# Reprints

# THE INDUS SCRIPT AND ITS DECIPHERMENT

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## The Indus Civilization

The Indus or Harappan Civilization was the most extensive urban culture in the world when it flourished in the Greater Indus Valley in and around present-day Pakistan about 2600-1900 BC. Harappa and Mohenjo-daro are the best known of its walled cities. The cities had citadels usually built on raised platforms, and contained imposing buildings such as the Great Bath. The residential areas had a preplanned network of straight streets oriented according to the cardinal direction. The houses built of kiln-burnt bricks and had wells, and bathrooms provided with drains. The uniformity of weights and measures and many other artefacts throughout the large area suggests centralized government. The economy was based on agriculture and trade.

## The Indus script

The Indus Civilization created a script of its own, found on stamp seals (made of steatite, sometimes agate or even lapis lazuli), seal impressions on clay, small bi- or trifacial tablets of different materials, potsherds, and vessels. Besides an inscription, the seals include pictures of high artistic value, most often an animal figure. The seals, usually 20 to 30 millimetres square, have a perforated knob for suspension on the reverse side.

The Indus script fell into disuse when the urban phase of the Harappan Civilization came to an end about 1900 BC. If deciphered, it could enlighten us about the dark prehistory of South Asian languages and religions. It is the fourth oldest writing system of the world, after Sumerian, Proto-Elamite and Egyptian scripts.

## What makes the decipherment difficult?

Since 1875, around a hundred attempts of decipherment have been published, but none of them has won general acceptance. Why has it been so difficult to force the Indus script to deliver its secrets? There are many obstacles to decipherment. First of all, it was forgotten long before the earliest preserved literary records of South Asia were composed, and it has no external relationship with any other known writing system. Due to an almost complete absence of historical information, the identity of the language(s) underlying the Indus script remains much debated.

Most ancient scripts have been deciphered with the help of translations into known scripts and languages. In the case of the Indus script, no bi- or multilingual texts exist. In addition, some other facts make the Indus texts unusually difficult to tackle. All texts are very short, on the average just five signs. Even the longest text is merely 26 signs. Clearly distinguishable word dividers are absent. Many script signs, moreover, are so simplified that the recognition of their pictorial meaning is virtually impossible.

## What gives hope for a successful decipherment?

Still, the case of the Indus script is not so hopeless as some experts have pronounced it to be, for there are also positive aspects. Thus the number of inscriptions known to date is relatively large, around 5000. Apart from some vacillation in the early period, the signs have been standardized, likewise the direction of writing, which normally runs from right to left.

There is also much repetition in sign sequences, which makes it possible to distinguish some linguistic patterns and leaves no doubt that real writing is involved, or in other words, that the script represents spoken language. And in spite of the simplification process, demanded by fluency in writing, some signs remain clearly pictographic and thus enable identification of their iconic meanings. There are also various kinds of contextual clues, notably the type of inscribed objects and the iconographic motifs that often accompany the inscriptions.

## Methodology of decipherment

Indus signs have been equated with similar-looking signs of other, readable scripts and their phonetic values have been transferred to the Indus signs. This method, however, works only when the scripts compared are closely related, and even then there are pitfalls. It is true that some Indus signs have close formal parallels in other ancient scripts. For example, the Indus sign looking like a mountain can be compared with signs occurring in Sumerian, Egyptian, Hittite and Chinese scripts. But each of these parallel signs represents a different language and has a different phonetic value, even if the meaning is the same or similar.

What then is a sound methodology? Some preparatory tasks have proved useful in the decipherment of all kinds of scripts. They include collecting all available texts into a comprehensive and reliable text edition. In the case of the Indus script, the texts are being published both in photographs and in standardized, computer-drawn form. Concordances systematically recording all occurrences of individual signs and their sequences in the texts have been prepared. Compilation of a reliable sign list, which distinguishes between distinct signs and their merely graphical variants, also belongs to the most fundamental tasks. Composite signs should likewise be analyzed.

Linguistic features can be recognized from the distribution of signs and sign sequences: some signs may occur only or mainly at the beginning or at the end of an inscription. This information can be used to locate smaller linguistic units within the texts. Even automated analyses have been used, for the location of junctures or morph boundaries, for discovering which signs are functionally similar to each other, and so on. The problem of the two principal unknowns, the script and the language, need to be separately tackled.

