S.R. RAO'S DECIPHERMENT OF THE INDUS SCRIPT

Iravatham Mahadevan

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1 INTRODUCTION

1.1　The Harappa inscriptions have been 'read' with a bland assurance and a complete lack of any authority by more than one person, and given more than one interpretation. One can only say that, apart from attempts to connect it with the nineteenth century 'script' of the natives of Easter Island in the Pacific, the Harappa script has perhaps suffered less from lunatics than the Minoan. But perhaps it is only the shortness of the available Harappa inscriptions that has deprived us from such entertaining fantasies as the transliteration of the Phaistos Disc into Basque hexameters.

So wrote Stuart Piggott in his book *Prehistoric India to 1000 B.C.*[1] in 1950. He wrote too soon. In the next three decades the Harappan or Indus inscriptions have indeed been "read" as verses in the Vedic metres of Old Indo-Aryan and in the *Kuraḷ* metre of Old Tamil. The signs of the Indus script have been identified variously as ideographs, phonetic syllables or "alphabets", or as tantric symbols or even as representations of animal bones and not a system of writing at all. The Harappan language has been identified as Indo-Aryan, Dravidian or "Indo-Sumerian". According to G.F. Dales,[2] there are 42 published "decipherments" and analyses, but his file is perhaps incomplete and must in any case be growing fast. However, while the publication of source material and raw data (sign lists, texts, concordances and statistical tabulations) has been well received and some limited progress in the formal analysis of the script acknowledged (as in the case of the determination of the direction of writing), none of the proposed models of actual decipherment has so far won general acceptance.

1.2　The book under review is the latest and the most comprehensive work in the field. This is an important work by a distinguished scholar and archaeologist, whose excavations of Lothal and other Harappan sites have added so much to our knowledge of the Indus civilization. Rao's earlier works, *Lothal and the Indus Civilization*[3] and *Lothal, A Harappan Port Town, Vol. I*[4] are mainly devoted to the excavations, but still give us a preview of his approach to the problem of the Indus script. The present work is the outcome of a Jawaharlal Nehru Fellowship awarded to the author in 1976. Rao has updated and consolidated the results

1 Pelican Books.
2 "New Inscriptions from Moḥenjo-daro, Pakistan", *Kramer Anniversary Volume*, ed, Barry L. Eichler (Verlag Butzon & Bercker Kevelaer, Neukirchener Verlag Neukirchen-Vluyn, 1976).
3 Asia Publishing House, Bombay, 1973.
4 Archaeological Survey of India, New Delhi, 1979.

of several years of sustained research in this book and has given us a completed model of his decipherment of the Indus script.

1.3   The work is divided into nine chapters. In chapter 1, Rao summarizes the salient features of the Indus civilization and briefly reviews the previous attempts to decipher the Indus script. Chapter 2, which is the most important section in the book, contains a detailed description of the methodology developed by Rao to decipher the script. Chapters 3 and 4 provide the readings of over a thousand inscriptions with texts, transliteration, translation and commentary. The Harappan language emerging from Rao's readings is analysed in chapter 5. The next three chapters (6-8) are devoted to the contents of the inscriptions. In the last chapter Rao provides a summary of his main findings and conclusions. The volume is profusely illustrated with manual copies of the inscriptions and analytical charts and diagrams to elucidate Rao's methodology. Photographs of selected inscribed objects are reproduced in the plates at the end of the volume. A "Harappan Chrestomathy" is added (Appendix I) to serve as a glossary of the words read by Rao in the inscriptions with meanings and parallel references to similar words from the Vedic literature.

2   METHODOLOGY

Rao's methodology is based on three main concepts which may be briefly summarized as follows:

2.1   *Structural analysis of signs*

Rao assumes that the signs of the Indus script as found in the inscriptions are mostly composite and subjects them to a "complete structural analysis" to identify "basic" signs and "auxiliary" marks, which are the two fundamental building blocks from which he derives all the "compound" signs by combination (figs 47-61). The basic signs are classified into two types, namely "pictures" and "linear (cursive)" signs. Rao also distinguishes the pictures from "psuedo-pictures" which look like pictures but are really combinations of two or more linear signs. The auxiliary marks (that is, the short strokes attached to the signs) are considered to be "vowel-helpers" indicating medial vowels. Rao's postulates of compound signs and vowel-helpers are based on the corresponding features of combinations and stroke-additions found in the historical Indian scripts (Brāhmī and Kharoṣṭhī).

