as much as possible. Perpendicular bends have been straightened and lateral lines made horizontally straight. The result is more stable, easier-to-read letters. The kana letters have been made larger in comparison with the Chinese characters. As a result, the space between letters as well as to both sides is more uniform. The apostrophe-like mark above the letters have been made straight and perpendicular and placed at a fixed spot in the frame (lower panel of Typos characters).

and the small circular diacritical marks used to achieve the "P" sound seems almost as difficult as the city planning of Metropolitan Tokyo.

Traditionally, Japanese sentences were and to some degree still are, written vertically. In this format the esthetic appearance of the sentence was more pleasing. More Japanese is now being written and printed horizontally. The use of kanji, hiragana, katakana, and occasionally some Western lettering all appearing in the same text in a horizontal format present the typesetter with an extremely complex spacing problem.

Because of the complexity and of the limitations connected with designing typefaces, not many new ones appear. Although there are many designers in Japan who have had a desire to create a typeface of extreme beauty and legibility, many have abandoned the study of this problem. The comparison might be somewhat unfair, in view of the small size of the Western alphabet, but the fact remains that we have not had any typefaces of such renown as Bodoni, Caslon, or Garamond.

Ikko Tanaka

1. The Japanese language makes use of three quite different writing systems. First of all there are some 3,000 separate kanji or characters which were introduced from China. Then there are the two groups of phonetic symbols—hiragana and katakana. Both of these groups contain 48 symbols. Naturally the kanji are the basis of the written language. Up until now there have been only two typefaces in use in Japan. One is the Mincho type (comparable to roman types in Western languages) and the Gothic type (comparable to the sans-serif types). See also the discussion of the writing systems used for the Japanese language in Horie Tomohiko, "Japanese Calligraphy," JTR, I (October 1967), 409–448.

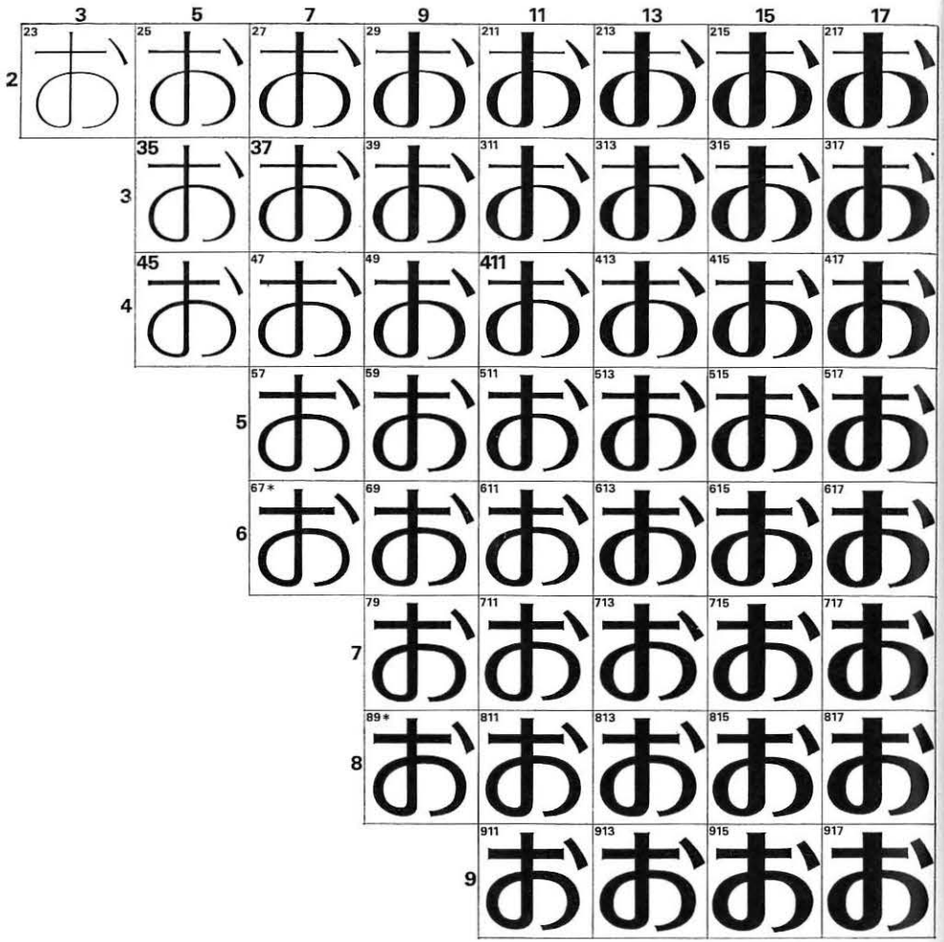


Figure 7. Numbers indicate the relative proportion of the widths of the vertical and horizontal lines to each other and to the width of the square, which is rated as 100. In Typos 35, for example, the horizontal lines are 3/100th's the width of the square and the vertical lines 5/100th's. Typefaces such as 23, 45, and 67 in which there is little difference between the widths of the horizontal and verticals blend well with Gothic type. Type with extreme differences of variety (such as 29) have been eliminated from the family. At present, four faces of Typos (35, 37, 45, and 411) are available; the asterisk on 67 and 89 indicates that these are now being designed.

Letterforms as a Medium for Artistic Expression

Hella Basu

Although the major function of writing is transmitting verbal communication, the variety and beauty of man's letterforms indicate several important non-verbal considerations. Pattern-forming properties of letterforms can be explored as artistic expression independent of verbal meaning, but optical elements must be related to verbal ones. The author's development of calligraphic "visual aids" for classroom use is described, and a selection of these is illustrated.

I. *Some Thoughts on Creative Lettering*

The common way of looking at writing is as a means of communication; indeed, in some people's minds that is its only function. The arrangement of letterforms into lines of manuscript or print, the combination of lines into pages, and pages into handy assemblies such as pamphlets and books is undertaken with very practical aims in mind —the passing of a message from an author to his reading public; it is irrelevant whether this author is a poet or an advertising copywriter.

Looked at in this light, it would seem that a standard letterform could be achieved which would contain all the elements of legibility that can be crystallized out of many centuries of use in handwriting and print from the results of scientific research. Such a letterform could then be used as a pattern to be universally applied to all types of print and imitated in handwriting with the necessary adjustments for the cursive element.

This exercise seems simple enough. Why then have attempts in this direction been unsuccessful so far? We still have little agreement between experts on which alphabet is most suited to the teaching of writing and reading in primary schools; we still employ hundreds of different printing types—ever increasing in number—a range much greater than is warranted by the functions of communication. Even after allowance has been made for the different conditions which exist

between display letterforms (which have to be assimilated fast and from a greater distance) and typography for reading large quantities of information at close range, we still cannot account for the issue, year after year, of scores of new typefaces. The demand created by changing fashions only implies that something in human nature responds to change and variety.

Much of the existing variety has grown organically over several thousand years with increasing velocity. It is well worth studying the development of letterforms to examine how they relate to the initial capacity of thought in a civilization, to the growing complexity of thought, and eventually to the varying trends of taste of a civilization. Variations reflect also the tools with which writing was executed on the changing vehicles which carried it—clay, papyrus, stone, slate, wax tablets, vellum, parchment, and eventually paper.

The letterforms we employ at present are "deteriorated" pictures—pictures which were originally independent of language, to be understood on the basis of optical recognition of the object itself. Deterioration took place as a result of greater speed of writing and having to use pictures of objects to represent abstract concepts; e.g., the sun to represent warmth.

This deterioration, however, turned out to be a positive factor. What almost started as a result of neglect and compromise developed into rationalization and organic development. Pictographic scripts developed into ideographic, syllabic and alphabetic (phonetic) scripts; the forms of the letters themselves were simplified and legibility gradually enhanced by the addition of punctuation.

Whether the alphabet we have now is the best that is possible is doubtful; whether it is even rational is questionable. But at no time in history has a panel of experts sat down to examine the task of international communication through letterforms, with the aim of constructing a system which would be best suited to reproduce the varying linguistic sounds. Letterforms in alphabets used around the globe have gradually evolved—stimulated by the varying needs of each civilization—rather than being created by thoughtful and rational intent. Evolution in all its manifestations invariably produces, eventually, something which is as nearly perfect as the complete absence of design intent and reasoning permits. That which fills a need—however unaccountable—survives; the futile and meaningless fades into

oblivion. That which survives is richer and normally far more diverse than would be necessary to perform a given function, and a balance is achieved by natural selection which in many cases exceeds the success of rationalization and intent.

Moreover, the range of choice created in the process of evolution fulfils a need for variety in human nature which so often embellishes our articles and concepts far beyond their functional requirements. So, independent of all aesthetic considerations, the range of letterforms which we have inherited is now capable of reflecting most of the manifold nuances in our lives—from the strong to the delicate, from the clinical to the joyful.

Something further has happened beyond requirements of communication, beyond the reflection of historical developments and its associated psychological features: letterforms have acquired pattern-forming properties which can be explored independently of any verbal meaning. Letters can be used individually—but more effectively in combinations—to give purely optical pleasure. These pattern-forming features are partly dependent on the letterforms themselves. The scripts of different regions of the world vary wildly in the textures of their patterns. Furthermore patterns vary in accordance with the normal arrangements in which given alphabetic styles are strung together to form sentences and paragraphs—horizontally or vertically —and completely unexpected things happen where, occassionally, both horizontal and vertical alignments have been ignored.

Letter design in itself is something quite different from letter combination. A letter all by itself, however beautifully it may be designed and executed, is as a person taken out of his social context. Letters are meant to live in families, that is in words and sentences. Their environmental structure is similar to that of the human scene in that the families, too, belong to wider groups and a state of competition exists inside the family structure as well as inside the group structure. Family loyalties outweigh group loyalties, and group loyalties are so strong that, for instance, inter-marriage is strongly frowned upon. Mixing of styles—common recommendation to the contrary—usually produces disastrous effects, but may, unexpectedly, result in strong and beautiful variations.

With all this in mind, we are now more conscious of the way in which letterforms can serve us towards a better and faster under-

standing of verbal meanings, as well as being in themselves a medium for artistic expression based on purely optical factors.

Critical appraisal of creative calligraphy in terms of definite standards is almost impossible because the criteria of judgment are too varied. Fashion plays its part, but rules are found faulty the moment they are formulated and none of them can ever be universally applied. Rational examination can filter out common faults and virtues, but the total pleasure or displeasure in viewing depends as much on the viewer, his background and experience, as it depends on the judgment (and luck) of the creating artist. It is only in the regions in which we have experiences in common that a pre-determined degree of joy can be established. That designer who manages to crystallize such regions most successfully has the widest appeal, while minorities with common specialized experiences may get a deeper satisfaction from designs which lie outside the reach of the majority. No universal value judgment can be applied.

In a medium such as calligraphy, which depends to a large extent on the verbal message it is intended to convey, freedom of creativity is somewhat restricted. Words and sentences have meanings which must not be ignored. Optical elements have to be related to the verbal ones, however disguised these may appear. Creative freedom exists only inside the limits permitted by the subject matter. As in illustration, stage production, and musical performances interpretation can become an art in itself in calligraphy, but there is no guarantee that even an interpretation which is completely valid in its own right would be universally acceptable. The less explicit a solution, the better is the chance of its success because it leaves much open to enlargement by the reader's imagination. This is particularly true where the text with which the design is concerned, is a poem which in itself is usually open to an infinite number of interpretations, and the pleasure which the reader gets from it will be in proportion to the wealth of his own inner life.

Where full harmony exists between the author, the artist and the reader, the total will become more than the sum of its components and the ultimate aim will have been achieved.

II. *Creative Lettering for the Classroom*

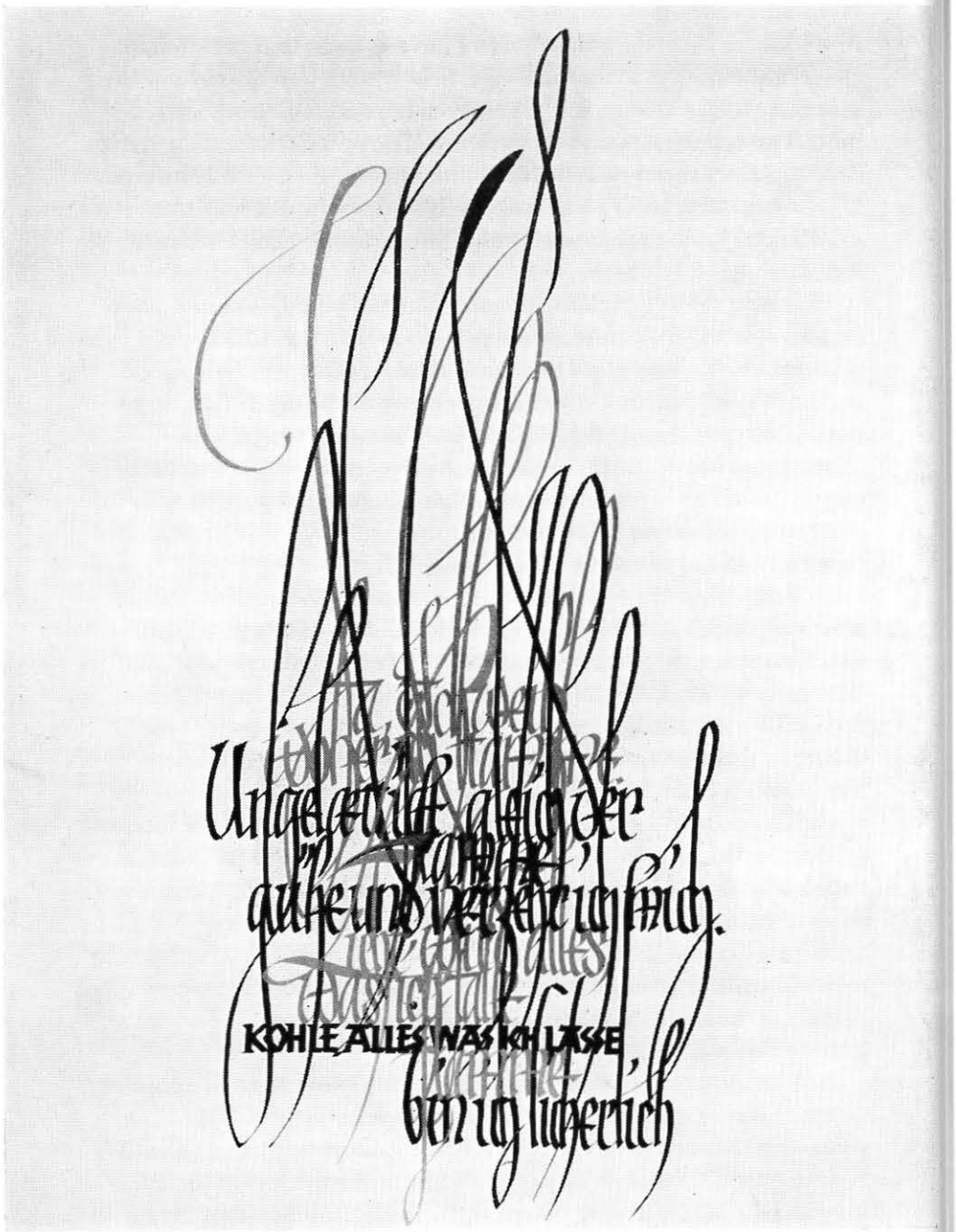
As a lecturer in typographic design I have to insist that my students concern themselves more than superficially with letterforms and their arrangements into lines and pages, even beyond their immediate impact on type design and typography. The practice of tracing letters from alphabet sheets does little towards encouraging a lively interest. On the contrary, by dealing exclusively with existing letterforms available in type, the range of possibilities is limited and enterprise stifled.

Unfortunately curricula and syllabuses as devised by course planners give far too little time for the practice of writing, which alone can produce the skill necessary to evolve lettering designs of flowing rhythms. Such practice in writing has other advantages. As it necessitates both patience and discipline, it is in itself of the greatest educational value. Furthermore it provides an easy way of working out relationships of text elements without constant dependence on the composing room and helps to explore the pattern-forming possibilities of letters and to evaluate the resulting degree of legibility.

In design, letters present themselves as valuable building stones which can be used to relate variants such as size, measure, weight, space, contrast, positioning, etc. They are emotionally neutral and therefore more suitable for the objective evaluation of elements than, for instance, illustrations which involve both the designer and the viewer in those aspects of stylistic criticism which draw attention away from the purely optical and spatial problems.

