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Article

The Indus Script as an Alphabet—Examining Conformity in the Usage of the Indus Script

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Abstract: This paper presents a novel approach to decoding the Indus script, which was used by the Indus Valley Civilization (IVC) from approximately 3300 to 1900 BCE. The main focus of this research is the structural analysis of the signs within the Indus script. The central objective of the paper is to determine whether the Indus script can be classified as an alphabet, and it aims to provide compelling evidence regarding the number of primary signs. This includes establishing the actual count of Indus signs through the decomposition of compound signs, identifying diacritics and analyzing their consistent usage, as well as exploring the underlying concepts and implications associated with sign extraction. To comprehensively examine the Indus script, the paper analyzes over 400 signs, encompassing the entire script rather than a select subset of signs or texts. The visual decomposition of the signs employs a simple grid methodology. By summarizing the logical findings, the paper successfully identifies the primary signs and develops an understanding of their phonetic representation within the alphabet. The study recognizes the diverse writing styles used to combine the basic signs, The writing style of the Indus script incorporates variations in formation, composition, and combination, resulting in a significant number of signs. The research findings indicate that the Indus Script primarily consists of only 40 core signs.

Keywords: indus script; ancient scripts; undeciphered scripts; indus alphabet; classification of indus signs; archaic alphabetic scripts

Introduction

All ancient writing systems can be classified into three main types of signs or characters: word signs, syllabic signs, and alphabetic characters. Word signs, also known as logograms, originated from pictographic writing and consisted of three types of signs: ideograms, rebus writing, and phonograms (Schmandt, 1979).

A significant breakthrough in the history of writing was the use of signs to represent sounds without conveying specific meanings. This breakthrough led to the development of syllabic signs by creating phonetic syllables from word signs.

The Egyptian Script played a crucial role in the early development of writing. It introduced "alphabetic" or uniliteral consonantal signs by disregarding the vowels present in the corresponding syllabic words. However, Egyptian writing remained predominantly ideographic until its conclusion. True alphabetic writing emerged with the Semitic consonantal scripts around 1500 BC (Hawkins, 1979; Wansbrough, 1983; Driver, 1976). The Greeks later added vowels in 800 BC, completing the evolution of alphabetic writing.

Ancient Oriental scripts can be classified into three types based on the signs they employed: logographic scripts, syllabaries, and alphabets. Each type consists of distinct components: logograms, syllabic signs, or alphabetic characters (Mahadevan, 1989).

The classification of the Indus script has been a central topic of debate among scholars. The determination of the total number of signs in the Indus script is a crucial factor that influences various opinions. It poses a paradox for the writing system of the Indus Valley. Despite the existence of a significant number of compound signs, the possibility of considering it as an alphabet has not

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received much attention from scholars. This lack of attention can be attributed to established premises regarding the evolution of epigraphy. Prominent scholars such as Mahadevan and Parpola consider the script as logo-syllabic, consisting of word signs and phonetic syllables, while other scholars support the same proposition (Mahadevan, 1988; Parpola, 1994; Wells, 2015; Zvelebil, 1970). Rao is the only scholar who deciphered the script as an alphabet (Rao, 1982), and Kak also supports the possibility of it being alphabetic (Kak, 1994). Some scholars suggest the presence of partial pictographic signs (Clauson, Chadwick, 1969; Robinson, 2015; Fairservis, 1983). All the Indus texts exclusively consist of sequences of numbers (Subbarayappa, 1996) even in some scholarly walks the script has not been accepted as a writing system and Indus civilization as a literate civilization. (Witzel et.al, 2004).

Numerous claims of decipherment have been made regarding the Indus writing system, leading scholars from around the world to conduct extensive examinations. Posselh provides a historical perspective on these scholarly endeavors and presents a comprehensive account of the contributions made by researchers from diverse regions. His assessments demonstrate a balanced approach, refraining from endorsing any decipherment claim unequivocally due to the lack of conclusive evidence (Posselh, 1996).

'The image of a literate Indus Valley has been considered an incontrovertible historical fact by most specialists. If this image were true, the vast geographical extent of archaeological ruins in the Harappan civilization would make it the largest literate society of the early ancient world, underscoring the importance of the Indus script for ancient Indian history and human history as a whole' (Witzel et al., 2004).

While the concern about the literate Indus Valley is valid, the pursuit of this idea in the research history of the Indus civilization has been limited. However, the truth reveals its significant impact on human history as a whole. The obstacle lies in the premises of research. Alternatively, if the search had focused solely on continuity, decipherment would not have taken such a long time. The comprehensive examination of writing systems in Mesopotamia and Egypt was made possible through the discovery of bilingual and trilingual tablets. These invaluable artifacts provided researchers with insights into the earliest forms of writing, such as the appearance of cuneiform on clay tablets around 3200-3000 B.C. (Michalowski 1996), and the use of hieroglyphics on ivory plaques dating back to 3100 B.C. (Ritner 1996). The earliest evidence of writing, found in the form of graffiti from the late 4th millennium BC, presents a compelling case. When comparing the inception of Sumerian cuneiform and Egyptian hieroglyphs to their eventual evolution into alphabets, it becomes evident that the Indus Valley civilization had already developed an alphabetic system during its mature phase. In contrast, the journey of cuneiform and hieroglyphs towards an alphabetic writing system was significantly longer. This fact qualifies the Indus Valley civilization as the largest literate civilization and demonstrates its superiority over other contemporary civilizations. Thus, it is reasonable to consider the roots of the ancient alphabetic system to be found in the Indus Valley, as this approach aligns with the truth. In the recent study Convolutional neural networks were employed to examine the proximity of Phoenician alphabet letters and Brahmi symbols to the symbols found in the Indus Valley script. Remarkably, analysis revealed that, overall, the Phoenician alphabet exhibits a significantly closer resemblance to the symbols of the Indus Valley script compared to the Brahmi script (Daggumati, et.al, 2018). After a period of five years, the same cautious traditional assumption remains prevalent in the study. The analysis has yielded three distinct groups arranged in chronological order. The first group includes Sumerian pictograms, the Indus Valley script, and the proto-Elamite script. These scripts are thought to have originated in Mesopotamia during the early Bronze Age. The second group consists of Cretan hieroglyphs and Linear B, which emerged in Europe during the middle Bronze Age. Lastly, the third group comprises the Phoenician, Greek, and Brahmi alphabets, which likely originated from the Sinai Peninsula during the late Bronze Age. The classification of these groups is based on their geographical locations and estimated periods of origin. (Daggumati, et.al, 2023). The prevalent use of a particular sign, known as P-311 or M-342 (Kenoyer, 2006), adorned with diacritical marks. Based on this evidence, it can be inferred that this fully developed writing system emerged at its inception, suggesting a divine origin in other words,

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the script was invented at once according to the Parpola's opinion during the final phase of the early Harappan period between 2800 to 2500 BC (Parpola, 2010). Its primary users were common people, including potters, artisans, and individuals of earlier doctrinal seminaries. Thus, perfection should not be expected in its nascent stages. However, the development of doctrinal seminaries and the flourishing of civilization led to the continuous refinement, maturation, and establishment of a standardized script. It reached its peak around 2600 to 2500 BC (Parpola, 1996), coinciding with the zenith of the civilization itself. Minor graphic variations exist for many signs in these scripts, but the script remained in a standardized form without significant changes throughout its existence (Mahadevan, 1989). The extraction principles of alphabetical characters remained unaltered, with only minor adjustments made to the format. Noteworthy modifications or substitutions may have occurred only in the representation of avian and animal motifs. Hence, the theories of the evolution of writing systems, such as pictographs, ideographs, logographs, or syllables, do not find application in the Indus writing system. The temporal context of the Indus writing system predates the establishment of organized doctrinal seminaries. Therefore, the nascent or formative state of both the doctrinal seminaries and the writing system in the Indus Valley predates the development and maturation of the valley itself, potentially tracing back to approximately 1000 BC.

Embracing a broadminded and imaginative approach is crucial, as the idea of deciphering the Indus script as an alphabet has the potential to challenge existing premises in epigraphy, linguistics, archaeology, genetics, and anthropology. By adopting this broader viewpoint, researchers may overcome limitations imposed by conventional assumptions and gain new insights into the ancient civilization that has fascinated scholars for generations.

