AIRĀVATI

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Iravatham Mahadevan

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Is the Indus script indeed not a writing system?[1]

Parpola, Asko

Is the Indus script a writing system or not? I represent the traditional view that it is, and more accurately, a logo-syllabic writing system of the Sumerian type. This paper is an enlarged version of the criticism that I presented two years earlier in Tokyo, where it was published soon afterwards (Parpola 2005). What I am criticizing is "The collapse of the Indus script thesis: The myth of a literate Harappan Civilization" by Steve Farmer, Richard Sproat and Michael Witzel (2004), where the authors categorically deny that the Indus script is a speech-encoding writing system.

Farmer and his colleagues present ten main points or theses, which according to them prove that the Indus script is not writing:

1. Statistics of Indus sign frequencies & repetitions
2. "Texts" too short to encode messages
3. Too many rare signs, especially "singletons"
4. No sign repetition within any one text
5. "Lost" longer texts (manuscripts) never existed
6. No cursive variant of the script developed, hence no scribes
7. No writing equipment has been found
8. "Script" signs are non-linguistic symbols
9. Writing was known, but it was consciously not adopted
10. This new thesis helps to understand the Indus Civilization better than the writing hypothesis.

I shall take these points up for discussion one by one.

Statistics of Indus sign frequencies & repetitions

Firstly, Farmer and his colleagues claim that comparison of the Indus sign frequencies "can show that the Indus system could not have been a Chinese-style script, since symbol frequencies in the two systems differ too widely, and the total numbers of Indus symbols are too few" (Farmer & al. 2004: 29). They also point out that signs are repeated within a single inscription much more often in Egyptian cartouches than in Indus seals of a similar length.

There is no difficulty to agree with these observations. There is a vast difference between the Chinese script with its theoretically nearly 50,000 signs (and even in practice about 5000 signs) and the Indus script with only about 400 known graphemes.

"*But* [as Farmer and his colleagues themselves conclude,] studies of general sign frequencies by themselves cannot determine whether the Indus system was a 'mixed' linguistic script [that is, a logo-syllabic script of the Sumerian type]... or exclusively a system of nonlinguistic signs" (Farmer & al. 2004: 29).

As this is an important point, my colleague Dr Kimmo Koskenniemi, who is Professor of Computer Linguistics at the University of Helsinki, verified from Dr Richard Sproat by e-mail in April 2005 that they both agree on the following: "Plain statistical tests such as the distribution of sign frequencies and plain reoccurrencies can (a) neither prove that the signs represent writing, (b) nor prove that the signs do not represent writing. Falsifying being equally impossible as proving."

Rebuses were used very much from the earliest examples of the Egyptian writing. Around 3050 BC, the name of King Narmer was written with the hieroglyphs depicting 'catfish' (the Egyptian word for 'catfish is *n'r*) and 'awl' (the Egyptian word for 'awl' is *mr*). (cf. Gardiner 1957: 7). Egyptian rebus-punning ignored wovels altogether, but the consonants had to be identical (cf. Gardiner 1957: 9). Other early logo-syllabic scripts too, allowed moderate liberties, such as difference in vowel and consonant length. The Egyptian words represented by the hieroglyphs could contain three or two consonants or just one (cf. Gardiner 1957: 25). Eventually only the one-consonant signs were selected by the Egyptian-trained Semitic scribes for writing their own language, but they were used copiously also in Egyptian-language texts, and not only for writing foreign proper names. This easily explains the difference in the statistics between Egyptian cartouches and Indus seal inscriptions.

"Texts" too short to encode messages

The second argument of Farmer and his colleagues is that "Indus inscriptions were neither able nor intended to encode detailed 'messages', not even in the approximate ways performed by formal mnemonic systems in other nonliterate societies" (Farmer et al. 2004: 42). One of the two reasons adduced in support of this thesis is that the Indus inscriptions are too short.

But although the Indus texts have as their average length five signs, this is quite sufficient to express short noun phrases in a logo-syllabic script of the Sumerian type. We cannot expect complete sentences in seals and other types of objects preserved (cf. Parpola 1994: 87). But even written noun phrases qualify as language-based script — I shall return to this point later.

The Mesopotamian seal inscriptions typically contain: a proper name ± descent ± occupation (cf. e.g. Edzard 1968). In the most elaborate seals of the high officials, this information is couched in an invocation addressed to the King or other dignitary. Here are two examples of Mesopotamian seal inscriptions: "Adda the Scribe", "O Sharkali- sharri, King of Akkad: Ibni-sharri the Scribe (is) your servant". These Akkadian seals are contemporary with the heyday of the Indus Civilization, and the latter one in fact attests to contacts with it. The water-buffalo depicted in it was imported to Mesopotamia from the Indus Valley during the rule of Sargon the Great, King of Akkad (2334-2278 BC) and entered Mesopotamian iconography towards the end of his 60 year long rule, to disappear from the iconography and the faunal remains in the beginning of the second millennium BC when the Indus Civilization collapsed (Cf. Boehmer 1975).