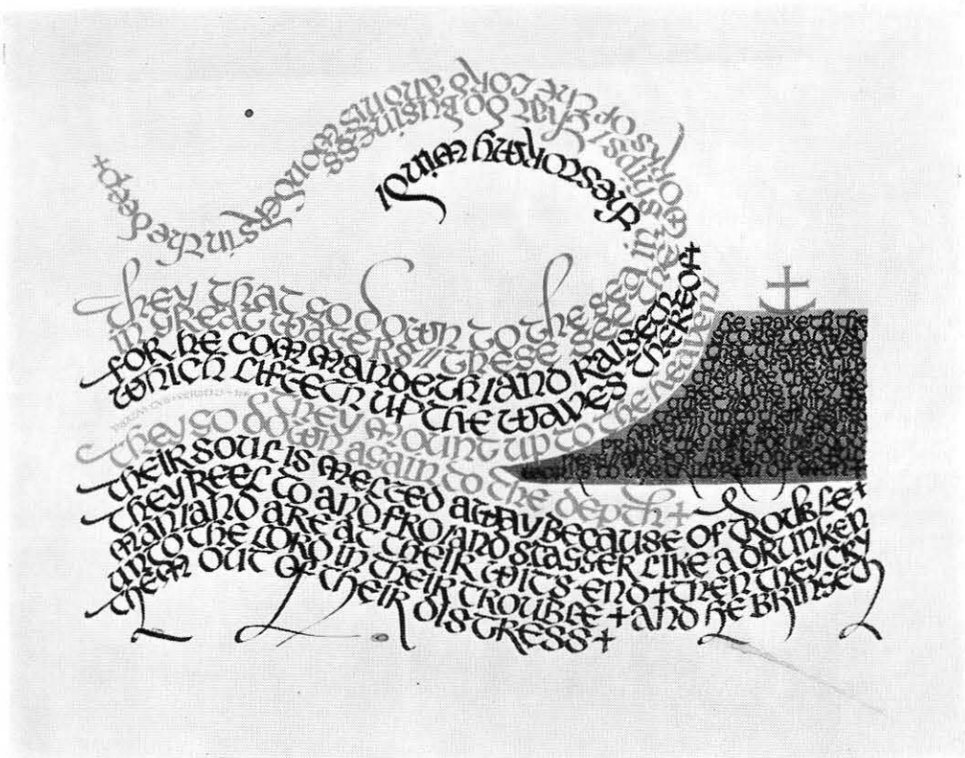
Confronted with the need to involve my students in a more intense study of lettering than alphabet tracing and the viewing of slides of the historical development of letterforms permit, I decided to devise some visual aids to demonstrate a variety of the problems, without taking up too much curriculum time. The results had to be sufficiently exciting visually for the students to take an interest beyond a casual glance, in the hope that their own imagination and sense of exploration would be stimulated.

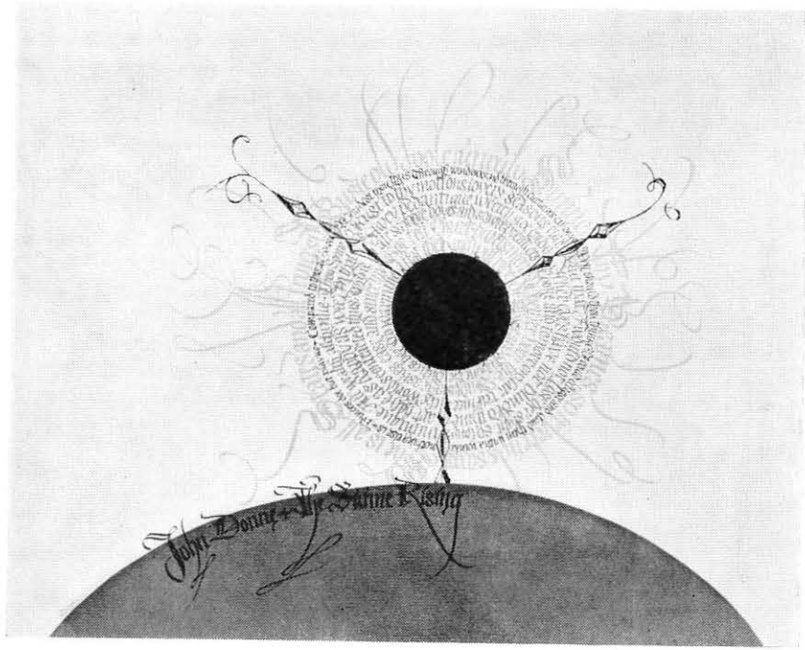
As I had to produce these visual aids in my own time and at home (where I have no access to type), I had to make use of calligraphy, drawn and cut-out letters. Each of these media presented itself with certain possibilities of its very own—some of them relevant to printing (such as the cramming of letters, vertically and horizontally,

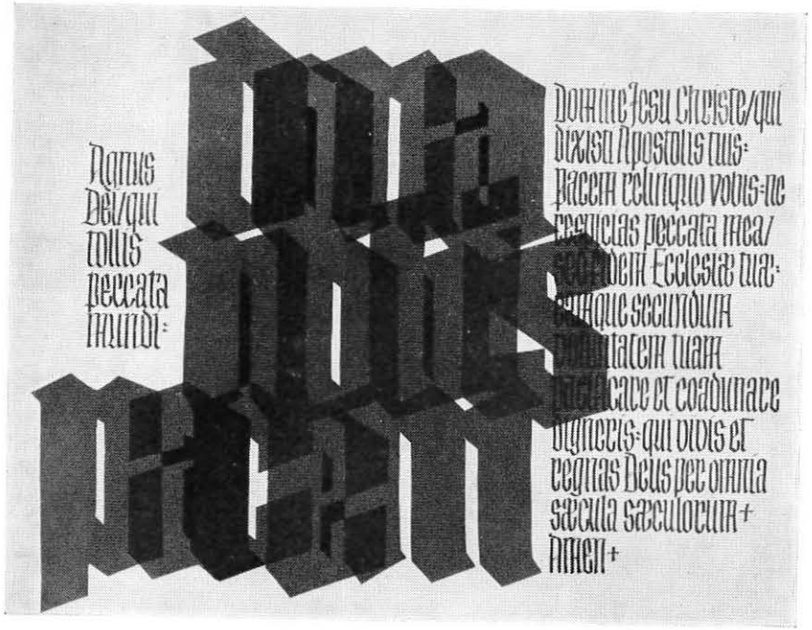


Surely I must be a flame, Nietzsche. Yes, I know where I come from. Dissatisfied, like the flame, I glow and devour myself. Everything that I touch becomes light, everything I let go of stays coal. Surely I must be a flame. Here is an aspiration towards excessive heights of perception and emotion—the pain and the glory of burning, the confusion of the vibrating particles, never again to be reassembled in just that order! What problems does a soul like that present to those who want to read it? You can't read it. You have to take it in with your senses and your enthusiasm. Color scheme: red, yellow, orange, black.

Psalm CVII, verses 23 to 31. "They that go down to the sea in ships . . ." get tossed high into heaven. So goes the writing. When "they go down again to the depth," the writing follows—an uncial majuscule which is here produced with the calligraphic nib held at an oblique angle, not horizontal as in most uncial manuscripts. When "He maketh the storm calm" the lettering flows quietly in horizontal lines, black over a sea in graded blues. The anchor cross, in orange, serves as symbol for the ship and for its safety.







The Sunne Rising, John Donne. One of the most charming of John Donne's poems—light-hearted, playful, and sparkling in wit. The circular arrangement suggested itself so obviously that I didn't struggle against it. With it I had to accept the colour scheme of golden yellow, orange, russet and (here comes the unexpected) blue for the center section to throw out all the more the brilliance of the outer rims. The seventeenth-century text willingly permits the decorative curls of the ascenders to liven up the empty background and to represent the radiation of warmth and light. The three verses had to be somehow separated, hence the three spearlike features in black, slightly reminiscent of markings on compass roses. This way the reader's eye does not have to follow the circle right around. The difficulty of the design lay in the varying length of the individual lines of the poem, which demanded very subtle adjustments in the proportions of the letters.

which some of the new photographic letter devices are also able to offer), others without any direct reference to printing (such as the exaggeration of extenders in calligraphy into outsize lengths and their use as decorative twirls. The overlapping of cut-out letters suggests the effect produced in printing by the use of full color and negative screen.

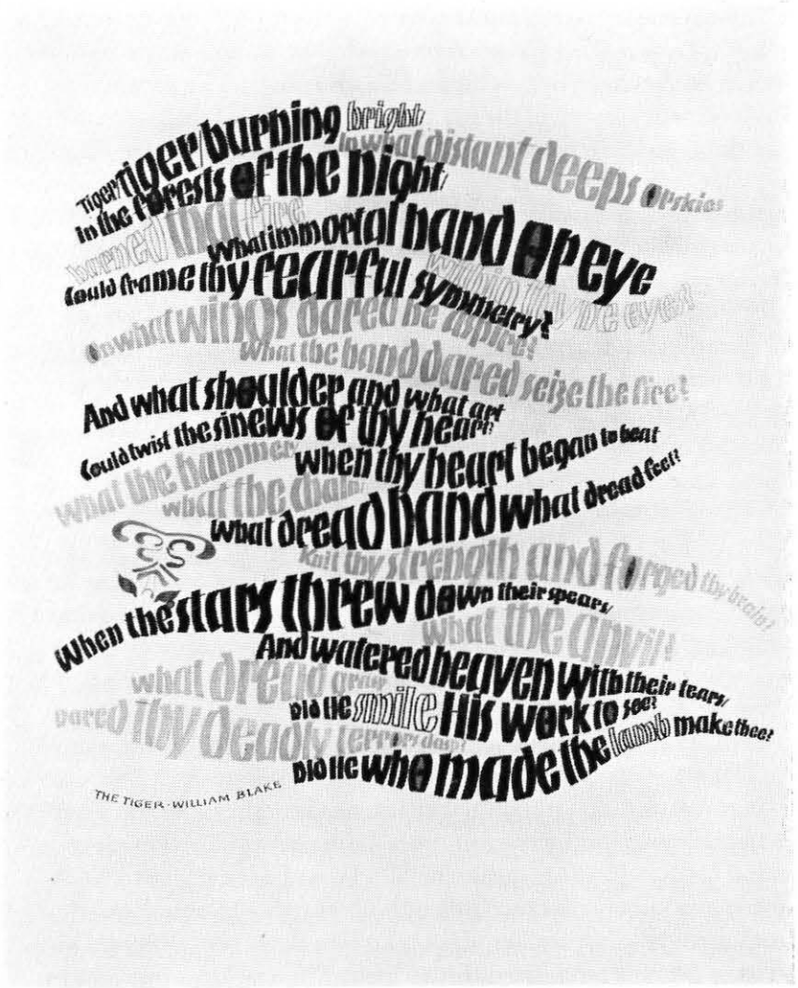
Hand-drawn letters can be infinitely varied in size so that a line can be gradually expanded, a method which printing does not permit nor even calligraphy where one is limited by the definite width of the nib. Even though this can be changed, a continuous progression is not possible.

Since color in the production of one-off hand drawn teaching-aids does not add to the cost, as it does in printing, I have made rich use of it (to the benefit of the originals but to the detriment of the black and white reproductions shown here).

Carried away with all these rich opportunities of embellishment, I sacrificed more often than seems fair the element of legibility which, in day-to-day lettering work, is so important. It must be remembered, however, that the student has ample opportunity to examine these

Dona nobis pacem. A design in brown, grey, and black to reflect in its elongated Gothic and Fraktur the vertical stresss of an imaginary cathedral. The use of tissue paper for the center feature has proved more successful than previous attempts in water color and gouache, partly because the texture of the paper provides a welcome, livening effect to the relatively large flat areas and partly because of the natural way in which the "overprint"sections deepen in colour. The text calls for overall restraint in letterform and arrangement—hence no further attempt at embellishment.

From *Hymn to God my God in my sickness*, John Donne. In this poem John Donne manages to face severe illness and the idea of possible death by associating afterlife with an experience of music—not *hearing* music but *becoming* music. So the whole design had to reflect music in immediate imagery, color, and style of lettering. A color scheme of analogous reds, pinks, purples, and oranges is assisted by a joyous minuscule with multi-line capitals and decorative extenders. The reader's eye follows the lines in natural sequence—left to right.



The Tiger, William Blake. The possibility of progressively increasing and decreasing the height of letters in a line is not available in type because of the restrictions imposed by the range of sizes available. Some photo-setting devices are capable of an infinite range of sizes, but the necessary adjustments are more complex than is warranted by results. Calligraphy, too, is limited in range because of the availability of nibs and brushes and the difficulty of pigment changeovers. Here a fine nib has been used for the outlines and the letters were then filled in by the brush. Color scheme: black and beige with green eyes looking out of the dark and purple pupils glowing.

elements in various examples of print. Also, the subject matters I chose for my writing pictures were such that immediate readability might indeed have been a distinct disadvantage. The personal involvement created in the gradual decyphering of the poems helps the desire to learn more about them. The visual experience gained by looking at the pictures is one of reviving a mental experience which one has already savoured and enjoyed in the past when reading the poem elsewhere. The trick of obscuring a message in order to enhance its interest is, of course, frequently employed in advertising.

To the student it is interesting to see how the pattern-forming elements in letter arrangements counteract rather than aid legibility. This realization helps him to make decisions on his treatment of printed texts. He learns to separate those texts which appear as decorative elements from the ones which require immediate assimilation.

The illustrations which you see here fulfil the purpose for which they were devised only partially. As I got down to the task, the subject matter itself made demands of its own. The texts which I chose for the experiments suggested their own solutions and limitations, so that I found myself to some extent in the position of the sourcerer's apprentice—no longer fully in control but at the mercy of the spirits he has invoked. Eventually I caught myself producing designs not for the sake of making a particular point but for the love of the thing itself.

The results are open to various criticisms. What isn't? The lettering expert will find that individual characters lack the precision which the craftsman who produces prototypes for mass reproduction must demand of himself; the historian will find that I have not strictly followed any known manuscript hands, although I have borrowed much from them; the interpreter of the texts may have very different ideas to those I have emphasized. I may have different ideas myself—tomorrow.

What you see is a plan, an idea, an impulse, some hours of joy and expectation, a mental apprehension of the unforeseen and unexpected and a reverence for that section of the past which presented us—in love and patience—with visual thoughts of beauty.

Cresci and His Capital Alphabets

Donald M. Anderson

Renaissance art was marked by a vigorous adaptation of classical themes, and in restyling roman capital letters no one approached the excellence of Giovan Francesco Cresci. In *Il perfetto scrittore, parte seconda*, published in 1570, Cresci mastered the combination of classical elements with his own refined style. In contrast to those who were obsessed with *divina proportione* and who sought to interpret the roman letters through compass and rule, Cresci's alphabets were derived from ancient sources such as the inscription on Trajan's column. The drift in Cresci's thinking toward a closer allegiance to the classical letters is shown through his selection of proportion; his serifs show modification to forms closer to calligraphy.

It is now just 400 years since Giovan Francesco Cresci's *Il perfetto scrittore* first appeared in Rome. And yet there is little knowledge about Cresci's life that adds significantly to that which can be deduced from his published works. As indicated in the title pages of *Il perfetto scrittore*, Cresci was a citizen of Milan. His family was well connected. A. S. Osley (1968), working from the few clues available, believes the date of Cresci's birth was near 1534. A youthful Cresci appeared in Rome early in the 1550s and was appointed scriptor to the Vatican library in 1556; a second appointment with the Sistine Chapel came four years later. In these appointments Cresci no doubt sharpened his skills in the Chancery cursive style of writing in development before 1500 and featured in the writing manuals of Ludovico degli Arrighi, Giovanantonio Tagliente, Giovanbattista Palatino, and others. A good many plates in Cresci's first writing manual were devoted to the *cancellaresca*, and his reputation as an innovator in this form brought him into a rather bitter word confrontation with an older expert, Palatino—but that is another story.

