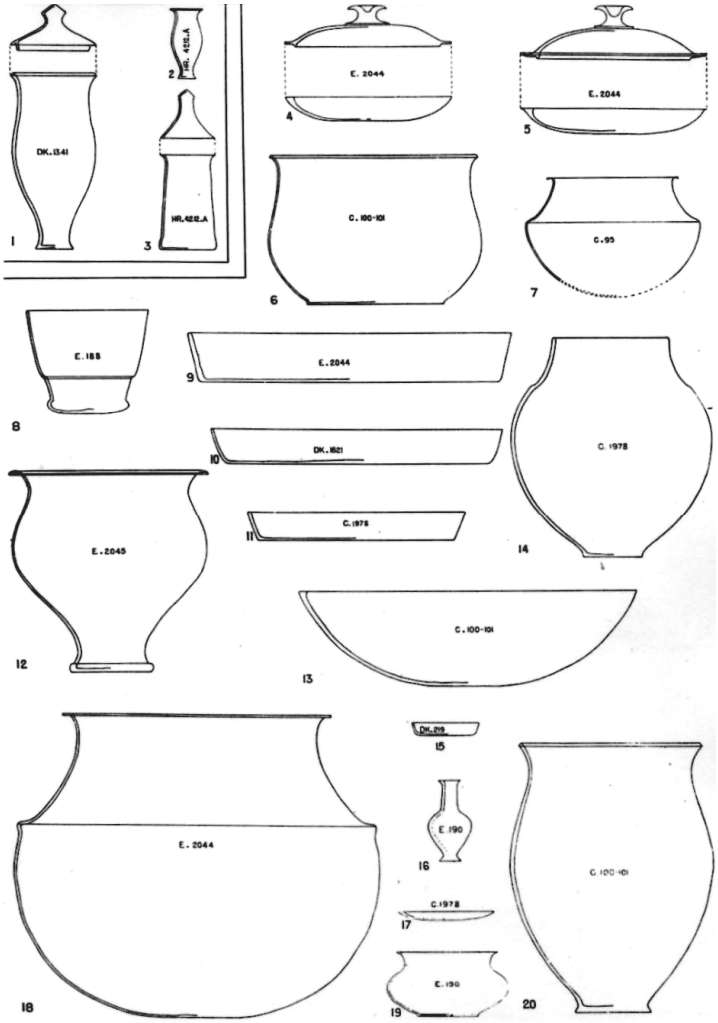
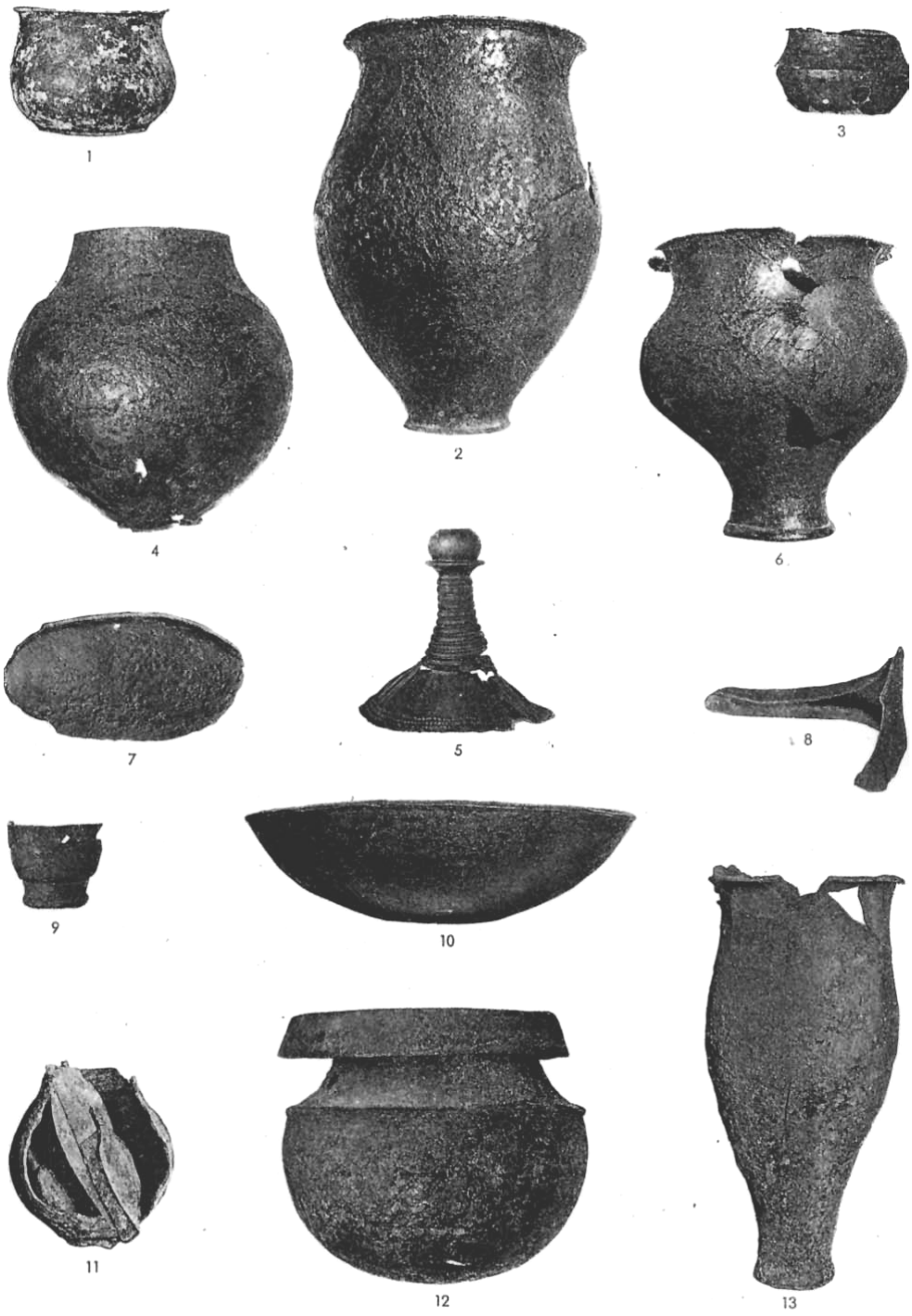
MIC, Pl. CXXXIX. Copper and bronze tools etc.

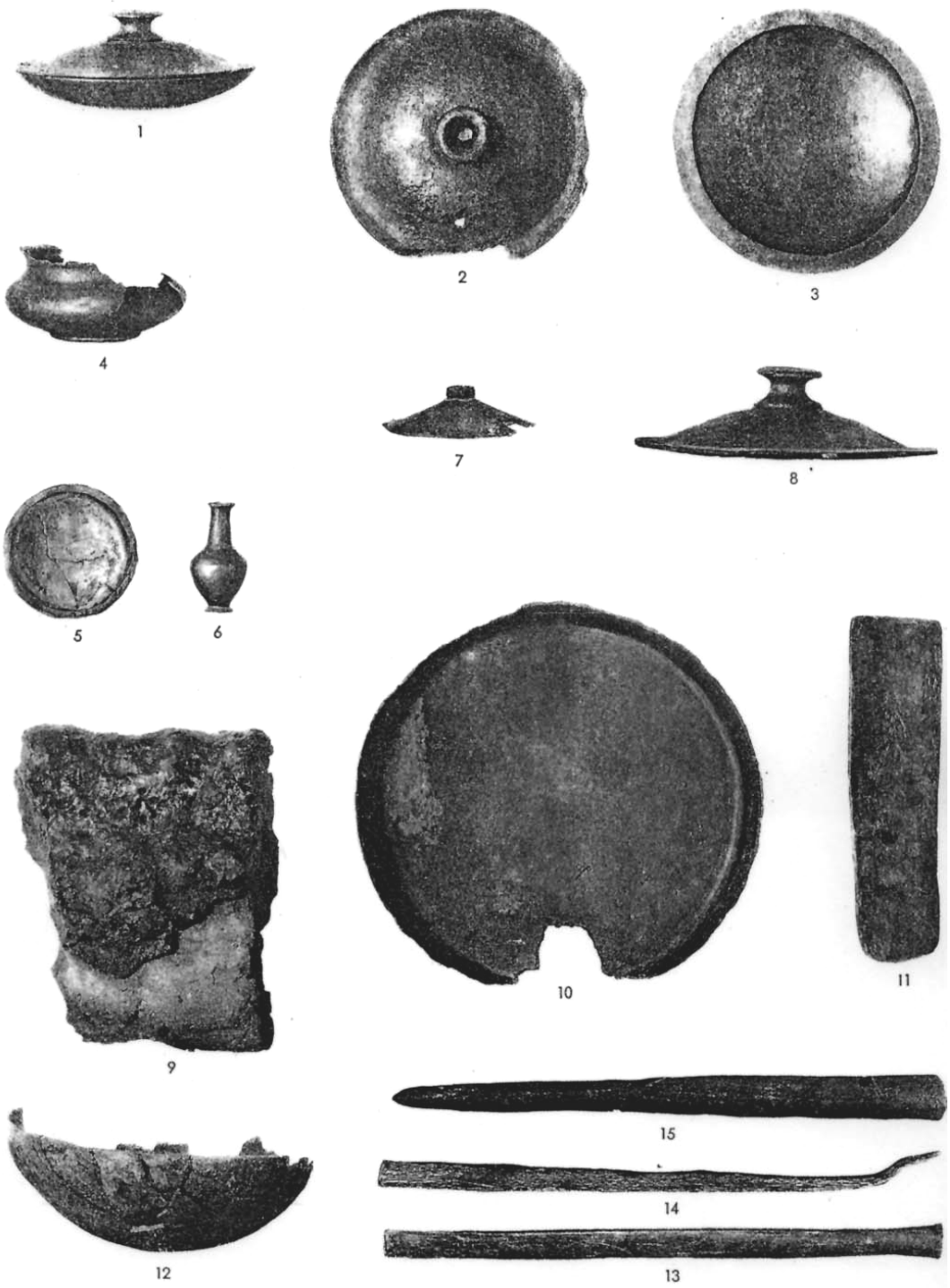


MIC, Pl. CXL. Items 1,2,3: Silver vessels. Others: Bronze and copper vessels.

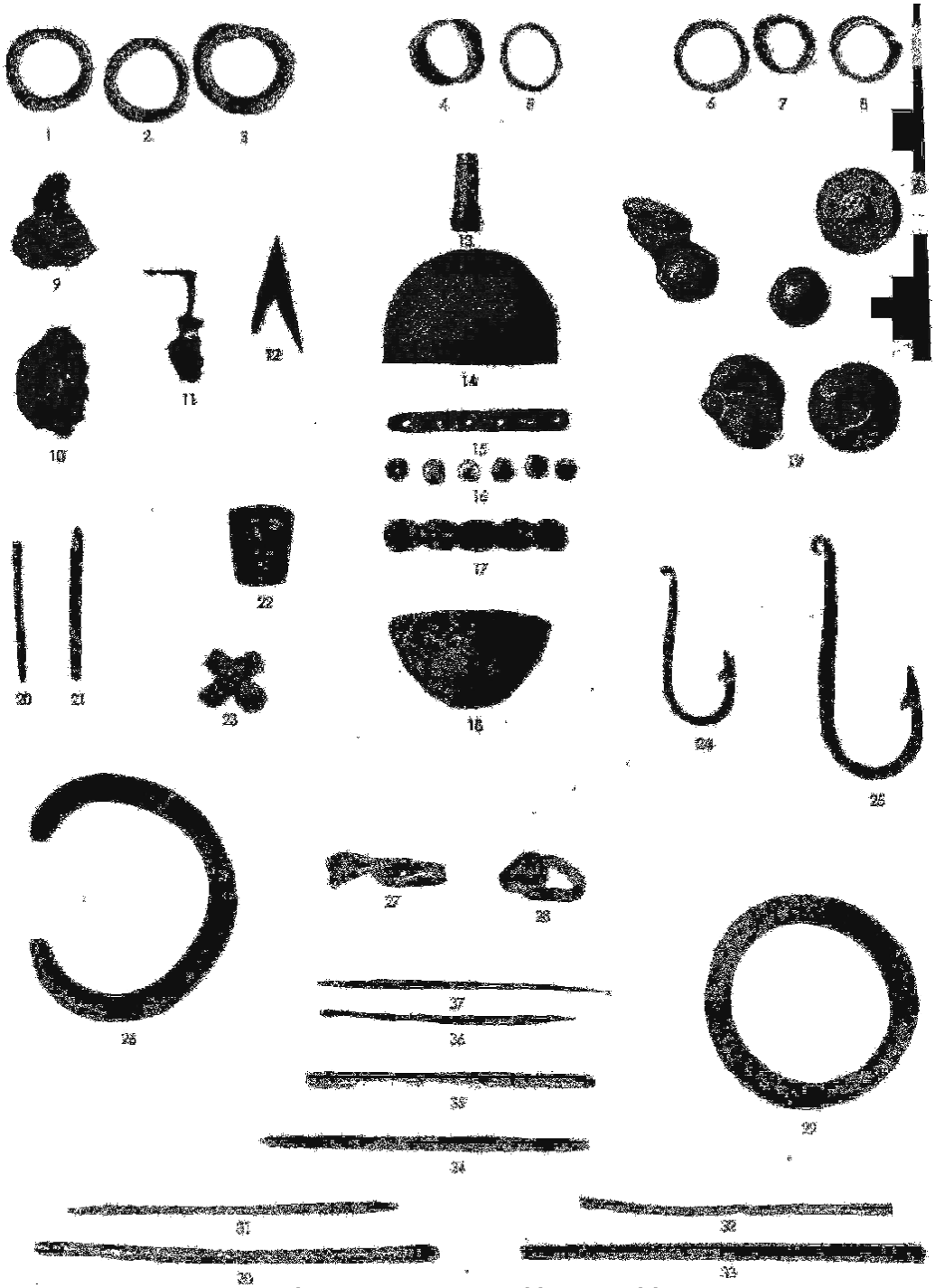
Kurada: Copper bowls.



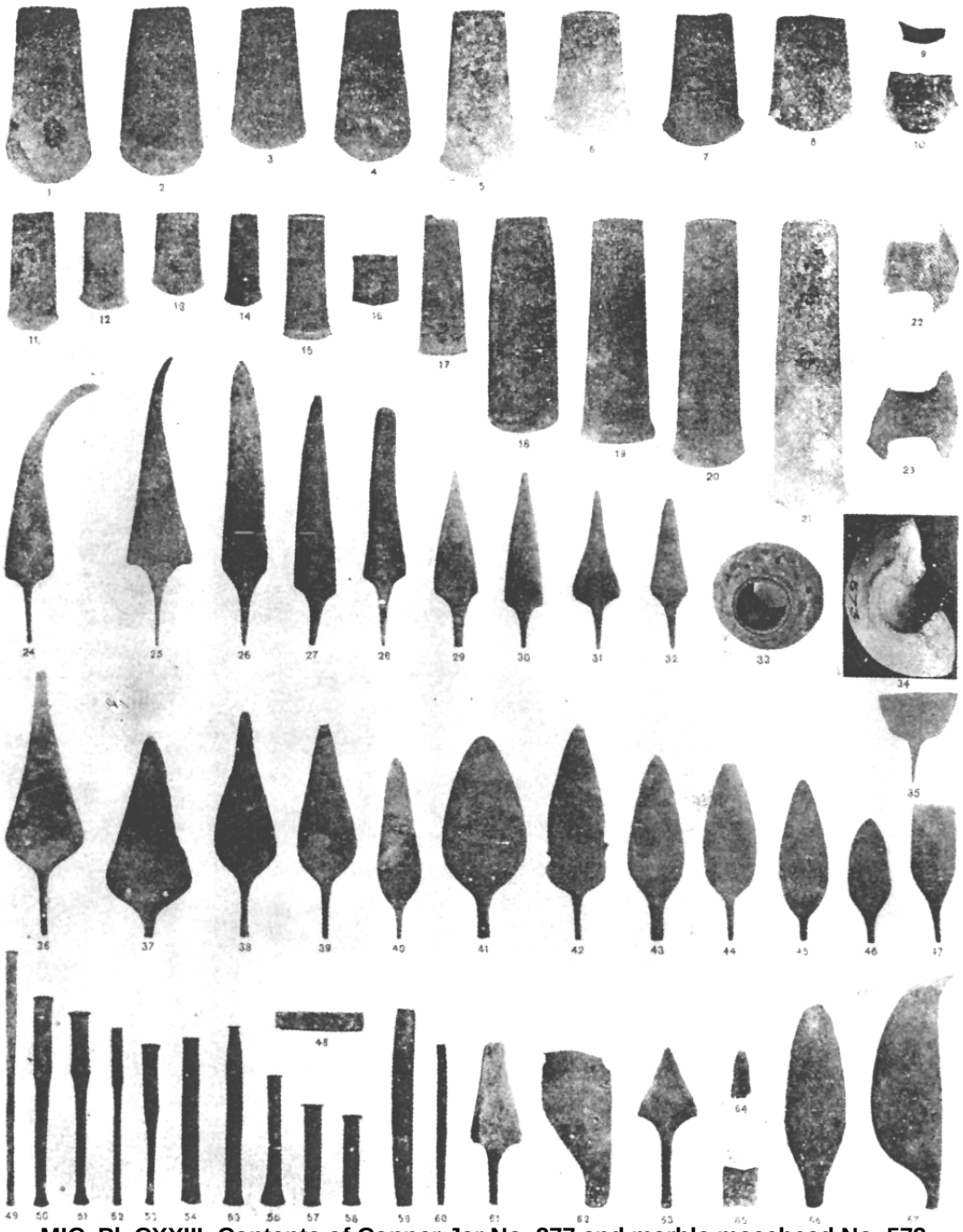
MIC, Pl. CXLI. Copper and bronze vessels.



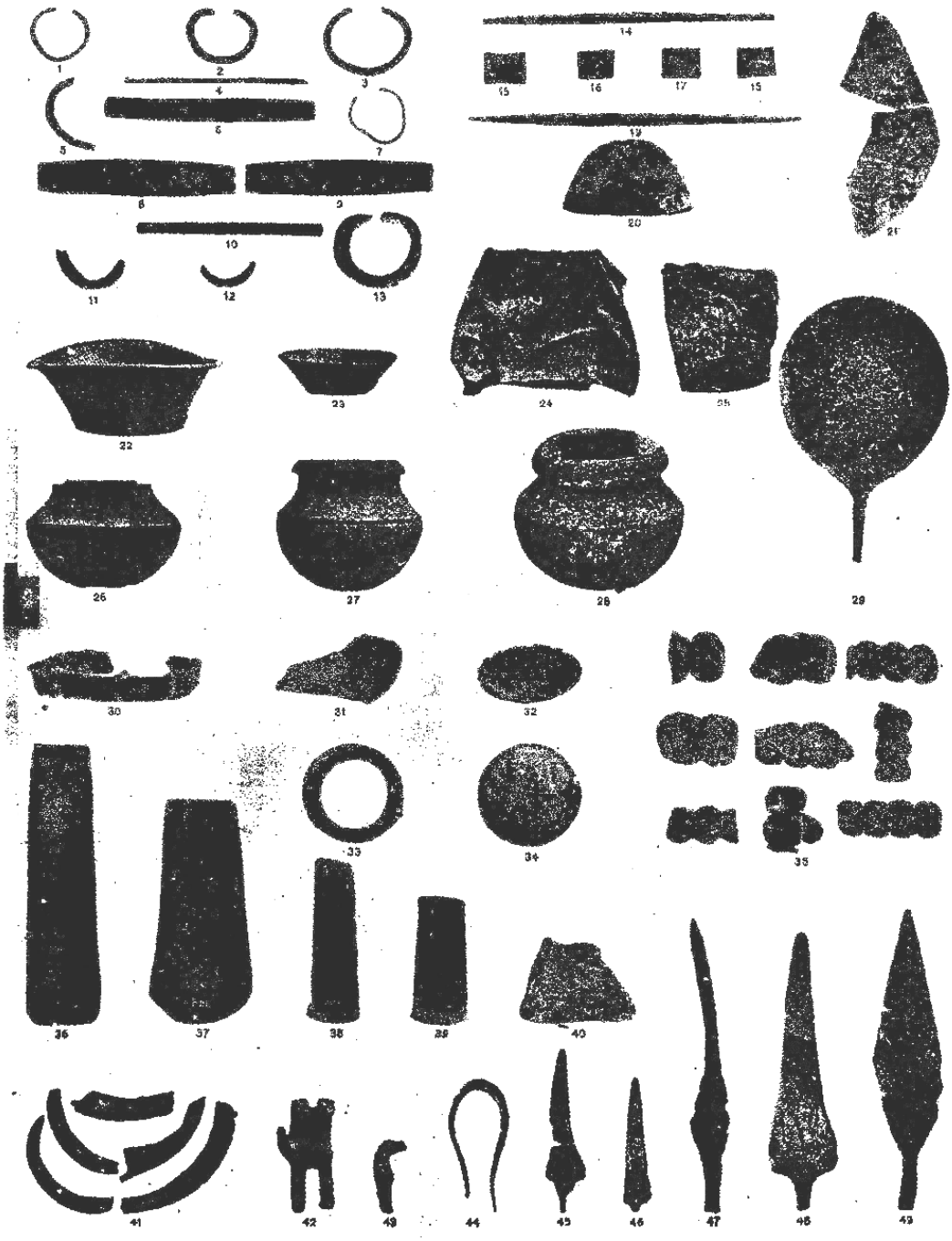
MIC, Pl. CXLII. Copper and bronze vessels and objects.



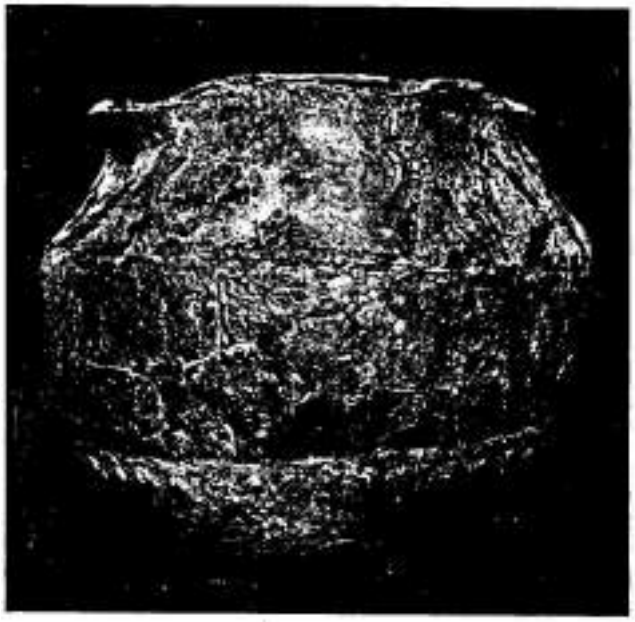
MIC, Pl. CXLIII. Copper and bronze objects.



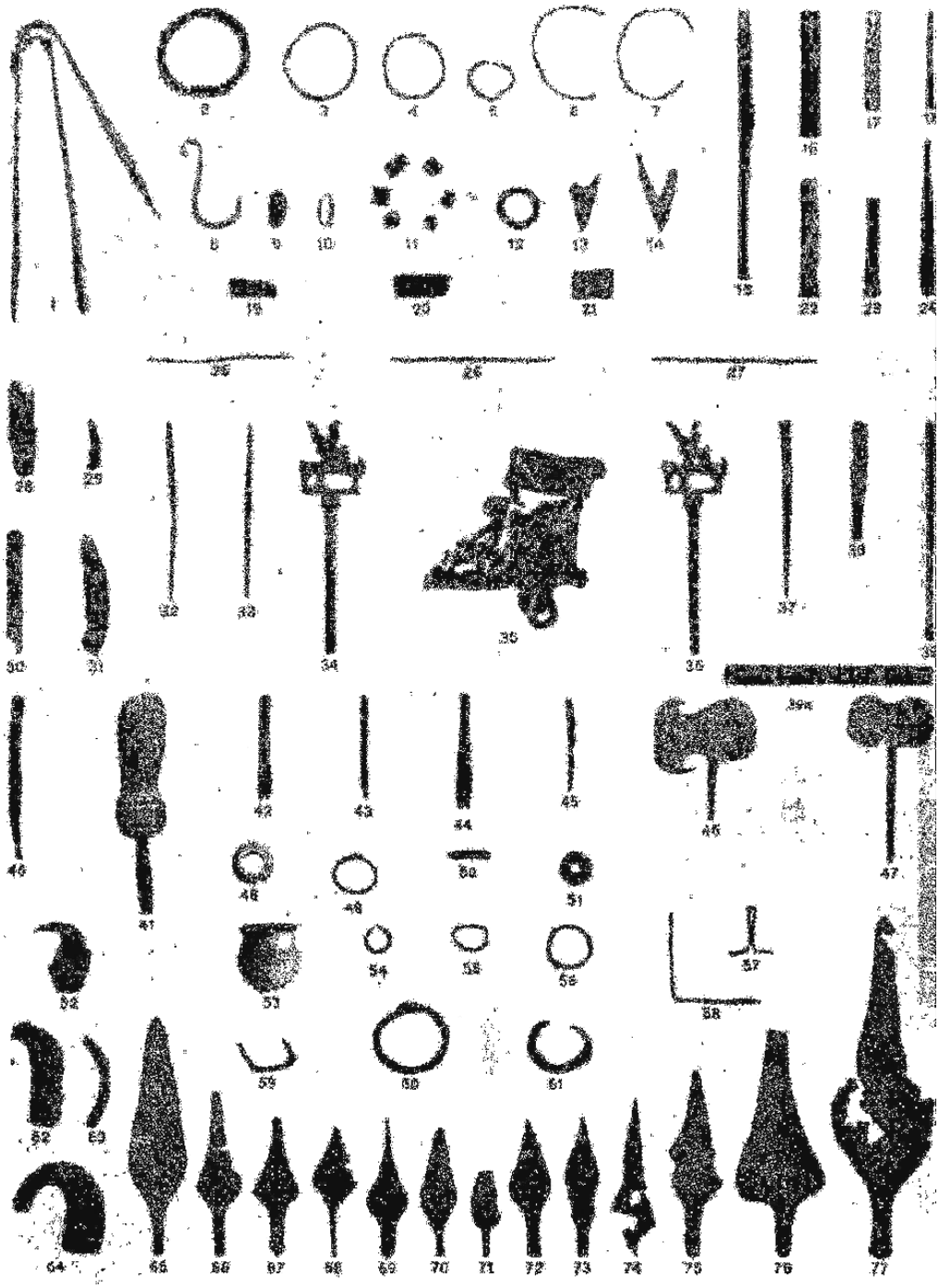
MIC, Pl. CXXIII. Contents of Copper Jar No. 277 and marble macehead No. 573.



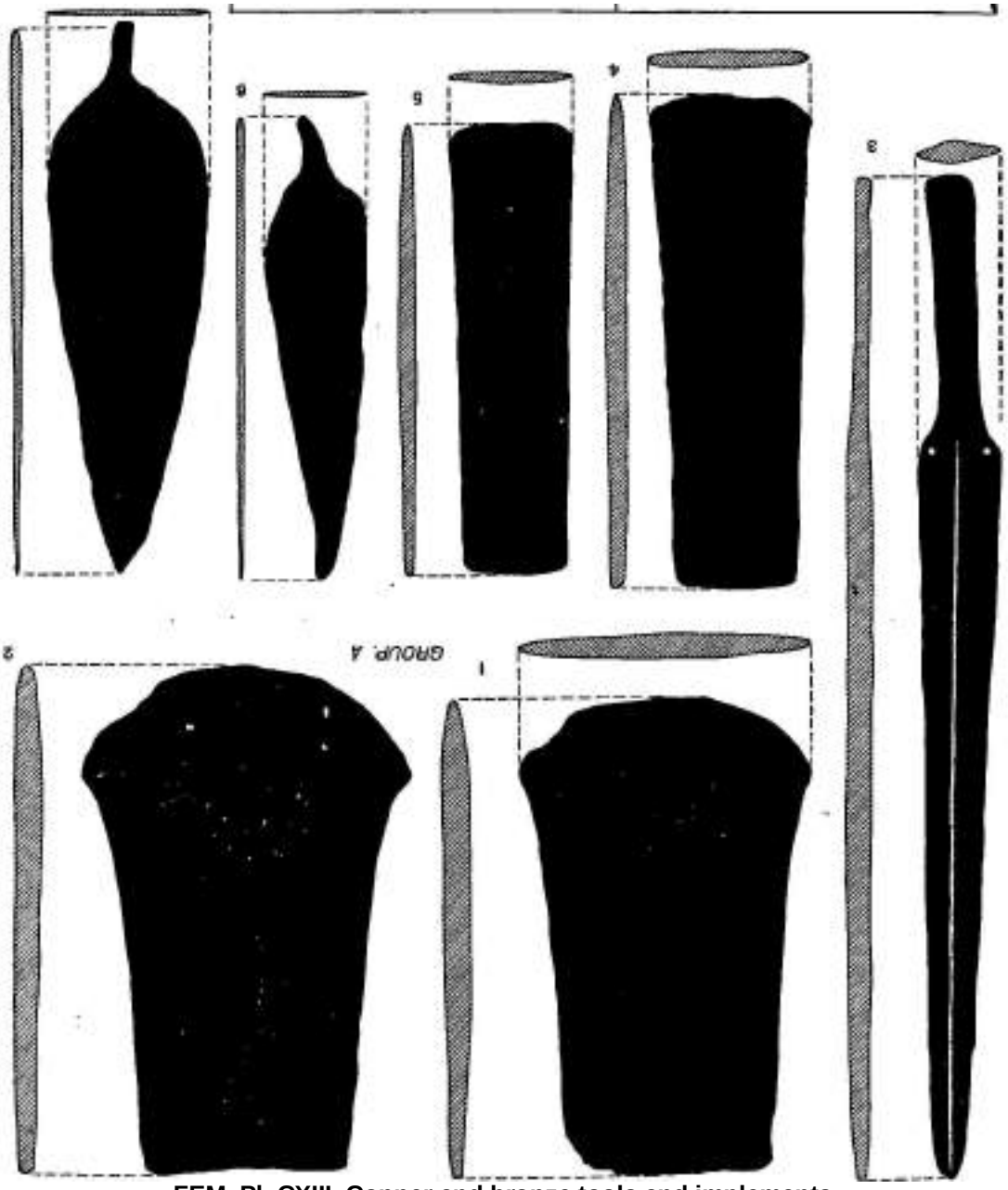
MIC, Pl. CXXIV. Copper and bronze ornaments, utensils, implements, weapons etc.



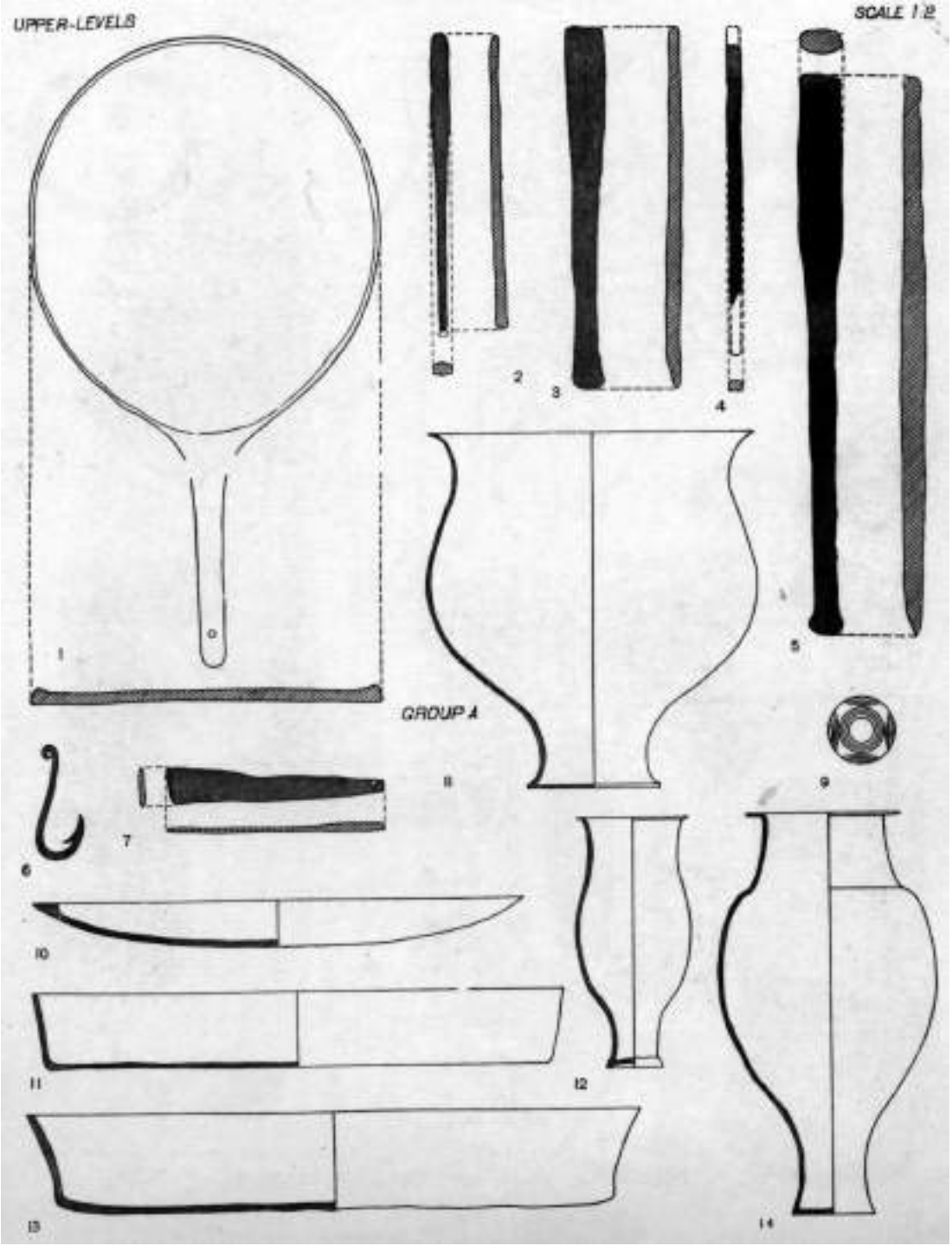
Lothal. Riveted copper jar. Comparable in shape to the jar found at Mohenjo-daro. [After SR Rao, 1985].



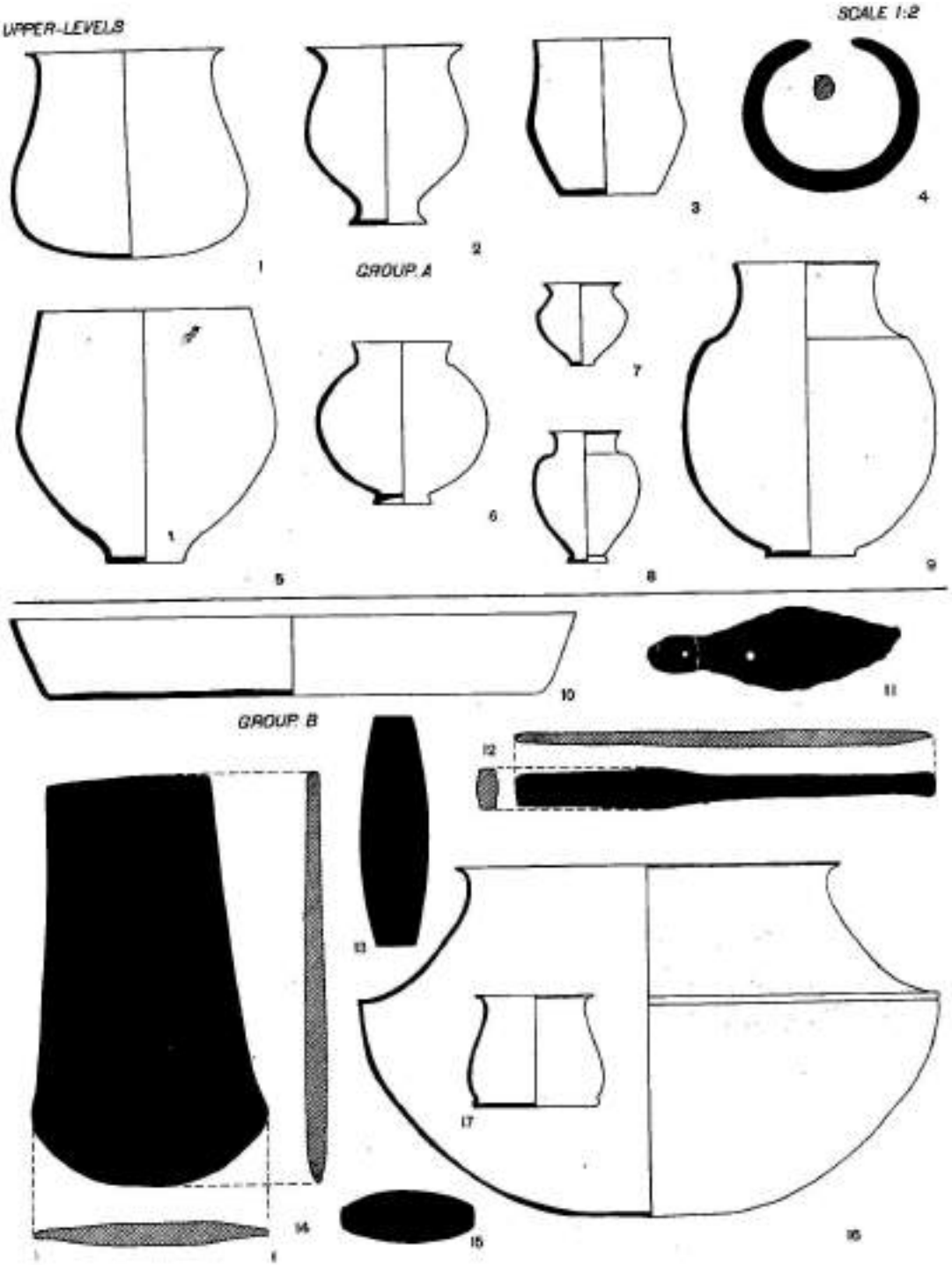
MIC, Pl. CXXV. Copper, bronze, silver and gold objects. Item 35 is referred to as an 'ekka'; it could also have been a box for a ratha.



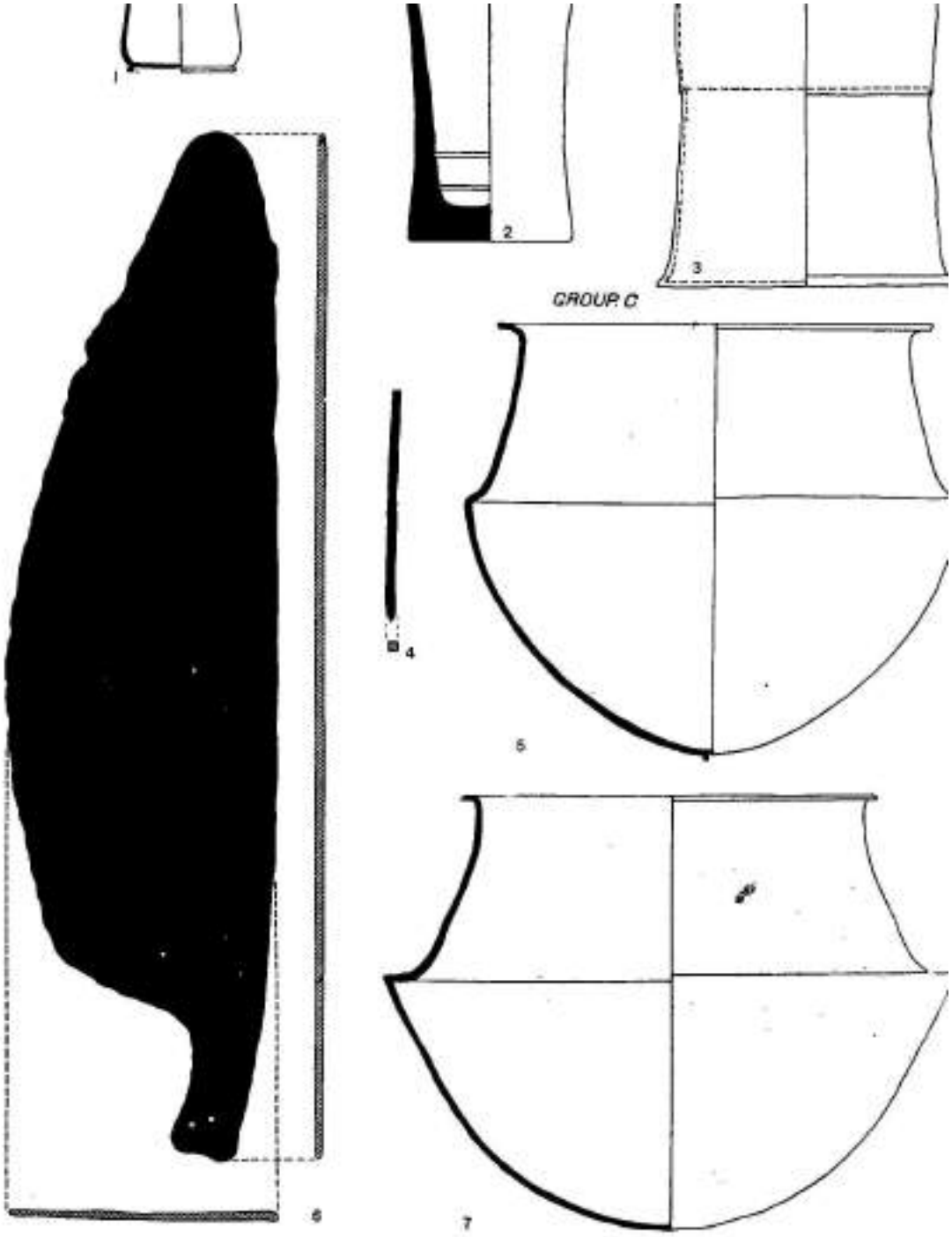
FEM, Pl. CXIII. Copper and bronze tools and implements.



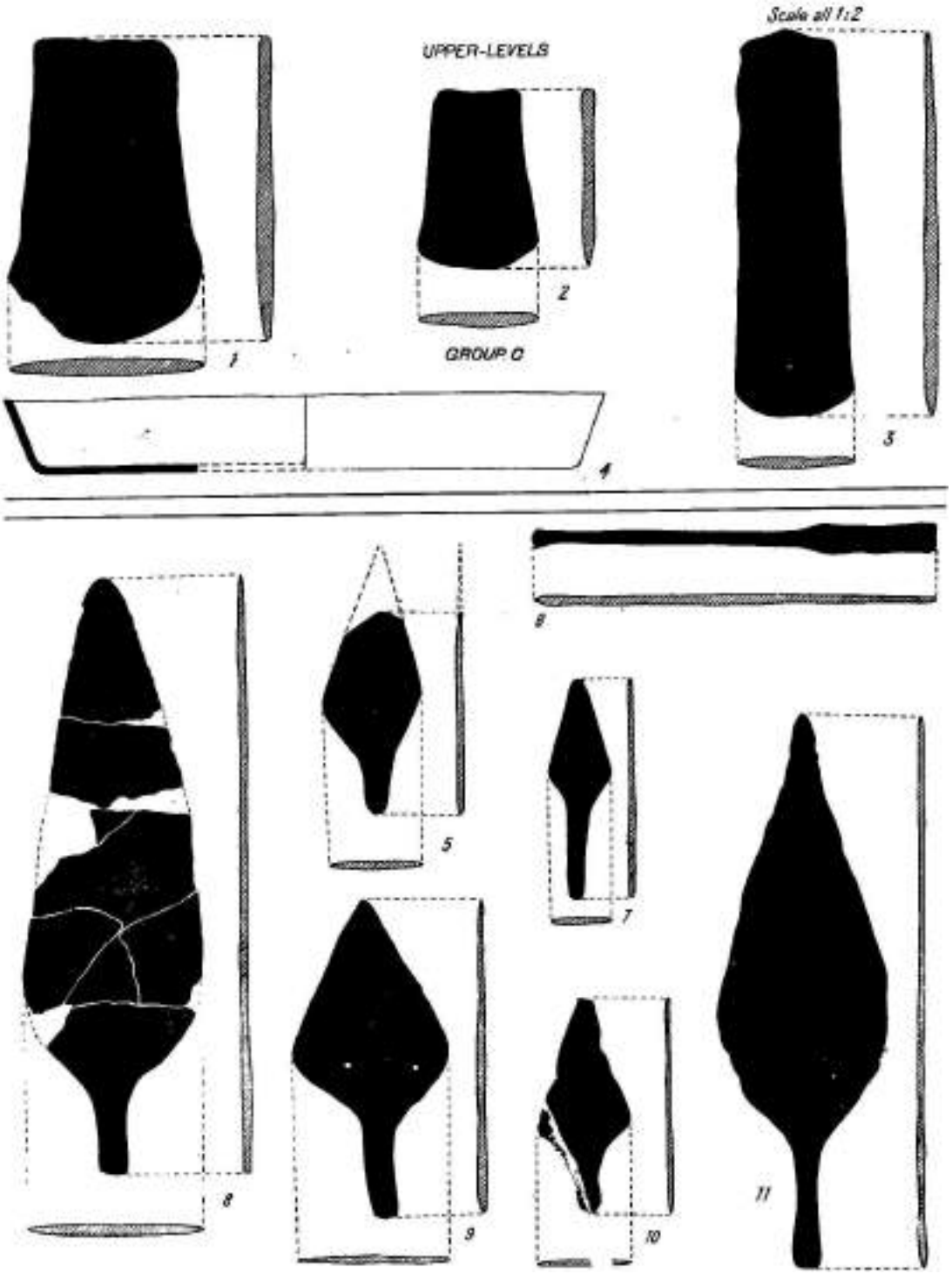
FEM, Pl. CXIV.Copper and bronze tools, implements and utensils



FEM, Pl. CXV. Copper and bronze utensils, tools and stone weights.

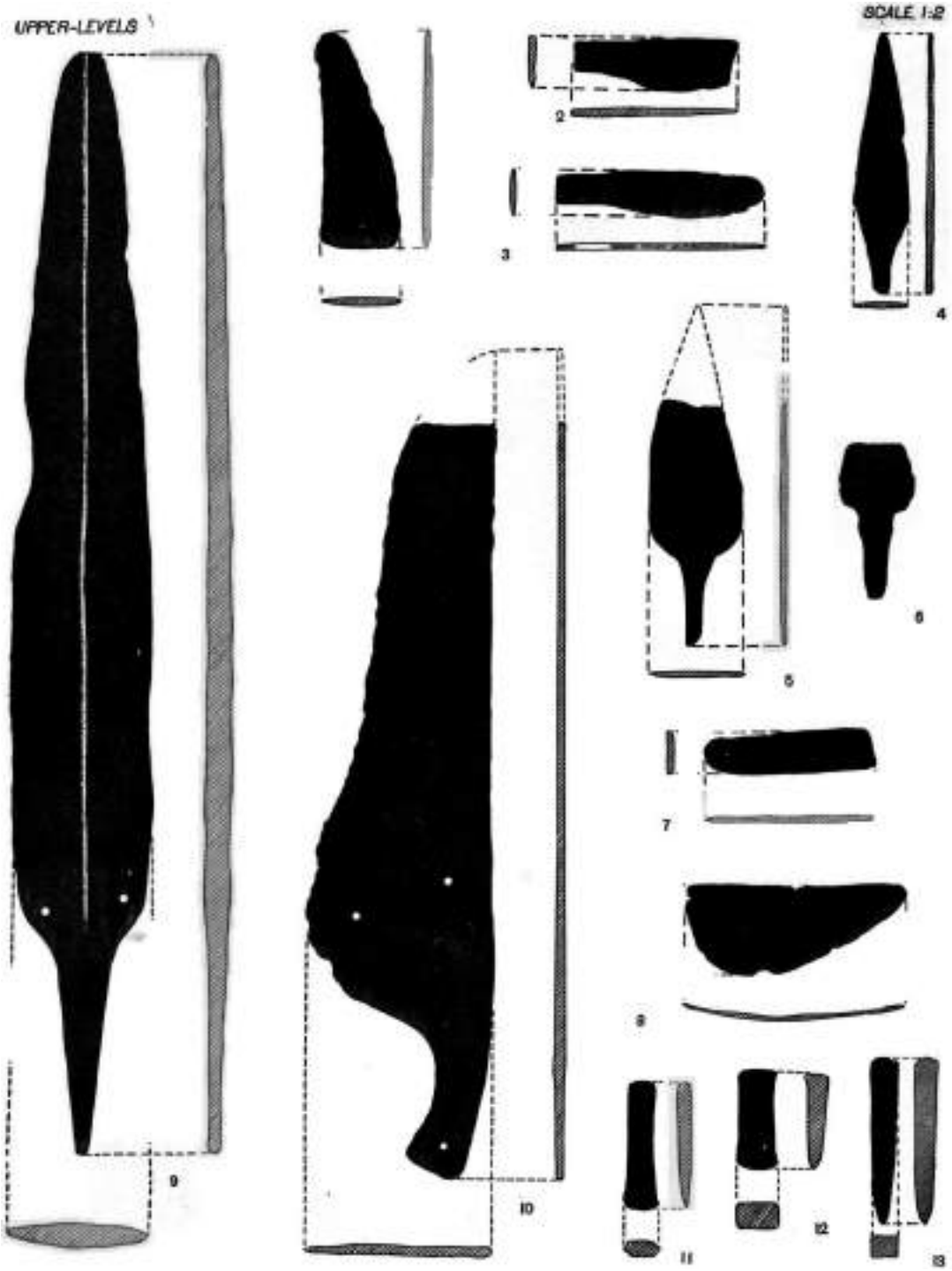


FEM. Pl. CXVI. Copper and bronze tools and utensils and stone vessel.

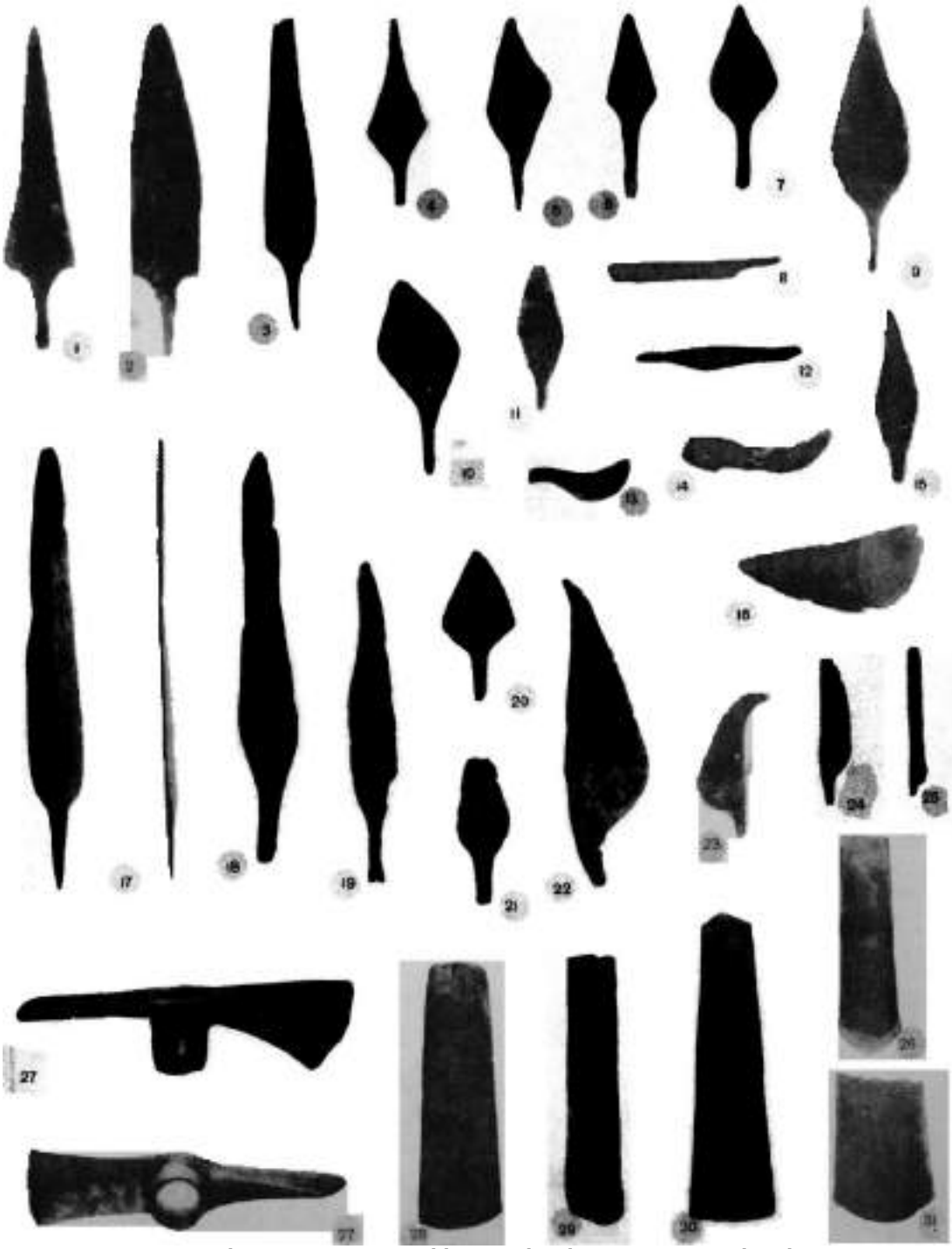


FEM. Pl. CXVII. Copper and bronze tools.