Why and how is the Indus Script an Alphabet?

By decomposing compound signs, modifiers, potential diacritical marks, and single basic signs can be isolated from the ligatures. This process allows us to determine the actual number of primary or basic signs, which provides reasonable evidence in support of an alphabetic system.

Determining the accurate number of primary signs in the Indus script has long posed a challenge, yet it holds the key to unlocking a deeper understanding of this ancient writing system. A crucial aspect of research involves decomposing signs to identify and isolate fundamental or primary signs. This enables us to examine how their combinations result in new designs or formats.

In a study conducted by Yadav et al. (2010), Indus signs were categorized into basic signs (154), provisional basic signs (10), and modifiers (21). Wells, in his extensive collection of signs, classifies them into different categories: simple signs totaling 127, complex signs totaling 175, compound signs totaling 135, and 146 signs marked with additional markings, along with 18 sets of markings (Wells, 1998). On the other hand, Mahadevan categorizes the signs into ideograms, phonograms, conventional signs, numeral signs, and phonetic signs (Mahadevan, 1989), while Fairservis categorizes them into different groups: some from ancient origins, some from local origins, compounds derived from the same local origin, and rare affixes (Fairservis, 1992). In contrast, Rao's conclusion suggests the existence of only 62 signs and proposes the evolution of graphic variants. However, Mahadevan does not seem to agree with Rao's perspective on this matter (Rao, 1982). It is important to note that previous studies by different scholars have yielded varying concepts of what constitutes a basic sign, resulting in different counts of Indus basic signs. However, this particular study identifies only 40 basic signs.

In the Indus writing system, primary or fundamental signs are commonly and independently utilized, while the remaining signs are compounds that can be broken down based on the typology of their allographs. Typically, compound signs consist of two or three composite signs, although some instances may be considered illegible. By decomposing these compound signs, a significant number of primary signs or basic phonemes can be identified. This observation provides evidence supporting the notion of considering the Indus writing system as alphabetic.

In order to gain a more comprehensive understanding of primary signs and thoroughly analyze their behavior, it is crucial to focus on potential vowel diacritical marks and principal modifiers. These elements are commonly used in conjunction with multiple signs. While many diacritical marks and the wedge symbol modifier can also be employed independently with the signs, their combined

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usage introduces variations in allographic position and modifies the sign in distinct allographs and graphic variants.

Likewise, the combination of two or three composite signs results in different sign variants, highlighting the distinct writing styles that emerge through their arrangement. By studying these variations and combinations, we can delve deeper into the Indus writing system, gaining insights into its complexity and the nuanced ways in which it can be expressed.

When examining the primary signs, excluding compound signs, we observe a consistent pattern in their modification, leading to the creation of new graphemes. The process of altering the allography of the fundamental signs is evident, resulting in the formation of different phonemes within the same class. The following section provides a detailed exploration of the variations in the allographic design of the primary sign.

The specific concept of the classification and extraction of the sign as a phonemic variations and typological design from the fundamental allographic form of the signs:

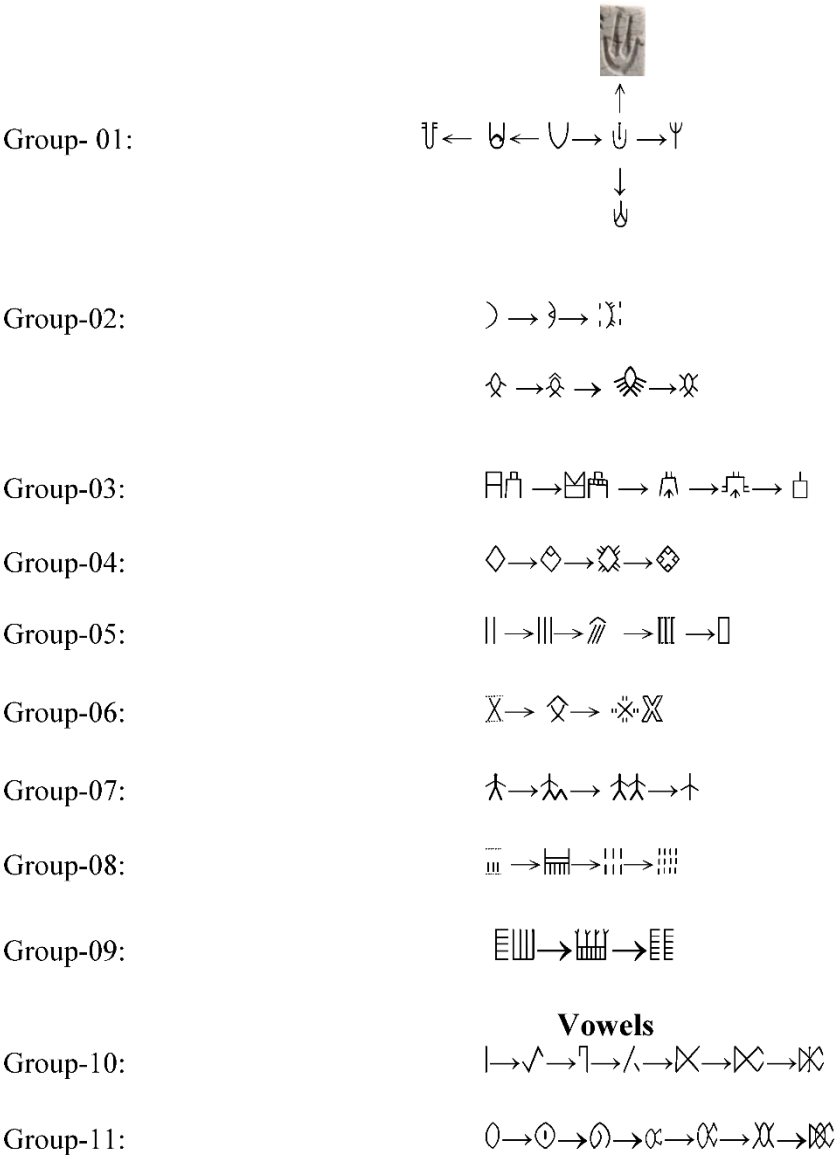

Figure 1. Consonants.

The study focuses on a detailed structural analysis of the general makeup and mechanics of the Indus signs discovered to date. The primary decomposition for this study is the sign list of Asko Parpola, which has been utilized in the NFM Indus font based on his concordance. Additionally, the

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sign lists compiled by Mahadevan (1977) and Bryan Well (2015) have been included to further enhance our understanding.

Primary Data Source

Mahadevan's comprehensive corpus, which is the first of its kind, consists of 419 signs found on 2,911 inscribed objects, comprising a total of 3,554 lines of text. The list also includes variants of signs (Mahadevan, 1977).

Asko Parpola's influential work in the field of Indus script research includes the compilation of a sign list based on approximately 3,700 legible inscriptions. This list, consisting of 385 primary signs along with an additional 5 variants, has been transformed into the NFM-Indus Script font through collaboration with the National Funds for Mohenjo Daro and the Culture Department of the Government of Sindh.

Parpola's dedication to the study of the Indus writing system has yielded valuable insights. Through a meticulous process of collection and critical editing, he aimed to determine the number of graphemes and the average word length present in the script. His investigation involved identifying primary signs as well as composite signs, leading to the development of a comprehensive sign list for the Indus script. Each entry in this list includes the principal graphic variant along with a corresponding decomposition (NFM-Indus Script; Introduction).

In addition to Asko Parpola's seminal work, an updated sign list has been provided by Well (1998, 2006, 2011, 2015). This comprehensive list comprises 709 signs and represents the most recent compilation as of May 2022. The inscriptions containing these signs are housed within the ICIT database (Interactive Corpus of Indus Texts), which contains a total of 4,660 artifacts with inscriptions. It is important to note that some artifacts bear inscriptions on multiple sides, resulting in a grand total of 5,644 texts and 19,831 occurrences of signs. Among these, 3,657 texts are complete, accounting for 13,672 sign occurrences (Fuls, 2022). This updated information enhances our understanding of the Indus script and contributes to ongoing research in the field.