## Clarifying the type of script

From the history of writing we know that the writing systems of the world have evolved historically and stagewise, in three successive steps. We can ask if the script is logosyllabic (do the signs represent words or corresponding syllables), syllabic (do the signs almost exclusively have a syllabic value), or alphabetic (do the signs represent a separate phoneme, in the oldest scripts of this type mainly a consonant)? The main criteria that can be used to define the type are the number of distinct signs, the word length measured in the number of signs, and the age of the script.

In the Indus script, the number of known signs is around 400, with about 200 basic elements. This number corresponds fairly well to the number actively used in logosyllabic scripts at one time; it is too high for the script to be syllabic or alphabetic. Word divisions are not marked, but there is a good number of inscriptions comprising only one, two or three signs. In logosyllabic scripts one to three signs is a very typical word length, but in syllabic and alphabetic scripts many words are much longer.

As to the age of the Indus script, the Mature Harappan phase in which the fully developed Indus script was used is assumed to have started around 2600-2500 BC. Short inscriptions that include the most frequently attested sign of the Indus script, found on a recently excavated baked seal impression and a potsherd, suggest that the Indus script was actually created already during the proto-urban period, about 2800-2600 BC. Inspiration, restricted to the basic principle of logosyllabic writing, may have come from the Proto-Elamite script, which spread widely over the Iranian Plateau by 2900 BC. The creators of the Indus script seem to have resorted to traditional local symbols.

In any case, the Indus script is much older than the earliest known syllabic scripts, the Eblaite cuneiform of Syria and the Linear Elamite of Susa, which date from around 2350 and 2250 BC respectively. The earliest alphabet was created c. 1600 BC. The syllabic and alphabetic systems came into being as simplifications of the logosyllabic scripts used in Mesopotamia and Egypt.

Thus all criteria agree in suggesting that the Indus script belongs to the logosyllabic type. The prospects and methods of deciphering such a script without translations differ in some essential respects from those of syllabic and alphabetic scripts, which form closed systems that cover the entire phonology of the language, and can be decoded as a systemic whole.

In logosyllabic scripts, there are many more signs and variables to take into account, and the phonetic bond between the signs is weaker. There is no chance of building phonetic grids of the kind invented and realized in the decipherment of the Linear B. A complete phonetic decipherment of the Indus script is not possible with presently available materials. We can only hope for a partial phonetic decipherment covering some individual signs. But to reach even this limited goal we need a valid method and good starting points for hypotheses.

## The rebus principle used in picture puzzles

If the pictorial meaning of a sign can be recognized from its shape, and if the contextual clues for determining approximately the meaning which a particular sign was intended to have in a particular context are sufficient, we have a chance to understand a sign. This is the case with the U- or V-shaped sign, which can be understood to mean a vessel from the pictorial scene accompanying an inscription that contains this sign: It shows a kneeling man who holds a U- or V-shaped object in his hands and extends it towards a tree in front of which he is kneeling (See fig. 1). In such a case it is not necessary to know how the word was pronounced.

A sign, however, is not fully deciphered as long as its ancient pronunciation has not been recovered. A sign can stand for the thing that it depicts as well as for any other thing which has the same phonetic value. The use of this rebus principle is necessary particularly when abstract concepts have to be expressed. Homophony in the form of puns undoubtedly played a role in folklore long before it was utilized in writing. Importantly, puns usually are so language-specific that their point is lost

Figure 1. 'Sacrificial vessel' in the iconography and text of a moulded tablet (M-478) from Mohenjo-daro.

in translation. Thus we have a chance to identify the language that underlies the Indus script and to recognize the phonetic value of sign(s) involved in those cases alone, where the rebus principle has been applied.

## The language

While minority languages are likely to have been spoken in the Greater Indus Valley, only one written language is attested in the Indus texts of South Asia. As the population numbered around one million, we must surmise that the Indus language belonged to a language family which is represented among the languages known from other sources. The cuneiform texts speak of a distant country called Meluhh, which most scholars identify with the Greater Indus Valley. There were interpreters of the Meluhh language, which implies that it differed from the languages commonly spoken and understood in ancient Near East. Some seals found in the Near East contain typical Indus signs, but their sequences are often completely dissimilar from those occurring on native Harappan texts. This suggests that Harappans residing in the Near East had adopted the local language and that it was different from the Indus language.