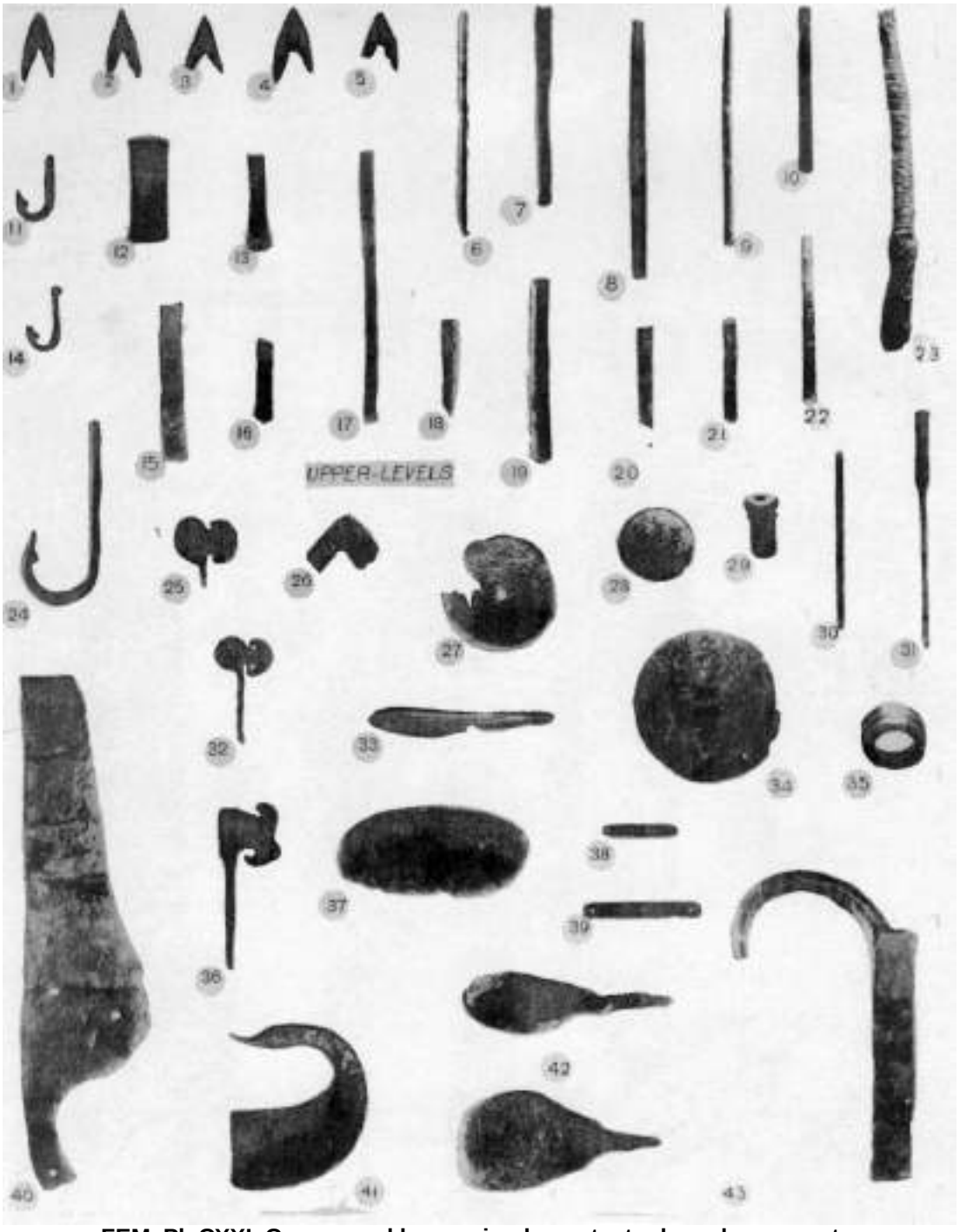
FEM, Pl. CXVIII. Copper and bronze objects. Upper levels.



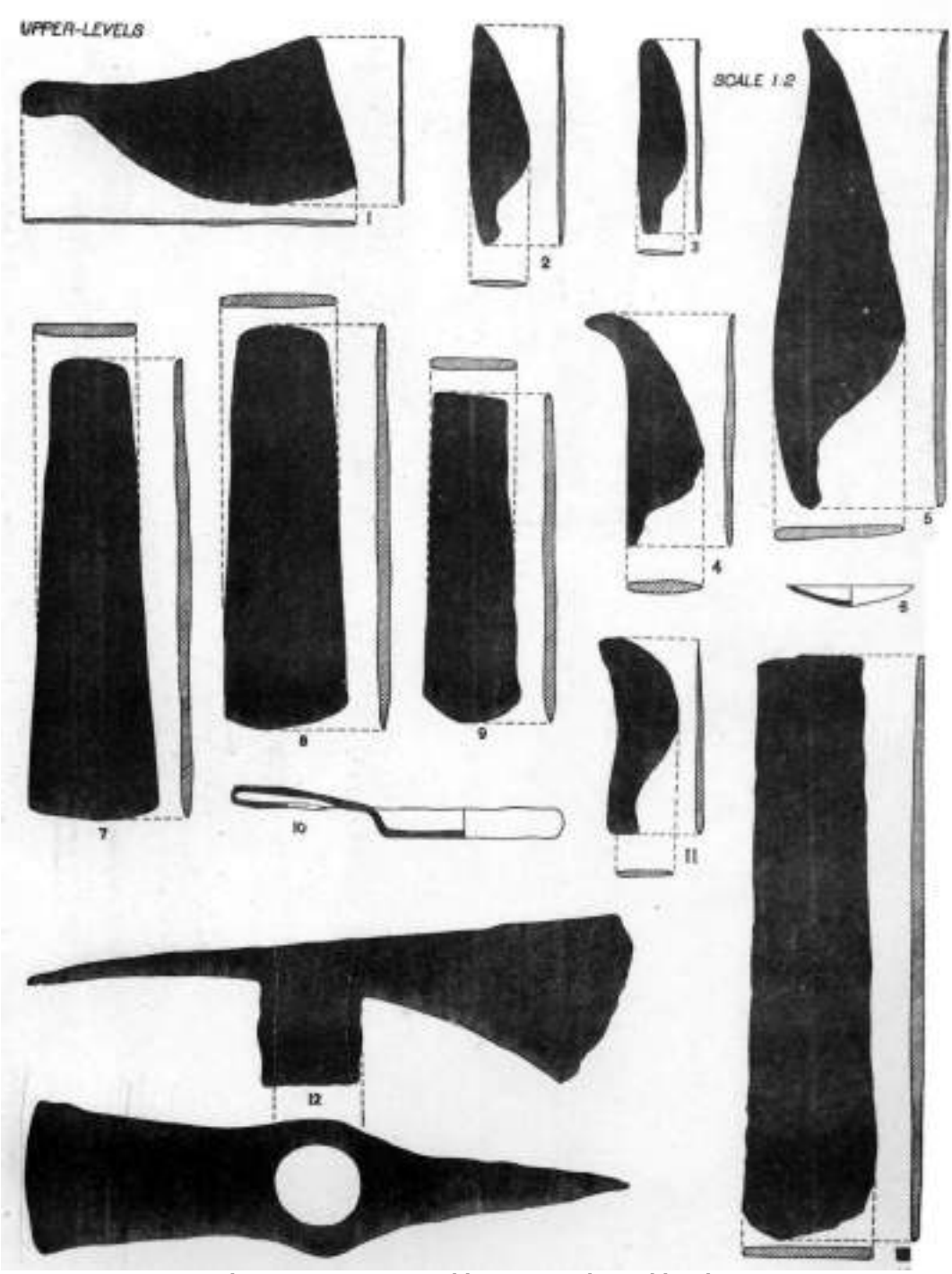
FEM, Pl. CXIX. Copper and bronze tools and implements.



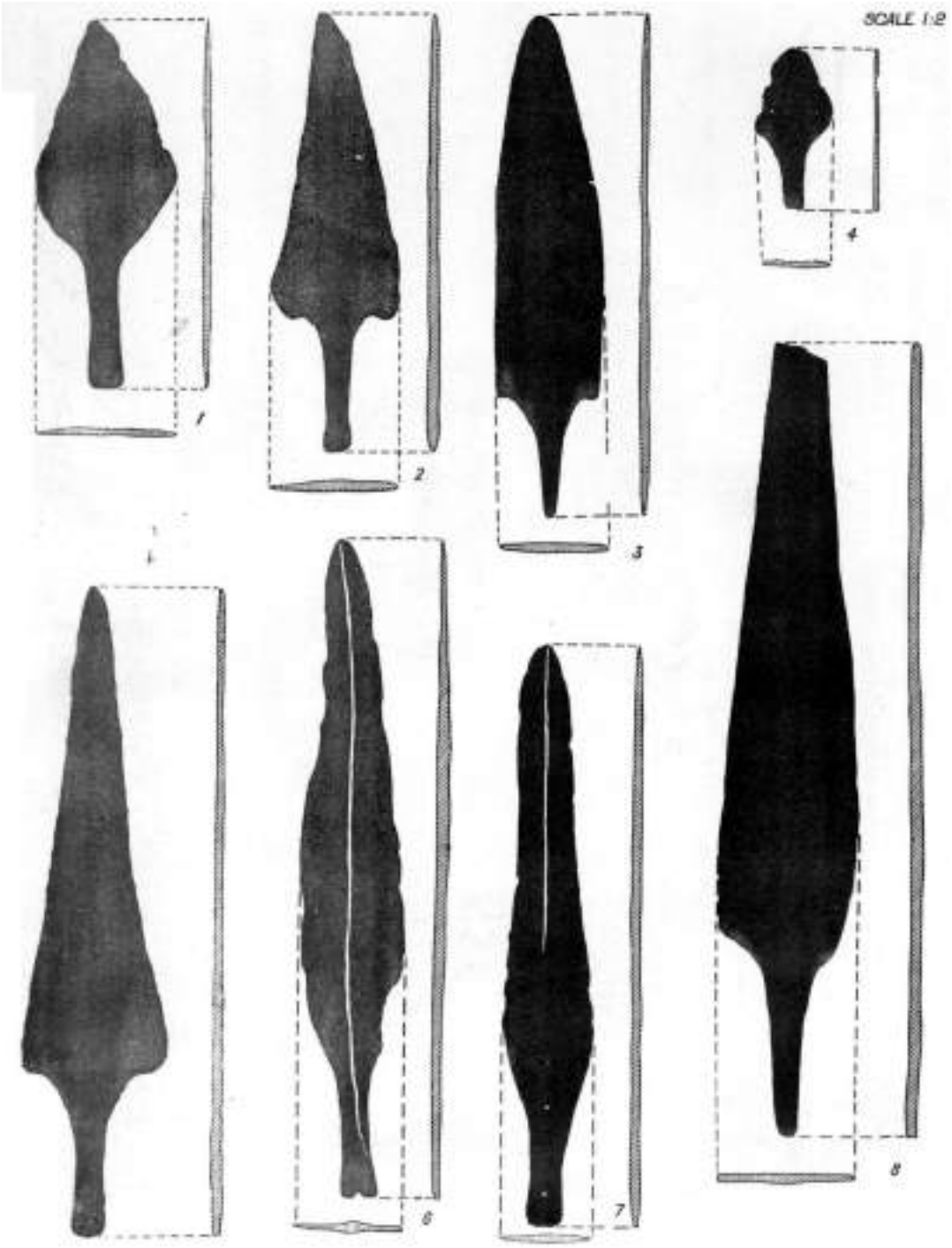
FEM, Pl. CXX. Copper and bronze implements. Upper levels.



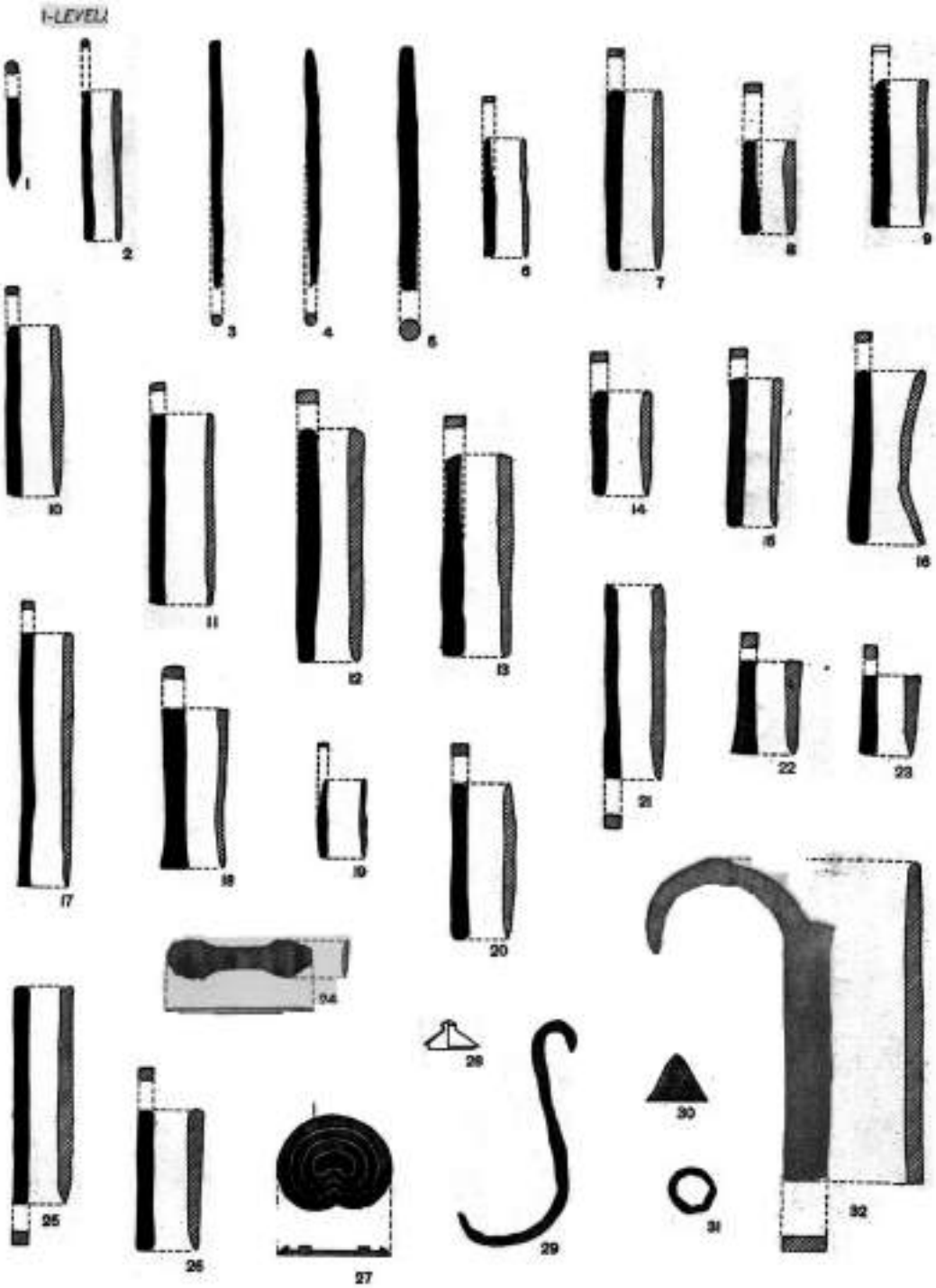
FEM. Pl. CXXI. Copper and bronze implements, tools and ornaments.



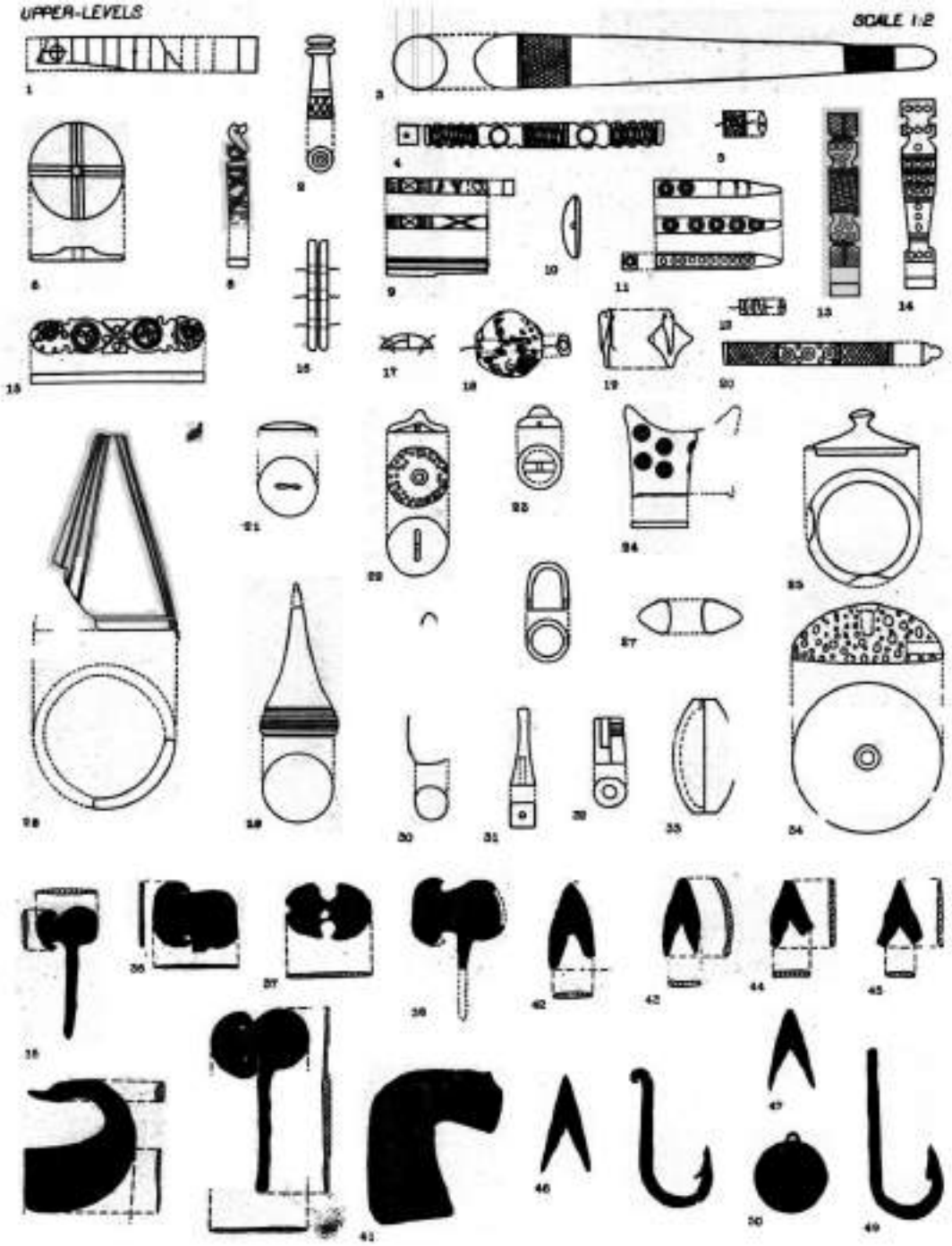
FEM, Pl. CXXII. Copper and bronze tools and implements.



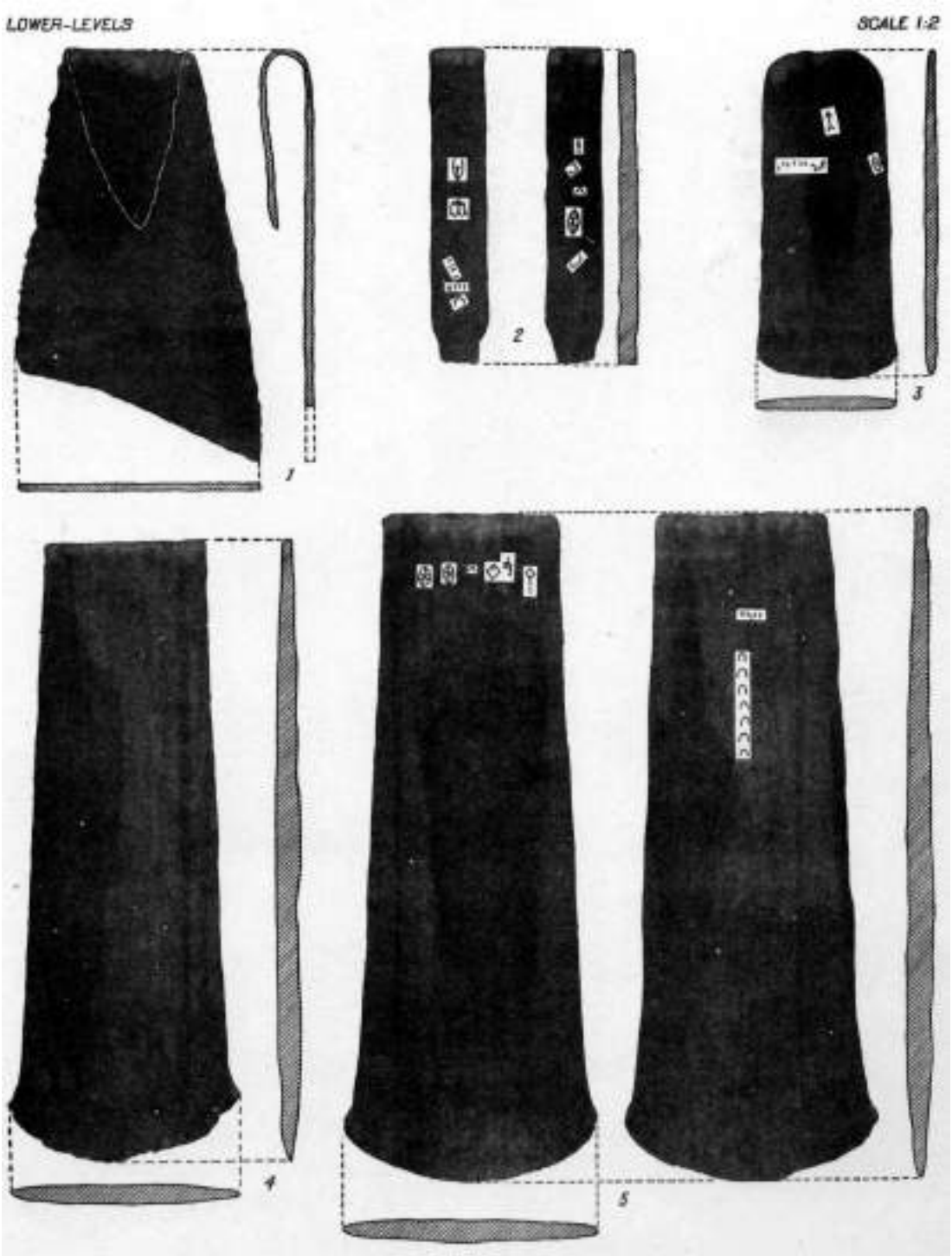
FEM. Pl. CXXIII. Copper and bronze knives and daggers.



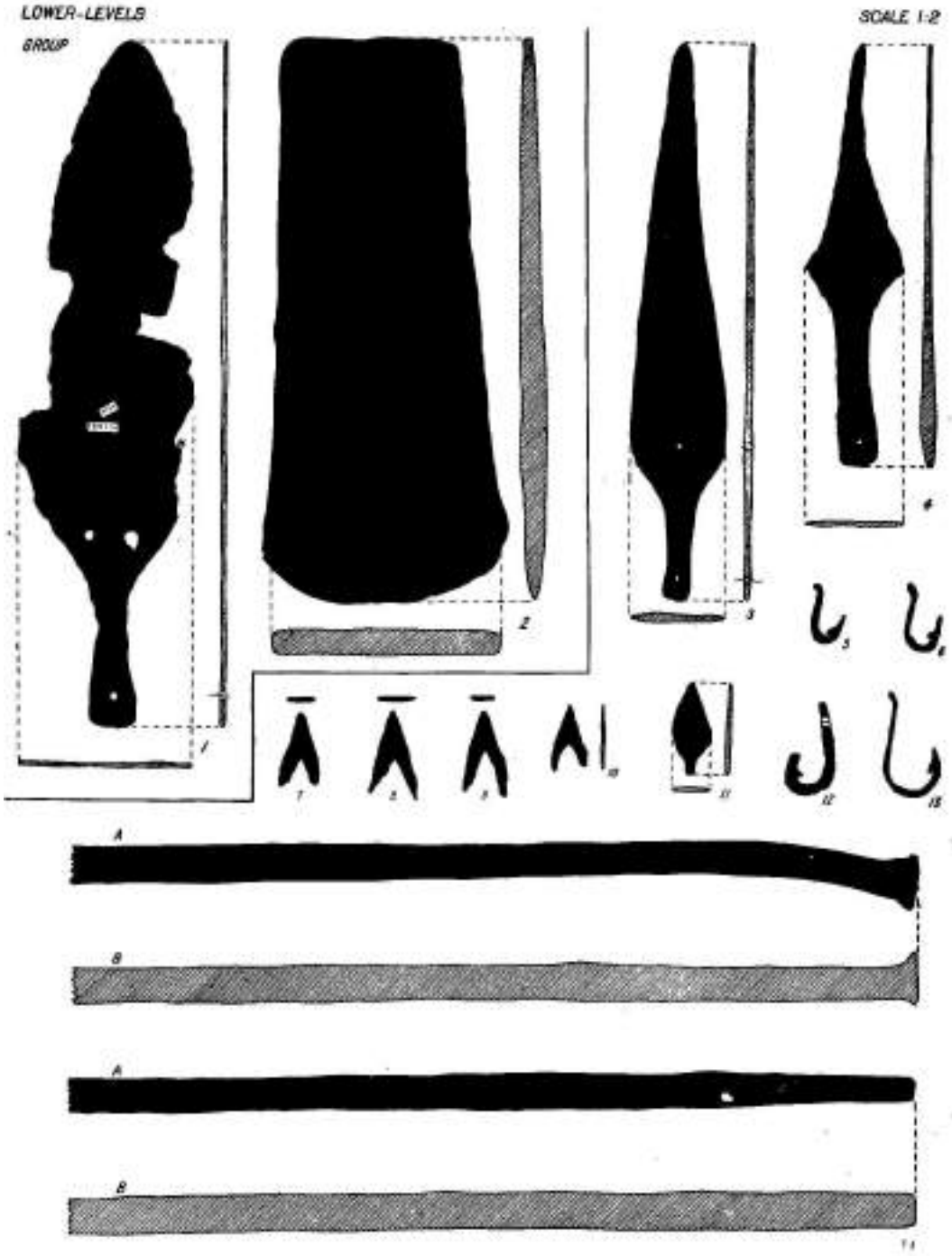
FEM. Pl. CXXIV. Copper and bronze objects.



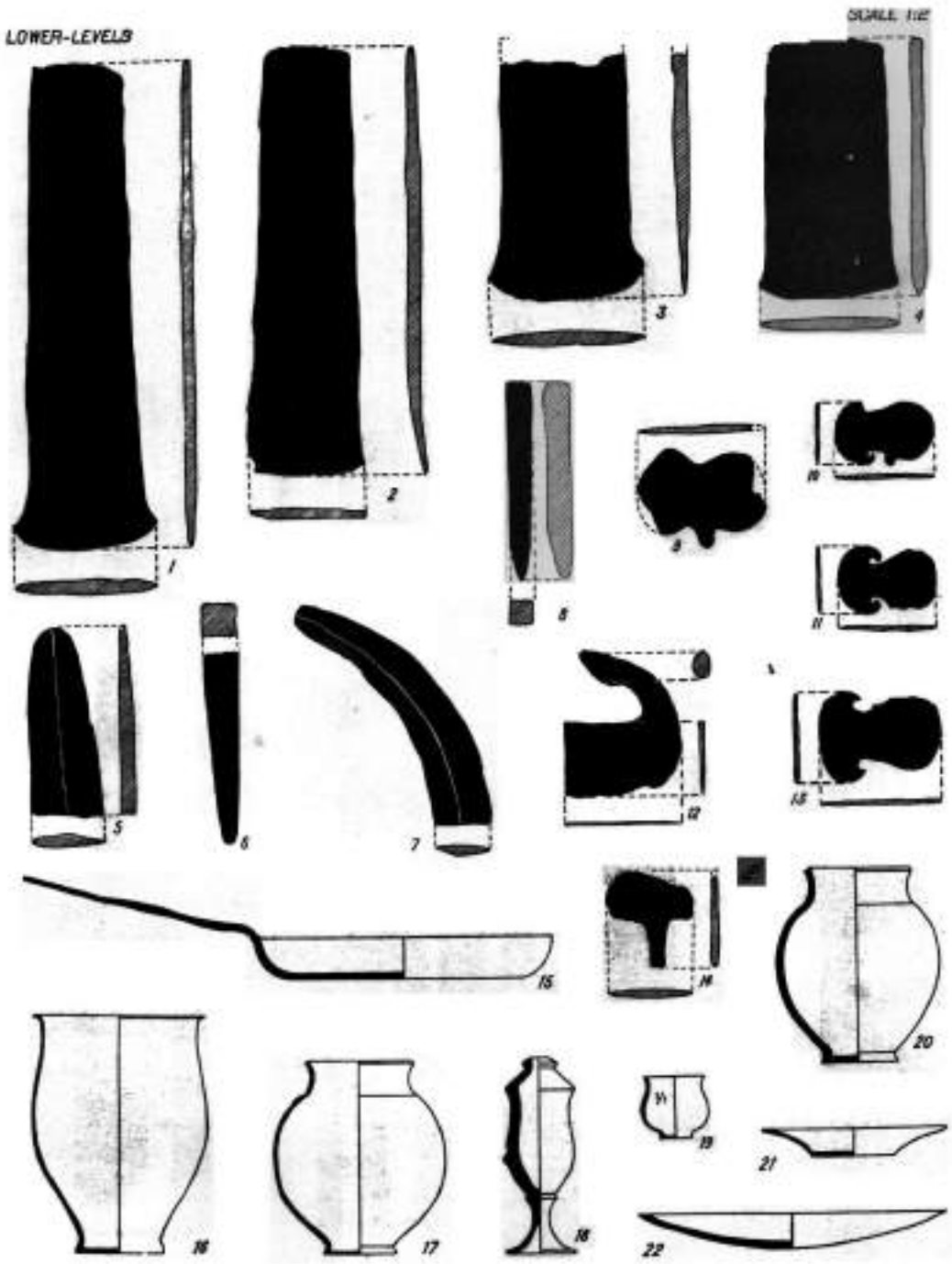
FEM. Pl. CXXV. Miscellaneous objects. Copper implements, arrowheads, fishhooks.



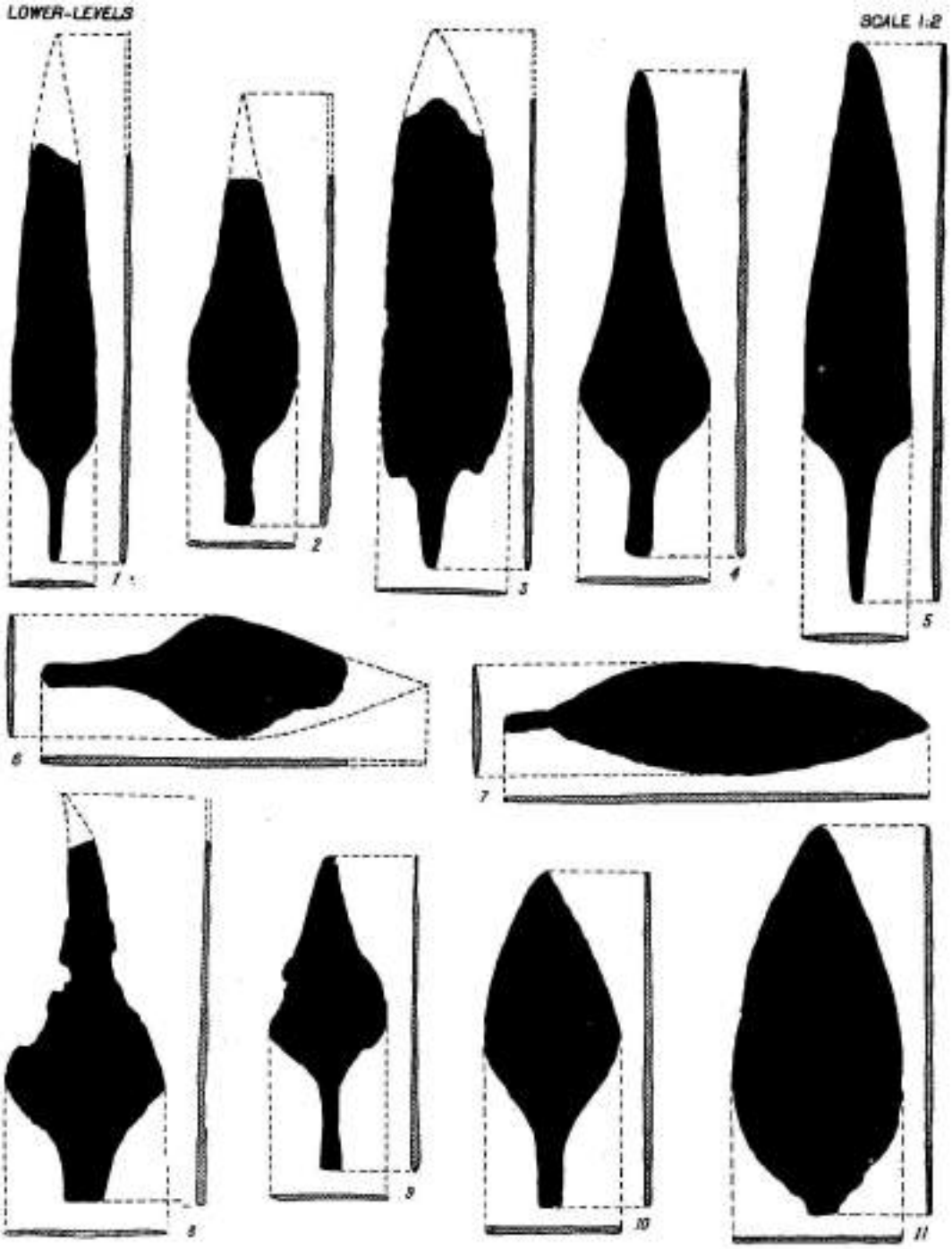
FEM. Pl. CXXVI. Copper and bronze implements and tools, some with inscriptions.



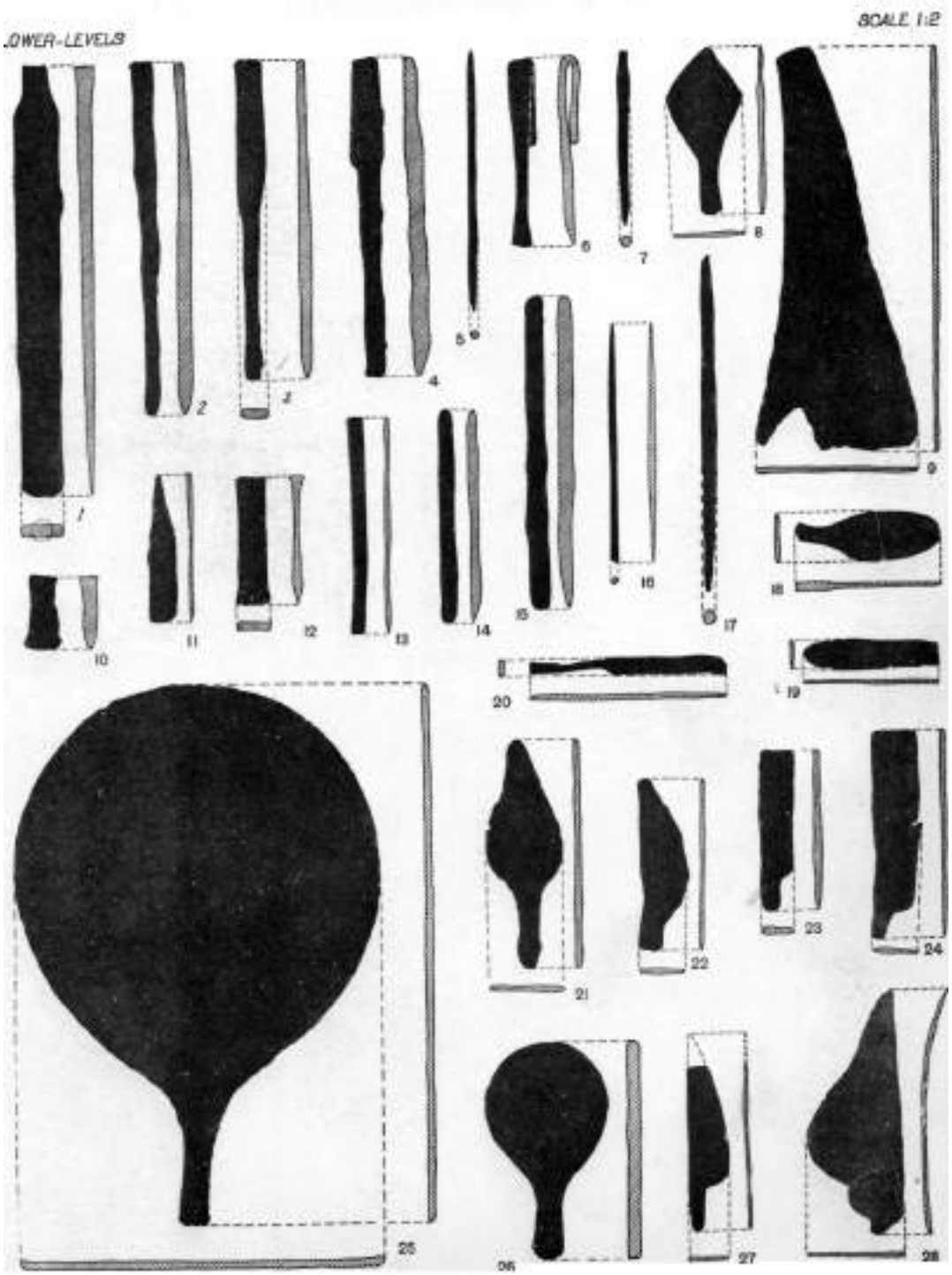
FEM, Pl. CXXVII. Copper and bronze objects.



FEM. Pl. CXXVIII. Copper and bronze tools and utensils

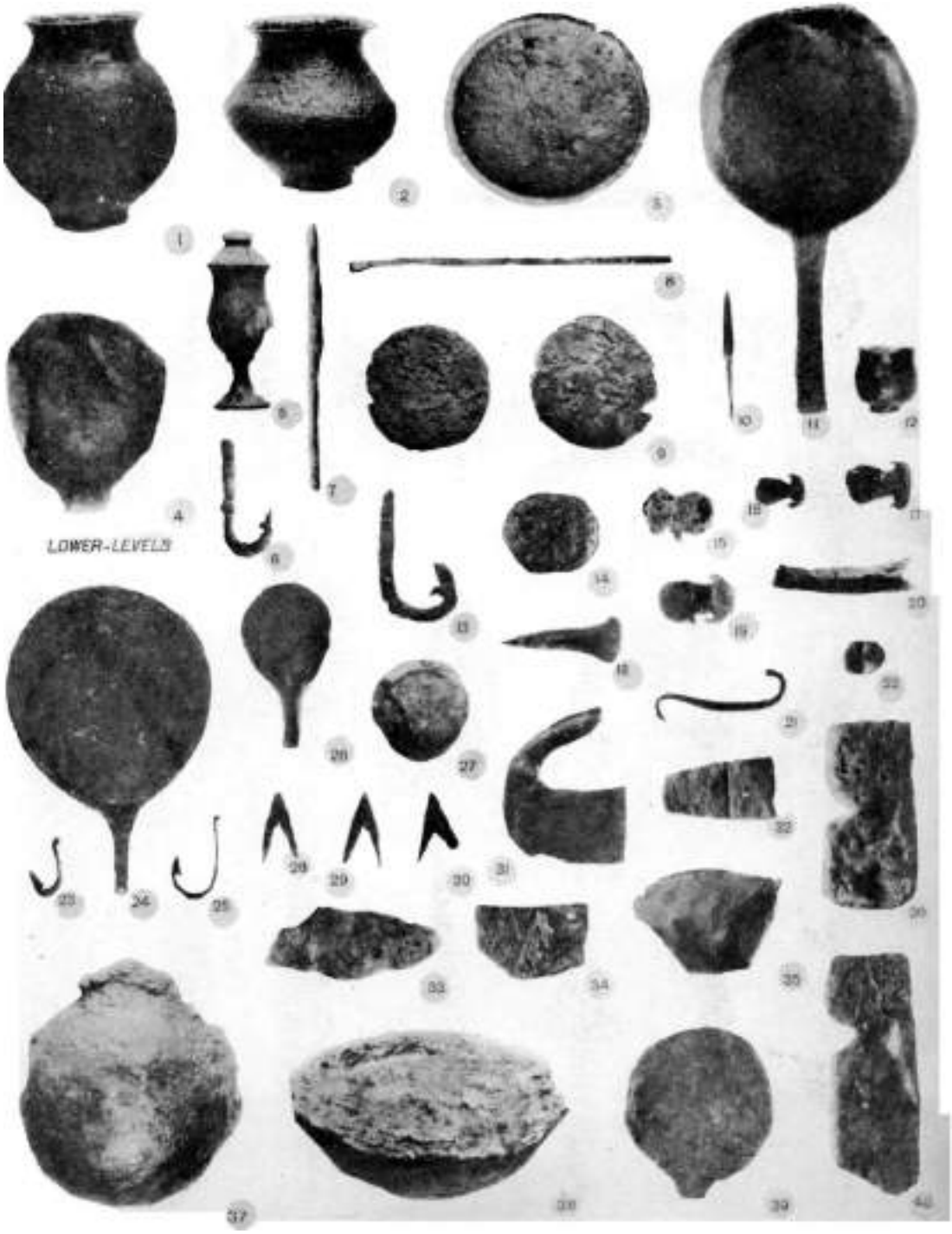


FEM. Pl. CXXIX. Copper and bronze knives and daggers.

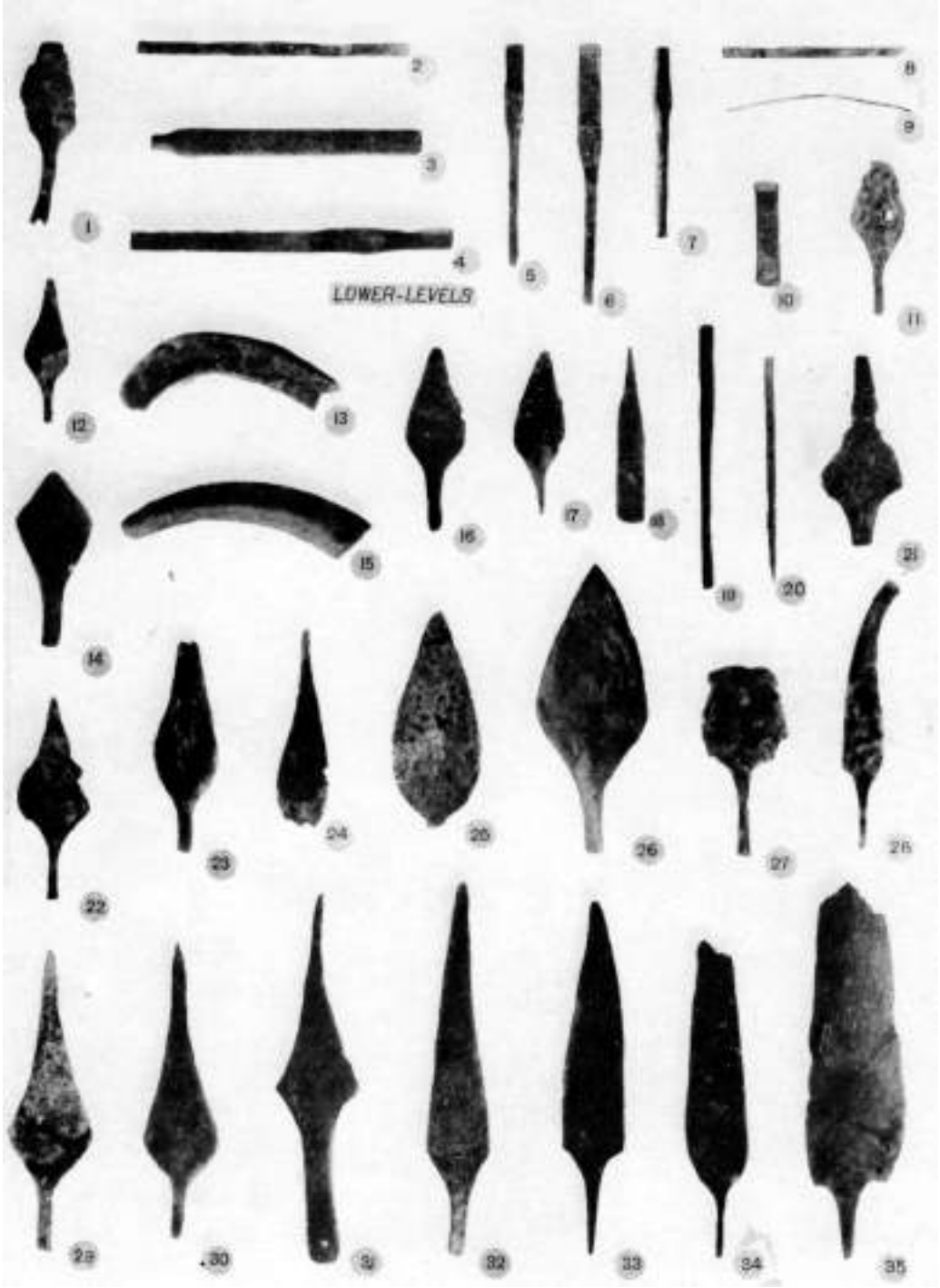


FEM, Pl. CXXX. Copper and bronze tools and other objects.

FEM. Pl. CXXXI. Copper and bronze tools and implements. Upper levels.



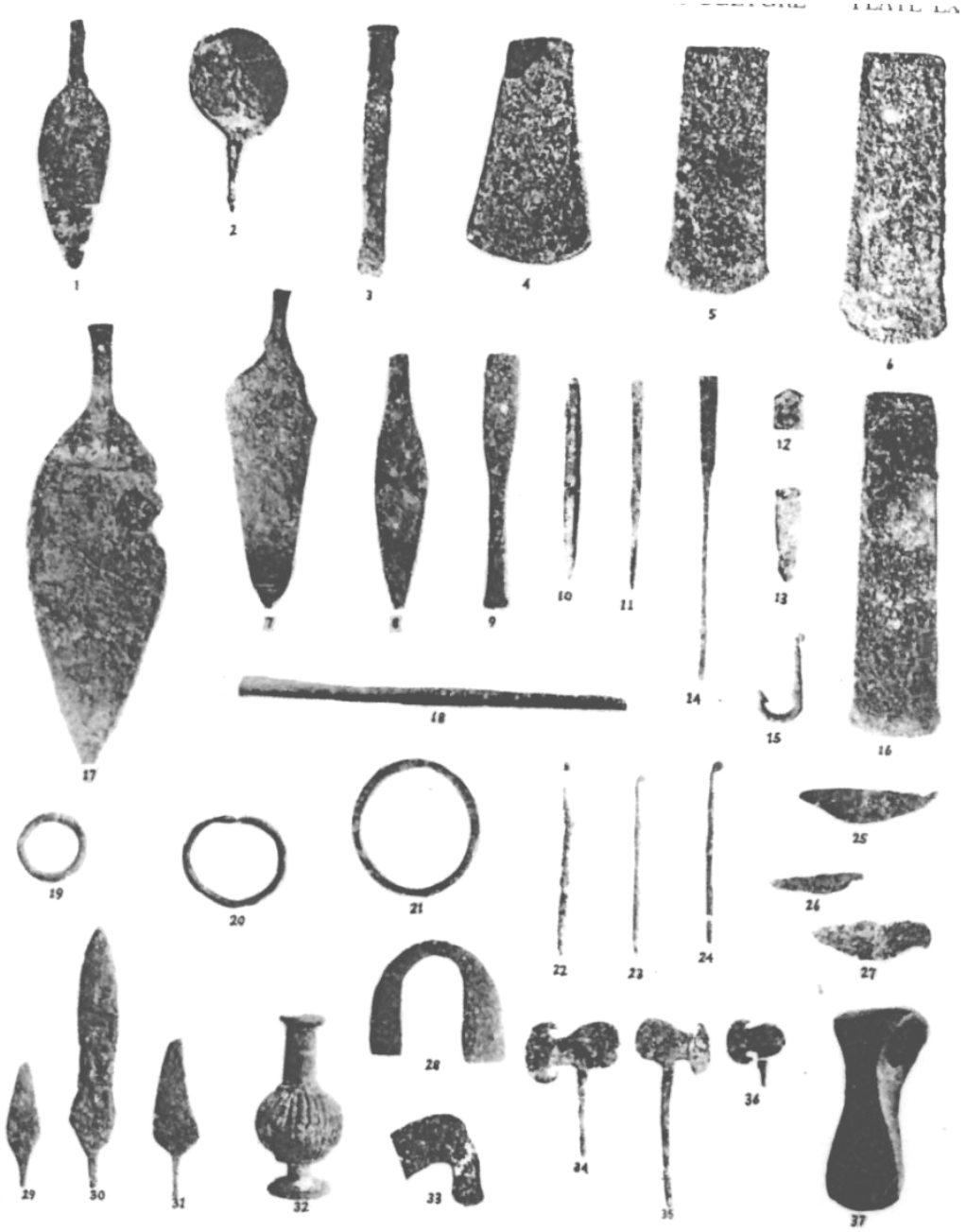
FEM. Pl. CXXXII. Copper and bronze utensils and other objects.



FEM. Pl. CXXXIII. Copper and bronze tools and implements.

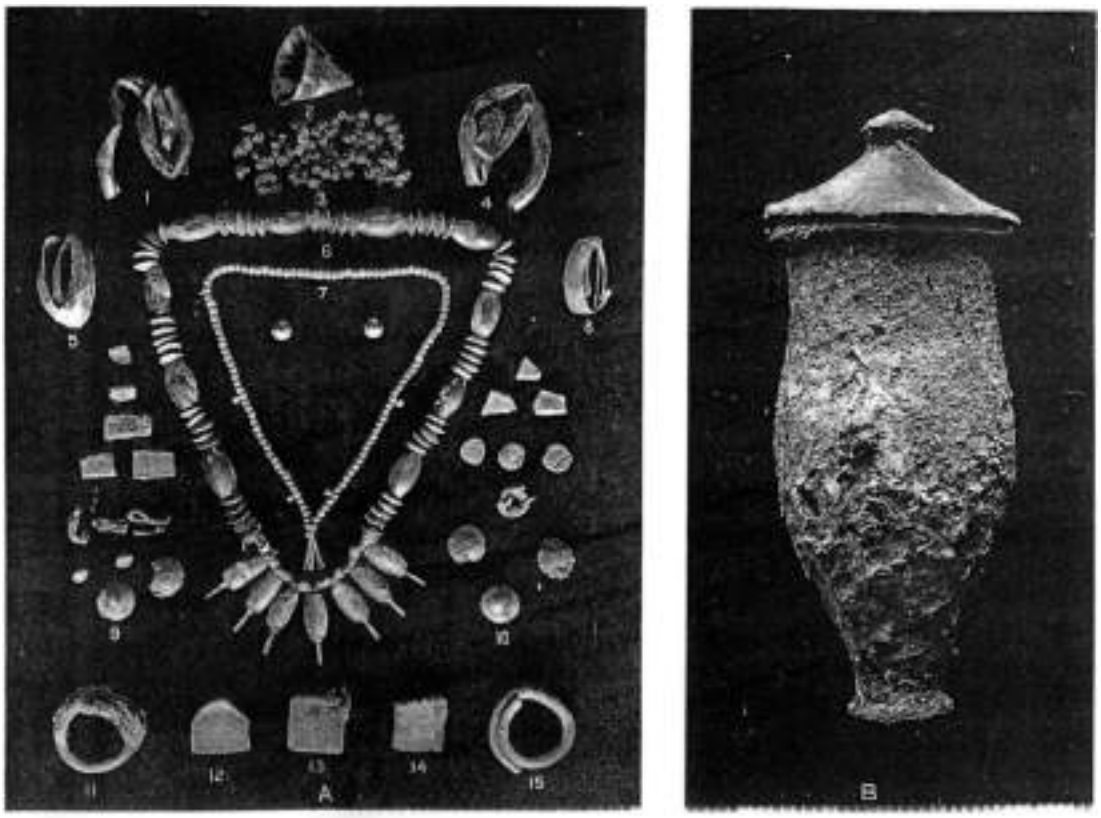
Chanhu-daro, Pl. LXXIV. Copper aqnd bronze tools and utensils: Harappa_ Culture. Items 1 and 1a are two sides of a blade incised with an inscription

Chanhu-daro, Pl. LXXV.Copper and bronze implements and utensils: Harappa_ Culture.



