THE HARAPPAN CIVILIZATION

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A Model for the Decipherment of the Indus Script

By
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PREFACE

The following account represents some ten years of work on the writing of the Harappan or Indus Civilization. It began out of frustration with our inability to more than record the seal-tablets and graffiti emanating from our excavations at the Harappan site of Allahdino near Karachi. The fact has been that of all of the primary civilizations of the Old World only that of India has not been deciphered. Without the knowledge of the writing we are terribly handicapped in identifying that civilization's place, not only in terms of subcontinental history but in the larger history of civilization itself.

Over these years the research has led up many blind alleys adding only frustration on the one side, but also evoking a very real admiration for the similar efforts of others who were and are working on the same problem. Among them in particular I must express my very great regard for the work of I. Mahadevan, A. Parabola and his colleagues, Y.V. Knorozov, N.V. Gurov, A.M. Kondratov and their colleagues of the Soviet team. S.P. Rao has been a real pioneer in arguing for one approach and there are others like him who have been drawn to the problem and come away.

If there was one advantage I have had in this work it has been some thirty-five years of participation in the archaeology of the Indo-Iranian Borderlands during which I have come into intimate contact with the relics of the Harappans. It is from that basis I have proceeded.

The problems of historical linguistics or philology have been slow to solve but those solutions are essential to any decipherment. In order to come to grips with them and at the same time to move just a little bit ahead in spite of the, at times, overwhelming negation of my efforts in that field, I have sent out reports on my work at regular intervals to a number of concerned experts as well as colleagues in archaeology.

Much of the funding for this work came from the Frederick Voss Fund of the American Museum of Natural History, Vassar College faculty research funds, the Smithsonian Institution Foreign Currency Program, The American Philosophical Society, and the A. Strelsin Foundation.

I believe that the Harappan script is now well on its way to a final decipherment because of these efforts as hopefully the following text will demonstrate. We can at last move ahead in our understanding of the significant culture of India's remote past.

WALTER A FAIRSERVIS

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I would like particularly to thank Dr. Gregory Possehl, whose support in the years it has taken to research this account and to see it published is deeply appreciated. Mr. Mohan Primlani is owed special thanks for his willingness to publish a complicated manuscript with a sense of real responsibility for the outcome.Ms. Indu Ramchandani took on the immense task of editing the manuscript and her careful attention to detail is a tribute to her, as well as her concern for correctness even when my writing is not always lucid.

A final tribute to my wife, Jan, whose orthographic respect for the writing makes her one with the ancient scribes. I am sure they would applaud her.

WALTER A. FAIRSERVIS

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PART I

TOWARD A DECIPHERMENT OF THE HARAPPAN WRITING

INTRODUCTION

A truism in South Asian Studies is that in spite of a number of excellent efforts to decipher the script of the Harappan civilization over the years, since its first discovery in 1921, it still remains untranslated. Yet archaeological research has enormously amplified our understanding of the artifacts, settlements, and environments of that civilization. There have also been significant advances in related fields, such as subcontinental linguistics, ethnography, and history as well as a general increase in use of instruments such as the computer, which make access to raw data much easier than before.[1]

It is obvious that we ought to know more about the Harappan writing system than we do. However, an outsider examining the efforts of scholars in recent years, becomes aware of a situation which has sharply handicapped work on the problem. This is that a substantive gap exists between the concerned historical linguists and the archaeologists involved. Ever since the first announcement of the discovery of the Indus River civilization at Mohenjo daro and Harappa, the civilization has been labelled India's first. Consequently, efforts have continually been made to tie the Harappan culture to later developments and institutions. Proto-Sivas, Pasupatis, Vedic gods and monarchs, caste, Brahmi, Hindu rituals, etc. litter the pages of those who read or interpret Harappan. There are those who find parallels in later Indian cultures and would move the Harappans to a genetic place for the whole of Medieval India.[2] The ancient near East has also had its place as the progenitor for the forms of art, iconography, and even of polity accredited to, or imposed upon the Harappans. As for language, Canaanite, Hittite, Proto-Elamite, Sumerian, Altaic, Dravidian, Munda, Indo-Aryan, and even unknowable or lost tongues have been placed in the mouths of the people of the Indus.[3] One thing does stand out. Few have conscientiously attempted to interpret the Harappan writing in the very real context of the Harappan civilization itself! A civilization about which a great deal is known, thanks to archaeology.

A quick summation of what we do know is in order. Nearly a thousand sites have been identified, stretching from the vicinity of Delhi in a great arc along the Doab and Indus River systems to Kutch and the Narbada River.[4] Sites have been found as far north as Badakhshan, as well as in the Zhob-Loralai, Kachhi, Las Bela,

and Makran regions of Baluchistan. Most of the sites are small, running from an acre or two to less than ten acres. A few are much larger and can be called urban on the basis of size, such as Mohenjo daro, Harappa, Judeirjo daro, Ganweriwala, and others. It is clear that the Harappan cultural stage is the consequence of a long indigenous development within the Indus River valley and its immediate hinterlands. Although there are occasional exotica in rare stones, shells, and precious metals, the bulk of the Harappan artifacts reflect indigenous, local sources and the plebian utilities of daily life.

Cattle pastoralism and grain and cotton agriculture along with cottage crafts and industries were the major economic themes while public and private storage with consequent record-keeping is evidenced. Excellent house builders in brick and stone, the domestic architects of the flood plain built structures on platforms for obvious reasons. Conscious of the value of water for nutrition, sewage disposal, and probably coolness, the Harappan savants developed and maintained an excellent well and drainage system. Inundation irrigation on the flood plain and kach damming elsewhere, augmented grain and cotton agriculture as well as a variety of rabi and kharif garden crops.

In all, there is little to differentiate much of Harappan culture from that of traditional tribal, or aspects of village India today, without arguing for relationships. Developed for life amid the exigencies and benefices of the great valley, the Harappan civilization stands forth among the most ancient civilizations with which it is contemporary as particularly unique. There is no evidence for warfare, for alien states, for great kings, or for monumental building on the scale of Near Eastern or Egyptian or Chinese; there is no evidence for large temples, pantheons of deities, slavery, class division, fortifications, elaborate state rituals, palaces, etc. In effect, there is nothing comparable to the civilizations of Early China, Pharaonic Egypt or Sumero-Akkadian Mesopotamia. There is evidence for clans, moieties, primary and subsidiary chiefs, emphasis upon wealth in cattle and certain commodities, town markets, a precise measuring system, certain technological advancements in engineering and, of course, the writing system, which mark the uniqueness of Harappan polity, social organization, technology, economics, and ideology. There are differences of another kind, too. Present indications are that at least the heyday (urban phase) of Harappan "dominance" did not last more than two or three hundred years and that the total life of the civilization was probably no more than three or four centuries (2300-1900 B.C., or 2400-2100 B.C., or 2100-1700 B.C.).[5] The chronology emphasizes how remote the Harappans were temporally from Vedic or Medieval India, without, however, denying that they probably had an important role in laying and spreading the foundation of traditional Indian village life. The clear paradox of studies of this earliest civilization rests on the chronological remoteness yet cultural nearness of some Harappan traits to later village (and tribal) India.

It is obvious then that methodologies that seek by hindsight from Medieval or Vedic India to interpret the Harappan civilization are methodological nonsense, unless a full understanding of what we do know about that civilization is

considered primary. This has not been the case to date. However, this writer has been involved with the archaeology of the Harappan civilization and its genesis for many years and it is from that academic basis that this present work has evolved. Hence its hopeful value.

The Seal Tablets[6] (Chart IIA)

The Harappan script is generally found on small (an inch or so) squarish tablets of steatite. There are occasional graffiti on pots, some copper tablets, and a series of clay tokens from Harappa. In all, some 4,000 inscribed objects are known today. Evidence for the script however, is largely found in the tablets. These are collectively labelled "seals" although few sealings have been found and most of the tablets show little of the wear one would expect from seal usage. These tablets usually have a pierced boss at the back, presumably to hold the cord which attached them to the wearer. This suggests the possibility that the tablets were used as badges or even marriage tāli, something given to women upon marriage in parts of village India. The tablets are almost always found in habitation debris, where they heve been uncovered during excavation, evidencing their ordinariness in the scheme of Harappan daily life.[7]

The tablets generally have two graphically displayed subjects incised or carved in them. These are the main motif, or motifs, and the writing. The former consists of animals and usually an attendant device, which take up three-fourths or four-fifths, or two-thirds of the surface of the seals. The remaining part of the surface is inscribed with the characters of Harappan writing, usually above the main motif.

The Principal Motifs

(Detailed discussion given in Appendices B and C together with illustrations.)

It is of value to sketch the character and probable meaning of the main motifs before proceeding to the writing itself, since they are obviously interrelated in some way. There are several rare and invaluable prismatic tablets as well as some "seals" which depict the interrelationships of the "seal" animals, as well as certain anthropomorphs, Charts VII-IX (the numbers below refer to illustrations within Charts VII-IX). The majority of the seal tablets (this term will be used hereafter to prevent the possible error of emphasizing "seal" as against other usage) have a main motif of a bovid animal, often referred to as a "Unicorn Bull" since the tablet artist depicts the animal's horns as one horn apparently projecting from the forehead—probably an artist's convention showing the curved forward aspect of the horns (6). Other animals, fewer in examples, include the zebu (22b), the gaur (22c), the water buffalo (21d), the tiger (21c), the elephant (21a), the rhinoceros (21b), the goat or ibex (22d) and the gavial (3a). The latter is shown surmounting or central to all or most of these animals when depicted with them (2a, 2b). In other cases the tiger, elephant, water baffalo and rhinoceros are

iconographically placed about an anthropomorph, buffalo-horned, dais-seated, who is heavily bangled and obviously master (or masterful) (5). In turn, his water buffalo "subject" is shown on a seal tablet tossing and goring some peacock-feathered individuals (9) who, in turn, are seen in a calmer situation as seven upright figures below a tri-horned human figure emerging from or in the midst of a pipal tree (*Ficus religiosa*) (8). They appear to be represented by a kneeling, ornamented human figure accompanied by a large female goat. In still another tablet the unicorn bulls are connected by their necks to the pipal tree (7).

This evidence suggests the notion that the animals associated with the unicorn bull, and thus the pipal, include the goat, the zebu and the gaur, which indeed are shown together on the prismatic tablet previously mentioned, and that these domestics had in some ways an antagonistic relationship with the wild animals: tiger, elephant, buffalo and rhinoceros. This is to be expected when pasturage conflicts with feral traditional grazing and hunting grounds. The anthropomorphs suggest a mythopoeic explanation for this natural situation.

However, the fact that in a corpus of seal tablets all of these animals are shown as singular, whatever their number, evidences that each individual who bore a seal tablet had a relationship to another individual who bore a similar tablet. That these tablets, with their animal motifs, occur in many Harappan settlements, no matter how distant from one another, strongly suggests that pan-settlement sodalities like clans or associations were present, and that these sodalities divided into a rough moiety of wild and domestic animal related groups. Most interesting are the seal tablets with composite animals, such as those with elephant trunks and tiger or bovid bodies, etc., suggestive of sodality interrelationships (Appendix C: Sy-34, 44, 45).

Thus these main motifs of the seal tablets emphasize two cultural phenomena. The first is that there was a rich mythopoeic basis for the use of these motifs. The second is that the main motifs emphasize pan-settlement relationships, i.e., something held in common in the society at large, namely, the sodality to which the individual belonged. In contrast, we can assume that the Harappan writing identifies the individual who bears the seal tablet since the sign order is rarely duplicated. Here then is a clue to the meaning of the writing as it appears on the seal tablets. With high probability it describes the individual who bears the tablet by name, title, occupation, social status, family, etc., in the conventional manner of the time. In toto the large seal tablet motifs represent the sodality to which the bearer of the seal tablet belongs. The writing identifies the individual within the sodality.

Graphemic Behavior

There are approximately 419 signs known for the Indus script. These consist of what might be called basic signs, such as  or  and combinations of these, . Examination of the seal tablet texts demonstrates that certain

signs, such ,  , , occur with considerable frequency in the texts while other signs numerically range from common to very rare. Clearly, knowledge of the behavior of all the signs in the context of the seal tablet texts is an essential priority in understanding the underlying graphemic system. Questions regarding syntax, inflection, syllabization, and semantics can only be answered if there is a control.

In response to a need for such a control, Russian, Finnish, and Indian scholars have utilized the computer.[8] Their computer studies have provided numerically valid data on frequency of signs, pairing, and order: initial, medial, and final. This has led to morphemic assignments dealing with case, tense, and syntax. All of these, however, have failed to be convincing because the computer-arrived data has been forced into language or vice versa. The morphemes given inflectional roles, for example, are often assigned those roles on the basis of frequency since inflectional indications are common in languages that use them. This is a reasonable conclusion based on the data, but often the language chosen to illustrate this semantic assignment is shaped to meet the situation by the scholars involved. Thus, to conclude that a sign which generally terminates a text could be a marker of the genitive possessive is excellent logic, given the role of "seals" as markers of property. Let us suppose that that sign is a drawing of a cow. An eager search is made through the etymologies to find a word for cow, which is also a word or sign for the genitive possessive. When no clear rebus occurs, numerous explanations are set forth from linguistic drift to cultural change, which are either erroneous or unprovable. Proper objectivity requires that the original graphemic assignment be abandoned in search of another explanation. As has been properly pointed out by critics of these decipherments, one should not confuse writing with language in developing a sound methodology.[9]

One ongoing problem is that the computer, for all its value in storing and arranging data, is often detrimental to these studies. In the case of the published concordances a certain amount of standardization occurs, which creates serious epigraphic errors. In some cases signs are listed as variants when they are really different signs. Furthermore, the western scientific syndrome of relying on number as a proof is invalid in a cultural complex. A single occurrence can be as meaningful as a multiple one. The only valid method ultimately in the study of an ancient script, is to examine and record qualitatively, with each text viewed for its own sake. In this procedure the quantitative aspect becomes a sound adjunct, not a central theme.[10]

The Grid (Chart I)*

The most effective way of determining graphemic behavior is by the construction of a grid. In the case of the Harappan writing such a grid has been

* See Appendix D for Charts I through X.

utilized by this writer.[11] The bulk of the seal tablets have a text consisting of about five or six signs. Rarely does a text go beyond twelve or fourteen characters, though there is one known with twenty-one. Accordingly, a grid is utilized having fourteen columns. Each text is centered on these columns so that the majority are placed from columns four to ten or twelve (reading from left to right). In order to understand how a seal-tablet text is formed, signs that duplicate one another are placed in the same column. In traditional gem engraving the gem stone is gridded by the artist using a template (Chart IIB). This enables the carver to cut the gem within a system of squares. Typically, when certain symbols needed for the design are repeated, a model is made in which the order of the symbols is designate. In the case of the Harappan seal tablet scribe, the regular use of certain signs apparently motivates such a model. A faience tablet found at Mohenjo daro (Mackay, 1937; Plate XCI – 15a + b) is sectioned on the one side by incised grooves in which the vertical strokes cut the edges of the tablet (Chart IIA). On the other side five of the most common signs in the Harappan script occur in a specific order

By following the vertical cuts on the reverse side, all of the graphemes are proportioned to one another. Thus the scribe could readily place the graphemes on a blank tablet and have them scaled by the order of the grooves.

The order of the signs on this scale too is by inspection of the seal tablets the regular order in which they occur. In other words, when  and  occur on the seal tablet, no matter what signs may occur between, the will always be to the left of . So it is with the other signs. Thus a Columnar Order is indicated for the signs found in the sign tablets (Chart III). The result, as shown in the chart, is that Columns 5, 8, 9, 10 and 11 were the positions of a limited number of signs, while Columns 6, 7 and 12 were frequented by the greatest variety of signs. Frequencies demonstrated that certain signs among those in Column 4 also had a moderately high occurrence, while some of those of Columns 5 and 11 were restricted to that Column (Chart III, note). All other Columns, infrequently occupied, had no particular manifestations.

Another aspect of the grid is that of pairing, particularly in the case of Columns 10 and 11 (see Chart I), where certain signs of Column 11 always appear with certain signs of Column 10 when in those Columns.

The grid then demonstrates that in any seal tablet text there is a high probability of a Columnar Order, where certain signs will always bear the same positional relationship to one another. These signs are also the most frequently occurring in the seal tablet corpus. We are thus justified in assuming that they represent conventions in stating the identity of the seal tablet bearer, if indeed our assumption is correct that the texts are for this purpose.

If the signs of Columns 4, 5, 8, 9, 10 and 11 are representative of these conventions, the signs of Columns 6, 7, and 12 with their diversity of signs, have other meanings. These can be presumed to be more personal statements of

identity. A parallel of sorts illustrates this point. Sir John Smith, Sir Alexander Scott, Sir Paul Forsythe, are names of British nobility. The convention is obviously Sir whatever the individual name. The names, however, are the personal identity of the individual title-holders. Some such system appears to have been used by the Harappans. In addition to columnar positional regularity of signs, the grid also demonstrates that there are certain signs which are not subject to this regularity.

Among these, we have the wide usage and positional variety of the long strokes, or gathered short strokes, which ostensibly may represent number. Their repetition suggests that number was involved as a convention of the seal tablet texts. Similarly, the tiny single vertical stroke which occurs as an isolate in Columns 10 and 3, also appears affixed to a number of signs such as  ,  , and  for example. This ubiquity carries the idea of a special function.

Within the grid, then, we have a framework with which to assess graphemic behavior. Some researchers hold that conventions used in scriptal writing on seal tablets are not governed by syntax, but by a system approaching that of iconography or heraldry. In those systems, symbols are arranged in a strict order of precedence affected only by aesthetic style. In such an order the signs of Column 5 would always follow those of Columns 8, 9, 10, 11, and 12 in a right to left reading. As a rule, this appears to hold true, which may mean that certain signs were used not for their syllabic or ideographic values but for their iconographic or classificatory function.

It should be noted that several studies of the script have proven that it should usually be read from right to left. This is based on two proofs: graffiti in which the overlap of strokes proved it was written from right to left, and the positional frequency of signs which in a split sequence would be followed. Thus, for example, where  occurs in the normal text the order of signs is as shown. In a split sequence (the signs on two lines) the lower line would initiate with  . However, some graffiti do not always follow this sequence and apparently can be read from left to right or in some cases from top to bottom.[12]

Having established a grid wherein the positional order and frequency of pairing are demonstrated, the necessary next step is to examine the signs themselves.

The Signs

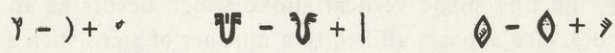
Surprisingly, perhaps, the identity of the individual signs has been largely ignored in the study of the script. This may be due to lack of real knowledge regarding the civilization which manifests the script, as already mentioned. There appear to be four kinds of graphemes present.

1. Signs derived from the ancient world generally, some of which are universals and of great antiquity. These include the use of anthropomorphs, enclosure signs,  ,  , and artifacts   (see Chart III).

2. Signs that appear to be local in origin and are representative of Harappan artifacts or natural environment:

3. Compounded signs made up of graphemes from the above categories:

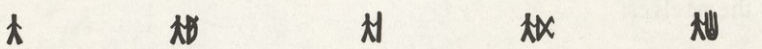
4. Signs affixed to other signs which rarely or never occur in isolation:



The identity of these signs rests on several approaches. The first means of identifying the sign is the obvious one. The sign is a demonstrable picture. Thus  provides us with little difficulty. It is a picture of a man and can be compared to  which is suggestive of a female in headdress. We know from the excavated figurines that women wore such headdresses.[13] Here then is a second source of identification, Harappan culture itself. Thus  , a bow and arrow are known archaeologically, as are  measuring devices,  the mortar and pestle,  house on a platform,  the peacock,  the pipal leaf, and the balance  . All of these objects are thus identified by their pictorial character and by their presence in the Harappan culture.[14]

Another method is that of the division of certain signs. Thus  divides into a man and  a bow and arrow:  a bow and  an arrow. Thus  is a combination of an arrow and part of a pipal leaf. The mortar and pestle can be construed as  mortar and  pestle.

In terms then of an epigraphic survey of the signs we appear to be on solid ground in describing signs recognized as pictures of objects as symbolic of what they depict. This identification is supported by the presence of these objects in the Harappan culture. Accordingly, many of the anthropomorphic signs of Columns 6 or 7 carry surface identities, for example:



man, man with bow and arrow, man with staff, man with pincers, man with mortar

It thus follows that these are:

bow and arrow, staff, pincers, mortar and pestle.

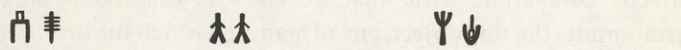
We can also ponder the possibility that these anthropomorphic signs might be occupational in meaning. Thus: archer, overseer, smith, miller, etc. All of these occupations are evidenced one way or another in an archaeological context.

Other signs, such as:

cloth or shirt, notational stick, water or river, rain, sun and plough

are known in other ancient cultures, ex. Archaic Egypt, Sumeria, proto-Elamite, old Europe, etc. and can be fruitfully identified in the Sign List (Chart III).

When known signs are paired or compounded, such as:



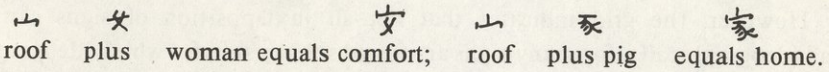
notational stick with house, two men, mortar and pestle with grain,

grain with container,

we have little initial difficulty in translating these sign groups on the basis of surface identity, i.e., counting house, numerous men, grinding grain, container of grain (like a bushel). If we say rain, that is, water falling from the sky, then the top line is sky. In a compound such as:

sky and heap,

the infilled triangle is presumed to be representative of a heap of something (see Chart IV); thus the notion of "high-heap" is viable with possible superlative connotations. In such cases we have a strong sense of an ideographic order as in the Chinese:



roof plus woman equals comfort; roof plus pig equals home.

Orthographic study of the signs also assists in identifying them. Thus the sign  , which appears to be a container with slanted contents gains further identity in such examples as  where the slanted sides suggest a special kind of container, such as a crucible (see page 34). Similarly,  turns out to be not a fish but is derived from a knot or twist in a loom (see Chart IV). In such studies all examples must be examined since some are more pictographic than others. One of the problems we do have in Harappan is that there is little indication of an evolutionary trend in the script as occurs in Egyptian hieroglyphics, Sumerian, and Shang-Chou-Han Chinese. The script appears to have arrived full blown and with the minor exceptions of some signs, to have died out without change. We have little ground then to understand how the stylization of signs occurred since we do not have the original forms from which they derived.

A text from a tiny clay token from Harappa (HR, 1940-351) reads in part:

Based simply on the Sign List it can be read notationally as stick, house, cloth, crucible (metal?) or, in other words, an accounting place (storage) for cloth and metal (metal manufacture). We do not need syllabization to "read" our text since the individual signs and their juxtaposition carry viable meaning. This meaning is perfectly compatible with what we know of the Harappan civilization itself. Furthermore, the tiny object, one of many, on which the inscription occurs, has no boss or hole for suspension and has in continuation of the text the combination  which on other similar objects forms one to four lines:  ,  ,  . This reinforces the notion that is a container and the strokes beside it represent number. The grapheme then has a sense of amount or total quantity. Thus the little inscribed objects might be tokens marking accounts of commodities stored. In toto, therefore, we have reason to come to such a conclusion based on text, number, and archaeological context.

The Sign List
(Appendix A)

The sign list is therefore the consequence of an epigraphic approach which attempts to define an individual sign on the basis of literal identity, columnar position, ideographic value, and archaeological context. The list forms a way of taking another step towards a decipherment: If most signs can be identified, their position in the seal tablet texts ascertained, and the notion followed that the texts refer to the individual who carries the seal tablet, then we are in a position to attempt a decipherment.

However, the grid indicates that not all juxtaposition of signs can be read ideographically, for many signs are found side by side for which ideographic pairing, with high probability, is not possible. Signs with  , for example, are also found independently as are the signs in Columns 6 and 7. This is also true of the so-called number signs, such as  , , and . There are some "number" signs which do, however, regularly pair with signs, for example: and . Are we to read these as seven buildings or seven irrigation sluices? This is probably unlikely in a naming context unless the number 7 had a particular ideological or even aesthetic value. If this is so, then do the other numbers from one to seven in the texts also carry such values? That would appear to be most unlikely although, of course, possible.

Another explanation for the location and special use of signs is, of course, that they were utilized syllabically. This carries further credence in the limited number of signs used compared to ideographic systems like Chinese. However, this number is higher than the number used in basically syllabic systems, which rarely have more than 100 signs. We are apparently

justified in believing that a logo-syllabic system was involved. That is, some of the signs were used as ideographs and others as syllables. If so, it is likely that some signs at least carried both values as occurs in other logo-syllabic systems, that is, literal semantic meaning and special syllabic value(s). (Polysyllabic roles are also possible. A problem which can only be faced in context.)

Here we have to consider the possibility that the rebus was utilized as in other ancient writing systems. Signs such as  are frequent in the texts not only on seal tablets but in graffiti. The sign is literally a depiction of a man with a shoulder pole or yoke with two loops dangling from attached ropes. This depicts a rather menial task and unless one is to argue that such tasks were especially prestigious, it seems the sign must mean something else. Perhaps it means that its syllabic value was used to express something else, just as the picture of an eye in a child's game could mean the pronoun "I". Nrmr, the name of a primary King of Archaic Egypt, is written as a catfish and a chisel. The combinations of Harappan signs could in this sense be used syllabically either as in the Nrmr example, as strict sounds to build substantives, or as direct homophones to describe qualities or substantives which otherwise could not be represented. This, of course, raises the problem of the identity of the Harappan language.

However, there is a limitation in the relationship of signs to language. The Harappan writing system demonstrates remarkable consistency in its performance. Once a sign was built into the system it remained regular in its orthographic qualities even though scribal talents varied. In the seal tablet texts the scribal problem was to provide maximum meaning within a space rarely more than an inch or so in lateral dimension. The seal tablet also had to carry a certain aesthetic quality and probably had a prestige value in the graphic statement of that quality. It is no coincidence that the seal tablets are often of the highest quality, expressive of great skill in carving and cutting. The choice of signs was accordingly, to some extent, limited by spatial and aesthetic concerns.

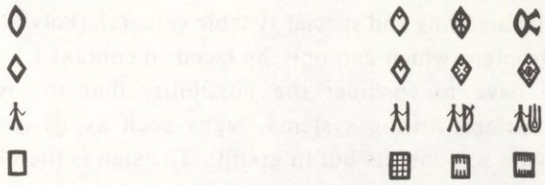
The signs therefore may have had condensed or multiple values understood by those who carried or read the seal tablets. In such cases syntax was necessarily secondary to substantive lexemic concerns.

In making up a grapheme, the Harappan scribe may have considered an initial semantic and pictorial value which would be consistent even when compounded. However, unlike hieroglyphic Egyptian and early Sumerian writing a determinative or classifier system was apparently rarely used, unless the group of anthropomorphic signs can be considered determinatives for occupations. Both by number of signs and the limit of the subject matter which the signs depict and in consideration of the varied artifactual context of the Harappan civilization, classifiers were not commonly utilized.

However, the basic forms of the signs, which are limited in number, and their affixation or compounding, suggests something of a semantic value was carried over from the original form into the variations on that form.

Examples:

BASIC FORM VARIATIONS



This idea of a semantic value adhering to a basic sign form can be of importance in finding language equivalents to the signs of the script and thus the text itself.

Language

What was the Harappan language? It should be stated at once that though the Harappan civilization itself was comparatively short-lived, its widespread settlement, its long genesis, its technological control and organization in pastoralism, agriculture, architecture, and crafts generally, makes its contribution to early subcontinental culture obviously of great importance. Furthermore, there is evidence, particularly in Gujarat and perhaps Maharashtra, of a gradual emergence of post-Harappan cultural forms that contain traits which owe their origin with high probability to the Harappan culture. Arguments that the Harappans spoke an unknown language appear to be denied by the evidence for the importance of their culture. Furthermore, there is no evidence that the end of the Harappan civilization was caused by a genocide and an extinction of the "race".[15]

There is also the now-established knowledge of widespread Harappan stations in Badakhshan, Punjab, Bahawalpur, Sind, Loralai, Kachhi, Las Bela, the Makran, Rajasthan, and Gujarat. Contacts with inner Asia were regular as were those with indigenous people within and without the Harappan regional sphere. The presence of loan words, even the possibility of a bi- or trilingual situation, is very good. A degree of hybridization is natural enough given the extended world of Harappan civilization. We cannot therefore consider the Harappan language as a consequence of a homogeneous isogloss, but a viable workaday language with many influences foreign and indigenous alike.[16]

We have four language possibilities:

Munda an Austro-Asiatic family, largely spoken by tribal people in the eastern portion of the subcontinent (but note Korku in Central India). Reconstructions of proto-Munda indicate nothing as complex as the Harappan civilization. For example, there is an absence of words for wheat, barley, and cotton—staples of the Harappan economy.[17]

Indo-Aryan the language spoken by the Vedic peoples who inhabited the subcontinent after perhaps 1500 B.C. Their origins as expressed in the Rig Veda were Central Asian with heavy emphasis on cattle and horse pastoralism.

From Indo-Aryan have descended various languages, such as Punjabi, Sindhi, Gujarati, Hindi and others spoken in traditional Harappan territories today. Language specialists in general acknowledge that the development of Indo-Aryan languages on the subcontinent was probably influenced by already indigenous tongues like those of Dravidian.[18]

Other Languages: There are a variety of languages, such as those of the Turkic branch of Altaic, which entered India in times of the Turko-Mongol conquests but these are remote in time and space from the Harappan and earlier invaders, such as the Kushan, may well have brought Altaic etymologies into the subcontinent in times much later than those assigned to the Harappans. The Sumerian language, which was contemporary with the Harappan, had agglutinative characteristics which could relate eventually to an Altaic ursprache but this is by no means confirmed. There is, in any case, no evidence of a Sumero-Harappan language affinity based on contacts revealed so far by archaeology. While there is always the possibility that some of the languages still spoken today in remoter parts of the subcontinent and adjacent regions were of original Harappan stock, neither by local history or cultural relic are these viable candidates for the language we seek.

The archaeological evidence gathered in the Indo-Iranian borderlands largely confirms this developmental scheme:

1. The presence of agricultural and herding-based communities practicing transhumanance beginning by at least the 6th millennium B.C.
2. During the 4th millennium B.C.. the increased presence of village communities of Iranian sedentary type.
3. In the 3rd millennium B.C. there is evidence for a process of indigenous Indianization which eventuates in the Harappan civilization in the Indus region and the Kulli and Kulli-related cultures in the western highlands.

In all there is a continuum of settled life and no evidence for its disruption until post-Harappan times.[19] On this basis we can assume that the Harappan language was rooted on the one side in that continuum and on the other was powerfully influenced by languages indigenous to the West. Since Altaic languages in this region are found north of the subcontinent in recorded history, there is little reason to consider their candidacy for Harappan. There is, of course, the possibility that all early agglutinative languages of Western, Central, and Southern Asia have in common an ursprache, thus linking Sumerian, Dravidian, and Ural-Altaic. This obviously is a moot point in the context of the Indus civilization.[20]

Dravidian: This language family is today largely found in South India where it is spoken by nearly one hundred million people.[21] However, there are tribal groups in Central and Eastern India who speak the tongue and in North India (Malto, Kurukh) as well as in Baluchistan (Brahui) there is additional representation. In consideration of this geographic spread and for substantive linguistic reasons, linguists divide the Dravidian Family into three groups: North Dravidian: Brahui, Kurukh, Malto; Central Dravidian: Kui, Konda, Pango, Gondi, Parji, Kolami, Naiki, Telugu, etc.; and South Dravidian: Tulu, Kannada, Badaga, Kodagu, Toda, Kota, Irula, Tamil and Malayalam. In terms of relationships, these languages are regarded as branches off a mainstream with North Dravidian the earliest and South Dravidian the latest, with Tamil representative of the farthest south of the mainstream. Tamil also has the merit of being the earliest literary language, beginning late in the first millennium B.C. Kannada followed, about six hundred years later, then Telugu and Malayalam. Within these various language divisions there are also a variety of distant and close linguistic relationships. Tamil and Malayalam for example are very close.

In terms of cultural complexity, urbanized states arose about the time of Christ in South India and in one form or another continued until recent times. The earliest literary records demonstrate a sophisticated vocabulary adapted to this complexity. This is due in part to a process of Sanskritization but also to an already indigenously developed etymology and linguistic structure. The latter may have come about because of "mainstream" traditions originating in an as yet unknown history. Archaeology has so far contributed little to an understanding of that history. Attempts to tie Dravidians to the megalithic complexes of South India, for example, have borne little fruit simply because we have insufficient knowledge of the culture(s) of the megalith builders themselves. There is, however, a scattering of evidence for certain traits to have moved from north to south, a phenomenon characteristic of developments of South Indian culture, whatever their indigenous elaborations and contributions may be. A point in fact should be emphasized in that connection that is that the bulk of the languages of Dravidian are spoken by tribal people, many of whom live in what Subbarao called "Areas of Isolation".[22] Their cultures are of course adapted to local ecologies. Their way of life is in sharp contrast to that of the urbanized Dravidian groups. Convergences of etyma are usually in the area of core traits, i.e., terms for kinship, some basic tools of crafts and occupations, some geographical terms, words for number, etc. Obviously, in seeking ancient vocabularies words found in all Dravidian languages which parallel are probably of ancient derivation. It is the convergence of etyma and certain structural features among Dravidian languages that allows for proto-Dravidian reconstructions.

There are a number of sound reasons for regarding Dravidian as a candidate for the Harappan language. The first is the presence of North Dravidian pockets in the midst of an Indo-Aryan "sea".[23] Brahui in particular though heavily Iranized today, appears to represent a remnant of a once widespread Dravidian language zone in the Indo-Iranian borderlands including, of course, the Indus

River Valley. There are, in addition, a number of place names in Sind and Las Bela of non-Sanskritic, Arabic, or Indo-Iranian derivation that appear to be of Dravidian origin: Sukkur, Porali, Urtal etc.

Another support for the Dravidian thesis has been the work of David McAlpin on the relationship between Elamite and Dravidian which rests on correspondences in verbal morphology and lexemic cognates.[24] Though there have been sharp criticisms of details of his work, in general it is admitted that there may have been an Ursprache relating Uralic-Elamite and Dravidian located on the Iranian Plateau at least as late as 4000 B.C. Dravidian, then, became an eastern branch moving into the subcontinent. To some extent the movement of certain traits, such as pottery form and design, metal work, cattle domestication, etc. in the prehistoric village settlements of the Iranian plateau to the Borderlands are suggestive of such a movement.

K.V. Zvelebil, a leading Dravidianist, has even hypothesized a southeastern movement of Dravidian speakers off the Iranian plateau starting about 3500 B.C. into the subcontinent with the various tribes "peeling off" the main stock.[25] He supports his argument with two observations. The first point is that many Dravidian groups have names derived from terms meaning hillmen. His second observation concerns the god Murukan (Murugan), the ultimate Dravidian deity, whose worship is evidenced as early as the 10th Century B.C. He presents evidence to support the idea that Murukan, "the god of the Dravidian par excellence, was the god of mountains and hillmen". The mountains, of course, would be those of the northwest of the subcontinent, the Suleimans, for example (Chart VI).

There is, of course, the interesting possibility that Kannada and Tulu contain lexemes that are older than those found in Tamil or, in effect, are closer to an older segment of the Dravidian mainstream than Tamil. The sophistication of neolithic and chalcolithic sedentary farming societies located by archaeologists in Maharashtra, and the Karnatica, some of which were obviously influenced by Harappan cultures, stands in tandem with the geographic nearness to Harappan sites in Gujarat. Nearer, for example, than the modern and traditional situation of Kurukh and Malto speakers of Northern Dravidian.

A movement of Dravidian-speakers into the subcontinent proper would initially begin in the Indo-Iranian borderlands and might be manifest in the development of sedentary farming and cattle pastoralism there. Development is the term necessary here because one must avoid the idea that early Dravidian-speakers initiated the village ethos that led to the Harappan civilization. Quite the contrary, it bears repeating that archaeological evidence increasingly proves not only that there was a long development going back at least to the 6th millennium B.C., but that there was a considerable amount of local cultural diversity at almost any period in those regions. However, if the thesis that Dravidian was spoken by at least some of the village sedentists and their pastoral counterparts is viable, there is no reason why the Harappan development could

not have been made by them as well as by whatever indigenous groups were already present. The uniformity of Harappan culture from site to site, at least in its mature period, does however evidence a spread of that culture and it is reasonable to believe that it also represents a spread of the language as well.[26]

Critical, of course, to the identity of the Harappan language is the relationship of the language to the writing system that has preserved it in the ancient context. If the evidence points to Dravidian as the language family of the Indo-Iranian borderland, then Harappan was probably an early Dravidian language. What can we look for? Or better, how can we relate language to writing? What are the Dravidian language characteristics pertinent to our problem?

Dravidian is classified as an agglutinative tongue, characterized by monosyllabic roots which are open CV or closed VC or CVC. The vowels can be long or short. The consonants are: K, C, T, N, P, M, Y, R, R̲, (L), V and, of course, the remaining retroflexes Ṛ, Ḷ, ṭ, ḍ. Retroflex consonants appear to be characteristically Dravidian but in proto-Dravidian do not initiate a word.

Grammatically proto-Dravidian always suffixes. Noun suffixes in proto-Dravidian appear to have been restricted to a plural and to case, with case suffixes following the plural. Although there is some question as to whether there was gender differentiation of nouns, there is agreement that gender distinctions in proto-Dravidian were made probably by appending terms for male and female to nouns of person. Personal pronouns, like nouns, were similarly inflected.

The verb, like the noun, has a monosyllabic root which is modified by a variety of inflectional suffixes and there are often complicated forms resulting, depending on the noun or pronoun involved, as to number and person. There is a causative used in both active and passive voice and, of course, distinctions as to tense.

The proto-Dravidian reconstructs tend to illustrate a system of morphemic roots with limited suffixation. While the suffixes change, the root remains phonemically unchanged. Dravidian is as with numerous languages combining morphemes:

Tamil:	aṟi	– to know, knowledge
	aṉ	– a man
	aṟivaṉ	– a wise man (DED 265)
Kannada:	mane	– a house
	ara	– royal
	ara-mane	– palace (DED 167)
Tamil:	poru	– to fight
	atu	– to move, shake
	pōr-aṭu	– to fight, struggle (DED 3708)

Naturally, there are also homophones in Dravidian:

Tamil:	kā	— to guard (DED 1192)
	kā	— pole with ropes hung on each end (DED 1193)
	ney	— to weave (DED 3103)
	ney	— butter, ghee, oil (DED 3104)
	noḷ	— to bale out (DED 3140)
	noḷ	— to swallow (DED 3141)

There are interesting derivations:

vāy	— mouth (DED 4385)
vāyil	— doorway (DED 4386)
vē	— burn, hot (DED 4540)
veyar	— to sweat (DED 4516)

In consideration of some of these characteristics of Dravidian, can we relate the Harappan script to the language? What method can we use which is testable, consistent, and has results which are meaningful in terms of the Harappan civilization itself?

The obvious first step is to equate a Dravidian word to a sign. That is, if the Harappan system is in part ideographic, then there is probably a word for each sign. That word, in keeping with Dravidian characteristics, would tend to be monosyllabic. If the ancient scribe's text was syllabic, each sign with its syllabic value secure, should then add up to something meaningful in the Harappan context. However, in a logo-syllabic system only some signs would have been used that way. In such cases the syllables might in some way modify, enhance, or extend the meaning of the ideograph, as in the Japanese kanji-kana relationship. In addition, there may be simple morphemes whose role might not be either ideographic or syllabic but only markers, as occurs with English question marks or hieroglyphic diacriticals.

The Dravidian Etymological Dictionary and its supplement compiled by Burrow and Emeneau, like Monier-Williams' great dictionary of Sanskrit and Turner's of Indo-Aryan, is an indispensable source.[27] In addition, there is the work of Caldwell on the Dravidian family and more recently the fundamental studies of K. Zvelebil on Dravidian morphology, which serve as guides in making this critical first step of equating sign and language.[28] The Dravidian Etymological Dictionary and its supplement contains the basic etymologies for all Dravidian languages. It draws on the field work of the authors and that of other field workers as well as the literary sources, particularly that vast compendium, the Tamil Lexicon. In attempting to assign Dravidian value to the signs of the Sign List one runs into a considerable number of possibilities for each sign. For example, there are 45 words listed for the item basket in the dictionary and its supplement; 13 words for boat, 17 for arrow, etc. What is the method by which one can choose among them?

Obviously if a similar word is found in most Dravidian languages including

North Dravidian, it is a good candidate for the equivalent Harappan sign. Such a word is the one for bow (DED 4449 & Supplement).[29]

Tamil	– vil	Parji	– vil
Malayalam	– vil	Gadba	– vind (oll)
Kota	– vily	Gond	– vil
Toda	– pis	Konda	– vil
Kannada	– bil	Kui ridu	– vilu
Kodagu	– billi	Kuwi	– veltu
Tulu	– billu, biru	Pengo	– vil
Telugu	– vilu, villu	Manda	– bil
Kolami	– vil	Brahui	– bil

Similarly, the word for arrow-ampu, ambu, am, is found in six South Dravidian languages and eight in the Central Dravidian group, but not in North Dravidian: Kurukh-cār, Malto-cāru. In the case of arrow a cultural factor influences choice. the Kurukh-Malto term appears to have been based on a reed tree which locally is the source of arrow shafts. One can envision the substitution of one term for another in such circumstances, much as the English word "a copper" means a penny, or "silver" means knives, forks and spoons.

A number of words for arrow have to do either with the material used, e.g., sticks, or its functions, i.e., to pierce; objects resembling arrows in nature: thorn, quill; and even with categories of weapons: sword-arrow. Interestingly, although the DED lists the Brahui word for bow it has no word for arrow. Since the bow and arrow has probably not been used by the Brahui since at least the 18th century, the loss of the term for arrow is understandable. I have personally seen Brahui craftsmen in Baluchistan using the bow-drill on the other hand, and the preservation of the term based on that morphology is possible.

As one works with Dravidian etymology a kind of pattern emerges. Tribal groups, such as those of North Dravidian (exclusive of Brahui) and of the Central Dravidian family tend to have words that reflect a comparatively primitive way of life. The word comparatively must be emphasized here for there are complexities in the aboriginal world which belie ideas of simplistic ways of doing things. These, however, have to be taken up on an individual basis. It is clear though that many of the core words critical to the way of life shared by these cultures are of ancient derivation. The divergence of these cultures over geographic distance and varied ecology attests to the antiquity of their language origins.

In contrast, the sedentism of the peoples of the South Dravidian group with emphasis upon Tulu and Kannada, apparently the earliest branching off of that group, parallels in general that of the Harappans with its emphasis upon cereal crops and pastoralism. The latter economic and ideological activity is also accented by the Toda and with it a symbiotic relationship with the Kota. Tamil, in turn, or in terms of Dravidian language development Proto-Tamil, with its highly developed civilization as Zvelebil puts it, "of all Dravidian speakers, preserves

most of the identifiable features of the parent language".[30] In turn, Malayalam shares with Tamil much of the "parent language".

In terms of what might be called cultural logic, North Dravidian and Central Dravidian tribal groups can be considered to have shared aspects of an older Dravidian core vocabulary and a local indigenous etyma reflective of local borrowing and adaptation. There may well be words of relic status, that is, not used to mean what was meant originally but something else, as for example, the English "gay" meaning happy and its modern usage referring to a homosexual. This would also be true of the South Dravidian group but their generally more complex institutions especially those referring to sedentism and to consequences in polity, social organization, and ideology have a comparably complex lexicography. At least some of this lexicography would be of older derivation and, in turn, could be considered as possibly of Harappan derivation or genesis.

An ongoing study by F.L. Southworth and D. McAlpin is of great importance in the identification of the Harappan language. They have been "extracting from the Dravidian Etymological Dictionary those etyma which can be reconstructed to early levels of Proto-Dravidian, and which can be considered to refer to 'cultural' objects or concepts, in order to be able to reconstruct as much as possible of the prehistoric culture of the speakers of these languages".[107] The writers indicate that Brahui differs enough from Malto-Kurukh to be placed in its own category and is representative of the earliest level. The scheme they have evolved further challenges the tripartite division of Dravidian languages on the grounds that South and Central Dravidian share more etyma than either does with North Dravidian.

The scheme depends on the appearance of etyma identical in meaning in any two branches of Dravidian which can mean they represent proto-forms. This is the conventional way of arriving at proto-Dravidian etyma. As the authors see it, there are four cultural stages which are represented by these proto-forms for which tentative dates can be given based on P. Gardner's scheme of lexicostatistics [P. Gardner, 1980: Lexicostatistics and Dravidian Differentiation *in situ.* Indian Linguistics 41 (Nos. 3-4): 170-80]

PDR-0: SDr/CDr	– Brahui	CE. 3000–4100 B.C.
PDR-1: SDr/CDr	– Kurukh-Malto	CE. 1900–2800 B.C.
PDR-2: SDr	– CDr (Kolami, Naiki, Parji-)	CE. 1100–1500 B.C.
PDR-3: SDr I	– SDr II (Tamil, Telugu)	CE. 900–1000 B.C.

This chronology would put PDR-1 contemporary with the early and mature phases of the Harappan civilization. It is interesting therefore that certain etyma derived from this study of the script independent of the Southworth-McAlpin research fall into place among their selected reconstructions.

		Harappan Sign List
PDR – 0	irai-iragh-food	C – 1
	nūṟu-nusing-grind	I – 6
	ūr-urē-settlement house	N – 4, 5
PDR – 1	uṛu-uinā-to plow	I – 12, 13; I-1(?)
	koy-goy-cut, reap	I – 3
	vīr-bise-sell	H – 2
	aṭṭam-attā-upper storey	G – 1
	hey-essna-weave	L – 7, J – 8
	vēl-bēlas-ruler	Sy – 61
PDR – 2	ankaṭi–angaḍi-bazaar (Tu)	G – 6, G – 7

Clearly the Southworth-McAlpin scheme is critical to work on the identity of the Harappan language.[107] As will be seen in the present text, Tulu and Kannada, the former in particular, contain etyma which fit the Harappan sign list most closely. Archaeologically, the Western coastal zones and particularly their immediate uplands with the availability of local river systems extending from Gujarat to as far South as Northern Malabar are producing evidence for substantive village life and pastoralism comparable to that evidenced for the Harappans. The substitution of rice, millet, and the sorghums, and the decreased emphasis on cotton as a consequence of changing ecologies is expected, particularly since experiments with early rice cultivation in Harappan times is known.[108] These areas are precisely where Kannada and Tulu have more widely flourished in the past and remain now in what might be called a remnant situation.

This is not to say that these languages are connected historically but the dendritic model used by Dravidianists suggests that Tulu and Kannada "branched off" from the mainstream early in the history of South Dravidian. The fact that the two languages share so many identical lexemes and are located in what hypothetically are areas of Harappan cultural descent in Western India, makes their etyma of particular importance to this study.

Due caution must be exercised in the use of homophones. For equivalencies to be made there must first of all be semantic validities followed by phonological ones. Proto-Dravidian reconstructs are not necessarily to be considered close to the Harappan. After all, the Harappan language must have had its own morphemic structures and phonology. Proto-Dravidian phonologies based on convergences relate to the main stem of Dravidian, something probably never spoken but manifest in the divergent languages of Dravidian, of which Harappan can be considered to be one of the earliest in the methodology herewith undertaken.

Direction in the phonological aspects of Dravidian is obtained by the phonetic correspondences set forth in the Dravidian Etymological Dictionary. Here the differences in phonetization among the languages is apparent. Shifts between k and c, ṇ and n, between long and short vowels, and the addition or

dropping of certain consonants, etc. appear to follow linguistic rules of some reliability. Care must accordingly be taken not to assign semantic and phonological values to Harappan signs which are arrived at by methodological considerations that are at variance with those rules. However, borrowing, cultural variance, history itself, all stirred by human foibles, can negate the rules at times. To cling purely to the Proto-Dravidian theoretical reconstructs would have its problems and its errors.

What follows, then, is a narrative of how a methodology can be applied in order to prove the relationship of Dravidian to the Harappan script. It is set forth as a narrative in order to illustrate how a step by step procedure arrives at certain conclusions—be they right or wrong. In sum, however, it is believed that the whole is a proof that the Harappan language was basically an early Dravidian language and that the script was a logo-syllabic system using that language within the formal boundaries created by the utilitarian needs of the Harappan Civilization.

No apology is necessary in admitting that there are flaws to be eventually eliminated in this methodology, but the substance stands forth and therein lies the proof.

THE METHOD APPLIED

Each sign identified is represented by a type (parenthesized) found in the corpus of known texts from Mohenjo daro, Harappa, Kalibangan, Lothal, etc. The type is the best or representative example. It refers to an accurate orthographic demonstration of the sign involved. When necessary, especially in the area of variants, examples are also listed. The semantic and consequent syllabic values as described by the methodology are then assigned to the sign. Where there are problems of identification the narrative outlines how a conclusion was reached, including a description of other possibilities.

