



# Indus zoomorphism and its avatars

## With a classification of seal-impressions\* based on a design logic and genealogical figure charts

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### Abstract

This paper re-classifies over 2000 seal-impressions with at least one zoomorphic element drawn from the *Corpus of Indus Seals and Inscriptions* Volumes 1 to 3.2 (Joshi & Parpola, 1987; Shah & Parpola, 1991; Parpola et al., 2010, 2019). The classification is presented as supplementary data, *SI*. Tables 1, 2 and 3 explain the organisation of the data in *SI*. The tables and 8 figure charts reveal that Indus iconography is based on six principles of production design—formative, additive, extractive, subtractive, orientative, and associative. The associative principle illustrates the dynamics between the animal icon, the object in front, and other icons in a group or *en file*. The additive and extractive principles feed off each other, the latter being a device to deconstruct a compound design unit, the final product of an additive expression, and use that component-avatar in isolation or in a different context, in a way that the component and the compound recall each other. The compound-component genealogy is illustrated in figure charts. The classification yields at least 139 design units. 43 units have a singular expression on seals. The remaining 96 obtain from additive compounds on seal-impressions, hitherto not organised as such, even if recognised. The labels assigned to the component-avatars are non-interpretive and purely descriptive. However, there are a few instances where a label forces an interpretation and these are discussed case by case.

**Keywords** Indus visual grammar · Communication systems view · Iconography · Design logic · Seal-impressions · Instruments of reproduction and mass production

*Dedicated to Iravatham Mahadevan who showed the way.*

## 1 Introduction

An Indus seal-impression is a document that culminates from centuries of innovation in art, agriculture, cattle rearing and animal husbandry, metal working, surface transport, metrology, urbanisation, long distance wealth exchange, and the necessary systems and communication. Long distance trade and communication define the mature Harappan. This

paper takes a systems and communications view of over 2000 Indus seal-impressions recorded in the supplementary file, *SI*, see download link below. The data in *SI* is available for web query at <https://mvbhaskar.com/induszooat>.

The said communication objects carry imagery (icons) and text (signs). We start with the animal icons that often appear with an object in front (Fig. 1). We isolate about 140 visual components from seal-impressions with at least one animal icon.

We will look at examples of how these components combine and un-combine in 8 figure charts. We will study how they organise themselves into complex compounds on narrative seals and explain some of them individually.

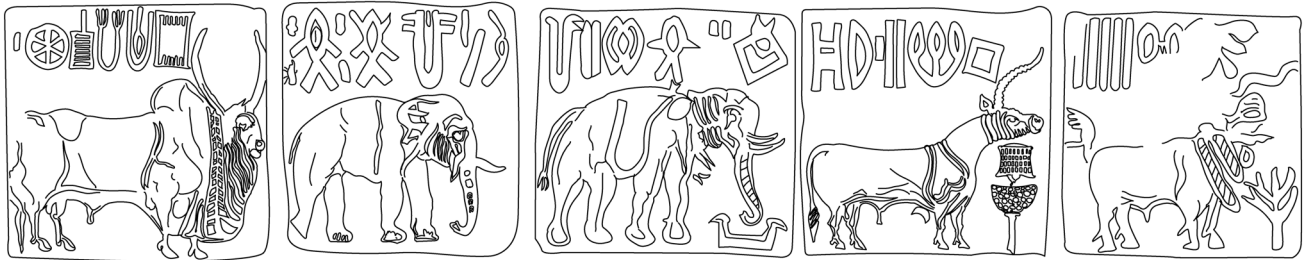
## 2 Dataset

The dataset for this study is drawn from the *Corpus of Indus Seals and Inscriptions* (Vol. 1 to 3.2; Joshi & Parpola, 1987; Shah & Parpola, 1991; Parpola et al., 2010, 2019; hereafter

\*The hyphenated expression ‘seal-impressions’ includes stamp and mould seals and their impressions on any medium, and excludes any expression that is not directly involved in the reproduction or mass production of Indus iconography. By definition, it excludes “miniature seals (that) were meant to be read direct”, Vats (1940, p. 325), and media that is referred to as incised. All seal imagery in this article faces as impressed.

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**Fig. 1** From left: One example each of **a** Animals that always stand free (zebu, M-1103), **b** Animals that occasionally stand free (elephant, H-89), **c** Animals that face a manger (elephant, M-1152),

**d** Animals that face a container (unicorn, H-6), and **e** Animals that face an Indus sign (human-faced markhor, M-1180). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

*CISI*) with some filters applied. The primary filter is zoomorphic, its selection based on the presence of at least one animal image on an Indus seal-impression. Other criteria for omission or inclusion are noted in *SI*.

*SI* counts **2072** seal-impressions with zoomorphism on at least one face, all from the mature Harappan period: **1067**, Mohenjodaro (M- 1–312, 317–328, 410, 415–417, 427–433, 436–442, 445–454, 477–480, 482, 486–493, 496–499, 595–1050, 1077–1180, 1182–1186, 1199–1208, 1221–1227, 1367, 1369, 1383, 1385, 1387–1388, 1390–1402, 1405, 1423–1425, 1427–1431, 1660–1919, 1923–1929, 2000, 2008, 2010–2022, 2029–2033); **430**, Harappa (H- 1–97, 102, 163, 168–169, 170–174, 176–177, 180–182, 252–265, 266–275, 276–277, 356, 383–521, 530, 597–602, 606, 609–610, 612, 1020–1056, 1657–1687, 2590); **188**, Lothal (L- 1–50, 65–66, 107, 124–170, 189–204, 206–207, 209–214, 217–220); **69**, Kalibangan (K- 1–44, 49–50, 56, 66–76, 80, 89, 145–152, 155–157); **39**, Chanhudaro (C- 1–27, 32, 51–77, 81–83.); **48**, Banawali (B- 1–17, 23); **1**, Dholavira (Dlv- 1); **2**, Jhukar (1–2); **1**, Lahumjodaro (Lh- 1); **1**, Pabumath (Pbm- 1); **2**, Rakhigarhi (Rgr- 1, 3); **1**, Surkotada (Sktd- 1); **1**, Pirak (Pk- 1); **8**, Alladinho (Ad- 1–8.); **1**, Amri (Ai- 6); **5**, Balakot (Blk- 1–5.); **1**, Kot-Diji (Kd- 5); **5**, Nausharo (Ns- 5–9, 52–59, 61); **2**, Nindowari-damb (Nd- 1–2).

The above choice narrows the dataset to the instruments of reproduction and mass production, intrinsically more reliable than incised media, graffiti etc. Restricted to the mature period, the chosen dataset also eliminates early experimentations when the design convention may not have settled, as well as samples from the late period when the convention might have become decadent.

No particular attention is paid to the material composition or other morphological features of the objects considered. It does not matter to this inquiry if, for example, a seal-impression is made of steatite or copper, if the seal is square, round, uni-, or poly-faced, or if an impression is on clay or faience, or if the object is bossed, perforated or not, and least of all, the size of the object. The medium is not the message.

The study ignores the Indus script altogether. Visual design is its only domain. However, there is a brief discussion on the inter-relationship between the two and a tentative suggestion that they may be more inter-related than previously suspected.

### 3 Classification<sup>1</sup>

The header columns and rows of *SI* are excerpted and presented below in Table 1. The header columns give the structural view of the classification and its underlying design logic. The zoomorphic and the associated imagery on each seal-impression from *CISI* is tabulated against a set of five principles of communication design, namely, formative, additive, extractive, subtractive, and orientative. The attributes for each entry cumulate across the header columns—positively from ‘formative’ to ‘additive’, negatively through ‘extractive’ and ‘subtractive’, and neutrally with regard to the ‘orientative’. The object in front is tabulated as associative.

The second column in Table 1, Additive, has a variety of expressions. Each additive feature is given a P number and the range of this numbering goes from 1 to 20 (Tables 2, 3). See Table 4 for the value of each P label.

Table 2 documents M-488, a prism seal impression of 3 faces, A, B, and C (see Fig. chart 3). Across its 3 faces the object carries 11 component-avatars, serialised from S1 to S11. The component-avatars are impressed *en file*, on each face. The table lists the icons in the order of their appearance from right to left. Each component-avatar is described under Face A/B/C. When a face of a seal impression does not carry any pictogram, its first entry carries the suffix X (see *SI*). Conversely, when a face has one or more Indus pictograms on it, the first entry carries the suffix + (see S7). An F label is used for defining an icon’s association with the object in

<sup>1</sup> Pure, singular zoomorphs are already classified as such in *CISI*, as are joined animals, composite animals, and animal groups. *CISI* presents animal orientation in all cases which this paper reflects.



**Table 1** Excerpt of the header columns and rows from S1: Catalogue of Indus zoomorphism on seal-impressions

Formative	Additive	Extractive	Subtractive	Orientative	Associative
	Features	Component-avatar			

**Table 2** Documentation of M-488, a prism seal impression

Formative	Additive Feature/s	Extractive Component-avatar	Subtractive	Associative	Impression		
					Face A	Face B	Face C
	P15	S1		en file, p	Composite- Horn/Tail-Zebu/Snake X		
	P20	S2		Group, en file	Tree		
	P3	S3			Kneeling human on tree		
	P7	S4			Turning tiger		
		S5		en file	Svastika		
✓		S6		en file	Elephant		
		S7	✓	en file F2	Unicorn+		
	P1	S8		en file	Deity in pipal pot X		
	P15	S9			Composite- markhor horned		
	P3	S10			Kneeling deity		
		S11			Object on stool		

See Table 4 for the values of P labels

**Table 3** Documentation of M-304, a seal with content on a single face

Formative	Additive Feature/s	Extractive Component-avatar	Subtractive	Associative	Seal Face A
	P11	U1		Group	Buffalo
		U2			Rhino
✓	Relative direction- away	U3			Elephant
✓		U4			Human
	P9	U5			Tiger
	P5, P18	U6			Yogi/ni, four heads
	P13	U7	✓		Goat × 2 facing away
		U8			+

See Table 4 for the values of P labels

front or with an adjacent icon. Sometimes a part of a seal is used rather than its full face to create an impression. Such partial impressions are marked with the suffix ‘p’ as in the case of S1 in Table 2.