Chanhu-daro. Pl. LXXVI. Copper and bronze implements and tools: Harappa_ Culture.

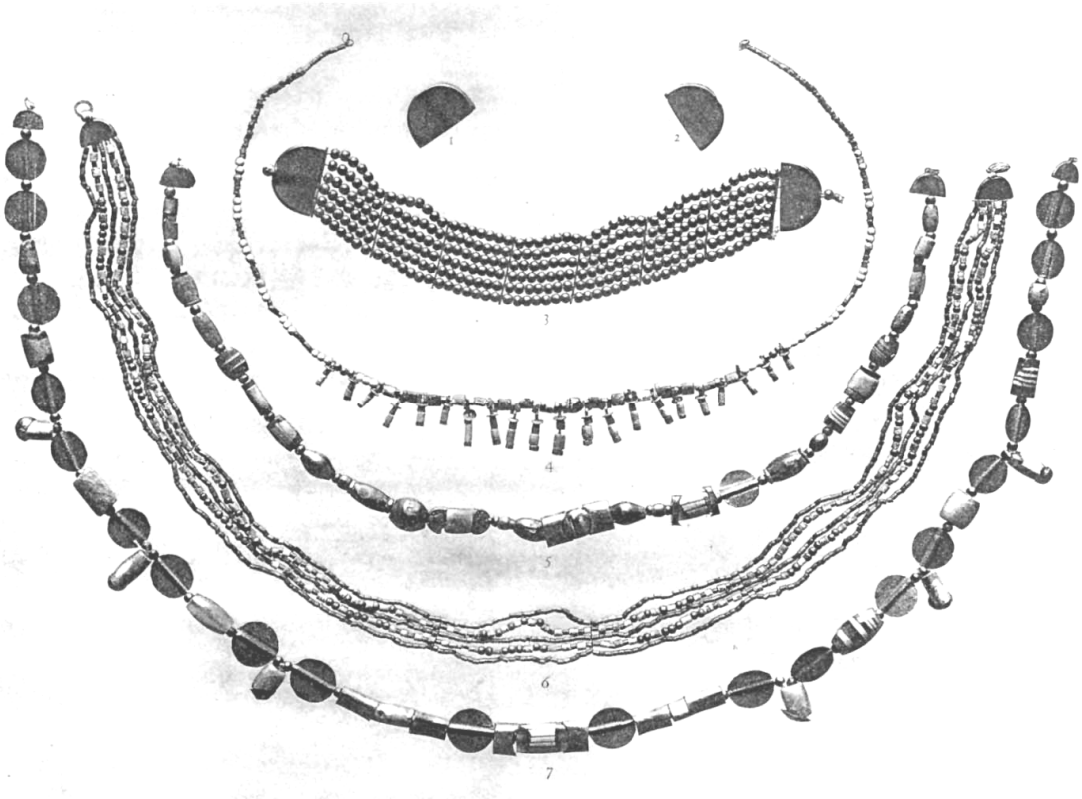
MIC, Pl. CXLIV. Copper and bronze figures and other objects. Items 5 and 6 are two views of a bronze, unpolished, of the 'dancing girl' bronze statue.



MIC, Pl. CXLVIII. Gold jewellery and silver vase.

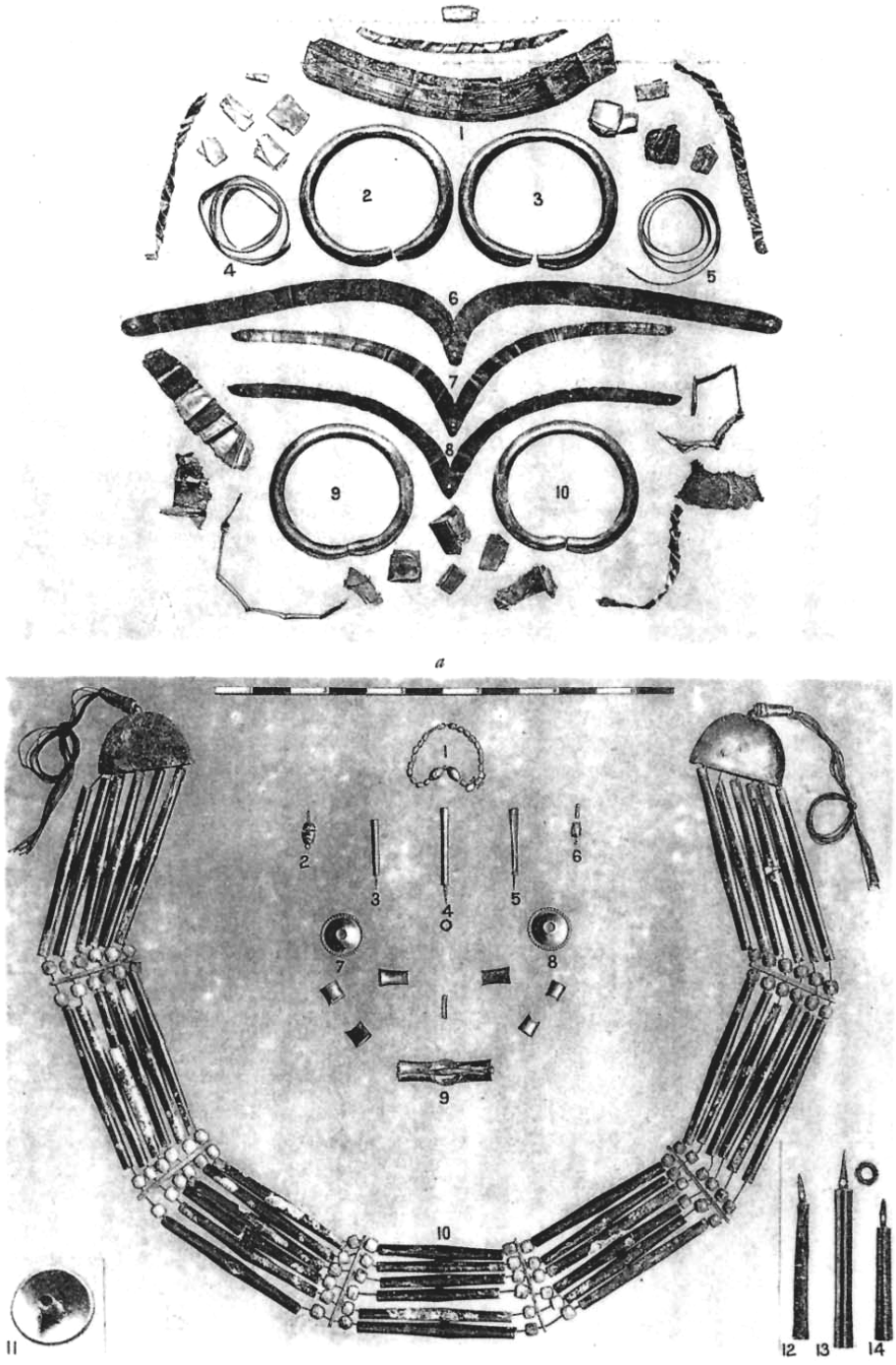
Harapa. Terracotta figure; necklaces adorn the figure. [After Fig. 7.23 in JM Kenoyer, 1998].

Straight and curved gold fillets; beaded choker; thirty hollow cap-shaped gold ornaments with tiny hoops on the inside of the tip. [After Fig. 7.38 in JM Kenoyer, 1998]. Fifty-four smaller gold caps were found in a hoard at Harappa that may have been sewn onto clothing or a belt; one bearded male terracotta figure is shown wearing a skirt or wide belt covered with conical projections which may be this type of gold caps.

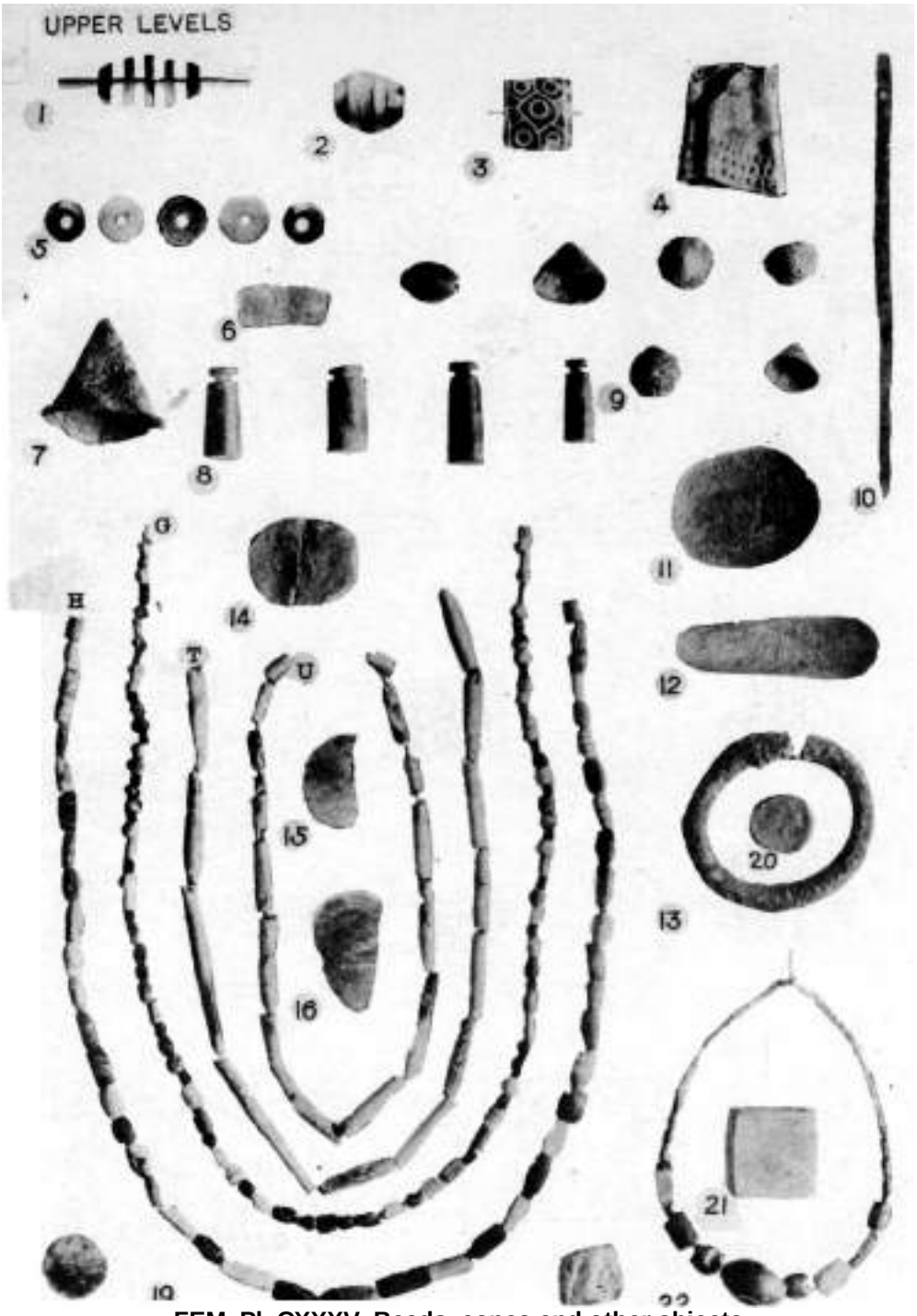


MIC, Pl. CXLIX. Jewellery.

MIC, Pl. CL. Stone beads.

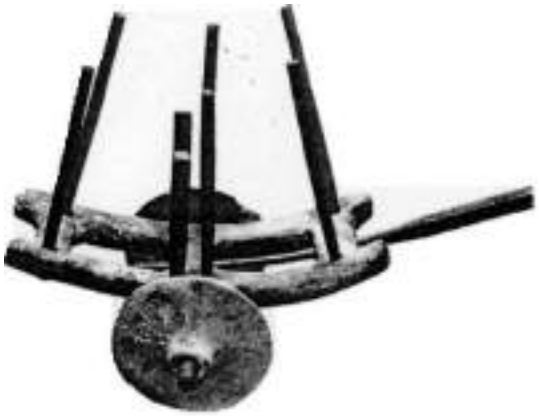


MIC, Pl. CLI. Jewellery.

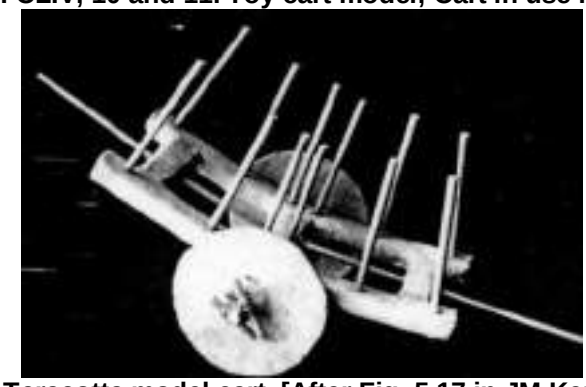


FEM. Pl. CXXXV. Beads, cones and other objects

FEM. Pl. CXXXVI. Beads,. Amulets and other objects



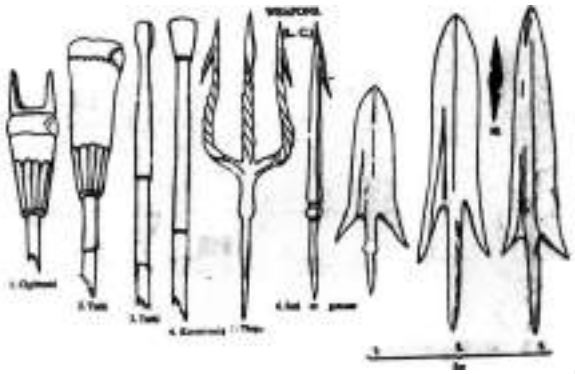
MIC, Pl. CLIV, 10 and 11. Toy cart model; Cart in use in Sindh.



Nausharo. Teracotta model cart. [After Fig. 5.17 in JM Kenoyer, 1998]

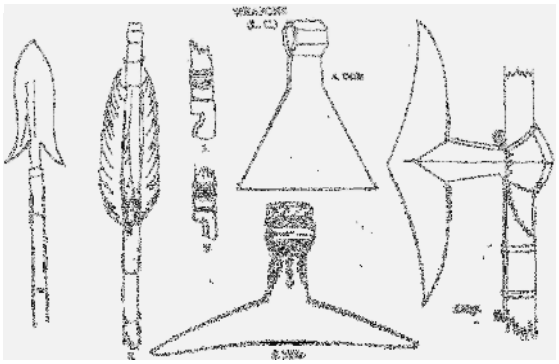
Chanhu-daro. Pl. LVIII. Toys: Harappa_ Culture.

MIC, Pl. CLVIII,1. Pin-head with a deer motif and dotted circles on the body.

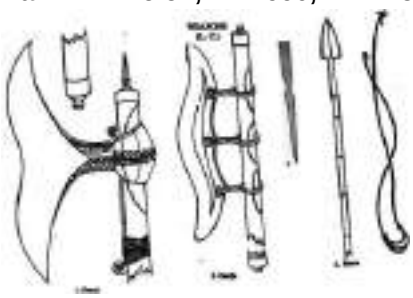


1.Cigithuthi; 2. Tuthi; 3. Torhi; 4. Kundritorhi; 5. Thopa; 6. Suti or gatusar; 7,8,9. sar [After Pl. II in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

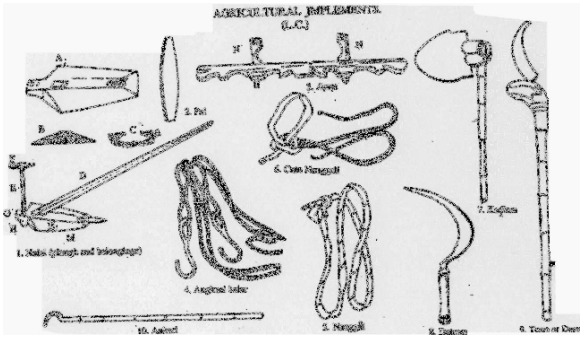
1 to 3. Sar; 4,5. Tabla; 6. kapi [After Pl. III in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

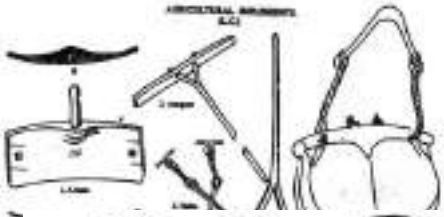


Pharsi; 2. Gan.d.a; 3. Barca; 4. Dhelkusi [After Pl. III in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

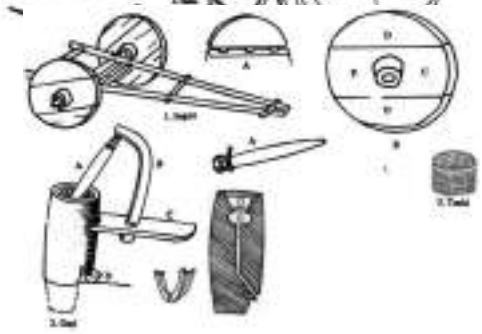


1.Naial (plough and belongings); 2. Pal; 3. Ar.ara; 4. Angkusi baiar; 5. Nanggal; 6. Cutn Nanggali; 7. Kudlam; 8. Datrom; 9. Tono or Duru; 10. Ankari [After Pl. XIII in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]



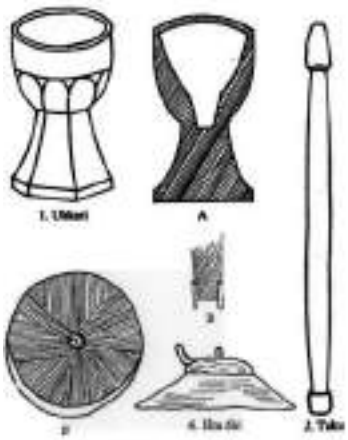


1. A Kara; 2. Atargom; 3. Halka; 4. Kara dand.a; 5. Bai^sli [After Pl. XIV in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

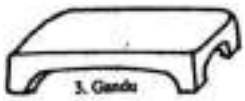


1. Sagari; 2. Gar.i; 3. Tunki or Dali [After Pl. XV in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

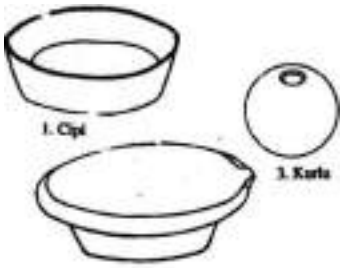
1. Uhkari; 2. Tuku; 6. Ja^ta diri [After Pl. XVIII in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]



Janum urung cimta; 3. Bai^t.hi; 4. Marang Katu; 5. Huring Katu; 6. Kond.e; 7. Hake [After Pl. XX in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

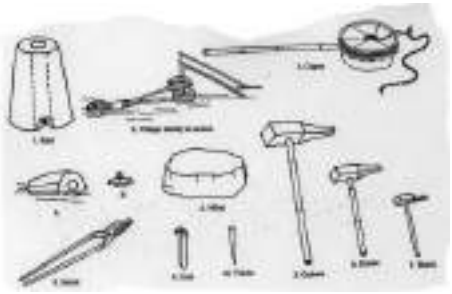


Gandu. [After Pl. XXI,3 in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]



1. Cipi; 3. kurlu; 5. Dia [After Pl. XXV, in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]

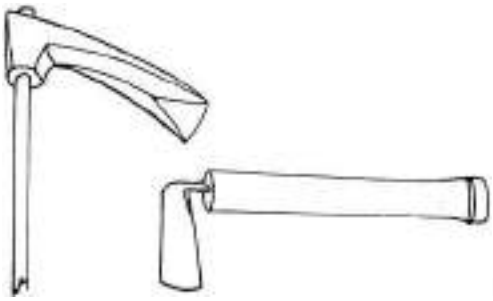
Holad.



Smelting furnace, blacksmiths: 1. Kuti; 2. Use Capua; 4. Nihai; 5. Gahana; 8. Sarasi; 9. Ceni; 10. Tokna John Hoffmann and Arthur *Encyclopaedia Mundarica*,

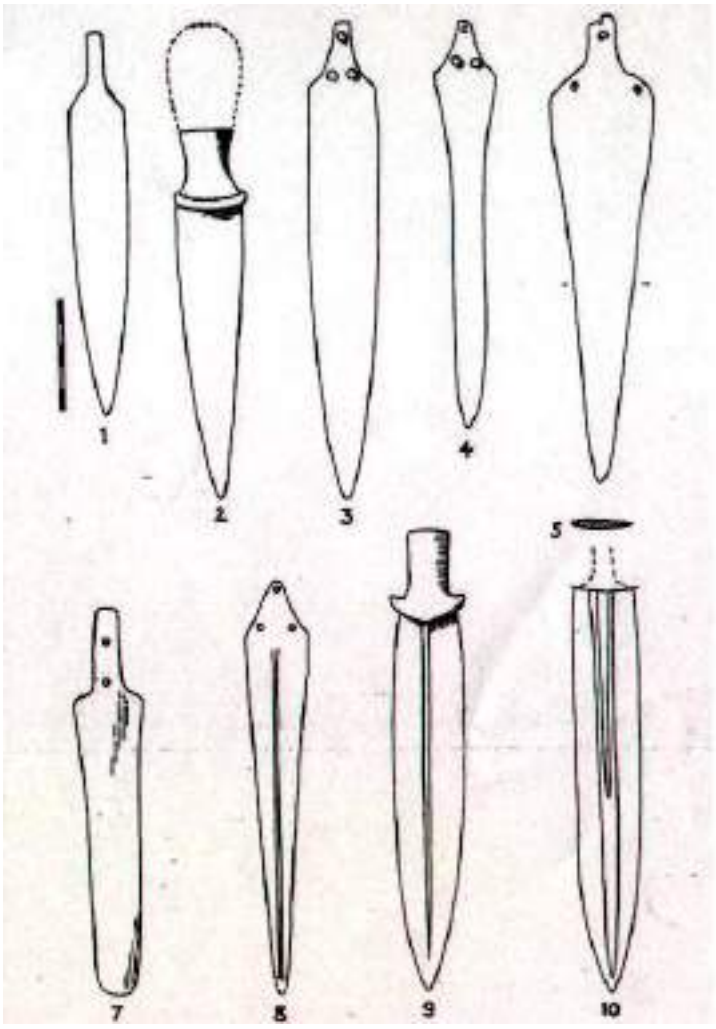
implements of of bellows; 3. 6. Kotasi; 7. Maria; [After Pl. XXVI, in: Van Emelen, 1990, Vol. XVI]

Dancing (Paiki = sword dance) implements and weapons: 1. Susun-sota; 2. Susun-Kanda; 3. Tela-sota; 4. Piri [After Pl. XXX, in: John Hoffmann and Arthur Van Emelen, 1990, *Encyclopaedia Mundarica*, Vol. XVI]



Kurpi

Bronze age artifacts in areas neighbouring Sarasvati Civilization



Types 1.5, 7.10 Daggers and swords; Type 1. Tepe Sialk. Ghirshman, Fouilles, I, pl. LXXXV, S.127; Type 2. Ur. Woolley. Royal Tombs, pl. 228, U. 9121; Type 3. Ur. Woolley, op cit, pl. 228, U. 9117; Type r. Ur. Woolley, op cit, pl. 228, U. 8108; Type t. Soli, nr. Mersin. Luschan, Globus, LXXXII (1902), 297,3; Type 7. Not illustrated; Type 7. Chagar Bazar. Mallowan, Iraq, IV, 2 (1937), Fig. 13,4; Type 8. Ur. Woolley, Royal Tombs, pl. 228, U. 8140; Type 9. Ur. Woolley, op cit, pl. 228, U. 14222; Type 10. Ur. Woolley, op cit, pl. 228, U. 12479.

Type 1. This is the most primitive form of western Asiatic dagger, but until the blade was strengthened by thickening or a midrib down the centre and rivets were introduced, it cannot have been a very efficient weapon, and must often have buckled upon impact...The dagger from Tepe Hissar, however, shows traces of the V-shaped overlap of hilt and blade. It is interesting that this type, which first appears in those levels of Tepe Hissar and Tepe Sialk when smiths were beginning to cast in an open mould, was not confined to the Prehistoric period, and than an example from Nuzu is dated as late as the Third Dynasty of Ur or First Dynasty of Babylon. In western Asia the geographical distribution extends to Persia, Turkestan, the Assyrian Eastern Provinces, Babylonia , Asia Minor, the Caucasus, and Cyprus and it seems probable that on the Asiatic mainland the type originated in the highlands of Persia and spread to the river valleys in the Jemdet Nasr period or earlier when the inhabitants of this area became acquainted with the technique of metalworking and were able to obtain supplies of copper from the Zagros mountains or Cilicia...In the early third millennium the remarkable similarity of metal types all over western Asia suggests that smiths in different areas were in close

contact with each other and that there must have been a centre situated in a metalliferous area where the smiths could learn their trade, and then once the technique was mastered could return home and invent local types. Cilicia, with its long tradition of trade in metal and metal objects, has been suggested by Smith (Early History of Assyria, 57 ff.) , while Frankfort (Archaeology and the Sumerian Problem) has stressed the importance of the Caucasus as a metallurgical centre in the Early Dynastic period.

Against this view Jessen (A.A. Jessen and B.E. Degen-Kolvalevski, Iz Istorii Drevney Metallurgii Kavkaza, Moscow, Leningrad, 1935. English summary in Georgica, 1937, nos. 4 and 5, pp. 312 ff.) in his study of the ancient metallurgy of the Caucasus (in view of the fact that there is as yet no evidence that Caucasian copper ores were being worked as early as the first half of the third millennium, although this is probable), believes that it cannot be strictly established that the earliest metal objects found in the Caucasus were produced locally, and that it is not until later, in the second millennium, that the district attained its full importance as a centre for metalworking. The fact, however, that simple tanged rivetless daggers are found in the Kuban-Terek region at Novosvobodnaya (Carskya), Konstantinovka, and Privolnoe is not surprising in view of the widespread distribution of this type alll over the Near East, and Childe, in his summary of recently published Russian evidence, concludes that the foundation of a local school of metallurgy in northern Caucasia begins in Period II (Schmidt's Middle Kuban period, ca. 2300-1600 BC0, when 'hammer-pins and other ornaments decorated in cire perdue in imitation of filigree work, narrow flat celts and flat rivetless daggers' are found. The extent of Mesopotamian influence on the Caucasus region in Period I is difficult to determint, but the available evidence suggests that it undoubtedly existed in or soon after the Early Dynastic period. A final solution mus tawait the results of further excavation, especially in the Kuban region.

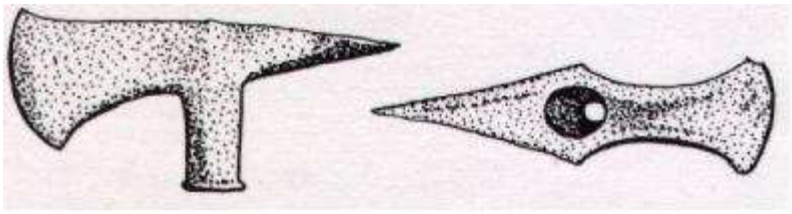
"Type 2. Flat blade, pointed; slightly convex sides; tang with one, two or three rivets. This type represents an improvement on Type 1. Whiel the blade remains leaf-shaped and only slightly curved in section, the rivets in the tang ensured that the hilt and blade remained securely fastened together when the weapon was used in combat...On the Asiatic mainland most of the examples date from the Early Dynastic period, and there are many examples from Cyprus dating from as early as E.C.I (ca. 2700 BC), but the type remained in use until the middle of the second millennium. On the present evidence it seems to hae died out in Babylonia after the Sargonid period. Yet this form of dagger, which must have been evolved by an Asiatic craftsman in Early Dynastic times, is found later in Syria, Phoenicia and even Asia Minor as well as in Persia and the Assyrian Eastern Provinces...The popularity of this type of Asiatic dagger in Egypt during the Hyskos period, coupled with its occurrence in a Hyskos context at Ras Shamra, shows that the metalsmiths working in Egypt were not averse to copying a common Asiatic form which remained in use alongside the more elaborate types which belong to the Hyksos period in Egypt...

"Type 3. Flat balde; slightly convex sides; three rivets; shoulders sloping to narrow tang. In this type the arrangement of the rivets shows an attempt to ensure that the blade did not break off from the tang on impact. The tang is therefore shorter than in Type 2, and the blunt point on some of the extant examples may be due to lack of sharpening or, alternatively, may show that the blade was used as a tool where only a sharp cutting-edge was needed...Like Type 2, it is probably Sumerian in origin, and subsequently spread into Palestine, Syria, Phoenicia and Cyprus. As yet no examples are known from Persia or Asia Minor...

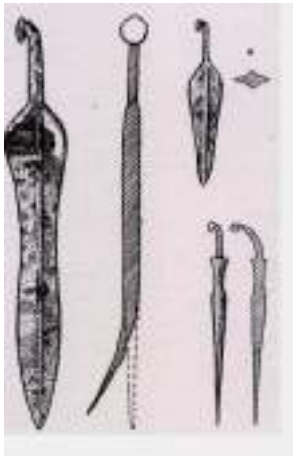
Type 8. Pointed blade with curved shoulders; straight sides; triangular-shaped tang with three rivets; raised midrib down centre of blade. This is a technically advanced type, as is shown by the strong midrib, the arrangement of the rivets, and the straight sides. Typologically it is a logical development from Type 3. There would be no danger of the blade buckling on impact, and the leaf-shaped blade forms which may have sometimes proved a disadvantage (owing to the difficulty of withdrawing the weapon quickly) were discarded in favour of this narrow straight-sided form...As yet there are few extant examples of this type of dagger in western Asia outside Sumer...the fact that the Sumerian examples are probably earlier than the Cretan need not lead one to suppose that the idea originated only in Sumer...

"Type 9 and 10. Leaf-shaped blade; single or multiple ribbing down centre; bronze guard, separate from the blade which is socketed to take the wooden handle. Standard Royal Cemetery type, including most of the gold examples.

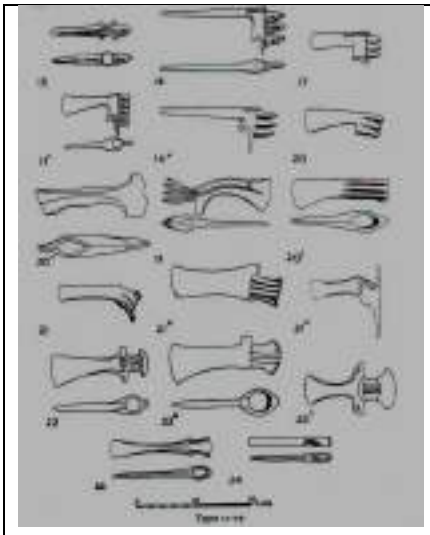
"The leaf-shaped blade was also strengthened by a midrib or longitudinal blood-rills and on present evidence Type 9 seems to have been more popular in western Asia than the straight-sided Type 8. The earliest examples of Type 9 are from Babylonia, and the type probably spread into Iran at the end of the third millennium, where it later developed into a short sword.""(Maxwell-Hyslop, Rachel, Daggers and Swords in Western Asia, in: *Iraq*, Vol. VIII, 1946, pp. 1-65).



Tepe Hissar; from the 'Burnt Building' in level IIIB, ca. 2000 B.C. after Schmidt; combination of the basic forms of an axe and adze produced the axe-adze. Similar instrument was found in the reign of Shalmaneser III, ca. 850 B.C. Typical trough-sprouted vessels found at Tepe Hissar are similar to the types used in the karum at Kultepe in Cappadocia. Use of lead vessels is also paralleled in Kultepe, ca. 1900 B.C. [Kultepe is the place in Anatolia, with tin mines, see Yener's notes.]

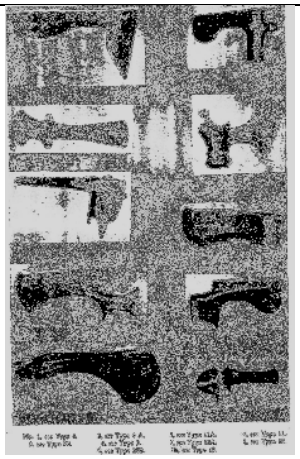


Hissar III B dated a little before 2000 B.C. yielded the skull of a horse; the horse was domesticated at Shah Tepe much earlier, thus long anticipating the first appearance of it at Boghazkoy in Central Asia Minor in the early Hittite period. (Mallowan, p. 123).

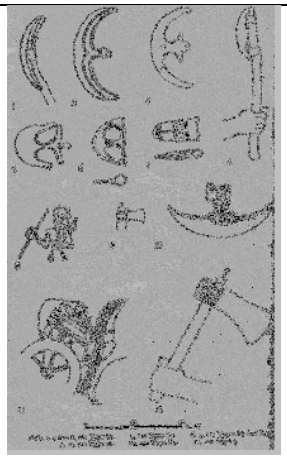


West Asia axes, Plate XXXIV

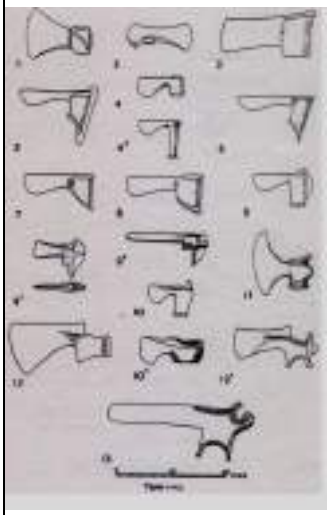
West Asia axes, Plate XXXVII



West Asia axes, Plate XXXVIII



West Asia axes, Plate XXXIX



West Asia axes, Plate XXXV

West Asia axes, Plate XXXVI

Tepe Hissar, ca. 2000 B.C.: spears with medial ribs and ridge-stopped tangs (Mallowan, Ill. 133) Tepe Hissar yielded gold, variegated jewellery, copper and silver vessels, many varieties of beads, among them much lapis lazuli; perhaps, Hissar was an entrepot in trade with taking the stone from the mines of Badakhshan.

Spears with medial ribs have parallels from Carchemish and Ugarit in north Syria dated a century before 2000 B.C. Such spears do not appear to occur in Mohenjodaro or other Harappan sites

(Plates from: Rahel Maxwell-Hyslop, Western Asiatic Shaft-hole axes, in: *Iraq* XI, 1949).

"...there are few reliably dated examples and the fact that many types of bronze axe remained in use over several centuries shows how unwise it is to attempt to date these axes by typological analogy.. The question of craftsmen's guilds also needs consideration and many isolated examples of certain types can almost certainly be explained by the activities of individual members of these guilds travelling along the Asiatic trade routes. In the ancient East presumably the same conditions were enjoyed by metalsmiths as to-day are found among the Sulaba_, the travelling blacksmiths of the desert who are granted a certain immunity by the Beduin and can trespass on tribal land on account of their useful activities. If in periods of invasion and war metalsmiths were the only people able to travel easily, this may explain the curious distribution of some of these types of metal axe.

"It is clear that the vexed problem of the Luristan axes cannot be solved until many tombs containing axes associated with material than can be closely dated, have been properly excavated and recorded. In the vast amount that has been written on Luristan bronzes there is still extremely little dating evidence evidence, and in this study I have attempted to relate certain Luristan axes to those Asiatic types of which stratified samples exist...

"Simple shaft-hole types: Type 1 Shaft-hole axe with wide splayed blade and cutting edge parallel to the shaft; Babylonia: Jamdat Nasr (Mackay, pl. LXXV, Jamdat Nasr period (ca. 3200-3000 BC), Al'Ubaid (Childe, in ESA, IX, Fig.3. Painted clay model. Early Dynastic Period (ca. 3000-2700 BC), Eridu (RLA, 2, Taf. 63, Clay model), Lagash (De Sarzec, Decouvertes en Chaldee, Pl. 45, 6. clay model. Early Dynastic period (ca. 3000-2700 BC), Ur (Woolley, pl. 223, U. 15314, Early Dynastic III Period (ca. 2700-2400 BC); Anatolia: Bogazkoy (Przeworski, M.A., Taf. XI,4) (Plate XXXIV, 1) The technique of casting a single axe blade with with a vertical socket for the shaft made in one piece with the blade must have been known as early as the Al'Ubaid period, although there are no metal socketed axes of this period extant. But we have models from Al'Ubaid and Jamdat Nasr and these show that smiths could produce a simple type of shaft-hole axe with an oval-shaped socket and a wide straight edged blade. Round sockets are found on double axes of stone from Al'Ubaid levels at Arpachiyah and on a clay model of an axe, probably of stone, from the site of Al'Ubaid itself. The primitive shaft-hole form with oval-shaped socket is confined to Babylonia and the only example outside this area comes from Bogazkoy (Plate XXXIV, 1)

"Type 2 (Anatolia: Ahlatlibel. T.T., II. Ab.354 and 383. Bittel in A.F.O., XI, 12936, Fig. 7, pl. 2)(Plate XXXIV,2). In Anatolia the earliest metal shaft-hole axes are two copper examples from Ahlatlibel which have been dated by Bittel to ca. 2500-2000 BCE. The blade has convex sides and splayed cutting edge and is pierced by an oval shaft hole. There is no attempt to extend the socket down the shaft and the butt of the blade is curved and could have been used as a hammer. It is not a form well suited for casting in metal and the smith must have had a stone prototype in mind. In the Early Dynastic and Sargonid periods in Babyloina the socketed bronze axe along with the bow and lance became an important weapon of war and the simple form with rectangular blade set at right angles to the shaft hole, as well as the more advanced types 5,6,7 and i (Plate XXXIV, 5-8) is known not only from extant examples, but also from reliefs. The enemies of the Akkadians, the Lulubu, inhabitants of the Zagros mountain sused the same kinds of axes and the products of Akkadian metalsmiths must have been fairly common among the Eastern tribesmen. The two Luristan examples catalogued below may both belong to the Akkadian period and it is worth noting the figure on the rock relief at Darband i

Shaikha_n, near Ho_re_n at the foot of the Zagros mountains who uses a curious weapon (Plate XXXVI, 4), with wide splayed blade and heavy moulding round the shaft hole edges...we know that Akkadian smiths could make shaft-hole axes which were used in warfare as the Lagash relief shows Type 3 carried by a soldier, and at the time of the Third Dynasty of Ur, this type was used again as is shown by the Ur Nammu stele from Ur...Reliefs from Ashurnas.irpal's palace at Nimrud shows the type with blade set at right angles to the shaft and no shaft tube for the socket. It is carried on the king's chariot as a hunting weapon (see Plate XXXVII, 11). But while the Elamites are portrayed fighting the Assyrians with socketed axes, for the Assyrian soldiers the axe was not as important a weapon as the short sword and was used more as a pioneering tool by the Assyrian charioteers who carried it in their weapon carriers. An interesting example comes from Luristan now in the Savory collection (Archaeologia, 88, pl. LXXII, 5). This is a heavy, well-made axe, certainly not made for ceremonial purposes but for use, and Przeworski has suggested that it may be the prototype of the Tall Sifr example. (British Museum, Bronze Age Guide, Fig. 186). The Tall Sift hoard has been dated to many periods from 2000 BCE to 1200 BC, but a date in the Early Dynastic III or the Third Dynasty of UR period is more probable. The weapons are all copper and an adze is very similar to an example from Luristan, now in the Brussels Museum, inscribed with the name of Gimil-sin of the Third Dynasty of Ur. Another axe from Sippar, now in the Brussels Museum, is an interesting, though unstratified example of this type with clearly marked mouldings rond the base of the socket (Plate XXXVIII,6).

Type 3. The blade is long and rectangular in shape and in most examples the socket does not protrude below the level of the lower edge of the blade. Babylonia: Ur (Woolley, pl. 223. U. 11915. Early Dynastic III period (Plate XXXIV.3); Ur (British Museum, No. 118054); Lagash (Sarzec, Dec. en Chaldee, pl. 5 bis. Relief. Sargonid period); Sippar (Brussels. Musees Royaux. No. 0350. Plate XXXVII,6). BMAH, May 1932, p. 61); Tall Sift (British Museum Bronze Age Guide, FIg. 186; Guide to the Iraq Museum, pl. XXIV, IM. 10776); Iran: Luristan (Przeworski, in Archaeologia 88, pl. LXXII, 5. Savory collection); Luristan (BMAH, Jan-Dec. 1946, p. 3, Fig.u); Susa (DPM, I, Fig. 263); Naram-Sin stele (Contenau, Manuel, II, Fig. 469, Sargonid period (ca. 2400-2200 BC); Darband i Shaikha_n nr. Ho_re_n Rock relief (Contenau, Manuel, I, Fig. 47 (Plate XXXVI, 4).

Type 4. (Plate XXXIV, 4, 4b; Plate XXXVI, 13; Plate XXXVII,2). The top of the balde and socket in a straight line: the lower edge of the blade is cut away leaving a narrow width between the junction of socket and blade. (Iran: Tepe Khazineh: DPM, VIII,Fig. 308, Early Dynastic I period; Luristan: Cambridge, Museum of Archaeology, Nos. 34, 910: Plate XXXVI, 13; Tepe Giyan: Contenau, pl. v, 4. Level IV, ca. 2300-2000 BC). The edge of the blade was curved and this shifted the point of impact on the cutting edge. Early examples of this occur in tombs in the Musyan region; the Tepe Khazineh example is associated with 'Scarlet ware' and therefore should belong to the Early Dynastic I period (Plate XXXIV, 4). Metal is not common in these tombs but while the stratification is uncertain, when this example is compared to dated Early Dynastic III types, it seems likely that it should belong to the earlier period. Other examples and variants also from Iran where the type has a long history. Tomb 104 at Tepe Giyan has yielded a similar axe with a slightly longer shaft tube which belongs to Level IV and may be dated to about 2300-2000 BCE.

Type 5, 6, 7 and 8 (Plate XXXIV, 5-8; Plate XXXVII, 1; Plate XXXVI, 5, 6, 15). Type 5: socketed axe with cutting edge on under side of blade and flange at outer edge of socket (Babylonia: Ur. Woolley, pl. 223, U. 1187. Early Dynastinc III period; Woolley, pl. 223, U. 8065. Early Dynastic III period; Kish. Mackay,

Part II, pl. LXII, 1. Early Dynastic III period; Ur. Woolley, pl. 223, U. 11701. Early Dynastic III period; Stele of the Vultures: De Sarsec, Decourvertes en Chaldee, pl. III, bis. Plate XXXVI, 6; Early Dynastic period; Ur. Woolley, pl. 223, A. 2b. Early Dynastic III period) In the Early Dynastic III period, Sumerian metalsmiths developed the socketed axe from the simple Type 3 and by the time Ur cemetery were producing welll-made, technically advanced models in bronze, gold and electrum. Earlier examples at Ur were probably cast in a two-piece mould and the flange on the outside of the socket gave added strength to the shaft. Typologically later types do not show this flange but keep the feature of the tubular collar at the top and bottom of the socket. On the Stele of the Vultures, Type 5B with the flange is shown as well as TYpe 8 (see Plate XXXVI, 5,6). In Types 5 and 6, the cutting edge was on the underside of the blade which was set at an acute angle to the shaft. When compared to Type 3 the effectiveness of these blades seems doubtful, yet they are portrayed on the Ur standard, as carried by Sumerian soldiers and therefore must have been used for warfare. In Types 7 and 8, the cutting edge is shifted to the front of the blade; the shaft hole is broader and Type 8, as shown on the Stele of the Vultures (Plate XXXVI, 5) and the Ur standard, is obviously a serviceable weapon. Important stratified examples of Type 8 come from Til Barsib. Examples of Type 6 from Tepe Ali Abad, near Musyan, are of Early Dynastic date and the unstratified Luristan axes of Type 6 have exactly similar blades and sockets. The Susa example of Type 8 is important for dating purposes. It was found inside a copper vesel with two adzes and a flat axe blade in a level which can be dated with fair certainty to the Third Dynasty of Ur period. The Cambridge Luristan axe (Plate XXXVI, 15) is almost exactly similar and it is unlikely that these Luristan axes and the Iranian example from Kirmanshah (Type 7) are much later than 2100-1900 BCE.)

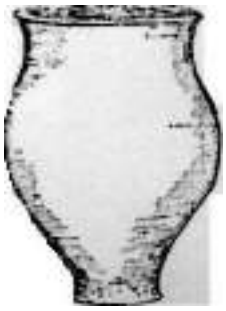
Crescent axes, e-shaped blades and balberds (Plate XXXVII, 1-4, 8). The simple curved blade found at Ur (Plate XXXVI, 1) in the tomb of Queen Shub-aid, can be regarded as the earliest form of both the curved sword or scimitar and the crescent axes and e shaped blades. This blade was fixed to a wooden handle by a rivet driven through the handle at either end and by a band of gold which passed round the handle and was rivetted to the centre of the blade. An inlaid plaque from Kish shows this weapon held by the king in his left hand (Mackay, Part I, Pl. III). In its more developed e shaped form the blade is practically semicircular and has a definite projecting central tang. When riveted to the wooden shaft, two openings would result and this characteristic is found on all the latter axes of this class. Both the e shaped and crescent axes were evidently important weapons of war. A relief discovered at Ur (Smith, Early History of Assyria, Pl. 5, p. 73) certainly contemporary with or earier than the First Dyansty of Ur shows two e shaped axes of developed type in the weapon-carrier of a chariot and later Sargon of Akkad's soldiers use the simpler form (Plate XXXVI, 4). In this style, the axe is portrayed in Egypt on a Predynastic stone vase and was later used in the Twelfth Dynasty period (Scharff, Die Altertumer der Vor-und Fruh-zeit Agyptens 2, Taf. 22, N. 108)...Evidently the idea of making this axe with a socket was of Asiatic origin as on a Twelfth Dynasty painting, where Egyptians carry blades of this type hanted into the handle; the Syrians in the same scene carry a socketed axe (cf. Petrie, T.W., pl. VI, 173).

Bharat, Hurrian, Mitanni

Gordon Childe points to the parallels between Mesopotamian and Harappan cultures. There are references in Hurrian and Mitanni texts to the cultural traditions of Meluhha and later, Bharat which are elaborated in the context of warfare described in the Mahabharata – with particular reference to the ratha, horse-training, arms and armour.

Mesopotamia and Harappa

The wolf in the second panel has a dagger tucked in the belt. The bottom panel shows a scorpion-man being offered two vases by an antelope. Shell inlay from Royal tomb at Ur. In: V. Gordon Childe, 1929, *The most ancient east: the oriental prelude to european Prehistory*, New York, Alfred A. Knopf.



Copper beaker from Harappa [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Fig. 86]. 'Vessels were made of copper, silver, shell, and pottery...One silver vase is cylindrical in shape, while some copper vases resemble tall beakers with narrow cupped bases and splayed out lips. The pottery types include many similar beakers, great elongated piriform jars with very narrow bases and well-formed necks. Some craters stand on pedestals.' (Childe, opcit., p. 207).

'The Indus and Sumerian beakers have an unmistakable family likeness. The cylindrical vase of silver from Mohenjo Daro invites comparison with the alabaster vessels of the same shape from Ur and Susa.' (Childe, opcit., p. 211).

Copper dagger and chisel, Harappa [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Fig. 85]. 'Some of the chisels broaden out a little below the butt, the sides then contracting only to splay out again at the blade.' (Childe, opcit., p. 207).

'The daggers from Harappa, again, belong to the same tanged family as the Sumerian, but to a more primitive stage.' (Childe, opcit., p. 211).

'As a counterpart to the Babylonian constructional methods and artistic motives appearing in Egypt we now have the sistrum (fron an early tomb), the funerary barque, the chamber tombs and the alabaster vases...on the same inlay as the sistrum appears Gilgamesh and on the very same panel a bear! We are dealing accordingly with intercourse between two mature cultures...In any case in material progress and wealth Sumer was far ahead of Egypt. The latter country lacked, for instance, the finer types of metal tool, such as the socketed axe, and wheeled vehicles, and no Egyptian jewelry anterior to the Third Dynasty can compare either for sheer wealth or artistic merit

and technical excellence with that of Shub-ad...The native genius of the people who could invent writing and wheels and harness the ox and the ass will doubtless explain very much...Perhaps the dynasts who concentrated wealth and power in the cities were foreign conquerors...The first prosperity of Sumer was bound up with Indian intercourse.

'The regularity and intimacy of the intercourse with India is proved by the occurrence on Sumerian sites of objects imported from the Indus Valley, the oldest indisputable instances in the world of manufactured goods of precisely defined provenance being transported for long distances from the centre of their fabrication. At Umma, Lagash, Ur, and Kish, in the last two instances in pre-Sargonic deposits, have been found rectangular stamp seals of steatite, in some instances glazed, which agree precisely in shape, material, and design with those found in great abundance in the ruins of prehistoric cities in the Indus valley. Then in the archaic tombs at Kish Mackay found beads of cornelian etched with patterns by an elaborate process. Such beads, to which Ur has now yielded parallels, are in Mesopotamia confined to this one period, but in India they are common and enjoyed a long popularity. Finally from 'Ubaid come fragments of vases made from a rock, identified as the 'pot-stone' which is used still in India for the manufacture of vessels. The survival of such scraps is some indication of the liveliness of commercial intercourse between the two distant lands.

'It has, however, been suggested that this intercourse denotes more than trade. The popularity of mother-of-pearl as a material for inlays connects the Sumerian civilization by one of its most fundamental traits with the south. The legend of Oannes who came up the Persian Gulf to found the first Sumerian city at Eridu and the Sumerian location of paradise in the south point in the same direcdtion. Those who believe that the kaunakes was a palm-leaf skirt can cite the use of a similar garment in modern India and above all its association with the pre-Aryan godess Parnas'avari. Dr. Hall has drawn attention to the resemblance of the Sumerians as represented in their statuettes to the Dravidians of India. And now the discoveries on the Indus have revealed a civilization still more advanced than that of Mesopotamia before the middle of the thrid millennium; there many of the distinctive elements of the Sumerian's cultural superiority existed in a still more developed form.

'Do the trade relations attested about 3000 BC, just continue older ethnic relationships? Were the higher elements of Sumerian culture inspired by India? Did the Sumerian themselves as a conquering minority bring those devices to Mesopotamia?' (Childe, opcit., pp. 196-199).

'The bow was probably already of the variety known as composite; in any case some bows were bound with gold asnd the ends were tipped with curved pieces of copper to which the string was attached. The arrow-heads were normally of metal and leaf-shed, sometimes barbed or four-sided; most are tanged but some have tubular sockets formed by folding the beaten copper. However, one bunch of arrows from the tomb of Mes-kalam-dug at Ur had been tipped with chisel-bladed heads of flint. These were based upon the trapeze, but the edge opposite the blade has been narrowed down into a sort of tail. The shafts were reeds often equipped with little metal prongs, like the spear-butts on a smaller scale, to replace the notch.(Childe, opcit., p. 181`).

'At the one site, Mohenjo Daro in Sindh, no less than ten superimposed cities have been identified, though only the three latest have hitherto been explored. The parallel site in the Punjab, Harappa, was apparently abandoned sooner and the material gathered there is on the whole older than that reached further south. But the high antiquity of the Indus civilization is proved in other ways. Our material is derived from vast cities with regular streets, houses, and temples. But not only is the civilization thoroughly urban, its authors have dwelt in towns so long that they have devised amenities, such as drains and baths, the necessity of which was only recognized in relatively modern times.

