VISIBLE LANGUAGE
Volume VI, Number 1, Winter 1972

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Visible Language, Volume VI, Number 1, Winter 1972. Published quarterly (Winter, Spring, Summer, and Autumn) by Visible Language, c/o The Cleveland Museum of Art, Cleveland, Ohio, USA 44106.
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The Origin of the Sexagesimal System: The Interaction of Language and Writing

Marvin A. Powell, Jr.

The origin of the sexagesimal system has been much debated, but all past theories have neglected the linguistic evidence of the ancient cuneiform lexica. The problem of origin is twofold: 1) the origin of counting with sixty as a base and 2) the origin of sexagesimal place notation. The first problem is linguistic and anthropological in nature and must be studied through the ancient lexica. The second can be elucidated by a combined analysis of the Sumerian number words and the symbols used to represent them. Such an analysis indicates that sexagesimal place notation arose from an interaction between the numerational framework of the Sumerian language and the symbols used to write those numbers, but the sudden appearance of place notation about 2050 B.C. indicates that the final step toward the creation of place notation was an act of conscious invention.

Readers of this journal may well ask themselves what the sexagesimal system has to do with written language. In fact, a little known but important episode in the history of writing revolves around the sexagesimal system of numeration, and it provides an interesting example of the mutually dynamic relationship between writing and language. For most people, the word sexagesimal brings to mind the division of the circle and the hour, but these are developments subsequent to those with which we are concerned here. Sexagesimal, in the mathematical sense of the word, refers to a system of numeration or numerical notation which rises in powers of sixty. In this paper I use the term sexagesimal to denote the system of numeration employed by the ancient Sumerians—a people who flourished in Southern Iraq during the fourth and third millennia B.C.—in spite of the fact that it does not conform precisely to the mathematical sense of the term.

The Sumerians spoke a language which has no known linguistic affinities with any other language. Our knowledge of Sumerian is dependent upon the fact that the Sumerians, who seem to have been the inventors of writing as a system, used clay and a reed stylus as

Visible Language, VI (Winter 1972), 5–18.
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their writing materials. The durable character of the clay which received the imprint of the stylus has resulted in the survival of many thousands of documents written in this language, in the script which has been dubbed "cuneiform" by modern scholars because of the characteristically wedge-shaped markings left by the stylus on the clay. Of only slightly less importance for our understanding of Sumerian is the fact that a Semitic people, speaking a language called Akkadian, adopted the Sumerian script with which to write their own language. Since the Sumerian script employed large numbers of logograms (word-signs, formerly referred to as ideograms), the Semitic peoples of the Tigris-Euphrates Valley developed an elaborate set of lexica, giving—in the more complex series—the sign, its Sumerian pronunciation, and its meaning in Akkadian. It is upon these "lexical series," as they are called by the modern Assyriologist, that one must largely depend for a knowledge of the Sumerian language and its system of numeration. In Figure 1 I have presented the basic outlines of this system of numeration, insofar as one may reconstruct the system from the evidence of the ancient lexica.[1]

Controversy over the origin of the sexagesimal system has revolved around two major points: the origin of the use of sixty as a base and the origin of the system of place notation attested in mathematical texts from the eighteenth century B.C. to the end of cuneiform writing in the first century A.D. Even in antiquity scholars began theorizing about the first point. Theon of Alexandria (4th century A.D.) argued that the Babylonians used the number sixty as a base because of its divisibility. This argument has also been repeated in modern times, but the nineteenth and early twentieth century favored explanations drawn from geometry, astronomy, the length of the solar year, and various combinations of these.[2] There was not a single scholar among this earlier group of theorizers who had sufficient knowledge of the Sumerian language and the documentary evidence—which only became available in large quantity in the twentieth century—to warrant such speculation, and, as is often the case when people debate something about which they have no firsthand knowledge, one groundless theory produced another to support it.

The work on Babylonian mathematics done in this century by François Thureau-Dangin and Otto Neugebauer has had the effect

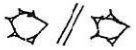
Number	*Number Word*	*Etymological Meaning*	*Cuneiform Notation*
1	diš	unknown	
2	min	unknown	
3	eš	many/much	
4	limmu	unknown	
5	ia	unknown	
6	aš	five, a single one	
7	imin	five, two	
8	ussu	unknown	
9	ilimmu	five, four	
10	u	unknown	
20	niš	unknown	
30	ušu	ten threes	
40	nimin	two twenties	
50	ninnu	two twenties, ten	
60	ĝeš	uncertain	
3600	šar	everything	
216000	šargal	big everything	
12960000	šargal šunutaga	big everything which hand cannot touch	

Figure 1. Sumerian numeration and notation. The number 60 (ĝeš) is multiplied by 2, 3, 4 . . . 10; then 60 times 10 (ĝešu) is multiplied by 2, 3, 4, 5; 60 times 10 times 6 is called šar (i.e., 60^2), which forms the basis for the next stage of numeration. The number šar is multiplied by 2, 3, 4 . . . 10 to arrive at 10 šar (šaru). The next stage is uncertain. It is either: šar times 10 multiplied by 2, 3, 4, 5, (and 6), or šar times 20, 30, 40, 50, (and 60) to arrive at 60^3 (šargal). Multiples of šargal and šargal—šunutaga are not specifically attested. They presumably follow the pattern of šar.

of bringing this barren speculation to an end by providing abundant documentation for the true character of Babylonian mathematics.[3] Both of these scholars advanced their own theories about the origin of the sexagesimal system; Neugebauer's, being the most recently expounded,[4] appears to have the widest vogue among scholars interested in the history of science. These theories merit brief consideration, since they rest in part upon documentary evidence but nevertheless both result in false conclusions.

The Origin of Sixty as a Base

Basic to the understanding of the origin of the Sumerian system of numeration is the recognition that numbers are an integral part of a language and cannot be separated from a discussion of the language as a whole.[5] Thureau-Dangin, as a philologist, quite rightly sought the origin of the use of sixty as a base within the framework of the language itself. The solution to the problem, wrote Thureau-Dangin, was that the Sumerian word for sixty was identical with the word for one. Unfortunately, this identification rests upon the misinterpretation of a passage in one of the ancient lexical series and is therefore invalid.[6] Neugebauer, on the other hand, has maintained since 1927 that the sexagesimal system owed its origin to an original decimal system interacting with the process of weighing and measuring.[7] This theory contains several crucial philological errors and false assumptions regarding the Sumerian metrological system too complicated to go into here, but the basic error is a methodological one: the failure to recognize the linguistic nature of the problem. This error results in the over-emphasis of the graphic representation of the numerals to the exclusion of the evidence offered by the language itself. There is, in fact, no linguistic evidence which supports the idea of a "decimal core" in Sumerian numeration.

As one may see by a glance at Figure 1, Sumerian numeration certainly employs the numeral ten as a *multiplier*, but to refer to this use as a "decimal system" in any sense of the word is to use the word system in a peculiar manner and to ignore the basic linguistic facts. Let us look for a moment at these facts to which I refer. Although ten functions in Sumerian as a multiplier, it is never *multiplied*, as in our decimal system. The assumption, drawn from the system of notation, that ten plays a prominent role in primary Sumerian numeration

(one through sixty) cannot be supported by evidence from the language. Perusal of the chart of numerical notation and etymologies presented in Figure 1 will reveal that the system of notation does not by any means reflect the etymological meanings of the number words. Thus, niš, "twenty," *cannot* be analysed as "two tens." The word ušu, "thirty," has the remarkable etymology "ten threes," *not* "three tens," as one might suppose on the basis of the notation. The word for forty is "two niš," for fifty "two niš, ten"; ğeš, "sixty," is again a word of uncertain etymology. In fact, Sumerian numeration up to sixty has rather more a vigesimal than a decimal character.

Sumerian numeration seems to have begun—as most primitive systems of counting do—by numbering the fingers, one through five. Then one started over again and added up to ten—though eight is anomalous and of uncertain origin. This process was apparently repeated on the toes until one arrived at twenty. Then, beginning with the hands once more, one counted to twenty again by the same method and arrived at forty, which was called "two twenties." Then, starting back on the hand again, one counted to fifty, calling this stage "two twenties, ten," and, continuing on, one counted again on the feet until one reached sixty. This stage should have been—in keeping with the vigesimal stages "two niš" and "two niš, ten"—"three niš." This would be in Sumerian, theoretically, *nišeš, but such an etymology cannot be made to conform with the form ğeš, since the phoneme which we conventionally transcribe /ğ/ is represented in standard cuneiform orthography by syllabic signs beginning with /g/ or /m/, whereas the word niš is only attested spelled with a sign beginning with /n/. The best policy is to leave the question of etymology open for the present.[8]

The Sumerians, having arrived at sixty, now began to count over again, and this process resulted in the formation of the sexagesimal system. The problem is: why did they begin to count over at sixty? This is the crux of the matter, and unfortunately we are not in a position to answer it with certainty so long as the etymology of the word for sixty remains uncertain. The clue to the riddle is probably to be sought in the role played by the numeral three. A unique role for three is indicated not only by the word ušu, "ten threes," for thirty, but also by an alternative system of numeration, in which three plays a central role.

This system of numeration is definitely Sumerian, but it differs radically from the normal system employed in the main dialect. It is attested, oddly enough, only in one copy of a text from the Neo-Babylonian period, some 1500 years after Sumerian ceased to be widely spoken. In this system, the word for three is peš. Four is represented by pešbala, "three passed." Five is pešbalage, "three passed, one." Six is pešbalagege, "three passed, one, one," and seven is pešpešge, "three, three, one."[9] As a consequence of this, I am inclined to connect, in some fashion, the word for sixty and the word for three and to see the stage sixty in Sumerian numeration originating from a vigesimal system of counting of the fingers and toes interacting with the special word three, which seems to be identical with the third person plural morpheme of certain forms of the Sumerian verb. This is a solution which is not susceptible of proof at the present time, but it at least conforms to the facts in a way that none of the other theories have done.

The Origin of Place Notation

The Sumerian system of sexagesimal place notation antedates that invented by the Hindus by some two thousand years. It is a fully developed place system of notation like that of our decimal system, with the exception that the absolute value of the numerals (indicated in our system by the decimal point) is not indicated, and a sign for zero is lacking. The absence of these two factors caused Neugebauer to regard place notation as the product of gradual evolution out of the terminology and notation used in the system of weight metrology.[10] There can be little doubt that the standard system of notation provided the necessary conditions for the creation of the place system, but the transition from the old to the new system is brought about by the act of conscious creation. This is vividly illustrated by a text published over fifty years ago—the significance of which has not been recognized—but before we can address ourselves to this piece of evidence, we must give a brief account of the graphic developments which lie behind the invention of place notation.

Around the end of the fourth millennium B.C., the Sumerians invented the system of writing, which in the course of the third millennium developed into what we call cuneiform script. This script did not always possess the wedge-shaped character which has resulted in

its modern name. Originally the script was quite linear, being drawn upon the clay by the tip of the stylus. This writing procedure was especially necessary for executing the graphs containing curved lines, but already in the archeological stratum Uruk IVa (radio-carbon date: 2815±85 B.C.), most of the straight lines appear to be made by simply pressing the edge of the stylus into the clay to form the line. In the course of time, broadening of the tip of the stylus resulted in the wedge-shaped script called cuneiform. The transition from linear to cuneiform script is more or less fully accomplished by about 2600 B.C.[11]

Unlike the rest of the language, the Sumerian numerals were never written in a linear script, so far as we know. The Sumerians used two distinct reeds to execute the graphs in their system of numerical notation. One of these reeds was identical with the standard stylus, but in making numerals the end opposite to the usual writing end was employed, as though we, writing on a soft material with a pencil, should turn the eraser end of the pencil around and push it into the material to make number symbols. The number signs made with the standard reed were those for one and ten, and this method of making ten is reflected in the Akkadian name, *gigurû* (from Sumerian *gigura, "turned reed"), for the sign used to represent ten, long after the sign ceased to be made in this way. The other reed used to write numerals seems to have been originally twice the diameter of the standard reed. This double-diameter reed was used to make the signs for sixty and 3600.

The signs made by these two styli are illustrated in Figure 2. The signs for one and sixty are executed by holding the round ends of the styli at an angle of about forty-five degrees to the tablet and pressing

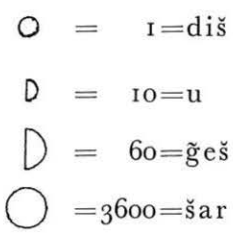


Figure 2. Archaic (rounded) Sumerian numerals.

them into the clay. The signs for ten and 3600 are made by holding the styli perpendicular to the tablet and pushing the round ends into the clay, the small one (the normal stylus, also used to make one) to make ten, and the larger one (also used to make sixty) to make 3600. It has sometimes been assumed that the signs for sixty and 3600 could be thought of as a "big one" or a "big ten," but actually these signs have nothing in common but their superficial resemblance and their character as numerals. The Sumerians could have written their numerals in linear script just as easily as the rest of their language, but the inventor or inventors of the script chose not to do this, for the obvious reason that the notation produced by the round ends of the styli stood out vividly from the linear script and made the process of totaling and book-keeping much easier. Indeed, from the standpoint of visual communication, the early notation with "rounded" or "curvilinear" numerals is certainly superior to the later cuneiform notation.

Why then, one may ask, did the Sumerians abandon a superior system of visual communication for an inferior one? The answer to this question is to be sought in the exigencies of the writing process. The use of round numbers passes out of existence as the need for more economical expression is felt. Round numerals took up a disproportionately large part of the available writing space on the tablet. In the earlier documents, the thing which is being counted and its intended use are represented in such an abbreviated manner that it is still impossible for us to understand much more than what the object is. As time went on the script became more precise, which enables us to understand what is being done with the objects enumerated, but with precision came the need for more room to write and therefore reduction of the space available for numerals. Finally also, the cumbersome process of inverting the stylus to make the numerals one and ten and of changing to another reed to make sixty and 3600 was abandoned, and numerals came to be written with the same tip of the stylus that one used to write the rest of the language.

This was not a process which happened very quickly. The rudiments of standard Sumerian numerical notation can be discerned in tablets from Jemdet Nasr,[12] a site in northern Babylonia, which belongs to a time period somewhat later than the earliest examples of systematic writing. The earliest examples of writing as a system come

from the archeological stratum Uruk IVa (2815±85 B.C.),[13] and the Jemdet Nasr tablets may belong to the twenty-eighth century B.C. It is not until the so-called Presargonic period (ca. 2500–2350 B.C.) that one begins to find evidence of the use of protocuneiform numerals in certain cases in place of round numerals, and it is another two centuries before round numerals are abandoned for cuneiform notation, corresponding in general to that shown in Figure 1. This last change is itself a gradual one and seems to have extended over a period of about a generation at the end of the reign of Shulgi, king of Ur (ca. 2094–2047), and the first part of the reign of his son, Amar-Su'ena (ca. 2046–2038).

The result of this process was that the sign for ten came to be written by a sideways thrust of the stylus into the clay to produce the sign shown in Figure 1. This is really the evolution of a practice already discernible in the Presargonic period, which represented ten by simply holding the standard writing stylus perpendicular to the tablet and pushing the normal writing tip of the stylus into the clay instead of inverting it as previously done.[14] The round sign for 3600, originally written with the double-diameter round reed, was represented in the new notation by four or five cuneiform wedges arranged in a more or less circular shape, as shown in Figure 1. The sign for sixty, however, came to be written with the standard stylus, in the same manner as the sign for one. At first, the sixty is written larger than the one, but from the beginning, the distinction between these two signs was so small, they could only be easily distinguished by their position in the script.

From the standpoint of unequivocal visual linguistic communication, this type of notation has serious drawbacks, since it is sometimes impossible for us to tell, lacking the context which must have made doubt impossible for the Sumerians, whether one or sixty sheep, cows, or workmen are intended by a single vertical wedge. The Akkadians, who inherited the Sumerian system of writing, also felt this problem and solved it by writing their word for sixty after those signs which stood for sixties rather than ones. Oddly enough, it was precisely this defect, this lack of distinction stemming from unplanned development of the script, which was to play a fundamental role in the invention of sexagesimal place notation and, therefore, indirectly in the development of Babylonian mathematics. But, in spite of this acci-

dent, sexagesimal place notation may never have been invented, had it not been for the role played by the system of weight metrology.

The system of weight metrology is probably the youngest of the three primary systems: length, capacity, weight. It is also the system which most closely reflects the sexagesimal character of Sumerian numeration. The basic units of this system were, from smallest to largest: the barleycorn, the shekel, the mina, and the talent. The notation used for the three larger units during the latter part of the Third Dynasty of Ur (after ca. 2050 B.C.) is illustrated in Figure 3. It will be observed that these three units stand in a perfect sexagesimal relation to one another, for there are sixty shekels in the mina, and sixty minas in the talent. Higher multiples of the talent are counted and written in the normal system illustrated in Figure 1. The composition of the shekel departs from the strict sexagesimal pattern in that it is composed of three sixties of barleycorns instead of one sixty, for reasons which are too complicated to go into here.[15] The mina was the central unit of the system, and it was possible, at least in certain cases, for the Sumerians to express fractions such as one-sixth by the term "ten shekels." The signs in the bottom row of Figure 3 easily lend themselves to the mathematical interpretation: 60^1, 60^0, 60^{-1}.

Thus one may see the system of weight metrology and its notation as the immediate background to the invention of the place notation system, but the existence of this prototype system must not be allowed to obscure the striking departures from standard notation found in the new place system. The system of place notation cannot be said simply to "evolve" out of standard notation employed in the weight system: it is to be regarded as the product of conscious human invention.

The new features of the place systems are decisive in favor of invention as opposed to evolution. These new features are: (1) abandonment of all number signs except those used in writing the numbers one to sixty, which reduces the number of symbols used to two: that for one and that for ten; (2) the use of this notation, in a manner analogous to our decimal notation, to write the smallest fractions on up to the highest integers; (3) abandonment of the standard signs used to write four, seven, eight, nine, and forty (as shown in Figure 1) for a new notation with better visual contrast (as shown in Figure 4). This system, for which a gradual evolution out of the metrological system

Number	*Talent*	*Mina*	*Shekel*
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
20			$\frac{1}{3}$ mina
30			$\frac{1}{2}$ mina
40			$\frac{2}{3}$ mina
50			$\frac{5}{6}$ mina
60			

Figure 3. Notation of weight units.

has been posited,[16] is shown fully developed in a text which would appear to date from the fifth year of Amar-Su'ena (ca. 2042 B.C.), king of Ur.[17] Moreover, it appears on this tablet as an instrument of calculation, in which the weights of certain commodities written in the old system of notation are restated in the new place system, and thus *evolution* out of the metrological system is excluded as the sufficient cause for sexagesimal place notation.

sign NI, with which the word niš is spelled in the lexica, is never used, to my knowledge, to represent initial /ǧ/.

9. I have discussed this in *Sumerian Numeration and Metrology*, pp. 28–32.

10. In *Vorgriechische Mathematik* (1934), p. 108, Neugebauer wrote:
"But origin [of the place notation system] out of the originally concrete weight notation also gives us immediately place notation. This is nothing but an omission of specifically naming the units of measure. If this place notation owed its origin to conscious mathematical reflection, it would be impossible to imagine how one could have failed to introduce a zero sign for lacking places."

11. A major problem in attempting to deal with graphic history in the first half of the third millenium B.C. is the lack of any certain point of chronological reference. For dating examples of writing before ca. 2500, we are still dependent upon stylistic considerations. Where there is a clear order of development, the style of writing is useful in providing a relative chronology, but this does not tell us how much time elapsed between each development. The dates used in this paper, though more or less those used by scholars in the field, must be regarded as strictly provisional.

12. See Stephen Langdon, *The Herbert Weld Collection in the Ashmolean Museum: Pictographic Inscriptions from Jemdet Nasr* (Oxford Editions of Cuneiform Texts 7, 1928), esp. no. 100.

13. The oldest corpus of texts is that published by Adam Falkenstein, *Archaische Texte aus Uruk* (Ausgrabungen der Deutschen Forschungsgemeinschaft in Uruk-Warka 2, 1936).

14. This practice also accounts for the diverse shapes of the sign for ten, which include three-sided and four-sided forms. This also tells us, incidentally, what the tip of a stylus looked like. For references to the various sign forms, see Anton Deimel, *Die Inschriften von Fara I: Liste der archaischen Keilschriftzeichen* (1922), no. 821.

15. I have treated this in *Sumerian Numeration and Metrology*, pp. 208–211.

16. *Cf.* note 10. This was also the position of Thureau-Dangin; *cf. Osiris*, VII (1939), 110–111.

17. Clarence E. Keiser, *Selected Temple Documents of the Ur Dynasty* (Yale Oriental Series 4, 1919), no. 293. The date is not absolutely certain, because the name of the king is not given in the date formula, and the formula itself is abbreviated. An alternative date might be the second year of Ibbi-Sin, fifteen years later.

This article was originally given as a paper at the Works-in-Progress Session of the meeting of the History of Science Society, December 1970, and is presented here in revised form.

The Development of Visual Poetry in France

David W. Seaman

Poems which contain visual elements in their construction—e.g., pattern poems an acrostics—are often considered isolated aberrations. By examining literature in Europe and especially in France, one can discern a fairly continuous tradition of visual poetry. Beginning in antiquity and recurring in every period of western civilization, visual stimuli in writing and typography are applied to the composition of poetry. Although at first they are usually incidental or decorative, by the nineteenth century they are considered valid attributes of serious poetry.

The development of visual poetry can best be traced through French poetry because France provides the most continuous tradition of writers who were sensitive to visual stimuli. It is nevertheless necessary at times to take account of a significant contribution or a pertinent example in a related literature, and most important, it is necessary to trace this tradition from a time when the French language did not even exist. For the history of visual poetry begins, certainly, with the origin of the alphabet. The pictograms inherent in the alphabet inevitably reappear to scribes, poets, and readers, whether in their original connection (e.g., the head of an ox becomes A, a house B, and so forth) or whether in a new relationship suggested by the letter's shape (e.g., Francis Ponge sees curly beards in the s' of *Assyriens*).[1] Plato was the first to theorize that the shape of letters might play a role in the meaning of a word, implying in the *Cratylus* that the word for "round" relies on the o's in it.[2] Since Plato's time, many theories have supported similar ideas, and regardless of their accuracy, they are sure signs that men see meaning in the visible aspect of language.

