

The priority of reading over writing

Oral speech and written word are both acts, or represent acts, which seek to communicate. But the essential act of communication does not take place unless the speech is heard and the writing is read. The operation is completed only in the act of sharing between two or more persons, in which one vocalizes or inscribes and the other receives and recognizes the effect produced. Sometimes it is necessary to state the obvious, especially in tackling the concept and problems of literacy. For whereas historians who have touched upon literacy as a historical phenomenon have commonly measured its progress in terms of the history of writing, the actual conditions of literacy depend upon the history not of writing but of reading. In dealing with the past, it is obviously much harder to be certain about the practice of reading, its conduct and extent, than about writing. For the latter can simply exist in an artifact, whatever its use or application may have been. In antiquity this existence is measurable by records inscribed on stone or clay, with a meager supplement from Egypt provided by both wrappings and papyrus fragments. From the late Middle Ages the documentation provided by perishable materials, parchment and paper, takes over in quantity. But reading is an activity, not a material artifact, which is why scholarship has paid relatively little attention to the presence or extent of reading in historical cultures. An inscriber or "writer" can imprint on a material marks which are not intended for communication at all. The activity can be solipsist, as in the case of children who will write "letters" to themselves in imitation of adult practice in shapes that only they can decipher. For an adult, inscription can serve solely as a self-reminder. He can scan the marks he has made to refresh his own memory before communicating orally

with someone else. This admittedly is an extreme situation, though in my opinion some ancient writing, so-called, is nothing more than this. But once we consider the theoretic possibility of the solipsist use of writing and theoretically extend its boundaries, we begin to realize that whereas the use of writing for solitary recognition represents a rare and untypical practice, it cannot have been at all rare or untypical for the recognition of writing to be shared by a comparatively few persons. The systems current before the Greek alphabet were all in various measure restricted in their circulation. They were practiced by experts or elites for reading by experts or elites, serving as reminders, as mnemonic devices for recapitulating bodies of information or belief which for whatever reason it was desirable to preserve in this form. Argument to support this conclusion can be postponed. I state it now only to illuminate the truth that literacy cannot be defined as coterminous with the historical existence of writing in Egypt or Mesopotamia or Mycenae or Greece. Literacy, though dependent on the technology employed in inscription, is not to be defined by the simple existence of that technology. It is a social condition which can be defined only in terms of readership.

If readership is not a phenomenon easily amenable to examination and measurement, the fact should not be used as an excuse for ignoring it. If evidences are available at all, they are indirect, to be gathered by inference. In the case of the Greeks, they can be supplied by some references in literature which are incidental, some usages in inscriptions which permit inference as to the public that was expected to read the inscription, and some portrayals in art, which usually, however, portray recitation and very rarely portray reading. The truth is that the act of reading passes virtually unnoticed by the authors and artists of any culture where read-

ing occurs. The same is not true of oratory, or music, or playing games, or fighting, or eating, or running, or even sleeping or dying. Of all the activities of mankind which we now take to be ordinary, reading is historically the one which is most sparsely recorded. But we know it goes on now and that it went on in antiquity, but to what extent, and under what conditions?

These difficulties in providing precise answers should not withhold us from establishing certain propositions which are axiomatic, and upon which any consideration of literacy should base itself. Whereas we can apply the term "literate" to an individual, its operative meaning derives from the fact that his literacy is shared by a given number of people, all of whom are readers; not only do he and his fellows exercise a common skill employed upon a common material, but in exercising it they place themselves in automatic communication with each other. First, he is literate in so far as he reads documents and also does so as a matter of habit, not painfully deciphering them, but fluently and rapidly recognizing what has been written. Second, this body of writing would not exist for him to be read if it had not been composed for others to read as well. A Robinson Crusoe could theoretically step onto his island equipped with a small library to refresh his solitude, but this artifact could never have come into existence for him alone. Its "authors" had created it solely in the expectation of its use by a reading public.

It is the numerical ratio of this reading public to the total population using the spoken tongue which determines the degree to which "literacy" and the "literate man" have come into existence at any given historical moment. In short, literacy is not a term with a single determinant; to take on meaning, it has to be qualified quantitatively to indicate the extent of the readership within which the individual act of

reading takes place. In the cultures that immediately preceded the Greek, if I may anticipate, the limitations enforced on readership require us to speak of pre-Greek literacy as craft literacy. When Greece acquired her own writing system after 700 B.C., superior as it was to previous systems, the term craft-literate should still be applied to her culture for at least a century and a half after this date. Thereafter the increasingly rapid extension of reading habits in the late sixth and fifth centuries permits us to describe periods of semi-literacy, of recitation literacy, and finally of scriptorial literacy, achieved as Hellenic culture extended itself over the Mediterranean world at the beginning of the fourth century. Waiting in history's anteroom there was still typographical literacy, dependent upon the invention of movable types, and it should be noted that in the intervening centuries, after the fall of Rome, most of Europe reverted to what in effect was a period of craft literacy employed by clerics. The same was to hold true in the Eastern Empire when conquered by the Turkish language and script.