The first of Cresci's manuals, *Essemplare di più sorti lettere*, was published in Rome in 1560. If, as seems reasonable, the 53 plates of *Essemplare* were in preparation for a year or two, Cresci might have

been 24 or 25 years of age when his first roman capital alphabet was drawn and converted to plates. This alphabet appears at the end of *Essemplare*, 24 letters, with Y appearing in two versions. Two blocks prepared by Francesco Aureri of Crema for the presentation of Cresci's first interpretation of the ancient roman capitals are reproduced in Figure 1. Letters appear white on a dark field, which means that Aureri cut them intaglio, below the surface of end-grain slabs of wood. This method of letter reproduction and its hazards were no doubt the principal consideration in Cresci's decision to print the capital letter blocks in *Il perfetto scrittore* twice. Some brief explanation of Renaissance printing techniques will illuminate the problem Cresci confronted.

In Europe letters and illustrations were combined in relief-cut wood blocks before the use of metal types—the so-called block book. Gutenberg's method of letter production in relief metal, and the spread of it, had led to the death of the block book by about 1480, but large initial letters, decorative borders, and illustrated material of all kinds continued to be cut in wood and used with metal types.

The method of the block book was revived, however, in the first writing manual, *La operina* by Ludovico degli Arrighi, published in Rome in 1522. The whole of this manual was cut on wood blocks without the aid of metal types. An addition to this, Arrighi's *Il modo de temperare le penne*, was published in 1523, with the essay material accompanying the wood-cut writing specimens set in italic types of Arrighi's design. After 1523 writing manuals were produced in a combination of wood-cut and metal type relief images, until Giuliantonio Hercolani issued his *La scrittor' utile* (1574) with writing specimens cut intaglio in copper plates.

The intaglio wood method employed by Cresci and Aureri in Cresci's capital alphabets of 1560 and 1570, with letters reading white on a black field, is first observed in writing manuals in Arrighi's *Operina*, where in a single usage it appears in a fine little colophon (Fig. 2). In *Il modo de temperare le penne* Arrighi's usage of the engraved method increased to eight examples, with several alphabetic presentations seen white on black, notably two blocks presenting Arrighi's version of proper roman capitals. These are reproduced here (Fig. 3) to establish Cresci's models in method of alphabetic presentation, and also to introduce one of several letter traditions that Cresci was heir to.

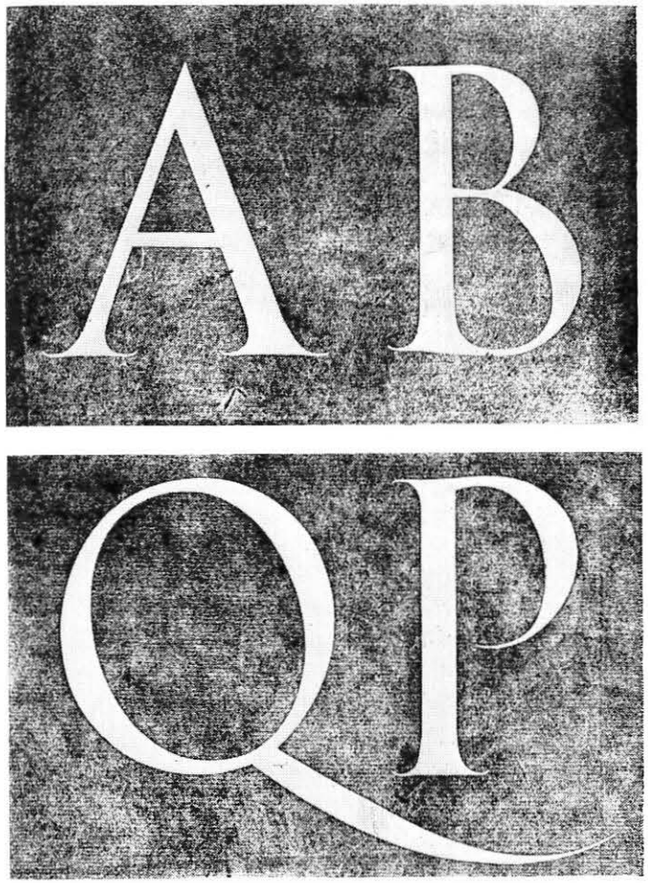


Figure 1. Alphabetic plates from *Essemplare di più sorti lettere*, 1560. The Newberry Library, Chicago.

Figure 2. Arrighi's colophon from *La operina*, 1522. The Newberry Library, Chicago.

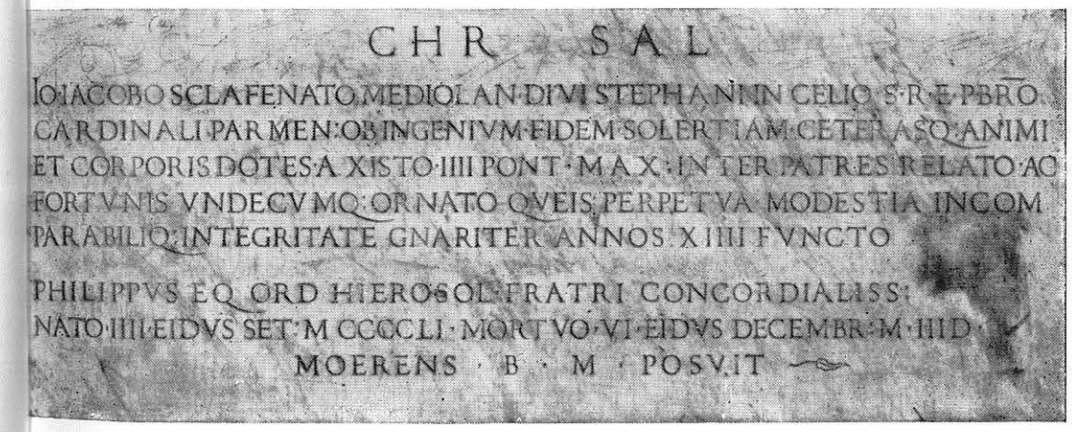
As we may see in the reproduction of four of Cresci's 1560 letters (Fig. 1), his first rendition of the roman capitals does indeed communicate power in graphic content. They are sturdy letters, strong and handsome, with a proportion of one to eight in stem width to height. Serifs are very generous and end in a little calligraphic curl. These flourished serifs are attached to stems which are rigidly parallel, and these two characteristics give Cresci's 1560 alphabet a unique character. In Cresci's treatise on the roman letters that precedes the plates of *Essemplare*, tribute was paid to ancient Latin inscription capitals for exemplifying "the origin and basis of perfect writing." In the design of B, Cresci cited the example to be observed in "that fine inscription at the foot of Trajan's column." Cresci had in fact at that early age studied the ancient forms quite carefully, and the curve and bowl formations fairly reflect Roman inscription calligraphy. The pleasant asymmetry of the counter forms of the roman B are also seen in Cresci's B.

Cresci held fine appointments and he was skillful. He broke no new ground in modesty, but exemplars are few in that era. Rather, he reflected his times in Cresci on Cresci, stating that the simple truth concerning the ancient letters could be found in his essay in *Essemplare*, in which he places himself as that authority who explains the true and fixed rules of the ancient capitals in spite of the enmity of rivals who seek "to bite me with the tooth of envy." Thus in his early career Cresci had already attracted real and imaginary adversaries, and acquired that arrogance which so marked the utterance of later writing masters that Isaac D'Israeli paused to dissect them in a choice essay in *Curiosities of Literature*.

Cresci undoubtedly overstated his case in the 1560 manual, and the 1560 capitals contain many features which differ from the calligraphy of the Empire stones. His treatment of serifs, for instance, varies from the older letters, and there seems no comparison between the letters of *Essemplare* and the Roman inscriptions available to Cresci that could give a paleographer the palpitations of discovery. Nor does it seem likely that the Cresci alphabet of 1560 can be derived from inscription styles of the Renaissance, which, particularly after Alberti's effort on the façade of Santa Maria Novello in Florence in 1456, evince the clear imprint of the Empire letter in skilled imitation. This may be seen in our reproduction of the inscription on the tomb of Cardinal

Figure 3. Arrighi's capital alphabet from *Il modo de temperare le penne*, 1523. The Newberry Library, Chicago.

Figure 4. Letters from the tomb of Cardinal Sclafenati, in Rome *c.* 1497. Alinari photograph.



Jacopo Sclafenato, who died in 1497 (Fig. 4). Sclafenato's inscription was produced by the workshop of Andrea Bregno, who in the last third of the fifteenth century was influential in the use of the Imperial inscription form. It should be noted that the elimination of the medieval letter and the acceptance of the Trajan model was complete in Rome by 1500, long before Cresci drew his *Essemplare* capitals.

It is quite likely that the vigorous letters in *Essemplare* are only in part derived from inscription sources. The serif treatment is very much like that seen in Arrighi's capitals. Perhaps this earlier Vatican scribe suggested, in the letters of *Il modo de temperare le penne*, how Cresci might draw his own letters in his own way, for they are unique.

Of the various essays in *Essemplare*, that part devoted to the capital letters was a defense of Cresci's own views in deriving his style from that of the ancient letters and at the same time an attack on those who sought to interpret these honored letters through compass and rule. The letters and the essay in *Il perfetto scrittore* may be said to complete his views on the subject.

Cresci did not like compass derivations, and in so stating he dismissed the entire log of respected humanistic lore on ancient decrees of proper proportion. Interest in these matters had been prefaced by a return of ancient mathematics to Europe through translations of Arabic manuscripts into Latin in the twelfth century. Humanistic scholarship of the fifteenth century became deeply involved in Euclid and in arithmetical operations and algebraic methods. A part of this, peripheral perhaps to the advancement of arithmetic, geometry, and algebra in their purest propositions, was that part of descriptive geometry called perspective. First outlined in the classic work of Vitruvius Pollio, *De architectura*, the subject was again taken up by Leon Battista Alberti, who presented his first views on perspective in 1446, in *Della pictura*, with his pyramid of rays running from the eye to the object and intersecting an intermediate picture plane, as it is called in our day. *De prospectiva pingendi* (*c.* 1478), Piero della Francesca's more detailed work, went into the tedious documentation of rules and also offered brilliant graphic representations, including strange projections of column capitals and human heads. There followed the skilled projections by Albrecht Dürer, of which the

circular helix or spiral staircase is of classical order. This background helps to explain the tools and methods of drawing available to those who constructed roman capitals in the Renaissance. In matters of proportion these men mainly relied on the measures outlined by Vitruvius, the talented Greek practitioner of Roman engineering, architecture, and what have you.

No doubt a central part of the holy science of Vitruvius in the Renaissance times derived from Euclid, in the concept of the square inscribed in a circle and the circle inscribed in the square. Apparently Vitruvius added certain elements, derived from older sources, that impressed a number of Renaissance scholars and artists. This is most evident in the famous drawing by Leonardo da Vinci deriving from *De architectura*, Book III, Chapter I: "Then again, in the human body the central point is naturally the navel. For if a man be placed on his back, with his hands and feet extended, and a pair of compasses centered at his navel, the fingers and toes of his two hands and feet will touch the circumference of a circle described therefrom."

These ideas from Vitruvius, a practical man, invaded the thinking of later practical men, who included them in ideas concerning the construction of roman letters. This particular theme is an invading premise in many of the constructed alphabets of the Renaissance. For example, the writing manual published by Giovam Baptista Verini, his *Luminario* (1526), featured a representation of the Vitruvius figure (Fig. 5) that should tempt a diagnostician.

The first Renaissance treatise which attempted to relate roman capitals to classical lore was created by Felice Feliciano in about 1460.[1] This alphabet exists in the Vatican Library (Ms. Vat. lat. 6852) and was not printed in its own time. Feliciano's manuscript rationale appears beneath each letter. His version of the roman capitals used a main stroke of one to ten in stem width to height. This undoubtedly stems from Vitruvius too, who remarked that the Greeks considered it a perfect number: "Again, while ten is naturally perfect, as being made up of the fingers of the two palms, Plato also held that this number was perfect because ten is composed of the individual

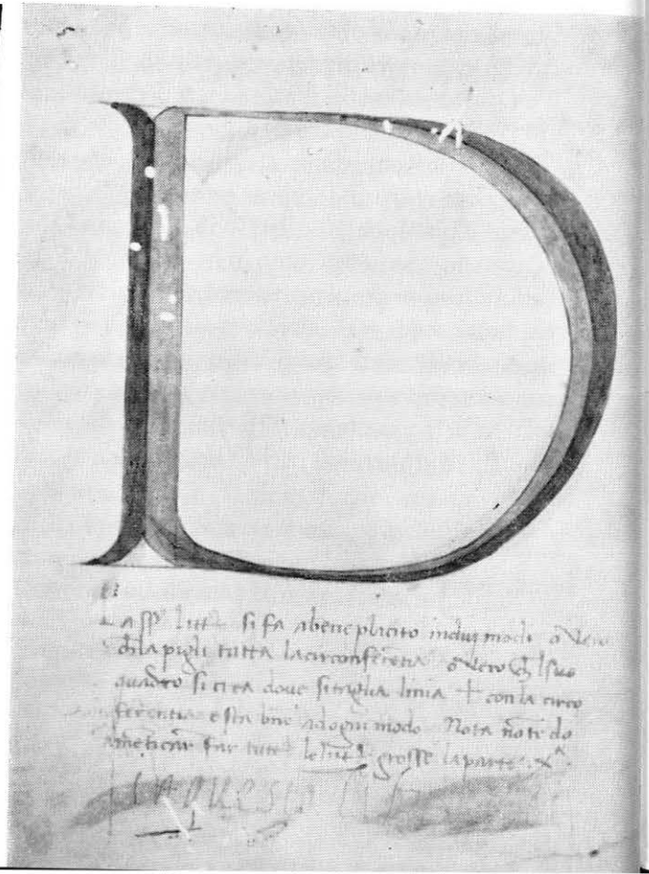
1. See also Millard Meiss, "The First Alphabetical Treatises in the Renaissance," JTR, III (January 1969), 3–30.

units, called by the Greeks *monades*. But as soon as eleven or twelve is reached, the numbers, being excessive, cannot be perfect until they come to ten for the second time."

Of course, this particular measurement was available from ancient inscription capitals *in situ*, and Feliciano had considerable experience in copying the ancient letters. One instance of his participation is recorded in "*Jubilatio*," quoted in Paul Kristeller's *Andrea Mantegna* (1902), wherein the two friends, Feliciano and Mantegna, toured the shores of Lago Garda with companions, obtaining 22 inscription copies before or during festivities of lesser scholarship. Feliciano said that he had measured the ancient letters and no doubt he had. The persistence of the mythology of Vitruvius in the constructed alphabets of the Renaissance suggests that having indeed measured the ancient letters Feliciano and others found only a happy confirmation of what Vitruvius had said, whereas in reality the pragmatic brush callig-

Figure 5. Vitruvius figure from Verini's *Luminario*, 1526. Biblioteca Nazionale Centrale, Florence.

Figure 6. The D of Felice Feliciano, *c.* 1460. Biblioteca Vaticana, Rome.



graphy of Roman inscriptions seems to have developed without the benefit of Vitruvius or any other theoretician on proper proportion. Feliciano's alphabet and text is a marvelous document, because the author was not sufficiently skilled in writing (or drawing, for that matter) to have hidden the fact that the doctrine of Vitruvius and what he observed around Lago Garda and otherwhere were in conflict. His pitiable attempts to reconcile the two views should have warned more learned men who failed the same test.