Visual poetry belongs to a tradition of visual communication which can be distinguished from the oral-aural tradition. What we call literature was transmitted and conserved orally until the invention of writing, and even written literature was for centuries just the record of

Visible Language, VI (Winter 1972), 19–44.
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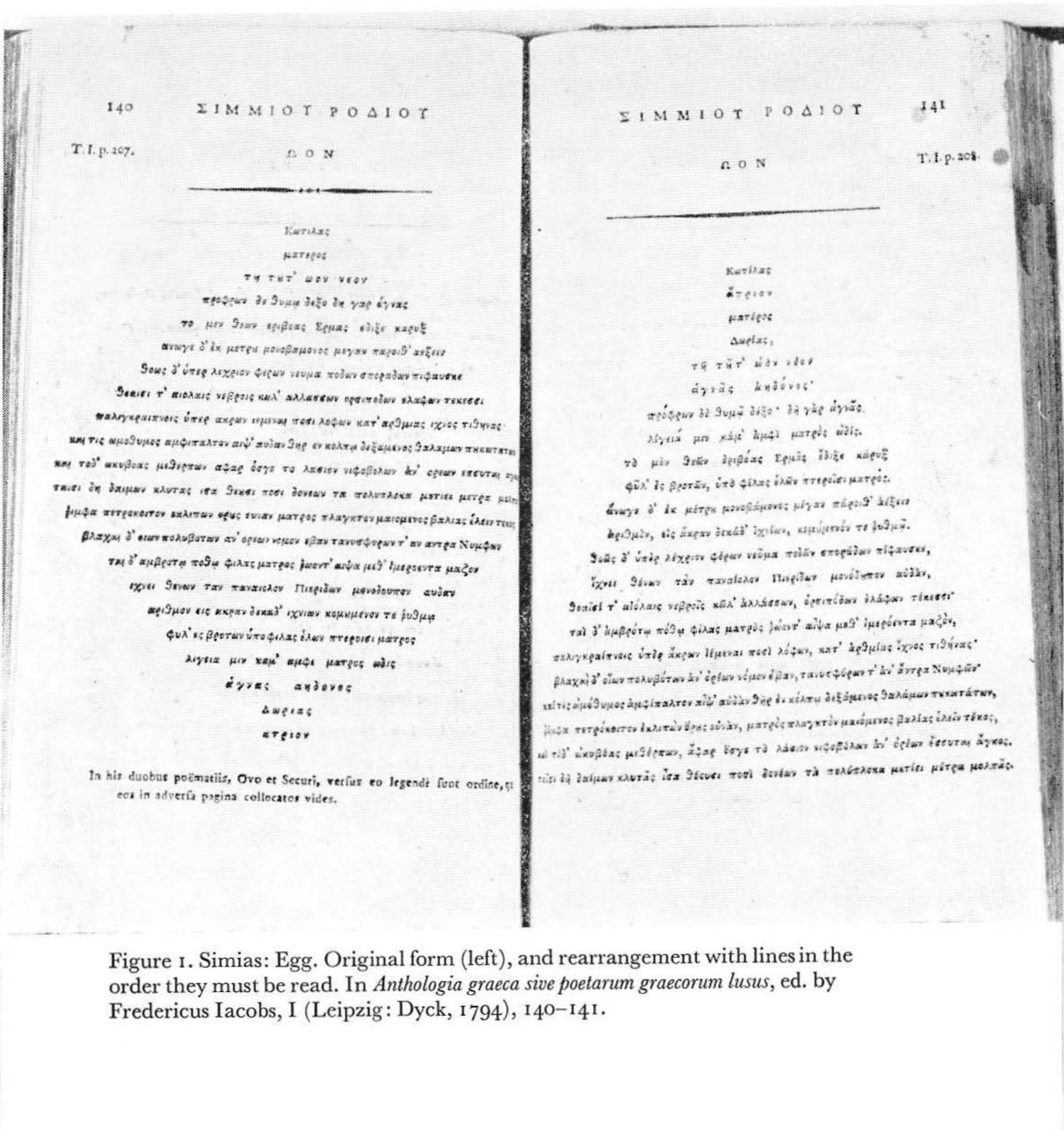
an oral tradition. As late as the Middle Ages it was common practice to read aloud, even in private; thus Saint Augustine, in his *Confessions*, records his surprise that Saint Ambrose read silently.[3] The establishment of printing quickly silenced literature, making it a visual medium, and this silence has been lamented by poets from the seventeenth century to the present. Joseph Joubert said, for example, that "one of the principal causes of the corruption and degradation of poetry [in the eighteenth century] is that poems are no longer made to be sung."[4] Today, as Marshall McLuhan points out, speed-reading techniques are built on the principle of separating vision and inner verbalization;[5] meanwhile poet-critic John Ciardi suggests defining poetry purely visually, as writing with an irregular right-hand margin.[6]

In the face of this evidence, there is nevertheless a great reluctance on the part of the literate readers of western civilization to recognize the importance and seriousness of visual poetry; thus, I am seeking here to show that what are often considered isolated aberrations are actually part of the growing visual tradition in literature.[6a]

The first time this visual aspect of writing was applied to poetry was, to our knowledge, in the *Greek Anthology*. The nucleus of this collection is the Stephanus (garland) of Meleager, collected by that poet in the first century B.C. and containing his own epigrams and the best epigrams of the period from the seventh to the third centuries B.C. It is primarily known through the Palatine and Planudean manuscripts, which expand the contents to include Christian epigrams up through the tenth century A.D.

Simias of Rhodes (fl. 300 B.C.) composed three of the six visual poems in the *Greek Anthology*, and probably influenced Theocritus, Dosiadas, and Besantinus who wrote the others. All these poems claim some relationship to an object on which they might have been inscribed —an altar, an axe, etc. Since there exists one attested Greek tombstone with an epigram patterned to conform to its shape, we may assume that these poems were actually used decoratively, on altars or on votive plaques forming an axe, wings, and pipes of Pan.[7] The one possible exception to this, Simias' Egg (Fig. 1), could have been written on an egg or ovoid stone, but it is the poetic imagery which dictated the form, for the epigram depicts the poem as a young bird ("weft") newly hatched of a nightingale (the poet): "Lo here a new weft of a twittering mother, a Dorian nightingale. . . ."[8] This poem, like the Axe, must be


140 ΣΙΜΜΙΟΥ ΡΟΔΙΟΥ

T. I. p. 207.

ΩΟΝ

In his duobus poëmatiis, Ovo et Securi, versus eo legendi sunt ordine, quo eos in adversa pagina collocatos vides.

ΣΙΜΜΙΟΥ ΡΟΔΙΟΥ 141

ΩΟΝ

T. I. p. 208.

Figure 1. Simias: Egg. Original form (left), and rearrangement with lines in the order they must be read. In *Anthologia graeca sive poetarum graecorum lusus*, ed. by Fredericus Iacobs, I (Leipzig: Dyck, 1794), 140–141.

read in alternating lines from the beginning and end into the middle. This technique enabled the poet to write in couplets of equal length, and further demonstrates a willingness to force readers out of the normal sequential pattern.

Another visual device, the acrostic, is used in the altar poem composed by Besantinus in the first century A.D. Acrostics were used in earlier poetry, such as the Psalms, but there they are doubtless only mnemonic aids of an oral literature. Two Latin writers of the second century B.C., Ennius and Plautus, were known to use acrostics; none of Ennius' have survived, but Plautus' plays all use an acrostic of the title in the argument. The audience clearly would be unaware of the acrostic, but its presence indicates that someone was definitely expected to look at the script and see the visual word play.

Another Latin writer, Publilius Optatianus Porphyrius, who lived during the reign of Constantine (around 300 A.D.), wrote several visual poems. An altar and a set of shepherd's pipes seem to follow the *Greek Anthology* quite closely, but a hydraulic organ, *Organon*, is original (Fig. 2). This organ describes one of the many wind and hydraulic organs in existence at that time, which were often in public places such as the circus, where they were used to herald the players. Porphyrius' *Organon* declares a certain Augustus to be the winner of his contest. Turning the poem on end, one sees that it is in three distinct parts: There is a row of 26 lines, each having 18 letters; these make up the keyboard, and the text describes Augustus' victory. Just above this is a phrase which the organ puffs out: "What pleasure to praise Augustus the winner!" Above this stand the 26 organ pipes of different length, increasing gradually from 25 to 50 letters apiece. This part of the text describes the technique used to make the poem.[9]

There are two notable innovations in Porphyrius' organ poem, apart from the clever design. One is that we are obliged to a degree to manipulate the text, turning it on its end in order to see the organ properly, and in order to read the line in the middle. This is a small step in the attempt to break down the strong horizontal format of Western writing. The second innovation works rather to strengthen the rigidity of the written text, since the poet has carefully counted and regulated the number of letters in each line. The Greek technopaegnia were designed metrically, and perfect form must be attained by careful inscription or type-setting. Letter-counting insures the creation of the desired form,

Post Martios labores,
Et Caesarum parantes
Virtutibus per orbem
Tot laureas virentes,
Et Principis tropaea;
Felicibus triumphis
Exsultat omnis aetas,
Urbesque flore grato,
Et frondibus decoris,
Totis virent plateis.
Hinc ordo veste clara
Cum purpuris honorum
Fausto precantur ore,
Feruntque dona laeti.
Jam Roma culmen orbis
Dat munera et coronas
Auro ferens coruscas
Victorias triumphis,
Votaque jam theatris
Reddunturet choreis.
Me sors iniqua laetis
Sollemnibus remotum
Vix haec sonare sivit
Tot vota fonte Phoebi
Versuque compta solo
Augusta rite saeclis.

AVGVSTO VICTORE IVVAT RATA REDDERE VOTA

O si diviso metiri limite Clio
Una lege sui, uno manantia fonte
Aonio, versus heroi jure manente
Ausuro donet metri felicia texta,
Augeri longo patiens exordia fine,
Exiguo cursu, parvo crescentia motu,
Ultima postremo donec fastigia tota
Ascensus iugi cumulato limite cludat,
Uno bis spatio versus elementa prioris
Dinumerans, cogens aequari lege retenta
Parva nimis longis, et visu dissona multum
Tempore sub parili, metri rationibus isdem,
Dimidium numero Musis tamen aequiparantem:
Haec erit in varios species aptissima cantus,
Perque modos gradibus surget fecunda sonoris
Aere cavo et tereti, calamis crescentibus aucta.
Quis bene suppositis quadratis ordine plectris
Artificis manus in numeros clauditque aperitque
Spiramenta, probans placitis bene consona rythmis,
Sub quibus unda latens properantibus incita ventis,
Quos vicibus crebris juvenum labor haud sibi discors
Hinc atque hinc animaeque agitant, augetque reluctans
Compositum ad numeros, propriumque ad carmina praestat,
Quodque queat minimum ad motum intremefacta frequenter
Plectra adaperta sequi, aut placidos bene claudere cantus
Jamque metro et rythmis praestringere quicquid ubique est.

Figure 2. Porphyrius: *Organon.*

if based on the assumption that each letter has the same size. This is obviously a technique aimed at manuscripts rather than works set in type, although the regular spacing of most typewriters again makes it possible.

Porphyrius used the technique of regularly spaced letters frequently in his long *Panegyricus Constantino Augusto Dictus*, from which came the altar mentioned above.[10] In this work are numerous visual poems which follow a slightly different procedure: Each line has exactly the same number of letters, and is written accurately to form a rectangle. Within this rectangle certain letters are emphasized (in modern editions by boldface, in manuscripts by different colored inks) and stand out in a pattern. By reading the letters in the pattern, one sees another line or more of poetry, constituting an addition, a commentary, title, or other information. Porphyrius can be credited with another important innovation, combining two different letterforms to add more dimensions to the text. This technique will still seem scandalous when Mallarmé uses it at the end of the nineteenth century.

These patterned acrostics were practised and developed by several Latin poets of the Carolingian Renaissance around 800 A.D. Hrabanus Maurus wrote one including a crown poetically presented to Judith; Alcuin made diamonds and squares, and his disciple Joseph Scott wrote many similar ones, and also the more interesting design in Figure 3. In this visual poem three crosses under a pointed arch form a typical Romanesque design, which evokes the facade of a church, the three crosses on Calvary, an altar-piece, or the ornamented vestment of a priest, as the fringe-like letters at the bottom suggest. In the larger cross there is a neat arrangement so that the first four words radiate from the letter at their intersection: "*S*ancta cruci*s* *s*emper *s*alvet. . . ."[11]

The most complex acrostic of this kind is the anonymous *Fragmentum Augienses* (Fig. 4).[12] This partially reconstructed text existed in two copies, with some interesting variations in the form, primarily in the central ornament, where one manuscript had the design $\frac{C|R}{U|X}$ while the other bore an image of Christ. Color was used, and the letters in boldface in Figure 4 were originally colored red. (The lower-case letters are reconstructions.) The words which form the Greek cross can be read starting at the left margin of line 12, going clockwise to the

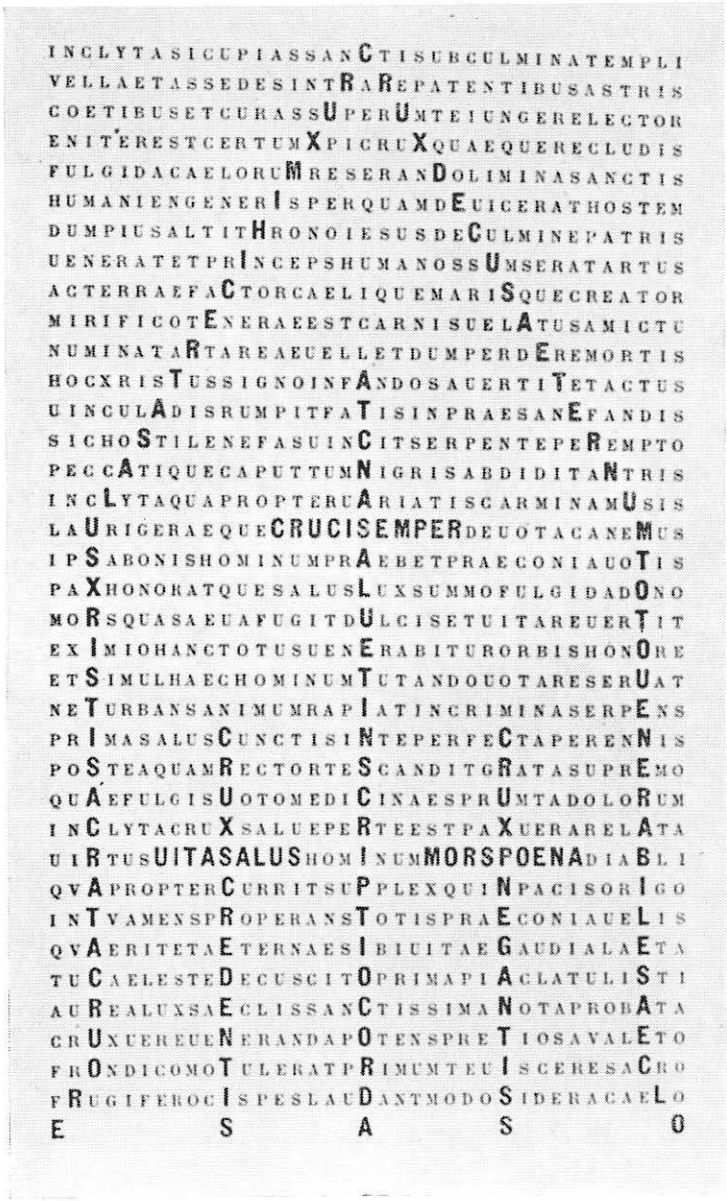


Figure 3. Joseph Scott: Acrostic.
Courtesy of The Newberry Library.

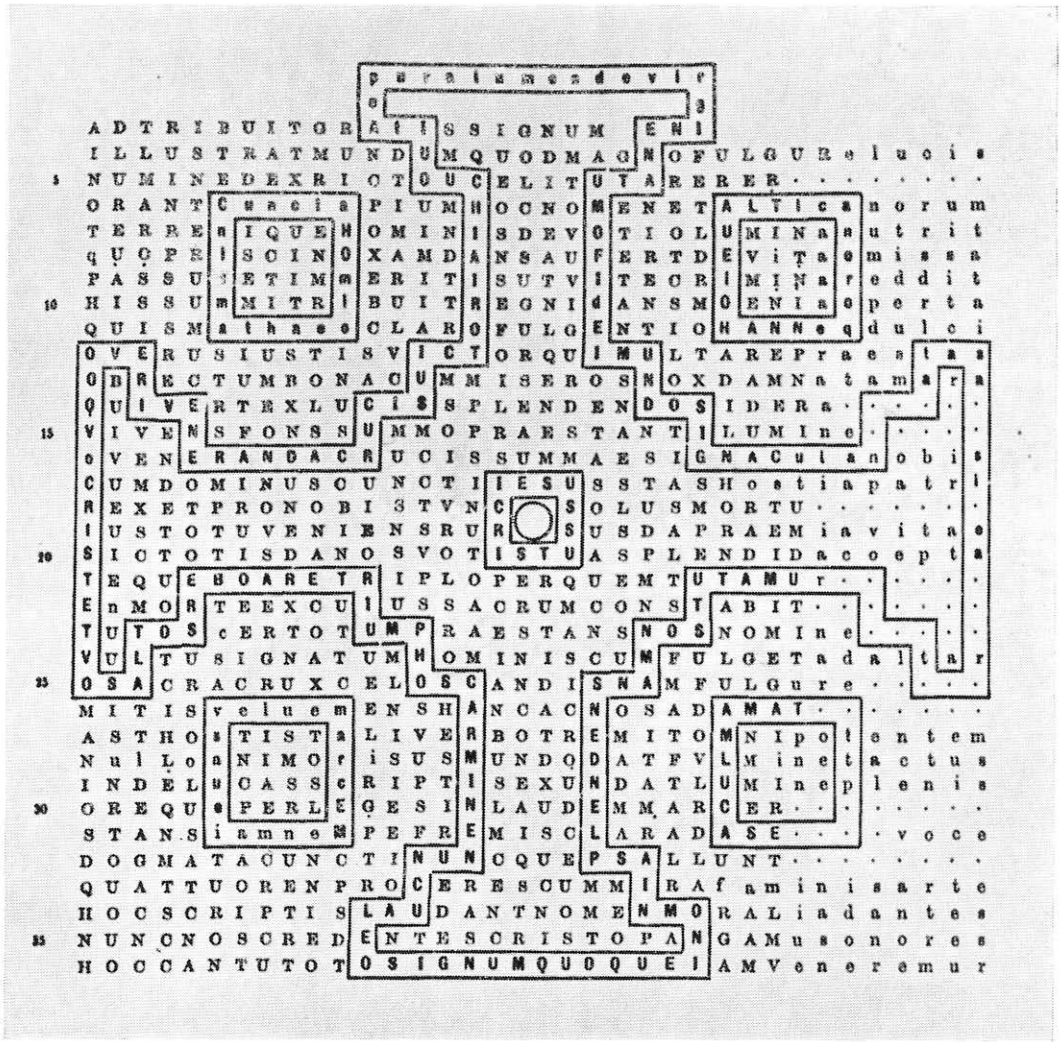


Figure 4. *Fragmentum Augienses*. Courtesy of The Newberry Library.

other side, then taking up again at the left margin of line 13 and going down. The four squares follow in clockwise order.

To prepare complex visual texts like these, the poet took advantage of the unstable orthography of the time, and used any available abbreviations. Digraphs are written as two letters, H can be inserted after T (e.g., thriumphat), Christ may be spelled with a CH or an X, semi-colon replaces the ending -US, and a final M can be signified by a long accent over the final vowel. Presumably the poet worked simultaneously on both the acrostic pattern and on the letter-count of the whole text. Since most of these poems are prayers or hagiographies, they do not aspire to originality, and can overwork a specialized vocabulary which facilitates their composition. As such they have much in common with Medieval illuminations and decorated initials. It must be remembered that for a monastic scribe, writing the holy word was an act of worship, so that ornamentation, even covering a whole page with one decorated initial, was an expression of devotion. In a similar fashion these complex acrostics not only were devotional for the poet, but could also stimulate meditation: the reader follows the letters like the beads of a rosary, finding satisfaction in the resolution of the poetry and the acrostic, while the visual design of the acrostic turns the text into an icon.

For this reason I object to F. J. E. Raby's view, expressed in his *History of Secular Latin Poetry in the Middle Ages*, that such visual poems as technopaegnia and acrostics are perversions and symptoms of declining taste.[13] A much better characterization, if one must be made, is to apply the term "mannerist." As defined by E. R. Curtius, mannerism is a tendency to neglect the synthesizing theme of art, and concentrate on one aspect—here, the rhetorical *ornatus*, which Curtius in *European literature and the Latin Middle Ages* finds gloriously exemplified in technopaegnia.[14]

It is not surprising to find the so-called "Rhétoriqueurs" at the center of the visual tradition in vernacular poetry of the late Middle Ages and early Renaissance. Since this is a poetry written primarily for courtly circles, it rejects such oral devices as the formulaic style of the epics, and shuns the meditative quality of the monastic works we have seen. Rather than the measured acrostic, it was the intellectual word-game which predominated. The simple acrostic was of course practised, with François Villon in the mid-fifteenth century signing his

name acrostically in several of his ballads, including the *Ballade des contre-vérités* (Ballad of counter-truths), which ends in this manner:

V oulez vous que verté vous die?	*Do you want the truth from me?*
I l n'est jouer qu'en maladie,	*Well, there is no joy save in sickness,*
L ettre vraie qu'en tragedie,	*No truer words than in tragedies,*
L âche homme que chevalereux,	*No cowards other than knights,*
O rrible son que melodie,	*No horrid sounds except in songs,*
N e bien conseillé qu'amoureux.[15]	*No better advised than lovers.*

One of the simpler forms of visual poetry from this period is the "vers brisés," where the lines of a poem are divided into two columns. These could then be read individually or straight across, and the feat was even more admired if the meaning was changed by the different readings. This poem by Jean Bouchet (1476–1557?) does just that, and makes sure no one will miss the point by adding an explanation:

Heureux est il	Celui qui n'a procès
Qui plaidera	N'est prins pour homme sage;
S'il est subtil	On lui faict des excès;
Mal il n'aura	S'il n'est rempli d'oultrage.

Allez droict, vous ne plaiderez;
Sincopez: procès vous aurez.[16]

Happy is he	*The man who has no case*
Whoever will sue	*Isn't taken for a sage;*
If subtle he'll be	*He's heaped with excess;*
He'll have no rue	*If he's not full of outrage.*

Go straight, you won't sue,
But divide, and you do.

Another popular technique was to write poems that could be read from bottom up, or from right to left, as well as in their normal fashion. The fifteenth-century courtier and poet Jean Meschinot wrote a hymn to the Virgin which he said could be read in 32 different ways, while a modern critic has seen 254 permutations of it. It is essentially two columns of attributes which can be read in any order.[17]

The "rhétoriqueur" Jean Marot (1450?–1526), a courtier under Anne de Bretagne and Francis I, is responsible for one of the most curious of visual poems (Fig. 5).[18] He makes brilliant use of the rebus,

including one in every line, and avoiding repetition. The rebuses here are based mainly on the placement of the words or parts of words in relation to each other. The adverb describing this relation then became part of the poem. In the French of Marot's time, "over" is expressed by *sur* and *su* (also spelled *ceu*), and "under" is expressed by *sous* and *sub*, while "between" is *entre*. The deciphered version follows, with the adverbs in italic:

Figure 5.
Jean Marot: Rebus poem.

En *sous*riant fuz nagueres *sur*pris
D'une *sub*tile *entre* tous affectée,
Que *sous* espoir j'ai *sou*vent *sous*haitée;
Mais de*ceu* fuz quand s'amour *entre*pris,
Car j'apper*ceu* que ses mignards *sous*ris
Estoient *sous*traicts d'amour mal as*sur*ée,
En *sous*riant.

Escus *sous* l'oeil, *sous* de moy elle a pris,
M'*entre*tenant *sous* maniere ruzée;
Et quand je veux *sur* elle faire *entrée*,
Me dit que *sui*s *entre* tous mal apris
En *sous*riant.

Quite a collection of such visual word play, some poetical and some not, is presented in the book, *Les Bigarrures* (curiosities), by Estienne Tabourot (1547–1590). He includes, for instance, various kinds of Macaronic verse, and palindromes, which can be read forward and backward, letter for letter or word for word. There are many pictorial rebuses, the rebus-poem by Marot, and another class of rebus in which letters or numbers are included in the line of poetry, their homonyms supplying words. The following anonymous example, Tabourot claims, is a letter from a headmistress to the parents of a student. It makes a clever poem, because on one level it is a discussion of the girl's calligraphy, but when the letters are replaced by their homonyms, as in the second version given by Tabourot, it bears more on her behavior. In reading the second version, it must be noted that V was used for U, and that M was pronounced "ame."

Vostre fillette en ses escrits	*Your little girl, in her writing lessons,*
Recherche trop ses a a.	*works too much on her small a's.*
L met trop d'ancre en son I,	*She puts too much ink in her I,*
L s trop ses V V ouverts,	*And she leaves her U's too open.*
Puis son K tourne de travers	*Then she turns her K askew*
Et couche trop le Q infame;	*And lays out a messy Q;*
C'est cela qui gaste son M.	*That's what is ruining her M.*
Vostre fillette en ses escrits	*Your little girl, in what she writes,*
Recherche trop ses appetits.	*Seeks out too much her appetites.*
Elle met trop d'ancre en son nid,	*She puts too much anchor into her nest,*
Et laisse trop ses huis ouverts.	*And too often leaves her windows agape.*
Puis son cas tourne de travers,	*She isn't straightforward, for the rest,*
Et couche trop le cul infame;	*And she sleeps too often with her bottom foul;*
C'est cela qui gaste son ame.[19]	*That is what is spoiling her soul.*

The serious poetical intent of such bagatelles is never insisted on, and Tabourot tells us even, "I gathered them here and there, on the white walls of various taverns."[20] These poems easily become graffiti because they can hide a double-entendre: one meaning is for the eye, the other is for the ear. This explains in part the many anonymous epigrams in the collection *Le Cabinet satyrique* (1618, amplified in 1700), where scabrous double-meanings were hidden in acrostics.[21] This application of visual technique detracts from the reputation of visual poetry, which too often is relegated to such collections as these two, or more recently

to C. C. Bombaugh's *Gleanings for the Curious*.[22] It must nevertheless be recognized that a part of the attraction of visual poetry is in its entertainment, which can be prurient or ridiculous, as well as poetic and intellectual.