1. See also the discussion in E. A. Havelock, "Prologue to Greek Literacy," in *Lectures in Memory of Louise Taft Semple*, University of Cincinnati Classical Studies, vol. 2 (University of Oklahoma Press, 1973), pp. 347-348.
2. G. S. Kirk, *Songs of Homer* (Cambridge University Press, 1963), p. 49.
3. Cf. Havelock, loc. cit.
4. For the contrary view see F. D. Harvey, "Literacy in the Athenian Democracy," *Revue des Etudes Grecques*, 29 (1966) : 585-635.

The Pre-Greek Syllabaries

The more readers in ratio to the population, the more literate a given population becomes. This quantitative conception once proposed seems obvious and easy to accept. What is not so obvious is that the quantitative dimension is likely to depend historically upon qualitative factors, namely the efficiency of the script used. What do we mean here by “efficiency”?

The act of recognition

Reading, to repeat, is an act of recognition whereby inscribed shapes are matched against their agreed counterparts. In phonetic reading, these counterparts are elements of sound usually meaningless in themselves, though the brain of him who is visually scanning the script recollects them as elements of language. If this procedure, for whatever reason, is so arranged that it is rather complex and difficult, it will remain in the status of a craft, a special skill. Decipherment is the word we would then apply to the act of reading. If the procedure becomes easy and swift, not requiring specialized attention and time, then it can cease to be a craft and is available to the common reader to practice.

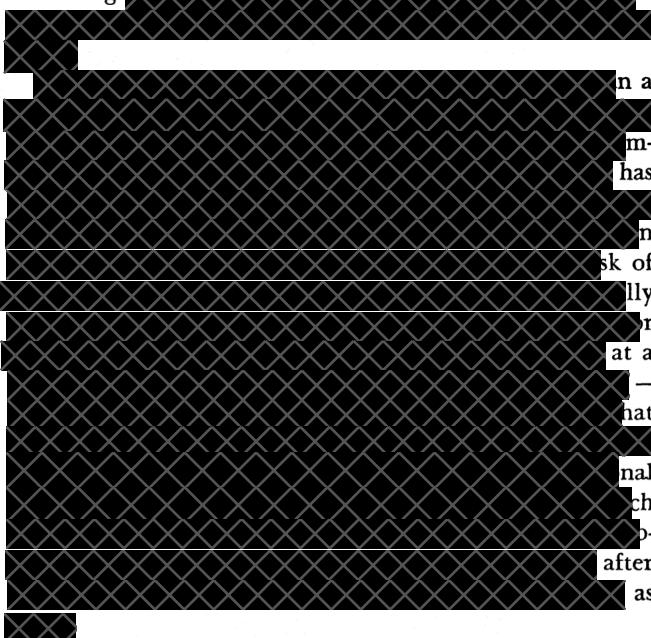
What are the required qualities in a script which will produce this result?

The conditions to be met are ideally three, each distinct from the other. First, the coverage of linguistic sound offered by the writing system should be exhaustive. The visible shapes (I avoid here the term "letters" because of its association with the uniquely Greek invention) must be sufficient in number or character to trigger the reader's memory of all sounds of the language which are distinctive in the language. Conveniently, these noises can be reduced in any language to a given number and identified by the modern term "phoneme." Ideally there should be no exceptions to be supplied by guesswork from context.

Second, this function should be performed unambiguously. That is to say, any one shape or combination of shapes must trigger the memory of one and only one phoneme. Again speaking from an ideal standpoint, there should be no room for a requirement imposed upon the reader to make choices in his attempt to recognize the sound represented.