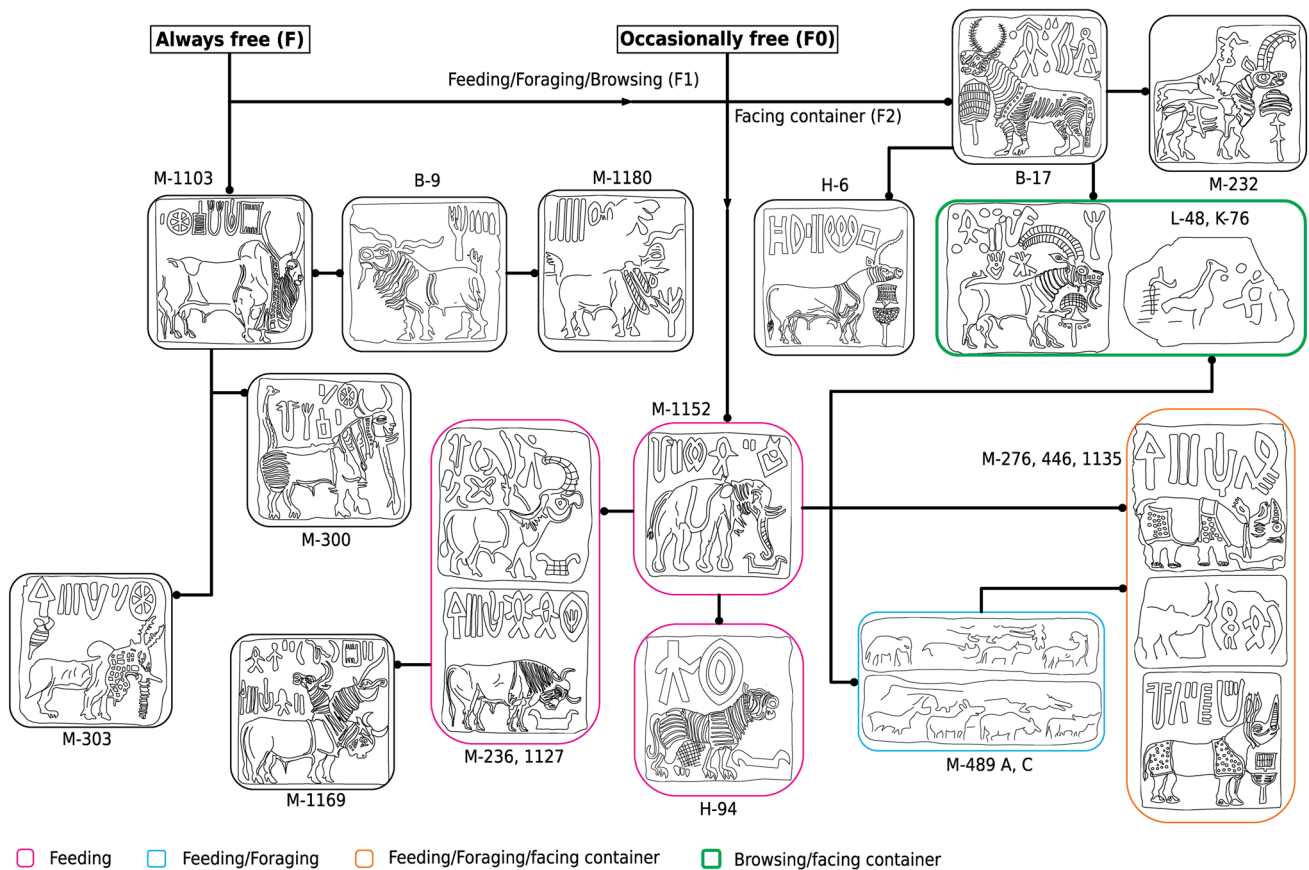
Table 3 documents a seal, M-304 (see Fig. chart 3). On Face A the object carries 8 component-avatars, serialised as U1 to U8. The components are in a group. Each component-avatar is described under Face A.

### 3.1 Design units

Proceeding as shown in the tables above, the classification yields at least 139 design units, while the actual count

remains a work in progress. 43 units have a singular expression on seals, recognised easily, if not classified as such in *CISI* (Fig. chart 1). The remaining 96 obtain from additive compounds on seal-impressions, hitherto not accounted for as such. Compounds feature animal-animal or animal-human compositions, and additional elements. Some elements like the kneeling man, the turning tiger, and snake occur only in compounds (see M-309 in Fig. chart 3), and *S1* and Fig. charts 2, 3, 4, 5, 6, 7 and 8 present them as components extracted from a compound. Units that are extracted from a seal face are labelled U1, U2, U3... Units extracted from seal impressions are labelled S1, S2, S3... A U-series component coincides with an S-series in some instances. For instance, the turning





**Fig. Chart 1** Animal avatar by association with the object avatar in front. From left: F has two branches of animals that always stand free—the zebu, markhor (with sub-branches for the composite animal that each inspires). F1 features native megafauna led by the elephant, 1. feeding from a manger as is the case for the tiger, elephant and

bison-buffalo, or, 2. feeding on /foraging through fish or fowl as is the case with the gharial and rhino, or, 3. browsing foliage as with the goat. F2 shows animal-container pairing with the urus, unicorn, goat and horned tiger, besides the rhino which has an F1 lineage as well. Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

tiger which always appears with the kneeling man on a tree on seals as a U component, occurs with other companions on seal impressions (see M-489 in Fig. chart 3) as an S component. U and S series numbers are assigned starting with the face that CISI identifies as the first.<sup>2</sup>

**3.2 Icon series**

An icon series, whether *en file*, in a group, or a scene, is tabulated from right to left. The order of the icons, their adjacencies, must be of significance though this study does not attempt a positional analysis within icon sequences.

The tabulation follows the same face order as CISI. And to note, seal-impression faces with no text are shown with an ‘X’ appended to the CISI number. A ‘+’ is appended for every face that supports text. Identical faces are denoted ‘i’.

**3.3 Object in front**

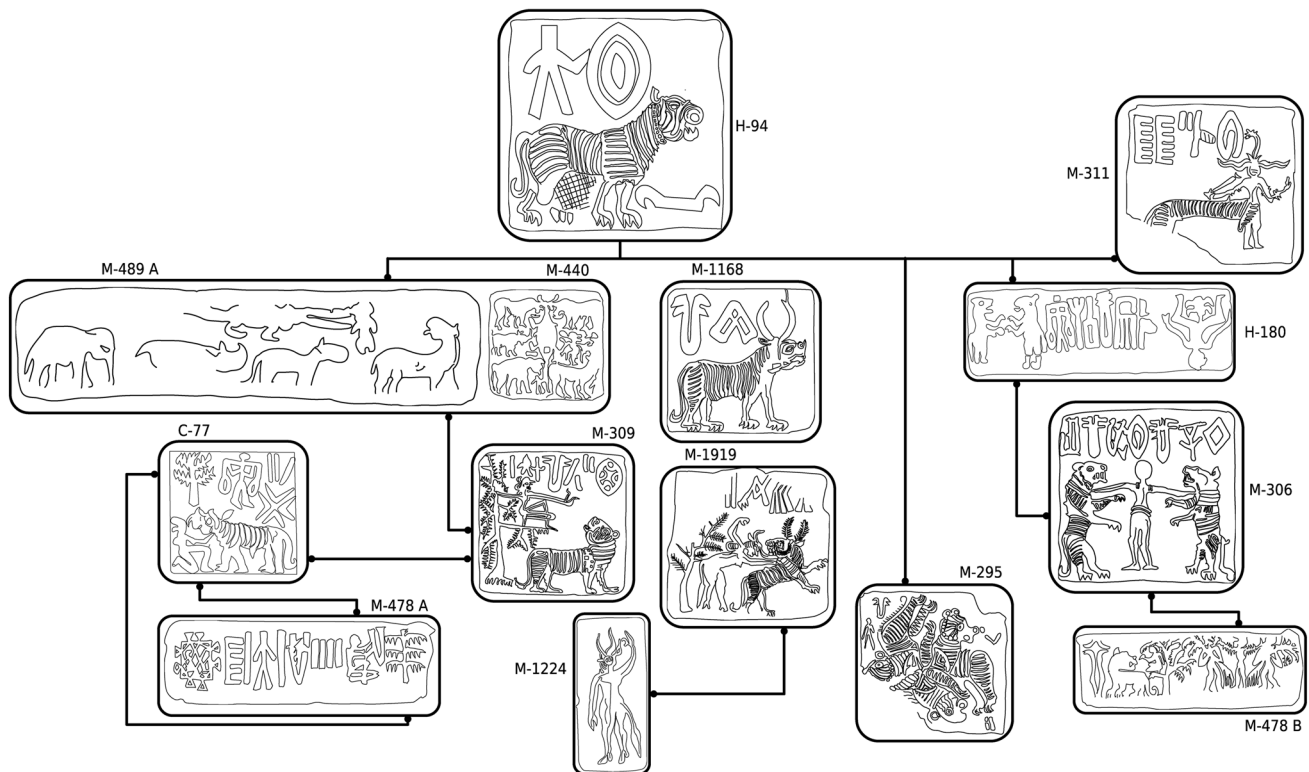
The classification simply follows the animal’s gaze as it stands in profile. And the object in front of an Indus animal icon is identified as an associative element (Fig. 1). The compound that arises from this pairing is categorised in four types and an F number is appended—F. Always free (no object), F0. Occasionally free, F1. Manger (feeding)/Fish-Fowl (feeding/foraging)/Tree (browsing), F2. Container (carrying). When the object in front is broken off, the entry is suffixed with a ‘b’. When a seal is partially stamped or impressed, the entry is suffixed with a ‘p’. The ‘F’ type classifier is marked against each object in *S1*.

**3.4 Design principles**

Formative is the first principle and the first column in *S1* and Table 1. An animal image is borrowed from its natural state and used as is. The resulting portrait is realistic, as is mostly the case with the elephant, zebu, rhino, and hare. These four

<sup>2</sup> This is sometimes inconvenient and clumsy. CISI goes by the primacy of text and labels the text-face of an object as the first face.





**Fig. Chart 2** The felid and its avatars. From left to right, Gen 1: Turning tiger (M-489 A and M-440). Horned tiger (M-1168). Joined tigers (M-295). Facing felids (H-180). Theriomorphic tiger (M-311). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

animals are rarely shown in another state besides formative. There are variations though. The elephant is sometimes bristled, or without the tusk in a few cases, respectively the depiction of a calf and a female (Mackay, 1938, p. 329), but there is no evidence that such featuring is context-specific. The zebu has different decorative collars. The elephant trunk and the zebu horn lead the form of composite animals. The rhino has varying degrees of ‘armour plating’ and traces of warty excrescence (Mackay, 1938, p. 330), and participates in a composite animal form. But the basic form of these four animals is rarely altered, additively or otherwise, even *en file*. Five other animals occur in the formative state as well as in the additive state—urus, markhor, goat, tiger, and gharial. Two animals, the bison and buffalo, are not represented in the formative state, and begin additive.