Not all Indus texts[2] are so short — for instance the one-line seal inscription M-355 from Mohenjo-daro has 14 signs. But even a single sign of a logo-syllabic script can convey a message. The single-sign seal inscription H-94 from Harappa probably renders the occupational title of the seal owner. Single-sign texts may consist of non-composite signs, but here this single sign is a composite sign consisting of two component signs. Many composite signs (like the one in the text H-94) have 'man' as the final component and may denote occupational titles such as 'police-man' or 'milk-man'. Partially identical sequences show a functional correspondence between compound signs and their component signs (cf. Parpola 1994: 80-81 with fig. 5.3). The Egyptian script around 3000 BC was used in a number of inscriptions, most of which were very short, often consisting of just two or three signs. They recorded proper names with a high percentage of rebus signs and thus qualify as writing.

Too many rare signs, especially "singletons"

The third argument of Farmer and his colleagues has been put into words as follows: "Further evidence that clashes with the Indus-script thesis shows up in the large number of unique symbols (or 'singletons') and other rare signs that turn up in the inscriptions ... A number of inscriptions

also contain more than one singleton in addition to other rare signs, making it difficult to imagine how those signs could have possibly functioned in a widely disseminated 'script'" (Farmer & al. 2004: 36).

It is true that around 25% of the about 400 graphemes of the Indus script are attested only once (cf. Mahadevan 1977: 17; Parpola 1994: 78, table 5.1).

But if more texts are excavated, many of these 'singletons' will occur more than once; there will also be new rare signs. Many of the Indus 'singletons' occur in the midst of more frequently occurring signs, which helps their understanding. All logo-syllabic scripts had rarely occurring signs, some of these scripts quite many. Chinese has very many rare signs, and some of them do occasionally occur even in newspapers.

No "random-looking" sign repetitions within any one text

Although Farmer and his colleagues in passing refer to logosyllabic writing systems of the Sumerian type and their functioning, their argumentation implies that in order to represent a language-based script the Indus signs should largely be phoneticized in the manner of the Egyptian cartouches. However, in early logosyllabic scripts one sign often stands for a complete word. Even a seal with a single sign can express its owner, and there is mostly little reason for sign repetition in short seal texts written in an early logosyllabic script of the Sumerian type. The alleged lack of what they call random-looking type of sign repetition is mentioned as the fourth and most important and critical evidence against the thesis that the Indus script is a writing system: "Most importantly, nowhere in Indus inscriptions do we find convincing evidence of the random-looking types of sign repetition expected in contemporary phonetic or semi-phonetic scripts" (Farmer & al. 2004: 29-30).

Farmer and his colleagues themselves admit that "some Indus signs do repeat in single inscriptions, sometimes including many repetions in a row" (p. 31). However, they do not accept the evidence of such duplications: "Whatever the origins of these different types of duplications, all that is critical for our purposes is to note again the lack of any suggestions in them of the random-looking repetitions typical even of monumental scripts like Luwian or Egyptian hieroglyphs" (p. 36).

The hieroglyphic signs drawn in black in fig. 1 mark the repetitions in the cartouches of Ptolemy and Cleopatra; they were crucial in the

decipherment of the Egyptian script. But these are the repetitions when both of the two cartouches are taken into consideration. Farmer and his colleagues speak of sign repetitions limited to single cartouches, in which case Ptolemy's cartouche has only one sign repetition, namely the duplication of the sign E, one after the other in a row, which according to Farmer & al. does not count as a "random-looking" repetition. Within Cleopatra's cartouche, there is likewise only one sign repetition, namely that of the eagle-shaped sign for A. This latter case would qualify as an example of a "random-looking" sign repetition.

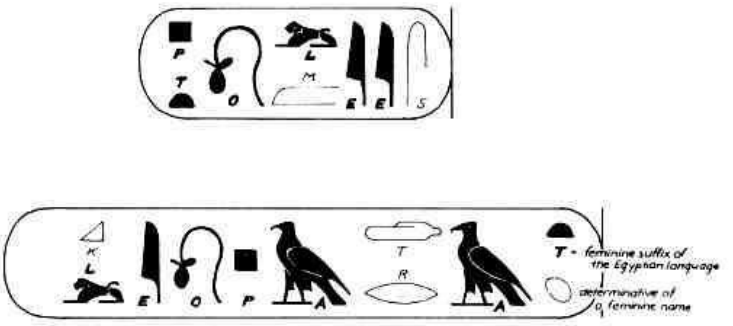

Fig. 1 : Cartouches of Ptolemy and Cleopatra: the Egyptian hieroglyphs and their transliterations (with repetitions shown in bold). (After Parpola 1994: 41, fig. 3.1.)