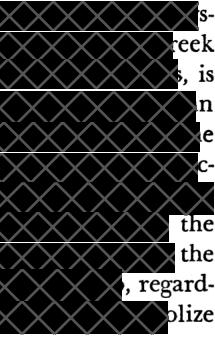
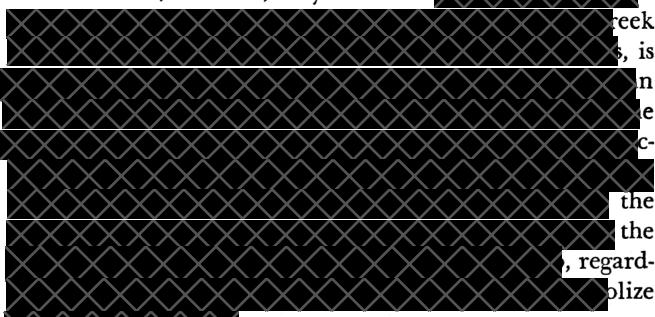
Third, the total number of shapes must be held to a strict limit to avoid overburdening the memory with the task of mastering a large list of them before the process of recognition, that is of reading, can even begin. It is to be remembered that it is not enough for the brain to catalogue the shapes with precision. It is also required to associate them with a corresponding series of sounds and to be prepared to recognize the connection not in the tidy, constant sequence of the letters of a memorized alphabet, an "abecedarium," but in the thousand eccentric combinations which make up words and sentences. The brain has been biologically encoded to contain a memory of these varieties as they occur acoustically in a spoken tongue. It has not been encoded to manage a corresponding variety of shapes.

The fewer the shapes, the less is the burden on the brain to memorize them. To be sure, the trained memory can accommodate a very large number, as the example of Chinese illustrates. But the history of human cultures since the introduction of writing encourages the empirical conclusion that the degree of participation by a given population in the skill of reading (referring this degree not only to actual numbers who read at all, but to the variety of the material read) varies in inverse proportion to the number of signs employed; and that a number between twenty and thirty has in fact proved to be the "ideal" number for the "democratization" of reading.

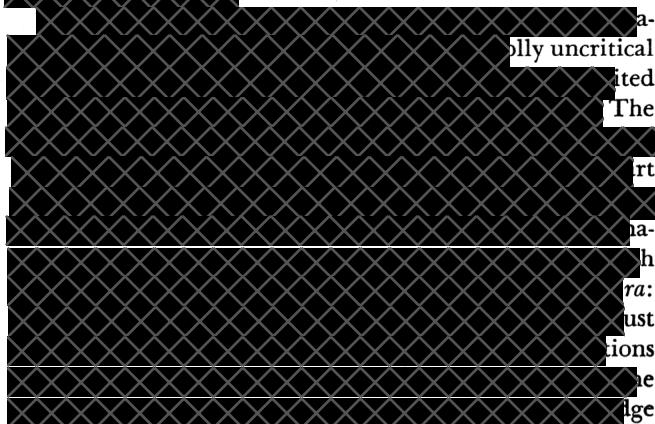


Alphabet versus syllabary

To meet these three qualitative conditions simultaneously in a linguistic sign system has proved extraordinarily difficult for mankind and indeed was achieved only after 700 B.C. and only in Greece. The instrument provided was the Greek alphabet, and in the following pages the term "alphabet" will be restricted to this invention. A wider application of the word is, however, very common.

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The understandable but crucial difficulty encountered by man in successfully symbolizing linguistic sound for reading purposes becomes explicable when the technology of the syllabary is compared with that of the Greek alphabet. The technology of the syllabary itself proceeds through two stages, the earlier being exhibited in the cuneiform and the later in

the Northwest Semitic. If we keep steadily before our minds the fact that a language consists of sounds, not symbols or letters, and then reflect how these sounds are actually made, we can perceive that the basic elements of a language as it is pronounced — the linguistic noises so to speak — are formed by combining two physical operations. There is the vibration of a column of air in the larynx or nasal cavity as it is expelled past the vocal chords and modified by them, and there are the controls, restrictions, and releases imposed upon this vibration by the interaction of the tongue, teeth, palate, lips, and nose. The vibration by itself can produce a continuous sound which is modifiable simply by altering the shape of the mouth. These modified vibrations we call vowels. The rest of the physical equipment can also be used, to start the vibration or to stop it, or to do both. When this occurs, the representation of the start or stop is called a consonant. Although both "vowel" and "consonant" seek to describe sounds, they were coined only after the Greek alphabet made these sounds "visually" recognizable as "letters," and strictly speaking vowel and consonant, though derived from the Latin, denote types of letters of the Greek alphabet.

The more exact terminology of linguistic science, remaining faithful to the oral character of language, identifies the theoretic units of a spoken tongue as phonemes, meaning the minimal acoustic constituents distinctive from each other out of which a given tongue is constructed. We can say that the Greek system, by "atomizing" linguistic sound into theoretic components, approached a system which aimed in principle at identifying phonemes, though with only relative success.