Mahadevan's concordance provides sign variants for only 178 out of the total 417 signs. This limited coverage makes it challenging for researchers to determine the appropriate usage of specific sign variants within the concordance or when encountered in the actual texts. However, Parpola's concordance proves to be more beneficial for researchers due to its comprehensive nature. Not only does Parpola provide original transcriptions, but his sign collection, embodied in the NFM-Indus Script, facilitates researchers in accurately reproducing Indus Texts based on the original sources.

Although there are discrepancies in sign classification methods between Mahadevan and Parpola, both researchers approximate a similar number of signs, around 400. This level of agreement establishes a foundational understanding of the sign inventory and contributes to further analysis of the Indus script.

On the other hand, the abundance of signs in Well's collection may appear excessive. However, a notable advantage is the inclusion of new entries that contribute to an expanded understanding of the compositional style of the signs. These additions provide insights into a fresh perspective on variant forms resulting from the combination of signs, as well as the identification of novel nuances in writing and engraving styles. Among these new entries, the following signs are featured: W-41, 42, 58, 85, 107, 141, 223, 225, 242, 316, 325, 326, 376, 418, 481, 490, 525, 591, 597, 793, and 843.

Apart from these specific signs, the remaining signs in Well's collection can be adjusted and aligned with Parpola's classification. Nevertheless, it is important to note that the classification of certain signs as distinct entities may appear exaggerated, and the underlying approach may not always adhere to a logical framework. Numerous examples from Well's collection could be cited to support this observation, but for brevity, I will mention only one instance, spanning signs 290 to 308, where even sign 311 could be considered as belonging to the same category. This highlights potential areas of divergence and raises questions about the classification system employed. On the other hand, it appears that Parpola sometimes exhibits an excessive emphasis on distinguishing signs, leading to an exaggeration in the number of signs documented in (Figure 21). Additionally, there are several other compound signs that may not have been adequately addressed. Furthermore, there are

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instances where careful distinction seems to have been overlooked, as exemplified by signs #88, 292, and 341.

Note:

a) For the representation of mentioned sign collection, the terms are used for Mahadevan (M-000) for Parpola (P-000) and for Well's (W-000)

b) The sign † represents the sign variants according Mahadevan in APPENDIX- 1

Methodology

The process of isolating basic signs involves utilizing the grid structural methodology to visually recognize and separate the individual components within compound structures. This methodology enables us to identify and distinguish the basic signs from the complex ligatures.

By employing visual recognition techniques, we can isolate the modifiers, diacritic marks and compositing signs within the modified signs. This allows us to analyze their specific characteristics and understand how they contribute to the overall allography of signs.

Through the decomposition of modifiers diacritic marks and compositing signs, we gain a deeper understanding of their function and their impact on the possible phonetic value, reading, and meaning of the sign. This process helps us recognize and interpret the variative writing styles employed in the Indus script.

The grid structural methodology and the subsequent decomposition of modifiers, diacritic marks and compositing signs provide crucial insights into the organization and structure of the modified compound signs in the Indus script. This knowledge enhances our understanding of the complexity of the writing system.

By employing these analytical techniques, we can unravel the intricate nature of the Indus script and gain a more comprehensive understanding of its writing conventions and communication methods. The process of isolating basic signs is further explained in the following section:

Modified compound signs	Decomposition of the modifiers from Modified Sign	Independent signs status according concordance	Decomposition of the composite signs
P-250	" " " "	P-249	P-245 +|| P-129
P-251	P-173	P-249	P-245 +|| P-129
P-252		P-249	P-245 +|| P-129

Figure 2.

The Compositing Primary Signs in the Compound Signs (Ligatures)

Currently, the identified number of compound signs is 90; however, it is important to acknowledge that this count may increase as further research is conducted. These compound signs are formed by combining two or more basic or primary signs in their composite forms. The process of compositing involves merging individual phonemes to create a unified unit. Ligatures are employed for various purposes, including enhancing aesthetics, improving readability, and efficiently representing frequently occurring combinations of allographs.

Within the compound signs, the compositing process brings together phonemes, which are the smallest meaningful units in the Indus writing system. This amalgamation can take different forms, such as merging allographic shapes or combining constituent parts. By integrating these individual components, compound signs establish a harmonious connection between the allographic variations of basic phonemes, resulting in a visually cohesive written representation. It is worth noting that the process of combining elements within the Indus script gives rise to a significant total of 330 distinct Brahmi signs solely for the 33 consonants, without considering the conjuncts. Therefore, it is not

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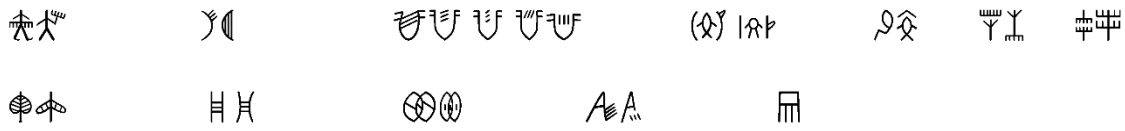
surprising that the Indus script comprises approximately 400 signs, with many of them undergoing similar modifications observed in Brahmi (Kak, 1994).

The decomposition of compound signs has been conducted with meticulous care and consideration. It is important to recognize that compound signs should not be viewed as merely compressed versions of individual basic signs found in the Indus texts. This is primarily due to the infrequent occurrence of the constituent basic signs appearing as sign sequences. Even in the few instances where the components of a compound sign do appear in certain combinations within the text, the context in which the compound sign is used and the context of the sequence formed by its constituent basic signs are significantly distinct (Yadav et al., 2010). Through meticulous observation and examination, the basic or primary signs have been isolated and identified.

Some examples of the variation in the combining technique of the same primary signs:



Serial No:	Indus Sign	Composited signs	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
1.		M-323+ +𒀭		E05-8, E06-8	17† - 5	148 - 106	9 -12
2.		𒌅+		E23-D	348†	772	105
3.		𒌅+		E27-0	351	767	112
4.		+𒌅	#12;18	E27-1	372	768	113
5.	-	--		E2B-C, E2B-E	368 - 371	783 - 786	123
6.		+𒌅		E4B-6	229†	535	140
7.		+𒌅		E64-6	352	750	318
8.		𒌅+--		E66-4	--	766	325

Figure 3. List of the decomposed combined or ligature signs.

Serial No:	Indus Sign	Composited signs	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
9.	-	𒀭+		E03-A, E08-D	38† - 19†	136 - 132	6 -27
10.		𒀭+	#13;33	E09-3	23	133	29
11.		𒀭+		E06-6	4	105	11
12.		𒀭+		E08-8	37	121	24
13.		𒀭+		E09-5	--	145	31
14.		𒀭+		E09-8	--	--	32
15.		+𒀭	#13;33	E09-F	--	147	36
16.		𒀭+		E0A-0	27	146	37
17.		𒀭+		E0A-3	28†	125	38
18.		𒀭+		E0A-C	36	122	40
19.		𒀭+		E0A-E	32†	111	41

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20.				E0B-3	34	112	42
21.				E0B-5	35†	113	43
22.				E0B-6	30	119	44
23.				E0B-8	31	117	45
24.			 # 7; 3	E1A-0	48†	176	87
25.				E20-5, E20-6	165 -166	-- 394	94 - 95
26.				E22-1	399	373	98
27.			 #13;31	E24-3	--	715?	106
28.				E2A-D	232	462	119
29.				E2C-3	364	777	124
30.				E32-7	90†	40	151
31.				E33-5	94	--	155
32.				E34-D, E37-C	290† - 311	903 - 897	164 - 180
33.				E37-F	305†	891	182
34.			 # 11; 9	E38-2	306	--	183
35.				E38-7	56†	204	184
36.			 # 4;57	E38-A	412	201	185
37.				E38-D	310	894	186
38.			# 12;24	E3F-A	178	467	202
39.				E46-C	181†	309	218
40.				E47-2	227	532	220
41.				E47-3	--	--	221
42.				E2B-7	--	--	122
43.			# 7; 8	E47-C	--	--	224
44.				E48-7	221	556	228
45.				E48-9	219	561	229
46.				E49-1	223	564	231
47.				E49-8	224†	565	232
48.			# 7; 9	E4C-5	235	457	243
49.				E4C-F	141†	685	249
50.			# 4; 46	E4D-7	145	686	253
51.			#13;38	E4D-E	160	82	255
52.				E4E-4	--	--	259
53.				E4F-E	151	694	262
54.				E4F-F	152	693	263
55.			#15;65	E51-0	243	623	271
56.			#4;42	E55-E	251	593	280
57.		--		E55-F	199	570	281
58.			#15;60	E58-C	--	--	291
59.				E18-A	--	--	85
60.				E59-8	186†	313	292