It bears emphasizing that our initial step has to be lexemic. That is, each sign is to be considered as representative of a lexeme, whatever its actual function. To assume other functions is to put the cart before the horse. Our method, as set forth by the preceding description is:

1. To identify a given sign and establish what it represents according to the categories of sign identification previously described.
2. To find an equivalent lexeme in Dravidian.
3. To choose the lexeme best suited; one which,
   a. has the widest usage in the various Dravidian languages and therefore can be considered the consequence of historical convergence; or
   b. has a status within some Dravidian language(s) which suggests its ancient usage, and that it
   c. is a Dravidian word.

   Here we have to express a caution, for as outlined previously, both the genesis of the Harappan civilization and its geographic distribution

indicates contact with indigenous peoples of Western India and with those of inner Asia. We can, therefore, expect to find non-Dravidian lexemes. Indeed there is always the possibility that an Harappan elite spoke a Dravidian language while the local populations spoke other languages (or dialects).

The question of why a particular lexeme was chosen over other possibilities, needs some further explanation. A critic has pointed out, for example, that there are at least a dozen lexemes meaning pot or vessel. Why did I chose the one I did: (pān – pot or vessel (DED 3394) see page 17 and J-1)? Aside from the rejection of certain lexemes as possibly of Indo-Aryan or Sanskrit derivation (ex. matā, kutam) or because the depiction (in this sign) is of a wide mouth vessel and not a small pot, which would select out terms such as tūtai, kannal; nor was it of brass – muntai; or because the stated function: boiler pot, toddy pot, etc. is at variance with the possibility that a measuring vessel was meant (the argument for which is stated in the text) the fact is that an anthropomorph is ligated to the sign. This suggests an occupational grapheme like potter, for which pān (bān) or possibly vān (see DED 4362), is a suitable candidate.

Of course these selections can be wrong but the method, to be workable, must be consistent whatever the error. It would, of course, take up considerably more space to set forth all the lexemic possibilities for each sign. However the availability of the various Dravidian etymological Dictionaries makes this unnecessary. The reader should avail himself of these references. However, a sequel based on an eventual critical review of this method and its results is planned.

4. Having arrived at a suitable lexeme, consider it both by its substantive value and by its syllabic value:
   a. In the context of a text, does it fit–say as an ideograph, or does it, in conjunction with values given to other signs, add up to a meaning validated by what we know of the Harappan civilization?
   b. Does its assumed syllabic value have homophonic possibilities sensible in the seal tablet and other contexts?
   c. How well does it fit in the context of naming individuals in the seal tablet usage?
5. The values arrived at for the various signs should hold true in texts other than those initially reviewed.
6. The orthography of all signs must be noted so that variation can be considered, either as meaningful in terms of the semantic value of signs, or as scribal habits.

PART II

IDENTIFICATION OF SIGNS

ANTHROPOMORPHIC SIGNS

Sign	Type	Identity	Derived sign
A-1 	MD, 1931–483	A man. This sign is drawn in three steps: a, b, c, . The term for man appears to be related to āḷ-āṇ since the term aṉ is used as an occupational ending. The Dravidian āḷ-āṇ (DED 341) means man, male, in seven South Dravidian tongues including Tamil and Kannada; and āl in Kurukh is presumed to be closest to the Harappan phoneme. For our purposes the morpheme aṉ is used for occupational anthropomorphs and āḷ-āṇ for male anthropomorphs independent of those ligatures. The original Harappan sound may not have been retroflexive, of course.	
A-2 	MD, 1931–182	A woman. This is a rare sign marked by a headdress resembling that found on certain female figurines (ex., Marshall, 1931 Pl. XCV-7, 13, 26, 27) the term for female appears to have been peṇ-poṇ (DED 3608) or peṇ(c). The sign occurs but twice according to the concordances.	
A-3 	MD, 1937–401	A woman? This may be a variant of the above. There are only three clear examples of this sign. Signs designating female are so rare numerically that it is suggestive that women's names were not written on the seals or that the feminine gender was rarely used in these texts.	

Sign	Type	Identity	Derived sign
A-12 	MD, 1931-410	A man with his arm in a holding position. These signs are human figures to which another individual sign is attached. This sign also occurs independently. It can be said that when affixed the sign acts as a classifier. We are justified in assuming that these signs represent occupations. Some are obvious pictorially: archer, miller, smith, recorder. We are safe then in assigning ideographic values to these combined signs. In the context of seal tablets the use of occupational designations in the context of naming is a time-honored idea, worldwide in utility. These can be "read" for their pictographic value, at least initially. One morphemic aspect could be held in common as in terms like miller, miner, driver, philosopher, etc. Dravidian possibilities show the occupational endings are usually an: e.g. (Tamil) panikkan–carpenter (DED 3209); (Tamil) kollan–blacksmith (DED 2773); (Tamil) villan–archer (DED 4449); etc. It is therefore reasonable to utilize this "ending" for the anthropomorphic signs which seem to belong to occupations.[31]	
A-13 	MD, 1931-437	A man holding one stick or staff.	
A-14	MD, 1931-117	A man holding two staffs or poles.	
A-15 	MD, 1931-70	A man holding a bow with an arrow.	
A-16 	MD, 1931-43	A man holding a bow.	
A-17 	MD, 1937-49	A man holding two bows with arrows.	
A-18	MD, 1931-165	A man holding a container.	
A-19 	MD, 1931-42	A man holding a mortar and pestle.	
A-20 	MD, 1931-260	A man holding a crucible or cauldron.	

Sign	Type	Identity	Derived sign
A-26	Mahadevan 1977–187	A man holding a stalk of wheat (?); this sign only in Mesopotamian context.	
A-22	MD, 1931–37	A man holding a comb.	
A-21	MD, 1937–88	A man holding a pair of tongs or pincers.	
A-27	MD, 1937–347	A man holding an animal haunch. Doubtful identification, only one example.	
A-24	MD, 1937–203	A man holding a marked stick.	
A-25	MD, 1930–398	A man holding two marked sticks.	
A-4	MD, 1931–339	A man with horned headdress. This is shown frequently with the horns coming from the "shoulders" or upper arms.	

OCCUPATIONAL ANTHROPOMORPHS[32]

A-13

This sign is troublesome because the staff being held has to be differentiated from what is apparently the number sign for one in the series | || ||| |||| etc. Though the single stroke also appears in isolation, for example in its pairing with (MD, 1937–293) in that case it is probably for its numerical value (see P-1). As a staff then, it must be tentatively identified by its relationship to the anthropomorph. In that context there are but two viable Dravidian words: forms of kōl (DED & DEDS 1852) 7/10/0* and forms of taṭi (DED 2459) 5/0/0*. The sign itself suggests an individual whose staff has something to do with his station (one recalls the Sheikh el-Beled of Old Kingdom Egypt or the hieroglyph sr—meaning official or noble). Therefore the combination of kōl-an or taṭi-an might conceivably mean someone of recognizable status. In the case of the former, the term kollan—blacksmith (DED 1773) is unsuited for two reasons: we have a term for smith (see A-20) and a shift ō—0 is required. No other possibility is obvious in the DED. However, in the case of taṭi-an there is a possibility in (Kannada), daṇḍi—staff (DED 2459) and daṇḍi—greatness, power eminence (DED 2449), also (Tulu

Sign	Type	Identity	Derived sign

daṇḍi–great. (One hates to consider taṭiyaṉ, Tamil word for fatman!) In sum, a syllabization akin to daṇḍi (y) aṉ with a meaning of eminent person is viable for this sign, barring other evidence.

A-14 

The doubling of the staff in this case may be a way of introducing the syllabic value ir(V) into the text. This is a common syllable in Dravidian names: Iravathan, etc. It may have a sense of the superlative, that is, "double eminence". [Note iṟa (Tamil), esna (DED 438), and iṟai–eminence (DED 448)]. For our purposes it can be syllabized as Iradaṇḍiyaṉ or Iraṭaṭiyaṉ where the y is introduced for euphony and to separate the adjacent vowels.

A-15 

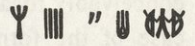
Since the term vil for bow is so common in Dravidian, 8/8/1 (DED 4449) we have reason to syllabize this sign as vil(l) aṉ meaning archer. In keeping with other so-called occupational signs, the archer grapheme has considerable ubiquity, occurring with some regularity in Columns 6, 7 and in Columns 11 and 12, but there are singular occurrences in other Columns.

A-16 

This sign occurs but twice in the seal tablet corpus. It appears to be a variant of the bowman grapheme (Type: HR, 1940-113 and MD, 1931-43). However, from the Harappan calendar study it could be related to the crescent moon (see F-7). This would read as nilavu (DED 3113), nilaṟu (DED 3042), nela-nela, etc., something to do with a condition of order, uprightness, endurance? Perhaps in connection with the calendar (DED 3128)-time? There is also the possibility of the crescent moon and therefore some relationship to great (peru)–per, etc. or as vilan-merchant [Note (DED 4448) vil, bil–to sell].

A-17 

The doubling of bows provides for the syllabization of ir(v) vilaṉ. A rectangular sealing found at the Sumerian site of Umma carries this sign as an initial in a text of 5 characters:[42]. It is associated with a presumed locative affix



(see P-2). The contraction Irvilaṉ could be a Harappan way of writing "Man of Irbil". Irbil is a city of the Subarians, a people native to Assyria and known to the Sumerians.[43] The other two examples of this sign are unusual in that one is on

Sign	Identity	Derived sign

a bar-seal text from Mohenjo daro (MD, 1937-49) and the other on a prismatic bar seal tablet from Chanhu daro (unpublished, but see Mahadevan, 1977 pp. 192-6402). The latter is of importance because it associates the double-bow sign with the place name (see N-4, 5). On the other hand, the doubling as in A-14 may simply be an honorific form.

Excursus: Bow and Arrow Signs

H-1 

This sign is readily divided into three components (type: MD, 1937-148):

H-2 

bow with string

H-3 

bow without string

H-4 

arrow

The bow with string, but lacking the arrow is a comparatively rare sign (MD, 1937-413; MD, 1937-519). Interestingly, it occurs at Kalibangan paired with the bow and arrow, evidencing a difference of meaning that goes beyond its representation, i.e., seller (trader) of bow and arrows? (see G-7).

G-6 
(a)

(b)

More important is the pairing with these signs, apparently representing two posts separated by horizontals, suggesting that the scribe, in designating the posts via the horizontals, was concerned with the space between them:

(a) Type: HR, 1940-262; MD, 1931-342;
(b) I can find no type for this sign but Mahadevan (1977, pp. 447-449) lists some from unpublished sources.

G-7 

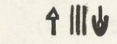
In combination with the bow this has important homophonic possibilities in Dravidian: ex. 6/12/1 vil–bow and 6/1/0 vil–sell, price, which in this combination may well refer to a market place:

(but see I-12)

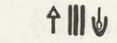
Sign	Identity	Derived sign
	aṅkaṇa—space between two pillars (DED 30). this combined reads vilaṅkaṇa—business space (note DED 37, Tamil aṅkāṭi—bazaar) (type: HR, 1940-678; MD, 1937-148).	
H-3	The bow, by itself, without string is a common sign readily confused with what appears to be the sign for crescent moon noted in the calendar study (Fairservis, 1977, pp. 11 ff.).[44] The moon sign does, however, face in the opposite direction (a).	 F-7 (a)
	The regular pairing with the container sign in numerous seal texts evidences that a personal name is meant in the context of an occupation, ex., bowman? or bowmaker? There are associations, however, which demonstrate that this sign had other values as well (see page 68 ff.). It appears as multiples with the container sign (HA 1940-713). None of these associations indicate that it equates to crescent moon.	 (b) 
H-4	The arrow sign is always shown as a single slanted line. The angle of the slant is the same as	
H-1	that shown when it is associated with the bow. Though most frequently found with the slant from right to left, the reverse also occurs in the double bow combination or in the "pipal-man" sign (A-5). The arrow sign rarely occurs as an independent grapheme; an exception appears in a combination found at Chanhu daro (CH, 1943-13, 24, 33).	 A-5
H-1	The arrow is am-ambu in most south and central Dravidian languages (DED 150 and DEDS 150).	
	* * * * *	
A-18	A man holding a container.	
J-1	The "container" sign derives its identification from its obvious shape, from its appearance as a mortar in (I-6)—the	

Sign	Type	Identity	Derived sign
I-6  J-5 		mortar and pestle sign—and as an essential part of the jar, pot, or basket sign where it appears with handles (J-5). There are examples of its function in a number of cases where a kneeling human figure extends the sign as if to catch or to retain something (see A-28, 29) (MD, 1937-815m 856 and HA, 1940-372). It has a probable syllabic value of aḷa(C)a, e, related to its role as a measuring container (DED 252). Thus: aḷa(V)an— one who measures (by quantity). However, the North Dravidian khō (Brahui) and kōy (Tamil) (DED 1842), both meaning vessel of some kind, and the (Kurukh) khōynā, (Malto) goye—to measure (DED 1843) provide another possible syllabization, if the concept of measurer of quantity is meant by the anthropomorph, i.e., kōy(V)an—one who measures quantity. The concept of measure for this sign is particularly well supported by the group of small token tablets from Harappa (see page 72).	
 A-18		If this grapheme is intended to be read simply as pot, vessel the anthropomorph might well represent a potter. Dravidian words such as kala (DED 1098) and kuṭam (DED 1376) in combination with an are possible. However, the association of this sign with other signs for quantity (see page 39) seems to support the notion of measure.	
 J-1		There are etyma for pot: (Tamil) pāṉai, (Kannada) bāne, etc., (Kodagu) pa'ni—measure, and (Tulu) pāṇi (DED 3394) which may be cognate to (Tamil) vaṉai—to form, and (Kannada) bān—to make as a potter does (DED 4362), bāmba—potter. These may be cognate with (Tamil) vaṉṉiyan—a caste title (DED 4366). The syllabization of bān is not remote from aṉ, the phoneme assigned to the "container" (see J-5). Are we justified then in syllabizing this as, bān(C) aṉ-potter related to bāmbaṉ-potter?	
A-19 		A man holding a mortar and pestle.	
I-6		A mortar and pestle sign. This obviously combines the container with the pestle rod. The rod itself does not occur independently except in one questionable case known to me, in which it is reversed (MD, 1931-209). The mortar and pestle sign regularly pairs with a three-stroke sign, both in	

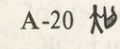
Sign	Type	Identity	Derived sign

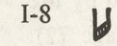


the common formula and in the absence of the third sign (MD, 1937-524). There are numerous examples of this sign in other contexts (e.g., MD, 1937-284). There is a direct Dravidian homophonic parallel in nūṟu—to grind, pulverize and the number 100 (DED 3089-3090). Note there are no words for mortar and pestle directly pertinent here except the form of nūṟu (DED 3089)/7/5/1 (Brahui) nusing; the transfer s— —r is not noted in the Table DED XIII, nūṟu—crush, powder.



There are many occurrences of this sign. Mahadevan, 1977 records 236, and in the majority of the examples in a pairing with III. This is suggestive of a formula (see page 69). With the anthropomorph we can construct a word nūṟ(u)vaṉ—One Who Grinds (flour?) i.e., miller?

A-20 

I-8 

A man holding a crucible or cauldron.

The cauldron or crucible sign. Its identity rests on four features, all of which are not always found in any particular sign. the first feature is, of course, its general shape, which we assume to represent a container. The second feature is the oblique way the contents of the container are depicted. This suggests that the contents were in the process of being poured. A third feature limited to more depictive examples shows that the container was bent, as would occur with handles or a pouring lip (MD, 1931-260, 340; MD, 1937-644; etc.) The fourth feature is rarely depicted. It shows that the handles of the container were probably notched (MD, 1937-605).

This notching presumably allowed the container to be hung from a horizontal rod, perhaps necessary in heating the contents. In all, these features reinforce the notion of a crucible in which the contents were highly heated and then poured. However, it is likely that the scribe is referring not to the crucible proper but to its metal contents, in lieu of a more definitive way of depicting metal. No other sign is as good a candidate for metal, which was commonplace in Harappan settlements although apparently not abundant. The metal involved was probably copper, the most common metal used by the Harappans. A syllabization of cambu-cembu (DED 2282) is possible here. The crucible—kōve (DED 1509) and the term for crucible (Tamil)-kuyai, (Kukai and Kannada) kōve (DED 1509) may be cognate to forms of

Sign	Type	Identity	Derived sign

kol as a root in kolle (Kodagu)—blacksmith; kollan—blacksmith (DED 1773) and perhaps even kolime, kulame—furnace (Kannada) (DED 1774). However unlikely, we can construct a word kŏ(C) an meaning "smith" when it is associated with the anthropomorph.

The sign occurs independently in Columns 6 and 7 with some regularity (see J-8) and in that context (see page 64, no. 18) it appears to be representative of a commodity, which we presume to be metal—not iron, nickel, silver, gold (see page 40) but bronze or copper; accordingly ce(a)mbu (as already noted). But the anthropomorph could be thus ce(a)mban. Not "Copper Man" obviously, but "One Who (works with) Copper," or better, "Smith"—Kōve(y)an.

A-26 

A man holding a stalk of wheat(?). This grapheme has but one occurrence, an example published by M.H. Van der Osten in 1934.[45] It is presumed to come from Mesopotamia or at least Western Asia. The sign is doubled in the text. Both by its uniqueness and its doubling it is not characteristic of texts from India-Pakistan. It is thereby suggestive of another language.

A syllabization of nel(nil)-an literally means wheat-man, i.e., farmer. But if the scribe in Mesopotamia was attempting to use the Harappan syllabary to write another language it may well be that only a syllabic value was sought. The doubling, ostensibly a pluralizing technique (see page 61) would give us nelan-ār or nelank(V)l or nilagāḷ.

A-22 
L-9 

A man holding a comb.

The comb sign in its vertical position is to be considered signifying "his mark". [Note (Dravidian) cippu—comb (DED 1341), (Kannada) kiri—to shave (DED 1305); kiru (giru)—to scratch, mark, write (DED 1352); (Tamil) cikkam—comb (DED 2059).]

This sign, with almost unceasing regularity, occupies Column 4 position. It is occasionally doubled (e.g., MD, 1937-347), which most likely indicates its syllabic values were being used to form the name of the seal owner. In such

Sign	Type	Identity	Derived sign

cases probably one sign serves a syllabic function while the terminal sign still conveys the idea of "his (or her) mark".

A-22

There is also the possibility that as ki it might represent the dative of "person". This is particularly true in the case of the quantity-designating small seals from Harappa (examples HR, 1940-444, etc.) (see page 39).

Common sense has a role in identifying the meaning of this sign. Clearly "One who Bears a Comb" is nonsense considering the pragmatic quality of Harappan life. The more reasonable alternative is to consider the sign as representative of a scribe—kir̄(i)(y)an̲ [note (indo-Aryan) kiraka—scribe],[47] suggesting a different anthropomorph (MD, 1937-546).

A-21 

A man holding a pair of tongs or pincers.

Excursus: The Tongs Sign (I-II) 

A study of this sign and its combinations has revealed much about the why of certain combinations and illustrated how limited is the usage of classifier techniques in forming graphemes.

This sign is clearly a depiction of a pair of tongs or pincers. It appears in a number of forms and contexts:

1. As an independent sign it occupies Column 7 in the grid and is regularly paired with the plough sign  (I-13); it occurs less often in Column 6 and is paired with  (J-5).

   It has an important position in Column 11 where it pairs with the lineage (?) sign combination (P-15).
2. The tongs sign is combined with the sign for sun or day (F-1) and is a regular occupant of Column 9 in that form.
3. There are two occurrences of the sign in combination with an anthropomorph (Mackay, 1957-88, 434).
4. It occurs in combination with the measuring square (K-1), .

   This ubiquity of combination and position is

Sign	Type	Identity	Derived sign

evidence for a multiplicity of meanings in context, but united by linguistic similarities.

Dravidian terms for tongs, pincers are as follows:

(a)	Kannada	ikkuṟ, ikkuṛa	(DED 356)
	Tulu	ikkuḷi, ikkuḷe	„
(b)	Tamil	iṭukki	(DED 377)
		iṭukku—to pinch	
	Kannada	iḍaku—to pinch	
(c)	Kannada	kāru	(DED 1232)
	Telugu	kāru	„
(d)	Tamil	kuṟaṭu	(DED 1529)
	Telugu	koṛaḍu	„
(e)	Tamil	koṭiru	(DED 1707)
	Malayalam	koṭil	„
	Kota	koṛ	(DEDS 1707)

The lexemes in (a) appear to combine a verbal for ik with a substantive kuṛa-kuḷe. The verbal morpheme may be cognate to iṭu (DED 375), which appears to refer to acts in general but in (b) has a context "to pinch" with the possibility that the substantive involved is the contracted morpheme ki-ku.

The lexemes of (e) appear to be derived from cognates of crooked, or bent, e.g., Kannada kuḍu, Tamil koṭu (DED 1709a) and possibly Tamil koṭice—jaws (DED 1706). The koṭa retroflex ṛ also occurs in Kurukh and Malto, althŏugh the shift ṭ-ṛ is common to South Dravidian and in Central Dravidian ṛ is common. Whether or not these forms of (e) are cognate to (c) and (d), it does appear that the proto-form for tongs or pincers was k(V)r. (Note the various shifts ṟr-r-s-ṣ-š) (DED, Table I).

The combination of ◊ and ⋈ into ⋉ in its positional regularity a situation shared with signs having directional meaning (see page 86) and the combination per se, sun and tongs, suggests that the phonemic aspect of the tongs sign is homophonic to words having directional meaning. In this case the obvious candidate is kăr (u). With the sun sign this becomes paṭu-kār, with kār meaning rain

Sign	Type	Identity	Derived sign

and paṭu a verbal form of to rise, or to appear (see page 46). Since the monsoon arises in the southwest, a directional attribution is implicit. Furthermore the combination with 0-11, i.e., kiṟ—below or south, confirms this attribution. In the pairing kār(u)gāl-ă̄ (see page 84) we have an almost exact identification with Tulu kārkāla (DED 1073c) —rainy weather (monsoon).

However, the combination , which pairs the sign for plough (I-13) with the tongs grapheme, argues for a particular and different reading since rain and plough are semantically clumsy, though possible. Although kă̄ru means plough in Malayalam (DED 1084) and is the root in Tamil karuvi—tool (DED 1084), the Harappan scribe apparently did not mean that the above pairing was simply to spell out plough. In fact, the lexeme uṟ (DED 592) is a most likely candidate for the original term—to plough. Possibly the tongs grapheme has something to do with plough, however. A suitable lexeme in this context is Tulu koru, Kannada kuṟa, Tamil koṟu (DED 1785); the latter two meaning ploughshare and the former, bar of metal. But even so in a statement of ploughing—ploughshare, i.e., uṟ(u)-koru (etc.) there is an ambiguity that does not seem right for the seal context. A better identity seems to be forms of Kannada gōru, gōri—to draw (objects) (DED 1847) and Telugu gōra—a drill plough. Here has a verbal meaning, i.e., to draw a plough—gōri-uṟ. Here the form kŏ̄ru, kŏ̄ri emerges if this "translation" is correct. In turn there is a cognate koṟi—to nip, nibble (DED 1798) and koṟi—sheep (DED 1799). Here may mean herd(s) and with plough(ing) refer to the owner of herds and ploughed (fields).

The anthropomorphic grapheme does not appear to mean rain-man, or black man, karu—black (DED 1073a), however, as koṟa(V)aṉ or kuṟavaṉ there are a number of references, including hillman, basket-maker, and other castes or tribes, and shepherd (DED 1530). Thus shepherd among these has greater validity in view of the signs for occupations (see K-17 for example).

The sign combines tongs with the carpenter's square grapheme , for which maṭṭa, maṭa (see K-1, K-2) is definitive (DED 3811). In the dramatic seal, the so-

Sign	Type	Identity	Derived sign

called "Lord of the Beasts" (MD, 1937-420), the inscription reads:

Here the tongs sign appears both independently and in combination. Interestingly, the positional regularities as worked out on the grid suggest that  , which is directly over the head of the central figure (see Appendix C, Sy-6), divides the text so that  (piran̲—Lord, King, see translation no. 43) reads from right to left. The right-hand text reads from left to right terminating in the anthropomorph which is below the line of the text. Thus  precedes  . If we hold to the syllabic determination for these signs, we have k(V)r-maṭ(ṭ)a kāru-āḷ (see A-1).

In view of the depiction of many animals on the seal centring on the buffalo-horned anthropomorph, the context suggests that kor̲i—flock or herds (as with sheep) with maṭ(ṭ) a refers to the kind of herds or their properties. For this the Tulu mōḍē—buffalo (DED 3933) might be suitable, i.e., herds of buffalo. However maṭ(ṭ)a refers to measurement, limit, etc.; thus the combined grapheme possibly refers to size of herds.

The succeeding tongs sign is thus to be construed as meaningful to both the following anthropomorph, which in this context probably is a nominative singular third person (see page 13, 24) i.e., He, and to the previous size of herds combination. The best candidate for the meaning of the tongs sign then in this context is found in kuṛa—assemble (DED 1513), collect—kuṛuval, kuṛāal, kūṭu (Tamil) (DED 1562), (Kannada and Tulu) kūṭa—assembly, join, etc., (Tamil) (DED 1595) kūḷ—assemble.

It must be emphasized that the large motifs on this seal (see Appendix B), refer to clans or animal symbolized sodalities (totemic clans ?). Thus the term kūta (assemble) must refer to what is assembled, in other words, the sodalities. For this possibility we have the Tulu term karē and that of Malayalam kara (DED 1088) meaning parish, and in the former case referring to a social division. If maṭ(ṭ) a can be conceived of as cognate to the Tamil

Sign	Type	Identity	Derived sign

maṭu and Kannada maḍu (DED 3808)—to join closely, unite, then kar-maḍu can mean United Clans, and kuṛ(t)u-āḷ—He (who) Assembles.

The context of graphemes, as illustrated by the tongs sign, has a great deal to do with their identifiable use in a text. This is where combinations such as  with  ,  , and  indicate the case of classifiers in Harappan writing.

One should also note the drift of the vowel a-o-u in the case of . It can be argued that the original morpheme was homophonic to lexemes meaning black, rain, sheep, and clan.

* * * * *

A-27
D-4

A man holding an animal haunch.

The haunch of an animal (MD, 1931-289) shows a suggestion of a hoof in some examples and that suggestion has led to an idealization of the sign in both the Indian and Finnish concordances. There are possible misidentifications of this sign (Note: HA, 1940-227, for example) and its form is obscure. Only one example of the presumed anthropomorph and haunch is known.

A-24
K-41

A man holding a marked stick.

The notched or marked stick is one of the most universal signs in the ancient world. Since man first kept records of any kind it appears that notching a piece of wood, bone or other material in sequence was the method used.[48] The symbol for this tool consists of variations on the vertical with cross-lines and is found, for example, in proto-Elamite, Archaic Sumerian and among the Vinca Cultures of South-eastern Europe[49] (Chart III).

At Mohenjo daro an incised shell was found with regular notches cut at right angles to the main axis.[50] This may or may not relate to a sequential measurement as occurs in recording time or quantity. It is critical to note that such objects made larger were with good probability used in liquid measure as well as surface length. In Dravidian (both Kurukh and Malto) there are related words khōynā and qoy (DED 1843) and (Kannada) koḷaga, also (Tulu) kuḷa (DED 1517), all of which mean "measure, usually of

Sign	Type	Identity	Derived sign

capacity or quantity". These words may be cognate to kol-stick (DED 1852); also note: (Kannada) kol, kul—length, largeness (DED 1854) and (Telugu) koyya and (Parji) koyya—stick (DED 1764), also (Tamil) kōṭṭai—measure of capacity (DED 1832).

Semantically the sign can be defined as representative of a recorder or accountant, one who is in charge of storage, or at least storage records. Storage was apparently a significant part of Harappan settlement.[51]

There are possible cognates in forms of kō—meaning basically leadership (DED 1810), note also kō—to string, arrange (DED 1809). There are also possibilities in (Kannada) kōru—share, part and (Tamil) kūru—division, share (DED 1602). Perhaps the best syllabization is kuḷa(g)an or koḷagan—registrar (?).

A-25 

A rare form shows a man with two marked sticks. Perhaps the doubled notational sticks provides the syllabic ir(V), i.e., irakula(g)an?

A-4 

The "horned" anthropomorph has to be regarded as an individual wearing a horned headdress for which we have numerous examples, both in Harappan figurines, seal tablets and in pre-Harappan contexts.[52] The Harappan emphasis upon cattle makes this grapheme particularly important because of a possible insight into Harappan religion. The pipal-arrow holding sign has a possible identification with a "divine" mother associated with the pipal (see E-6, A-5). Does this anthropomorph identify another such "deity"? We may well ask the question since a horned "deity" was apparently present.[53]

The term muri, murg—to bend, curve (DED 4080) and muri (Tamil), muri (Kannada) —bull, ox (DED 4137), coupled with an (aṇ) gives a syllabization muri(C)an, Murukan? (DED 4081). This is, of course, the name of the ancient Dravidian deity Murukan.[54] The combination with

the "container" sign (as in HR, 1940-307) provides the syllable an (see page 24). This makes it possible that the anthropomorph could be muri(y)ā! plus an. However a more likely cognate is maragh—horn (DED 3864) with the anthropomorph: thus Maraghan, whom we can define as a cattle god (presumed to be ancestral to Murukan?).[55]

Sign	Type	Identity	Derived sign
		However, the use of the identical affix (0-6) with the sign for chief (see Q-5) plus the Columnar regularity this sign shows with other anthropomorphic signs evidences that a god was not designated. In consideration of the fact that terms for horn (DED 3864) (Tamil) paruppu, (Kurukh) marag, (Malto) margu and (Brahui) margh, may be cognate to terms meaning priest, demon, spirit, even madness (shamanistic) (DED 3866)– ' maru(a)  āḷ(i,u), i.e., maru ( )āḷi–it is likely that the sign means priest or shaman. Thus the sign Q-5 refers to a head or chief priest.	
A-6		A man with a pole across his shoulders found in MD, 1931-312 provides the Dravidian root word for carrying pole–kā (DED 1193). This is apparently directly homophonic to kā– to protect, guard (DED 1194).[33] This sign can be syllabized as kā(v)āḷ–protector. The v is introduced for euphony. The homophony of āḷ–man (DED 342a) to āḷ–to rule, āḷi–one who rules (DED 341), suggests a reading of "The Guardian (Who Rules)", i.e., lord or ruler. Note (Kannada) kāvala– guard (DED 1192), thus watchman.	
A-11 	MD, 1937-518	Two men bearing a load or weight attached to a carrying pole. This sign occurs only once in the known texts but it is important in this context for it demonstrates the pros and cons of the methodology used herein and provides values for a number of signs. Conical weights of considerable size have been found at Mohenjo daro.[34] They were apparently to be suspended since a hole near the top suggests that method of carrying or lifting. In order to arrive at a possible Dravidian meaning, as well as a syllabization, we have to consider the sign as a composite one. It consists of two men, a carrying pole and the suspended weight. The carrying pole provides us with the notion that the weight is being carried and is thereby suspended, rather than acting as a measure. If this is so, our method requires us to assume that kā, the arrived at syllabization for carrying pole, must be a part of the word. The act of suspending a	

Sign	Type	Identity
		weight leads us in our search in the etymologies. There are two possibilities it seems. The North Dravidian khōyna (Kurukh), and qoye (Malto) (DED 1843) which mean to measure, weigh (Malto), on the basis of presumed nearness to the proto-language; and the forms of tūnku-tūkku (Ta.) tūgu, tūka, tūka (Ka.) DED 2777), which carry the idea of hanging or suspending in the context of weight or weighing. The latter seems to be more suitable. The forms also occur in seven South Dravidian languages, at least that many in Central Dravidian, and there are possible semantic allomorphs in North Dravidian. The combination of tū(C)v with kā coupled with the anthropomorphs, suggests the act of weighing, carrying, or suspending, particularly the former. The doubled anthropomorphs can be conceived of as a scribal convention to emphasize the act of suspending a conical weight, while at the same time iterating the act as an occupational one. We arrive at a word like Tū(k)kā(v or y) an—one who measures by weight. However it may be that the doubling of the men is a pluralizing convention, thus (v)r like ār.[35]
A-7 	MD, 1931-218	A man with a carrying pole from which ropes are suspended terminating in carrying loops. We already have in kā, the carrying pole, the notion of guarding, protection, etc. It is the looped ropes that provide the clue as to what is meant specifically by the grapheme. It should be noted that the loops on the carrying pole have often been referred to as vessels or jars, or loads of some kind.[36] However, there are no vessels of the type depicted in the glyph known for the Harappan civi-
	Chanhu daro 1943-18	

Sign	Type	Identity
		lization. As to the loops representing "loads", since the kinds of loads is not depicted and carrying loops are necessary for suspending any load, we appear to be on safe ground in assuming that what is represented is the means of suspension, not what is suspended. Thus we are looking for a compound of a carrying pole, kā with a word for rope. The best candidate is vaṭi (Ta., Ka., Te.) (DED 4268) which in combination with kā forms kāvaṭi (or kavaḍi), a Dravidian word in Tamil, Malayalam, Kannaḍa, Tulu and Telugu meaning carrying pole or yoke (DED 1193). However the sense of kā as meaning guard, protection, indicates that the above designation is not to be read as "one who carries a carrying pole" but as a particular kind of guardian. But that special sense rests with vaṭi. The only phonemic equivalency appears to be vaṭi-baḍi, South Dravidian words for stick, cudgel (DED 4272); also Telugu baḍe. In this sense we obtain a meaning such as "One who Carries a Club" (like one who carries a carrying yoke) or something akin to "Powerful Guardian" or "Watchman". These carrying pole signs probably refer to a special group of kāvaḍi(y)an who had special functions according to their seal tablets, and special status. (Paṇḍiya-kāvidi?)
A-8 	MD, 1931-129	A man with a carrying pole and attached ropes, with the "container" sign as the surmounting affix. This is a combined sign.
J-5 	MD, 1931-34	The "container" sign. This is much discussed as it is the most commonly occurring of the sign list. It occurs regularly in Column 5. B.B. Lal has described the

Sign	Type	Identity
		history of efforts to identify it and has shown evidence from Kalibangan that the original sign was drawn in imitation of the curve of Harappan goblets. In one case he has even been able to identify a disc base. The appendages which occur at the lip and upper part of the sign can therefore be regarded as handles. These are drawn last when the sign appears in graffiti form.
	MD, 1943-21	In some cases the upper handle is shown as a part of the continuity of the goblet shape.[37]
		Mahadevan has demonstrated that the regularity with which this sign terminates a seal text makes it a prime candidate for an honorific suffix to personal names, particularly of males. He then relates Dravidian names for vessels to the pronominal honorific anr so that the sign can be read as -an(r) or -an.[38]
		The combined sign, above, can be assumed to read kāvaṭi (v)āḷan, with āḷan perhaps having an honorific quality of "leading guardian". The regularity with which this combined sign appears in Column 5 suggests it is an honorific. An important frequency of pairing of this sign with number suggests that some system of ranking may have been used for those who were kāvaṭi (v)āḷan. there are 14 pairings with I, 2 pairings with II, 18 pairings with III, 2 pairings with IIII, and 3 pairings with IIIII according to the Mahadevan concordance of 1970 (pp. 179-180).
A-9 	MD, 1931-79	A man with carrying pole and attached ropes with a triangular point as the surmounting affix. This symbol occurs independently as a triangular point and line (a). It should not be assumed to be related

	Sign	Type	Identity
H-5	(a)	(b)	to the angle (b) which surmounts some signs.
		MD, 1937-289	This sign has irregularities of execution which can cause errors of epigraphy.
		MD, 1937-371	The relationship of the point to the yoke is not standardized in size or shape.
		MD, 1937-428	
		MD, 1937-472	The two independent signs, (a) and (b) occur frequently in the script. (a) however, occurs regularly in Column 5, a placement identical to that of this carrying pole sign. It is terminal in the seal tablet texts. We can therefore consider it in the naming context as a personal ending. If the "container" sign is the terminal syllable in its affixation with the carrying pole sign, its common syllabization an in proper names is not applicable here. However, another common personal ending is the plural suffix ăr (Tamil) in an honorific context. The possible identification of ār—pointedness (Tamil) and arci—goad, point (Kurukh) (DED 314) with this spearlike sign, as well as its relationship to the suffix ār, suggests its syntactical place. Thus the combined sign would read kāvaḍi(v)alā̤ r, which can be presumed to be another honorific title.[39]
A-5		MD, 1931-101	A man holding an arrow. This sign is drawn in several ways. In this the head shows above the crossed arms.
		MD, 1931-339	No head shows here and the appearance of a pipal leaf is achieved by the upper body, apparently a scribal convention.
		MD, 1931-18	There are examples where a bow and arrow are seen in the positioning of the

Sign	Type	Identity

arms, emphasizing the "arrow-holding" aspect of the figure. The sign is an anthropomorphic combination of the arrow and the pipal. It is thus: arrow-pipal, or pipal-arrow plus man. The surface values of the combination make little sense so that we must consider another meaning is intended (for the identification of arrow, see H-4).

Excursus: The Problem of

A-5 

The term for arrow, am(C) in combination with man-āṇ gives us ambāṇ or amāṇ. The former is like the Indo-Aryan amba meaning "mother".[40] While the latter "approaches" the Dravidian amma (DED 154) with the same meaning (note Kannaḍa—ama). Is this sign then a word for mother? If the pipal (see E-6) is indeed to be read as ara, a word for this compound sign emerges as ara(s)ambāṇ with a meaning akin to "Royal Mother" (DED 167). The fact that the pipal is indeed associated with an elevated being, perhaps female (Sy-4, Sy-10) may bear upon this. The sign occurs most frequently in Column 7 in longer texts but is also found initiating a text in the shorter examples. In any case there appears to be ubiquity of columnar position, which suggests a varied role in the make up of Harappan names. If amba-amma is the reading, the possibility of an Indo-Aryan term finding its way into a Harappan etymology evidences a cultural relationship between inner Asia and the borderlands already made explicit by the archaeology. Is there an historical connection between the Dravidian and the Indo-Aryan term?

MD, 1937-353

MD, 1937-632

BIRDS AND ANIMALS

Sign	Identity
B-1 	A chicken or other gallinaceous fowl. Probably syllabized as kor (DED 1768) (MD, 1931-338).
B-2 	Forms of the peacock. An interesting observation on the drawing technique of the scribe can be made. There is a continuous line from head to tail (MD, 1931-342).
B-3 	Could the Kurukh and Malto cubba, cuwe give us cu(C) as the probable early syllabization for peacock (DED 2203) (MS, 1937-365).
B-4	
B-6 	A calling or shrieking bird (head). Probably syllabized as kū(C)(V) (DED 1551), with an independent meaning—to announce, call, etc. (MD, 1931-83).
B-5 	There is only one occurrence of a duck in the script. It appears to represent a bird in a pool or pond, but one also has to consider its encirclement as a cartouche. Lacking other etyma for duck (Tamil) tārā (DED 2588) must suffice here. Interestingly the text brackets this between "container" signs (J-6). Thus we have aṉ(aṇ) tār (ā) aṉ(aṇ), an inscription suggestive of words relating to excellence, superior (e.g., āṇi (DED 296); also (Kannada) aṇi—beauty (DED 98) and aṇa—excellence (Kannada) (DED 96)). It should be noted that (Kannada and Tulu) tara (DED 2587) refers to a copper coin. The tiny prismatic seal on which the "duck" text is found could conceivably have been a token of exchange or at least a token symbolic of a certain value (see page 60), which is consistent with the fact that this seal tablet is of metal(?). (MD, 1931-93).
B-7 	A dog. In some examples the ears and tail are much exaggerated in size and the body is carved rather than simply incised. Possibly syllabized as nāy (DED 3022) (MD, 1931-527).

Excursus: Fish

B-8 	The "fish" grapheme is very rare in the Harappan script. It appears as a motif rather than a scriptal sign and is probably

Sign	Type	Identity

confined to that role. An excellent example appears on a seal tablet from Mohenjo daro now in the National Museum of India, New Delhi. It has been published by Stella Kramrisch (see B-8). The term for "fish" mīn (DED 3949), suggested by a number of scholars, has homophony with the term for "star"-min (DED 3994) is probably derived from the Sanskrit mīna. In any case, the grapheme for "star" (Chart IV) is pictorial. There is no reason why the Harappans should put a "fish" in the sky to represent a star when they could very well use more universal symbols for that heavenly body. The idea of "fish" being symbolic of prosperity, particularly in marriage, is widespread in India, and is an essential design in much folk art there (see E. Bharnani, 1976, Folk and Tribal Designs of India. Taraporevala, Bombay, Pl. 81-4 for example).

* * * * *

D-5 

A tusk of a rhinoceros or elephant, for which the term kam(bu) (Kannada, Tulu, DED 1759—Cent. Dravidian: kom-kommu) seems most suitable.

J-2 

Found in combination with a sign assumed to be a bunch of flowers, syllabized as pū. Here the plural suffix uḷ derived from the combination of aḷa with  pū plus the root syllable kom gives the possibility of kompū-uḷ(V) or tusks.[56] Since the text occurs commonly on the Harappan tokens this surmise appears to have validity. If indeed the flower sign pū (see F-4) is compounded with the tusk sign we have a clear example of the use of syllabization to construct words (but see pages 41-42 and J-2) (HR, 1940-460)

D-7 

A wing or feather of a bird perhaps. It can be confused with the comb sign (see L-9) but it has more than five strokes and is sometimes slanted. It does, however, occur usually paired with a man with a staff (MD, 1931-118). It is often in a Column 6 position, whereas the comb sign falls in Columns 4 or 5. The term for feather or wing (Tamil) iṟai, iṟakkai (Kannada), eṟake (DED 2133) may be cognate with iṟa—to be preeminent (DED 438) and possibly ciṟa (Tamil) to be eminent (DED 2131). This fits with the presumed meaning of A-13—eminent person (but see C-1).

Sign	Type	Identity

Excursus: The Problem of (See Chart IV, V)

Q-1 

That this is an important sign is demonstrated by the regularity with which it appears in seal texts in its various forms. These "fish-like" forms (i.e., with apparent fins) are a regular occupant of Column 8 on the grid, indicating that they had regular and identical meaning from text to text. Heras' acrophonic interpretation of the "fish" signs as mīn—Dravidian for fish—with the Dravidian word for star or planet, has been followed by Soviet scholars Gurov and Knorozov, by Parpola, and by Mahadevan. The latter, however, carries this interpretation further by emphasizing linguistic shifts that make possible ancient words for—to shine, chief, priest-ruler.[57]

The question is, is this sign representative of a fish? A significant number of facts lead me to believe it is not. The argument is as follows:

Those who identify the sign as a fish do so on the basis of two aspects. The first is that in general appearance the sign resembles a fish, that is, its slender fishlike shape coupled with two oblique lines construed as fins; the second is the association of the sign with the gavial in several examples where the crocodilian is either swimming with the "fish" or appears to be consuming it (MD, 1931-CXVIII-10, CXVI-20; Chanhu daro, 1943-LII-33).

There are several counter-arguments to the above identification (Chart V):

L-4 

1. In numerous examples of animals depicted by the Harappan scribe, there is some effort to designate features of the body by infilling lines. This infilling only occurs in the "fish" series in cases where no fins are depicted, and thus a fish identification in these specific cases is dubious. There is no example, to my knowledge, where the infilling technique is used in the "finned" variants.

2. The infilling technique applied to fish does occur in pottery painting, in which case the fish always have eyes.[58]

3. In the anatomy of fish the tails are generally of two types, those with a distinct "V" shape and those with a triangular shape. Neither of these are designated by

Sign	Type	Identity

this sign, unless one is to regard the absence of any designation of tail in one fashion or another on the hundreds of examples we do have, as due to stylization.[59]

4. In a majority of teleost fishes, including those of the Indus River, a distinction between dorsal and ventral fins occurs. Such a distinction occurs in none of our examples.[60]
5. It should be noted that among the various species of fish characteristic of the Indus River Valley and adjacent Arabian Sea coasts, all have several fins.[61]

L-3 

6. In the study of the scribal way of drawing this sign, the body is made by using an under-over technique quite perceptible in some of the more detailed seals. Again, granting glyptic stylization, another way of drawing a fish body is possible; however, the overwhelming fact is that none of the supposed fish show another way of drawing. This is a telling consideration.

7. The graffiti that the so-called "fins" are often drawn on, show them as paired dashes with no particular effort to place them near the head or tail of the "fish" sign.[62]

8. Often the scribe draws the sign with a sweep to the "tail" that reduces the "body" portion, as if the "fish" had an enormous tail. There is no consistency in this.
9. The association of this sign with stars fails to take into consideration its relationship to the gavial. Are we to assume that the gavial is symbolic of star-eating in some mythic account?

The alternative identification of this sign is that it represents a twist, loop, or even an aspect of a knot (Chart IV, V):

L-7 

1. As the sign is drawn, the twist aspect is obvious. The two lines overlap to form a loop. Loops of this order are found in the so-called "endless knot" motif (Sy-53) (MD, 1937-Pl. LXXXII-3, XCIII-4 and MD, 1931-LXVIII-5). They are also found as part of the sign for loom, where normally the strands of rope, cord, or fiber hang straight down from the already

Sign	Type	Identity

woven part (Chanhu-daro, 1946-LII-29 and MD, 1937-P1. XCVI-495). The twist of these cords is clearly demonstrated in two good examples (HR, 1940-24, and MD, 1937-XCVIII-616).

2. The "endless knot" motif shown in MD, 1937-P1. XC-23, which we can assume to be a decorative design, perhaps worn on clothing, shows the twist with "fins" as an element relating other "twists" to itself via the "fin" element. The position of the loop in such cases is derived from the relationship of these appendages. Note MD, 1931-30, where the "fin" elements parallel by position the loop or knot situation.

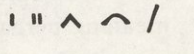
   Thus in order to differentiate pir(i) –twist from pir– chief, the scribe used a conventional diacritical marking ' ` affixed to the body of the sign (see P-11). This gives a fin-like appearance to the grapheme.

3. The relationship of this twist or loop sign to the gavial is iconographic. In all cases where the gavial is shown with other animals or motifs, it is dominant. This is expressed either by its scale or its centrality in the composition (see MD, 1937-IIII-16) or by the fact that it surmounts these symbols (Sy-24). This emphasis on important position in such cases underlines the preeminence of the gavial as a symbol of some quality or status presumed to be superior in character. We have already suggested the possibility that there is a homophonic relationship between Dravidian words for crocodile–mutalai, mudali (DED 4055) to words for first, foremost, first chief–mutali (DED 4053). In turn, there are words for twists, loop, net, etc.–piri, puri (DED 3436) or veḷāḷa (DED 4531), which are apparent homophones to chiefs, or leaders–pir (DED 3613) veḷāḷan (DED 4531), (Kannada) beḷḷara, veḷḷaraṉ (DED 4533) and also (Sy-61) vēḷ (DED 4562), vēḷir. There are evidences of Harappan social organization which suggest the presence of ranked chiefs, which is in keeping both with the presence of sodalities, the urban centers, and the goods and services redistribution system.[63]

Sign	Type	Identity

This interpretation of the loop signs is more in keeping with the archaeological evidence than the un-Harappan theory of stars, star-gods, constellations, etc., which some researchers have postulated.

A system of ranking and function within the leadership of the Harappan polity emerges. We have to differentiate between the polity as a whole and its parts. Perhaps the scribes conceived of that polity as similar to a net. The net itself is portrayed in the seal texts (e.g., Harappa, 1940-24, also Sy-61). The phonemic relationship of (Kannada) beḷḷāru—net (DED 4531) to the veḷḷāḷan (Tamil) and veḷḷāḷar (Malayalam) (DED 4533) to terms for ancient chiefs—vēḷir, etc. (DED 4562), provides us with a term for the system of chiefs as a whole, i.e., veḷḷāḷā(r). However the chiefs themselves are graphemes based on the twist, i.e., piri-puri (DED 3436), which has phonemic relationships to pēr(u)—the great, etc. (DED 3613). These graphemes are modified by a number of affixed marks as follows:



Q-2 

Q-5 

The short stroke has to be considered in its larger context. It is a common feature of a number of signs. It also occurs as an independent grapheme, either within the text (e.g., MD, 1937-231), or as it appears in (MD, 1931-67, 384). In other words, it is not confined to either a Columnar place in the grid or to a particular sign. It is this ubiquity that makes this mark an excellent candidate for an inflexional device. More than likely it is the mark of the genitive (possessive). If the Harappan language was a form of early Dravidian, then ă might be its syllabic value[64] (P-I).

The paired marks are varied. There are examples of a slight curve (MD, 1937-52, 647) or ones at a more acute angle than the lower "fins" (MD, 1957-48, 271, 256; note also MD, 1931-339, 116, 214, 137). There are instances in which a suggestion of the trihorned crown found among the larger motifs of certain seals (MD, 2937-XCIX-A, and HR, 1940-XCIII-307) occurs at the top of this sign (MD, 1937-338, MD, 1937-426). However, a number of these signs evidence that multiples of paired markings are simply a device for multiplying strokes. The characteristic Harappan

Sign	Type	Identity

way of demonstrating the plural is to double the signs (see page 61). This is a clumsy device, particularly with the limitations of space on a seal tablet. The alternative was to add a number of small strokes to the grapheme to be pluralized (see P-6). The number of strokes is apparently not limited, responding perhaps only to aesthetic or spatial strictures. In the case of these pir signs we have several examples of additional strokes: (MD, 1937-153, and MD, 1931-395).