2.2   *Evolution of the Indus script*

On the basis of the classification of signs as well as chronological considerations, Rao proposes that the Indus script passed through two main stages of evolution:

I   *The early or mature Harappan script* in use during the mature phase of the Indus civilization (2500-1900 B.C.) at Harappa, Mohenjodaro, Lothal-A and other early sites;

II   *The late Harappan script* in use during the last phase of the civilization (1900-

1200 B.C.) at the uppermost levels of Mohenjodaro, Lothal-B, Rangpur IIC-III, Daimabad and other late sites.

According to Rao, the Indus script evolved progressively in its *external* form from a pictographic-cum-linear script to a linear script by dropping almost all the pictorial signs and reducing the number of linear signs in the late stage. There was a corresponding *internal* development from a logographic-cum-syllabic script to a syllabic-cum-alphabetic script (tending towards the purely alphabetic system). According to Rao's counting, the mature Harappan script consisted of 62 basic signs while the late Harappan script had only 20 basic signs. Rao draws an important inference from his sign-counts, namely that the Indus script with a relatively small number of basic signs could not have been ideographic and must have been phonetic in character even in the early (mature) phase.

2.3 *Assignment of phonetic values from Semitic alphabet*

According to Rao, 75 per cent of the basic linear signs of the late Harappan script are almost identical in form with those of the contemporary Semitic alphabetic script. The similarity is explained by him to be due to the borrowing of the late Harappan script by the Semitic peoples as the model for their own writing system. This is the basis on which Rao assigns Semitic phonetic values to the corresponding Indus signs (fig. 8), assuming that similarity in form must mean identity of sound. Rao claims that when he read some of the Harappan inscriptions (figs 14 and 15) with "Semitic" phonetic values, the Harappan language turned out to be Indo-Aryan. This discovery enabled him to take the final step in his decipherment, namely the assignment of appropriate word-values from Sanskrit to the "pictorial" and "numeral" signs (pp. 110-2).

3   RESULTS

The following is a very brief summary of the results of the decipherment as claimed by Rao.

3.1   *The Harappan language*

The Harappan language is identified as an earlier or archaic branch of the Old Indo-Aryan, resembling closely the language of the *Ṛgveda*. The language as recorded in the inscriptions has only 24 sounds written with 40 basic signs. There are seven vowels including three diphthongs (*ə, a, ā, ṛ, ae, ao* and *ay*) and two semi-vowels (*r* and *v*). The vowels *i/ī* and *u/ū* are not found. There are no palatal or cerebral consonants. The sounds *y* and *l* do not also occur. There are three sibilants (*ś, ṣ* and *s*) and three laryngeals (*h, ḥ* and *ḫ*). Two additional aspirates found in the Harappan are *mh* and *rh*.

3.2   The Harappan language consists mostly of mono-syllabic words. The root itself generally serves as the nominal stem. There are no examples of dual or plural number, feminine or neuter gender. There are only three case-endings, each represented by one invariant "inflexional suffix", namely *ae* for the Dative, *ā* for the

Instrumental (Ablative ?) and (*a*)*ha* for the Genitive cases. When names and titles occur in apposition the inflexional suffix is added only to the terminal noun. Word order in the inscriptions is quite flexible; for example, the attribute can either precede or follow the noun it qualifies.

3.3 *Contents of the inscriptions*

The seals were used by the rulers and their officials to seal cargo or documents. However, the inscriptions contain mostly only their personal names and eulogistic titles, the most common being *pat, pa/pah, śāsa, paka* and *bhaga* which mean "governor", "protector", "ruler", "guardian" and "lord" respectively. The inscriptions refer to some Vedic clans (for example, Papṛ, Dasa, Dṛh, Vṛṣa, etc.) and confederacies (for example, the "Five" or the "Seven" peoples). Some of the place names found in the inscriptions which can be identified include *Hapta-dvīpa* (Indus valley) and *pañca-dvīpa* (Gujarat region). Some information on the Harappan religion can be gathered from the seals and the inscriptions. The "horned deity" depicted on the seals (including the famous "Paśupati" figure) is identified with Agni, the fire-god. The animals represented on the seals were deified and served as emblems of different clans.

4-6 CRITIQUE OF METHODOLOGY

4.1 *Structural analysis of signs*

The first step in the decipherment, namely "structural analysis" of the signs, which Rao claims to be his "most significant breakthrough" (p. 8), is also likely to be the most controversial. Some of the problems posed by the methodology are briefly considered below:

4.2 Rao's distinction between "pictorial" and "linear" signs is highly subjective and even idiosyncratic. For example, he recognizes the sign � as the picture of a man, but describes the sign 𝞫 as a "psuedo-picture" because what the man holds in his hands is, according to Rao, not a "bow and arrow" but a "semi-circle with an oblique line added to it" (p. 8). He does not take note of unmistakable examples of pictorial depiction of anthropomorphic signs, for example, the man with the club on the ivory plaque from Mohenjodaro,[1] and the man carrying loads on the Ashmolean Museum seal from Harappa.[2] If one is not to be guided by commonsense in recognizing such obvious pictorial depictions one may as well describe the sign � as a "linear" sign consisting of a vertical line with two pairs of oblique strokes attached to it !

4.3 Rao's identification of the "picture signs" is doubly suspect on account of the uncertainty in the recognition of the objects represented by the pictures and the

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1 J. Marshall, *Mohenjo-daro and the Indus Civilization*, 3 vols (Arthur Probsthain, London, 1931), pl. CXXXII : 10.

