Classification of patterns on Indus objects

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Abstract

One of the most outstanding features of Indus culture is their works in inscribed objects\(^1\). These include seals, sealing and other objects of terracotta, ivory, copper etc. The objects, in general, have a wide variety of designs and contents. We take a holistic view of the content of the inscribed material. We discuss different types of design components on these objects and classify them into twelve different categories. Distinct types of inscribed objects were probably made and used for different purposes. We briefly summarise the symmetrical aspects of some of the designs found on these objects. This work provides an overview of the different kinds of patterns found on the inscribed material and provides percentage contribution of each of them in the inscribed corpus.

1. Introduction

The Indus culture had been one of the largest and most urbanised cultures in the ancient world (see Kenoyer (1998), Possehl (2002), Agrawal (2007), Lawler (2008), Wright (2010) for a detailed overview). It reached its peak between 2500 BC

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\(^1\) Inscribed object: As there are a variety of inscribed objects catalogued in the CISI volumes and they are often multisided, the study takes each of these inscribed sides as a unit. The use of the word “object” in the paper refers to an inscribed object with any kind of inscription on at least one side of it. Various kinds of Indus figurines are out of scope of the present study.
and 1900 BC after which it declined. During its flourishing period, it was spread over an area greater than one million square kilometres along the river beds of Indus and now dried up Hakra river in Pakistan and Ghaggar in Western India. It included many urban and semi-urban centres. One of its most interesting features is the absence of any monumental structures. Extensive planning and expenditure of resources on setting up living environment and general care of population was an important characteristic of this culture. Apart from extensive water network in the city, the culture is known for the great bath, huge buildings (erroneously called granaries, see Possehl, 2002, pp 103-104) and meticulous planning for movement of people and goods within and around the towns. The Indus culture strikes one as highly utilitarian, organised and disciplined, taking great care of its citizens but so far, no clear evidence of any centralised power structure has been found.

An important feature of the Indus culture was the use of small, inscribed objects of terracotta and other material on which various aspects of the culture are depicted. A large variety of patterns can be seen on the Indus objects catalogued in the two volumes of Corpus of Indus Seals and Inscriptions (CISI), volume 1 by Joshi and Parpola (1987) and volume 2 by Shah and Parpola (1991)), henceforth referred to as CISI
Volumes 1 and 2). The Indus script often occurs as a string of signs mostly on the top part of these objects.

The Indus script makes its appearance on seals, sealing etc. most of which are between 2 to 5 square centimeters in size. These objects by themselves are of various shapes (square, rectangular, rolled, circular and so on, see Figs. 1a-e) and material type (terracotta, steatite, copper etc.).

As per Mahadevan’s concordance of the Indus script (Mahadevan, 1977, hereafter referred to as M77), the sign list of Indus script consists of 417 distinct signs, while others such as Koskenniemi and Parpola (1982) have identified 396 signs. In a more recent study, Wells (2002) has identified 676 signs in the Indus sign list. In spite of several inspired attempts, the script, which is often found on the inscribed objects, is not yet deciphered. Moreover, these inscribed objects contain a variety of other patterns in addition to the Indus script. In a recent series of papers (Yadav et al. (2008a, b), Rao et al. (2009a, b), Yadav et al. (2010), Rao et al. 2010) Yadav et al. (2008 a, b)) we have shown that the Indus script is highly structured. However, the contents of the script remain un-deciphered.

Since the inscribed objects depict a variety of patterns often in association with Indus script signs, the relation of the Indus script with these patterns must be analysed in order to gain insight about the probable context of the script. To comprehend the script, we need to understand the context of the
inscribed objects on which it is generally found. These objects are generally assumed to be used for identification, trade or religious purposes but this is not certain. The present study is an attempt to put the inscribed objects and the Indus script in perspective.