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61.				E5B-7	330†	703	298
62.				E5B-9	332†	734	299
63.				E5B-E	331†	709	301
64.				E5E-3	337†	733	303
65.				E5E-7	--	711	305
66.				E63-D	345†	745	314
67.				E66-1	357	761	323
68.				E66-2	355	753	324
69.				E66-5	317	931	326
70.				E66-7	393	930	327
71.			#15;67	E66-9	316	--	328
72.				E68-B	407	845	340
73.				E6A-5	--	--	348
74.				E6A-6	--	--	349
75.				E6A-9	58	794	350
76.			#13;29	E6B-0	266	858	352
77.			# 12;24	E6B-2	265	--	353
78.			# 7; 17	E71-B	280	869	381
79.			# 7; 17	E71-E	270	863	383
80.			# 7; 17	E71-F	271	--	384
81.			# 7; 17	E72-0	273	862	385
82.			# 7; 17	E72-2	236	628	386
83.				E72-5	--	58	B - 3

Figure 4. List of the Compound signs contains two or more compositing signs.

Serial No:	Indus Sign	Composited signs	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
84.				E08-3	42	118	22
85.				E08-B	--	--	26
86.			#13;33	E09-4	24	134	30
87.				E0A-A	29†	127	39
88.				E47-7	228†	533	222
89.				E64-3	346	749	316
90.			#13;31	E64-5	--	751	317

Figure 5. List of the Compound signs contains double or more compositing signs .

91. (P-01)	92. (P-03)	93. (P-04)	94. (P-05)

Figure 6. These signs are discussed well in the topic logographic sign Pati. (Muhammad, 2023).

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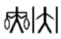
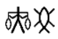
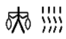
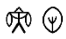
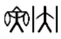
Excluding the sign P-05 that has used only one time in the texts, the usage of the rest three signs with the same signs indicates the possibility of having the same value despite having some allographic variation:

2076 (00)  4479 (10)  8013 (00)  1045 (00) 

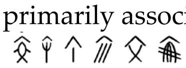
2371 (00)  6209 (00)  6225 (00)  4029 (00) 

The Three Principal Modifiers

After careful observation and analysis, it is evident that the addition of three specific signs serves to modify the basic signs in order to introduce phonetic variations and enhance the character's value within the alphabet. The following three lists present the modified signs, each list incorporating different modifiers. These modifiers are consistently applied in diverse ways, resulting in variations in sign design. Through a meticulous examination of these signs, it has been identified the consistent use of modifiers with different signs. This recognition provides valuable insights into the compositional process of applying modifiers to basic signs.

By conducting a thorough analysis and inspecting the overall structure of the signs, I have isolated three distinct modifiers based on their design across various variations. These modifiers have been intelligently utilized with the signs. Consequently, the application of these modifiers has varied depending on the allographic design of the basic sign.

The wedge Symbol

The frequent addition and usage of the sign indicate that, although it is found in only nineteen signs and does not exhibit any specific pattern of usage with a particular group of signs, careful observation reveals its consistent usage across various groups of signs. Additionally, it is also observed in conjunction with other signs that are not explicitly mentioned in the (Figure 4) extracting sign process but they all included in the following list. Therefore, it can be speculated that this sign potentially contributes to variations in the phonetic value of each character in the alphabet. The usage of the sign is primarily associated with the primary sign. The general behavior is its usage on the top of the signs;  other variation style of employing according to the needs of design of basic signs;  .

Serial No:	Indus Sign	Basic sign modified with the sign 	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
1.				E08-0	41	104	21

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2.				E12-1	65	235	70
3.				E19-1	47	175	86
4.				E20-2	163	391	93
5.	&			E30-3	159 & 126	515 & --	142 & 215
6.				E32-8	92	44	152
7.				E34-7	301	920	162
8.				E3C-A	192	335	196
9.				E47-9	226	554	223
10.		two times		E4B-B	233	455	241
11.				E4C-E	138	678	248-189
12.			#13;38	E4E-0	159†	83	257
13.				E5B-C	334†	729	300
14.				E5C-F	--	707	302
15.				E5E-9	340†	--	306
16.				E66-0	356	762	322
17.			#4;49	E66-A	318	932	329
18.				E70-9	267	861	376
19.	--			--	361	--	--

Figure 7. List of the modified signs with the modifier sign P-200.

It is important to note that the sign P-358 has not been classified as a primary sign. However, there are substantial reasons and evidence suggesting similarities in formation and usage to later archaic scripts, particularly Brahmi. Therefore, it has been tentatively included as part of the sign list in Table 04, for speculative purposes.

Two Equal Signs and Four Inclined

The usage of two equal signs or the double use of the sign P-127 as a modifier can be observed with signs P-(74, 172, 311, and 288). Furthermore, there are four inclined stroke signs that may function as modifiers and can be seen in association with 18 different basic, modified, combined or two independent single signs, such as the sign , , and . Upon careful analysis, it becomes apparent that the inscriber or engraver occasionally attempted to combine both the two equal signs and the four inclined strokes into a double inclined modifier sign. For instance, the sign P-172 was merged into P-157, albeit with one stroke missing. This practice can also be observed in other signs, including P-92 or P-351. It appears that the two equal signs modify the value, while the inclined signs may serve different functions, as indicated by their simultaneous usage on the two basic signs. These observations suggest that such modifications do not necessarily alter the significance or value of the individual primary signs.

The independent form of the inclined sign can be represented by the signs W-14 and M-105, while its singular form is denoted by W-12 and M-101. The application of the two equal signs as a modifier appears to be a common practice to modify the primary sign, as seen in the example . However, when attempting to use both the equal signs and inclined signs simultaneously, the engraver deviates from the typical implied approach of the sign, resulting in variations such as . Nonetheless, the general concept of the design is maintained.

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Serial No:	Indus Sign	Basic Sign with Diacritical Mark " " " "	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
20.				E13-7	74†	228	74
21.				E20-1	164	393	92
22.				E33-D	--	926	157
23.				E33-E	289†	--	157
24.				E36-1	292†	910	172
25.				E39-5	308	895	188
26.				E3F-C	179	466	203
27.				E4C-9	140	680	246
28.			#4; 46	E4D-1	143†	689	250
29.				E57-7	194†	585	288
30.				E61-6	342†	740	311
31.				E6A-D	264†	853	351
32.	--			--	--	42	--
33.				E6E-0	384	823	365

Figure 8. List of the modified signs with equal signs marks.

Serial No:	Indus Sign	Basic sign with Diacritical Mark ' ' '	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
34.				E09-D	26	144	34
35.				E10-C	60†	226	61
36.				E10-D	61	944	62
37.			#11;2	E11-6	71	232	67
38.			#15;57	E11-C	73†	234	69
39.			#7;2	E12-6	66	236	71
40.				E13-4	68†	241	73
41.			#11;12	E27-6	377...?	646	115
42.				E32-0	88	--	149
43.		--		E36-1	292†	910	172
44.			#14;45	E3C-8	207	506	194
45.			#4;42	E49-0	220	562	230
46.				E55-C	250	592	279
47.				E68-8	404	--	338

48.			#17;78	E6B-E	288	804	355
49.				E6E-B	392	945	369
50.				E6F-D	285†	878	374
51.			#4;75	E71-C	281	870	382

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Figure 9. List of the modified signs with the inclined marks .