The first additive principle is an animal attitude. The bison and buffalo are almost always stylised with a characteristic attitude. The bison always looks down, as if charging. The buffalo always glances sideways. These two animals are rarely shown in the formative state and are born additive, their postures frozen.

The tiger, goat, and markhor begin formatively and acquire an extra additive state, more than one as we will see. These three animals look back. In joined animal portraits, the urus looks back as well. The tiger and goat also have

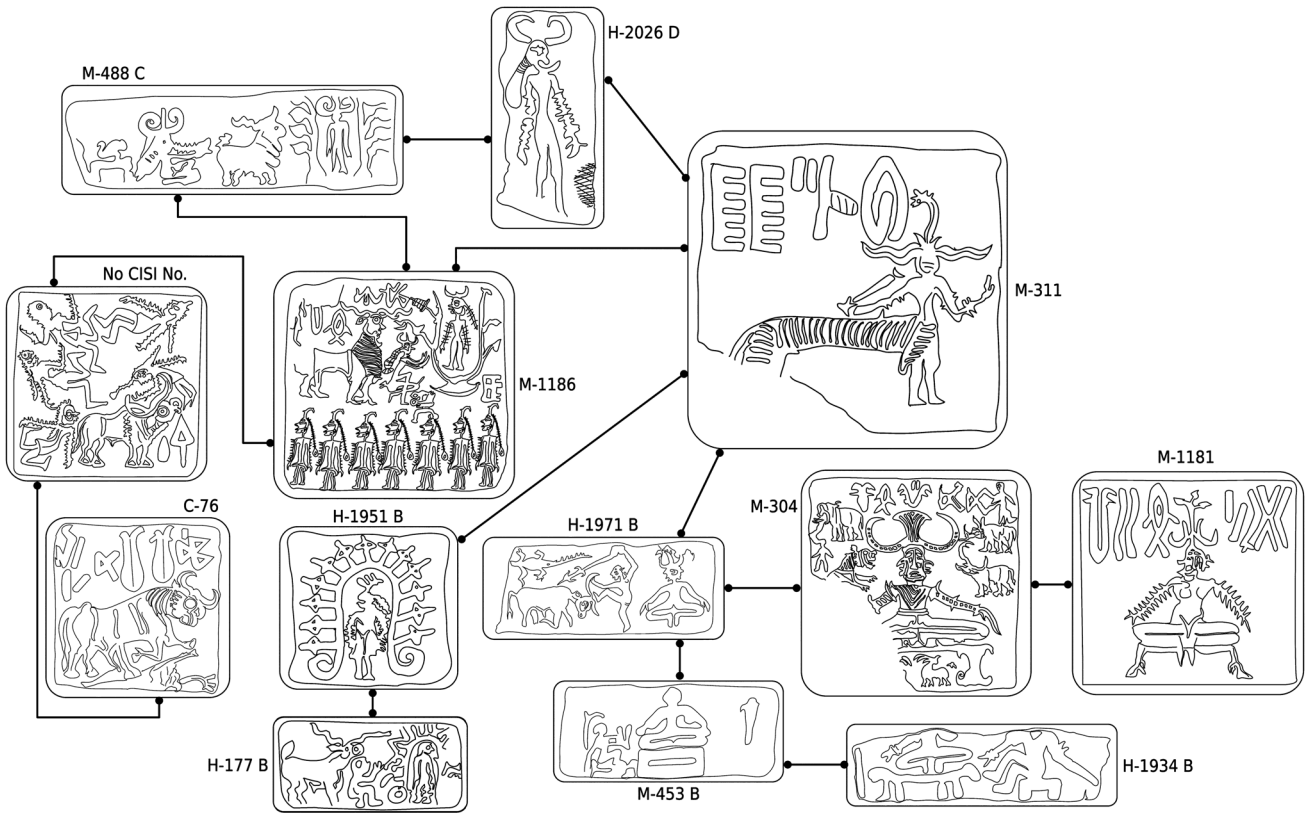
rampant avatars, each facing its mirror image. The markhor leads a composite animal form, a trait it shares with the zebu. To generalise, the joined animals, the composite animals, and the theriomorph use additive fusion.

Two types of joined animals are discernible: joined at the neck, or joined to a central axis, and each has sub-types. Composite animals are either zebu-horned or markhor-horned. The zebu-horned composite animal is also expressed with a snake tail. The zebu-horned composite is, in one instance (M-303), zebu-humped. The incised copper tablets of Mohenjodaro feature many other composite animals which are excluded from this dataset. However, there is a bas relief tablet, M-489, its B face featuring a composite animal of the type that is seen on the Mohenjodaro incised copper tablets (Mackay, 1931, p. 396).

The classification enumerates 20 additive features and codifies them as P1–P20 with a legend for each particular feature in *SI* and Table 4 (see below). Sometimes two or more additive features combine, e.g. P12, P11, to make an expression.

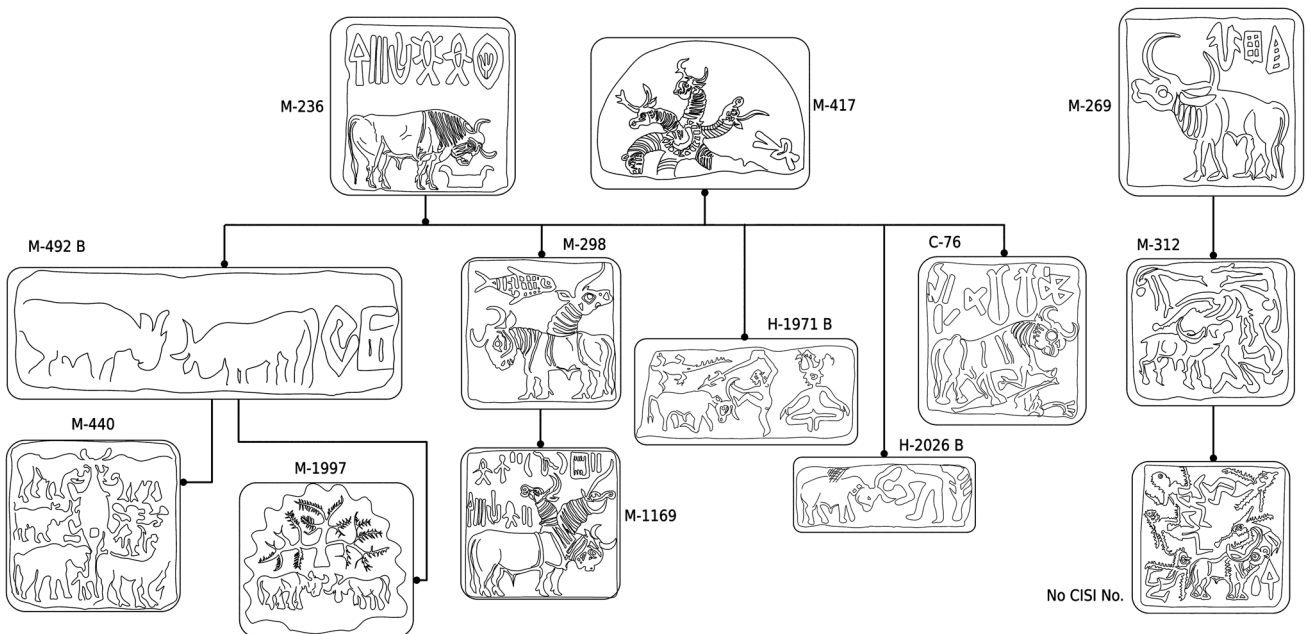
Additive featuring is taken to its extremes in compound units (e.g., the turning tiger and the treetop man, M-309, Fig. chart 1) leading to expressions that encode a whole scene to make the compound unit viable. Even so, these





**Fig. Chart 3** The theriomorph and its human avatars characterised by the horned dress and bangled arms. Anti-clockwise from top left, Gen 1: Standing deity (H-2026 D). Standing deity in pipal pot

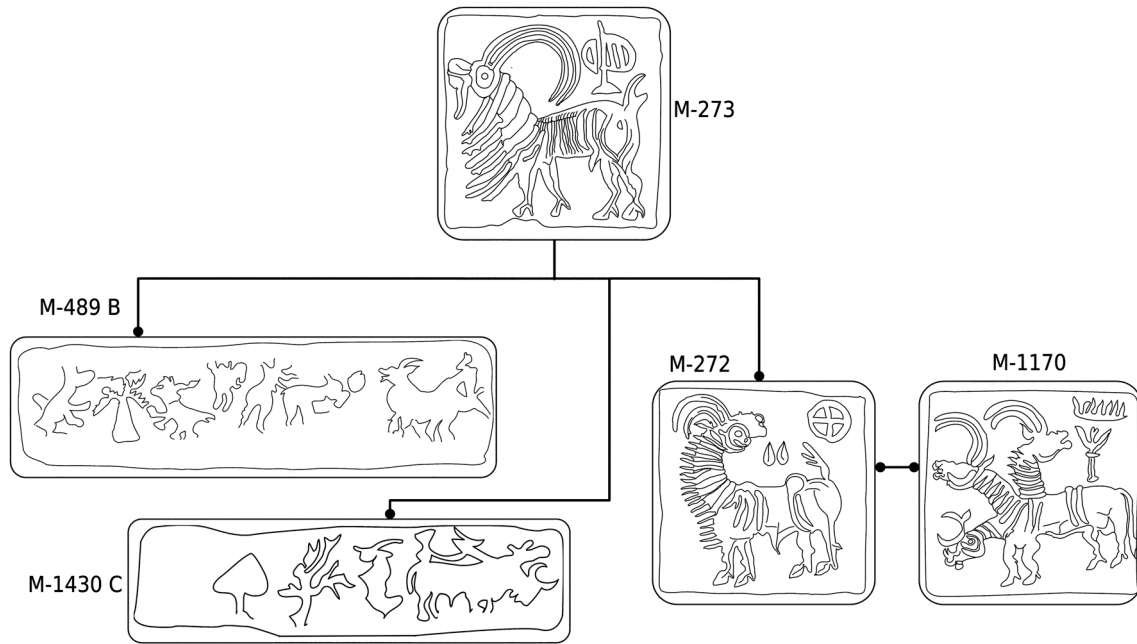
(M-1186). Kneeling deity (M-1186). Standing deity under pipal arch (M-1951 B). Seated deity (M-1971 B). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale



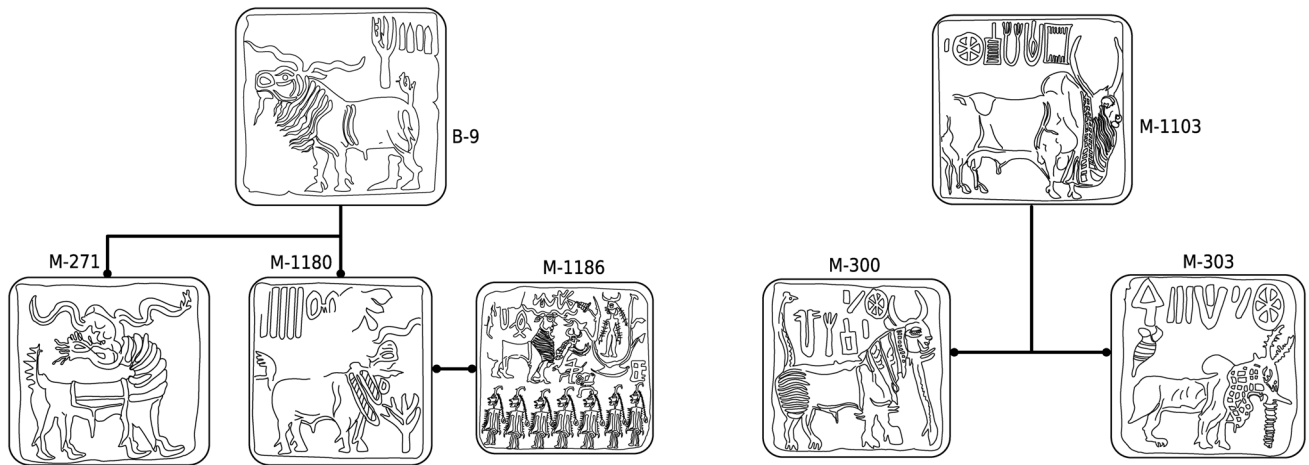
**Fig. Chart 4** Bison, buffalo and their avatars. From left, Gen 1: Facing bisons (M-492 B). Bison joined with other animals at the neck (M-298). Bison joined to a central axis with other animals (M-417).

Bison attacked (M-1971 B). Bison negotiated (M-2026 B). Bison in intercourse (C-76) Buffalo attacking (M-312). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale





**Fig. Chart 5** Goat and its avatars. From left, Gen 1: Facing goats (M-489 B). Rampant goat (M-1430 C). Turning goat (M-272). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale



**Fig. Chart 6** Markhor, Zebu, and its avatars. From left, Gen 1: Turning markhor (M-271). Markhor-horned composite (M-1180) Zebu-horned composite (M-300). Zebu-horned and humped composite (M-303). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

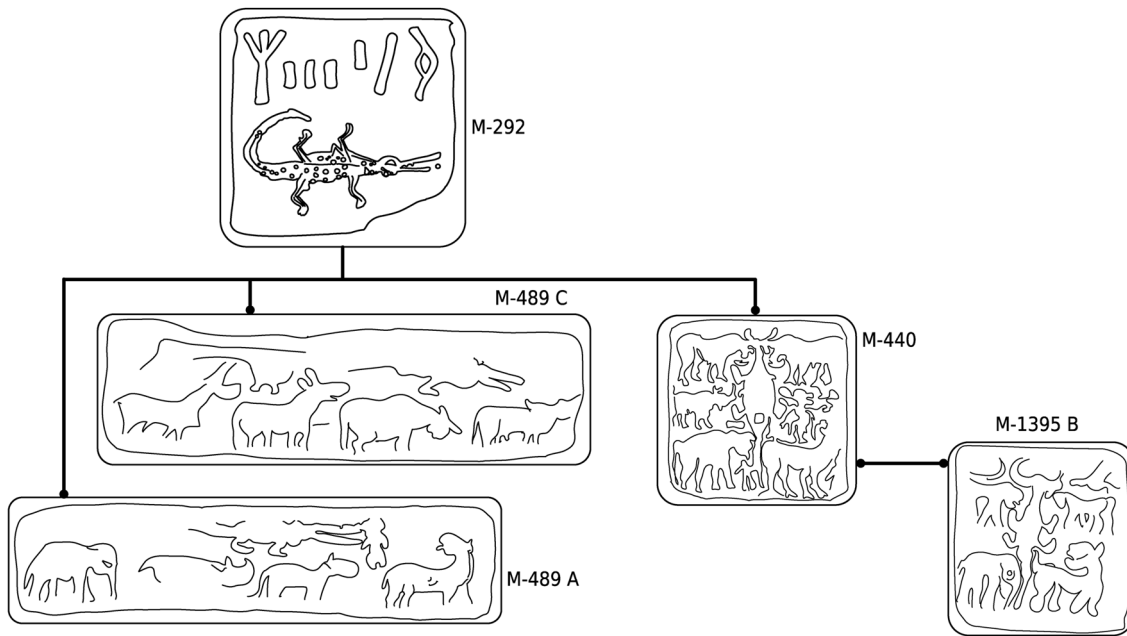
elaborations often do not tell the whole story, and depend on other units, as implied in two bibliographic sources of foundational significance to this paper—(Possehl, 2008, pp. 140–144 and Ameri, 2018, 4440). By design, each unit informs the other.

Compound units yield component-avatars for independent use. The principle behind this is labelled as extractive in *SI* and their iterative dynamics are illustrated in Fig. charts 2, 3, 4, 5, 6, 7 and 8.

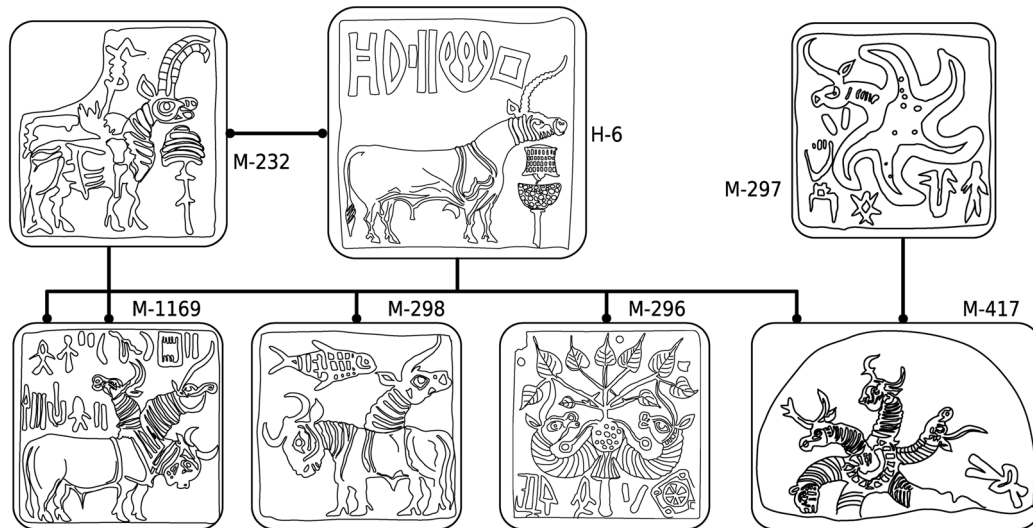
In the case of the unicorn, the design principle is subtractive, as the animal is an urus with one horn less (Joshi & Parpola, 1987, p. XXX).

In a majority of the cases, a zoomorphic unit faces right when impressed. But almost every zoomorphic unit has some left facing expressions, and these are labelled as ‘orientative, left’.





**Fig. Chart 7** The gharial and its avatars. From left, Gen 1: Gharial+fish (M-489 A). Gharial+fowl (M-489 C). Gharial-centric (M-440). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale



**Fig. Chart 8** The urus, its subtractive expression, the unicorn, and their avatars. From left, Gen 1: Urus-unicorn in a joined animal (M-1169). Unicorn in a joined animal (M-298). Unicorn×2 (M-296).

Unicorn+5 (M-417). Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

Overall, the data is organised to conveniently append to CISI, thence to other corpora.<sup>3</sup> In this sense, the re-classification may be more appropriately called sub-classification.

The paper proposes a method for recognising a design unit—individually, in a compound unit, in a sequence, and in a range of related sequences—and reports at least 96 component-avatars. This count will increase when other morphisms are accounted for, including a few illegible zoomorphisms, which is a work in progress.

<sup>3</sup> For an exhaustive summary of Indus corpora, see Parpola (2018, p. 3916).





**Table 4** Catalogue of additive techniques

	Animals	Deity	Human	Remarks	
<i>Posture</i>					
P1	Standing	✓	✓	✓	Animals never sit
P2	Standing in middle	✗*	✗	✓	*Except reptile
P3	Kneeling	✗	✓	✓	
P4	Sitting	✗	✓	✗	Only deities sit
P5	Sitting middle	✗	✓	✗	Deity
<i>Attitude/gaze</i>					
P6	Rampant	✓	✗	✗	Tiger, Goat, Snake
P7	Turning	✓	✗	✗	Tiger, Goat, Markhor
P8	Charging	✓	✗	✗	Bison
P9	Sideways	✓	✗	✗	Buffalo
P10	Dominant	✓	✗	✗	Buffalo
P11	Aggressive/combative	✓	✗	✓	Bison, Armed/Unarmed human
P12	X 2 and facing	✓	✗	✓	Bison, Tiger, Goat, Human, Unicorn, Snake
P13	X 2 and facing away	✓	✗	✗	Snake, Goat
P14	Waving	✗	✗	✓	Human
<i>Feature/s</i>					
P15	Horn (±)	✓	✓	✓	Tiger+, Composite+, Unicorn–, Deity+, Therianthropomorph+, Devotees–
P16	Special tail	✓	✗	✓	Composite, Therianthropomorph
P17	Fused	✓	✓	✗	Deity=theriomorph
P18	Joined @ neck	✓	✓	✗	One body, many heads
P19	Joined @ centre	✓	✗	✗	Tiger, Unicorn
P20	Stage marker				Tree, Temple

## 4 Genealogical figure charts

The first figure chart illustrates the interplay between the animal and the object in front, showing the associative principle at work. Figure charts 2, 3, 4, 5, 6, 7 and 8 illustrate the interplay of the first four design principles proposed in this paper—the formative, additive, extractive, and subtractive. They show the additive and extractive principles as iterative. The fifth principle, orientative, is not illustrated, only tabulated.