'...the alabaster statuettes depicting a type not unlike the Sumerians with prominent nose, thick lips, and receding forehead. The hair was worn long done up in a bun at the back of the head,

exactly as in Sumer. The upper-lip alone was shaves, a short chin beard being allowed to grow. A patterned shawl was worn over the left shoulder and under the right. A kilt or skirt was draped round the loins like the Sumerian kaunakes...And true cotton was grown for the manufacture of textiles...

'(Cities) were regularly laid out with streets, temples, and baths. The universal building material was brick, the bricks being thin and biscuit-shaped (11 in. by 5.5 in by 2.75 in., or 17 in by 8.5 in. by 3 in. at Mohenjo Daro) but kiln fired and set in genuine lime mortar. Bitumen was used as a damp-course in drains and baths. Stone was perhaps used for pillar bases. But wood was employed for floorings as well presumably as for roofs...drains were covered over with a corbelled vault. In one or two external walls niches two to three feet wide and nine inches deep were used decoratively just as in Babylonia.

'Naturally such a civilization subsisted on trade. Copper was imported from the neighbouring highlands to the east or the west, tin from Khorasan or Burma, shells and fish from the sea coasts, bitumen perhaps from Mesopotamia. This trade was facilitated by a system of writing which was still partly pictographic. The signs are found stamped on copper bars or engraved on seals that served to authenticate documents which have perished. A system of weights was recognized which differed from the Babylonian.

'...a copper model from Harappa depicts a two-wheeled cart with a gabled hood over it. Navigation, at least on the Indus, is presupposed in the evidently regular intercourse with the coast.

'The urban artisans were expert in working metals, principally by hammering but also to some extent by casting, and could even make an alloy of copper with from 6 to 12 percent tin. The crafts of the potter, weaver, goldsmith, and jeweller were no less flourishing. Moreover the secret of producing glazed fabrics had been mastered, and beads and larger articles were made of a blue encaustic fayence.

'None the less even in the cities metal had by no means ousted stone tools; chert was used for spheroid mace-heads. At the same time copper was employed for the manufacture of many tools and even for vessels of considerable size and was alloyed with tin where a specially durable edge was required as in razors. Few types have yet been published and the number of weapons is particularly small. We may note here long flat axe-heads and adzes (celts), narrow chisels, tapering daggers with pointed tangs but no rivet holes and straight backed saws with a convex blade. Some of the chisels broaden out a little below the butt, the sides then contracting only to splay out again at the blade...

'The large tanks are supposed to have been connected with temples, that no doubt existed at points where later sanctuaries now stand. Female figurines of clay are quite common and may be votives denoting, as in Babylonia, the cult of a Mother Godess. Of great importance is a fayence plaque representing a female deity sitting cross-legged between two serpent-votaries in attitudes of adoration. There are, moreover, hybrid figures engraves on the seals that have been compared to the Sumerian monsters of the Gilgamesh cycle...In any case the cross-legged deityh between serpent adorants directly anticipates a well-known theme of Indian iconography, and on the seals the pipal-tree is already represented as an object of sanctity...' (Childe, opcit., pp. 203-206, p. 209).

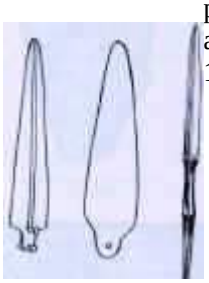
'What looks like a provincial variant of the same culture is coming to light at Nal in the Zhob valley, and at other sites in the hill countries of Baluchistan and Waziristan. But even here the houses were of brick, and boasted several rooms. Though flint implements are more numerous than in the plains, copper was used at Nal too. Axes, adzes, chisels, and daggers, all of the Indus type, have been found, and even copper vessels have come to light...Fractional burials represented at Mohenjo Daro by one example only, were quite common at Nal, though cremation and total interment in the contracted posture were also practices.' (Childe, opcit., p. 21).

Stone vase carved with procession of animals, Erech. [V. Gordon Childe, 1929, *The Most Ancient*

East: the oriental prelude to European prehistory, London, Kegan Paul, Trench, Trubner and Co. Ltd., Plate XX]. 'Among the Sumerian vessels of gold, electrum, silver, copper, alabaster, obsidian, lapis lazuli, and ostrich-shell had ousted fine pottery from the tables of the wealthy, while the friezes of animals painted on the prediluvian clay vbases have been replaced by the processions carved on low relief on the stone vessels.' (Childe, opcit., p. 181).

Circular bas-relief showing a hunt in the marshes. [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Plate XX b.] Note the harpoon. 'The harpoons used in fishing were chisel-ended and single-barbed. They look like metal versions of the tyupe formed by setting a flint lunate obliquely at the end of a reed.' (Childe, opcit., p. 181`).

Golden dagger with lapis handle and its sheath, Ur [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Plate XIX a.] 'The daggers have flat ogival or long triangular blades strengthened witha midrib and extended by a tang projecting from the base. The shoulders are square or steeply sloping. The hilt of wood or lapis lazuli were rivetted to the tan by one, two, or three rivets; the junction of hilt and blade was sometimes covered with a carefully shaped ferrule. This often overlapped the blade, but never curved round it as in early Egyptian specimens, so that the meeting point of blade and hilt formed a straight or even line convex, never a semicircular indentation. For sharpening the dagger warriors carried whetstones suspended from the belt by a ring passing through a perforation at one end.' (Childe, opcit, pp. 179-180).



Sumerian dagger blades, Kish A, and poker-butted spear-head, Ur [V. Gordon Childe, 1929, *The Most Ancient East: the oriental prelude to European prehistory*, London, Kegan Paul, Trench, Trubner and Co. Ltd., Fig. 75] 'The spear was no less typical than the axe in Sumerian armament. The majority oif the actual specimens (of spears) have lanceolate or poker-shaped blades and rectangular tapering butts (whence the name poker-butted spear-head). The butt fitted into a reed shaft which was frequentlyh strengthened with a metal ferrule or casing. Some of the throwing spears were hurled with the aid of a sling. They are accordingly provided with little forks of metal to servfe as notches. Cones of sheet copper perforated with rivet-holes may represent the butt-pieces (sauro_te_rs) of the pikes.' (Childe, opcit., p. 179).

'The Sumerian army as illustrated on an inlay recently discovered at Ur included both charioteers and infantry. The chariots were manned by a warrior and a driver. The charioteers were armed with spears of two types, one designed for throwing, the other for in-fighting. These weapons were carried in a special receptacle, apparently of basketry, in the front of the chariot. The footmen were divided into skirmishers armed with arrows and heavy pikemen who fought in the phalanx, anticipating the Macedonians by three thousand years.These were protected by copper helmets and wore in addition to the kaunakes a cloak of some spotted material hung over both shoulders and fastened at the throat.' (Childe, opcit., pp. 176-177).

'The implements of the protohistorical period were almost entirely of metal which had practically ousted stone in the urban centres. The chisels were long and flat, often with a pointed triangular butt. As a new tool appears the bronze saw. It was equipped with a tang for the handle, and the serrated blade curved away slightly from the base. By this date too the 'jaw-bone' sickle had been translated into metal, and the type with a looped tang for handle is to be regarded as Sumerian...

'The weapons include the battle-axe, the spear, the bow and arrows, the mace with pear-shaped head of stone, and a curious smashing weapon resembling a boomerang-club armed with a copper blade.' (Childe, opcit., p. 176, pp. 177-178).

‘Vessels were made of copper, silver, shell, and pottery. One silver vase is cylindrical in shape, while some copper vases resemble tall beakers with narrow cupped bases and spayed out lip. (Fig. 86)…Harappa yielded an interesting toilet set. It consisted of a pricker, a narrow knife, and a pair of tweezers. The butt of each implement had been hammered out into wire, which was bent back and twisted round the stem to form a loop. This triad of interlaced implements forms an almost exact counterpart to the Sumerian reticules, and show that the idea of the knot-head was familiar on the Indus. Elaborate metal plugs made in two pieces were worn in the ears…The cylindrical vase from Mohenjo Daro invites comparison with the alabaster vessels of the same shape from Ur and Susa. The Sumerian and Indus toilet-sets are in principle identical, and each show the same peculiar construction of the looped head…Motives like the trefoil and the rosette, even religious themes such as monsters, are common to both countries. It is fantastic to suggest that the wheel and carts had been independently invented in both lands…fourth millenniu. Already the Arabian Sea was ploughed by dhows, freighted with the stuffs of Sindh consigned to Babylonian river towns.”(pp. 206-213).

Copper. Lid. 17 cm. Dia. 4 cm. Thick. E2044 Mohenjo-daro. Marshall, 131: pl. CXLII.2: Yule, 1985: 9, no. 64, tabl. 9.64. Yule, P., 1985. *Harappazeitliche Metallgefashe in Pakistan and Nordwestindien. Prahistorische Bronzefunde II.* 7. Munchen.

Haraqppa. Dagger with tapering blade and long tang. Sharpened along one edge and both edges at the tip. Found in a jar thought to be the hoard of a copper merchant. National Museum, Karachi NMP 54.271; Vats 1940: 87, pl. CXXIII,30. 17.9 cm. Long and 4.5 cm. Wide.

Cylindrical vessel. Bronze/copper. Mohenjo-daro. 13.5 cm. 12.5 cm. Dia. NMK 52.1022; DK 11 337. Mackay, 1938: 443, pl. CXVI.3; Yule, 1985: 11 no. 82. tabl. 12.82.

Plates. Bronze/copper. Harappa, Mohenjo-daro. 1. 4.1 cm; 24.4 cm. Dia; Yule, 1985: 5 no. 16, tabl. 6.16; Vats, 1940: 384, note 3; 2. 2 cm. 16.7 cm. Dia; Yule 1985: 8 no. 52, tabl. 9.52.

Bronze/copper cauldron. Harappa.16.5 cm. 25 cm. Max. dia. NMK 52.3214; Vats, 1940: 85.384. note 3.

Bronze/copper. Mohenjo-daro. 28.3 cm X 7.2-10.8 cm. DK 7535. Mackay, 1938: 454, pl. CXXVI.5.

Spear-head. Mohenjo-daro? Bronze/copper. 18.6 cm. Long; 5.9 cm. Wide. NMK 51.987? Mackay, 1938: 459-60.

Spear-head. Bronze/copper. Harappa? 15.6 cm. Long; 4.4 cm. Wide. HM 13317? Vats, 1940: 383-6; Mackay, 1938: 459-60.

Razor. Bronze/copper. 21.4 cm. Long; HM 13.488? Mackay, 1938, pl. CXX.12

Rod. Bronze/copper. Mohenjo-daro. 24 cm. Long; 2 cm. Wide; MM 140: DK 10 781.(1). Mackay, 1938: 473, 483, pl. CXIV.5

Axe-Blade. Bronze/copper. Mohenjodaro. 16 cm. Long; 6-9 cm. Wide; MM 132: VS 1450. Marshall, 1931: 229, 496, pl. CXXXVIII,6

Axe-Blade. Bronze/copper. 17.3 cm. Long; 3.8-5.3 cm. Wide; MM 136: DK 3469. Mackay, 1938: 455, pl. CXX.28

Settlements

"The largest, called city or town (nagara, pura), was an outgrowth of the village (gra_ma, khet.a), and is represented as walled; while the village is a collection of houses around a fort (durga). The village itself is often no more than the natural development of the ghos.a, or 'cattle-ranch', which the king is bound to have guarded, and seems to have converted in favourable places into a small village by erecting a fort

like that around which the gra_ma naturally arose. With this ghos.a, and on a par with it, are sometimes mentioned the small barbarian settlements called *palli_ (palli_ghos.a_h*, xii.326.20)…

"There is no part of Hindu literature so old that walled cities are not mentioned in it. (Va_sis.t.ha Dharmas'a_stra ii.49; Gautama Dharmas'a_stra xvi.32)…Manu (of a king): 'He should live in a city fortified by a desert, by an earth (wall), by water, by trees, by men, or by a hill; but best of all, let him occupy a hill-fort (town set on a hill).'" (p. 123).

Arms of the Vedic and Epic ages

An army camp in ths Epic times was said to be located built near to the city wall (a_yudha_ga_ram vapra_ntam (i.147.13).

"The (army) camp itself (s'ibira or sena_nives'a) consisted of separated tents stored with arms. (Bows, bowstrings, corselets, swords, honey, butter, lac, fodder, arrows, axes, spears, quivers, besides ponderous machines, are prominent among the stores of the camp…Chariots, armed elephants, etc. are in all parts of the camp.) …Watch-words and secret signals by which friends may be recognized are given out before the battle begins (abhijn~a_na_ni or sam.jn~a_h, vi.1.11 ff.)…arsenal: sa_m.gra_mika and a_yudha_ga_ra are the usual terms. (pp. 136-137, p. 178).

"Comparing the Epic and the Vedic ages, we find in the Epic the arms of defense equally developed with those of offense, whereas in the Veda the former seem more deficient, not only in construction but also in number. The Vedic hero rides in a two-wheeled chariot, and his chief weapon (a_yudha) is the bow (dhanvan), not straight, but already bent before use. To this was added one string of leather (jya_), and the arrow (is.u), which was drawn not to the breast but to the ear…other national names are given: e.g. ba_n.a (reed); s'arya, later s'alya (dart). The left hand was already protected with a leather strap. The arrows were feathered, and often poisoned; tipped with horn or metal, and preserved in a quiver (is.udhi, nis.an:ga). Besides this, the warriors had spears (r.s.t.i), and, perhaps, short swords (kr.ti); while to heavenly powers the singers attributed ju_rn.i, perhaps lightning only; and the axe (paras'u), though not disdaining the throwing of rocks. In defense the Vedic warrior carried the 'defender' (varman): a word common to the Vedic and Iranic. This covered his shoulders, and was either made of metal wire or covered with metal, while for the head he carried a helm of several pieces…Such is the picture presented by the Vedic knight, the earliest Aryan warrior (Drawn from Zimmer's *Alt. Leben*, pp. 298 ff.) " (pp. 178-179).

Epic Chariot

A ratha may be for war (sa_m.gra_miko rathah) or for peace (kri_d.a_rathah) (MBh. xiii.53.28).

"When two horses are sufficient, one sa_rathi or charioteer is sufficient also. In the case of four horses (two fastened to the pole, two by straps outside, not tandem: dhur and pa_rs.n.i), we have one charioteer in the middle, who guides the pole-horses, and on each side of him the two drivers of the outer steeds, pa_Rs.n.isa_rathi_…

"Parts of the chariot. Beaneath is he axle (aks.a), to the ends of which the wheels are attached, and above and before which is the charioteer's place, while above and behind is the place of the knight. The 'nest' or box is so intimately connected with the axle that the two are often broken together. (bhaganacakra_ks.ani_d.a_h, vi.71.32). The noiseless running of the axle is praised. (aku_jana_ks.ah (rathah) v.48.28 – Pa_n.in.i uses ku_jana of wheels)…The wheel consists, besides the wooden circle, of the tire (rathanemi, vi.117.54), the spokes (ara), and the hub (na_bhi). The 'place at the spokes' (ara_stha_na) was reserved for knights, high-born attendants of the king, 'who at the master's chariot did mighty deeds in the van.' (vii.34.14; xii.98.28: bhartu_ rathe ca yah s'u_ro vikramed va_hini_mukhe). The tire, which was also called 'fore-circle' (praman.d.ala), appears to be of iron, if we may judge from constant reference to the 'noise of the hoofs and the tires' (ix.9.14015)…The upastha (rathopastha) was the general bottom of the car; the ni_d.a (rathani_d.a) was the little shelf in front where the charioteer stood. (That the driver has a seat is indicated by the term bandhura or atibandhura [vii.96.31; iii.241.31) handed down from the Vedic age, here as the seat of the driver, while (if one exists) the knight's seat is called talpa (vii.192.68)]…

"The chariot gives the honourable title of rathin and atirathin to the knight. According to the opening of the war, the knights are classified as 'those that have chariots,' 'superior chariot-men,' 'very superior chariot-men,' etc. [These terms were also employed as proper names. Adhiratha, a_dhirathi, Atiratha (vii.134.13,11; viii.51.68; vii.132.6: 133.44), were at first those skilled in driving 'on the car.' Proper names are also made by forming ratha into the end of a compound, as Vr.karatha (na_ma bhra_ta_karn.asya), vii.157.21]…

"There appears…to have been a guard of some sort round the car in the Vedic period; and in the Epic we may probably translate the 'guard' (varu_tha) in this way, though it also means an over-shield…The 'pole of the car' (ratha-i_s.a_), or commonly the pole alone (ku_bara), is fastened to the box of the car (ka_s.t.ha), and to the double yoke (yuga) that crosses it, and (dhur) rests in turn on the necks of the steeds. (yugam.dhara – yoke-holder vi.1956C; dhur = load, either pole or half-yoke). The fastenings of the yoke (like the general cakrabandha, rathabandha) are termed yoktra, fastening yoke and pole, or sam.nahana, 'joiners,' and all appear to be of lelather, as do the reins (ras'mayah), and are gilded, so that they 'shine like the sun,' with the gaudy rest. When a distinction is intended, i_s.a_ is the lower, ku_bara the upper end of the pole…

"The standards and flags of the war-cars, dhvaja, ketu, pata_ka. These bear an important part in battle, for they are the rallying points of either party, and the standard of a great knight is well spoken of as the upholder of his whole army…Arjuna carried 'an ape with ferocious mouth and a lion's tail,' and had flags besides; Karn.a had a hastikaks.ya_; Dron.a, a steer; still others bore peacocks, boars, elephants, sometimes bearing bells of silver or of gold; and one knight has a silver boar in a gold net. (Arjuna has one sim.hala_n:gu_lam ugra_syam va_naralaks.an vii.105.8…The govr.s.a is S'iva's sign (vr.s.adhvajah); the boar, Vis.n.u's)…Karn.a is distinguished by a symbol called kaks.a_ or kaks.ya_: I think, a tiger…

Arms in a chariot

"The car…was an arsenal, holding a complete assortment of arms in large numbers…More specific is the account given in the following (viii.76.17): 'Six ayuta_ni of arrows, numberless darts, hammers, spears, knives, bhallas (also

arrows) – which not even a wagon drawn by six cows could carry (s'akat.am s.ad.gavi_yam) – are here left under the care of one warrior. 'With darts (54.7, vis'ikha, vipa_t.ha; 29, pr.s.atka) and handguards, with quiver and horn and banner, with brest-plates, diadem, sword, and bow,' is the description of a knight in his car (iv.53.9)…A hundred quivers, besides clubs, s'ataghni_s, bells, spears, spits, darts, bows, are I a car with a varu_tha (viii.11.8)…

"[War-car]'Harness up (sajji_kuru ratham), the saint cried; prepare quickly thy chariot called the war-car, with weapons and banners, with a spear and a gold staff (yas.t.i), noisy with the sound of bells, furnished with ornamental doors (yuktas toran.akalpanaih, 31), gilded, supplied with hundred of arrows; this was done, and the king placed his wife at the left of the pole (va_me dhuri), and himself at the right, and laid within the car the goad, sharp-pointed, made of three sticks' (tridan.d.am vajras'u_cya_gram pratodam tatra ca_ dadhat) – for this was another naraya_na, and the king and his wife were forced to drag the car for a great saint. (sam.gra_miko rathah and kr_d.a_rathah, xiii.53.28 ff.)…

"…we find in a list of parts of chariots, besides those already discussed, the dan.d.aka, apparently equivalent to yas.t.i, the banner-staff; the jan:gha_, probably the aks.ajan:gha_ or 'axle-tree'; and das'ana, perhaps the spokes (unless the harness in general is meant)…

"The charioteer, su_ta, sa_rathi, yantar, niyantar, rathayanta_rau, pa_rs.n.iyantar, pa_rs.n.isa_rathi_, abhi_s'ugraha (viii.32.19), rathava_haka, rathin (abstract, sa_rathyam): the car held one or three charioteers…

The chariot-steeds

"The most popular war-steed is the horse (as'va, haya, turaga, rathava_ha, va_ha etc.). Mules were, however, often employed, and seem to be admired especially on account of their great speed. [Two best horses are reckoned equal to four best asses in making a bargain: iii.192.51]. Camels are used as steeds only in peace; elephants, only when ridden…The most famous horses come from the Sindh country or from Kamboja; of the people of the latter country the pseudo-Epic speaks as among the finest horsemen…Saindhava alone means a horse, as well as a man of Sindh. Nearly as famous appears to be the steed of Balhi. (ba_lhika, ba_lhija_ta, i.221.51; v.86.6; R. i.6.24)…

"The reins and goad (the latter, of three pieces) have been already spoken of…Besides the straps of the harness, the horses sometimes wore leather robes and a net, probably as armour. So also a wooden breastplate seems to have been worn. Such is perhaps the uracs'chada (vii.23.36). The bridle-bit (valga_ for ras'mi – vii.27.23; ratha_c caturyujo hemakhali_nama_linah, i.198.15)…

"Mules are used in war…Black-haired mules in a white chariot make a princely gift. (dadya_m s'vetam as'vatari_ratham yuktam anjanakes'I_bhih, as'vatari_bhir yuvati_bhir va_, viii.38.5 ff.) The ass, gardabha, is yoked to a ratha, but here a peaceful wagon is meant; the ass is goaded on the nose as the man walkes beside it (xiii.27.10). Generally when a long journey is to be performed with great speed, mules or asses are taken. In one case a wagon, ya_na, is dragged by mules going fourteen yojanas a day; and some black-necked huge-bodied asses' fly a hundred (yojanas in a day), a feat performed by Nala's horse also. Asses fattened like camels (also used for draught, xv.23.1 ff.) on various nuts, and brought as tribute with camels and horses, are mentioned (ra_sabhayuktena syandanena_ 'suga_mina_ tvaritam gatva_ -- i.144.18-19)…

"rathayuddha (vii.103.23 ff.). 'Then much enraged, and licking his lips, he looked, but found no spot on the foe's body not protected by armour. Nevertheless he shot; with sharp, well-delivered, deathlike arrows he rendered lifeless the steeds, and slew both the side-drivers; he cut the foe' bow and his qui9ver; he cut off his hand-guard (hasta_va_pa). Then the ambidextrous knight proceeded to destroy the chariot, splintering it with arrows. Next the foe, deprived of his war-car, with two sharp arrows he pierced; pierced by arrows was he through both hand-guards in the flesh beneath the nails. Then the kingly foe was tormented and flight became his chief desire; but unto him in that extreme of need flocked his best bowmen, anxious to rescue (their

king) overwhelmed by the darts of their foe. And the conquering foe they hemmed in with thousands of chariots, with harnessed elephants and horses, with floods of thick-packed footmen; so that neither the knight nor his charioteer nor the chariot was to be seen, for the rain of the arrows and the billows of the people. But the great knight by the power of his arrows broke that protecting array (varu_thini_), and wounded the elephants, now crowding about him. Smitten were the elephants, and smiting they rushed upon his chariot; but firm in all that tumult stood the car.'

"Cavalry. I find in the Epic no word corresponding to this heading, but several for 'horse-riders' (as'va_roha, haya_roha, haya_rohavara, va_jin, sa_din), all meaning 'those mounted on a horse'…Zimmer says that horse-riding is known to the Vedic age, but finds no mounted cavalry in battle. In the Epic age we have, indeed cavalry, but unorganized. (Pa_n.ini gives us a_s'va, but this is not necessarily cavalry). The mounted soldiers are recognized as a body (kulam) apart from others, of course, but do not act together…The arms of the cavalry – men are usually darts only, but we find also spears and knives or short swords used by them. (vii.165.21, sa_Dinah sa_dibhih sa_rdham pra_sas'aktyr.s.tipa_n.ayah sama_gacchan. Compare arms of elephant and horse-riders as pra_sa, mudgara, nistrim.s'a, paras'vadha, gada_, R. vi.52.11)…The riders wore breas-plates and turbans besides their arms. (In viii.(21.23)24.66 (horsemen armed with darts, swords, spears, and wearing kan~cuka and us.n.i_s.a); the khali_na, coverings, etc. of vi.54.59 ff., might belong to any horses)…

"Elephant-riders. The common names for the elephant used in the Epic, gaja, na_ga, dvipa, hastin, Karen.u, Karin, dantin, dvirada, ma_tan:ga, kun~jara, va_ran.a, pota…armed with spikes and iron harness. The tottra, prod, and an:kus'a, hook, are used to urge and direct the beast. To these we have perhaps kan:kat.a to add, as a goad. (vii.187.47 may mean breast-plate or goad)…

[Ankus'a. Elephant-goad. Top. An:kus'a covered with diamonds; part of the decoration on the handle is enamel. South Kensington Museum. After Fig. 14. Bottom: 1. Tanjore XVII. Steel head and wooden handle; 2. Java XVIII. Head only, all steel; 3. Ceylon XVII. Steel head inlaid with brass and silver, wood shaft; 4. Ceylon, head only; steel inlaid with silver; 5. Central India. Carved steel head and shaft with a brass monster on the end; 6. Southern India XVII. Steel head, ivory handle, shaft carved and fluted cylinders of crystal separated by gilt rings; 7. Rajput XVIII. Blackened steel inlaid with gold; 8. Ceylon, head only, all steel; 9. Silver plated head and ivory handle; 10. Southern India. Carved steel head and wooden handle, separated by an ivory ornament; 11. Ceylon XVIII. Steel head, handle painted with

bands of bright coloured lac; 12. India. Steel head, flat shaft and butt forged in one piece; wood covers riveted to the shaft; 13. All steel inlaid with silver; 14. Mysore. Very rough iron forging; 15. Very small, probably made for some mahout's child. Steel socketed with a ring on the back, short wooden handle painted red; the points have been rebated so that it could not injure the elephant. 10 in. long; 16. Central India, XVIII. Steel head, carved ivory handle. [After Fig. 15 in: George Cameron Stone, 1934, *A glossary of the construction, decoration and use of arms and armour in all countries and in all times*, New York, Jack Brussel].

Ankus'a, elephant-goad.1.Leaf-shaped central balde, the curved blade is **shaped like a crocodile**. South India, late 17th cent. CE. 2. Metal an:kus'a; the handle is chiseled all over. North India, late 17th cent. Ce. [After Pl. lxxxii and lxxxiii, GN Pant, 1997].

Ankus'a or elephant goad was a boat-hook in general shape with a short spear and on one side of the head a hooked point. [After Fig. 181 in: Frederick *Wilkinson, Edged Weapons*, New York, Doubleday and Company, Inc.] The ankus'a was the main means used by the mahout or elephant-rider to controlt he animal. These are 19th cent. CE examples. The lower one has a hollow haft enclosing bells which roll and jingle when it is raised. The ankus'a decorated with gold koftgari work, rubies and part is in the form of an elephant's head with eyes of

lying on top is diamonds. The upper onyx. (Wallace *historical guide to Arms* on File, p. 174].

Collection).). [After Fig. In: Stephen Bull, 1991, *An and Armor* (ed. By Tony North), New York, Facts

Weapons

"The arms inevitably first are bow, quiver, and arrow, as one group. [Bow, arrow and breast-plate are the weapons and defense of the early period. Compare Ait. Br. 7.19 (Weber, *Ind. Stud.* X.30), athai'ta_ni ks.atrasya_ 'yudha_ni yad as'rarathah kavaca is.udhanva).

"Bow.…in the Veda, a_yudha is both the general world for weapon and, without limitation, for the bow. (sarva_yudha, vii.175.12; the bow, vi.118.43). More specific names for this weapon are the commonly used words dhanus, ca_pa, s'ara_sana, and (from their material) ka_rmuka, s'a_rn:ga (viii.79.23)… The length of the bow is several times spoken of as ta_la-ma_tra, a 'palm' long, which, when compared with the numerical qualification employed in s.ad.aratni, may probably be interpreted as six cubits in length. But we hear of the bow of a demon being a cubit broad and twelve cubits long…As in the Vedic age, the knight held the bow as high as possible: that is, with the shaft level to the eye, and well forward, pulling the arrow back to his ear…

"Quiver. Is.udhi, 'arrow-holder'…tu_n.a or tu_n.i_ra; nis.an:ga 'hanger,' may be both sword and quiver. Upa_san:ga also means a quiver…kala_pa is the quiver with its arrows, one word comprising both, and often antithetical to the bow (kala_pa_ni dhanu_m.s.i ca)…

"Arrows…of two chief sorts, vain.ava, 'made of reeds,' and a_yasa, 'made of iron.'..The oldest and commonest names are is.u and s'ara (reed). Like the first in meaning is astra, 'missile,' united with it in is.vastra, the bow, and in the expression kr.ta_stra, which, like dhanurdhara, denotes a fine archer, and is an honorary title of a good knight. Like the second in meaning, but of later use, is ba_n.a, a reed, but employed also of iron arrows; while the very common s'alya means the arrow-point, and thence, the arrow as a whole.[Astra and

is.u are each etymologically merely a missile telum. Sa_yaka, arrow or dart, conveys the same idea…Late also is ka_n.d.a, 'joint,' in the sense of arrow [savis.am ka_n.d.am a_da_ya mr.gaya_ma_sa vai mr.gam xiii.5.3…the root of astra gives us further pra_sa, 'a projectile,' also a common synonym of any arrow. Compounds of these words are is.uka_ra, is.va_sa and upa_stra, all rare words, the arrow-maker, the arrow-thrower, the little arrow (?)]…ks.urapra is a knife-shaped arrow; that is, with a blade-head…We have in Dron.a's leadership a list of arrows comprising na_raca, vatsadanta, bhalla, an~jalika, ks.urapra, ardhacandra…(In vii.25.57-58 the sa_yaka is a general term for anything thrown (may be sword or arrow)…vipa_t.ha…arrows…

"Club. This weapon appears to be more used than the sword…Like the bow, the favourite club bears a pet name, as in the case of Kr.s.n.a's kaumodaki_. (kaumodaki_ na_mna_ gada_, i.225.28 the vajrana_bhas' cakrah in 22)…The club is called by severalnames, most commonly musala ('pestle') and gada_…The pina_ka also seems to be a general term for the club, but is usually confined to the weapon of the deity, and may mean a bow, as it is later identified with the trident-spit, s'u_la…But beside these we often find parigha, explained by modern works as a catapult, built in the Epic an iron-bound club flung with the hand…The descriptions of this weapon are generally quite uniform, and amount to a heavy inlaid gold-plated sharp-cornered club of iron girded with spikes…To prepare for a club-fight, one binds up the hair, and fastens on a breastplate and helmet (ix.32.60 ff.)…

"Sword. The Epic age seems to represent the epoch where the bow is yielding to the sword. The latter is known earlier; it is used, but not so much, like the club, as a secondary weapon…Indra presents Arjuna with the bow Ga_n.d.i_va; S'iva presents him with the sword Pa_s'upata… (sword) cast like a javelin…As an illustration of this use, compare the verse: 'he was then overwhelmed by (a number of weapons cast at him, namely), sharp arrows, clubs, pestle-clubs, spears, post-clubs, darts, and swords, all spotless and sharp' (iii.204.24). We may translate khad.ga here as scimeter, and add asi and nistrim.s'a as other common names of swords…The asi may be a sabre (often called maha_si, di_rgha_si, 'long sword') and nistrim.s'a a short sword…The sword-belt (mekhala_) sustained the sheath (kos'a), wherein the sword hung on the left side…The Epic writers represent the sword and other offensive iron weapons as being a special product of the western countries. (ii.51.28, the tributaries give apara_ntasamudbhu_ta_n di_rgha_si_n r.s.t.is'aktiparas'vadha_n, 'long-swords and speards and battle-axes made in the west')… nistrim.s'a is synonymous with asi (sword, viii.13.29-30)…[ku_t.akhad.ga (dagger) is pecular to R. vi.80.4]…

"The sword appears to have been worn at all times, as a fully equipped knight is described as 'bearing a breastplate and arrows, and a sword and a bow.' (vii.111.51: compare R.ii.49.5, tatah kala_pau sam.nahya khad.gau baddhva_ ca dhanvinau jagmatuh)…In the Ra_ma_yan.a (vi.51.18), we have a war-car described wherein were thirty-two quivers, many bows and clubs, and two swords, one on each side, with hilts four hands long, themselves ten hands… [Bhi_s.ma, being asked what the best weapon is for all kinds of fighting (kim svit prakaran.au s'res.t.ham sarvayuddhes.u), replies that the sword (asi) is agryah praharn.a_na_m; the bow is a_dyam. He further makes the sword, asi, the type of justice; the Pleiades are its constellation; Agni is its divinity, etc.]

"Spear. This weapon in its various subdivisions is one of the most important in Hindu warfare…The s'akti was a spear or javelin particularly used as an adjunct to the bow by the warrior in the chariot. Hence it often receives the name of 'chariot-spear.' (Although the Petersburg Lexicon correctly explains the rathas'akti as a 'banner-staff',… the general use is that of a weapon). This weapon is made of iron (a_yasi_ s'aktih, vi.104.30; sarvapa_ras'avi_, 116.52), and is represented as cast after the club-casting had failed (hemapat.t.a_ gada_, the golden-plated club, is flung first; then the s'akti, ibid.)…(sharp and flung weapons): pat.t.is'a and r.s.t.i, the kunta, the kan.apa and kun.apa. " (Hopkins).

The pat.t.is'a may also be an axe…r.s.t.i seems to belong more to the common soldiers, and is perhaps a javelin…kunta has the special addition

of iron and may be a pike used for thrusting…kan.apa…kun.apa…iron projectile (kan.apa, kun.apa are spoken of in i.227.141; vi.57.24; 76.4 ff…they are all on occasion ks.epan.i_ya or missile weapons (vi.76.6). Gos'i_rs.a, in vii.178.23, is probably a spear…In Ni_tipraka_s'a, the ring and cow-horn spear are emblematic of a king)…

"Other offensive weapons…bhindipa_la…missile flung by hand, and is usually associated with darts, hammers, clubs, etc (v.19.3; vi.96.57 ff.; 106.22 ff.; vii.25.59)…tomara is a dart of iron, either straight, or, less often, a straight shaft bearing at the end a hook…Less important missiles are the hammer, axe, spit, and other less definite weapons…hammer, mudgara, if of iron (ayoghana)…the axe, paras'vadha, kulis'a…battle-axe (kut.ha_ra) is Paras'u-Ra_ma's pet weapon. A distinction (unknown) is made between paras'u and paras'vadha (v.19.3; vi.96.57 (ayaskuntaih paras'vadhaih: 46.13:vii.25.59; Ra_ma's axe, xii.49.33; a distinction in paras'u, iii.160.58 (paras'vadha, flung); and in kulis'a, iii.20.34, from paras'vadha, 33. Here N. gives vajra_n.i, thunderbolts, as the meaning of kulis'a_ni. Paras'u is properly nothing but a woodman's axe. Compare R.ii.111.10, drumo yatha_ vane paras'una_ kr.ttah. So da_tra, v.155.7, is merely a sickle.) S'iva's weapon, the trident, is imitated among arms by the s'u_la or spit, a missile of iron, but very effective, and easily cut in tow. The s'u_las'akti is a trident-headed spear. (The last quotation from iii.20.33 ff. mentions gada_, hala, pra_sa, s'u_las'akti, s'akti, paras'vadha, kulis'a, pa_s'a, r.s.t.i, kan.apa, s'ara, pat.t.is'a, bhus'un.d.i_ in a heap. For use stated above, compare vi.92.27; ix.21.24; tris'u_la, trident of S'iva, vii.202.42. Vis.n.u has the cakra and s'a_rn:ga, S'iva the s'u_la or pina_ka)…

"Among projectiles we must reckon the claw-knife or concealed knife (**nakhara**, va_s'i_), besides the simple knife (ks.ura), used as projectile, or as a kind of hand-weapon with which to tear out the eyes of a foe…masses of weap;ons of all base sorts…carried by the infantry (xv.we.r), and by bands of men on elephants. (A list is given in v.155. 'Hair-catchers,' balls of hot iron, sand, oil, pots of poisonous stuff ('snakes'), cords, nooses, concealed knives, etc. Ka_n.d.adan.d.aka may be a regular weapon (trident). Ploughshares (si_ra) are found here, and baskets with pans of coals. The noose, pa_s'a or rajju (cord), is used to throttle the foe. Some such noose seems to be used by the knights as a lasso in viii.53.24 ff., called a pa_dabandha, or na_gam astram, 'snake-weapon'. Comapare this with R. v.46.15, astrapa_s'air na s'akyo 'ham baddhum atya_yatair api).

"Not to be flung, but to be held before one, and to pierce and bore the fo's body, are the s'ala_ka and s'an:ku, said by the commentator to be identical. They are apparently sharp pointed stakes, perhaps of wood (vii.25.50; vi.46.34)…

"A typical sea of weapons is casually presented in the following passage (vii.178.23 ff.): 'they rained upon each other with a stream of weapons – iron clubs, spits, swords, knives, darts, arrows, wheels, axes, iron balls, staves, cow-horns, mortars,' etc. with a last resort to trees torn up, (compare R. vi.55.28; also ib. 61.20)…In this passage, under 'clubs,' we have four kinds mentioned, (gada_, parigha, pina_ka, musala); lances and darts are trebly named (pra_sa, tomara, kampana); arrows are of three names (bhalla, s'ara, na_ra_ca); and there remains the cow-horn and bhindipa_la…and the mortar (ulu_khala); with iron balls that are probably slung or dropped heated on the foe…

"Here we read how the great mass of soldiers drew out in array, and what the arms were: of the common soldiers first, and then specially of the knights (v.155.1 ff.). 'Now the king drew out his forces and divided his eleven armies according to their highest work, their medium ability, and their worthlessness. (sa_ra, Madhya, phalga). Then they advanced, armed and provided with the chariot-planks,' (anukars.a) with large quivers (tun.i_ra), with the 'leather protectors of the war-car,' (varu_tha) with javelins (tomara), and 'quivers for horse and elephant (upa_san:ga), with the foot-soldiers' quivers (nis.an:ga), with metal spears (s'akti), with heavier wooden-handled spears (r.s.t.i), with flags and banners (dhvaja, pata_ka_), with heavy arrows (s'ara_sanatomara, 'avery heavy arrow discharged by a bow' (not a hand-tomara, javelin), with cords and nooses (rajju, pa_s'a), with blankets, with hair-seizers (paricchada and kacagraha…perhaps

paristara should be read and karagraha; in either case the first word is equivalent to a_staran.a, blankets or coverings of some sort; and the second word, if not hair-catcher, is hand-catcher (kaca- is the usual word: weapon cast upon one…a_stara is boomerang); with lighted (?) powder of pitch (sarjarasapa_m.savah), with bell-hung spears or swords (ghan.t.aphalaka, on sword of spear or even shield, perhaps, phalaka is board or blade), with 'water heated by iron balls,' (ayogud.ajalopala) and stones, with spits and spears (s'a_la- or s'u_la-bhindipa_la), with 'missiles of wax melted,' and hammers (madhu_cchis.s.t.a-mudgara), with trident or spiked staves) (ka_n.d.adan.d.a = kan.t.akadan.d.a, or v.1. dan.d.akan.t.aka, same meaning), with ploughshares and darts (javelins) that are poisoned (si_ravis.t.atomara), with 'baskets with which to fling hot balls, and the box containing these balls resting in the baskets' (s'u_rpapit.aka), with hooked-lances (an:kus'atomara (or javelins), with wooden breast-plates (ki_lakavaca or ki_lakrakaca, saws in wooden handles), with weapons concealed in wood (va_s'i_ or va_si_), with 'blocks of wood with iron spikes' (vr.ks.a_dana), with tiger and leopard skins 'for man and war-car', with dart and horn (r.s.t.i and s'r.n:ga: 'r.s.t.i is a hand-missile used among the Dravidians, crooked, with wooden shaft (phalapa)': s'r.n:ga is curiously defined by N. as 'a means of freeing (killing) on ebleeding when smitten with a club; (?) hud.a or hula, in the list of iii.15.5, defined by a commentator to Manu, reading hud.a for gud.a in M. iii.133, as a double-edged sword; but the Epic commentator in iii.284.4 defines it as a privy-horn, mu_tra_dyutsarjana_rtham s'r.n:gam), with crooked javelins, with axes, spades and oil of sesame and flax [pra_sa (bhalla), kut.ha_ra, kudda_la, tailaks.aumasarpis: the last explained as protective oil-cloth], and gilded nets(rukmaja_la).' Such was the array of the Kurus, exclusind the chariot-description following, where we also find javelins, bows, etc.

"These weapons are all retained or discharged by the hand…

"The barbarians are worse than the natives as to their arms, but are occasionally spoken of in an angry way as using un-Aryan methods. What could be more Aryan, however, than the arms poured out upon Arjuna by the barbarians in general (mlecchas)? 'They cast upon him the eared reed arrows, and iron arrows, the javelins, darts, spears, clubs, and bhindipa_las' that the Aryans themselves used. [karn.ina_li_kana_ra_cais tomarapra_sas'aktibhih, musalair bhindipa_lais'ca, viii.81.12 ff.] But we learn that the Kira_tas use poison (and appear to be blamed for it!); that the Ka_mbojas are particularly 'hard to fight with'; that the barbarians generally are 'evil-minded'; that the S'akas are 'strong as Indra' (vii.112.38 ff.); that the barbarians generally use 'various weapons'; that the Ka_mbojas, agai, are 'cruel and bald'; that the Yavanas carry especially arrows and darts; and that the mountaineers, Parvati_yas, are proficient in throwing stones, an art the Kurus asserted to be unfamiliar with (vii.119.14 ff.; 121.14; as'mayuddha, s'ila_yuddha, ib. 31-45.36,32).

"…several foreing excellencies in war-like matters (are grouped) under one head…each nation shall use its own arms. 'Let each man fight according to his native usage. The Ga_ndha_ra_h and Sindhu-sauvi_ra_h use claw-knives and darts (quoits?) (nakharapra_sayodhinah); the Us'i_nara_h are good at all weapons; the Pra_cya_h are excellent at elephant-fighting (ma_tan:gayuddha); they are also deceitful fighters (ku_t.ayodhinah); the Yanava_h and Ka_mboja_h, with those living near Mathura_, are expert in kicking (or boxing? Niyuddhakus'ala_h); the Da_ks.ina_tya_h are especially swordsmen (asipa_n.ayah)' (xii.101.1 ff.)…

Armour and Defence

"The armour described belongs to the knight…skins were used as shields to the chariots, even rhinoceros-hide (kha_d.gakavaca) being so employed…We have a picture of a Hindu warrior, as he stands ready for battle. He is 'armed with a cuirass, and with guards for his hands, and has on his fingers the protector, on his arms the guard against the bow-string.' (iii.37.19; x.7.52, kavacai_ satalatra_n.o baddhagodha_n:gulitrava_n, and dhanus.pa_n.ir baddhagodha_n:gulitrava_n)…of what material

the pieces of defense, mainly shields, cuirasses, and breasplates, were made. We find them seven in kind: iron, copper, brass, silver, gold, wood, hide...

"Varman and kavaca are the usual names of the body-armour. [s'ara_vara(n.a), 'arrow-guard', may be anything that protects the body from arrows, as shields, helm, breastplate, or quiver. As shields, perhaps, in vi.60.17; vii.14.72]… Varman, generally iron, and carman, leather armour, are often mentioned together (vii.148.40; i.194.7)…Next to the varman and kavaca comes the shield, called carman, which is of leather adorned with figures (vi.54.26 ff.); or a simple tiger-skin or bear-skin worn over the body besides the brazen breastplate served as a shield…The shield (that is, hear a real shield, worn as a plate) might have as many as three bosses (carma triku_t.am, xii.166.51 ff. As carma_n.i are differentiatd from phalaka_ni xii.100.9, I prefer to take phalaka here and in x.8.59 as 'sword'.)…

"The helmet (s'irastra_n.a, 'head protector,' with the kiri_t.a, as part for whole) is represented to be of metal and adorned with gems, chiefly the diamond…It is worn over the ear-rings (R.vi.78.16). The little towers called nirvyu_has figure apparently as helmets andmust have been high head-pieces, perhaps a kind of tiara…The commentator defines the word as a weapon. There was a band of cloth, turban, called us.n.i_s.a or ves.t.ana, which was worn with the helmet. (s'irastra_n.a is of gold, iv.55.57; ix.32,63 (ja_mbu_nadaparis.kr.tam); viii.21.27 (susam.naddha_h kavacinah sas'irastra_n.abhu_s.an.a_h); xi.18.18 (s'irastra_n.a_ni). Nirvyu_ha with the sword (sanirvyu_ha_h sanistrim.s'a_h), vii.89.17; v.19.4. Us.n.i_s.a with the helmet (sos.ni_s.am sas'irastra_n.am.. (s'iras) apa_tayat), vii.54.28)…The head with helm and earrings 'looks like a full moon'…Brazen, ka_m.sya, implies brass used quite as much for adornment as for use; and it is quite possible, therefore, that mention of brazen arms must be classed in the same category as that of golden. ('brass and gold' are as noble petals put parallel, as ka_m.syam ca haimam ca sarvam, viii.2.29)…

"The ultimate expansion of the theory of weapons resulted in the theory of war, and this was expanded agin into a theory of polity; and we thus have on one side our modern ni_tis'a_stra or 'system of royal polity,' and on the other the practical instruction in the use of arms or the 'science of weapons.' Thus, in a late book we read: 'he will comprehend the science of weapons, and the different weapons, and the system of polity.' (xiv.66.24. In the later books, the 'system of polity' was so familiar as to be used in proverbs: e.g. adhi_tya ni_tis'a_stra_n.i ni_tiyukto na dr.s'yate, 'not everyone that has perused the works of polity is wise in polity': xiii.164.7. The Agni Pura_n.a gives a dhanurveda (in chapter 248 ff.) The account describes the names, lengths, and methods of using various arms, with the proper employment of forces). A system of war is implied when we read, for example, of the 'system of Us'anas,' 'the system of Angiras' son,' etc. [The general furniture of cars, men, horses, elephants, etc., goes under the name of bha_n.d.a.]…

"The kettle-drum, dundubhi, is often mentioned as accompanied by the bheri_…In the Ra_ma_yan.a it (bheri_) is beaten with a stick…The many kinds of drums and like instruments are shown by groups frequently found, such as this: 'they then brought forth the very loud sound of the pan.ava, mr.dan:ga, dundubhi, krakaca, maha_naka, bheri_, and jharjhara' (vii.39.31). To these we may add pes'I_, also a drum, and pus.kara, as indefinite, defined the same. (vi.47.7-8; 99.17-18)…Quite common also is the muraja, tambourine, but the drum pat.aha is very rare…The usual instrument for trumpeting was the conch-shell, bearing etymologically the same name, s'an:kha, and carried by each chief. Compare this description: 'then standing on the great car drawn by white horses, he blew in his gold-adorned shell – Arjuna blew in his shell Devadatta; Kr.s.n.a, the shell that was called Pa_n~cajanya…' (vi.51.24. The shells of the other Pa_n.d.us have also their names given in the same verse. Bhima's is named Pa_un.d.ra; Yudhis.t.hira's Anantavijaya; the twins', Sughos.a and Manipus.paka.)…A number of new instruments, t.an:ku, d.amaru (with khet.aka), d.amaruka_, etc., meets us in the Puranic period. (Compare Ag. P. 43.27; 50.2,8; 52.24,31 ff.,

etc.)…We find, not one, but a band (gan.a) of musicians singing the deeds of old heroes, and accompanying themselves on the lyre (vi_n.a_), and called vi_n.a_ga_thin (lyre-singer). (S'at. Br. Xiii.4.3.3 and 5; WeberI.8.i.187)…'Sing ye the king or some other braver hero' is the command given to the two lute-players in the course of the ritual (Pa_r. G.S. i.15.7)…the congregational singing (va_n.asya saptadha_tur ij janah: RV x.32.4) shows us that a lyrical beginning is probable, and that not of a late, but of an early period…For sacrifices as important as a horse-sacrifice, the divinities kindly provide the music; Tumburu and other celestials 'expert in song' (as well as in dancing) officiate as chief musicians at the most celebrated of these ceremonies (xiv.88.39), and seem to be a survival of the musical exhibition as wont to be performed by men…(women singers) appear to belong properly to processional music, and sing to the sound of various instruments as the victor goes by, being accompanied by the su_tas, ma_gadhas, and na_ndi_va_dyas (iv.68.28)…(ga_tha_ is a secular song, distinct from sa_man, a religious song)…The lyre (vi_n.a)…described as having seven cords, saptatantri_ (iii.134.14). The seven musical scales are described as a branch of study (va_n.i_ saptavidha_, ii.11.34); and we have the bass described as the chord giving the 'big sound', maha_svana…The common reed-flute, known as ven.u, and found everywhere in the Epic beside the lyre, is not known to the Rigveda by that name; but other reed instruments (na_la_, na_d.i_, etc.) are common from the earliest time…"
[Edward W. Hopkins, 1889, *The social and military position of the ruling caste in ancient India as represented by the Sanskrit epic*, repr. 1972, Varanasi, Bharat-Bharati]

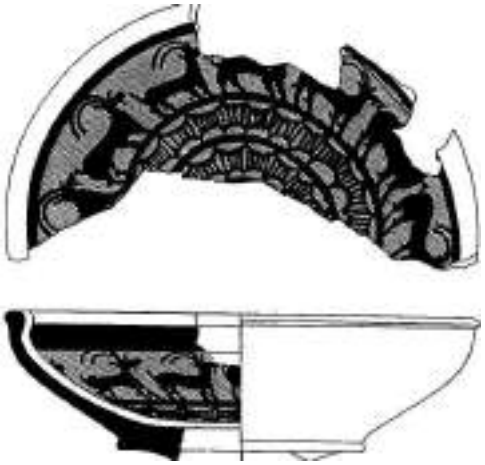
The Dhanurveda is clear about who was eligible to learn the science. (Verse 3: dhanurvedaguruvipra prokto varn.advayasya ca yuddha_dhika_rah s'u_drasya svayam vya_pa_dis'iks.aya_: every god and soldier, every bra_hman.a and ks.atriya and every youth, physically and mentally fit and not belonging to the lower caste, was expected to learn the science. The s'udra could learn it of their own for hunting purposes; cf. Agni Pura_n.a 100.7). Kaus'i_taki_ Bra_hman.a notes that the best daks.in.a_ for a guru was a bow and three arrows.

A consequence of urbanization is the beginning of organized irrigation and organized warfare. Storing of agricultural surplus is perhaps evidenced by the so-called warehouses found at Harappa. The rise of the cities on the banks of the rivers also necessitated the re-training of rivers using 'gabar bunds' to direct the flooding waters from meandering river channels into irrigation canals and channels for transport. Inaction could otherwise lead to river-floods damaging the crops and settlements fortified by mud-brick walls.

Sapara. "An ancient type of Assyrian sword. It has a very peculiarly curved blade and no guard. (Burton Sword 207)." [GC Stone, Fig. 694, p. 539]. **Note the incised figure of an antelope seated on a pedestal.**

Image: spotted deer: **pha_r.ho** hogdeer or cervus porcinus (S.); **pa_hr.a_** (L.P.); **pa_r.ha_** spotted antelope, hogdeer (H.)(CDIAL 8044). 6596.**Wild goat**: **pa_r.o** wild goat, fawn (Ku.); **pa_d.asa** fawn (OM.)(CDIAL 8042). **benkre** a wild goat (Kon.lex.) cf. **bakri_** goat (H.lex.)

s'uru the wild goat or markhor (Kt.); (Pas'.)(CDIAL 12331). **s'ambara, sambara** a sort of deer (Ka.); (M.) (Ka.lex.)

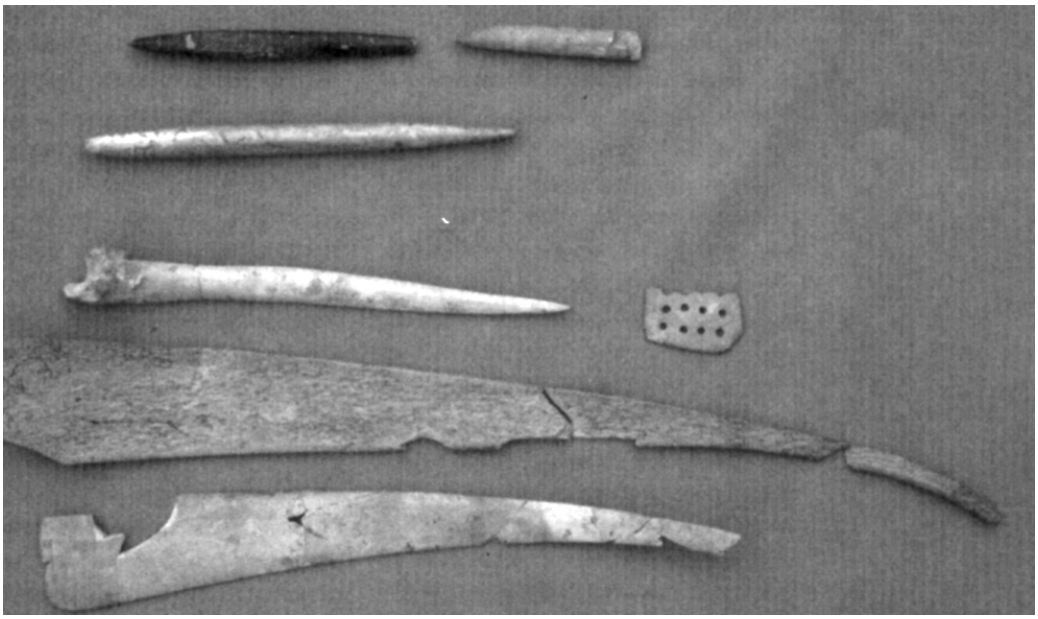


s'a_ru ibex **s'abara, sa_mbara**

Nausharo. Decorated pedestalled bowl. Period IV (c. 2100-2000 BCE). [After Fig. 2, JF Jarrige, From Nausharo to Pirak: continuity and change in the Kachi/Bolan Region from the 3rd to the 2nd millennium in: *South Asian Archaeology 1995*].