But sign repetition within single Indus inscription DOES occur, also of the "random-looking type" completely missed by Farmer and his colleagues. Such repetition occurs even in the "bar-seals", which Farmer and his colleagues (2004: 33) consider particularly crucial for the Indus script thesis. The following counter examples by no means exhaust the material.

In the 10-sign text M-682 from Mohenjo-daro, one sign is repeated three times, two other signs are repeated twice, and all in different places, that is, not in a row.

In M-634 from Mohenjo-daro one sign is repeated in three different places. Farmer and his colleagues have noticed this case, but disqualify it because in their opinion the "sun symbol" shows that non-linguistic symbols are involved. Of course this sign can very well depict the solar wheel with rays, as I have myself proposed on the basis of Near Eastern and later Indian parallels (cf. Parpola 1994: 104, 106 fig. 7.5; 110; 116-

117). But, how do Farmer and his colleagues know that this sign has not been used phonetically as a rebus sign: after all, it is precisely this type of "random repetition" that they consider as proof for phonetic usage!

In M-1792 (Marshall 1931: III, pl. 106 no. 93) from Mohenjo-daro one sign (different from that of M-634) is also repeated in three different places.

The seal K-10 from Kalibangan has ten signs. One and the same two-sign sequence is repeated in two different places.

In the 11-sign text M-1169 from Mohenjo-daro, one sign is repeated in two different places.

In the 8-sign "bar-seal" M-357 from Mohenjo-daro, one sign is repeated in two different places.

I agree with Farmer and his colleagues that some of the sign duplications in row imply quantification (cf. Farmer & al. 2004: 31). I shall come back to the probable function of the small bifacial tablets later on. The inscription on one side of them usually has just the U-shaped sign, preceded by one to four vertical strokes for the numbers 1 to 4: UI, UII, UIII, UIIII. In some tablets, such as H-764 from Harappa, the U-shaped sign is repeated three times: UUU, obviously an alternative to UIII, where III = number 3 is a numeral attribute (cf. Parpola 1994: 81). Farmer and his colleagues want to deny the use of number signs as numeral attributes of following signs; according to them they are independent symbols for fixed conceptions: thus seven strokes should denote "THE seven". However, different numbers clearly alternate before certain signs, among them the U-shaped sign, clearly suggesting attributive use (cf. Parpola 1994: 81-82; 88; 120, fig. 7.21, I).

Farmer and his colleagues (2004: 31) surmise that the duplication of other signs may emphasize their magical or political power. They do not mention that such sign reduplications can reflect emphasizing linguistic reduplications common in Dravidian (and other Indian languages) especially in onomatopoeic words, or as grammatical markers, such as Sumerian nominal plurals (cf. Parpola 1994: 82). There are also cases like the reduplication of the sign "dot-in-a-circle' that could depict the 'eye'. Comparing the Dravidian words *kaN* 'eye' and *ka:N* 'to see', I have proposed reading their reduplication as a compound word, namely *kaN-ka:Ni* attested in Tamil in the meaning 'overseer', a meaning that would

suit very well for instance its occurrence on an ancient seal-impression on a potsherd from Mohenjo-daro (M-1382) (cf. Parpola 1994: 215; 275).

"Lost" longer texts (manuscripts) never existed

All literary civilizations produced longer texts but there are none from the Indus Valley — hence the Indus "script" is no writing system: Farmer and his colleagues reject the much repeated early assumption that longer texts may have been written on "birch bark, palm leaves, parchment, wood, or cotton cloth, any of which would have perished in the course of ages" as suggested by Sir John Marshall in 1931 (I, 39). Farmer and his colleagues are ready to believe the "Indus script thesis" only if an Indus text at least 50 signs long is found.

But even though Farmer and his colleagues speak as if our present corpus of texts was everything there ever existed, this is not the case. More than 2100 Indus texts come from Mohenjo-daro alone, and yet less than one tenth of that single city has been excavated. Farmer and his colleagues do not know what has existed and what may be found in the remaining parts of the city, even if it is likely that only imperishable material of the kinds already available continue to be found. The Rongo-Rongo tablets of Easter Island are much longer than 50 signs. But does this make it certain that they represent writing in the strict sense?

Seed evidence shows that cotton has been cultivated in Greater Indus Valley since Chalcolithic times, and cotton cloth is supposed to have been one of the main export item of the Harappans. Yet all the millions of Harappan pieces of cotton cloth have disappeared for climatic reasons, save four cases where a few microscopic fibers have been preserved in association with metal (cf. Possehl 2002: table 3.2, with further references). Alexander's admiral Nearchus mentions "thickly woven cloth" used for writing letters in the Indus Valley c 325 BC. Sanskrit sources such as the Ya:jñavalkya-Smrti (1,319) also mention cotton cloth, *(ka:rpa:sa-)paTa*, as writing material around the beginning of the Christian era. But the earliest preserved examples date from the 13th century AD (cf. Shivaganesha Murthy 1996: 45-46; Salomon 1998: 132).