2 Iravatham Mahadevan, *The Indus Script: Texts, Concordance and Tables* (Memoirs of the Archaeological Survey of India, No. 77, New Delhi, 1977), 5123.

arbitrariness in the choice of the corresponding words from out of the many alternatives available in the Sanskrit lexicon. It is not at all certain that the sign ᛤ is a "scorpion" (*vṛścika*) or that the sign ⟪ is a "hand" (*hasta*) as supposed by Rao. Even if the signs ᴧᴧᴧ "hill" (*adri*), ⫚ "bird" (*śakunta*) and ⳾ "fish" (*śakula*) are correctly identified, the words chosen by Rao are by no means unique or even the most common words in Sanskrit to denote the respective objects. The principle of acrophony applied by Rao to assign phonetic values to the "picture" signs is not followed in the case of the sign ⟰ where the last sound *r* from *nṛ* "man" is chosen instead of the first sound *n* as required by the system.

4.4 The distinction made by Rao between "basic" and "compound" signs is also subjective and his technique of "analysis" (a euphemism for breaking up of signs) is quite arbitrary. Rao defines a "basic" sign as one which occurs "independently" (that is, in its "basic" form) in the inscriptions (p. 21). However in the absence of controls to identify the unique or correct solution, it is possible to apply this criterion and get results different from those obtained by Rao. To take a hypothetical case, the sign ⟰ which Rao considers as "basic" can be analysed as a "compound" in at least three different ways by combining "basic" signs occurring independently (see III A below).

$$\text{大} = \text{个} + \wedge$$

$$\lambda + \wedge$$

$$| + \wedge + \wedge$$

III A. Hypothetical "analysis" of MAN sign.

4.5 As regards "compound" signs Rao's criterion for identification is that the processes of joining and stroke-addition should be "clear" (p. 22). This is quite a subjective test as what is clear to one may not be so to another. For example, Rao reads the sign ⟰ as *ra* (fig. 11. 17) after an "analysis" which involves (i) *detaching* the lower right part of the sign; (ii) *inverting* it upside down; (iii) *reversing* the
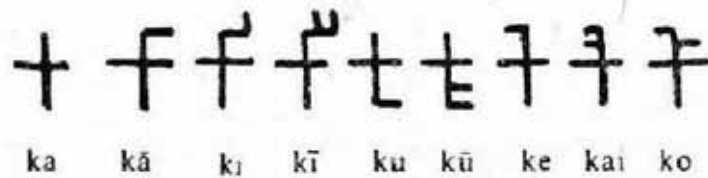
normal direction of reading; and (iv) *emending* the phonetic value *ŗ* to *r* to produce the final reading. None of these manipulations would appear to be "clear" in the sense of being obvious. Rao's "analysis" involves not merely the dismemberment of signs, but sometimes even their reconstruction in different configurations to produce signs of his choice. Some examples of his "analysis" of the Rangpur graffiti signs (fig. 5) are reproduced here (See 111 B below) to show how Rao applies this unusual technique to produce Indus signs out of the pottery graffiti.

| S.No.	RG	ANALYSIS	INDUS SIGNS	PHON. VALUE
13.	⌐┘	⌐ + ⎮	⌐⎮	ga
16.	⊐P	D + ⎮	⍉	da
29.	♯	▤ + ⎮ + ⎮	⎏	hā
36.	⅄	⊐ + ⎮	⊒	ha
40.	⋎	⋎ + ⎮	Ψ	ka

111B: Rao's "analysis" of Rangpur Graffiti (RG).

4.6   The "vowel-helpers" do not seem to be very helpful in actual practice. According to the theoretical model (fig. 10 and App. III), one short stroke is said to stand for -*a*, two for -*ā*, three for *ae/e* and four for *ao/o*. The strokes can be vertical, horizontal or oblique and may be attached to the signs at any point, above, below, at the sides or even inside (See 111C).

The addition of vowel-strokes is so unsystematic, unlike in the Brāhmi script, that it is a mystery how Rao was able to figure it all out, especially in the absence of any interlocking evidence. But much more surprising is the fact that Rao seldom uses his own system of vowel-helpers and relies more on the context to identify the medial vowels. For example, the sign ⎏ which is supposed to stand for *hā*, is almost always shortened to *ha*; and the sign 𝕏 which is given the

h	ha	hā	hae	hao

s	sa	sa	sa	śā

ka   kā   kı   kī   ku   kū   ke   kaı   ko

IIIC: Vowel markers in Indus and Brāhmī scripts.

theoretical value *śā* is often read as *sa*. Even more surprisingly, the sign ∪ which is given the theoretical value *ā*, is very often read as *a*, rendering this most frequent sign in the script practically superfluous in such cases, because the preceding consonant can also be read with the "inherent" *-a* in Rao's system. Rao's argument that such cases (of C-V combination) prove the alphabetic character of the script is weakened by the more frequent occurrence of consonants with attached "vowel-helpers" followed by the *ā* sign (that is, C^v-V combinations like *rā-ā*, *śā-ā*, etc.)

