LINGUISTICS AND WRITING SYSTEMS

By Marshall Durbin
Tulane University, New Orleans

A writing system is a mnemonic device. Mnemonic devices can be viewed as kinds of structures which are abbreviations of other structures.[1] Between the original structure and the structure of the mnemonic device there exists a kind of morphism.[2] That is, given certain information the original structure can be coded into the structure of the mnemonic device and vice versa.

In the course of man's history he has employed many kinds of mnemonic devices such as musical notation, quipos, petroglyphs, pictographs, rosaries, notched sticks, wampum belts, alphabets and grammars. For this reason, there exists a firm meeting ground between linguists and those who are attempting to decipher any code, especially a writing system, for on the one hand the linguist is attempting to encode a mnemonic device in the form of a grammar which will be as complete and concise as possible[3] and on the other hand the decipherer is attempting to decode a mnemonic device which has a human language as its source structure. It is interesting to note, however, that in man's history writing systems and a few other mnemonic devices precede grammars as mnemonic devices. This is due to a peculiarity of mnemonic devices. Every mnemonic device by its very nature incorporates some of the structure of the original. Even a marking of seven horizontal lines and three vertical lines on a North American Indian's gravestone to remind one of the seven campaigns and the three battle wounds of the dead chief (Pedersen, 1964) in a very

---

[1] In fact, it appears that one could consider language itself as a mnemonic device, i.e., a mnemonic device which maps the totality of human experience by sub-categorizing.

[2] Exactly what type of morphism is involved is in doubt. It would appear that isomorphism can be excluded. Probably some kind of homomorphism would best describe a mnemonic device.

[3] See Chomsky, 1965, for the requirements of a grammar.

gross way incorporates something about the nature of discourse structure for that particular language, albeit that structure is lost when the last speaker dies.

In this sense then every writing system incorporates structural information about the language which it records. However, before a writing system comes into existence we have to suppose that the culture-bearers in question have certain ideas about their language, i.e.; they must have ideas about where sentences end and begin; they must have word-category distinctions; they must have some concept of phrases or clauses, etc. Otherwise, they would not be able to record even a small portion of the language. This kind of information which can be incorporated into writing systems has been called "folk-linguistics" by Hoenigswald (1966) which he suggested as a valid field of study. This is not to say that the culture-bearers in question are overtly aware of this knowledge. For this reason I am calling writing systems "unintentional mnemonic devices." The linguist on the other hand overtly incorporates "conscious knowledge" about a language into a grammar which I am calling an "intentional mnemonic device." But, as I mentioned above, unintentional mnemonic devices precede intentional mnemonic devices and I believe we can safely say that modern-day linguistics has its foundations in writing systems and the covert knowledge which accompanies them. Bolinger (1965) has pointed out that the phonemic concept was the culmination of over 3 000 years of attempting to perfect a writing system. He further pointed out that syntactic information was covertly transmitted for several centuries before it became a part of grammar proper. He suggests that the field of semantics could profit by a study of what lexicographers have been doing for centuries. It is certainly well-known that the ideas contained in a transformational generative grammar are at least three centuries old (Chomsky, 1966) and probably more.

In this sense, then, a study of the development and progression of writing systems is crucial for the linguist because the founders of such systems are, in effect, "primitive linguists." I would further submit that the study of writing systems outside the Indo-European system may give linguists an independent check on linguistic analysis since we are all curious as to how an autochtonous school of Sino-Tibetan or Amerindian linguistics would appear.