Emperor Asoka had long inscriptions carved on stone (pillars and rocks) all around his wide realm in 260 to 250 BC. They have survived. But also manuscripts on perishable materials must have existed in Asoka's times and already since the Achaemenid rule started in the Indus Valley c 520 BC. This is suggested among other things by the mention of *lipi* 'script' in Pa:Nini's Sanskrit Grammar (3,2,21) which is dated to around 400-350

BC. Sanskrit *lipi* comes from Old Persian *dipi* 'script'. The earliest surviving manuscripts on birch bark, palm leaves and wooden blocks date from the 2nd century AD and come from the dry climate of Central Asia (cf. Shivaganesha Murthy 1996: 24-36; Salomon 1998: 131). We can conclude that manuscripts on perishable materials have almost certainly existed in South Asia during 600 years from the start of the Persian rule onwards, but they have not been preserved; this period of 600 years with no surviving manuscripts corresponds to the duration of the Indus Civilization.

No cursive variant of the Indus script developed — hence no scribes

The sixth argument of Farmer and his colleagues is based on the observation that everywhere scribes writing manuscripts tended to develop a cursive style. From the fact that the Indus script changed very little during its 600 years of existence they conclude that there were no longer texts nor any scribes.

But the Egyptian hieroglyphs preserved their monumental pictographic shapes for 3000 years.The Egyptian cursive hieratic style of papyrus manuscripts does not differ so very much from the monumental hieroglyphs. The difference between Maya manuscripts and monumental inscriptions is not all that great, either.

Actually there is quite a lot of graphic variation in the Indus signs (see the sign list in Parpola 1994: 70-78, fig. 5.1), and in my opinion this variation provides also an important key to their pictorial or iconic understanding. On the other hand, the Indus script emerges in the Mature Harappan period already more or less fully standardized, and by this time a lot of shape simplification or creation of a more cursive script had already taken place.

No writing equipment has been found

No writing equipment has been found, hence Farmer and his colleagues conclude that there were no scribes nor any manuscripts. Four archaeologists specializing on the Indus Civilization have interpreted some finds as writing equipment, but their suggestions "are no longer accepted by any active researchers" (Farmer et al. 2004: 25).

But thin metal rods, such as used in South India to incise palm leaf manuscripts, could have early on corroded away or beyond recognition. From painted Indus texts on Harappan pots (e.g. Sktd-3 from Surkotada

in CISI 1: p. 392) and bangles (cf. Blk-6 from Balakot in CISI 2: p. 432) we know that Indus people used brushes to write, although such brushes have not survived or have not been recognized — and in North India palm leaf manuscripts have been painted with brushes. For the record, some of the provisional identifications for Harappan writing equipment (Mackay 1938; Dales 1967; Konishi 1987; Lal 2002) were published fairly recently, and two of these scholars are still themselves "active researchers".

The Indus "script" signs are actually non-linguistic symbols

Instead of a language-based writing system, Farmer and his colleagues (2004: 45) see in the Indus signs "a relatively simple system of religious-political signs that could be interpreted in any language". The non-linguistic symbols of Mesopotamian iconography are said to be a particularly close and relevant parallel, as they may be arranged in regular rows with a definite order like the Indus signs.

But in Mesopotamian seal iconography, the non-linguistic symbols usually occur as isolated signs, for instance near the gods they belong to. Arranged in longer rows and with a definite order they occur only in very limited contexts: mainly on stelae and boundary stones (kudurru) between 1600 and 600 BC. Mesopotamia was a literate civilization, and the symbols on the boundary stones followed the order of divinities in curse formulae written down in cuneiform texts — the symbols represented deities invoked to protect the boundary stone (cf. Black & Green 1992: 15-16; 113-114).

Writing was known to the Indus people from Mesopotamia, but it was consciously not adopted

Finally, Farmer and his colleagues ask themselves: "The critical question remains of why the Harappans never adopted writing, since their trade classes and presumably their ruling elite were undoubtedly aware of it through their centuries of contact with the high-literate Mesopotamians" (Farmer et al. 2004: 44). Their answer is that the Harappans intentionally rejected writing for some such reason as the Celtic priests of Roman times: for the druids were averse to encode their ritual traditions in writing like the Vedic Brahmins of India (ibid.).

But it is not likely that the Harappans would have rejected writing for such a reason because: adopting writing did not oblige them to divulge their secret texts, which could be guarded in an esoteric oral tradition. In

any case literacy must have been fairly restricted. Even in Mesopotamia literary texts were written down only long after the invention of writing. It is true that some complex societies did prosper without writing — the Incan empire for example used instead a complex communication system of knotted strings. But writing does offer advantages not easily discarded.