Each figure chart begins at the top at Gen 0 and branches down to a maximum of Gen 4. Gen 0 can be formative as in Fig. charts 1, 4, 5, and 6, or additive as in Fig. charts 2 and 3, or formative-subtractive as in Fig. chart 8.

When Gen 0 is formative, its Gen 1 is additive, Gen 2 is additive compound, Gen 3 is extractive (component-avatar), and Gen 4 is associative. When Gen 0 is additive, its Gen 1 is additive compound, Gen 2 is extractive (component-avatar), Gen 3 is associative, and so on.

Before we set forth to examine each figure chart, it is perhaps worth mentioning that they can all be merged into a single master chart, that it is theoretically possible, but that it is consciously avoided to stay away from a distracted discussion of which came first, losing focus on the more meaningful engagement with how the system works.

### 4.1 Figure chart 1: Animal avatar by the object avatar in front

This chart frames the constraints that operate on how faunal imagery, natural or imaginary, pairs with an object in front, a regular fixture in Indus seal compositions with two basic expressions and two more that arise from one of the basic two. These are suffixed with an F notation in *SI*. The notation essentially indicates what the animal does. Some animals stand free, do nothing. The others show intent. They feed, forage, or browse. And a third group faces an object. Each group has a genealogy of its own with some intersections. These are expressed in Fig. chart 1 and detailed below.

#### 4.1.1 Always free, F

The zebu, markhor, the composites that they determine, and the joined animals are always free of an object in front (F). For this class of animal imagery, the valency with an object in front is null.

#### 4.1.2 Occasionally free, F0

All animals are occasionally free of an object in front (F0). When not free, the animal is in F1 or F2, as detailed below.



Some animals are strictly F1, some or strictly F2, while some animals can at times be F1 and at other times be F2, but never both at the same time on the same object.

#### 4.1.3 Feeding, F1

The buffalo-bison and tiger pair only with the manger (F1). They are univalent. The elephant is almost always univalent with the manger (F1), but it pairs in one odd instance with the container (F2), on a seal from Alladinho (Ad-8, not shown in the figure chart), which shows the pachyderm casually carved in a very bison-like attitude.

#### 4.1.4 Feeding/foraging, F1

The gharial is bivalent. On seals, it bonds with a fish that the reptile holds in its snout (F1) and feeding, which, I read, is an aquatic analogue to the manger a land animal faces. On impressions, the bonding with the fish is at times loose. The fish floats away from the snout, and the reptile pairs sometimes with a fowl instead of fish. Basically, the reptile isn't actually eating the fish or fowl, but is foraging thereabouts.

#### 4.1.5 Feeding/foraging/ facing container, F1/F2

The rhino is trivalent or omnivalent. It pairs with the manger (F1) frequently, in one instance with the container (F2), and on a series of impressions with fish-fowl (F1). The rhino's F1 affiliation is akin to the gharial's. The rhino is a herbivore and eats neither fish nor fowl. So it is not eating but foraging in the floodplains. The fish-fowl combination seems mandatory. On 6 bas relief tablets of two identical faces, the rhino is shown overseeing a fish and a fowl enclosed in brackets (see *SI*). In the bracketed expression, it is always fowl first when we read it proceeding from the icon. However, when the icon-pair gets kicked upstairs to the sign sequence, the order reverses in some cases. Mahadevan (1977) accounts for both as two distinctive signs, IM-63 (Fowl-Fish), and 64 (Fish-Fowl). These technicalities aside, the bas relief tablets with the rhino + F1 open a fascinating window into an icon in transition to a sign.

#### 4.1.6 Browsing/facing container, F1/F2

The goat is bivalent. It pairs with a container in a single instance, L-48 (F2). On several seal impressions, the goat browses foliage, from one or both sides of a tree (F1).

#### 4.1.7 Facing container, F2

The urus, unicorn, and horned tiger never face a manger, never shown feeding, as if to say, 'does not eat'. They face a container, a term for the object in front that I borrow from Parpola (2018, 4140), "...toward a 'cult object' (two different containers superimposed on a stand)". The container has diverse avatars, see (Shah & Parpola, 1991, Table 1, p. 433). And the pairing opens up a rich visual vocabulary, too vast to address right now. Suffices to say that F2 means, reading from right to left, cargo and carrier.

F2 comprises two natural animals (urus and goat) and two imaginary animals (unicorn and horned tiger). A natural and an imaginary animal pair up, urus and unicorn, and goat and horned-tiger.

By design logic, the horned tiger connects F2 with the tiger and the zebu (B-17). It is fascinating how F2 unlocks F1, even F. It clarifies why the tiger's horn is bristled. It merges the bristle aspect of the urus horn with the zebu horn in B-17, but not in M-1168 where the horned tiger stands free (F0).

F2, the container, enjoys an iconographic status independently of animal imagery on several seal-impressions (M-457–463, 1407–1414, 2025; H-98, 195, 196 AB, 197, 228, 739–743, 1779–1784, 1788–1789, 1791–1792, 2006, 2022). We see it carved and sculpted in ivory (M-2116), engraved on gold (M-2125), and incised on steatite (H-291–293 + similar). The coming together of the two to form a convention must have been an inflectional point in the development of the iconographic communication system of mature Harappa.

#### 4.1.8 Facing an indus sign, F3?

The class of animals from F, F1, and F2 often face an Indus sign (F3). So, does an Indus sign, sometimes more than one sign, proxy for the object in front? Something like that happens on four seals for the manger, once each with the buffalo and the tiger, and twice with the rhino. One or more Indus signs substitute the container, thrice with an urus, six times with the unicorn, and once with the goat. F3 occurs also in front of the zebu, just once, and on four seals with the markhor, in one instance with a human-faced markhor. Based on this, no relationship between the container/manger and the Indus sign, which I initially suspected may be substituting it, can be conjectured. Perhaps the line of inquiry that F3 substitutes for F1/F2 is flawed to begin with, the reason why it is dropped from the figure chart. However, F3? is noted in *SI*, with a question mark. It is possible that F3? is nothing but F0, and an Indus sign is there in front of the animal because the space allows it, which by no means is the only possibility.



### 4.1.9 Animal in front of object

The classification of the avatars of the object in front opens up a tantalising possibility, to pivot to the F class objects as the primary element and regard the animal as facing the object. The vast plurality of Indus animal imagery then gets condensed to four basic types. It implies that the iconography and iconographic sequences (or narratives) should also be read from right to left, as is the case with Indus sign sequences.

## 4.2 Figure chart 2: The felid and its avatars

Gen 0, H-94+ similar.<sup>4</sup> The tiger, more generally felid, is the only zoomorph that determines a theriomorph. The term ‘felid’ is better-suited as there is visual evidence for more than one type of cat: on M-489 A on which a turning tiger leads another cat-like animal; on H-180 and M-306+ similar where the facing felids cannot said to be identical; on M-295+ similar with the imagery of joined tigers.

### 4.2.1 Avatar 1: Turning tiger

Gen 1: The turning tiger is a component in animal-animal (M-489 A, M-440+ similar) compounds. Gen 2: It joins an animal-human compound in M-309+ similar, the turning tiger and the treetop man. When we deconstruct it, it yields component units. The kneeling man and the tree each becomes a unit that then has its own avatars in context. Gen 3: we see the three elements of M-309+ similar un-combine and re-combine on C-77. Gen 4: on M-478 A+ similar, the kneeling man and the tree assume their own avatars, no tiger at all.

### 4.2.2 Avatar 2: Horned tiger

Horning, as an additive feature, and the horning of tigers and humans seems to occupy a central role in Indus iconography. Gen 1: M-1168+ similar present the formalised expression for the horned tiger. Gen 2: the horned tiger combines with a therianthropomorph with horns, tail, and bovine feet in M-1919. Gen 3: the latter manifests independently as a component-avatar on M-1224 C, E+ similar. When the horned tiger combines thus in M-1919, it is a turning, leaping tiger, embodying an intersection of avatars 1 and 2.

<sup>4</sup> Throughout this paper, I cite one example per design unit by its *CISI* number and append to it a ‘+similar’ when there are multiple examples. Every *CISI* number cited features in a Figure chart. The others (+ similar) are listed in S1.

### 4.2.3 Avatar 3: Joined tigers

Gen 1: three tigers join to a plan view of a central axis on M-295+ similar. An animal joining its own type three times over is exclusive to the tiger in Indus glyptic art. On M- 441, 1395, and 2015, this motif is the obverse of the gharial-centric composition on the reverse (see Fig. chart 7). In this arrangement on two-faced seal-impressions, the gharial-centric composition adapts to show just three surrounding components instead of five as in cases where the gharial-centric composition is on its own on a uni-faced seal-impression (M-439+ similar). Such rejigs make it clear that the joined tiger motif was not just decorative, and that it has a design motive with a specific communication intent.

### 4.2.4 Avatar 4: Facing felids

A rampant animal that faces its own type is common to the felid and the goat (see Fig. chart 2). Gen 1: a pair of facing felids occurs on H-180. Facing animal compositions, felid or caprid, seem to invite a middle element to join in. The middle element is a human in felid pairs, and a tree in caprid pairs. In Gen 2, M-306+ similar, the middle element is a human that seems to hold the felids at bay. In Gen 3 (M-478 B+ similar), the human in the middle takes its own avatar away from zoomorphisms and in the middle of a mirrored pair of tree-lifting humans.

### 4.2.5 Avatar 5: Theriomorph

On M-311+ similar (Gen 1), a standing human with a horned head dress and long banded arms fuses with the elongated body of a tiger to shape the only definitive theriomorph of Indus glyptic art and design. Away from the tiger, the human component takes on several avatars. See Fig. chart 3.

## 4.3 Figure chart 3: Theriomorph and its human avatars

Gen 0: M-311+ similar. The theriomorph yields five component avatars, their common character being the horned head dress and the banded arms. There is a variety—head dress, horn type, hair style, cresting with foliage, and gender—that warrants its own classification which is kept aside for now. The label ‘deity’ is used for the component-avatars that emerge from the theriomorph while the classification remains neutral to the religious value that the label attaches to this class of imagery.

### 4.3.1 Avatar 1: Standing deity

Gen 1: detach the standing human from the theriomorph on M-311+ similar in Gen 0, and we obtain the standing deity



as a component-avatar, H-2026 D+ similar. The extractive logic is straightforward and a modularity is easily perceived.