5.1   *Evolution of the Indus script*

Rao's postulate of the existence of a "late Harappan script" which is said to have evolved from the mature Harappan script by dropping most of the pictorial signs, reduction in the number of linear signs and changeover from a logographic-syllabic script to syllabic-alphabetic script rests on a very insecure foundation. There are too few inscriptions from the late Harappan period to form the basis of such far-reaching conclusions. According to Rao, the late Harappan material consists of 22 inscribed objects excavated by Dales (1976) from the uppermost levels of Mohenjodaro, 4 seals from Lothal (late levels), 1 each from Alamgirpur (unpublished ?), Daimabad and Rakhigadhi, and 210 inscribed potsherds from various sites (out of which only 25 sherds have 2 or more signs and only 3 sherds have 4 to 6 signs each). The inscriptions from Dales' excavations at Mohenjodaro

have to be excluded from this total as they do not in fact show any perceptible variation from those found at the lower levels to justify Rao's claim that they "confirm the simplification of Indus writing" (p. 237). Dales himself makes no such claim in his comparative analysis of the inscriptions. I would also leave out the half a dozen seals from Lothal (late levels), Daimabad and Rakhigadhi as these are also inscribed in the mature Harappan style and are in no way different from similar inscriptions of the earlier period. What remains is only a small number of pottery graffiti, hardly two dozen, with two or more signs in each. On the basis of the slender evidence presently made available to us, it cannot be said that the existence of a separate "late Harappan script" is established.

5.2 There is a serious fallacy in Rao's theory of evolution of the Indus script based on the absence of "pictures" and reduction in the number of "linear" signs in the late Harappan period (Table 2.1 ; figs 63-4). The fact is that it is statistically highly improbable that the less frequent signs (whether "pictorial" or "linear") will turn up in such a small sample except by pure chance. For example, the BIRD signs occur only 53 times in a total of 7281 sign-occurrences at Mohenjodaro (see my *The Indus Script: Texts, Concordance and Tables*; hereafter *IS:* Table III), and one cannot therefore expect even a single occurrence of a BIRD sign in the inscriptions excavated by Dales at this site with a total of only 76 sign-occurrences. This then is the true explanation why there are no "animals", "birds" or other infrequent "pictorial" signs in the very few late Harappan inscriptions found at Mohenjodaro, Lothal-B, Rangpur and other sites. Rao also ignores the qualitative difference between seal-texts and pottery graffiti both in respect of their contents and in their styles of writing. A more meaningful comparison would have been between the pottery graffiti of the mature Harappan and the late Harappan periods. It is significant that there are very few occurrences of pictorial signs of "animals", "birds", etc., in the pottery graffiti excavated from any of the Harappan sites (*IS:* Table IV). Furthermore only about one hundred different signs (that is, only about one-fourth of the total number in the sign-list) occur in pottery graffiti (*IS:* Table IV). There can hardly be any doubt that here again the apparent reduction in the number of signs is due to the smallness of the sample, the extreme brevity of the graffiti (with an average length of less than 3 signs) and possibly the difference in contents when compared with the seal-texts. There is therefore no force in Rao's contention that the reduction in the number of signs in the "late Harappan script" is evidence of phonetic "simplification".

5.3 According to Rao, the mature Harappan script consists of 62 signs and the "late Harappan script" 20 signs (p. 24). It is revealing how Rao fights shy of admitting the total number of signs even according to his own reckoning. The actual total in his model which is never mentioned in the book is 92, consisting of 40 "linear" signs (figs 47-59), 21 "pictures" (figs 59-61), 18 "stray" signs (all lumped together in a single entry in fig. 61 !), 10 "numeral" signs (which should also be counted as Rao assigns them syllabic values by phonetic transfer) and the 3 so-called

"word-separators". Rao's count of 20 signs in the "late Harappan script" is far too low to be credible.

5.4   Rao's theory that there was an inner development in the character of the Indus script from logographic to alphabetic systems is based mainly on external changes. There is, however, no necessary correlation between the outer and the inner developments in a writing system. The Egyptian was transformed from the highly pictorial hieroglyphic script to the highly cursive demotic script without any change in the inner character of the writing. Rao's implicit assumption connecting the external form of a sign with its internal character is also unwarranted. He seems to believe that "basic linear signs" must have alphabetic values, "compound linear signs" syllabic values and "picture signs" logographic values. However, none of the deciphered scripts shows such neat correspondences between form and sound. Rao himself assigns alphabetic values to the "picture" signs 𝈌 and 𝈆 , but resolves the contradiction by including these two signs alone in his inventory of "linear" signs (fig. 8) ! As Maurice Pope remarks in his recent book,[1] the application of the term "linear" to mean "non-pictorial" is highly subjective, "and in so far as it claims to tell us something about the inner structure of a script from the outward appearance of its signs, it is an impostor".