![Fig. 1a](image1a.png) ![Fig. 1b](image1b.png) ![Fig. 1c](image1c.png)

**Fig. 1d** ![Fig. 1d](image1d.png) **Fig. 1e** ![Fig. 1e](image1e.png)

*Figs. 1a-e: Inscribed objects of various shapes other than commonly discussed square and rectangular shapes (see Figs. 2.2a-d and 2.3 a, b)*

The Indus script was apparently used in a variety of contexts, and on various types of objects, from square and rectangular seals, minitature tablets, copper tablets to pottery shreds, bronze implements and so on. It is found in the Indus valley at several sites such as Mohenjodaro, Harappa, Lothal, Kalibangan, Chanhudaro etc. to several west Asian sites in Persian Gulf and Mesopotamia. The study of context of writing on a variety of objects found at these sites and its relation to
other patterns on these objects is indispensable to understanding the culture as a whole.

Kenoyer (2006) has discussed some of the important issues related to the nature of script and its evolution based on archaeological data as well as the variation of writing on objects from different periods. We concentrate on analysing the patterns found on the various inscribed objects catalogued in CISI volumes 1 and 2 and classify them into different categories defined below. For the present, we do not separate the sample by site nor do we take stratigraphy, but these will be taken into account for more detailed mapping of the patterns.

2. Inscribed Objects: Pattern component classification

The inscribed objects are typically a few square centimetres in size with intricate markings on them. Several hundreds of them have been catalogued in CISI Volumes 1 and 2. The various patterns which are found on these objects can be seen as a combination of one (or more) of the following basic components.

1. Less defined patterns
2. Indus script
3. Animal motifs
4. Manger or Special decorated object
5. Composite animals
6. Multi-headed animals

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2 The sequencing of the basic components is arbitrary and does not indicate any specific preferences.
7. Mythical figures
8. Scene: Mythical or General
9. Plant motifs
10. Geometric patterns
11. Abstract design
12. Human figures

Apart from the excellent work done by Parpola et al. (1987, 1991) in CISI Volumes 1 and 2 which provide photographic documentation of these inscribed objects, there have been some detailed studies on various interesting aspects of these inscriptions by a number of scholars such as Rissman (1989) (as quoted by Possehl, 1996: 31, 32), Ute Franke-Voigt (1989) (as quoted by Possehl, 1996: 33, 34), Talpur (1994) and so on. They have extensively studied some specific kinds of patterns or objects from specific sites.

The present study is an attempt to define quantitatively the contribution of various kinds of patterns in the corpus of inscribed material published in CISI volumes 1 and 2. We first identify and define 12 basic components and then analyse the pattern on each inscribed surface of the Indus objects listed in CISI volumes 1 and 2 to catalogue the basic components for each of them. This catalogue of the basic components for all inscribed surfaces can further be used to analyse correlation amongst the different types of components. It must be noted that the pattern on an inscribed surface of an Indus object may
consist of one or more of the basic components listed above. We will discuss each of these basic components of patterns found on various inscribed objects with examples below. We analyse the patterns on all the objects catalogued in CISI volumes 1 and 2 and classify them into these 12 component classes to compute the percentage contribution of each of these components in the inscribed corpus. A list of all the objects analysed in the paper is given in Table 1 in Appendix. Table 1 also provides other relevant information such as CISI number, site of occurrence and size of these objects.

2.1 Less defined patterns

These patterns are generally seen on pottery shreds, clay lumps or stone pieces. Some of the depicted patterns look similar to the script signs and hence could be examples of early stage of writing. Few examples of the patterns falling in this category are given in Figs. 2.1a-c. For example, the human figure in Fig. 2.1a resembles sign no. 8 of M77 and the writing on the pottery shred (Fig. 2.1c) is very similar to sign no. 167 of M77.

![Fig. 2.1a](image1.png)  ![Fig. 2.1b](image2.png)  ![Fig. 2.1c](image3.png)

*Figs. 2.1a-c: Less defined patterns*
2.2 Indus script

The Indus script is a significant component of the patterns found on various inscribed objects. These are found on almost all kind of inscribed objects. Figs. 2.2a to 2.2c give some examples of rectangular bar seals with strings of Indus script signs. Some cases of twisted seals with Indus script are also known (Fig. 2.2d).