The horizontal and vertical lining or shedding

The observational analysis of the basic signs suggests that both shedding techniques may serve different functions in terms of adding phonetic variations. However, it is important to note that this discussion is not directly relevant to the purpose of classification or decomposition. As a result, the signs with both horizontal and vertical elements are presented together in the same table, regardless of their potential phonetic differences. IIII or ≣: The vertical and horizontal shedding may have different functions as according to the general behavior in the usage in the texts but sometimes the engraver drops the strictness; .

Serial No:	Indus Sign	Basic sign with shedding as a Diacritical Mark IIII ≡	NFM Unicode PUA	M-1977	W-2015	P-2010
52.		ICIT 525	E0E-A	254†	526	54
53.		--	E0F-3	84†	279	56
54.			E10-6	75	243	59
55.		--	E16-5	51†	255	83
56.			E27-A	327†	388	116
57.			E2A-A	326†	384	118
58.			E37-7	297	924	178
59.		ICIT 490	E3B-4	205†	495	192
60.			E3D-2	193†	337	197
61.			E41-2	136†	484	210
62.			E54-6	252†	595	277
63.			E59-F	190†	429	295
64.			E5E-C	141†	717	307
65.			E60-8	338†	721	309
66.		--	E0C-C	182†	322	48

Figure 10. List of the modified signs with the inside horizontal and vertical lining or shedding marks IIIIIII/≣.

The diacritical marks

After conducting a meticulous analysis and comprehensive examination of the signs presented in the following tables, it has been determined that there are eight distinct diacritic marks with unique design variations. These diacritics have been consistently and thoughtfully applied to the basic signs throughout the script. Importantly, the design of the basic sign influences the ways in which these diacritic marks are employed, leading to variations in their allographic appearance. Consequently, the inclusion of diacritic marks not only modifies the primary signs but also transforms them into distinct signs. It is also worth noting that four of these diacritics are independently used within the script.

The engraver varies the applying style of the diacritics according the design of the primary signs accordingly:

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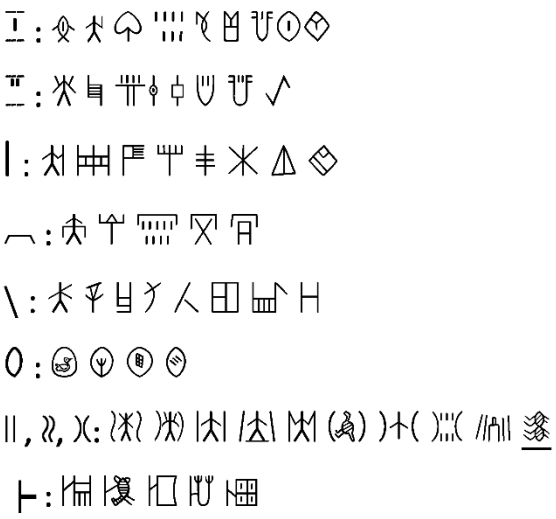

Serial No:	Indus Sign	Basic sign with Diacritical Mark	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
1.				E08-5	18	95	23
2.				E11-5	70†	231	66
3.		--		E29-4	325	382	117
4.				E2F-4	112†	17	134
5.			# 7; 6	E35-D	302†	252	171
6.			# 7; 7	E3C-B	--	--	196
7.			#18;109	E4A-7	214†?	542	235
8.				E4D-8	158†	--	254
9.				E56-6	127†	440	283
10.			# 8; 29	E62-7	342†	741	312
11.				E65-F	350	764	321
12.				E6C-4	375†	832	358
13.			# 7; 17	E71-A	277†	--	381

Figure 11. List of the modified signs with the diacritical mark P-128.

Serial No:	Indus Sign	Basic sign with Diacritical Mark	NFM Unicode PUA	M-1977	W-2015	P-2010

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14.			E04-B	8†	100	7
15.			E54-6	254†	527	54
16.	--		--	--	597	--
17.			E21-D	174	364	97
18.			E27-3	397	371	114
19.			E54-2	253†	510	276
20.	--		--	--	525	--
21.			E5B-1	329	702	297
22.			E62-E	344	740	313
23.			E40-0	130†	435	204
24.			E35-B	--	465	202
25.	--		--	--	646	--

Figure 12. List of the modified signs with the diacritical mark ¨ P-127.

Serial No:	Indus Sign	Basic sign with Diacritical Mark |	For Further decomposition See (Fig; S.no)	NFM Unicode PUA	M-1977	W-2015	P-2010
26.				E09-9	25	142	33
27.				E0D-F	185	--	52
28.			 #18;102	E22-2	170	950	99
29.				E22-3	256	611	100
30.				E22-A	171†	415	101
31.				E23-4	173†	416	104
32.				E22-E	172	417	102
33.				E26-1	177†	413	108
34.				E2A-C	326†	384	118
35.				E32-E	93	--	154
36.		ICIT 490		E3A-2	209	500	190
37.				E3A-7	--	--	191
38.				E4D-F	--	647	256
39.				E53-F	--	511	276
40.				E67-E	409	171	334
41.				E70-E	275	868	379

Figure 13. List of the modified signs with the diacritical mark | P-147.

Serial No:	Indus Sign	Basic sign with Diacritical Mark ⌒	NFM Unicode PUA	M-1977	W-2015	P-2010

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42.			E04-1 E01-0	10	64 - 150	6 - 1
43.			E22-F	212	521	103
44.			E30-1	117	51	141
45.			E3C-4	206†	504	193
46.			E40-4	131	454	205
47.			E4C-4	234	455	242
48.			E4C-C	139	679	247
49.			E4D-4	142	687	252
50.			E59-B	203	361	293
51.		--	E60-C	339	719	310
52.			E3C-9	208	505	195

Figure 14. List of the modified signs with the diacritical mark ⌒.

Serial No:	Indus Sign	Basic sign with slanty Diacritical Mark /	NFM Unicode PUA	M-1977	W-2015	P-2010
53.			E06-3	7	98	10
54.			E07-B	40†	137	19
55.			E26-4	213†	92	109
56.			E0F-1	255	363	55
57.			E11-A	72†	233	68
58.			E34-0	288	901	159
59.			E34-1	--	922	163
60.			E35-5	--	250	168
61.		ICIT 490	E3C-2	205†	491	192
62.			E3E-C	129	66	201
63.			E44-5	124†	61	216
64.			E48-1	222	555	226
65.		ICIT 620	E50-B	242	621	270
66.			E56-E	128†	444	284
67.			E58-E	186†....?	315	292
68.			E60-7	191	329	308
69.			E67-6	320	166	331
70.			E6A-4	263	849	347

Figure 15. List of the modified signs with the diacritical mark \ .

Although the diacritic mark mentioned below has a distinct formation from the previously discussed slanty sign, the usage of both signs in the Indus texts exhibits similarities on many seals. Based on this observation, it has been included as the same diacritic mark as mentioned above.

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71. (P-160)	72. (P-161)	73. (P-166)	74. (P-176)	75. (P-359)	76. (P-362)

Figure 16.

Serial No:	Indus Sign	Basic sign with Diacritical Mark 0	NFM Unicode PUA	M-1977	W-2015	P-2010
77.		any bird	E14-F	82	952	78
78.			E6B-2	387	803	354
79.			E6C-5	385	811	358
80.			E6C-B	148	809	360
81.			E6C-C	.....?	813	361
82.		ICIT 620 and	E6D-6	.....?	816	363
83.			E6D-D	379†	831	364

Figure 17. List of the modified signs with the diacritical mark 0 P-341.

The signs ||| P-129-148, P-173, and P-175 have been classified as distinct signs not only by Parpola but also by Mahadevan and Wells. However, there are examples from the texts that suggest these signs may be variations of the same sign. Additionally, all three signs have been used as diacritical modifiers in a similar manner, alongside the primary sign. Although no examples from the Indus Texts are provided here, the mentioned variative use of diacritical signs with the same primary sign supports the notion that they are likely the result of the engraver's writing style rather than representing a distinct form or separate signs. Another modifier, P-126, which is not attached to any primary sign but used independently, is not included among the eight diacritic marks.