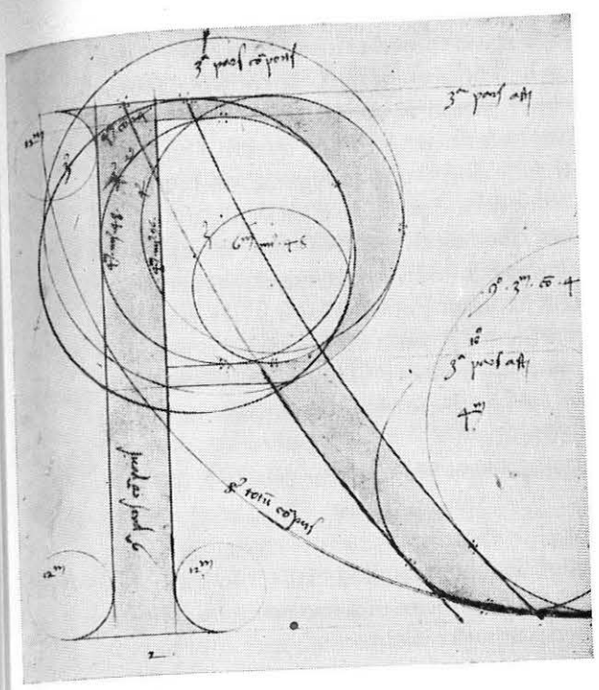
The format which Feliciano initiated for the explanation of the ancient Roman capitals was the square and inscribed circle with diagonals from the corners of the square. The diagonals made by connecting the corners of the square were not of much use to Feliciano but he did use one of them to establish the stress angles of O and Q—a decision which should have astonished any *marmorarius* of the day. One consistently weak part of Feliciano's theory resides in his thinned transversals. It is hardly possible that he could have observed this feature in the horizontal strokes in ancient inscriptions, and so it must be assumed that these too are a feature derived from classical lore on proportion. Were these one-fifth the width of vertical stems and so a part of the Vitruvius mystique? In any case, these decisions of Feliciano left him vulnerable, although in one instance, the K, he was successful. In stretching K into a square format, Feliciano showed genuine imagination. He produced an interesting letter, which depended on his ability as a calligrapher, but not a letter that a carver could have used. Other instances are less happy, for example, letter D (Fig. 6). Feliciano believed he could stretch this form into a square but, as is clear, his thin transversals left him without a chance to succeed. Curiously, Feliciano made an acceptable R (in fact two of them) and explained that the *soprascripta* of R was in great part determined by P. It was the tail or *coda* of R that proved to be difficult, and Feliciano declared that it could not be perfectly achieved by the compass. He was undoubtedly correct in this view, and explained further that it was necessary to experiment many times in order to draw a coda well. His alphabet survives as a monument to a losing struggle with Vitruvius, the compass, and the ancient Roman inscription letter.

The next treatise on constructed letters and the first to be rendered on wood blocks and printed was by Damiano da Moyle (1480). This

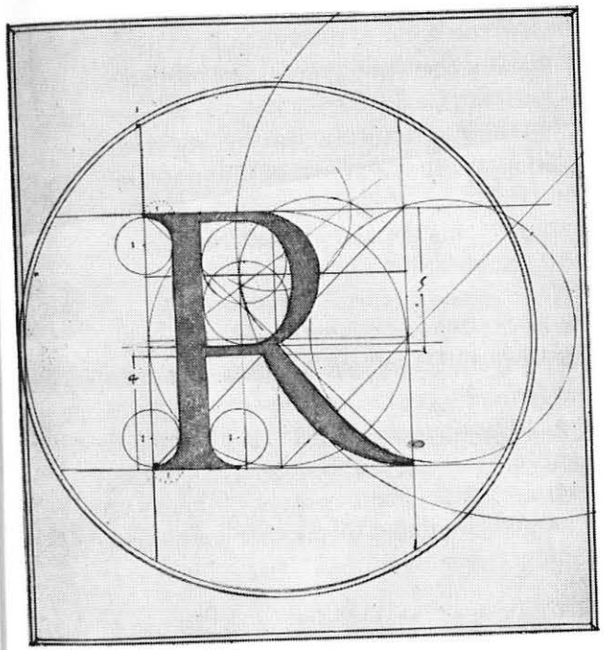
author preferred a proportion of one to twelve in stem width to height, a relationship which may also be devised from Vitruvius "On Symmetry": "The mathematicians, however, maintaining a different view, have said that the perfect number is six, because this number is composed of integral parts which are suited numerically to their method of reckoning. . . . Finally, twelve, being composed of the two simple integers, is called double (Book 3, Chapter 1, No. 5)." The da Moyle alphabet presented letters A, C, D, G, H, M, N, O, Q, and V in the square and inscribed circle, but differing formats explained thirteen other letters. Da Moyle also used a 45° diagonal to establish the stress angles in O and Q, thus perpetuating Feliciano's gross misinterpretation. Details in some of da Moyle's letters were described in the arbitrary terms of the ruler, which was neither Vitruvius nor inscription calligraphy. The transversals of his E ended on seven, six, and eight of a twelve-unit division of the square. Da Moyle forced his D wide, nearly square, and this letter is more acceptable than Feliciano's D.

Da Moyle's uninspired alphabet had about it a measure of consistency for which the author deserves full credit. Cut on blocks, da Moyle's alphabet was an expression of the limitations of this medium. Compass skills of this period are best observed in original manuscripts, and the second such expression devoted to roman capitals is the anonymous Newberry manuscript dated some time before 1500. From this manuscript alphabet letter R (Fig. 7) demonstrates the manner in which original calligraphic serifs were interpreted by an individual skilled in the use of the compass. As may be observed, the coda of R, which disturbed Feliciano, is in this example delineated by intersecting compass curves of very large radii. This extended effort did not improve the tail. The letters in the Newberry manuscript are sturdy, with a proportion of one to nine in stem width to height. Millard Meiss reminds us that this too may derive from a classical proportion, the Platonic as outlined in the *Timaeus*. Presumably the author of the Newberry manuscript capitals would have known of this. The Newberry alphabet is unique in its clarity of intention but its apparent sophistication should not blind anyone to the fact that its letters are, in the view of the veteran calligrapher James Hayes, ugly. Few would care to dissent.

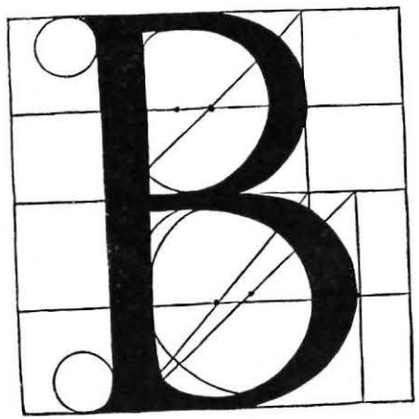
The author of the Newberry capitals omitted the square and in-



LEFT
Figure 7. Letter R
from Anonymous Newberry,
dated prior to 1500.
The Newberry Library, Chicago.



LEFT BELOW
Figure 8. Palatino's
manuscript R, *c.* 1550,
Kunstbibliothek, Berlin.



BELOW
Figure 9. Pacioli's B
in *De divina proportione*, 1509.
Grolier Club facsimile,
New York, 1933.

scribed circle but this usage was restored in a printed treatise by Luca Pacioli, a mathematician who had published the best known algebra of the period, *Summa de arithmetica, geometria, proportione et proportionalita*, in Venice in 1494. Capitals drawn by Pacioli were a part of *Divina proportione*, a work otherwise devoted to polygons, solids, and a ratio known as the golden section, and published in Venice in 1509. Pacioli used the square and inscribed circle in all of his letter structures excepting B and S (no Z was printed). Like a good teacher, Pacioli presented a short text of explanation with each letter in the prescribed manner. The first sentence of most of these texts proceeded in the manner of that accompanying letter I: "This letter is made from the circle and the square and its thickness must be one-ninth; so that it is easier to make than others."

Thus Pacioli also used the proportion found in the Newberry letters. There are other similarities between the two alphabets; the two R's are practically identical, including the use of large compass curves to form the tail. Although Pacioli stretched his D into a square with moderate success, his alphabet, in terms of a successful meshing of the Vitruvius lore with observation (a task in which he might have been expected to excel), is as coarsely pedantic as any other. Pacioli's B (Fig. 9) demonstrates that units of nine widths should suffice as well as any other to explain the bowls of this letter so subtly achieved in many Roman inscriptions. In placing *Divina proportione* in its proper historical niche, mathematics historian Carl B. Boyer states in *A History of Mathematics* (1968) that the letters are noteworthy for their excellence. It is to be hoped that some other way can be found to honor Pacioli.

Other methods of constructing roman capitals followed. Sigismondo Fanti produced the next version in his *Theorica et pratica . . . de modo scribendi . . .*, published in Venice in 1514. Another was published by Francesco Torniello in Milan in 1517, *Opera del Modo de Fare le Littere Maiuscole Antique*. Albrecht Dürer's well-known version of the roman capitals appeared in *Underweysung der Messung* (1525). Dürer presented alternatives in proportions embodied in the letters and details of form, describing three differing A's. His approach to the roman capitals was perhaps more subtle than some others, although he extolled the virtues of the compass as a tool. Still another constructed alphabet was presented by Giovam Baptista Verini in his

Luminario of 1526. Verini's method was strong in compass theory and his instructions were fairly complete.

Geofroy Tory's constructed alphabets appeared in the famous *Champ Fleury : L'art et science de la proportion des letterres* (1529). Tory followed the Vitruvius-Leonardo line of thought in relating the human figure to the square and inscribed circle. He also attempted to relate the human figure to the capital letters and the square and inscribed circle, going so far as to draw faces in O and OI combined. In constructing the capitals, Tory used a grid system of one hundred squares. Thus his central proportion was one to ten in stem width to height—derived from the nine Muses with Apollo added. Tory not only attempted to relate ancient capital letters with Vitruvius but threw in generous portions of classical mythology and any other idea that came to hand. Here is his commentary on letter Q:

> This letter Q is the only one of all the letters that goes below the lowest line, and I have never been able to find a man who could tell me the reason therefor; but I will tell it and set it down in writing. I have thought and meditated so much on the shape of these Attic letters that I have discovered that the Q extends below the line because he does not allow himself to be written in a complete word without his trusty comrade and brother V[U], and to show that he wishes to have him by his side, he embraces him with his tail from below, as I shall draw him hereafter, in his turn.

Stanley Morison, in *Fra Luca de Pacioli* (1933), mentioned Tory's "insistence upon the importance of his caballistic abracadabra." Although Tory vented his scorn on the constructed alphabets of Fanti, Arrighi, Dürer, and Pacioli (accusing the latter of stealing his letters from Leonardo da Vinci) there is nothing particularly distinguished about his own.

The search for the perfect letter form went on into the sixteenth century and writing master manuals included some graphic representation of the ancient capitals with or without compass marks or texts of instruction. The last effort to be reproduced here (Fig. 8) is the R from the manuscript alphabet by Giovanbattista Palatino, the celebrated scribe and author of the writing manual *Libro nuovo, etc.* (1540). This manuscript version of constructed capitals exists in the Berlin Kunstbibliothek (Ms. OS5280) and James Wardrop's date of *c.* 1550 is approximate; the manuscript and letters seem to have been assembled over a period of time. In Palatino's manuscript R, the

circle and inscribed square is still in evidence although obscured by the extended play of the compass. Palatino's effort, still echoing Vitruvius, brings us to the date of Cresci's debut in Rome. In all of the compass alphabets from Feliciano to Palatino we can observe the same symmetrical treatment of bowls and that identical treatment of serifs which, shrivelled, stiffened, and deprived of calligraphic grace, mark these static *sylloge*.

Giovan Francesco Cresci would have none of this, and instead advocated a return to the study of ancient inscription letters. It is not known how many compass methods Cresci had seen. In his *Essemplare* facsimile, A. S. Osley has indicated that in *L'Idea* (Milan, 1622), a posthumous publication by Cresci's son, Cresci stated that Dürer might have avoided errors of proportion had he seen Roman inscriptions. Of course he had, in visits to Italy before Cresci was born. The discorso in *Essemplare* contains several well-chosen remarks directed to the authors of compass alphabets: "And in drawing every curve of each letter they make more circles than a sphere for the most part contains." Cresci's summation is even better: "I have come to the conclusion that if Euclid, the prince of geometry, returned to this world of ours, he would never find that the curves of the letters could, by means of circles made with compasses, be constructed according to the proportion and style of the ancient letters."

While Cresci disposed of the constructed alphabets in his *Essemplare* essay it is apparent that he recognized that the 1560 alphabet which he presented in argument was not the perfect case for ancient letters. The conclusion must be drawn that in the decade between *Essemplare* and *Il perfetto scrittore* Cresci became more impressed with the fine detail imbedded in classical inscriptions and less impressed with his own contribution. It must not be concluded that the Trajan inscription was the only set of letters that Cresci admired, but he did cite these letters in *Essemplare* and in *Il perfetto scrittore*. In the latter, the Trajan letters were mentioned in the dedication to Cardinal Salviati and in the discourse on capital letters.

The Trajan inscription appears at the base of a column erected in Rome in A.D. 113 to commemorate Emperor Trajan's victories on the frontier of the Danube. (Curiously, the last two of its six lines have never been translated properly.) Most of the larger letters of the inscription measure about $4\frac{1}{2}$ inches vertical. It is interesting to note that the Cresci letters are actually larger than the letters of the Trajan inscription, measuring about $4\frac{7}{8}$ inches vertical. The only copy to derive from the Renaissance inquiry was that made by Leopardo Antonozzi, and published in *De caratteri* (Rome, 1638). Cresci's praise for them constitutes, therefore, a somewhat lonely stand in his time. More contemporary views have tended to confirm his judgment on the excellence of the Trajan letters.

Modern interest in the Trajan letters chiefly stems from the work of William Lethaby, Edward Johnstone, and Eric Gill in London around the turn of this century. That part of their significant calligraphic movement that concerned inscription forms was based on a plaster copy of the Trajan column deriving from a metal cast ordered by Napoleon III, and acquired by the Victoria and Albert Museum in London in 1864. Neither Napoleon III nor the syndics of the Victoria and Albert Museum seem to have had the slightest interest in the inscription, and it is generally held that the bas-reliefs spiralling the grand monument provided the principal motivation in the chain of events.

Thus the Trajan letters came to be "discovered" again not in Rome but in the Victoria and Albert Museum. Lethaby, the school man, and Johnstone, the scholar and calligrapher, generally deferred to Eric Gill and Percy Smith in matters pertaining to inscription forms, but it was Lethaby, writing an editor's preface to Johnstone's famous book *Writing & Illuminating, & Lettering* (1906), who outlined the methods employed by Roman inscription writers:

> The roman characters, which are our letters to-day, although their earlier forms have only come down to us cut in stone, must have been formed by incessant practice with a flat, stiff brush, or some such tool. The disposition of the thicks and thins, and the exact shape of the curves, must have been settled by an instrument used rapidly; I suppose, indeed, that most of the great monumental inscriptions were designed *in situ* by a master writer, and only cut in by the mason, the cutting being merely a fixing, as it were, of the writing, and the cut inscriptions must always have been intended to be completed by painting.

There seemed few who were willing to heed Lethaby's statement. James Mosley has pointed out, in "Trajan Revived" in *Alphabet* (1964), that even before the publication of Johnston's book a new

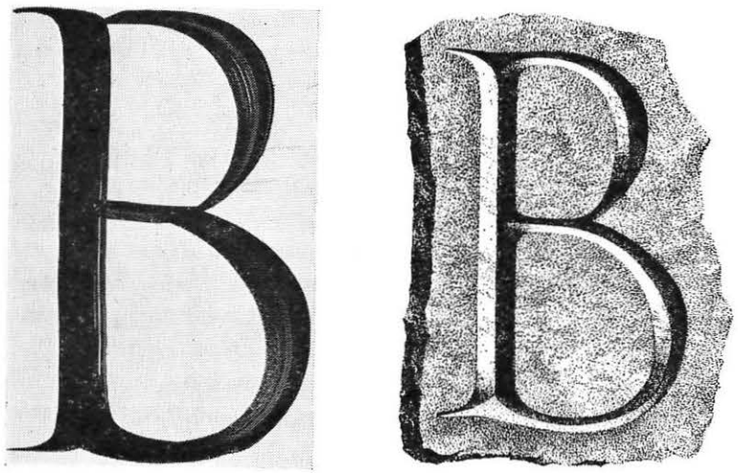
round of compass alphabets had started in being. These inherited the same defects to be seen in efforts from the fifteenth and sixteenth centuries. Even the great Stanley Morison, writing in *Fra Luca de Pacioli*, the splendid Grolier Club edition of 1933, stated: "According to the most authoritative of modern students of epigraphy, Emil Hübner, it is obvious that the more elegant inscriptions were drawn or painted with aid of the rule and compass."

Although Lethaby's statement was correct and Morison's incorrect, proof of the earlier assertion was not forthcoming for lack of original research on the Trajan inscription letters in Rome. The Victoria and Albert cast was a rather gross interpretation of the subtle detail of the original, but between Emil Hübner's study *Exempla Scripturae Epigraphicae Latinae* (1885), and 1935, the only recorded study of the Trajan letters was represented by four crude rubbings obtained by Ernst Detterer, who had earlier studied briefly with Johnstone at Ditchling, and a companion in 1922.