"Contemporaneous with the decline of the Indus Civilization, the Pirak Culture with its characteristic geometric polychrome pottery arose on the Kachi plain where the site of Mehrgarh had also prospered. Here horses and camels were domesticated for the first time in South Asia, and the riding of horses is clearly attested. Another major transition occurred as summer crops, namely sorghum and rice, were added to the existing winter crop assemblage which was dominated by wheat. This saw-toothed stone sickle was probably used to harvest these cereals."

http://bosei.cc.u-tokai.ac.jp/~indus/english/3_1_03.html



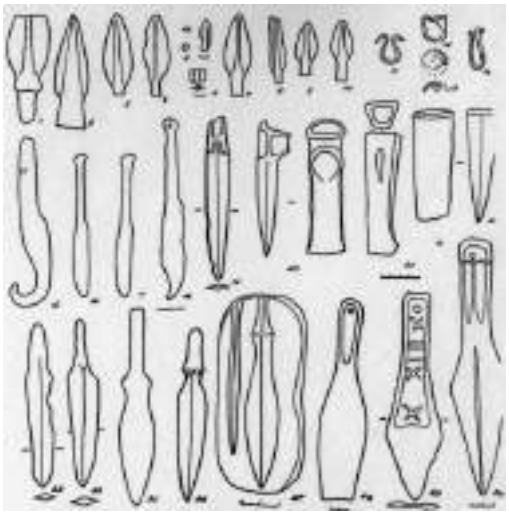
Bone tools – projectiles, weaving instruments -- circa 3300 to 2800 BCE. Harappa. (After Harappa Archaeological Research Project/Courtesy Dept. of Archaeology and Museums, Govt. of Pakistan).

Vedic Chariot

"The earliest chariot was a car of two or three wheels, and with one, two, or three horses; in the Epic we find the same, or one of four, sometimes eight, wheels; and with two, three, or four horses, or (in the latest portions) eight.

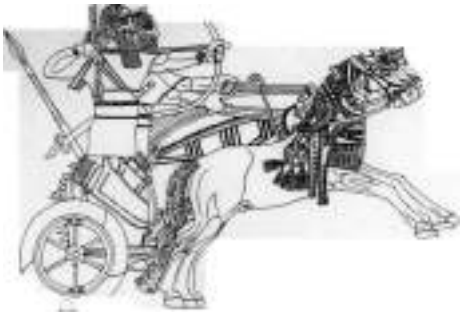
"In particulars, we find the Vedic war-car, ratha, placed on a box, kos'a, fixed on a wooden axle, aks.a, fastened by cowhide thongs. The seat, bandhura, is single; in the case of gods, three to eight seats, as fancy dictates, are mentioned. The knight stands on the floor of the car, garta, to the left of his driver. A rim is perhaps to be assumed as protecting the car, called an:ka… The wheel-spokes are of wood. A banner-pole stands erect in the car. (Pa_r. G.S. iii.14.13 stambha). A horse stands on each side of the pole, and the two are yoked, guided by a bit, s'ipra_ and reins, while urged by a goad (or whip)…The car and pole were decorated. Axe and bow were the chief weapons, but knives and others smaller are used…" [Edward W. Hopkins, 1889, *The social and military position of the ruling caste in ancient India as represented by the Sanskrit epic*, repr. 1972, Varanasi, Bharat-Bharati]

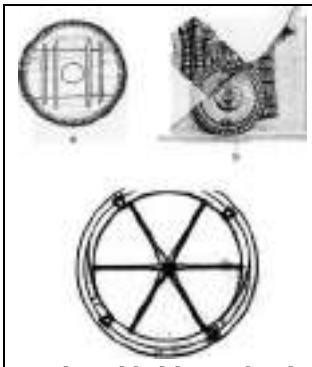
Weapons. Andronovo type. Namasga settlement; 2. Ashgabar; 3. Bala-Ishem site; 4. Anau settlement; 5. Shortugai settlement (period IIB); 6,23,24,29. Tulhar cemetery; 7. Uzbekistan; 8. Kuin-Kuju well; 9. Togolok 5 settlement; 0. Tahirbai 2 settlement; 4 Kumsai cemetery; 2. Tandyrjul cemetery; 3. Jazdepe settlement; 5,27. Kangurt-Tut settlement;
6. Beshkent II cemetery; 7. Arsaf-Sai; 8. Nurek cemetery; 9. Tiger Gully cemetery; 20. Karim-Berdy settlement; 2



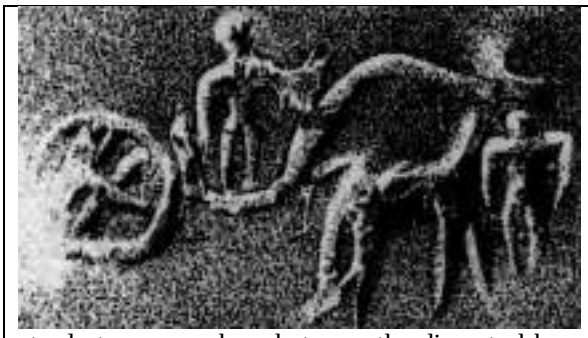
. Kultintepe; 22. Varahsha; 25. Kala Koderay site (period IV); 26. Tashkent oasis; 28. Vahshuvar; 30. Dashly 3 settlement. The radiocarbon dates for wood and charcoal samples from Sintashta are from the twenty-third to fourteenth centuries BCE. "…the wargear of a charioteer, i.e. a chariot, a composite bow and arrows, and armour (S'Br. 5.3.5; ABr. 7.9; TBr. 2.03). A bronze knife-dagger, a stone axe, a stone four-edged mace, leather armour and a whip are also mentioned. Gods fight with these weapons and bestow them on heroes. The Avesta describes the same panoply and armour (Yashts 5,7,0,5,30,0,30)….Mitanni…the charioteer was armed with a composite bow, two quivers with 30 socketed arrows, a spear, a dagger, a whip, a leather cap protecting the head, neck and shoulder and cuirass with split sections. It is described in the texts from Nuzi (Zaccagnini,
978)." [E.E. Kuzmina, 997, The cultural connections between the shepherds of the steppes and south Central Asia, Afghanistan and India in the Bronze Age, in: *South Asian Archaeology 995*]. Tus'ratta, the Mitanni king, sent bows as a gift to Amenhotep III and three quivers with 90 arrows to Amenhotep IV.

Nimrud. Detail of a stone relief of Ashurnasirpal II (After Littauer and Crouwel, 979, *Wheeled vehicles and ridden animals in the ancient Near East*, Leiden, fig. 53). "Ninth-century BCE Assyrian chariots (figure 53) appear to have had draft poles in Y form…The rear-axled chariot is still shown as a fast, mobile firing platform for flanking, pursuing, and harnessing. Because only two of the horses were under yoke, the vehicle remained quite maneuverable. **Crossed quivers (containing bows and arrows and sometimes axes) were fixed outside the body, and a thrusting spear stood at the rear; the two last, being short-range weapons, were for use dismounted or from a standing vehicle."** (JH Crouwel and Mary Aiken Littauer, Chariots, in: Eric M. Meyers, ed., 997, *The Oxford Encyclopaedia of archaeology in the near east*, Oxford University Press, pp. 485-487).

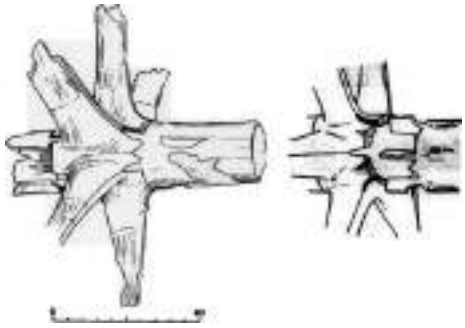




Figs. a,b,c. Wheel types. (a) reconstruction of a wheel type from graves in Kish, Ur, and Susa, mid-third millennium BCE; (b) depiction of a wheel on a stela of Gudea, late third millennium BCE; (c) drawing of a six-spoked wheel surviving from eighteenth-dynasty Egypt (After Littauer and Crouwel, 979). "Archaeological evidence for the wheel appears in the Near East as early as the Early Dynastic II period (c. 2750-2650 BCE). Earlier pictographs from Uruk level IVa (c. 300 BCE) show sledges raised over what are eigher two captive rollers or four disk wheels. Remains of actual wheels were found in graves at Kish, Ur (Early Dynastic III), and Susa (figure a) in the mid-third millennium. These were all tri-partite; made of three planks cut vertically from a tree trunk and held together by external battens as well as by rawhide, with wooden or metal tires (from .5 to .83 m. in dia.) that were sometimes hobnailed…The wheels appear to revolve on fixed axles. A variation of this wheel first appears on a stela of Gudea in the Ur. III period (fig. b), in the late third millennium. It shows what seems to be a relatively small solid wheel rimmed by two metal half tires with hobnail tread, secured by clamps at either ends. Actual metal tires in six or seven segments, with a clamp at either end and one in the middle, indicate disk wheels with diameters of .67--.97 m. These come from early second-millennium Susa, As's'ur, and elsewhere.



"Of lasting significance were attempts to lighten the disk wheels, as first seen on a third-millennium seal from Hissar IIIB (fig.2). On it, the central plank, through which the axle passes, is narrowed to a diametral bar; the flanking planks of the Hissar. Depiction of a wheel on a seal from Hissar IIIB. 3rd millennium BCE (After Figure 2, Littauer and Crouwel, 979). tripartite wheel are eliminated, and the former bonding slats are turned into sturdy transverse bars between the diametral bar and the felloe. This crossbar wheel is also clearly illustrated in the second millennium BCE, fixed on a revolving axle; it has remained in use with simple carts in various parts of the world.

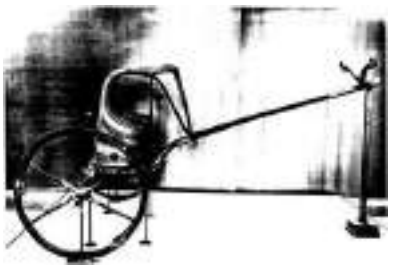


"By far the most important innovation was the spoked wheel, which first appeared with four to eight spokes, in Anatolian and Syrian glyptics and other graphic remains from the early second millennium BCE. Actual four-and six-spoked wheel (fig. c) survive from eighteenth-dynasty Egypt. These have composite spokes made from single rods, half oval in section, and heart bent in the middle to form an angle (of 60 degrees for a six-spoked wheel and 90 degrees for a four-spoked one). The 'legs' are glued back to back to the 'legs' of the adjacent spoke, the resultant whole spoke being fully oval in section. The wider diameter of the spoke is set at right angles to the felloe, which is composed of two lengths of heat-bent wood, overlapping at the ends. Rawhide, applied wet, constricted and solidified the naves and felloes. This construction, based on tension and without metal parts that could be jolted loose, required great skill to make and was vulnerable to dampness. It is attested in Egypt, the Levant, and the Aegean…

"Third-millennium representations in Mesopotamia show disk-wheeled vehicles in military, hunting, cult, and travel contexts only. Evidence for their use in warfare, for which they were clearly unsuitable, fades rapidly after the middle of the millennium." (JH Crouwel and Mary Aiken Littauer, Wheel, in: Eric M. Meyers, ed., 1997, *The Oxford Encyclopaedia of archaeology in the near east*, Oxford University Press, pp. 343-344).

Egypt. Tomb of Amenophis III. Nave and spokes of wheel. This is a clear depiction of the evolution of the spokes of a wheel from the earlier styles of wheels with bi-partite or tri-partite joined planks constituting the solid wheel.

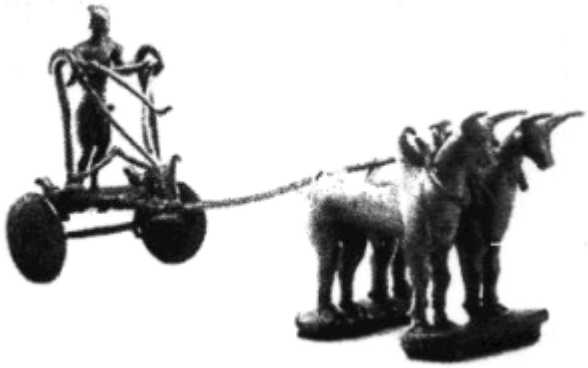
Chariot A I (Obj. no. 22, Cairo Museum, [After Pl. VII in: MA Littauer and JH Crouwel, 985, Chariots and Related equipment from the Tomb of Tutankhamu_n, Oxford, Griffith Institute.]

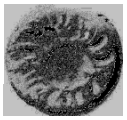


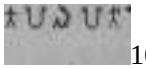
'The six, actual, full-sized chariots of Tutankhamu_n are of singular importance, not only to the history of chariotry in general, but to the understanding of Late Bronze-Age warfare…Chariots are first attested in Egypt in the earlier part of the 6th cent. BCE, on the so-called 'second stela' of the pharaoh Kamose, where the text refers to the 'chariotry' of his enemies, the Hyksos, and this is followed by a few texts and representations of Egyptian chariots of early New Kingdom date…In Egypt, chariots were included among the grave goods of pharaohs. No harness animals, however, were buried with them, as they had been in Mesopotamia and Elam in the 3rd millennium BCE, and as they were to be in China, from the Shang period onwards, and in st millennium BCE Cyprus

…Chariots A1 and A2 (called 'state chariots' by Carter) are conspicuous for their sumptuous decoration in gold and inlay, which covers virtually all parts, and which would seem to restrict them to parade and ceremonial use…(Amarna letter 22, describing the splendid chariot and equipment given by Tushratta, king of Mitanni)…Egyptian representations of chariot horses show that these were controlled either by a bitted bridle or by what appears to be a cavesson, with noseband placed so low that it could exert pressure on the sensitive, fleshy part of the horse's nose, below the end of the nasal bone. [cf. MA Littauer, *Antiquity*, 43 (1969), pp. 292 f.].

ra~t = a car, a four-wheeled carriage; tat., rat.rat., rat.rut. = to creak, creaking, an imitative word; rat porob = the car festival; rat – the car of Jagannath, the car festival; observe the car festival; rat = a car, a four-wheeled carriage; rath (H.) (Santali.lex.) rath [Skt.] a war-chariot, a car; ratha-ja_tra_, ratha-ya_tra_ a festival observed in Vis.n.ava temples on the 2nd day of the bright fortnight of the month of A_s.a_d.ha (June-July), on which day the idol is placed in a chariot, and driven round the city; rathi_ = a warrior who sits in a chariot and fights; rat.na_ adj. Wandering, roaming; rad.a-vad.a = wandering about (G.lex.) ?ran.a = a battle, a war, a fight, a quarrel; a battle-field (G.lex.)





m0428Bt  1607 Pict-132: Radiating solar symbol.**ra~t** = rays of the sun, glare (Santali.ex.) ra_t = a sunbeam, ray of the sun, glare. [?Or, **bel.a** day-time]

rata sukri = a boar (Santali.lex.)

rad.h [Hem. Des. lahad.a = Skt. ramyam, charming] deep meditation (G.lex.)

Daimabad. Copper model chariot with solid wheels; a standing charioteer and a curved draught-pole drawn by two bullocks. Daimabad, on Pravara river, a tributary of Godavari, near Nasik; this is a

settlement dated to ca.1961 to 1420 BCE. Other bronze models found at this site, include animals mounted on four-solid wheel platforms. Daimabad site is generally considered a post-Harappan settlement. The suddenness with which such a bronze-model 'chariot' appears cannot be seen as an isolated occurrence. The 'chariot' is a vehicle which dates back to the Vedic times in Indian civilization with extensive metaphors revolving around the 'ratha' starting with the R.gveda. [Source for the pictures: Sali, S.A. 1986. *Daimabad 1976-79*. New Delhi: Archaeological Survey of India; Fig.10.55 from Allchin, B. and Raymond Allchin, 1982, *The rise of civilization in India and Pakistan*, Cambridge Univ. Press; Fig. 4.5 from Kosambi, D.D., 1965, *The culture and civilisation of ancient India in historical outline*, London, Routledge and Kegan Paul].

Daimabad chariot is an import from Harappa

Kosambi explains the chariot model: ""Dholavira is a purely chalcolithic site which, as the excavations show, was first occupied around 2200 BCE and was finally deserted by 1000 BCE after which it was never reoccupied. Hence the artifacts from the site can be safely placed between circa 2200 BCE - 1000 BCE (uncalibrated)...The bull chariot is the most remarkable piece in the hoard. Its total length is 45 cm and the breadth is 16 cm. The complete bronze consists of an elaborate chariot yoked with two bulls and driven by a man in it. It has two solid wheels having a projecting hub on the inner side in which the axle is fixed in such a way that it moves along with the wheels. It looks more like a Roman biga than a cart and justifies its classificatin as a chariot. It has a front guard consisting of two vertical curved bars with turned upper ends, whereas the lower ends are attached to a horizontal bar which, in its turn, has two ring loops for the axle. The guard also has two horizontal bars fixed to it. Of these, the upper one is straight while the lower one is angular. The guard is furtherstrengthened by two oblique bars soldered together in a dog standing on the central pole just in front of the guard. The platform on which rises the guard has on its either side a pair of birds formed into one by merging bodies, but having their heads in opposite directions. Stylistically they are related to the terracotta bord whistles from Harappan sites. The man (ht. 16 cm) driving the chariot is seen standing on the platform. His left hand rests over the front guard and in the right hand is a curved stick. The man is portrayed realistically. His physiognomy indicates that he is probably a Proto-Austroloid. To a great extent, he resembles, stylistically, the terracotta head of a man from Kalibangan which, according to BB Lal, resembles the head of the famous limestone priest from Mohenjodaro (Lal 1979: 89, pl. XXIV). He has a broad, snubbed nose with wide nostrils; his lower lip is thick and protruding. His curly hari, indicated by incised lines, is parted in the middle and is gathered at the back in an elongaged role. He does not appear to be wearing any lower garment but a vertical projection of the abdomen, looking like a hooded cobra, must been part of the lower garment. The chariot has an inordinately long central pole, 32 cm. long. The bulls are not fixed to the yoking pole and can be removed whenever required. It may be noted that the modern cart in Sind also has an inordinately long pole, but a high bent pole seems to be a peculiarity of Sumerian chariots (Mackay 1929: 28, fig. 1 and 2). The pair of bulls hoked to the chariot are extremely interesting in as much as the modelling of their hind part has lent them the appearance of a horse rather than that of a bull, and their tails look more like a horse's tail. And what is more, their mouth too resembles that of a horse. This bull-horse combination of the body is strikingly similar to that of the unicorn which is so commonly depicted on Indus seals. It is equally noteworthy that a unicorn with two horns has been carved on a seal from Kalibangan (Lal 1979: 91). The most remarkable feature of these bulls is their projecting horns. This is a feature which is characteristic of the terracotta

bulls from Chanhu-daro excavations and we are told that they are even today seen in Sind (Mackay 1943: 164, Pl. LVIII, 1 and 1a). Such bulls, however, are not represented in the chalcolithic art of the Deccan.

"It will thus be clear that the chariot is characterised by many Harappan features. It should, however, be made clear that such an elaborate vehicle has so far not been reported from any Harappan site and what we have are only a few toy cart models of copper (Piggott 1970). But they too share some elements in common with the Daimabad chariot. They all have projecting ring loops through whch the axle was passed. The most noteworthy feature of the axle is that it is fixed to the wheels in such a way that it moved along with them. The same feature is also to be noticed in the case of the Daimabad chariot. About the toy carts, presumably of bronze, from Chanhu-daro, Mackay (1943: 164) reports that, 'The wheels are now immovable, but they must originally have revolved in two axle-brackets cast in one with the frame'. This possibly facilitated the dismantling of the vehicle because the chassis could just be lifted off the axle as they do today in Sindh (Mackay 1929: 26-28). It is pertinent to quote Childe in this connection who observed that 'Sumerian and other early vehicles were probably just as easily taken to pieces, and this point must be remembered in considering the possibility of using them for long distance transport' (Childe 1951: 183). This could be possible because of the manner in which the axle was fixed to the wheels. This mechanism, we are told actually marks an early stage in the evolution of wheeled vehicles (Singer et al 1956: 72). And even in the village carts of modern Sind, which 'Preserve the main outline of the ancient Harappan vehicles, the wheels turn in one piece with the axle as do those of many other recent carts with solid wheels.' (Mackay 1929). This can thus be said to be a distinguishing feature of Harappan vehicles and the same is to be seen the Daimabad chariot."(pp. 163-165).

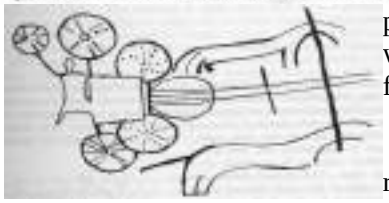
Daimabad, bronze. The model with the elephant is instructive. The holes in the base are for inserting the axles and wheels. This structure of the 'rathava_hana', of stand for the vehicle, is comparable to the Chanhudaro chariot box which has also protruding tongues with holes to insert the wheels and axle. The wheels shown on other animal model stands are solid disc wheels.

"The exact find spot (of the bronze models) was examined by S.R. Rao (1978: 62) who confirmed that the bronzes belonged to the Late Harappan phase (ca. 2000-1800 BC). The calibrated dates would be ca. 2200-2000 BCE which would place it in the Late Mature Harappan phase. The next problem relates to the authorship of the bronzes. DP Agrawal (1978: 45) has questioned their antiquity on the basis of the presence of arsenic which, according to him, is absent in artifacts from chalcolithic sites in the Deccan...It has been observed that 'The hardness of most of the copper objects found at Harappa has been shown on analysis to be due to a high arsenic content. The presence of this arsenic is believed to be accidental, being indigenous to the copper deposits from which the ores were extracted rather than secondarily introduced' (Coghlan 1951: 44-45). Lamberg-Karlovsky (1967: 151) therefore rightly argues that 'We must not disregard the possibility, however, that the

smiths recognised the advantages of an ore with arsenic in it for producing a harder, less brittle tool'. In the light of evidence of Harappan artifacts, we are of the opinion that the Daimabad bronzes may originally have been Harappan, that is, from Harappa proper, and that they were probably imported into the Deccan. Arsenical alloying is also most significant in the Copper Hoards from the Ganga-Yamuna doab (Agrawal et al 1978)..." (p. 168)

Controvery of authorship of Copper Hoards in Ganga-Yamuna doab: Nishadas or Aryans?

"The origin and development of Copper Hoards is the knottiest problem. In an exhaustive study SP Gupta (1963: 1965) has attempted to trace the evolutionary stages of Copper Hoards...It is highly likely that the Copper Hoards originated in Bihar where the ore is also available...it is well night impossible to provide a reasonable time bracket for Copper Hoards...The Ochre Coloured Pottery (OCP) is not found in eastern UP and Bihar which, according to Gupta (1963), was the original home of the Copper Hoard people. We may not be far off the mark if we assign them to the middle of the second millennium BC, say between 1700-1400 BCE... The Copper Hoards problem again received attention of scholars when a hoard was accidentally found while digging a canal at Bahadarabad (Dist. Dehra Dun, UP). Immediately a small excavation was undertaken at the site by YD Sharma (1961), but no copper artifact was found in the pre-Painted Grey ware levels, which were the earliest. Since Lal associated the Painted Grey ware with the Aryans, the OCP clearly belonged to the pre-Aryan period. He concludes (Lal 1951: 38). "Thus, if the copper hoards are to be associated with the ill-fired, ochre-washed, thick ware, it would follow that they are the products of a people who inhabited the Gangetic basin, presumably before the arrival of the Aryans." Lal based his argument on the evidence of the bar celt which forms an important type in



Copper Hoards. This tool was a copy in metal of the stone prototype which was found in the Chota Nagpur region from where Copper Hoards have also been reported. Moreover, a tool resembling the harpoon in the hoards is found depicted in prehistoric cave paintings in the Mirzapur district of UP which is in the Vindhyan region. These analogies led Lal (Ibid: 39) to conclude: 'If these similarities have any significance, it would appear that the authors of the Copper Hoards were once associated with the areas just stated. At present these tracts are known to be chiefly occupied by Mundas, Santhals and other tribes belonging to the Proto-Australoid group of the Indian population. Can it then be said that the ancestors of these Proto-Austroloid tribes were responsible for the Copper Hoards...The Vedic Aryans, on reaching the plains of northern India, encountered certain aboriginal tribes whom they called the Nishadas.' All said and sone, the Copper Hoard problem is stilla controversial issue in Indian archaeology". (pp. 258-260).

Spoked-wheel chariot of ca. 800 BCE

Two views of the chariot painted on the Morhana Pahar cave. See also notes at: http://sarasvati.simplenet.com/ratha4.htm

[Sources: Fig.8, Discus-throwing charioteer in a Mi_rza_pu_r Cave, circa 800 BCE in: Kosambi, D.D., 1965, *The culture and civilisation of ancient India in historical outline*, London, Routledge and Kegan Paul;

Fig. 4.12 Morhana Pahar, Central India: rock painting of chariots ambushed by men on foot in: Allchin, B. and Raymond Allchin, 1982, *The rise of civilization in India and Pakistan*, Cambridge Univ. Press].

Kosambi goes on to surmise and present arguments: "The Dark Hero of the Yadus. The creed which would survive to the twentieth century as the 'true religion' for millions in India was not to be Buddhism but the heterogeneous worship of Krishna, a personal god to whom anyone could pray for succour in distress as one could not to the human teacher Buddha...The sole archaeological datum about Krishna comes from his traditional weapon, the missile discus, a wheel that could be thrown and was sharp enough to behead an enemy. This is not Vedic, and went out of fashion long before the Buddha; but a cave drawing in Mi_rza_pu_r district (the Buddhist Dakkhina_giri, in fact) shows a charioteer attacking the aborigines (who drew the picture) with such a discus. The date would therefore be about 800 BC, roughly the time when the first settlement at Bana_ras was founded. The charioteers would be Aryans exploring the region across the river for iron ore, the rich haematite with which the cave pictures were drawn. On the other hand, Krishna in the Rigveda is a demon, enemy of Indra, his name being the generic designation of hostile dark-skinned pre-Aryans. The basis of the Krishna legend is that he was a hero and later demi-god of the Yadu tribe, one of the five main Aryan people (Pan~ca-jana_h) in the oldest Veda; but these Yadus were alternately cursed or blessed by the hymn-singers according to current alignemnt in the constant fighting between Panja_b tribes. Krishna is also a Sa_tvata, an Andhaka-Vrishni, and fostered in a gokula (cattle-herders' commune) to save him from his maternal uncle Kamsa. The transfer related him, moreover, to the A_bhiras, an historical and pastoral people early in the Christian era, progenitors of the modern Ahir caste..."(pp. 114-116).

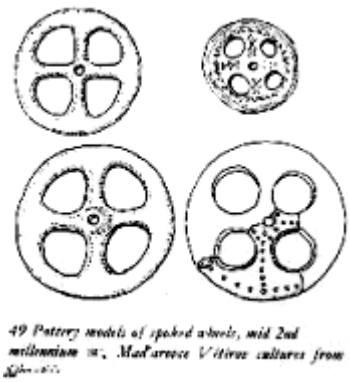
Harappan Spoked-wheel

Light vehicles with spoked wheels of the Second millennium (No references to these 'light-weight' vehicles can be surmised from the Rigveda, except in the term, 'rathava_hana', which can also be interpreted as a chariot-stand; the term ara_ used in Rigveda may also connote the three parts of a tri-partite solid wheel of the Tell Agrab type which is dated to the fourth millennium BC).

"...There remains for discussion a problem akin to that which faced us...that of the relationships between the adoption and development of the light vehicle with two spoked wheels, normally horse-drawn, in second-millennium communities of the Near East and of Europe. Whereas a technological progression from fenestrated tripartite disc wheels to cross-bar types seems likely, CHild's view that 'though naturally an expression of the wheel idea, the spoked wheel was a new invention rather than a modification of the tripartite disc' (1954, 214) remains a valid hypothesis. If we accept it, our next step must be to examine the evidence for a place of origin for the new invention, and the alternative, that it could have been independently developed in more than one area where the antecedent condition of domestic horses available for secondary use as tranction animals, was present. The latest statement of the problem is that of Littauer and Crouwel (1979, 68-71). They consider that the Near Eastern evidence they have assembled in exemplary detail 'strongly suggest the possibility of a local evolution of the light, spoked-wheel horse-drawn chariot in the Near East itself, in contrast to the long-held theory that this was introduced from outside in an already evolved form by Indo-European steppe tribes'. They would see the technological genesis of the wheel with nave, felloe and radial spokes, in the cross-bar wheel, both forms being documented from the very beginning of the second millennium BC, with bent-wood techniques also of early origin, together with equid draught with onagers.

Horses too were becoming familiar to Mesopotamian peoples from equally early in the second millennium BC, and the linguistic and lexical evidence adduced for Indo-European influences is regarded as too late to be relevant to origins. 'Whatever the role of particular peoples in the origin of the spoked-wheeled, horse-drawn chariot, there appear to be no cogent archaeological or linguistic arguments against its development in the Near East itself'. If this thesis were accepted, all the European instances of spoked-wheel vehicles surveyed...from the Urals to Slovakia, would be accounted for in terms of the model of diffusion from 'higher' to 'lower' cultural contexts, from the Orient to EUrope, which Childe developed and maintained so persuasively in the past, and within which we have seen the development of the tripartite disc as best explicable...The writer recently restated the case for an initial development of the light, two-wheeled, horse-drawn vehicle beyond the ambit of the anciet Near Eastern civilizations, and saw its development into the familiar oriental war-chariot as 'the result of a ready social acceptance of the light, spoked-wheel, horse-drawn vehicle from alien, non-urban, non-literate communities to the north...within the natural territory of the wild horse'. This was in the course of an enquiry into the origins of chariotry in Shang China (and incidentally, Vedic India) in the late second millennium BC, and it was suggested that these might better be found in the Timber Grave and Andronovo continuum rather than in the metropolitan ancient Near East itself. (Piggott 1978)...(P.103) (Piggott, S., 1992, *Wagon, Chariot and Carriage*, London, Thames and Hudson).

48 Representation of chariot on pot, mid 2nd millennium BC, from Timber Grave culture burial at Sarator, Lower Volga, USSR



49 Pottery models of spoked wheels, mid 2nd millennium BC, Mad'arovce Veterov cultures from

[After Fig. 48, Piggott, S., 1992, *Wagon, Chariot and Carriage*, London, Thames and Hudson: representation of four-partitioned solid-wheel chariot on pot, mid-2nd millennium BCE.]

Timber Grave culture burial at Sarator, Lower Volga, USSR) (After Fig.49, Piggott, S., 1992, *Wagon, Chariot and Carriage*, London, Thames and Hudson: pottery models of spoked wheels, mid-2nd millennium BCE Mad'arovce Veterov cultures from Slovakia).

If we restrict the enquiry to the evolution of the spokes in the wheel, the surmise that the tripartite disc yielded the spokes as a next step in evolution of the chariot, is still a valid hypothesis. We have seen that the Timber Grave culture (Sintashta) burial showed not a spoked-wheel burial but a tripartite wheel. (See the pottery models of spoked wheels, mid-2nd millennium BC, Mad'arovce Veterov cultures from Slovakia: Fig. 49 in Piggott, 1992; the models clearly show that it is still the solid disc with the four 'ara_' created by scooping out four segments of the solid block). The Rigvedic description of the chariot delineated in the URLs of this site (from ratha1.htm to ratha8.htm), will match the Tell Agrab model, rather than the European 2nd millennium model.

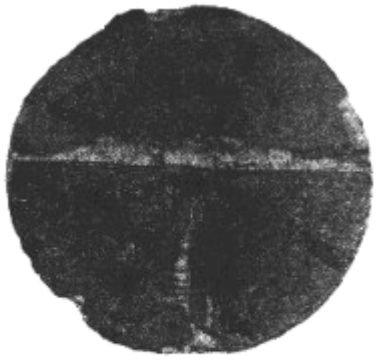


Fig. 9.2 : Terracotta spoked wheel from Kuntasi.

The spoked-wheel is a 'sign' of the script of the civilization and is vividly used three times on the Dholavira sign-board

Kuntasi, Gujarat (Harappan site); Fig. 9.2 Terracotta spoked wheel from Kuntasli (about 9 cm. dia) in: Dhavalikar, M.K., 1999, *Indian Protohistory*, New Delhi, Books and Books; "There is no evidence of a chariot like vehicle from any Harappan site so far but for the solitary exception of the Daimabad bronze chariot which can be dated to the Mature phase. It is very light in construction, resembling the Roman biga, with a cross bar at the front. But it too has solid wheels, like those of Harappan clay carts. All the same it shows that the Harappans had chariots. A very important contribution of the Vedic Aryans is supposed to be the spoked wheel. It marks an important technological advance the various developmental stages of which have been traced (Singer 1956: 1.724 ff.). There are only four specimens from Harappan sites which may be taken as models of spoked wheels. One of them is a solid wheel of a terracotta toy cart from Kuntasi which is painted with what look like spokes (Fig. 9.2). They can also be taken as decoration, but look more like spokes. There are similar specimens from Rupar, Mitathal and Lothal (Sharma 1995: 20ff.) all of which are from Late Harappan levels, but there is one from Banavali which comes from the Mature Harappan phase. A spoked wheel also occurs on Harappan seals in an inscription. There are some other knick knacks like the shaft hole axe which has been associated with the Aryans; it occurs at Mohenjodaro and the mid-rib sword from Fort Munroe (Heine-Geldern 1936). The evidence would thus point to the infiltration of certain Aryan elements into the Harappan culture rather surreptitiously and not as a result of an invasion or immigration on a large scale. It has been observed that the evidence for the development of two wheeled war chariot with spoked wheels in West Asia itself is prior to the advent of Aryans in that region. They reached there not before ca. 1600 BCE (Sharma 1995: 20ff) and hence they cannot be said to have introduced this contrivance in West Asia. All this goes to show that the horse, the spoked wheel and the chariot, need not be taken as distinguishing features of the Vedic Aryans and they are therefore not the ethnic markers of Aryans." (pp. 297-298).

Dhavalikar goes on to argue and make many surmises:

"...It is not unlikely that the Aryan culture was not much different from that of the late Harappans. The theory of large scale invasion by Aryans is now discounted as there is no evidence to support it. Theory of migration has been advanced by Renfrew but has nothing to commend itself...The only evidence available is that in the second millennium BCE the Late Harappans had occupied the land of Sapta-Sindhu...According to the Rigveda, various Aryan tribes were occupying the region between the Sarasvati, and the Indus and even in the Sarasvati valley they were in the

upper courses of the river which was the region occupied by the Late Harappans. Between the Sindhu (Indus) and Vitasata (Jhelum), there were the S'ivas (Sibis) in the north, the Vrichivants in the centre, and the Yadus in the south; between the Asikni (Chenab), and Parushni (Ravi), there were the Druhyus, Turvas'as and Anus; and the region between Parushni and the Sarasvati was occupied by the Bharatas and Tritsus. Among these there were some tribes like Druhyus and Turvas'a who have been supposed to be foreigners and Yadus were supposed to have come from outside. Naturally there were some native tribes as well. According to the RV (Shafer 1954: 17), the Anus, Druhyus, Yadus, Turvas'a and Purus attacked the Aryans of the Parushni. This would indicate that the Aryan tribes were fighting among themselves as any other tribes would do...It appears that there were several Aryan tribes in the land of Sapta-Sindhu which were fighting among themselves and each one abusing the other in derogatory terms like ana_sa, dasyu etc...The pastoral nomads from Central Asia were doubtless coming through the Khyber and the Bolan Pass even in pre-Harappan times. They must have found employment here and got assimilated with the local groups. They in all probability brought with them the domesticated horse, the chariot, the spoked wheel, and such specialised artifacts as the socketed axe-adze which has been found at Mohenjodaro, the Shalozan trunion axe, and the Fort Munroe sword as novelties...Could it be that very soon after they got naturalised and after their assimilation into the pattern of Indian culture, they gave expression to what was already in existence here. We might invoke the Kushan parallel. After the revival of Sanskrit under their patronage, a vast body of religious and philosophical literature of Buddhism came to be produced within a couple of centuries by discarding Pali and Prakrit in which the earlier literature was produced. It is because of this that the religion of the 'Enlightened One' came to be known as Sanskrit Buddhism. It is not unlikely that something like this may have happened in the Late Harappan times. This would then raise the question of the language of the Harappans. Once the Indus civilization was presumed to be the handwork of the Dravidian speakers, Sanskrit became the language of the invaders. But it has never for a moment been thought that Sanskrit, or some form of Prakrit which was very close to it, was probably spoken by the Harappans. This is a distinct possibility in view of the evidence from the S'atapatha Bra_hman.a where occurs for the first time the term mleccha which later came to mean a stranger or a foreigner. But in the beginning it denoted a person who does not speak the language -- that is Sanskrit -- properly. I have elsewhere tried to show that the term mleccha is the Sanskritised form of Meluhha which was the name of India as it is recorded in the Cuneiform documents of the third millennium. Ths S'Br. is generally dated to the beginning of the first millennium BC, and it is quite likely that it records the events of a still earlier period (Dhavalikar 1997), in this case, of the late second millennium BCE. This is the time when the Late Harappan cultures were breathing their last. In fact they have vanished from many areas but small pockets may have survived in some places...I lay no claim to have solved the (Aryan) problem; far from it...As has been observed, this was the time period and the region where the Late Harappans were living. It may then be asked whether the Late Harappans were Vedic Aryans? The answer is not simple, but the possibility cannot be ruled out."(pp. 299-301).

“So far as wheeled transport goes, the ancient Sumerians shared with those other peoples, from Neolithic Europe on the west to the bronze-utilising civilization of the Indus Valley to the east, the use of the ox-drawn wagon or cart from the beginning of the third millennium BCE. That ox-wagons could, as on the South Russian steppe, play a symbolic role in the burials of an upper stratum of society, reflecting as carriages for the living, is shown by the remains of disc-wheeled wagons and bovid skeletons in princely tombs of Early Dynastic III date, c. 2500 BCE, in the Ur Royal Cemetery (Grave PG 580: four bovids and a probable vehicle; PG 780: 6 bovids and two four-wheelers; bovids uncertainly with Puabi’s throne sledge in PG 800) and again at Kish and Susa less well recorded…

“The Sumerian, from the end of the third millennium BCE, show the use of a generic ‘equid’ word, **anse** covering asses and their hybrids, onagers and horses, distinguished by qualifying epithets in which for instance ‘equid of

the desert' denoted an ass or donkey, and 'equid of the mountain' meaning a horse, reaching the Mesopotamian plain from the mountainous north…Sumerian seems to have had two main vehicle words, one **mar-gidda** for a four-wheeled draught wagon (**eriqqu** in Akkadian), and the other **gigir**, a general all-purpose vehicle word but especially for one with two wheels, the cuneiform character for which shows a stylized disc wheel. In Akkadian this was equated with another all-purpose word from a Semitic 'conveyance' root, **narkabtu**, which then became specialized as a chariot, invariably horse-drawn, whereas the Akkadian heavy-duty wagon, **sumbu**, was drawn by mules or, as traditionally, oxen. With **narkabtu** then, we come to the beginning of one of the great chapters of ancient history; the development of the light two-wheeled chariot drawn by paired horses as a piece of technology and as an institution within the socil order as an emblem of power and prestige….Behind this (narkabtu) is the root **rkb**, a 'conveyance' word, appearing in Ugaritic **mrkbt**, and when Egypt took up the chariot package-deal from Mesopotamia and Syria in the seventeenth century BCE, it adopted as a loan-word **mrkbt** for a chariot. In the Levant versions of the same word later appear in Hebrew and Aramaic and it is perhaps significant that Arabic, the language of a people who had from the first repudiated wheeled transport for the camel, uses the same root for both land vehicles and ships: the tired old metaphor fo the 'ship of the desert' is literally simply a conveyance on land. (S. Salonen, *Studia Orientalia*, XIV.2., 1950, 1-8; *Landfahrzeuge*.., 1951)." (Stuart Piggott, Wagon, 1992, *Chariot and Carriage: Symbol and Status in the history of transport*, New York, Thames and Hudson, pp.37-41, p. 50).

In Avestan, a warrior is known as rathae_s'tar, i.e. 'chariot rider'. Mary Boyce notes " (rathae_s'tar).. a term evolved evidently after the Iranians had adopted the war-chariot instead of fighting on foot. This development is held to have taken place during the second millennium BCE; and so popular did the chariot become that in time most of the gods of the Iranians and Indians came to be conceived as driving in one. Zoroaster himself seems to have made use of a wheeled vehicle in his jouryings; but the vocabulary of his poetry still reflects an older state of affairs, when probably the weak and old traveled in heavy ox-drawn carts, and men would have made their way, and fought, on foot."(Mary Boyce, 1996, *A history of Zoroastrianism*, Vol. I, Leiden, EJ Brill, p. 6; See Stuart Piggott, *Prehistoric India to 1000 BCE*, 2nd ed.n, London, 1962, 268-9, 275-83; A Kammenhuber, *Hippologia Hethica*, Wiesbaden, 1961, 10 f.; RA Crossland, *Cambridge Ancient History*, 3rd ed., I 2, 1971, 873-4; DM Lang, *Armenia*, London 1970, 82-3; See Yasna 51.12; Bartholomae, *Air. Wb.* 1417, that **va_za_** is dual for 'two draught-animals').

Kikkuli, the horse trainer, called himself in his Hittite horse training manual **assussani** which is comparable to Sanskrit **asvasani**. He also uses Sanskrit terms to indicate the number of laps run by the horses in daily training; this indicates the presence of a Sanskrit-speaking group among early Hurrian Mitanni with technical terms transmitted to Hittites. Semitic Akkadian renders horse as **assisu**. "The intimate linkage between Proto-Indo-Europeans and the horse and chariot is a myth. As long ago as 1957 the linguist Ronald Crossland wrote that 'archaeologists now doubt whether the Indo-Europeans already had the chariot, as distinct from heavier vehicles which could have been drawn by oxen. There is no inherited word for it, or for any part of it which a cart could not have, and there is no philological proof that any Indo-Europeans had it before c. 1450 BCE.'(RA Crossland, 1957, 'Indo-European origins: the linguistic evidence', *Past and Present*, 12, 16-46). And more recently, Mllory has quoted the Russian historian Igor Diakonov as seeing 'no case for employing the first appearance of the domestic horse and chariot as an ethnic marker for Indo-European

migrations'. (JP Mallory, 1989, *In Search of the Indo-Europeans*, 41). As for the Indo-European 'homeland' and the wild horse, the fact that they may have coincided or overlapped may be no more than a zoogeographical accident…The vehicle (Vedic chariot) seems to have been of normal Near Eastern type and was known as **ratha**, a wheel-word cognate wih Latin **rota** or German **rad**; for the wheel itself another Indo-European alternative was used, **cakra** (Greek **kuklos**, English '**wheel**')…Akkadian texts…**mariannu**, 'primarily as a noble who is a chariot-warrior'…a loan-word from Indo-Aryan with the sense of 'young man'." (Stuart Piggott, 1992, pp. 51-52, 55-57).

Dismembered chariots in the tomb of Tutankhamum at Thebes, c. 1440-1330 BCE. [After Pl. 3 in: Stuart Piggott, 1992]. The wood used for making chariots in the tomb of Tutankhamum at Thebes (mid-fourteenth century BCE) has been identified as: tamarisk (locally available), elm and birch-bark (possibly imported from temperate woodlands of north Syria and Anatolia)."The contemporary Mycenaean Greek documents mention elm, willow and cypress, and the very late, immediately pre-Roman, northwest rueopean and British finds of wheels of chariot type include elm, ash, willow and hornbeam in their structure." [cf. S. Pitgott, 1983, *Earliest Wheeledd Transport*, 28; MA Littauer and JM Crouwel, Chariots and related equipment from the tomb of Tut'ankhamu_n, Oxford, 1985; Stuart Piggott, Wagon, 1992, *Chariot and Carriage: Symbol and Status in the history of transport*, New York, Thames and Hudson, p.45].

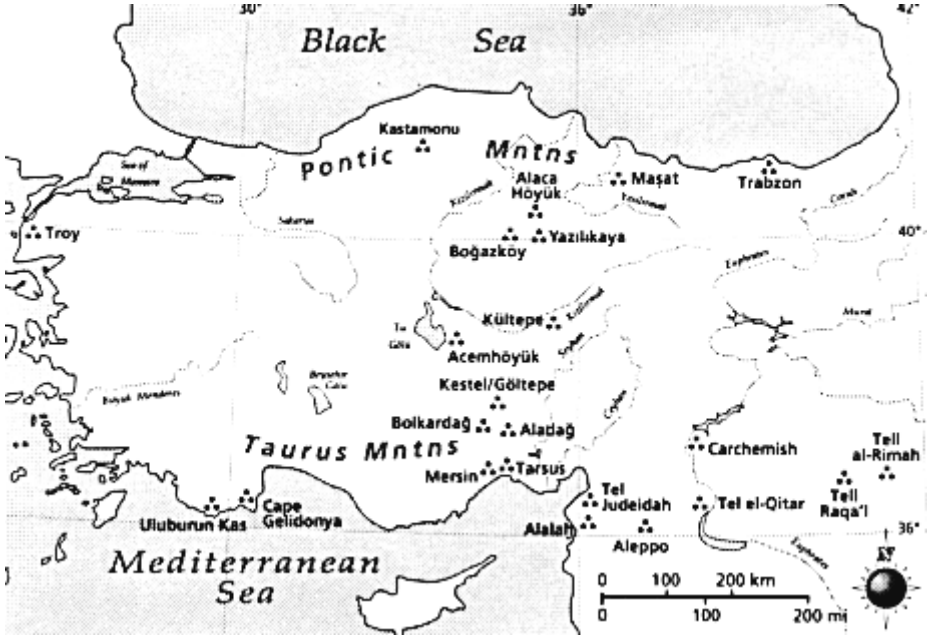
In contrast to these woods used for light-weight chariots, RV 3.53.19 refers to the use of heavy, hard woods: khayar and s'is'u: khadirasya sa_ram is the text; khadira = *mimosa catechu* of which the bolt of the axle is made; while the s'im.s'apa, *dalbergia sisu* furnishes wood for the floor; these are still timber-trees in common use. The aks.a (axle) was made of 'arat.u' wood (RV 8.46.27).

Discussing the question of origins of the two-horse chariot, Roger Moorey notes: 'No single ethnic or linguistic group seems to have been the master innovators in the history of horse-drawn light chariotry in the Near Eastern Middle Bronze Age. A diversity of peoples and circumstances more probably explain the gradual incremental change evident in the available, albeit inadequate, range of evidence.' (PRS Moorey, 1986, 'The emergence of the light horse-drawn chariot', *World Archaeology*, 18.2, pp. 196-215). Mary Littauer and Joost Crouwel have argued for the local evolution of the light, spoked-wheeled, horse-drawn chariot in the Near East itself, and not, an introduction from the northern steppe areas. They also note that the spoked wheel evolved from the 'cross-bar' type tri-partite solid wheel from the late third millennium BCE shown on seals from Tepe Hissar in Iran and c. 2000-1850 BCE at Kultepe in Anatolia. (MA Littauer and J. Crouwel, 1979, *Wheeled Vehicles in the Ancient Near East*, 68, 99).

("Third Millennium. "...different types of axes: single, double-bladed, or fenestrated, they functioned as ritual, ceremonial, and currency-exchange objects, in addition to military usage. Various knives, spears, daggers, slings, and throwing-sticks were also used...The Stela of the Vultures from Lagash (circa 2500) portrays a very tightly formed phalanx of foot soldiers with overlapping spears held horizontally and with rectangular shields, and this sculpture is the clearest evidence from the period for battle formation. It suggests a highly trained and disciplined force...Two main types of chariots are known: the four-wheeled 'battle-car', conveying a spear-thrower, and the two-wheeled chariot, which may have been developed for the hunt. Since horses seem to be unknown in Mesopotamia until the end of the third millennium, some other kinds of equid--perhaps onagers--acted as draft animals. The vehicles were very heavy: their wheels were of solid timber, perhaps banded with tires of rawhide, metal or wood. The axles were

probably fixed to the wheels and so rotated with them. The draft pole was straight, and fixed very low down at the front. Such vehicles cannot have been either swift or maneuverable; they appear to belong always to men of very high status. Indeed, it may in marking status that their importance lies, rather than as a practical asset in war...(Horses seem to have appeared in Mesopotamia around the end of the third millennium.)...The Second Millennium...War was a seasonal activity: many workers were allowed to cultivate palace ilku-land (state-owned fields farmed in return for a share of the produce; the right to farm them could be inherited, but carried the duty of military service) in return not only for a tithe of produce but also for duties that included military service and corvee work, especially on canals...Kassites, whose origin may lie in the mountains to the northeast of Mesopotamia, formed enclaves within Babylonian cities and put their specialist skills as horsemen at the disposal of native Akkadians; during this time the horse was bred and trained in Mesopotamia. Certain technical developments made the chariot a slightly more viable vehicle for battle: the spoked wheel was invented, perhaps in Syria, and lightened the whole. Although the bridle still controlled the horse by means of a nose ring at the beginning of this period, the mouth bit, at first rigid and then soon jointed, emerged to give a far easier control. Kings and persons of very high status began to be shown shooting with a bow and arrow from their chariots, which seem to have served as mobile firing platforms in battle, helping to disrupt putative lines off infantry and picking off stragglers...The Amarna and Middle Babylonian Periods...Battle chariots regularly had two wheels, mostly with four spokes (although six, eight and nine are also known), and were drawn by a pair of horses, with one or two more running beside them as outriggers. A chariot-owning aristocracy arose, known as *mariyannu/martianni* which is thought to come from a word of Indic origin. Aryan involvement is confirmed by a horse-training manual found in the Hittite capital Bogazkoy (ancient Khattusha), in which many technical terms are given in an Aryan language related to Sanskrit. The charioteers were based on the palace, and individual terms for officers are often identical with terms for court officials. Warfare was more international than before: the Semites and Hurrians of Mesopotamia met Hittites and Egyptians on battlegrounds in Syria, the country which appears to have led in technical developments. The time and expense involved in training and equipping for the chariot-owning aristocracy was such that soldiering became a more professional, hereditary occupation which affected activity all year round even though campaigns remained seasonalStephane Dalley, 1995, Ancient Mesopotamian Military Organization, in: Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, Vol. III, pp. 413-422).

A remarkable evidence of the use of inscriptions on weapons comes from ancient Anatolia, attesting to the advances in Hittite metal and armour industry.