A more serious application of visual poetry, and a worthy successor to the Carolingian acrosticians can be found in Eustorg de Beaulieu, who was at various times both a priest and a reformed minister, as well as poet and musician. The multiple acrostic in Figure 6 was on the final page of his volume of poetry, *Les Divers Rapportz* (1537). It is based on the phrase "Gloire à Dieu seul" (Glory to God alone), which can be read by following the letters in any horizontal and vertical zig-zag, proceeding from the center toward any corner.[23]

Imitation of the classics was an important aspect of the Renaissance, so it is not surprising to find that the Planudean manuscript of the *Greek Anthology* appeared in two editions in 1516, and that imitations of the Greek technopaegnia abounded in all corners of Europe. Tabourot wrote pattern poems in his school days, and the sixteenth-century scholar Salmon Maigret (Macrinus) included a Latin one in his *Lyricorum Liber II* (1531). The first English pattern poem is a crude set of wings included in Stephen Hawes' *The Convercyon of Swerers* in 1509, and it was apparently already influenced by earlier French models.[24] The elegant wings by Melin de Saint-Gelais (1491–1558)

```
l u e s u e i d i e u s e u l
u e s u e i d a d i e u s e u
e s u e i d a e a d i e u s e
s u e i d a e r e a d i e u s
u e i d a e r i r e a d i e u
e i d a e r i o i r e a d i e
i d a e r i o l o i r e a d i
d a e r i o l G l o i r e a d
i d a e r i o l o i r e a d i
e i d a e r i o i r e a d i e
u e i d a e r i r e a d i e u
s u e i d a e r e a d i e u s
e s u e i d a e a d i e u s e
u e s u e i d a d i e u s e u
l u e s u e i d i e u s e u l
```

Figure 6. Beaulieu: Acrostic.

O heureuse nouvelle, ò desireux rapport
De la santé de qui la maladie
Estoit fin de plus d'une vie!
O aggreable port,
Dont les plaisirs
Sont égaux
Aux travaux!
Des longs desirs,
O favorable sort!
Et toy, ò mon ame assouvie,
Qu'attends-tu plus? as-tu encore envie
D'avoir un plus grand bien ça bas avant la Mort?

Oh happy news, oh desirous report
On the health of her whose malady
Was the end of more lives than one!
Oh pleasant burden
Whose pleasures
Are equal
To the labor!
After long wishing,
What a favorable outcome!
And you, Oh my assuaged soul,
What more do you wait? do you still wish
To have a greater gift in this world before your Death?

Figure 7. Melin: Wings.

are a good example (Fig. 7). These wings should be turned sideways to reveal their shape; they symbolically bear a message of good tidings concerning the health of the mother of King Francis I.[25]

A few original shapes of visual poetry appeared during the flurry of imitations. These include a pear by Richard Willis, and the famous bottle in the disputed fifth book of Rabelais' *Gargantua et Pantagruel*, which was published posthumously in 1564 (Fig. 8). The bottle appears at a point when Panurge is led before the oracle of the Holy Bottle and is obliged to sing an epileny, or grape-harvester's song.

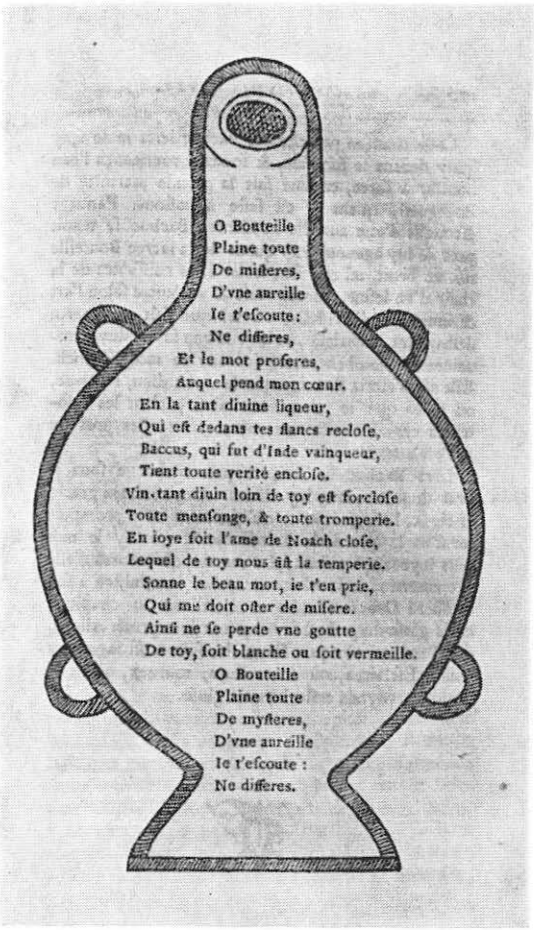


Figure 8. Rabelais: Bottle. In *Les Oeuvres de Maistre François Rabelais, III* (Paris: Alphonse Lemerre, 1873), 168–169.

O bottle
All full
Of mysteries
With one ear
I listen;
Do not wait,
Give me the word
On which my heart hangs!
In the liquor so divine
Which is enclosed within your sides,
Bacchus, who was conqueror of India
Keeps all truths enclosed.
Wine so divine, far from you is forclosed
All lying and all deceit;
Let Noah's soul rest in joy,
He who made you our fair weather.
Sound the beautiful word, I pray,
Which must raise me out of misery.
Therefore let no drop be lost
From you, either white or red,
O bottle
All full
Of mysteries.

Designed with metrically longer and shorter lines, the bottle's shape is clear, with a straight neck and rounded trunk, then a straight base; sometimes the first word, "O", is printed separately, like a mouth or stopper. The shape is triply appropriate, as it is a wine-drinking song addressed to the Holy Bottle, and anticipates the oracle's answer: "Trinc!"[26]

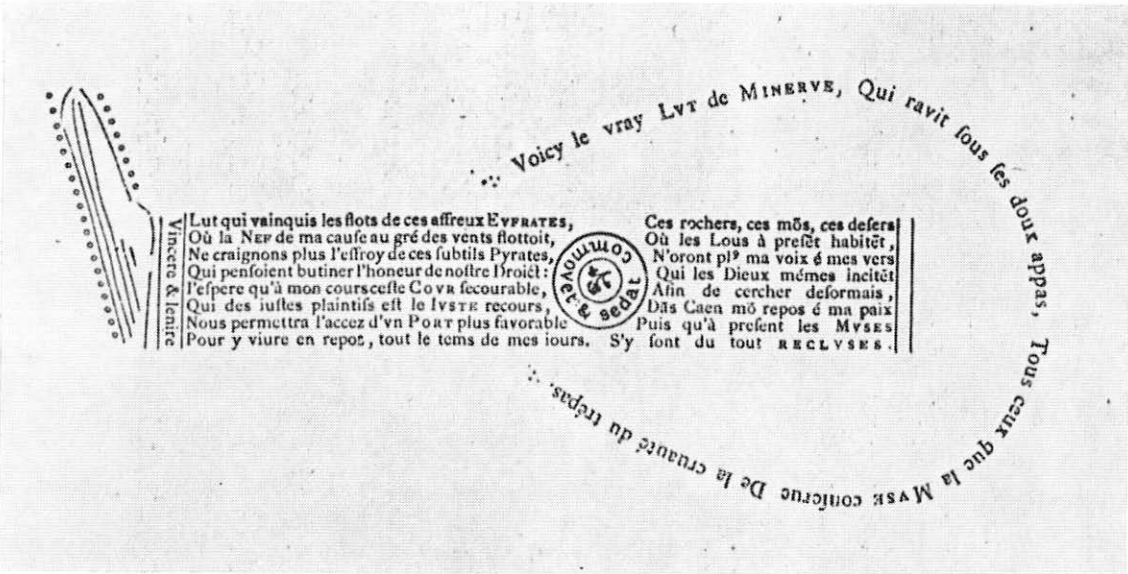
Before the end of the sixteenth century, George Puttenham prepared the first extensive treatise on how to write visual poetry, in his *Arte of English Poesie* (1598). This book described all the fine points of

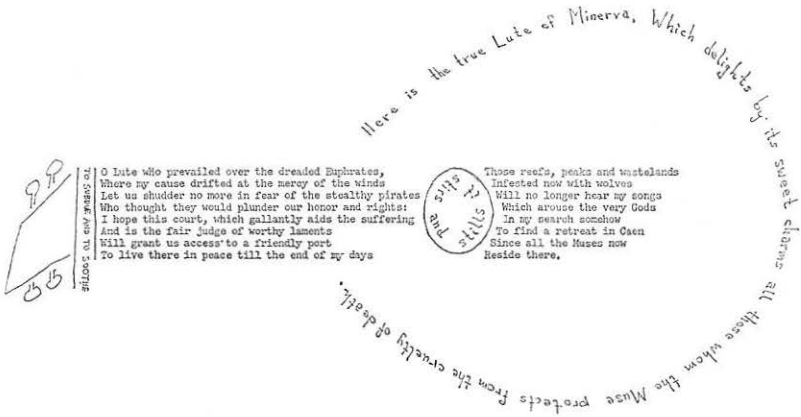
writing verse, dealing with metre, rhythm, ornaments, and the uses of verse. In a chapter on "Proportion in Figure," Puttenham discusses the construction of pattern poems, referring to Simias' Egg, and also claiming a source in Oriental poetry. He gives careful metrical instructions for making poems in a variety of geometrical shapes: square, triangle, lozenge, oval, taper, etc. More interesting, however, than Puttenham's interest in the craft and attractiveness of these shapes, is his insistence on their symbolic or suggestive value. In an exchange of love letters, for example, he feels the rejected suitor should write in the shape of a taper, signifying hope; the taper is a tall, thin triangle shape, and in Puttenham's own examples the poem is read from the base up to some culminating word on the peak. A similar case is made for the feeling of infinity in the sphere, steadfastness in the square, and so forth.[27] These observations by Puttenham represent a crucial step in the developing awareness of the value of visual poetry; the visual contribution can be more than a mere game, or an ornament: it can actually carry part of the meaning of the poem. While this may have been recognized or taken for granted by some poets, it is gratifying to see it expressed explicitly. The application of this idea is nevertheless slow to appear.

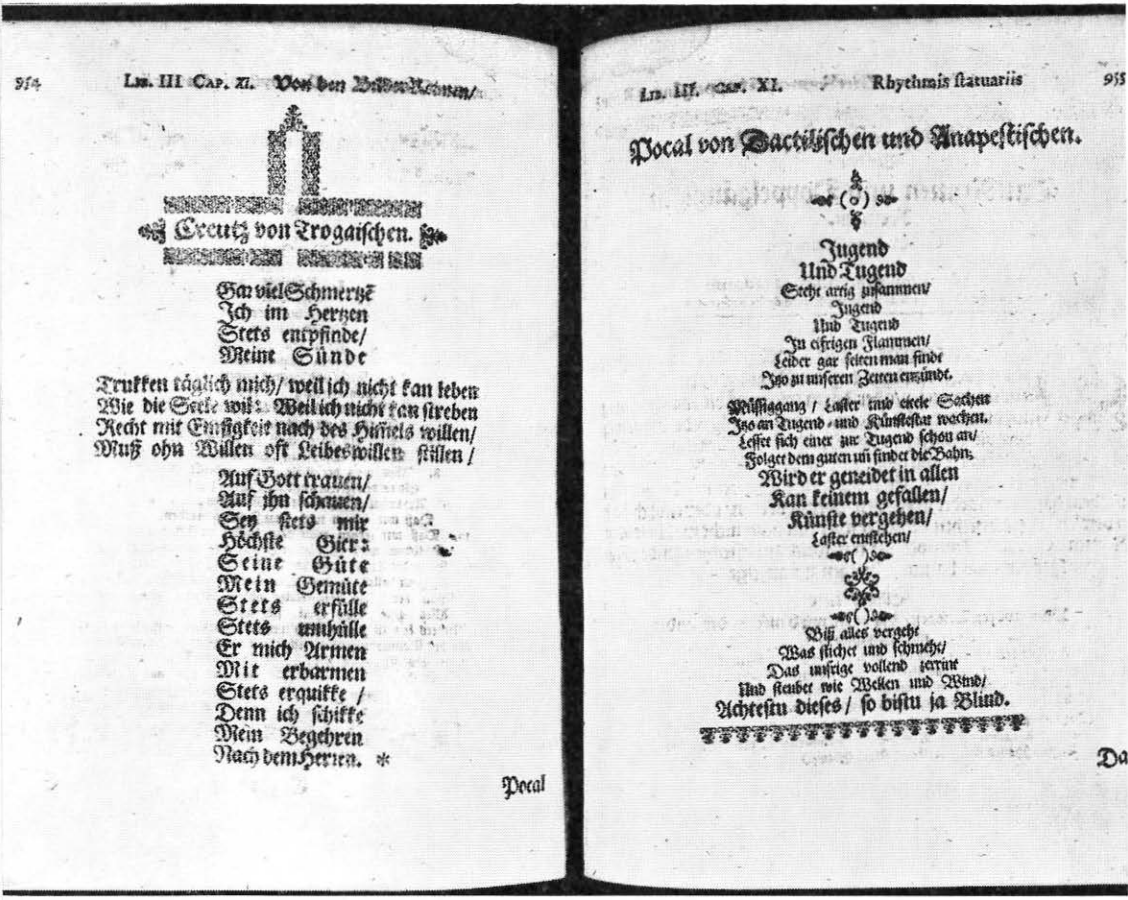
Robert Angot's *Chef-d'oeuvre poétique* (1634) demonstrates in several pattern poems an early attempt to break away from the straight linear matrix of the printed page. Of the five pattern poems in his collection, two are constructed on the familiar lines, while the other three use such devices as turning the print sideways or obliquely, curving the lines of print, and adding hand-drawn designs. His shapes are leaves of laurel, bottles, Easter eggs, a cross, and the lute seen in Figure 9. The theme of Angot's collection is a concert of the muses, and it opens with this lute, whose sound box is outlined by a long curving line of type (actually a regular octosyllabic quatrain). The hole in the sound box is a circular emblem with a Latin motto, and there is also a Latin motto upside-down at the top fret of the finger-board. The main part of the poem is made up of two sets of eight lines, forming the strings of the instrument, and some tuning keys are drawn in by hand.[28] The design is simple but unmistakable, using straight lines where they make the most sense, and relying heavily on that long curving line which must certainly have required the patient cooperation of the printer. The versatility of typography is put to use in the composition of a pattern

poems by Justus Georg Schottel (Fig. 10). These examples are included in his *Ausführliche Arbeit von der Teutschen Haupt Sprache* (1663), a linguistic treatise where he explains how pattern poems are written, much as Puttenham did. Although his patterns are developed by metrical variation, he (or he and his printer) shows the ability to manage the length of the lines by using different typefaces, and he also makes decorative use of all sorts of printer's devices—vignettes and ornaments, as well as a large repertory of punctuation and diacritical signs.[29]

Figure 9. Angot: Lute. Courtesy of The Newberry Library.






914 Lib. III Cap. XI. Von den Bilder-Reimen/

Creutz von Trogaischen.

Ob viel Schmertze
Ich im Hertzen
Stets empfinde/
Meine Sünde
Drukken täglich mich/ weil ich nicht kan leben
Wie die Seele wil: Weil ich nicht kan streben
Recht mit Emsigkeit nach des Himels willen/
Muß ohn Willen oft Leibeswillen stillen/

Auf Gott trauen/
Auf ihn schauen/
Sey stets mir
Höchste Zier:
Seine Güte
Mein Gemüte
Stets erfülle
Stets umhülle
Er mich Armen
Mit erbarmen
Stets erquikke /
Denn ich schikke
Mein Begehren
Nach dem Herren. *

Pocal

Lib. III. Cap. XI. Rhythmis statuariis 915

Pocal von Dactilischen und Anapestischen.

Jugend
Und Tugend
Steht artig zusammen/
Jugend
Und Tugend
In eifrigen Flammen/
Leider gar selten man finde
Jtzo zu unseren Zeiten entzündt.
Müssiggang / Laster und arge Sachen
Jtzo an Tugend- und Künsten stat wachen.
Lesset sich einer zur Tugend schon an/
Folget dem guten nu sinder die Bahn.
Wird er geneidet in allen
Kan keinem gefallen/
Künste vergehen/
Laster entstehen/

Bis alles vergeht
Was sticht und schmeicht/
Das unsrige vollend zerrint
Und stiebet wie Wellen und Wind/
Achtestu dieses / so bistu ja Blind.

Da

Figure 10. Schottel: Cross and Goblet. Courtesy of The Newberry Library.

The spirit of "reason" so dominated eighteenth-century France that even the poetry is expository and prosaic, and there seems little inclination toward visual poetry. Among the few pattern poems to be found are two by Charles François Pannard (1694?–1765), a writer of vaudevilles who composed the glass and bottle in Figure 11. They are both drinking songs, one apostrophizing the glass and the other the bottle in a cheerful manner that imitates eloquent love poetry.[30] They are masterpieces of pattern design, with little justifying required to reveal their form. But a more characteristic attitude toward visual poetry is

found in the *Voyage du jeune Anacharsis en Grèce* (1788), a long account by Jean-Jacques Barthélemy of imaginary travels in fourth-century B.C. Greece. On discovering the technopaegnia of Simias, the hero calls them "puerile and laborious."[31]

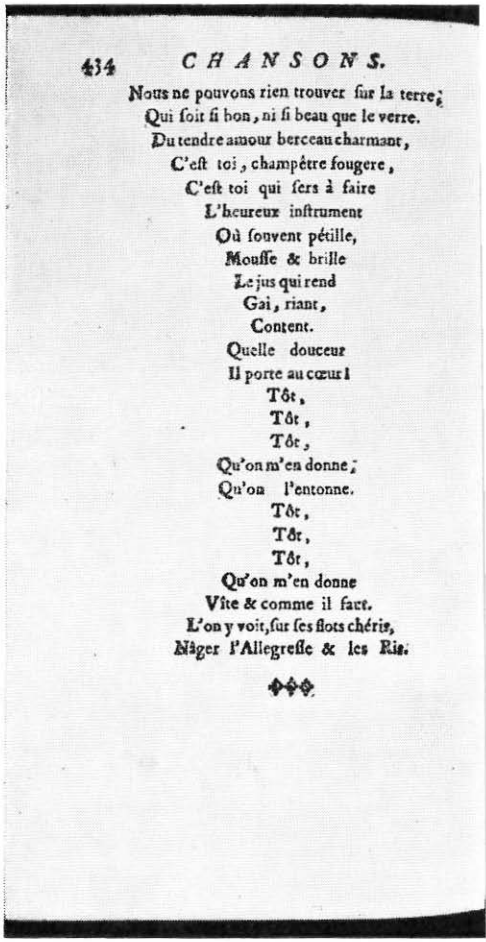
While the poets contributed little to visual poetry, other eighteenth-century writers diligently tore away at the old printing conventions. The clearest example is Laurence Sterne's *Tristram Shandy*, which is a virtual compendium of typography and book design. Included in the narrative are deliberate omissions, blank pages, lists, diagrams, use of italic and gothic faces, a spurious Latin manuscript with facing "translation," and the startling black and marbled pages. All of these techniques are employed with deliberate intent to disturb, Sterne even taunting readers to try to decipher the marbled page.[32]

The influence of this in France shows up somewhat later; Charles Nodier's *Histoire du Roi de Bohème* (1830) takes off from a story in *Tristram Shandy*, and multiplies its digressions in a caricature of eighteenth-century style. At one point the narrator declares his desire to place letters in a new order, and to give bizarre placement to the lines of print, but his demonstration of this desire is minimal.[33]

The work of Nicolas Cirier certainly can be called bizarre, however. Cirier was a typographer and proof-reader who defended his difficult trade in a treatise called *L'Oeil typographique* (1839), a strange brochure which concludes with a diagram in many languages of what he calls the "typographic eye." Cirier's masterpiece, according to Raymond Queneau, who owns one of the few extant copies, is another brochure called *L'Apprentif* [illegible], published in 1840 (Fig. 12). This work contains numerous foldouts and inter-folios in different colors, is full of characters from strange alphabets, and makes ample use of other printing arts, for example etching and lithography.[34] The dedicatory page shown in Figure 12 indicates the kind of typographical mélange which will not be seen again until the twentieth-century Lettristes.

The craft of printing did influence at least one poet of the nineteenth century, as the illuminated books of William Blake amply demonstrate. Blake was dissatisfied with conventional typography, and ultimately grew to consider his illuminated books as his chief means of poetic expression.[35] By a complicated process calling on his skills as engraver and as water-colorist, Blake produced several books where his poetry appears on the page in the script he has chosen and printed

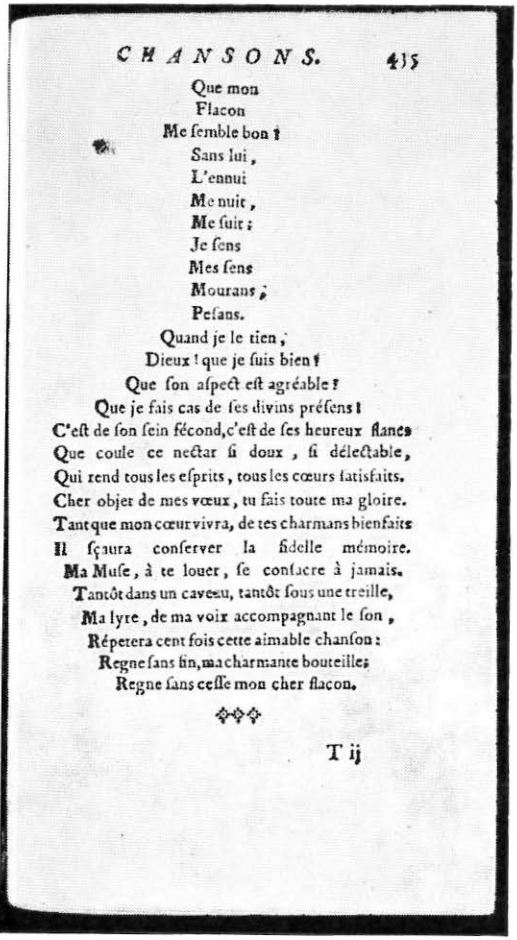
Nothing can we find upon the Earth
So good or so lovely as a glass.
Charming cradle of tender love,
It's you, country fern,
It's you who serve to make
The happy instrument
Where often fizzes,
Foams and sparkles
The juice that makes us
Gay, laughing,
Content.
What sweetness
It brings to the heart!
Soon,
Soon,
Soon,
Bring me some,
Ring it out,
Now,
Now,
Now,
Give me some,
Fast and just right.
One can see in its darling floods
Gaiety and Laughter brimming.



434 CHANSONS.

Nous ne pouvons rien trouver ſur la terre;
Qui ſoit ſi bon, ni ſi beau que le verre.
Du tendre amour berceau charmant,
C'eſt toi, champêtre fougere,
C'eſt toi qui ſers à faire
L'heureux inſtrument
Où ſouvent pétille,
Mouſſe & brille
Le jus qui rend
Gai, riant,
Content.
Quelle douceur
Il porte au cœur!
Tôt,
Tôt,
Tôt,
Qu'on m'en donne;
Qu'on l'entonne.
Tôt,
Tôt,
Tôt,
Qu'on m'en donne
Vîte & comme il faut.
L'on y voit, ſur ſes flots chéris,
Nâger l'Allegreſſe & les Ris.

in color, complemented by a picture on the same plate with the text. The result is related to an illuminated manuscript, except that the poet himself has selected and controlled all the separate elements. In this way Blake is assured that a severe title will appear in stiff, bony letters, while a gentle title—*The Songs of Innocence*, for example—can be in a graceful script with extended finials that reflect the design of the accompanying illustration. The use of color and ornamentation affects even the lines of poetry, when in *The Chimney Sweeper*, for example, the



CHANSONS. 435

Que mon
Flacon
Me ſemble bon !
Sans lui,
L'ennui
Me nuit,
Me ſuit ;
Je ſens
Mes ſens
Mourans ;
Peſans.
Quand je le tien,
Dieux ! que je ſuis bien !
Que ſon aſpect eſt agréable !
Que je fais cas de ſes divins préſens !
C'eſt de ſon ſein fécond, c'eſt de ſes heureux flancs
Que coule ce nectar ſi doux, ſi délectable,
Qui rend tous les eſprits, tous les cœurs ſatisfaits.
Cher objet de mes vœux, tu fais toute ma gloire.
Tant que mon cœur vivra, de tes charmans bienfaits
Il ſçaura conſerver la fidelle mémoire.
Ma Muſe, à te louer, ſe conſacre à jamais.
Tantôt dans un caveau, tantôt ſous une treille,
Ma lyre, de ma voix accompagnant le ſon,
Répetera cent fois cette aimable chanſon :
Regne ſans fin, ma charmante bouteille ;
Regne ſans ceſſe mon cher flacon.