Thus while the Trajan letters became popular in the schools and letter trades of London the inscription in Rome remained undisturbed. After Antonozzi's published study of the Trajan letters (1638), the first accurate rendition of them was produced by Fr. Edward M. Catich, who in the late 1930s made tracings from a scaffold, and finally published them in *The Trajan Inscriptions in Rome* (1961). Catich's studies of the *ductus* of Imperial letters are found in his *The Origin of the Serif* (1968).

Figure 10. Brush-written B, courtesy Fr. Edward M. Catich, St. Ambrose College, Davenport, Iowa.

Figure 11. Drawing of the large B in the Trajan inscription in Rome, A.D. 113. D. M. Anderson.



Even one skilled in the handling of the ancient calligraphic brush will not find the Catich theory easy. It is clear, however, that Lethaby's "master writer" was just that. A key part of the Catich paleography lies in his revelation that some vertical stems of letters are not quite vertical and indeed could not have been ruled or measured, a myth which seems to have been particularly difficult to dislodge not only in the thinking of Vitruvius addicts of an earlier day but in our own.

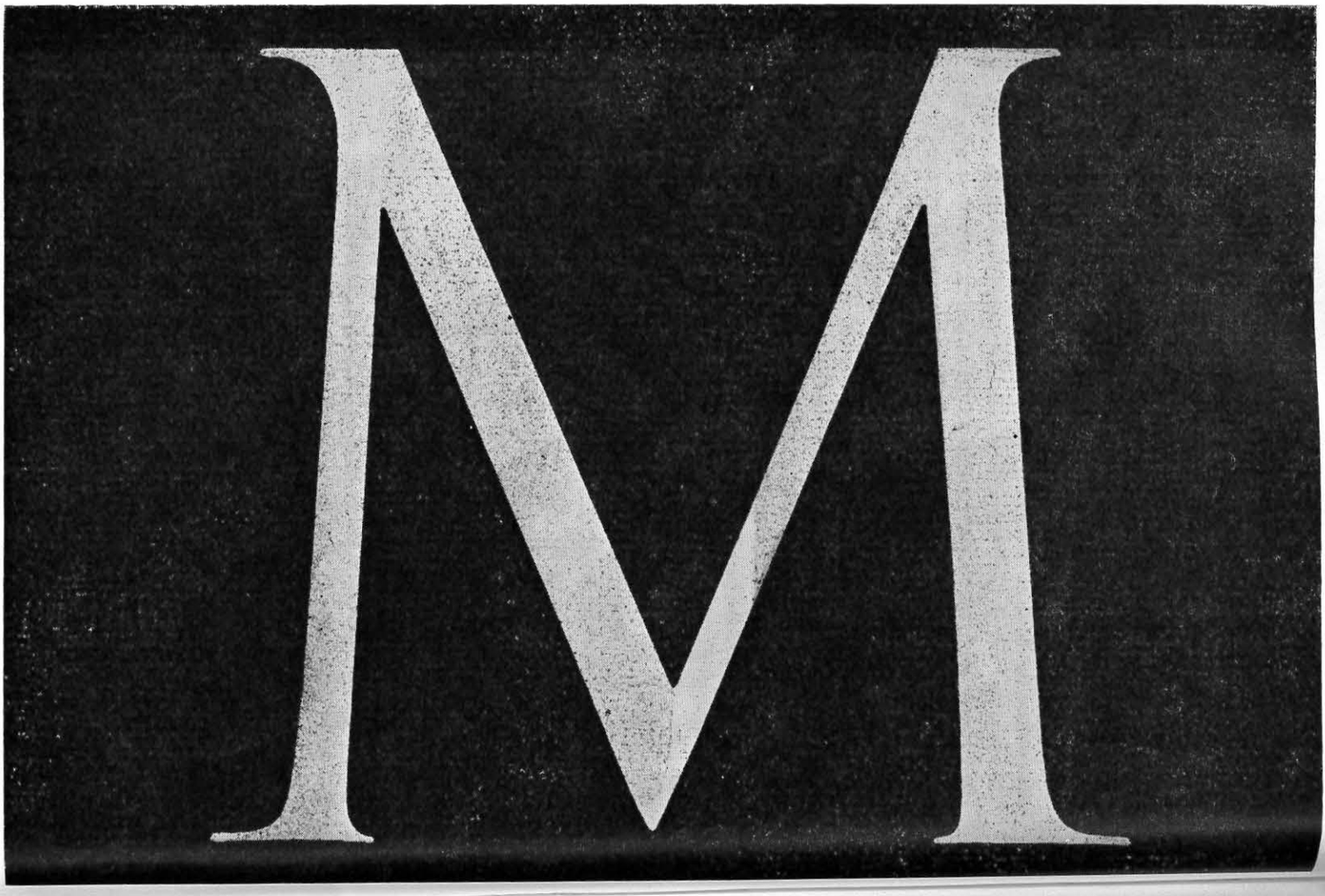
The Catich interpretation of the brush strokes of Imperial B is seen here with Pacioli's constructed B, and a drawing of the larger B found in the Trajan inscription, this last showing how the Roman carver interpreted the brush-written letter in V-cut incisions (Figs. 9–11). Since our understanding of these matters has only recently been advanced by Catich, it seems even more certain that no one in Renaissance times understood serif structure or the nature of its origin. The 1570 alphabet of Cresci and the fine inscriptions emerging from the *bottegas* of Italy were then in part skilled imitations.

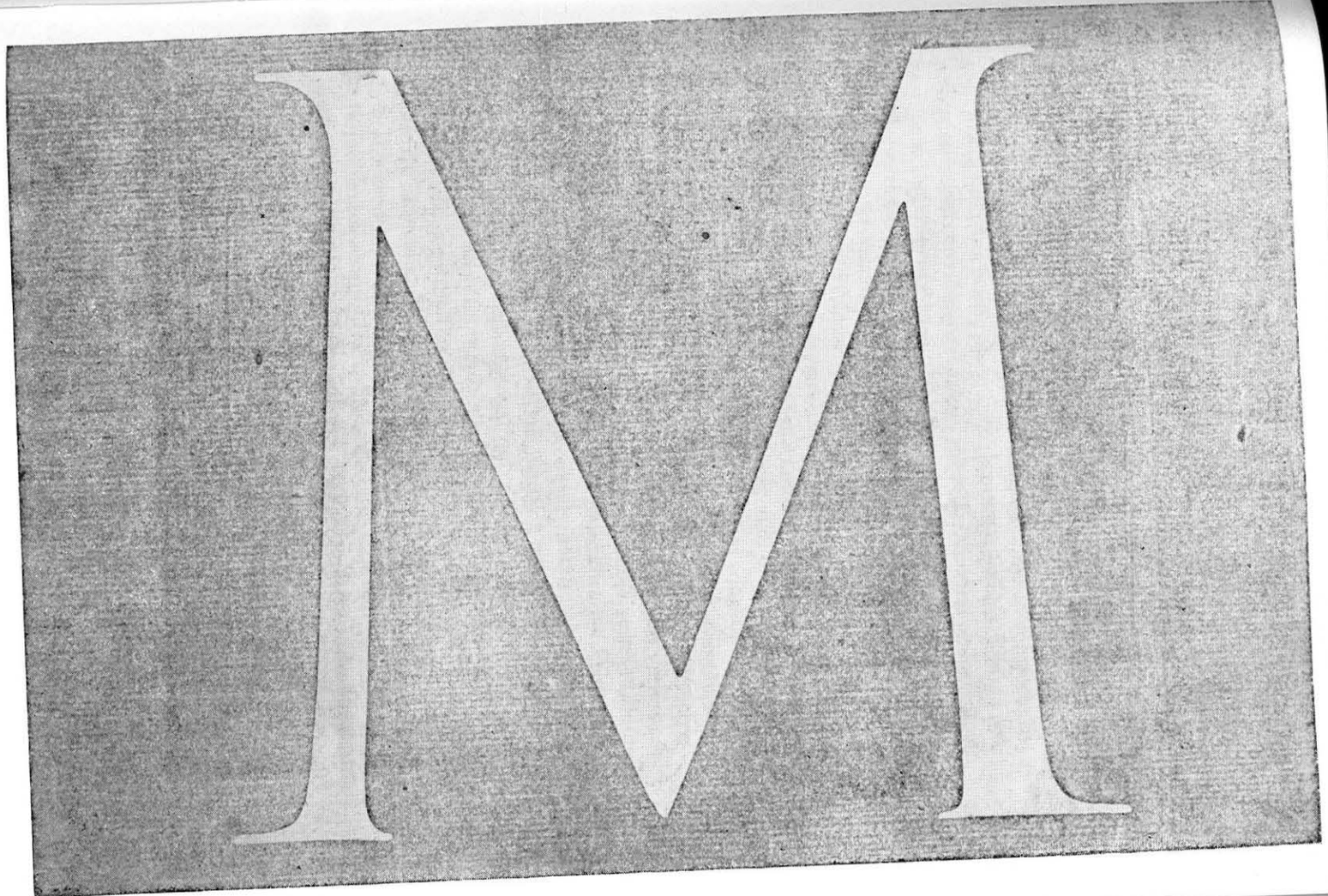
The drift in Cresci's thinking toward a closer allegiance to the classical letter is first traced through his selection of proportion. He gave up the one to eight proportion seen in his 1560 letters for a proportion that is reasonably close to that existing in the Trajan letters. Of course the proportions found in the Trajan letters vary from one to less than nine through one to more than eleven. The proportion of Cresci's 1570 letters seems something like one to ten and a half. Cresci was never rigid on proportion, believing that a number of ratios could suit differing needs, so in the drawing of the *Il perfetto scrittore* letters the move toward the Trajan letters seems deliberate.

Cresci significantly gave up the stiff vertical serifs on the horizontal stroke of T, and changed these in the 1570 letters to forms more like those deriving from calligraphy. Median transversals on the E and F of the 1570 alphabet show some modest change along this line too.

OVERLEAF

Figure 12. The Cresci M as double printed with black and grey fields, reproduced actual size from the facsimile edition of *Il Perfetto Scrittore, Parte Seconda*.





Cresci apparently had intimate knowledge of the stress angle of O and Q. In his 1560 letters he turned this angle slightly counterclockwise and gave reasons for the move. In the 1570 letters O and Q possess angles that are almost as vertical as those found in the Trajan letters.

The anatomy of M and N deserve special mention. In the Cresci M shoulder serifs are present (Fig. 12) while the Trajan letters have none. This latter treatment in classical inscriptions is by no means standard. In inscription M's before the date of Trajan blunt endings are usually seen at the shoulders, a natural meeting of vertical and diagonal brush strokes. But occasionally serifs are seen as in inscription no. 45 in the classic collection by A. and J. Gordon, *Album of Dated Latin Inscriptions* (1958–65). After a rough date of A.D. 200 serifs are more frequently seen on the shoulders of M's but the treatment shows wide variation. It may be said that the form of shoulder serif used by Cresci was the version that won out in the Renaissance, a stabilization of form taking place before Cresci was born. The Trajan form, without serifs, is extinct in the Renaissance.

There are also changes in N through the years. There is little to comment on in the serif initiating the right stem, since this feature was one of the stable parts of classical letter anatomy. Serifs atop the left stem are certainly seen before the date of the Trajan column, most notably perhaps in the Gaius Caesar inscription of A.D. 1 and in the epitaph of C. Iulius Eros, a baker, dating A.D. 11. Again there was a wide variety of treatments for the left shoulder of N, at times full serifs on a bias directed to the diagonal, and at other times a mere suggestion of brush strokes initiating the diagonal. These various serifs of the left shoulder of N are increasingly seen after the Trajan date and may be said to be a stable feature of N before 1500. Both verticals in Cresci's N were thinned down in comparison to these same strokes in the Trajan N's. This too was a standard practice before Cresci's time. This is not to say that the Roman calligraphers were mistaken, but in black and white versions of N the letter benefits from the thinning of these strokes.

Cresci did not want to see his alphabet printed with a black field. It could not be avoided, apparently, and he consented to it only "to satisfy certain friends whose wishes I could not slight," naming no names. Cresci printed the grey-field alphabet for himself. "The requirement of less ink for the field of the capitals makes them stand

out more clearly and in greater relief without their lines being in any way distorted." The first part of this statement seems to constitute evidence that Cresci was aware that the white-on-black alphabet, with its dazzling contrasts, interfered with perception—a view in which he would now receive support. In any case the alphabet of the grey field is preferable and the double printing of the Cresci-Aureri blocks is indeed unique and belongs to Cresci. As Figure 12 shows, Cresci's alphabet of the grey field reveals the texture of brass wires used in the laid moulds employed in the hand-production methods of papermaking of 1570, before the development of paper by wove moulds in England by the middle of the eighteenth century. The slightly engraved quality of Cresci's paper undoubtedly complicated the printing problem. Lighter inking in the grey-field alphabets was satisfactory, but in the black-field inkings the laid mould texture was never quite hidden. So much the better for students of papermaking, even though it was a problem for Cresci and the printers of his *casa.*

It cannot be said that Cresci's sensible views won the day. His emphatic rejection of the compass as a proper tool in creating roman letters was countermanded by his most gifted student, Luca Horfei da Fano, and more banal compass alphabets followed. Rather, Cresci's aesthetic concerns make him a man for our own times. In the discourse in *Il perfetto scrittore* he said, "And let no one marvel if on measuring the capitals (as, for example, the A) he finds that the transversal is thinner than the first (left) stroke, for if it were as thick, it would, being shorter, seem even thicker."

In the commentary accompanying his alphabets Cresci stated that he had hoped to include the rules for drawing the ancient letters he admired. The reason given for the omission was lack of space. The better reason is that Cresci's views prevented his inclusion of such rules. If there is a content of maturity in the treatise of *Il perfetto scrittore* it surely resides in this tribute:

> These ancient capitals are so noble in themselves that I think one can truly say that they provided the opportunity for infinite study. In this regard, I should like to cite by way of example the art of painting: Although there are rules and proportions to assure that in painting a beautiful figure its various parts are in harmony, nevertheless, there are still some painters who are so studious in their craft and so favoured by heaven in their art

that despite rules, they will infuse more life, energy and grace into their figures than will another no matter how good a painter he may be. I repeat, then, that the possibility of study in these capitals is so limitless that one should not attempt to lay down precise rules about them or any other matter which someone, as I have shown by my example, could surpass in grace and beauty.

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This article has been adapted with kind permission from Donald M. Anderson's introduction to *A Renaissance Alphabet: Il Perfetto Scrittore, Parte Seconda*, by Giovan Francesco Cresci (Madison, Milwaukee, & London: University of Wisconsin Press, 1971), 11 × 8½ inches, $12.50.

This first facsimile edition of the writing manual handsomely reproduces Cresci's 23 capital letters; as in the original edition, the characters are printed twice—lightly inked, and heavily.

Why Serifs are Important: the Perception of Small Print

David Owen Robinson, Michael Abbamonte, and Selby H. Evans

The use of serif type styles has continued to dominate printing since the introduction of sans-serif type a century and a half ago. Several theories are considered to account for the continued popularity of the older typefaces. It is suggested that the neurological structure of the human visual system benefits from serifs in the preservation of the main features of letters during neural processing. A computer simulation of visual processing supports this theory, and suggestions are made concerning the function of serifs in letters of different sizes.

Sans-serif typefaces first appeared in the 1830's and were considerably developed earlier in this century. Since there can be no doubt that **H** conveys the same information to literate humans as **H**, it seems strange that the older styles with serifs have been highly resistant to extinction. Because we can perceive each letter without the little additions at the end of their component lines, the continued use of serifs appears at best only decorative and at worst merely superstitious. However, a glance at a selection of journals and books shows that sans-serif type styles do not appear in nearly as many examples as do typefaces with serifs.

Poulton (1964) compared three sans-serif styles of printing with three serif styles in a study of the efficiency of labelling drugs. He found no effective difference between the groups, although Gill Sans was more legible than Univers or Monotype Grotesque 215. Tinker (1963) compared ten different type styles for legibility, including one sans serif—Kabel Light. He found that this type style was read as rapidly as the others but that "readers did not prefer it" and it was placed ninth out of ten for judged legibility. Dowding (1957) suggested that sans serifs are most difficult to read and further commented: "It has been calculated that when the same piece of 'copy' is set in two different types—an old face and a sans serif—that 7½% more time is needed to read the latter."