#### 4.3.2 Avatar 2: Standing deity in pipal pot

Gen 1: the standing human from the theriomorph in Gen 0 takes on a locative context in M-1186+ similar. The deity is placed inside a pipal pot.<sup>5</sup> The scene on M-1186+ similar, commonly referred to as ‘divine adoration’ of a tree spirit (after Mackay, 1938, p. 337), is usually composed with a ‘kneeling deity’ (another Gen 1 branch) who offers something to the standing deity in the pipal pot. The two deities are identically adorned, and invariably so. The adorer and the adored have an intertwined fate and no independent identity. A morkhor-horned composite animal is a constant companion in the exchange between the deities. On M-1186+ similar, 6 or 7 ‘devotees’, each with a headdress of a single horn, witness the exchange between the deities, whatever that exchange be. Gen 2: As it turns out, the devotees (unicorn humans) are dispensable in the retelling of this story as evident from M-488 C+ similar, where we encounter a component group of the deity in pipal pot, the kneeling deity and the markhor-horned composite animal, besides the prop by the side of the kneeling deity, frequently interpreted as a human head, thence human sacrifice, and other views to the contrary (Mackay, 1938, p. 338; Vats, 1940, p. 195). In the third branch (Gen 3), we see the devotee icons isolated and placed in two different contexts. In one expression, the devotees (unicorn humans) are attacked by a buffalo. In the second, a lone unicorn woman is sexually overcome by a buffalo (Allchin, 1985; Ameri, 2018 5001). See also Fig. chart 4.

#### 4.3.3 Avatar 3: Kneeling deity

The iconography of the Indus deity extracted from M-311+ similar is expressed in three postures—standing, kneeling, and sitting. The kneeling position is common to the decorated deities and undecorated humans as we have seen before under Fig. chart 2, on M-478 A+ similar. It is noteworthy that the kneeling deity is always identically adorned as the deity standing in front, the latter the first among equals and determined by the situation, as in the so-called divine adoration, with devotees (M-1186+ similar, Gen 1) or without (M-488 C, Gen 2).

#### 4.3.4 Avatar 4: Standing deity under pipal arch

Gen 1. On H-1951 B+ similar, the standing deity is carved under a pipal arch. Not all of its occurrences are tabulated

<sup>5</sup> The label ‘pipal pot’ forces an interpretation, discussed later in this paper. Also note that it may be equally valid to present this avatar as the second generation of the standing deity.

as many of them do not have a zoomorphic association. The most significant association occurs on H-177 B, Gen 2. A kneeling human adorer and a markhor-horned composite line up in front of the deity under the pipal arch in a scene that is reminiscent of the so-called divine adoration, but which is a little different as elaborated under Heading 6.

#### 4.3.5 Avatar 5: Seated deity

The yogi/ni is the only Indus icon that is shown in a seated position that is formalised and repetitive. Indus animals are never couchant. Undecorated humans, without the horned head dress and bangled arms, never feature in a conventionalised seated posture. The seated deity takes on avatars. Gen 2: on a seal-impression (M-453 B), it is adored by two kneeling humans, one of them with an offering cup, and flanked by attendant snakes; on another (M-2033 B), the yogi/ni is flanked by a vertically oriented gharial on the left and fish and other indistinct creatures on the right; elsewhere (H-176 B), it is shown with a compound unit of the turning tiger and the treetop man on the left and a turning goat and a hare on the right; on occasion (H-1934 B+ similar), the yogi/ni shares the space with another seated, cross-legged human; the yogi/ni’s benign presence is invoked alongside a bison that’s attacked (H-1971 B)... and in an unexpected leap, the yogi/ni is imagined with many heads on M-304 and M-1181 (Gen 3).

### 4.4 Figure chart 4: Bison, buffalo, and their avatars

For convenience, the bison and buffalo are taken up together for discussion. Separating them is not easy either as they are sometimes used interchangeably (Ameri, 2018 5001), especially on seal impressions that show them in conflict with humans. They are both born additive and are rarely represented in their formative state on a seal-impression. This means that in this figure chart, Gen 0 is additive and Gen 1 is compound. Gen 0 for bison is M-236+ similar, for buffalo M-269+ similar.

#### 4.4.1 Bison avatar 1: Facing bisons

Gen 1: a bison faces another, M-492 B+ similar. An animal that faces its own type is a familiar, formulaic theme, common to the tiger and goat as previously mentioned. In the latter two cases, an avatar of the facing animals accommodates a middle element, a human in the case of the tiger (Fig. chart 1) and a tree in the case of the goat (Fig. chart 4). But nothing comes between the facing bisons. Gen 2: the paired bison features as a component in two scenarios—in gharial-centric compositions (M-440+ similar) and in another lone instance in front of a tree (H-1997).



#### 4.4.2 Bison avatar 2: Joined animals (at the neck)

The bison is the determinative element in all compositions of animals joined at the neck, two heads or three (Gen 1 > 2; M-298 > M-1169+ similar). Its head is the invariant element even when the body of the animal may be that of the urus.

#### 4.4.3 Bison avatar 3: Joined animals (to a central axis)

The bison is as much a part of animal heads joined to a central axis, but in this classification, the type in which six animal heads join to a central axis (M-417, Gen 1), the group is justified to the unicorn as the determinative and shown in Fig. chart 8.

#### 4.4.4 Bison avatar 4: Bison attacked<sup>6</sup>

In one of the rare cases of a use of a weapon on an Indus seal-impression (the others being the hunting of an antelope by three archers on a twisted bas relief tablet, M-2029 B, a Kalibangan cylinder seal, and some copper tablets from Mohenjodaro, the latter two omitted from this study), a human spears a bison (Gen 1, H-1971 B+ similar). The attacker has no specific attributes and the spear is barbed (Mackay, 1938, p. 336).

#### 4.4.5 Bison avatar 5: Bison negotiated

If there was ever an ancient and definitive visualisation of the phrase, taking the bull by its horns and taking its head on, we see it on H-2026+ similar, Gen 1. The human that negotiates the bison is unarmed.

#### 4.4.6 Bison avatar 6: Bison intercourse

On a Chanhudaro seal, C-76, a bison is depicted in an intercourse with a woman. Often discussed as rape (Possehl, 2002: Fig. 8.7; Allchin, 1985, pp. 369–84), the penetration is clearly evident, and the woman wears the type of head dress of a single horn that is familiar to us from the scene of the divine adoration in M-1186+ similar. See also Fig. chart 3.

#### 4.4.7 Buffalo avatar 1: Attacking buffalo

A buffalo attacks five humans and tosses them in the air (M-312, Gen 1). There is a similar seal from Banawali (Gen 2), not featured in *CISI*. Otherwise identical to M-312, the Banawali seal shows the victims wearing a head dress of a single horn. As noted in Fig. chart 2, these unicorn humans appear as devotees in the so-called divine adoration (M-1186+ similar).

<sup>6</sup> This category and the next may be placed under buffalo rather than bison. This ambiguity is one of the main reasons that the bison and buffalo have been figure-charted together.

#### 4.5 Figure chart 5: Goat and its avatars

The formative goat in Gen 0 (M-273+ similar) becomes rampant in Gen 1, facing one of its own with a tree in the middle (M-489 B+ similar) and browsing the foliage. In its second avatar (M-1430 B), a lone rampant goat stands facing a tree. In a third avatar, the goat turns (M-272) which in turn features as one of three joined animals on M-1170 (Gen 2).

#### 4.6 Figure chart 6: Markhor, zebu, and their avatars

The markhor and the zebu are taken up together as they both determine the composite animals of Indus.

##### 4.6.1 Markhor and its avatars

Gen 0: B-9+ similar where the markhor appears in its formative state. It has a lone additive expression as a turning markhor in M-271 (Gen 1). Its horn is determinative of the composite animal as in M-1180+ similar (Gen 1), and the markhor-horned composite animal, and no other, is an invariant participant in the so-called divine adoration (M-1186+ similar, Gen 2). See also Fig. chart 3.

##### 4.6.2 Zebu and its avatars

The zebu is steadfast to its formative state (M-1103+ similar), except as a determinative to the zebu-horned composites. In one expression (M-300+ similar, Gen 1), the zebu composite has no hump and in another (M-303, Gen 1) it has one that looks like a ‘cut-paste’ job. It’s a matter of mere convenience that I justify this composite to the zebu horn as the determinative and not to the elephant trunk which is as prominent an element.

#### 4.7 Figure chart 7: Gharial and its avatars

The reptile dominates compounds that feature it, hovering above or taking centerstage. The formative, Gen 0, shows the gharial all by itself as in M-292+ similar.

##### 4.7.1 Avatar 1: Gharial+fish

The gharial is fish eating by nature and shown as such on M-489 A+ similar (Gen 1).

##### 4.7.2 Avatar 2: Gharial+fowl

The gharial is shown in the company of water fowl on M-489 C (Gen 1), at contrast with the fish-eating gharial. The animal action here, it can be said, is foraging.



### 4.7.3 Avatar 3: Gharial centric

The reptile is often the focal point of the megafaunal groups of Indus. They gather around the reptile in M-440+ similar (Gen 1). In cases where the gharial-centric compound is on the reverse of a two-faced seal impression with the joined tigers on the obverse (M-1395 B+ similar, Gen 2), the middle register (featuring the rhino, among others), is dropped.

## 4.8 Figure chart 8: Urus, unicorn, and their avatars

This figure chart is exceptional as it shows two animals at Gen 0: urus (M-232+ similar) and its subtractive counterpart, unicorn (H-6).

### 4.8.1 Urus and its avatars

Urus participates as a turning animal with the unicorn and bison, or goat and bison, in a joined animal compound (Gen 1, M-1169 A+ similar; M-1170).

### 4.8.2 Unicorn and its avatars

Unicorn joins other animals at the neck (Gen 1, M-1169 A+ similar; M-298). In one instance (M-296) it converges with its mirror image into a central column that is crested by an arc of pipal leaves (Gen 1). On M-417, another Gen 1 avatar, unicorn joins five other animals in spiralling out from a central axis. M-417 yields M-297 in Gen 2 of the figure chart, the latter an abstraction with five hollow arms and one arm made of unicorn establishing it as the determinative element in these compositions. The genealogical relationship between M-417 and M-297, is one of the clearest illustrations of how the glyptic art of Indus abstracts an established compound unit to extract a component-avatar.