T ij

Model
Bottle,
Her I'll coddle!
Forlorn,
I'm bored,
Followed
And gored,
Feelings,
Reeling,
Feel like
Dying.
But to hold her,
God! how I smolder!
How her look is agreeable!
How estimable her presence divine!
It's from her fertile breast, it's from her happy side,
That flows this nectar, so sweet, so delectable,
Which renders all men's hearts and their minds satisfied.
Dear object of desire, you make all my glory,
So long as my heart lives, of your charms bona fide
He will know to preserve a faithful memory.
My Muse lives to have you forever glorified.
Whether down in a cellar, or under the stars,
The sound of my lyre, as my voice joins the task,
Will repeat the song where a hundred times we ask:
Reign without cease my bottle and my cask,
Reign without end, my charming flask.

Figure 11. Pannard: Glass and Bottle. Courtesy of The Newberry Library.

letters are shaded a sooty grey, and hang like a cloud of smog over the miserable boy in the picture.

Blake's creation is the unique expression of a poet with many talents, something that is impossible to copy; yet, it is an important sign of reaction against the apparent rigidity of typography and printing. Although his alphabets are actually closely related to printing faces, Blake captures the decorative spirit of the Medieval illuminator, but also announces the sensitivity of serious poets to the nuances in visual

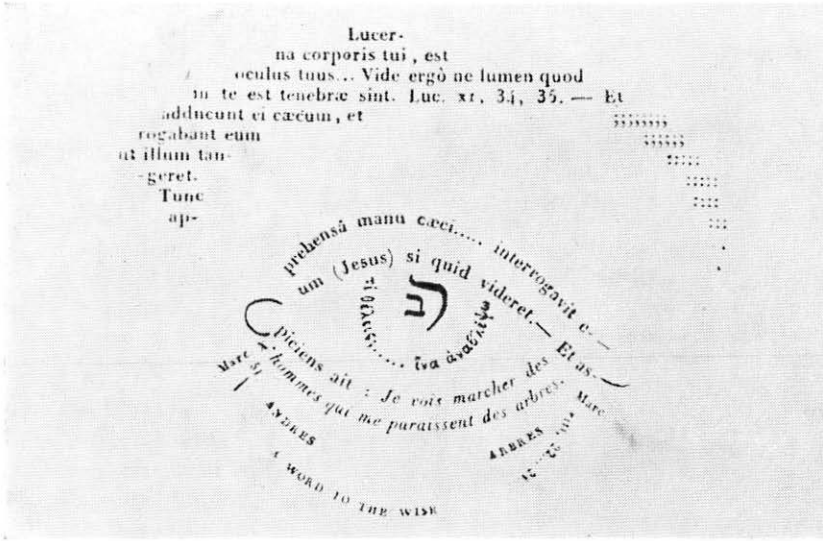


Figure 12 (above). Cirier: Typographic Eye. Figure 13 (opposite). Cirier: Dedicatory page to *L'Apprentif*. Both are in Raymond Queneau, *Batons, chiffres et lettres*, © Editions Gallimard.

stimuli. Indeed, there is a significant shift of emphasis in the visual poetry of the nineteenth century, and particularly in France. While the efforts of Cirier and Blake represent a dazzling liberation from conventional printing, there are for the first time more subtle applications of visual techniques. At the same time there are reassuring evidences of visual poetry composed by highly esteemed poets.

Victor Hugo is the ideal figure to represent the new tendency in visual poetry, partly because of his prominence in literature, and partly because of his explicit appreciation of visual cues. In a remarkable page of his *Journal de 1839*, Hugo does for letters what Puttenham did for pattern poems, suggesting a symbolic or pictorial value for every letter of the alphabet: "A is the roof, the gable with a tie beam, the ark; or it is the greeting of two friends who embrace and shake hands; D is a man's back; B is D on a D, a hunchback; C is a crescent, it is the moon. . . ."[36] Most of the references are to men and the principle elements of man's universe; thus it is not too difficult to look at Hugo's poetry and find instances where the letter shape seems to inform the poetry. In the following lines from *La Source*, in *Les Contemplations*, the

ONSIEUR, — Quand je me donnais tant de peine, plutôt pour être cru quelque jour que pour devenir un correcteur passable (1) : quand je m'enfonçais en sauvage dans l'étude de la typographie et des langues, je restais nécessairement étranger à une infinité de connaissances qui sont, sans contredit, d'un bien plus grand usage dans la vie civile. Par exemple, je négligeais, ou plutôt je ne soupçonnais même pas..... je m'aperçois, hélas ! que le mot n'est pas dans l'Académie, qui connaît, qui possède si bien la chose. Le mot dont j'ai besoin manque à la langue, il n'ose pas encore s'avouer français : mais

★ Ce mot *dédiquasse* n'ayant point été composé en types mobiles, mais inamoviblement tracé sur cuivre, ne se prêtait point à ce que nous appelons, nous autres typographes, *correction sur le plomb*. Et pourtant j'avais, je devais avoir à cœur, moi correcteur de mon métier, d'empêcher que personne pût soupçonner un seul

letter Y, which stands out both as a capital and in its isolation at the beginning of line 2, bears several of the suggestive meanings which Hugo mentions.

Un lion habitait près d'une source; un aigle
Y venait boire aussi.
Or, deux héros, un jour, deux rois,—souvent Dieu règle
La destinée ainsi,—
Viennent à cette source où les palmiers attirent
Le passant hasardeux
Et, s'étant reconnus, ces hommes se battirent
Et tombèrent tous deux.[37]

A lion lived near a spring, an eagle
Came to drink there too.
Now one day, two heros, two kings, —God often arranges
Fate that way,—
Come to this spring where the palms attract
The passerby
And, recognizing each other, these men fought
And both fell.

For Hugo the letter Y was a tree, the fork of the road, a confluence of streams, a goblet, and so forth. In the little scene in this poem the Y is the spring itself, it is the palm tree, and—especially in its role as adverb of place—it is the meeting of the roads of the two kings.[38]

Hugo's visual sensitivity also applies to the pattern of the poem on the page, as can be seen dramatically in *Les Djinns*. The fifteen strophes tell the tale of the arrival and passage of a horde of Djinns, Oriental demons of the night, the lines of poetry increasing from two syllables to eight, then decreasing again to two. Rhythmically, the effect is breathtaking, and visually it strongly suggests something which approaches from a distance, grows larger, then fades away, swirling like the whirlwind mentioned in the poem. Figure 13 shows Hugo's manuscript for the conclusion of the poem, where it is possible to see that he gave it the spiral shape even as he composed it.[39] What is evident here in Hugo's work, and what becomes more prevalent in the rest of the nineteenth century, is visual poetry written, not as a display of wit and ingenuity, but as a synaesthetic art form.

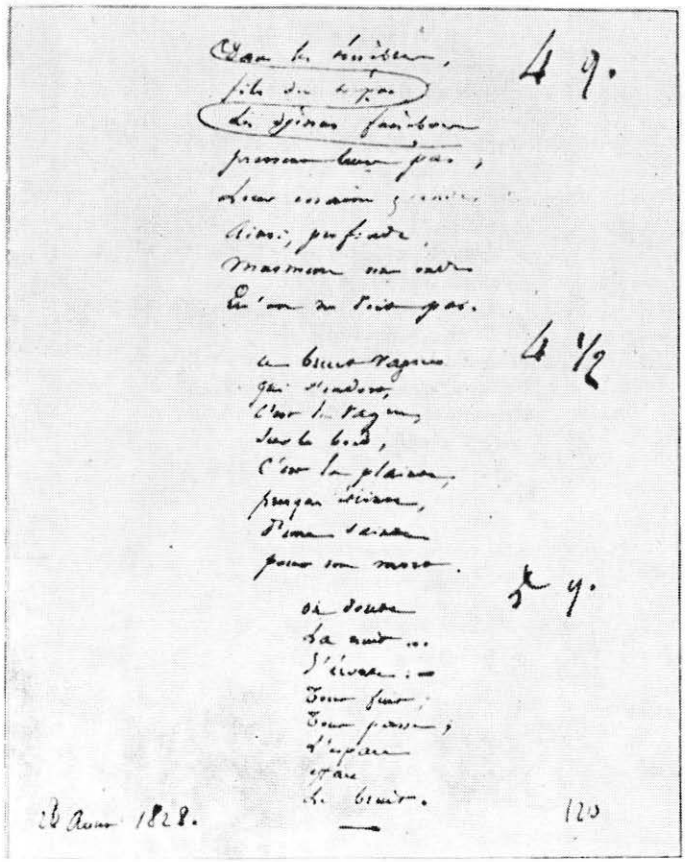


Figure 14. Hugo: Manuscript for *Les Djinns*.
Courtesy of Editions Albin Michel.

1. *Le Grande recueil II* (Paris: Gallimard, 1961), p. 217.
2. Trans. by H. N. Fowler (New York: G. P. Putnam's Sons, 1929), p. 147.
3. Trans. by William Watts (New York: Macmillan, 1912), I, 273–75.
4. Jacques Charpier and Pierre Seghers (eds.), *L'Art poétique* (Paris: Seghers, 1956), p. 197.
5. *The Gutenberg Galaxy* (Toronto: University of Toronto Press, 1962), p. 43.
6. *Saturday Review* (September 17, 1966), pp. 10–11.
6a. The most extensive collection available illustrating visual poetry, decorated alphabets, and other visual treatments of language, is Massin's *Letter and Image* (New York: Van Nostrand Reinhold, 1970).
7. Hermann Beckby (ed.), *Anthologia Graeca* (Munich: Ernst Heimeran Verlag, 1954), IV, 536.

8. *The Greek Anthology in Five Volumes*, Loeb Classical Library, trans. by W. R. Paton (New York: G. P. Putnam's Sons, 1918), V, 134.
9. N. E. Lemaire (ed.), *Poetae latini minores* (Paris: Lemaire, 1824–26), I, 708–9.
10. *Poetae latini minores*, I, 395.
11. E. Duemmler (ed.), *Poetae latini aevi carolini* (Berlin: Weidmann, 1881–84), I, 159.
12. *Poetae latini aevi carolini*, IV, 1115.
13. (Oxford: Clarendon Press, 1957), p. 17.
14. (New York: Pantheon Books, 1953), pp. 274, 284; see also Helmut Hatzfeld, "Mannerism is not Baroque," *L'Esprit créateur*, VI, No. 4 (Winter, 1966), 225–26.
15. *Oeuvres* (Paris: Garnier Frères, 1962), p. 132.
16. Charles Bruneau, *Charles d'Orléans et la poésie aristocratique* (Lyon: Chez Henri Lardanchet, 1924), p. 192.
17. Bruneau, p. 193.
18. *Le Recueil* (Paris: Antoine Bonnemere, 1538), pp. unnumbered.
19. (Rouen: David Geoffrey, 1616), fol. 17.
20. *Ibid.*
21. Fernand Fleuret and Louis Perceau (eds.) (Paris: Librairie du Bon Vieux Temps, 1924).
22. (Baltimore: Kurtz, 1860).
23. Hélène Harvitt, *Eustorg de Beaulieu* (New York: AMS Press, 1966), p. 85.
24. Margaret Church, "The First English Pattern Poems," *Publications of the Modern Language Association*, LXI, No. 3 (1946), 637–38.
25. *Oeuvres complètes*, ed. by Prosper Blanchemin (Paris: Paul Daffis, 1873), II, 130.
26. *Oeuvres complètes*, (Paris: Garnier Frères, 1962), II, 451.
27. English Reprint Series (London: J. Murray, 1869), pp. 98–113. [New reprint available: Kent, Ohio: Kent State University Press, 1970; cloth $7.00, paperback $3.75].
28. Prosper Blanchemin (ed.) (Rouen: Boissel, 1872), p. 2.
29. (Braunschweig: Zilligern), p. 954–955.
30. *Théâtre et oeuvres diverses de M. Pannard* (Paris: Duchesne, 1763), III, 434–35.
31. (Paris: Dabo & Tremblay, 1819), VII, 65.
32. *The Life and times of Tristram Shandy, Gentleman* (New York: Odyssey Press, 1940), p. 226.
33. (Paris: Chez les libraires qui ne vendent pas de nouveautés, 1830?), p. 41.
34. Raymond Queneau, *Bâtons, lettres et chiffres*, Collection "Idées" (Paris: Gallimard, 1965), pp. 287, 290.
35. Geoffrey Keynes, *William Blake: Poet, Painter, Prophet* (New York: Orion Press, 1964), pp. 11, 27.
36. Jean Massin (ed.), *Oeuvres complètes* (Paris: Club français du livre, 1968), VI, 715–16.
37. *Oeuvres complètes* (Paris: Hetzel, s.d), V, 227.
38. A twentieth-century echo: Paul Claudel, in his essay on Nijinsky, prefers spelling the dancer's name with a final y instead of the usual i in French, "because of the Y which looks like a leaping dancer." *Positions et propositions* (Paris: Gallimard, 1928), I, 227.
39. J.-R. Chevaillier and Pierre Audiat (eds.), *Victor Hugo: Poésie* (Paris: Librairie Hachette, 1950), p. 89.

The Development of Word Perception and Problem Solving Strategies

Lita Furby

This study examines the nature of children's word perception, focusing on both the developmental changes in the perceptual process itself (in terms of the ability to decenter) and the role these changes play in determining choice of strategy in a problem solving situation (anagrams). It also demonstrates the importance of individual differences (in spatial ability) as a source of information about developmental processes and changes in perception and cognition. Eight, eleven, and fourteen year-olds solved anagrams of various types and took several aptitude tests. The results give support to Piaget's formulation of perceptual development and demonstrate the role of both perceptual development and individual aptitude differences in children's problem solving strategies.

Many theories of the development of perception present a picture of the young child's perceptions being global and diffuse at first, and then becoming more differentiated as he grows older. More specifically, Piaget and Morf (1958) see perceptual development as follows: the young child's perceptions are "centered", i.e., they are static (limited to the dominant perceptual organization) and are governed by field effects (Gestalt-like principles such as good form, closure, and contrast). With increasing age the development of perceptual regulations (internalized sensori-motor acts) leads to a higher-order perceptual system which allows the child to break down a configuration and to rearrange the component elements. This development results in the older child's perception being what Piaget and Morf call "decentered."

One purpose of this study is to test the validity of this theory of perceptual development when it is applied to the perception of verbal symbols and to investigate developmental changes in word perception in terms of the ability (or lack thereof) to break down a word perceptually into its component parts. It should be noted that "word perception" is an ambiguous term and may include a number of different

Visible Language, VI (Winter 1972), 45–58.
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processes. First, it necessarily involves perception in the classical sense: awareness of the stimulus; i.e., perception of the letters per se. Second, word perception may include recognition of the phoneme correspondences to the perceived letters or groups of letters. Third, it may also require recognition of referential meaning. It is the first process—the perception of letters and groups of letters per se—which is of primary interest in this study; it investigates the child's ability to perceive the parts (individual letters) of a whole (a word), an essential process when learning to read or when sounding out new words.

A second purpose of this research is to examine developmental changes in strategies used to solve problems involving word perception and to show how these changes are intimately related to level of perceptual development. In addition to depending on developmental perceptual level, choice of strategy in problem solving that requires word perception (such as breaking down the word into component parts vs. whole word perception) may also depend directly upon aptitudes such as spatial ability. The success of a strategy that requires rearrangement of the component letters is a function of the ability to manipulate and rearrange figures internally. In other words, both a child's developmental perceptual level (where he is on the centering-decentering continuum) *and* his spatial ability will determine not only his *choice* of problem solving strategy, but also his *success* with his chosen strategy. Interactions of developmental perceptual level (as described by Piaget) with abilities or aptitudes are probably more accurate predictors of the nature of a given child's problem solving strategies than either developmental level or aptitude alone.

In addition to the theoretical interest of this question, a child's ability to break down a word perceptually into its component parts (letters or subgroups of letters) has important implications for reading instruction, especially when considered in terms of aptitude-treatment interactions. The latter notion suggests that children high in a given aptitude or ability (e.g., decentration, spatial ability, etc.) might do best under one type of instruction (e.g., phonetics reading instruction), while those low in that ability might do best under another (e.g., whole-word approach to reading instruction). In addition, those low in a given aptitude or ability might profit from practice or training in using that ability. It would be useful to broaden our conceptual framework for studying word perception by supplementing a

general theory of perceptual development like Piaget's with important information about individual differences.

The anagram task, as yet only rarely used in developmental research (Beilin, 1967; Elkind, Horn, and Schneider, 1965; Stevenson and Odom, 1965; Stevenson, Klein, Hale, and Miller, 1968), seems particularly appropriate for the study of both word perception processes and problem solving strategies. Word perception is obviously an essential part of the anagram task, and different strategies used by subjects are relatively easy to identify by varying parameters of the task such as anagram type (the set of letters presented to the subject may be either in word form or in nonsense form), frequency of the solution-word, letter transition probabilities of the solution-word, etc.

The perceptual processes proposed by Piaget's theory of perceptual development should result in age differences in strategies used in the anagram task. The young child has very little ability, and therefore very little tendency, to rearrange the letters of an anagram in attempting to solve the problem. Rather, he perceives the anagram as whole, and then proceeds to search his word store for words whose letters match those in the anagram before him. While our present knowledge of memory and search processes does not allow us to be very specific about how the search is carried out, we would suspect on the basis of children's verbal associations, that words similar in sound to the word or nonsense anagram would be called up for comparison. However, the main suggestion here is that the young child does *not* tend to rearrange the letters of an anagram in trying to solve the problem, but rather uses a whole-word strategy in which he produces words from memory and checks to see if they match the anagram letters.

On the other hand, the older child, as a result of both his increasingly decentered perception and his growing experience with and knowledge of the characteristics of his language, tends more to break the anagram down into its component parts and to rearrange those letters or syllables into likely sequences. The evidence for this strategy in adults has been presented elsewhere (Furby, 1968). It is quite clear why the older child chooses to use a new strategy which is now at his disposal—it is much more effective. Not only is the whole-word method ineffective for him since his word associations are likely to be on the basis of meaning (at least when the anagram is a word), but

furthermore, his knowledge of letter transition probabilities is extremely useful in ruling out a large percentage of the possible letter rearrangements (Ronning, 1965). Thus, a search process based on letter rearrangement turns out to be more efficient in general than one based on calling up whole words.

Individual aptitude differences should play a role in determining strategies used in solving anagrams. It has been demonstrated that spatial visualization ability is important in solving complex problems in general (Frandsen and Holder, 1969) and in solving anagrams in particular (Gavurin, 1967). Thus, with the above picture of developmental changes in perception in mind, it follows that spatial ability should be more important as a determinant of the performance of older children than of the performance of younger ones, since the former are more likely to use a strategy that requires spatial ability. Furthermore, individual differences in strategy used at any one age level may depend upon individual differences in spatial ability. Those children who are low in spatial aptitude may stick to a whole-word approach much longer than the average child, indeed a few may still use such a strategy in adulthood as Beilin and Horn (1962) have shown. Frederikson (1967) has presented data supporting this idea that aptitudes affect strategy choice.

On the basis of the above analysis, it was expected that spatial ability would correlate with anagram performance for those cases where letter rearrangement is the predominant strategy. Therefore, anagram performance should be more predictable from spatial ability scores for older children than for younger ones. Furthermore, spatial ability should correlate more highly with older children's performance on nonsense anagrams (where they are more likely to rearrange letters) than it does with their performance on word anagrams (where they tend to use a whole-word strategy). This differential between word and nonsense anagrams can be explained by Gestalt principles which predict that it is easier to break apart (perceptually) nonsense anagrams than it is to do so for word anagrams.

METHOD

Subjects

The subjects were public school children in Palo Alto, California. There were 24 boys and 24 girls tested in each of three grade levels, second (mean age of 7 years, 11 months), fifth (mean age of 11 years, 2 months), and eighth (mean age of 13 years, 11 months). The only selection criteria used were that subjects have no perceptual abnormality, no outstanding reading disability, and not be bilingual.

Materials

Aptitude tests. Five aptitude tests were administered: two measures of decentration, two measures of linear spatial visualization, and one measure of general spatial ability.

(1) *Decentration* is the ability to free oneself from the given or dominant perceptual configuration and to analyze that configuration into its component parts, thus making possible a new perceptual organization of the given stimuli. The content of one of the decentration tests was figural and the content of the other was symbolic.

(a) Three-letter Words: This is a slight modification of a test developed by Bechtoldt (1969), the only change being in the length of the words (in order that the difficulty level be appropriate for very young children). The test consists of lines of equally-spaced letters within which can be found three-letter words, randomly-spaced. The subject's job is to circle all of the three-letter words he can find.

(b) Hidden Patterns: This is a test developed by Thurstone (1944) which consists of a given model figure and a number of more elaborate choice figures. The subject must indicate in which of the choice figures the model is embedded.

(2) *Linear spatial visualization* is the ability to manipulate figures and symbols which differ in their linear order from the given arrangement. One figural content and one symbolic content test were used to measure this ability.

(a) Jumbled Letters: This test consists of a string of three to five letters with arrows indicating possible new positions for these letters and thus a new left-to-right order for the given string of letters. In addition, there are a number of possible rearrangements presented,

and the subject's task is to indicate which of these possibilities represent the new order that would result from rearranging the letters as indicated by the arrows.

(b) Jumbled Figures: This test differs from Jumbled Letters only in content, the stimuli being familiar shapes (circles, triangles, etc.) rather than symbols.

(3) *General spatial visualization* is "the ability to apprehend visually the spatial arrangements of things in one's psychological field" (Guilford, 1967, p. 93). This was measured by Card Rotations, a widely-used test developed by Thurstone (1938).

Reading achievement. Reading level was measured by standardized tests administered by the schools. For the second graders this was the Stanford Achievement Test (SAT), Form 4F—Primary IW. For the fifth graders the measure was the Sequential Test of Educational Progress (STEP), Level/Form 4A. For eighth graders it was also the STEP, Level/Form 28.

Anagrams. The anagrams were constructed to vary systematically on the following parameters.

(1) *Solution-word frequency*: High frequency words were all (a) AA words in the Thorndike-Lorge (1944) adult count (found at least 100 times in 1 million words) and (b) greater than 500 in the juvenile count (found at least 500 times in 4.5 million words in 120 juvenile books). Low frequency words were all (a) less than 100 in the adult count and (b) less than 500 in the juvenile count. One addititional criterion was that all subjects know all the words in written form. This was assured by pre-testing the words on second graders.

(2) *Solution-word letter transition probability* (LTP): The Mayzner and Tresselt Tables of Bigram Frequencies (1965) were used for computing letter transition probabilities. They indicate the number of times that a given bigram was found in a given position in words of a given length in their count of 20,000 English words. The LTP of a word is computed by summing all of the bigram frequencies for that word. For high LTP solution-words the mean LTP was 296; for low LTP solution-words the mean was 174.

(3) *Anagram letter transition probability*: The LTP of each anagram *stimulus* was calculated and the anagrams were chosen so as to equate

anagram LTP's as nearly as possible, thus avoiding differences in solution-times due to the effects of the LTP of the anagram stimulus. Thus, throughout this study LTP of *solution-word* is systematically varied while LTP of *anagram* is equated across various types of anagrams.

(4) *Anagram type*: The stimulus presented to the subject was either a word (word anagram) and his task was to make another word using all of the letters presented but no additional ones, or the stimulus was a nonsense arrangement of letters (nonsense anagram) and the subject's task was to make a word using all of the given letters and only those letters.