Unless we are prepared to believe that preference for serif styles of type is merely a matter of aesthetics, then psychology ought to be able to offer some convincing explanation for the survival of older type styles. The most obvious explanation is that the choice of typefaces is merely a matter of conditioning. That is, people who choose typefaces for books and magazines were brought up on serif styles and so are more likely to choose them rather than the newer type styles. However, if that argument had any validity, the draft of this article would not have been written in ballpoint script but with a quill pen!

A more sophisticated theory would be that the serifs increase the horizontal continuity of a line of type. However, it does not appear subjectively more difficult to distinguish the lines in a block of sans-serif print. Furthermore, since adults only make a few eye fixations in reading each average-length line of print, it seems unlikely that the continuity from one letter to the next should be an important factor in legibility and reader-preference.

An alternative theory is that one should expect serif-form letters to convey more information to readers because there are more lines present in each letter than in equivalent sans-serif forms. Against this, it could be argued that serifs do, in fact, detract from the information conveyed by each major component line of a letter by adding "noise" to the visual stimulus. In other words, if letters are perceived in terms of their component lines, the addition of serifs is as useful as scattering soot across a page of sans-serif print.

The explanation which this article proposes depends on the physiological structure of the human visual system. Light falling on the retina excites photoreceptors, and, because there are many millions of these in each eye, even a line which is perceived as being very thin may fall across a band which is several receptors in width. The retina is connected to the visual cortex of the brain by the optic nerve. There are not enough "telephone lines" in this communications link for each receptor to be directly connected to the cortex, and it has long been known in physiology that the receptors do not combine in a simple additive manner.

Using the technique of single-cell recording—implanting microelectrodes into nerve cells and monitoring the activity—the visual systems of a number of animals have been studied. These investigations have included work on the frog, the pigeon, and the cat. In their

article "What the Frog's Eye Tells the Frog's Brain" Lettvin, Maturana, McCulloch, and Pitts (1959) reported that the information transmitted from the frog's retina to its brain concerns the detection of a number of very simple features in the frog's environment, such as a moving bug or an overall darkening due to the shadow of a predator. The pigeon's retina detects straight horizontal lines, codes this information neurologically, and sends it to the cortex. A large part of the literature on the topic has resulted from the research of Hubel and Wiesel working with cats. They have shown that the visual system of the cat includes several types of feature detectors: spot detectors, line detectors, edge detectors, and corner detectors. A spot detector "fires" only if a group of receptors in a small spot are stimulated, while most of those in a ring round the spot are left unstimulated—an "on-center field" or, vice versa, an "off-center field." A line detector responds when a straight line appears in a particular part of the retina. There are intuitive reasons to believe, and some non-physiological data (Schoenberg, Katz and Mayzner, 1970) to confirm, that the visual system of human beings is organized in the same way.

A Model of Human Visual Processing

A digital computer model of "Hubel and Wiesel line detectors" was reported by Evans, Hoffman, Arnoult, and Zinser (1968) who showed that such a system was efficient in retrieving degraded (i.e., "dirty") patterns. The firing of neural components was modeled by numbers and the way in which component parts of the visual system interact and join together was simulated by multiplication and addition. It is possible to convert the results of these processes into meaningful pictures in computer print out. In another test of the model by the present authors (in preparation) the computer program was shown to imitate human behavior in the perception of geometric illusions. The model made mis-estimations of the lengths of lines in these figures in just the same way as the human visual system.

The Model Applied to Letters

The digital computer model of human visual processing was applied to letterforms with serifs, and without serifs, as a test of a line-detector explanation of the importance of serifs which may be stated as

T T E E

f f h h

Figure 1. The stimuli letters used in the experiment. These IBM Selectric characters were transformed into 48 × 48 matrices suitable for digital computer input.

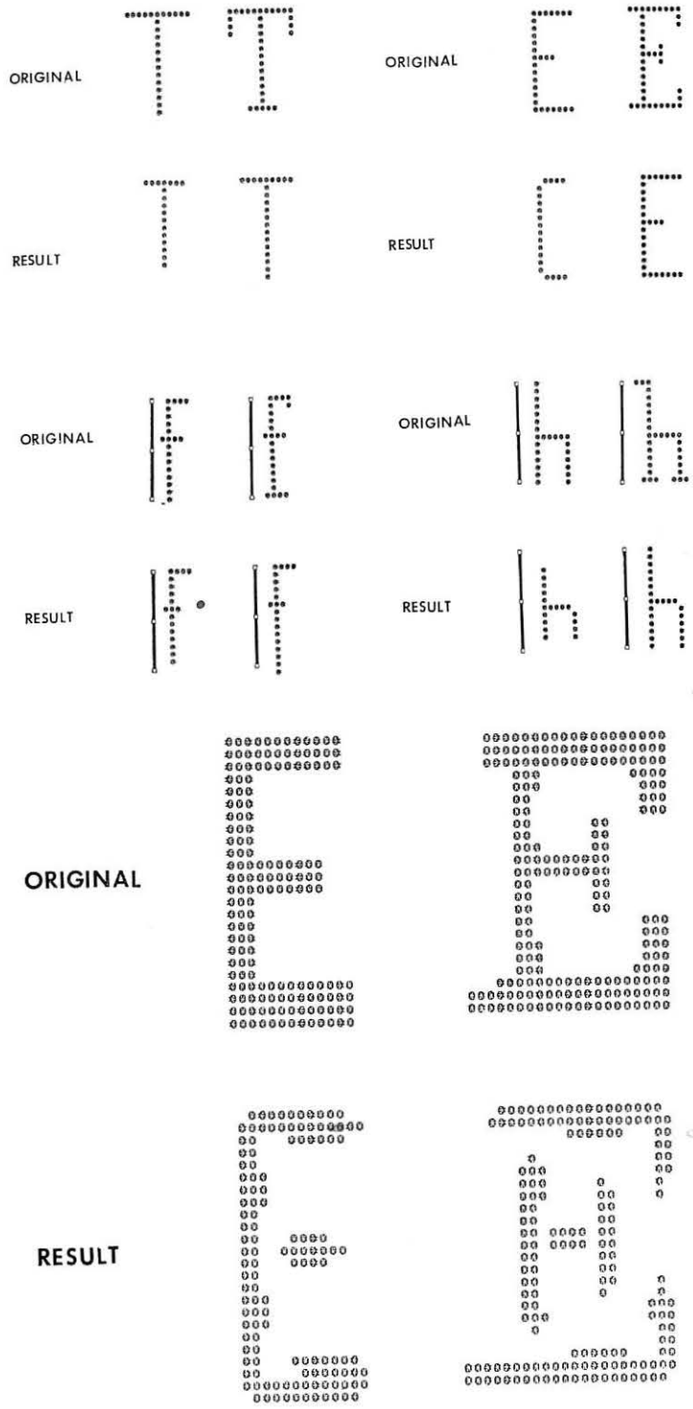
follows: "Serifs are important in the perception of small letters by humans. They react with the line detectors of the visual system with the component lines of letters. The component lines of letters are made easier to see when the letters are of serif form."

The letters used were E, T, f and h in serif and sans-serif forms with corresponding examples within each of two letter size groups having exactly the same height, width, and line thickness. The examples were based on two IBM Selectric typewriter faces—Courier (serif) and Artisan (sans serif) (Fig. 1). The input to the computer was in the form of a 48×48 matrix and the operators which are the part of the model which imitates human visual feature detectors are matrices of size 5×5. The relative sizes of the input pattern and of the operators were chosen on the basis of neurological and psychophysical data. Of the two sizes of letter used, the smaller corresponds to the images formed on the retina by ordinary bookprint held at a comfortable reading distance, and the larger examples were nearly twice as high and were of three times greater line thickness. The stimuli letters were submitted and, to each one, a "spot operator" was applied. In effect,

OPPOSITE

Figure 2. The results of applying the computer model of the line detectors of the human visual system to small letters without serifs (the left of each pair) and with serifs (the right of each pair).

Figure 3. The results of applying the computer model of the line detectors of the human visual system to large letters, with and without serifs.



this instructs the computer "Look at this picture: Where are there printed areas?" The results of this operation were stored on tape and horizontal and vertical line operators were then applied to these resultant pictures. This is equivalent to the instruction "What horizontal and vertical lines do you see in these pictures?" The results of these two operations were printed out, which is like asking the computer to draw what it has seen.

Results

In Figure 2 it is clearly shown that serifs perform an important function in preserving the original image of a small letter in a perceptual system with horizontal and vertical line detectors. The image of the sans-serif E is considerably degraded, whereas the corresponding serif-form letter is perceived without deformation of the major component lines. Standard reference lines of equal length placed alongside each of the lower-case letters show how the height of sans-serif forms is perceived as less than original, whereas the serif forms are perceived without decrement of the main lines. The difference between the two type styles is least in the case of the letter f; however, this is an expected result since the difference between the original figures is very small.

Serifs are not useful when large letters are presented to a line detector system, as shown in Figure 3. When the line width of the image of the letters is greater than the width of the detection, serifs do not help to preserve the main features of a letter. One example is given here; similar results apply to three other letter pairs which were submitted to the same operators.

Discussion

Serifs are only important in letters which are small enough to be perceived by line detectors: most ordinary print in the texts of books, periodicals, and typewritten material. Larger and/or thicker letters are probably perceived by a different part of the system—the edge detectors. However, the image of large letters *are* of line-form when viewed from a distance. Serifs are useful not only when the letterforms are physically small, but may also be functional when large letters form a small image on the retina—as, for example, when a billboard is seen from far away.

The line-detector theory of the importance of serifs in the perception of small print can be supported by three observations. As mentioned above, a sans-serif style was not preferred by readers when compared with serif styles and the examples used were of "small letter" size. Further, when one perceives small letters, one is not necessarily aware of the serifs. They can be detected on closer examination either by bringing the material closer to the eye (thus increasing the size of the retinal image) or by selectively attending to line detectors of finer resolution. The line detectors of the visual system are in a range of sizes, and it seems probable that one can "tune-in" to a certain size of detector when the situation demands—a kind of neurological fine tuning of the receptor system. Finally, the degradation of the neural image of sans-serif letters does not have a disasterous effect on legibility, as might be supposed from the sans-serif examples in Figure 2, because of the considerable influence of context. For example, if one erases one third of the letters in a sentence it is still readable: An *xa*pl* of* se*te*ce *it* mi*si*g l*tt*rs.

If the computer model has any validity as an imitation of the human visual system, then one may conclude that serifs are important in preserving the image of small letters when they are represented in the neurological structure of the visual system.

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Research in Brief: Graphic Trends in Consumer Magazine Advertising, 1938–1968

Fred Bauries

The graphic techniques of consumer magazine advertising have changed dramatically during recent decades, but little has been done to quantify the typographic and illustrative trends in advertising which seem to set the pace for—or do they reflect?—the graphics of the editorial environment. The present study is an attempt to quantify measurable graphic trends.

Life magazine was selected as reasonably representative of general magazines published during the period of the study. Seven "landmark" years were chosen at five-year intervals between 1938–68. Six issues from each sample year were studied in detail, using the first issue of odd months; i.e., January, March, etc. Only advertisements one full page or larger were included. Seven students who had completed the advertising graphics and production course at Michigan State University were trained as coders. Sample years and coders were randomized to minimize coder bias. The code sheet used for the study was the end result of considerable testing and several revisions. Data are the result of careful examination of 1,383 advertisements which appeared in the 42 issues studied.

Headline Letterforms. For purposes of accurate coding, type styles were divided into just three categories: serif, sans-serif, and script. A fourth category was used to code those headlines which combined more than one of these. More discrete categories were tested, but proved disasterous for accurate coding. While it might reasonably be expected that the use of sans-serif headlines increased substantially during the period studied, the data fail to support this expectation. With the exception of the 1940's, the use of sans-serif headlines has remained fairly close to the 40–45% range throughout the period studied. Meanwhile, the

use of serif letterforms increased from about 35% to nearly 50%. The use of script and mixed headlines was most popular in the late 1940's when more than 30% of the headlines fell into these categories. This practice has diminished to the extent that such headline forms are now all but non-existent.

Headline Formats. The use of all-capital headlines has declined substantially from a high of 40% in 1938 to less than 10% in 1968. The use of all-caps was substantially less in the 1940's than the 1950's. This probably was a result of the heavy use of script headlines during the 1940's. Use of all-lowercase headlines never has caught on in advertising. Non-existent in 1938, the trend appears to have peaked around 1963 when 4.3% of the headlines were set all lower-case. The use of the cap and lower-case headline format appears to be solidly entrenched in advertising practice with more than four out of five being set this way in 1968.

Headline Type Size. Advertising headlines seem to be growing larger with each passing year, perhaps due in part to the growing use of photolettering. The data generally support this suspicion. The mean type size increased more than one-third between 1963 and 1968, from an x-height of 9.1 mm to 12.6 mm. As a point of reference, commonly used typefaces with lower-case x-heights of approximately 12.6 mm include 60 pt. Univers Bold, 72 pt. Caslon Bold, and 84 pt. Bodoni Bold.

Headline Background. The use of tint backgrounds, reversed headlines, and headlines set in mortises all appear to be dying techniques, especially the use of background tints, which declined from 8.5% in 1938 to 0.6% in 1968. Techniques which clearly have gained favor among advertising art directors in recent years include superimposing headlines on the illustration by surprinting (black type against a light portion of the illustration) and dropout (white type against a dark portion of the illustration). Nearly 30% of the 1968 headlines were surprinted or dropped out. A result of this trend is that only about 60% of the 1968 headlines were printed with white backgrounds compared to nearly 80% during the 1950's.

Size of Logotype. The tendency for advertisers to make the signature the largest typographic element appears to have declined in recent years.

Throughout the 1940's, 1950's, and early 1960's the logotype was the largest typographic element in about 40% of the ads studied. Only a little more than one ad in five exhibited this characteristic in the 1968 sample.

Body Copy Letterforms. While the use of sans-serif letterforms in headlines remained very stable throughout the period of this study, the same cannot be said for the body copy. Use of sans-serif body copy grew from 5.1% in 1938 to 16.3% by 1948, declined to 6.4% in 1958, and then jumped to 42.7% in 1968. It appears art directors were bold about using sans-serif headlines long before they were convinced of its suitability as a body type.

Body Copy Format. In 1938 nearly all the ads studied were set in the formal and traditional justified format. Thirty years later only about 40% of the ads had justified body copy. The informal flush left, ragged right format was used in nearly 30% of the 1968 ads, but did not appear in a single 1938 ad. Another format growing in favor is body copy contoured to an illustration. Nearly 10% of the 1968 ads were set this way.

Background of Body Copy. The use of white background for body copy was at a 30-year low in 1968. More than 21% of the 1968 ads studied had either surprinted, dropped out, or reversed body copy.

Typographic "Color." There has been a clear-cut trend away from using what typographers refer to as typographic "color" during the 30 years covered by this study. Such things as subheads and bold, capped,

1938 (Insurance) Headlines tended to be set in all caps, illustrations hand-rendered, and body copy set justified in a roman face with initial letter or other forms of typographic "color." Original in black and white.

1948 (Kaiser) Peak period for script headlines and multiple-illustration layouts. Photography was being used more, but hand-rendered illustrations were still most common. Original in four-color.

1958 (Smirnoff) Four-color used in nearly two-thirds of ads. Photography had largely replaced other forms of illustration and logotypes still tended to be the largest typographic element. Original in four-color.

1968 (Mennen) Headlines grew larger, type tended to be superimposed on illustration, and body copy was frequently set in informal formats in sans-serif. Original in black and white.

or italicized lead-ins, paragraphs, or words appeared in the body copy of 72.9% of the 1938 sample, while such techniques were used in only 30.4% of the 1968 ads. One form of typographic "color" not in evidence in 1938 is underlining. This technique reached a 4.5% level in 1958 and appeared in about 3% of the ads studied in the 1960's. The initial letter was extremely common in 1938 when it was used in 39% of the ads studied. It has fallen from favor gradually to the point where initial letters appeared in only 2.3% of the 1968 sample.

