

# EXCAVATIONS AT HARAPPĀ

BEING AN ACCOUNT OF ARCHÆOLOGICAL  
EXCAVATIONS AT HARAPPĀ CARRIED OUT  
BETWEEN THE YEARS 1920-21 AND 1933-34

BY  
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**Arrow-head.**

No. 63 (4028) in Pl. CXVIII is the only example from Harappā of a chert arrow-head. It is leaf-shaped and of red colour. The edges, though a little rough, are sharp, but the tip and tang are slightly broken. It is 1.7 in. long, 0.75 in. wide and 0.2 in. thick. Mound AB, Extension of Pits I and II; from spoil earth.

*Chert burnishers* (Pl. CXVIII, 32-36).

Only five burnishers, all of chert, have been found at Harappā. Shaped like a shuttle, they are triangular in section, with slightly convex faces tapering to both ends. Thanks to the hardness of the material, they take a high polish and are well suited for burnishing metal objects, especially those of gold and silver. Such burnishers are still used by lapidaries in India.

No. 32 (10755) is of cream colour, mottled red—the only complete specimen found at Harappā. It is 6.6 in. long and 0.75 in. thick in the middle: somewhat shorter and thicker than the burnisher illustrated in *M. I. C.*, Pl. CXXX, 36. Mound F, Trench V, Square L 12/8; Depth 8 ft. b.s.; Stratum IV.

Nos. 33 (2469) and 34 (3143) are flesh-coloured with red and blue veins. Slightly less than half their original size they are 0.65 in. thick at the broken end, and 3.25 and 3.1 in. long respectively. Both of them were found in Mound AB, Extension of Pits I and II, the former in Square R 24/7; at a depth of 4 ft. 6 in. b.s., in Stratum II, and the latter in Square R 24/3, at a depth of 8 ft. b.s., in Stratum IV.

No. 35 (H33) is the smallest of the five. It is of a uniform buff colour so highly polished as to be almost translucent along the edges. More than half of it is missing. L. 1.8 in.; thickness in the middle 0.3 in. only. Cemetery H, Eastern Section, Square S 34/9; Depth 1 ft. 6 in. b.s.; Stratum I.

**Grey.**

No. 36 (1849) is less than half the original size. Its original colour was grey mottled pale yellow, but the surface has been darkened, possibly by some artificial process such as heating in oil.<sup>1</sup> Mound F, Trench III, Square N 9/9; Depth 11 ft. 3 in. b.s.; Stratum. V.

*Weights* (Pl. CXVIII, 1-31, and Pl. CXVII, 47-48).**Material.**

Weights have been found in very large numbers in all parts of the site and in association with all the strata. Although in the table given below I have included only the finer class of weights made mostly of chert and granite, there can be little doubt but that larger weights of a rougher kind, made, perhaps, of natural pebbles were also in use. The small Harappā weights found up to the year 1927, have already been examined and weighed along with those of Mohenjo-daro by Mr. A. S. Hemmy, late Principal of the Government College, Lahore, who has summarised his results in Chapter XXIX of *M. I. C.* In preparing the table appended below I have followed Mr. Hemmy's designations and limits within which those designations apply.

<sup>1</sup> According to Sir Edwin Pascoe, the dark colour of hornblende pendants may be due to some process of artificial darkening, such as heating in oil, cf. *M. I. C.*, p. 526, footnote 2.

According to their shape the Harappā weights may be divided into the Types. following types:—

- (a) Cuboid.
- (b) Barrel-shaped.
- (c) Cylindrical with flat base and top.
- (d) Spherical with flattened base and top.
- (e) Cone-shaped.

*Type a: Cuboid weights (Pl. CXVIII, 1-28).*

Weights of this shape were most popular and easily predominate over those of all other types taken together. The smallest Harappā weight of this type (No. 10443) is of exactly the same dimensions as the Mohenjo-daro weight Dk. 140 which measures 0.3 by 0.3 by 0.25 in., but the largest weight (No. 635) here measures 4.3 by 4.3 by 3.2 in. as against that of Mohenjo-daro which measures 6.8 by 6.0 by 3.8 in. These weights are made mostly of chert. Among them there is not a single true cube, though it may be observed that in a very large majority of cases the top and bottom are perfect squares. As already pointed out by Dr. Mackay,<sup>1</sup> they were first roughly chipped into shape and then ground and polished. The first process of chipping into shape is illustrated by No. 12 (1095) in Pl. CXVIII which measures 4 by 4 by 2.6 in. Most of the chert weights are beautifully banded or mottled; those of granite are mottled grey and black.