We can indeed ask a counter question: Why was the Indus script created? In my opinion for economic and administrative reasons, like the Archaic Sumerian script. This is strongly suggested by the fact that the majority of the surviving texts are seal stamps and seal impressions quite clearly used in trade and administration (cf. Parpola 1994: 113-116). But proper judgement requires acquaintance with the evolution of the Indus Civilization. (The following short overview is mainly based on Possehl 2002).

The Indus Civilization came into being as the culmination of a long cultural evolution in the Indo-Iranian borderlands. From the very beginning, this was the eastern frontier of a large cultural area which had Mesopotamia as its core pulsating influence in all directions. In Western Asia, the domestication of animals and plants started by 8000 BC. This revolution in food production reached the mountain valleys of western Pakistan by 7000 BC. From the Neolithic stage, about 7000-4300 BC, some twenty relatively small villages are known, practically all in highland valleys. People raised cattle, sheep and goats. They cultivated wheat and barley, and stored it in granaries. Pottery was handmade, and human and bovine figurines reflect fertility cults. Ornaments reflect small-scale local trade.

During the Chalcolithic phase, about 4300-3200 BC, the village size grew to dozens of hectares. Settlements spread eastwards beyond the Indus up the ancient Sarasvati river in India, apparently with seasonal migrations. Copper tools were made, and pottery became wheel-thrown and beautifully painted. Ceramic similarities with southern Turkmenistan and northern Iran also suggest considerable mobility and trade.

In the Early Harappan period, about 3200-2500 BC, many new sites came into existance, also in the Indus Valley, which was a challenging environment on account of the yearly floods, while the silt made the fields very fertile. Communal granaries disappeared, and large storage jars appeared in house units. Potter's marks suggest private ownership, and stamp seals bearing geometrical motifs point to development in administration. Irrigation canals were constructed, and advances were made in all crafts. Mastery of air reduction in burning enabled making

high quality luxury ceramics. Similarities in pottery, seals, figurines, ornaments etc. document intensive caravan trade with Central Asia and the Iranian plateau, including Shahr-i Sokhta in Seistan, where some Proto-Elamite accounting tablets have been discovered. There were already towns with walls and a grid pattern of streets, such as Rahman Dheri. Terracotta models of bullock carts attest to improved transport in the Indus Valley, which led to considerable cultural uniformity over a wide area, especially where the Kot Diji style pottery was distributed.

The relatively short Kot Diji phase between 2800 and 2500 BC turned the Early Harappan culture into the Mature Indus Civilization. During this phase the Indus script came into being, as the recent American excavations at Harappa have shown. Unfortunately we still have only few specimens of the early Indus script from this formative phase (see CISI 3: pp. 211-230). At the same time, many other developments took place. For instance, the size of the burned brick, already standardized during the Early Harappan period, was fixed in the ratio 1:2:4 most effective for bonding.

During the Indus Civilization or Mature Harappan phase, from about 2500 to 1900 BC, the more or less fully standardized Indus script was in use at all major sites. Even such a small site as Kanmer in Kutch, Gujarat, measuring only 115 x 105 m, produced during the first season of excavation in 2005-2006 one clay tag with a seal impression and three carefully polished weights of agate (Kharakwal et al. 2006: figs. 11-12).

During the transition from Early to Mature Harappan, weights and measures were standardized, another very important administrative measure suggesting that economic transactions were effectively controlled. Weights of carefully cut and polished stone cubes form a combined binary and decimal system. The ratios are 1/16, 1/8, 1/6, 1/4, 1/2, 1 (= 13 g), 2, 4, 8, 16, ... 800.

By about 2500 BC, the Harappan society had become so effectively organized that it was able to complete enormous projects, like building the city of Mohenjo-daro. The lower city of at least 80 hectares had streets oriented according to the cardinal directions and provided with a network of covered drains. Many of the usually two-storied houses were spacious and had bathrooms and wells. The water-engineering of Mohenjo-daro is unparallelled in the ancient world: the city had some 700 wells constructed with tapering bricks so strong that they have not collapsed in 5000 years. Development of water traffic made it possible to transport heavy loads along the rivers, and to start direct trade with the

Gulf and Mesopotamia. Over thirty Indus seals and other materials of Harappan origin, such as stained carnelian beads, have been found in Western Asia.

That the numerous Indus seals were used to control trade and economy is certified by the preservation of ancient seal impressions on clay tags that were once attached to bales of goods and otherwise to safeguard property. There are impressions of clothing and knotted strings on the reverse of these clay tags, such as the one found at Umma in Mesopotamia (cf. Parpola 1994: fig. 7.16). Almost one hundred such clay tags come from the port town of Lothal on the coast of Gujarat (see CISI 1: pp. 268-289). A warehouse had burned down and therewith baked and preserved these tags. Many of them bear multiple seal impressions, some involving four different seals, as does the clay tag K-89 from another site, Kalibangan. The practice suggests the use of witnesses. Such bureaucratic procedures imply keeping records comparable to the economic tablets of Mesopotamia. Registers and other official documents — the kind of longer texts that I miss — are likely to have been written on palm leaves, cotton cloth or other perishable material that has not survived for climatic reasons.