Illustrations

Number of Illustrations. The trend toward a single, dominant illustration appears clearly documented by the data. Slightly more than half the ads studied in the 1968 sample contained a single illustration, while the late 1940's show up clearly as the peak period for the multi-illustration vogue. Only one ad in four used a single-illustration format in those early post-war years, but nearly 40% of the ads appearing in 1938 used the now-popular one-illustration layout.

Rendering of Illustration. The use of photography, as opposed to hand-rendered forms of illustration, has grown dramatically in recent years. Nearly nine out of ten ads in 1968 were illustrated photographically, while in mid-war 1943 two-thirds of the ads were hand-illustrated. The data seem to suggest the war may have made photographers and/or photographic supplies scarce, since photography was being used in about half the ads before and after the war, but in less than one-third of those published in 1943.

Use of Color. The use of four-color process printing grew dramatically and then declined during the years studied. Only about one-quarter of the ads published in 1938 were full-color. Five years later more than half the ads were four-color. The use of full-color may have peaked around 1958 when nearly two-thirds of the ads were four-color. After that year, the use of black and white increased from 26.8% to 38.6% in 1968. Users of black and one color always have been in the minority, and the minority has grown increasingly smaller since 1953.

This article is based on a paper presented to the Graphics Division of the Association for Education in Journalism at its Annual Convention at the University of South Carolina, August 1971.

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Research in Brief: The Graphics of Prose

John M. Smith and Maxwell E. McCombs

With one important exception, the graphics of a newspaper are out of the hands of the individual reporter. It is the editors, not the reporter, who usually decide where a particular story will go and how it will look. Column width, type size, head size and style, number and placement of columns all influence the appearance of the story —and all are controlled by news editors.

The one area where the reporter has almost complete control over the appearance of his story is in the graphics of his prose, the area examined in this experiment.

Flesch's yardstick for measuring readability is based on the discovery that shorter words and shorter sentences create more readable writing.[1] This experiment was designed to demonstrate that a story which ranks high by Flesch's reading ease formula not only is easier to read, but also is preferred over less readable copy on the basis of its appearance. The reason is white space. Shorter words and shorter sentences, as well as more paragraphs, create more white space within a story. It is hypothesized that a reader will prefer a story with large amounts of white space over one with less white space.

Method

Although one of the effects of improving readability (using shorter words and sentences) is to increase white space, the manipulation of prose graphics for testing the hypothesis emphasized paragraphing while controlling for level of reading ease. Four versions of the same news story were prepared. The first version had a low amount of white space and a Flesch reading ease rating of "very difficult." The

1. Rudolf Flesch, *The Art of Readable Writing* (New York: Harper, 1949).

second version also had a low amount of white space but a reading ease rating of "easy." The third version of the news story had a high amount of white space (created by using more open punctuation and more paragraphing) and a reading ease rating of "very difficult." The fourth version also had a high amount of white space but a reading ease rating of "easy."[2] The hypothesis predicts that reader preference will increase monotonically from versions one to four.

These story versions were set in type—in a standard one-column width—and printed (Fig. 1). The printed columns were then placed in pairs, side by side, in all six possible combinations. Photographic slides were made of these pairs after insuring that the columns in each pair were of equal length. A second set of six slides was made after transposing the columns in each pair. This was to insure that position did not influence preference.

Subjects were told that this was an experiment concerned with "the attractiveness, or reader appeal, of columns of type." The subjects also were told that the pair of columns that they would see on the screen contained basically the same information and that during the first phase of the experiment the columns would be flashed too quickly to try to read.

During this phase, slides were flashed on a screen for a duration of one second. After each slide the subject was asked to choose which of the two columns he would "prefer" to read. The one-second time period was long enough to permit the subject to respond to the general appearance of the columns, but it was too fast to permit the subject to read the pair of columns. Thus the subject could respond to the graphics of the prose without being aware of the actual reading ease level of the copy.

2. The precise Flesch scores were: Version 1, 27.6; 2, 80.5; 3, 22.4; 4, 08.3.

TABLE I. Scale Scores for Story Versions

Version	*Phase I*	*II*
(1) Low white space, low reading ease	.000	.000
(2) Low white space, high reading ease	.019	.489
(3) High white space, low reading ease	.447	.928
(4) High white space, high reading ease	.686	1.225

Figure 1. Details (actual size) of the printed story versions in order, left to right, of the Table I listing.

Gambling is the nomenclature that most homo sapiens would utilize, but Joseph Gunther describes it as work. For 15 years Gunther has supported his family entirely by revenues derived from gambling endeavors which he considers simply a tedious but rather profitable occupation.

Several seasons ago particular gamblers who had learned to second-guess the slot machines confronted manufacturers and demanded payment not to manipulate the contraptions. The manufacturers' reaction was to retaliate by constructing machines calculated to frustrate the gamblers.

But Gunther was not disconcerted, because he did not have a system. Instead he manipulated his eyes to spot the symbols on the machine's rotating rollers, even when they are proceeding at maximum speed. Fifteen years ago he discovered his ability and since then he has earned 250,000 marks watching choice numbers align themselves before he arrests the machine to collect the coins. Gunther, who is 33, uses a container of coins in

Gambling. That is what most people call it. But Joseph Gunther calls it work. For 15 years Gunther has supported his family from his winnings. Gambling is simply a job for Gunther.

A few years ago some gamblers could beat the slot machines, or so they thought. The gamblers went to the slot machine makers. Pay us and we won't play your machines, they said. The manufacturers smiled. New machines were designed to foil the gamblers.

But Gunther wasn't foiled. He doesn't have a system. He simply uses his eyes. He can spot the numbers on the machine's rotating rollers, even when the rollers are going full speed. He discovered this ability 15 years ago. He watches choice numbers line up Then he stops the machine. This trick has earned him 250,000 marks.

Gunther is 33. His briefcase is a bag of coins. He drives to work and he has business stops like a traveling salesman. Landlords in the inns know him. But they let him work because he does eat

Gambling is the nomenclature that most homo sapiens would utilize — but Joseph Gunther describes it as "work."

For 15 years Gunther has supported his family entirely by revenues derived from gambling endeavors.

But he considers gambling simply a tedious but rather proffitable occupation.

Several seasons ago particular gamblers, who had learned to second-guess the slot machines, confronted manufacturers — "Pay us and we won't manipulate the contraptions," they said.

The manufacturers' reaction was to retaliate by constructing machines calculated to frustrate the gamblers.

But Gunther was not disconcerted, because he didn't have a system.

"I manipulate my eyes to spot the symbols on the machine's rotating rollers . . . even when they are proceeding at maximum speed," he said.

Fifteen years ago he discovered his ability and since then

Gambling.

That's what most people call it — but Joseph Gunther calls it work.

For 15 years Gunther has supported his family from his winnings. For Gunther, gambling is simply a job.

A few years ago some gamblers could beat the slot machines.

Or so they thought.

The gamblers went to the slot machine makers. "Pay us and we won't play your machines," they said.

The manufacturers smiled.

New machines were designed to foil the gamblers.

But Gunther wasn't foiled. He doesn't have a system. He simply uses his eyes.

He can spot the numbers on the machine's rotating rollers — even when the rollers are going full speed.

He discovered this ability 15 years ago. He watches choice numbers line up. Then he stops the machine. This trick has earned him 250,000 marks.

Gunther is 33. His briefcase?

During the second phase of the experiment the same slides were shown to the subject, but for a duration of six seconds. This permitted the subject to read and scan portions of both columns and make a choice based on both the general appearance of the columns as well as the reading ease of the two versions. (The subjects were not told that they were viewing the same slides a second time.)

There were 24 subjects. Half of these saw the first set of six slides, the other half saw the second set of transposed slides. Slide order was rotated across subjects.

In the third phase of the experiment each subject was handed one of the four versions of the news story and asked to read it once just as he would a normal news story. The subject was then asked to rate the story on a five-point semantic differential scale for Dislike/Like, Difficult/Easy, and Boring/Interesting. Finally, subjects were given a ten-question quiz to measure their comprehension of the version which they read. Each version was read and rated by six subjects.

Since in the first and second phases of the experiment each subject expressed his preference in all six possible combinations of the story versions, it was possible to array the results along an interval scale of preference using Thurstone's paired-comparisons technique. Scaling the results not only indicates the order of preference for the versions, it also yields information about the distance between them on a psychological preference continuum. Ordinal data (rank order of preference) would test the hypothesis, but interval data yield more insight.

Results

The results of this paired-comparison analysis are presented in Table I. Both in phase one (a one-second glance) and in phase two (six seconds of scanning) the results are in the predicted order. Lowest on the scale is the version with low white space and low reading ease. Improved reading ease does increase preference, but the highest scale scores are for the versions with high white space. In general, improvements in both the readability and white space of a news story seem to result in increased reader appeal. But white space seems to make more of a difference in the appeal of the story. The intervals between versions differing only in white space (e.g., 1 and 3) are considerably greater than the intervals between versions differing only on reader ease (e.g., 1 and 2).

TABLE II. Semantic Differential Mean Ratings

	Version			
	1	*2*	*3*	*4*
Difficult/Easy	3.2	3.3	4.0	4.2
Dislike/Like	3.0	3.5	4.2	3.8
Boring/Interesting	3.3	3.8	4.7	3.7

Corroborative evidence on the efficacy of prose graphics is provided by the semantic differential ratings for each version reported in Table II. The ratings on the Difficult/Easy scale show some slight effect from improvement in readability, but primarily reveal the effect of improvements in white space. Since readability is concerned directly with reducing the difficulty of understanding a message, one might have expected this scale to show greater effects for shifts in readability than for shifts in white space. The other two semantic differential scales are more concerned with reader preference or affect. Both indicate that versions with more white space tend to be preferred, but neither perfectly follows the predicted rank order.

Finally, analysis of the comprehension test revealed no differences among the four versions, suggesting that the effects of the graphics of prose as applied here are in the initial phase of reader behavior, selection of the message, rather than in the subsequent understanding and response to the message.

Application of the idea tested here should enhance the individual writer's chances against competing messages on the same or similar topics. This, of course, assumes that the intended audience has some interest in the topic. Ultimate success in mass communication requires a combination of skillful message packaging with knowledge of the intended audience's information-seeking behavior.

This article has been reprinted with kind permission from the Spring 1971 number of *Journalism Quarterly*, c/o School of Journalism, University of Minnesota, Minneapolis, Minn. 55455.

John M. Smith is assistant professor of journalism at the University of California, Los Angeles; Maxwell E. McCombs is associate professor of journalism at the University of North Carolina, Chapel Hill. This study was supported by a grant from the U.C.L.A. Academic Senate.

Book Review

Edward Johnstone, *Formal Penmanship*. London: Lund Humphries, 1971. 160 pages of text, 20 pages of plates. £5.80.

Edward Johnstone (1872–1944) believed that "No man can know 'how it is done' until he himself has done the thing."

Armed with this he set out to rediscover the uses of the broad-nibbed pen. Used so that eveness of pressure and change of direction alone produced the thickening and thinning of strokes, he reproduced the shapes that characterize our present alphabet. It is here, in this renewal of the relationship between the formal use of the broad pen and the shaping of new printing types that the continuing importance of his work lies.

First he developed and described in his classic work for scribes, *Writing & Illuminating & Lettering* (1906), a very round upright "Foundational Hand," this was based on what was thought to be a Winchester manuscript but is now attributed to Ramsey in Huntingdonshire.

Sydney Cockerell was quick to point out that his style was to change and follow the course of writing from the eleventh to the fifteenth century; his calligraphy tended to become more and more gothic and compressed. "There were some who lamented this, but . . . *no original artist can stand still and go on repeating himself* [my italics] . . ." Johnstone saw the revival of formal lettering containing this paradox: "We have almost as much—or as little—to be afraid of in Originality as in Imitation." Nevertheless he produced manuscripts that were replete with personality and were a sympathetic expression of the text.

He has not been fortunate in his scriptorial disciples. In England, they have mostly produced anaemic and mechanical reproductions of his work, and in the States comic parodies. His influence on writing—at one stage removed and under the pressure of alien letter styles—has been less sterile in Germany. His student Anna Simons taught in Dusseldorf and translated *Writing & Illuminating & Lettering* into German. Johnstone himself lectured in Dresden, and between 1910 and 1930 designed typefaces for Kessler at the Cranach Press at Weimar. Rudolf Koch, Berthold Wolpe,

and Hermann Zapf were all influenced by him—and in Germany, there has been a consistent creative development from his example—vitality and imagination in letterforms and a tenseness of composition that Johnstone would have admired.

That the best modern practitioners of lettering were also designers for the printed page is significant; printing has provided Johnstone's work with its *raison d'être*. Looking again at Britain and the United States, Johnstone's influence is to be found everywhere in printing—his own revolutionary sans type for London Transport still in use and a touchstone for everything they produced after 1916; the support he gave to his pupil Eric Gill;[1] and above all his co-editorship of and his essays in *The Imprint*, 1913. This magazine was set in a then special typeface of the same name designed by J. H. Mason—the first of the great line of Monotype cuttings of historically inspired typefaces.

The *Imprint* essays ("Decoration and Its Uses: Formal Writing and the Broad-nibbed Pen"; "The Development of Types, and Formal Writing," three parts; "The Choice of Letterforms and the Simple Arrangements of Letters"; "Special Arrangements of Letters," two parts) appear in the book under review, *Formal Penmanship*. These are followed with a collection of notes that he planned, during his last fifteen years, to form an extended coda to *Writing & Illuminating & Lettering*. These have been edited by his pupil Heather Child and handsomely presented in modern dress by the publishers. There are four chapters on tools and techniques; two on copying manuscripts, followed by notes on different letterforms, and the physical and graphic structure of the ancient book.

In truth, the notes add little to the basic technology of the scribe; it was all there in great clarity in *Writing & Illuminating & Lettering*. What this book does add is more reproductions of Johnstones' remarkable student samples; a demonstration of his firmness of belief in what he was about; and the agony he was put to before achieving the preciseness of description that made him an exemplary teacher.

He was to say of his first book: "It was comparatively easy then because I knew nothing about the subject." The object of *Writing & Illuminating & Lettering* was "to hand over a little simple knowledge": the point of *Formal Penmanship* was to "tell, if it be possible, some beliefs and hopes." He wrote the chapters on decoration and its uses at a time when decoration was still thought synonymous with art, but he saw it as an exuberance of good workmanship and, as in most of his writing, omits the use of the word "art"

1. Gill wrote to Johnstone: "I take every opportunity of proclaiming the fact that what the Monotype people call 'Gill' sans owes all its goodness to your underground letter."

altogether. He does allow beauty however—again as a simple extension of fine workmanship—choice of materials and respect for the text,[2] he had already put in print: ". . . after all the problem before us is fairly simple—*To make good letters and arrange them well.*"

But it is the measure of the man and his school that beliefs and hopes were to be put down as an extension of craftsmanship. "Our formal penmanship is primarily a handicraft. . . . Our ideals are craftsman's ideals, our practices are craftsman's practices. We work in substances, we aim at usefulness, we proceed by methods. This course does not prevent beauty being our ultimate aim, but it reaches beauty by these three steps—in the craftsman's way."

He saw as the negative side of this approach that, ". . . overplanning is one of the greatest dangers to be aware of. Its speciousness misleads the practical. Overplanning . . . forms the almost insuperable difficulty of the professional 'designer' who is not a craftsman." "Seek for simplicity in their intentions; then, if our methods are right, the work will grow by nature beautiful." And all this is conveyed in the style of consistent moral purposefulness: "Usefulness and beauty are the two ends of embodied truth: usefulness is the end that all can grasp; . . . sovereign safeguard against the three sins which most easily beset us craftsmen. Against the danger of falling into faint-hearted doubtfulness, empty mimicry or foolish *affectation*, we set the simple rule—to be true to readableness, to penmanship and to our author."

Through Johnstone in this latest work we still hear the voice of William Morris and even more so the complete Arts and Crafts chorus assembled by Lethaby in those remarkable early days of the Central School. Johnstone helped make the Arts and Crafts movement, and in his thought and his work he lived a life shaped by its ideals.

Colin Banks

Colin Banks was trained as a calligrapher and has since designed several display typefaces for UK and United States photosetting companies. At present he is drawing a family of alphabets—part of a complete corporate identity scheme his design group, Banks and Miles, is preparing for the British Post Office.

2. He said in a paper on labelling addressed to the Arts and Crafts Exhibition Society (reprinted here): "I study the words and consider their meaning carefully, *sometimes for a day or more*, before writing them."