Most popular shape.

Method of manufacture.

Nos. 4 and 13 (635) are two views<sup>2</sup> of the largest chert weight from Harappā. It is broken along the edges and corners and measures 4.3 by 4.3 by 3.2 in. Wt. 2652.8 gms. Mound F, Trench I, Square M 12/17; Depth 4 ft. b.s.; Stratum II.

Description.

No. 3 (7168) is chipped at the corners and is the second largest weight found at Harappā. It measures 4 by 4 by 3.7 in. Wt. 2703.9 gms. Mound AB, Extension of Pits I and II, Square Q 23/15; Depth 4 ft. b.s.; Stratum II.

No. 27 (902) is of grey granite mottled black: it measures 1.15 by 0.95 by 1 in. Wt. 49.75 gms. Mound F, Great Granary Area, Square J 9/23; Depth 2 ft. 3 in. b.s.; Stratum I.

No. 28 (4368) is similar to No. 27 and measures 0.9 by 0.9 by 0.65 in. Wt. 27.65 gms. Mound AB, Extension of Pits I and II, Square Q 24/21; Depth 3 ft. b.s.; Stratum I.

*Type b: Barrel-shaped weights (Pl. CXVII, 47-48).*

Eight complete and two fragmentary examples of this type have been found at Harappā. Their length varies between 1.75 and 4.15 in., diameter in the middle between 0.35 and 1 in., and diameter at the ends between 0.23 and 0.6 in. With the exception of three unfinished examples, two of grey stone and one of slate, they are quite symmetrically made and highly polished.

<sup>1</sup> M. I. C., p. 462.

<sup>2</sup> The illustrations being cut-outs from different photographs bear no proportionate relation to the original size of objects.

No. 47 (1651) is of hornblende, as are also the four following examples. It is 3.1 in. long, 0.8 in. in diameter at the middle and 0.35 in. across the ends. Wt. 61.3 gms. Mound F, Great Granary Area, Square I 9/14; Depth 4 ft. b.s.; Stratum II.

No. 48 (1094) is 3.7 in. long, 1 in. in diameter at the middle and 0.6 in. at the ends. Wt. 130.2 gms. Mound F, Great Granary Area, Square J 9/23; Depth 4 ft. b.s.; Stratum II.

No. 7597 (unillustrated) is 4.15 in. long, 0.95 in. in diameter at the middle and 0.6 in. across the ends. Wt. 128.15 gms. Mound AB, Extension of Pits I and II, Square P 24/21; Depth 13 ft. b.s.; Stratum V.

No. B1480 (unillustrated) is the smallest and best finished weight of this type. It is 1.75 in. long, 0.35 in. in diameter at the middle and 0.23 in. at the ends. Wt. 7.65 gms. Mound AB, Trench B; Depth not recorded.

No. A333 (unillustrated). This is also of hornblende, slightly irregular and the least polished in that substance. Wt. 80.65 gms. It is 3.7 in. long, 0.85 in. in diameter at the middle and 0.55 in. across the ends.

Unmarked (unillustrated). This is of grey sandstone unfinished. It is 3.5 in. long, 0.95 in. in diameter at the middle and 0.6 in. across the ends.

No. 12063 (unillustrated) is also of grey sandstone measuring 2.3 in. long, 0.7 in. in diameter at the middle and 0.4 in. at the ends. Wt. 37.5 gms. Mound AB, Trench at the Southern Edge, Square Q 28/21; Depth 14 ft. 6 in. b.s.; Stratum V.

No. A347 (unillustrated) with oblique bands is the only example in slate. It is unfinished and slightly irregular in shape measuring 2.15 in. long, 0.7 in. in diameter at the middle and 0.4 in. across the ends. Wt. 25.5 gms. Mound F, Great Granary Area, Depth 3 ft. 2 in. b.s.; Stratum II.