I spoke earlier of sign duplications that imply quantification. The small bifacial tablets mainly known from Harappa had some economic and ritual function. At the right end of the tablet M-478 from Mohenjo-daro (cf. CISI 1: p. 115 & Parpola 1994: 109 fig. 7.12), we see a worshipper kneeling in front of a tree, undoubtedly sacred, and extending towards the tree what looks like a pot of offerings shown in profile. The accompanying inscription, read from right to left, begins with a U-shaped sign similar to the assumed pot of offerings, preceded by four strokes that represent number four. One side of most tablets from Harappa usually has nothing but this pot-sign, preceded by one to four vertical strokes for the numbers 1 to 4. In some cases, as in the tablet H-247, the pot-sign is held by a kneeling worshipper, as in the scene of the tablet M-478. In Harappa, many identical tablets have been found in one and the same location. They may have been distributed by priests to people who brought a given amount of offerings, either as receipts that dues had been paid to the temple, or as protective amulets in exchange of offerings. In either case, the priests probably kept some kind of log of the transactions. In a South Indian village where I have done field work (Panjal in Kerala), I have witnessed how each house brings one or more vessels full of paddy to the local shrine at festivals, to be managed for common good by temple priests.

Conclusion: Is the Indus script writing or not?

So is the Indus script writing or not? We have seen that all evidence adduced by Farmer and his colleagues is inconclusive: none of it can prove their thesis that the Indus script is not writing but only non-linguistic symbols, "a relatively simple system of religious-political signs that could be interpreted in any language" (Farmer & al. 2004: 45).

The question requires the consideration of some further issues. One of these is the fact that non-linguistic symbol systems ("potter's marks" and iconographic symbols) existed as early as since 3300 BC not only in northern Indus Valley but also in Baluchistan, Seistan & Kerman on the Iranian Plateau and in southern Turkmenistan, a circumstance not mentioned by Farmer and his colleagues (cf. Vidale 2007).

In contrast to these relatively simple systems of non-linguistic pot-marks, the Indus script has a great number of different signs, around 400, and they have been highly standardized. Moreover, the signs are usually neatly written in lines, as is usual in language-bound scripts. The normal direction of writing is from right to left; this is the direction of the impressions made with seal stamps, which were carved in mirror image. Occasionally the seal-carver ran out of space, and in such cases he cramped the signs at the end of the line to preserve the linear order. For instance in the seal M-66 from Mohenjo-daro, the single sign of the second line is placed immediately below the space which had proved too small. The three last signs thus have the same sequence as the last three signs in the seal M-12 from Mohenjo-daro.

But the most important characteristic of the Indus texts from the point of view of speech-encoding becomes evident if we do not limit the observation of sign repetition to single inscriptions as Farmer and his colleagues do. The fact is that the Indus signs form a very large number of regularly repeated sequences. The above discussed sequence of the three last signs in the seals M-66 and M-12 occurs in Indus inscriptions about 100 times, mostly at the end of the text. The order of these three signs is always the same, and this sequence is recorded from nine different sites, including two outside South Asia, one in Turkmenistan and one in Iraq (see fig. 2). If the Indus signs are just non-linguistic symbols as Farmer and his colleagues maintain, for what reason are they always written in a definite order, and how did the Indus people in so many different places know in which order the symbols had to be written? Did they keep separate lists to check the order? And one should note that there are hundreds of regular sequences that occur several times in the

texts. The text of eleven signs written on top of fig. 2 (attested in several identical tablets from Harappa: H-279 through H-284, see CISI 1: p. 222-223; and H-871 through H-873, see CISI 2: p. 335) can be broken into smaller sequences all of which recur at several sites (see fig. 2). As this small example shows, the texts even otherwise have a regular structure similar to linguistic phrases. The Indus signs do not occur haphazardly but follow strict rules. Some signs are usually limited to the end of the text, and even when such a sign occurs in the middle of an inscription, it usually ends a recurring sequence. Some other signs are limited to the beginning of the text, but may under certain conditions appear also in other positions. And so forth. (See Parpola 1994: 86-101).

Fig. 2 : Indus signs occur in strictly ordered sequences that recur at many different sites. Table compiled by AP for this paper

The unrelated graffiti scratched on pots at the Megalithic site of Sanur in South India (see fig. 3) offer a contrasting example. Three signs occur many times together, but their order varies. It does not matter in which order they are placed. This is what one normally expects from non-linguistic symbols. I do not believe that these Megalithic graffiti represent real writing in the sense of speech-encoding, but are non-linguistic symbols.