The importance of these examples is that, in contrast, the sign most common has a specific limit in number of strokes, suggesting it could be syllabized as a plural, but that it can mean something else. Here the horn affixes create a semantic viability, e.g., marupir or priest (see A-4). or possibly cattle owner.

Q-3 

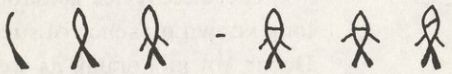
The arrow sign, described above, raises a significant question in this context. If the loop sign refers to a chief of some kind, does the affixation of the arrow mean something like "arrow chief" or is a less obvious meaning involved?—a meaning perhaps derived from the syllabic value of the arrow? That the latter is unlikely is evidenced by the consistent Columnar position of this sign, which is true of the entire group based on the loop. When signs within this group are paired, the marked one generally follows. However, the serious problem of sign identification arises. The Mahadevan concordance lumps all signs as horizontally crossed. In examining the published seals, in both the Marshall and Mackay volumes, this orthography was not applicable to all the seal texts involved. Where identifiable from the photographs, the following orthographic aspects are observed:

Marshall	(see: seals 468, 470)	5	
Mackay	(see: seal 570)	4	
Marshall	(see: seals 295, 326, 345, 456)	6	
Mackay	(see: seal 87)	4	
Marshall	(all other examples)	12	
Mackay	(all other examples)	4	

Sign	Type	Identity

There are also two graffiti inscribed sherds in which a single slanted line is associated with the loop (MD, 1937-482 and HR, 1940-708).

Even in the above breakdown there are problems of tracing the lines, and one would not like to be held to the foregoing in terms of accuracy. The point is that there are serious orthographic mistakes involved. Necessarily, computer programs urge standardization which, in this case, has led to significant error. Characteristically, the Harappan seal scribe cut the central line, whatever its kind, within the body of the loop. He usually did not cross the lines of the loop proper. The order of cutting was analyzed as follows:



The question is, therefore, were the central lines deliberately cut differently to create different meanings, or are the differences simply a consequence of scribal difficulties in marking the loop within a very small space? The solution appears to rest on the preservation of the lines of the loop. One might expect the modifying lines to cross or be imposed upon that which they modify. In sum, there is no consistency in the drawing to warrant one conclusion or the other, although I am inclined to the former.

The fact remains, however, that whatever the character of the inner marking, it was deliberate. I am inclined to eliminate the diagonal and the curved crossing in this discussion because there is so little to endorse their reality, and to examine the more secure and numerically more common sign  . In most cases there seems to have been no effort made in drawing this sign to relate the inner horizontal to the pair of exterior lines or "fins".

G-6 

The only other sign which has a horizontal line, or lines, is this one, already described above (G-6). Here the scribe apparently wanted to emphasize the space between two uprights or poles, a situation obviously not called for in the case of the loop. A more likely possibility is that the horizontal line represents the shed rod, or even the reed, in weaving. Of interest in this regard is the Dravidian word

Sign	Type	Identity

accu (DED 45) meaning weaver's reed, which may have a homophonic equivalent in accaṉ—father (Tamil), and forms of the word ajja(e) (Kannada, Tulu, etc.) meaning father, grandfather or mother or grandmother—acci, ajji. The Dravidian Etymological Dictionary suggests these terms were borrowed from Indo-Aryan, as in the Sanskrit arya. Even so, the concept of the loop as pir or vēḷ(aṉ)—a chief, is not contradictory to the idea of the status of a given chief in the seal context, i.e., elder. It bears repeating that one of the difficulties we have in attempting to decipher the Harappan script is the refusal by some analysts to consider the possibility that the Harappan language had numerous borrowings.

The discoveries at Shortugai in Badakhshan and the long known presence of such Harappan sites as Duki and Dabar kot in Loralai, as well as the strategic location of Harappan sites near passes into inner Asia, evidence contacts far from the Indus River. These contacts were certainly with peoples speaking non-Harappan languages, among which were Indo-Aryan tongues. The so-called Aryan invasion of the subcontinent has proved to be more a gradual infiltration than a mass migration. Indeed, if the Harappan chieftains formed a kind of aristocracy, Indo-Aryan etymologies might well have provided the basis of a short-lived lingua franca among them. At the indigenous level, the rapid spread of the Harappans from still unknown centers, now confirmed by archaeology, brought them into contact with alien residents whose languages offered their own vocabularies to what was apparently an increasingly cosmopolitan linguistic situation. The details of that situation we do not yet know, but it is a methodological mistake to consider the Harappan hegemony a linguistically pure impenetrable isogloss.[65]

P-4 

The angle occurs as an isolated grapheme but in such cases it is as large in size, or as prominent as all the other signs in the text (MD, 1937–111, 119). Its most common usage is as a modifier to a number of signs. Its surmounting position in such cases should be noted. There is some possible confusion between the triangular point and this sign, but the former sign regularly occupies Column 5 (See H-5) in

Sign	Type	Identity

the grid, while signs modified by this sign are not found in that text-terminating position. Furthermore, the lower horizontal line closing the triangle marks a symbolic difference. This difference may lie in the idea of "spear" or "point", whereas it seems to have the meaning "head" (DED 2529), for which the ubiquitous term tale-tala-tal (DED 2529) appears fitting. Thus tal-pir(pur)—head chief. One should note the resemblance to the Talpurs of Sind, the predominant rulers of that and adjacent areas prior to the conquests of Napier.[6]

The situation then is that, under the Mutal(ai)—Primary Chief came the Vēḷaḷa(r)—Assembly of Chiefs, or pirs. There were four kinds of pirs:[62]

 pir — a chief of ordinary rank
 talpir — head chief, i.e., ranking pir
 acci-pir — elder
 maru-pir — chief priest

The grapheme  which combines the assumed genitive diacritical with pir or pir-a$\breve{}$ simply means "of the chief".

Of interest, and something of a test for the above are these combinations (these pairings have been recorded by Mahadevan, 1977):

  4 occurrences
  14
  4
  44
 4*
  24*

  6 occurrences
  4
  8
  28*
  3

  7 occurrences
  4*

* These signs recorded by Mahadeven as are all actually .

These pairings demonstrate that talpir (pur) initiates in 88 examples and follows in 12 examples. This is suggestive of a ranking order wherein the individual head chief was in authority at times over other chiefs. Taken literally, it can also mean a recorded history where one starts as an ordinary

Sign	Type	Identity

chief and becomes head chief, not unlike the ancient Egyptian system wherein all ranks held in one's life were listed in one's tomb.[68]

Q-1

The distinction, then, between pir—chief and piri—loop is made by the addition of two strokes to the body of the sign. It is possible that the added strokes represent the number two —ĭr(u) and are added, not to change the syllabization, but to enhance it to emphasize the difference in meaning.

NUMBERS IN THE TEXTS

N-8 

One of the signs found associated with the so-called Calendar Signs  and and one of particular importance because it raises the problem of the relationship of numbers found within texts to the graphemes with which they are associated.

(MD, 1937-3d, 214), the type example, demonstrate that the point in the lower part of the sign is an entire joined unit. In addition, the "openings" are never separated from the body of the sign by the seal cutter. The walls of the body of the sign enclose the point.

In excavations at Allahdino a central well fed water into a central place that was tapped by a main channel which, in turn, had branches.[78] The accomplishments of the Harappans in creating drainage, sewage, and plumbing systems is well known. Their existence and character are readily ascertained in the various excavation reports.

In this context, then, the point appears to emphasize direction or possibly pouring, the body of the sign the well, pool, or other source of water, and the "openings" to the sides and top the sluices into respective channels. Accordingly, this sign appears to represent a drainage, or possibly an irrigation system. The nearest modern equivalent for irrigation-sluice rests on the interpretation of the point, which apparently indicates the flow or pouring of water. The best equivalents appear to be forms of vār—pour, flow (DED 4387), which also possibly relate to ār—pointed (see H-5). This may be only part of the syllabization kāl-vār, or vāy. Thus the could be kāl and vār (DED 1239) or vāy (DED 4385)—mouth, edge of a knife; note Brahui bā.

Sign	Identity

With some limited exceptions this sign pairs with the number seven in the texts (for example MD, 1937-214). The presence of a number sign in the midst of a seal text is not unusual. It occurs with almost all the known numbers. Ostensibly one might read this combination as meaning "seven sluices". Of course, the combination might be a formula of some kind meaning "good luck" or some such epithet of fortune an unprovable assumption. The sign itself also pairs with the grain sign and thus has a possible calendric place. It is tempting to suggest that pairing with the number seven otherwise makes this combination an alternative to the seventh month, a period of heat when the rains are expected but irrigation is the only source of water to the fields. This may well be the fact.

The numbers within texts have three possible interpretations. The first and most obvious is that they are to be read as ordinals. This is probably the case in a number of examples (MD, 1937-109, 120). A second possibility is that they were used for euphony, whatever their original meaning—an improbable assumption for now.

There does exist another and possibly more valid possibility. Zvelebil has pointed out that the adjectival form of numerals in Proto-Dravidian was probably:

oru(C)	ōr(V)	–	one	cay(C)	cay(V)	–	five
iru(C)	īr(V)	–	two	caṟu(C)	cār(V)	–	six
mu(C)	mū(V)	–	three	eṛu(C)	ē̃r(V)	–	seven
nāl		–	four				

(from Zvelebil, 1977, pp. 34-35)

If indeed the language of the Harappans was Dravidian, one is tempted to relate this early number syllabization to homophones; for example, the pairing of a sign for water-system with the number seven, eru-er, suggests that the number specifically related to the function or genesis of that system. Thus the possibly cognate verbal forms ēṟu (DED 776) and eṟu (DED 723a) (note shift in Brahui and Tulu r to Tamil ṟ), which have a context of "establishing, raising" etc., may mean that the seal-bearer was a "hydraulic engineer" who made water systems or raised water from them. This is not too far fetched in consideration of the

many concrete examples we have of complex water works in the Harappan culture.

If the number seven can thus be homophonically related to verbal or other modifying usages to the substantives involved, this may also be true of the several other numbers whose ubiquity in the seal texts likewise qualifies them. For example, the number six may have been used as an ancient pluralizer (V)r. There is a possibility that nal–good, etc. (DED 2986) may be cognate ultimately to nāl–four (DED 3024). In the case of mŭ, mŭ(n)–three (DED 4147) there is a strong possibility of a homophone in forms of mun–front, foremost, etc. (DED 4119a) (see O-3). Apparently the Harappan scribe was conscious of all these possible interpretations and one has to accept his use of them in the appropriate context.

NUMBER SYSTEM AND THE CALENDAR

The possibility that we have artifactual evidence for an Harappan calendar has been described in a previous account.[69] Mackay found a "glut" of ivory sticks in the excavations at Mohenjo daro, some of which were marked with Harappan graphemes  ,  ,  ,  and associated vertical lines ,  ,  , etc. A number of these pieces, most of which were square in cross section, were grooved as if to be slid along a cord. One of these had alternating graphemes  and  along one side arranged in regular intervals, except at one end where the interval was halved. On the assumption that the graphemes represented moon and sun, or night and day, the piece was measured against the lunar month and proved to represent apparently a three-week period, or $21\frac{1}{2}$ days, if each interval could be regarded as a full day, midnight to midnight. This means that from the first crescent to the last, i.e., (→), with a moonless period of about one week, by sliding the piece along a cord seven/eight intervals the full month of $29\frac{1}{2}$ days could be achieved. Mackay's "glut" might then have been the remains of a calendar "machine" by which pieces were slid along cords to record calendrical time (Chart VIIA).

The association of the sign  , assumed to represent a stalk of grain  the alternate but semantically identical

grapheme), with the vertical strokes which are clearly number, as well as with signs , , , etc., suggests that these represent the names or numbers of months in the lunar year (Chart VI B). Since the signs pictorially represent grain but are used to name months in this context, it is logical to seek among Harappan language candidates for etyma that meant both grain and month.

The Dravidian nel—grain, rice (DED 3112) and nilā (Tamil) and nela (Telugu) (DED 3113) provided a gratifying answer[70] (also note DED 3042 nira—to arrange in order, line, row). Therefore the number signs associated with the grain-moon graphemes could very well represent the numbers of the months themselves.

Frequency of occurrences charted by Mahadevan, 1977		Other sign-pairings which could be regarded as calendrical			
	16		26		
	27		101		
	45		11		10
	18		12		
	12		31		
	10		13		

There may be additional occurrences, if some of the short stroke pairings are counted, but on the whole these can be regarded as separate entities (see Sign List, Appendix A).

It should be noted that in the calendrical system pairings with one long stroke do not occur, suggesting the initial month is represented by another symbol.

There is substantive evidence to support the idea that the Harappan number system has a base eight. This derives in large part from studies of the frequency of occurrences of the extended, or long stroke signs which, however, are sometimes grouped as a series of short strokes (see 0-1 to 0-12).

The Mahadevan concordance sets forth the following

frequencies[71] (note the sharp change in number of occurrences between 7 and 8):

	Long Strokes		Short Strokes		Total
1		149			Too hard to differentiate from presumed inflectional sign (P-1)
2		365			Too hard to differentiate from presumed inflectional sign (P-2)
3		314		151	465
4		64		70	134
5		22		38	60
6		3		38	41
7		6		70	76
8		0		7	7
9		0		2	2
10		0		1	1

There is evidence that Dravidian once had a base eight.[72] We are therefore in a position to differentiate among the calendar related signs for equivalents for the numbers 8, 9, 10, 11 and 12 in Dravidian.

O-13 

The number 8: eṭṭu-eṇ—eight (DED 670) (notes also eṇ means calculation, count, etc. (DED 678) allows us to speculate that there may have been an equivalency between the linked circles and the number 8. The Dravidian iṇai (Tamil), eṇe, eṇa (Kannada) iṇe, iṇe, (Tulu) etc. (DED 387), which carries the notion of pairing, doubling, joining, etc., is the best equivalency in modern Dravidian which, if it holds true, would make this sign the equivalent to the number 8.

O-15 

The number 9 must equate to something like toḷ or toṇ which, according to Zvelebil, was the old morpheme.[73] This sign may represent a square weight, an object found

frequently in the excavation of Harappan sites. (MD, 1937-Pl. CV-1-5; Chanhu-daro, 1943-Pl. XCI-29-32, etc.) Scale pans and beams for balances are also found (e.g., Chanhu-daro, 1943, p. 178). It may be that the vertical line which surmounts the square in the sign refers to and accents the point that a weight for weighing in a balance is what is signified. It therefore follows that a Dravidian equivalence between weight, weighing, etc. and the number toḷ or toṇ is required if this sign is to have that value. The nearest possibility is tūnku (Tamil) or tūkku (Tamil), tūgu (Kannada) (DED 2777a), which are too remote from toḷ or toṇ linguistically, although there is always the possibility of unusual shifts outside the rules of linguistic drift, given the fact of outside influences.

N-10

The most likely possibility is that the square does not represent a weight at all but is an enclosure of some kind, perhaps a house. In support of this idea are the various interior treatments given this form. If a house or hall is meant, the vertical stroke, or strokes above and below (MD, 1937-511) could represent the pillars which support the beams of the roof, or even the roof itself. Infilling with horizontal lines could represent rafters. It should be noted that in the sign generally considered to represent a balance, the pans are always round or oval not square. A reconstruction of this sign with squares would be necessary if the square is to be regarded as a suspended weight, as though it were part of a balance pan (see K-9).

G-10 

Forms of tūṇ(a) (DED 2780) – (Tamil) tūna (DEDS 2780) – (Tulu) meaning stake, pillar, post; and toṇṭu–log of wood (DED 2877, DEDS 2877) support the notion that this sign could mean a house with a pillar or pillars. Squares, rectangles, and diamond shapes are used in many cultures to represent buildings, gardens, pools, etc. By placing the pillar designations within the square, the Harappan scribe could designate the building itself, not the pillars, and thereby confuse his meaning (see G-11, etc.). [Note also the sign of two long strokes connected by a horizontal in which the verticals represent posts (see G-6)]. Thus this sign is a good candidate for the number 9, though by no means conclusively so. It regularly pairs with the grain grapheme

which, in terms of the Harappan calendar, would mean the ninth month, or harvest(?) month. This suggests the notion that this pairing was a formula in proper names presumed to represent the beneficent effects of a good harvest evolved into a name (e.g., Gloria, Augustus, Dost Mohammad, Singh, etc.)

The number 10 in the Harappan system of counting ought to be this sign. What does it represent? The basic sign without the left side strokes pairs regularly with one which is probably the symbol of the rising or setting sun (see F-6), while this complex sign pairs only with the signs for grain. The glyptic artist carved the sign on the seal or incised it on other material, with some variation in shape. Commonly it was cut with curved sides separated by two horizontal lines under which a number of vertical strokes were made (MD, 1931-176; MD, 1937-508; MD, 1931-161; and MD, 1937-470). Although usually only two horizontals were made, there is an example of three such lines preserved (MD, 1931-P1. CXVII-5). Rarely the space between the horizontals was treated with vertical line infilling (MD, 1937-428). The multiple verticals below the horizontals often number two, but examples of three, four, or even five, are known (MD, 1937-508, 226, 220).[74]

(see P-12)

The idea that this sign may represent a multilegged vessel is belied by the non-existence of such vessels in the ceramic catalogues of the excavated Harappan sites. The multiple verticals attached to the crossbar evidence that a harrow or rake device is depicted, while the curved exterior lines, in that context, can be construed as the poles to which a draught animal was attached. The extension of these poles as teeth can be construed as a scribal convention.[75]

The terms for harrow, and its cognate, tooth, have the root pal (DED 3288), which is homophonic to words meaning many (DED 3289). Zvelebil has pointed out that if *pat(V) or *pan(C) may connect with *pat or *pan, which are words for the number 10, the basis of the number would be a word for many (Zvelebil, 1977, p. 36). It would seem that the Harappan sign provides this connection.

The number system is then:

1
2
3
4
5
6
7
8
9
10
11

(a)

The slanting stroke in the complex sign for ten has something to do with the Harappan calendar as it is associated with the grain month signs (see Appendix D, Chart VII B).

(b)

It is found associated with other signs in the series. The single long stroke can then be considered a determinative device or prop to make certain that the slanting line is not considered inflectional, as might occur if that line were drawn alone (see P-1).

(c)

The slant of the affix in signs (a), (b) and (c) indicate that this is the arrow sign (see page 32) and that it is to be grouped with the other signs with that determination.

A-15

(H-4 & P-1 or O-1)

In the absence of other numerically comparable correlations, or even single occurrences, it is likely that the bowman anthropomorph is a part of the Harappan calendar (see Appendix D, Chart VIC). Again, the arrow sign acts as a determinative here. Quite possibly the pairing with diagonal as in (b) represents the first month since this occurs 31 times. Here the slanted line, the arrow, represents the sign for month while the single stroke might well represent the ordinal "first".

The "arrow" months cluster: the eighth, ninth, tenth, eleventh, and twelfth. This suggests that the five months were grouped into a seasonal designation. In these regions a two-crop year is traditional: kharif, the summer season (April to September), when cotton, rice and the millets are the principal crops raised; and rabi (October to April), when wheat, barley, gram and oil seeds such as Sesamum are the crops. Rice is not attested for the Harappans and the millets are apparently later domesticates on the subcontinent.

Wheat, barley, gram and sesame are evidenced for the Harappans, however.[76] This emphasizes the importance of the rabi crop, which is cultivated in the cooler, drier season, pre- and post-monsoon. Characteristically, ancient man timed the agricultural seasons with the appearance of stars or constellations, either on the horizon or as a dominant feature of the skies during the season.[77]

Traditionally, the New Year starts with the beginning of the sowing season, which in the Harappan case would be about the beginning of October, counting from the appearance of the new moon or from the middle of October, counting from full moon to full moon.

The term for arrow—am-ambu (see H-4, P-12) has homophony to terms for water, wet (DED 158-158S). Accordingly the arrow designated months probably correspond to the kharif—wet season. The dry season months are summarized as nerdē, niṟu—dry period (DED 3128-3131) as designated by North Dravidian. As the Chart (VI C) demonstrates, the eighth month—Eṉṉelam(b) starts the rainy season since it is designated by the number eight—eṇ, and by the arrows within the joined circles. This is followed by Toṉṉel (am). Now the absence of the arrow sign is made up by the probable cognate of toḷ with tulu (DED 2764)—rain (drops). Although the eighth month is part of the kharif season, rains usually fall in late June-July. This auspicious occasion may be the reason why the combination  is so common in proper names. The tenth month, designated by the harrow in combination with the arrow sign, is quite obviously the tenth month but in the kharif period. The following month combines two meanings. The first is obviously the number eleven, that is, the three strokes within the joined circles which equal eight, combine with the circles make the number eleven. The second is that the multiple strokes also designate rain (see F-10, F-11) and thereby act as a classifier of sorts. The final month of the kharif season combines the arrow sign with a single stroke representing the inflection mark for the genitive (P-1). This can be read Nelam-ā̆—literally "Of the Rain" month. But possibly cognate to proto-forms of Tamil (DED 137) amar—to become quiet or still, i.e., end of the rains (?).

Sign | Identity

CRESCENT MARKS AS NUMBER

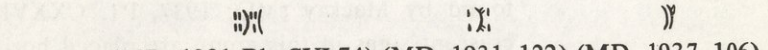
F-7 (

F-16)(

Traditionally, on the highlands above the Indus River Valley, the prehistoric potters marked their wares by inserting a finger nail into the wet clay. These marked wares have been found in sites of Zhob-Loralai, Quetta, and more recently at Mehrgarh in Kachhi.[79]

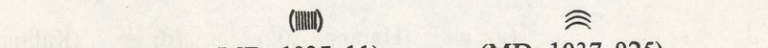
The potters' marks on the whole form a consistent system of mutually intelligible graphemes in those regions of the Indo-Iranian borderlands. The fingernail marks run from one to six, after which other kinds of stick-incised marks were used. This system is not found in Harappan pottery; potters' marks are generally the signs of the script, with a few exceptions.

The fingernail, however, does seem to occur as a grapheme in the seal writing. It should not be mistaken for the sign for "bow" with which it may be readily confused. The difference appears to be that the bow sign is apparently never more than two, while the fingernail grapheme is either multiple or affixed in some distinctive way.



(MD, 1931 Pl. CVI-74) (MD, 1931-122) (MD, 1937-106)

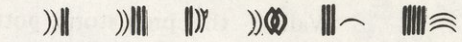
There is, however, an apparent exception in the use of this sign as a bracketing device, and in vertical rows:



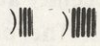
(MD, 1937-11) (MD, 1937-925)

In North Dravidian the fingernail is referred to as orokh (Kurukh), orgu (Malto), and hor (Brahui) (DED 479). It also has a relationship to okkuni—to scratch (Tulu) (DED 783). There appears to be some relationship of this word to Dravidian words for one—oru-okka (DED 834a, b) but with an adjectival and often a collective meaning. The fact that the sign is often modified by number marks suggests that it represents a specific quality in such cases. Its bracketing may refer to the idea of "total".

Unfortunately, our lack of texts other than seals and graffiti makes it virtually impossible to understand to what these signs really refer. The seal tablets demonstrate that these fingernail signs are often associated with number in their pairing,



and possibly



if the crescent, in certain contexts, is given a value other than "bow" in the inscriptions.

There are also examples associated with quantity in the small sealings from Harappa (e.g., HR, 1940–502). There appears to be a tendency in these numerical associations to emphasize odd numbers—3, 5, 7, 9. If the long vertical strokes applied to, or associated with Harappan signs, as indicated in the number system previously described, are numerical in meaning, then it is quite possible that the associated crescent graphemes have a special kind of numerical value. In one case the crescent seems to be a value, perhaps used in connection with weight or class of metal, as in the inscribed bronze axe from Mohenjo daro found by Mackay (MD, 1937, P1. CXXVI-5). All the crescent signs in this group are placed horizontally and occur only in bronze or copper implements, or graffiti. In the horizontal group we have multiples to 3 and one example of 7. It is of value to note the pairings or associations:[80]

(a) (Harappa-802)
(b) (Mohenjo daro-923)
(c) (Harappa-804)
(d)  (Kalibangan-302)
(e)  (Chanhu daro-306)
(f)  (Mohenjo daro-925)

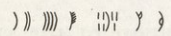
Note the pairing of three lines in one case (a) and three lines and two crescents in another (c); while (c) has to be compared to the two crescents in (d). There is also the unusual grouping in (b) compared to the pairing in (e). This recalls the situation where a fixed numerical unit is added

to: in Chinese when two strokes follow the sign for ten they equal the number 12, when they precede the sign this indicates multiplication and equals 20.

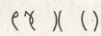
It follows, then, that the right-to-left reading of the Harappan script gives us unit-plus-number, i.e., addition; but number before unit is probably a statement of multiplication. The multiples of the unit presumably up through seven suggest that eight was again the critical number. We can therefore hypothesize a system as follows:

(1)		multiples of crescents up through 7
(2)		crescent plus number up through 7 (read from right to left)
(3)		crescent added to crescent plus number to an unknown limit
(4)		number plus crescent

In the case of the vertical crescents the system is one of direct affixation or association of strokes or other diacritical marks, plus multiples of the sign:



There is also a series in reverse.



The crescent is used regularly in bracketing.

These crescent signs tend to occur in Columns 6 or 7 of the grid. These are the columns which are occupied by the greatest variety of signs. The exception is  , which regularly occurs in Column 11 where it is paired with the short stroke and broken vertical common in Column 10 (see F-6).

The single, unmodified crescent is, of course, the "bow" sign (see H-3). There are numerous occurrences of this sign with the "container" sign which, if our syllabization for these signs holds true, is akin to vil(l)an—archer, but since there is another sign (A-15), the homophonic relationship vil—bow to vil—buying and selling (A-16) probably means the sign merchandise or something cognate to that

meaning (see A-15, A-16). This is a not unlikely name for a person of the time in which one presumes the seal was made.

P-8, P-9 

Another sign combines the crescent "bow" with four strokes and four strokes at the sides possibly marking the number four. Though the number of ligated strokes involved is regularly four, it is likely that they are pluralizing diacritical marks, their number and placement the result of scribal aesthetic convention. Note that the four strokes have appeared closely spaced as another way of expressing the plural when there are space limitations. There is also the possibility that the Dravidian word for "irrigation channel" (see N-8) was synonymous with a pluralizing suffix, kāl (note DED 1239, 1237).

The four diacriticals which bracket the main sign are found also with the "loop" signs, as well as with a few other (presumed to be) non-numerical graphemes. When used with the linked circles, the marks may have the numerical value of four since the central sign is a number. In these other cases, however, the diacriticals (never less than four) could be adjectival in character. If Dravidian, they could refer to nāl—four and nal—good, great (DED 2986) (see O-4).

Further examination of the strokes on a range of examples of actual seal tablet inscriptions seems to indicate that they are actually intended to represent dots or tear-shaped strokes and are not to be confused with the short-stroke graphemes common elsewhere (see, for example, P-2, Q-5). There are several examples where a comparison with the short-stroke group can be made (see MD, 1937-199 and 235) and Banawali.[81] Where inflection is meant, the strokes are made a part of the sign inflected, or in the case of the locative, conventionally placed high to the side (on the left in the sealings). As "tears" or "drops" the sign refers probably to milk—kar̲y (DED 1173); ornamental dots—kar̲e, kar̲i (Kannada) (DED 1166). Note that the characteristic way in which water or liquid is symbolized is by multiple strokes:

N-2 stream or river,

F-10  rain.

Thus the bracketed signs probably refer to aspects of milking, to milk, dairy, milch cow, etc., if the meaning of the signs is correlated to the concept of liquid, i.e., milk. However, in context then probably refers to tribute, i.e., gift-giving in a Chieftainship; probably cattle (see P-9).

F-11 

The multiple small strokes set forth in three rows of four do not seem to be intended to represent the number 12. In conformance with the formation of the grapheme which represents water, the idea of rain is conveyed by the formation of this sign. The notion that number is not involved with this particular sign is reinforced by the absence of similarly formed signs, which represent the numbers between 7 and 12. The occasional graphemes that do add up to 8, 9, or 10 are so rare that they are probably only used in a non-numerical scriptal function (e.g., HR, 1940-693).

N-2 

These signs differ slightly, but seem to be identical in what they symbolize. With two exceptions, in the 15 examples we do have they both pair regularly with two long strokes. In the ancient world water is frequently depicted by zigzagging lines, representative of streams and rivers. In the Dravidian word nīr, īr (DED 3057) appears to be a suitable syllabization for this sign. What is of greatest interest is the relationship to īr—two strokes. Does the initial sign act as a determinative while the following one becomes the syllabization? Or was the pronunciation something like nīr īran?

MD, 1937-669

Among the many words for rain in Dravidian pey (Tamil) and poye (Malto), pir (Brahui) (DED 3610, DEDS 3610) is probably nearest to the Harappan. A combination like the one in MD, 1937-669 suggests something akin to "Lord of the Rain". Did the Harappans have individuals who by magic or other similar techniques were supposed to control the vital rains? [Note (DED 3635) pāy—devil, wildness, (Tulu) pēyi—demon.]

F-10 

This sign is probably identifiable as rain falling from the sky. This is a common enough designation in the ancient world.


Egyptian


Chinese

American Southwest

But if rain is twelve short strokes normally, why only nine here? Is this simply a scribal conservatism or was it intentional? We have only one example of this sign (HR, 1940-693) but a combination with "sky" occurs with other signs. Does the number 9 here have a syllabic value, i.e., toṇ, toḷ, essential to the meaning of this sign? One assumes that the top line is prefixal in character. A Dravidian equivalent for sky has a root syllable mi(C), me(C) (DED 3966, 4163, 4173, also 3962, 3998). There are many connotations related to superior, high, great, above, etc., so that one can assume these qualities are contained in the combinations with this sign. It never occurs solo to my knowledge.

A combination me(C) toṇ or me(C)toḷ, makes no real sense in terms of what we know of the Harappan civilization. This suggests that the scribe merely wanted to express the idea of rain graphically. In any case, the combinations with sky, a grapheme with probably high qualities in keeping with its meaning, indicates that it was used as a superlative affix enhancing the qualities of the substantive it modifies (q.v.). (but see I-19).

HARAPPAN STORAGE TOKENS

The fortunate recovery of a group of tiny seals, particularly by Vats, at Harappa (HR, 1940, Pl. XCIV-342 ff.; XCV-various; CVI-429, -495; XCVI-497, -580; XCVIII–various; C-651, -692) provides us with a body of evidence for Harappan quantitative measurement. These "miniature" seals are rectangular and inscribed on two sides. On one side is the "container" grapheme paired with the vertical strokes from one to four. On the opposite side are seal texts, generally conventional in character. The majority of these texts terminate, in a right to left reading, with  or , evidencing a proper name. Thus one can presume that the seal was used to stamp a quantity figure on a commodity for its storage along with the owner's name.

But these seals are too tiny to stamp into clay without a

holder of some kind. Furthermore, none of them evidence a hole or other carrying device. It has been pointed out that these objects were found in the lowest levels at Harappa (HR, 1940, p. 324) and as such may anticipate the larger seals common to all but those levels. However, the script style, the existence of motifs such as the crocodile, and the so-called standard, depicted in the normal way, as well as the fact that the associated artifacts are of a type no different from the later levels belies this assumption. But they are indeed much smaller than the seal tablets, at 0.7″ to 0.36″ in length, 0.6″ to 0.2″ width and 0.3″ to 5.0″ thickness. (from Wheeler, 1968, p. 106).

A better possibility is that these objects were made to fulfill a special function, a function which obviously had to do with quantification measurement. Importantly, it is obvious that these quantities were measured in units of four, in keeping also, it seems, with the base eight of the Harappan number system.

One interpretation of this body of material is that these objects are not seals but tokens used in an accounting presumed to be akin to taxes. The individuals named on one side pay into the central administration at Harappa given quantities of some commodity. The statement of the amount, say one container, two containers, etc., is the fixed amount for that particular individual. As each amount is paid, a token is given to the central authority, or is already at hand and then placed with the others in an accounting box or jar. The total amount adds up to the amount in storage. In turn, that storage acts like a bank so that individuals are issued the amount owed them according to the tokens in hand. The system was perfectly efficient. One of Sir Mortimer Wheeler's major contributions to Harappan studies has been the definition of storage areas at the urban sites. This, coupled with the growing knowledge of the redistributive economic character of the Harappan polity, supports this notion of the role of these tiny tokens. Study of the names found on them ought to give us some good indications about the nature of Harappan society in terms of who paid and how much. Inspection has shown that individuals paid or were paid varying amounts. The archaeological context is not clear and we are uncertain as

to the range of time involved. Clearly, however, there was a regularity in bureaucratic procedure.

A determination of the commodities involved is possible owing due to the fact that six of these tokens list them; each token duplicates the other in listing the material, but of the six, three represent one individual, while the rest are single individuals (HR, 1940-344, -349, -351, -466, -672; also Punjab Series 35:3856)

The commodities are as follows:

K-4 

The first sign (reading right to left) is the recording stick (see A-24, K-4, K-5). It modifies the following sign since it commonly pairs with that sign in the texts.

G-1 G-2 

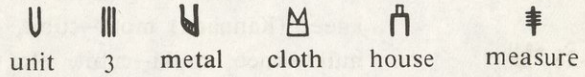
The next grapheme has no particular columnar order. It has some tendency, however, to pair with seven short strokes eṛ and, of course, with the measuring stick sign. If we adhere to the position stated previously (also O-11) that seven short strokes might be verbal in context, the pairing might mean that this "is built" thus; when it appears with the container sign it must be considered to refer to "the builder". The sign can be identified with a house, without specifying what kind of house. Pairing with the measuring stick raises the notion of storehouse, or place of measurement (of commodities in this context). This grapheme apparently represents a platform with a building on top. The use of the platforms in this manner is well known at many Harappan sites and needs no reference here. A type example of the rendition of this sign (MD, 1931-15) demonstrates that the upper element rests on the lower and is not open to it. The reason for mentioning this here is to emphasize the depictive aspect of the sign where one structure rests on another.

L-2 

The following graphemes are commodities. The first is represented by the sign for cloth. This is a widely used sign in the ancient world (see Chart III). It was probably syllabized as something akin to the Dravidian guḍḍe (see L-2).

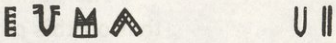
I-8 

This is the sign for metal (see I-8, A-20). A good guess is that it represents a particular metal, whether from ore or smelted artifacts is not certain. At Allahdino a pot filled with broken silver, copper and bronze jewelry was recovered. It may evidence the collecting of used or broken metal objects to be melted down and the metal accordingly used for other objects. Thus the text "reads":



Or, in effect, "Three units of cloth and metal in the storehouse (accounted)".

Of particular interest are the names of the individuals who participated in the storehouse operation.

Harappa 679 

K-2 

On this token all but the first sign are familiar. This sign is with great probability a measuring device not unlike a carpenter's square. Perhaps the fragment found at Mohenjo daro was a part of such an instrument.[82] In any case, the precision with which Harappan structures and their appurtenances, stairways, drains, windows, etc., were constructed, argues forcibly for this identification. The most likely Dravidian word for this kind of measure is matta (DED 3811).

L-1 

The following sign, with its infilling, probably refers to a special kind of cloth or clothing (see L-2). A sense of this is evidenced by the regular pairing with the measure sign, which only occurs once in the case of the cloth sign and that, too, in a dubious example (HR, 1940-707). I would interpret this to mean that the cloth sign refers to someone akin to a tailor, or at least a "measurer of clothing". There is also a pairing with eight short strokes (HR, 1940-369) where the second sign can be interpreted as meaning en—to count (DED 678) (see O-12). This may mean, of course, a "recorder of cloth" in the storehouse bureaucracy.

HR, 1940-372 

This inscription is of significance in its statement of the character of Harappan names in the token context. It occurs on a button "seal". On the reverse is a kneeling figure holding a container in one hand, a measuring stick in the other. This figure clearly evidences the relationships previously set forth of the role of these tiny tokens. The knee is associated with Dravidian words for cubit (DED 4093), for example (Tamil) muṟam—cubit, muṟan kāl—knee; kāl refers to leg (DED 1238); mora, moṟa kāl—cubit, knee; (Kannada) mora—cubit, moṟa kāl—knee; (Malto)

A-28  mūki—knee, muki—cubit, etc. In a mature male the approximate distance from the center of the knee to the ankle joint is about 18 inches, well within the range of the ancient cubit. The kneeling figure carrying the objects of quantification measurement represents perhaps one Harappan cubit.

The number two which precedes the figure evidences that on this particular token 2 cubits are meant. (Note the regularity with which the measuring stick is divided by 4 horizontals as if in keeping with the idea that each container was measured in fourths.)[83]

A-29  The kneeling figure also occurs without the measuring stick which, for the moment, we can construe as a variation, although there is a suggestion of both arms holding the container (MD, 1937-II, Pl. XC-23).

E-4 This is possibly a flower sign. It consists of the head, a bud-like shape, the crescent stem, and the paired leaves which are usually drawn in an ovoid form (MD, 1937-597). The possibilities inherent in attempting to identify the meaning of this grapheme are wide. The discussion that follows lucidly demonstrates the methodology used here.

Q-7 The bud and stem, now ligated to the sign for head—tal (see P-4). The Dravidian word for flower has a root syllable pū (DED 3564). With the sign for head—tal, we have pūtal, possibly a verbal noun, i.e., flower and forms of "to sprout, blossom," etc.—talir (Kannada) (DED 2555) and also tar—bud (DED 2585).

Q-8  The "verbal noun" is now modified by adding four strokes

[the usual number, though three (MD, 1931-195,-295) and even five strokes are known (MD, 1931-10)]. The pluralizing technique (see P-6) can mean that pūtal is now pūtalar—"many flowered plant," or "many flowering plants".

There are a number of examples of  occurring with  (MD, 1937-379), which appear to indicate an alternative way of using ār(u) for suffix (see H-5).

A consistent pairing of this sign with -aṇ which normally means that a name is indicated (see page 24) leads to the name Pāṭaḷa̲vaṇ—"Flourishing Plant One". However other pairings, such as those with  -cloth (HR, 1940-419) suggest other possibilities. One of these is dependent on the literal reading of the four stroke affix as nāl. Thus pūtal(a)nāl which, for all the possibilities in the homophony with "good" (see O-4), is undeniably far from the mark. However, it is possible that the particle -ār(u) (see page 46) could change tal to talāru or taru—to lead, conduct, give, etc. (DED 2526). In this case pū becomes unnecessary since the syllabization of tal is evident. If, however, ār(u) can be considered as modifying pū then pū ār(u) would result. With the Dravidian separation of vowels by consonants, the addition of r is possible thusly: pū(r)V plus tal, or pū(r)(V)tal which could be pūrantal or pūrartal. There is the possibility that forms of pore (Kannada) or pura (Tamil) (DED 3515) derived from pū as possibly a cereal plant which can be related to concepts of crop-nourishment and thus a special kind of leadership; pūrantal (ār) as 3rd person singular honorific. Note purantar—kings (Tamil) (DED 3515) and puri—strength (Kannada) (DED 3517). With  we have pūrantala(r)aṇ—One Who Protects, Nourishes, Cares (for something)—distinctly an honorific title. However, it is clear that the Harappan scribe was not concerned with generalities but wished to make lucid what the sign-symbol meant.

The concept "flowering," as in flowering plants, is a western idea for it depends on a taxonomic arrangement by which plants in general can be contrasted with other forms of life. For ancient and aboriginal man, who saw life as an essential vitalism, the expression of that vitalism was not based upon a systemic order as western science conceives of

it; nature tended to be classified by function, only secondarily by homologous structure. Thus the ideogram which emerges out of ancient life is a specific representation of something characteristic of that life. Consequently, the plant represented is possibly a particular kind of plant, not "plants" in general. Accordingly, the ideogram probably represents a plant known to the Harappans for its function and not because it represents plants in general.

E-4 

The sign can be more specifically identified as a cotton plant with the boll in bud and attendant leaves that are so characteristic of that particular plant. The etymology for cotton (*Gossypium herbaceum*) brings attention to the words (Kannada) parti, parti, parti, and (Tulu) parti, (Kui) parti (DED 3280). Note also (Tamil) pāram (DEDS 3280). The unmodified plant sign for our purposes has a root par(C)(V). But note Telugu dūdi and (Kannada) dūdi—cleaned cotton (DED 5533). Cotton is, of course, attested in an archaeological context.[84]

Q-7 

The cotton bud on its stem with the tal—"head" affixed makes a syllabization of partal(j)—flourishing or sprouting plant, or the crop cotton.

Q-8 

The cotton boll or bud, with its stem affixed with strokes is partal but multiplied, partalār (?) [Note (Kannada) paru—to grow (DED 3390)]. As noted previously the majority of examples of this sign are paired with  . If tal can be construed as meaning "to nourish," in the sense of cultivation, the name of the individual  becomes Partalāraṇ—"Cotton Cultivator," an occupational designation in keeping with the anthropomorphic consciousness of Harappan personal naming. But the  (Mahadevan, 1977-5293) literally means "Cotton Cloth One" but in the sense of bringing, not manufacturing, since storage is involved (see page 40) (Note DED 2526—taru, etc.). Accordingly,  very likely refers to the act of bringing, thus: "One Who Brings Cotton (for storage)".

H-9  H10

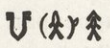
These graphemes appear to represent shields. One is a plain character and the other decorated. They are both found regularly in Column 6 in the grid. The plain one is always paired with the "container" sign, while the decorated one,

though limited to only six occurrences, appears not to have any particular pairing tendency. That the Harappans used such shields is evidenced in a number of examples (HR, 1940 Pl. XCVIII-599; MD, 1937 Pl. XCII-11). The shields were curved rather like a buckler, apparently. They appear in profile in a number of central Indian wall paintings and look almost identical to these graphemes.[85]

The most obvious Dravidian syllabization for shield in the DED appears to be based on the stem word aḍḍa–obstruct, impediment, etc. (DED 73); (Tulu) aḍḍana, aḍana–a shield; (Brahui) aḍ–protection, aṛ–obstruction.

P-7 

On this crescent the affixed mark appears to represent an ear, probably of a bovid. It is frequently drawn with an upswing (MD, 1931-148; MD, 1936-451). In Dravidian ear has the syllabic value of ke(C?), ki(C?) (DED 1645, 1677). Its affixation suggests an inflectional role which was probably the dative case (see Zvelebil, 1977 p. 31, 35).



In the context of a common combination (Chanhu daro, Pl. LI-24) bracketing requires attention. The affixed crescent sign is presumed to be the dative of vil (vila) (ke?) which in turn modifies the loop sign. But the reversed crescent intervenes between that combination and the hypothesized 3rd person masculine singular honorific -aṇ. It is unlikely to be a repeat of vil (although this is possible), and may be given another value. This value may be found in the assumed calendar stick (MD, 1937, Pl. CXLIII-54) where the crescent faces to the right towards the sun (or day) sign (see Chart VII A). Are we then to read this second crescent as equivalent to the crescent moon? The most obvious term for crescent moon is (Kannada) per, piṟai (Tamil), with connotations of "new birth" in both Southern and Central Dravidian languages (DED 3622). The homophonic relationship of this syllabization to per, per–great, superior, etc. (DED 3613), both found in most Dravidian languages, appears to be very close (see F-7). If we accept the loop sign as pir–chief (see Q-1) our phrase becomes:

talpir vil(a)ke pir per (pir)-aṇ
"High Chief to Bow Chief(s) the Great One"
In other words "Piraṇ, Commander of Bowmen".

Whether or not these "readings" are valid, it does not appear to me that the "bracketing" means it should be read as if it were one unit. The first crescent, however, does appear to modify the central sign (note the reverse of this sign, e.g., MD, 1931-403); each sign should be read individually.

LINEAGE AND OTHER FUNCTIONS IN NAMING

One of the more intriguing inscriptions from Mohenjo daro is:

(MD, 1931-12)

Its length of seventeen characters is unusual in seal texts and it constitutes a complex whose potential decipherment is critical to this study, since it tests the assumptions made previously and offers new ones vital to the understanding of texts like those of the tokens from Harappa. [The upper part of this text is also found elsewhere in seals from Mohenjo daro (MD, 1937-690).]

In the seal texts one group of signs is found regularly in Column 11, which are paired with the combination  in Column 10. There are four such signs:

The consistency with which these signs occur in columns and in combination indicates that they share a common theme [Note MD, 1931-189; MD, 1931-335, -361; MD, 1937-122, -273, 508; MD, 1937-157, -146, 625, -65, etc.).

P-15 

The combination  should be reviewed initially. Scribal vagaries being what they are, the first stroke in the grapheme is sometimes almost a vertical without a break (MD, 1931-170) or a miniscule dash (MD, 1931-412). Very often it is slightly slanted and an almost straight line (MD, 1931-361, -345). This line cannot be confused with the arrow sign (see H-4) which has a distinct slant  , as much as twenty-five degrees from the vertical, as found in the bow and arrow sign. The arrow sign is also elongated in contrast to this grapheme. Note the distinct break in the right-hand part of the symbol. Clearly the scribe was concerned in

differentiating between the two signs, but with the regularity of columnar position and the combination with the dash, as well as varying skills in seal carving, the two signs could well be the same. For the moment that assumption must stand.

D-1  D-2

The construction of the anthropomorph (MD, 1937–64, -74, -254, -131, -217, etc.) demonstrates that the body part is connected on the left (or right) side by a continuous line and then the opposite leg is added, followed by the arms. Thus the order appears to be in three distinct stages. Step one connects the body and the leg. If the scribe wished to identify a leg he might, like the Egyptians, draw one realistically (see Gardiner, 1927, p. 449). However, by retaining the body element in the regularly used anthropomorph the leg is differentiated from other diagonal lines.

A-1

In terms of Dravidian words for leg, kāl (DED 1238) appears to be an excellent equivalent for the ancient syllabization. It occurs in seven South Dravidian languages and ten of the Central Dravidian group. It also may occur in Brahui. If we consider the paired single dash as the genitive (possessive) ă̄, the syllabization kāl-ă̄–"of the leg" results. Of itself this makes no sense unless the kāl was a suffix of the previous sign. We have here then a clue to the meaning of the signs in this group. They should all terminate in kă̄l and be equivalent in their semantics.

The four signs which accompany this combination have nothing in common–the pincers, the crescent with an interior mark, the circle with three crossed lines, and the cross or X form. There is some clue as to meaning, however, in the circular form. In the case of the calendar the plain circle appears to be the day sign (F-1), as opposed to the crescent which is to be construed as night (see F-7 and Chart VII A). This day sign has a number of "variations". The most important of these occur frequently in inscriptions (see F-4, N-9).

It is not unreasonable to assume that these signs share a common theme which their basic form suggests is present. Thus if the circle is day, or the sun, one might assume that all other signs based on it, have that identity in common either by semantics or phonology.

Table 1 (from Mahadevan, 1977)

Sign	Occurrences	Sign	Occurrences
	61		14
	57		7
	2		195
	17		102*
	5		134*

*Discussion of the problem of differentiating between these signs is found on pages 82, 83, 86, 90.

N-7 

One of the fundamental mistakes in the Mahadevan concordance is the confusion of a circular sign with a diamond-shaped sign.

N-5 

Compare MD, 1937-288 and 324, for example, where the circle is drawn exactly the same. (Note also MD, 1937-491 where a circular sign is placed adjacent to a diamond shaped-sign to demonstrate that the differences in shape are no accident.) Both signs are, however, modified by the diacritical pair . Of 77 discernible texts in the Mackay volume (1937), 40 have signs of the diamond-shape and 37 are drawn as circles. They are not the same. We have every reason to add the circular sign to the group of circular signs above. The importance of this addition is that the circle is affixed by the diacritical  . This mark found in  is also patterned in an  sign (e.g., MD, 1937-493, -220; MD, 1931-87, -370). Again, a distinction has to be made here from the concordances where  is lumped with  (compare MD, 1931-370 with 412).

K-16 

This sign is a statement of division, whose root is pa(C) —to divide, share [e.g., paku (Tamil); pakhna (Kur.) (DED 3145); payal (Tamil) (DED 3247); pati (Tamil); payu (Telugu) (DED 3364); and pal (Kannada) (DED 3371)]. We have reason, it seems, to equate the diacritical  as a marker which acts as a determinative in both the circle and the diamond. In effect, other semantic values must exist for the basic sign proper.

F-2 

Since we are dealing with the sun, or day, sign  , we have a clue as to what the sign with three crossed lines might mean. It has something to do with sun, and it ends in kăl. An answer is found in pakal (Tamil), pagal (Kannada) (DED 3151) with forms in seven South Dravidian languages, five Central Dravidian ones, and two North Dravidian. All refer to sun, dawn, day. In Parji, day is pokkal and in Malto dawn is poypohre (DED 3151). It is possible that the Harappan word for sun was originally pōkal with the root pŏ̄(C) found in such related meanings as pon̲—gold, splendor (DED 3732), poṭi—to spring up (DED 3668), and poli—bloom, splendor (DED 3717). Potto (Kannada), pōtu (Tamil), and related syllabizations in Central Dravidian also retain the ŏ. These in most cases mean sun, day, etc. (DED 3724 and DEDS 3724).