P-15 or P-8 or P-172 P-320 P-(126,368)

Serial No:	Indus Sign	Basic sign with Diacritical Mark ||, ⟫ or ⟪	NFM Unicode PUA	M-1977	W-2015	P-2010
84.			E04-F	9†	103	8
85.			E07-2	2†	97	15
86.			E07-7	2†	--	18
87.			E09-E	2†	143	35
88.			E0F-B	85	281	57
89.			E10-E	62	222	63
90.			E11-0	64	940	64

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91.			E11-3	63	--	65
92.			E14-3	81†	269	77
93.			E26-E	401	375	110
94.			E2B-6	156	75	121
95.			E30-0	113	48	140
96.			E31-9	122	57	146
97.			E36-6	244†	907	174
98.			E53-5/E53-2	244†	632	273
99.			E6A-1	416	217	345
100.			E72-3	--	223	b-1
101.			E72-4	291	412	b-2
102.			E59-3	202†	360	50
103.			E72-6	--	577	b-4
104.			E13-9	83	244	75
105.			E1D-4	57†	209	90
106.			E4E-A	149†	690	260
107.			E4E-E	149†	--	260
108.			E4D-3	144	688	251
109.			E4A-3	214†	540	234
110.			E68-1	--	170	336

Figure 18. List of the modified signs with the diacritical marks; P-129, P-175 & P-173.

Serial No:	Indus Sign	Basic sign with Diacritical Mark ⊢	NFM Unicode PUA	M-1977	W-2015	P-2010
111.			E0D-7	183	321	49
112.			E18-9	52	256	84
113.			E50-5	--	--	267
114.			E65-E	349	765	320
115.			E69-D	413	203	343
116.			E6F-2	248	627	372
117.	--		--	246	616	--

Figure 19. List of the modified signs with the diacritical mark ⊢.

Another Possible Diacritic Mark

Serial No:	Indus Sign	Basic sign with Diacritical Mark ⊢ or ▯	NFM Unicode PUA	M-1977	W-2015	P-2010
118.			E01-4	13	--	2
119.			E07-0	3	93	14

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120.			E09-2	20	131	28
121.			E07-9	40†	137	19
122.			E07-F	--	138	20
123.			E26-F	400†	--	111
124.			E07-5	43	--	17
125.			E56-C	128†	443	284

Figure 20. List of the modified signs with the diacritical marks P-125 & P-266.

Identical Signs: Contemplating Variations in Engraving Styles and the Perception of Distinct Signs

However, it should be noted that Parpola has identified these signs as distinct ones and has even assigned separate identity numbers to them. While my perception about the signs mentioned below is that they are actually identical signs rather than distinct ones. The differences in their formation are minor and can be attributed to variations in writing styles. It is likely that these variations were a result of the engraver's artistic choices, showcasing their versatility in writing.

The distinct signs assigned independent status	**Identical with**
1. (P-17)	(P-13)
2. (P-120) extracted semi sound from	(P-13)
3. (P-79)	(P-76)
4. (P-80)	(P-76)
5. (P-81)	(P-76)
6. (P-82)	(P-76)
7. (P-83)	(P-76)
8. (P-125)	(P-128)
9. (P-148)	(P-129)
10. (P-173)	(P-129)
11. (P-175)	(P-129)
12. (P-177)	(P-129)
13. (P-126) extracted semi sound from	(P-129)
14. (P-132)	(P-133)

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15. (P-134)	(P-133)
16. (P-135)	(P-133)
17. (P-144)	(P-145)
18. (P-156)	(P-165)
19. (P-181)	(P-187)
20. (P-209)	(P-200)
21. (P-211)	(P-200)
22. (P-233)	(P-225)
23. (P-270)	(P-272)
24. (P-271)	(P-272)
25. (P-282)	(P-287)
26. (P-285)	(P-287)
27. (P-292)	(P-289)
28. (P-367)	(P-368)
29. (P-375) may be different sound	(P-373)
30. (P-294)	(P-107)
31. (P-46)	(P-48)
32. (P-47)	(P-48)
33. (P-51)	(P-48)
34. (P-335)	(P-337)
35. (P-18)	(P-15)
36. (P-158)	(P-159)
37. (P-315)	(P-314)
38. (P-227)	(P-220)

Figure 21. List of the Identical signs.

Exploring the further identical signs in the classification of concordances

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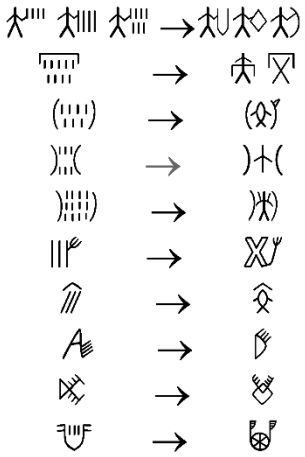
Animal Sign: P-46 appears to be an initial engraving practice of the sign P-47. Through a process of evolution or refinement, P-48 emerges as a more developed form. Additionally, P-51 could be regarded as another variation of the aforementioned signs.

Bird Sign: Despite variations in the bird sign, it can still be regarded as the same sign. Considering the diverse engraving styles within the region, it is expected to encounter variations. An example of this can be observed in the animal sign 46, where its evolution can be recognized in sign P-47, ultimately leading to the development of sign P-48. However, this pattern does not appear to be present in the bird sign. Nevertheless, in some inscriptions, sign P-83 shows characteristics that suggest it may be a developed form of the bird sign. Furthermore, all bird signs, namely P-76, P-77, P-78, P-79, P-80, P-81, and P-82, can be classified as the same sign. This classification may also include modified versions such as P-77 and P-78.

Semi Signs: Two additional signs,  P-120 and  P-266, appear to have been derived from the basic signs  P-13 and  P-270/W-620, respectively. These signs may represent a semi-phonetic value associated with the basic signs.

Stroke Signs: There is a widely held belief that stroke signs primarily serve as numerical indicators, implying their association with numbers. However, previous studies have overlooked an important aspect: their usage. Upon careful investigation and observation of stroke signs, it becomes apparent that they are not merely used in a manner similar to other primary signs, but they also undergo modifications akin to other primary signs. This argument suggests that stroke signs should be regarded as a type of primary sign rather than being exclusively tied to numeral values. Indeed, while it is true that examples of the usage of each modifier or diacritic with available signs are not available, there are instances where certain modifiers and diacritics are employed in a manner similar to other primary signs. These examples provide compelling evidence that undermines the previous assumption and suggests that stroke signs may have a broader function beyond being solely numeral indicators.

Here are a few instances of stroke signs that undergo modifications or modify in a manner similar to other primary or core signs:



The three signs P-130, consisting of long and short strokes, are frequently encountered. While these signs undoubtedly have different values, they often appear confused in many inscriptions due to their size. The signs P-137, P-138, and P-139 can be seen as evolutionary experiments on the style of short-stroked signs. This influence can be observed in later alphabetic scripts;

(P-137)  (P-138)  (P-139)

Despite the distinct functions and phonetic values of signs P-130, P-133, P-135, and P-145, the inscriptions suggest that the number of strokes is not the primary concern of the engraver. However, it is observed that a minimum of three strokes is necessary for representing the sign., the signs M-

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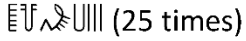
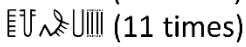
89†, M-95, and P-130, P-131, and P-153 are all identical and have been used interchangeably in numerous texts. There may be slight differences in interpretation between these signs, for example:

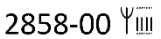
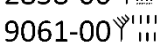
4387 (10)  (25 times)
4476 (10)  (11 times)

In addition to the mentioned stroked signs, there are other examples worth noting. The sign consisting of five long strokes, M-96 and P-132, can be contrasted with the sign of five short strokes, which appears to represent a writing variation. On the other hand, there are other signs with five strokes that yield the same value, such as M-186 and P-292. Furthermore, there are two rare signs with two vertical short strokes, namely M-101 and W-12, which are not included in Parpola's sign collection. and appear only once in a specific text (1903-00). They can be considered variants of M-99, M-100, P-127.

Variations in writing style can be observed in the below texts for the signs M-103† and P-143.

6203-02 
2270-00 

The common Indus text exhibits a consistent usage of different numbers of short strokes as a form of writing variation. While there may be slight differences in pronunciation, the examples below illustrate this phenomenon; These variations in the number of short strokes contribute to the richness and diversity of the Indus script.