The Indus sign sequences are uniform all over the Harappan realm in South Asia, suggesting that a single language was used in writing. By contrast, both native Harappan and non-Harappan sign sequences occur on Indus seals from the Near East, the sequences usually being in harmony with the shape of the seal: square seals are typical of South Asia, round seals are typical of the Gulf and cylinder seals are typical of Mesopotamia. One would expect that the most frequently attested Indus sign would very often occur next to itself, but this is never the case in the Indus Valley. The combination is however attested on a round Gulf-type seal coming from the Near East, now in the British Museum (BM 120228). This seal contains five frequently occurring Indus signs but in unique sequences (cf. Parpola 1994: Fig. 8.6). This suggests that Harappan trade agents who resided in the Gulf and in Mesopotamia became bilingual and adopted local names, but wrote their foreign names in the Indus script for the Harappans to read. The cuneiform texts in fact speak not only of a distant country called Meluhha which most scholars equate with Greater Indus Valley, but also of a village in southern Mesopotamia called Meluhha whose inhabitants had purely Sumerian names.

Farmer and his colleagues claim that the Indus script is a system of non-linguistic symbols that can be understood in any language. They suggest that it belongs to the category which Andrew Robinson (2002: 30) proposes to call “proto-writing”, and to which he assigns “Ice Agecave art, Amerindian pictograms, many modern road signs, mathematical and scientific symbols and musical notation”. The speech-bound scripts or in Robinson’s terms “full writing “ came into being with the phonetization of written symbols by means of the rebus or picture puzzle principle.

Let us consider the rebus principle utilized in logo-syllabic scripts. Most signs were originally pictures denoting the objects or ideas they represented. But abstract concepts such as ‘life’ would be difficult to express pictorially. Therefore the meaning of a pictogram or ideogram was extended from the word for the depicted object to comprise all its homophones. For example, in the Sumerian script the drawing of an arrow meant 'arrow', but in addition 'life' and 'rib', because all three words were pronounced alike in the Sumerian language, namely *ti*. Homophony must have played a role in folklore long before it was utilized in writing. The pun between the Sumerian words *ti* 'rib' and *ti* 'life' figures in the Sumerian paradise myth, in which the rib of the sick and dying water god Enki is healed by the Mistress of Life, *Nin-ti*. But the Biblical myth of Eve's creation out of Adam's rib no more makes sense because the original pun has been lost in translation: ‘rib’ in Hebrew is *Sela:c* and has

no connection with Eve's Hebrew name *H'awwa:*, which is explained in the Bible to mean "mother of all living". (Cf. Parpola 1994: 102.) The point is that homophony usually is very language-specific, and rebuses therefore enable language identification and phonetic decipherment.

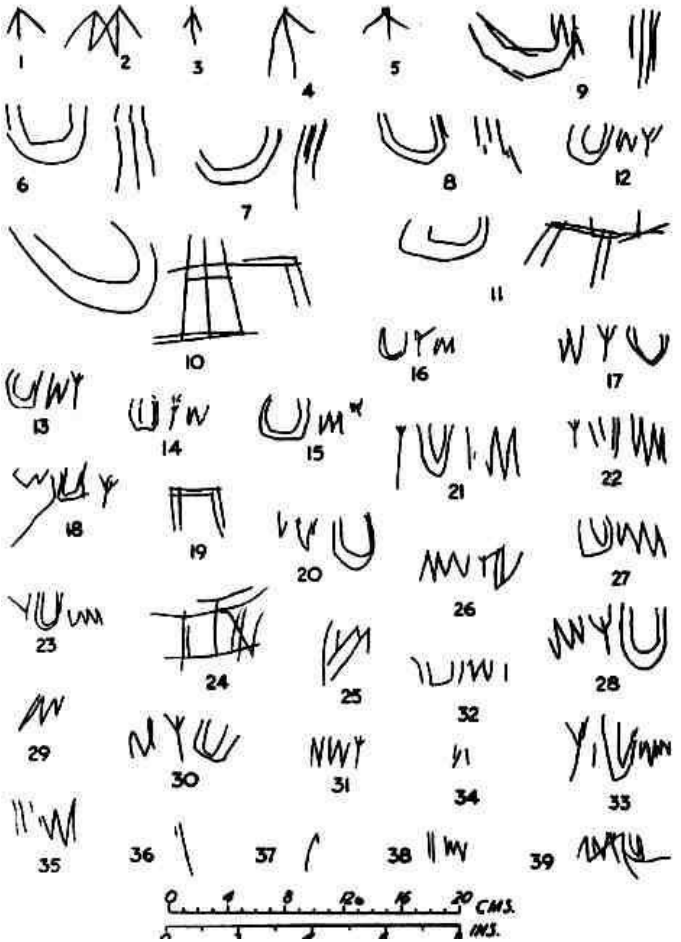

Fig. 3 : Pottery graffiti from the Megalithic site of Sanur in TamilNadu, South India. After Banerjee & Soundara Rajan 1959: 32, fig. 8.