What about the more likely alternatives, languages known to have existed in South Asia? The Sino-Tibetan languages, Burushaski, and the Austro-Asiatic languages can all be left out of account as unlikely, because their genetically related languages are in the north or east and there are no archaeological cultures warranting an earlier spread of these languages to the Indus Valley. The Aryan branch of the Indo-European language family could be a candidate were it not for the absence of the domesticated horse in the Indus Civilization. The horse has played an important role in the culture of the Indo-Iranian-speakers.

The only remaining alternative is the Dravidian language family, now mainly spoken in South India. One Dravidian language, Brahui, however, has been spoken in Baluchistan immediately west of the Indus Valley for at least a thousand years. Even areal linguistics of South Asia supports the hypothesis that the Indus language belonged to the Dravidian family. Numerous loanwords and structural borrowings from Dravidian have been identified in Sanskrit texts composed in northwestern India at the end of the second and first half of the

first millennium BC. We can try if a phonetic decipherment of some Indus signs is possible on this basis.

## The 'fish' signs of the Indus script

The function of an inscribed artefact provides one of the most important clues to the general meaning of its text. The vast majority of the Indus texts are seals or sealings. Impressions of cloth, strings and other packing material on the reverse indicate that the Harappan seals were used to control economic administration and trade, as is the case with the Mesopotamian seals. The historical contact between the two cultures makes it highly probable that the Indus seal inscriptions also chiefly contain proper names of persons with or without their occupational or official titles and descent, as do the contemporaneous Mesopotamian seal inscriptions.

The sign looking like a 'fish' probably has the meaning 'fish' on Indus tablets that seem to mention offerings of one to four pots of fish. But although Mesopotamian economic texts often speak of fish, they are never mentioned in Mesopotamian seal inscriptions. The 'fish' sign, both plain and modified with various diacritic additions, occurs so frequently on Indus seals that almost every tenth sign belongs to this group. This suggests that these signs denote something else than fish on the seals. They could refer to deities, for names of gods are used to form Mesopotamian as well as later Hindu proper names of persons.

The most commonly used word for 'fish' in Dravidian languages is *m"n*, and this word is pronounced like the word *m"n* meaning 'star'. In the Mesopotamian cuneiform script the 'star' sign precedes the name of every deity. Astronomy, including the use of a star calendar, played an important role in Mesopotamia, and deeply influenced the religion: all the main gods were symbolized by particular stars or planets. In Hindu religion, too, stars and planets have important divinities as their 'overlords'. The domestic manuals of the Veda further prescribe that children should be given secret 'star names'. Thus it does not seem a farfetched idea that the 'fish' signs on Indus seals could stand for Proto-Dravidian names of stars, used as symbols for gods and as such also in human proper names.

This hypothetical reading can be tested by studying the composite signs in which the 'plain fish' is one component, as well as the compound words in which the 'plain fish' is preceded by a numeral sign (consisting of a varying number of short vertical strokes); for example, one large seal contains nothing but the signs '7' and 'plain fish'. Translating these words into Proto-Dravidian, we obtain the compound *eḷu-mîn* '7-star', which is attested in Old Tamil texts as the native Tamil name for Ursa Major, the 'Great Bear' or 'Big Dipper', a constellation consisting of seven stars.

Similarly, one of the composite signs consists of two components, the 'plain fish' and a 'roof' over it. 'Thatched roof' is *vêy / mêy* in Proto-Dravidian, and this is nearly homophonous with *may* 'black'. The Old Tamil name for the planet Saturn is *mai-m-mîn* 'black star'. Saturn is not only a dim but also a slow planet; in the Buddhist and Jaina iconography, the planetary god Saturn is represented as riding upon a turtle. The turtle can be labelled an aquatic animal, as it largely lives in water. As it moreover always carries a roof-like shield over itself, the symbol of 'fish with a roof' is even pictorially an appropriate symbol for the slow planet Saturn.