*Fig. 2.2a*  *Fig. 2.2b*  *Fig. 2.2c*

*Fig. 2.2d*

_Figs. 2.2a-d: Indus script on rectangular bar seals_

This component of the inscribed patterns appears on a variety of objects apparently used for various purposes. The presence of the Indus script on varied kinds of objects has led to suggestions that the script was quite versatile and that it could have been used to encode a variety of messages (Kenoyer 2006). It appears with almost all other components of the Indus patterns (or inscriptions) and its correlation with other components of the inscribed patterns will be helpful in understanding its role in the culture.

2.3 Animal motifs
An animal motif is another significant component of the patterns found on the Indus seals (Fig. 2.3a and Fig. 2.3b). Many square seals typically consist of a very conspicuous animal motif at the centre with a written text at the top, and an object often near the face of the animal. However, there are inscribed objects where the animal has been drawn in the same line as the written text (Fig. 2.3c).

![Fig. 2.3a](image1) ![Fig. 2.3b](image2)

*Fig. 2.3a-b: Objects with animal motif*

![Fig. 2.3c](image3)

*Fig. 2.3c: Object with animal motif in line with script signs*

The most common animal motif is unicorn (Fig. 2.3a). It accounts for about 1159 occurrences of all animal motifs. The frequency of usage of different types of animal motifs in Indus seals is given in Appendix II of M77. The most acceptable description of unicorn is “a mythical animal with a single horn”. Various theories exist about the nature of this animal too. According to one of these, the second horn is
behind the first horn and hence cannot be seen. It is interesting to note that in some of the structures of Persepolis in Persia, similar figures can be seen with their horns so symmetric to each other that from the side view they look similar to the unicorn. It has been argued in the literature that this is the edge view of a genuine double horned animal but, there are clear depictions of two horned animals with both their horns visible on several objects such as in Fig. 2.3b. Moreover, there have been several finds of figurines of a single horned animal that suggest that the Harappan people had a concept of one horned animal. Rissman (1989) (as quoted by Possehl, 1996: 31, 32), has discussed in detail the iconography of unicorn and associated object usually found in front of the animal in detail.

2.4 Object near the face of Animal motif: Decorated object or Manger

A large fraction of seals depict an object (generally decorated as in Fig. 2.4a) or a manger (a flat dish, as in Fig. 2.4b) in front of the animal motif. However, in rare cases, we do find seals with this object alone (Seal no. H-742 B, Parpola 1991).

Various suggestions have been made about the decorated object found near the face of the animal. As already mentioned, Rissman (1989) (as quoted by Possehl, 1996: 31, 32), has discussed various forms of this object in detail. According to Mahadevan (1985) these decorated objects are
vessels used for making the Soma drink. Another interesting suggestion is based on the seals M-490 and M-491 (Fig. 2.4c) where the object is being depicted as a standard in a scene, showing procession of men holding portable standards.

Fig. 2.4a: Decorated object near Fig. 2.4b: Manger near animal face

Fig. 2.4c: Object depicting standards in procession

2.5 Composite Animals

Apart from the animal motifs, there are several objects where the depicted animals are composites of several other animals. Figs. 2.5a and 2.5b show two such examples.

Fig.2.5a

Fig. 2.5b

Figs. 2.5a-b: Objects depicting composite animals
Of these, the composite animal in Fig. 2.5a has been discussed in detail by Huntington (see web reference³). One possible reason for depicting such composites could be to incorporate the important features of various components of the composite into a single figure. For instance, the head of human could be suggestive of intelligence; claws of tiger could be suggestive of strength and so on. The object in Fig. 2.5b shows a human form with animal body and a plant apparently coming out of its head. There are several other examples of this type too.

2.6 Multi-headed animals

Multi-headed animals are another interesting component of patterns on inscribed objects. The multi-headed animals typically have heads of different animals. Fig. 2.6a and Fig. 2.6b are typical examples for these, where this feature can be clearly seen. Moreover, the round eyes in this figure (Fig. 2.6b) are typical of Kulli-culture motifs (Uesugi, 2008).