The three crossed lines within the circle may simply refer to the sun's rays and mean the full sun, i.e., the observable object. However, we already have a sign for sun  (F-1). Furthermore there is the identification of  as sun on the horizon (see Chart III). Thus is pakal-ă and refers to another heavenly body. Since the crescent  (F-7) refers to the crescent moon, could be the full moon?

Our method then requires us to find the word for moon ending in kăl (găl). Such a word occurs in tiṅkaḷ (Telugu) (DED 2626), tiṅgaḷ (Kannada) and other South Dravidian languages (note F-9 for gala). The syllable ti̯(C) has a sense of brightness associated with it [e.g., tikar̤—to shine, glimmer (DED 2616) and tiḷi—pure, become bright (Kannada) (DED 2825); and there is tel, tī (Tamil)—fire (DED 2672) and (Brahui) tīn—heat, tīrūnk—spark.]

The term tiṇ (DED 2634) with its emphasis upon strength in most South Dravidian languages and in Malto as "strain," is also a good possibility for these occurrences where the sign is not in its Column 11 position (e.g., MD, 1937-532).

There is also the possibility, however, that the sign as "bow" pronounced vil (see H-2, H-3) is the original pronunciation for moon. [See DED 4524, note particularly (Malto) biḷpu, also (Kannada) bile and bilapu.]

F-8 

The symbol for star in many cultures, both ancient and

modern, is often a series of crossed lines.[86] The sign as the Harappan scribe draws it is noticeable for the closed ends of the arms of the cross as compared to other X signs. This can then be considered a possible candidate for star, in keeping with the theme of this group. Of all the names for "star" in Dravidian, cukkai (Tamil), cukke (Kannada) and Central Dravidian words such as cukka (Naiki) and cukka (Parji), suka (Konda) (DED 2175) are closest to our combination of a root morpheme for star plus kăl. There is also the town of Sukkur in Sind. This is a non-Indo-Aryan name probably derived from the root suk (Ka). combined with ūr—village, town, city, etc. (DED 643), thus "Star City" or "City of the Star".

The presence of the diacritical mark for the genitive in combination, the stroke and the "leg," identifies the individual seal bearer as (accordingly):

tingal-ă pakal-ă sukkāl-ăl kārugal-ă
Of the Moon Of the Sun Of the Star(s) Of the Monsoon

The relationship of lineages or individuals to natural phenomena is a trait found in many cultures and needs no illustration here.[87] There is an interesting and applicable use of the term kāl (DED 1238) as meaning "family" in Tamil and Toda. It also can relate to place, i.e., quarter.

C-1 

A clue to the original syllabization of "the prawn" is found in (Tamil) iṟavu, iṟā and iṟāl (DED 440), which has a possible and context-suitable equivalent in (Tamil) iṟai and (Brahui) iragh (DED 415); the latter referring to food. The fact that the sign is diacritically suffixed in what may be the dative case may provide us with the notion that whosoever the individual is, he has something to do with food. That "something" is presumably explained by the next signs in the text (see translation no. 16).

This sign is often confused with the scorpion because of the large tail. But the pictogram lacks the characteristic foreclaws which start at the head of the scorpion. The trailing antennae below the tail are typical of the swimming

prawn. It is often drawn as if it were affixed, but study of the examples of the sign indicate that the left protuberances are extensions of the body. The right is, however, the so-called "ear" affixation or dative case (see P-7). This sign is probably syllabized iṟa (ical) (DED 440).

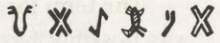
I-2

This sign apparently represents a hook (type: MD, 1931-370). Words for "hook" in Dravidian are: (Tamil) kol and (Kannada) koṇḍi (DED 1788); also (Tamil) kōṇ–crookedness (DED 1834); and koṭu–bent, etc. (Tamil) and (Malto) qonqe (DED 1689) may be connected to kūṭu (Tamil) and khōṇḍrnā (Kurukh) (DED 1562) referring to collecting and assembling.

K-16

This sign (see P-3 and K-16) with its clearly divided parts and the particular use of the ˇ diacritical marks pa can, with some confidence, be interpreted as meaning "division, share," etc. Its cross shape provides a possible syllabization of gal(r) (see page 108). Thus a syllabization something akin to pagal(l) is warranted as the Harappan word for "division, share," etc. (DED 3154).

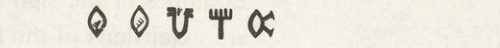
In sum, the text breaks down as follows:



place lineage or family of the star (s)		sukkăl-ă-	He of the Lineage (place, (family) of the Star(s) (a group within the bureaucracy?)
for food		iṟa	The One who Assembles the Food (stores)
collect		kuṭu	
divide		păgal-	And Distributes It (divides into shares)
one (he)		-aṇ	He, The One

(for the remainder of the text see translation no. 45).

DIRECTIONAL SIGNS



F-3 

This composite grapheme is one, with four others, that regularly occupies a Column 9 position in the seal tablet texts.

F-4 

The others are also composite signs. In terms of orthography, the grain sign is familiar (E-2). It is written sometimes with the curve facing in the opposite direction. There is a real distinction between the grain sign and the line with three strokes, which may well represent fire (see MD, 1937-83, also F-13). The difference is most generally demonstrated by the length of the strokes and the bend in the stem of the grain sign in rough imitation of a head of grain. The fire sign is made with three equal strokes, the grain sign with four of unequal length. The sign for fire never occurs independently but is always affixed. It can be found as a part of a number of signs. The grain sign does occur independently.

F-14 

The fire sign affixation is a part of F-14, for example. Here the tongs grapheme kăr(u)—black as in burned, charred (DED 1673) acts as a determinative (?) for the affix.

The term for sun, as we have seen previously (page 83), was possibly based on a root pŏ(C) or pă(C) [Note pōtu (Telugu), pottu (Kannada) —sun (DED 3724), and pakal (Tamil), pagal (Kannada) (DED 3151)]. The combination of sun and grain then is pă(pŏ)(C)nel (see F-3, F-4). Nel can be related to nēram (Tamil) (DED 3128) and to dē (Brahui) (DED 3128), both of which are related to sun as "time". [Note the term paṭu—to go down, to set (DED 3190); paṭu-ñayiṟu—setting sun (Tamil); and (Kannada) paḍu-nēsar—the setting sun; Fire in Dravidian has numerous possibilities relating to the actions of the sun]. The most obvious relate (Kurukh) bijjnā, (Malto) bije—to dawn (DED 4570); to ideas of heat and fire (DED 4540); (Malto) bice—to be heated, (Kurukh) bi'inā—to be cooked, (Brahui) bising—to be cooked; also (Tamil) veyar, vēr—to sweat (DED 4516) and of course vē—to burn (Tamil) (DED 4540); vey(y)il—heat of the sun, (Kannada) bē—to be scorched by the sun's heat, and the words bisil, bisal, sibul—sun.

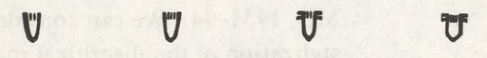
We are thus on reasonable grounds in noting that the

grain-sun sign probably means "sunset," or "the west," pronounced something akin to paṭu-nel. Here paṭu means "to descend" (DED 3190).

The fire-sun sign can accordingly be interpreted as meaning paṭu-ve–sunrise, dawn, or "the east," where paṭu now means "to rise" (DED 3191).

Given east and west in this group, we have a clue to the meaning of the other three signs. The "container" sign (see J-5) has a syllabic value of aṇ (MD, 1937–115). In addition to its 3rd person singular honorific identity, it also has the semantic value of "up," or "upper" (DED 96). The diacritical mark produces the genitive* ā "of the upper".

Excursus: Modified Container Signs



Q-15 Q-16 Q-17 Q-18

This group of signs shows clearly the container graphemes modified by the addition of the signs for numbers up to three:

(MD, 1931-206) (MD, 1931-248) (MD, 1931-29) (MD, 1931-469)

If one would interpret this affixing as a statement of number, that is two quantities, three quantities, it would be difficult to imagine that such quantities did not go beyond three. It is more likely that the modifying affixes were used for their syllabic value, or that specific meanings other than quantity were intended. Each is a combination, however, based on the interpretation of the root signs J-1 and J-5. The first two deal with quantity, the second two are honorific in character (q.v.). It follows that in a sign such as the one representing grain (J-4) it is reasonable to expect that the affixation of that sign to the container means "quantity of grain" in whatever amount the text might signify, or by inference what the presence of a quantity or quantities of grain might mean to the Harappans: happiness,

fruitfulness, fortune, etc. This would then hold for other commodities or items.

(J-4) (J-9) (J-3)
(MD, 1937-253) (MD, 1937-178) (MD, 1931-22)
So Much Grain So Much Wood (?) So Much Cotton

* * * * *

Q-11 

The drawing of this sign is particularly important to its identity. The comb sign (see L-9) is here placed horizontally on top of the vertical stroke (e.g., MD, 1931-177, -458, -322). The lower stroke rarely intrudes into the comb (note MD, 1931-94). We can consider the long stroke below as a stylization of the diacritical mark since the orthography of the sign would be difficult aesthetically if it were separate. Note the variations in the length and angle of the stroke (MD, 1931-540, -50; MD, 1937-48, -207, -380); also the comb sign in the horizontal position occurs in isolation, not combined with the vertical stroke (MD, 1931-382).

L-9 

If the root for "comb" is kĭ, we are justified in looking for a directional meaning for this sign in this context. Thus, forms of kiṛ (Tamil) (DED 1348), (Brahui) ki, kī, ke—below, provide us with an opposite of the stroke-container sign, i.e.,  kiṛ-ă—"of below" or "of the south". The context is, of course, in relationship to the river which flows north-south. Of interest, is the use of the term in Tamil, Malayalam, Kodago, as meaning east. This is natural enough if one follows the flow of the main rivers in territories encompassed by the languages where "down river" is "eastward".

Q-10 

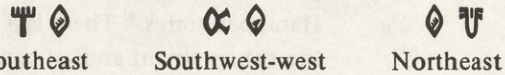
The combination of the sun sign with the pincers or tongs needs no great imagination to interpret. The sign clearly refers to the direction from which the summer monsoon comes, or the "southwest". The dark clouds characteristic of one of the most striking natural phenomena in Asia are designated by the pincers—kăru, and the relationship to the

sun emphasizes the extinction or diminution of daylight–patu-kăr(u).

This group of signs demonstrates that the Harappans had five cardinal directions:

aṇ-ă	kiṛ-ă	paṭu-ve	paṭu-nel	paṭu-kăr
Upriver	Downriver	East (sunrise)	West (sunset)	Southwest (monsoon)

There exists a kind of proof that these directional identifications are accurate in that the texts do not juxtapose opposite points; except for examples of Upriver-Downriver they are all viable combinations, such as



Southeast Southwest-west Northeast

SIGNS FOR PLACE[88]

There is a group of graphemes in Column 11, all seemingly modified by the double-stroke diacritical marks in Column 10. Occasionally, other signs appear in this column which are also paired with this sign, but these are usually in combination with the signs which regularly occupy that Column.

We have some clues as to the meaning of these signs. Initially we can assume from the positional order that the Column 10 diacritical marks were suffixed to those of Column 11 or otherwise modified the meaning of those signs. Taken as two marks and not more, it is clear that the seal scribes meant exactly that, i.e., "two marks". As such, we can assume a syllabic value for "two" and not mean that number. Thus the Dravidian ir(u), īr (see O–2) has a substantive sense of "place". However it is as a suffix that we have a proto-Dravidian inflectional identity in the locative case il.[89] The word il per se generally means "house" or "home" (DED 420). If this interpretation of the diacritical double-stroke is correct, we have reason to

identify the signs of Column 11 as designating different places within Harappan settlements.

N-7 

The combination of the sun and diacritical described earlier (N–7), possibly results in a syllabization of pŏ̄(C) or pă̄(C) which, with the locative il(ir) gives us pă̄(C)-il or pŏ̄(C)-il. The consonant is likely to be t or ṭ, or d or ḍ, as in paṯu (page 86). Thus pō̤ṭu-il or pā̤ṭu-il results. The "poduyil" was a place of assembly in the Cola government.[90] There appears to be little doubt that this combination of signs could indicate some such place.

N-5 

For the moment let us by-pass the combination with the diamond to examine the other signs and by a process of elimination arrive at its possible meaning.

Q-9 

This sign combines the arrow sign amb (see H-4) and the pipal leaf (E-6). The pipal was a favorite subject of pot-painters in the Indo-Iranian Borderlands even in pre-Harappan times.[91] There is a tree (*Ficus religiosa*) native to the subcontinent and, of course, it has been significant to both Hinduism and Buddhism as a symbol of shade, rest, growth and even life itself. In Dravidian the tree has a stem ara(C); (Tamil) aracu, (Kannada) arase (DED 168). Thus, in

E-6 

combination, we have arrow-pipal–ambara(C?). This in terms of place has Dravidian equivalents in (Tamil) ampalam, (Kannada) ambala, (Tulu) ambila (DED 145). (Note also Chidambaram, the temple city of South India.)[92] The association of ambara with temples makes this sign, as place, a good candidate for identity with Harappan temples, or temple area–since no temple structures have been securely identified in the excavations so far carried out.

F-2 

This sign has previously been identified with the full moon (see page 83). The effect on  is that it can be considered to have a root of tiṇ. In terms of place, this creates the possibility that the reference is to the platform or elevated area characteristic of many Harappan sites. Note DED (2633) (Tamil) tiṭṭu, (Kannada) tiṭṭu, (Tulu) diḍḍu–mound, elevated ground, hillock, etc. and (DED 2639) (Tamil) tiṇṇai, (Kannada) diṇṇe, dinne–raised platform, eminence; (DED 2641) (Tamil) tippai, (Kannada) tippe–elevated ground, hillock, etc.; (Malto) tube–a heap of sweepings.

So far we have the following:

"	poduyil	place of assembly
"	tiṇ-il	platform (Wheeler's "citadel"?)
"	amb(p)ara-il	temple (?) or temple ground (?)

N-6b

N-6a

There remains the " which has a number of modified forms.[93] One with 4 diacriticals (N-6b) and another with the circle with three crossed lines at the center (N-6a) are the most important. Both of these signs occur frequently in Column 11 modified by " . We can thus consider them as markers of place. The sign with the three crossed lines at its center reminds one of Harappan settlements with their high and low areas of occupancy. The circle sign, as high ground at center, creates the sense that the diamond shape is the settlement itself with the at each corner representative of four divisions within it. The term ūr is widely used in Dravidian languages to designate settlements, whether village or town (DED 643). It is also a term built into the names of places in Sind, the Punjab and Baluchistan, many of which are pre-Islamic in origin: Nirur, Sukkur, Mansura, Saimur, Urtal, Kura, Bhampur, Kannazbur, Sakura etc.[94] The Brahui term urā–house, also preserves the idea of place. Could the term tiṇūr have been the syllabization for this sign, meaning perhaps "Capital City"? Note how ti(n, r) initiates the names of Dravidian cities in the South: Tirukkaratur, Tirukkoyitur, Tinnevelly, etc.

Variations on the diamond-shaped sign are then name designations. The whole sign involves, however, the presence of P-3, which indicates a syllabization such as pa, pari (pali), etc. (see K-16, P-3) combined with the syllable ūr. Thus pali(y)ūr, paṟi(y)ūr, etc. But the affix may only act as an unpronounced classifyer as vĕ(1)ūr and kālūr (?). Note variations:[95]

Thus it is possible that the Harappan settlements were designated on the seals as:

pali(y)ūr	settlement
tiṇpali(y)ūr	chief city
nālupali(y)ūr	settlement, city, town (four division settlement)

Within these settlements, unless the seals refer only to the local situations, were the podu(y)il—assembly area, the tiṇ(ṇ)il—platform eminence, and the ambara—temple (?) area.

It may well be that the diamond shape simply meant "place" (village, town ?) —ūr, whereas and refer to larger or special settlements. The various affixes with the exception of the one with a diagonal cutting the edge (—the genitive of ūr) are thus meant to name settlements:

Nelūr
Cayūr
Eṇūr
Vēlūr or Iruvēlūr

N-1

Another place designation appears to be the triple triangle. This is an example of the prevalence of certain signs among a number of the early civilizations[96] (see Chart III):

(a) Early Sumerian sign for mountain (s)

(b) Egyptian hieroglyph for hill-country

(c) Proto-Elamite sign

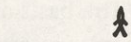
(d) Chinese character for hills, mountains

The type (MD, 1937–433, -439) demonstrates the sign was made in two parts. Of interest is the Sumerian word kur meaning "mountain" which has Dravidian parallels in names of mountain tribes—the Kuram (Tamil) (DED 1530), and Kunram—mountain (Tamil) (DED 1548). Whether this is a coincidence or not is a matter related to the entire problem of Sumero-Dravidian origins as well as possible borrowings. This is a problem that has been little studied to date. In any case, the notion of "mountain" in Dravidian carries with it the sense of "country".[97] Two syllabizations

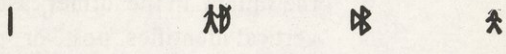
are possible: kuṟu, koṇḍa, or simply k(V) as in kō(y) (DED 1530, 1548, 1811), or mal (DED 3882). Note (Brahui) mash and (Malto) maleh-malay. The latter is apparently of Indo-Aryan derivation. The former appears to be a better choice considering its "Dravidianness" (see note no. 97).

This sign occurs frequently with the sky mark (F-10) above it (MD, 1931-534, -405; MD, 1937-417, -433). In both cases these signs appear in Columns 6, 12 and 13. The pairing with  of the unadorned sign (MD, 1931-42, -417; MD, 1937-410, -288, etc.) suggests a proper name like "He of the Mountains (or Mountain Country)". Accordingly, kuṟaṇ is a possible way of syllabizing this pairing.

Although there are examples of this sign paired with the locative (MD, 1931-6; MD, 1937-33), other signs intervene, indicating that a specific mountain place is what is meant:



In this case the breakdown can be conceived as:

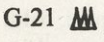


First (foremost) Archer Mountain Chief

(but see translation no. 46).

In the case of we must assume that the affix  is mĕ, mĭ (see page I-19) meaning—high or elevated, and thus the sign means "High Mountain"—mĕkur(am).

SIGNS FOR STRUCTURES

G-21 

This sign has possibly been confused with  . It is frequently drawn in tipped fashion and is sometimes lower or smaller than adjacent characters (MD, 1937-174, -202; MD, 1931-186, -139). While commonly drawn as three simple elongated triangles, it sometimes has decided extended peaks (e.g., MD, 1931-322). Each part is distinct in any case. The sign appears on the left in a Column 6 position in pairings with or  (MD, 1931-526b; MD, 1931-123). It is always drawn as three attenuated triangles. In appearance the sign looks like three bundles, or even towers, while the emphasis on three suggests that the

word used had mŭ—three, as a syllabic part. We have a gratifying equivalency in mutai—bundle, sack (DED 4134) and muṭṭukh—bundle (Brahui) (DED 4043), as well as (Kannada, Tulu) muḍi and (Tamil) muṭi. The pairing with the infilled triangle which is apparently a "heap" suggests that this identification is the correct one (see K-6).

K-6 

Thus the combination reads:

MD, 1931-561
MD, 1937-499  

He-One sacks heap-up

(heap-up sacks of (grain) He) "Collector of Grain"

G-10 

However, another regular pairing involves the sign G-10 (MD, 1931-201) made of two strokes and a square. This sign recalls the one used to represent the number nine (see O-15). The basis of that identity is the perception of a pillar and an enclosure. In both O-15 and G-10 the epigraphy involves a connection between the upright and the square. In the former case this relationship to the single vertical identifies "post" or "pillar"; in the latter the double vertical appears to emphasize the square, presumed   to be a pillared hall or house with posts. Since tŏl, or tŭṇ is the number 9, that syllabic value has to be in some way associated with this sign as it is, and still retain the semantic value assumed to identify it. Such a correlation appears to occur in forms of toṟu, toṇṭu—cattle pound (Tamil), cakur-tol—cattle shed (Parji) (DEDS 2905) and via toṟu to (Kannada) toṭṭi—building with a square open court in the center (DED 2869), and doḍḍi—cowpen, fold, etc. If this sign represents a cattle corral, what then is ?

The syllabic value mŭ must be a part of the identification and the semantic relationship to defined. The grapheme suggests three containers, thus (Kannada) mukku (DED 4013), (Tulu, Tamil) muṭṭi (DED 4040), (Tamil) muntai, and (Kannada) munde (DED 4068). All of these are terms for vessels of one kind or another and might be suitable. However, vessels of the shape shown by the sign are unknown in the repertoire of Harappan ceramic or metal vessels. The most obvious answer is that the

triangular shapes refer to structures in which the products of cattle sheds are kept. Thus mucar—buttermilk (Tamil), mucar-curds (Kannada) (DED 4015), and (Tamil) (DED 4001) mukar-bale, measure of liquid, heap or paddy, and mū—sacred dairy vessel of the Toda, and (Kota) muṛyal—conical dairy of the Todas, muṛy—top of conical dairy (Toda) (DED 4030). Until recently, the Todas build conical-shaped dairies.[98] In this section concerning structures it is possible, given these interpretations, that the three small triangles are conical storage houses in which commodities such as grain were collected and also dairy products, i.e., muṛyāl.[99]


G-21 J-8

This sign also pairs with another and we are justified in considering it another product that was stored. It appears to be a round bottom pot with the lines coming up from it or out of a flat lid. The number of lines differs; there are often three (MD, 1931-121; MD, 1937-216), sometimes four (MD, 1931-420; MD, 1937-159). One has little hesitancy in identifying the sign as representing a lamp. Such lamps are known. One was found at Allahdino. It consists of a central basin with small pots fastened to the rim. In the bottom of each pot was a hole, presumed to allow a wick to reach the oil which filled the basin. Sand in each small pot would hold the wick in place and allow the flame to surmount the rim of the vessel.

A side view of such a lamp would show the basin rim cutting across the line of flames. The lamp, however, is not a commodity in the sense of the storage implied but rather a representation of the oil necessary for the lamp. The Dravidian word for oil, grease, fat, etc. has a root nĕ, nĭ found in nearly all Dravidian languages: (DED 3104) (Tamil) ney, (Kannaḍa) ney, nēy; (Kurukh) nĕ̄ta, (Malto) nenya. These share homophony with words meaning "to weave": (DED 3103) (Tamil) ney, (Kannada) nē, nēyu, etc. The sign also pairs with the loom sign (see L-7), which probably had a syllabic value of mag (ma) (DED 3775). We thus have a pairing of "weave" and "loom", nĕ̄y mag(?). There are possible homophonic ties of mag with terms for "son, boy, daughter, girl, man," etc. (DED 3768). But in this


J-8 L-7

case the ideographic pairing of weave and loom are self-explanatory. In such cases the lamp sign has to be considered as the commodity "oil" presumed to be sesame oil or animal fat.

Excursus: Weight and Storage

The variation in triangular signs may denote semantic and phonemic differences. The cross-lined triangle appears to have two meanings. The first is associated with the shoulder-carrying pole found with anthropomorphs (see A-6, A-7).

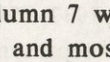
(MD, 1931-540)  (MD, 1937-274) 

In these cases the suspended weight–tūka, tūgu is a reasonable identification. However a second meaning is apparent in the independent sign (MD, 1937-97). This pairs in Column 7 with Column 6 signs  (5 times), (6 times) and most frequently with (27 times). Here a fitting interpretation of the sign is of an unsuspended) conical weight, or more likely, a heap or pile of something. The possibility that (and its variants) represents a storeroom or storehouse (see G-16, 17) suggests that is an image of a heap of a commodity that could be stored. There are a number of possible etyma for "heap".

K-6 

uḍḍi (Kannada) (DED 515)
oṭṭu (Ka., Ta.) (DED 807)
guḍḍe (Kannada) (DED 1402)
kuppe (Ka., Ta.) gope (Malto), kuppai (Ta.) (DED 1440)
kūppu (Ta.), kumpu (Ka.) (DED 1449)
tuppe (Ta.) (DED 2749)

There is a possibility that "heap"–tuppe, kŭppe, and "weight"–tūka, etc. may be related, with tŭ(C) as the root. In any case the semantics reinforce the notion that is a substantive which is to be read per se in its pairing, thus:

(MD, 1937-449) 

could be read: tṯ̆(C) muṛyāl aṇ "One who Accumulates That Which is Stored". But if  means storage of dairy product(s): milk, butterfat, etc., has to have a more specific relationship to a given commodity. Its numerous pairings with suggest that what was stored fitted into small compartments within the storehouse. Our evidence suggests that the most numerous and viable commodity for this kind of storage was grain, the rabi crop (wheat or barley). The relationship of nel (grain) nira (see page 61) to neṛ, nir, the stem in words meaning full, abundant, etc. (DED 3049), even to load, heap, etc.; is possible evidence that is to be read as neṛ. Thus our reading of the text is "Full Storehouse One: with referring to dairy products and to grain storage. In any case, an appropriate name in its statement of good fortune is possible here.

K-6 

It follows then that the other variants (HR, 1940-46) and the latter found only at Harappa, carry the same adjectival quality of fullness, abundance, even

K-8

perhaps of wealth, and a specific depiction of heap or pile, i.e., accumulated material advantage. Thus:

is nēr(i,e)aṇ-ă̆ "(Of) the High One"
nēri "The Prosperous One"

* * * * *

I-10

This sign appears to represent a compartmented tray. It is found in isolation with the famous horned anthropomorph (see Sy-4) in a tree seal (MD, 1937-430) where it appears above the last of the seven figures. It also occurs as a small sign below larger graphemes (MD, 1937-471), as well as below the animals which form the larger seal motifs (MD, 1937-279; MD, 1931-386, -550). The type (MD, 1937-648) suggests a deliberate division into three parts, two smaller, one large, though this is not always constant (MD, 1937-147). Its normal Column 4 place appears to be constant when it is present in a text. It has an unusual relationship to seals where composite animals or anthropomorphs are

(see above references, also MD, 1931-387, -355). In such cases it tends to be in isolation from other signs.

On one "bar seal" found by Mackay at Mohenjo daro (MD, 1937, P1. XC-13) this "tray" is shown held by a woman who, while grasping it in two hands, bends over as if to shake it in some way. The drawing shown in the Mackay volume is incorrect as study of the original seal reveals the tray is identical with the sign. This evidence identifies the sign as probably representative of the act of winnowing or sieving. One has to keep in mind the scribal problem of not confusing signs. Thus crosshatching could well represent a winnowing tray but could be confused with a sign for storehouse (see G-16). In identifying this sign's meaning in text context, we have to consider that positionally the sign occurs either as a terminal grapheme or in isolation, and the latter in connection with unusual seals or seal motifs. There is also the fact that the parts of the sign occur as separate graphemes: (a) (MD, 1937-664), (b) (HR, 1940-296), (c) (MD, 1931-461). Thus we have reason to correlate measure of some kind with winnowing and emphasize that both the semantics and the syllabization must relate to the positional requirement of the sign.

K-14 (a)

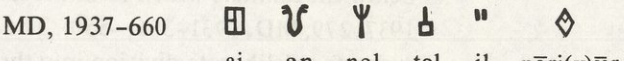
K-13 (b)

K-12 (c)

These requisites are best satisfied in forms of āy, āya—measure (DED 311), winnow or sieve (DED 306, DED 306) and as a morpheme important to position. Thus āy—mother (DED 308) and (Tamil) aiya—exc'amation of wonder, etc; also (Malto) aya (DED 780). There is also ayya, aya—father, sage, etc. (Kannada) (DED 163). The etymological relationship to ārya—noble, respectable (Turner, 1347) is apparently entirely possible (DED 163).

Dravidian names ending in ay or ai are well known: Aḷḷūr Nanmullai, Maturai, Añcilāntai.[100]

Thus we would read:

MD, 1937-660 

ai -aṇ nel toḷ (tuṉ) il pāri(y)ūr

"Pali(y)ūr-il Toḷ Nelaṇai" (for translation see No. 25). However, the context also requires explanation of the sign in isolation. Could it be an epithet such as "Oh Mother," i.e.,

"Protect Me!" or is it the naming of an actual person, in this case a deity or spirit?

In view of all the speculation concerning Harappan religion and its possible relationship to later Indian religions, one is reluctant to add to that corpus of, in large part unconfirmable and often fantastic, ideas. Archaeologically, there has never been a building or object discovered upon which there is a unanimity of opinion that it is "religious". The "phalluses" turn out to be pestles, the "sacrificial fires" simply cooking areas, and the figurines normal to a society with modeling skill and social pleasure thereto, as well as numerous children.[99a] However, the relationship of this sign to an unusual group of depictive seals, some with anthropomorphs, is strong evidence for a deity, possibly female, who was invoked, perhaps for protection in view of the possible amuletic aspect of the tablets. The idea of a divine mother associated with the harvest (winnowing), with measurement (order) and with parentage, is certainly a prevalent one in the ancient world and not confined to India. Ārya is, of course, a name for Sarasvati, who as the daughter and consort of Brahma, is associated with the act of, and sustenance of, orderly creation in the later Indian religion. There may be a link to the Harappan āya accordingly.

The term Āryas—noble ones, obviously identifies the Aryans. If the Harappans invoked an Arya were they invoking the true Āryans, i.e., followers of Ārya, whose name was appropriated by the acculturating Indo-European speakers that followed in history?

I-10

The divisions of the "tray" suggest that the sign represented a whole unit of which the parts, one quarter  , two quarters  , and one half  , were represented. In terms of occurrence there are only six examples of the half, possibly four of the two quarters, and three of the one quarter. The half rectangle appears tripled in one case  (HR, 1940-251) in a fragment of a seal with seven anthropomorphs. But these look more like structures than graphemes. There are too few examples of this and the other signs to establish either positional regularity or to speculate upon possible Dravidian equivalents. Terms like arai, aray—half (DED 192) and bara—quarter (DED 4301)

have a euphony that recommends them in this context but there is little basis for this correlation until more examples are recovered.

G-12 

This rectangle represents an enclosure of some kind, within which are a number of strokes.

The following are the variants.

 (MD, 1931-2, -421)
 (MD, 1931-550)
 (MD, 1937-271)
 (MD, 1937-618)
 (MD, 1937-24)
 (MD, 1931-34)
 (MD, 1931-337)

A cursory examination of the number of occurrences of these types within the published reports,[101] where the text can be ascertained, shows the following frequency of appearances:

Sign	Occurrences	Sign	Occurrences
G-11	7		1
G-12	4	G-15 	2
G-13 	1		12

Most of these were on the small "tokens" from Harappa. Clearly the numbers refer to something the enclosure represents. Do the signs with small horizontals signify something different from those that use only vertical strokes, or are they simply a means of utilizing the small space? We have no clear answer, of course. However, the fact that a majority of these signs are associated with the "tokens" evidences an immediate utility associated with accounting and probably storage. What comes to mind is that the rectangle represents the square weight

characteristic of the Harappan civilization (see page 62). Thus the numerical value assigned has reference to just so much weight, or whatever accounting procedure was involved. Thus:

*found in the script corpora.

The simple crescent, or bow sign, found in some examples, porbably refers to exchange values (DED 4448) or price, or even market. MD, 1931-150 is an example, (see G-7, H-2). The fact that these signs are sometimes used in a seal-tablet text where their usual Columns 6-7 position makes them a part of a personal name of an individual, leads us to kāṇam—an ancient weight (Tamil) (DED 1210), which might be our best bet for a syllabic equivalent. Presumably, the name of the number involved would prefix the weight name.

There is a very high frequency of pairing with the pir sign (see Q-5) as in:

HR, 1940-502) 

The consistency of this sign in pairing indicates that the particular individual was concerned with the weighing process or the use of the weight proper. If the term for the "horns" associated with the loop sign is related to cattle, i.e., (DED 1824) kōṭu—horn, with kōḍi, kōḍē—cattle (DED 1823), the probable identity of  is something like "Chief Herdsman" (note also DED 1709a), koṭu—bent, curved) or "Cattle Owner". However, the North Dravidian marag (Kuruch), margu (Malto), and margh (Brahui) (DED 3864)—all terms meaning "horn"—are probably older than forms of koṭi (Sanskrit?) and are more specifically "horns" (see page 22) but storage of cattle meat would have been perilous, at the least, in the climate of the Indus River Valley. Does the enclosure sign refer then to the numbers of cattle within a stockade and not to weight at all? If so, a term like mane (DED 3911) or manru (DED 3913), both of which are used at times to mean "cowshed" (note also DEDS

3911). Also (Kurukh) mankhā and (Malto) mangu–buffalo (DED 3912), would be fitting equivalents for □ . There is also (Kannada) manaka-young cow or buffalo (DED 3887).

One difficulty is that the reverse side of the numerous tokens from Harappa on which these signs occur carry the quantity signs:

Clearly a commodity, measurable or accountable in such units, was involved. This again is evidence for cattle products rather than cattle per se. At the site of Allahdino over 23,000 clay "counters" were found along with several hundred fragments of clay cattle figurines, as well as miniature carts. One can envision an accounting system whereby so many counters in a cattle count, or a wagon load count, added up to one cattle figurine, or cart-model, and thus so many figurines or models would give a total figure. If we consider ▯ as equivalent to a figurine in such a system, then the divisions of 4, 8, 16, 32, etc. could be recorded by the tiny tokens on which the rectangles and loop signs are found. It could be simply another method of accounting for storage and wealth, or numbering people within a household (DED 3847b):

aṇ mani Mani(y)aṇ

Terms like maṇiyam–relating to revenue inspection (DED 3825) and mandi–herd (Kannada) (DED 3847a) appear to etymologically support this idea. There are even terms for king or chieftain–manneya (Kannada) (DED 3909), which may have derived from the Harappan mani–count, or counter.

There is the fact that numerous texts evidence that the 3rd person singular honorific–an follows these graphemes, G-11 to G-15. This emphasizes that the names of individuals are meant in the pairing. What appear to be numerals within the sign suggest that they are to be read as suffixes to the syllabic value of the sign itself. If they were

meant to prefix, it is more likely that the number signs would have preceded (as they do elsewhere, see signs in category 0. Note the formula  nūṟu mŭṉār.

Thus we can translate the following:

 mani(y)āraṉ (Mahadevan 1977-2806)

 manivilār (Marshall 1931-550)

 maninālī (u) (Marshall 1931-2)

 manipala (Marshall 1931-337)

In general, the term mani(ẹ) probably refers to buildings of some kind and, more than likely, the concept of superintendence found in the later Dravidian terms maṇiyam (Tamil) and maṇiya (Kannada) (DED 3852) or (Kannada) manneya–chieftain (DED 3909) were carry-overs from the Harappan, whatever the exact role in the ancient culture they may have had. The term for priest–marupir (Q-5) is a frequent pairing with these graphemes, which emphasizes this quality or function of leadership. Perhaps certain mane were indeed temples.

G-16

Another enclosure sign which appears in Column 6–7, is often doubled, and regularly preceded in such cases by the anthropomorph with a staff (A-13). There is considerable variation in the sign, however, something the computer orientation of the concordances generally overlooks. This sign may appear with a variable number of crossing strokes. Whether these differences represent significant differences in semantic value is unknown, but epigraphically this massing of signs into one form is untenable. Variations are:

 2 verticals 3 horizontals (MD 1937-350)

 1 vertical 2 horizontals (MD 1937-346)

 2 verticals 2 horizontals (MD 1937-345)

 1 vertical 4 horizontals (MD 1937-30)

 1 vertical 3 horizontals (MD 1937-461)

The type, apparently, is MD 1937-431, two verticals over

three horizontals. In addition to regular pairing with the man with the staff (A-13), pairing with the heap sign (K-6) also occurs with considerable frequency (MD 1937-97). This pairing suggests that this sign does represent a storeroom but the characteristic plan of numerous Harappan houses also shows a honeycomb of small rooms which formed a lower story when such existed (MD, 1937, Pl. XIX Area c, Section South; Pl. XVIII DK Area, c., Section Intermediate; Pl. XVI DK Area c, Section-note 4; etc.) More than likely these small rooms were for local storage in the context of a redistributive system linking central storage with local outlets or even private ones.

A probable syllabization is kūṭi—house (DED 1379) which may have a tie originally to kuṭu—to collect (DED 1526) (Kurukh) khōṇḍa—collect into one place. However, the doubling of the sign with regular frequency suggests that iru—place, seat, residence (DED 407) (as a prefix) may have been involved in the syllabization. (Or could it have a sense of doubling the wealth of whatever is stored or signified by the rooms of a house?)

L-8

One sign usually ignored in recording the graphemes was made by running fine diagonal strokes across two verticals (MD, 1931-4) In the same text the storeroom sign (G-16) also occurs which precisely marks a difference. This sign is doubled in the inscription. It suggests a matting or basket weave, or a piece of cloth, or possibly a net, though the latter is unlikely. The doubling value of ĭr may be related to a term meaning something akin to iṟavalar—a hill tribe of basket makers (DED 442). This grapheme is, for the moment, silent as to possible meaning. However, if it is to be construed as a net, it may relate to the veḷaḷa (Sy-61) though not in terms of chiefs but to its actual representation.

I-16

The forked stick sign appears in the famous "Gilgamesh Seal":

MD, 1937-75

There is a homophony between kavar—fork, bifurcate (DED 1113) and kavar—to seize (DED 1114). The phrase

Iru Kavar—"Seizer of Two" fits the act of the superhuman figure who holds aloft two hapless tigers (Sy-1).

G-20 

The forked poles connected by horizontals in G-20 may be identified as a stockade (MD, 1937-175, -395). The syllabization ka—forked stick, becomes associated with forms of kā—to guard, protect, enclose, etc. (DED 1192) and when multiplied, the former was multiplied. These forms are often related to the protection and care of cattle or to protected enclosures—kāval (Ta.), kāvu (Ma.), kāralu (ko.), kāyu (Te.), khwāfing (Br.)—to take to graze. The va(l) is possibly derived from forms of bara-vara (Ka., Ta., etc.) (DED 4301). Note (Tamil) varai—to restrain (DED 4314) and vari—to bind (DED 4305).

This sign inevitably pairs with three long strokes—mū(n) (see page 32). Mū has a sense of cover, enclose, as in mūṭu (DED 4132) and in mūṭam—dark clouded sky (DED 4131), also murru—to surround (DED 4119) and muṭṭu—to hinder, prevent (DED 4042). However, since this sign already contains these qualities in its semantic identity it appears to be repetitive to replicate in an ideographic system unless the number grapheme acts as a classifier.

F-15 

This little oval sign is generally affixed to, or in close proximity to, main motif animals on the seal tablets (MD, 1931-135) and apparently to be understood as a syllabization of sun—pōtu (DED 3724), pottu, portu and has homophony to poddu (Ka.), porduni (Tu.) (DED 3709)—be in harmony, associated with. Note (Telugu) pem-puḍu (DED 3633)—tame, domesticated. Is this a statement of a particular relationship to a given animal possessed by the seal-tablet bearer?

OBJECTS OF DAILY LIFE

I-13

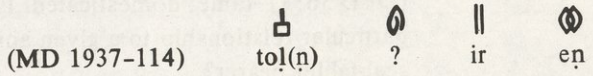
The plough sign, widely recognized in the ancient world, pairs regularly with the pincers (see I-11). It is an abbreviation of the more detailed sign shown in some seals (see MD, 1931-325) (I-12). The type (MD, 1931-244) is sometimes tipped diagonally (MD, 1931-447). Correlation with the pincers, where the latter can be conceived as verbal in meaning rather than simply depictive, forms iṭu—the act of doing something (DED 3751) (see page 19). The plough

sign might be interpreted as cāl, sāl–furrow (DED 2038), perhaps an idea inherent in the central square, a ploughed field connected to a plough by extending the two verticals. There are also the terms kāru–pincers, ploughshare (DED 1232), kāṟu (Tamil, Kannada) (DED 1263) and karuvi–plough, tool (Ma.) (DED 1084). Note also kalappai–plough (Tamil) (DED 1097).

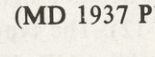
The apparent Dravidian term for "to plough" is uṟu, uṛ (DED 592) (Malto, use ?). This appears to be cognate to (Kannada) kuṟa–plough (DED 1785). The term ikkuṛ(a) (Kannada) (DED 356) also occurs. The link appears to be the metal (iron ?) of which both the ploughshare and the tongs are made. The combinations then provide a verb iṭu, with kuṛ when pincers is meant, and in combination with plough it acts as a determinative to uṛ, uṛ–plough, to plough. [Note the plough and bird head combination kū uṟu (HR Mahadevan 1977-511)]. But a most likely alternative is that in the combination of plough and tongs, the latter represents herds (see page 38) and the former ploughed (fields) and each is to be read separately.

K-17

The spiral, or whirl, drawn as a right-hand or counter clockwise swirl, has considerable variation in Columnar position: Columns 4, 6–7 and 13. In the latter position it initiates a seal text (MD 1931-214); it also terminates a text (MD 1931-106). In addition, it occurs in what appears to be a number sequence:

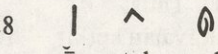


It has a frequent pairing with the crescent or thumb-nail sign (see K-15) (MD, Mahadevan 1977 p. 558; Ha 1940-328 bar seal). At Mohenjo daro two copper tablets were found with the inscription:

(MD 1937 Pl. XCIII-5, 6) 

It seems clear that the sign has something to do with number, quantity, measurement, or the object of these entities. Dravidian terms for spiral, swirl, circularity, etc.–

curi (DED 2211), suroli (Ka.), cural (DED 2223a), sulipini (Tulu), and a possible related etyma, tur̤a—to stir, (Tu.) rudder (DED 2760). A syllabization of sulv, solv is conceivable and also a semantic value related to the texts. Such a value appears to be solage, solige—a measure of capacity (Kannada) (DED 1954). However the syllabic sol, sul (or kol, kul ?) was apparently used in word formation, a rare phenomenon in the Harappan writing system. Thus:

HR, 1940-328 

ŏr tal sul vil Vil(a) Sul Talŏr

vil(a)su(r), vilasu—to mix (DED 4434) join, unite (Telegu), total, whole, sum.

Also note the inscription:

MD, 1937-905, -906 

The sense of a spiral is to surround or enclose, hence total, or whole (see DED 2238)—curru, and forms of cur (DED 2223a). The sign) vil has a meaning of price, or value (DED 4448); the combination  three-quantity (basket, container) (see J-1) thus: Vilasu(1) Talŏr, Talŏr—Head One, or perhaps "One of the Highest Value". But  can mean simply "total" and Talŏr might refer not to person but to a commodity or a measurement of some kind. However, cognates in kur̤u—curl (DED 1511), to kur̤u (DED 1513) (Kannada), gun̤du—to assemble, give a verbal aspect viable in context (see K-17).

If | as ondu—one thing (Kannada) (DED 834d) can be connected with ontu—share or portion (Kannada) (DED 826) then tal ontu would mean "primary share," or even "first share" (or portion). This would be in keeping with the sense of "total" in whatever function the inscribed piece was concerned.

M-1 

An intriguing object, in its probable identification as a lyre, lute, or other stringed instrument, only three examples of this sign are known (HR, 1940-680, -692; MD, 1931-46). In the examples from Harappa which are identical in text we have:

Harappa    Mohenjo daro  
kĕ kāvāḷaṉ pāṇ kĕ ār pāṇ

Thus these texts combine Columns 5 and 4 signs related to the endings of names (see L-9, H-5). If the object signified is a musical instrument, the obvious interpretation of these texts relates to musician(s). The Dravidian pāṇ–song (DED 3351) has some relationship to lute (DED 3351). Thus:

Pāṇ Kāvāḷaṉ kĕ(kĭ) –"Belonging to Pāṇ Kāvalaṇ (Musician Protector").

On the reverse of the tablet is -"Three Shares (or quantities)".

The Mohenjo daro text would be Pāṇār kĕ(kĭ). In both cases the comb sign acts as the dative case.

Excursus: The Wind Sign

F-9 

The wind sign has a number of forms in the texts. Its positional ubiquity confirms its wide usage while its variation suggests a syllabic value above and beyond its literal identity. The type (MD, 1931-179) shows that it is a simple cross, usually of left over right (in keeping with the right to left reading of seal texts?). The syllabization gāḷ–wind (DED 1258) (note also (Tamil) kāl (DED 1240), is probable. [Note also kār–rainy season, monsoon (DED 1073c)].

The cross is possibly representative of an angled hook, known to the Harappans. Such a hook was found by Mackay at Mohenjo daro (MD, 1937, Plate CIX-11, -12, -13). The Dravidian term gāḷa–fishhook, angle, suggests the rebus basis of gāḷ–wind for this sign. The cross with a flat cover me (mi) can be read mi gāl(ḷ)–greatness (DED 3962)(type, MD 1931-136). The cross with the angle cover–tal could be read Tal(V)gal–high wind or, perhaps, "Superior One". [Note possible allusion to āḷ–ruler, master, lord (DED 341)].

Also note:

(MD, 1937 Plate XCI-3) 

One of the most interesting aspects of this sign is the possibility that its variants describe a windmill. It is depicted with sails in one example:

MD, 1937-325

I-15 

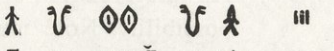
The earliest example of that innovation is known in adjacent Seistan.[102] It appears that the sign could represent the sail holding struts mounted on a single pole with the compound sign given a classifier in the affixed sign for heap—ner (V ?).

There is a regular pairing of with  toḷ, (MD, 1937, Plate XCI-3) as illustrated above. The sign is already described as a post or pillar of an enclosure and syllabized as tūṇ on the basis of its identification as the number 9. In its literal meaning then it meant "post" and in that context perhaps "post-enclosure" which, with the cross sign, becomes "wind-post enclosure". It takes little imagination to consider that what is meant is the "windmill". The windmills known for Sind, Baluchistan, Western Afghanistan and Seistan are sails up the side of the central post and surrounded by a wind-catching clay structure. By itself the cross, though meaning wind, may possibly refer to that which was ground by the windmill. However the above inscription can be read as talāl gāḷa toḷ(tūṇ ?) or "Headman (operator) of the Windmill".

* * * * *

N-9 

The sun sign with the stroke, syllabized pat-ă̄—"Of the Sun," is found doubled in many texts where the positioning is in Columns 6-7. In such cases the inflectional diacritical for the genitive is obvious. When pluralized we have pat-ă̄ pat-ă̄.



MD, 1937-582 āḷ aṇ pat-ă̄ pat-ă̄ aṇ pir mun nelpaṭu

This is a "bar seal" recovered by Dales at Mohenjo daro. On the reverse is a picture of a boat. This has important bearing

on the meaning of this sign.[103] The term paḍa is found in Dravidian in (Tulu)(DED 3175), pāti (DED 3391), also pataku (Tamil), paḍagu (Kannada), and pāṟu (Tamil and Kannada); all these examples mean "ship". Thus we have a reasonable identity of this sign as a syllabization of the word for ship or boat. The depiction of boats in the Harappan culture is, of course, well known as the Dales example attests. Thus our inscription reads:

nel-paṭu	mū(n) piṟaṇ	pat-ă̄ pat-ă̄	aṇ(n)āḷ
"Of the West	Mūn Piṟaṇ	Boats	Captain"

"Mūnpiṟaṇ of the West, Captain of Boats"

(Note the doubling here which pluralizes, designates boat, pată̄ rather than sun, pata-ă̄ (the genitive case).

M-2 M-3 M-4

There are three "drum" signs. The hour-glass shape is found in numerous drums of India even today. Early Tamil literature describes several drums.[104] The sign is drawn in some cases without interior lines as in M-2 (type MD, 1937-120), but it is also commonly shown with thin lines which define the drum heads as in M-3 (type MD 1937-473). The triple drum of M-4 (type MD, 1931-129) gives us a clue that that drum at least is likely to have a syllabic value of mū involved in its syllabization. Thus: muracu, muruṭy—drum (DED 4076) and muṟaru, muṟā—drum (DED 4092) are possibilities. Of course, the concept of the Muracu Drum, as the royal drum,[105] is related or perhaps in the Harappan case, the drum used for leading chiefs.

The M-4 drum sign inevitably initiates a text. Some examples are:

MD, 1931-191, -336		
MD, 1937-233, -390	ara amban̲	muṟ

An interpretation of muṟ ara amban̲—"Drum Master" is a possibility. Note muṟā (DED 4092) has a sense of "all, whole" (also DED 4095), perhaps etymologically motivated by the all-encompassing quality of large "drum sound". Thus the various texts initiated by the triple drum may mean that what follows is what the seal-bearer does, or has charge of in its entirety.

The solitary drum sign has, in general, two positional variations: as an occupant of Column 6 (MD, 1937-268) and as an isolate (MD, 1937 Plate XC-20). The latter is in the "token" group. This suggests that the sign had a dual meaning of drum and also of something related to the use of the token. Such a combination occurs with paṟai—drum (DED 3319), which also means "a measure of capacity" [also possibly pati—a weight (DED 3187)]. Most interesting is the possibility that ⋈ is concerned with trade: para—to spread, diffuse (DED 3255); also remotely paṟai—to speak, word, etc. (DED 3318), but in the sense of communicating over distance as in trade, however:

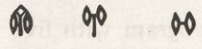
MD, 1937-268 

-aṉ paṟ tiṇ-il Tiṇ-il Paraṉ

"Of the Tiṇ (high area) Drummer"

(proper name)

But the single drum, in isolation, as in (HR, Mahadevan 1977, p. 474) could be paṟ(r)a—trader, the occupation implicit in the seal itself as a kind of iconographic element. In the case of the tokens (paṟ(ai) —a unit of capacity.