1220-00 
2705-00 
2858-00 
9061-00 
1422-00 
2127-00 
7072-00

In the case of the sign P-202, there is a notable practice of varying the number of strokes in its different variations and styles. This demonstrates the flexibility and adaptability of the Indus script. The specific examples showcasing these variations in stroke count within the sign P-202 are as follows:

Indeed, the variations in stroke count within signs such as P-202 suggest that the number of strokes is not strictly regulated in the Indus script. Instead, it appears to be influenced by the engraver's individual choices and stylistic compositions. This flexibility in stroke count adds further complexity and diversity to the script, allowing for diverse artistic variations within the writing system.

 **and**  **signs:** Parpola has already classified as the same to all variations of the signs M-161, M-162†, M-167†, and M-169† into a single sign, namely P-91. Building upon Parpola's suggestion, I further support this classification, that this is a difference of the engraving style rather considering them distinct signs.

The wedge or leaf like symbols: The sign M-134, P-200, or W-480 is frequently used as a modifier sign. This sign appear to be related to M-135, M-136, M-323, M-325, M-326, P-117, P-118, P-209, P-210, P-211, P-212, W-380, W-382, W-383, W-384, W-385, W-482, W-483, and W-484. The variations among these signs primarily involve differences in writing style and the addition of diacritical marks or other modifications.

4402-10 
4030-00 

Squire and oval or circular signs: It is noteworthy that Mahadevan and Parpola have not distinguished the difference between two major signs, namely □ and □. However, in Wells' collection, these signs are recognized as separate and distinct signs.

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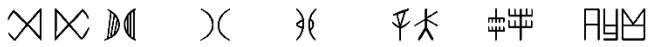
Inverting the position of the primary signs: The inversion of primary signs reveals a notable degree of flexibility. It is observed that the positioning of these signs can vary, depending on the engraver's artistic style and their consideration of spatial constraints. Importantly, this inversion does not alter the phonetic value of the sign and does not indicate a distinct form of the primary sign. Several examples illustrating this phenomenon are provided below:



The Paired Primary Signs

In M-77, 30 pairs of signs have been identified. Wells has classified all of them as independent signs in his sign collection. However, only some of these pairs have been given the status of independent signs in the sign collections of Mahadevan and Parpola.

Serial No:	Indus Sign	NFM Unicode PUA	M-1977	W-2015	P-2010
1.		--	--	69	--
2.		E07-3	1†	91	16
3.		E69-C	410	200	342
4.		E70-C	268	202	377
5.		--	--	219	--
6.		--	--	261	--

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7.		--	--	381	--
8.		--	--	401	--
9.		--	--	479	--
10.		--	--	698	--
11.		--	--	699	--
12.		--	--	821	--
13.		E68-4	403†	840	337
14.		--	--	893	--
15.		E36-7	294†	904	175
16.		E36-5	303†	906	173
17.		--	--	919	--
18.		E3E-7	231	461	199
19.		--	--	441	--
20.		--	--	519	--
21.		--	--	531	--
22.		--	--	586	--
23.		--	--	596	--
24.		--	--	617	--
25.		--	--	791	--
26.		--	--	792	--

Figure 22. List of the paired signs.

Unaddressed signs: These engravings appear to be uncommon, with a low frequency of occurrence. As a result, it is challenging to justify their significance at this time. While there may be speculative justifications, it would be more prudent to withhold judgment until further research is conducted, comparing the texts and related inscriptions. Therefore, I refrain from addressing these signs for the time being, as their determination requires further investigation and analysis.

1.  P-53	2.  P-56	3. P-58	4.  P-238
5.  P-244	6.  P-258	7.  P-264	8.  P-265
9.  P-330	10.  P-332	11.  P-333	12.  P-356

13.  P-357	14.  P-366	15.  P-B5

Figure 23. List of the unaddressed signs.

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The Final determination of the Primary Signs:

In conclusion, the classification of primary or core signs follows a systematic approach that involves categorization and recognition of these fundamental signs. The primary criteria for this classification are their formation and design. Attempts to visually decompose these signs into smaller components have proven to be ineffective or impractical. Instead, the classification and identification of basic signs rely on their formation and design as the primary basis. Further decomposition of these signs does not seem to be applicable. It is important to note that these basic signs are often used in their simplest form, without any further breakdown. This highlights the significance and integrity of these signs as basic phonemes of the alphabet.

Serial No:	Indus Sign	NFM Unicode PUA	M-1977	W-2015	P-2010
1.		E06-D	1†	90	13
2.		E10-A	59†	220	60
3.		E12-D	67†	240	72
4.		E13-D	78†	266	76
5.		E1B-E	53†	798	88
6.		E1E-2	162†	390	91
7.		E24-A	176†	400	107
8.		E26-9	400†	374	109
9.		E2D-6	99	2	127
10.		E2D-9	98†	1	128
11.		E2D-C	87†	32	129
12.		E2D-F	89†	33	130
13.		E2E-1	102†	3	130
14.		E2F-0	109†	16	133
15.		E31-5	121†	18	145
16.		E31-A	86†	31	147
17.	 or	E33-A or E34-F	287† or 299	900 or 899	156 or 165
18.		E37-D or E38-F	304 or 307†	890 or 892	181 or 187
19.		E3C-2	205†	491	192
20.		E3D-B	230†	460	198
21.	 or	E3E-8 or E40-9	134 or 135	480 or 482	200 or 209
22.		E43-5	402 †	367	214

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23.		E45-D	180 †	306	217
24.		E46-E	225	530	219
25.		E47-D	216†	550	225
26.		E4A-6	137†	645	245
27.		E50-3	237	625	266
28.	or	E51-8 or E6E-E	245† or 247†	615 or 626	272 or 371
29.		E55-0	249	590	278
30.	or or	E56-1 or E56-F or E57-4	199 or 195 or 194†	570 or 572 or 576	282 or 285 or 287
31.		E58-5	197†	575	289
32.		E5A-D	328†	700	296
33.		E5D-5	336†	706	302
34.		E65-D	347†	760	319
35.		E69-4	261†	850	341
36.		E69-9	373†	790	341
37.		E6E-8	391†	820	368
38.		E6F-4	284†	877	373
39.		E70-8	267†	817	376
40.		--	--	--	--

Figure 24. The List of Basic or Primary Signs.

Examined Signs

Parpola's exhaustive compilation of 391 signs has been subjected to meticulous scrutiny in order to attain a comprehensive understanding of their design, mechanisms, and variations in writing style. In instances where further elucidation was required, thorough investigations were conducted. Furthermore, the signs from Wells and Mahadevan's updated collections have been integrated into the study, resulting in a collective examination of over 404 signs. It should be noted that certain signs have been individually discussed and excluded from the figures.

Notwithstanding any counterarguments pertaining to the decomposition of specific signs, the concept of the Indus script as an alphabetic writing system remains robust. This comprehensive approach enables us to acquire valuable insights into the actual number of Indus signs and their specific applications, thereby reinforcing the notion of considering them as an alphabet with a high degree of certainty.

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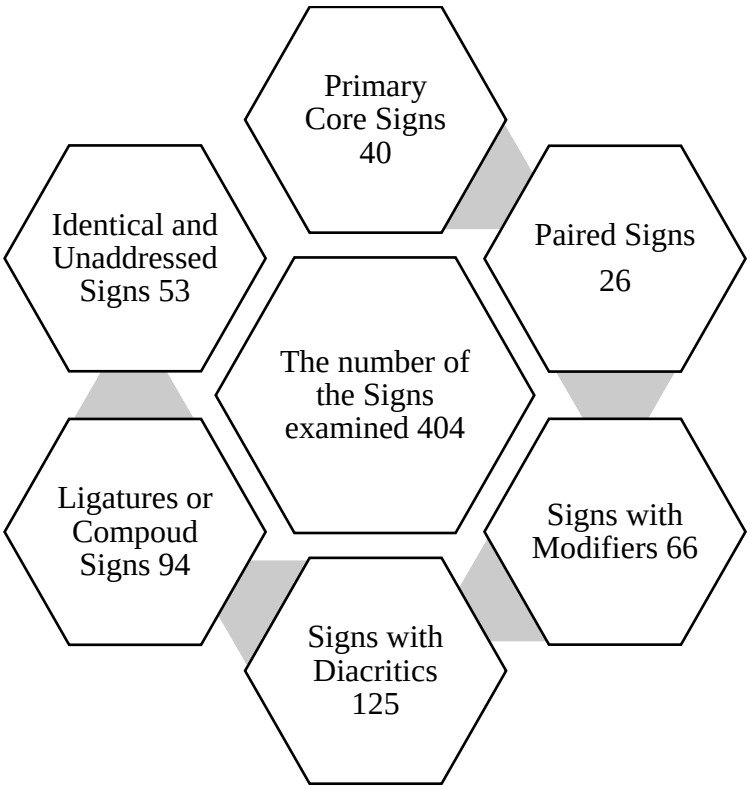

Figure 25. The classification of the sign collection of Parpola.