The syllabaries on the other hand are so called because they seek to represent syllables, which again is a confusing term, so far as it purports to describe a given type of lin-

guistic noise but in fact describes a combination of written letters which represent this noise. The type consists of a vowel started and/or stopped by a consonant or consonants. It is therefore in one sense phonetic, but the phonetic analysis has not been carried far enough.

Yet it is more empirically based than any true alphabetic system, for what it tries to do is to represent without too much ambiguity units of speech as they seem actually to issue from the mouth in what we call "syllables." The syllables into which a spoken tongue can be divided are far more numerous than are the ultimate units of linguistic sound; and moreover, a syllable can embrace two and sometimes three consonant noises occurring together, as tongue, palate, and teeth combine in a joint movement. The syllabary by insisting that a written symbol represent a single consonant plus a vowel gets into immediate trouble in representing combinations which do not fit this pattern, as for example the first word of the *Odyssey*, *andra*.

In sum, the syllabic system builds itself on the principle of symbolizing each of the separate sounds in a given language which are actually pronounceable. Its theoretical objective is to represent these visually on a one-to-one basis. The result could be a sign system which might run into hundreds. This can be done, and the resulting shapes can be memorized, but the pressure on the brain to cut down the number is very great. The reason for this may lie in the complex nature of the psychology that is employed in the act of reading and which I have earlier sought to analyze. If I may repeat what has been said, the brain's memory, built by natural selection, is encoded to hold an enormous variety of acoustic units and combinations thereof. It is not encoded to hold anything like a corresponding variety of visual shapes, and so the procedure of matching shape with sound requires very great effort, which can be mitigated only by visual economy, by

cutting down drastically the number of shapes that require to be held in the memory. But in the case of the syllabaries as the process of economy is pursued, the range of ambiguity of recognition is inevitably extended. One sign has to represent several sounds and the open choices left to the reader, which are acoustic, become extensive. The attempt to transliterate the language from sound into shape has partially broken down.

The Greek alphabet dissolves the syllable into its acoustic components — we might almost say its biological components in so far as these are actually effects produced by movements of different parts of the human body. It therefore scrapped the syllable as a graphic unit and substituted a quite different type of unit, essentially theoretical. Looked at in this way, the Greek invention looks like a quantum jump. But this is misleading. The jump occurred in two steps, one of which was supplied by Phoenician, the chief representative of that family of scripts known as Northwest Semitic. In Phoenician, the syllable has been retained in thought as the ultimate unit of speech, which it is not. But it has been realized that syllables fall into “sets” which can be grouped according to a common feature, namely the consonantal noise which starts them off. That is to say, Phoenician grasps the principle that “ba be bi bo bu” constitutes a set of “b” syllables. Previous syllabaries would have used five unrelated signs for these five sounds. Phoenician uses one, the consonantal “index” of the set. In a sense therefore Phoenician prepares the way for the recognition of the consonant as a theoretically separate element of speech, and the system is able to reduce the number of signs used to something over twenty, and this is why it is often hailed as an “alphabet.” But its obvious drawbacks are: (i) it is less flexible than the Greek system, being designed to index only syllables beginning with a consonant; (ii) it is much more ambiguous,

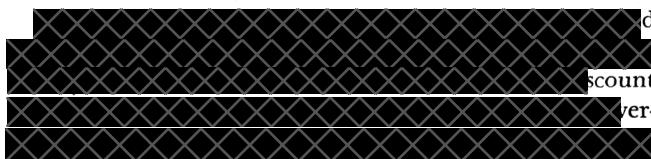
since it requires the reader to infer whether vocalization has to be supplied and if so how much. The Greek word *andra* again offers a case in point; it is as intractable for Phoenician as for syllabic script. It should also be remembered that the syllabaries had carried analysis far enough to identify the vowels as separable components of speech, treating them as syllables to be included in the sum of consonantal syllables. The Phoenician and its descendants, the Aramaic and Hebrew scripts, abandoned this discovery, only to be forced to reintroduce it later, but in a very limited way as a kind of supplement. The grammar of Semitic tongues, it is claimed, makes it relatively easy for the reader to make the correct guesses. There is however the possibility that if a script is inherently ambiguous, this may encourage the users insensibly to simplify the grammar of what they wish to say. However that may be, the margin of guesswork was wide enough, as is seen by subsequent attempts to supply vocalizations, like using the letter *jod* for the vowel *i*, and *vau* for *u*. In short, non-vocalized syllabaries require a little more effort, a little more time, on the part of the reader who deciphers accurately, than does the Greek system. To that extent, even at their best they are less efficient reading instruments.