K-9 K-10 K-11

The weighing scales (see K-9, K-10) has a high incidence of pairing with the number 5 (MD 1931-37, -50). It also occurs on the token type of "bar seal" (HR 1940-483). Only one example shows the sign as flat with no stem (K-11) where it occurs on one surface of a square "seal" which is inscribed on all sides (MD 1937-405), one surface of which retains two examples of the sign with a stem. The other type (MD 1937-171) shows the entire scales and it is paired, in three out of the four examples known, with two long strokes on the right and two short inflectional strokes (P-2) on the left. Clearly a "place name" is meant in view of the presence of the locative (examples: MD 1931-537; MD 1937-171; HR 1940-55).

The shorter form is clearly meant to mean something different from the full scale sign. It pairs with the "mortar and pestle" (see I-6) —nūṟu, in all the examples known and is found only on the token type "bar seals" (MD, 1937 Pl. XC-15, Pl. XCI-21, and Pl. CI-9).

In the case of the curved scale sign occurring with two long strokes iru (?) il, the full scale or balance is shown, for which an equivalent occurs in Dravidian, takkaḍi—balance, scales (Kannada) (DED 2437). Thus:

MD, 1937-171

il takkadi iru Iru Takkaḍi-il

(locative) scale place "Place of the Scales (Balances)"

The curved form with no stem, however, emphasizes the pans of the scales. Since the Harappan weight was square it could, in drawing, be confused with the enclosure signs (see G-8, G-9). By emphasizing the pan of the scales the identity is more of the "act of weighing"—tūkkam, tūka-tūga, tūnku (Kannada) (DED 2777). Thus the token inscribed:

tūga nūṟu Nūṟu Tūga (?)

"One Hundred Weight"

probably refers to that amount by weight in the Harappan record keeping.

The regular pairing of the scales ideogram with five long strokes again brings an apparent quantitative value to the sign. However, since it pairs only with the number 5 it apparently is a formula invoved in some Harappan names. The terms takkar—worthy, proper (DED 2435) (Tamil) and (Kannada) takka, could be homophonic to takkaṭi—balance, scales (DED 2437), as well as such terms as takkam—stability (DED 2443). Note also tūṅku, tūgu—to weigh (Kannada) (DED 2777a) and taṅgu—to stop, tarry (Kannada) (DED 2443). The number 5 has a proto-form cay (Zvelebil, 1977 pp. 34-35) which may be related homophonically to say, sey, cey—straightness, merit, honesty, etc. (Kannada) (DED 2265). In all, a term like takka(C) say is perfectly in keeping with the need for rectitude in measuring and "Honest Weight," a sound name for an honest fellow!

This is the basic Harappan form for designating "house". (There are no occurrences of this in the script.)

G-5 

This is the grapheme for the gate or door of a house proper. (Note "  " (Mahadevan, 1977, pp. 458-3320). Here il (see P-2) is the terminus. This is possible evidence for the term for gate or doorway—vāyil (Ta.), bāgil and vākkil (Ka.), and bākilu (Tu.) (DED 4386).

MD, 1937-661 pali-ūr vākil Vākil Pali-ūr
"Gate of the Settlement (village town?)" "Gate of Pali-ur"

HR, 1940-550 āḷ aṇ vākil Vākil aṇ-āḷ
"Gate Keeper"

G-1 

A house on a platform, or a second storey, type (MD, 1937-120) is likely to be syllabized maḍ(ṭ)a or māḷa (Kannada) (DED 3930a). Also note maccu—upper storey (Ka.) (DED 3782); also manai (Ta.) and mane (Ka.) —house (DED 3911). Houses on platforms were commonplace in the Indus Valley, built as a means of avoiding the frequent floods.[106] Note the combination:

MD, 1937-120 aṇ māṭa eṛ Eṛ măṭa-aṇ
"One Who Raises (Builds) Houses"

Māḍu, māṭa—to build (Kannada) (DED 3931) may be a contraction of māḍa and iṭu (DED 375), or possibly aṭṭa—upper loft (Kannaḍa) (DED 83). In any case, măṭ(ḍ)a is a good candidate for the ancient syllabization. Măṭ(ṭ,ḍ) is presumably the stem.

This is a doubtful sign. In appears, in all the cases available to me, to be a variant of G-6 in which the open space is covered over (a covered market?) (MD, 1931-262).

G-2 

A variant of the house on a platform sign (there are only four examples, two of which are doubtful (HR, 1940-583; MD, 1937-355).

G-22

This is probably an ideogram representing a flight of stairs, a common enough feature of Harappan houses. It regularly pairs with the container sign in a Column 7 position. It appears that Dravidian etyma relative to stairs, steps—meṭṭu, meṭṭige (Kannada) (DED 4150) and (Tamil) meṭṭu, are homophonic to (DED 4151) meṭṭu (Tam., Ka.) mēḍu, miṭṭu—hillock, heap, rising ground; and probably to mettai (Tamil) and (Tulu) mettige-upper story (4158). The idea of heap or high paired with nel aḷ—quantity of grain (see page 87)—mēḍu nel, is certainly in keeping with Harappan storage customs and thus perfectly fitting in a proper name.

PART III

THE HARAPPAN TEXTS

GRAMMAR

Introduction

1. The writing system of the Harappans was ideo-syllabic, limited to about 200 basic graphemes and extended by affixes and combinations to approximately 419 signs in use. Syllabic values were obtained by homophones or by established usage, particularly among diacritical marks used for case. Combinations of ideograms used as syllables were used in word formation. Ideograms were occasionally combined to be "read" literally.
2. The language of the Harappans was one of the early Dravidian group. Its closest affinity is to Tulu-Kannada in lexemic morphology and in lexemes proper. There are, however, etyma of North Dravidian derivation, particularly of Brahui. The Harappan language also contains etyma of Indo-Aryan type as well as what appears to be of indigenous non-Dravidian origin. It therefore admits to a degree of hybridization in keeping both with its geographical location and its varied cultural contacts. This is supported by archaeological evidence as well.
3. The seal-tablet texts are read from right to left or from the head of the animal depicted on the seal or tablet.
4. Both the boustrephon and a return to the right to left orientation occur in longer texts.
5. Number signs within a text can be verbal or adjectival according to context. Their presence does not insure that the text refers to number.
6. The majority of Harappan texts are concerned with the name, title, status, lineage, or occupation of the individual within the social and political, and economic sectors of the culture. Ideology appears to be secondary to these aspects.

It should be noted that this context and the shortness of Harappan texts (the average is 5-6 signs) make identification of syntax difficult if not impossible since sentences per se do not exist in the texts recovered to date.

Characteristics*

1. The basic stem or root of each sign, with some exception, is monosyllabic: VC, CV, CVC. Combinations of signs can result in the identity of polysyllabic substantives or verbs.
2. Adjectives appear to combine with what they modify, resulting in compounded substantives.
3. A third person masculine singular pronoun is known (see Translation No. 43). There are also third person singular forms which appear to be honorific in character and are meant to be translated. They appear to be prototypes for later early-Tamil or other Dravidian proper names. There are three conventionally used:

 -aṇ—The High (One) (most frequently used)

 -ār—The Powerful (One)

 -aya (ai)—The Father (The Mother)

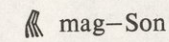
These occur as terminal signs in names or in qualifying statements within a naming context.

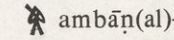
4. The plural is formed in four ways:
   a. By doubling
   b. By affixing diacritical dashes
   c. By use of the long stroke ōr in reference to an individual's occupations
   d. By the use of the sign for quantity  al, paired with the commodity involved  , , etc. (see J-2, 3, 4, 7).

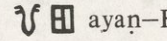
   The plural syllabization for (a) and (b) was probably V- or Vl(l). The former because there are textual references to the personal class in the context of the seal-tablets. This is, however, largely an arbitrary decision (see Zvelebil, 1977, pp. 12-18) until more evidence is at hand.
5. Four cases have tentatively been identified. The case markers are usually affixed to the signs they modify or are suffixed to them.
   a. A nominative case for substantives ending in am, designated by the sign for arrow, H-4 am(b). This is rarely used.
   b. A genitive ă (often used in the possessive sense) designated by a diacritical stroke, P-1.
   c. A locative il represented by the double short stroke, P-2.
   d. A dative represented by a bovid ear and always affixed: kĭ, kĕ, kŭ [vil(a)kŭ ].
   e. A dative represented by the sign ki, L-9. It is possible to translate as (His) Mark, or "Belonging to." Case always follows the plural.

*Details are obtained by referring to the Sign List (Appendix A) or to the translations given in the next section.

6. In combinations, vowels were probably separated by a euphonic phoneme. y, r, v. This phoneme is not syllabized apparently but is used here because of its presence in modern Dravidian. Its existence in Harappan is not yet authenticated.
7. Gender has so far not been confirmed. There is the possibility that most of the texts refer to males since so far symbolic females are not indicated. However the fact that the seal tablets may well be tāli (see page 138) suggests that the feminine gender may have been applied to the seal tablets as a whole.
8. Kinship terms identified to date:

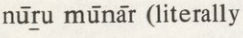
 mag–Son of (Daughter of)

 ambāṇ(al)–Mother (?)

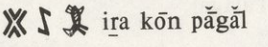
 ayaṇ–Father

Trautman has demonstrated that cross-cousin marriage is characteristically Dravidian. If tāli were given to cross-cousins on the female side from one generation to another, or to the female cross-cousin where settlement exogamy is involved, it is possible that a system of matrilinearity existed prior to the Harappan mature period and remained in some sodalities. Much more work is needed on this question.[110]

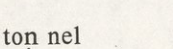
9. Formula were used in an honorific sense. Those so far identified include:

 nūṟu mūnār (literally hundred) "Foremost, Powerful"

Here the number one hundred is used as a superlative modifying mun– foremost (in strength or power):

 iṟa kōn pāgāl (literally food) "collector, divide(r)"

where the object food is collected and divided, i.e., a provider;

 toṇ nel

(refers to ninth month of agricultural year)

Probably July, or June 15 to July 15, the beginning of the monsoon and presumably a time of good fortune. However toṇ is also a place which, with nel, can refer to a granary; implying in the name context a "full" granary achieved at the end of rabi and the beginning of kharif.

 āya

This sign in isolation may mean "Wonderful" or its equivalent. Perhaps an equivalent in Harappan context to Amen! Ojala°, etc.

10. In certain tablets the main motifs may be translated as text (see Sy-18). The direction of the text is obtained by following the order of the main motifs. In the case of Sy-18: left to right, upward, then right to left (i.e., counter-clockwise).

"TRANSLATIONS"

The following are "translations" of critical Harappan texts chosen because they are substantially representative of the textual corpus. Details of the signs are found in the Sign List (appendix A) and in the select vocabulary section that follows.


1. HR, 1940-475	kĭ	kāvaḍi(y)aṇ	karytoḷ	Karytoḷ Kāvadiyaṇ kĭ
	mark* of	guardian	milk cattle	

"Mark (token) of Karytoḷ, Guardian (i.e., of milk cattle)"
pn.


2. HR, 1940-407	kĭ	talagăl	talagăl ki
	mark of	high wind	

"Mark of Talagăl"

3. HR, 1940-682	kĭ	vilambu	munambupaṭu	munambupaṭu
	mark of	bow and arrow	foremost arrow maker	vilambukĭ

"Mark of Vilambu, Foremost Maker of Arrows"

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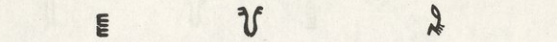
*The use of this term is self-explanatory (L-9). It probably represents the dative case and can be translated as "Belongs to".

4. HR, 1940-548



kǐ aṇ partalār̲

mark of one cotton crops owner

"Mark of Partalaran (i.e., Owner of Cotton Crops)"
pn.

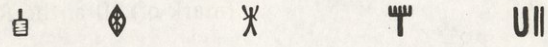
5. HR, 1940-314

-aṇ iruvil margh(a)pir paliyūr-il

one two bows chief priest division, town, settlement

(mark of) "The Chief Priest Iruvilan (i.e., two bows) of the Settlement of Pali(y)ur"

6. HR, 1940-606

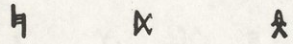


tur̲a tiṇ marughāḷ kiṛ̲-a two aḷa

place high priest south of

(mark of) "The Priest Tiṇtur̲a of the South"

7. HR, 1940-360

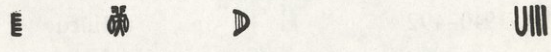


uṛ̲(u) kor̲i accipir Accipir

plow herd elder (chief)

(mark of) "The Elder Chief Kor̲i-uṛ̲"
(i.e., Lord of Herds and ploughed fields)

8. HR, 1940-680



kǐ kāvaḍi(y)aṇ pāṇ pāṇ kāvaḍi(y) aḷamun

mark of guardian of music aṇ kǐ three aḷa

"Mark of the Musician Pan"—"Mark of Paṇ, the Minstrel"

9. HR, 1940-581

kĭ	-aṇ	ir	nīr	Nīriraṇ kĭ
mark of	one	double highest	water	

"Mark of Nīriraṇ"–"Mark of Nīraṇ"

10. HR, 1940-374

-ār	accipir	Accipirār
powerful	senior chief	

(mark of) "The Senior Chief, [the Powerful (One)]"

11. HR, 1940-512

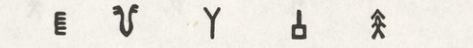
-aṇ	eṇ	il-aă	Ila Eṇaṇ
one	recorder		

(mark of) "Il-a, the Recorder"

12. HR, 1940-502

ambara	vil	Vilambara

(mark of) "Vilambara"



13. HR, 1940-646

kĭ	-aṇ	ner(1)	toḷ	talpir	Talpir Toḷneraṇ-kĭ
mark of	one	month	9	head	chief

"Mark of the Head Chief Toḷneraṇ (The Ninth Month One)"

14. HR, 1940-492

kĭ	-aṇ	paliūru	kom	Kompaliūraṇ kĭ
mark of	one	division of settlement	horn	

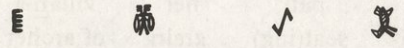
"Mark of Kom(bu) Pariuraṇ"

15. HR, 1940-446

-aṇ eṛi aṇ-ă̄ ūr-ă̄
one

"Of Ūr of the North Eṛi(y)aṇ (i.e., bright one)"

16. HR, 1940-579



kĭ kāvaḍi(y)aṉ kōṇ iṟa Iṟakōṇ
mark of guardian collector food Kāvaḍiaṉ kĭ

"Mark of Iṟakon Kāvaḍi(y)aṉ" (administrator of food collection) (i.e., taxes in kind ?)

17. HR, 1940-448

kĭ -aṇ neraḷ(a) pir irukiṟ-ā
mark of one quantity of grain chief p.n.

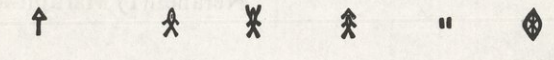
"Mark of the Chief Neraḷaṇ of Irukiṟ"

18. Chanhu daro, LI-32

-aṇ (ara)ambāḷ kōve mag aṇ-ă̄
one master metal son p.n.

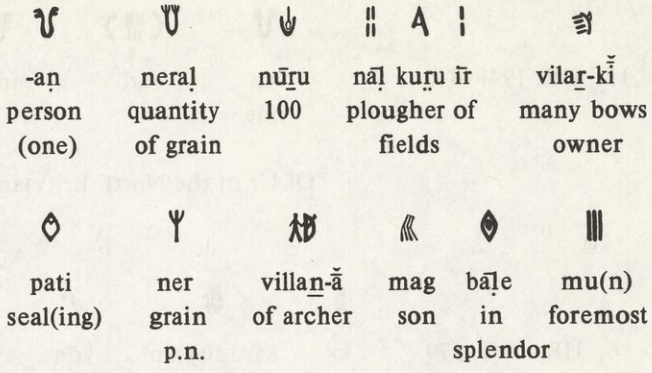
(mark of) "An Son of Kōve ambāḷaṇ" (son of the smith?)

19. MD, 1931-400



-aī̄ pir-ă̄ marupir taḷpir -il tiṇ
the powerful of chiefs priest head chief high eminence

"Tin-il Head Chief, Priest, of Chiefs the Powerful One"

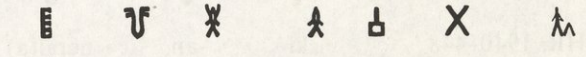


-aṇ	neraḷ	nūṟu	nāḷ kuṛu ir	vilaṟ-kĭ
person (one)	quantity of grain	100	plougher of fields	many bows owner

pati	ner	villaṉ-ā	mag	bāḷe	mu(n)
seal(ing)	grain p.n.	of archer	son	in splendor	foremost

"Tin-il Head Chief of the 'Citadel', Priest, of Chiefs the Powerful One; The Plougher of Fields, Grinder of Quantities of Grain, Foremost in Splendor, Son of Vilaner (Many Bows), Possessor of this Seal"

20. MD, 1937, Pl. XCI-3



kĭ	-aṇ	marupir	pir	toṇ	gāḷa	taḷtaḷ
mark of	one	priest	chief	pole place	wind	headman

"Mark of Headman of the Windmill, Chief Priest Marupiraṇ"

21. HR, 1940-5212

-ār	marupir	il	nel	ṉera	Ṉeranelil
powerful	priest	place	grain	storage	Marupir-ār

(mark of) "Full Storage Place, the Priest Neraneli(1) Marupir-ār (the Powerful)"

22. Nindowari

uṛu	cār	
plough	straight	Cāṟuṛu, or Cāṟuṛu

(mark of) "Straight Furrow Plough(er)"

23. MD, 1931-110

kĭ̆	kĭ̆	tiṇ	pir	ŏr-ă̆	koṛi	koṛi	tiṇ(n)
mark of	p.n.	high place	chief	(plur. gen.)	herds		feeder

"Mark of Chief (Tiṇ(n)akĭ̆, Kori(v)ŏr-ă̆ (One Who Feeds Herds)"

24. MD, 1931-122

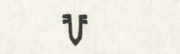
-aṇ	kaṛy	vilagal	ă̆	-aṇ	aya	Ayaṇ-ă̆ Kaṛyvilagalaṇ
one	p.n.		of	one	father	

"Possession of the Father (?) Kaṛyvilagalaṇ"

25. MD, 1937-660

aya(ai)	-aṇ	nel	tūṇ	il	pāri-ūr
father (or honorific name)	one	month	ninth	place	name of (place)

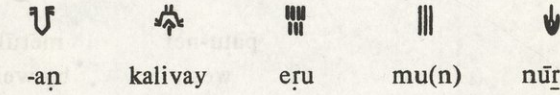
(mark of) "Tūṇ(a)nelaṇai of Pāriūr"



26. MD, 1931-1005

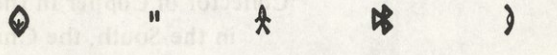
-aṇ	aḍ ana	Aḍanaṇ(a) - p.n.
one	shield	

(mark of) "Aḍanaṇ, the Shield Bearer" (Warrior ?)



27. HR, 1940-20

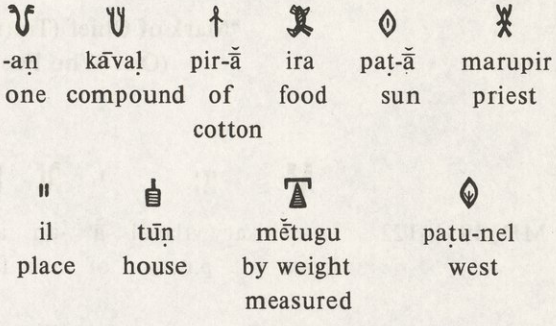
-aṇ	kalivay	eṛu	mu(n)	nūṛu
one	irrigation dam	build	foremost	100



nel-paṭu	il	pir	kuṛ	paṭu
west	place	chief	mountain	sun

(mark of) "The Sun Mountain Chiefdom of the West, Foremost Constructor of Dams, Eṟukalivay-aṉ"
p.n.

28. MD, 1931–49

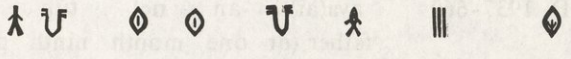


-aṉ kāvaḷ pir-ă ira paṭ-ă marupir
one compound of cotton food sun priest

il tūṉ mĕtugu paṭu-nel
place house by weight measured west

(mark of) "Ira Piri-ă Kāvaḷaṉ, Priest of the Sun, of the Western High Storehouse" (place name)

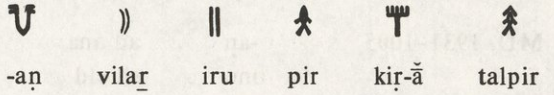
29. Dales, 1967



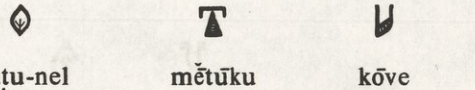
āḷ -aṉ pată pată -aṉ pir mun paṭu-nel
captain boats one chief foremost west

(mark of) "Munpiraṉ of the West, Captain of Boats"

30. MD, 1931–49



-aṉ vilar̲ iru pir kiṟ-ă talpir
one p.n. two chief south head chief



paṭu-nel mĕtūku kōve
west by weight measured metal

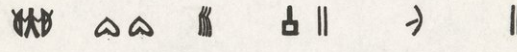
"Collector of Copper in the West, Head Chief in the South, the Chief Iruvilaraṉ"

31. MD, 1931–30	kāvaḍi(y)aṇ	ŏru-ă	-aṟ	mu(n)	nūṟu
	guardian	one	powerful	foremost	100

(mark of) "The Foremost One Nūṟumunār, First Guardian (administrator)"

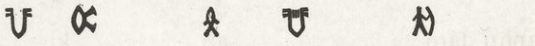
32. Shortugai	kalam pot		(graffiti)
	(DED 1098)		

Either (mark of) "Kalam" a proper name or refers to a certain kind of vessel



33. MD, 1937–49	iruvilaṉ	ir ara	mag	toḷ ir	vil-ă	mu(n)
	two bows	araṟu	son of	Irutoḷ	merchant	foremost
	p.n.	noble		p.n.	(?)	

"The Foremost Merchant Irutoḷ, Son of the Noble Iruvilaṉ"



34. HR, 1940–113	-aṇ	paṭu-kār(u)	pir	munaṇ	vilaṉ (aḍanaṉ)
	one	monsoon	chief	highest	shieldman, i.e., warrior
		S.W.			

"The Foremost Warrior Chief Paṭu-kāru(y)aṇ (One of the Southwest)"

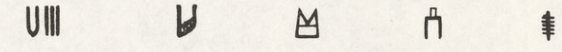
35. MD, 1937–657	nel	mu(n)	il	aḷavaṉ	suru(a)
	grain	foremost	place	measures	assemble
				one who	

(mark of) "Munnel (who) Measures the Grain Storage"

36. MD, 1931-474

-aṇ	kōve	pir
one	metal	chief

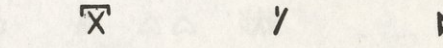
(mark of) "Chief Kōve(y)aṇ (the Smith ?)"



37. HR, 1940-351

three aḷa	kōve	guḍḍe	mǎḍa	kuḷa
unit	metal	pile (large quantity)	house	measure

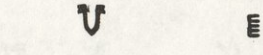
Record of Quantity of Metal (copper ?) (in the) Storehouse-Three Aḷa



38. MD, 1931-136

mē̆ gal	amb-ă̄	kori
high wind p.n.	mother (master)	flock

(mark of) "Mēgal, Mistress (master) of the Flock"



39. Chanhu daro, 1943 LII 13

-aṇ	kī̆
one	write p.n.

"Kī̆(r)aṇ, the Scribe"

40. MD, 1937-632

-aṇ	marugāḷ	ambāḷa	mag	kāvaḍiyaṉ	patu (podu)
	p.n.	mother master	son	guardian	sun

(mark of) "Paṭu Kāvaḍiyaṉ, Son of Ambāḷa Mother (master) Marugāḷaṇ" (priest)

41. MD, 1937-353


turai	māḍu	nūru	ambāḷa
place	high house	grind mill	master (mother)

(mark of) "(Master) of the Mill, Ambāḷa"

42. MD, 1937-904



tal-ă	irunelaṉ	ara	kā(v)āḷaṟ
head of	two grain one (title)	noble	protector

(mark of) "The Protector, the Noble Irunelaṇtal"
(ă) here is genitive for the whole seal text ?)

43. MD, 1937-420


-aṇ	pir	aṇ-il	koramāṭa	kuṭu	āḷ-ă
one	chief	the high	assembled	joins	Hé
(piran = ruler)			clans		

"Aṇ-il the Ruler, He (who) Gathers the Assembled Clans"

44. Ur: Gadd, 1932


cay	kōve	ă	paṭu-nel	kiṟ-ă
āy	metal	of	west	south
(honorific ?)				p.n. Kish

"Kōve(y)ay(ai) Collector of Metal, he of
(the city) of Kish of the West"

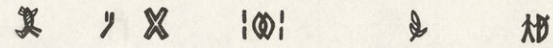
45. MD, 1931-12





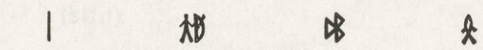


-aṇ	paṭu-nel	kāl-ă	suk	-aṇ	pă(g)	kōṇ
one	west	of the	star	one	divider	collector
			lineage			



iṟa	kālă suk	eṇ kaṟy	pū	vil(l)aṉ
food	lineage of star	counter of tribute	(formative) particle	archer p.n.

"Lineage of the Stars, the Collector of Food, the Divider, (of food) Lineage of the Stars, (Lord) of the West Villanpu, Counter of Tribute"
Sukkālă iṟakōṇpă(g)aṇ Sukkāl-ă Paṭu-nelaṇ Villaṉpū Eṇkaṟy.



46. MD, 1931-190

ŏr	villaṉ	kuṟ	pir
one	archer p.n.	mountain	chief

(mark of) "Chief Kurvillaṉŏr"

SELECT VOCABULARY (FOR TRANSLATIONS)

Harappan Signs	Syllabization	Interpretation
	kove mĕtuku (metugu)	collect metal (copper?)
	nūṟu mun ār	great foremost one (honorific formula)
	munaṇ	highest (a superlative)
	kụla mă̆ḍa	house of records
	guḍḍe kove	(large) quantity of metal (copper ?)
	mĕgaḷ	high wind (storm ?) but also excellence in the sense of strength (i.e., like the wind)
	mă̆ḍa turai	settlement(s) (?)
	koṟe uṟ	herd(s) and plough(s)—a formula (owner of) fields and pastures
	eṛi	daylight bring(er), i.e., shining or bright

	iṟa kōṇ	collection of food (supplies)
	ir̤ kuṟu nāl	plougher of fields
	tūga nel	place of abundant grain storage
	suggi	harvest season
	sol aḷa(v)an̲-il	granary (sol–sur interchangable)
	kōve say(ai)	collector or selector of metal (copper) etc. terminal in text gives ending ai
	viḷasur(u)	crop(s)
	suraḷaṇ	the short (one) p.n.
	suraḷa(v)an̲	assemble (one who)
	tal-ă̄, tara	to bring, give? (in some contexts) as affix ending in some proper names
	parti pū	cotton flowering plant, also a formative with roots
	amb-ōr nel	end of the kharif season
	iruḷ	moonless period ca. one week
	iruḷ (am)	rain ( as determinative)
	iruḷōḍa	wooden boat (palm wood) (see DED 408-876)
	ney muryāl	grease, butter, oil storage (house)
	ney mag	weaving; loom and to weave
	paṭu amb	making or acquiring (DED 3191) arrows; the slant of the interior strokes indicates arrows (H-4) are meant
	ir̤an	double highest (an honorific term)
	cār̲(u) uṟ̲(u) cāl	straight furrow plougher furrow plough (I-13)

	ŏr-ă	a plural of person with genitive case? (a rare form)
	măḍa nūṟu	mill (for grain)

CONCLUSIONS: THE HARAPPAN "CIVILIZATION"

The Harappan "civilization" was a hegemony of chiefdoms with paramount chiefs in each and a system of subsidiary chiefs responsible to the former. These chiefs were organized into a group, the Bellāra, and within their ranks were statuses called pirs: ordinary chiefs, elders, priests or cattle-owners, and head chiefs. Their responsibilities included heading the bureaucracy of the paramount chiefs and of providing leadership in Harappan settlements or settlement areas. The settlements were widespread and locally characterized by functional distributions: industrial sites (metal, shell, pottery, cloth working), cattle camps, agricultural villages (basically scattered households), and administrative centers. Storage and redistributive systems sustained by the bureaucracy were the economic heart of the system and allowed for necessary cohesiveness among the diverse activities.

Cotton (and sesame ?) in the kharif season, and wheat and barley in the rabi season, were the main crops. Each required storage. Dairy products were also stored. Metal, copper in particular, both in manufactured form (?) and as a raw material was stored and redistributed. Archaeological and/or textual evidence for luxury items or exotica–gold, silver, antimony, lapis, ivory, peacock feathers, and shell–is attested and these were presumably, in whatever form, regarded as luxuries widely sought but not necessary to the basic economy.

The society in the chiefdom(s) was highly specialized, the whole having a basic symbiosis. Milling of grain, perhaps with wind power (note monsoon winds are regular at the end of the rabi harvest), casting of metal, cultivation of grain and cotton, herding of goats, sheep and cattle, and weaving of cotton cloth were specialized jobs. The storage of commodities required granaries and a variety of storehouses. There was an elaborate system of records with measurements sensitive to the commodities involved. For commodities capable of quantification measurement in containers there were ala, which were counted from one to four. Metal was measured by weight and used an okka, or finger-nail designation, equivalent to stone square weights weighing from less than a gram up to numerous kilograms, the latter measured by large conical weights. All these were presumably weighed by scales or suspensions. Linear measurement was by the standard cubit (ca. 18-20 inches).

The number system was a base-eight with symbols used for eight and above. The higher numbers beyond ten were combined with single-stroke multiples. This system was used in following the calendar, which was lunar, with measurements of 21 1/2 days, from crescent to crescent moon, with an eight-day dark interval acknowledged as a part of any given month. The calendric

year acknowledged two seasons–kharif–neṟam, from June to September, and rabi–paṭuneṟ(l), from October to May. The days and months were probably recorded on an abacus type of mechanism.

Individual participation in the storage system was based on the possession of tokens which listed the contributor's name and the aḷa amount involved. The tokens were either given at the time of contribution or listed as amounts which were withdrawn. Individual recorders or registrars were employed in recording the storage and their position was apparently a prestigious one.

Other occupations included: musicians–pāṇaṉ, particularly drummers and also those who played the lyre, boatmen–patāraṉ, scribes–kiraṉ, hunters–vil(l)aṉ, smiths–kōvaṉ, bazaar keepers–vilaṉ, irrigation engineers–kaḷivayaṉ, house builders–kuṭu(y)aṇ, potters–bāniyaṉ, shepherds–koṟivaṉ, record keepers–koḷagaṉ, and millers–nūṟuvaṉ. These are attested in the seal tablets.

The larger Harappan settlements–tiṇpali(y)ūr–were characterized by functional divisions. There was the assembly area–poduyil, where presumably chiefs and administration gathered: the high area–tiṇil, an area of public buildings where the chiefs had quarters and where there were special storage facilities; and the ambara–another open area, probably serving a religious function. Most Harappan settlements of size, generally referred to as pali(y)ūr, contained at least one of these special areas. Each area also had someone in charge of its function(s).

The Harappans recognized five directions: upriver (north)–Aṇ-ă̄, downriver (south)–kiṟ-ă̄, sunrise (east)–paṭu-ve, sunset (west)–paṭu-nel, and monsoon direction (southwest)–paṭu-kār. They were also aware of the western highlands–mekuṟ and the northern highlands–an-kuṟ. The rivers–nir, were also importantly involved in their geography but to date no words for sea have been identified, perhaps because the Harappan chiefdoms were so inland oriented. Settlements were designated according to this directional system and by the chiefs who lived there. The bulk of the seal tablets are from the larger sites so a great number of them refer to places within those settlements. Here too, the term ūr may refer to habitation areas or even houses within the larger community.

In general, settlements were not walled, exceptions comprising those with large public storage or, because of a concern to circumscribe administrative functions, those that served the bureaucracy.

A particular group within this bureaucracy was known as the kāvaḍi(y)aṇ. The job of this group was essentially administration of the bureaucracy itself with all its special functions. It was a prestigious post and carried honorific qualities characteristic of status within a chiefdom. Rarely, chiefs (pirs) were included within this group. It has functions outside those of the beḷḷāra and may well have been more superior in status than the beḷḷāra. The number of times the kāvaḍi(y)aṇ appear paired with aṇkaḍi(y)aṉ, or merchant, suggests that some prestige attached to far-flung efforts to bring exotic things to the Harappan hegemony. It should be noted that kāvaḍi(y)aṇ are listed in Harappan texts found

in Mesopotamia. Other functions relative to internal guardian or proprietorship were carried on by this group however.

Harappan technology was largely oriented to cottage industries: the potter's wheel, the horizontal loom, a variety of copper or bronze saws and phlanged bits for cutting or piercing shell and stone, the latter via circular motion, ovens for firing brick, crucibles for smelting metal—all these are attested. What was manufactured appears to have been for local use, although the modicum of gold and silver jewelry and other more exotic materials which have filtered down to us, evidences that some extralocal industry was prevalent.

Two and four solid-wheel carts and the carrying pole or yoke—kā, were used to transport goods. Draught cattle are attested—eddu (?) but the donkey, known from faunal evidence, is not evidenced otherwise. This is also true of the camel. There is evidence for the domestication of the elephant—āne.

Costume was scanty. Men occasionally wore round caps with large rolled brims, women wore elaborate headdresses of cloth or basketry with alate extensions bilaterally or forward. Horned headdresses are evidenced for both sexes. Wrap-around and off-shoulder cotton robes, and possibly the dhoti for males, were standard clothing. Some "topless" female figures have been found. Bangles and bracelets of clay, shell, and copper were very popular and worn by women in great profusion, and by men in ceremonial garb.

Houses—kuṭi, were basically square or rectangular in plan. In the larger examples there were two stories connected by stairways with in inner court. The lower story labyrinthed with storage, kitchen, and bathroom facilities, the upper for living and sleeping, created a complex plan. Wells often reached to the upper story so that water could be brought up and correspondingly poured downwards, with consequent benefit to coolness and to ablutions, for which elaborate drainage and sewer-systems were created.

Oil lamps with both single and multiple wicks lighted the interiors and some latticework over a few windows brought shaded sunlight into hallways. The impression is, however, that most Harappans lived out-of-doors as much as possible, not unlike their subcontinental counterparts today. Wealth elaborated houses but roof-living was the home, whatever lay beneath.

There is no suggestion of a public art other than that indicated by the masterfully drawn animals on the seal tablets. Clay figurines were generally crude but there are a few superbly executed examples of animal sculpture. A comic flare is evidenced in a variety of animal and human figurines with big bellies, spouts for mouths, movable arms and caricatured forms. The famous limestone "priest"—marupir (?), and some copper or bronze female figurines are the extent of the "fine art". Even vase-painting, one of the splendors of the pre- or non-Harappan borderlands, is largely limited to stock designs, well executed but repetitive in both motif and patterning. It appears to reflect an adherence to tradition that, along with the generally standardized form of Harappan artifacts in general, evidences a short-lived and orthodox cultural style.

It is in social organization that the Harappans may have had their most significant development, which could well be their contribution to later India. The present work on the Harappan texts and motifs attests to that development.

According to the sources given here there once was a heroic man, capable of picking up tigers by their throats, who met a woman with flowing hair. Their union resulted in the birth of a crocodile (gavial) who became lord over wild and tamed, or domesticated, animals. This was the origin of the paramount chiefs of the Harappan hegemony of chiefdoms.

Among all the animals known to the Harappans, the goat, steer or "unicorn" bull, the gaur, and the zebu on the domesticated side, and the rhinoceros, elephant, water buffalo and tiger on the wild or dangerous side, were the most important. Society evaluated their importance by individual membership in sodalities represented by those animals. In turn, the eight sodalities divided into two moieties representative of the wild and the domesticated.

The most important sodality was that of the "unicorn" bull, representative of the cattle herds, which were the source of much wealth and power and whose existence insured well-being. This animal was closely associated with the pipal tree—cāli, symbol of agricultural land and of domestication generally. The pipal leaf—ara(c) was also symbolic of union and well-being.

In contrast, the acacia tree, indigenous to grassland environments, generally symbolized grazing and pastoralism. A persistent mythic theme was that a deity called Kāli, a combination of bovid and human female attributes, lived in the acacia and from there taunted and even attacked the tigers who frequented the grasslands preying on the herds. A shrine in her honor consisted of a walled grove with an acacia tree (or trees) in its midst. Walling-in of the acacia was symbolic of control of the grazing land.

This was a precarious control. In the myth, giants pulled up acacias by the roots and hence were attacked by the great champion, who also choked tigers. Water buffalo goared, tossed, and trampled followers of the pipal. Again the heroic "chief", armed with shield and spear, set forth to defend the peaceful from the wild.

It is in this sense of defense that the sodalities were highly utilitarian. Members of the wild-animal sodalities were fewer than those of the cattle sodalities, but every settlement contained at least some members of most, or each, of them. It appears that membership in these sodalities required some ritualistic statement of the power or qualities of the animals that represented them. This required acknowledgment of totemic ancestors which, like the crocodile account, gave reason for the existence of a given sodality. Each moiety had its paramount head—Mutali. In the case of the wild-animal group the chief was called An̤-il, or "High Place One," and his attribute was the wearing of a buffalo-horn headdress. This headdress had high prestige value as it symbolized paramount status.

We are on good ground in labeling the Harappan sodalities totemic clans. Each clan served a function of service, defense, administration, etc. Each clan had

its own chiefs as well as followers but there was no particular occupation confined to any one sodality.

The role of the clans was largely to govern social relationships and by so doing provide for cohesiveness in the larger society as well as unity at the local level. To understand what was at stake, one must envisage the stress brought about by the rapid spread of the Harappan chiefdoms. Within a period of 300 years Harappan settlements had spread hundreds of miles from centers on the Indus River Valley, the alleged locale of the Harappan cultural style.

Something triggered and motivated that movement. That "something" was doubtless the emphasis upon cattle as wealth. Cattle need good grazing, fodder in off-season, and a regular supply of water. Any increase in the herds amplifies these needs. But agriculture is also a source of wealth as well as sustenance and there is a coincidence of good grazing land and good agricultural land, as well as identical need for a regular water supply. Agricultural land, particularly with grain farming, encroaches on grazing land. This, combined with the incursions of wild browsers and grazers, such as the elephant, buffalo, rhino and others, makes agriculture a precarious business, complicated further by the vagaries of the seasonal climate.

Clearly, since prestige and status were geared to the size of herds, the Harappans had to find solutions which would bring about a balance between the demands of pastoralism and those of agriculture. The answer was migration to new pastures and fields. Thus, the comparatively rapid and widespread movement of the Harappans in the western part of the subcontinent.

The movement was an organized one, with a number of phratries within the concerned sodalities represented with their chiefs. A Harappan settlement was then a symbiotic one with households scattered and concentrated into different but neighboring ecologies, or it was a concentrated one created to serve a specific function, as is demonstrated by the far-flung sites of Sutkagen dor in Makran, Dabar Kot in Loralai, and Shortugai in Badakhshan. What was vital to these settlements was not only their own cohesiveness, but the maintenance of connection to the Indus Valley settlements to which they had traditional ties. These ties probably included annual tribute to central chiefs and attendance in some form at given seasonal rituals.

The social organization and the Harappan polity were tightly integrated in this situation. The Harappans acknowledged certain significant lineages to which given chiefs—pir, belonged in each sodality—kara. These lineages—of the Sun—Pakal, Moon—Tiṅgaḷ, Stars—Sukkal, and Rain (Monsoon)—Karugaḷ, were central lineages. Thus a chief of a Sun lineage at Allahdino near Karachi had a familial relationship to a Sun lineage chief at Mohenjo daro. The two also shared membership in common sodalities although it was perfectly possible for an individual to have the same lineage but belong to a different sodality.

The heart of the system was in the marital relationships which unified society. The composite animals demonstrate that phratries existed within the moiety system, which bound clans within a moiety maritally. Cross-moiety marriage

occurred, but apparently only between the tiger clan and one of the cattle group—zebu or unicorn bull.

If the Dravidian system of cross-cousin marriage existed among the Harappans, as seems probable, lineage exogamy had the effect of binding disparate lineages while clan exogamy and phratry endogamy resulted in pan-settlement cohesiveness. The endogamous phratries and moieties gave definition and continuity to the various sodalities involved. Thus the principle of unilineal descent is evident, but was it matri-, patri- or bilateral in character?

There is no clear evidence in the matter but there are some strong possibilities. Marriage was celebrated in conventional ways with striking ethno-historical parallels. It consisted of a number of distinct stages (see Chart X):

1. A procession in which the effigies of the sodality animals involved were exhibited on standards and a marriage pole with a basin attached carried along.
2. A pandal of leaves, usually pipal, was prepared and magical or sacred designs painted on the floor and walls of attendant structures.
3. Bride and groom were elaborately dressed, with emphasis on many bangles and buffalo-horn headdresses.
4. The marriage pole was set in the ground and a libation (of unknown kind) filtered through a basket weave at the top into a basin. Presumably the couple partook of this drink at some point in the ritual.
5. Critical to the wedding was the hanging of a tāli around the neck of the bride. This tāli, one of the seal tablets, bore the name of the groom, his occupation, lineage, place, status, etc. as well as his particular sodality. The woman wore this tāli as a token of her status as a married woman.
6. Cattle were festively painted or caparisoned and participated in the procession. Perhaps some were sacrificed or, in the case of the goat, brought as a part of the bride's dowry.

On some of the depictive tokens, or seal tablets, the woman is shown outside the pandal kneeling to the groom. It suggests that allegiance to the male's family was involved and may be evidence, together with the basic ritual of cattle exchange in pastoralism generally, that a patrilocal system was in vogue.

In any case, an individual was a member of an exogamic lineage (not necessarily of the central lineage group) of an exogamic clan, and of an endogamous phratry or moiety. He or she thus had social ties pan-settlement, and within them, which were recognized by the whole society.

Religion among the Harappans was primarily concerned with providing a mythic basis for the polity, i.e., semi-divine paramount chiefs, and emulating in narrative form the descent of the sodalities. There is possible evidence for a cattle god—Marag-aṉ, for a cow-acacia anthropomorph—kāli, possibly a divine mother—Amban, for an Āya, and also a sun priest—Patā-aṉ. It may be that Maru(g) (āḷ) Marupir, were shamans and healers. The etyma suggest that possibility. In all,

Harappan religion is generally amorphous. We have no evidence for temple buildings, unless those on high platforms qualify, and none of this more graphic or textual material evidences any elaborate pantheistic creed, such as that of the Sumerians or even of the Indo-Aryans.

The evidence, both archaeological and textual, demonstrates that the Harappan polity was that of a chiefdom; that the economy was agricultural and pastoral and depended on a bureaucracy to provide for formal exchange of goods and services among the various occupations; that the technology was pragmatic and, with rare exception, simple and honed by the practical needs of the society, which narrowed its uses to immediate concerns; that the social organization was that of unilineal descent with clans, phratries, and moieties (each with their own character and exogamic or endogamic practices) which had as their principal goal the cohesion of society in spite of great geographic disparity; that the religion was of the primitive kind, admitting some deities, some concern for after death existence (graves contain furniture), and probably practicing shamanism. The main purpose was to thwart the regular and natural dangers of life in the western part of the subcontinent and to insure fertility and growth.

The language of the harappans was one of the early Dravidian groups but with Indo-Aryan and possibly pre-Harappan lexemes. The writing was hybrid in origin, ideo-syllabic in character, and used almost solely for naming and for record keeping.

With reference to the civilization of early Sumeria, Egypt, or China, the Harappan culture is not comparable. It does not fit the classical models of civilization as they have been described: monumental buildings, aristocracies, armies, priesthoods, monarchs with great courts, literatures, pantheism, etc. The Harappans constitute a different category. They were very advanced in some traits but on the whole in a peculiarly Indian way, and in that rests their contribution.

FOOTNOTES AND REFERENCES

[1]Computer-based concordances include:

Koskenniemi, S., A. Parpola and S. Parpola. 1973. *Materials for the Study of the Indus Script.* University of Helsinki, Helsinki.

Koskenniemi, S. and A. Parpola. 1979. *Corpus of Texts in the Indus Script.* Research Reports, no. 1, Dept. of Asian and African Studies, University of Helsinki, Helsinki. (also 1980).

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A Concordance to the Texts in the Indus Script. 1982 Research Reports, no. 3, Dept. of Asian and African Studies, University of Helsinki, Helsinki,

Mahadevan, I. 1977. *The Indus Script.* Memoirs of the Archaeological Survey of India, New Delhi, no. 77.

[2]Knorozov, Y.V. *et al.* 1965. *Preliminary Report on the Investigation of the Proto-Indian Texts.* Nauka, Moscow. (also 1968).

Zide, A.R.K. and K.V. Zvelebil, eds. 1976. *Proto-Indica: Brief Report on the Investigation of the Proto-Indian Texts.* (translation and critique)

Zide, A.R.K. and K.V. Zvelebil, eds. 1976. *The Soviet Decipherment of the Indus Valley Script.* Janua Linguarum, no. 156, Mouton. (translation and critique) *Proto-Indica,* 1970, 1972, 1975, 1981.

The Soviet effort is particularly noteworthy in its investigation and collation of what are categorized as "morphological markers". Analysis of these markers (in terms of positioning of certain signs or block words) produced a morphemic structure parallel in a number of features to Dravidian. The Major error is that in the consequent search for lexemes, some were included which describe later Indian cultural manifestations rather than Harappan.

[3]A most important critique and summation of the problem of deciphering the Indus script as well as suggestions regarding procedures is:

Parpola, A. 1975. Tasks, methods and results in the study of the Indus script, *Journal Royal Asiatic Society,* pp. 178-209. Another important contribution is:

Zvelebil, K.V. 1973. The so-called "Dravidian" of the Indus inscriptions, pp. 32-43. In: *Proceedings of the Third International Conference-Seminar of Tamil Studies* Paris, 1970. Pub. de L'Institut Francais d'Indologie, no. 50. Pondichery.

[4]The extent of our knowledge of the Harappan civilization at this date is summarized in:

Possehl, G.L., ed. 1982. *Harappan Civilization: A Contemporary Perspective.* Oxford Press, New Delhi (in collaboration with the American Institute of Indian Studies).

A summation of past work is found in the following:

Possehl, G.L., ed. 1979. *Ancient Cities of the Indus.* Vikas, New Delhi.

Fairservis, W.A. 1991. *The Fourth River.* Knopf Publ., New York (in press).

Allchin, B. and R. Allchin. 1982. *The Rise of Civilization in India and Pakistan* (especially pp. 131-225). Cambridge University Press, Cambridge.

Allchin, B. and R. Allchin. 1968. *The Birth of Indian Civilization.* Penguin Books, Harmondsworth, Middlesex.

[5]The work of the joint German and Italian team headed by M.Jansen of the Technical University of Aachen and M. Tosi of Ismeo, Rome at Mohenjo-daro appears to confirm a short occupation of that site,

i.e., less than 250 years (unpublished report). J.G. Shaffer, in compiling and editing radiocarbon dates from eleven excavated Harappan sites, found a time range for the Harappan phase of 2400–2100 B.C. [This information will appear in the new (3rd) edition of *Chronologies in Old World Archaeology* edited by R.W. Ehrich. University of Chicago Press, Chicago, in press].

[6]The primary sources for the seal tablets are the various excavation reports. The most important of these are the following:

Marshall, John. 1931. *Mohenjo-daro and the Indus Civilization.* Arthur Probsthain, London, 3 vols.

Mackay, E.J.H. 1937. *Further Excavations at Mohenjo-daro.* Government of India Press, New Delhi, 2 vols.

Dales, G.F. 1976. New inscriptions from Mohenjo-daro Pakistan, pp. 111–123. In: Kramer Anniversary Volume. Ed. B.L. Eichler et al., Kevelaer Neukircher-Vluyn, Verlag.

Franke, U. 1984. A selection of inscribed objects recovered from Mohenjo-daro, pp. In: *Reports of Field Work Carried Out at Mohenjo-daro Pakistan, 1982-83, Ismeo-Aachen University Mission.* Interim Reports, vol. 1. M. Janson and M. Tosi, eds., Aachen. pp. 117–138.

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Rao, S.R. 1973. *Lothal and the Indus Civilization.* Asia Publishing House, Bombay.

Rao, S.R. 1979. *Lothal, A Harappan Port Town (1955-62),* vol. I. Memoirs of the Archaeological Survey of India, no. 78, New Delhi.