(5) *Word length*: The stimulus (and thus the solution-word) was either three letters or five letters long.

Design

There were four different lists of 32 anagrams per list. Each list contained two instances of every possible combination of the above four parameters (they were equated on the fifth parameter, anagram LTP). The order of the various types of anagrams within a list was systematically counterbalanced so as to control for any order effects. Each subject received one of the four lists (32 anagrams). Thus we have a six-way design with the following factors: age (second, fifth, and eighth graders), sex (boys and girls), anagram type (word and nonsense), solution-word frequency (high and low), solution-word LTP (high and low), and anagram length (three letters and five letters).

Procedure

Every subject was tested individually by one of four experimenters. The five aptitude tests were administered first followed by the 32 anagrams. Each anagram was in block letters on 3×5 cards. The subject was allowed one minute in which to produce the correct solution. If he succeeded in less time, the number of seconds to solution was recorded and he proceeded to the next one. If he did not find the right answer within one minute, he was given a score of 60 sec. for that anagram, told the correct answer, and then directed to go on to the next anagram.

RESULTS AND DISCUSSION

Anagram Measure

There were two different measures of performance on anagrams, (1) solution-time and (2) whether or not the solution was arrived at within the time-limit. Following the advice of Winer (1962) the time scores were transformed to logs and the number correct scores were transformed according to the formula, $^{x}\text{transformed} = \sqrt{^{x}\text{observed}} + \sqrt{^{x}\text{observed} + 1}$. As in previous studies, the correlation between these two measures was very high: .89 for second graders, .83 for fifth graders, and .81 for eighth graders. Since the pattern of results is very similar for the two different measures, only the analysis using number correct scores will be presented here.

Table I presents the means and standard deviations of both the raw and transformed scores by grade.

Preliminary tests revealed no experimenter nor anagram order effects.

Aptitude Measures

The means and standard deviations of the aptitude measures are presented by grade in Table II and their intercorrelations appear in Table III.

The two tests used to measure decentration, Hidden Patterns and Three-letter Words, correlated significantly with one another for second and eighth graders but not for fifth graders. In addition, it should be noted that decentration was soundest as a construct for eighth graders. The two measures of decentration correlated .43 with one another and also both correlated significantly with eighth graders' reading achievement. Thus there seems to be some justification for considering them measures of the same factor. On the other hand, word recognition is required in Three-letter Words, a process not at all involved in Hidden Patterns.

Jumbled Figures and Jumbled Letters were highly correlated with each other at all grade levels. However, neither correlated significantly with Card Rotations except for grade 2 where Jumbled Figures was significantly related to Card Rotations. This difference between the general spatial ability measure and the linear spatial ability measures seems to indicate that the two different kinds of

TABLE I. Means and Standard Deviations of Raw and Transformed Anagram Scores (Number Correct) by Grade

	Grade 2	Grade 5	Grade 8
Raw Score			
Mean	18.63	23.42	26.60
s.d.	5.27	3.68	2.96
Transformed Score			
Mean	8.64	9.75	10.40
s.d.	1.03	.77	.69

Note. All figures are based on 48 cases.

TABLE II. Means and Standard Deviations of Aptitude Tests by Grade

	Grade 2		Grade 5		Grade 8	
Aptitude Test	Mean	s.d.	Mean	s.d.	Mean	s.d.
Hidden Patterns (maximum = 100)	8.56	3.46	15.65	6.50	29.04	8.81
Three-letter Words (maximum = 40)	6.25	3.55	12.52	3.85	18.29	5.98
Jumbled Figures (maximum = 30)	25.63	3.74	27.35	2.51	28.73	1.76
Jumbled Letters (maximum = 30)	26.06	3.99	27.98	2.36	29.08	1.88
Card Rotations (maximum = 112)	20.71	5.52	26.63	5.33	36.17	8.87

Note. All figures are based on 48 cases.

measures are quite independent. Although Card Rotations is considered a measure of *general* spatial ability, it actually only requires the ability to visualize *rotations*; Jumbled Figures and Jumbled Letters require the ability to visualize linear (left to right) spatial rearrangements.

Relation of Aptitude Measure to Anagram Performance

Decentration. Hidden Patterns, the measure of decentration with figural content, did not correlate significantly with the anagram performance of any of the three grade levels. Three-letter Words on the other hand, the symbolic measure of decentration, correlated significantly with total anagram score for all three grade levels (see Table III).

The above analysis of the anagram task and of strategies used in it

TABLE III. Correlations Between Aptitude Tests and Anagram Performance by Grade

	Hidden Patterns	*Three-letter Words*	*Jumbled Figures*	*Jumbled Letters*	*Card Rotations*	*Reading Achievement*
Three-letter Words	.28* .10 .43**					
Jumbled Figures	.20 .32* .13	.25 .38** −.09				
Jumbled letters	.30* −.02 .20	.23 .25 −.16	.70** .44** .88**			
Card Rotations	.26 .27 .18	.27 .04 .05	.28* .09 .11	.18 −.18 .17		
Reading Achievement	.25 .14 .33*	.20 .16 .38**	.05 .24 .31*	.22 .19 .19	−.05 .00 .14	
Total Anagram Score	.15 −.06 .08	.50** .34* .39**	.18 .29* .05	.06 .33* −.06	.06 .23 .00	.33* .37** .33*
Word Anagram Score	.00 −.05 −.08	.44** .29* .46**	.13 .08 .02	−.02 .20 −.06	−.06 .33* −.06	.20 .23 .13
Nonsense Anagram Score	.27 −.05 .24	.49** .37** .09	.21 .38** .06	.13 .38** −.02	.18 .23 .07	.43** .42** .40**

*p < .05
**p < .01
Note: The first figure in each cell is the correlation for 2nd graders, the second for 5th graders, and the third for 8th graders. All correlations are based on 48 cases.

predicted this significant correlation between the ability to decenter and anagram performance: a letter rearrangement strategy is more efficient in most cases than a whole-word strategy, given a minimal knowledge of LTP's in one's language and given an anagram whose solution-word LTP is at least average. Thus, those subjects, at any

age level, who are best able to decenter, are also those most likely to use a letter rearrangement strategy successfully simply because those who cannot decenter have no choice—they are unable to rearrange letters. Thus, those subjects most able to decenter also solve the most anagrams.

The discrepancy between Hidden Patterns and Three-letter Words in their relations to anagram performance is undoubtedly due to their differential content. Hidden Patterns is a general figural measure of decentration and the content of both parts and wholes has little meaning. Three-letter Words is a verbal-symbolic measure and its parts (three-letter words) are meaningful. Thus, the content of the Three-letter Words task is more similar to that of anagrams than is the content of Hidden Patterns. In addition, Three-letter Words requires word recognition, as does anagram solving when a letter rearrangement strategy is employed.

Closer analysis reveals the following: for eighth graders, Three-letter Words correlated significantly only with word anagram performance. The lack of a relationship between Three-letter Words and nonsense anagrams seems to be due to the fact that almost all eighth graders are able to decenter sufficiently to employ a letter rearrangement strategy on nonsense anagrams. Decentration does not differentiate between fast and slow solvers because both types of subjects can decenter adequately for the task, and thus decentering ability does not account for individual differences in performance. Following this line of reasoning, why is there a correlation between decentration and eighth graders' performance on word anagrams? As argued above, it is more difficult to break down a word into its component parts than it is to break down a nonsense arrangement. This Gestalt effect explains why word anagrams are more difficult for adults than nonsense ones. Therefore, it seems likely that perceptual decentration has developed in eighth graders sufficiently so that almost all of them can break a nonsense anagram into its component parts, but not sufficiently so that most of them can break a word anagram into its component parts. Thus, decentration still differentiates between fast and slow solvers on word but not on nonsense anagrams.

Spatial ability. The general measure of spatial visualization, Card Rotations, was not significantly related to total anagram performance

at any of the three age levels (see Table III). Jumbled Figures and Jumbled Letters, the two measures of *linear* spatial visualization, were unrelated to the anagram performance of second graders and of eighth graders, but they were both significantly correlated with the fifth graders' total anagram score. This is consistent with the analysis presented above that Card Rotations measures the ability to visualize *rotations* while Jumbled Letters and Jumbled Figures measure the ability to visualize *linear* (left-right) rearrangements.

The lack of correlation for second graders between anagram performance and linear spatial visualization is consistent with the hypothesis that they are using a whole-word strategy. For fifth graders, closer analysis reveals a significant relation between linear spatial ability and nonsense anagram performance but no such relation for word anagrams (see Table III). This is consistent with both the theory and findings on decentration reported above. Older children seem to be able to break down perceptually a *nonsense* anagram into its individual letters or sub-groups of letters, and thus they tend to use a letter rearrangement strategy for which spatial ability is important. On the other hand, they have more difficulty in breaking down a *word* anagram for which they therefore use a whole-word strategy and diminish the importance of spatial ability.

The eighth graders show no relation between linear spatial ability and word anagram performance for the same reason as fifth graders. However, the predicted correlation between spatial ability and performance on nonsense anagrams was not confirmed. This appears to be due to a ceiling effect (see Table II) resulting in the standard deviations of scores on Jumbled Figures and Jumbled Letters decreasing as age increases. Thus these tests differentiate very little between older subjects high in linear spatial ability and older subjects low in that ability since almost all of the eighth graders have sufficient linear spatial ability to visualize rearrangements of strings of letters up to five units long. A linear spatial visualization test requiring the rearrangement of more than five letters or figures would certainly differentiate better among subjects. *However*, such a differentiation would be meaningless when it is at a level far above that required by the task.

A similar pattern of results is obtained by regressing anagram performance on decentration and examining the partial correlations of

TABLE IV. Partial Correlations of Jumbled Letters (Linear Spatial Visualization) with Anagram Scores after Regressing on Three-letter Words or Hidden Patterns (Decentration), by Grade

	Grade					
	2		5		8	
Anagram Type	*Three-letter Words*	*Hidden Patterns*	*Three-letter Words*	*Hidden Patterns*	*Three-letter Words*	*Hidden Patterns*
Word	.26	.08	−.11	−.17	−.08	−.15
Nonsense	.07	.00	−.34*	−.47**	−.03	.05
All	.18	.04	−.28*	−.35*	−.07	−.04

*p<.05
**p<.01

spatial ability with anagram performance as presented in Table IV. As expected, after regressing on ability to decenter there is no relation between linear spatial ability and anagram performance for second graders. For fifth graders there is a significant partial correlation for *nonsense* anagrams but not for *word* anagrams. For eighth graders there is no relation between linear spatial ability and either word or nonsense anagram performance when decentration is partialled out. These results are all strictly parallel to those presented immediately above and the same interpretation applies.

Reading Achievement

Previous studies (Elkind, et al., 1965; Stevenson and Odom, 1965; Stevenson, et al., 1968) have found positive correlations between reading achievement and anagram performance. The present study helps to specify the nature of this relationship: reading achievement correlated significantly with *nonsense* but not with *word* anagram performance (see Table III). A possible interpretation is that a letter rearrangement strategy (more likely for nonsense anagrams) requires the recognition of a string of letters as a word (i.e., reading) while a whole-word strategy (more likely for word anagrams) requires the subject to call up words from his word store and to see if their letters match those in front of him. The latter does not necessitate word recognition.

Summary

These results suggest that: (1) Piaget's theory of perceptual development as a process of increasing ability to decenter is a valid one, (2) the level of perceptual development plays an important role in the reading process, and (3) both perceptual development and individual aptitude differences are important determinants of children's problem solving strategies.

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The Work of Bruce Rogers

James Wells

No designer has played a more influential role in the revival of the typographic arts in America than Bruce Rogers (1870–1957). His work spanned half a century; its significant contribution is based on his adaptation of historic styles to machine production while maintaining the highest possible design and technical standards. Rogers' approach was that of an artist (rather than that of a scholar or a practicing printer), which he demonstrated with remarkable versatility—from the playful limited editions to the majesty of the Oxford Bible.

It is most fitting that Purdue University, with its fine Bruce Rogers Collection, much of it the gift of B.R., should honor the memory of one of its most distinguished alumni.[1] His contribution to American book design and typography—nay, to book design and typography wherever they are practiced in the western world—has been a significant one, and will undoubtedly prove a lasting one. The first half of the twentieth century witnessed a remarkable revival in the arts of printing and typography, based upon a reappraisal of the past and an adaptation of historic styles to machine production. Rogers was one of the most skilled of the designers who helped to bring about that revival. We are experiencing today another industrial revolution in the printing trade, much like that of the nineteenth century, in which new technology has outstripped the capacity of the designer to harness and utilize his machines; photocomposition, electronic composition, and the like have reached the stage at which more exacting designers and customers are required—people like B.R., who will not be satisfied until they have achieved the best which is possible.

To discuss the work of Bruce Rogers is not an easy task, since there was so much of it, and so much merits mention. Inevitably, in so large a body of work, spanning better than half a century, there are differences in quality; some books are better than others. The best, I am sure—and there are many—will stand the test of time, a few of

Visible Language, VI (Winter 1972), 59–78.
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them among the typographic masterpieces not only of our century but of the ages.

A brief resumé of B.R.'s various periods may make my comments somewhat easier to follow. Like that of Picasso, his work divides rather neatly into stylistic segments, although with Rogers the nomenclature is apt to be that of geography rather than color. Again, like Picasso, there is enough inconsistency within each to confound the unwary. There has been a great deal published about Bruce Rogers: the catalogue of the John M. Wing Foundation on the History of Printing, of which I am custodian, shows several dozen books and articles by him or about him; I am sure we don't have everything on the subject, by any means.[2]

B.R. found his métier, still in the late nineteenth century a comparatively new one, surprisingly easily. On leaving Purdue, where he had been one of the two male members of the art school—the other was John T. McCutcheon, whose centenary occurred within a few days of B.R.'s—he went, in 1890, to seek his fortune in the city—B.R. chose Indianapolis, the closest one; McCutcheon went to Chicago. He landed a job as illustrator on *The Indianapolis News*, but quickly abandoned it—the noise and the pressure were too much for him. B.R. always loathed rush and routine, above all the routine of getting up on time, and newspapermen were supposed to thrive on long hours and little sleep. There followed a series of false starts: landscape painting, which was pleasant but didn't offer a living; office boy in a Kansas railroad yard, working for his brother, more lucrative but extremely boring; back to Indianapolis as general draughtsman in a short-lived illustration agency. J. M. Bowles, whom he had met during his newspaper days, had become editor of a new quarterly called *Modern Art*, and gave B.R. occasional commissions. In 1894, when Bowles was asked to print a book on the Walters Collection of paintings, he asked B.R. to help with it; he designed the title page, headbands, and initials, and helped with the typography. The general style was Indianapolis Kelmscott. B.R. also did various other free-lance jobs occasionally, among them one for T. B. Mosher and several for Herbert Stuart Stone and Ingalls Kimball, who had recently arrived in Chicago from Cambridge.

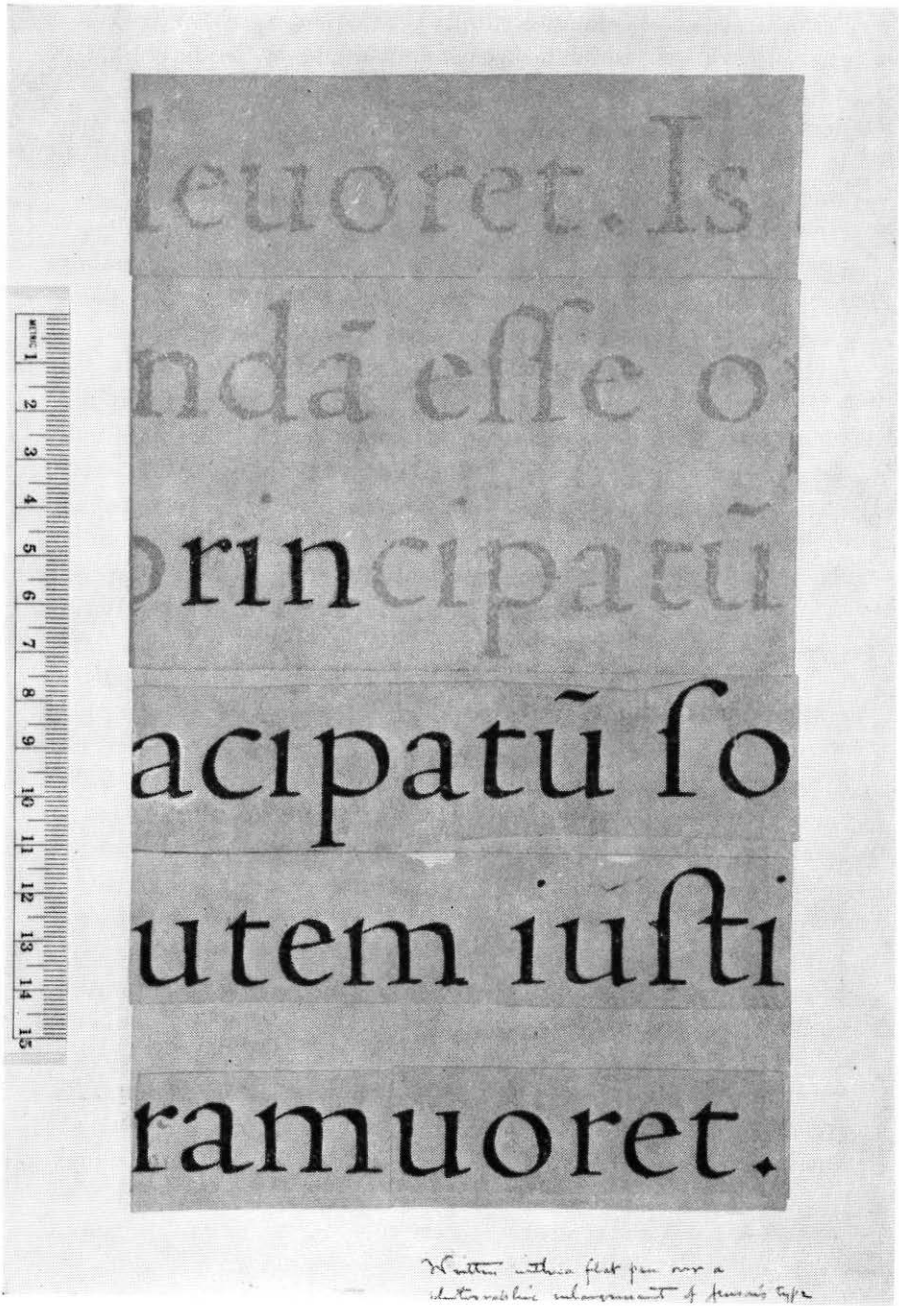
In 1895 *Modern Art* moved to Boston at the invitation of the Prang Press, famous for its chromolithography. Soon B.R. was asked to

follow it, to become designer at fifty cents an hour, with a weekly guarantee of $10, which he occasionally made—when he could resist the temptation of wandering off to acquaint himself with Boston and the New England countryside, to which he took at once. It was a good time to be around Boston: Updike, who was to be a lifelong friend and a strong influence, was also just starting out; Karl Heintzemann had recently moved into a splendid new plant designed by Bertram Goodhue; Will Bradley would soon arrive; there were connoisseurs and collectors, especially around Harvard, like Charles Eliot Norton and Herbert Copeland, the latter still an undergraduate and about to become a publisher.

In 1896 B.R. made one of the most important connections of his professional life. He accepted a post as book designer offered him by George H. Mifflin of the Houghton Mifflin Company in its trade book department. Four years later he was appointed director of a new department to publish fine editions, mainly of classical texts, under the imprint of the Riverside Press Editions. Some sixty titles appeared before the department was closed in 1911, a result of constantly rising costs and diminishing profits.

The Riverside Press editions show B.R. gradually learning his craft under almost ideal conditions. Mifflin was a generous employer. When B.R. left the Riverside Press, he was earning $6,000 a year, an extremely good salary in 1911. More important, he was given full support in his goal of producing the finest possible books; he was given the types, the paper, the workmen, and above all the time to achieve the results he wanted. To this period belong B.R.'s rediscovery of the Brimmer types (later ascribed by Stanley Morison to John Bell), his first reworking of Jenson roman type for an edition of Montaigne's essays, and his Riverside Caslon. For the 1909 translation of Bernard's *Geofroy Tory* Rogers spent months retouching photographs of Tory's woodcuts, achieving a splendor of printing rarely found in Tory's own books. But despite all these opportunities B.R. grew bored and restive at the necessity of meeting publishers' deadlines, and longed for the independence to travel and to think. One suspects that Houghton Mifflin may also have tired of so much unprofitable prestige. At any rate, there was an amicable parting of the ways, and B.R. finally had time for a long-desired trip abroad.

He sailed in 1912 to spend most of that summer in England.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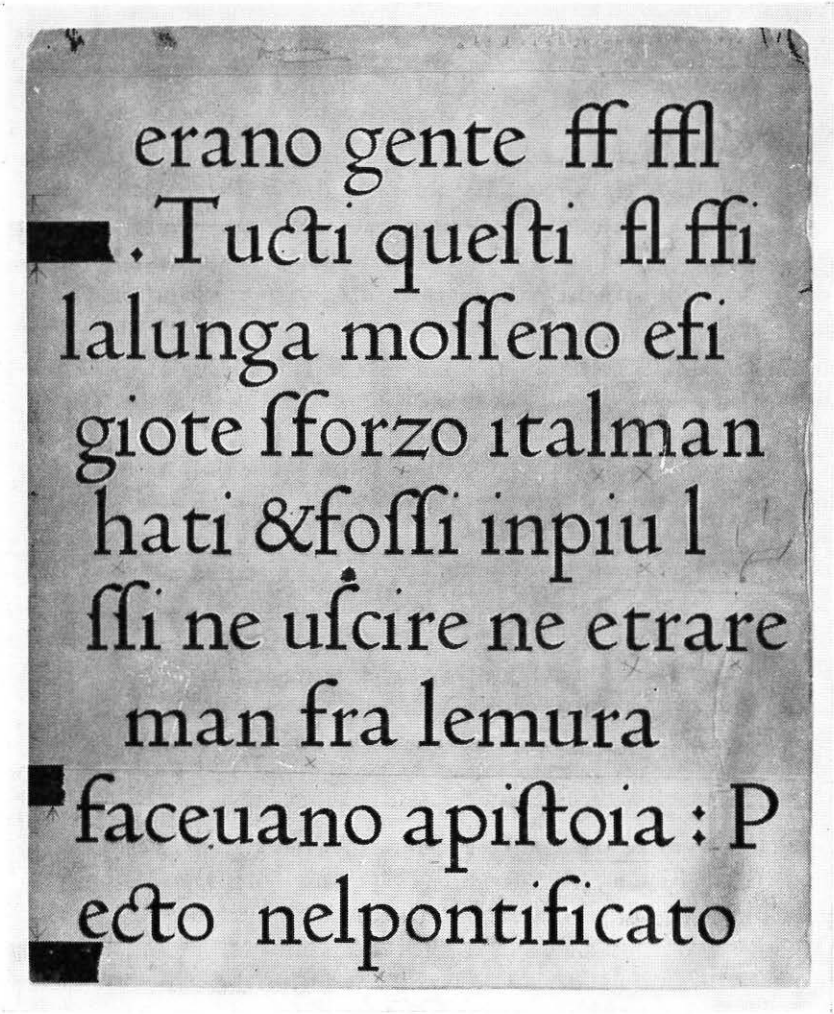


Figure 1 (opposite). Bruce Rogers' drawings for Centaur type written freely over enlargements from Jenson's 1470 *Eusebius*, with a note in his hand on the method employed in making them. From the John M. Wing Foundation of The Newberry Library, Chicago.

Figure 2 (above). Drawings for Doves type made in Emery Walker's office from enlargements of Jenson's roman. The markings are presumably by Walker, who supervised the design of the type for use by the Doves Press which he owned in partnership with Cobden-Sanderson. From the John M. Wing Foundation of The Newberry Library, Chicago.