In this way, several other composite 'fish' signs or compound words involving the 'fish' sign can systematically be interpreted as names of stars or planets in Proto-Dravidian (see fig. 2).

| | SIGN OR SIGN COMBINATION | PICTORIAL MEANING | SHARED PHONETIC SHAPE IN DRAVIDIAN | INTENDED MEANING |
|---|---|---|---|---|
| A |  | fish | mīn | star |
| B |  | roof + fish | mey / may + mīn | black + star (= Saturn |
| C |  | halving, dividing+fish | pacu+ mīn | green + star (= Mercury) |
| D |  | (intervening) space + fish | veḷi / veḷ (ḷi) + mīn | white (bright, star) + star (= venus) |
| E |  | fig – tree + fish | vaṭa + mīn | north + star |
| F |  | fig – tree + space | vaṭa + veḷḷi | north + star |
| G |  | six + fish | caru + mīn | six +star (= Pleiades) |

Figure 2. Systematic Dravidian interpretations of some 'fish' and related signs of the Indus script.

## The banyan tree and the North star

To take another example, in the Purāṇa texts written in Sanskrit the mighty banyan fig, called either *vaṭa* or nyagrodha, is the tree of the northern direction. Why? *Nyag-rodha* Sanskrit literally means 'downwards growing', from the fact that the characteristic air-roots of this tree hang down and reach towards the ground, later taking root and becoming new trunks of the tree.

Sanskrit *vaṭa* appears to be of Dravidian origin: it can be derived from the Proto-Dravidian word *vaṭam* 'cord, large rope, cable', for hanging air-roots resemble ropes. Tamil *vaṭa-maram* 'banyan' therefore literally means 'tree with ropes'. The connection of this tree with the north is due to the fact that Proto-Dravidian had another, homophonous word *vaṭa*, which means 'north'; but there is

no such linguistic association between 'banyan' and 'north' in Indo-Aryan languages. But there is more to the matter than this.

In the Indus script, there is a compound consisting of the signs for 'fig tree' and 'fish', yielding a Proto-Dravidian compound *vaṭa-mîn* 'north star'. In Old Tamil literature, *vaṭa-mîn* is attested as the name of the tiny star Alcor (Sanskrit Arundhatî) in the constellation of Ursa Major. It is supposed to represent the faithful wife of Vasiṣṭha, one of the Seven Sages with which Ursa Major is associated. This star is to be shown to the bride in the marriage ceremony according to both Vedic and Old Tamil texts. It is likely that originally *vaṭa-mîn* denoted the nearby pole star (Thuban, the 'immobile' centre of the rotating heavens in 3000 BC.). The Sanskrit name of the pole star is *dhruva* 'fixed, firm, immovable, constant', and the pole star is also shown to the bride as an exemplar to be emulated.

The Purāṇa texts contain an interesting conception about the pole star, which seems to be explained by the name *vaṭa-mîn*. In reply to the question, why the stars and planets do not fall down from the sky, these heavenly bodies are said to be bound to the pole star with invisible 'ropes of wind'. These 'ropes' seem to refer to the air-roots of the cosmic banyan tree, which God Varuṇa is said to hold up in the sky in the earliest Indian text (Ṛgveda 1,24,7, dating from c. 1000 BC), a conception naturally following from the Dravidian name *vaṭa-mîn* 'north star' = 'banyan star' = 'rope star'.

## Note

This paper was originally written for the exhibition "The Tower of Babel" organized at the Art Historical Museum of Vienna, Austria. The theme of the exhibition was the origin and multiplicity of languages and scripts, and included also an attempt to convey to the general public an idea of how forgotten scripts of antiquity have been deciphered. The paper was published in German with the title "Die Indus-Schrift und ihre Entzifferung" on pages 323-329 of the four-volume publication associated with the exhibition: Wilfried Seipel (Hrsg.), *Der Turmbau zu Babel: Ursprung und Vielfalt von Sprache und Schrift*, Band IIIA: Schrift. Wien: Kunsthistorisches Museum & Milano: Skira editore, 2003. The English version is published in *Ancient Pakistan* at the kind request of the editor, Professor Muhammad Farooq Swati.

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