Correspondence

The editors welcome comments on articles, reviews, and letters that have appeared in past numbers. Communications should be addressed to the Editor, c/o The Cleveland Museum of Art, Cleveland, Ohio, USA 44106.

Dear Colleague Designer:
During the latest A.Typ.I. Congress in London (July 1971) a small subcommittee was organized by some members of the Designers' Committee to investigate the financial and copyright arrangements existing between designers of type and typefounders (or other manufacturers of "type images" and composing machinery). Among those present were (in alphabetical order): Wim Crouwel (Netherlands), Adrian Frutiger (France), André Gürtler (Switzerland), Albert Hollenstein (France), David Kindersley (Great Britain), Huib van Krimpen (Netherlands), Hubert Leckie (U.S.A.), John Miles (Great Britain), Gerrit Noordzij and Gerard Unger (Netherlands), Kurt Weidemann and Hans Peter Willberg (West Germany).

We feel that designers are often in an unnecessarily weak position *vis-à-vis* typefounders and similar manufacturers as to the remuneration offered them for their designs, mainly because many designers do not fully realize the extent of their basic rights. We therefore intend to formulate a set of minimum rules and conditions any designer should adhere to when selling a design.

To enable us to do this we ask you to state the exact and precise terms on which you have concluded agreements with typefounders and similar manufacturers. When sufficient data are available, we intend to list these in statistical form. This table should serve as starting point for the above mentioned "minimum conditions" and will be supplied to every type designer known to us—both "recognized" and "prospective" designers and irrespective of whether or not they are members of the Association Typographique Internationale, though those who are not yet members will be encouraged to join.

It goes without saying that all information received will be treated *strictly confidentially*.

To facilitate replying, we have summarized below the most important points. (In this connexion, for "foundry" may be read "manufacturer of

composing machinery," ". . . of matrices," ". . . of master images for filmsetting," etc.—according to circumstances.)

Initiative. Was your design commissioned by the foundry or did you approach them? Were you at the time employed by the foundry?

Exclusivity. Did you sell your design to one foundry exclusively? If you work for one foundry exclusively, how is that exclusivity limited, if at all?

Initial honorarium. Were you paid an honorarium for a sketch of, say, six characters? If so, how much? Were you paid an honorarium for your finished design? If so, how much? If your design was for film or CRT or a similar system, were you paid for the working out of definite spacing, justification, etc.? If so, how much? Did you feel payments were adequate?

Royalties. Were you offered or did you stipulate royalties in some form? If so, please state full terms.

Duration of protection and payment of royalties (if any). If (basic international) Copyright Law is strictly interpreted, protection (and hence payment of royalties) should exist during the natural life of the designer followed by a period of fifty years after his death. We find, however, that parties may agree upon a period of protection for as few as ten, twenty, or thirty years; longer periods appear to be rare exceptions. In some cases such periods are known to have been reckoned as from the date of agreement instead of from the date of actual launching!

Licences. If and when your foundry provides another manufacturer with a licence to use your design, do you in any way benefit? If so, how?

Year. As a result of continuing inflation all over the world it is of some importance that you state in which year an agreement was concluded.

Most, if not all, of these points may be covered in formal agreements you concluded with your foundries. If you think it would be simpler to send us a photostat or xerox of such agreements instead of answering this questionnaire, by all means do so, provided the agreements are written in a language that is generally understood.

We stress the point that it is in your own interest to supply the fullest data possible. We thank you in advance for your co-operation!

Please send your answers to
Huib van Krimpen
Churchill-laan 35a
NL 1010 Amsterdam
Holland

To the Editor:

During the London Congress of Association Typographique Internationale in July 1971, an A.Typ.I. Educational Committee was founded. The concern of the Committee is the teaching and application of writing and lettering. It will be the purpose of the Committee to raise the standards of such teaching on all educational levels by international discussion of starting-points and methodology.

As the problems involved are not likely to be restricted to western writing, the Committee will extend its activities to non-western writing as well. The cooperation of authorities on Arabic, Hebrew, Chinese, Russian, and other writing-conventions will be welcomed.

Provisionally, the Committee is represented by a working panel, which has the following members: Adrian Frutiger (France), André Gürtler, *Chairman* (Switzerland), Ladislas Mandel (France), Gerrit Noordzij (Holland), Tibor Szanto (Hungary), Michael Twyman (England), and Kurt Weidemann (Germany).

A system of national correspondents will link Committee members and the working panel. The Committee will keep in touch with similar activities of other organizations (Icograda, Unesco).

The Committee is drawing up a report on the present situation in education, based on a world-wide inquiry. The result of this inquiry will no doubt show the necessity of the Committee.

Anybody who can contribute information or wants to join the Committee is encouraged to do so.

The Educational Committee of A.Typ.I.
c/o André Gürtler
Im Mühleboden 72, 4106 Therwill, Switzerland

To the Editor:
There is an important sense in which your change of title is a retrograde step: I refer to the meaning carried in the word typography which is not present in the words visible language. This meaning is set out in an article by the seer and teacher Anthony Froshaug ("Typography is a Grid." *The Designer*, January 1967; and *Design Dialogue* 1, Stafford, 1969) which begins:

"To mention both typographic, and, in the same breath/sentence, grids, is strictly tautologous. The word typography means to write/print using standard elements; to use standard elements implies some modular relationship between such elements; since such relationship is two-dimensional, it implies the determination of dimensions which are both horizontal and vertical."

The words visible language carry no sense of the concept "co-ordination," which is basic to communication in any form; nor of the technology involved in the control of the things which are required to be co-ordinated. Typography is loaded with both ideas.

Modern linguistics holds that meaning in language is a condition of the position of a word in a phrase. We can extend this by saying that in typography, meaning is a condition of the position of an event in space.
I may arrange:
the name of my dog is rover.
I may not arrange:
thena meof m y d ogisr o v e r.

Position—order in space—matters. When concern for position is relaxed, language becomes loose at the joints, disintegrates. To position implies the ability to position which, in typography, is a condition of the units of measurement built into the machines we use to assemble meaningless things meaningfully. It follows that interest in typography will be compounded of concern shared *equally* between the structure and use of language and the structure and use of machines. Simply looking at pages of text will reveal nothing of this relationship.

Peter Burnhill
Design Department, Stafford College of Art and Design.
22 Wolverhampton Road, Stafford, England

Résumé des Articles

Traduction: Fernand Baudin

L'écriture et la calligraphie maya *par Michael D. Coe*
Les hiéroglyphes maya étaient taillés dans la pierre, écrits sur des feuilles d'écorce, peints ou gravés sur les poteries funéraires. On croyait jusqu'ici que les inscriptions lapidaires ne reproduisaient que des calendriers. En fait elles retracent aussi des chroniques dynastiques. Les livres contiennent exclusivement des rituels, tandis que les inscriptions des poteries se rapportent au périlleux voyage de l'âme dans le monde inférieur. L'écriture était primitivement pictographique. Elle a évolué vers une forme phonétique—syllabique. La calligraphie maya était considérée comme un art de peintre.

Typos, un nouveau caractère japonais
Le japonais pose des problèmes redoutables à ceux qui font profession de dessiner et d'utiliser les caractères. Comme il fait appel à trois types d'écritures différents, il s'agit de dessiner plus de 1000 signes qui se composent dans un nombre de combinaisons proprement illimité. Les principes et les méthodes qui ont guidé la création de ce nouveau caractère japonais sont examinés, illustrés et comparés avec des caractères existants.

Le dessin des caractères comme moyen d'expression artistique *par Hella Bassu*
La fonction primordiale de l'écriture est de transmettre la communication verbale. La variété et la beauté des lettres témoigne cependant de plusieurs aspects non verbaux mais importants. Le tracé des caractères peut être exploité à des fins d'expression artistique à condition que les éléments optiques soient assortis aux éléments verbaux. L'auteur expose et illustre une méthode pour l'enseignement des éléments calligraphiques de la visualisation.

Les capitales de Cresci *par Donald M. Anderson*
La Renaissance fut marquée par l'adaptation délibérée de thèmes classiques. Dans le domaine de la lettre personne n'égala Giovan Francesco Cresci. Dans son *Il perfetto scrittore, parte seconda*, publié en 1570, il réalise une parfaite combinaison des éléments classiques avec son style personnel. Par opposition aux obsédés de la *divina proportione*, de la règle et du compas, Cresci s'inspire de modèles anciens tels que l'inscription de la colonne trajane. Sa fidélité au modèle classique est manifeste dans les proportions qu'il fait siennes; et la forme de ses empattements tend à se rapprocher de modèles calligraphiques.

L'importance des empattements dans les petits corps *par David Owen Robinson, Michael Abbamonte et Selby H. Evans*

Les empattements n'ont pas cessé de dominer dans les caractères typographiques en dépit de l'avènement des linéales, il y a un siècle et demi. Plusieurs explications sont envisagées. Notamment: la structure du réseau nerveux de l'appareil oculaire humain serait aidée par les empattements dans l'enregistrement des caractéristiques essentielles des caractères. La simulation par ordinateur des phénomènes de visualisation confirme cette théorie et quelques conclusions sont tirées concernant la fonction des empattements dans des caractères de différents corps.

Kurzfassung der Beiträge

Übersetzung: Dirk Wendt

Alte Maya Schrift und Kalligraphie *von Michael D. Coe*

Maya-Hiroglyphen-Schriften waren in steinerne Denkmäler gemeißelt, auf Rinden-Papier-Manuskripte geschrieben und auf Keramik-Urnen gemalt oder geprägt. Bei den Stein-Inschriften, von denen man früher annahm, daß sie nur kalendarische Informationen enthielten, hat man gefunden, daß sie die Geschichten von Dynastien darstellen. Die Manuskripte behandeln ausschließlich Ritual-Angelegenheiten, während die Texte und Bilder auf den Tonkrügen von der gefährlichen Reise der Seele in die Unterwelt berichten. Die Schrift entwickelte sich aus einem hochgradig bildhaften System in eins, das eine starke phonetische Silbendarstellungs-Komponente hatte. Als Kalligraphie war die Maya-Schrift im Grunde eine Mal-Kunst.

Entwurf einer neuen japanischen Druckschrift: Typos

Die japanische Sprache ist äußerst schwierig für jemanden, der sich mit dem Entwurf und Gebrauch gedruckter Worte beschäftigt. Da die japanische Sprache zum Schreiben die Kanji, die Hiragana und die Katakana benutzt, bedeutet die Aufgabe eines Druckschrift-Entwurfs das Entwerfen von über 1000 Symbolen in einer solchen Weise, daß sie zusammenpassen, wenn sie untereinander austauschbar in einer fast unbeschränkten Zahl von Kombinationen benutzt werden. Die Theorie und Konstruktionsmethoden, die angewendet wurden, um Typos, eine neue japanische Druckschrift, zu schaffen, werden diskutiert und illustriert im Vergleich mit bestehenden Schriften.

Buchstabenformen als Mittel künstlerischen Ausdrucks *von Hella Basu*

Obwohl die Hauptfunktion des Schreibens die Übertragung verbaler Mitteilungen ist, geben die Vielfalt und Schönheit der menschlichen Buchstabenformen doch Anlaß zu einigen bedeutenden nicht-verbalen Betrachtungen. Die bildgestaltenden Eigenschaften der Buchstabenformen können als künstlerische Ausdrucksform unabhängig von der verbalen Bedeutung erforscht werden, aber die optischen Elemente müssen mit verbalen verbunden sein. Die Verfasserin beschreibt die Entwicklung ihrer kalligraphischen "visuellen Hilfen" für den Schulgebrauch und zeigt ausgewählte Beispiele.

Cresci und seine Großbuchstaben-Alphabete *von Donald M. Anderson*

Die Kunst der Renaissance war durch eine kräftig betriebene Aufnahme klassischer Themen gekennzeichnet, und in der Neu-Stilisierung römischer Großbuchstaben erreichte niemand den hohen Stand von Giovan Francesco Cresci. In "IL PERFETTO SCRITTORE, PARTE SECONDA" gelang ihm die Kombination klassischer Elemente mit seinem eigenen hochentwickelten Stil. Im Gegensatz zu jenen, die von der *divina proportione* besessen waren und die römischen Buchstaben mit Zirkel und Lineal zu erklären suchten, waren Cresci's Alphabete von antiken Quellen wie den Inschriften der Trajanssäule hergeleitet. Die Verschiebung in Cresci's Denken in Richtung auf eine engere Bindung an die klassischen Buchstaben zeigt sich in seiner Wahl der Proportionen; seine Serifen zeigen Modifikationen zu mehr kalligraphischen Formen.

Warum Serifen wichtig sind: die Wahrnehmung kleiner Schriften *von David Owen Robinson, Michael Abbamonte, und Selby H. Evans*

Der Gebrauch von Serifen-Schriften hat seit der Einführung serifenloser Schriften vor anderthalb Jahrhunderten nicht aufgehört, im Druck zu überwiegen. Es werden verschiedene Theorien zur Erklärung dieser andauernden Beliebtheit älterer Druckschriften herangezogen. Es wird angenommen, daß die neurophysiologische Struktur des menschlichen visuellen Wahrnehmungssystems während der neuralen Verarbeitung die Hauptmerkmale des Buchstabens durch die Serifen leichter bewahren kann. Eine Computer-Simulation der visuellen Informationsverarbeitung stützt diese Theorie, und es werden Vermutungen angestellt, die die Funktion der Serifen bei Buchstaben verschiedener Größen betreffen.

This number of *Visible Language* has been composed in Monotype Baskerville types and produced by W & J Mackay Limited, Chatham, England, on Bowater B20 Cartridge, 100 gm². The layout is based on the original design by Jack Stauffacher of the Greenwood Press, San Francisco.

The Authors

Michael D. Coe is professor of anthropology at Yale University (New Haven, Conn. 06520). Since 1960 he has acted as adviser to the Robert Woods Bliss Collection of Pre-Columbian Art, Dumbarton Oaks, Washington. He has undertaken archaeological excavations in Mexico, Guatemala, British Honduras, Costa Rica, Tennessee, and Connecticut. His current research includes the study of the early Olmec civilization and Maya iconography. Among his publications are *Mexico* (1962) and *The Maya* (1966), both published in the "Ancient Peoples and Places" series; and *America's First Civilization: Discovering the Olmec* (1968).

Group Typo (Kuwayama Design Room, 105 Gyoen Heights, 1 Naito-Cho, Shinjuku-Ku, Tokyo 160, Japan) consists of: Katsuichi Ito, freelance designer and member of Japan Typography Association; Yasaburo Kuwayama, member of Japan Typography Association and lecturer at Musashino Art College; Katsumi Nagata, Dentsu advertising designer; Takao Hayashi, Yuho Co., Ltd. (photocomposition), and member of Japan Typography Association.

Hella Basu (Fisher's Brook, Stratford Road, Warwick, England) is lecturer in typographic design at the Lanchester Polytechnic, Coventry. Born and educated in Germany, she has lived in England since 1950 and worked in advertising agencies and for the BBC's department of educational publications. She will shortly join the City of Leicester Polytechnic as pro rata senior lecturer. Mrs. Basu's lettering designs have been exhibited in West Berlin, Santiniketan (India), and at the Victoria and Albert Museum, London.

Donald M. Anderson (Route 1, Dane, Wis. 53529) is a professor in the graphics area of the Art Department of the University of Wisconsin. He came to the University as an instructor in 1947 following military service and government positions in Washington. Professor Anderson is the author of *The Art of Written Forms*, 1969.

David Owen Robinson, Michael Abbamonte, and Selby H. Evans (P.O. Box 30791, Texas Christian University, Fort Worth, Texas 76129) are members of the Institute for the Study of Cognitive Systems of which Dr. Evans is director. The Institute specializes in human pattern recognition and computer models. Robinson graduated from the University of Durham, England, and is now at Brown University conducting research in the perception of letters by young children. Abbamonte, a graduate of Texas Christian and of the University of Maryland, and Dr. Evans, who studied at Columbia and Southern Methodist University before moving to TCU, continue their research on the computer generation of novel and familiar patterns for use in psychological research.

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H

H may be N for those who speak
Russian, although long E in Greek;
And cockneys, like the French, agree
That H is neither N nor E
Nor Hate's harsh aspirate, but meek
And mute as in *Humanity*.

—Robert Graves