5.5   A serious problem in understanding Rao's theory of the inner development of the Indus script is his unusual and inconsistent terminology. As generally understood by epigraphists, a logogram is a word-sign, a syllabic sign is a phonetic syllable and an alphabetic sign represents a single sound, either a consonant (C) or a vowel (V). In Rao's terminology, logographic signs are generally described as "syllabic", and syllabic signs (of the CV type) as "alphabetic", forcing him to use the expression "purely alphabetic" for the single-sound signs. The following examples from Rao's book (fig. 2) illustrate his usage:

Rao's readings	*Rao's terminology*	*Correct description*
Aśva-śak ("Aśva, the powerful")	"Syllabic"	Logographic (two word-signs)
Aśva-pa ("horse-protector")	"Syllabic-cum-alphabetic"	Logosyllabic (one word-sign and one phonetic syllable)
Pa-ra (*para*, "supreme")	"Alphabetic"	Syllabic (two phonetic syllables)

Rao confines the term "logographic" only to his "pictorial" and "numeral" signs. He uses the term "logosyllabic" for word-signs "pronounced in syllables" (p. 182), whatever that might mean. He restricts the use of the term "syllabic" only to closed syllables and uses the term "conjuncts" to denote open syllables (of the CCV type). According to him, a "phoneme" is a phonetic syllable or even a

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1 *The Story of Decipherment from Egyptian Hieroglyphic to Linear B* (Thames and Hudson, London, 1975).

meaningful word (p. 46) ! In general, Rao's terminology is so confusing that one has to turn from his text to his examples to gather his real intention.

6.1 *The Semitic key*

Rao's choice of the Semitic alphabet as the key to the phonetic values of the Indus script is as surprising as his suggestion that the similarity between the two scripts is due to the borrowing of the late Harappan script by the Semitic people some-time during the middle of the second millennium B.C. While it is true that the Harappans had trade contacts with West Asia when the Indus civilization was flourishing, it is doubtful whether such contacts continued during the late Harappan period. Rao himself describes the level of the late Harappan culture thus:

> In the post-flood days, the late Harappans too lived in small villages. Their main occupations were agriculture and cattle-rearing. In a few large villages, metal working and bead-making supplemented their incomes. The decline in urban discipline was due to the disappearance of effective leadership and political control once exercised over large areas (p. 239).

Rao does not explain how these impoverished late Harappans leading a pastoral existence carried on such extensive trading with the Semitic peoples as to induce the latter to borrow the late Harappan script in preference to many other writing systems available almost at their door-step. It is also surprising that if the Semites indeed borrowed the Harappan writing, they left out such useful parts of the script identified by Rao as the vowel-signs and medial vowel marks and had to reinvent diacritics for vowels.

6.2 It is difficult to accept Rao's assertion that "the late Harappan alphabets used in late seals of Mohenjodaro, Lothal-B, Rangpur and Daimabad between 1900 and 1500 B.C. closely resemble those of the Proto-Sinaitic (1600 B.C.) and Ahiram (1200 B.C.) inscriptions" (p. 27). There are in fact hardly any resemblances between these two systems of writing *as found in the actual inscriptions*. For example, compare fig. 6 (some early Semitic inscriptions) with figs 14 and 15 (Indus inscriptions containing "Semitic" signs only) in the book. What Rao really means by his claim (p. 303) that 75 per cent of the "linear signs" of the "late Harappan script" are identical with the Semitic signs can be understood only when one bears in mind that Rao's "basic linear signs" are the creation of his "structural analysis" and are thus almost wholly artificial constructs. Even assuming that some of the simple linear forms in the two systems happen to resemble one another, this can hardly be the basis for inferring phonetic identity. As I.J. Gelb[1] points out, signs of the linear scripts are likely to show some resemblances to one another by accident, as these are based in practice on a few simple forms of straight lines, triangles, squares, and circles which can be more easily remembered. Gelb also cites two amusing incidents when school-children composed artificial alphabets

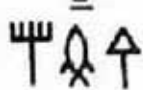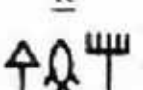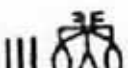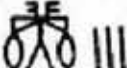1 *A Study of Writing*, rev. edn (Chicago University, 1963).

in which quite a few forms were found to resemble Semitic, Cretan and Cypriote signs !

7   REVIEW OF READINGS AND INTERPRETATIONS

7.1   *Direction of Reading*

In some cases Rao reads the inscriptions in the wrong direction by a mechanical adherence to the general rule of reading from the right, without looking into the sequence of signs, which clearly shows that the writing is reversed in these exceptional cases (for example, fig. 17B.66). At least in a few of these cases the selection of texts written in the reversed direction and reading them from the wrong end seem to be dictated by subjective considerations (for example, figs 16.5, 16.6 and 17.44 copied with the sign ٦∫ in the right-end position and read initially; cf. figs 16.7 and 17.42 where the sign is read as "initial" *ā* from fragmentary texts). As a matter of fact this sign is the most frequent final sign and seldom, if ever, occurs initially in the texts, and is thus the least likely candidate to represent an "initial" vowel in a syllabic script.