## 5 Design logic

A design-logic approach to Indus zoomorphism (to all of its iconography, if a bit stretched) does not seem to have been attempted before. The reference classification that this reclassification relies on is “the 6th criterion: the iconographic motifs” proposed in Joshi and Parpola (1987, p. XXX). I understand from numerous secondary sources, (Parpola, 1991, pp. 125–132 and Potts, 1993, pp. 140–142) in particular, that Franke-Vogt 1991, now out of print, inaccessible, and commended for the classification of iconography and much else, seems to have taken a different approach. Vahia and Yadav (2010, pp. 343–368) classifies the shapes and symmetries on faces that bear geometric patterns from the first two volumes of *CISI*. Yadav and Vahia (2011, p. 1–36) attempts “an

understanding of the general makeup and mechanics of design of Indus signs”, but not of the zoomorphisms.

The present study proposes a typology by design unit in *SI*. A design unit is atomic, but a design unit is not necessarily singular. Even a seemingly singular unit such as the bison encodes multiple concepts such as attitude or gaze. Thus the view in Aruz (2018, pp. 26–32) that “Harappan composites are additive in nature...” is equally true of many seemingly singular units.

Indus uses subtractive featuring as well, where an element is taken away. Thus the famous, ubiquitous Indus unicorn is derived, with one horn less, from its realistic counterpart, urus (Joshi & Parpola, 1987, p. XXX).

The composite animal, profusely additive in design terms, and intriguing as it is, has received a lot of attention (Marshall-Mackay, 1931, p. 390; Parpola, 2011, p. 173; Fairsevis, 1984, pp. 43–50), and I single out (Frenez & Vidale, 2012, pp. 107–130) for its structural, functional predisposition, and its central hypothesis that the animal composite is a form of hypertext.

In fact, every compound design unit, not just the composite animal, can be argued for as a hypertext, evident as such from Indus motifs hitherto regarded as narratives, which reveals from the design logic presented in Table 1, which is labelled as ‘extractive’, and which will be elaborated after a brief coverage of the significant ways in which the narratives have been approached so far, keeping aside the purely descriptive, hypothetical, and interpretive, such as the proto-*siva* of Marshall (1931, pp. 53–55), and leaning more towards the structural and methodological discussions as in Possehl (2008, pp. 140–144, Figs. 1–9), and Ameri (2018, Fig. 9.x ff). However, it must be noted that it is not possible to show if a component was visualised first to additively arrive at a compound or if a compound was conceived of in its entirety and a component extracted from it.<sup>7</sup>

Possehl (2008) starts out with a ‘scenic’ approach to the commentary on the turning tiger and its usual companion, the kneeling man on a tree, which occurs 21 times on Indus seal-impressions (M-309+ similar), and compares it with a seal from Chanhudaro (C-77) that shows a similar scene with a variation (see Fig. chart 2). On the Chanhudaro seal, the tree stands by itself as a stage marker, the kneeling man has descended to the ground beneath, and the feline is licking his face. Possehl adds: ...it is clear that the posture of the (kneeling) human in the tree is repeated elsewhere, and could be said to be an ‘Harappan posture’. There are also many other places where we find representations of animals looking back, over their shoulder and this is another

<sup>7</sup> This limitation is illustrated in Fig. charts 2, 3, 4, 5, 6, 7 and 8 with genealogical links shown as bidirectional. The limitation is analogous and abiding to Possehl (2008, p. 141), paraphrased: In serialising multiple scenes, ambiguity of event chronology is inevitable.



‘Harappan posture’. There are actually a number of other items in the corpus of Indus glyptics...” The extractive principle proceeds from Possehl (2008) and isolates, for example, the turning tiger in the compound design unit on M-309 and presents its appearance on M-489 A, on its own, without the tree or the man, amidst other animals *en file*, as a component-avatar that recalls the compound. The classification does not rush to the meaning or explanation of why the tiger is turning, but first to the recognition that one is derived from the other, and that the ‘extractive’ becomes ‘iterative’. Proceeding in the same vein, it tabulates 96 other Harappan component-avatars.

Ameri (2018) takes a narratological approach and attempts several correlations between Indus narratives. The approach again starts out as scenic, and proceeds to “reconstructing multi-scene narratives”. Like Possehl (2008), Ameri (2018) too goes from the scenic to the elemental, especially in the latter’s suggestion that “The widely varied representations of this seated figure (labelled yogi/ni in *SI*) suggest that its posture is its most important attribute...”, and in the identification of the scene on M-488 as a “short-hand version” of the so-called divine adoration scene on M-1186. See Fig. chart 3 for the cited imagery and their genealogical affinity.

The tabulation in the present paper swings to the elemental end of the scenes depicted on the zoomorphic seal-impressions, relies on unitary deconstruction of the scenes, and does it for every instance of zoomorphism on a seal-impression listed in *CISI*. In doing so, design logic becomes the primary mode of investigation as opposed to the aforementioned narrative logic. The design logic is justified to seal-impressions, and limited to instruments of reproduction and mass production.

There are at least four more principles of design—prohibitive, determinative, correlative, and prescriptive—that are neither tabulated, nor illustrated, and merely discussed. The prohibitive relates to the exclusion of certain fauna or styles of depiction from usage in the formative set. The faunal repertoire of Indus art is greater than that of the glyptic design of Indus seal-impressions. The monkey, dog, and peacock, for example, are not found fit for the latter. The lion, for instance, is altogether absent on seal-impressions and found only in the statuary. The snake, on the other hand does not make it into the formative set, but only into the compounds. While the gharial is prominent and frequent, the mugger is marginal, as are other aquatic creatures. There is just one turtle seal impression (H-241 B). Avifaunal representations, quite prevalent in the Indus signary, confine to a lone iconic representation on Lothal L-50. Avifaunal composites like winged animals are altogether absent. The interplay between the formative-prohibitive is instructive. The primary inclusion set, predominated by native megafauna, consciously avoids species not unique to the Indus domain (cf. Mackay,

1931, p. 391; see also Bose, 2019) in comparison with the neighbouring territories of West and Central Asia.

A determinative principle is self-evident in joined animals and composite animals. The bison always determines the other heads, one or two, that join at the neck, even if the body of the animal is not that of the bison’s. The unicorn apparently determines the other heads that join a central axis. The zebu and markhor have the say as regards how composite animals are constructed.

The composite animal that is always present in the so-called divine adoration is always markhor-led. This reveals a correlative principle at work. The correlative principle operates at many levels and governs which morphism appears with which other, in what order, and in which relative direction and sizing. The last two attributes, relative direction and sizing need specific elaboration.

Relative direction is not to be confused with orientation. The former pertains to which way a design unit faces in relation to the other design units within a composition, and the latter to which way a design unit, compound or component, faces in relation to the object that bears the imagery.

The relevance of relative direction is amply evident in gharial-centric compositions where the tiger is exceptional and faces away from the middle (M-440 in Fig. chart 2). It is equally evident in the so-called *paśupati* seal (M-304 in Fig. chart 3) in which the elephant is exceptional and faces away.

Relative sizing finds definitive expression in gharial-centric compositions in which the rhino alone is sized down compared to the other zoomorphisms.

The coverage and summary of the elements of design logic so far inform that the seal workshops of Indus had the components and their conventional design prototypes ready to compose in the desired combination much like the modern letter press that keeps foundry type fonts in different sizes and ready to assemble. Customers could order a seal or just purchase a seal impression and copies with the desired image and text sequence. Design had become modular to suit arrangement, reproduction, and mass production.

Modular usage of design components is particularly evident in the following examples: in a series of bi-faced, twisted seal-impressions (M-478 A-B in Fig. chart 2+ similar) where two different seals are impressed on two separate strips of clay and pressed together to twist-bind the object (cf. Mackay, 1938, p. 354, Pl. XC 23); in all poly-faced seals, especially H-597 where the C face of the seal embeds a bar seal with the repetition of the full line of text from the A face; on M-452 and M-1400 (cf. Mackay, 1938, p. 361, Pl. CI 15 and 11), where two different seals are impressed side by side on the B face with the impressions causing the clay in between to raise in sharp relief to show, in the case of M-452, a zebu-composite on the left register and an indistinct animal on the right with two Indus pictograms above,



and a clearer version of the same on M-1400; on several other objects where the body that receives the impression is smaller than the seal that delivers the impression, an act that reveals intention and decision to crop and compose at the time of stamping (see 490-B in Fig. 2 for a good example of crop, compose and impress, with the lower part omitted from the impression; cf. Mackay, 1931, p. 384; Pl. CXVI 5 and 8, CXVIII 9);.

Modular design is envisaged and embedded in the artistic vision of Indus glyptics, and quite apparent in joined animals and the theriomorph. The technique used is additive fusion, wherein the fusing is left to perception. There is no attempt, for instance, to make the human torso sprout from the animal form in the theriomorph.

Table 4 below presents a typological summary of column 2, Additive, of Table 1.

It emerges from the above tabulation that additive techniques are rule-bound, and the set of rules is finite (20) and selectively common across the categories of animal, deity, and human. The overall picture that emerges is a visual grammar of great economy that is highly conventionalised to suit methods of reproduction and mass production of the elements of communication.

The prohibitive principle, discussed earlier in the context of the formative set can now be understood to be pervasive. Animals never sit. Only some animals turn. Only the marker and zebu determine the composites. The bison always determines the joined animals. The identity of a deity is always the same, horned head dress and bangled arms... Visual units that are purely anthropomorphic—H-1934+ and H-178+—occur only on seal-impressions with equal space and weightage for animal symbolism. Arguably, an iconographic basis for communication that is purely anthropomorphic barely exists.

### 5.1 Prescriptive usage of seal-impressions

The prescriptive principle, mentioned earlier as an aspect of design logic, but not discussed up until this point, can be inferred from how the so-called divine adoration is deconstructed, reconstructed, and abstracted (Fig. chart 3). It is equally evident from the compound, the turning tiger and the treetop man, and from how each of the three elements un-combine, re-combine, and function independently in other contexts (Fig. chart 2); from the way other animals are assembled around the gharial, and selectively re-assembled when the gharial-centric compound shares the reverse of a seal-impression with the joined tigers on the obverse (Fig. chart 7); from the way the hollow spiral of six arms with one arm carved to detail the unicorn can recall the disc with six arms with each arm showing a different animal (Fig. chart 8).

However, these examples make it sound like the prescriptive is just a synonym for the extractive. The following example, by no means the only one, makes the differentiation clear.