Thus, a writing system is a mnemonic device in that 1) it attempts to record permanently a message which can be transmitted verbally, and 2) it incorporates certain structural facts about the language it records. A writing system and a grammar are distinguished from all

other mnemonic devices in that they must incorporate some phono-
logical information of the language in question whereas a rosary does
not. A writing system and a grammar are distinguished in that a writ-
ing system will always contain some ambiguities while an ideal gram-
mar should not.[3]

Let us now examine what structural acts a writing system can
incorporate. I shall begin at home and ask what linguistic facts the
English writing system incorporates as regards the English language.
The English writing system, for the most part, incorporates information
about the phonological structure of English, i.e., 'pit' and 'bit' are
written differently since they contrast structurally but the 'p' of 'spit'
and the 'p' of 'pit' are not written differently since they do not
contrast. Morphophonemic information is recorded in the English writ-
ing system since an unpronounced written 'e' often distinguishes
between nouns and verbs as in 'breath' vs. 'breathe' and 'wreath' vs.
'wreathe.' In the case above the 'e' also provides the speaker with the
information that 'th' is to be voiced rather than voiceless; 'e' when
it occurs finally also denotes vowel change and stress placement in
some items as in 'urban' vs. 'urbane.' The writing system also marks
sentence boundaries and word boundaries, and in a few cases phrase
boundaries. Syllable boundaries are not marked unless the word hap-
pens to coincide with the single syllable. Word order is indicated in
the English writing system and sometimes morpheme boundaries are
indicated by the presence of morphophonemic information.

The German writing system operates similarly to the English writ-
ting system but carries much less morphophonemic information. The
Spanish and Italian writing system, as well as some of the present-
day Indic languages, carry practically no morphophonemic information
and are pretty nearly isomorphic with the "phonemic" structure of the
languages, though not entirely. It is to be noted that writing systems
which carry the entire phonological structure of the language leave
little room for ambiguity and are called alphabetic as compared with
writing systems which are not alphabetic. We can note that the writing
systems which do not have a one-to-one correspondence with the phono-
logical structure of the language admit more ambiguity and varieties
of interpretation which must be resolved in some fashion.

Let us now examine a portion of the Chinese writing system in
order to determine what linguistic facts are incorporated. We find
that this writing system incorporates phonological information to a
certain degree as is always necessary, information about the syllable
as well as the word structure since the two often coincide, and a

particular type of semantic information above and beyond that which is incorporated in all other writing systems. For example:

空   穴

杠   木

扛   手→扌
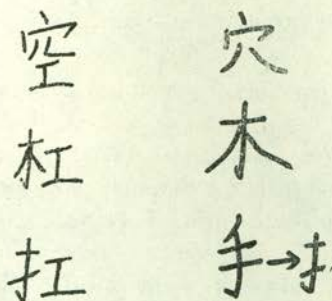
Number 1 says: "Think of something which sounds like kung[1] and has something to do with "hole."

Number 2 says: "Think of something which sounds like kung[1] and has something to do with "tree."

Number 3 says: "Think of something which sounds like kung[1] and has something to do with hand." (Pedersen, 1964)

This allying of "tree" and "carrying pole" in the writing system gives us an idea of a portion of the semantic field of Chinese. This type of semantic information is most unusual in writing systems, but it serves to resolve the ambiguity which is created by a lack of phonological information. The Semitic writing system on the other hand gives us syllabic information as well as information about the consonants of each syllable but we receive little if any information about the vowels. This creates ambiguity since k-t-b can be either the verb "to read" or the noun "book". This ambiguity is sometimes resolved by diacritical marks which indicate whether the word is a noun or a verb and in what tense the verb is occurring. This type of information is morphological. Further information which can be used to resolve ambiguity is syntactic information which the Japanese writing system employs. But the best example of syntactic information in an unintentional mnemonic device occurs in Papini's grammar in India. This grammar was developed sometime between 500 B.C. and 500 A.D. as a mnemonic device to teach young Brahmin priests various prayers. Although it was certainly writ-

---

* Los ejemplos de la escritura china presentados por el autor en su trabajo, fueron ligeramente modificados con objeto de mantener la mayor fidelidad a la grafía y a la lengua chinas; estos pequeños cambios, sin embargo, no alteran de ninguna manera el objetivo original de los ejemplos de Durbin (D. Cazes).

ten down in the Devanagari script by 500 A.D., it must have taken several hundred years to develop to its perfection. It incorporated the syntactic as well as the phonological structure of the Sanskrit language.