7.2   Even more strange is Rao's practice of reading the *same* text in *both* directions (for example, figs 14.1 and 14.2; 23C.65 and 23C.73; 26.14 and 26.15; 26.10 and 27.32; 26.1(a) and 27.48 (b) etc.). It is true that in many languages pairs of words with reversible spellings occur, as for example, GOD and DOG in English. But there is strong textual evidence for a fixed order of signs in the Indus script. For example, the following pairs of texts cited by Rao

L	R	Fig.	Nos
ᙡ𝑸↑	↑𝑸ᙡ	23C.73	23C.65
‖‖Ψ	Ψ‖‖	27.32	26.10
‖‖𝕆ᐱ𝕆	𝕆ᐱ𝕆‖‖	26.14	26.15
‖‖∪	∪‖‖	27.48(b)	26.1(a)

can be read only in a fixed order, that is, from the right for the texts in the right-hand column above (R), and from the left for the texts in the left-hand column above (L). This can be proved from the fixed order of these signs occurring in longer texts with known direction. Hence the reversed readings attempted by Rao is not warranted by the evidence and will produce only illusory words like *daśaha* (fig. 23C.73) and *Atr(i)* (fig. 27.48b).

7.3 Emendations

Rao reads each inscription generally in two stages, namely a preliminary reading based on the theoretical phonetic values assigned by him to the signs and an emended final reading which serves as the basis for interpreting the text. The empirical rules of emendation are so framed as to produce meaningful words from the "raw" readings. According to these rules, Ə is always lengthened as *a* and *ā* is often shortened as *a*; the -*a* endings may be changed to -*i* or -*u* endings (even though the vowels *i* and *u* are not represented in the script); the diphthongs *ae* and *ao* are generally read as *e* and *o* respectively; the vowel *ṛ* is often read as the consonant *r*, and the values of the "vowel-helpers" may be altered to suit the context. The "mute" consonants are generally read with "inherent" -*a* endings; the surds and the sonants may be interchanged in reading (*k*/*g*, *t*/*d*, *p*/*b*); the aspirated consonants may be read without aspiration and *vice versa* (*b* as *bh*; *dh* as *d*, etc.); and the sibilants can be read one for another (*ś* as *s*). For example, *ba-ka* (fig. 14.19) and *pagh-ā* (fig. 16.13) are both emended and finally read as *bhaga* and translated as "lord". If the Indus script is an invention by the Harappans to record an Indo-Aryan language and is not an importation or adaptation from the writing systems of non-Indo-European peoples, it is difficult to explain the extraordinary degree of flexibility in the orthography of the inscriptions as proposed by Rao.

7.4 Interpretations

A characteristic feature of Rao's interpretation of the texts is the multiple meanings given to so many of the words read by him. For example, the reading *ma-ḥā* (fig. 17.38) is emended as *makhā* and interpreted as: "(1) 'cheerful'; (2) 'vigorous' (*Ṛv*); (3) 'sacrificial oblation' (*Ś.Br.*); (4) name of a mythical being (*Ṛv*); and (5) *maha*, 'great, mighty, strong' (*Ṛv*). Originally *magh*" (p.67). The reader is bewildered by this mode of interpretation without any regard to the context. A very interesting example is Rao's interpretation of the most frequent text found on the sealings from Lothal (pl. VIIB; fig. 31.130). Rao rightly claims (p. 241) that the sealings bearing impressions of seals on one side and of packing materials on the other and found in the warehouse of Lothal prove conclusively that the seals were used mostly for commercial purposes. It therefore comes as an anti-climax to learn from Rao the meaning of this sealing-text (p. 135): "*pa*"— (*sapta*)-*ā*: "From protector Sapta".

> As *Sapta* is enclosed in brackets, it must be a name or an epithet of god or man or of a group or of *ṛṣis* or devotees. *Sapta* is also an epithet of Śiva according to some post-Vedic texts.

8 REVIEW OF RESULTS

8.1 Harappan Phonology

The phonology of the Harappan language as deciphered by Rao (p. 184 ff.) is far

too deficient to have served the needs of Old Indo-Aryan as known to us from the *Rgveda*. Even if one concedes for the sake of argument that the Harappan language was much more archaic than the Vedic and had not developed the cerebral consonants, it is inconceivable that even the most archaic Indo-Aryan would not have possessed the vowels *i* and *u* and the palatal consonants as proposed by Rao. One has only to glance through A.A. Macdonell and A.B. Keith, *Vedic Index of Names and Subjects*,[1] to see what a large proportion of the most common and essential vocabulary of Vedic Sanskrit would be unrepresented by the Harappan phonology as deciphered by Rao.