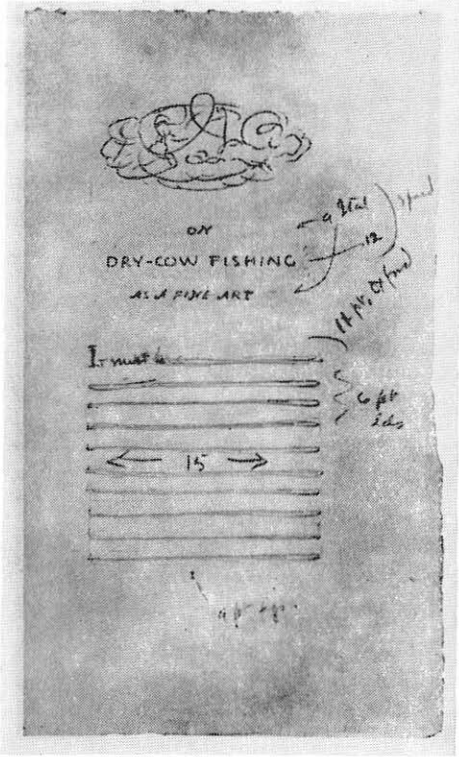
During the voyage he wrote an article for a London *Times* printing supplement, in which he shrewdly surveyed the current American scene, with sound criticism of the work of many designers, including his own. He was probably an Anglophile even before the trip; there is no doubt that he returned as one. But unfortunately he saw no prospect of earning a living in England and so he came back to hang up his shingle as a free-lance designer. In an advertising circular he announced his availability to handle "not only the details of book decoration, viz., covers, title pages, initials, vignettes, and other page ornaments, but also for a wider variety of uses, among which may be named bookplates, letterheads, type faces, type ornaments, and fine bindings." Some of his best work, incidentally, can be found among this "wider variety"—his bookplates, especially, and, above all, his Centaur type. The latter owed its inception to a commission from Henry Watson Kent, who wanted a distinctive typeface for the Metropolitan Museum Press, to be used for labels, catalogues, and the like. Rogers had experimented with Jenson's roman at Houghton Mifflin; at that time, in a 1909 letter to the editor of the *Dial*, he called it unequivocally "the Roman letter . . . done once, perfectly for all time." The copy of Jenson's *Eusebius* which he used as a model, and the drawings for the type, made from blown-up photographs freely drawn over, are among the most prized possessions of the John M. Wing Foundation. The book, a splendid copy, is in a superb binding B.R. designed for it in memory of my predecessor, Ernst Detterer, which was executed by Harold Tribolet at the Lakeside Press Extra-Bindery. By 1915 B.R. had enough of his new type to print at the Montague Press of his friend Carl Purington Rollins an edition of Guérin's *The Centaur*. The book is one of his finest achievements. Its restrained design shows off admirably the purity of line and delicacy of detail of his new typeface.

In 1916 B.R. decided to try once again to settle in England—certainly not the most opportune time for such a move. He was encouraged to do so by Emery Walker, whom he had met in 1912, and who became one of his closest friends and staunchest supporters. Walker is one of the unsung heroes of the revival of fine printing. He had an instinctive nose for quality, a keen eye, and unfailing generosity, as his dealings with Morris, Cobden-Sanderson, St. John Hornby, Rogers, and many others demonstrate. The Mall Press,

which he established with Rogers, produced only one book, Dürer's *On the Just Shaping of Letters*, before wartime shortages closed it down. There followed two years at Cambridge where, at the recommendation of Sidney Cockerell, the Syndics appointed B.R. Typographical Consultant to the Press. The results of the sojourn were meagre, but important; his report on the typographical materials of the Press, and on its needs, prepared the way for the achievement of Stanley Morison and Walter Lewis and their successors in making the Cambridge University Press one of the most distinguished learned presses in the history of scholarly printing—distinguished not only for its editorial quality but also for the excellence of its design and printing. Despite the difficulties of living and working in Cambridge, described in gloomy detail in his letters to Kent, B.R. was proud of his association with Cambridge, as later with Harvard and Oxford; he congratulated himself on his good fortune in having worked in three institutions willing and able to maintain the highest possible publishing standards.

In 1919 Rogers returned to the freedoms and frustrations of free-lancing, more difficult when there was a family to support. From 1920 to 1927 these difficulties were lessened by his appointment as typographical advisor to Harvard University Press, an appointment highly advantageous to both sides. To B.R. it meant a steady income and the opportunity to design serious books, which he enjoyed. In a speech delivered at a testimonial dinner to George Macy of the Limited Editions Club he complained, with wit, delicacy, and no little daring, of the boredom of printing books "fated to live mostly in glass-fronted bookcases," and rarely if ever read. For Harvard he designed monographs, festschriften, catalogues, bibliographies—all the bread and butter staples of a scholarly press—as well as occasional bibliophilic editions for private and institutional customers.

But the most fruitful of B.R.'s many associations with a printer-publisher was that with William Edwin Rudge which began in 1919 and lasted until about 1928. At Mount Vernon he found a well-equipped shop, a highly sympathetic proprietor, and a relaxed and gentlemanly attitude about such mundane matters as time and money. Moreover, Rudge was a gifted salesman, who did much to create the Rogers vogue among collectors, and to make his work highly sought after in the rare book shops and auction rooms. Here B.R. conducted what amounted to an advanced school of fine book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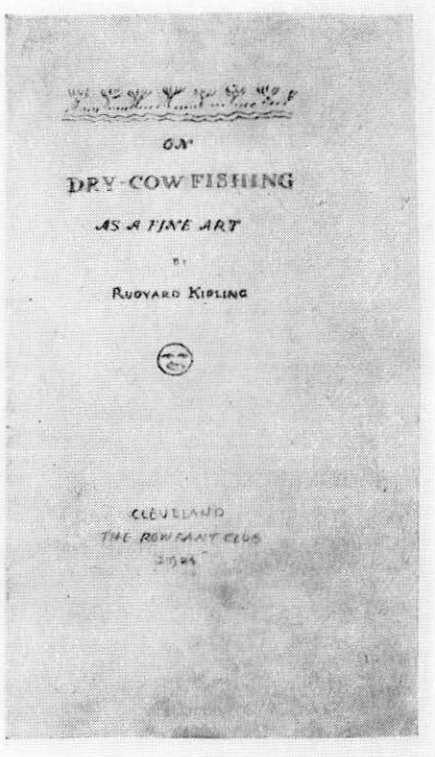
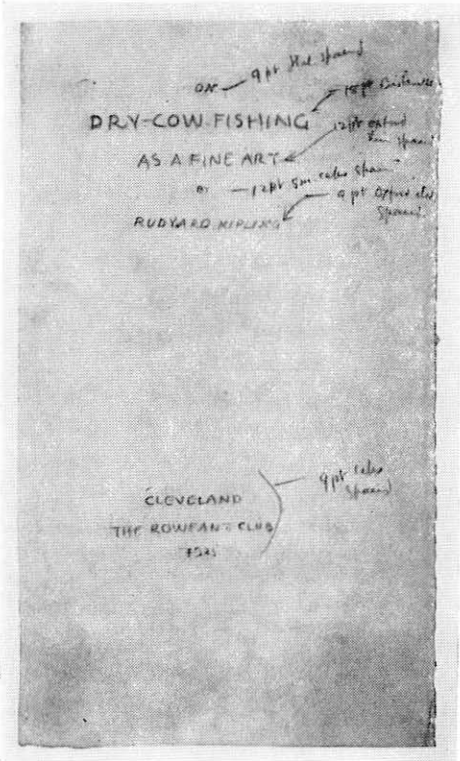
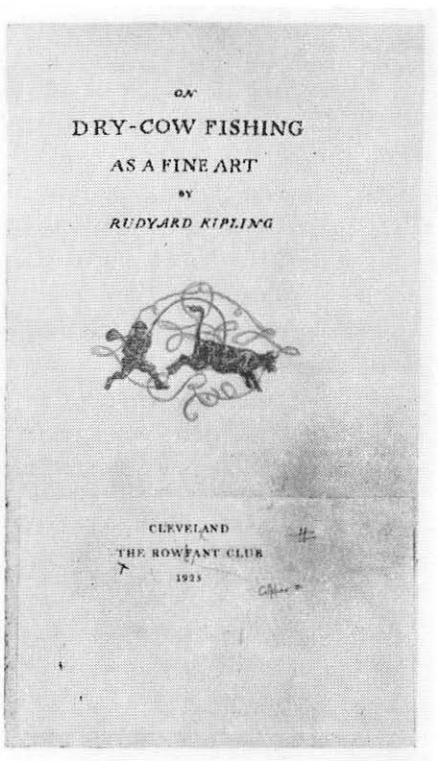
DRY-COW FISHING
AS A FINE ART


ON
DRY-COW FISHING
AS A FINE ART
BY
RUDYARD KIPLING
CLEVELAND
THE ROWFANT CLUB


DRY-COW FISHING
AS A FINE ART
RUDYARD KIPLING
CLEVELAND
THE ROWFANT CLUB


ON
DRY-COW FISHING
AS A FINE ART
BY
RUDYARD KIPLING
CLEVELAND
THE ROWFANT CLUB
1925

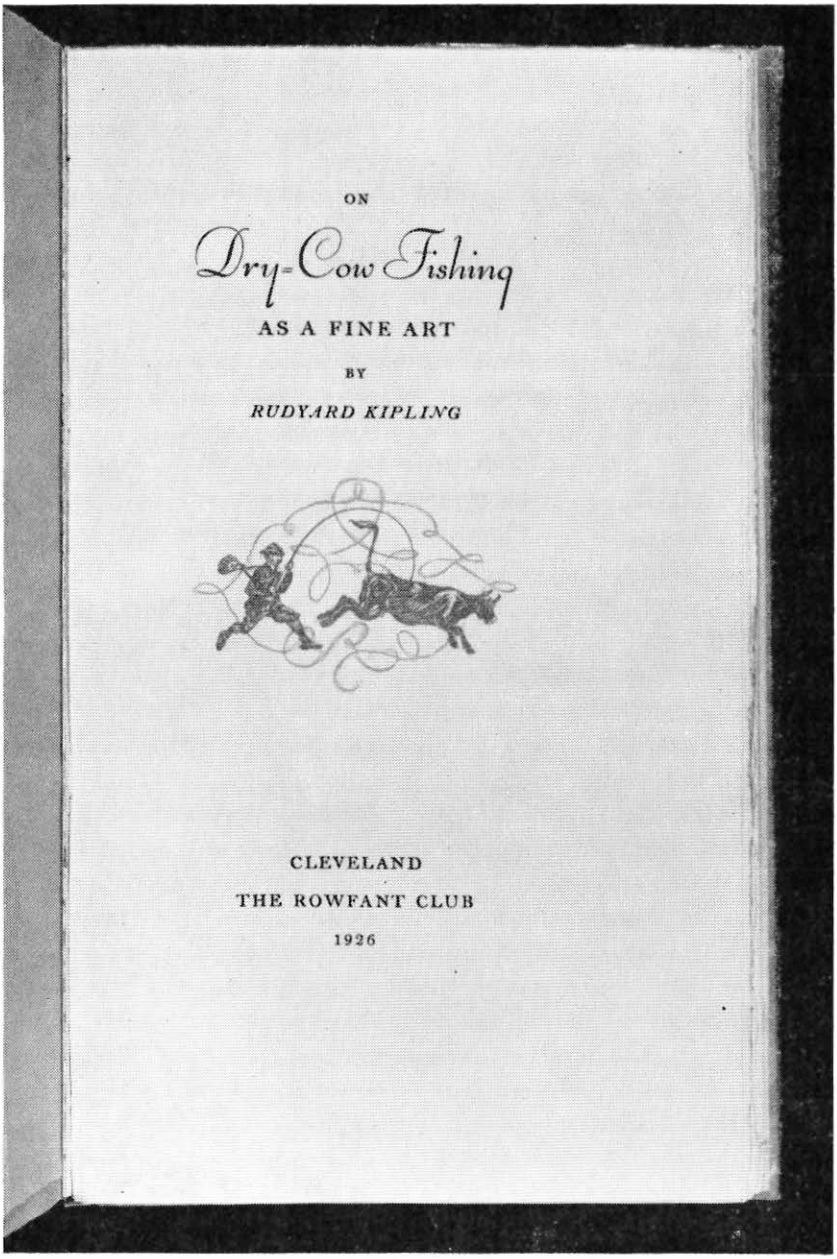


Figure 3. Several of Rogers' preparatory layouts (from *The Work of Bruce Rogers*. New York: Oxford University Press, 1939) and the final title page.

design and production, whose student assistants included Joseph Blumenthal, Peter Beilenson, Frederic Warde, John Fass, Melvin Loos, Herbert Simon, James Hendrickson, and many others. Here he had the time and opportunity to develop the playful style, with its clever and dexterous manipulation of type ornaments, which forms one of the most engaging facets of his work. To this period belong such books as *The Pierrot of the Minute*, *The Symbol and the Saint*, *On Dry-Cow Fishing as a Fine Art*, and *The Silver Cat*—elegant trifles, perhaps, but supremely elegant ones. Here, too, were printed his first books for the Limited Editions Club, one of his most faithful patrons.

B.R.'s second long sojourn in England, this time for four years, began in 1928. Old friendships were resumed and new friends made, among them T. E. Shaw (Lawrence of Arabia), John Johnson of Oxford University Press, and Walter Lewis of Cambridge University Press. From this period came three of his greatest books, all printed in Centaur: the magnificent Oxford lectern Bible, which I consider not only his masterpiece but one of the finest editions of the Bible of all time; the limited edition of Shaw's translation of *The Odyssey*, published with Walker and Wilfred Merton; and Morison's *Fra Luca de Pacioli*, printed for the Grolier Club at Cambridge. He did several books for Oxford's Hesperides series, one of the most readable I know, and supervised the adaption of Centaur for use on the Monotype. But despite his work and his friends, he grew bored and lonely, and complained to Kent of the monotony and discomfort of his life. In 1932 he returned to his Connecticut home, making annual visits to England until 1939, when the war made further trips impossible.

He remained busy—continuing the great edition of the Boswell Papers for Colonel Isham; finishing the Pforzheimer Catalogue begun by Frederic Warde, and Porter Garnett's Frick Catalogue; designing the thirty-seven volume edition of Shakespeare for the Limited Editions Club. The latter contains some of his loveliest type-ornament, executed in varied colors. As a whole, however, it is unsatisfactory, a result of the unevenness of the illustration, parcelled out among a number of artists who differed greatly in talent. No one, not even B.R., could give it unity. In 1949 he designed his second folio Bible, using type ornament to give the book an oriental flavor. I cannot share his preference for it over the Oxford Bible—I find it a bit precious, a bit fussy. As he grew older he lost the faculty of self-

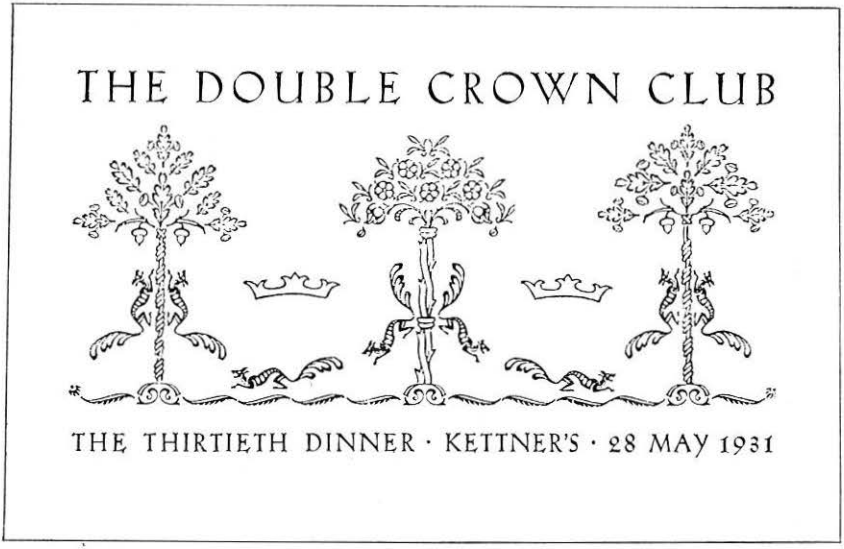
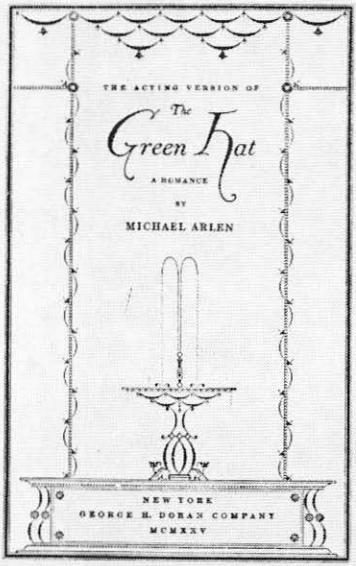


Figure 4. Type-ornament design by Rogers for The Double Crown Club, London.

criticism. When his edition of Dante's *Divine Comedy*, in which he redrew Botticelli's drawings rather weakly, appeared in 1955 he called it the most important book of his life. I doubt whether many impartial critics would share that judgment.

One of the criticisms frequently levelled against B.R. during his lifetime—and I suspect it rankled a bit—was that he was an eclectic typographer. Eclecticism today has become a dirty word—imagination, innovation, are all the thing—although, when one looks closely at current styles, whether in clothing or décor, in architecture or typography, one realizes that eclecticism is very much the vogue again. How else explain the fads for art nouveau, for Edwardian costume, for Victorian lettering? Yet, even if the charge were well founded—even if B.R. did borrow from the past—he always reinterpreted his borrowings, fused into them not only something of the present but, even more important, something of himself. An example can be seen in the Centaur type. Jenson's roman has been used as a model and an inspiration by many type designers, among them Emery Walker, who used it at least twice: as one of the sources for Morris's Golden, the other being the roman of Jacobus Rubeus; and, of course,


THE ACTING VERSION OF

The Green Hat

A ROMANCE

BY

MICHAEL ARLEN

NEW YORK
GEORGE H. DORAN COMPANY
MCMXXV

living just like everyone else. Now, child, I represent the "Daily Mercury."

MAID. *Daily Tripe!*

REPORTER. Don't be vulgar, please.

MAID. I'll get you chucked out!

REPORTER. I was chucked out downstairs, so I had to come in unofficially.

MAID. Did you?—Well, you'll go out unofficially too! (*Starts up for phone back left.*)

REPORTER (*stopping her*). Come, now, let's have some details. All I know is that the late Mr. Fenwick—

MAID. You know you're like a vulture, you are! Why can't you leave the poor young lady alone?

REPORTER. Now, girl, be reasonable, as I shall only have to make up the news if I don't get it. At the present moment all London is plastered over with placards announcing "A Society Tragedy," "Honeymoon Death," "Was It Suicide!"

MAID (*horror-struck*). The beasts! They don't say that!

REPORTER. They do! So you had better tell me the truth—or I'll be adding "Was It Murder?" (*Door center bursts open and enter* MAN, *who is obviously in authority. He is almost speechless at the sight of the reporter, but not quite. He begins at once a rapid harangue in French.* MAID *corrects him with* "Englishman," *then crosses left to door.*)

MANAGER (*center*). Oh!—You were not climbing up my

SCENES

Act I: Summer, 1915. The sitting room of a suite in the Hotel Vendôme, Deauville.

Act II: Ten years later. Napier Harpenden's flat in Mayfair, London. (The few seconds in which the curtain is lowered in this act must be taken to represent the passage of about an hour.)

Act III: Nine months later. A convent nursing-home on the outskirts of Paris.

Act IV: Four months later. The library of Stilton Marle, Sir Maurice Harpenden's country house, not far from London.

THE

Green Hat

The Acting Version of the Play

ACT ONE

Time: It is the summer of the year 1915.

Scene: The sitting room of a suite on the third floor of the Hotel Vendôme, Deauville. There are two tall French windows right, wide open, showing a terrace wide enough to hold several people. The light seen through the windows is of sunset over the sea. Throughout this act the light imperceptibly darkens into twilight. The room is luxurious, formal. Double doors on the back wall leading to hotel corridor. Double doors on the left wall leading to bedrooms of the suite. It doesn't matter where the chairs, sofas, etc., are, as no one sits down in this Act for more than a second. There are no flowers. A great "Innovation" trunk is somewhere near doors L.

At Rise: At rise of curtain the head of a MAN *appears over the parapet of the terrace outside. He pulls himself up, climbs over the parapet onto the terrace, stealthily business. He is young. He enters stealthily down right.*

for the Doves type. When one compares the Doves with Centaur, both designed by drawing over enlargements of Jenson's type, one immediately notices how much more free, how less rigid is the Rogers version. The same is true of B.R.'s book designs—many people have used Geofroy Tory's borders and decorative elements, but few have used them with the assurance and freedom that B.R. did. He was perfectly willing to redraw, to touch up, to do whatever was required to give the evenness of color, the balance of composition that he wanted on the page. Moreover, he was willing to spend hours of his own labor on the task, as well as countless other hours checking proofs, talking with printers and binders until they had achieved what he sought. The reminiscences of those who worked with him and under him, from the old Houghton Mifflin days through the English days and the Rudge era, reveal that, far from being upset by his high standards and the demands he made, they responded to this, respected it, and valued what they learned by satisfying him. If one wishes an object lesson, I recommend a comparison of the Grolier Club *Pacioli*, printed at Cambridge to B.R.'s specifications, with the recent reprint: the Grolier Club book is a triumph not only of design but of craftsmanship; the reprint is an extremely good reprint, but lacking in color, in texture, in the meticulous attention to detail which, to use a word popular today in another context, constitute soul.

One of my theories about B.R. is that one of the virtues of his eclecticism was his response to the challenge posed by a text—in his best work he was a master of the use of Beatrice Warde's crystal goblet, the vessel which contains without distortion the thought of the author. B.R. chose a style which enhanced the author's words but did not overwhelm them. This is particularly true of the early Riverside Press Books, still among the most readable editions I know of books one wants to read. He was also extremely responsive to two other factors: the climate in which he worked and the demands made upon him by his client.

Figure 5. Design by Rogers for William Edwin Rudge, Inc.; reproduced from the American Institute of Graphic Arts catalogue for the 1925 Fifty Books Exhibition.

Climate is, I admit, an ambiguous word; his letters to Kent complain bitterly about the English climate, and I doubt whether many Cantabrigians will defend too strenuously the Cambridge winters. Rather, I mean the intellectual and aesthetic climate of Oxford and Cambridge and London, which stimulated him and challenged him, and brought out some of his best work. Knowing and working with people like Emery Walker, Walter Lewis, John Johnson, and Stanley Morison had a considerable impact on him. B.R. had a genius for friendship, as his correspondence with such people as Kent, T. E. Shaw, and many others reveals. He also had the ability to win extraordinary loyalty and devotion—perhaps, at times, almost too great a loyalty. He became something of a cult figure and, in late years, when he was receiving less attention and less adulation, he became extremely lonely and depressed.

When I speak of the influence of the client, I mean that his best work was done when he had not only a difficult task but a demanding taskmaster, whom he respected—he was not unlike his assistants and workmen in this way. When dealing with Kent, who acted for the Metropolitan and the Grolier, John Johnson at Oxford, or Stanley Morison and Walter Lewis at Cambridge, he gave his best because his best was expected and understood. This was not always the case when dealing with less particular clients and printers—for no artist can always be at his best, alas.

He reacted, too, to the quality of the text when he designed a book—for he was not only a careful reader, but a sensitive one. We have at the Newberry, in the previously mentioned collection of his correspondence which he presented to the Library back in 1948, several letters which indicate this. The roster of correspondents is impressive: Winston Churchill, not yet knighted, seeking advice on the typography of his life of Marlborough; Ezra Pound, with a query —spelled in this instance with two "e's"—asking whether the close fit of sixteenth-century italic was a deliberate attempt to get long lines of poetry on to a page without breaking words. It has a rather charming line—"I haven't, unfortunately, seen any of your work, although Eliot writes me it is the best now done in America"—followed by "I dare say you have never seen any of the editions I have struggled (from author's angle, not printer's) to produce" and asking for candid advice on their typography. Within a few months, "Bruce

Rogers, Esq." had become "My dear B/R." A letter from Willa Cather demonstrates the author-designer relationship at what must be its best—and perhaps rarest: Miss Cather accepted B.R.'s advice not only on design—"If it suits your plan better to omit the section marks, I certainly have no right to object"—but on style; B.R. objected to "came down the millrace," a Virginia colloquialism, as being rather odd, and Miss C. meekly changed it to "walked along the millrace." Moreover, when he said that the stairs in a millhouse could not possibly creak, because only dried-out timber develops such noises, she "simply threw up her hands and asked for clemency." The closing paragraph throws an interesting light on her methods of working: she was worried that the book, a nostalgic one—*Sapphira and the Slave Girl*, I think it was, from the date—was cut severely, for fear of being diffuse; this may have resulted in a bit of vagueness in some places, but—"The chapters and paragraphs which I eventually cut out weighed exactly six pounds."