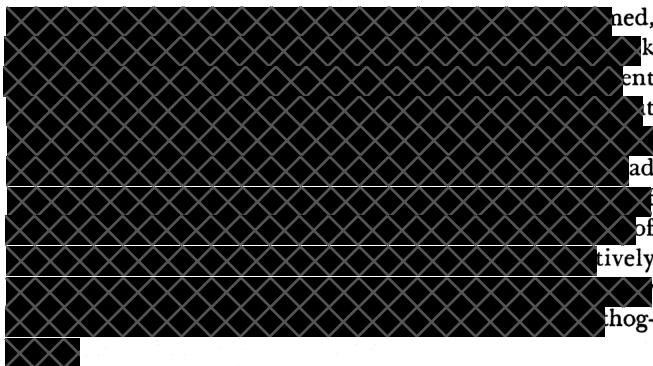
Literacy and literature

However, they are also forced to operate under a limitation much more severe than this, which has not received the attention it deserves hitherto from scholars or laymen alike. In all documentation which is pre-alphabetic the speed with which the correct guesses and choices are made by the reader is governed by a factor of familiarity with the material which he is expected to read. The content of what is placed in the script requires to be governed by his previous expectations. The translated versions of Egyptian and Near Eastern

texts that are available are commonly described as "literatures." A term originally applied to describe the written products of alphabetic literacy is transferred backward to the products of pre-alphabetic cultures. Is this a proper application of the word, or rather one more instance of the intellectual confusion which has intruded into all consideration of writing and its relation to reading?

If a speaker be imagined as the voice behind a given pre-alphabetic script, he is required to address to the reader such statements and sentiments as fall into an idiom easily recognizable. They will tend to partake of the formulaic, and this is as true of a modern Hebrew or Arabic newspaper as of the Old Testament even if the modern equivalent of the ancient formula becomes a slogan. One can state a general law which governs the operation of all types of script as follows: the range of ambiguity in decipherment stands in inverse ratio to the range of possible coverage supplied by the content. If you want your reader to recognize what you intend to say, then you cannot say anything and everything you might want to. You must fit your intended meanings to meanings that he will be prepared to accept. The specific effects of this will register themselves in an unconscious limitation imposed upon vocabulary and upon syntactical arrangement of vocabulary and upon the subjects treated in the vocabulary. The written language, in short, will fail to exhibit the full possibilities of the spoken tongue. Ambiguity being inevitable, it is better to minimize it by minimizing the possible expectations of the reader, so that he can slide as it were into well-tried themes.

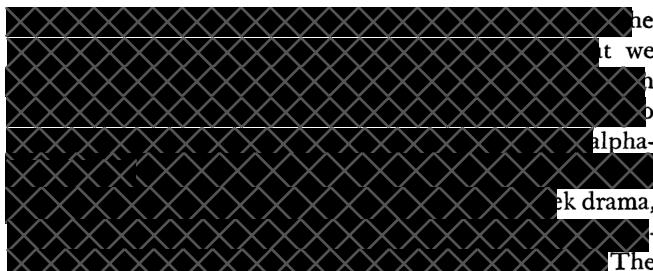




The control of technology over content

It may be objected that to ask this question at all brings one closer to accepting that modern doctrine or slogan which states that "the medium is the message." Though coined to apply to electronic and audio-visual means of communication recently invented, there is indeed some truth in the dictum as it can be applied backwards to the medium of script. The coverage and content of the message depends upon the efficiency of the script used, and efficiency is measured by accuracy and speed in the act of recognizing or as we say "reading" what the script intends to "say."

There is a further element of control likely to intrude into the content of all pre-alphabetic scripts, one which operated independently of writing. Not only was the content required to be limited and familiar. To meet this requirement it was likely to have been put together orally before being inscribed, and put together according to the laws of composition which would tend to preserve the statement in its oral form. These laws are rhythmic. Orally preserved statement has to be "poetized statement." [REDACTED] and their



scripts of the Near East had to be cut down to the coverage of their own oral poetry, but of this poetry itself they offer what I have called an authorized version essentially simplified, not the original epics, nor the songs of the people, not the full record of their hopes, fears, aspirations, and emotions. Ambiguities of the script, in short, would be bound to encourage a selectivity practiced at the expense of the oral originals, one which concentrated upon central facts and sentiments at the expense of the more unique, eccentric, and we might say the more personal element in the oral repertoire. The former were more easily accommodated to or matched with the script, the latter more difficult to document adequately and more difficult to recognize when documented. Syllabic scripts in this way produced paraphrases of oral originals rather than the originals themselves, with some tendency to standardize syntax and vocabulary. In short, they supplied overall a simplified orthodoxy of statement and acceptability of narrative readily recognizable and easily deciphered by those skilled in using the system.