Since the appearance of my criticism in 2005, Farmer and his colleagues have underlined that the rebus principle is occasionally used also in symbol systems not so tightly bound to language[3]. As an example they mention the use of rebus puns to express proper names in the otherwise

clearly non-linguistic communication system of heraldry. But by definition any ancient or modern symbol system which consciously uses rebuses and which therefore at least partially can be read phonetically counts as full writing.

Even short noun phrases and incomplete sentences qualify as full writing if the script uses the rebus principle to phonetize some of its signs. (Cf. Robinson 1995: 12.) Archaic Sumerian is considered a full writing system, because it occasionally uses rebus puns, for instance on a tablet, where the single word *gi* 'reimburse' (expressed by the sign depicting 'reed' = *gi* in Sumerian), constitutes the very incomplete phrase in its own compartment that constitutes a text unit (cf. Robinson 2002: 26). Even in later times, the Sumerian script had more logograms than syllabic signs, although with time the number of phonetic signs increased. When the cuneiform script was adapted for writing the Akkadian language, the system could be improved upon, and the script became almost fully phonetic.

The Egyptian script around 3100-3000 BC was used in a number of very short inscriptions, often consisting of just two signs, which recorded proper names but with a very high percentage of the signs used as rebuses (see e.g. Schott 1951). The famous palette of King Narmer with an inscription already quoted above is a good example. This is definitely already a writing system, even if the texts are on average shorter than the Indus texts! Here two rebus signs express the proper name of King Narmer, whose feats are related in a non-linguistic way in the pictures taking up the rest of the palette, yet with many formalized conventions. This is fully parallel to the use of rebus symbols to express proper names in the non-linguistic communication system of heraldry or coats of arms.

The new thesis helps to understand the Indus Civilization better than the writing hypothesis

As to the very last point raised, and claim made, by Farmer and his colleagues in their 2004 paper, I honestly cannot understand how the hypothesis that the Indus signs are non-linguistic symbols helps us to understand the Indus Civilization much better than the hypothesis that the Indus script is a logo-syllabic writing system. In a logo-syllabic script the signs may denote what they depict, or they may be used as rebuses. Before we can even start pondering their use as rebuses, we must clear up their iconic meaning. This necessary first step is identical with the efforts of Farmer and others to understand the Indus symbols as pictograms.

As an example of my own efforts to understand the pictorial shapes of the Indus signs, I would like to mention my interpretation of one particular sign as depicting the palm squirrel (Parpola 1994: 103 with fig. 7.1): the sign clearly represents an animal head downwards, tail raised up and four legs attached to a vertical stroke representing tree trunk. The palm squirrel spends long times in this pose, wherefore it is called in Sanskrit 'tree-sleeper'. In seal texts, the sign is more likely to have been used as a rebus rather than in its iconic meaning (for my interpretation see Parpola 1994: 229-230). Could the non-linguistic approach of Farmer and his colleagues offer a better explanation for the meaning of this sign?

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Notes

[1] This paper was written for, and presented at, the workshop on "Scripts, non-scripts and (pseudo-)decipherment" organized by Richard Sproat and Steve Farmer at the Linguistic Society of America's Linguistics Institute on the 11th of July 2007 at Stanford University (http://serrano.ai.uiuc.edu/2007Workshop/). It was also read as a public lecture at the Roja Muthiah Research Library, Chennai, on the 16th of February 2008. I thank the organizers of both events for this opportunity to participate in the debate on the nature of the Indus script, and am glad to publish the paper in honour of my old friend Iravatham Mahadevan, a great epigraphist.

[2] The Indus texts are cited in this paper with their labels in the CISI (see references).

[3] From the abstracts of the Stanford workshop papers (http://serrano.ai.uiuc.edu/2007Workshop/abstracts.html), I got the impression that at least one of the three authors wants to back out from their original thesis and change it into something else. While Farmer repeats the claim that "the so-called Indus script was not a speech-encoding or writing system in the strict linguistic sense, as has been assumed", Witzel writes as if he and his colleagues had only claimed that the Indus script does not SYSTEMATICALLY encode language in the sense that "Indus signs do not encode FULL phrases or sentences" (my emphasis, AP). Witzel also admits that "Indus symbols... may... contain occasional puns". Or maybe, when speaking of recent studies which suggest this, he is referring to me, since these have been my very assumptions, namely that the Indus seals hardly contain complete sentences and that they contain puns. In any case, I am happy if Witzel has changed his previously more radical view and now agrees with me. When I mentioned these impressions of mine at the Stanford workshop, Michael Witzel assured me that he was not backing out from the original claim but continues to maintain that the Indus script does not encode language.