Fig. 2.6a

Fig. 2.6b

Figs. 2.6a-b: Objects with Multi-headed animals

³http://huntingtonarchive.osu.edu/Projects/Iconographic%20Discussions/harapam%20seals/Harappan%20Seals.pdf
2.7 Mythical figures

A large number of inscribed objects in the collection have figures which depict mythical figures in very specific poses, surrounded by either script signs or proportionately much smaller animals. We have suggested in section 2.3 that, even unicorn may belong to this class but is being categorised in the category of animals because of the uncertainty attached to it. However, some of the more classical mythical figures are given in Fig. 2.7a and Fig. 2.7b. These mythical figures appear on several inscribed objects, mostly on seals depicting mythical scenes. An excellent example of this is in Fig. 2.7a inside a U shaped plant or even in a sequence of seven figures at the bottom.

Fig. 2.7a  Fig. 2.7b

Fig. 2.7a-b: Object with Mythical figures

Another widely discussed mythical figure is shown in Fig. 2.7b. This has been suggested to be a three headed god while at other places this has also been suggested to be a human seated in yogic posture. This object is often referred to as the Pashupati seal.
2.8 Scenes: Mythical or General

Scenes form a special class of basic patterns. These are usually composed of human or mythical figures that seem to be representations of myths and legends of that period, often depicting what appears to be gods, goddesses or heroes performing heroic deeds or engaged in various kinds of activities (Figs. 2.8 a-e). These patterns can be seen as narratives, their characters (human or mythical figures) being involved in the events or stories depicted and it seems justifiable to analyse them as a whole. Hence they are kept as a separate class.

Fig. 2.8a

Figs. 2.8a-b: Objects with scenes

Some of the inscribed objects on which these scenes appear reveal a careful attempt to describe an event on unusually small objects (Fig. 2.8c). It is interesting that in order to get a larger width (since the event or legend often tends to require a longer format), they preferred to use small rolled seals rather than large sheets of clay. These rolled seals can in turn be rolled out on terracotta sheets or other image reproducers in order to comprehend the inscribed pattern. Clearly, this shows a
remarkable intelligence and understanding of space and art by its creators.

Fig. 2.8c

Fig. 2.8d    Fig. 2.8e

Fig. 2.8c-e: Some more examples of objects with scenes

Human seated in a tree is yet another commonly found scene on the inscribed objects (Figs. 2.8a and 2.8d). Scenes depicting everyday activities are quite rare but an example is given here (Fig. 2.8e). Moreover, a glimpse of this aspect of the culture can be found in terracotta and clay figurines which are out of the scope of this paper.

2.9 Plant motifs

While plants were clearly an important part of Harappan life, there are surprisingly few inscribed objects with plant motifs. There are many seals (see e.g. top left of Fig. 2.7a) where a mythical figure is enclosed in a ‘U’ shaped plant formed by two branches. In some of the objects with scenes, a
human form sitting on a tree is also depicted. Examples of solo plant motifs on the inscribed objects remain quite rare. Figs. 2.9a and 2.9b give examples of some of them. However, leaf motifs can be seen as part of some abstract designs as well as pottery graffiti.

Fig. 2.9a  Fig. 2.9b

Fig. 2.9a-b: Objects with plant motif

2.10 Geometric patterns

Intricate geometric patterns of varied nature, from ‘+’ and Swastika like signs to grid and circular patterns can be seen on different inscribed objects. Some examples of objects with geometric pattern on them are shown in Figs. 2.10a to 2.10d. These objects are good indicators of understanding of geometric shapes by the Indus people. Some of these are exquisite in terms of their finish and seem to have manufactured using special technology compared to other crude examples.

Fig. 2.10a: Object with fountain pattern  Fig. 2.10b: Object with concentric circle pattern
Though examples of artefacts with crude geometry exist, there are quite a few examples with geometric patterns which seem to be exquisite in terms of ratio, proportion and spacing between the circular rings (in case of concentric circular pattern). The detailed study of some of these geometric patterns is done in Vahia and Yadav (2010).