Discussion

Particular qualities of the signs have been discussed according to the variation in the Indus texts for the elaboration of their general mechanism and behavior in the engraving style. The modified or compound signs have not always merged the same way, due to their design. with a specific focus on variations in engraving styles and their potential influence on the perception of distinct allograph. Noteworthy examples from various sources, including works by Parpola, Mahadevan, and Wells, are examined to shed light on the classification, interpretation and determination of these signs. Additionally, the role of diacritical marks and principal modifiers and their relationship with primary signs is explored, offering valuable insights into the engravers' writing practices. While examples from the Indus Texts for exploring the nature of each sign are not provided in this study, the presented evidence suggests that certain variations in implying diacritical marks and principal modifiers are likely attributed to the engraver's unique style rather than indicating a separate form or distinct allograph.

Following a meticulous examination and investigation, the primary signs have been successfully isolated through the process of decomposing all compound signs. This careful analysis has allowed for a focused study of the individual elements that make up the primary signs, enabling a deeper understanding of their distinct characteristics and functions within the compounds.

Furthermore, it is observed that the inversion of signs in the Indus script appears to be flexible, based on the engraver's discretion and the requirements of the inscription. There is no strict rule or adherence to a specific orientation. This flexibility in inversion adds to the complexity and artistic expression within the script, allowing for variations and adjustments as per the engraver's intent.

The several signs have been identified as identical signs according to their minor allographic design in the script. A comprehensive analysis of these factors, this study contributes to a deeper understanding of identical signs and encourages further research in this captivating field.

Certainly! The concise examples effectively illustrate the overarching process of application and the fundamental characteristics of the signs found in the Indus script. Additionally, they shed light on the behavior, mechanism, design, and writing style of the elementary signs encompassed within the alphabet.

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Application Procedure: The signs within the Indus script are employed across various contexts, encompassing inscriptions on seals, tablets, tools, vessels, bangles, ladles and other artifacts on wide variety of the raw material ranging between steatite, marble, calcite, limestone, silver, copper, faience, terracotta, ceramic, shell, bone and ivory (Coningham,2002). Consequently, these signs are meticulously arranged and combined in accordance with the specific nature of the inscription.

General Qualities: The signs within the Indus script demonstrate a wide array of shapes, encompassing geometric forms, abstract symbols, and depictions of natural objects or animals, with the exception of certain animal and bird symbols. In terms of the characteristics of the Indus symbols utilized for the alphabet characters being a first ever concept of writing system, it may be said they appear to possess linear qualities.

Behavior: The signs within the Indus script exhibit a notable degree of flexibility in their utilization. This encompasses variations in stroke count, inversion, the incorporation of diacritical marks, and the manner in which the basic signs are combined in compounds. Such behavior of the signs not only allows for artistic expression but also permits individual interpretation, further enhancing the script's versatility.

Mechanism: The mechanism underlying the basic signs revolves around their systematic combination and arrangement to construct words and phrases. While there may exist certain variations in the style of their combination, efforts have been made to uphold uniformity and ensure accuracy. This earliest intricate and robust writing system facilitated effective communication and enabled expressive capabilities not only within the Indus civilization but also extended its influence beyond its geographical boundaries

Design: The design of the fundamental signs in the Indus script exemplifies the craftsmanship and artistic sensibilities inherent in the script. The incorporation of a wide range of diacritical marks, modifiers, and the combining style employed in the formation of compound signs results in the distinctive shapes observed. This approach to sign composition is reminiscent of the practices observed in the Brahmi script.

Writing Style: The basic signs within the Indus script exhibit a diverse array of stylistic elements, encompassing variations in stroke, direction, size, and arrangement. These deliberate stylistic choices contribute to the script's inherent uniqueness and individuality, culminating in its visually captivating nature. Notably, as the earliest known alphabetic writing system in recorded history, the Indus script bears a semblance of logographic features in its overall appearance.

It is essential to acknowledge that the age of the script's inception does not provide conclusive evidence of a commonly utilized writing medium, such as paper. Instead, it is plausible to consider that materials such as leather, leaves, or cloth were initially employed for the purpose of writing. The prevalence of clay tablets, seals, or similar materials further indicates their continued usage over an extended period, likely due to the limited availability of alternative mediums like paper. The eventual invention of a paper-like material may have sparked the recognition of the necessity for a more streamlined, linear form of writing. This transition towards a fully linear writing system gained momentum, particularly in the late second millennium BC, as evidenced by historical developments.

Thus, the signs within the Indus script showcase a plethora of diverse qualities, encompassing their application procedure, general characteristics, behavioral flexibility, underlying mechanism, intricate design, and distinctive writing style. Collectively, these aspects contribute to the intricate nature and artistic essence of the Indus script. Moreover, they enabled effective communication and facilitated expressive capabilities within the ancient Indus civilization. Furthermore, the script laid a solid foundation, opening new vistas and avenues for future generations as a medium of wisdom and expression.

Conclusion

To comprehend the engraving of sign designs as an alphabet, we must adopt a more lenient perspective and abandon rigid notions regarding the accuracy of sign designs in combinations. It is important to consider the vast region of the valley and the limitations of communication at the time, as these factors had a significant impact on the writing and engraving style of the same signs and

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their compositions across the region. However, it is worth noting that the level of accuracy in writing skills demonstrated by the Indus script is remarkable.

Rather than solely focusing on understanding the process of combining signs and identifying their variations and engraving styles, it is not logically sound to insist on an extensive number of signs. The controversy surrounding the indigenous founder of the civilization, as well as the acknowledged history of writing and its evolution, presents a significant obstacle to the development of the idea or concept that the Indus Valley may have possessed an alphabet as early as 3200 BC.

The study asserts that the Indus script encompasses a total of 40 fundamental or primary signs, along with 3 principal modifiers and 8 diacritical marks. Additionally, there are two other signs that could potentially be categorized as diacritics. Despite the presence of some illegible signs, various depictions of birds, animals, and stroke-like symbols can be considered equivalent signs based on their contextual usage. The general attributes of sign utilization suggest that the Indus alphabet possesses characteristics that encompass both alphabetic and abugida systems. Furthermore, these characteristics were subsequently embraced by later archaic alphabets, aligning with the cultural and educational milieu in which they developed.

To achieve a deeper understanding, it is crucial to explore the connection and similarities between the Indus Script and other ancient scripts. This exploration aims to recognize the phonetic values of the characters. In my opinion, adopting a uniform system for extracting distinct phonemic characters from the fundamental allographic design of the signs of the same phonetic class may assist in identifying their specific sound values. It should be noted that being such an ancient script, the Indus Script likely had an influence on later archaic scripts. Therefore, it would not be an exaggeration to consider the Indus Script as the origin of all ancient alphabetic scripts.

By testing the preliminary results, the readings of Indus texts confirm that the language of the valley was Prakrit. This language not only belonged to the Indo-European language family but may also be the origin of the entire Indo-European language group. Consequently, comparing the readings of the Indus texts with archaic Vedic documentation can unveil new avenues for understanding the origins of the Indus Valley civilization and shed light on the various forms of writing and their true interpretation. Furthermore, this comparison may help in understanding and clarifying illegible or confusing texts within the Indus Script.

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