Expected and recognizable discourse becomes highly traditional both in form and content. Such traditionalism is characteristic of a craft, the secrets of which are carefully nurtured by its practitioners. The scribes who used these syllabaries were practitioners of this sort. The so-called literacy that they represented was craft literacy. The scripts

were readable by elites. This was true of the so-called alphabets of the North Semitic systems no less than of the previous syllabic systems. For in North Semitic the task of expertise became not memorization of a large number of signs, but interpretation of a smaller number now offered to the reader. Given the range of possible ambiguity, the interpreter had to be prepared to pronounce what the script might say and this gave him and his peers authority to dictate the interpretation. The “scribe” of the time of Christ was still the required and recognized exponent of scripture, because the script used was precisely of that kind which required the services of an interpreter. That is to say, the Palestinian culture, even at that date, was according to our previous definition only craft-literate. As for the parables and sayings which constitute the bulk of the teaching of the three synoptic Gospels, their Aramaic originals were cast in oral form to be addressed to audiences who did not read but listened and memorized and orally repeated what they had heard. In this strictly technological sense the three gospels are “Homeric.” Meanwhile the expert who was reading in the synagogue from the books of the law addressed himself to a script which required a series of choices basically acoustic in nature but which would, however, reflect mental decisions as to what the text ought to mean. Scholars of the Old Testament have pointed out how in the period of stabilization and canonization of the text there was room for scribes to interpret the unvocalized script in different ways according to their theological inclinations. Once a given reading became orthodox, the need to guard it against alteration stimulated the production of commentaries. One of the reasons for the lore and learning which has accumulated round the books of the Judaic law lies in the original ambiguities of the script.

7. David Diringer, *The Alphabet: A Key to the History of Mankind*, 3d ed., vol. 1 (Funk and Wagnalls, 1968), pp. 160–165.
8. I. J. Gelb, *Study of Writing*, rev. ed. (University of Chicago Press, 1963).
9. Gelb, op. cit., pp. 147ff.

The Greek Alphabet

We recall the three theoretic requirements for a true alphabet to be met concurrently in the same system. First, coverage of all the phonemes in the language is to be exhaustive, second, the letter shapes are to be restricted to between twenty and thirty, and third, individual shapes are not asked to perform double or triple duty. Their acoustic identities must be fixed and unchanging.

The pre-Semitic syllabaries tried to achieve the first of these, but the nearer they came to success by multiplying the syllabic signs the further they removed themselves from the second requirement. The Semitic unvocalized syllabaries met the second requirement at the cost of abandoning the third. The Greek met all three, but how did it do it?

The problem, we remind ourselves, is both visual and acoustic: the sense perception is visual but the triggered memory is acoustic. The solutions available can be illustrated by a linguistic-visual model of the simplest sort. Let us take the nursery rhyme “Jack and Jill went up the hill, etc.” The problem begins at once with the first three words. How are they to be transcribed? The fact that they use the

phonemes of English rather than of Assyrian or Phoenician makes no theoretic difference to the problem. First, we convert the arbitrariness of the English spelling to get the true alphabetic transcription:

JAK AND JIL (Example 1)

This consists of a total of nine signs, of which seven are unique. They yield instant recognition of the correct linguistic noises to anyone who has mastered this particular alphabet, that is, has been trained to "read," as we say.

How would a syllabary transcribe these sounds? It would do it only with overkill, so to speak. Let us choose for convenience a syllabary which tries to index all possible "open" syllables of the language, as many syllabaries do.

JA and JI would offer no difficulty. They would be represented by two different syllabic signs. Let us make them up as

JA and JT

Let us also allow our syllabary to have signs for vowels, as is claimed to be true of Greek Linear B.

Then the A of AND will give us no trouble.

For the rest, that is the terminal consonantal stops and the double consonants, the syllabary could only supply more than is needed — excess sound, so to speak, since every sign in the system contains a vowel. Let us assume that when this occurs the vocalic type that is chosen will be that which repeats the vowel of the previous syllable, so that K in this instance will be represented by the sign for the sound KA, N by NA, D by DA, and L by LI.

These will all possess their separate symbols in the syllabary.
Let us make them up as

KANA PA III

The whole phrase would then read as follows:

J A K A A N A D A J I L (Example 2)

A total of seven signs, all unique.

The Semitic system then takes over and cuts the whole thing down to

J K N D J L (Example 3)

Only six letters, of which five are unique.