Archaeological sites of early and late bronze age in Turkey. “Current understanding of Hittite metallurgy comes from metal assemblages excavated from several Late Bronze Age sites such as Bogazköy, Masat, and Alaca Höyük. A partial list of these assemblages includes metal armor, weapons, pins, tool, wagons, figurine, seals, and treaties…A recent hoard found near Kastamonu produced other examples of ritual iconography in metal: plates engraved with hieroglyphic inscriptions and decorated with registers in relief of griffins; trees of life, combat scenes with lions and bulls; lions and lions; and hunting scenes (Emre and Cinaroglu 1993). Moreover a fragment of an oxhide ingot of copper excavated at Bogazköy (Müller-Karpe 1980) links this seemingly landlocked empire with a circum-Mediterranean maritime commerce. ..The quantities of metal objects with ritual significance began early, as the findings at Troy and Alaca Höyük demonstrate. Weapons are prominent members of this grouping. Two examples from the Middle Bronze Age are a bronze spearhead engraved with inscriptions of Anitta the King and a sword dedicated to the god Nergal (Güterbock 1964). Engraving inscriptions onto metal continued into the Hittite period. A sword with an Akkadian inscription celebrates Tuthaliya II's victory over the western Assuwa-land (1430 BCE). The inscription dedicated the sword to the storm god (Ertekin and Ediz 1993, Ünal 1993). Another example of a numinous weapon is a spearhead inscribed *walwaziti* ,"Great scribe," probably dating to the reign of Hattusili III and Queen Puduhepa (Bilgi and Dincol 1989). Swords and axes were decorated with human, animals, and fantastic divine creatures. These weapons have a smooth background from which figures stand out in relief their forms are reflected in the Hittite relief depicting the Dagger God at Yazilikaya, which may have been based on a metal prototype. Its hilt is shaped like a god's head framed by four lions (Bittel et al. 1941). In addition to weapons, treaties were cast in metal. Recent excavations at Bogazköy revealed a bronze tablet inscribed with a treaty between Tuthaliya IV and Kurunta, King of Tarhuntassa (Otten 1988; Houwink ten Cate 1992).” [K. Aslihan Yener, Swords, Armor and Figurines:
http://www-oi.uchicago.edu/OI/PROJ/GOL/BA_95/BA_95.html]

In the treaty between the Hittites and Mitanni, the Mitanni king swears by: Mi-it-ra (Indic Mitra), Aru-na (Varun.a), In-da-ra (Indra) and Na-sa-at-tiya (Nasatya or As'wins).

A Hittite text on horse-training and chariotry, written by Kikkuli (a Mitanni) uses Indic numerals to indicate the number of turns made by a chariot on a track: aika (India eka 'one'), tera (tri 'three'), panza (panca 'five'), satta (sapta 'seven') and na (nava 'nine').

Opening instructions from the Hittite text on horse-training by Kikkuli the Mitanni. In order to describe Kikkuli's profession, the text employs the Indic word assussanni (Skt. asvasani-).
'Thus (speaks) Kikkuli, the assussanni (the horse-trainer), from the land of Mitanni: When he lets the horses onto the meadow in the autumn, he harnesses them. He lets them trot 3 mails, but he lets them gallop over 7 fields. But on the way back he has them gallop over 10 fields. Then he unharnesses them, provides for them, and they are watered. He brings them into the stable. Then he gives them mixed together 1 handful of wheat, 2 handfuls of barley and 1 handful of hay. They eat this up. As soon as they have finished their fodder, he binds them close to the post.'

Archaeological evidence for the horse. Gorgan region southeast of the Caspian shows the first appearance of a domesticated horse about 3000-2250 BCE. Surkotada in the Rann of Kutch, Gujarat, India has yielded bones of the horse, dated to mid-third millennium BCE. Tal-i Iblis in south-central Iran (3500 BC) and Selenkahiyeh in Syria (2400-2000 BC) also attest the presence of the horse. There is a cylinder seal depicting a horse-drawn vehicle excavated from Hissar IIIB. Linked with the evidence of the Mitanni horse-trainer, Kikkuli's horsemanship manual, the migratory route for the Indics would appear to have been through Hissar to Mesopotamia. There is a possibility that the spoked wheel for the chariot was an indigenous development within Mesopotamia, as an evolution from the two-wheeled onager-drawn cart into a spoked-wheel chariot drawn by horses prior to ca. 1600 BCE. The incorporation of the indic elements in Mitanni should have taken place centuries prior to 1600 BCE.

Pirak, Baluchistan, ca. 1000 BCE. Geometric seals in terracotta and bronze. [After Fig. 9.12 in JM Kenoyer, 1998].

Horse. "A terracotta figure found by Mackay in his excavations at Mohenjo-daro was identified by him as that of the horse. This identification has been accepted by many but not all. However, in recent years a lot of new light has been thrown on the issue. Lothal has yielded not only a terracotta figure of the horse but also the second right upper molar of that animal. To recall what Bholanath of the Zoological Survey of India has stated, the tooth 'resembles closely with that of the modern horse and has pli-caballian (a minute fold near the base of the spur or protocone) which is a well distinguished character of the cheek of the horse' (in S.R. Rao 1985: 641). Surkotada has yielded quite a few bones of the horse, which have been identified as such not only by A.K. Sharma but also by Sandor Bokonyi, an internationally recognized authority on the anatomy of the horse. To repeat one of his significant observations; 'The occurrence of true horse (equus caballus L.) was evidenced by the enamel pattern of the upper and lower cheek and teeth and by the size and form of incisors and phalanges (toe bones). Since no wild horses lived in India in post-Pleistocene times, the domestic nature of the Surkotada horses in undoubtful.' Horse remains have been identified at Kalibangan too; and Bholanath

also states that an earlier collection from Harappa examined by him did contain remains of the true horse. However, no horse-bones have so far been reported from the current excavations at the site. Finally, attention must be drawn to the discovery of terracotta figurines of the horse by Jarrige and his colleagues (in press) in the Harappan levels at Nausharo in Pakistan." (B.B. Lal, 1997, The Earliest Civilization of South Asia, New Dehli, Aryan Books International, pp. 285-286).It is a debatable issue if the appearance of the horse and the chariot can be treated as an ethnic marker for the Indic speaking peoples.

Another Hurrian text from Yorgan Tepe uses Indic words to describe the colour of the horses, for example, babru (Indic babhru 'brown'), parita (palita 'grey') and pinkara (pingala 'reddish'). The Mitanni charioteer is called marya (Indic-Vedic marya 'warrior, young man'). Added to these are a series of names of the noblemen or aristocracy of Mitanni which are clearly Indic. The conclusions are: "an element of Indic-speaking chariot warriors superimposed themselves on a native Hurrian-speaking population to form a ruling dynasty that endured for several centuries...there are also possible (though disputed) Indic traces in the names of a few gods revered by the Kassites (Surias and Marytas: i.e. Su_rya and Maruts)...By the thirteenth century the Mitanni kingdom collapses which sees an end to the Indic presence in Southwestern Asia..." (J.P. Mallory, opcit, 1989, p. 38).

"We cannot reconstruct Proto-Aryan religious terms--and much less Proto-Aryan religious ideas--by simply and naively projecting Rigvedic data into Proto-Aryan times. A reconstruction can be attempted only by a careful confrontation of Vedic and Avestan terminology'. (P. Thieme, 'The 'Aryan' gods of the Mitanni treaties', *JAOS*, 80, 1960, 301-317). The same conclusion was argued by Sten Konow (*The Aryan gods of the Mitani people*, Christiania, 1921).

"It is now generally agreed by most authorities on the subject that the Aryan linguistic vestiges in the Near East are to be connected specifically with Indo-Aryan, and not with Iranian, and also that they do not represent a third, independent Aryan group, and are not to be ascribed to the hypothetically reconstructed Proto-Aryan. This conclusion is incorporated in the title of M. Mayrhofer's bibliography of the subject, *Die Indo-Arier im alten Vorderasien* (Wiesbaden, 1966), and it can now be taken as the commonly accepted view. It is based on the fact that where there is divergence between Iranian and Indo-Aryan, and where such elements appear in the Near Eastern record, the latter always agrees with Indo-Aryan. Such items are aika 'one' and s'uriyas' 'sun' and the colour-names parita-nnu and pinkara-nnu which correspond to Sanskrit palita- 'grey' and pingala 'reddish' .

"...the name of the capital of the Mitanni state, Was's'ukanni...we should see in the first member a noun vasu 'wealth', and not an adjective vasu- meaning 'good' as in Iranian (Av. vohu-). In this case the second element is obviously khani- 'mine', the whole meaning 'mine of wealth (i.e. precious metals)', and this explanation provides the motive which attracted those Proto-Indoaryans to this region. It was an age when prospecting for metals, precious or otherwise, was being actively pursued, and the Aryans were as much interested in this activity as anybody else. It is understandable that when it came to their knowledge that a new and large deposit of such materials has been found, it would stimulate them to attempt to get control of that territory...

"...the division of Proto-Aryan into two branches, Indo-Aryan and Iranian, must have taken place before those languages were established in their eventual homes, and not merely be due to developments which took place within each of the two groups after the Indo-Aryans had settled in India and the Iranians in Iran. This conclusion could only be shown to be wrong if it could be shown that the Vedic Indians, having migrated all the way to the Punjab from their earlier home, had then retraced their steps and undertaken yet another migration in the direction of the Near East. Konow was prepared to believe this, but there is no evidence for it, and it seems that a theory involving such complication can be safely ignored...A further conclusion from this is that the

date of the Proto-Aryan period must be pushed back further than has often been thought, and probably it cannot be brought down below 2000 BC, at the latest.

"...The identification of the Aryan traces in the Near East as Proto-Indoaryan has, in Thieme's words, 'considerable historical implications'...

"...Sarasvati_ is in the first place the Proto-Indoaryan name of the river in Iran, which after the migration was transferred to the river in India. The Iranian name (haraxvaiti_) is a loan word from Proto-Indoaryan, with a substitution of h- for s-, occurring also in hindu-..Another case is the river name sarayu_, which was transferred from Iran (haraiva-/haro_yu_) to a river in North-West India, and then again from there to a tributary of the Ganges in eastern India...

"...Of the four divine names mentioned in the Mitanni treaty...Varun.a would remain exclusively Vedic...There is, however, no reason to believe that Indra and Na_satya ever belonged to the Iranian religious tradition...They are gods which were being worshipped by the Proto-Indoaryans in eastern Iran when Iranians gook over the country...The geographical horizon of the Avesta is almost exclusively eastern Iranian...but eventually the defences of the Proto-Indoaryans to the west were overcome, and this was followed by massive Iranian immigration into central and western Iran...

"The usually accepted date of Zoroaster is based on a tradition dating from Sasanian times which places him 258 years before Alexander...very influential scholars have adopted it, notably A. Meillet in 1925 and W.B. Henning in 1951 (A. Meillet, *Trois conferences sur les Ga_tha_s de l'Avesta*, Paris, 1925; W.B. Henning, *Zoroaster*)...The conclusion that the old Yas'ts and in particular the Fravardin Yas't are to be dated before the migration of the Iranians to central and western Iran provides a basis for calculating the date of Zoroaster, since we can begin from the earliest mention of the Medes and Persians in the Assyrian annals, which occurs in the second half of the ninth century BCE(Parsua 844 BC, Madai 836 BC)...If we take the hundred years between Zoroaster and Sae_na and add them to the period represented by the four generations from Sae_na to Utayutay, we arrive at a period of 200 years at the very minimum between Zoroaster and the composition of the Yast. Adding this to the date 900 BCEsuggested above as the time of the movement west of the Iranians, we obtain 1100 BCEas the lowest possible date for the founding of the Zoroastrian religion...We may conclude the Iranian conquest of eastern Iran was an event that took place not later than the fourteenth century BCEand it thus coincided with the period when the Proto-Indoaryans had their furthest extension westwards. At this time large numbers of Indo-Aryans had migrated into India, and as a result of these two migrations the position of the Proto-Indoaryans in their original base in eastern Iran must have been considerably weakened, thus providing the Iranians with an opportunity to move in and take over.

"...Since the Proto-intoaryans must have been in north-western Iran in order to reach the Mitanni country, it will not be unreasonable to suggest an Indo-Aryan etymology for this name (Lake Urmiya), if one is available. Such an etymology is available if we compare Skt. u_rmi- 'wave' and u_rmya- 'undulating, wavy' which would provide a suitable descriptive name for the lake. This is a case where the phonology of Indo-Aryan and Iranian have diverged quite widely (cf. Av. varemi- 'wave') and it is interesting that the name of this lake, if the above etymology is correct, should go so clearly with Indo-Aryan." (T. Burrow, The Proto-Indoaryans, *JRAS*, 1973, No.2)

Burrow provides no linguistic basis for his hasty assumption that Sarasvati is a proto-Indo-Aryan name of a river in Iran: *haraxvaiti_* with the substitution of *h-* for *s-*. The name could have been derived from River Sarasvati in north-western Bharat, after the people migrated westwards, away from River Sarasvati, after the desiccation of the river started.

Hurrian

In Mundarica, hor means a 'man'. In Tamil, kor-r-am means 'victory, power, sovereignty'.

"The major Semitic languages, other than Akkadian, derive their usual word for 'free' from the root |h.rr. Vullers, in his article 'Uber die Rassenfarben in der arabischen Literatur' (Centenario della nascita di Michele Amari I, Palermo, 1910, 84-95), connected this with |h.rr, 'hot, buring', and with |h.wr, 'white'. The underlying concept, Vullers argued, has to do with fire and light...Vullers imagined the ancient history of the Near East to have been similar to that of India where the (presumably) dark-skinned original population was subjugated by Aryan invaders from the North. There is, however, no evidence for such a state of affairs in the lands inhabited by Semitic speaking peoples. Nonetheless, and despite the blatant racism underlying Vuller's whole line of argumentation, one cannot rule out some sort of semantic connection between the concepts 'white/bright/light' and 'free/noble'... The other occurrences of |h.rr in Achaemenian Aramaic are the h.ry yhwdy (or yhwd), the 'freemen/nobles of the Jews/Judaea', in two documents from Elephantine (A. Cowley, *Aramaic papyri of the fifth century BC*, Oxford, 1923, no. 30: 19, 31:18)...Persian wuzurga_n ud a_za_da_n, 'magnates and nobles', corresponds to Syriac rawrba_ne_ w-h.e_re_, but h.e_re_, 'nobles' occurs by itself in entirely non-Persian contexts, see for example the bnay h.e_re_ of Nagra_n (South Arabia) who are mentioned repeatedly in the Book of the Himyarites. (A. Moberg, *The book of the Himyarites*, Lund, 1924). Hebrew h.o_ri_m occurs 13 times in the Old Testament...In all of these instances the English Authorised Bible has 'nobles' and in most cases we clearly have to do with dignitaries of some sort (e.g. the 'nobles and rulers', ha-h.o_ri_m we-ham-mega_ni_m, in Neh. 2,4,4,5,7)...For Arabic h.urr the dictionaries give (1) 'free'; (2) 'liberal, generous, frank, etc.'; (3) 'noble'.. Ancient South Arabian has h.r, plural, 'h.rr, feminine plural, 'h.rrt, 'freeman/woman'...then the special development represented by Geez h.ar(r)a_wi_, 'soldier', and h.ar(r)a_, 'troops', which do not seem to have left any traces in the modern Ethiopic languages." (Francois de Blois, 'Freemen' and 'Nobles' in Iranian and Semitic Languages, *JRAS*, 1985, No. 1).

Enumerating divinities in treaties

"There was a tendency to enumerate a maximum of gods and godesses able to safeguard the implementation of oaths...An interesting example is the list of deities in the treaty between Suppiluliumas, king of the Hittites, and S'attiwazza, king of Mitanni: from the Hittite side the gods of the empire are invoked...Most of them are Hattic but some are Indo-European (thus, along with the Hattic Sun-godess of Arinna the Hittito-Luwian Sun-god is also mentioned), or Hurrian (thus, the Thunderer-god has been identified with the Hurrian Tes's'ob...and by the Hurrian mountain-gods 'south and north' (Nanni and Hazzi); moreover included in the list are seventeen Thunderer-gods, differentiated either according to the sphere of life which each of them patronizes or according to their places of worship...From the Mitannian side the deities are divided into three groups: (a) the gods of Kizzuwadna, (b) the gods, presumably of Harra_n (anyway, Semitic gods), (c) Mitanian gods proper...Group (c) includes also a mention of certain Indo-Iranian gods (probably protectors of the dynasty): there is a Hurrian sentence wedged into the Akkadian text: 'the Mithraic gods, the Varunian (?!) gods (the original has 'Urwanian (or 'Arunian') gods'; Urwana- and Aruna- are hard to explain from the Hurrian), Indra, the gods Na_satya'. Further, it includes a number of Akkadian gods firmly rooted in most Hurrian pantheons." (Diakonoff, I.M., Evidence on the Ethnic Division of the Hurrians, in: M.A. Morrison and D.I. Owen (Eds.), Studies on the Civilization and Culture of Nuzi and the Hurrians, Eisenbrauns, Winona Lake, Indiana, 1981pp. 77-89).

The oldest cuneiform spelling is Ma-i-ta-ni, used by S'uttarna I (S. Smith in Antiquaries Journal XIX 42); later the name is written variously as Mi-i-it-ta-a-an-ni, Mi-i-it-ta-an-ni,

Mi-i-ta-a-an-(ni), Mi-i-ta-an-ni; the Egyptian form Mitn is found in inscriptions of Thutmose III (1490-1436). The state of Mitanni was populated mostly by Hurrians and was ruled by kings whose names indicate that they had Indo-Aryan origin. The nobility, marianni, were also Hurrians. Tus'ratta called himself 'the Hurrian king'. Bogazkoy documents refer to the people of Mittanni as Hurrian. In the first half of the first millennium BC, Hurrians are restricted to the area between northern Mesopotamia and Lake Van.

In the ancient Near East, the custom was to name (first-born?) children after their grandparents. This custom is also well-known in ancient India. In Tamil language, pe_ran- (lit. the one having the same name) means a grandson. (Ignace J. Gelb, 1944, *Hurrians and Subarians, Studies in Ancient Oriental Civilization No. 22*, Illinois, University of Chicago Press, p. 79).

Hurrians are only one among several ethno-linguistic groups present in significant numbers in Mesopotamia in early second millennium BCE. In Hurrian, huradi means a soldier; in the neo-Assyrian period, a verb hara_du 'to keep watch' was perhaps derived from it. Many persons with Hurrian names are listed as having occupations: scribes, chariot-builders, leather-workers, farmers (is's'akku_), fisherman, weavers, and musicians (naru_). For over a century (c. 1350-1225 BC), Hurrians formed a notable minority within the population of Babylonia, particularly in the south central area around Nippur. (J.A. Brinkman, Hurrians in Babylonia in the Late Second Millennium BC),

The art on cylinder seals of the Mitanni is an appropriation of the conventions of their adopted homeland, Mesopotamia, from the late third to the late second millennium BCE. and paralleled in the cylinder seals of the Sarasvati Sindhu Civilization. In Mitanni, the lion is the main opponent in the contest motifs of all periods. Leopard becomes an opponent in the late period in Mesopotamia. The lion's original

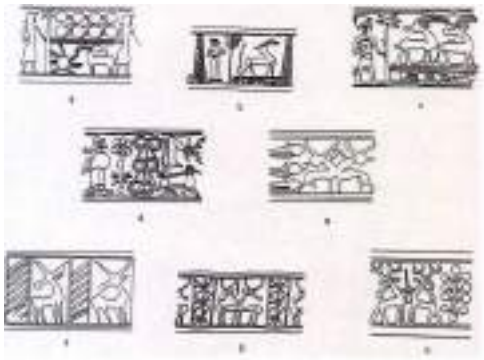
in: M.A. Morrison and D.I. Owen (Eds.), *Studies on the Civilization and Culture of Nuzi and the Hurrians,* Eisenbrauns, Winona Lake, Indiana, 1981).

Aryan names found in Mesopotamia, Syria and Palestine are attributed to Mitanni influence: s'uvardata (*svarda_ta 'given by heaven'; s'atuara (*satvata = satvan 'powerful, victorious: a warrior), artamanya (r.tamanya 'thinking on th elaw'), biridas'va (vr.ddha_s'va 'possessing large horses') biryawa_za (vi_ryava_ja 'having the prize of valour'), indarota (indrota (RV) 'helped by Indra), s'ubandu (subandhu). In the Kassite documents there is a list of names of gods with Babylonian equivalents: s'urias' (rendered s'amas') equated with Sanskrit 'su_rya. Maruttas' the war god (rendered En-urta) is compared with Sanskrit marut. Among the kings of the Kassite dynasty (ca. 1750-1170 BCE, apparently originating in the mountainous regions of western Iran) is a king names abirattas' (abhi-ratha 'facing chariots (in batle)'. (T. Burrow, *The Sanskrit Language*, London, Faber and Faber, 1955).

Mitanni glyptic art tradition has parallels only in Mesopotamian and Harappan

The second millennium cylinder seals of Mitanni, both from east and west of the Mitanni empire, i.e. from Nuzi and Alalakh, show glyptic art motifs of Babylonia, either directly or through what is called Syrian glyptic.

victim in the conflict between the wild and the domesticated is the bull. It is the bull which the hero is called upon to protect. Later, the bull also becomes an opponent.

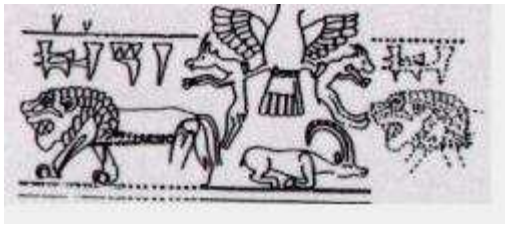


Cylinder seal impressions: (a) Nuzi (D. Stein); (b) Ugarit (Schaeffer-Forrer 1983); (c) Alalakh (Collon 1982); (d) Alalakh (Collon 1982); (e) Nuzi (D. Stein); (f) Nuzi (D.Stein); (g) Ugarit (Schaeffer-Forrer 1983); (h) Alalakh (Collon 1982).

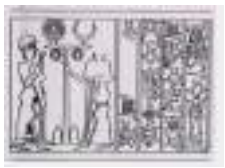
The styles are: juxtaposed antelope, humans and trees framed by geometric patters. The styles have prehistoric roots in Mesopotamia and glyphs such as an antelope with its head turned, jointed animal heads are also seen in Harappan inscription motifs.

Cylinder seal impression of Idrimi of Alalakh (Collon 1975); Legend: Idrimi, servant of IM; the seal was used by Idrimi's son, Niqmepa. Secondary scenes of opposing animals and dimunitive motifs with wings are on superimposed registers divided by a spiral (guilloche) pattern.

Cylinder seal impression of Niqmepa or



Ilimilimma (Collon 975); Legend: ...(?), Niqmepa. The heraldic composition of Saus'tatar's seal occurs at Alalakh on this seal of Niqmepa or his son, Ilimilimma.



Cylinder seal impression of Ithiason of Kipi-tes's'up (Drawn by D. Stein); Legend: Ithia king of Arrapha son of Kipi-tes's'up; this is noted as early eastern court style: full-scale figures interspersed with filler motifs.

Urkesh norther Mesopotamian city; bronze lion protome; New York Meropolitan Museum of Art; two bronze lion protomes protected the foundation tablets of the temple dedicated to Nerigal by the Hurrian king Tis'ata end of third millennium BC; inspiration seems to be from the Mesopotamian tradition of lion representation particularly in Akkadian art.

Cylinder seal of Tehes'-atal the scribe (British Museum); Legend: Zabazuna strong king:

Tehes'-atal the scribe is your servant).

The seal is modelled on Ur III presentation scenes of the 'Arad-zu' type, in which a worshipper stands before the seated king. On this seal, the king is seated on a throne rather tan the usual padded stool, one of the worshippers is not bareheaded and neither raises his right hand, as on the metropolitan prototypes. (Diana L. Stein, 'Art and Architecture', in: Gernot Wilhelm, *1989, The Hurrians*, trans. by Jennifer Barnes, Warminster, Aris and Phillips Ltd.).

Lapis lazuli Cylinder seal of Zardamu King of Karahar (British Museum); Karhar is on upper Diya_la near the Zagros foothills;

Legend: Zardamu, Sun-God of his land; beloved of Nergal, his god; Annunitum, his mother; S'ul-pae, his...; [of DN], his...; En-sig-nun, who walks on his right; ...of S'amas', his? Tammuz; strong king, king of Karahar and king of the Four Parts, spouse of Is'tar. The iconography harks back to the famous victory stele of Naram-suen in the Louvre. "In the tradition set by this Akkadian king and revived by the rulers of the Ur III Dynasty, Zardamu describes himself as divine king of the Four Quarters of the Earth (Sollberger 1980) and depicts himself in ascending posture, trampling on his fallen enemy.

Cylinder seal impression of S'uttarna, son of Kirta (Collon, 975); Tell Atchana (Alalakh IV), Turkey.

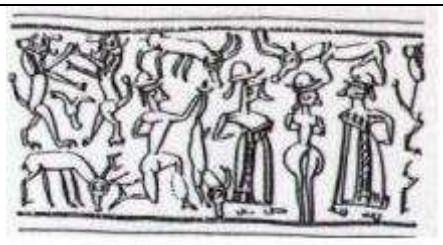
Impressions on tablets AT 13,14. Legend: Suttarna, son of Kirta, King of Maittani; two lions are defeated by a central single human-headed lion-demon in bird costume; worn and recut, the seal is used as a dynastic emblem by Saus'tatar in mid second millennium BC; two tablets found in Alalakh which record judicial decisions taken by Saushtatar are authenticated with the 'dynastic seal', which bears the legend' S'uttarna, son of Kirta, king of Maitani'. The seal reflects the style of Post Akkadian and Ur III periods (Collon 1975). "The contest scene, first introduced as a frieze of overlapping figures during the Early Dynastic period, is epitomized at the height of the Akkadian period as a symmetrically composed conflict between balanced pairs of protagonists. Long associated with kingship, this theme developed into the three-figured struggle depicted on the seal of S'uttarna, in which an animal victim is pitted against two human assailants (Collon 1982: 111). The seal was used as a dynastic seal by Saushtatar of Mitanni in about 1450 BCE; it was probably originally cut in the late 3rd millennium BCE but was subsequently recut along the lines of the original design and a new inscription was added. Antakya and BM; Collon, 1975, No. 230.

Towards the middle of the 2nd millennium BCE, a new material for seals arrived. This was sintered quartz, also known as composition (or, less accurately, as faience, frit or paste). This composition is often used in the beads and seals

of the Sarasvati Sindhu Civilization. This opaque material, which was easy to cut and could be fired and glazed, made it possible to mass-produce seals.

Cylinder seal impression: Nuzi (Drawn by D. Stein); Alalakh (Collon, 1982). Hunting scenes with the motifs

scattered freely in the field.

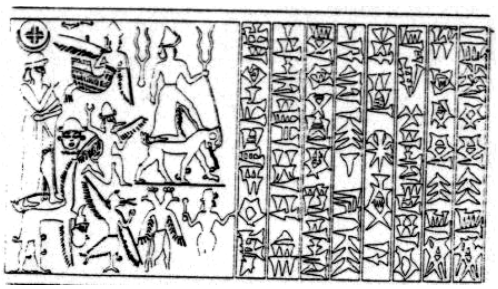


BM 89315; haematite; Frankfort, 1939, Pl. XXXIa. This is an Old Babylonian seal depicting the king with a mace between two suppliant godesses, to which Mitannian figures have been added, together with a two-register scene based on Syrian iconography (Collon, 1987, Fig. 268).

Cylinder seal impression: Ugarit (Schaeffer-Forrer 1983)--contest, hunting scenes.

Alalakh (Collon 1982)--a register of animals in a row above a row of worshippers; two antelopes in opposition, a standing lion.

Nuzi--person seated on a throne in front of a standing lion, a row of animals on top register, antelope? (Drawn by D. Stein).



Cylinder seal impression of Ithi-tes's'up son of Kipi-tes's'up; Nuzi Iraq. Impression on property decree. Legend: Ithi-Teshub son of Kip-Teshub king of Arrapha (Kirkuk) rolls out this seal on (a tablet concerning) a legal decision about fields and houses. For evermore let no-one break (the tablet). 5.1 cm.; (D. Stein; Collon, 1987, Fig. 269). The second seal of Ithi-Tes's'up displays many demons and deities which typify the late court style at Nuzi.

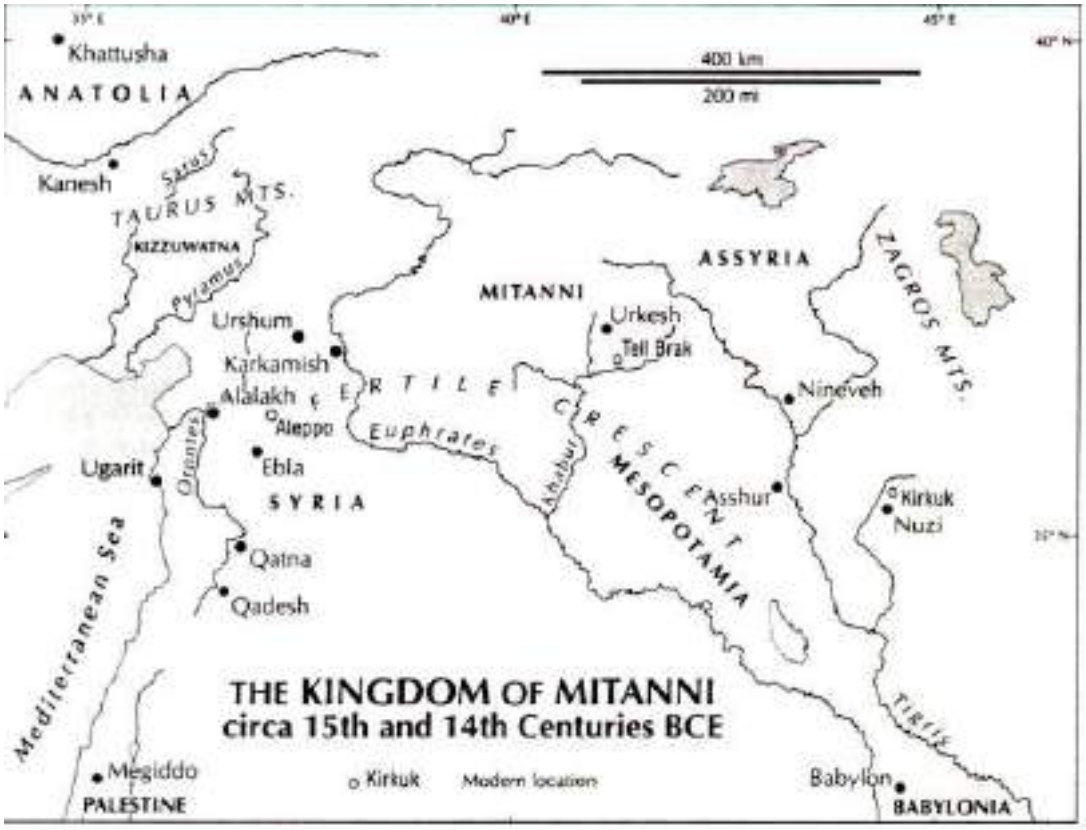
Divided here on two levels, the demonic figures composed of lion, fish, bird, scorpion, snake and hina elements, have been interpreted as creatures of the netherworld (Porada 1979). The design is comparable to the design on Saushtatar's seal. Nuzi lay in the territory of Arappha.

A similar design appears on the seal found near Khorsabad (Dur Sharrukin), Iraq. BM 89819 (Badger Coll. 1853); pink and white jasper; Wiseman, 1959, Pl. 51; Collon, 1987, Fig. 270.

"Although hurlili constitutes a linguistic definition, and is basically a self-descriptive term, that corresponded to one in the Mitanni letter itself (hurwohe, hurrohe 'Hurrian'), several scholars went along with Ungnad's suggestion and called the language 'Subarian' after the place name Subartu found in Babylonian (Ungnad 1915, 1923, 1936: 133ff.). Since the language is already attested in proper names in the Ur III period (Hommel 1913) and earlier (Thureau-Dangin 1912), but the name Hurrian itself only since the Old Hittite period, Ungnad wanted to keep the word 'Hurrian' for the 'Subarian' of the Bogazkoy texts, even though he himself discovered that there was no essential difference between 'Hurrian' in this sense and 'Subarian' of the Mitanni letter...The excavations in Hattus'a, Mari, Ugarit, and Emar yielded new Hurrian texts...and the roster of Hurrian proper names rose into the thousands as a result of material uncovered in Nuzi, Kurruhanni, Alalakh, Ugarit, and many other places...One particularly extreme position was adopted by Ungnad (1936), who considered them to be the oldest ethnic substratum of Mesopotamia and of prime importance in post-neolithic culture..A new approach to the subject was postulated by I.J.Gelb, who proposed a clear-cut distinction between Hurrians and Subarians. In his view, the latter had been the linguistic and ethnic substratum of northern Mesopotamia since earliest times, while the former were merely late arrivals, a view shared by Speiser... (Gelb 1944)...Undue importance has long been attached to the historical significance, still controversial today, of the groups speaking Indo-Aryan, the origin of a whole range of names and appellatives which appear from the 15th century BCEonwards in texts from the Hurrian Mitanni kingdom and its political and cultural spheres of influence. Investigations into this specialist area within Hurrian studies have been charted by M. Mayrhofer (1966, 1974) in the form of an analytical Bibliography... the question of a possible prehistoric migration, perhaps from the other side of the Caspian Sea (Kammenhuber 1977, 1978: 214), must remain a matter for speculation until new sources come to light...Hurrians may be presumed to have been in the Near East from early times on the basis of the old Sumerian craft-word ta/ibira, 'copper worker', for which convincing proof of a Hurrian source can be adduced (Otten 1984, Wilhelm 1988). Atal-s'en describes himself as the son of one S'atar-mat, otherwise unknown, whose name is also Hurrian. The rule of Atal-s'en cannot be dated with certainty, but probably belongs to the end of the Gutian period (ca. 2090-2048 BC), or into the first decades of the Ur III period (2047-1940 BC)...Records from the Ur III period reveal that the mountain areas to tbe east and north of Tigris and Euphrates valley were at this time occupied by Hurrian-speaking peoples, who had meanwhile also penetrated the eastern Tigris country to the north of the Diya_la...As a result of S'ulgi's (2029-1982) wars, large numbers of Hurrian prisoners found themselves in Sumer, where they were employed as a labour force. This why so many people with Hurrian names can be traced in Southern Mesopotamia in the Ur III period...the etymology of some names is certainly or most probably Indo-Aryan, for example Artatama = Vedic r.ta-dha_man 'whose abode is R.ta', Tus'ratta (Tuis'eratta) = Vedic tves.a-ratha 'whose chariot surges forward violently', Sattiwaza = Old Indo-Aryan *sa_ti-va_ja 'acquiring booty', Vedic va_ja-sa_ti 'acquisition of booty' (Mayrhofer 1974: 23-25)...since the Hurrian language was in use in the 14th century BCEat least as far away as Central Syria (Qatna, also probably Qadesh), and since this expansion probably results from the population shifts during the rise of Mittani, it is not a priori impossible that

Indo-Aryans also made their way to this part of the country...Among the gods who were still being honoured in the late 14th century by the kings of Mittani, we find Mitra-, Varun.a-, Indra-, and the Na_satya-twins, who are known to us from the Vedas, the oldest Indian poems. However, in as much as they are only attested so far in two versions of a state treaty (Laroche 1971 Nos. 51 and 52), the worship of these deities may have been restricted to dynastic circles. The inherited names of the kings of Mittani make it clear that the Indo-Aryan speaking groups played a role in the changing scene in North Mesopotamia in the 16th and 17th centuries which was not unconnected with an accomplishment suggested by the sparse remains of the Indo-Aryan language itself: various terms for horses, current in Nuzi in the early 14th century BC, were certainly or probably of Indo-Aryan origin (Mayrhofer 1966: 17ff., 1974: 29f.; also Kammenhuber 1968: 211ff.), and a Hittite tract on training horses (Kammenhuber 1961) derives from a Mittani expert in this field and contains Indo-Aryan technical terms, and from these two facts we may deduce that the Indo-Aryans were experienced in the breeding and training of horses. A combination of this equestrian skill and the use of the two-wheeled chariot engendered a military expertise which without doubt contributed much to the expansion of the Mittani kingdom...The two-wheeled chariot itself is now generally considered to have developed in the Near East and not, as once thought, to have been imported by the Indo-Aryans...In Mittani as well as in Syria and Palestine chariot-drivers were called marijanni-na, a term that has often, though not uncontroversially, been linked with the Old Indian marya 'yong man' (in Avestan also 'member of a group of men' (Mayrhofer 1966: 19, 1974: 16, Kammenhuber 1968: 222f., Diakonoff 1971: 76, Laroche 1980: 168)... (Gernot Wilhelm, *1989, The Hurrians*, trans. by Jennifer Barnes, Warminster, Aris and Phillips Ltd.).

"...on the other side of the Fertile Crescent. Here, from the beginning of the historical record to the middle of the second millennium BCE, it was the Hurrians who penetrated the agricultural regions of the lowlands--through long periods of time peacefully and as individuals, but occasionally en masse and in a warlike manner. The earliest written sources providing information about the political and linguistic situation in northern and eastern Assyria as well as in western upper Mesopotamia reveal that Hurrian minor states already existed in these districts about 2200 BCE. We cannot say when Hurrians first arrived in this area. Linguistic criteria, however, seem to indicate that the ancestors of the historical Hurrians had already inhabited the mountainous regions of eastern Anatolia for several centuries... The Sumerians probably borrowed their word for 'coppersmith' (TABIRA, TIBIRA) from proto-Hurrian [Hurrian *tab-li* 'copper founder'; *tab-iri* 'the one who has cast (copper)']...



Map of the kingdom of Mitanni, ca. 14-15th cent. BCE

"...letters and documents of the Old Assyrian trading colonies of the twentieth and nineteenth centuries...

reveal that although practically no Hurrians lived in Kanesh (modern Kultepe), the center of trading activity, Hurrian names were common south of the Anti-Taurus Mountains in this period. We do not know when Hurrians migrated into the area between the Euphrates and the Mediterranean. The Ebla tablets of the twenty-fourth and twenty-third centuries give no indication of Hurrians in this region...

"...The Egyptian tomb biography of Amenemhet, an official who claimed to have invented a device for measuring time, refers to events of the final decades of the sixteenth century and includes the earliest mention of the name of this trans-Euphratean Hurrian state: Mitanni. This designation originates from the personal name Maitta, which is often attested in texts from Nuzi (modern Yorghun Tepe)...The names of the kings of Mitanni are known to us only from the early fifteenth century and later. Not one of these names is Hurrian. Rather, they are all derived with more or less certain etymologies from an archaic form of Indo-Aryan...In addition, a number of gods known from ancient Indian religious texts, such as Mitra (Mithras), Varuna, and the divine pair of the Nasatya, were worhipped at the court of the Mitannian dynasty. Finally, a number of words of Indo-Aryan origin are found in texts having some relation to Mitanni, most importantly terms associated with horse breeding, as well as the designation for the Mitannian chariot driver (*mariyanni*)... As the dynasty of Mitanni maintained the tradition of Indo-Aryan throne names into the thirteenth century, we may assume that the dynasty itself was of Indo-Aryan origin... the language spoken in Mitanni remained Hurrian...

"...At present the earliest known direct evidence for a Mitannian ruler is the seal of a King Shuttarna, son of Kirta. Impressions of his seal are found on two records from the second half of the fifteenth century produced by a later king, namely, Saushtatar...

Drawing of the seal impression of King Saushtatar, Mitanni; from a tablet found at Nuzi; now in the museum at An Nasiriyah, Iraq (drawing by Diana Stein-Wunscher). The seal also gives the name of Saushtatar's father: Parsatatar. Legend on the impression: **Saushtatar, son of Parsatatar, King of Maittani.** The seal draws upon the glyptic heritage of northern Mesopotamai, where the repertoire of Early Dynastic and Akkadian themes was revived by multifarious winged monsters and demons. Created at the height of the Mitannian kingdom, this seal survived several generations as a dynastic seal used by Artas'umara and Tus'ratta at Tell Bra_k (Finkel 1985; Oates 1987) and by an unknown king at Nuzi (Stein 1989). The seal impressions on tablets have been found at Nuzi, Iraq and Brak, Syria. Porada, 1979, Fig. 2. Period Vb.

"The seal of Shuttarna I still stands fully in the tradition of Mesopotamian glyptic...The rule of Parrattarna I is to be dated to the first half of the fifteenth century...Already in the late sixteenth and early fifteenth centuries the expansion of Egypt under the first kings of the Eighteenth Dynasty had led to a confrontation with Mitanni. After the reign of Queen Hatshepsut, who interrupted this military expansion, Thutmose (Tuthmosis) III continued his grandfather's tradition and through far-ranging campaigns attempted to subjugate much of Syria to Egyptian rule...

"...The son and successor of Artatama, Shuttarna II, sent another Mitannian royal daughter to Egypt, where Amenhotep (Amenophis) III now rules...About 1365, Amenhotep was forced to break off diplomatic relations with Mitanni after the murder of its king. Following Shuttarna II, his son Artashumara became king, but after what was probably only a short reign--recently documented by a record from Tell Brak issued in his name--he was murdered and replaced by a younger brother Tushratta, who was still a minor...The most important source for the history of Mitanni from the reign of Artatama I on is constituted by the letters that Tushratta later--after his assumption of full rule--sent to the pharaohs. In these letters, which were discovered at Tell al-Amarna (Akhetaten) in Middle Egypt, he often refers to past events...He mentions as his initial military success a victory over the Hittites...Amenhotep accepted Tushratta's offer of the resumption of friendly relations. On his side, hearing of an illness of the pharaoh, Tushratta sent him the statue of the famous godess Shawushka of Nineveh, as his father Shuttarna had already done before him...

"...A Hittite army was sent to reconquer Mitanni, where Kili-Teshub henceforth bore the Indo-Aryan throne name Shattiwaza (formerly also read as Mattiwaza or Kurtiwaza). Since a copy of the Hittite-Mitannian treaty was deposited before 'Teshub, lord of the KURINNU of Kakhat,' this city, which probably is to be identified with Tell Barri (near the center of the Khabur triangle), must have belonged to the area controlled by Shattiwaza...Hittite influence over Mitanni was not of long duration. Shuppiluliuma died a few years later; his successor, Arnuwanda II, survived him for only about a year; and the next king, Murshili II, was still a youth and lacked the prestige of an experienced warrior...

"...Shattiwaza's country was no longer called Mitanni, but rather Khanigalbat...we learn that a king of Khanigalbat by the name of Shattuara I, probably the successor of Shattiwaza, owed tribute to Assyria...A change took place when the son of Shattuara, named Wasashatta (the

inversion of Shattiwaza), in vain sought the support of Khatti against Assyria..."

(Gernot Wilhelm, 1995, The Kingdom of Mitanni in Second-Millennium Upper Mesopotamia, in:Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, Vol. II, pp. 1243-1254).

"Chariot models in clay as well as pictorial representations and full-sized chariots in burials show that wheeled vehicles had begun to make an appearance, but probably only for ceremonies, for their design suffers from severe shortcomings. Two main types are known: the four-wheeled 'battle-car', conveying a spear-thrower, and the two-wheeled chariot, which may have been developed for the hunt. Since horses seem to be unknown in Mesopotamia until the end of the third millennium, some other kinds of equid – perhaps onagers – acted as draft animals. The vehicles were very heavy; their wheels were of solid timber, perhaps banded with tires of rawhide, metal or wood. The axles were probably fixed to the wheels and so rotated with them. The draft pole was straight, and fixed very low down at the front. Such vehicles cannot have been swift or maneuverable; they appear to belong always to men of very high status. Indeed, it may in marking status that their importance lies, rather than as a practical asset in war. When they eventually developed into efficient battle chariots, they never lost that early association with superlative status. This is largely because a man had to be very wealthy to own and maintain a chariot and a team of horses. (Horses seem to have appeared in Mesopotamia around the end of the third millennium.)…

"The Amarna and Middle Babylonian Periods…Late Bronze Age in the second half of the second millennium…Battle chariots regularly had two wheels, mostly with four spokes (although six, eight, and nine are also known), and were drawn by a pair of horses, with one or two more running beside them as outriggers. A chariot-owning aristocracy arose, known as **mariyannu/martianni** which is thought to come from a word of Indic origin. Aryan involvement is confirmed by a horse-training manual found in the Hittite capital Bogazkoy (ancient Khattusha), in which many technical terms are given in an Aryan language related to Sanskrit…The time and expense involved in training and equipping for the chariot-owning aristocracy was such that soldiering became a more professional, hereditary occupation which affected activity all year round even though campaigns remained seasonal…Charioteers wore body armor consisting of copper or bronze platelets which overlapped and were attached to leather garments, the whole weighing up to fifty-seven pounds (about twenty-six kilograms). Sets of such armor were issued from the palace treasury, **bi_t nakkamti**, by the official in charge, **s'a_kin bi_ti**. Helmets were sometimes plumed and coverred in scales; one set of body armor, according to an administrative text, required 400 large copper scales for the coreselet, 280 small scales for the sleeves, and 190 scales for the helmet. The king was accompanied by a bodyguard known as 'men at the king's feet', s'u_t s'e_pe_ s'arri, consisting of ten chariots each containing the driver and an archer, with quivers containing upto fifty arrows attached to the side of the chariot car…Specialist craftsmen, including carpenters and bronzeworkers, were counted among palace staff. The Nuzi texts indicate that the economy of palaces was largely devoted to military supply with a professional organization that was capable of moving very large armies over long distances." (pp. 414-417).

[Setphanie Dalley, Ancient Mesopotamian Military Organization, in Jack M. Sasson (ed.), *Civilizations of the Ancient Near East*, pp. 413-422].

"The earliest weapons found in the Near East are microlithic projectile points from the Mesolithic period, some, at least, of which were used as arrowheads…Fortifications, which may be taken as evidence for the practice of warfare, appeared as early as about 4300 BCE at Mersin, in Cilicia, where a solid wall with projecting

sections and simple interval towers was integrated into a ring of houses constructed on the wall's interior face. The system featured a simple straight gate passage, flanked by towers. By 3000 BCE, the city of Uruk in southern Mesopotamia was surrounded by a fortification wall about 9.5 km (6 mi.) long, built, according to the Epic of Gilgamesh, by Gilgamesh himself…By 3000 BCE the cities of Egypt were fortified with massive, solid walls strengthened by equally massive solid interval towers, sometimes rectilinear and sometimes semicircular…In about 2000 BCE, the most important …events were the collapse of the empire of the third dynasty of Ur (c. 2000 BCE) and the reunification of Egypt by Mentuhotep II (c. 1900 BCE)…In about 1600 BCE the first dynasty of Babylon was brought to an end by conquest by the Hittite king Mus'ili I, and in about 1550 BCE Ahmose I, first king of the eighteenth dynasty of Egypt, expelled the Syro-Palestinian dynasts…

"In Mesopotamia, the period beginning in about 2200 BCE saw the introduction of a revolutionary new weapon, the composite bow, which is first seen in the hands of NaramSin, King of Agade. His armies, like those of his grandfather, Sargon the Great, reached as far as the Mediterranean Sea.Yigael Yadin suggests that this weapon, with its unprecedented range and power, was a major factor in these conquests. (Yigael Yadin, 1963, *The art of warfare in biblical lands in the light of archaeological study*, London)…

"Middle Bronze Age II.. The crescentic battle-axe became heavier and generally had a socket for the haft. The advent of bronze body armour and helmets led to developments in the battle-axe, which became elongated and slender. Ultimately, it was reduced to a heavy armour-piercing spike, rather than the cutting edge it had been in the Early Bronze period. The wide-spread use of bronze also led to the development of the first swords, which were sickle shaped, with the cutting edge on the outside of the curved portion of the blade…The daggers of this period were distinctive, having a broad, veined blade attached to the hilt by rivets in a short tang. These daggers frequently had a crescentic pommel, often of stone. The type originated in Mesopotamia in the Early Bronze Age and in the Middle Bronze Age spread throughout the Near East and into Europe. Javelins and socketed thrusting spears were also in widespread use, as were slings, known primarily through artistic depictions.

"Although the compound bow had long been in use in Mesopotamia, surviving bows from Middle Kingdom Egypt, like the artistic depictions of bows, are all of the simple self-bow type, although some of them are slightly double-convex.

"At some point, probably late in Middle Bronze Age IIC/Middle Bronze Age III, a weapon was introduced into the Levant which was to change the shape of warfare in the ancient Near East and become the most important tactical factor until the end of the Bronze Age. This formidable weapon was the horse-drawn, two-wheeled chariot. Lightweight and highly maneuverable, the chariot served both as an assault weapon to break up infantry formations and as a mobile firing platform. As the infantry had no answer to the onslaught of chariots, particularly when they were used en masse, they quickly came to dominate warfare. In the form in which they were introduced into the Near East they came from the steppes of Central Asia. The manual used for training horses throughout the region then is known for its Indo-European technical terms, including the equivalent of the mediaeval knight: the **maryanu** warrior or charioteer." [Rupert Chapman, Weapons and Warfare, in: Eric M. Meyers, ed., 1997, *The Oxford Encyclopaedia of archaeology in the near east*, Oxford University Press, pp. 334-339).]

IE wagon, 'ratha', as a dwelling; ignorance of the use of bricks and mortar for houses

"Chapter IX. Dwellings. Wagon-Dwellings -- Terminology of Wagon-Building-- Underground Habitats -- Indo-Germanic Huts -- Their Materials -- Their oldest Form -- Door -- Window -- Hearth -- Stalls...The ancients knewe that a great portion of the north of Europe was occupied by a semi-nomad population, whose only dwellings were their wagons, on which they conveyed their goods and chattels, wives and children, to fresh settlements and pastures new. This is stated most unanimously, with regard to the east of Europe, about the Scyths and Sarmatae, whose wagon-life is one of their most important characteristgics: 'Campestres melius Scythae, quorum plaustra vagas rite trahunt domos, vivunt et rigidi Getae.' (Hor., c. iii.24).

"But the same custom is to be found amongst peoples undoubtedly Indo-Germanic. Thus, the Bastarnae, the first Teutonic tribe to make its appearance in history (about BCE 200), carry their wives and children on wagons with them (Mullenhoff, *D.A.*, ii. 104, f.)...The dwellings of the Cimbri, which likewise were on their wagons ('domus plaustris impositae'), were defended by the dogs when their owners fell (Pliny, *Hist. Nat.*, viii.40.61), etc. (The most frequent term for the travelling wagon of the north is the Lat. *currus*, probably itself a barbarous word...Cf. O.I. carr, OHG charro, also καραμα ...In war these *carri* were used as a defence, *carrago*.)...

"After what we have said above (ch. v) about the unsettled mode of life amongst the other Indo-Europeans, and about the weakness of the ties that bound them to the soil on which they settled, there can be no doubt that the use of wagons as dwellings is a trait from the life of the primeval period which the northern tribes preserved. Nor can we wonder if we find a tolerably extensive terminology for wagon-building in the original language. To say nothing of the fact that nearly all Indo-European languages plainly use the root *ve^gh* to designate the wagon (Sanskrit va_hana, G. οχημα̣OHG. wagan, OS vozu, Lith. wezimas, OI fen (*veg-n), we find agreement in the names of the following portions of the wagon:

Wheel: Lat. rota, Lith. ra~tas, OHG rad, OI roth, Sans. ratha ('wagon')

Wheel: Sans. cakra, G. κνκλοαζ AS hweol (*qw-qlo'J)-- without reduplication: OS kolo, ON hve~l

Axle: Skt.. aksha, G. αεων̣ Lat. axis, OHG ahsa, OS osi, Lith. aszis.

Nave: Skt. na_bhi, AS nafu, OHG naba, OPr. nabis.

Linch-Pin: Sans. a_n.i, OHG lun, AS lynes, O.Sax. lunisa, (Fick, *B.B.*, vii.95).

Pole: Lat. te^mo^ (*teicsmo^), OHG di^hsala, ON pisl, AS thi^xl (?).

Yoke: Skt. yuga, G. ξνγον̣ Lat. iugum, Goth. juk, OS igo, Lith. jungas, Cymr. iou.

"**In this collection, it will be observed, there is no equation for the spoke of the wheel (Sans. ara_, G. κνγμ̣γLat. radius, OHG speihha). The terms for felloe also diverge, except G̣.ιτνυζwhich correspond exactly to Lat. vitus (lit. 'withy'). Perhaps OHG felga, 'felloe' belongs to OHG felawa, 'withy' (above, p. 271).**

"This indicates that we must conceive the primitive wheel as being without spokes. In the oldest times the only way known of making a pair of wheels was to hew them and the axle-tree connecting them all in a piece out of one and the same tree-trunk: and it must therefore be regarded as an advance when -- obviously before the dispersion -- the art of manufacturing the axle-tree separately, and of fastening it into the tympanum by means of a linch-pin, was discovered. (emphasis added).

"The picture we thus get corresponds to the description given by the ancients of the Roman plaustrum: 'The wheels of the plaustrum have not spokes, but are tympana which are of a piece with the axle-tree, and are surrounded by

a rim of iron. The axle-tree turns round with the wheels; for the wheels are fastened by the spindles, i.e., the most projecting part of the wheel' (Probus on Virg., *Georg*., i.). The Teutonic wagon drawn by cattle, which is represented on the triumphal column of Marcus Aurelius, must have been exactly the same (cf., e.g., Felix Dahn, *Urgeschichte der germ. und roman. Volker*, ii. 161).