Thapar, B.K. 1975. Kalibangan: A Harappan metropolis beyond the Indus Valley, *Expedition,* 17, 2, 19–32.

Fairservis, W.A., Jr. 1976. *Excavations at Allahdino: Papers of the Allahdino Expedition-I.* New York.

There are numerous finds of individual seals and other texts by excavators. A description of these can be found in various concordances (see No. 1 above). Unpublished material also includes seals and texts from most of the above sites. This has been in large part remedied by the publication *Corpus of Indus Seals and Inscriptions I Collections in India* edited by J.P. Joshi and Asko Parpola: Memoirs of the Archaeological Survey of India no. 86 and the Annales Academiae Scientiarum Fennicae Series B239 Helsink; 1987. Unfortunately not available at the time of this writing.

[7]See for example the distribution of seal tablets at Allahdino (Fairservis, 1976, fig. 1).

[8]See footnote No. 1.

[9]Numerous claims to decipherment or statements of methods that could lead to decipherment have been made. Concomitantly, there have been criticisms, many quite sharp, negating these claims or statements. Thus considerable literature is available on the subject. The most important works are the following:

Mahadevan, I. 1970. Dravidian parallels in proto-Indian script, *Journal of Tamil Studies,* vol. 2, no. 1, April, 1970.

Mitchiner, J.E. 1978. *Studies in the Indus Valley Inscriptions.* Oxford University Press, Oxford.

Kinnier-Wilson, J.V. 1974. *Indo-Sumerian.* Oxford University Press, Oxford.

Zide, A.R.K. and K.V. Zvelebil, eds. 1976. *The Soviet Decipherment of the indus Valley Script.* Janua Linguarum, Series Vintica, no. 156, Mouton. (translation and critique)

Fairservis, W.A., Jr. 1976. *Excavations at Allahdino - III: The Graffiti. A Model in the Decipherment of the Harappan Script.* New York, Privately printed.

Rao, S.R. 1972. *The Indus Script–Methodology and Language.* Proceedings of the International Symposium on Radiocarbon and Indian Archaeology, Tata Institute of Fundamental Research, Bombay.

Note also the early work of the following:

Hunter, G.R. 1934. *The Script of Harappa and Mohenjo-daro.* Kegan Paul et al. London.

Ross, A.S.C. 1938. *The "Numbered-Signs" of the Mohenjo-daro Script.* Memoirs of the Archaeological Survey of India, New Delhi, no. 57.

Meriggi, P. 1934. Zur Indus script. In: *Zeitschrift der Deutschen Morgenländischen Gesellschaft.* Weisbaden, vol. 12, pp. 198-241.

Hrozny, B. 1941/42. Inshriften und kulture der proto-Indien von Mohenjo-daro and Harappa, *Archiv Orientalni,* vol. 12, pp. 192-259; vol. 13, pp. 1-102.

In the 1930s, H. Heras was a most prolific writer on the Indus script and iconography. Particularly important works are these:

1939/40. The numerals in the Mohenjo-daro script, *New Indian Antiquary,* vol. 2, pp. 449–459.

1963a. Chanhu-daro and its inscriptions, *St. Xavier's College Magazine,* vol. 29, pp. 102–108.

1963b. Two proto-Indian inscriptions for Chanhu-daro, *Journal Bihar and Orissa Research Society, Patna,* vol. 22, pp. 308–320.

Important critiques are as follows:

Cohen, R.J. 1981. (on Mitchiner's work, 1978), *Journ. of Asian Studies,* vol. XL, no. 3, May.

Clauson, G. and J. Chadwick. 1969. (on the Finnish work, 1969), *Antiquity,* vol. XLIII.

Burrow, T. 1969. Dravidian and decipherment of the Indus script, *Antiquity,* vol. XLIII.

Trautmann, T.R. 1970. (on the Finnish work, 1969), *Journal of Asian Studies,* XXIX, 3, 714-716.

Lal, B.B. 1973. Has the Indus script been deciphered? (Rao and Mahadevan's work). In: *Reports of the Indian Institute of Advanced Study.* New Delhi.

Zvelebil, K.V. 1973. *The So-called "Dravidian" of the Indus Inscriptions.* Pub. de L'Institut Francais d'Indologie, no. 50. Pondichery.

Zide, A.R.K. and K.V. Zvelebil. 1970. (on the Russian and Finnish attempts), *Language,* 46, 4, 952–967.

Zide, A.R.K. 1973. How to decipher a script (and how not to), pp. 347–358. In: *Radiocarbon and Indian Archaeology.* Eds. D.P. Agarwal and A. Ghosh. Tata Institute of Fundamental Research, Bombay.

McAlpin, D.W. 1979. (on the Fairservis method), *Journal American Oriental Society,* 99, 2, 353–354.

[10]In the case of the concordances, computer standardization has caused numerous errors. Well over a hundred orthographic mistakes occur in one of these concordances. Often this "standardization" labels fundamental differences "variants". In effect, errors are compounded. There is also the very real danger that the printout sheet becomes the object of study rather than the original text.

[11]Fairservis, 1976.

[12]For comments on the direction of the writing, see the following:

Ross, A.S.C. 1939-40. The direction of the Mohenjo-daro script, *New Indian Antiquary,* vol. II, p. 554.

Lal, B.B. 1966. The direction of writing in the Harappan script, *Antiquity,* vol. XL, p. 52.

Lal, B.B. 1967-68. A further note on the direction of writing in the Harappan script, *Puratattra,* vol. 1, p. 15.

Mahadevan, I. 1977, pp. 10–14.

[13]For example, Mackay, 1937, pl. LXXV-1, etc.

[14]All of these can be identified in the various excavation reports. See in particular, Marshall, 1931 and Mackay, 1937. These objects are also discussed in the following:

Wheeler, Mortimer. 1968. *The Indus Civilization.* Cambridge University Press, Cambridge, 3rd ed.

Piggott, S. 1950. *Prehistoric India.* Pelican Books, Hammondsworth.

Allchin, B. and R. Allchin, 1968, 1982.

Fairservis, W.A., Jr, 1975, 1986.

[15]Regarding the extent of our knowledge of the question, see the publications listed in footnote No. 4.

[16]See forthcoming discussion of these questions in Fairservis, 1987.

[17]The Zides' work on proto-Munda is referred to here:

Zide, A.K. and N.H. Zide. 1973. Semantic reconstructions in proto-Munda cultural vocabulary, I, *Journ. of Linguistics Society of India,* 34, 1, 1-24 (March). (Reprinted in University of Chicago, Committee on Southern Asian Studies, Reprint Series No. 53).

[18]The heady question of the place of Indo-Aryan vis-a-vis the Harappan language has evoked numerous debates. If the Harappan culture(s) is the consequence of a long indigenous development in the borderlands, as the archaeological evidence indicates, it is unlikely that the Harappan language was "Indo-Aryan" for several reasons. The earliest Indo-Aryan sources (the Rig Veda) demonstrate a non-Harappan way of life. There is every indication that within early Indo-Aryan there was lexical borrowing from indigenous languages, particularly Dravidian, and with this an increased phonemic influence, especially on the retroflex consonants. The development of Indo-Aryan languages on the subcontinent demonstrates patterns of divergence and convergence which evidence growing dominance and local integration with already indigenous languages.

In addition to the archaeological evidence, specific to the borderlands (see footnote No. 4), there is the concomitant evidence from the subcontinent proper. See:

Sankalia, H.D. 1974. *Prehistory and Protohistory in India and Pakistan.* Deccan College, Poona.

Fairservis, W.A., Jr. 1975. *The Roots of Ancient India.* University of Chicago Press, Chicago.

Possehl, C.L. and P.C. Rissman (in press). The chronology of prehistoric India. In: Chronologies in *Old World Archaeology.* Ed. R. Ehrich. University of Chicago Press, Chicago, 2nd ed.

Also see B. and R. Allchin, 1968, 1982.

The most significant linguistic studies on this and related problems are those of Franklin C. Southworth of the Department of South Asia Regional Studies, University of Pennsylvania.

1976. *Lexical Evidence for Early Contacts between Indo-Aryan and Dravidian.* Proceedings of the Conference on Aryan and Non-Aryan in India. University of Michigan, Ann Arbor.

1977. Linguistic-Archaeology in India. Penn. Linguistics Colloquium (unpublished).

1982. Substratum Influence on Early Indo-Aryan. Third Conference on South Asian Languages and Linguistics. Central Institute of Indian Languages, Mysore (unpublished).

1985. *Ancient Sociolinguistics—the Reconstruction of Prehistoric South Asian Language Contact.* New York Academy of Science, New York.

1973. Cereals in South Asian prehistory: the linguistic evidence, pp. 52-75. In: *Ecological Backgrounds of South Asian Prehistory.* Eds. K.A.R. Kennedy and G.L. Possehl. South Asian Program, Cornell University.

[19]The best, most recent, survey of the stages of development in the Indo-Iranian borderlands is by J.G. Shaffer.

1978. The later prehistoric periods, pp. 71-186. In: *The Archaeology of Afghanistan.* Eds. R. Allchin and N. Hammond. Academic Press, London.

[20]Note K.V. Zvelebil's comments on the problem in JAOS, 1974b, vol. 94, pp. 384-385.

[21]The basic resource for Dravidian etymology is the work of M. Emeneau and T. Burrow:

Burrow, T. and M.B. Emeneau. 1961. *A Dravidian Etymological Dictionary.* Oxford University Press, Oxford.

Burrow, T. and M.B. Emeneau. 1968. *A Dravidian Etymological Dictionary—Supplement.* Oxford University Press, Oxford. Also see:

Caldwell, R. 1913. *A Comparative Grammar of the Dravidian or South Indian Family of Languages.* 3rd edition, edited by J.L. Wyatt and T. Ramakrishna Pillai, Kegan Paul, Trench, Trobner & Co., Ltd. London.

K.V. Zvelebil is preeminent today in the study of Dravidian historical linguistics. Particularly pertinent to this Harappan research are the following of his works:

1977. *A Sketch of Comparative Dravidian Morphology: Part One.* Janua Linguarum, Mouton.

1973. The So-Called "Dravidian" of the Indus Inscriptions, pp. 32-43. In: Proceedings, Third International Conference—Seminar of Tamil Studies, Institut Francais d'Indologie, Pondichery.

1974a. Dravidian languages, pp. 989-992. *Encyclopaedia Britannica,* 15th ed.

1965. Harappa and the Dravidians—an old mystery in a new light, *New Orient Bimonthly,* no. 3, pp. 65 ff.

1972. The descent of the Dravidians, *Intern. Journ. of Dravidian Linguistics,* vols. 1-2, pp. 56-63.

Also see:

Mahoney, C. 1975. Archaeology in "South India," pp. 9 ff. In: *Essays on South India.* Ed. B. Stein. Asian Studies at Hawaii, no. 15, University of Hawaii, Hawaii.

[22]B. Subbarao, 1958. *The Personality of India.* M.S. University Archaeology Series, Baroda, no. 3, ch. III.

[23]For language distribution on the subcontinent, see:

Schwartzberg, J.E. 1978. *A Historical Atlas of South Asia.* University of Chicago Press, Chicago, sect. X, B 1.

[24]D.W. McAlpin. 1974. Toward Proto-Elamo-Dravidian, *Language,* 50, 1, 89-101 (March).

Also see:

McAlpin, D.W. 1975. Elamite and Dravidian: Further evidence of relationship, *Current Anthropology,* 16, 1, 105-115 (March). Also note critiques in McAlpin, 1975 and Zvelebil, 1974b.

[25]Zvelebil, 1972. The descent of the Dravidians, IJDL (see footnote No. 21).

[26]Apparently, there were at least three major cultural groups in western India in pre-Harappan times: hunters-gatherers in Gujarat; village farmers along the Indus and east to Malwa; and village farmers and herders in Baluchistan and southern Afghanistan, divided into at least three regional variants. If these represent differences in language, dialects, etc., the Harappan cultural spread may represent an integration of language—unless the Harappans represent an elite who spoke Dravidian regardless of indigenous tongues.

Fairservis, W.A. 1976. Archaeology and Linguistics—An Indo-Pakistan Model. Paper presented at meeting of the Amer. Anth. Assoc., Philadelphia (November) (summarized in F. Southworth's work, 1982).

Fairservis, W.A. and F.C. Southworth. 1986. Linguistic Archaeology and the Indus Valley Culture. Paper presented at meeting of the Amer. Anth. Assoc., Philadelphia (November).

[27]See footnote No. 21.

[28]Zvelebil, 1977.

[29]The abbreviation Ded stands for *Dravidian Etymological Dictionary* and DEDS for its supplement (see footnote No. 21).

[30]Zvelebil, 1972. The descent of the Dravidians, IJDL, p. 57.

[31]Note the terms: tha(c)can—stone mason or carpenter; pon kolavan—goldsmith; paakan—charioteer or an attendant of elephants or horses. These are found in the Tamil-Brahmi inscriptions. See:

Mahadevan, I. 1968. *Tamil-Brahmi Inscription of the Sangam Age.* Proceedings of the II International Conference Seminar of Tamil Studies, Madras, p. 100.

However, in a more detailed account, Corpus of the Tamil-Brahmi Inscriptions, presented in 1966 to the Seminar on Inscriptions, Madras, Mahadevan transliterates: tha(c)an as tacan (71); pon kolavaṉ as poṉkolāvaṉ (30); and paakaṉ as pākaṉ (12).

[32]See A. Parpola, S. Koskenniemi *et al.,* 1969-1, p. 29.

[33]This homophone was recognized by the Russian team. See the various reports by Proto-Indica, e.g., Y. Knorozov etc. (footnote No. 1).

[34]For example, Mackay, 1937, vol. 1, p. 402.

[35]See Zvelebil, 1977, p. 15.

[36]Mahadevan, 1970, p. 103; Fairservis, 1977, Chart la; and Mahadevan, I. 1982. Terminal ideograms in the Indus script, pp. 314-315. In. *The Harappan Civilization.* Ed. G.L. Possehl. Oxford Press, New Delhi.

[37]B.B. Lal. 1974. Some aspects of the archaeological evidence relating to the Indus script, *Puratattra,* no. 7, pp. 23-24.

[38]Mahadevan, 1970, pp. 9-23.

[39]For example: A.K. Ramanujan. 1975. *The Interior Landscape.* Indiana Univ. Midland Edition, p. 119.

[40]R.L. Turner. 1966. *A Comparative Dictionary of the Indo-Aryan Language.* Oxford University Press, Oxford, p. 574.

[41]The formula 7/10/0 means: In seven South Dravidian languages, ten Central Dravidian, and zero North Dravidian in related forms.

[42]*Revue d'Assyriologie et d'Archéologie Orientale,* vol. XXII, p. 56, 1925.

[43]*Cambridge Ancient History.* vol. I, pt. 2, p. 298, 1971.

[44]Fairservis, 1977, pp. 11-25.

[45]M.H. Van der Osten. 1934. *Ancient Oriental Seals in the Collection of Mr. Edward T. Newell.* Oriental Institute Publication, Chicago, no. XXII, pl. III-23.

[46]Zvelebil, 1977, pp. 14-18.

[47]Turner, 1966, 3170.

[48]A. Marshak. 1972. *The Roots of Civilization.* McGraw-Hill, New York, esp. Chap. VII.

[49]The system was continued in Sumero-Babylonian:

6 ka	12 ka	18 ka	24 ka, etc.

[50]MD, 1937, Pl. CXXV-1.

[51]For example, see Wheeler, 1968, pp. 34-35, 43-44. But also see:

Fentriss, M. 1984. The Indus "granaries". Illusion, imagination and archaeological reconstruction, pp. 89-97. In: *Studies in the Archaeology and Palaeo-anthropology* of South Asia. Eds. K.A.R. Kennedy and G.L. Possehl. Oxford, New Delhi.

[52]For example, MD, 1931-357; MD, 1931, Pl. LXXII-7; Mackay, 1943, pl. LII-36. Also see:

Lal, B.B. 1979. Kalibangan and the Indus civilization, pp. 66-96. In: *Essays in Indian Protohistory.* Eds. D.P. Agrawal and D.K. Chakrabarti. B.R. Publishing Corp. Delhi, p. 79, pl. XII.

[53]See footnote No. 52, also Appendix 3 eg. Sy-15

[54]See F.W. Clothey. 1978. *The Many Faces of Murukan.* Mouton, The Haque, Paris, New York

[55]Pastoralism in South India is attested at least as early as the late Third Millenium B.C. See F.R. Allchin. 1936. *Neolithic Cattle-Keepers of South India.* Cambridge University Press, Cambridge. Also see G.L. Possehl and P.C. Rissman, 1986 (?), Table 29.

[56]See Zvelebil, 1977, particularly pp. 12-14 for a discussion of plural markers. Are combinations with  ;  ;  ; etc. amounts? i.e., plurals of the designated commodity? (see this book, page 61).

[57]Mahadevan, 1970, pp. 23-38. This includes a discussion of the history of interpretations of this sign by the Europeans.

[58]Mackay, 1943, Pl. XXXVI-17, 20, 21.

[59]Note for example Harappa, 1940, Pl. XCV-427 and Pl. C-658.

[60]Note the following:

Casal, J.M. 1964. *Fouilles d'Amri.* Klincksieck, Paris, vol. II? fig. 75-323.

Jarrige, J.F. and M. Lechevallier. 1979. Excavations at Mehrgahr, Baluchistan. In: *South Asian Archaeology 1977.* Ed. M. Taddei. Istituto Universitario orientale series minor VI Naples, vol. I, fig. 24-25.

Kramrisch, S. 1965. *The Art of India.* Phaidon, London fig. ld.

[61]See for example, *Marine Fishes of Karachi and the Coasts of Sind and Makran.* Govt. of Pakistan, Ministry of Food and Agriculture (Central Fisheries Dept.), 1955.

[62]M. Tosi, 1984 (personal communication).

[63]Fairservis, 1986.

[64]Zvelebil, 1977, pp. 31-33. The choice of ă may have some relationship to the syllabization of the number 1, i.e., or; in any case an open vowel.

[65]A telling paper on the question of Harappan-Indo-Aryan relationships as archaeologists envision it, was delivered by J.G. Shaffer in 1980 The Indo-Aryan Invasions: Cultural Myth and Archaeological Reality. Ninth Annual Wisconsin Conference on South Asia, Beloit. Shaffer refutes the concept of an invasion.

[66]For example: J. Burne, 1831. *A visit to the court of Sinde.* Oxford University Press (1974 edition) Karachi.

[67]The term pir is common in Sind and has a meaning of "holy man," even "saint". Pir has been said to be a Muslim title, probably of Persian origin. However, there is no Persian or Arabic equivalent in areas other than Sind. The title is clearly indigenous in origin. See: P. Mayne. 1956. *The Saints of Sind.* J. Murray, London, particularly p. 20 ff.

[68]See for example: K. Baer. 1960. *Rank and Title in* the Old Kingdom. University of Chicago Press, Chicago, p. 35 ff.

[69]Fairservis, 1977, pp. 11-17.

[70]I am most grateful to David McAlpin, then of the Department of South Asian Studies, University of Pennsylvania, for pointing this out to me.

[71]Mahadevan, 1977, p. 718.

[72]Zvelebil, 1977, p. 36.

[73]Zvelebil, 1977, pp. 35-36.

[74]In the concordances this sign is occasionally confused with another (e.g., Mahadevan, 1977, p. 505), but there are examples of the two signs paired, which marks their distinction (MD, 1937-508).

[75]A harrow, carefully depicted as a main motif, was found by Rao at Lothal.

Rao, S.R. 1979. *Lothal, A Harappan Port Town (1955-62),* vol. I. Memoirs of the Archaeological Survey of India, New Delhi, pl. CXXVI-23.

[76]F.R. Allchin. 1969. Early cultivated plants in India and Pakistan, pp. 323-329. In: *The Domestication and Exploitation of Plants and Animals.* Eds. R.J. Ucko and G.W. Dimbleby. Duckworth, London. Also see: Vishnu-Mittre and R. Savithri. 1982. Food economy of the Harappans, pp. 205-221. In: *Harappan Civilization: A Contemporary Perspective.* Ed. G.L. Possehl. Oxford, New Delhi.

[77]The practice continued in Sind and Las Bela well into the twentieth century. For example: Las Bela, *Baluchistan District Gazetteer Series,* vol. VIII, pp. 76-77, 1907.

[78]W.A. Fairservis, Jr. 1982. Allahdino: An excavation of a small Harappan site, pp. 102-112. In: *Harappan Civilization: A Contemporary Perspective.* Ed. G.L. Possehl. Oxford, New Delhi.

[79]W.A. Fairservis, Jr. 1956. *Excavations in the Quetta Valley, West Pakistan.* Anthro. Papers of the American Mus. Nat. History, vol. 45, pt. 2, pl. 14. Also: W.A. Fairservis, Jr. 1959. *Archaeological Surveys in the Zhob and Loralai Districts, West Pakistan.* Anthro. Papers of the American Mus. Nat. History, vol. 47, pt. 2, fig. 59a.

[80]Mahadevan, 1977, pp. 556-557.

[81]See: R.S. Bisht and S. Asthana. 1979. Recently excavated Harappan sites. In: *South Asian Archaeology 1977.* Ed. M. Taddei, Istituto universitario orientale series minor VI Naples, vol. I, p. 231, fig. 5.

[82]Mackay, 1937, pl. CVI-30.

[83]Wheeler, 1968, p. 84, has pointed out that the Harappans apparently used both the foot and cubit systems.

[84]Wheeler, 1968, p. 85.

[85]R.R.R. Brooks and V.S. Wakankar. 1976. *Stone Age Painting in India.* Yale University Press, New Haven, Connecticut (for example, p. 82, style 13). Though much later than the Harappan period, apparently this manner of drawing shields is assumed to be much earlier, certainly at least to the Second Millenium B.C.

[86]Note: Gardiner, 1927-N-14; B. Buchanan. 1981. *Early Near Eastern Seals in the Yale Babylonian Collection.* Yale University Press, New Haven, Connecticut, figs. 462, 463, etc.

[87]Many examples are given in J.V. Ferreira, 1922 (reprint 1965). *Totemism in India.* Oxford, New Delhi.

[88]I. Mahadevan read an important paper written by him, Place Signs in the Indus Script, at the Vth International Conference Seminar of Tamil Studies at Madurai, January, 1981, in which on the basis of their universality in ancient writing, he regarded certain signs as designating place. We concur on several of these. Our basic disagreement lies in the suggestion of a palace-king oriented civilization rooted in possible parallels to those of the ancient Near East or to early Tamil civilization. In my view,

already expressed, this orientation is not applicable to the Harappan world. Paradoxically however, terms such as ampalam, potu(y)il, and mantu , which are Old Tamil place names, fit my interpretation but, as is clear from this account, for other reasons.

[89]See Zvelebil, 1977, pp. 32-33; Caldwell, 1974 (Ist Indian edition), pp. 303-305.

[90]K.A.N. Sastri. 1975. *The Colas.* University of Madras, Madras, p. 70; X.S.Th. Nayagam. 1970. *Tamil Culture and Civilization.* Asia Publishing House, Bombay, p. 142.

[91]For example, Fairservis, 1956, pp. 306-307; J.M. Casal, 1964, vol. II, fig. 76, 77; J.F. Jarrige and M. Lechvallier, 1979, fig. 22.

[92]I am quite aware of Zvelebil's objection to the use of the homophony of South Dravidian aracan—king, and aracu—the pipal tree (DED 167 and DED 168) (Zvelebil, 1973, p. 39). The fact is that the pipal is an important element in Harappan orthography. It signifies something. I agree with Zvelebil that "king" is not what is meant, however much one wants to use it. The Indo-Aryan rajan—chief is not out of line with our understanding of Harappan polity (Turner, 10679). Furthermore, the pipal is not a tree of the assumed Aryan homeland. The interdigitation evidenced by archaeology of the Indo-Iranian borderlands with inner Asia (see footnote No. 18) emphasizes that linguistic borrowing was probably characteristic of the time. Harappan adoption of Indo-Aryan lexemes and vice versa can be considered a norm for the time. If the pipal had particular significance to the Harappans, as the evidence suggests, the adoption of a term like rajan is not unexpected with, however, semantic uses that are Harappan in character (see Fairservis and Southworth, 1986).

[93]See Falkenstein, 1936, Nos. 196, 204, 428-430 as probably referring to place.

[94]For old Sindi names, see: Sir H.M. Elliot. 1976. *History of Sind.* Sind Adabi Board, vol. I (Ist Pakistan edition).

[95]See Mahadevan, 1977, pp. 533-534 for diagrammatic drawings not perceptible in the original publications.

[96](a) See S.N. Kramer. 1963. *The Sumerians.* University of Chicago Press, Chicago, fig. 6.

(b) A. Gardiner, 1927, p. 477.

(c) Brice and Grumach, 1962, fig. 1-39.

(d) For example: L. Wieger. 1965. *Chinese Characters.* Dover Press Edition, New York, p. 208.

[97]Zvelebil, 1972.

[98]W.H.R. Rivers. 1906. *The Toda.* MacMillan Co., London, pp. 45-46.

[99]R.N. Mehta. 1982. Some rural Harappan settlements in Gujurat, pp. 167-174. In: *Harappan Civilization: A Contemporary Perspective.* Ed. G.L. Possehl. Oxford Press, New Delhi. J.P. Joshi and M. Balce (on Bhagawanpur), *ibid.*, p. 191.

[99a]See G. Dales. 1985. Sex and stone at Mohenjo-daro, pp. 109-115. In: *Frontiers of the Indus Civilization,* Sir Mortimer Wheeler Commem. Vol. Ed. B.B. Lal and S.R. Gupta Oxford, New Delhi. Presents a lucid comment on phallic interpretations.

[100]See Mahadevan, 1970, p. 21 ff.

[101]MD, 1931; MD, 1937; HR, 1940.

[102]Sir W. Muir, ed. 1924. *The Caliphate,* p. 187 (for Iran); G. LeStrange. 1930. *The Lands of the Eastern Caliphate,* p. 337 (for Seistan). Cambridge University Press, Cambridge.

[103]G. Dales, *Expedition,* 9, 4, 38, 1967.

[104]G.L. Hart III. 1975. *The Poems of Ancient Tamil.* University of California Press, Berkeley, pp. 31-32.

[105]*Ibid.*

[106]See Fairservis, 1987 (in press).

[107]F.C. Southworth. 1984. Some Aspects of Dravidian Prehistory Based on Vocabulary Reconstruction. Paper presented at the Amer. Anthro. Assoc. Meeting, Denver (November). I am very grateful to Professor Southworth for making this material available to me.

[108]For descriptions of sedentary farming sites in Maharashtra and Karnataka, see: Allchin and Allchin. 1982. *The Rise of Civilization in India and Pakistan,* especially pp. 262-297; and H.D. Sankalia. 1974. *Prehistory and Protohistory of India and Pakistan,* 2nd ed. For rice husks (paddy) at Lothal see Allchin and Allchin, 1982, p. 191.

[109]Weddings in India are highly social affairs with considerable emphasis upon elaboration for the sake of prestige. Caste endogamy and usually village exogamy are the rule. This extends social relationships beyond the kin group while simultaneously strengthening that group through marriage to new affinal relations. Although most of the references are to Hindu marriages, the fact is that the

majority of Indian weddings contain similar rituals and concepts, whatever the religion or region involved. This suggests, at the least, that pre-Hindu traits integrated into the Hindu ritual.

Among the wedding traits shared pan-India are: rituals of purification, the pandal (mandap, etc.), religious invocation, processions with decorated animals by the groom and his family, marriage poles, vessels, offering tables, etc. of sacred or semi-sacred character. In many instances a sacred fire, music, exchange of gifts, feasts, acknowledgement of local deities and, if clans are present, of the clan leader, are commonly observed. Other customs include the dressing of the bride and groom in princely robes or other insignia, the ritual sharing of food and drink, and the use of painted or other graphic designs, which generally have sacred or magical allusions. Finally, the marriage ceremony is generally concluded with the groom placing a necklace or badge, a tāli (or mangal sutra) around the neck of the bride or the two exchanging rings or other ornaments. There are numerous descriptions of wedding rites in India, but see:

Hiebert, P.G. 1971. *Konduru.* (Telegu). University of Minnesota Press, Minneapolis, especially pp. 147-148 and Appendix III.

Mayer, A.C. 1970. *Caste and Kinship in Central India.* University of California Press, Berkeley especially pp. 227-235.

Dube, S.C. 1955. *Indian Village.* Routledge and Kegan Paul, London, pp. 120-121.

Lewis, O. 1958. *Village Life in Northern India.* Random House, New York, pp. 157-195.

Elwin, V. 1974. *The Muria and Their Ghotal.* Oxford, New Delhi, especially Chapter V.

[110]The best work on Dravidian kinship is by T.R. Trautmann. 1981. *Dravidian Kinship.* Cambridge University Press, Cambridge, see particularly p. 75 ff.

[111]On the question of cattle as wealth, see Fairservis, 1987, *Expedition.*

APPENDIX A

LIST OF SIGNS

The list constitutes a summation of all the principal signs of the Harappan corpus. Its divisions are obvious; however, some comments are made in the list not found in the text and some of the type examples (listed below each sign) differ from those in the text. Column Place refers to the Grid (Chart 1) where the columnar order is established, with the order shown in Chart III.

Abbreviations:

DED – Dravidian Etymological Dictionary, also DEDS – the Supplement and DEDR-the revised edition, 1987

Ka – Kannada

Tu – Tulu

Ta – Tamil

Br – Brahui

Kur – Kurukh

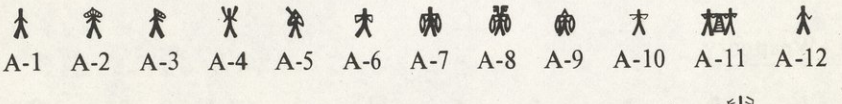
Malt – Malto

Te – Telegu

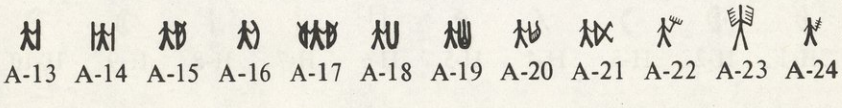
Ma – Malayalam

With the list and the text the reader should be able to follow the raison d'etre for the translations. Signs not found in this list are either too obscure or are combinations of the list signs and the reader can accordingly arrange them. The formula 0/0/0 means in order north, central, south Dravidian. It is used here to mean the distribution of certain etyma as described in the DED. Homophones, combined forms and uncertain identifications are usually without this formula.

A. Men and Women, Occupations



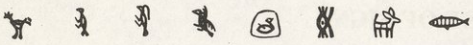
A-1 A-2 A-3 A-4 A-5 A-6 A-7 A-8 A-9 A-10 A-11 A-12



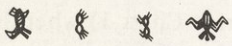
A-13 A-14 A-15 A-16 A-17 A-18 A-19 A-20 A-21 A-22 A-23 A-24


A-25 A-26 A-27 A-28 A-29

B. Birds and Animals


B-1 B-2 B-3 B-4 B-5 B-6 B-7 B-8

C. Invertebrates


C-1 C-2 C-3 C-4

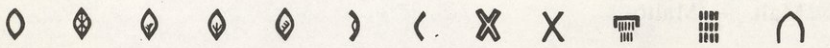
D. Parts of the Human or Animal Body


D-1 D-2 D-3 D-4 D-5 D-6 D-7

E. Plants and Trees


E-1 E-2 E-3 E-4 E-5 E-6

F. Sky, Earth, Water and Fire


F-1 F-2 F-3 F-4 F-5 F-6 F-7 F-8 F-9 F-10 F-11 F-12

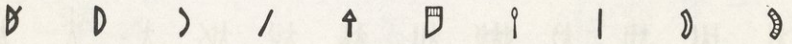

F-13 F-14 F-15 F-16 F-17

G. Buildings and Parts of Buildings

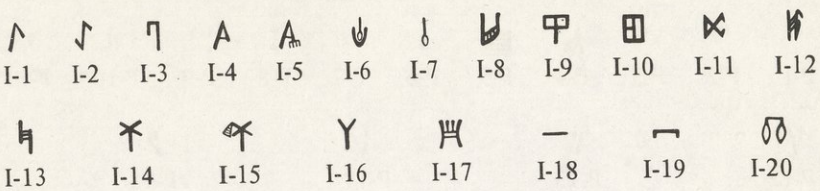

G-1 G-2 G-3 G-4 G-5 G-6 G-7 G-8 G-9 G-10 G-11 G-12


G-13 G-14 G-15 G-16 G-17 G-18 G-19 G-20 G-21 G-22 G-23

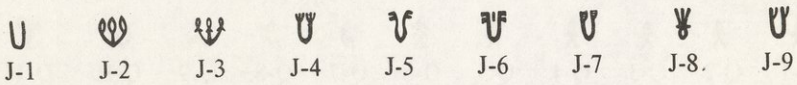
H. Weaponry


H-1 H-2 H-3 H-4 H-5 H-6 H-7 H-8 H-9 H-10

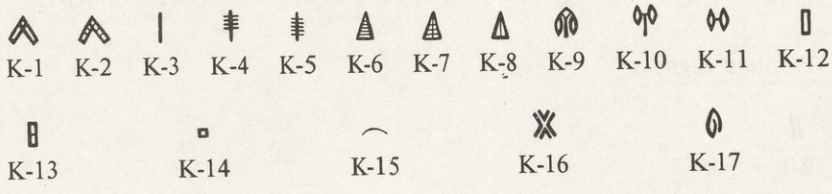
I. Tools of Agriculture and Crafts



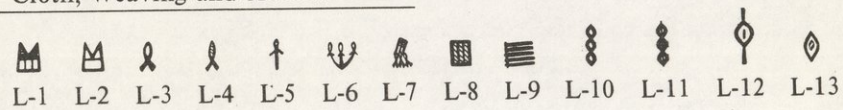
J. Containers



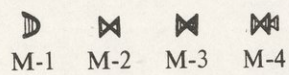
K. Measures and Measuring Devices



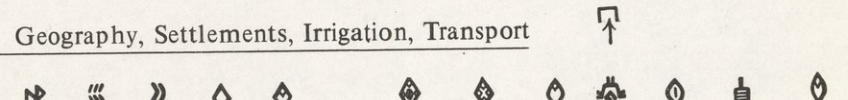
L. Cloth, Weaving and Accoutrements



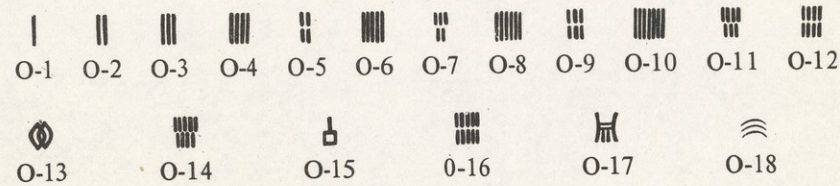
M. Musical Instruments



N. Geography, Settlements, Irrigation, Transport



O. Numbers



P. Affixes, Diacritical Marks


P-1 P-2 P-3 P-4 P-5 P-6 P-7 P-8 P-9 P-10 P-11


P-12 P-13 P-14 P-15

Q. Primary Compounded Signs


Q-1 Q-2 Q-3 Q-4 Q-5 Q-6 Q-7 Q-8 Q-9 Q-10 Q-11


Q-12 Q-13 Q-14 Q-15 Q-16 Q-17 Q-18

R. Problem Signs


R-1

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
A-1	 MD, 1931-483	4	a man	āḷ-āṉ aṉ	342 0/1/7	āḷ	341 0/1/7	rule ruler	
A-2	 MD, 1931-182	?	a woman	peṇ	3608a 0/3/7	peṇ ?	3633	take care of	
A-3	 MD, 1937-401	?	a woman	peṇ	3608a 0/3/7				 variant
A-4	 MD, 1931-339	6	a man with horns	margh-āṉ maruḷ-āḷ	3864 1/2/1 3866 0/0/6	maru(k)aṉ		possibly a shaman, priest, name of a deity?	 variant see Q-5
A-5	 MD, 1931-18	7	a man with arrow	amb-āṉ am-āṉ	see H-4	mother	154	mother as a deity (?)	for Amba, see Turner, 1966, p. 574
A-6	 MD, 1931-312	5	a man with carrying pole or yoke	kā(v)āḷ	1193 0/7/5	kā	1192 1/8/8	guard guardian	
A-7	 MD, 1931-218	5	a man with a carrying pole with looped cords	kā + vaḍi(y)aḷ kāvaḍi (y)aḷ	1193 0/7/5 4272	see A-6		watchman	for a graphic depiction of this sign see Chanhu-daro, 1943-18

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
A-8	MD, 1931-129	5	a combination of A-7 + J-5	kāvaḍi(y)āṉ		A-7, A-8, A-9 refer to a special category of administrators		an honorific title like "Great Guardian" or "High Guardian"	but administrator in context
A-9	 MD, 1931-79	5	a combination of A-7 + H-5	kāvaḍi(y)ār				an honorific title like A-8 (?) related to a different guardian role	but administrator in context
A-10	MD, 1937-242	5 ?	a man with carrying pole on shoulders	kā(v)āḷ kāvaṉ				guard (see A-6)	probably a variant of A-6
A-11	 MD, 1937-518	?	two men with carrying pole with conical weight suspended	tūkā(y)ār or tūkevālār	A-10 2777	a combined sign with tūka- weighing by suspension		If tūka-tūgu can be related to toku (DED 2861)—to collect, accumulate; then to be read "One who Assembles" or "Those who Assemble"	
A-12	MD, 1931-410	6-7	a man with his arm in a holding position, an occupational suffix;	-aṉ		(as in) panikkaṉ kolaṉ	3209 0/4/8 1773 0/1/5	carpenter (Tamil) "One who" blacksmith (Tamil)	
A-13	 MD, 1931-437	6-7	a man with a staff	daṇḍi(y)aṉ	2459	daṇḍi	2449	eminent person	(elder ?)

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
A-14	MD, 1931-117	5-6	a man with two staffs	iṟaḍaṇḍiyaṉ	see 438 448	a proper name where iṟa,an honorific quality			
A-15	MD, 1931-70	6-7 11-12	a man with a bow and arrow	velaṉ	4555	vil(l)aṉ vilambaṉ	4449	(hunter ?) archer (warrior ?)	(see P-12) a calendrical designation 1st or 12th Month
A-16a	MD, 1931-43	6-7	(a) a man with a bow	vil(l)aṉ	4449	vil	4448	merchant ? variant of Q-15 ?	see H-9
A-16b			(b) a man with a shield	aḍaṇaṉ	73			warrior	
A-17	MD, 1937-49	?	a man with two bows	iṟavilaṉ	see A-14	a combination iṟa– two and velaṉ (A-15)		an honorific title	or is it Irbil(man) (a city of the ancient Near East)
A-18	MD, 1931-165	6-7	a man with a container but as pot	aḷa(v)aṉ pāṉ (Kā)	252 4362	pāmba, pāṇi(y)aṉ		recorder potter	one who records by quantity or measures quantity ala
A-19	MD, 1931-42	6-7	a man with a mortar and pestle	nūṟuvaṉ	3089			miller	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
A-20	MD, 1931-260	6-7	a man with a crucible	kōvaṉ	1509			smith	
A-21	MD, 1937-88	6-7	a man with a pair of tongs or pincers	koṟa(tu)van koṟivaṇ	1529	terms for goat/sheep grazing	1799 1798 69a	shepherd	
A-22	 MD, 1931-37	6-7	a man with a comb	kīriyaṉ	1352	forms of comb comb-cippu to shave-kiri comb-cikkam	 1341 1305 2059	scribe	
A-23	 HR, 1940-241	?	a man holding fire (a brand?)	ni(r)yaṉ	2389	Note DED 1794: kol kolli 1773-killaṉ-smith?		fire-maker?	see DED 2384 DED 2390; also A-23
	30221 0/8/T	Possehl & Raval: Harappan Civilization and Rojdi, 1989 Plate II: Irani(r); pn.?							
A-24	 MD, 1937-203	6-7	a man with a recording stick or marked stick	koḷagaṉ	1517			record keeper (one who records by length, depth, amount)	
A-25	 HR, 1940-498	?	a man with two marked sticks	irakoḷagaṉ		(?) double an honorific		see A-24	see A-17 and A-11
A-26	 Mahadevan 1977-187	?	a man with a stalk of grain	nelaṉ nil(r)aṉ				farmer (of grain?) one who keeps order (in farming?)	see E-2 E-3

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
A-27	MD, 1931-289	?	a man with an animal haunch	?				?	only one example is known
A-28	HR, 1940-372	none	a kneeling figure holding a container and a marked stick	moṛa-kāl moṛa	4093			cubit (one?)	amount of quantity, depth & length
A-29	MD, 1937, XC-23	none	a kneeling figure holding a container	moṛa-kāl moṛa	4093			cubit	amount of quantity (depth?)
B-1	MD, 1931-338	6	a chicken (hen)	kor	1768 0/8/0				 rooster? MD, 1931-207
B-2	MD, 1931-342	6	peacock	cuc cubba cowe malto Kurukh	 2203 2/0/0		see 3469 3439 3449	pīli-tail pilli-sorcery, magic pil̤le-child	
B-3	MD, 1931-172	6	peacock (with plume) (male)	cuc see B-2	2203			see 7 Peacock Headresses of MD, 1937-430, etc.	see Sy-67
B-4	MD, 1937-365	?	peacock (spreading wings)	cuc see B-2	2203			see B-2, B-3	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
B-5	MD, 1931-93	?	duck (in pond)	tārā	2588 0/0/2	tāra	2587 0/0/3	a token of an unknown but certain value	
B-6	MD, 1931-83	12-13	the head of a shrieking or calling bird	kūc	1551 0/8/7				
B-7	MD, 1937-527	?	a dog jackel	nāy nari	3022; 0/8/T 298/; 1?/3/7				
B-8	Kramrisch 1965—Fig. d		a fish	bāḷe	4408 0/1/4 (764) (4316)	bāḷvē	4402	prosperity	
C-1	MD, 1931-370	7	a prawn (shrimp)	irā ica (Malto) ere (Ka)	440 1/3/2	irai irugh (Br.) ere (Ka.)	415 1/0/5 448	food master	(?) irei-ere --- (?)
C-2	MD, 1931-276	?	an insect	ī (?)	453 1/6/5		see 351		(?) used as demonstrative when initial in text
C-3	MD, 1931-182	?	an insect (ant ?)	ī (?) īcal	453 457				

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Hom ɔphone	DED No.	Meaning	Comment
C-4a	 MD, 1937-422	?	bee (?)	pira	3614	piracam		meaning in combination honey	note shape of body, see L-3
C-4b	" " MD, 1937-422	?	flying fish (?)	kōlā	1856	kola (in various forms)	1855	beauty, dance	
D-1	MD, 1931-335 186	10	a leg (of a man)	kāl	1238 13/6/5			lineage (?)	terminal syllable in astronomical & lineage etyma
D-2a	 MD, 1931-410	?	two legs and body (of a man)	irukāl				combined sign a proper name (?) doubtful reading	see I-16, differs; see D-2b
D-2b	 MD, 1931-410	?	a body [(?) plow]	mēd, mēn mēṭi, mēṇi	4185 4183				note Tulu n ←→ ṇ
D-3	 MD, 1931-194	?	an insect leg	ī-kāl				see C2, C3	
D-4	 MD, 1937-152	7 (?)	animal haunch or leg	khosqa kuraCv	1527 1/8/4	kuravaṇ ? with 	1530	a mountain tribe	see A-27
D-5	 MD, 1937-79	7	a tusk (?) (rhinoceros horn)	kam, kom	1759 0/4/8	kōṭu, kōr (Ka.) kōḍu (Tu. & Ka.) kōḍe (Te.)	1824 1823	horn bull	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
D-6		affix only	cattle horns	marg	3864 3/0/1	see A-4	(horns do not occur independently)		
D-7	 MD, 1931-118	?	wing or feather	cir̄ai (Ta.) er̄ake (Ka.)	2133 0/4/7	cir̄a (Ta.) ere (Ka.)	2131 438	illustrious master	to be differentiated from L-9
E-1	 Mahadevan, 1977-7028	?	tree (?) *Acacia arabica*	mara man (n) cāli	3856 2/8/8 2041 0/0/2	see: kāli (Ta. Ma.)	1243	cow	associated with cow-anthropomorph
E-2	 MD, 1937-8 MD, 1937-215	6, 7, 9	stalk of grain	nel(a)	3112 0/0/6	nila-nela also: nira	3113 0/8/5 3042 0/0/4	lunar month order, line, row	
E-3	 MD, 1937-127 (see E2)	6, 7, 9 12, 13	stalk of grain (abbreviated form)	nel(a)	3112	nila-nela	3113	lunar month	see E-2
E-4	 MD, 1937-597	12	cotton plant (?) a plant	parti pū	3280 0/3/5 3564 2/8/8	as a formative of roots			see Q-7, Q-8

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
E-5		affix	bud (or bole) of cotton plant	parti	3280	this does not occur independently but is affixed Note Q-7 as ār-371 DEDR, i.r. ara-cloth 318?			see E-4 see J-2, Q-7
E-6a	 MD, 1937-461	6-7	pipal leaf	araC	168 0/1/5	ara	167	head or high superior as in Chief or God, (not) royal in Harappan sense)	
E-6b	 MD, 1937-435	6-7	pipal leaf	araC	(presumed to be a variant of E-6a)				 (?) variant E-6b
E-6c	 MD, 1937-232	6-7	pipal affixed form of E-6a	araC see E-6a					(see P-7) affix probably marks the dative case
F-1	 MD, 1937 CXIII-54	12, 14	sun day	pǎC (pāṭu) pŏdu, poddu pagal	3724 0/4/8 3151 (day) 1/4/6	paṭu	3190 ((?) 3191 (note 2371	to set forms of action to rise, do, obtain, etc.) (Malto) niṛu)	(see F-3, F-4)
F-2	 MD, 1937-531	11	full moon	tiṅ(gal) 0/1/7	2626	tittu 2633 mound tinnai 2639 hillocks tippai 2641 platform (as adjectival form tin 2634 strong, ? but to mass, gather) (as a verb tin (tin) 2670a to feed, eat)			

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
F-3	MD, 1931-467	9	sun affixed by grain sign (E-2)	paṭu-nel(r)	3190			setting sun west (see F-4)	this is a rare sign not to be confused with F-5
F-4	MD, 1937-123	9	sun affixed by abbreviated grain sign E-2	paṭu-nel(r)	2190			setting sun west	see sun-niru note F-1
F-5	MD, 1937-23	9	sun affixed by fire affix (see F. 13)	paṭu-vĕ	3191			rising sun dawn east	see F-3 differs, F-5 has short, even prongs
F-6	MD, 1931-29	11	sun on the horizon	paṭu-kal	3151 0/3/8	paṭṭa-ppakal	3198	dawn or day sun as a lineage	
F-7	MD, 1937 PL. CXLIII-54	6-7	crescent moon	pīrai (Ta.)	3622 0/3/8	pĕr	3613 4/9/8	great, night (calendar)	see A-16 bow or shield differs; see 0-18 as number
F-8	MD, 1937-74	11	star (a full cross with ends closed)	suk(k)V cukke	2175 0/7/3			star (as lineage)	
F-9	MD, 1937-349	4	a cross or hook	gāḷa	1254 0/1/3	gāḷ kāl	1258 0/4/4 1240 0/0/5	wind	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
F-10	 HR, 1940-693	?	rain (carrying pole rain as 9-toḷ	kāntoḷ mĕtoḷ	4173	kontal if is sky	1730	rain	but tal-head? see P-4, (2529)
F-11	 HE, Mahadevan 1977-821	6-7 etc.	rain	paṉi(r)	3322 2/9/7	see: 0-16, N-2 pan-12 + nir-water	3236 3057		note: 
F-12	MD, 1937-262	?	cover, roof	muccu (?)	4025			covered bazaar with 	see G-6
F-13		?	fire (only as affix ?)	vĕ	4540 2/8/8			fire	see F-14, also see A-23
F-14	 MD, 1937-588	4, 6	affix F-13 to I-11 tongs + fire	kăruvĕ		see I-11		storm (black + fire)	karu—monsoon see Q-10
F-15	MD, 1931-135	?	small version of F-1	pŏtu poddu	3724	poddu pudu (Ka.)	3709 3684	be associated with partnership (? always with animals)	
F-16	MD, 1937-455	various	two crescent moons back to back-dark period	mă ? iruḷ (Ka.)	3918 2120			night, winter? dark period in the lunar month	
F-17		various	two crescent moons facing one another	eṛi-el	732 707	used in bracketing but each part read separately as with Q-1 vila for H-3; peru for F-7		day, light—summer, spring (see 2176 for B-2, B-3; also see 0-10, 0-11)	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
G-1	MD, 1937-120	etc.	(on a platform)	aṭṭa	0/3/5 83	[maccu (Ku.)]	3782	platform (upper room upper story)	
G-2	HR, 1940-583	10 ?	structure house (? variant of G-1)	māḍa	3930a				
G-3	MD, 1937-530	?	platform or building with fire			(kāve)		? watchfier)	
G-4	MD, Mahadevan 1977-3217	11	platform or building with grain	nel-māḍa				granary	
G-5	MD, 1937-103	?	gate or doorway to a house	bāk-il	4386 0/4/6				
G-6	HR, 1940-262 MD, 1931-342 	6	space between two poles	aṅkaṇa	30 0/0/4	aṅgaḍi	37	bazaar (?) courtyard (as different from G-7)	see Mahadevan 1977-447, p. 449
G-7	HR, 1940-678	6	G-6 combined with bow or plough sign (but see DEDR App. 44)	vilaṅkaṇa		see G-6		bazaar	possible confusion with I-12

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
G-8			large open square or enclosure	mane manru	3911 0/0/7 3913 0/0/6	basis for graphemes G-9–G-15 (does not appear in this form independently in the script) But see page 53-54. This eqn and its compounds as weights			confusion with K-14 small square
G-9	 MD, 1931-40	7	enclosure with pillar or pole	tūn· (but see DEDR APP44)	2780 2780 DEDS	*toḷ-*toṇ toṟu	2912 (see D-15, 6-10)	number 9 cow(s)	see: N-10, 0-15 see Zvelebil 1977 pp. 35-36
G-10	 MD, 1931-201	7	enclosure with two pillars or poles	toṟu toṇṭu	2905	toṭṭi	2905 2869	cowpen or fold	also 3526 DEDR to?tu
Excursus G-9, G-10	A recent paper by Mahadevan, 1983, "The Cult Object on Unicorn Seals: A Sacred Filter?" given at 31st Intern. Congress of Human Sciences, Tokyo, makes us consider these signs as scoops or cups donne (Ka.) 2913 tōṇṭu 2927 to dig In seal context this seems doubtful.								
G-11*	 MD, 1931-2, 421	6, 7	enclosure with four marks	mani(e) mani nāl(u) (possibly) Maṉṉinaḷu	3911 see G-8	mane see G-12	3911	enclosure see G-8 These signs G-11–G-15 pair with (J-5 or its equivalent) suggesting proper names for which the enclosed diacriticals are suffixed.	
G-12	 MD, 1931-38	6, 7	enclosure with six diacritical marks	maṇi(y)ār maṇiya (Ka.) Maṉicăru (?) six caru	3825	see G-8 for alternative meaning as weight		Note terms for superintendance A prestigious title in Harappan? Probably drops "c" when used as suffix.	