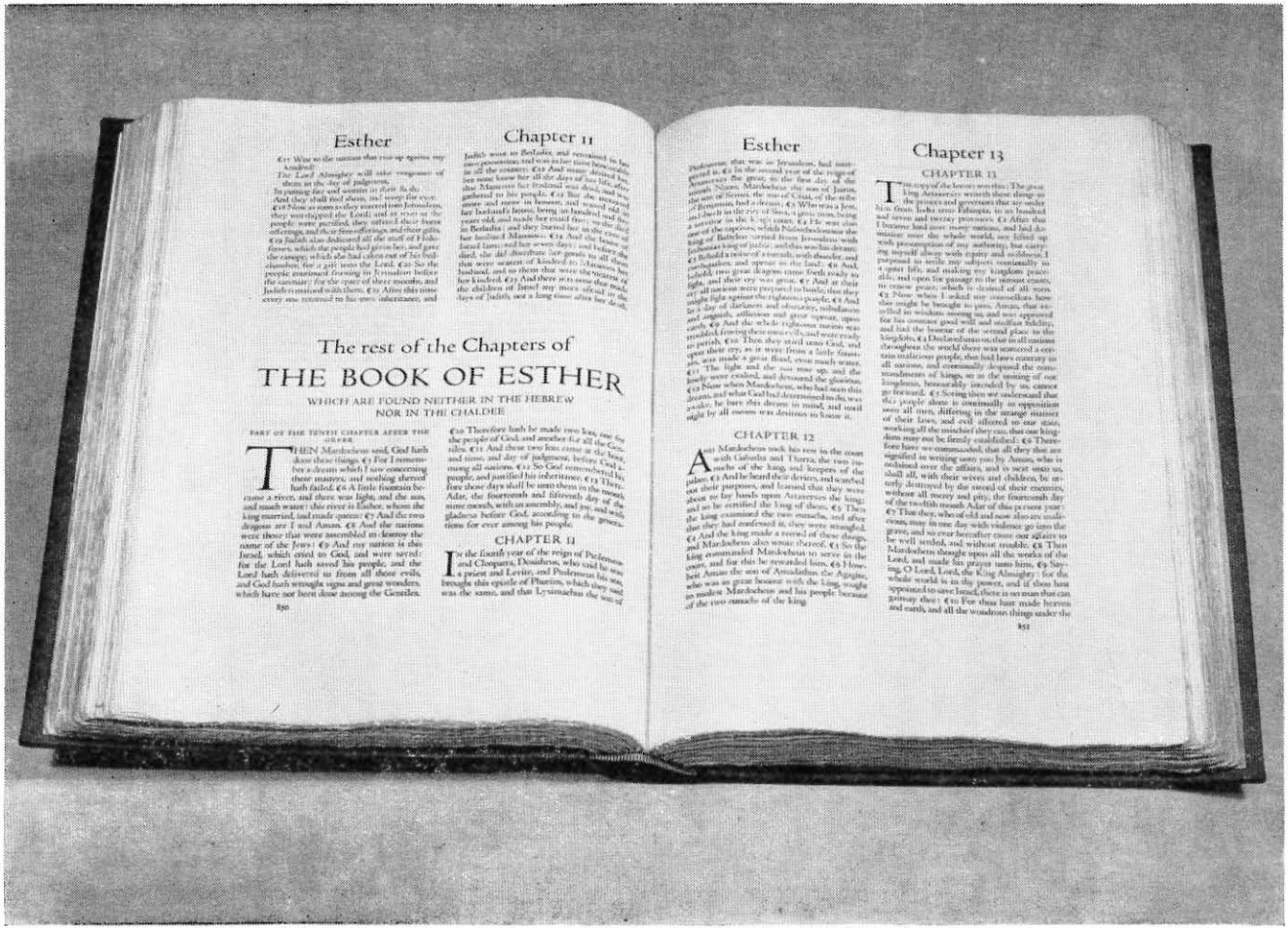
The letters with his peers and colleagues are equally revealing. These include Updike, Goudy, Grabhorn, Meynell, Cockerell—and many less well-known names. All, whether with the famous or the obscure, reveal the quality of the man—polite, witty, kind, helpful, but not without a redeeming drop of acid, when acid was called for.

What is the point of this rambling disquisition? I suppose I am trying to isolate those qualities in the man and his approach to his work which will help explain the qualities of the work itself. These can be found best stated, I think, in B.R.'s own writing, particularly in the *Paragraphs on Printing*, in *Pi*, and in the report to the Syndics of the Cambridge University Press on the Press's typographic material. Few designers have been more eloquent, or more rational, when writing about their profession; Updike and Morison are the two who come to mind when one searches for parallels and comparisons. B.R. emerges as less scholarly than either—less intent on authenticating sources, or even finding sources—less doctrinaire in stating first

OVERLEAF

Figure 6. The Oxford Lectern Bible, printed in Centaur; photograph courtesy Oxford University Press.

Figure 7. Rogers' second folio Bible, for World Publishing Company, 1949.



Esther

Chapter 11

The rest of the Chapters of

THE BOOK OF ESTHER

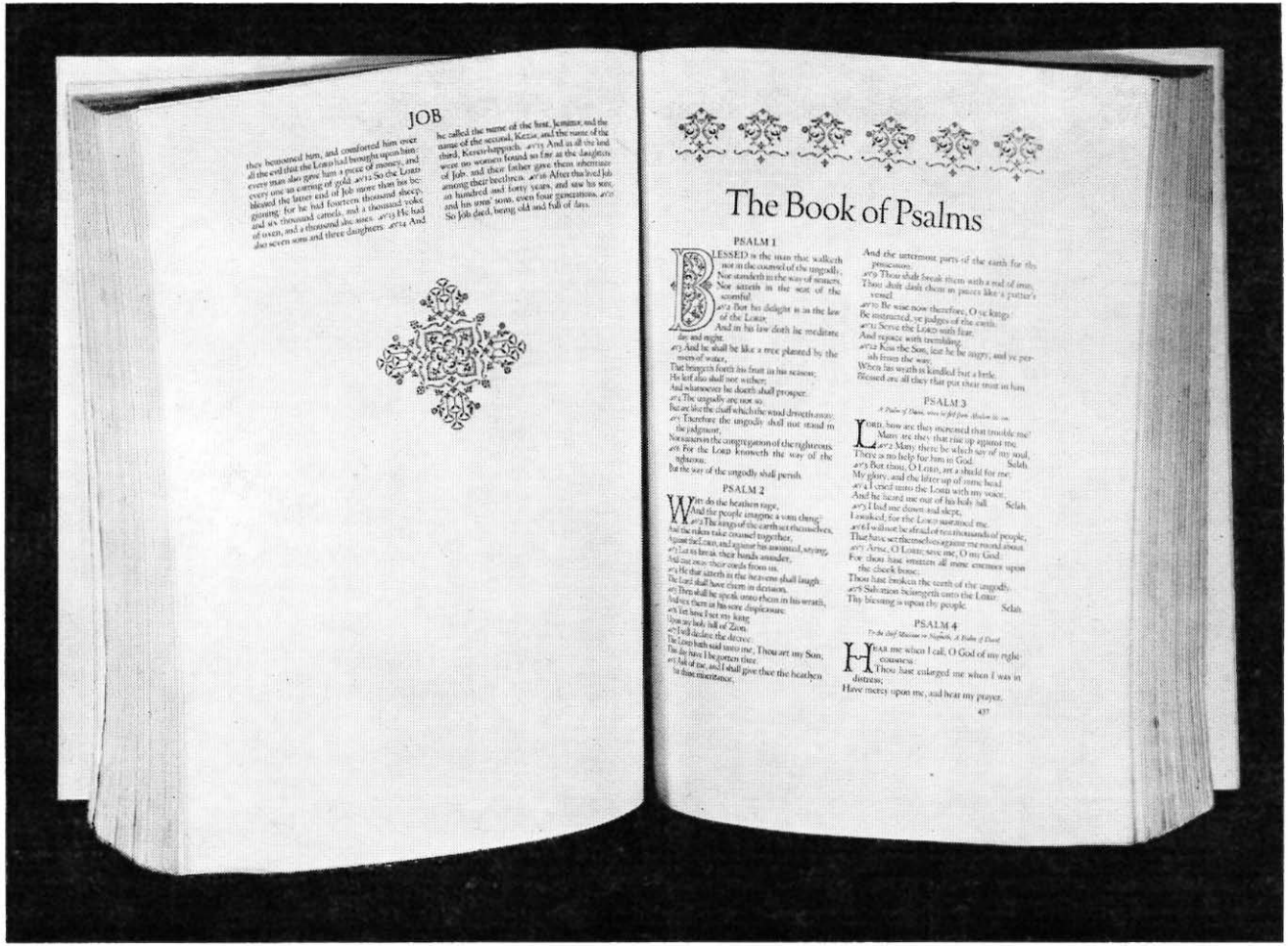
WHICH ARE FOUND NEITHER IN THE HEBREW NOR IN THE CHALDEE

Esther

Chapter 13

Esther

Chapter 12



JOB

they bemoaned him, and comforted him over all the evil that the LORD had brought upon him: every man also gave him a piece of money, and every one an earring of gold. 42:12 So the LORD blessed the latter end of Job more than his beginning: for he had fourteen thousand sheep, and six thousand camels, and a thousand yoke of oxen, and a thousand she asses. 42:13 He had also seven sons and three daughters. 42:14 And he called the name of the first, Jemima; and the name of the second, Kezia; and the name of the third, Keren-happuch. 42:15 And in all the land were no women found so fair as the daughters of Job: and their father gave them inheritance among their brethren. 42:16 After this lived Job an hundred and forty years, and saw his sons, and his sons' sons, even four generations. 42:17 So Job died, being old and full of days.

The Book of Psalms

PSALM 1

BLESSED is the man that walketh not in the counsel of the ungodly, Nor standeth in the way of sinners, Nor sitteth in the seat of the scornful.

1:2 But his delight is in the law of the LORD; And in his law doth he meditate day and night.

1:3 And he shall be like a tree planted by the rivers of water, That bringeth forth his fruit in his season; His leaf also shall not wither; And whatsoever he doeth shall prosper.

1:4 The ungodly are not so: But are like the chaff which the wind driveth away.

1:5 Therefore the ungodly shall not stand in the judgment, Nor sinners in the congregation of the righteous.

1:6 For the LORD knoweth the way of the righteous: But the way of the ungodly shall perish.

PSALM 2

WHY do the heathen rage, And the people imagine a vain thing?

2:2 The kings of the earth set themselves, And the rulers take counsel together, Against the LORD, and against his anointed, saying,

2:3 Let us break their bands asunder, And cast away their cords from us.

2:4 He that sitteth in the heavens shall laugh: The Lord shall have them in derision.

2:5 Then shall he speak unto them in his wrath, And vex them in his sore displeasure:

2:6 Yet have I set my king Upon my holy hill of Zion.

2:7 I will declare the decree: The LORD hath said unto me, Thou art my Son; This day have I begotten thee.

2:8 Ask of me, and I shall give thee the heathen for thine inheritance, And the uttermost parts of the earth for thy possession.

2:9 Thou shalt break them with a rod of iron; Thou shalt dash them in pieces like a potter's vessel.

2:10 Be wise now therefore, O ye kings: Be instructed, ye judges of the earth.

2:11 Serve the LORD with fear, And rejoice with trembling.

2:12 Kiss the Son, lest he be angry, and ye perish from the way, When his wrath is kindled but a little. Blessed are all they that put their trust in him.

PSALM 3

A Psalm of David, when he fled from Absalom his son.

LORD, how are they increased that trouble me! Many are they that rise up against me.

3:2 Many there be which say of my soul, There is no help for him in God. Selah.

3:3 But thou, O LORD, art a shield for me; My glory, and the lifter up of mine head.

3:4 I cried unto the LORD with my voice, And he heard me out of his holy hill. Selah.

3:5 I laid me down and slept; I awaked; for the LORD sustained me.

3:6 I will not be afraid of ten thousands of people, That have set themselves against me round about.

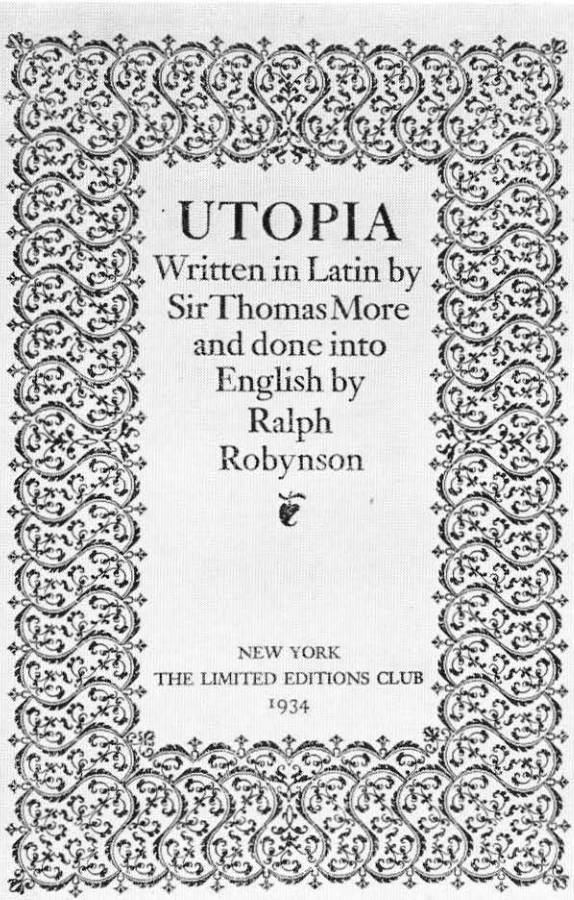
3:7 Arise, O LORD; save me, O my God: For thou hast smitten all mine enemies upon the cheek bone; Thou hast broken the teeth of the ungodly.

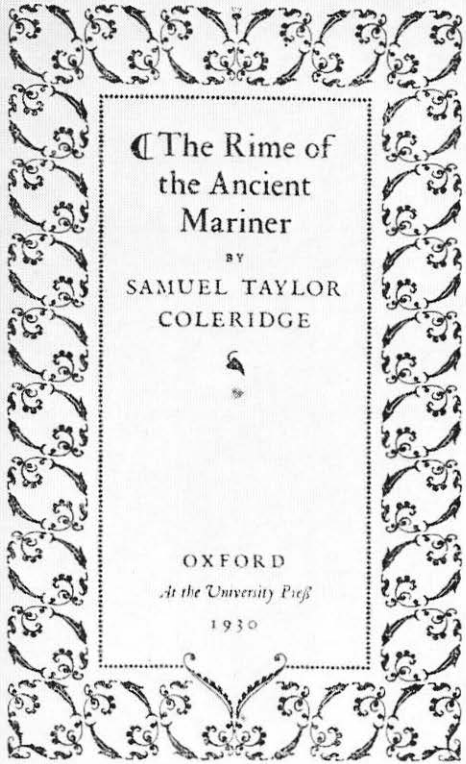
3:8 Salvation belongeth unto the LORD: Thy blessing is upon thy people. Selah.

PSALM 4

To the chief Musician on Neginoth, A Psalm of David.

HEAR me when I call, O God of my righteousness: Thou hast enlarged me when I was in distress; Have mercy upon me, and hear my prayer.


UTOPIA
Written in Latin by
Sir Thomas More
and done into
English by
Ralph
Robynson
NEW YORK
THE LIMITED EDITIONS CLUB
1934


The Rime of
the Ancient
Mariner
BY
SAMUEL TAYLOR
COLERIDGE
OXFORD
At the University Press
1930

principles, or for that matter any principles—less original, certainly, than Morison, in his approach to the history of printing design, as well as less thorough, but far more sensitive and original in his use of those historical sources. His was the artist's, rather than the scholar's or the practicing printer's, approach—not that one can denigrate his scholarship, nor his knowledge of what the printer could be called upon to do, and cajoled or bullied into doing—but his eye ruled his mind to a greater extent than did theirs. If this be heresy—I plead, with Miss Cather, for clemency.

His work as a result shows a marvelous versatility: the comparatively yet elegantly sober books of the Riverside Press period (could this have been the Boston climate, and the interchange of ideas with Updike?); the majesty of the Oxford Bible; the wit and humor of the smaller books, like the Swift (certainly the *Lilliput* qualifies as one of the smaller books); the utility of such works as the Pforzheimer Catalogue, the Frick Catalogue, the Boswell Papers—here is a man who may have been eclectic but who used eclecticism intelligently and, for that matter, went beyond it. For when Rogers borrowed—or, more properly, adapted—he knew what to borrow, the telling detail, and how to make it fit the purpose for which he required it. When he used French or Dutch fleurons, he did not simply steal a Fournier or Enschedé arrangement: rather, he chose the flower or rule or whatever piece he wanted, refined it, rearranged it, fiddled with it—and what emerged did not pretend to be eighteenth-century, nor was it mere pastiche; it was a new, if minor, work of art. This bothered B.R.—there is a recurrent theme through his letters, through his writings: did the finished result merit the pains required to achieve it; should he have, perhaps, stuck to water color, or painting, or sculpture? I think he made the proper choice: first, because at his best the end did justify the means and, secondly, because he probably did not really possess the genius to have become a great painter or sculptor. His water colors were pleasant, but rather weak; the wood carving, the figure heads, and the like were decorative and skilled in their carving, but lacked power. Rogers was first-rate at interpreting, through the printed page, other men's ideas—and that

Figure 8. Title pages of books designed by Rogers.

is a skill not to be despised. He was a man of taste, of discrimination, and above all of high standards, who did not perhaps admit to himself his true reasons for having given up the fine arts for the applied arts, although he may have suspected them. Certainly he was a man filled with self-doubts, as his correspondence with Henry Watson Kent constantly reveals.

Those high standards do explain the quality of B.R.'s work. The attention to detail and the willingness to keep at it until he had achieved what he wanted are constantly referred to in the anecdotes of those who worked with him: the doctoring of the *Q* on the cover of the *Architectural Quarterly of Harvard University* (a bit of solder and the top of an italic *T* soldered to the base of an *O*); the struggles to get the gold right for the roundels of the *Odyssey*; the painstaking spacing of the Hunter College inscription. The results are so right that few stop to think what pains and visual acuity were required to achieve them. That, I am sure, is what B.R. intended.

1. This article has been adapted from a paper presented at the Bruce Rogers Centennial Conference held at Purdue University on May 8–9, 1970, and is published here by kind permission of Professor Barnet Kottler, Curator of the Purdue University Bruce Rogers Collection. Professor Kottler was responsible for organizing the conference, which was attended by some hundred people—designers, publishers, editors, writers, printers, and collectors from throughout the country—a remarkable tribute to the vitality of Bruce Rogers' work.

2. I have relied heavily on Frederic Warde's *Bruce Rogers, Designer of Books* (Cambridge: Harvard University Press, 1925); *BR Marks & Remarks* (New York: The Typophiles, 1946); John Dreyfus, *Bruce Rogers and American Typography* (New York: Cambridge University Press, 1959); and two of B.R.'s own books, *Paragraphs on Printing* (New York: William E. Rudge's Sons, 1943) and *Pi* (Cleveland: World Publishing Company, 1953). I have also used various letters to B.R. in the manuscript collection at The Newberry Library, and his letters to Kent published in *Printing and Graphic Arts* (Lunenburg, Vt.: Stinehour Press, 1955–56). I have also examined (more frequently, re-examined) various books designed by him. The best way to appraise the man's work is, unquestionably, by looking at it.

A Select Bibliography on Script and Language

John Lotz

The literature about script is extensive and varied in the extreme, both as to topical approach and soundness in scholarship. The subject has been dealt with by representatives of a number of fields: archeologists interested in ancient objects, ethnographers interested in culture, printers and artists interested in print and calligraphy, educators and missionaries interested in developing writing systems and literacy, and, of course, philologists and linguists.

The linguistic approach—which is my main concern here—has been mostly philological, mainly dealing with historical questions, especially the origin and diffusion of script. In grammars, script was generally treated as a topic outside of the central core of language research. For the most part Aristotle's view that script is a secondary reflection of speech (which in its turn directly mirrors meaning) has been the prevalent one, as, for instance, in all schools of American structural linguistics. In the last item of this bibliography I tried to develop a theory which integrated script organically into the general framework of grammar.

The chronological bibliography which follows represents what I consider the most significant contributions in Western scholarship dealing with the problem of script. It includes both general and comprehensive treatments of script as an independent phenomenon as well as a few articles which reflect the views of structural linguists on the role of script.

This bibliography was compiled for a conference on reading problems sponsored by the National Institute of Child Care and Human Development in May 1971 at Belmont, Maryland.

Visible Language, VI (Winter 1972), 79–80.
© 1972, *Visible Language*, c/o The Cleveland Museum of Art, Cleveland, Ohio, USA 44106.

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Homage to Alberto Tallone, 1898–1968

Jack W. Stauffacher

Poor Venice. It was in the grips of a foreign invasion during the late summer of 1956. One searched for clean air, for the old Venetian harmonies (actually, I was searching for Aldus Manutius' workshop and a local cafe). Glancing through a gallery window, I noticed a cluster of books on display that had something of the Venetian mood I was seeking. This was how I discovered a second Aldus: Alberto Tallone.

In the gallery Comune di Venezia, Opera Bevilacqua la Masa, was a large exhibition of Tallone's work, and at first I was puzzled—whose books where they? What unknown Italian had created them? Suddenly a man emerged from the gallery, greeting me with warmth. It was Alberto Tallone, artist and poet of those beautiful cased volumes. At once the scattered images of a Palladio, a Goldoni, and the measured sounds of Vivaldi fell into place. And there was Tallone offering his hand of welcome!

Some years before I read an article in *Signature*[1] about Tallone's work in Paris, and the designing of a typeface. What caught my attention at that time was the special Italian–French flavor of Tallone's development, and also that he was so involved with literature—the list of texts he selected reflected a civilized eye: Petrarch, Dante, Erasmus, Tasso, Rabelais, G. De Nerval, Valéry, Neruda, etc. I was attracted to the whole spirit of *la typographie pure* of the book typographer who attempts to make the subtle balance between the choice of type and the manner in which one reads the texts, whether Dante or Valéry.

The true beauty of a book must be understood from the beauty of the written work; without illustrations; in the beauty of the typography, in the beauty of the printing, in the absence of colors, in the beauty of the paper. Tallone had taken these lines from the French poet, Charles Péguy, as his motto and the opening statement in all his catalogues.

Essentially Péguy's statement leads to a profound purification of the book. It clarifies the role of the typographer, defining it as the thoughtful

Visible Language, VI (Winter 1972), 81–89.
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transmitter of manuscript into print. It is like turning back to the beginnings of the art—saying, my god, I never realized the infinite beauty of the roman letters! The secret truth of Tallone's books was in the transparency of their typography which linked word to word. What a strange and wonderful mixture of selective typographic interpretation and love Tallone showed with these authors he so carefully brought to light.

Alberto Tallone emerged from a rich atmosphere of art. His father, Cesare Tallone, was a famous portrait painter ("the Italian Manet of his day"), and his mother had a deep love for poetry. Both influences were strong. Alberto was born at Bergamo (near Milano) in 1898, and later moved to Milano with his family. As a young man he worked until 1932 in the rare bookstores of Milano, when he decided to devote himself to the art of bookmaking. He left Milano in 1932 and went to apprentice himself to a master, Maurice Darantiere, in Paris.

It was during the second year with Darantiere that he produced his first volume, Dante's *Vita Nuova* in 4°. This choice had a significance that was to shape the whole spiritual voyage of his work. Dante was the one author that he always returned to: *The Divine Comedy*, 1939–41 in 4°; *Rime*, 1942 in 4°; *Convivio*, 1965 in 4°; and again *Vita Nuova*, 1965, and the *Rime*, 1965, and a *Divine Comedy*, 1951, in a pocket edition, 32°; and, separately, *The Inferno*, 1967 in 4°, with the recent critical text by Giorgio Petrocchi—the last book he worked on, and which remained unfinished. Thus Dante began and ended the span.