The prescriptive intent of Harappan miniatures is perhaps best illustrated in M-490 B+ similar (Fig. 2). The seal-impression here shows four standard bearers in a procession. The unicorn standard is led by two indistinct banners and trailed by a standard of the object that usually appears in front of the unicorn, variously described as cult object, incense burner (Marshall, 1931, p. 69), sacred filter (Mahadevan, 1985, pp. 219–226; 2017, pp. 35–69), etc. I feel compelled to highlight an aspect of this seal-impression that has been under-emphasised in prior discussions. The representation of the procession and its carriage presents incontrovertible evidence for the monumental usage of imagery that we only encounter in the miniature remains. M-490 B is by no means an exception in illustrating the monumental usage of Harappan imagery.

H-196 B in Fig. 1 shows the container on a monumental scale. The human figure at bottom right measures less than half compared to the container. It may be thought of as a component unit extracted from M-490 B, in line with the logic presented in Fig. charts 2, 3, 4, 5, 6, 7 and 8. M-490 B may also be thought of as prescriptive of a processional order for when multiple standards are carried, or as a documentation of a specific or a typical event. In either case, the seal-impression holds aloft the proof to the monumental usage of Indus iconography, albeit on a material (cloth, wood...) that could not survive.

### 5.2 Orientation, seal-impressions with animals facing left

Every Indus animal icon faces left when impressed, on a significant number of objects, even the mighty zebu which remains immutable otherwise. Joined or composite animals are no exception. Left orientation as a principle of design logic applies equally to compound units such as the turning tiger and the treetop man. Of course this does not apply to animals joined @ the centre as the symmetry in such units makes orientation redundant. That left orientation operates at a reasonable frequency in the mature Harappan period indicates clear communication intent, howsoever obscure its actual meaning.

### 5.3 Pure zoomorphism

*S1* shows at least 255 zoomorphic faces on Indus seal-impressions that carry only the icon. 14 of them occur on seals, 241 on impressions. 154 of the latter carry text on another side. It seems, communication could only be complete when the icon and text worked together. The content







**Fig. 2** Above: M-490 B+similar show a procession and its carriage of Indus standards of monumental scale. Right: H-196 B re-emphasises the monumentality with the cult object towering above and dwarfing the human underneath. Illustrations by Karthikeyan Pitchaimallian, after CISI. Not to scale

had to make sense to both the non-literate and the literate, even if only partially to the former. It was always possible that the icons and text were impressed by more than one seal, side by side on the same face, the animals *en file*, animal and text or animal only in registers, or on multiple faces.

87 seal-impressions are purely zoomorphic and pure zoomorphism is at its most eloquent in M-489, a prism seal impression with 13 zoomorphisms on its three sides. It is the most complete representation of the faunal range chosen for Indus glyptic design and reproduction.

## 6 Two interpretive labels

As pointed out right at the outset, two labels in the classification scheme force an interpretation that we shall look at below.

### 6.1 Snake × 2 + Roof

See M-478 B in Fig. chart 2. *S/I* labels the visual unit on the extreme left of M-478 B+similar as ‘Snake × 2 + Roof sign’, (cf. Mackay, 1938, p. 538; Pl. LVI 22-7; Pl. CXIV 12), for the argument that this visual unit is a special type of pottery vessel, also a metal jar. My interpretation is on the basis that the left curve of the so-called jar can be seen as a snake with its mouth open. A cleft is noticeable. If this be the case, then the visual unit as a whole represents an anthill, or a snake mound as it is commonly referred to in India, which is worshipped as the temple or abode of the snake gods. However, as I am not a practicing archaeologist and lack the physical familiarity with the objects, which might mean that I am seeing a cleft where none exists, or

that the cleft that I point to is no more than a chip, a minor damage, I must remain open to the suggestion to reverse this interpretation. Its only impact will be that *S/I* should count one entry less.

### 6.2 Standing deity in pipal pot

See M-1186 in Fig. chart 3. Table 1 labels the object of the so-called divine adoration in M-1186+similar as a ‘standing deity in pipal pot’, (cf. Mackay, 1938, pp. 337–338; Pl. XCIV 430; Pl. XC 23). One consequence of the proposed label that the deity is standing inside a sectional view of a (burial) pot is, the scene of the ‘divine adoration’ then becomes a scene of ‘succession’. This explains, not without some elegance, why the ‘regalia’ of the adored and the adorer are identical in every representation of this scene. The adorer fills the void created by the passing of the adored, assumes the same rank, and inherits or offers the markhorn-composite (whatever its value, but not an object of sacrifice as proposed as well as dismissed by Mackay (1938), p. 338 and Vats (1940, p. 195). The adorer accepts that position in humility, kneeling, and is inducted into it in the company of witnesses (devotees). Overall, the scene depicts the political rather than the religious though the two cannot be separated, especially in a scene that captures the intersection of life, death, and after. That the scene depicts succession rather than coronation reveals something about the nature of Indus polity. It indicates governance by nomination, rather than a rule by dynastic passage, or ascension by conquest.

If the deity in the pipal pot represents passing, the deity under the pipal arch (H-1951 B+similar) may well represent reigning. On a seal impression from Harappa (H-177 B, see Fig. chart 3), we see a composition of a standing deity under a pipal arch, and an unadorned human kneeling in front of the deity with a markhorn-composite behind the latter. Here, the adored and the adorer are not equal. The latter is not poised for a succession. It more likely represents a material transaction. Someone pays dues. The entitled one receives.

When all instances of the so-called divine adoration and its variants are taken together, the intimacy of the pipal leaf with the governing elite establishes firmly in context. Having advanced the perspective, I feel obligated to point out once again that interpretation is not the primary objective of this paper but the classification of Indus seal-impressions as an applied method for reproduction and mass production of communication with a modular design principle. Therefore, if the proposed interpretation suffers a reverse in the face of compelling evidence, its only impact will be that the label ‘standing deity in pipal pot’ will change to ‘tree spirit’ or an equivalent. A justifiable objection may well be based on how little we know about the cremation-burial practices of Indus





**Fig. 3** From left, M-635, M-1206. Images from *CISI*. Not to scale

(Marshall, 1931, pp. 79–89). However, it is probably superfluous to mount an objection on the basis that a vessel with pipal leaf painted on it which can be securely established as a burial urn has not been excavated.

### 7 The *paśupati* puzzle, three faced or four?

See M-304 in Fig. chart 3. An analysis of the so-called *paśupati* seal by design logic settles the long debate, Is *paśupati* three faced or four? The analysis also establishes the relevance of design logic in the attempt to understand and decode Indus iconography. The specific aspect of design logic that is called upon to decode the number of heads of *paśupati* is ‘relative direction’ (see Heading 5). There are four animals that surround the central figure of the yogi/ni. One of them, the elephant, faces away from the centre. Now, if each animal corresponds to a face of the yogi/ni, then there is, *there ought to be*, a fourth face that looks away, just as the elephant does. *Paśupati*’s body attire has four folds. The horned head dress converges to a crest with eight curved strokes, two horns x four heads. The yogi/ni sits more comfortably than ever before, aware of everything, every direction.

We know from M-440+ similar, where a turning tiger faces away from the middle, that relative direction is deterministic and conventional, not unintended or accidental. Back on the *paśupati* seal, there is a human above the tiger. If s/he is a part of the iconography, the standing human may well be an avatar of the tiger’s usual companion, the kneeling treetop man.

Together with the goats below, M-304 features all animals classed as F1, which reinforces their privileged status.

### 8 Indus icons and signs

See M-492 B in Fig. chart 4. This impression presents the tantalising possibility that at least a part of the Indus signary can be understood from internal evidence such as with Mycenaean Linear B (Parpola, 2018, 4266). On this seal impression, and a seal (M-1168), the facing bisons are accompanied by two signs (from right, IM-201 and IM-267). It is easy to suspect that each sign corresponds to one of the two facing bisons. If this be true then it must be imperative that there is no seal-impression of a single bison that can then have both the signs in any position in a sequence. This is verifiably so. In fact, only IM-267, occurs on a bison seal-impression. A deeper study on this basis, not envisaged as part of this one, may lead us to other such sign shorthands for Indus icons, or illustrated longhands for Indus signs, as the case may be.

There are other features of Indus seal-impressions that point to the affinity between the icon and sign. If not for their entwined fate, a seal like M-635 or M-2016 (Fig. 3) should not exist. On the former, there is evidence of the obliteration of the sign sequence above a unicorn, indicating that a mismatch between icon and sign had to be averted. On the latter, a previous icon under the inscription has been sawn off and a bison carved in its place to ensure the right match between icon and sign (cf. Frenez, 2018, p. 179, Fig. 13).

The larger implication is, for the Indus script to be properly investigated, the Indus iconography has to be decoded. The classification in this paper may well serve as the basis for an interpretation of the iconography which I reserve for a forthcoming paper.



## 9 Discussion/conclusion

The zoomorphic classification is a first step to an ongoing panmorphic study. The genealogical figure charts are indicative. Such charting can begin anywhere. For instance, we can take the idea of the joined animal heads as analogous to the concept of the human with many heads, deconstruct the components thereof, and connect the branches and nodes. It is like saying *rāma* is an avatar of *viṣṇu*, as is *kr̥ṣṇa*, and *kr̥ṣṇa* is the next avatar of *rāma*, and you can begin the narrative anywhere and then connect the dots. As mentioned before, it is even possible to produce a unified chart.

The list of entries of seal-impressions in *SI* will most likely not be free of errors, it has a few noted uncertainties, and all of it is subject to scholarly verification. However the list of zoo and related morphisms presented under the header columns and rows should be error-free.

Design logic as a mode of investigation is a useful supplement to art historical approaches to understanding the visual content of Indus, its icons and narratives. Design, by definition, deals with methods and instruments of reproduction and mass production which Indus seal-impressions definitely were. Efficiency and productivity must have been paramount, especially for a communication system that produced document trails for authenticated administration based on glyptic miniatures as primary instruments. That they were executed on tricky materials, with special tools and treatments, must have made it an unforgivingly difficult enterprise, which Indus transformed into a creative urge with zoomorphism as its muse.

It seems likely that zoomorphism also served as the artistic longhand for at least a part of the Indus signary, calling into question views that Indus animal symbolism was not intrinsic to its communication system and that it was featured only as it is “possessed of special powers” and that “were it not for the inscriptions upon them, these seals would be useless” (Mackay, 1931, p. 381), or that it was “subordinate to the inscription” or had “a function completely or partially separate from the inscription” (Frenez, 2018, p. 172).

### Supplementary Information

The online version contains supplementary material available here

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