Dr. Mackay has pointed out that weights of this type were common enough in Egypt, early Mesopotamia and Elam, where they were made of various materials.<sup>1</sup>

*Type c: Cylindrical weight with flat base and top.*

No. 29<sup>2</sup> (4881) in Pl. CXVIII is made of finely banded dark grey chert and is the only example of this type. It is smaller than the similar example found at Mohenjo-daro being 0.43 in. in height and 0.6 in. in diameter at the top and base. Wt. 6.45 gms. Mound AB, Extension of Pits I and II, Square Q 24/9; Depth 8 ft. b.s.; Stratum IV.

*Type d: Spherical weight with flattened base and top.*

No. 30 (J576) in Pl. CXVIII is the only example of this type. It is made of carnelian and coated with white paint which has partially disappeared. At Mohenjo-daro six examples of such weights have been found. This one is 0.8 in. high, 1.1 in. in diameter at the middle and 0.7 in. across the top and

Known in Egypt,  
Mesopotamia  
and Elam.

Carnelian.

<sup>1</sup> M. I. C., pp. 463-64.

<sup>2</sup> But for the fact that its weight fits within the limits of weights designated E in the table below it might have been described as an ear-plug.

base. Wt. 27.34 gms. Area J, Trench I, Square Q 31/18; Depth 4 ft. b.s.; Stratum III.

*Type e: Cone-shaped weight.*

No. 31 (11028) in Pl. CXVIII is the only cone-shaped weight found at Harappā. It is of grey granite and measures 1.2 in. high and 1.3 in. in diameter at the base. It is 53.6 gms. in weight and falls under the designation H according to Mr. Hemmy's nomenclature. Mound F, Trench VI, Square O 10/25; Depth 4 ft. 6 in. b.s.; Stratum II.

Large conical weights with a hole for suspension mentioned by Dr. Mackay in *M. I. C.*<sup>1</sup> under type *d* and those of a hemispherical shape described under type *g* are not found at Harappā. The following is a table of the weights:—

No.	Type. <sup>2</sup>	Weight <sup>3</sup> in grammes.	Substance.	Designation and limits of weights in grammes.	No.	Type.	Weight in grammes.	Substance.	Designation and limits of weights in grammes.
635 <sup>4</sup>	a	2,652.8	Chert	2 N units. 2652.8—2703.9.	4993	a	54.0	Chert.	Uncommon.
7168 <sup>4</sup>	a	2,703.9	Chert.		12106e	a	54.1	Chert.	
12218 <sup>4</sup>	a	1,595.5	Sandstone	3979	a	54.25	Chert.		
421	a	492.2	Cherty limestone.	771	a	54.35	Chert.		
8822	a	263.5	Chert	10953	a	54.6	Chert.		
11079	a	121.4	Chert	J 121.4—135.9	J49	a	54.6	Chert.	
5736	a	124.25	Grey sandstone.	1651	b	61.3	Hornblende.		
1339	a	127.35	Chert.	270	a	67.5	Chert.		
3480	a	127.45	Chert.	B1461	e	36.85	Grey stone	Uncommon.	
7597	b	128.15	Hornblende.	3693	a	35.6	Chert		
1553	a	128.4	Chert.	844	a	25.05	Grey stone	G 25.05—29.5	
A1161	a	129.0	Chert.	12440	a	25.2	Limestone.		
7099	a	129.3	Chert.	120	a	25.35	Grey stone.		
1094	b	130.2	Hornblende.	A347	b	25.5	Slate.		
PitIV	a	130.8	Chert.	3904a	a	25.72	Cherty limestone.		
11241	a	132.0	Chert.	2943	a	25.87	Chert.		
..	a	132.5	Granite.	4509	a	25.95	Mottled grey stone.		
2988	a	132.6	Chert.	1156	a	26.1	Chert.		
PI-87	a	133.3	Limestone.	3735	a	26.25	Chert.		
1978	a	134.0	Chert.	7670	b	26.3	Grey stone.		
A616	a	134.8	Chert.	36501	a	26.3	Limestone.		
11446b	a	135.45	Chert.	H 49.75—67.5	8497	a	26.4	Limestone	G 25.05—29.5
771	a	135.9	Chert.	5380	a	26.5	Chert.		
902	a	49.75	Granite	11421	a	26.5	Chert.		
5086	a	52.2	Cherty limestone.	8979	a	26.5	Chert.		
10274	a	52.25	Granite.	G248	a	26.6	Chert.		
12500	a	52.3	Chert.	8501	a	26.7	Chert.		
Ae101	a	53.1	Chert.	12356	a	26.75	Chert.		
11072	a	53.6	Chert.	525	a	23.8	Grey stone.		
11028	e	53.6	Granite.	12571	a	26.85	Agate.		
H407	a	53.75	Chert.						
5448	e	53.9	Granite.						