It is obvious that Example 3 is the most economical in terms of the amount of writing involved, and thus easy to see how such a system tempts its interpreters to hail it as the great alphabetic breakthrough. But it is equally obvious that neither Example 2 nor 3 will yield instantaneous recognition of the linguistic sounds of the oral original. How then can they be read? The answer lies in the familiarity of the original linguistic statement; its rhythm and rhyme is there at the back of our memory and once we get used to handling an unvocalized system like the Semitic its six consonants will ring a bell in our acoustic memory and we supply the missing vocalics in Example 3. More laboriously, as we work on Example 2, we will be encouraged to recall the same rhythm and so discard the redundant vocalics. Both systems design themselves to fit the task of triggering memory not merely of sounds but of whole meanings, arrangements of sounds that are previously known and recognizable.

Why is JAK AND JIL so superior a vehicle of recognition? So superior as to be a revolutionary invention? We note first that it is the least economical of the three, employing a total of nine signs to trigger the correct acoustic memory as against seven and six in its earlier rivals. If we were to continue the transcription of the line through "went up the hill" etc., we would find this disparity increasing. The actual number of signs used per word would continue to

increase over both Examples 2 and 3. Number 2 would include an increasing number of *unique* signs, however, requiring separate cataloguing in the memory. Numbers 1 and 3 would keep repeating a restricted stock.

In Example 1 something important has happened. What is it? The usual answer given is that the Greek system invented signs for the five vowels. But this cannot be the real answer. Example 2 can index vowels as well as vowels in combination with consonants. Indeed as a system it is very fully vocalized. The real answer begins to emerge when we ask the further question: why do the imperfect systems, numbers 2 and 3, use fewer signs than the perfect one to index the same number of phonemes? The answer to this one is that they assign or attempt to assign one symbol and only one to each phoneme; that is, the linguistic units of the spoken language are indexed as it were or copied empirically on a one-to-one basis. Example 3, even though it is in shorthand, essentially retains this intention but the intention is most evident in Example 2. The technique of Example 1, however, calls our attention to the basic analysis of what a linguistic unit is, namely, a vibrating column of air which is also started or stopped, or both started and stopped, as in the word "JAK," by the action of lips, palate, tongue, and teeth. It is the combination of these two physical acts which constitutes an actual linguistic unit, that is, an actual noise which can be made separately from other noises. The starts and the stops created by the action of the lips and so forth, which we think of as "consonants," can by themselves produce no sounds at all. A consonant is a non-sound and was correctly so designated over two thousand years ago by Plato. The pre-Greek systems set out to imitate language as it is spoken in these syllabic units. The Greek system took a leap beyond language and beyond empiricism. It conceived the

notion of analyzing the linguistic unit into its two theoretic components, the vibrating column of air and the mouth action imposed upon this vibration. The former could exist by itself in language, as in exclamations like "Ah." The latter could not. It was therefore an abstraction, a non-sound, an idea in the mind. The Greek system proceeded to isolate this non-sound and give it its own conceptual identity, in the form of what we call a "consonant."

Once achieved, this step led automatically to the principle that any given linguistic unit except an isolated vocalic requires at least two and possibly three or four signs for effective symbolization, and that is why Example I uses more signs than its rivals. Whereas all syllabic systems, including the Semitic shorthand, aim to reproduce the actual spoken units on a one-for-one basis, the Greek produces an atomic system which breaks up all units into at least two abstract components and possibly more. Now, since the number and variety of vibrations is limited and the variety of starts and stops is also strictly limited in any language, the resultant system, while less economical in a mere quantitative sense than the Semitic one, could provide a complete coverage of all possible phonemes while keeping the required letter signs under a total of thirty. A combination of two to five of these, forming diphthongs and double consonants, could identify with precision any linguistic noise that the mouth chose to make.

The Greeks themselves perceived that the twenty-three or so signs of their own invention now furnished a table of elements of linguistic sound, and accordingly when their philosophers later came to propose an atomic theory of matter, thus explaining the variety of physical phenomena as the result of a combination of a finite number of primary elements, they saw the analogy with what the alphabet had

done to language and likened their atoms to letters. The consonant represented an object of thought, not sense, just as the atom did to those who first proposed its existence. The one was invisible and the other we might say inaudible, although this is an exaggeration. More strictly, some like the "s" sound can be prolonged and so are "semi-pronounceable," others are unpronounceable except with the assistance of vocalization. Hence the original Greek term *aphona* — "voiceless elements" — used by Plato was later replaced by a more accurate classification into *hemiphona* — "semi-sonants" — and *sumphona* — "con-sonants," elements voiced "in company." Atomism and the alphabet alike were theoretic constructs, manifestations of a capacity for abstract analysis, an ability to translate objects of perception into mental entities, which seems to have been one of the hallmarks of the way the Greek mind worked.