8.2 *Harappan Morphology*

Rao's Harappan morphology (p. 203 ff.) is quite dissimilar to that of Old Indo-Aryan as known from the *Rgveda*. Even if one assumes that the absence of the feminine gender and the plural number is due to the limited context of the inscriptions, it does not seem possible to explain away the grammatical peculiarities in Rao's model on the plea of archaism. In particular Rao's invariant "inflexional suffixes", which are added only to the terminal nouns, behave more like post-fixes than inflexional case-endings. Rao seems to have committed a serious mistake in identifying the sign ⟩f as the "Instrumental" case-ending *ā* (p. 219), but translating it throughout as the "Ablative" case-ending with the meaning "from". As the sign is the most frequent one in the script, the confusion has seriously affected the interpretation of a very large number of inscriptions. In any case, neither the Instrumental nor the Ablative case-endings are known to occur in the final position in the Indian seal-texts of the historical period, most of which end in the Genitive case with a few occurrences of Nominative and Dative case-endings.[2]

8.3 According to Rao, the Harappan language was largely mono-syllabic (p. 218). Further, the inscriptions use mono-syllabic contractions of longer words (e.g. *ma* for *mahā* "great") in order to conserve space (p. 220). Thus mono-syllabic words account for almost all the signs in the script (e.g. *ā, ka, ga, ta, da, dha, na, pa, ba, ma, va, śa, ha*; see Appendix I). Rao's readings produce a strange and unfamiliar impression on those conversant with the phonetic and lexical patterns of the Sanskrit language. The possibility does not seem to have occurred to Rao that he is perhaps converting Sanskrit into a mono-syllabic language in order to fit his readings into a script with a preponderance of logographic signs !

8.4 In view of the serious problems raised by Rao's methodology, it does not seem profitable to discuss in detail his findings on the contents of the inscriptions. It may, however, be pointed out that the absence of essential Indo-Aryan phonemes like the vowels *i* and *u* and the palatal consonants, the presence of invariant post-fixed case-endings in the place of genuine inflexion, the addition of case-endings only to the terminal nouns, the placing of the attribute after the noun

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1 2 vols, 3rd reprint (Motilal Banarsidass, Delhi, 1967).
2 K.K. Thaplyal, *Studies in Ancient Indian Seals* (Akhil Bharatiya Sanskrit Parishad, Lucknow, 1972).

qualified by it, the absence of gender and number, and the preponderance of mono-syllabic words are all negative features in a theory which seeks to identify the Harappan language as Indo-Aryan.

9 DOCUMENTATION

9.1 *Copies of Inscriptions*

The volume is illustrated with manual copies of 1121 inscriptions (figs 14-46). The copying is not free from errors. In a number of instances, the same text is copied in two different ways and read differently each time ! For example, the same text[1] is copied in two different ways in figs 18.3 and 33.8 and read once as *g-ra-ā-ma* and again as *eka-t-ra-ā*. Other similar examples may be found in figs 16.3 and 34.25;[2] 23C.84 and 33.27;[3] etc. In many cases fragmentary texts are copied without the usual indications and read as complete texts. For example, the fragment $\sqsubset$ ᄀᚑ ...(*IS:* 2822) in which only the last two signs survive (which are known to be the most frequent pair of signs occurring at the end of texts) is copied as a complete text (fig. 16.7), read as *ā-hā*, emended as *āhu* and translated as "sacrifice" (p. 65) ! As a result of such copying of incomplete texts, signs are placed in the initial or final positions where they seldom occur in complete texts. See for example the incomplete texts in fig. 17.42 with the sign ᚑᚑ and in fig. 17B.65 with the sign ᚙ copied in the "initial" positions. Some copies are quite garbled and bear little resemblance to the originals (cf. fig. 16.27 with Mackay, op. cit., *f.* 471). There are even a couple of instances where the inscriptions are copied upside down (figs 14.39 and 15.40) ! The incorrect copying of the inscriptions from Djoka (*IS:* 9811) and Rakhigadhi (*IS:* 9111) in the charts (figs 65 and 70) to illustrate the evolution of alphabetic writing is quite misleading, as the originals are in the mature Harappan style and do not have the "linear" appearance of Rao's copies. Rao himself gives the correct version of the Djoka text elsewhere (fig. 36.3) ! Excellent photographs of the Rakhigadhi seal may be seen in A. Parpola and E. Grinstead.[4] Some of the copying errors are clearly subjective, as for example, when one sign is substituted for another in cases where Rao assigns the same phonetic value to both, for example, ᚷ for ᚷ in fig. 44 (Nos 13, 19, 25, 26) and ᚄ for ᚄ in fig. 17A (Nos 17, 18, 19, 25) etc. These pairs of signs are, in spite of their apparent similarity, not mere graphic variants, but independent signs with quite different patterns of positional distribution and functional characteristics.