"The acquaintance of the Indo-Europeans from of old with the art of wagon-building may be regarded as a distinctive characteristic of this family of peoples, which marks them off alike from the neighbouring Finns and the tribes of Turko-Tataric origin. Everything in the Finn languages relating to the art of wagon-building is of Slavonic or Teutonic origin (Ahlqvist, *Kulturwurter*, p. 125). So, too, according to Vambery (*Premitive Kultur*, p. 128), the wagon has been a foreign invention to the Turks of all times. From primeval times the inhabitants of the Asiatic steppes have employed the camel instead to carry on its patient back, tent, wife, and child. The Indo-Europeans however, who, as we saw on p. 267, did not enjoy the acquaintance of this valuable beast of burden, which is wagon and horses all in one, were at an early time driven to invent the wagon, a *sine qua non* of their wandering mode of life...

"...what their habitations were like...Here we have first to speak of the subterranean dwellings, i.e., dwellings dug in the earth, the existence of which is recorded amongst numerous Indo-Germanic peoples, and which afforded protection alike against the summer's heat and the winter's cold. Such habitations were still known in the Avesta under the name of kata* (: kan, 'dig') (Perhaps OS kasta, 'house, hut, tent', from *kont-ja, also beings here. It may be remarked that the Finn name for house is exactly the same as in Iranian: Finn kota, Esth. koda, Mordv. kud, Tscherem. kuda. Is this a case of borrowing?...Anyhow, the Finn. sauna, Esth. sawn, etc., 'subterranean dwelling', is genuinely Finn.). This word may be the source of the usual term for house in modern Persian (kad, kadah) and in the Pamir dialects (ked, ced, etc.); cf. Tomaschek, *Pamir D.*, ii. 77...

"The old Teutonic name for this kind of ssubterranean dwellings and weaving-rooms was OHG tunc; and to this day tung is the name given in Nurnberg, dung in Augsburg, to a cellar-like weaving-room. Now, as Tacitus expressly speaks of these dwellings being covered by fimus, nothing seems more obvious than to regard tunc, 'textrina', as identical with OHG tunga, 'stercoratio', 'manuring' (Wackernagel, *Haupts Z.*, vii.128, ff.). Only, on closer examination, it seems extremely suspicious that the Teutons should designate a kind of dwelling by a word which originally meant simply 'excreta' -- manuring was probably not known as early as Tacitus (Rautenberg, *Progr.*, p. 15, f., Hamburg, 1880).-- and not byh a derivate from the word.It seems to me, therefore, more reasonable to separate, as Graff (Sprachschatz) wished to separate, the two Old High German words, tunga, 'dun:ging', and tun, 'dwelling dug in the earth'. The latter can be referred to an Indo-Germanic dhn:gh. With this we could then connect the hiterto unexplained stock of words, G. ταφ–ροξ, 'trench'...in a perfectly regular manner as regards both phonetics and meaning...OHG tunc would then be equivalent to gruobe, with which it is occasionally synonymous (Wackernagel, loc. cit., p. 131)...

"It is, however, beyond the possibilities of doubt that they (Indo-Europeans) were already acquainted with the beginnings of the art of building huts and houses. This is directly indicated by such equations as: Sans. dama, armen. tun, Lat. domus, OS domu~, OI aur-dam, 'prodomus'; Goth. timrjan, 'joinjer'...Sans. s'a_la_, Lat. cella, Teut. halla (: cela^re, OHG helan); Zend. dvarem, 'door', Armen. durn, Lat. fores (also forum), OS dviri, 'door' (dvoru = forum), Lith. durys, Goth. daur, OI dorus (Sans. dva_r- (?)...

"According to the statement of Tacitus (*Germ.* 16), the Teutons were ignorant of the use of bricks and mortar...Herodian says (vii.2) of Maximinus: 'He burnt down (anno 234) the whole district (of the Alemanni, Chatti, Hermunduri)...fopr the fire readily consumed whole dwellings, as owing to the absence of stone and bricks they are made entirely of wood,' etc. (cf. Baumstark, *Ausf. Erl.,* i. 566). Basket-work, too, was employed, as linguistic evidence indicates. Thus, in Old High German, want, 'wall', stands by the side of Goth. vandus, 'withy', in Gothic itself the wall is called vaddjus (ON veggr), which, coming from *voj-u-s, may belong to the root vei (*vej-eti) mentioned in the previous chapter on p. 329, with the original meaning in this case of 'plait'...

"What indirectly proves that stone buildings were unknown to the Teutons is the fact that nearly all terms relating to this new art are derived from the Latin. A reference to the collections in W. Franz (*Lat. -rom. Elemente im Althochd.*, Strassburg, 1884), will here suffice. Cf. OHG mu^ra = mu^rus, ziegel = tegula (The Goths had a native word, skalja...)...pfost = postis, phi^lari = pilarius, turri = turris, scintala = scandula, pforzih = porticus, charch = calx, etc...

"The state of things among the Slavs is similar. That the Veneti built houses even in the first century BC, in contrast to the Sarmatae, *in plaustro equoque viventibus*, is stated by Tacitus (*Germ*. c. 46). What miserable affairs these houses continued to be even centuries later is shown by what Procopis says (*B.G.*, iii.14)...Here too, language shows that we are only to think of wooden structures, for 'there is no pan-Slav expression to warrant the assumption that the primitive Slavs understood the art of building with stone' (Krek, *Einleitung,* p. 145)...

"It is very remarkable that a term for the house as a whole (OS hyzu), which recurs in all Slavonic languages, was borrowed, and that at an early date, from Teutonic (OHG hu^s, etc., of uncertain origin). OS hlevu, 'stall, hlevina, 'house', are probably of similar origin (O.Sax. hleo, ON hle, Goth. hlija)...

"In view of the undoubted dependence of the Greeks on the orientals for the art of building, it is a characteric feature in their linguistic attitude towards the intrusions of foreign culture (cf. above, pp. 74,146), that they confine themselves almost entirely to the resources of their own language in providing for the terminology of building...The linguistic attitude of the Romans towards Greek culture differed from that of the Greeks towards Semitic civilisation; and a very considerable number of Greek termini, belonging to a more advanced stage in the art of building, were taken over by Latin in the course of time (O. Weise, loc.cit., p. 193, ff.).

"Finally, the Indo-Iranians of the oldest period were also quite ignorant of stone buildings. In the epoch of the Atharvaveda the Indian houise was a purely wooden structure, which is described by Zimmer (*Altind. Leben*, p. 153) as follows: 'Pillars -- four in number-- were erected in the solid ground, and stays were placed obliquely against them. The corner pillars and foundation pillars were fastened together by roof beams. On them wer eplaced long bamboo rods, to act as spars for the lofty roof. Between the corner pillars various posts, according to the size of the house, were also erected. Straw or reeds were used in bundles to fill the insterstices in the walls, and to a certain extent to line the whole. Nails, clamps, cords, and straps served to hold the whole together.'

"A very similar appearance may have been presented by the house of the Avesta, about which, however, we know but very little (cf. W. Geiger, *Ostiran. Cultur*, p. 216); though the ancient Persians already knew how to burn bricks (Zend ishtya).

"How lightly built and tent-like, at any rate, the house of the Avesta people was is shown by a passage of the Vendidad to which Geiger (*loc.*

cit.) refers, where in the case of a man.who has died from home two alternatives are mentioned as possible: either to take the corps to the dwelling or the dwelling to the corpse...

"Precautions must have been takenn at an early period to confine the fire to a certain place in the hut. Perhaps we may place here the -- certainly doubtful -- equation: Goth. auhns, OHG ofan = Sans. ukha~, 'vessel'. Cf., further Goth. azgo, 'ashes...just as Sans. a^sa, 'ashes' (Sans. a^sht.ri^, 'fireplace') = Lat. a~ra, Umbr. asa (OHG essa)...How foreign the notion of a regularly heated room was originally to the whole north is shown by the circumstance that the expression for the idea, though its origin is not yet ascertained, was taken over by the Teutonic (OHG stuba, Romance (It. stufa, and Lithu-Slavonic (Lith. stuba, OS istu~ba) languages alike...

[Dr. O. Schrader, 1890, *Prehistoric Antiquities of the Aryan Peoples: a manual of comparative philology and the earliest culture being the 'Sprachvergleichung und urgeschichte of Dr. O. Schrader'* translated by Frank Byron Jevons, London, Charles Griffin and Company, Exeter Street, Strand, pp. 338 to 354].

Sarasvati Civilization

An overview

A historical project in search of River Sarasvati to discover our roots, has become a magnificent opportunity for national resurgence and to make Bharat a developed nation.

This is presented in three sections: observations, conclusions and areas for further research.

Observations

Many sparks have emerged from the anvils of scholars and researches of a variety of disciplines – all focused on the roots of civilization of Bharat.

Collated together, these sparks have become a floodlight which throws new light on the civilization of Bharat.

It is a new light on the civilization because of the following reasons:

- A mighty river, a river mightier than Brahmaputra had drained in North-west Bharat for thousands of years prior to 1500 BCE (Before Common Era).

- The collective memory of a billion people, carried through traditions built up, generation after generation, recalls a river called Sarasvati; this memory is enshrined in the celebration of a Mahakumbha Mela celebrated every 12 years at a place called Prayag where the River Ganga joins with River Yamuna. River Sarasvati is also shown as a small monsoon-fed stream in the topo-maps of Survey of India and in village revenue records in Punjab and Haryana.

Yet, the tradition holds that there is a triven.i san:gamma (confluence of three rivers). The third river is River Sarasvati. This tradition has now been established as a scientific fact – ground truth -- thanks to the researches carried out using satellite imageries, geo-morphological studies, glaciological and seismic studies and even the use of tritium analysis (of traces of tritium present in the bodies of water found in the middle of the Marusthali desert) by atomic scientists. The desiccation of the river was caused by plate tectonics and river migrations, between 2500 and 1500 BCE.

These studies have established beyond any doubt that River Sarasvati was a mighty river because it was a confluence of rivers emanating from Himalayan glaciers; the River Sutlej and River Yamna were anchorage, tributary rivers of River Sarasvati. The river had drained over a distance of over 1,600 kms. from Manasarovar glacier (W. Tibet) to Somnath (Gujarat) with an average width of 6-8 kms. At Shatrana (south of Patiala), satellite image shows a 20 km. wide palaeo-channel (ancient

course), at the confluence of five streams – Sutlej, Yamuna, Markanda, Aruna, Somb – referred to as Pan~ca Pra_ci_ Sarasvati in Bharatiya tradition. This becomes Saptatha Dha_ra Sarasvati when two other streams – Dr.s.advati and Ghaggar – join the River Sarasvati at Sirsa

- A civilization was nurtured on the banks of this River Sarasvati as recognized through the work of archaeologists and the geographical/historical facts contained in ancient texts of Bharat, such as the *Mahabharata* and *Pura_n.a.* This civilization was an indigenous evolution from earlier than 10000 BCE and can be said to be one of the oldest civilizations in the world, heralding the Vedic heritage.

Over 2,000 archaeological sites have been discovered in the Sarasvati River Basin. There is a description, in 200 s'lokas, in the S'alya Parva of Mahabharata of a pilgrimage undertaken by Balarama, elder brother of Kr.s.n.a, along the River Sarasvati from Dwaraka to Yamunotri.

- The oldest extant human document is the R.gveda which is a compilation of 11,000 r.ca-s perceived by hundreds of seers. An understanding of this document is fundamental to an understanding of the cultural ethos of Bharat.
- R.gveda presents a world-view in allegorical and metaphorical terms perceiving an essential unity in cosmic phenomena and r.ta (a rhythm which modulates the terrestrial and celestial events alike). While the document presents the early philosophical thought related to *dharma,* it also describes the lives and activities of people – the Bharatiya. R.gveda thus presents a variegated picture covering a variety of facets of a maritime-riverine civilization, such as transport systems, agriculture, use of fire, minerals and metals to produce household utensils, ornaments, tools and weapons. Archaeologists have unearthed many examples of technology used in the days of the Sarasvati Civilization (from circa 3500 BCE to 1500 BCE). These provide evidence for the evolution of s'ankha industry in 6500 BCE, preparation of alloys such as pan~caloha, bronze, brass, pewter and bell-metal.
- A dialectical continuum has existed in Bharat from the days of R.gveda and Sarasvati Civilization. The civilization constituted a linguistic area, as it is even today in Bharat. Mleccha was a language spoken by Vidura and Yudhis.t.hira as evidenced by *Mahabharata*. Mleccha were vra_tya-s who worked with minerals and metals. The semantic structures (words and meanings) of all languages of Bharat – Munda, Dravidian or Indo-Aryan categories – present an essential unity among the speakers of various dialects of Bharat. The seven volume work on Sarasvati substantially draws upon the *Indian Lexicon*, which is a comparative dictionary of over 25 ancient languages of Bharat.
- Using this lexical repertoire of the linguistic area called Bharat, it has been possible to crack the code of the epigraphs of the civilization inscribed on over 4,000 objects including seals, tablets, weapons and copper plates. The epigraphs are composed of hieroglyphs (referred to as Mlecchita Vikalpa – picture writing --, one of the 64 arts listed by Va_tsya_yana).

The code of hieroglyphs is based on rebus (use of similar sounding words and depicted through pictures) and represent the property possessions of braziers – possessions such as furnaces, minerals, metals, tools and weapons. These were also traded over an extensive area upto Tigris-Euphrates river valley in Mesopotamia and the Caspian Sea in Europe.

- The tradition of epigraphy evidenced in punch-marked coins and copper plate inscriptions in the context of Sarasvati Epigraphs points to millions of manuscripts and documents remaining unexplored all over Bharat.
- Ongoing projects for the rebirth of River Sarasvati has opened a new vista in water management in Bharat, which has an ancient tradition of water management exemplified by the rock-cut reservoir in Dholavira, the grand anicut on Kaveri, the step wells and pus.karin.is in all parts of Bharat.
- Desiccation of River Sarasvati is a warning to us about the unpredictability of the impact of tectonics on hydrological systems sourced from the Himalayas, for e.g. the Rivers Ganga and Brahmaputra.

Conclusions

- River Sarasvati is neither a legend, nor a myth, but ground-truth, a river which was flowing for thousands of years prior to Vedic times.
- Bharatiya Civilization is an indigenous evolution and cultural continuity is established from the Vedic times to the present day.
- For thousands of years before the days of Mahabharata War (ca. 3000 BCE), the Bharatiya had contacts with neighbouring civilizations.
- The historicity of *Mahabharata* has been established making it a sheet anchoe of Bharatiya Itiha_sa.
- After the desiccation of River Sarasvati (finally by about 3000 years ago), Bharatiya-s moved to other parts of the world.
- The metaphor of Samudra manthanam (celebrated in the *Bha_vata Pura_n.a*) is a depiction of the reality of a cooperating society which had united all the people of Bharat into life-activities including the environmentally sustainable use of natural resource offered by Mother Earth (Bhu_devi).
- Sarasvati is adored in Bharatiya tradition as a river, as a mother and as a divinity – *ambitame, nadi_tame, devitame sarasvati.* This is an abiding spiritual foundation which resides in the heart of every Bharatiya.
- The epigraphs evidence one of the early writing systems of the world.
- The search and discovery of River Sarasvati has revealed a thread of essential unity – a bond among the people of Bharat. This has emerged from Vedic times and continues even today. This is the unity of an integral society, a resurgent nation and a unified culture which can be found in all parts of Bharat, from the Himalayas to the Indian Ocean.
- Research Institutions have to be established in different disciplines of historical studies to study the manuscripts and documents in the archival collections in all parts of the country.
- The initiation of a project for interlinking of rivers is a laudable, first step in creating a National Water Grid which has the potential to ensure equitable distribution of water resources to all parts of the country and to make Bharat a developed nation in 15 years' time.

The establishment of the Water Grid is a national imperative and should be an unmotivated action (*l'acte gratuite*) devoid of political overtones.

- The establishment of an inter-disciplinary Sarasvati Research Centre in Kurukshetra will help in progressing further researches on water resources management, and study of our history, heritage and culture.

Areas for further researches

- Glaciological researches are needed in relation to the glacial source of River Sarasvati which is referred to as *Plaks.a Pras'ravan.a* in the ancient texts.
- Seismological studies are needed to determine the chronology of events connected with the submergence of Dwaraka, the Gulf of Khambat and other coastal regions of Bharat.
- Meteorological, glaciological and seismological studies have to be related to plate tectonics – the dynamic Indian plate and the evolving Himalayas – for a better understanding of the hydrological systems, sustainability and management of a National Water Grid for Bharat.
- Archaeological work on the 2,000 sites on Sarasvati River Basin have to be related to the events described in the ancient epics: *Ramayana* and *Mahabharata*
- The Vedic texts, epics and Purana-s contain historical information.which can be validated through archaeological, astronomical and geographical studies.
- Epigraphical and language studies in relation to the evolution and spread of languages and scripts of Bharat.
- Scholars have to be encouraged to study the unexplored manuscripts lying in museums, libraries and private collections.
- Researches for establishing the National Water Grid should be objective and provide a new vision to reach out the water and agricultural resources of the country, equitably, to all people and for the development of the nation.

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End Notes

[1] **Cultural history of Himalaya: Metallurgical heritage of Badrinath**

Badrinath is a pilgrimage centre of Bha_rata. With the auspiciousness associated with metal weapons and the protective significance of weapons which adorn the s'ilpa of mu_rti in all temples of Bha_rata and in the sculptures which are seen all over Bha_rata, it is a reasonable hypothesis that Badrinath was also connected with the Bronze Age and metallurgical traditions of Bha_rata.

Indeed, it was. South of Badrinath was a band of ancient workings of copper mines.

Western Garhwal is the region where River Sarasvati_ originated from the Svarga_rohin.i mountain range (Bandarpunch massif, close to Rupin and Supin glaciers and the tributaries of Sarasvati_: Rivers Tons (Tamasa) and Giri), and north of Paonta Saheb in Himachal Pradesh. (Paonta Saheb now has a 10 km dia. lake as a relic of the spot where Yamuna captured the waters of River Sarasvati_ to join the Gan:ga at Prayag, after linking up with River Chambal -- Vais'ambhalya_, the nourisher of the vis').

"Jammu, Kashmir and Tibet. The areas which have major clusters of old workings are in the Banihal, Anantnag and Baramulla districts…In the Shomal area of Anantnag, the shafts are about 2m wide and 10 m deep while at Mamal, also in Anantnag, the hillside showed pits, generally 10m deep and 5m across. The old workings at Lashteal in Baramulla showed more complexity: the main shaft (1m wide) goes down for 3m, leveling off for about 5m to terminate in a room of about 10 cubic m. The shaft leading to it is about 2 m high. From the room-like space itself, a shaft (1m high) goes down steeply to come out of the side of the hill where the terrain is flatter and more accessible.

"Himachal Pradesh: Chalcopyrite and pyrite with some secondary chalcocite, malachite and azurite are spread along 13 km in the Shallu valley from Atoll to Batera in Simla district. The Chisani, Maol, Malanna, Kot Kandi, Chitrani, Shatgurh near Jerri and Kanor khad localities in Kulu showed copper, in addition to Narnaul and Danala where the mineralized zone extends for about 10 km in the Garsah valley, Uchih in the Parvati valley where pyrite and arsenopyrite occur at the **silver workings** and the Kulu Bijnar area where there are about 20 occurrences. In Sirmur, malachite stains were noted at Banal. Old workings with slag heaps have been noted in the Garsah valley, near Chisnai and in Sirmur (for the details, Raghunandan et al. 1981; Ball 1881).

"Uttar Pradesh: Kumaun-Garhwal: The occurrence of copper in the rgion including such high altitude districts as Chamoli and Pithoragarh have long been known. Ball (1881) is informative in this regard, but the old copper mines of Kumaon are also discussed in GW Traill's (1828) 'statistical sketch of Kumaun' and in an account of JD Herbert's 'on the mineral productions of that part of the Himalya mountains, lying between the Sutlaj and the Kali (Gagra) rivers' (JD Herbert, 1932, repr. 1980, On the mineral production of this part of the Himalaya mountains lying between the Satlaj and the Kali (Gagra) Rivers…, *Asiatic Researches*, 18, New Delhi,, 227-58). The most detailed early account is by FJ Stephens (1901-02: 393-414) whose description of the old workings and preindustrial mining methods underlines the scale and nature of copper extraction and ore processing in different parts of Kumaon. According to Stephens, there were two types of ore in the region: irregular deposits worked extensively at Dhanpur, Dobri and Al-Agur, and regular nodes distributed from near Pithoragarh to the area south of Badrinath and beyond Pokri. This 50 mile long band is the major copper-bearing zone of the region, with localities like Rai, Bellar and Barabesi in Kumaun and Gwaldrum and Pokri in Garhwal being located here. At Dhobri, Stephens noticed many old workings which ramified to an extraordinary extent. The Dhanpur hillside where the formations dipped with the slop of the hill and thus provided easier facilities for mining was burrowed with holes. Situated on the western bank of the Ramganga, the Al-Agur deposit where some old

workings went down to grat depths contained carbonate of copper and grey copper ore with a little pyrite. The other deposits included Tarag-ke-tal (10 miles north of Dwarrahath) and Goron (3 miles west of Pithagora) where the lodes were not rich but the old miners honeycombed them 'with holes like a rabbit warren, and taking out every particle of copper (FJ Stephens, 1901-02, Geology and mineral resources of Kumaon Garhwal, *Transactions of the Institution of Mining and Metallurgy*, X: 405). At Rai, Stephens noticed that 'the ancient miners must have gone down to a considerable depth, as every drive has more or less encountered unsuspected and masked old workings…the whole surface at Rai is honeycombed with irregular burrows of every description. In one of these, the remains of a skeleton partly impregnated with copper carbonate was discovered' (Stephens 1901-2: 409-10)." [Chakrabarti and Lahiri, 1996, pp. 14-15].

Pre-Harappan cultures. Aq Kupruk. "In Afghanistan, at Aq Kupruk (Dupree 1972; Shaffer 1978) the remains of an epipalaeolithic (last stage of Palaeolithic cultures) culture go back to c. 15,000 BCE, followed by a Neolithic culture with the evidence of domestication of sheep and goat. These Neolithic levels, without pottery, have provided two uncorrected (5730-half-life based) radiocarbon dates, viz. 8565+-240 BCE and 6960+-105 BCE (approximately 10,000-8,000 BCE calibrated). The subsequent ceramic bearing levels are dated by four dates viz., 5806 BCE, 5638 BCE, 5292/5286/5241 BCE and 3307-3110 BCE (Possehl 1990: 3-4). Thus, the beginning of the ceramic Neolithic, hence of pyrotechnology, in South Asia goes back to the sixth millennium BCE.

"Mundigak…(Period I) the most frequent metal artefact of the entire Mundigak sequence was a simple type of bronze point or punch with a circular cross-section…Frequently encountered utilitarian objects in Periods III-IV were small curved knives or sickles and chisels, and only in Period IV, a few barbed hooks. Three important metal artifacts located in Period III were the only examples of socket-hole axes (two) and an adze…Mehrgarh…The lowest levels of Mehrgarh, in area MR-3, yield a Neolithic culture with stone and bone tools: polished axes, adzes and chisels…Period III may be placed in the first half of the fourth millennium BCE…In Period III, fragments of crucibles with traces of melted copper, and **bun-shaped copper ingots** were also found…Period IV (c. 2800 BCE)…**A chisel, a flat axe and a double-spiral headed pin were the copper artifacts, as also compartmented seals, both in terracotta and stone**…Period VIII (mid-third millennium BCE)…The typically Harappan designs of **pipal-leaf, fish-scale and intersecting circles** had begun to appear in Period VII. The terracotta humped bull reminds one of the Harappan counterparts. The designs on terracotta seals include the **swastika, cruciform motifs** and what looks like **running animals**…Period VIII (contemporary with the late Harppan)…Bronze objects including a **shaft-hole axe**…Nausharo…6 km. South of Mehrgarh…Period II (first quarter of 3rd millennium BCE)…some pots bear characteristic signs of the Indus script…all structures of Period ID had been 'heavily burnt and the walls turned red due to heat' (Jarrige 1989: 64)…Damb Sadat…copper objects inclusive of a dagger, alabaster vessels, a compartmental seal, clay and shell bangles, bone and ivory beads…Nal, Kulli and Nindovari…faunal motifs include ibex, gazelle, zcorpion, fish, birds and humped bull…Mehi…cremation burials, the bones lying generally in urns…Nindowari…two seals with typical characters in the Harappan script with the unicorn motif…Rehman Dheri…ivory seal, with two holes…engraved two mountain goats, along with three symbols (c. 3000 BCE)…Sarai Khola…a dozen copper/bronze objects comprising spearheads, needles, nail-parers, antimony rods with rolled ends, pins, rings and bangles (mid-3rd millennium BCE)…Kot Diji…a fragmentary bronze bangle…Kalibangan…an axe, a paras'u and a bangle of copper/bronze…Banawali…an arrow-head and a fish-hook of copper…a stone weight (87.855 gms.)…Kunal…variety of ornaments in gold and silver. These include spiral bangles, 'crowns' and discular bead with axial perforation – all of silver and over twelve thousand beads…seven seals, six of steate and one of shell. These seals do bear motifs, mostly geometric, but no inscription." [DP

Agrawal, 2000, *Ancient metal technology and archaeology of south Asia: a pan-Asian perspective*, New Delhi, Aryan books international, pp.57-68].

[2] "Investigators in all periods have been faced with one major fact. Because southern Mesopotamia is virtually lacking in mineral resources, the materials used to make the metal artifacts found there must have come from another locale. Thus, our research led to the metallogenic zones in Iran, Afghanistan and Oman, where ores of copper, among others, are known to occur in substantial quantities...we have also uncovered significant new information on tin deposits which could have been exploited in antiquity...Other metals were also used for this purpose (alloying) by ancient metal workers, most notably arsenic, antimony and lead. Arsenic, in particular, played an important role in the early metallurgy of the Near East...The earliest occurrence of tin-bronze date to the 4th millennium.Though the total number of artifacts analyzed from this period is not large, those of tin-bronze are even fewer: three pins from Necropolis A at Susa (with tin contents of 4%, 8% and 2.3% respectively), and an awl from Sialk III (0.95%). In the later 4th and early 3rd millennia, greater tin values occur--5.3% in a pin from Susa B; and 5% in an axe from Mundigak III in Afghanistan; but these are still exceptional in a period characterized by the use of arsenical copper...arond 270 BC, during Early Dynastic III in Mesopotamia...eight metal artifacts of forty-eight in the celebrated 'vase a la cachette' of Susa D are bronzes; four of them -- three vases and one axe -- have over 7% tin. The analyses of objects from the Royal Cemetery at UR present an even clearer picture: of twenty-four artifacts in the Iraq Museum subjected to analysis, eight containing significant quantities of tin and five with over 8% tin can be considered true bronzes in the traditional sense...In addition, a contemporary shaft-hole axe from Kish contains 4% tin, and significant amounts were detected in a few artifacts from Tepe Giyan and Tepe Yahya IVB in Iran, and Hili in Oman. Thus, we see an increasing pattern of tin usage...We explored the area south of Herat, where several deposits of tin were said to exist. At Misgaran, tin appears 500 meters north of a copper mine which was worked in ancient times, although the precise dates of exploitation are not known. The copper ores here contain over 600 ppm (0.06) of tin. Tin-bearing sands, which can be easily beneficiated by panning, were worked in the nearby Sarkar Valley. There too the tin was found in association with copper, green traces of which are visible throughout the landscape...Gudea of Lagash (2150-2111BC) speaks of the tin of Meluhha...the geographer Strabo (XV.2.10) who, in referring to the inhabitants of Drangiana (modern Sistan), says that they have 'only scanty supplies of wine, but they have tin in their country'...this passage..does accord well with the discoveris in the area of Herat...There are two possible routes from Afghanistan to Mesopotamia. One crosses the northern part of the Iranian plateau, along the Elburz mountains, then through the passes in the Zagros descends to Babylonia and Assyria. In the 1st millennium it was one of the principal supply routes of eastern goods to Assyria. In the 2nd millennium the tin that Assur exported to Anatolia might have followed this route. Along it are found such sites as Tepe Sialk (where the use of tin is attested in the 4th millennium), Tepe Giyan and Tepe Hissar, wehre other finds (such as lapis lazuli at Hissar) implicate them in long-distance commerce in the 3rd millennium.

"The second route is by sea, along the Arabian coast of the Gulf, perhaps also going by land through souther n Iran. It was at the time of Gudea of Lagash and earlier in the Early Dynastic III period, the great supply route of eastern commodities to southern Mesopotamia. It is by this route that the copper of Makkan came, copper which analysis has shown to have originated in the peninsula of Oman. It also brought the products of Meluhha, including lapis lazuli, carnelian, copper, ivory and various woods. Nothing, however, suggests the passage of tin through this area. For example, there is little tin in the artifacts recovered at Qala'at al Bahrain, dating between 2300 and 1800 BCE. Furthermore, we know from the work of Limet, who studied texts concerned with metalworking in Sumer, that Mesopotamian metalworkers did their own alloying. We suspect, therefore, that the tin moved through this area in an unalloyed state.

"Recently Oman has yielded the first signs of the use of tin in the region. The analysis of a sword from Hili, dated to the mid-3rd millennium, shows a tin content of 6.5%, and a mold of a tap hole (?) associated with the remains of a furnace held metal with a tin content of 5%. The furnace is dated after the tree-ring calibration of a radiocarbon analysis (MC 2261) to circa 2225 BCE...it is clear that the tin was added to the copper and it is also clear that it did not come from Oman itself. At Umm an-Nar artifacts with tin contents on the order of 2% were recovered; the tin must have been mixed with the local copper...Meluhha...the use of tin is attested already in the late 4th or early 3rd millennium at Mundigak III in southern Afghanistan. Tin appears only in small quantities in artifacts from Sahr-i-Sokhta in eastern Iran and at Tepe Yahya in southern Iran...In the Indus Valley, the copper-tin alloy is known at Mohenjodaro.

"...Oman's trade with southeastern Iran and Baluchistan is well attested...Among the products attributed to Meluhha, lapis lazuli and carnelian are found in sites and tombs of the 3rd millennium. We can suggest with reasonable certainty that the tin used in Oman was in transit through Meluhha and that the most likely source was western Afghanistan. The discoveries of tin in artifacts at Hili, though singular, are important because the site lies in an area clearly involved in long-distance trade. However, there is no clear evidence that the site was a way-station on the route which brought tin from Afghanistan to Mesopotamia. Therefore the presence of tin at Hili indicates only that it was transported in the Gulf area, where it was also used to fill local needs.

"The collective indications are that western Afghanistan ws the zone able to provide the tin used in Southwest Asia in the 4th and 3rd millennia...In order to elucidate the questions raised by our findings, a project aimed specifically at tin-- its sources and metallurgy--should be organized." (Serge Cleuziou and Thierry Berthoud, Early Tin in the Near East, in: *Expedition*, Vol. 25, No. 1, 1982, pp. 14-19).

"...the stages in metal technology in Iran can be studied in greater detail. Coghlan (Cog 51) has traced the complete sequence of metallurgical development in Sialk. In the beginning, Pds. I and II, copper tools were produced by simple cold hammering. Casting, first in open mounds, was evidenced in Pd III,4. Closed moulds came into use from Pd. III,5. In Pd IV smelting and casting techniques by cire perdue method are also met with. All these techniques are datable (Pd I, ca. 5000 BC; Pd IV, ca. 3000 BCE onwards) and are thus much earlier than in India...

"Tal-i-Iblis in Mashiz Valley (Kirman range) is the earliest known centre of copper metallurgy (ca 4000 BC)...Kerman range is very rich in copper ores. Bevelled rim bowls in Tal-i-Iblis of Mesopotamian vintage (ca. 2800 BC) may show long distance trade in ores or metal (CS 66). Lamberg Karlovsky (L 67) studied the pottery collected by Stein from Daruyi and Tappa-i-Nurabad, east of Tal-i-Iblis, in the valley of Baluk. He found its close similarities with the pottery of Chah Husseini (Bampur), and Rana Ghundai I and II. These may provide the evidence for contacts and diffusion from this centre to India too.

"One does not know exactly how these techniques reached Baluchistan, via Makran or Afghanistan...we will trace these influences from Mundigak with which there is evidence of plenty of contacts. The Phase C (D 65) witnessed the advent of metal in this area which we placed in ca. 3300-3000 BCE. From Deh Morasi II Z, Dupree (Dup 63) has reported hollow copper tubes which resemble those from Hissar II levels... Mundigak (Cas 61) in Afghanistan offers a complete sequence of metalurgical development. Copper appears in Pd I as evidenced by the presence of elbowed blades (lame coudee) and an awl (Pd I,5). In Pd II, appear spear-heads, internaly voluted spiral-headed pin and eyed needle. Such spearheads continue to Pd IV. Lamberg Karlovsky (L 67) called it a tanged dagger with midrib, though in the section given, there is no midrib (Cas 61, Fig. 139,3). In Pd III, tin-alloying also is reported (L 67). But the analyses (Table 23) show that Pd I has higher tin content (0.86 to 1.06%) than that of

Pd III (0.6 to 0.77%). Pd III is relatively richer in copper. The tool repertoire includes shaftholed axe and adze (III), spearhead without midrib, a sickle blade (?). In Pd IV were found a pin with double voluted head, concave disc (IV) fish hook and other likebits, including a lance object with bent blade. In Pd V metal finds are not many, mostly they are arrow heads (Cas 61, Fig. 140, 26,25).

"In Baluchistan we hardly get any stratified metal relics. From Isplenji mound I (Pak 64) and Quetta some copper artifacts were recovered along with Quetta Ware. Few fragments of copper were found in Damb Sadaat II and III.

"In Phase D of Dales are mainly included the Pre-Harappan cultures of Sind, e.g., Kot Diji, Kalibangan and other sites in Bahawalpur region. From the pre-Harappan levels at Kot Diji only one copper object has been reported (Kh 65). At Amri only metal scraps appear along with a handmade pottery and Togau C sherds. Kalibangan I yielded only two-three pieces. The other sites only suggest some sort of use of copper. From Kulli we got a mirror, pin and flat axe. From Nundara only a bangle is reported.

"At Nal, a good number of metal tools were recovered from the cemetery and D, and F areas. The types include: knives; blades; bangles; axes etc.

"We have thus traced the diffusion from Iran, through Afthanistan and Baluchistan, to Sind. Thus we see that the metallurgical know-how is reaching the Harappans of Sind only about 2300 BC, more than 1500 years later than west Asia. During the Harappan period there is a sudden efflorescence of copper tools and their variety, as compared to the Pre-Harappan cultures. This obvious diffusionary route, the relatively late date of the Harappans and a full blown metallurgy from the very start preclude any independent origins of metallurgy in the Harappan culture." (D.P.Agrawal, *The Copper Bronze Age in India*, New Dehli, Munshiram Manoharlal, 1971).

[3] **INGOT: Some Indic Lexemes and Homonyms (used for logographs of the script) (Akkadian: le_'u)**

3833.To melt: li_ melt; lau absorption, devotion (H.); laya absorption (Skt.)(CDIAL 10962). ri_ melt, flow (Skt.); ri_yate_ melts, flows (RV.); ri_n.a melted (Skt.); riik to leak (of contents), drip; rieik to leak (of vessels), let drip (Kho.); rijan.u to water, to irrigate; to melt (S.); ri_n.a leaked, dripped (Pkt.); runna_ pret. of ren.ava_ (Si.)(CDIAL 10753). cf. re_n.i mud (Pkt.); ren.i_ ingot (L.)(CDIAL 10639). aliyuka to melt, dissolve (as salt, heart); alika, aliyikka to melt; aliccal, alivu melting, compassion; ali-ppun.n.u foul ulcer (Ma.); ali- (aliv-, alij-) to dissolve; (alip-, alic-) to dissolve (Kod..); aliyuni to dissolve, decay; eliyuni, e_luni to melt (as any soft substance, butter, lead etc.); elipuni, elpuni, e_la_vuni id. (Tu.)(DEDR 250). Image: to be delivered of a child: allna_ to become clear (of liquids left undisturbed)(Kur.); le to get clear (as water when left undisturbed)(Malt.); alga tidy, clear; alga a_va to be tidy, clear, be delivered of a child (Kui)(DEDR 261). Fluids: al.akam water (Ta.); al.aka, al.l.aka neither thick nor thin, as applied to fluids (Ka.); anuku semiliquid, semifluid (Te.)(DEDR 298). cf. al.acu to agitate (liquid)(Ka.)(DEDR 294).

5516.Image: flow, current: raya the stream of a river, current; speed, velocity (Ka.Skt.)(Ka.lex.) re_tas a flow, current (Vedic); ri_ti moving, flowing; motion, course; a stream, river (Skt.)(Skt.lex.) raya stream, current (MBh.); current, speed (Pali.Pkt.); rava speed (Pali); ra sediment left by river after inundation (S.); rau small stream from the mountains, course or flow of river (P.); current, stream, torrent, line (H.); rai long narrow channel made for flow of water from higher level (Or.)(CDIAL 10638). cf. re_n.i mud (Pkt.); ren.i_ ingot (L.); ingot of gold or silver (P.); ren. cement for metallic objects (G.); ravan.aka a filter (BHSkt.)(CDIAL 10639). ri_n. name of a deserted channel of the river Jhelam (L.)(CDIAL 10750). re_ve the Narmada_ river (Ka.lex.) ri_ti stream (RV.); ri_i path, fashion (Pkt.); ria shallow narrow channel for catching fish in dry season (Or.); ri_ method, manner (G.)(CDIAL 10751). reju, rejo irrigation, first

watering before sowing (S.)(CDIAL 10820). ri_ti dropping, flowing; a course; ri_n.a dropping, trickling, oozing, distilling, flowing (Ka.lex.) http://www.hindunet.org/saraswati/Indian%20Lexicon/ore.htm

[4] "Tin procurement at Mari was highly organized (Dossin 1970; Villard 1984: nos. 555-6). It travelled in the form of ingots weighing about 5 kg. each. It reached Mari by donkey caravan from Susa (Susiana) and Anshan (Elam) through Eshnunna (Tell Asmar). The relevant records contain the names of Elamite rulers and Elamite agents (Heltzer 1989). Tin was transmitted westwards, both as an item of royal gift-exchange and as a trade commodity...it may well often have travelled by sea up the Gulf from distribution centres in the Indus Valley. In the Old Babylonian period tin was shipped through Dilmun (Leemans 1960: 35), as it had been a millennium earlier to judge by references in the Ebla texts...Strabo (xv.ii.10) referred specifically to Drangiana, the modern region of Seistan in south-west Iran (into Afghanistan) as a source of tin. Muhly (1973: 260) associated this directly with Gudea's report of receiving tin from Meluhha...A number of scholars have pointed out the possibility that tin arrived with gold and lapis lazuli in Sumer through the same trade network, linking Afghanistan with the head of the Gulf, both by land and sea (Stech and Piggott 1986: 41-4)." (PRS Moorey, 1994, pp. 298-299).

"Latin *stagnum-stannum* only comes to mean 'tin' in Late Latin. The word originally designates 'a mixture of lead and silver'. Again, it si not clear why the word came to mean 'tin'. The original Latin designation for tin is not a distinct word at all, but the expression *plumbum album*, sometimes *plumbum candidum*, literally 'white lead'...Pliny refers to a practice of plating objects with tin to give them the appearance of silver:

A method discovered in the Gallic provinces is to plate bronze articles with white lead as to make them almost indistinguishable from silver; articles thus treated are called 'inoctilia'.

Recent archaeological discoveries indicate that such deceptions were practiced not only on metal objects, but also in clay. Excavations at several Mycenaean sites have produced clay vessels with surviving incrustations representing an original tinfoil covering applied with beeswax...

The Greek word for tin, □□□□□□□□□□, is again of unknown origin....Some feel that the word is to be analyzed as *kassi-ti-ra*, 'from the land of the Kassites'. This derivation is of considerable interest in the light of the suggested connection of the Kassites with the Zagros mountains and the indications...that this area might have been an important source of tin. Yet this etymology is quite improbable and cannot be substantiated...there is no indication that the Greeks played any role in (Celtic) trade before the founding of the Massalia (modern Marseilles) around 600 BCE. Since the Greeks did not come into contact with the Celtic peoples of Gaul much before the end of the seventh century BC, it would be strange to find a Celtic word already in Homer...this factor...rules out a Celtic origin for *kassiteros*...there is no common Indo-European word for tin. Of course the various Romance languages have a common word borrowed from Latin, and the various Germanic languages (with the exception of Gothic) seem to have a common word which may ultimately derive from the same source. This is all the result of a late development. The fact that Latin uses an expression like *plumbum album* to mean 'tin', indicates that the language lacked a real word for the metal...In fact, the earliest Indo-European texts, such as the Mycenaean Linear B tablets and the earliest Sanskrit texts, seem to lack a word for tin. What of Hittite? Unfortunately, here the situation is once again problematic. A word has been suggested, namely **dankui-*. However, even if correct, it says nothing significant about the source of tin in the Hittite empire. The word is clearly a manufactured one, derived from the adjective *dankui*, 'dark', very common in Hittite texts, especially in reference to the dark earth...a lexical text from Ras Shamra seems to equate the Hittite **dankui-* with Sumerian An.NA, Akkadian *ana_ku*, both words now translated 'tin.' Also, if the reference is to the black tinstone of alluvial deposits, the name is quite appropriate.

"The basic Hebrew word for tin is *bedi_l*. The principal reference is from the book of Ezekiel:

Tarshish traded with you because of your abundant wealth of every kind; she bartered with you silver, iron, tin, and lead.

This passage suggests that tin came to Israel from Tarshish, sometimes identified with the south coast of Iberia. The tin trade with Tarshish is thought to have been in the hands of the Phoenicians...this Hebrew word for tin has been compared with Sanskrit *pa_t.i_rah*, 'tin'...a late lexical word in Sanskrit, and seems to belong to that group of words which includes French *peautre*, Italian *peltro* and English *pewter*. These words all go back to an original **peltirum* or **peltrum*, often said to be of Ligurian origin...these words may all be based on the stem **pel-*, meaning 'gray, blackish'...the Old Testament has another word which may represent tin. *Ana_k* is traditionally translated 'plumb line' or 'plummet'. The most important reference is in the book of Amos:

Thus he showed me, and lo, the Lord was standing upon a wall, with a plumb line in his hand.

"...if Hebrew *ana_k* is to be compared with Akkadian *ana_ku*, then the *Homat. ana_k* should be 'a wall made of tin'. ..The Sumerian AN.NA is sometimes transcribed *nagga*, but there are objections to this reading and it is best to retain the reading AN.NA, in capitals. The meaning 'tin' is established by the fact that the cuneiform texts contain recipes involving the mixture of copper [Sum. *urudu*, Akk. *eru*) with AN.NA in order to produce what can only be bronze (Sum. *zabar*, Akk. *siparru*). The first of these texts dates from the pre-Sargonic period: *1 ma.na 1/3 urudu luh ha AN.NA bi gin 13 igi 3 gal* (That is, 80 shekels of pure copper and 13 1/3 shekels of tin are mixed together, producing a bronze with a copper-tin ratio of 6:1. The Sumerian texts from the Third Dynasty of Ur uses the expression *zabar-7-la*, indicating a bronze with a copper-tin ratio of 6:1. A ratio of 7:1 is also known from this period as the following text indicates: *5 gin AN.NA 1/2 ma.na 5 gin urudu luh-ha* (Here 5 shekels of tin are mixed with 35 shekels of copper giving a copper-tin ratio of 7:1). In the Old Babylonian period, the ratio is again 6:1: *3 ma.na zabar s'a 6 ba-al.lu* (three minas of bronze mixed (in the ratio) of six (to one)

"...Such a ratio means a bronze with about 17% tin...This connection between the texts mentioning the mixture of URUDU and AN.NA and the copper-tin ratio established through the analysis of ancient Mesopotamian bronzes is one of the most convincing arguments for the translation of AN.NA as 'tin'...A bilingual literary text refers to the fire-god: urudu AN.NA III.III bi za e-me-en *s'a e-ri i u a-na-ki mu-bal-lil-s'u-nu at-ṭa*(you (fire) are the one who makes an alloy of copper and tin.)...The Akkadian word seems to have cognates in Hebrew *ana_k*, Arabic *a_nuk*, Syriac *a_neka_*, Ethiopic *na_'ek*, and perhaps even Armenian *anag*...already in the Old Akkadian period, there are references to ingots of tin called *s'uqlu* and weighing about 25 kg. The Old Babylonian letters from Mari refer to tin in a form designated by the word *le_'um*. This word, usually translated 'tablet,' is also used to designate the Neo-Assyrian hinged wax-covered ivory writing board foundat Nimrud in 1953. The Mari references must be to an ingot of tin shaped something like a tablet. The Cape Gelidonya ship-wreck has now produced a Late Bronze Age example of a tin ingot. The excavator of the wreck, G.F. Bass, says of this find:

At Gelidonya, therefore, we may have the shape of the end of a tin ingot which was six centimeters on a side; the length of the bar is unknown. Such a shape would correspond to the larger ingot which we have identified in the tomb of Nebamu_n and Ipuky...

"...In addition to these ingots there also tin, as well as copper, ingots from the site of Harappa. (C.C. Lamberg Karlovsky, *American Anthropologist*, 69 (1967) 145-162, p. 149).The existence of tin ingots is well atteste for all periods and all areas of the ancient world, from ca. 2000 BCE. to 400 AD. Such an ingot the Egyptians called a *nms'.t dh* and *dh* must then be the Egyptian word for tin...

"The myth of Inanna and Mount Ebih also mentions 'the high mountain land, the mountain land of carnelian and of lapis lazuli' (kur.BAD-na kur-na gug-na za-gin-na) which is of interest as there seems to be, as will be shown below, some connection between the source of tin and the sources of carnelian and lapis lazuli...since one of the exemplars of this myth mentions Enheduanna, the daughter of Sargon of Akkad, it would seem that the work may go back to the Agade period.

"...The mountains of Lu_ristan are also the location of the land of Barahs'e, known from the Neo-Sumerian period as Marhas'i...One of the texts from al-Rimah does refer to fifty minas of tin from the Nairi-lands. The Nairi-lands are now fairly well known, especially as they appear in the inscriptions of Tukulti-Ninurta I and Tiglath-Pileser I. They occupy the area northwest of Assyria, the region of Diyarbakir and the lands to the east of it, with a population said to be related to the later Urartaeans. The 'sea of the Nairi-lands' (*tamdi s'a ma_t na-i-ri*) would then be identified with Lake Van...

"The reference to 'the Caphtorite' and the clear implication that tin was sent from Mari to Crete are bound to arouse heated controversy. It should come as no surprise here, as this study has repeatedly emphasized the eastern connections of Minoan metallurgy. Strange as it may seem to those rooted in the insularity of the Aegean world, we must now seriously consider the possibility that the tin used by Minoan metal-workers came to Crete from Mari. The 'itinerary' (published by G. Dossin) also implies that the representatives of Crete and Caria, together with a translator (Akkadian targamannum), received their tin at Ugarit...

"J. Bottero and M. Birot have assumed that the tin came from Iran and was brought to Mari by Elamites...The text TLC X 125 refers to 1 1/3 minas, 9 2/3 shekels of pure silver...This text may indicate that silver was brought to Larsa in order to purchase tin and that this tin was purchased in Susa. That is, Larsa did not purchase tin in the north. On the contrary, it supplied tin to the north...Old Assyrian and Old Babylonian period ca. 2000 BCE to 1600 BCE..The tin was sent from Sippar to Mari, and from there was re-exported to Syria and Palestine. The tin came to Sippar from Susa, either by way of De_r and Es'nunna or by way of Larsa, coming up from the south. The beginnign of the trade, the determination of the ultimate origin of the tin, still remains to be established...A text from the reign of Gudea of Lagash (ca. 2143-2124 BC) provides a possible clue in this direction. In his elaborate cylinder and statue inscriptions Gudea provides considerable information concerning the origin of the various materials used in his extensive building program. Gudea says that the tin he used came from the land of Meluhha:

(urud)u AN.NA lagab-za-gin na(k)u NE gug-gi rin me luh ha da (copper and tin, blocks of lapis lazuli...bright carnelian from (the land of) Meluhha)

"The land of Meluhha is well known as a source of lapis lazui and carnelian. This is the only direct reference to tin from Meluhha, but the Gudea passage suggests that tin may be associated with the Meluhha trade, a trade also involving copper, lapis lazuli and carnelian. Of all the items involved here, the one which is most securely localized is lapis lazulip. The lapis lazuli used in Mesopotamia came from northern Afghanistan, from the Sar-i-Sang mine in Badahshan. No one has ever proposed that Meluhha be identified with Afthanistan. The current tendency is to identify Meluhha with Sind and the coastal region of western Pakistan. This would mean that the expression 'lapis lazuli from Meluhha' refers not to the actual source of the material, but rather to the entrepot from which it was sent to Mesopotamia. Lapis lazuli from Meluhha would then be an expression parallel to copper from Tilmun.

"It is now assumed that the references to the land of Meluhha in texts relating to the latter part of the third and early part of the second millennium BCE are to be associated with the now established relations between Mesopotamia and the Harappn civilization of the Indus Valley during the Sargonic and Isin-Larsa periods. This was a sea-borne trade going down the Persian Gulf and across the Arabian Sea, such as existed in the

Hellenistic, Roman, and Byzantine periods. The best known example of such a voyage is that undertaken by Nearchus, the admiral of Alexander the Great, in the year 325 BCE. Nearchus set out from the newly built harbor at Pattala, near the mouth of the Indus river, with 1800 transports and galleys and 5000 sailors and marines, in September 325 BCE. The entire voyage to the mouth of the Euphrates, with many wanderings and delays, took 130 days. As Nearchus first sailed down the Indus river to pattala, his voyage represents a rpecise example of how the lapis lazuli of Afghanistan could have reached Mesopotamia.

"The voyage of Nearchus was not the first recorded example of a voyage from India. According to Herodotus, the Persian king Darius (522-486 BC) ordered the Ionian admiral Scylax of Caryanda to make a voyage from India to Egypt, a journey said to have lasted three months. Scylax set sail from 'the city of Caspatyrus in the Paktyan country,' a site which cannot be securely identified but which, according to another passage in Herodotus, is to be placed in northern India near Bactria. According to R. Carpenter, the description in Herodotus '...best suits the borderland between modern Pakistan and Afghanistan.' Here, then, is another voyage down the Indus river and then west across the Arabian Sea. Such voyages, from Egypt to India, became very common by the early years of the Roman Empire. Strabo says that, in the reign of Augustus, as many as 120 ships a year sailed from the Red Sea ports of Myos Hormos and Berenice for northeast Africa and India. By the time of the emperor Tiberius, when the Greek explorer Hippalos discovered the monsoons and direct voyages to Bombay became possible, the traffic to India became so extensive that Tiberius began to worry about Rome's balance of payments. Roman hard currency was leaving the country to pay for the gems and silks of India. The so-called *Periplus of the Erythraean Sea* describes this trade in detail. At the time this text was written (late first century AD) India was importing copper, tin, and lead. Her exports included such items as ivory, agate, carnelian, pearls and tortoise shell, many of which are familiar as items associated with the Meluhha trade...

"The archaeological evidence...suggests that such contacts (between Mesopotamia and the Indus Valley) began already in the Early Dynastic period and came to an end with the close of the Isin-Larsa period. In general terms, the dates 2500-1900 BCE give the approximate time range for the contacts between the two areas. The period of Mesopotamian contact seems to coincide with the period of Harappan civilization itself. That such contacts were by sea is suggested not only by the geographical setting and the known historical background, but also by references in the Mesopotamian texts to ships from Meluhha. The first such reference comes from *Sammeltafel* text, in abilingual passage relating to the reign of Sargon of Akkad. It refers to the ships of Meluhha, Magan and Tilmun which are docked at the quay of harbor of the city of Agade. The ships of Meluhha are mentioned in other Mesopotamian texts, including one which actually comes from the Old Akkadian period and is not a later copy. Another Old Akkadian text seems to refer to a sailor of a Meluhhan ship. The Sumerian myth known as *Enki and the World Order*, refers to the *magilum*-ship from Meluhha which brings gold, silver, and lapis lazuli to Nippur. The myth of *Enki and Ninhursanga* refers to the big ships brought from Meluhha. These references suggest that a Meluhha ship was a ship which came from Meluhha and that the trade with Meluhha was in the hands of the inhabitants of the Indus Valley. The presence of 'an official interpreter of the Meluhhan language' in Mesopotamia helps to confirm this impression. The most extensive description of Meluhha in cuneiform literature comes in the Sumerian myth of *Enki and the World Order*. In the translation by S.N. Kramer, the relevant passage reads:

He proceeded to the land of Meluhha,
Enki, the king of Abzu, decrees (its) fate:
'Black land, may your trees be large trees, may they be 'highland' trees,
May their thrones fill the royal palace,
May your reeds be large reeds, may the be 'highland' reeds,
May the heroes in the place of battle wield their weapons,

May yourbulls be large bulls, may they be 'highland' bulls,
May their cry be the cry of highland wild bulls,
May the great *me's* of the gods be perfected for you,
May all the *dar* birds of the highland wear carnelian beards,
May your bird be the *Haia* bird
May its call fill the royal palace,
May your silve be gold,
May your copper be tin (and) bronze,
Land, may everything; you have increase,
May your people multiply...