The results of the invention

The introduction of the Greek letters into inscription somewhere about 700 B.C. was to alter the character of human culture, placing a gulf between all alphabetic societies and their precursors. The Greeks did not just invent an alphabet; they invented literacy and the literate basis of modern thought. Under modern conditions there seems to be only a short time lag between the invention of a device and its full social or industrial application, and we have got used to this idea as a fact of technology. This was not true of the alphabet. The letter shapes and values had to pass through a period of localization before being standardized throughout Greece. Even after the technology was standardized or relatively so — there were always two competing versions, the Eastern and the Western — its effects were registered slowly in Greece, were then partly cancelled during the European

Middle Ages, and have been fully realized only since the further invention of the printing press. But it is useful here and now to set forth the full theoretic possibilities that would accrue from the use of the Greek alphabet, supposing that all human impediments to their realization could be removed, in order to place the invention in its proper historical perspective.

It democratized literacy, or rather made democratization possible. This point is often made, but in simplistic terms, as though it were merely a matter of learning a limited number of letters, that is, learning to write them. Hence even the Semitic system has often been erroneously credited with this advantage. If Semitic societies in antiquity showed democratic tendencies, this was not because they were literate. On the contrary, to the extent that their democracy was modified by theocracy, with considerable prestige and power vested in priesthoods, they exhibited all the symptoms of craft literacy. The Greek system by its superior analysis of sound placed the skill of reading theoretically within the reach of children at the stage where they are still learning the sounds of their oral vocabulary. If acquired in childhood, the skill was convertible into an automatic reflex and thus distributable over a majority of a given population provided it was applied to the spoken vernacular. But this meant that democratization would depend not only upon the invention but also upon the organization and maintenance of school instruction in reading at the elementary level. This second requirement is social rather than technological. It was not met in Greece for perhaps three hundred years after the technological problem was solved, and was abandoned again in Europe for a long period after the fall of Rome. When operative, it rendered the role of the scribe or the clerk obsolete, and removed the elitist status of literacy characteristic of craft-literate epochs.

Have the outward social and political effects of full literacy really been as important and profound as is sometimes claimed? Our later examination of oral cultures and the way they function may throw some doubt on this. What the new script may have done in the long run was to change somewhat the content of the human mind. This is a conclusion which will not be argued fully here. But this much should be said at once. The acoustic efficiency of the script had a result which was psychological: once it was learned you did not have to think about it. Though a visible thing, a series of marks, it ceased to interpose itself as an object of thought between the reader and his recollection of the spoken tongue. The script therefore came to resemble an electric current communicating a recollection of the sounds of the spoken word directly to the brain so that the meaning resounded as it were in the consciousness without reference to the properties of the letters used. The script was reduced to a gimmick; it had no intrinsic value in itself as a script and this marked it off from all previous systems. It was characteristic of the alphabet that the names of the Greek letters, borrowed from the Phoenician, for the first time became meaningless: *alpha*, *beta*, *gamma*, etc. constitutes simply a nursery chant designed to imprint the mechanical sounds of the letters, by using what is called the acrophonic principle, in a fixed series on the child's brain, while simultaneously tightly correlating them with his vision of a fixed series of shapes which he looks at as he pronounces the acoustic values. These names in the original Semitic were names of common objects like "house" and "camel" and so on. Uncritical students of the history of writing will even make it a reproach against the Greek system that the names became "meaningless" in Greek. The reproach is very foolish. A true alphabet, the sole basis of future literacy, could only become operative when its com-

ponents were robbed of any independent meaning whatever, in order to become convertible into a mechanical mnemonic device.

The fluency of reading that could result depended upon fluency of recognition and this in turn as we have seen upon the removal so far as possible of all choices upon the part of the reader, all ambiguities. Such an automatic system brought within reach the capacity to transcribe the complete vernacular of any given language, anything whatever that could be said in the language, with a guarantee that the reader would recognize the unique acoustic values of the signs, and so the unique statements conveyed thereby, whatever they happened to be. The need for authorized versions restricted to statements of a familiar and accepted nature was removed. Moreover the new system could identify the phonemes of any language with accuracy. Thus the possibility arose of placing two or several languages within the same type of script and so greatly accelerating the process of cross-translation between them. This is the technological secret which made possible the construction of a Roman