2.11 Abstract designs

Abstract designs are quite complex and they are generally very symmetric. They are done very carefully probably with a preconceived plan and thus are a portrayal of the artistic skills of Indus people (Figs. 2.11a and 2.11b).
2.12 Human figures

Human figures are a rare component of the patterns found on Indus inscriptions. These are generally seen as part of some narrative scenes depicted on the glyptic material. For examples of patterns with human figures see Figs. 2.8 a-e above.

3. Cataloguing and analysis of the basic component patterns

We catalogued a total of 4695 surfaces with various kinds of inscriptions using the CISI volumes 1 and 2. Note that a particular surface may have one or more of the above basic patterns. Also, for objects with more than one side with inscriptions or markings, each surface is treated as an independent unit. The relative percentages of various kinds of inscribed patterns on the 4695 inscribed surfaces are given in Table 3.1. Note that the total percentage does not add up to 100 since the same inscribed surface of an object may have more than one type of basic component pattern.

Table 3.1: Surfaces with different types of inscriptions

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Type of Basic Component Pattern</th>
<th>Total no. of inscribed surfaces</th>
<th>% of all inscribed surfaces</th>
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<td></td>
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<tr>
<td>1</td>
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<td>Indus script</td>
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<td>Composite animals</td>
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The percentage contribution of various kinds of basic components in the corpus of inscribed material i.e. CISI volumes 1 and 2 is shown in Fig. 3a.

![Figure 3a](image_url)

Fig. 3a: Percentage contribution of various component patterns (in decreasing order)
It is evident from Fig. 3a that Indus script appears on about 66% of all inscribed surfaces followed by animal motif which appears on about 35% of inscribed surfaces, and the decorated object (or manger) which appears on about 22% of inscribed surfaces in CISI volumes 1 and 2. These three components generally appear together on most of the objects.

4. Some interesting aspects of these patterns: Symmetry and use of select number of divisions

Two very interesting aspects of the patterns found on many objects are symmetry and use of select number of divisions in the patterns. We now discuss each of these briefly (for details see Vahia and Yadav, 2010).

4.1 Symmetry

A considerable fraction of the seals seem to have specific symmetries or division of the depicted pattern into specific numbers of parts. Some examples are given in Fig. 4.1a-c where objects with specific symmetries are shown. Fig. 4.1a is an object of foreign origin but the depicted pattern has 2-fold symmetry, Swastika (Fig. 4.1b) pattern has 4-fold symmetry and the pattern in Fig. 4.1c has 5-fold symmetry. Special emphasis is given to keep the patterns symmetric. It must be noted that symmetry is generally a characteristic associated with perfection too.
Another noticeable feature of some of the depicted patterns on these inscribed objects is their division into select number of parts. Figs. 4.2a to 4.2f show several objects where the patterns are divided into a specific number of patterns. Note that often the patterns are repeated a specific number of times most often 7 and 24 times on objects.

**4.2 Use of select number of divisions**

Figs. 4.1a-c: Seals with specific symmetries (See also Figs. 2.10a-d)

Figs.4.2 a-d: Objects where same pattern repeats 7 times along the circumference
Talpur (1994) has discussed various patterns on button seals like swastika symbol, stepped cross motifs and other designs with diagonals etc. and has highlighted the importance of number 24 by showing that the sum of the various line segments used in these designs adds up to 24. Thus her study also points to use of standard set of proportions and numbers by Indus people that may have been culturally important and a general understanding of geometry by Indus people.

![Fig. 4.2e and 4.2f](image)

*Fig. 4.2e Fig. 4.2f*

Figs. 4.2e, f: Objects with dots and other markings. Only specific number of marks such 24 are found

5. **Significance of pattern study in relation to Indus script**

The inscribed objects at times have patterns falling in different categories on one or more sides and hence a study of the correlations amongst these patterns may be useful in understanding the context of the object as well as the Indus script signs. This can add to our understanding of these objects, complementing other clues coming from some external features such as shape of object, size of object, its site of occurrence and so on. Some pattern on the seals show striking resemblance to
the signs in the Indus script. Few such examples are given in Fig. 5.