After five years of apprenticeship Tallone took over Darantiere's business, moved to the Hôtel de Sagonne (a beautiful seventeenth-century building designed by Mansart, the architect of Versailles), and established the Presses de l'Hôtel de Sagonne to further refine and shape his ideal typographic principles. In 1957 Tallone returned to Italy, opening his new atelier at Alpignano near Torino. This significant move after twenty-five years in Paris brought him back to his own cultural roots. There were many new titles: *Quattro Vangeli* (the Four Gospels), in a new translation from the Greek, 1962; *La Mandragola*, 1960, Machiavelli, in 4°; unedited poems by Pablo Neruda (*Sumario* in 8°), 1964, a poet with whom Tallone shared a strong and moving friendship.

How did Tallone achieve the evasive simplicity of his books? He had that subtle understanding and intimacy with letters—the beautifully formed geometric shapes of the roman alphabet, their density and coloring mirroring the "invisible signs" of memory; or, as F. M. Ricci has called them, "sintesi magiche di pensieri colti" (magical compressions of

tres, des planches pour les contenir, des vis et des poids pour les comprimer. Les mois et les années se consumaient avec sa fortune et avec les fonds des associés dans ces patiences, dans ces épreuves, dans ces succès et dans ces revers.

Enfin, ayant exécuté en miniature une *presse* qui lui parut réunir toutes les conditions de l'imprimerie, telle qu'il la concevait alors, il cacha ce modèle sous son manteau, et, entrant dans la ville, il alla chez un habile tourneur en bois et en métal, nommé Conrad Sispach, qui demeurait au carrefour Mercier, pour le prier de l'exécuter en grand. Il recommanda le secret à l'ouvrier, lui disant seulement que c'était une machine à l'aide de laquelle il se proposait d'accomplir des chefs-d'œuvre d'art et de mécanique dont on connaîtrait plus tard les prodiges.

Le tourneur, prenant, tournant et retournant le modèle dans ses mains, avec ce sourire de dédain d'un artisan consommé pour une ébauche, lui dit d'un air un peu railleur:

« Mais c'est tout simplement un pressoir que vous me demandez là, messire Jean! — Oui, répondit d'un ton grave et exalté Gutenberg: c'est un pressoir, en effet; mais c'est un pressoir d'où jaillira bientôt à flots intarissables la plus abondante et la plus merveilleuse liqueur qui ait jamais coulé pour désaltérer les hommes! Par lui, Dieu répandra son *Verbe*; il en découlera une source de pure vérité; comme un nouvel astre, il

Figure 1.
A. De Lamartine, *Gutenberg*. Torino: A. Tallone, 1960.

Figure 2.
Tallone at the case, Paris.

selected thought).[2] Only three styles claimed his attention: Caslon, Garamond, and Carattere Tallone—a type he designed himself in 1949. engraved by the skilled hand of Charles Malin.[3]

Commenting on Tallone's graphic visualization, Luigi Balsamo has written, "The page reveals proportions which unite a certain classical measure to an open balance, intense in its desire to avoid any danger of being static that could weigh down the reading; the preference for the oblong format is symptomatic and makes the Tallonian pages easy and inviting to read in the way that the eye of the present-day reader desires, without having to resort to capricious innovations. . . . His whole production is 'aristocratic' in its elegance—not ostentatious because the simplicity appears to be so spontaneous, natural. . . . Tallone's books illustrate a lesson of singular technique united to a rare taste; of artistic sensitivity which is sustained by authentic cultural interests. It seems to me, however, that one cannot understand the value of these precious, beautiful books in precise measure if it does not evolve from the true understanding of their most profound matrix, to the human condition in which they were created. I want to say that we cannot stop at the books. We must reap the lesson, which is just as precious, and comes from Tallone the man, for his life was lived with decision and courage in such a conformist period of history. The tenacious coherence with which he advanced in his obligation, without ever giving in to the temptation of the provisory, of current taste, was remarkable."[4]

Besides the careful and lucid style of Tallone's books, one cannot help but notice the exquisite papers the printer has used throughout his work. At the Cartiere Enrico Magnani mills at Pescia in Tuscany, I witnessed that rare chemistry of the "white art," whose craftsmen still look upon the making of paper by hand as a sacred act. There was a close link between the Magnani papers and Tallone's books. And it is through this relationship that one can understand the natural esteem that Tallone acknowledged in using these superb papers. I have in my library—a slim volume that speaks of this lasting collaboration between a papermaker and a printer. In *Ricordanze di un Cartaio* (Memories of a Papermaker) by the late Carlo Magnani—written when he was eighty, and printed by Tallone in 1962—Magnani begins, "A sheet of paper. A sheet of that good handmade paper, clear, velvety, which tastes like bread and has a soul and a voice. At present, few know about it, and less than a few love it, look for it,

Figure 3. Broadside of a sonnet by Christopher Plantin. Pure Tallone. (Approximately $9\frac{1}{2} \times 15$ inches).

CHRISTOPHE PLANTIN

1520-1589

LE BONHEUR DE CE MONDE

SONNET

Avoir une maison commode, propre et belle,
Un jardin tapissé d'espaliers odorans,
Des fruits, d'excellent vin, peu de train, peu d'enfans,
Posseder seul sans bruit une femme fidèle.

N'avoir dettes, amour, ni procès, ni querelle,
Ni de partage à faire avecque ses parens,
Se contenter de peu, n'esperer rien des Grands,
Regler tous ses desseins sur un juste modèle.

Vivre avecque franchise et sans ambition,
S'adonner sans scrupule à la devotion,
Domter les passions, les rendre obeissantes.

Conserver l'esprit libre, et le jugement fort,
Dire son Chapelet en cultivant ses entes,
C'est attendre chez soi bien doucement la mort.

A. TALLONE, EDITORE

Figure 4. Tallone's shop, Alpignano, Torino.

A B C
D E F G H I J K L M
N O P Q R S T U
V W X Y Z
Æ Œ
Ç

caractère "Tallone"

remember it as if it were a lost love. It is perhaps like those brocades, damasks; those soft, golden fabrics which are still fresh today, though woven by the ancient Luccan masters. It is rare today to find a good sheet of paper among so many false ones, and so many substitutions. No one makes it anymore other than a few sheaves for people who have disappeared, held in suspension between desperate love and oblivious dementia."

Alberto Tallone died on the 24th of March 1968, at the height of his creative energies. He had been waiting anxiously for Pablo Neruda's manuscript, *La copa de Sangre*, which arrived just after his death. At the end of the book, Neruda attached a moving homage, which is printed here for the first time in English.

Jorge Guillen, the Spanish poet, has written of his poetic search, "In the present moment of time one looks not for conflict but for connection and maximum generosity." I think it expresses what I felt when I met Alberto Tallone in Venice for the first and last time.

Adios a Tallone

From Alpignano, near Turin, Bianca writes to me: "Our Alberto was never able either to read your letter or to print your new book. He left us forever, two months ago."

Alberto Tallone, printer, was supposed to print the prose of Leonardo da Vinci and went to the town of Leonardo to get a feeling for the town and to live in it. There, he saw Bianca pass between the field and the road for an instant. He found her to be so leonardesque that he followed her immediately to tell her of his love. They were married in that same place a few days later.

I passed happy days in this Italian house between the two printers, Alberto and Bianca.

The press was right there, in broad view, shining, mounted for manual work like Gutenberg's for the illustrious examples of typography.

I felt honored because some of my books were printed by him, whom I consider to be the modern master of typography. And also because he chose by whim to print my poetry, and he made few exceptions for contemporary writers. But in the publication of the classics, he established a new spacious garden, severe and pure. Tallone's type, drawn by himself, flowers on Magnani paper from Pescia. The Garamond type triumphs

over the fine splendour of Rives paper (filigranado) or on the Japanese Hosho paper. I have Petrarca, the poems of Dante, the Loves of Ronsard, the Sonnets of Shakespeare, the poems of Cino da Pistoia, Pythagoras, Anaxagoras, Zenon de Elea, Diogenes, Empedocles, printed by his marvelous hands. The severity imposed itself on the limpid beauty of his editions. . . .

We believe that the book should reach a wide public, it should be before everyone's eyes, and accessible to everyone's hands. It should be distributed in thousands of cities, towns, warehouses, and fishing villages. But we as poets, have the obligation to defend the perfection of the book, in its luminous body.

Some small groups have been against some of my own books, because they show that Chilean printing can compete in quality with other more famous [printing]. I don't mind this bitter reproach. My books are also published in the more popular and surely more economical editions. I encourage both types and for different reasons. The rest is decided at the discretion of the editors.

In addition to printing the most beautiful books of our times, Tallone had the simplicity, the poetry, and the touch of the ancient artisans to whose school he belonged. His conversation excited me. In his home,

Figure 5. Tallone (right) and Pablo Neruda, Alpignano, Torino, 1964.

instead of a dining room, he had a *trattoria*, with tables like a small restaurant. He explained to me that his father, a portrait painter of the court, was a great bohemian. He painted portraits of the king's children, but was so slow in finishing them that when they were finished, the princes and princesses had grown up remarkably. The money he earned would be used to buy expensive, beautiful furniture, but then the painter would disappear, surrounded by his happy friends; and the [bankruptcy] court would take all the Tallone furniture. For this reason Alberto ate for only short periods, rarely, in the family dining room. During the "dismantled" periods, his mother took the children to eat in the neighboring *trattoria* on credit. Because of this, the grown and famous printer put his own *trattoria* in his own home where we ate happily more than once.

He collected locomotives and loved them. Without knowing this, Matilde and I once had a great start when we entered the garden; right in front of us we met tracks and a little further along suddenly a big locomotive belching much black smoke. We thought we were in the wrong place; perhaps we were at the station of the town.

But Bianca and Alberto Tallone appeared smiling. The smoke was in our honor.

The new manuscripts arrived late so that he could not [mount] them in the press. Bianca, heroic and alone, tells me that she shall do it herself.

I read in my copy of *Galeazzi di Tarsia* (1520–1553), printed by Tallone in 1950, these splendid verses:

> . . . *Donna, che viva gia portavi i giorni*
> *Chiari negli occhi ed or le notti apporti.* . . .
> [. . . Lady, who once in life carried the days
> Clear in your eyes and now you carry the nights. . . .]

Adios, Alberto Tallone, great printer, good friend, before you carried the light in your eyes, now the night travels through them. But in your books, small castles of man, beauty and clarity remain alive: through those windows, night shall never enter.

Pablo Neruda

1. John Dreyfus, "Alberto Tallone and His New Type," *Signature 16*, New Series, 1952.
2. Franco Maria Ricci, *Fregi e caratteri di G. B. Bodoni*, Pagina 7, 1964.
3. The Tallone types were recut in 1952 by Lanston Monotype Machine Company of Philadelphia.
4. "Ricordo di Alberto Tallone," *La Bibliofilia*, Ann LXX (1968), Disp. 1–2.

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.

To the Editor:

Although it is futile to wish that history could be altered, F. M. O'Hara's article (Spring 1971) on the development of the hyphen prompts me to repeat my wish (uttered nearly every time I need to excerpt a passage from a printed book) that the evolution of the hyphen had been somewhat different.

Mr. O'Hara shows that hyphens have taken on a variety of forms at different times and that the two functions of hyphens—to mark joined or compound words and to indicate word division at the end of a line—have not always been associated, for at certain times hyphens were used for one of these purposes but not the other. Since these two functions are so different and since various forms for hyphens have been current at different times, it is a pity that two separate standard forms did not emerge, each tied to one of these functions.

What we now have to put up with, since that did not happen, is a single symbol which reflects two concepts, with the result that its significance is sometimes ambiguous. When a word which is a possible compound has to be divided at the end of a line, the meaning of the hyphen may not be entirely clear. It marks a line ending, of course, but does it also indicate a compound word which should be hyphenated whether or not it is split at the end of a line? In some cases the question cannot be answered with certainty, because various words may be spelled either with or without a hyphen, and which way the author intended may not be clear if the word does not turn up elsewhere in the work. Thus anyone making a quotation from another person's writing may have to decide for himself whether or not to retain a line-end hyphen.

This problem is naturally of special concern to scholarly editors. Since their goal is to present a text as close as possible to the author's intention, they may have to engage in considerable research to make an intelligent decision about retaining a particular line-end hyphen. Then the new edition which they in turn publish is bound to contain a few line-end hyphens which will be similarly troublesome to its readers. For this reason careful modern editions, such as those issued under the auspices of the

Visible Language, VI (Winter 1972), 90–91.
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Center for Editions of American Authors, find it necessary to include two hyphenation lists in their apparatus, one recording the ambiguous line-end hyphens in the original edition (or other copy-text) and the other recording those in the newly edited text. Without the first, the record of the editor's decisions is not complete; without the second, the text cannot be considered fully established, since the reader would have decisions to make on his own. Ideally, therefore, when such an edition is reproduced photographically for reissue without apparatus, at least that second hyphenation list should be included.

By extension, it could be said that any book needs such a list, if a reader is to be able to make accurate quotations from it. Obviously it is awkward to have to append a table explaining one's own punctuation. The sensible solution is to have two different symbols, each unambiguous. Publishing-house editors and proofreaders are well aware of this problem and employ the double hyphen (=), in marking manuscripts or proofs, to indicate line-end hyphens that are to be retained, wherever the word falls. Carrying this system over into the printed book would be a simple and effective way of solving the problem. But the double hyphen on the printed page would call attention to itself as an unfamiliar symbol and would bother readers until it became thoroughly established. The solution is therefore not a feasible one in the near future. (I have made some further comments on the problem of ambiguous hyphenation in "Some Principles for Editorial Apparatus," *Studies in Bibliography*, XXV [1972], 41–88.)

As Mr. O'Hara points out, double hyphens have been used from time to time in the past; it is unfortunate that they did not remain in use, along with single hyphens, and gradually assume the function, for the general reading public, now assigned to them by proofreaders. The process of evolution which lies behind most widely recognized symbols is a long one, and it is perhaps useless to contemplate the establishment of a new mark of punctuation. Nevertheless, it would be encouraging to see a few publishers, in at least a few of their publications, take the pioneering steps in this direction by employing the double hyphen, as well as the single hyphen, on the printed page.

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Editor's note
Obviously the bibliographers have a point. Henceforth *Visible Language* will employ a double hyphen to indicate a compound word (e.g., "a fifth=century manuscript") which should be hyphenated and which is split at the end of a line.

Résumé des Articles

Traduction: Fernand Baudin

Les origines du système sexagésimal. Influences réciproques du langage et de l'écriture *par Marvin A. Powell, Jr.*

Cette question a été souvent débattue. Mais toutes les théories ont négligé jusqu'à présent les documents cunéiformes. La question est double: (1) depuis quand "soixante" a-t-il été employé comme base d'un système numérique? (2) depuis quand a-t-il une valeur positionnelle? La première question est de nature linguistique et anthropologique et doit être étudiée à l'aide des lexiques anciens. La seconde relève de l'analyse simultanée des termes sumériens et des symboles qui les représentent. Cette analyse révèle que la notation sexagésimale est née de l'influence exercée par la conception numérique des sumériens sur les symboles numériques et réciproquement. Mais l'apparition soudaine de la valeur positionnelle vers 2050 av. J.C. montre qu'il s'agit d'une invention délibérée.

La poésie concrète en France *par David W. Seaman*

Les poèmes qui font appel à des éléments visuels—par exemple les acrostiches et les vers figurés—passent souvent pour des aberrations. La littérature européenne et particulièrement la littérature française, témoignent cependant d'une tradition continue dans ce genre. Depuis l'antiquité des artifices calligraphiques et typographiques ont été introduits dans la poésie à chacune des périodes de la civilisation occidentale. Encore qu'à l'origine ils fussent généralement adventices ou purement décoratifs, depuis le dix-neuvième siècle ils sont considérés comme des éléments valables du lyrisme.

La perception des mots chez les enfants *par Lita Furby*

L'article s'attache à la fois aux modifications de cette perception (en termes de faculté d'adaptation) et à leur influence sur l'attitude adoptée par les enfants devant quelques problèmes particuliers (tels que les anagrammes). Il insiste au passage sur l'importance des aptitudes individuelles (dans la perception spaciale, par ex.) pour mesurer les progrès et les variations dans la perception et dans la compréhension. Des enfants de 8, 11 et 14 ans ont résolu divers anagrammes et passé des tests d'aptitude. Les résultats ont confirmé la description que Piaget avait donnée du développement de la perception. Ils ont également illustré l'influence des aptitudes et des progrès individuels sur l'attitude adoptée par les enfants devant les problèmes particuliers.

L'oeuvre de Bruce Rogers, *par James Wells*

Personne n'a exercé une influence plus déterminante sur le renouveau de la typographie en Amérique que Bruce Rogers (1870–1957). Son action s'est exercée pendant un demisiècle. Elle s'est manifestée surtout par l'adaptation des styles historiques aux nécessités de l'impression mécanique tout en maintenant les niveaux de qualités artistiques et techniques les plus élevés. L'attitude de Rogers était celle de l'artiste plutôt que de l'érudit ou de l'imprimeur professionnel. En tant qu'artiste il a fait preuve d'une remarquable souplesse, exerçant son talent dans les petits tirages et les oeuvres de fantaisie aussi bien que dans le genre majestueux de la Bible d'Oxford.

Kurzfassung der Beiträge

Übersetzung: Dirk Wendt

Der Ursprung des Sexagesimalsystems: Wechselwirkung von Sprache und Schrift *von Marvin A. Powell, Jr.*

Der Ursprung des Sexagesimalsystems ist viel diskutiert worden, aber alle früheren Theorien haben die linguistischen Belege der antiken Keilschrift-Lexika unberücksichtigt gelassen. Das Problem des Ursprungs ist ein zweifaches: (1) der Ursprung des Zählens mit einer Basis von 60, und (2) der Ursprung der sexagesimalen Stellenwertschreibung. Das erste Problem ist linguistischer und anthropologischer Natur und muß in den Lexika der Antike untersucht werden. Das zweite kann durch eine kombinierte Analyse der sumerischen Zahlwörter und der benutzten Symbole zu ihrer Darstellung erhellt werden. Solche eine Analyse zeigt, daß die sexagesimale Stellenwertschreibung entstand aus einem Zusammenkommen von Zahlenbezeichnungen der sumerischen Sprache und den Symbolen, die zu ihrer schriftlichen Darstellung benutzt wurden, aber das plötzliche Auftauchen der Stellenwertschreibung um 2050 v. Chr. deutet darauf hin, daß der letzte Schritt zur Einführung der Stellenwertschreibung eine bewußte Erfindung war.

Die Entwicklung visueller Poesie in Frankreich *von David W. Seaman*

Gedichte, die in ihrer Struktur visuelle Elemente enthalten—z.B. die ein bestimmtes Muster bilden, und Akrosticha—werden oft als vereinzelte Verirrungen betrachtet. Beim Studium der Literatur Europas und besonders Frankreichs kann man eine einigermaßen kontinuierliche Tradition visueller Poesie verfolgen. Visuelle Reize in Schrift und Druck, angewandt auf den Satz von Gedichten, beginnen in der Antike und tauchen in jeder Epoche westlicher Zivilisation wieder auf. Zwar sind die ersten von ihnen üblicherweise beiläufig oder schmückendes Beiwerk, aber seit dem 19. Jahrhundert werden sie als wertvolle Bestandteile ernstzunehmender Poesie betrachtet.

Die Entwicklung von Wort-Wahrnehmung und Problem-Lösungs-Strategien *von Lita Furby*

Dieser Aufsatz untersucht die Wort-Wahrnehmung von Kindern, indem er sich sowohl auf die entwicklungsmäßigen Veränderungen des Wahrnehmungsvorganges selbst (hinsichtlich der Fähigkeit zum Dezentralisieren) als auch auf die Rolle dieser Veränderungen bei der Festlegung einer Strategie in einer Problem-Löse-Situation (Anagramme) konzentriert. Er zeigt auch die Bedeutung individueller Unterschiede (in der Raumorientierung) als Informationsquelle über Entwicklungsprozesse und Veränderungen in Wahrnehmung und Auffassungsvermögen. Acht-, Elf- und Vierzehnjährige lösten Anagramme verschiedener Art und legten mehrere Leistungstests ab. Die Ergebnisse stützen Piaget's Annahmen über die Entwicklung der Wahrnehmung und zeigen, welche Rolle die Wahrnehmungsentwicklung und individuelle Fähigkeits-Unterschiede bei den Problem-Löse-Strategien von Kindern spielen.

Das Werk von Bruce Rogers *von James Wells*

Kein Entwerfer hat bei der Wiederbelebung der typographischen Kunst in Amerika eine größere Role gespielt als Bruce Rogers (1870–1957), Sein Werk erstreckte sich über ein halbes Jahrhundert; sein bedeutender Beitrag basiert auf der Anpassung historischer Stilarten an die Maschinen-produktion, wobei er die höchstmöglichen künstlerischen und technischen Ansprüche erfüllte. Roger's Ansatz war der eines Künstlers (und weniger der eines Gelehrten oder praktizierenden Druckers), was er in einer bemerkenswerten Vielseitigkeit demonstrierte —von verspielten Kleinauflagen bis zur Erhabenheit der Oxford Bibel.

Resumen de los Artículos

Traducción: Tony Evora

La obra de Bruce Rogers *por James Wells*

Ningún otro diseñador ha jugado un papel tan importante en el renacimiento del arte tipográfico en EE.UU. como Bruce Rogers (1870–1957). Su obra abarca medio siglo, radicando su contribución más importante en la adaptación de estilos históricos destinados a la producción mecánica, manteniendo a la vez el más alto nivel en diseño y técnica. La actitud de Rogers fue la de un artista (más que la de un estudioso o impresor práctico), actitud que demostró con notable versatilidad desde sus atrevidas ediciones limitadas hasta la majestuosidad de la Biblia de Oxford.

El desarrollo de la poesía visual en Francia *por David W. Seaman*

Los poemas que contienen elementos visuales en su construcción, p.ej. los compuestos bajo una pauta o los acrósticos, son frecuentemente considerados como aberraciones aisladas. Al examinar la literatura europea, particularmente la de Francia, se percibe una cierta tradición de poesía visual. Comenzando en la antigüedad y apareciendo en cada período de la civilización occidental, los estímulos visuales en la escritura y tipografía han sido aplicados a la composición poética. Aunque inicialmente son por lo regular incidentales o decorativos, ya en el siglo XIX son considerados como atributos válidos de la poesía seria.

El desarrollo de la percepción de la palabra y las estrategias resolutorias *por Lita Furby*

Este estudio analiza la naturaleza de la percepción de la palabra en el niño, concentrándose tanto en los cambios del desarrollo del propio proceso perceptivo (en relación con la capacidad de discernir) como en el papel que dichos cambios desempeñan al determinar la estrategia a seguir en una situación resolutoria (anagramas). Asimismo, demuestra la importancia de las diferencias individuales (en percepción espacial) como fuente de información sobre los procesos de desarrollo y los cambios en la percepción y el entendimiento. Los niños de 8, de 11 y de 14 años, han resuelto anagramas de diversos tipos y han realizado también varios tests de aptitud. Los resultados apoyan la fórmula de Piaget sobre el desarrollo perceptivo y demuestran el papel tanto de éste como de las diferencias en aptitudes individuales de estrategias resolutorias para niños.

El origen del sistema sexagesimal: la interacción entre lenguaje y escritura *por Marvin A. Powell, hijo*

El origen del sistema sexagesimal ha sido muy debatido, pero todas las teorías pasadas han desatendido la evidencia lingüística del antiguo vocabulario cuneiforme. El problema del origen es doble: 1) el origen del cálculo de base 60 y, 2) el origen de la numeración sexagesimal. El primer problema es, por su naturaleza, de carácter lingüístico y antropológico, por lo que debe ser estudiado a través del antiguo vocabulario. El segundo puede aclararse mediante un análisis combinado de las palabras-número sumerias y de los símbolos empleados en su representación. Tal análisis indica que la numeración sexagesimal surgió de la interacción entre la estructura numérica de la lengua sumeria y de los símbolos empleados para escribir dichos números, pero la repentina aparición de la numeración ordenada, alrededor del 2050 A.C. indica que el paso final hacia la creación de ésta, fue un acto consciente de invención.

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.

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