"This passage mentions a number of objects associated with Meluhha and listed elsewhere as coming from Meluhha. All of these items can be found in either Afghanistan or India and sometimes in both. Lapis lazuli has already been mentioned. It is found in Badahshan in northeastern Afghanistan. Carnelian is found in India. Gold, silver, and copper are all found in Afghanistan. They are also found in India. Gold has a particular association with India and there is extensive evidence for gold mining, both ancient and modern, in India, especially in the Kolar gold field, Mysore state. Gold also had a special connection with Meluhha, and the cuneiform texts refer to 'gold in its dust' from Meluhha. They also refer to silver from Meluhha. The copper from Meluhha has already been discussed.

"Besides the various stones and metals already mentioned, other natural products, said to be from Meluhha, are to be found in either India or Afthanistan. Ebony, the wood of Meluhha, is to be found in India. Ivory, said to be from Meluhha, is also from India, as is tortoise shell, which may also be another export from Meluhha. Among the birds mentioned in these texts the *dar-me-luh-ha mushen*, a variegated bird, is now thought to be some sort of chicken. The Meluhha species was known in Mesopotamia only from representations carved in ivory. The *dha-ja mushen* can now be identified as the peacock, the Indian bird par excellence. Both the dog and the cat are said to be from Meluhha, and there is evidence that both animals were domesticated by the inhabitants of the Indus Valley in Harappan times. Even the monkey may be associated with Meluhha, and there may also be an etymological connection as shown by the various words for 'monkey'.

"These are the principal products associated with the Meluhha trade. They represent exports from Meluhha, brought to Mesopotamia by traders from Meluhha in Meluhha ships...The same articles mentioned in the literary and historical texts appear as imports in the mundane economic texts of the Third Dynasty of Ur. All of the products said to be from Meluhha can be localized in Afghanistan or in the Indus Valley. This is in agreement with the generally accepted identification of Meluhha with the area of Sind and western Pakistan...The termination of this trade now seems to coincide with the collapse of Harappan civilization itself. This collapse may even be in some way responsible for the general economic decline in Mesopotamia and the absence of international trade after the Isin-Larsa period, i.e. after ca. 1900-1850 BCE...The lapis lazuli of Badahshan and the other stones and metals of Afghanistan must have been brought down the Indus river to some port on the mouth of the Indus. From Afghanistan the trade route must have gone south, over the Hindu Kush by means of the Khyber Pass to Peshawar. The Peshawar plain was known to the Persians as the satrapy of Gan-dh-a_ra and, from at least the sixth centyr BC, on, there existed a major trade route across Peshawar down to southern India. The cities of Cha_rsadda_ and Taxila testify to the importance of this route. Somewhere near the mouth of the Indus there must have been a port similar to that which Alexander the Great had built at Pattala, and from here the goods were shipped west eventually to reach southern Mesopotamia.

"It is generally assumed that such a port has been found and that it is located not on the Indus but at Lothal in the Gulf of Cambay...The radiocarbon determinations from Lothal suggest that the site was in use aproximatey in the period during which the trade with Meluhha was in existence.

"Although no actual remains of boats were found, the excavations at Lothal did uncover terracotta boat models and a number of so-called anchors of stone. It seems that industry was located right at the harbor site, for at Lothal were excavated not

only factories for making agate and carnelian beads, but also the workshops of coppersmiths together with ingots of almost pure copper...
"The quay (Sumerian kar, Akkadian ka_rum) is mentioned frequently in cuneiform literature and was a major factor in the economic organization of ancient Mesopotamia...The quest for metals was the factor which stimulated the trowth of an organized foreign trade. The trade with Tilmun, Magan and Meluhha must, then, be seen as part of the international age of metallurgy which developed in the second half of the third millennium BCE.

"The tin of Meluhha may even have something to do with the Harappan settlement at Lothal. The use of tin-bronze in the Harappan period has been outlined above. Of particular interest is the extensive use of tin-bronze at Rangpur in Gujarat. The bronzes here have a tin content of four to eleven percent. The absence of arsenic in the Rangpur bronzes and its presence in the bronzes from Harappa and Mohenjodaro indicates taht different sources of copper were used in each area. That used at Rangpur must have come from Rajasthan and this is the ore also worked at Lothal, because arsenic is also absent from the copper ingots found there. This indicates that the Harappans did not come to Lothal to obtain copper. They might have come in order to obtain tin...it should be pointed out that Gujarat has even been proposed as possible location for Meluhha." (J.D. Muhly, 1973, *Copper and Tin*, Hamden, Connecticut, Archon Books, pp.241-335).

[5] **Euphrates the copper river or URUDU and Tin from Meluhha**

"A copper trade down the Euphrates is extremely ancient; the river's original name was Urudu or 'copper river'. (Hawkes, J. (ed.), 1977, ***The First Civilizations***, London, Pelican: 159, 167-8)...The whole purpose of sending Assyrian merchants to Anatolia was to ensure a steady supply of Anatolian silver and some gold. In exchange they gave cloth and tin, 'transported by caravans of black donkeys bred in Assyria'. They made a profit on the cloth of 100% and on the tin of 75-100%. The quantities traded could be considerable; a cargo of 410 talents of tin (more than 12 t) is once mentioned, though for some curious reason tin prices are never recorded. Trade with Kanesh continued until ca. 1757 BCE when Hammurabi of Babylon destroyed Mari (900 km. up the Euphrates) and a period of wars followed which reduced 'central Anatolia, once rich, to a land of ruins'. The Kanesh tablets give no indicatin of where Assyrian tin came from...The texts from Mari show a way out of the difficulty by also recording tin being shipped up the Euphrates, presumably from the Persian Gulf, pointing to a distant origin involving maritime trade...The Arab geographer Muqadasi stated that tin occurred at Hamadan, 560 km south-west of Tehran. As Muhly wrote, 'a mineral zone running roughly from Hamadan to Tabriz seems to fit all the evidence for the Near Eastern tin trade'. (Muhly, J.D., 1973, *Copper and Tin: the distribution of mineral resources and the nature of the metals trade in the Bronze Age*, Hamden, Connecticut, Archon Books, p. 409)...

"Tin from 'Meluhha'...According to the Larsa texts, merchants were there (in Mari and Larsa) to purchase copper and tin: the copper came from Magan in Oman, via Tilmun (Bahrain), but the origin of the tin is left in question. Tin mines in north-west Iran or the Transcaucasus are highly unlikely. Fortunately, there is evidence for another tin source in texts from Lagash. Lagash, about 50 km east of Larsa, was of minor importance except under the governorship of Gudea (ca. 2143-2124 BC). His inscriptions indicate extensive trade: gold from Cilicia in Anatolia, marble from Amurra in Syria, and cedar wood from the Amanus Mountains between these two countries, while up through the Persian Gulf or 'Southern Sea' came more timber, porphyry (strictly a purplish rock), lapis lazuli and tin. (Burney, 1977, 86; Muhly, 1973, 306-7, 449 note 542; Muhly, J.D., 1973, Tin trade routes of the Bronze Age, *Scientific American*, 1973, 61, 404-13). One inscription has been translated:

Copper and tin, blocks of lapis lazuli and ***ku ne*** (meaning unknown), bright carnelian from Meluhha.

"This is the only reference to tin from Meluhha...either Meluhha was a name vague

enough to embrace Badakhshan (the northernmost province of Afghanistan) as well as some portion of the Indian subcontinent including the Indus valley, or 'tin from Meluhha' means that the metal came from some port in Meluhha -- just as 'copper from Tilmun' means copper from elsewhere shipped through the island of Bahrain. Whichever interpretation is correct, the result is the same. Tin must have come from somewhere in India, or from elsewhere along a trade route down the Indus valley. India is not without its tin locations, rare though they are...The largest deposits in India proper are in the Hazaribagh district of Bihar. 'Old workings' are said to exist... (Wheeler, R.E.M., 1953, *The Indus Civilization***,** CUP, 58)...Tin bronzes from Gujarat are at the southernmost limit of Indus influence. The copper could have come from Rajasthan, though copper ingots at the port of Lothal, at the head of the Gulf of Cambay, suggest imports from Oman or some other Near Eastern copper mining district. Tin supplying Harappa and Mohenjo-daro, most famous of the Indus cities, may have been sent overland to Lothal for export, though the scarcity of tin in the Indus cities makes this idea unconvincing.

"At Harappa, three copper alloys were used in the period 2500-2000 BC: copper and up to 2% nickel; copper and up to 5% nickel; copper with ca. 10% tin and a trace of arsenic. Ingots of tin as well as of copper were found at Harappa. (Lamberg-Karlovsky, C.C., 1967, Archaeology and metallurgy in prehistoric Afghanistan, India and Pakistan, *American Anthropologist*, 1967, 69, 145-62). The rarity of the metal is seen at Mohenjo-daro where, of 64 artifacts examined, only nine were of tin bronze. (Tylecote, R.F., 1976, *A History of Metallurgy*, The Metals Society, p. 11). Ingots of tin bronze have also been found at Chanhu-daro. Yet in spite of its scarcity, tin bronze was widely used. Its occasional abundance and, in the case of the bronzes from Luristan in southern Iran, the high quality of the tin bronzes produced, equally underline the fact that rich source of tin existed somewhere...

"The archaeological evidence from Afghanistan is not unequivocal...What is surprising is the discovery in 1962 of corroded pieces of sheet metal bearing traces of an embossed design and made of a low tin content bronze (5.15%)...The uncorroded metal is thought to have contained nearer 7% tin. (Caley, E.R., 1972, Results of an examination of fragments of corroded metal from the 1962 excavation at Snake Cave, Afghanistan, *Trans. American Phil. Soc.***,** New Ser. , 62, 43-84). These fragments came from the deepest level in the Snake Cave, contemporary with the earliest occupation dated by 14C to around 5487 and 5291 BCE. (Shaffer, J.G., in Allchin F.R. and N. Hammond (eds.), 1979, *The Archaeology of Afghanistan***,** Academic Press, 91, 141-4)...If this dating is acceptable, not only is this metal the earliest tin bronze known from anywhere, but it is also an isolated occurrence of far older than its nearest rival and quite unrelated to the main development of bronze age metallurgy...

"Even more exciting is the evidence from Shortugai. Since the discovery of the first Indus finds at Harappa in 1921, the sphere of influence of this civilization has been greatly extended, first southwards to Gujarat and the Makran coast of Baluchistan, and now into northern Afghanistan. In 1975, French archaeologists discovered on the surface at Shortugai, sherds of Indus pottery extending over more than a millennium - the whole span of the Indus civilization. (Lyonnet, B., 1977, Decouverte des sites de l'age du bronze dans le N.E. de l'Afghanistan: leurs rapports avec la civilisation de l'Indus, *Annali Instituto Orientali di Napoli*, 37, 19-35). The sites are clustered above the confluence of the Amur Darya and the Kokcha. Finds also included gold and, nor expectedly, much lapis lazuli. Particularly important is a Harappan seal bearing an engraved rhinoceros and an inscription which reinforces the belief that the site was a trading post. Shortugai is only 800 km from Harappa, as the crow flies, though the journey involves hundreds of kilometres of mountainous terrain through the Hindu Kush...Lyonnet's conclusion was that the most likely explanation for their existence was an interest in 'the mineral resources of the Iranian Plateau and of Central Asia', to which can now be added those of Afghanistan itself. Indus contacts extended well into Turkmenia where the principal bronze age settlements, such as Altin-depe and Namasga-depe, lie close to the Iranian border.

Imports here include square and oval gaming-counters of Indian ivory, and decorated sticks, numerous at Mohenjo-daro, related to types described in Sanskrit texts as being used in fortune-telling. The flat daggers of southern Turkmenia also closely resemble Harappan types...

"A fine copper axe-adze from Harappa, and similar bronze examples from Chanhu-daro and, in Baluchistan, at Shahi-tump, are rare imports of the superior shaft-hole implements developed initially in Mesopotamia before 3000 BCE. In northern Iran examples have been found at Shah Tepe, Tureng Tepe, and Tepe Hissar in level IIIc (2000-1500 BC)...Tin was more commonly used in eastern Iran, an area only now emerging from obscurity through the excavation of key sites such as Tepe Yahya and Shahdad. In level IVb (ca. 3000 BC) at Tepe yahya was found a dagger of 3% tin bronze. (Lamberg-Karlovsky, C.C. and M., 1971, An early city in Iran, *Scientific American*, 1971, 224, No. 6, 102-11; Muhly, 1973, Appendix 11, 347); perhaps the result of using a tin-rich copper ore. However, in later levels tin bronze became a 'significant element in its material culture' comparatble with other evidence from south-east Iran where at Shadad bronze shaft-hole axes and bronze vessels were found in graves dated to ca. 2500 BCE. (Burney, C., 1975, *From village to empire: an introduction to Near Eastern Archaeology*, 1977, Phaidon). The richness of Tepe Yahha, Shahr-i-Sokhta, and Shadad, are all indicative of trade and 'an accumulation of wealth unsuspected from the area'. (Lamberg-Karlovsky, 1973, reviewing Masson and Sarianidi (1972) in *Antiquit***y**, 43-6)....Namazga-depe and neighbouring sites are a long way from the important tin reserves of Fergana...The origin of Near Eastern tin remains unproven; the geological evidence would favour the deposits of Fergana and the Tien Shan range..." (Penhallurick, R.D., 1986, *Tin in Antiquity*, London, Institute of Metals, pp. 18-32).

[6] Carpentry, chariot-making and house-building in the Vedic Age

"Carpentry: The importance of this craft even in the Indo-European stage is indicated by words like 'taks.an', in Sanskrit, 'tashan' in Zend Avesta and 'tektan' in Greek. Taks.an meaning a carpenter is mentionedn in RV (RV 9.112.1) and later Vedic texts (AV 11.6.3; KS. 12.10; MS 2.9.5; VS 16.27 and 30.6; TB 3.4.2.1; SB 1.1.3.12). The carpenter made carts (s'akat.a and s'akat.i_) as referred to in RV (RV 10.146.3), Nirukta (6.22 and 11.47) and Cha_nd Upa. (4.1.8). Chariots (ratham na tas.t.eva: RV 1.61.4) and boats and ships (na_veva) (RV 1.61.4). Kulis'a, axe was one of the tools of the carpenter for the making of chariots (ratham na kulis'ah samr.n.vati: RV 3.2.1). The r.c (tas.t.eva pr.s.tya_mayi_:RV 1.105.18) refers to the fact that a carpenter bends over his work till his back aches...The carpenter made three types of bedsteads, talpa, pros.t.ha and vahya, referred to in RV (pros.t.hes'aya_ va_hyes'aya_ na_ri_-r-ya_-s-talpas'i_vari_h: RV 7.55.8; cf. AV 5.17.12)...The TS mentions instruments offering like 'sphya', 'vighana', pars'u' and 'pares'u'. (TS 3.2.4.1; cf. AV 8.28)...

"Besides, we find mention of kos'a (kos'am na pu_rn.am vasuna_: RV 10.42.2; cf. AV 1.14.4) in the RV meaning a box and bowls (dhis.ana) (RV 6.8.3; AV 19.49.8) some of which were decorated with carvings...We find the mention of the word 'druhantara' in the RV (1.127.3) meaning the destroyer of foes, which may be taken in the sense of a wood-cutter, as reflected in the simile (paras'u-r-na) here. The wood-cutter was then a very useful member of the society, as he supplied wood as fuel to the people and as raw material to the carpenter and because he cut and felled trees with axes, as reflected in the RV (RV 10.28.8; 1.32.5) and thereby helped the making of roads in the country abound with forests...Carpenters were never looked down upon in the society and rather their works were ever appreciated in the then rural societies for their usefulness in agriculture, as reflected in TS (taks.abhyo rathaka_rebhyas'cha vo namo namah: TS 4.5.4.2). Carpenters built also houses made generally of wood, as reflected in the RV where Brahman.aspati is said 'to have fashioned the earth and heaven from wood as carpenteres fashioned wooden houses'. The AV (AV 9.3.24) describes the different features of a dwelling house and the verse no. 24: 'like a woman, O dwelling, we carry thee where we will' suggests that the house was made of wood, light

enough to be carried, whenever required. The houses were fixed in the ground with wooden pegs, as reflected in r.c (...da_dartha pr.thivi_m-abhito mayu_khaih: RV 7.99.3) and they rested on wooden pillars (...sthu_n.eva jana_n~ upamidyayantha: RV 1.59.1). The AV (AV 10.3) gives us to understand the different parts of the house, beams, ties, binding grass, roofs, supported by props, and cross-beams, consisting of 'thousand-eyed net' (aks.u), stretched out as 'opas'a' on the division-line' (Verse 8).

"'Ratha' in the RV means a chariot (RV 1.20.3), as opposed to anas (cart) and its nave (kha) was greater than that of a cart (RV 8.91.7). The wheel consisted of a rim (pavi), a felly (pradhi), spokes (ara) (RV 1.321.5 and 5.13.6) and a nave (nabhya). The rim and the felly together were known as the 'nemi'. Its axle (aks.a) was made often of 'arat.u' (RV 8.46.27) wood and the pole *i_s'a_ or prauga) was fixed at right angles to the axle. The horses wre tied by the neck where the yoke was placed and also at the shoulder by traces (ras'mi or ras'ana_). While the cart was drawn by oxen, the chariot was drawn by horses, normally two except in some cases three or four. (*Ved. Ind.* II, p. 202)

"Ratha_kara as a class attained reputation in the R.gvedic society, as his skill was compared to that of a poet (ratham na tas.t.eva tatsina_ya), evidently because a chariot was very useful for war and also as a vehicle of very important persons in times of peace. As noted above, the TS refers to respectful salutation to carpenters and chariot0-makers. The Bodha_. S'. S. (nedi_ya enam-ete karmakr.tta upasam.gacchante taks.a_n.a-s'-cha rathakr.ta_-s'-cha maya kr.tas'cha kula_la_s'cha dvaya_h kaar5ma_ra_h nakhakr.tah saptame) indicates the separation of two classes, carpenters and chariot-makers. In As'vamedha the carpenter was asked to make sacrificial posts, wooden vessels, carts, mats etc., while the chariotmaker (rathaka_ra) was asked to manufacture chariots. Chariots were made of s'in~sapa wood (RV 3.53.19) but the pin of its axle (a_n.i) was made of kha_dira, wood. The wheels of chariots were usually made of s'almali_ wood. (RV 10.85.20). The AV (AV 3.5.6) refers to chariotmakers as clever workers and as one of those who are to be subject to the king, indicating thereby the importance of this industrial class. The Rathaka_ras had attained social prestige so as to form a separate caste, as attested by VS (VS 16.17 and 30.6), TB (TB 1.1.4.8) and S'B (S'B 13.4.2.17). Hillebrandt (*Vedische Mythologie*, 3.152,153). suggest that 'the Anu tribe formed the basis of the Rathaka_ra caste, referring to their worship of the R.bhus, who are, of course, the chariotmakers par excellence', but the learned authors of the Vedic Index do not agree with this view. (Vol. I, II, p. 204). The Ka_tya_. S'.S. howeever, refers to the rathaka_ra as a s'u_dra. (KS'S. 1.1.9). But there is little doubt that this classs was highly esteemed in the Vedic period for their skill, as noted before. In the later period the Rathaka_ra was raised to a higher level and regarded as competent to be 'upani_ta' and to perform s'rauta sacrifices."

"Gaya is a common term for a house in the RV (5.10.3; 44.7; 6.2.8) and later texts (AV 6.3.3 and 84.1; VS 27.3); so also dama (RV 1.1.8; 61.9; TS 5.2.1.2; VS 8.24), dha_man (RV 1.144.1; 2.3.2; 3.55.10; 8.61.4; AV. 4.25.7; 7.68.1; VS 4.34; Tait. A_ran. 2.7.2) in the sense of a house and its inmates and also in that of an ordinance of law, aga_ra (Kaus. Upa. 3.15; A_s'v. Gr. S. 1.7.21) and gr.ha (RV 3.53.6; 4.49.6; 10.18.12; 85.26; AV 1.27.4; 3.10.11; AB. 2.31 and 8.21.26.; VS 2.32 and 4.33, S'B 1.1.2.22). Dur (RV 1.68.10) means door of a house (duron.a) (RV 10.40.13). Sthu_n.a (RV 1.59.1) means a pillar of a house. The AV (9.3) refers to the method of building a house by means of pros (Upamit), supports (pratimit) and connector (parimit). It mentions beams (vam.s'a), ties (nahana), binding grass (prana_ha), and the sides (paks.a) of the house. The roof was formed of ribs of bamboo cane, a ridge called vis.uvant and a net (aks.u). The walls were filled up with grass in bundles (palada). This hymn refers to three parts of the house 'havirdha_na', i.e. oblation-holder, 'Agnis'a_la' (fire-place) and 'wives' site and seat (patni_na_m sadana') and 'sadas'. It speaks of hanging vessels (s'ikya_). **Posts were usually made of timber but some of them were made of metals like 'ayas', is evidenced byu the term 'ayasthu_n.a' (RV 5.62.8) used in connection with a chariot.** (emphasis added). A large building, unparalleled

among people is also refer4red to in the r.c (RV 10.47.8) for which the sage saptagu prayed to Indra.

"The Dasyu-s, i.e. the pre-Aryan people, at least their chiefs lived in cities, built of iron or of stone in the Vedic age, as evidenced by the r.cs. (RV 1.53.8, 1.103.31, 2.20.8 and 4.30.20): (1) tvam s'ata_ vam.gr.dasya_bhinat puro... (2) ...puro vibhindam-nacharat vi da_si_h... (3)...hatvi dasyu_n pura a_yasi_-r-nita_ri_t and (4) s'atam as'man-mayi_na_m pura_m-Indro vya_syat. The forts of kings had a thousand pillars (sahasrvasthu_n.a) (RV 2.41.5) and a thousand doors (sahasra-dva_ram) (RV 7.88.5). Indra is said to have killed the asuras or dasyu-s and to have helped his Aryan worshippers thereby, so that they would occupy the cities or castles, made of iron or stone. We hear of bricks, man.d.ales.t.aka (circular bricks) (TS 5.3.9), Vikarn.i_ (cornerless bricks) (TS 5.3.7) and chod.a_ (conical bricks) (TS 5.3.7) and bricks were made firm by mortar (puris.a) (TS 5.3.2). The rich lived in a house, built on 'foursided roof (chatuspaks.am-iva cchadih) (AV 3.7.3) or in a harmya -- harmyes.t.ha_h (RV 7.56.16), a house including the stabling etc. The sage Bharadva_ja prayed to Indra, for a house, tridha_tu and trivaru_tha. (RV 6.46.9). Here 'tridha_tu' means, according to Sa_yan.a, of three types (tri-praka_ram) or of 'three stories' (tri-bhu_mikam). Three types may be houses made of wood, brick or stone or of three different apartments, one of stone, the others of wood or brick. 'Tri-varu_tha' means, according toi Sa_yan.a, houses saving inmates from cold, heat and rains. (S'i_ta_tapa-vars.a_n.a_m va_rakam). The houses prayed for were built on roofs (cchardih), strongly built (Svatimat)...

"Charioteer; The RV (RV 1.144.3; cf. 1.55.7; 2.19,6; 6.20.5; 10.102.6) mentions a charioteer driving the car, holding fast the rein (ras'mi_n samayam.s.t.a sa_rathih), sometimes whipping the horses (pa_rs.n.ya_ va_ kas'aya_ va_ tutoda in: RV 1.162.17). Indra placed his charioteer just by his side, as stated in the r.c (uru s.a saratham sa_rathaye karindrah kutsa_ya su_ryasya sa_tau : RV 5.20.5) and this helps us to understand the prestige of a charioteer in the R.gvedic age. The respectable position of a charioteer is also attested by the AV (AV 15.2.1) and VS (VS 16.26) [Haripada Chakrabarty, 1986, *Socio Economic Life of India in the Vedic Period*, Calcutta, Sanskrit Pustak Bhandar, pp. 228 to 237].

[7] Extracts from: 'Discoid Weapons in Ancient India: A study of Vedic *cakra*, *pavi* and *ks.urapavi'* O.H. DE A. Wijesekera, *Adyar Bulletin*, Vol. XXV, 1961, pp. 250-267:

Of the weapons of attack mentioned in the ancient literatures of India the *cakra*, quoit, or discus, appears to be an implement peculiar to the Indian warrior's armoury, for it is hardly found in other cultures. Apart from its lexical citations, the references to this weapon occur mostly in mythical or legendary contexts, especially in Epic mythology where it is best known as the battle-disk Sudars'ana of Vis.n.u-Kr.s.n.a, Va_sudeva or Na_ra_yan.a. [See So_rensen, *An Index to the Names in the Maha_bha_rata*, p. 653 (s.v. Sudars'ana)]. In the MBh it is significanly referred to as being 'hurled with force from the hands of Vis.n.u' (I.1103, 1188), and Kr.s.n.a is stated to have cut Saubha in twain by means of the Sudars'ana (III.883). That a weapon, not merely an ornament, was implied by the Epic writers is further clear from Kr.s.n.a's epithet *cakra_yudha* found in the MBh (V.56; XV.665; cf. I.1163), *Harivam.s'a* (5800, 9242) and the *Ra_ma_yan.a* (VI.102.12), a use with which may be compared the term *cakrayodhin*, 'discus-fighter', applied to a Da_nava in the *Vis.n.u P.* (I.21.12). Most conspicuous among the gods of Epic and Pura_n.ic mythology as wielder of the *cakra* is doubtless Kr.s.n.a and such epithets as *cakradha_rin, cakra(gada_)bhr.t, cakra(gada_)dhara, cakrapa_n.i*, and *cakra_yudha* are applied especially to Kr.s.n.a, or to Kr.s.n.a *qua* Vis.n.u and in a few instances to Vis.n.u himself. (ibid., pp. 171, 421, 747). The *Bhagavadgi_ta* (XI.46) describes the Kr.s.n.a-Vis.n.u epiphany as *cakrahasta*, 'having a discus in hand', and the *Harivam.s'a* (8193, 8376) applies the epithet *cakrapa_n.in* to the same. The discus of Vis.n.u is also referred to in the *Vis.n.u P.* (I.13.46) and the *Vara_ha P.* gives an allegorical interpretation of Vis.n.u's *cakra* as 'the Cycle of Time', (See V.R. Ramachandra

Dikshitar, *War in Ancient India*, p.148), doubtless echoing RV, I.155.6. Another symbolic representation of the idea is found in the *Ra_ma_yan.a* (N.W.IV.35; cf. *Hariv.*, 12408, 12847). The *Ra_ma_yan.a* also mentions along with Guhyaka-s and Suparn.a-s a class of semi-mythical beings called the *cakradhara-s* (V.44.22), which is probably explained by the MBh reference to the Siddha-s as *cakradhara-s* (XIV.429). In the *Bha_gavata P.* (I.9.4) Kr.s.n.a appears as *cakrin* and S'iva himself receives that appellation in the MBh (XIII.745). That the term *cakradhara* is probably earlier than the Epic period may be inferred from its incidence in the *S.ad.vim.s'a Br.* (V.10) and the *Adbhuta Br.* (10). It is extremely significant that the term *cakradhara* is used in the MBh (III.8221) for a 'universal monarch' or emperor, an idea which may throw considerable light on the meaning of the famous epithet *cakravartin* which perhaps occurs in Sanskrit literature for the first time in the *Maitri U.* (I.4) if the *Br.haddevata_* reference (V.123) is considered posterior.

Apart form the above allusions of a mythical character, there are several references in the Epic and later Sanskrit literature which prove that the *cakra* was a real weapon wielded by human warriors and which also provide some knowledge of its construction and method of use. The MBh itself refers in one place to an actual warrior as *cakradhara* or 'discus-bearer' (I.6257). The same Epic (I.33.2 ff.) describes the weapon *cakra* as being made of iron (*ayasmaya*) and sharp-edged (*ti_ks.n.adha_ra*) and adds that it is cast by revolving or whirling (*paribhrama*). The *Matsya P.* (150, 195) defines it as a wheel having eight spokes and besmeared with oil. (Cf. Chakravarti, *The Art of War in Ancient India*, pp. 171 ff.). According to the *Va_mana P.* (79) the *cakra* has lustrous and sharp edges. Kaut.ilya (II, ch. 18) defines it as a *calayantra*, probably meaning a 'projectile mechanism'. Of the classical texts, the *Raghuvam.s'a* (VII.46) characterizes this weapon as *ks.ura_gra*, that is, as Mallina_tha understands it, 'whose edge is as sharp as that of a razor'. The *S'is'upa_lavadha* of Ma_gha (XVIII.45) describes it as a weapon which is hurled from a distance and cuts off the limbs of the enemy. The very late text on diplomacy, the *Ni_tipraka_s'ika_*, enumerates among the projectile or *sopasm.ha_ra* weapons four kinds of *cakra-s*: the *dan.d.a-cakra* or the lethal discus, *dharma-cakra*, the wheel of righteousness, *ka_la-cakra*, the discus of Death, and *aindra-cakra*, the discus of Indra. (Cf. *S'ukrani_ti*, ch. IV, sec. VII, 1.430, for three kinds of quoits). It further says (IV.47) that the weapon is a circular disc (*kun.d.ala_ka_ra*) with a triangular hole in the middle. The *Agni P.* (252.8) defines the techniques of handling the discus, and the *S'ukrani_ti* gives five or seven motions connected with the hurling of the weapon. Commenting on this passage, Oppert says that the *cakra* 'is most probably identical' with the quoit still in use in some Sikh regiments and also among the troops of native Indian princes'. (*On the Weapons etc. of the Ancient Hindus*, p. 15). Reference may also be made to representation of *cakra-s* in sculpture. In the Sim.hala fresco at Ajanta discoid weapons are seen to fly through the air. Hindu iconography shows several examples of *cakra-s* zome with spokes as in the chariot-wheels and others with spokes shaped like the petals of the lotus. (See Gopinatha Rao, *Elements of Hindu Iconography*, vol. I (*a_yudha-purus.a-s*). In some of these the sharp edges are distinctly marked. A few examples of Vis.n.u's discus also occur in sculpture. (Bhattasali, *Iconography of Buddhist and Brahmanical Sculptures in the Dacca Museum*, p. 78; cf. Zimmer, *Myths and Symbols in Indian Art and Civilization*, pp. 76, 78). Thus although most of the notices concerning the *cakra* as discus or quoit occur in the sphere of myth and legend, there seem to be sufficient grounds for inferring that in ancient India in actual weapon by that name was in use. In fact, in a South Indian text, the *Kalingattu Paran.i*, it is said that it was part of a prince's education to be trained in the use of 'the five kinds of weapons, beginning with the discus'. (See *Indian Antiquary*, 19, 332). Moreover, certain epigraphic references too seem to confirm this idea. (*South Indian Inscriptions*, vol. I, p. 153; *Corpus Insc. Indic.*, vol. III, p. 184, etc.)

In view of the above evidence for the existence of a real discoid or quoit-like weapon in post-Vedic India, it becomes an interesting problem to seek to discover whether such an implement of attack is found in the warlike culture of the RV. Such a

weapon if it existed would naturally be mentioned in connection with the more bellicore deities, particularly Indra and the Marut-s. And this is exactly what we find in the hymns of the RV. Among the weapons used by Indra against the Asura-s and other opponents we do find mentioned a *cakra,* or sometimes a *cakri_* of which the suffix *-i* may be regarded as only pleonastic on the authority of Wackernagel. (*Altindische Grammatik,* vol. II, pt.2, 247 e). At RV, VIII.85 (=96).9, Indra is implored to scatter, aided by the Marut-s the godless and weaponless Asura-s with the *cakra (ana_yudha_so asura_ adeva_s' cakren.a ta_m apa vapa r.ji_s.in).* Griffith in his translation has a note to the effect that *cakra* here means the 'discus, a sharp-edged quoit used as a weapon of war' (*Hymns of the Rigveda,* vol. II, p. 245) and Wilson actually translates it as 'discus' (*Rigveda,* vol.V, p. 183). Sa_yan.a's comment *cakraru_pen.a vajren.a* shows that he regarded it as a weapon of discoid shape but was doubtful as to its specific function as a club or projectile. Similarly at RV, II.11.20, Indra is reported to have 'hurled forth his *cakra* as the sun (sends his disk rolling), and, aided by the An:giras-es, rent Vala' (*avartayat su_ryo na cakram, bhinad valam indro an:girasva_n*); the figure of Su_rya rolling the solar disk is otherwise attested (e.g. VII.63.2). Sa_yan.a's explanation is as before: 'whirled his *vajra* for the slaughter of the Asura-s' (*asurahanana_rtham vajram abhra_mayat*). In another context (RV, II.34.9; cf. 14), the Marut-s are requested to 'save us from the inquirer, the mortal foe' and 'attack (lit. whirl at) him with the glowing (lit. heated) disk' (*vartayata tapus.a_ cakriya_bhi tam*). The use of heated missile in battle is referred to even in other places (e.g. *as'na_ tapus.a_,* RV II.30.4; *tapus.aim hetim,* III.30.17; cf. VI.52.3, VII.104.5). There is no doubt that the *cakri_* must have been made of metal (or stone?) to be able to be heated. In fact, Sa_yan.a understands some kind of javelinor dart in this instance (*r.s.t.ya_khyaya_ cakriya_*) and, in the same hymn, on *cakriya_* in verse 14 adds: *r.s.t.ya_khyena_yudhena.* Moreover, it is noteworthy that in the above examples the causative verb *vartaya-* is used in the sense of 'to hurl by rotatint' or' to send whirling'. Such a use is exemplified also in other contexts [See Grassmann, *Worterbuch zum Rig-veda,* s.v. *vr.t* (9,10)] both with the accusative object (weapon) and the dative of the victim as at RV, VII.104.4 (cf. I.121.9), and, with the instrumental of the implement and the accusative of the person attacked as in the passage under discussion and, for example at RV, VII.104.5. Such an idiomatic use of *vartaya-* may also be found at RV, V.30.7 and VIII.14.13. The sense of weapon for *cakra* is also clear from RV X.73.9 where the term obviously signifies the thunderbolt of Indra. Although this stanza has not been elucidated by Sa_yan.a for the RV, yet in his comment on the parallel passag at SV I.331, he gives the sense of *a_yudha* and Griffith renders it by 'quoit'. There is another instance of *cakra* at RV I.155.6 which seems particularly important in view of the famous connection with Vis.n.u with the discus already referred to. It is said there that 'like the whirling *cakra* he (Vis.n.u) has set in motion his ninety-four racing steeds' (*cakram na vr.ttam vyati_ravi_vipat*). Sa_yan.a's comment here is most illuminating: '*vr.ttam cakram na: bahvaropetam cakram iva tam yatha_ s'atror upari praks.epan.a_ya bhra_mayati...*' (like a *cakra* with many spokes, which he whirls with the intention of casting it on the enemy). It is certain that Sa_yan.a has at the back of his mind the celebrated discus Sudars'ana, the first of Vis.n.u's five weapons. For all these contexts Geldner in his translation (Reference is to Geldner's *Der Rig-veda* (HOS, vols. 33-5) and to Grassman's *Rig-veda* (2 vols.). Hereafter translations of the RV, will be cited by the author's name.) merely renders *cakra* by '*Rad*' (wheel) without commenting on its actual implication, probably following Grassmann who too groups all these under the simple sense of 'wheel' in his *Worterbuch* and gives the same sense in his translation.

The nature-myth imagery of the RV has in some places equated the solar disk (See Von Bradke, ZDMG, vol. 40, p. 357) with the*cakra*, and in some contexts Indra is said to have hurled at his enemies the solar disk, tearing off or plundering it from the sun (*svar, su_rya*). At RV, I.130.9 he is eulogized as having torn off (*pra br.hat*) the wheel of the sun (*su_ras*) and deprived his opponents (the tyrannous ones of verse 8) of their life (lit. speech). Sa_yan.a on this verse records a

legend (*itiha_sa*) as to how Indra used the sun's disk as a weapon against the Asura-s. In another passage (IV.16.12), Indra is implored to 'crush the Dasyu-s at once...tearing off in the onslaught the disk of the sun' (*sadyo dasyu_n pra mr.n.a... pra su_ras' cakram br.hata_d abhi_ke*). This idea has an exact paralle at RV, I.174.5 where the poet says' let him tear the sun's disk off in the onslaught, let the thunderbolt-armed go forth to meet his rivals' (*pra su_ras' cakram br.hata_d abhi_ke abhi spr.dho ya_sis.ad vajraba_huh;* cf. V.29.10). We are not wrong, therefore, if we see the same idea of tearing off the sun's disk at RV, IV.28.2 where Indra is said to have wrenched (*khidat*) the disk of the sun, and in another passage where he is described as having plundered (*mus.a_yah*) the sun's *cakra* in the fight and driven away the evil-doers (Grassman, *Worterbuch zum Rig-veda,* s.v. *rapas.*) (VI.31.3; cf. I.175.4, IV.30.4). Just as in the above instances the authors of the hymns seem to have asociated the image of the sun's 'wheel' with the *cakra* as mythical weapon of Indra, so do they appear to have connected in their imagination the latter with the wheel of the war-chariot. In a much discussed context, namely RV, I.53.9, Indra is said to have 'beaten down (*ni... avr.n.ak*) with his evil-footed [Geldner takes dus.pada_ as 'with the lame', but Griffith as 'outstripped', following Sa_yan.a (s'*atrubhih pra_ptum as'akyena*), qualifying *cakren.a.* Grassman's 'evil-footed' (*Worterbuch*) seem, to suit the context better, meaning, as he gives in his trans., 'a sharp wheel', although previously the present writer gave the sense of 'unassailable' to the compound (Belvalkar Felicitation Volume, p. 266)] chariot-wheel (*cakren.a rathya_ dus.pada_*) the twice ten rulers of tribes... (who advanced)'. Whether we find here a reference to armed wheels of the war-chariots, as Whitney suggested for the term ks.ura-pavi of the AV to be discussed later, remains problematical.

From the above discussion it may be surmised that the *cakra* as a weapon of attack implies a 'crossing' of two or three poetical images. The stone discus as a primitive implement, probably surviving (See the present writer's paper on 'Some Prehistoric Survivals in the R.gveda', *Indologen-Tagung,* 1959, Gottingen, 1960) from the neolithic hunting cultures of the primitive Indo-European period (See V. Gordon Childe, *The Aryans,* pp. 160-1) may perhaps be the prototypal concept. That Stone Age primitive man might have already devised even in a crude and rudimentary form such an implement (a potential weapon of attack) is inferable from the sharp-edged discoid flakes that have been unearthed by archaeologist. (See Burkitt, *The Old Stone Age,* 2nd ed., pp. 68, 99; De Pradenne, *Prehistory,* Row's trans., pp. 58 ff.). Moreover, it is significant that in ancient Greece the massive *diskos* made of stone was popular, although as an object of sport. (Homer, *Odyssey,* VIII.186, 188, 190; *Iliad,* II.774; Pindar, I.1.34. Excavated specimens are circular plates of stone, later of metal, nine to ten inches in diameter and four to five pounds in weight. See *Encyclopaedia Britannica* (14th ed.), vol. V, p. 420). The throwing of the discus or the quoit had become a game as had the throwing of the javelin, both originally perhaps projectile weapons of attack. (Cf. the *bolas,* a primitive hunting missile, now used as a game or a toy in Africa. ibid., vol. 23, p. 454). In the R.gvedic period, however, the discus seems to have survived at least as the mythical weapon *cakra* used by Indra, with its nature-myth counterpart in the solar disk of the heavens. On this image already complex, mytho-poetic fancy apparently super-added (see RV I.53.9) the symbol of the *wheel* of the war-chariot whose popularization among Vedic Aryans must be soleley attributed to the chariot-warriors reflected in the characters of Indra and his hosts, the Marut-s. Indra indeed is the *rathes.t.ha_, par excellence,* the epithet being exclusively used for him in the RV. (See Grassman, Wb., s.v.; cf. Piggott, *Prehistoric India,* pp. 260, 273).

Th above attempt to establish the sense of R.gvedic *cakra* as referring in some contexts at least to a discoid weapon receives considerable support from an isolated instance of its occurrence in the Avesta. In a fragmentary text, the *Aogemadae_ca_* (81) we find the phrase *hae_naya_ cakhravaitya_,* which the Sanskrit commentary of Nairyosang has rendered by '*cakra-s'astra-dha_ri_*' that is to say, 'bearing the weapon discus or quoit'. In spite of Herzfeld's ingenious suggestion that the text may be

referring here to a 'chariot-regiment' (*Zoroaster and His World*, vol. II, p. 687) -- *cakhra* in his opinion being used in this compound *pars pro toto* for the *ratha* -- one would rather agree with the traditional explanation, and regard the *cakhra* as a discus or quoit like the Vedic parallel. Bartholomae's interpretation of *cakhravant* here as 'bearing a wheel as field-badge (military emblem)' (*Altiranisches Worterbuch*, s.v. *cakhravant*-) is far more justifiable although he has offered no further explanation of its significance. If the meaning of discus or quoit be accepted for the Avestan word also, it may indicate an Indo-Iranian provenance for this particular weapon, which, as we had reason to surmise above, possibly survived into the R.gvedic period from an earlier era.

There is further evidence in the Vedic literature supporting the idea that the Aryans of the early period knew of a sharp-edged, circular metallic weapon of attack. It has been generally recognized that apart from its simple sense of wheel-band or tire of the chariot wheel (*Nirukta*, V.5: *ratha-nemi*) the word *pavi* also implies in a few instances in the RV some kind of weapon (See Grassman, Wb., s.v.; Geldner, *Ved. Studien*, vol. II, p. 12, f.n.1; Zimmer, *Altindisches Leben*, p. 248; Macdonell and Keith, *Vedic Index*, s.v.; Mayrhofer, *Kurz. Worterbuch des Altindischen*, s.v. *pavi*) although its exact character is not sufficiently clarified. This latter meaning, no doubt, is based on *Nirukta* XII.30 (=*s'alya*) and *Naighan.t.uka* II.20 (=*vajra*). Consequently *pavi* has been taken as 'metallic point of spear or arrow' or a 'bolt'. The etymology of this word is somewhat obscure (See ibid., *s.v.* pavi), but if connected with Latin *pavio_, pavi_re*, to strike or crush, Lithuanian *pjauti*, to cut or immolate, and probably also with Greek *paio_*(Pokorny, *Indogermanisches Etymologisched Worterbuch*, p. 821 (s.v. *pe_u*); cf. Mayrhofer, loc.cit., citing Charpentier, *Indian Linguistics*, II, 70 ff.; see also Grassman, Wb., loc.cit.), the meaning of some sort of weapon as Indian tradition pictured it is certainly plausible. It is significant that in some contexts of the RV the term *pavi* while obviously signifying the *tires* or rims of the chariot-wheels of the Marut-s (or the As'vin-s) also contains the suggestion of their being employed as rain-making implements (e.g. I.64.1, 180.1) reminding one unmistakably of the dual role of Indra's *vajra.* Perhaps it is the same idea that is implied at RV, I.88.2, where the Marut-s are said 'to strike the earth with the tire of their chariot' (*pavya_ rathasya janghananta bhu_ma*). These instance show a 'crossing' of the idea of *tire* and *weapon*, just as in the case of *cakra* as indicated above. It is, however, difficult to visualize an implement of the shape of a tire being used as a weapon, since in several contexts *pavi* is compared to a sharp blade, as of an axe, falling on the victim and chopping his trunk or limbs. On the other hand if the weapon is understood as some form of quoit which in the poet's imagination had sometimes been associated with the tire, on account of its circular metallic nature, the sense of several contexts seem to improve.

At RV, VI.8.5, Agni is implored to 'cut down the wicked (foe), as it were, with the *pavi*, like a tree with a sharp edge (of an axe) [cf. Geldner, HOS, vol. 34, p. 100[] (*pavyeva... aghas'am.sam.... ni_ca_ ni vr.s'ca vaninam na tejasa_*). Here Sa_yan.a equates *pavi* with *vajra*, as he often does for the term *cakra.* Griffith guesses with 'sharpened bolt', while Geldner cautiously takes it as 'iron weapon' (*Eisen*). What has to be emphasized here is the intended parallelism between *pavya_* and *tejasa_*, the latter, as Geldner has rendered it, meaning 'the sharpened edge (of a cutting instrument)' -- a sense several times found for *tejas* in the RV (See Grassman, Wb., s.v.). Hence by *pavi* reference to a weapon with extremely sharp edge, used with that edge striking the victim, is clear from this context. A similar appeal is addressed to Indra at RV, X.180.2 (= AV VII.84.3): 'Whetting they darting, sharp *pavi*, O Indra, dismember our foes...' (*sr.kam sam.s'a_ya pavim Indra tigmam vi s'atru_n ta_d.hi*). Sa_yan.a takes *sr.kam* as adjective to *pavim* in the sense of 'moving' (*saran.as'i_lam*) which seems preferable to regarding it as a noun with the meaning of a 'dart' as most translators have done. It is significant that both the verbs *ni vras'c* and *vi taks.* are most appropriate to describe the action of a sharp-edged weapon falling suddenly on the victim and severing his head or limbs from the trunk. We may compare the use of *vi taks.* at RV, I.158.5 (*s'iro yad asya*

traitano vi taks.at). It would certainly be odd to conceive of a rim-shaped metal band being capable of such a function. It is only if we take *pavi* as a quoit that these contexts assume some intelligent meaning. In Particular, the difficult stanza at RV, X.156.3 becomes amenable to a reasonable interpretation if *pavi* is taken in that sense. There Agni is addressed with the words: '*an:gdhi kham vartaya_ pan.im*'. Grassman in his *Worterbuch* promptly suggested the emendation of the curious *pan.im* to *pavim* and in his translation gave the rendering 'turn the wheel'. He had the support of the SV (II.7.15.3) which reads *pavim*, the reading followed by Griffith too in his RV translation. Geldner, who is not enthusiastic about this emendation, renders the phrase (with *pan.im)* as 'smear the hole (of the hub) and turn (i.e. convert) the niggard', adding a note to say that the idea is figurative. Unfortunately for him such a sense of *vartaya* is nowhere attested in the RV, whereas its constant use in the sense of 'whirling' (such as wheels or discoid weapons) has lready been referred to as in the case of *cakra.* Griffith's 'oil thou the socket, turn the wheel' following Grassman seems much more reasonable, the only objection being that *pavi* never means the *wheel* of the chariot in the Veda or elsewhere. As shown earlier, it means only the metallic rim or tire round the wheel. If we regard *pavi* her as the weapon, i.e. some form of quoit, a positively clear meaning is attained. In that sense the oiling would refer to some application of a lubricant to the inside socket (*kham*) of the quoit for a swifter whirling and easy release. That some discoid weapons had a triangular hole in the middle has been recorded in the *Ni_tipraka_s'ika_* as referred to earlier. We may also compare the art of throwing the Greek *diskos* which was swung with the help of a helve of wood put into the hole. (Liddell and Scott, Greek Lexicon, s.v. *diskos*). In fact, the *Matsya P.* (150, 195) actually refers to the weapon *cakra* as being oiled, an idea which clearly supports the above interpretation.

In view of the above occurrences of *pavi* in the likely sense of a quoit, the incidence of the term *ks.urapavi*, 'razor-edged *pavi*', twice in the AV (XII.5.20, 55) assumes particular significance. In this hymn, inculcating the danger of robbing or harming a Brahmin's cow, it is said that 'she is a bolt (*vajra*) when running (18); a missile (*hetih*) when she draweth up her hooves... (19); a *ks.ura-pavi* when she beholdeth (20)'. Again, lower down (54-5) in the same hymn the cow is addressed: 'Burning, consuming, as the *vajra* of the Brahman, becoming Death, as the *ks.ura-pavi*, pursue thy course' (*ks.urapavir mr.tyur bhu_tva_ vi dha_va tvam*). In both these contexts Griffith translates the term by 'sharp as a razor' (*Hyns of the Atharvaveda*, II, pp. 128, 130). Whitney too taking it as an adjective renders it as 'keen-edged', but in the latter context adds a note that the reading *vi dha_va tvam* 'probably carries on the figure implied in *ks.ura-pavi* which applies especially to the armed wheels of a battle chariot'. (*Atharvaveda Sam.hita_* (HOS, vol.8), p. 706). Whitney possibly refers to the sense of *pavi* as 'tire' developing into that of 'wheel'. But such a semantic development is hardly attested in the language, as remarked earlier. Thus, considering also what has been said above regardin the meaning of *pavi*, it appears justifiable to conclude that *ks.ura-pavi* most probably was a weapon of the shape of a *flattish metal ring* with its outer edge as sharp as a razor blade. Further evidence as to the substantive 'weapon' sense of the term may be found in the *Taittiri_ya S.* (II.1.5.7) where, in a cryptic simile, Prosperity is compared to the *ks.ura-pavi* and the sacrificial post, shaped like a wooden sword, to the *vajra;* its terror-striking character being implied at V.6.6.1, VI.2.5.2, etc. (Cf. S'atapath Bra_hman.a, III.6.2.9; *Hiran.yakes'in Gr.hya-su_tra*, I.24.5). This substantive sense is also found at *Maitra_yan.i_ S.* I.10.14 (= *Ka_t.haka S.*, XXXVI.8) where the Marut-s are described as having destroyed the victim with the *ks.ura-pavi*, the *Nirukta* (V.5) glossing is as 'tire or wheel-band'. The *S'athapatha Br.* (VII.3.2.5,6) refers actually to *vajra_n ks.urapavi_n*, and with this may be compared the statement at *Jaimini_ya Br.* I.98 which equates *ks.ura-pavi* with *vajra.* It may be observed that *vajra*, although prominently used for the celebrated thunderbolt of Indra, in course of time assumed in the Vedic period itself the general sense of 'weapon'. (Monier-Williams, Sanskrit-English Dict., s.v. *vajra*).

Definite support for the above interpretation comes from the existence in Pali (*Ja_taka*, IV.3)

of th eterm *khura-cakka* which is clearly conceived as a 'wheel' which immolates the victim by its rotation (ibid., p.4). Cowell (*The Ja_taka*, English translation, IV, p. 3) rendered the term as 'a wheel sharp as a razor'. The real character of this weapon is brought out in the phrase *khurapariyantena_pi cakkena* found in the *Digha Nika_ya* (I.52) which Rhys Davids translated as 'with a discus sharp as a razor' (*Dialogues of the Buddha*, I, p. 69), the Pali commentary on this passage (*Suman:galavila_sini_*, pt.I, p. 160) equating *khura-cakka* with *khura-nemi*, where *nemi* is the exact equivalent of *pavi* as shown earlier. It may be added that in Prakrit too *pavi* is found in the sense of *vajra*, the weapon of Indra (*Pais-sadda-mahan.n.avo* (pt.I), s.v.), a use which receives confirmation from the phrase (*vajren.a*) *ks.ura-bhr.s.tina_* at AV, XII.5.66, which Whitney has translated as 'razor-pronged (*vajra*)'.

The above discussion should throw some light on the obscure passage at RV I.166.10 where the Marut-s are described as 'having blades (razors) on their *pavi-s'* (*pavis.u ks.ura_ adhi*). Max Muller translated the phrase as 'on their fellies (are) sharp edges', suggesting, as Whitnely did for the AV *ks.urapavi* referred to above, 'armed wheels of a battle chariot'. However, he is doubtful 'whether in India or elsewhere the tires or the wheels of chariots were ever used as weapons of attack, as detached from the chariot...' (SBE, vol. 32, p. 173). Sa_yan.a says that weapons like the *vajra* with sharp edges is meant (*pavis.u vajrasadr.s'es.va_yudhes.u ks.ura_h ks.uradha_ra_h*), and, according to the context, *pavi* does not appear to imply any connection here with chariots. Considering the real nature of the other weapons carried by the Marut-s, it seems very probable that the reference is to some of sharp-edged quoit. Even more puzzling an occurrence of the term is found at RV V.31.5 which states that 'without steeds or chariots the *pavi-s* sped by Indra whirled upon the Dasyu-s' (*anas'va_so ye pavayo 'ratha_ indres.ita_ abhyavartanta dasyu_n*). It may be that this reference too is to rim-like quoits in their (horizontal) flight which the poet seems to connect with chariot-wheels in his imagination. (But see Macdonell and Keith, Vedic Index, vol. I, s.v. *pavi*, for a different interpretation).