From the above we can see that a writing system can incorporate structural facts about the phonology, the syllabic structure, the division of words, the morphophonemic system, the morphology, the syntax and the semantic system of a language. There seems to be no way to predict which system (outside of the necessary phonological information) or what combination of systems may be incorporated into a writing system. Before I go on to examine what linguistic structures may be incorporated in the Mayan hieroglyphs, let me first examine under what situations or conditions a writing system may develop.

There are at least three cultural prerequisites, it seems, for a writing system to come into existence. The first is that the society in question must at least be agricultural as opposed to hunting and gathering which is a social fact; the society must possess a fairly advanced "folk linguistics" which is transmitted orally which is also a social fact; and the language must possess a "fairly simple syllable structure" which is a linguistic fact. Let me substantiate these prerequisites with some empirical observations.

All the past and present writing systems in the world have come into existence in the past six thousand years. I maintain that an agricultural technology is necessary for the independent invention of a writing system since a need to record permanently certain aspects of the culture must be existent. This need will be highly unlikely to be present in a hunting and gathering society which is constantly on the move.

A folk-linguistics is necessary for reasons I have given above. Both the above prerequisites would imply a need for a writing system for various political, religious and economic reasons. By a fairly simple syllable structure, I mean a pattern such as C, CV, CVV, CVC, CVVC, CVCC, CCVCC, CCV, CCVV, CCVVC, CVVCC, and CCVVCC. This would eliminate languages which have vowels which occur initially and which have vowel and consonnant clusters of more than three in a series. All independent inventions of deciphered writing systems have contained a syllable structure of this sort and were syllabic writing systems after having passed through prior stages of pictographs and advanced to word symbols. Although there is doubt as to which is the oldest script in the Middle East, it seems likely that all may be related, though I hasten to add there is no proof of this. The best known, the Egyptian hieroglyphs, first appeared somewhere around 3000 B.C. and certainly incorporated the syllabic structure of Egyptian, namely a CV

and a C pattern. The Egiptians, however, retained many of their older pictographs and added phonetic information in order to resolve the ambiguities which arose. Perhaps the oldest writing system is the Sumerian cuneiform which appeared between 3500 and 4000 B.C. Sumerian also had a similar simple syllable structure and like the Egyptian was written syllabically. Ambiguities were resolved in Sumerian by the means of determinatives which indicated the general class or category to which the word belonged or were resolved by further phonetic complements. In 600 B.C. Sumerian cuneiform was adopted by the Persians (an Indo-European language with a complex syllable structure) and became an alphabet. This is a pattern which we see happening many times over. When a syllabic writing-system is borrowed by a language which possesses a complex syllable structure, we see the development of an alphabet as in the case of the Greeks burrowing from the Semitic script. That is, more phonological informational is added in order to handle further ambiguities which would arise. This is, however, not always the case as when Japanese borrowed the Chinese system and added morphological and syntactic information in order to accommodate the complexities of Japanese. It is possible that the Elamitic script was developed independently, nevertheless, it is also syllabic and incorporates a simple syllable structure. Certainly there is no doubt that the Chinese language has a simple syllable structure. One writing system which does not represent a simple syllable structure is the Cretan, but it is not known whether this writing system was borrowed or independently invented.

In light of the above, I believe that we can safely consider the Mayan writing system to be similar to the Old World writing systems and not be especially surprised to find it here; not in its generalities do we have to consider it as a special kind of case any more than we could consider Chinese, Egyptian or Sumerian writing systems as special cases. That is, whatever universals are operating in the Old World writing system we can safely expect at least some of them to be operating in the New World systems.

Let us now turn to the Mayan hieroglyphs to investigate what linguistic structures might be incorporated within the system. May I hasten to add, however, that a study of the linguistic facts in the hieroglyphs will not necessarily lead to a decipherment of the glyphs but may aid the decipherers in their task.

There always exists the possibility that certain information has been structurally encoded into the glyphs which is forever lost. Let us imagine that the Maya recognized a distinction between Noun Phrases and Verb Phrases and that they inscribed the former with

laughing faces and the latter with crying faces. This information would probably be irretrievable.