9.2 *References*

The documentation for the inscriptions cited in the volume (Appendix IV) is

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1 M.S. Vats, *Excavations at Harappa*, 2 vols (Government of India Press, Calcutta, 1940), *f.* 224.

2 *IS* : 7001; both references given by Rao are incorrect.

3 E.J.H. Mackay, *Further Excavations at Mohenjo-daro*, 2 vols (Government of India Press, New Delhi, 1937-8), *f.* 522.

4 "A Harappan Seal from Rakhigadhi, Haryana", *Acta Orientalia*, xxxv (1973), 103.

carelessly compiled and is full of errors. According to the conventions mentioned
in the Note (p. 390) prefixed to the Appendix, original publications are referred
to as M (Marshall), MK (Mackay) and V (Vats); citations from the *IS* are indicated
by the prefixes MD (Mohenjodaro), HP (Harappa), C(Chanhudaro) and K
(Kalibangan), while items from Lothal (L and LG), Rangpur (RG) and Rojdi
(R) are referred to fig. 3 of Rao's book as the source. In actual practice these
conventions are not consistently followed. Many of the citations are actually from
the *IS*, but given with the prefixes M, MK or V, *after removing the first digit of*
the IS Numbers ! The result is that a non-specialist who cannot work out this
puzzle will fail to locate the correct references either in the original publications
or in the *IS* ! The following illustrative examples may perhaps help the general
reader to find his way through Rao's documentation:

Fig No.	Rao's reference	Correct reference (following Rao's conventions)
16.16	M. 620	MD.1620
16.7	MK. 822	MD.2822
	V.715	HP.4715
17A.7	V. 874	HP.4874

For items from Lothal, Rao's references are sometimes to fig. 3 of his book, and
at other times to the *IS* (for example, fig. 14.14 = L.257 which is *IS*: 7257 without
the first digit !). In some cases the references are from the *IS* (Other Sites and
West Asian Finds series), but the source is not identified (for example, fig. 45.11 =
IS: 9902). None of the graffiti from Lothal and Kalibangan (LG, KG) is
documented. Fig. 14.22 (identified as RG) is not found in Rao's publication on
Rangpur (1963). Apart from inconsistent conventions, there are too many
instances where the citations are incorrect or cannot be traced at all in the originals
(for example, figs 16.3, 17.38, 17B.45, 17C.107, 23A.16, 23C.81, 82, 91; 33.18,
34.14, 25, 30; 35.4, 40.11, 43.13 etc.).

9.3   A curious aspect of Rao's documentation is that many of the copies which are
supposed to be faithful reproductions of the originals (See preface, p.xi) are given
multiple references as sources. Thus the copy in fig. 26.3 is given as many as 25
references and the one in fig. 41.9 has 19 references ! A test check shows that not
all these inscriptions are identical with the ones copied in the volume in respect
of sign variants and "auxiliary" marks. Even more curiously, a single source is
cited in many cases for more than one inscription (for example, fig. 14.6 has three
inscriptions with one source, M.166).

10   PROOF OF DECIPHERMENT

10.1   Is there any way to prove or verify the correctness of Rao's decipherment?
Normally, the decipherment of a syllabic or an alphabetic script should be self-
evident as its correctness would have been demonstrated beyond cavil merely by
the interlocking evidence of phonetic syllables. It is significant that this has not

happened in   Rao's model even though he has "read" over a thousand inscriptions. Rao himself offers only one "crucial" evidence of his decipherment, namely the "alphabetic" (—by which he means "syllabic"—) writing of the numerals, *aeka* (one), *tra/tr* (three), *happta* (seven), *daš/daša* (ten) and *šat/šata* (hundred) (p. 235). Let us consider the evidence briefly.

10.2   The reading *ae-ka* is based on an incorrect copy (fig. 33.23), the sign pair not being found in the original (*IS*: 6231). The word *trd* (fig. 42.2a) is represented by a single sign and hence not relevant to the argument. The word *ha-ppta* (pl.XXII, No. 11) is represented by a unique combination of two signs, the first occurring nowhere else, and the second only twice in the whole of the   corpus (*IS*: Table I); hence the reading cannot be verified. The word *da-ša* (fig. 23C.73) is obtained by reading the text in the wrong direction ! In two other cases (fig. 17A, 24, 25) the reading *da-ša/da-šā* cannot be verified independently, nor the meaning ascertained from the context. The reading *ša-t-ā* (fig. 22.59) is based on a fragmentary text and hence cannot be relied upon. In another case (fig. 34.30) the reading *ša-t* is obtained by wrong segmentation, as comparison with other texts shows that the word-boundary runs between these two signs. It will be seen from the foregoing discussion that there is no self-evident or verifiable occurrence of a numeral spelt out as a word. In general none of the readings or meanings proposed by Rao can be verified independently. One may accept Rao's decipherment of the Indus script only as an act of faith.