* For variants of signs G-11 to G-15 see page 100

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
G-13	 HR, 1940-40	6, 7	enclosure with eight diacritical marks	Mani(y)eṭṭu Mani(y)eṇe		see G-8		A proper name (see G-11, G-12)	
G-14	 MD, 1931-337	6, 7	enclosure with ten diacritical marks	Manipela		see G-8		A proper name (see G-11, G-12)	
G-15	 Mahadevan 1977 pg. 789-244	6, 7	enclosure with four verticals two horizontals & the bow sign	Manivilār		see G-8		A proper name (see G-11, G-12)	
G-16	 MD, 1937-350	6, 7	enclosure divided into compartments	kŭṭi	1379 1/6/8	kūṭu	1502	collect, store storehouse or work area	usually double irukūṭi
G-17	 MD, 1937-50	6, 7	enclosure divided into compartments	kŭṭi	1379 1/6/8	(variant of G-16 ?) house			
			See house types at Mohenjo-daro, MD, 1937 Pl. XIII–DK Area C-29; XVI–DK Area G-4; and XVII–DK Area 4, etc.						
G-18a	 MD, 1937-94	6	enclosure, square with 4 equal compartments marked	kuṭi(y)ār mani(y)ār	1379 3911	This is presumed to be a pluralized form here, perhaps meaning many store rooms (see G-11)			

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
G-18b	 MD, 1937-409	6	enclosure diamond-shaped	ūrār ? see N-4		possible variant of G-18a			
G-19	 MD, 1931-18	6, 12	a fence of poles	bēli	4556	bel Note: velton (Ta)	4561 4561	marriage (offerings) husband	paired with G-9 variant ton
G-20	 HR, 1940-91	6, 12	a stockade	kāval (note) I-16 kavar	1192 1113	(Note) bara (Tu) barabu ka + bara kā < ka	4301	boundary stockade	
G-21	 MD, 1931-322	6	three conical structures	muṛyāl	4001	(Note) mucar muka muṛy	4015 4001 4030	dairy, storage liquid measure, buttermilk, dairy or other storage, top of conical dairy	
G-22	 MD, 1937-341	7	stairway or stairs	meṭṭu meṭṭige	4150	meṭṭu	4151	heap, accumulation of a commodity	
G-23	 U. Franke paper Aarhus, 1985, Pl.1 Mohenjo-daro	?		(Note: Is this a short version of G-20 or I-20?, i.e. bēli ?)					
H-1	 MD, 1937-466	6	bow and arrow	vil-ambu	4449 150			also ambila-rice? ambal grain DEDR 174	possibly syllabized as vil, as in villan; see A-15 vellan

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
H-2	MD, 1937-148	6 ?	bow	vil	4449 1/7/8	vil	4448	sell, price, trade	
H-3	MD, 1937-381	?	bow without string, shield (A-16b)	vil	4449 1/7/8	vil	4448	sell, price, trade (can be confused with F-7 but this is reversed. However the signs must be taken in context.)	
H-4	MD, 1937-121	?	arrow	am(b)(u)	150 0/5/8	am ăm ăm	158, 158S 151	nominative case ending? water in calendric ref.? calendar designation?	
H-5	MD, 1931-19	5	a point or spear	ār	314 0/0/2	ār (Ka.)	349	be powerful	3rd person singular suffix, honorific
H-6	MD, 1937-216	6	axe blade (Note) blade	maṟu ? masu (Malto) alagu (Ka.)	3889 201	maḍu (Tulu) alaku (Ta.)	3889 202	 number	
H-7	MD, 1931-209	?	(Possibly ?) mace head, club, cudgel	baḍu	4272			(Possibly ?) pestle in reverse, see A-19; floral bud, see E-5	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
H-8	see A-13	?	(Possibly ?) staff, rod, spear	daṇḍi daḍi	2459	daṇḍi	2449	eminence	confusion with 0-1 suggests these meanings viable only in A-13
H-9	MD, 1931-5	6	a shield	aḍana	73			It is possible that this sign is an elaboration of H-3, thus the anthropomorph.	
H-10	MD, 1931-43	?	a shield	aḍana	73			Possibly not a variant of H-9 but there are too few examples to confirm this. A-16b may be shield bearer, warrior	
I-1	MD, 1937-532	7	part of pincers adze, hoe (?) drumstick (see M-2, Q-10)	kāru karu	1232 (Note)	karu kār̄ kari karuri	1175 1073c 1073c 1084	black darkness black (Tu.) rain tool	see I-11
I-2	MD, 1931-13	7	hook	kon koṭu	 1709a	kūṭu koṭu	1562 1708	to collect to give	(as with food) see C-1 iṟakoṭu-to give food
I-3	MD, 1937-166	7	sickle	koy	1763			to reap, or reaping (in context)	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
I-4	 MD, 1937-400	7	ploughshare	kuṟu (Ka.) also uṟ	1785 688	kuṟi	1511	dig(plough)	combine with ir̄ (461) drag plough
I-5		6, 7	I-4 combined with L-9	kuṟu-kī	Note: I-4 ru(u)-to plough 688 I-9 v̄r-to comb 5357 DEDR vāra-land share 5359 DEDR			to cut, as in writing, therefore "to write"? more than three strokes occur in some examples	
I-6	 MD, 1937-524	6, 7	mortar and pestle	nūṟu (to grind)	3089	nūṟu	3090	hundred a term used to mean many or innumerable	
I-7			pestle-does not occur as an independent sign, but see I-6, A-19, E-4, H-7.						
I-8	 MD, 1937-65	6	a crucible	kōve	1509	cembu	2282	as a commodity, i.e., copper	
I-9	MD, 1937-406	6 12	winnowing fan	tāṟi	2611	tāli	2594	the seal-tablet as tāli marriage token	
I-10	MD, 1937-430, MD, 1937-648	4	a winnowing tray	āyā-āy (Ka.)	306	āya (Tu.) aya (Ka.) āy-tāyi āy (Note) aiya	163 311 308 306 780	master measure (mother) father wise, judge "The Wise" exclamation, honorific ending for elders in 3rd person	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
I-11	MD, 1937-122	4, 7	tongs	koṟaḍu kuṟaḍu	1529	koṟ-aḍu	1798 1799 69a	shepherd, herder, sheep with A-12 to plough  ? better herd(s) and ploughed (fields)	
			tongs (short form)			gōru	1847	gather, draw in	
		6, 7	tongs	kāru	1232	mēti(?) kaṟu kār kaṟ	plough tail 5079 DEDR 1175 1073b 1253	storm, black, rain rainy season rain	
			see A-21, Q-10, Q-14			(with) kār-(u)gal—monsoon			
						kare, kara	1088	social division, parish Harappan clan	
				kūṭu kuṟa	1562 1513	(verbal form-to collect, assemble, see I-2)			
I-12	MD, 1931-325	13	plough	uṟu (uṛ)	592			to plough ploughing ploughed	see G-7 for a missidentification (Mahadevan, 1977, p. 449
I-13	MD, 1931-51	6	plough plough tail (?)	uṟu(uṛ) mēti	592 5079 DEDR mēda - chief 5091 mēda - basketmaker 5092 DEDR			see I-12	a short form of I-12 ?
I-14	Chanhu daro Pl. LII-1	?	wind pole	gāḷatūṇ combined form				see G-9 and F-9, but only a few doubtful examples are known	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
I-15	MD, 1937-190	?	wind pole with conical weight affix	gāḷa(ṭṭ)ūga				an affixed form of I-14 see A-11, K-6. Does tūga contract with tūṇ? "suspended weight wind pole" windmill (?)	
I-16	MD, 1937-75	?	forked pole	kavar	1113	kavar	1114	to seize	
I-17	MD, 1931-176	7, 12	harrow	pal palu	3228	pal	3289 3236	many, the number 10	see: Zvelebil 1977, p. 36
I-18	see A-10	?	carrying pole (?) (?) woof (in weaving)	kā acci ūṭu (see Q-4)	1193 45 634	see A-10 ajje ūṭu	 46 633	does not occur independently, confined to A-10? see Q-4 inside, middle—as affix	
I-19	MD, 1937-274	?	sky (a form of I-20 ?)	mĕ̆(1)v	4173	see A-6		excellence superior does not occur independently as affix only	
I-20			carrying pole with attached cords in nooses	kāvaḍi	1193	see A-7		does not occur independently see A-7 and A-6	
J-1	MD, 1947-208	12	container (pot, basket ?) used to measure quantity	aḷa bāne	252 3394	bān	4362	container—quantity pottery see A-18	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
J-2	MD, 1931-22	6	quantity of cotton (?)	partiyaḷa aḷa-parti (?)					
J-3	HR, 1940-439	6 ?	quantity of woven cloth spun thread (?)	piri-aḷa nūlaḷa					see: J-1, L-6, L-5
J-4	MD, 1931-60	6	quantity of grain	ner-aḷa					see: E-3, J-1
J-5	MD, 1931-24 MD, 1931-40	5	pot with handles	āṇ/aṉ				3rd person singular honorific (ending)	
J-6	MD, 1931-182	9, 12, 13	pot J-5 with affix see P-1	aṇ-ă	96			up, upper up river north (in context)	
J-7	MD, 1937-125	various	quantity of metal (?)	cemb-aḷa (see A-20, J-1)				most examples of this sign on copper tablets—probably as tokens for storage records	
J-8	MD, 1931-121	6, 7	oil lamp oil (sesame)	nē/ney	3104 2/7/8	ney	3103 0/4/8	to weave, weaving	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
J-9	MD, 1931-49	6	container J-1 I-16 affixed	ka(v)aḷ		controller "seizer of," modifies what precedes it in the text compound—place where commodities are gathered?			
K-1	MD, 1937-360	6, 7	carpenter's (?) square or rule	maṭṭa, maṭa mata (Ka.) maḍu (Ka.)	3811 3811 0/0/6 3808	 maṭu		measure (linear) to unite, join	pairing indicates meaning to measure in bricklaying, woodwork, etc.
K-2	MD, 1937-157	6, 7	measuring rule	maṭṭa	3811 0/0/6			measure-pairing indicates (linear) measure for cloth	
K-3	MD, 1937-297	6	measuring stick	kōl	1852	kōl	1854	see A-13, H-8 length—of stick in measurement (?)	
K-4	HR, 1940-344	?	measuring stick for depth capacity	koḷaga	1517	kōl goy (Malt.)	1843	measure of capacity measure	
K-5	MD, 1931-219	?	measuring stick for depth capacity						a variant of K-4
K-6a	MD, 1937-449	6, 7, 12, 14	a heap or pile "fullness abundance"	nera nira	3049	nel	3112	(heap of) grain	see E-2, E-3
K-6b	MD, 1931-367	?	suspended conical weight	tūga tūka	2777a	see A-11			"sky high" heap see I-19

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
K-7	 HR, 1940-315	12		tūnku tūgu (Ka.)	2777a	*toḷ, *tuṇ	see 0-14 0-15	ninth month	regularly pairs with E-2
K-8	 MD, 1931-182	12 ?	K-6a variant (?)						regularly pairs with J-6
K-9	 MD, 1937-171	11	weighing scales	takkaḍi	2437			to weigh, or as substantive	
K-10	 MD, 1937, XC-15	?	weighing scales	takkaḍi	2437	takkar	2435	worthy	also see K-9
K-11	 MD, 1937-405	?	scale pans of weighing scale	tūnku tūgu	2777a			weight, as a substantive paired with number signs	
K-12	 MD, 1931-461	?	one-half (?)	are	192				see: I-10
K-13	HR, 1940-296	?	two-quarters (?)	ĭruvara	4301				see : I-10
K-14	 MD, 1937-664	?	one-quarter	vara	4301				see : I-10

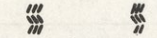
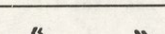
* Proto-Dravidian

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
K-15	MD, 1937-295	?	fingernail mark	okka or(o)	783 479	okka or(u)	834a,b	number unit for metal (found on metal objects in multiple groups)	
K-16	MD, 1937-91	6	a division of four units, or two units (?)	paku	3154	See: payal pāyu, pāti pāl pari paṟi	 3247 3364 3371 3267 3317	share division	see ∨ in P-3 diacritical mark
K-17	MD, 1931-214	4, 6, 7, 13, 14	spiral curl (also) *assemble	sura(a)ḷi kuruḷ (Tu.) guṇḍu (Ka.)	2211 1494 1513	kuṟu kuṟu gaṇḍa	1513 1511 986	assemble curl brave	
L-1	 MD, 1931-58	6, 7	cloth sewn, or prepared	javaḷi	1979				
L-2	 MD, 1931-89	6, 7	cloth (in general)	guḍḍe	1401	guḍḍe	1402	heap, pile, large quantity	
L-3			loop or twist (in weaving)	piri	3436			this sign not attested as independent grapheme; regular affix: see L-6, L-7	

* Proto-Dravidian?

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
L-4	MD, 1931-135	?	twist or loop with infilling	piri		see L-3			is affixed with P-4
			sew (?) stitching across the loop	pol	3720	poli	3716	increase, abundance, crops	
L-5	 MD, 1931-451 MD, 1931-6	6, 7	twist or loop on pole	nūl	3087	see J-3		yarn, thread	note are these identical
L-6			see J-3 and L-5						
L-7	 HR, 1940-24	11	a loom with twists	magga	3775	maga makkal	3768	son children	 see L-3 simple variant
L-8	 MD, 1931-4	?	basket, matting or net weave (always doubled)	val iṟavāḷar iṟava (?) eṟava	442	val vaḷ (Ta.) vari (Ta.)	4326 4341 4357	net lash bind, tie	maker of baskets?
L-9	 MD, 1931-46	4, 5, 6	comb	cīppu cikkam	1341 2059	kiri kīṟu	1305 1352	write "this mark" scratch kī-dative of person (?) as terminal in texts "belongs to"	see A-22
				sīr-īr	2158	sīre	2161	women's cloth	
L-10	 MD, 1931-252	2, 5, 6, 11	beads	malaku	3873	mallaru	3870	chief, important, great	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
L-11	HR, 1940-630	2, 6	beads on string necklace	māle	3954	male malya	3870	great, superior	
L-12	MD, 1931-67	11, 12	a bead, or bead on a necklace	tāli/taḷi	2594			special bead worn by married women	
L-13	MD, 1937-281	11	bangle bracelet	vaḷe/baḷe	4348	vaḷ vāḷ	4340 4406	beauty splendor (?)	
M-1	MD, 1931-46	6	lute or lyre	pāṇ	3351			song, music	
M-2	MD, 1937-120	6	a rare form drum M-3 measure (?)	paṟai	3319				see M-3
M-3	MD, 1937-473	6	drum	paṟai	3319	para paradu	3255 3318	communicate trade	
M-4	MD, 1931-129	3, 6, 13, 14	a triple drum	muracu	4076 4092	muṟā ?	4092 4095	all, whole	
N-1	MD, 1937-288	6, 13	mountain (s)	kuṟ	1530 0/0/7				universal sign

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
N-2	 HR, 1940-563	6, 7	river, stream	nīr/īr	3057 1/4/8			water	see F-10, F-11
N-3			river, stream	nīr/īr	1/4/8	this motif occurs in painted pottery in pre-Harappan sites of the borderlands			
N-4	 MD, 1937-86	3, 12	place	ūr (note: mane)	643 1/2/8 3911			see N-5, N-6 used as classifier for kinds of settlement	
N-5	 MD, 1937-177	11	settlement (village or town)	pāl-ūr pari-ūr (diacritical P-3 may be unpronounced classifier)		paḷḷi	3309		
N-6a	 HR, 1931-387	6, 12	settlement (urban)	tiṇ-ūr tiṇpali-ūr (?)	tiṇ (F-2)	2639 2633		a proper name for an urban settlement, eminance elevation	
N-6b	 MD, 1937-289	6, 7, 9, 11, 12	settlement (urban?)	nālupali(y)ūr		(see N-5, N-6a)		settlement, town	
N-7	 MD, 1931-19	11	open area (assembly area)	paḍu(y)il (this sign is distinctly rounded, see N-11	see F-1	podu(y)il		see P-2 the locative which occurs regularly with this sign	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
N-8	 MD, 1931-12	6	irrigation sluice	kālive kālu-vār kālu-vay	1239 4387				
N-9	 MD, 1937-582	6, 7	sun (see F-1)	paṭ-ă (with genitive possessive diacritical mark)		pata-pata	3175 3391	when sign is doubled it means boat(s)	
N-10		11	sign for place (?)	tuṟe	2773			can be confused with G-9	
N-11	 MD, 1931-400	various	seal imprint sealing to seal	pati ottu (Ka.) ottuni (Tu.) (this sign is distinctly slender, oval shaped)	3232 859	pottu (Ka.)		see F-1 to F-5 also N-7, N-5 sun (?)	
O-1	MD, 1931-287	various	number 1 (as adjectival form)	*oru/ōr	834			first, one also ok(k)-? 834b.	see A-13, K-3
O-2	HR, 1940-459	various	number 2 (as adjectival form)	*iru/īr	401	iru ir	407 461	prefix in proper names second two as place, seat (prefixed) to pull, draw (as in ploughing)	

* Proto-Dravidian

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
O-3	 HR, 1940-353	various	number 3 (as adjectival form)	*mu(n)/mū	4147	mun	4119a	foremost	
O-4	 HR, 1940-516	various	number 4 (as adjectival form)	*nāl	3024	nal	2986	good	
							3656	DEDR naḷ-day, time?	
O-5	MD, 1937-567	various	number 4 (another form of O-4?)						
O-6	 MD, 1937-215	various	number 5 (as adjectival form)	*cayN	2318	say, sey, cey (Ka.)	2265	honest; 2747 DEDR accuracy	
				cay		ay	306	to collect, choose, select	
O-7	 MD, 1931-157	various	number 5 (another form of O-6?)						
O-8	 MD, 1931-66	various	number 6 (as adjectival form)	*caṟu/cāṟ	2051	carakku	1944	merchandise	
						cal/sal	2038	continuous or straight furrow	
				(Comment: when suffixed as in G-12 the first consonant may have been dropped)					

* Proto-Dravidian

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
O-9	MD, 1931-243	various	number 6 (another form of O-8?)						
O-10	 MD, 1931-123	various	number 7 (as adjectival form)		772	eṟu, eṭu ēṟu	723 776	raise, build to raise	
O-11	 MD, 1931-25	various	number 7 (another form of O-10?)	in brackets as eri				bright, light, day	see F-16, F-17
O-12	 MD, 1931-71	various 7 (?)	number 8 (as adjectival form)	eṭṭu/eṇ	670	eṇ eṇe	678 387	count, number pair, couple	
O-13	 MD, 1931-257	various	number 8	*eṇ	670	eṇe	387	see O-12	
O-14	 HR, 1940-47	various	number 9 (as adjectival form)	*toḷ/toṇ					

* Proto-Dravidian

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
O-15	MD, 1931-539	various	number 9	*toḷ/toṇ		tontu DEDR 3526 cattle pound tol DEDR 3528 aperature tuṉ DEDR 3399 wall, pit tontu DEDR 3549 hollow			see G-9, N-10
O-16	 HR, 1940-821	various	number 10 (as adjectival form)	*pat(tu)/pan	3236				see F-11
O-17	 MD, 1931-176	various	harrow number 10	pal pal	3288	pala palV and panC	3289	many	see I-17
O-18	 MD, 1937-925	various	finger-nail marking	ŏr-okku	479 783	ŏru-okka	834a,b	one	perhaps a special term used for metal and pottery marking
P-1	MD, 1931-159	various	genitive possessive affix	*ă (also as syllabizer see N-9)				this also occurs as an independent sign terminating a text or phrase— see MD, 1931-30; MD, 1931-67	
P-2	MD, 1931-10	10	locative case	*il (ir/i)		also as the prefix il-house DEDR 494;		this has a regular pairing with F-2, N-5, E-5 N-6, N-7 but is not confined to this group	
P-3	MD, 1931-32	various	an affix (quarter)	păC pāl	 3371			this has a sense of division, part of a place, but also share or part (see N-5, N-6 and K-16)	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
P-4	MD, 1937-119	various	head an affix; an independent sign also;	tal(V)	2529 0/9/7 Note			see F-10, I-9, E-5 head, superior, top, etc. as in talpir–head chief	
P-5	MD, 1931-46	4	comb the dative (a terminal sign)	kī key				this should be translated as "his (her) mark," i.e., "belonging to" see L-9	
P-6	MD, 1937-157 HR, 1940-16	various	4 strokes the plural	-ār (possibly, but see Zvelebil 1977, p. 15)				this is an affixing technique to mark the plural	
P-7	HD, 1931-400	various	animal ear an affix the dative case	ke(v), ki(v)	1645	(affix example)		the dative in the sense of belonging to (?)	
P-8	MD, 1931-122	various	affix for channels a pluralizer	kāl/kāḷ	1239			a variant–kāl(1?)	
P-9	MD, 1931-535	various	ornamental dots drops this brackets a number of signs, particularly G-9, Q-1, etc.	kaṟy	1173 1166	kaṟe, kaṟi		ornamental dots milk, tribute (of milk cattle) flow (as with water)	
P-10	MD, 1931-214	various	suffix for substantives of person-plural	ōr	also okka? see 0-1;				talōr (HR, 1940-328) see A-13

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
P-11		various	2 strokes affix to syllabize or designate meaning	-ĭr					see Q-1
P-12			arrow	ambu	151	am(m)	158, 158S	water	this is used as a calendrical affix for the kharif season attached to O-13, O-17 and with P-1 (First Month?); also see A-15 as month name
						(also nominative case ending)			
P-13		various	combination of P-2 and P-10	il-ă		il	420	a proper name house	
P-14			prefix to I-4					see O-2	
P-15		10	leg sign D-1 with affix inflection see P-1	kāl-ă gal-ă	1238			lineage (?) or "group of" see F-2, I-11, N-7, A-1	
Q-1	MD, 1931-19	8	the twist L-3 affixed by P-11	pir/pir-ir	3436	per	3613	great man, lord, etc. i.e., chief	see L-7, L-3, L-4

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
Q-2	MD, 1931-362	8	Q-1 with genitive affix P-1	pir-ă				of the chief	
Q-3	MD, 1931-75	8	Q-1 with H-4 or P-12	piram(b)(u)	possibly twister DEDR 4177 twining			nominative case for chief? (an epigraphic question)	
Q-4	MD, 1931-3	8	Q-1 with I-18b or I-18c woof in warp	acci-pir	45	ajje	46	elders (chief)	but also pirokka with K-15, i.e. breeder
Q-5	MD, 1931-88	8	Q-1 with horn affix (see A-4) the cattle horns	maru-pir mara(gh)pir	3864	mardu maruru marasu masagu marcu	[note two possibilities (a) and (b)] 3865 3866 3866 3835 3865	physician madness rage be agitated to tame	(a) shaman, priest shamanistic elements (b) tamer of cattle maru-pir
Q-6	MD, 1931-16	8	Q-1 with P-4	talpir				head or high chief	
Q-7	MD, 1937-379	6, 7	E-5 combined with P-4	parC tal (?)		see E-5		cotton, as a crop possibly ara-cloth	
Q-8	MD, 1937-181	6, 7	E-5 combined with P-4 and pluralizer P-6	partalār				cotton, crops, cotton in general	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
Q-9	 MD, 1937-475	11	half of E-6 combined with H-4	ambara ampara ambala	145			court, open area by a "temple" or "temple" grounds	
Q-10	MD, 1937-231	9	F-1 combined with I-11	paṭu-kāṟ(u)				monsoon, southwest	
Q-11	 MD, 1937-168	9	L-9 turned to horizontal with affix P-1	kiṟ-a	1348			of below, downriver, south	
Q-12	MD, 1937-154	6, 7	Q-11 doubled stylistically	irukiṟ(ā)				a proper name (?)	Irukiṟā
Q-13	 MD, 1937-134	?	a man between two posts A-1 and G-6	aṅgaḍi(y)āḷ				bazaar man, merchant	
Q-14	MD, 1937-420	?	combination of I-11 and K-1	karumāṭa mōḍē	1082 3811	karamata mōḍe (Tu.)	1088 3933	united clans great buffalo (?)	
Q-15	 MD, 1931-206	12, 13	combination of J-1 and P-2	ilaḷ iraḷ				a quantity, i.e., how many	

Sign No.	Sign Type Seal	Column Place	Identification	Dravidian Equivalent	DED No.	Homophone	DED No.	Meaning	Comment
Q-16	MD, 1931-248	12	combination of J-1 and O-3	munaḷ				a proper name (?) foremost in quantity or a quantity	Munaḷ
Q-17	MD, 1937-420	various	combination of J-5 and P-2	aṇ-il				high place a proper name (?)	Aṇil
Q-18	MD, 1931-16	various	combination of J-5 and O-3	aṇ-mŭ(n)				high, foremost (a superlative)	often confused with munamb-an ?  foremost amb-an
R-1	 Chanhu-daro-13	?	doubled slanted lines	vara	4390	vara	4355	drought	not to be confused with  or the angle differs

APPENDIX B

The Main Motifs: Polity and Social Organization (See Charts VII-X in Appendix D; also see Sy motifs in Appendix C;)

One of the most frustrating aspects of the study of the Harappan civilization is the rarity in the archaeological corpus, of objects which literally depict the way of life—the beliefs, statuses, and functions—which are so graphically illustrated by actual depictions in other earlier or contemporary ancient civilizations elsewhere. Even the seal tablets tell us little by means of illustration. But there is a group of bars or three-sided prismatic clay objects which provide us with some information; however, many within this very limited group are so worn that we are often led to speculation rather than certitude in understanding what is depicted. Nevertheless these, together with the seal tablets and some sealings, do provide us with valuable insights. The fact that so many of the themes and motifs are repetitious to a degree, is reasonable evidence that our sampling, for all its limitations, does represent a significant statement of areas of Harappan life.

A study of the economic aspect of the Harappans reveals that cattle were of considerable importance. So much so, in fact, that the number of animals involved must have far exceeded the number necessary to maintain the proper intake of dairy and butchered products. We are also aware that the Harappans cultivated the rabi crops, wheat and barley, as staples and in addition the kharif crop of cotton, and also maintained gardens of peas, beans, etc. Clearly, any growth in size of cattle herds would imperil the areas under cultivation, particularly in the rabi season when herds in the western part of the subcontinent locate in the alluvial lands where grazing is viable. Some balance has to be found. Such a balance is especially significant when cattle are counted as wealth, as seems to be the case with the Harappans.[111] Since the best grazing land and the best cultivable land in alluvial areas are essentially the same, traditional customs throughout the world govern the rights of farmers and herders in such cases, ctherwise conflict between the two would endanger the cohesiveness of a society. An overall review of the archaeological evidence for Harappan life in tandem with a study of their script, evidences that it was those same customs which were critical to the character of the Harappan culture.

This conclusion must be qualified, however, for what is involved concerns not only the different economic emphases but the relationship of each to particular lands and their ecologies. There is also the more important fact that the economic systems of any society are intricately interwoven with all the other systems of that society, whether political, ideological or social.

Since we are working with graphemic symbolism, categorizations and their

interpretation are made by reference to those symbols and to the assumptions one might reasonably make from them. This, of course, has to be done with due caution, considering the limitations the material evidence imposes.

There are several leitmotifs which are immediately obvious (Appendix C)*:

1. The presence of heroic human figures.
2. A female anthropomorph with bovine characteristics—hooves, horns, tail.
3. Two plant-trees with special and different associations, i.e., pipal (*Ficus religiosa*) and acacia (*Acacia arabica*);
4. A deliberate division between particular wild and/or dangerous animals: rhinoceros, elephant, tiger and water buffalo; and domestics: goat, "unicorn" bull, zebu and short-horned cattle. There is also the milk goat, but she does not appear assembled with the above animals. The "unicorn" bull is frequently painted or covered with cloth. The elephant occasionally shows decoration. The rest of the animals are depicted with no surface treatment of any kind.
5. Anthropomorphs seated on platforms are depicted with their feet touching—either crossed or with the flat of the feet in contact. The arms are widely spread and covered with bangles that touch the knees. These figures wear headdresses varying from buffalo horns to combinations of those horns or those of the milk goat or cattle, and perhaps a sprig of acacia.
6. Crowned anthropomorphs are shown standing, often under a garland of leaves.
7. Upright women with peacock feather headdresses and kneeling women with buffalo-horn headdresses.
8. A series of devices: the swastika, the endless knot or knotlike design, a low basin or manger placed in front of wild or dangerous animals, a basket-standard carried in processions.
9. The ascendant position of the crocodile over both animal groups and its intimate relationship to the sign for chief, are repeated motifs.
10. The rarity of depictions of the cobra, and the negative evidence for once common animals of the region such as black buck, lion, cheetah, turtle, monitor, mongoose, monkey, pig, etc.

Disparate as these motifs seemingly are, they nonetheless fall into a coherent pattern which, with our knowledge of the Harappan writing, provides us with a lucid, though restricted, view of ancient thought, social structure, and polity. Each motif leads to another and can be followed quite easily through a selection of seal tablets.

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* These motifs and their appurtenances are listed in the List of Symbols by category (Appendix C). Each symbol is abbreviated as Sy-1, SY-2, etc.

CHART VII*

The starting-off point is represented by two scenes on respective sides of a flat tablet. A man carrying a spear and a curved knife stands before a seated woman whose uplifted arms and turned out hands give almost a sense of welcome (1a). Her hair streams away from her head, making clear what sex is depicted. On the reverse of the tablet a woman, presumed to be the same one, gives birth to a gavial at one side of the scene (1b); at the other side two tigers face one another in the position associated with the "Gilgamesh" hero (4). These motifs can be read as representative of a hero man who can grasp two tigers by the throat, who meets a woman, not necessarily of divine birth, who bears a gavial. On another prismatic tablet the gavial is shown above, i.e., superior to, all the eight animals, wild and domestic, found on seal tablets in general (2a) (2b). As mutalai—First Chief (see Sy-24), his paramount position appears to be linked with an ancestry semi-devine and all-powerful, as his father and perhaps his mother evidence. The gavial is also associated in several examples with the twist sign pir—Chief (3b) and it also occurs solo (3a) (see Q-1). The "Gilgamesh" figure is shown wearing a tight-fitted cap of crocodile skin, the knobs of which protrude suitably (4)

The text of this birthing tablet tells us that the owner of the tablet was called Ambara—vă̄kil aṇ-ă̄ Toṇnel Kāvaḍi (y)ā̲l —"Toṇnel, Keeper of the North Gate of (the Ambara". If ambara is a temple, it may refer to the sacredness of chiefly origins (see Q-9).

The relationship of the gavial to the eight designated animals provides us with a link to the so-called "Lord of the Beasts" seal tablet in which we have an anthropomorphic figure with buffalo headdress, heavily bangled arms, seated cross-footed on a dias with goats below and a tiger, man, elephant, rhinoceros and water buffalo on either side (5). The elephant has a flap of cloth or painting on his back; since in other examples of elephants a man stands nearby, this is possibly a domestication statement. The inscription above the central figure reads Aṇ-il Piraṇ Koṟamāta Kuṭu ā̲ḷ-ă̄—Aṇil the Ruler, He (who) Gathers the Assembled clans" (see page129) Piran (great high one) Paramount Chief, is again a reference to a paramount chief whose attendent animals are subordinate to Mutalai.

Mutalai's ascendancy over the domestic animals includes the ubiquitous "unicorn" bull, the most depicted of all the animals on the seal tablets (6). This animal is intimately associated with the pipal (7). The pipal, in turn, is the tree in which, in several examples, a buffalo-horned anthropomorph stands and is "recognized" by a kneeling female, also with buffalo headdress and a long "ponytail," a milk goat with widespread laterally arranged horns, and in some cases by a procession of women wearing peacock feathers down their backs (8). Several of these women are shown as broken bodies or individual(s) tossed in the

* Numbers in parentheses refer to motifs depicted in Charts VII-IX.

air by a water buffalo (9) or, in one case, being impregnated by the gaur (10). These creatures in turn are attacked by a spearman (11)(12), whom we can relate to the "Gilgamesh" warrior (1a).

There is a kind of grim tale here, with the peaceful female followers of domestic cattle and the probable pacific qualities accredited to the pipal [shade, shelter, fecundity(?), strength, firm roots] assaulted by wild or untamable beasts. The rescue is in the hands of spear-bearing chiefs.

This theme of conflict also occurs in connection with the tiger, a beast that frequently lurks near settlements to prey on unprotected animals. The "Gilgamesh" motif in which a heroic figure grasps tigers (4) has a parallel in another small flat tablet depicting a bangled anthropomorph heroically grasping two giants who have pulled up acacia trees by the roots (13). In the same scene a kneeling female figure taunts a tiger from the limbs of an acacia; the tiger looks over his shoulder at the taunter. In more detailed examples the taunting figure turns out to be a kneeling human female with hooves for hands (14) (15). In one example, this female attacks a horned tiger who tries to leap away. His attacker has a bovid headdress, a tail and hooves for hands and feet. Behind her is the inevitable *Acacia arabica* (16).

The acacia is a reiterated motif (17). Its relationship to wild animals is made clear on a wonderfully depictive flat tablet which shows the tree in a courtyard; at the presumed entrance of the latter stands a pillar crowned with cattle horns (18). Outside the courtyard a water buffalo has just tossed a hapless woman on whose head and back is attached the peacock tail feather associated with the victims of these attacks.

Elsewhere the acacia is depicted in what must have been a conventional situation, that is, a pair of goats standing on their hind legs to browse the tree (19). This scene also includes a composite animal with the head and neck of the gaur, and of the unicorn bull, and the body of the goat.

The pipal and the acacia represent two different ecologies. *Acacia arabica* is typical of semi-arid regions and found in grasslands and in near desert uplands. Its leaves have become needle-like to reduce evaporation. *Ficus religiosa* is a tree with broad leaves and broad roots and characteristically located in riverine alluvium or where water is abundant. It is regularly found in the midst of agricultural land and is well-regarded by villagers whose houses cluster near it. Its vicinity is favored for gatherings, where its shade deflects the intensity of an all-too-hot sun. The locale of the acacia is one in which grazing feral animals are at home. As cattle also graze in such locales, a conflict arises. But it is also true that agricultural land, wherever it may be, bears growing crops that are attractive to grazers, wild or domestic alike. Where grazers go, so goes the tiger. His ecological range is polythemic. The conflicts shown in these inscribed tablets are therefore natural enough. To protect the herds and insure the safety of the domestic animals as well as human beings, and to coordinate efforts to make that protection, that safety, regularly viable, was certainly one of the formidable tasks facing the Harappan chiefs. Clearly, even without human enemies, which seems to be the case, the

courage, skill, and vigilance, required for guardianships must have been prerequisites for leadership.

CHART VIII

The social organization created by the Harappans was a highly organized one. The polity dependent on the authoritarian role of chiefs was apparently called beḷḷara, a term symbolized by the woven fabric or net for which we have representation on another flat tablet (20a). This representation has a text showing a short-horned bull or gaur, the grapheme kāvaḍi (y)āḷ(n), and the horizontal loom with its woven portion visible when the structure is turned at a right angle. Finally, a text Irutiṇaṇ, the name of the particular chief, is shown. On the reverse (20b), we have the chief on a dais at center, at left the acacia-tiger motif, and on the right the tiger again, with its head turned, standing in a low basin, a motif found before wild animals in numerous seal tablets [Chart X (41)(45)]. The first side tells that Irutiṇaṇ was an important chief of the Beḷḷāra, a guardian, and that he was a member of the gaur sodality. The second side represents his assumed powers, giving him dominance over tigers. The Tamil term cali is the name for acacia, (Kannada) jali—*A. arabica* (DED 2041), and it is likely originally homophonic to that for herd of cows (or cow)—kāli (DED 1243). This perhaps comports with the cow—anthropomorph and its relationship to acacia. In this sense the tablet in which the center figure is dominant over tigers may refer to a leader who protects the cowherds from tigers or other such dangers.

The sodality principal is evidenced by the fact that the eight principal animals are divided on the basis of wild (21a)-(21d) and domestic or nonaggressive (22a)-(22d), and that each occurs solo on the seal tablets along with the name of the bearer. This indicates that the leadership of the Harappan chiefdom was vested in membership in pan-chiefdom, the social units of which were super-familial. Each of these units was symbolized by one of these animals. The most important among them on the basis of number of members was that of the unicorn bull, an animal whose sides and horns are almost inevitably decorated in the representations we have in hand (6), (22a). This animal appears to represent the ideal situation wherein cattle are present and cattle owners the epitome of prosperity. All other animals occur in far fewer number, but all sites where excavation is reasonably extensive have produced at least some of the latter, demonstrating the ubiquity of the sodality theme. Simply put, each seal-tablet owner was particularly related to another seal-tablet owner wherever their settlement, on the basis of membership in the same sodality. Each sodality was represented by an animal which might, on the basis of comparison with recent cultures, be totemic. In other words, an animal could be regarded on a mythopoeic basis as being the progenitor of the sodality or, in this case, a clan totem. Totemic clans, in turn, regulate their membership via systems of rituals and rules to make the actions of their members cohesive, not only intraclan but interclan as well. Clans may represent different social, ideological, economic and other functions,

which create symbolic relationships interclan, and thereby underpin society as a whole. Clan membership is carefully guarded for it carries with it prestige and status as well as function. In a chiefdom, clans may be ranked, and one or another may be the group from which chiefs are drawn. Such may be the case in the example of the crocodile or gavial sodality, for example.

Lineages rooted in matri- or patrilineal emphases are another aspect of social organization which appears to have characterized the Harappans. The script indicates that there were Kāl—"Lineages" of Sun, Full Moon, Stars, and Monsoon (see F 2, 6, 8, and I-II), and the seal-tablet motifs evidence that these were not confined to a given clan. This suggests that, with the possible exception of the gavial sodality, all the clans were equal in social status. Moreover, the composite animals appear to evidence that there was some membership in sodalities which were combinations. For example, a common combination is the gaur, the unicorn bull, and the goat (23); another comprises the tiger, a bovid (zebu ?), and the elephant (24). Clearly what is symbolized is a joining of clans or phratries. The fact that the combinations comprise animals already grouped together emphasizes that certain relationships outside the individual clan were important but restricted to the group of which the clan was a part. This suggests that generally social organization was divided into endogamous moieties but exogamous clans (but see Sy-44), within which were local lineages traced from pan-settlement lineages. Local settlement chiefs thus had lineage ties to central lineages, which presumably gave them local authority.

The emphasis on cattle in the seal texts evidences that the possession of cattle was essential to the status of the individual and particularly to that of the chiefs.

Cattle as markers of wealth and status, and the presence of plough agriculture are evidence for a patrilineal society whereby marriage was exogamous and virilocal. It could well have been that in pre-Harappan periods women owned the land and were the prime participants in the cultivation of crops. But with the value placed on cultivation, which evidences that an economy was present in which the storage of grain and cotton was central to the redistributive economic power of the chiefs, man and male inheritance of wealth was probably the rule. Cattle, in turn, require adequate grazing and a regular supply of water which, particularly in the rabi season, creates competition with agriculturalists, as outlined above.

Such competition appear to have led to the migration of small groups away from the larger communities in search or grazing land. The number of Harappan sites (now nearly a thousand are recorded), most of which are small and representative of such a single occupation, indicates this search for grazing land. One can envision the establishment of settlements where there were areas for agriculture and areas for grazing, kept separate but in symbiotic contact. The decentralization caused by migration was compensated for by allegiances obtained through the lineages and the sodalities, along with an expected tribute (kar̲y ) to the central chiefs. In this, marriage alliances were not only exogamous but intersettlement. A number of these inscribed objects evidence

this situation. First of all, the joined animal seal texts represent marriages generally within a phratry, whereby the individual involved is given representation in two or three sodalities versus the one normally symbolized. Thus the individual is representative of the phratry and not the single sodality.

Within the moieties, if one may call them such, there appear to be certain clans which, perhaps because of war-like functions, are more dominant than others. They therefore can be said to be leaders of the moiety and, accordingly, their presence must be acknowledged in circumstances that affect the moiety. Such is the case with the tiger in the acacia-wild-animal moiety, and with the gaur in the pipal-domestic -animal moiety. In the latter case the gaur (or short-horned bull), whose bellicosity is often demonstrated on the tablets (10), and who may be the ferocious aspect of the cow or gaur anthropomorph who attacks tigers (16), is the third party in the junction of the unicorn-bull and goat sodalities (see Sy-34). The whole forms a phratry but perhaps the gaur, whose body is foremost, puts the "seal of approval," as it were, on the junction of goat and unicorn-bull clans. Similarly, the tiger, found in one example in conjunction with the water-buffalo (or zebu? Sy-44), is dominant with that beast in combinations with others of the wild animals.

CHART IX-X

The peculiar depicted combination of a peacock feathered human female with a tiger's body and goat headdress (26) evidences quite lucidly the marital customs of the time. On one seal tablet (25) we have the bride, heavily bangled, standing beneath the crossed branches or poles held by female attendants. She is next seen in a combined form, clearly wed to a tiger, and given a cattle or goat headdress as a statement of her new status (Sy-20). Between her and her attendants is a branch of the acacia tree. As seen earlier, the cow-acacia anthropomorph and tiger theme is a prevalent one, but in that instance the anthropomorph is that of the kneeling female found with the milk goat and the pipal (8). Thus our scene is a statement of a marriage between the pipal and the acacia groups. This impression is further enforced by other seal-tablet depictions of the "Lady and the Tiger" in which she is shown with the milk goat horns and an acacia headdress (26) or simply with those horns and a peacock tail headdress (27). Iconographically, therefore, we have a literal depiction of a cross-moiety marriage, something essential to the cohesiveness of Harappan society.

The milk goat associated with the pipal and with the kneeling female with her buffalo-horn headdress, also appears as a male of the species when solo (28). But the goat indicated in the pipal relationship is related to iconographic ideas of milk, human female, pipal, and perhaps the peacock, which powerfully suggests matrithematic concepts rooted in women's ancient relationship to land, home, and settlement. The goring and trampling on the peacock-feathered woman carried out by the water-buffalo (9), reinforces the evidence for conflict between the grazers, wild or domestic, and the agriculturalists.

This makes all the more reasonable the idea that the great scene in which seven peacock-feathered ladies stand before and witness the buffalo-crowned lady, backed by her milk goat, as she kneels before a trihorn-crowned male figure standing in the midst of a pipal tree, is actually a wedding scene (8). The buffalo-horn headdress is identical in a similar scene (29). Here we have the reconcilement of the wild and the domestic. Whether or not the depiction is intended to represent deities or people, the reconcilement factor is what is apparently involved.

There are other and related insights into sodality relationships and their meaning to Harappan culture as a whole, based on marital contracts. The domestic unicorn bulls have before them a basket device (6) (22a), which was carried in processions in which the sodality-animals were carried in effigy on standards (30a) (30b). The device consists of a center pole, a basin (often highly decorated), and a basket device above the basin (31) which, in more stylized versions duplicates the basin shape but upside down (32), the whole resembling an hourglass, a shape that may appear independently within a text (33) (34). The basket aspect of the device is made quite clear by the glyptic artist (22a). It has particular reference to the unicorn bull, with which it most frequently pairs, and thus to the pipal. In one solo example it appears with two small female figures on either side of the main pole (32). They resemble yaksha-like figurines of later times with the accent on the turned hip. It also appears as the main device, *sans* animals, in a number of text examples which clearly indicate its pole character (31). Its intimate role in the domestic side of Harappan social organization and its appearance in processions (30a) (30b) suggest that it was probably a marriage pole, perhaps the basin to contain a liquid consumed during a marriage ceremony. Furthermore, the solo examples from Harappa are on tiny cylinder-like seals. A similar cylinder shows the familiar trihorn-crowned anthropomorph appearing under a garland or canopy of leaves, in some instances those of the pipal (35).

Conventions of the marriage ceremony on the Indian subcontinent are widespread.[109] Traditionally, they include a place prepared for the wedding, i.e., a canopy or pandal, under which the marriage ceremony takes place; a procession, often including animals decorated for the occasion; the walls and floors of the bride's home or place of marriage decorated with traditional designs in paint or paste, or other coloring or colored matter; the giving of a tāli—an object to be hung around the neck of the bride by the groom in token of her new status; in some areas the sacrifice of goats or other animals; the presence of a sacred pole, lamp or other object; and the sharing in public by the bride and groom of food or drink. There is also the custom of robing the bride and groom in splendid accoutrement to symbolize the "king and queen for a day" aspect of the marriage itself. Indeed, in some areas this concept is related to the marriage or coupling of certain deities.

The Harappan tablets illustrate most of those conventions: the man and woman in buffalo headdresses and perhaps elaborate hairdos (8), the man

appearing under the pandal (35), the woman also (25), the processions carrying the sacred poles (30a) (30b), the painting of, or covering with decorative cloth of cattle (6) (22a); the endless knot (36) (37) (38), svastika (38) (39) and other designs (40), some of which are found today among groups in India (see Sy-53), and the possibility that the basin of the sacred pole contains food or drink. The fact that the seal tablets are almost inevitably found in a habitational context reinforces the idea that they are essentially tāli to be worn by married women in statement of their new sodality membership and relationship to husbands whose names, titles, and statuses are described by the script. The sacred pole reinforces the tāli statement.

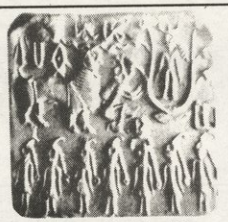
Of importance in this context is the coincidence that the term kūṭu means union (DED 1562), marriage, etc. and basket—gūḍe (Tu.) (DED 1564). These possibilities, if true, emphasize the clan-lineage social system previously outlined.

Before the wild animals and the gaur there is a low plate or basin depicted (41) to (45), (DED 2463) taṭṭe (ka.) which carries with it a meaning of either "to strike"—taṭṭu (DED 2466), or "to stop or check"—taḍa (taṭa 2) (Ka.) (DED 2460) because of its homophony (DED 2463) with those terms. This is fitting for an amuletic device aimed at warding off these animal dangers. However, as a part of individual sodality-symbolism it probably refers to the capability or role of the particular sodality to prevent or overcome danger in some way or another. Interestingly, a few dangerous animals are occasionally associated with the basket (or marriage) pole (46) (47) and presumed to be instances of marriage within that sodality or phratry.

In all, these graphic Harappan tablets appear to have little to do with religion but much more with the realistic demands of pragmatic daily life and the reinforcement of polity and social systems. There are unquestionable religious aspects in the depictment of cow-anthropomorphs and women birthing gavials. Surely the great hero figures are mythic in origin, and the origin stories of the various sodalities may well be also. Some of the seal tablets showing figures sitting on daises (48), some "worshipped" by kneeling humans, and others augmented by cobras, suggest royalty, if not deity (49), but the absence of real evidence for kingship, either in our archaeological records or in those "texts" suggests that the system of chiefs, paramount and lesser, was the Harappan polity. It is possible, as the previous outline might suggest, that the chieftainship carried with it concepts of divine origin. It would be surprising if it did not. The marvellous sealing found at Chanhu-daro by Ernst Mackay reinforces that idea (50)(Sy-16). A slender male figure sits in the midst of a pipal tree, crowned with a buffalo headdress, and upheld by two women symetrically placed on either side. The scene is reminiscent of many statements of court or temple and indeed may relate to both, but only in a Harappan definition of those terms.