That the glyphic writing system is not alphabetic is certain since otherwise there would be little ambiguity and we would hope to have a decipherment already. That it contains some phonological information seems certain for if it incorporated no phonological information it would not be considered a writing system and would hold no interest for decipherers. Thompson as well as others in their writings are undoubtedly correct in stating that some syllabic and word information is given and that some rebus forms are employed (Thompson, 1944). Thus, the situation is that we have enough phonological information to consider the hieroglyphs a writing system (rather than an art style) but only enough such that great ambiguity is evidenced as witnessed by the polemics which have been carried on in the field. What other structural information might the Maya have included in order to disambiguate their writing systems?

It is well known that main elements and affixes may interchange, i.e., main elements may be used as affixes and vice versa. Thompson says,

> The position of these glyphs in almost identical clauses make it virtually certain that the essential meaning they convey remains unchanged (when the main element has interchanged with the affix, MD), although they may be small grammatical variations involved in the change, just as we convey the same information by saying either 'that book is mine' or 'that book belongs to me. (Thompson, 1960:38).

Thompson further says,

> For example, the superfixes of certain months are sometimes moved to the left for purposes of symmetry without in any way affecting the meaning... Correspondingly the affixes to the right and below are generally interchangeable without effect on the meaning of the symbol... I think we can assume the prefix positions and postfix and suffix positions were always interchangeable and could shift in any way. (Thompson, 1960:37-38).

He attributes these affix movements to considerations of space and aesthetics. This is tantamount to saying, "take ten words in English and put them together any old way you please." Events like this do not occur in any language and I seriously doubt if it does in a writing system either. These are the particular areas which I feel are worthy of investigation and which may prove to be the disambiguating in-

formation which was employed. Another example of disambiguating information may be the change of forms in the comb glyph (Thompson's T-25) which has at least five variants and I do not believe they can all be explained by style variants. Undoubtedly, some can be explained as time, space and idiosyncratic variants, but not all. Speculatively, one can ask what linguistics information the variants and positions changes might carry. One of the most obvious answers is that the variants might represent morphophonemic information. The variants could also represent a particular syntactic class in which the main elements might be functioning. The interchange of the affix positions could represent semantic classes. If, as Thompson suggests, the changing of position represents a change in grammatical form without a concomitant change in meaning, then this is of importance since this is one of the most outstanding universals of language, i.e., "the creative aspect of language (Chomsky, 1965)." An example of the "creative aspect of English" occurs in the sentences, "here I am, here am I, I am here" which we would expect any writing system to handle effectively.

But this can only be speculation, since the only way it can be resolved and substantiated is to have a sound and firm knowledge of the phonologly, the morphophonemics, the morphology, the syntax and the semantic field of the various present-day Mayan languages.

REFERENCES CITED

BOLINGER, Dwight
    1966 The Atomization of Meaning. *Language*, vol. 41, Nº 4:55-73.

CHOMSKY, Noam
    1965 *Aspects of the Theory of Syntax*. M.I.T. Press, Cambridge, Mass.

    ———
    1966 *Cartesian Linguistics: A chapter in the History of Rationalist Thought*. Harper and Row, Chicago.

HOENIGSWALD, Henry
    1966 A proposal for the Study of Folk-Linguistics. In William Bright (ed.), *Sociolinguistics*. Mouton and Co., The Hague.

PEDERSEN, Holger
    1964 *The Discovery of Language: Linguistic Science in the Nineteenth Century*. Translated by John Webster Spargo. Indiana University Press, Bloomington, In.

THOMPSON, J. E. S.
    1944 *The Fish as a Maya Symbol for Counting and Further Discussion*

of Directional Glyphs. Carnegie Institution of Washington, Division of Historical Research, Theoretical Approaches to Problems, Nº 2, Cambridge.

1960   *Mayan Hieroglyphic Writing.* University of Oklahoma Press, Norman, Oklahoma.