Fig. 5: Resemblance between some patterns and Indus script signs as in Fig. 2.1a and 2.7a. The sign numbers are as in M77.

It is difficult to say whether such resemblance is just a matter of coincidence or whether there exists a genuine relation amongst them, but either way such resemblances are worth exploring. If the latter is indeed true, then even though we cannot say with certainty whether they retained the symbolic meaning associated with them, the study of such resemblances of the Indus signs with some patterns, can provide interesting insights about how and why certain abstract symbols found their way in the sign list of Indus script.

6.0 Discussion

In the present paper we discuss the various thematic patterns on Indus objects catalogued in Shah and Parpola (1991) and Joshi and Parpola (1987). We have identified 12 basic components of the patterns found on Indus objects and have analysed all the inscribed surfaces in CISI volumes 1 and 2, classifying the components of the pattern on each inscribed
surface into one or more of the 12 distinct categories defined above. We then present the percentage contribution of each of these basic components of the patterns in the corpus of inscribed material. Finally, we discuss briefly some interesting aspects of these patterns such symmetry, use of select number of divisions and the significance of this study with respect to the Indus script.

Some of the objects analysed here are as small as 1.3 cm x 1.3 cm (object in Fig. 4.2d) to as large as 8.5 x 7.4 cm (object in Fig. 2.1a). However, they all are of relatively small size. In the examples shown here, the pictures of the objects are often larger than the real object since otherwise, the intricate design work is difficult to see. The dexterity of the Indus people and the sharpness of the drawings apart from their appreciation of plane and circular geometry have to be appreciated. The standardisation of their weights with an uncertainty of just 6% has been pointed out by us in Vahia and Yadav, 2007. In Vahia and Yadav (2010) we have discussed the various geometric patterns on Indus objects in detail.

In another series of papers (Yadav et al. (2008a, b), Rao et al. (2009a, b), Yadav et al. (2010), Rao et al. 2010) Yadav et al. (2008 a, b)) we have shown that the Indus script has a rich syntax and logic in its structure. Together they make a composite and complex picture of the Indus people in terms of
their sense of geometry, symmetries and artistic skills. The picture of the culture that emerges is that of highly skilled, highly trained people who not only worked with great diligence but also with an excellent understanding of geometry. Such knowledge could not have evolved in a generation nor passed on and expanded in an informal manner. Identification and formal training of skilled artisans must have been an integral part of the Indus culture.

7) Conclusions

We have analysed various kinds of inscribed patterns on Indus objects catalogued in CISI volumes 1 and 2 and a few new seals available on www.harappa.com. We arrive at the following conclusions:

1) There are 12 different basic components that appear together or alone on the inscribed surfaces of Indus objects.

2) Indus script makes its appearance on about 66% of all inscribed surfaces, followed by animal motif (35%) and the decorated object or manger (22%) that are generally seen near the face of the animals. These three components most often come together on most of the seals.

3) The Indus script appears with almost all other components which are identified in the study, hence its relation with other components is crucial in defining its
context. Some of the patterns show close resemblance to some of the signs occurring in the sign list of Indus script.

4) Geometric patterns generally appear as independent component on most of the objects. There are some very complex concentric circular patterns on objects no more than a few centimetres in size suggesting a strong commitment to quality control.

5) Geometric and abstract patterns are in particular interesting due to their extensive use of symmetry and select number of divisions.

6) The patterns show remarkable intelligence and understanding of space and art by its creators.

Acknowledgements

We wish to acknowledge the support of Jamsetji Tata Trust for this work. We wish to acknowledge the pictures from Harappa.com and express our gratitude to them for making them available on their site. In particular, we wish to thank Iravatham Mahadevan for his insightful guidance in our work.

References


- Wells, B. K. 2006. Epigraphic Approaches to Indus Writing. Harvard University, Cambridge, Massachusetts.


Table 1: Details of objects discussed in the paper

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