APPENDIX C
A List of Symbols and Main Motifs of Harappan Seal Tablets

Number	Symbol	Identification	Comment
Sy-1	 MD, 1937-75	Man standing between two tigers holding each by the throat. He wears a tight-fitting cap of crocodile skin.	The two examples of this motif (see MD, 1937-86) do not duplicate the accompanying text, therefore the "Gilgamesh" figure is unnamed. However, this main motif, and the text which identifies the individual, both refer to that individual as a powerful figure.
Sy-2	 MD, 1937-279	Man with a spear or lance with one foot on the muzzle of a water-buffalo.	The proximity of the winnowing tray sign (I-10) to the figure of the man suggests a possible relationship. (aya - master (?))

Sy-3	 MD, 1937-XCII-11	Man with a spear attacking a gaur (short-horned bull) Note: cobra in background	This is the "great Man" concept of Sy-1 and Sy-2 and Sy-8. (See Sy-25)
Sy-4	 MD, 1937-430	Man with trihorn (buffalo) crown or headdress in a pipal tree bower. He has an extended hair-do like that of Sy-10	The headdress and the pipal suggest a marriage ceremony where the pandal is the pipal bower and the headdress refers to the status of groom. This may emulate a divine coupling.
Sy-5	 MD, 1937-LXXXII-c	Man with buffalo horn crown in the pipal tree bower.	See comment in Sy-4. This motif is part of the scene which includes the goat, the sitting woman with buffalo-horn headdress, and a table with something (food?) on it. The classic wedding?

Number	Symbol	Identification	Comment
Sy-6	 MD, 1937-420	Man with bangle-laden arms and buffalo headdress seated cross-footed on a dais, surrounded by wild animals. Beneath dais are goats.	The inscription refers to a paramount chief named An-il (see pg. 18T). The chief is the primary chief of the four sodalities, each represented by one of the animals.
Sy-7	 MD, 1937-XC-24b	Man with bangle-laden arms standing between, and straight-arming two giants who have pulled up acacia trees by the roots.	This probably is in reference to a powerful chief (or deity) who is more powerful than the lords (or spirits) of the acacia. Note the tiger, acacia, woman association in the next motif on this tablet (see Sy-40)
Sy-8	 HR, 1940-304	Man with weapons: spear in left hand, knife held at hip in the right hand. Before him a seated woman, her arms widespread, palms up; her hair streams off, her legs are outstretched.	This is assumed to represent the meeting of the man shown in Sy-2 and Sy-3 with the woman of Sy-9.

Sy-9

HR, 1940-304

Woman birthing a gavial. She is in reverse of the text and is therefore upside down. Her arms are extended over her knees.

The birth of the gavial is on the reverse side of the tablet on which is Sy-8. The tigers shown on the birthing side are those of Sy-1 (see Sy-43). The gavial is symbolic of First or Primary Chief (see Sy-24).

Sy-10

MD, 1937-430

Woman in buffalo horn headdress kneeling before Sy-4. Her long hair style duplicates that of Sy-4.

This figure represents a moment in a wedding where the bride bows before the groom in the pandal (see Sy-70).

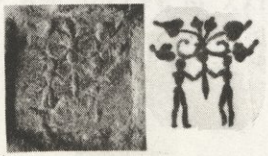
Sy-11

MD, 1937-430

Woman with peacock feather headdress, one of the seven in procession in the scene featuring Sy-4 and Sy-10.

The peacock feather - pīli (Ka . Tu., Ta. DED 3469) It may refer to the custom of marriage - pilli (Ka. DED 3470) when a toe ring is given to a woman at marriage (as occurs later) a substitution. It is also possible that pille - child (DED 3449) is meant. The procession may symbolize "many children".

Number	Symbol	Identification	Comment
Sy-12	 MD, 1937-510	Women being tossed and gored by a water-buffalo. One wears the peacock feather headdress of Sy-11.	This is a demonstration of a fundamental antagonism between whatever the women represent and what the water-buffalo represents. Women, pipal, goat symbolic of the domestic, the buffalo symbolic of the wild. The threat of the wild to be offset as in Sy-2 by a hero male.
Sy-13	 MD, 1931-357	Woman with gaur headdress, hooves and tail, attacking a horned tiger. Behind her is an acacia tree (acacia arabica).	The acacia - cali (DED 2041) or jali (Ka.) appears to be an ancient homophone of kāli - herd of cows or cow (DED 1243). The fact that it is a cattle anthropomorph suggests that tree and figure are meant to be related semantically (see Sy-14) Gaur adult males can take on tigers. (see Schaller, Note: Sy-29)
Sy-14	 MD, 1937-522	Woman with cup hoof, in an acacia tree, apparently taunting a tiger who looks at her over his shoulder.	There appears to be little doubt that this is identical symbolically to Sy-13 which is more literal. If kāli can be cognate to kālai - warrior (DED 1260), or even eventually to kālai - ox, bull steer (DED 1261) the scene can relate to ideas of defeating tigers, i.e. enemies.

			The acacia cow-woman motif is a comparatively common one. A shift in religious, economic and social emphases could cause a shift from female to male concepts. The Harappan clearly is female oriented here.
Sy-15	 MD, 1931-356	Cattle anthropomorph with tail, horns, and upraised arm with hoof hand.	The theme of a cattle "deity" or form is constant and is intimately related to interpretations of Sy-13, Sy-14. These isolated forms (Sy-14, etc.) are good candidates for deities: Muri (DED 4137) i.e. Muri(y)aṇ (?). If female possibly Kāli(y)aṇ.
Sy-16	 Ch. daro LI-36	Women upholding central figure in pipal tree.	This appears to be an act of adoration or a sacrement of regality with women as servitors associated with buffalo-horn anthropomorphs, probably chiefs having semi-divine status.

Number	Symbol	Identification	Comment
Sy-17	 Ind. Arch. Rev. 1963-64, Pl. XXIII-B	Woman under "pandal" made by female attendants.	This is probably a part of the marriage ceremony. (see page191)
Sy-18	 Ch. daro LI-18	Woman kneeling before tiger. Acacia tree in background.	This is the same iconographic order of Sy-13, Sy-14. The kneeling and the acacia are commonalities in these examples. If the word for kneeling - maṇḍi (DED 3828) is used this could be homophonic to "to attack" (DED 3830) The text can thus be read in counter-clockwise fashion: Maṇḍi pul Pakalam Iru Kāvaḍi(y)āḷ Kāli "The Attacker of Tiger(s) the Enemy, (Pakalam) Protector of Herds. p.n. Here the main motifs are translated as text.
Sy-19	 HR, 1940-309	Woman in "yaksha" position by basket pole device.	This is linked to the meaning of the basket-pole (Sy-48). As a marriage device it is possible that the "yaksha" refers to the fecundity of marriage.

Sy-20

Woman with goat-horns and tiger body. Her hair is as in Sy-10. She is under acacia branch.

This combined grapheme correlates tiger (puli) with the woman of Sy-10 and the goat of that scene (Sy-23). The sealing depicts the descent of the owner: woman & tiger mated. In this sense it expresses "Son (Daughter) of Tiger", (i.e. Tiger sodality).

IAR, 1963-64, XXICC-B (Kalibangan)

Sy-21

Woman with goat-horns and tiger body with peacock feather in hair as well as hairdo of Sy-10

This is identical with Sy-20 except the peacock feather may express more directly the descent of the individual, i.e. piḷi, piḷḷai - child of.

MD, 1937-347

Sy-22

Woman with goat horns and acacia branch on head, and peacock feathers headdres.

This is identical with Sy-20, Sy-21 except the reiteration of the acacia - kāli theme is obvious here. see page 191

ASI 68.1.8. Unpublished, Delhi; Kalibangan

Number	Symbol	Identification	Comment
Sy-23	 MD, 1937-430	The milk goat is readily identified on the basis of the absence of male genitalia. The wide spread and rippled horns are, however, found with males (see Sy-32)	The milk goat, or male goat is always (?) associated with the Buffalo-horn females like that of Sy-10. It may be the sacrificial animal, or gift at marriage ceremonies. Note apparent goat sacrifice shown on plaque from Kalibangan (see Allchin & Allchin, 1982-6.31).
Sy-24	 MD, 1931-361	Gavial - crocodile MD, 1931-CXVIII-10a,b	The symbol of the Primary or First Chief mudale - crocodile (DED 4055) (Tulu) modal - first (chief) (DED 4053) (Kannaḍa) mutali - chiet DEDR 4950 (Tamil) The dominance over the wild and domestic animals goes with this status; also note association with Q-1 sign.
Sy-25	 MD, 1931-CXVI-29	cobra	This animal is rarely shown. It appears as a "witness" to an "enthroned" chief here, see Sy-3 as witness to combat. Thus possibly are/taras DEDR 2359 to royal DEDR 20

Sy-26

Ch. daro-LII-28

Unicorn bull

MD, 1937-422

This is the most common animal and main motif on the seal tablets. It is inevitably accompanied by the basket-pole motif (see Sy-48)

Probably syllabized as eddu, (Ka.)addō (Kon) DEDR 815
Were these seal animals named in the formation of surnames? as surname clans?

Sy-27

MD, 1931-387

"Unicorn bull heads attached by their necks to the pipal tree.

No clearer statement could be to establish the relationship between pipal and this particular bull. If pipal is ara (see E-6) then the idea of elevated status is implicit, i.e. ara - eddu + ?
Note: inscription suggests the name of the owner ends in ai, or ay. see I-10

Tiṇpaliūr(y)am-ăPiṟārai
i.e. "Piṟārai of Tiṇpaliyūram"

Sy-28

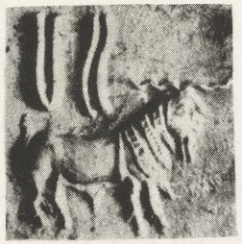
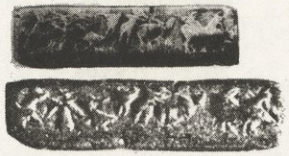
MD, 1931-337

zebu male

One of the domestic animal group and thus the symbol (totem ?) of a Zebu sodality. If the horns of Sy-41 and Sy-44 are of the zebu we have a cross moiety tie.

Probably syllabized gōnde (DED 1837)
Note: stem for hump - kōṇ (DED 1834)

Number	Symbol	Identification	Comment
Sy-29	 MD, 1931-318	gaur (short-horn bull)	One of the semi-domestic animals, known to be recalcitrant and dangerous (note Sy-3 for example). It is frequently shown with the basin (Sy-52) Probably syllabized as muri (DED 4137) (Note: possible homophone is muri - break, (DED 4109) See G.B. Schaller 1967 pg. 174-199 for statement on gaur behavior.
Sy-30	 Ch. daro, LI-13	gaur attacking - impregnating peacock-tail headdress woman see Sy-11 (see F.R. Allchin, 1983 pg. 369-383 for important discussion of this seal)	If the peacock feather represents marriage, children, (see Sy-11) then this mating can be construed as related to the fecundity of the gaur sodality for which the gaur is totemic. Text refers to Mekuran - "High Mountain One" possible reference to foothill country which gaur often inhabit (see Sy-67)
Sy-31	 MD, 1937-673	male ibex with curved horns	Probably one sodality of the domestic or non-aggressive animals moiety. Possibly syllabized as kala (DED 1103) A goat different in species from SY-32?

Sy-32	 MD, 1937-606	male goat with twisted horns	This can be confused with the milk goat Sy-23. It occurs solo whereas the female occurs only in context as in Sy-23. The term mēke (DED 4174) could possibly have been used for both sexes. Note: me as a prefixal term for - excellence, etc.
Sy-33	 MD, 1931-CXVIII-10c	goats standing on hind feet browsing in an acacia tree	The goat - tree theme is a common one in the ancient world. Its meaning here is obscure. The acacia is of itself representative of the cow-woman grapheme (Sy-13, Sy-14) of grazing cattle; it represents "grazing land". Goats eating acacia represent the invasion of the domestic into that land. (?)
Sy-34	 Mahadevan, 1977 III-59	gaur, goat and unicorn bull combined gaur in front rhinoceros hind quarters (?)	Iconographic statement of marital (or at least social) ties between the goat and unicorn bull sodalities in a phratry dominated by the gaur sodality.

Number	Symbol	Identification	Comment
Sy-34	 MD, 1937-24	combined goat, unicorn bull and gaur unicorn bull dominant	An iconographic statement of marital ties (see Sy-34)
Sy-35	 MD, 1931-306	water-buffalo	One of the sodalities in the wild animal moiety (?) It is apparently antagonistic to domestics (see Sy-12) Shown often with basin device Sy-52 Syllabized as bōri (Tulu) DEDR 4593? Note: pōr - to fight (Ka.) DEDR 4540 or possibly mankhā (Kuruckh) (DED 3912)
Sy-36	 MD, 1931-342	rhinoceros	One of the wild animal sodality animals. It is often shown with the basin device Sy-52. Note. the rhinoieros is native to South Asia Syllabized as gaṇḍa (Turner 4000) Note: gaṇḍa - strong male, warrior, etc. (DED 986)

Sy-37

MD, 1931-369

elephant

elephant calt

MD, 1931-366

One of the wild animal sodalities. It is often shown with the basin device Sy-52. Some examples have cloth or paint designs on the back as does the unicorn bulls endence for domestication?

Probably syllabized as ăn̄è (DED 4235)

Sy-37

MD, 1937-CIII-16

elephant in grouping of wild animals with the horned gavial 'chief' center

the elephant occasionally appears with a man (evidence for domestication?)

Sy-38

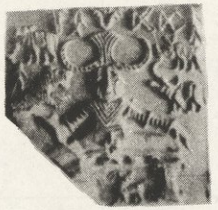
MD, 1931-351

tiger

One of the wild animal sodalities.
It is sometimes shown with the basin device SY-52.

Probably syllabized as pul(i) (DED 3532)

Number	Symbol	Identification	Comment
Sy-39	 MD, 1931-386	tigers mixed	This is a perplexing motif. It suggests that many tigers have been overwhelmed, but in keeping with the sodality thesis it is more likely a uniting of the membership. Syllabized perhaps as kala - mix, union (DED 1092)
Sy-40	 MD, 1937-522	tiger with turned head MD, 1937-XC-24b	This motif is regularly paired with the acacia-cow woman motif (Sy-14). The woman is taunting the tiger and it is subject to her, however as a thematic element in the social structure it probably has a mythopoeic validity within Harappan ideology.
Sy-41	 MD, 1931-357	tiger with turned head bearing cattle (bovid) horns the female anthropomorph bears gaur horns acacia arabica behind	This motif is similar to Sy-40 but the horns on the tiger add another element. The horns are textured like water buffalo horns but are at the angle of zebu horns. They presumeably are those of the buffalo representative, with the tiger, of the wild. In context with Sy-13 it demonstrates the triumph of the domestic over the wild. But see Sy-28.

Sy-42	 MD, 1937-420	leaping tiger	This is probably the seal-tablet artist's way of filling his space and creating a balance of position with the water-buffalo opposite (Sy-6). The tiger is representative of the sodality involved. (see Sy-38)
Sy-43	 HR, 1940-304	upright (hapless ?) tigers paired	The paired tiger theme is consistant with Sy-1, the "Gilgamesh" motif. It occurs also with Sy-8 and the birth of the gavial Sy-9, but carrying the same relationship to a superman.
Sy-44	 Banawali, 1982-10-16	tiger crowned with buffalo horns	This is a sodality theme in which within the same "moiety" the tiger clan and that of the water-buffalo are united. This is related to Sy-41. Tiger-buffalo may be a phratry within the moiety involved; see Sy-28.

Number	Symbol	Identification	Comment
Sy-45	 MD, 1937-521	tiger, buffalo, elephant combined bovid forepart with neck decoration and an elephant trunk, tiger hindquarters and tail	A statement of a phratry within the wild animal moiety.
Sy-46	 MD, 1931-CXVI-5	tiger on a standard in a procession	The procession is probably that of the wedding and the animal(s) mark the sodalities involved (see Sy-47). The standards carry the effigies of the animals.
Sy-47	 MD, 1931-CXVI-8	water buffalo on a standard in procession	The procession is probably that of the wedding and the animal(s) mark the sodalities involved. (see Sy-46). The standards carry the animal effigies thus marking both "clan" and reason for the procession.

Sy-48	 HR, 1940-256	the basket-pole or marriage pole	A conventional device placed before domestic animals but particularly the "unicorn" bull. It is most probably representative of marriage at which ceremony it serves as a "sacred pole" It is highly decorated and consists of three parts: the pole, by which it is carried or stuck upright in the ground, a lower basin and a basket cover or filter (But see Mahadevan 1981-83, Puratattva Numbers 13 * 14)
Sy-48*	 MD, 1937-11	marriage pole before the "unicorn" bull	Possibly only the lower basin is carried in the procession (see Sy-49). It's knobbed outer surface in the detailed examples suggests the knobs of the crocodile leather. During the wedding it appears that the basket device was used to drop liquid or food into the basin, presumeably to prepare for the sharing of this food which seals the marriage. There are numerous decorative differences
Sy-48′	 HR, 1940-320	marriage pole	kūṭu - marriage, union (DED 1562) kūṭu - basket-bucket (DED 1564) goḍe - water vessel (DED 1376) kuṭi - to drink (DED 1378)

Number	Symbol	Identification	Comment
Sy-49	 MD, 1931-CXVI-8 MD, 1931-CXVIII-9	the basket-pole in procession	See Sy-48, note the basin shaped device on the top of the pole.
Sy-50	 HR, 1940-309	stylized basket-pole forming an hour-glass shape suggesting a Mycenean shield	The pole aspect beneath the basin differs from the connection between filter and basin.
Sy-51	 Majumdar, 1934-XVII-38	stylized basket-pole an hour-glass shape related to Sy-50 but without carrying pole	See Sy-50, and Sy-48.

Sy-52

MD, 1931-345

Flat basin with upward curved sides. In some examples the sides appear to be basketry. There are occasionally indications of a pole underneath.

This device is typically found with the wild animals of that moiety, and with the short-horn bull (gaur) of the domestic. It too may have been carried in procession but no example of this has so far been found.

Sy-52*

MD, 1937-587

The Dravidian taṭṭe - flat plate (DED 2463) and terms such as taḍa - stop (DED 2460) and taṭṭu - to strike (DED 2466) carry the sense of these belligerent animals and an amuletic reason to prevent their onslaught or to amplify it in the case of the seal-tablet bearer.
There is considerable stylization of this device.

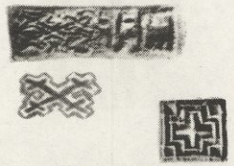
Sy-53

MD, 1937-XCIII-4

the endless knot

Sy-53*

There are variations of this knot. In one example it is a part of a seal-tablet scene (see Sy-53′)
It occurs independently. It occurs with the svastika (see Sy-56). It probably was used as an auspicious sign.

Number	Symbol	Identification	Comment
Sy-53′	 MD, 1937-XC-24a		There is every reason to believe that it was a motif used on occasions such as weddings as a floor or wall painting. This, of course, has ethnographic support (see for example: O.C. Handa *Pahāri Folk Art* Taraporevala, 1975, Bombay. pages 25-36.
Sy-54	 MD, 1937-XC a MD, 1931-528b	the cruciform design Sy-54* Mahadevan, 1977-138	This is in the same category as the endless knot motif Note: kaṭṭu - knot, tie (DED 961) and references to marriage, "stop by magic" amulet, bewitch, etc.(Ka.)
Sy-55	 MD, 1931-508	the svastika often drawn within a square and with accenting marks	Clearly an auspicious symbol and probably in the same category as Sy-53, Sy-54. It does occur with the endless knot (see Sy-56). Its correlation with the elephant (Sy-57) suggests that the elephant's qualities correlate with the symbol. Possibly syllabized en - ēn (DED 4235) to - ēṇ - stability, courage (DED 752 & DEDS 752)

			Could the svastika be an Indo-Aryan lexeme used by the Harappans meaning good fortune? (see Turner 13916)
Sy-56	 MD, 1937-LXXXII-3	svastika & knot	see Sy-53, Sy-55, this is an 'auspicious' combination
Sy-57	 MD, 1937-LXXXII-la	svastika & elephant the elephant's head is lowered as if to push against the svastika square	(see Sy-55) The probability is that the elephant was domesticated (see Sy-37) and thereby was useful and auspicious for the Harappans in spite of taming difficulties of behavior.
Sy-58	 MD, 1937-604	acacia tree or acacia branch	The acacia (Acacia arabica) is the symbol of grazing land. The acacia motif is probably used to symbolize the dominance of that land by the Harappans over the wild creatures who competed for its grass (see Sy-33) Possibly cāli (Ta.) DEDR 2474

Number	Symbol	Identification	Comment
Sy-59	 MD, 1937-CIII-8	see Sy-22 figure this could be a walled grove containing an acacia tree, the entrance (?) to the grove has a pillar whose capital is the woman with the buffalo-headdress see Sy-10	The walled grove suggests the control of grazing i.e. pasturage (see Sy-58). In the scene outside the grove a peacock-feathered woman (see Sy-12) is being tossed by a water-buffalo. The struggle of wild and domestic are symbolized therefore.
Sy-60	 MD, 1931-387	the pipal tree (Ficus religiosa)	This is the symbol of the alluvial area and of agriculture and settled life. Its leaves form the pandal of the marriage ceremony (see Sy-5 for example). It is closely associated with cattle (see Sy-27). Probably syllabized ara(c) (DED 168)
Sy-61	 HR, 1940-303	horizontal loom with woven net (?)	The woven net is net - beḷḷāra (DED 4531) and refers to the grouping of chiefs or chiefdom - veḷḷālas (DED 4533) i.e. the vēḷir (DED 4562) whose ranks were made up of pirs (see Q-1).

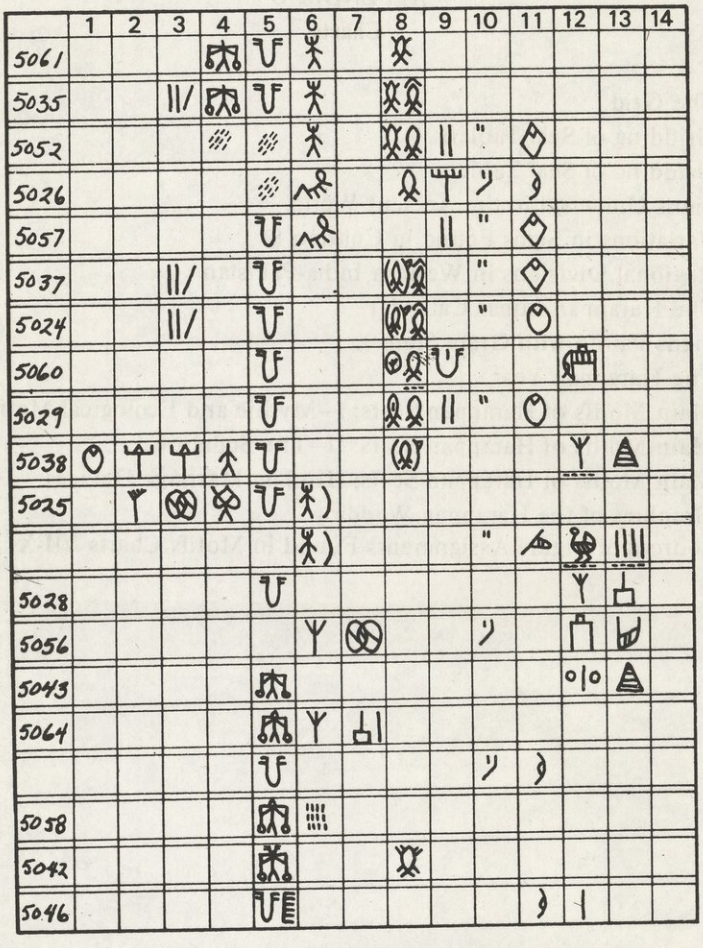
Sy-62	 MD, 1937-222	the dias or elevated platform this often has legs with hooves	This is commonly used for chiefs (or deities ?) in durbar. This is probably P-2 and F-2 tiṇ(ṇ)-il (see DED 2639)
Sy-63	 MD, 1937-420	buffalo horn headdress	This is the headdress worn by chiefs who are paramount (see Sy-6). Variation of this headdress are worn by men and women at marriage (see Sy-10).
Sy-64	 MD, 1937-222	acacia headdress note stylized buffalo horns	This is the headdress worn by chiefs or personages who control grazing land and thus presumeably large herds, especially of cattle. The acacia is often combined with buffalo horns. But see Sy-22
Sy-65	 Mahadevan, 1977-III-53	acacia and goat-horn headdress	This is worn by married women and represents control of grazing land. (see Sy-33, etc.) See Sy-22

Number	Symbol	Identification	Comment
Sy-66	  MD, 1931-CXVIII-9	ribboned pole carried in processions preceeding animal standards and the basket pole (see Sy-46 and Sy-47)	Its significance is unknown but it appears to have been customary in processions probably particularly for weddings.
Sy-67	 MD, 1937-430	the peacock feather	This is a symbolic part of women's headdresses. It probably represents youth, birth, children especially. pīli (DED 3469) to pilli (DED 3470) to piḷḷe (DED 3449) (see Sy-11)
Sy-68	 MD, 1937-641	"unicorn" bull head and neck associated with a five "necked" device, a blank at center	This is a unique piece. It can mean multiples of unicorn cattle, but is probably related to the mixed animal theme, see Sy-39.

Sy-69	↓  MD, 1937-XC-24b	small pot with pointed lid	In context the lid is tal (see P-4) the vessel was probably called caṭṭi (DED 1901) homophonic to caṭṭu - destroy, destruction (DED 1902) Thus "Great (tal) Destroy(er) (caṭṭi) of" in this case tigers.
Sy-70	 HR, 1940-307	pandal	A garland of leaves or bower set over the groom or bride at marriage. Pandal (Ka.) DEDR 3922
Sy-71	 MD, 1931-CXVII-6	rabbit, hare	This animal occurs only on copper tablets Probably syllabized as murū - muyeṛu mola (DED 4071) This is apparently not a hare sodality A reference to a quality of the individual (?) see DED 4070 - persevere

APPENDIX D
Charts

CHART I: THE GRID

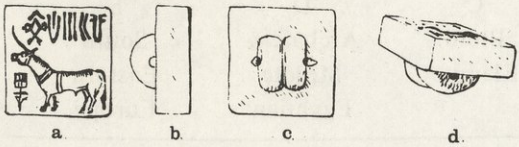


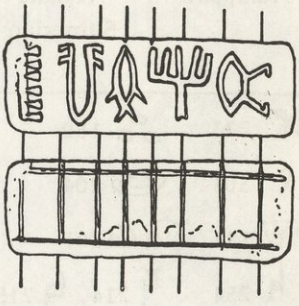
NUMBER OF SIGN OCCURRENCES IN GRID COLUMNS*

*see Appendix for specific sign columnar place

Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Signs	0	2	1	7	8	71	52	4	3	4	12	13	4	2

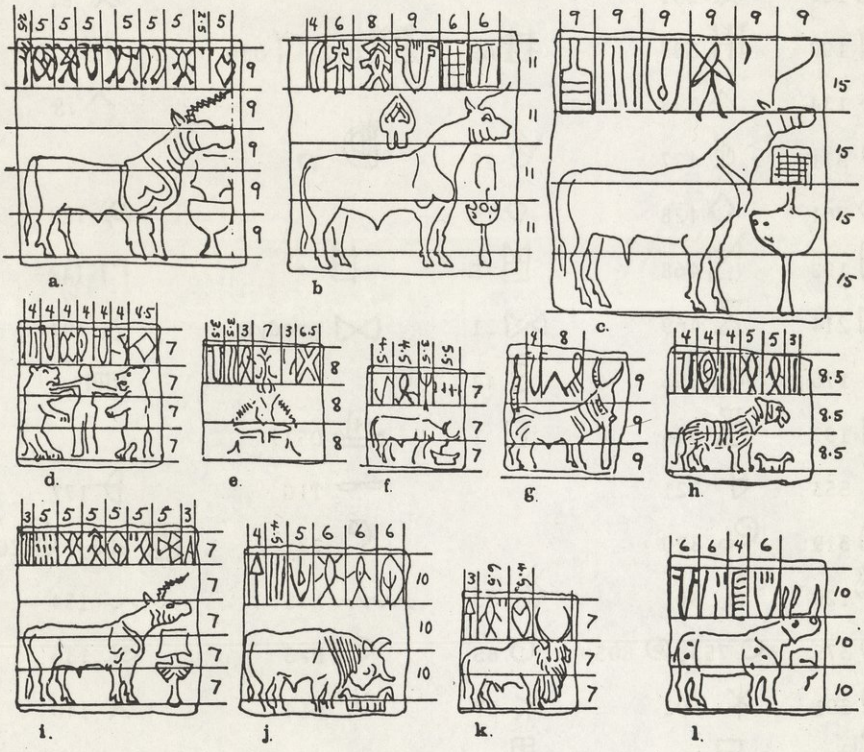
Typical seal showing pierced boss. Chart II A





Possible sealcutter's faience scale found at Mohenjo Daro (twice actual size)

Characteristic proportioning of animal seals Chart II B



Signs Universal in the Ancient World* Chart III

A Harappan	B Archaic Sumerian	C Proto Elamite	D Archaic & Middle Egyptian	E South Eastern Europe
233	189	39	N25	
301	204		N27	
117	207		N-4	130
254	214, 215	54	U13	162
177	235			27
150	351			81
190	387	69	042, 030	51
134	388			18
311	427	25	Y7	
261	428	13		120
192	468	5	*	148
214	469	21	predyn.	184
176	555	44		95
197	644	1	O51?	
553	721		T10	177
319	820		Z7; V1	206, 207
120	841	33	N35	134
375	753; 803	85	N-5	136
391	192	57	N14	140
180	366	61		
245	563	90	predyn.	64
204		9		109
168	111	91	predyn.	30

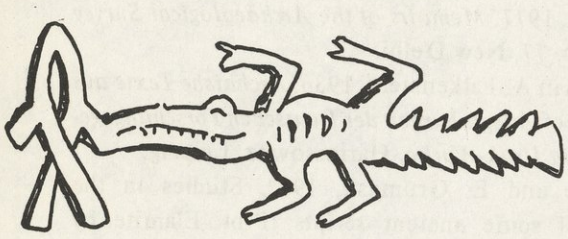
*See P. Kaplony, 1963 pg. 331 Vol. I

Chart III continued

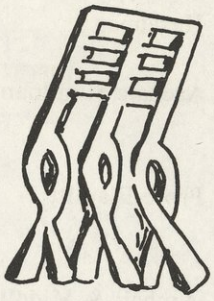
A. Harappan	Mahadevan, 1977. *Memoirs of the Archaeological Survey of India*, No. 77, New Delhi.
B. Archaic Sumerian	Signs found in A. Falkenstein, 1936, *Archaishe Texte aus Uruk,* vol. 2 of *Ausgraburgen der Deutschen Forschungsgemeinschaft in Uruk-Warka,* Harrassowitz, Leipzig.
C. Proto-Elamite	W.C. Brice and E. Grumash, 1962. Studies in the structure of some ancient scripts (Proto-Elamite by Brice), *John Rylands Library Hull.* pp. 15-39.
D. Archaic & Middle Egyptian	A. Gardiner, 1927. *Egyptian Grammar,* Oxford. P. Kaplony, 1963. *Die Inschrifton der Agyptischen Frubzeit,* vols I-II of *Agyptalogische Abbandlungen,* Harrassowitz, Weisbaden.
E. Southeastern Europe	Shan M.M. Wing, 1981. *Pre-writing in Southeastern Europe*, Calgary, Alberta.

*Number refer to references in these texts

Variations of signs found in Column 8 Chart IV



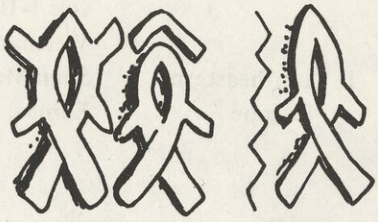
(a)



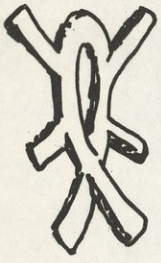
(b)

(c)

(d)



(e)



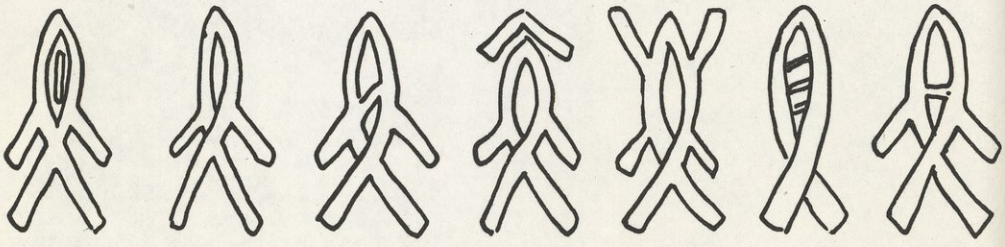
(f)

(g)

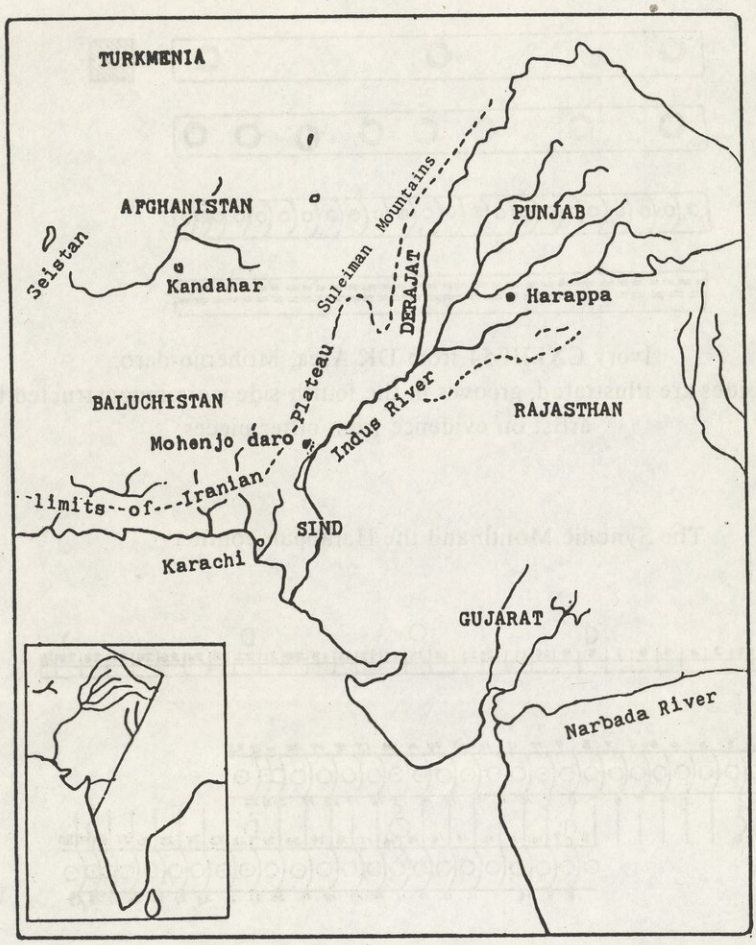
(h)

(i)

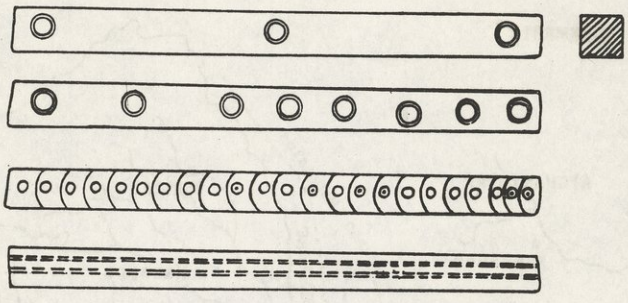
Affixing of signs of Column 8



Regional Divisions in Western India-Pakistan Chart V

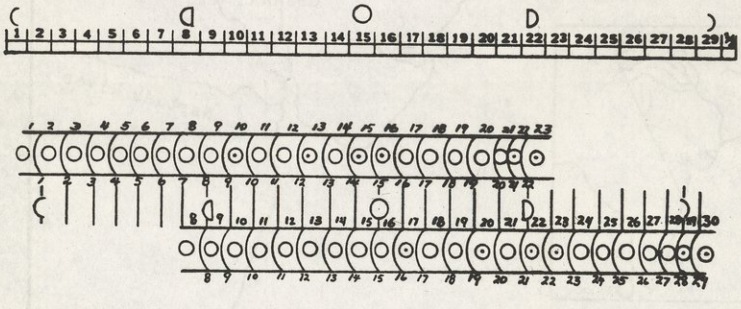


The ivory "counter" from DK Area, Mohenjo daro Chart VIA
Harappan Lunar Calendar



Ivory CXLIII-54 from DK Area, Mohenjo-daro.
Three sides are illustrated, grooves in the fourth side were reconstructed by the artist on evidence from other pieces.

The Synodic Month and the Harappan counter



Harappan lunar calendar from ivory (above)
coordinated with a scale of the phases of the moon.

Chart VIB: Signs Paired with Grain Signs

		Total
 2	 3	5
 3	 1	4
 10	 3	13
 6  8	 10  2	26
 20	 7	27
 21	 24	45
 5  1	 11  1	18
 10	 2	12
 3	 7	10
 2	 1  1	3
 1	 30	31
 2	 4	6
	 11	11
	 6	6
	 15*	15
 54	 47	101
 2	 2	4
 10	 2	12
	 26	26

Chart VIC: The Harappan Year

Harappan Calendar	Modern Calendar		Season
 Velaṉ nel	November		
 Ĭrunel	December		solstice
 Mŭnnel	January		
 Nāl(u)nel	February		Paṭuner(1)
 Cay nel	March		 Rabi
 Cāṟunel	April		Niruner
 Eṟu nel	May		 (Kala-vāy nel)
		Monsoon begins	
 Eṉṉelam(b)	June		solstice
 Toṉṉel(am)	July		
 Palanelam(b)	August		Neṟam
 Nĭra nel(am)	September		Kharif
 Nelam(b)-ă	October		
		Monsoon ends	

CHART VII: MAIN MOTIFS OF HARAPPAN SEALS:
I–Mythic and Ecological Motifs

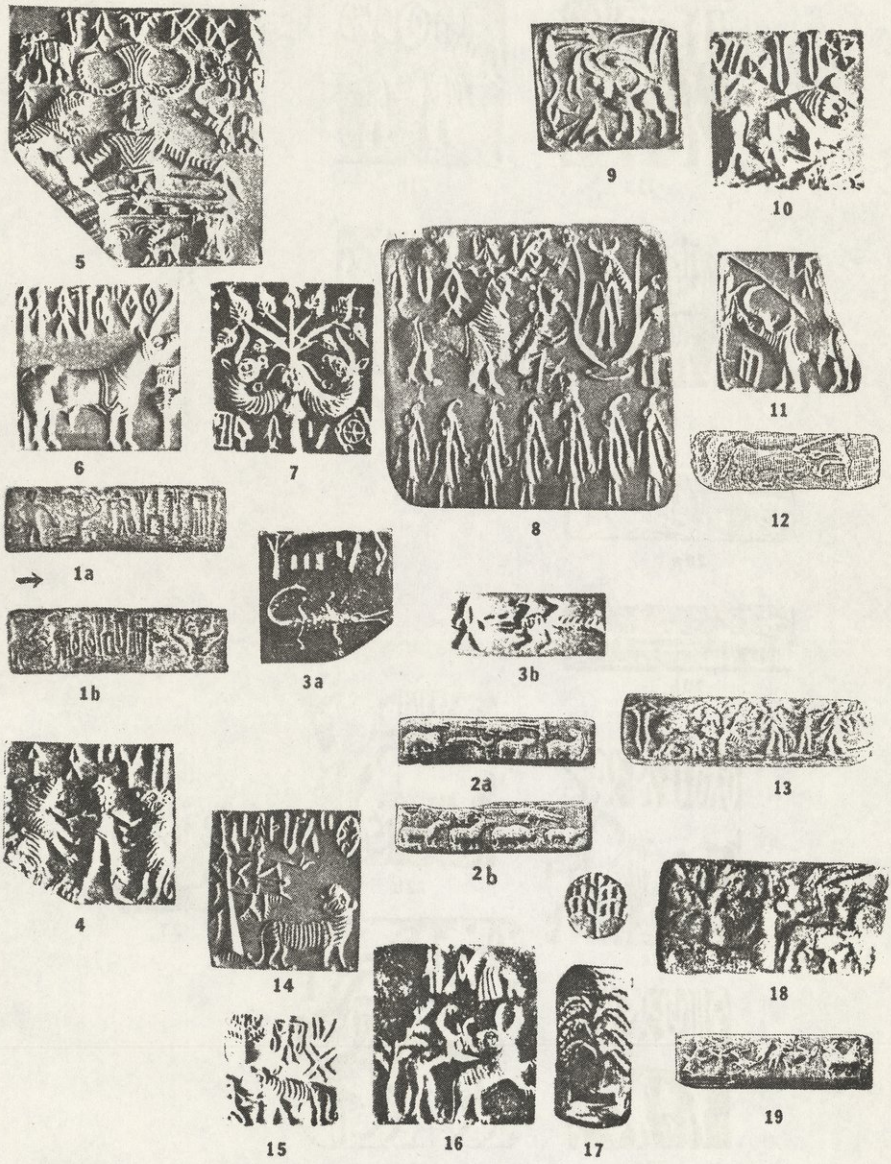


CHART VIII: MAIN MOTIFS OF HARAPPAN SEALS:
II—The Sodalities

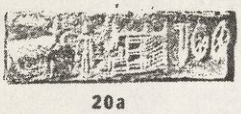

21a


21b


24


21c


21d


20a


20b


22b

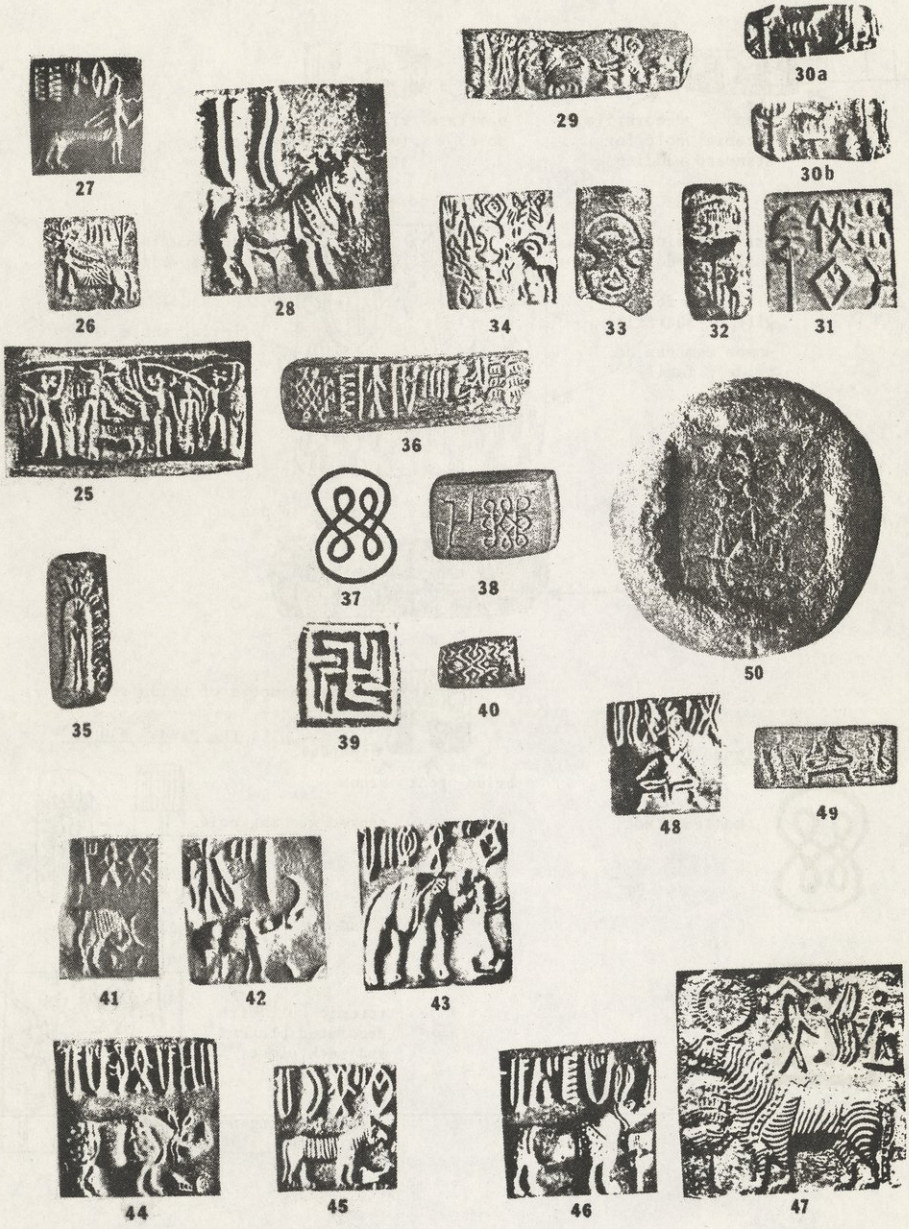

23


22a


22c


22d

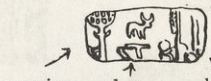
CHART IX: MAIN MOTIFS OF HARAPPAN SEALS:
III—The Marriage Devices



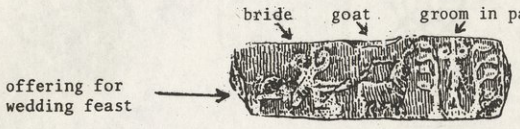
The graphics of the Harappan wedding

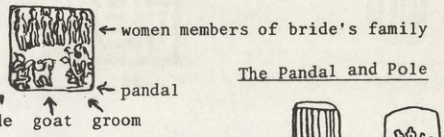
Chart X

The Procession

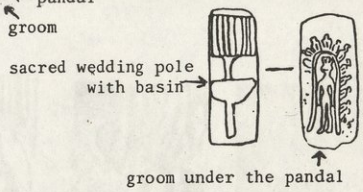


The Wedding





The Pandal and Pole



Auspicious Signs

endless knot

svastika

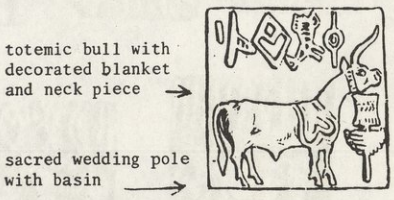


Chart XI
Sources of Figure Assignments Found in Motif Charts VII-X

I
- 1a -Sy-8
- 1b -Sy-9 (rev. of 1a)
- 2a -Sy-24
- 2b -on other side of 2a, 19
- 3a -Sy-24
- 3b -Md, 1937-133; Sy-24
- 4 -Sy-1
- 5 -Sy-6, Sy-42, Sy-63
- 6 -Sy-26; eg. Md 1937-539
- 7 -Sy-4, Sy-60
- 8 -Sy-4, Sy-22, Sy-67
- 9 -Sy-12
- 10 -Sy-30
- 11 -Sy-2
- 12 -Sy-3
- 13 -Sy-7
- 14 -Sy-14, Sy-40
- 15 -Sy-18
- 16 -Sy-13, Sy-41, Sy-43
- 17a -Sy-58
- 17b -Sy-58 (Mahad. '77-II-75)
- 18 -Sy-59
- 19 -Sy-33

II
- 20a -Sy-61
- 20b -Sy-40 (reverse of 20a)
- 21a -Sy-37 (MD, 1937-648)
- 21b -Sy-36 (MD, 1937-651)
- 21c -Sy-38 (MD, 1937-518)
- 21d -Sy-35 (MD, 1937-696)
- 22a -Sy-26
- 22b -Sy-28
- 22c -Sy-29 (MD, 1937-123)
- 22d -Sy-31 (Lothal: Indian Archaeology—A Review, 1956-1957, XIV-D)
- 23 -Sy-34
- 24 -Sy-45

III
- 25 -Sy-17, Sy-20
- 26 -Ay-22
- 27 -Ay-21
- 28 -Sy-3
- 29 -Sy-5
- 30a -Sy-46
- 30b -Sy-46, Sy-47, Sy-49, Sy-66
- 31 -Sy-48
- 32 -Sy-19, Sy-50
- 33 -Mahadevan '77-VII-133
- 34 -Sy-51
- 35 -Sy-70
- 36 -Sy-53, Sy-65
- 37 -Sy-53
- 38 -Sy-56
- 39 -Sy-55
- 40 -Sy-54
- 41 -Sy-29, (MD, 1937-385)
- 42 -Sy-52, Sy-35
- 43 -Sy-37
- 44 -Sy-52, (MD, 1931-342)
- 45 -Sy-38
- 46 -Sy-36 (MD, 1937-140)
- 47 -Sy-44
- 48 -Sy-62, Sy-64
- 49 -Sy-25
- 50 -Sy-16