<sup>1</sup> Pp. 463-64.

<sup>2</sup> For type, see p. 361 *supra*.

<sup>3</sup> Furnished by Pandit K. N. Sastri, Custodian, Archaeological Museum, Harappā.

<sup>4</sup> Khan Bahadur Mohammad Sana Ullah, Archaeological Chemist in India who has examined them, writes that "these weights are badly worn, the worst affected being No. 635. They are, therefore, not suitable at all for accurate work".

No.	Type.	Weight in grammes.	Substance.	Designation and limits of weights in grammes.	No.	Type.	Weight in grammes.	Substance.	Designation and limits of weights in grammes.
7416	a	26-95	Chert.		120	a	13-7	Chert.	
Ae155	a	27-0	Chert.		120	a	13-7	Cherty limestone.	
1252	a	27-0	Soapstone.		120	a	13-7	Chert.	
..	a	27-0	Granite.		10195	a	13-75	Chert.	
A357	a	27-0	Granite.		674	a	13-75	Chert.	
..	a	27-0	Chert.		1575	a	13-75	Chert	F 11.4-15.0
7640	a	27-0	Chert.		1173	a	13-8	Chert.	
10632	a	27-1	Banded agate.		Af94	a	13-8	Granite.	
B1807	a	27-2	Chert.		10631	a	13-8	Chert.	
11612	a	27-2	Granite.		8911	a	13-8	Chert.	
854	a	27-25	Chert.		10942	a	13-8	Chert.	
1356	a	27-25	Chert.		1074	a	13-85	Chert.	
10051	a	27-3	Chert.		4054	a	13-9	Chert.	
5756	a	27-3	Chert.		H662	a	13-9	Limestone.	
12106b	a	27-3	Chert.		8409	a	14-1	Chert.	
855	a	27-3	Chert.		J102	a	14-25	Chert.	
7664	a	27-3	Chert.		278	a	15-0	Chert.	
2550	a	27-31	Chert.		120	a	6-31	Chert	E 6-31-7.9
P11-38	a	27-32	Chert.		12417	a	6-45	Banded greystone.	
4009	a	27-32	Chert.		4881	c	6-45	Agate.	
8197	a	27-35	Chert.		J513	a	6-55	Limestone.	
7285	a	27-4	Granite.		817	a	6-6	Chert.	
Af284	a	27-4	Chert.		H70	a	6-6	Chert.	
H666	a	27-45	Chert.	G 25-05-29.5	5946	a	6-62	Chert.	
1252	a	27-45	Chert		4783	a	6-65	Chert.	
1308	a	27-45	Chert.		4250	a	6-72	Chert.	
3561	a	27-45	Granite.		H606	a	6-75	Chert.	
5531	a	27-65	Chert.		Ab308	a	6-75	Chert.	
4368	a	27-65	Granite.		11460	a	6-8	Chert.	
1356	a	27-7	Chert.		2555	a	6-82	Chert.	
5042	a	27-8	Chert.		J291	a	6-85	Chert.	
7110	a	27-8	Chert.		H539	a	6-85	Chert.	
4066	a	27-45	Chert.		7512	a	6-85	Limestone.	
4192	a	28-0	Chert.		5426	a	6-85	Chert.	
3663	a	28-25	Chert.		11517	a	6-9	Chert.	
5755	a	28-37	Chert.		Bg22	a	6-9	Chert.	
645	a	28-6	Chert.		8829	a	6-9	Chert.	
Bg14	a	28-6	Chert.		12242	a	6-95	Chert	E 6-31-7.9
3995	a	29-5	Chert.		12382	a	6-95	Chert.	
..	c	10-0	Agate	Uncommon.	2026	a	6-95	Limestone.	
583	a	11-4	Limestone	F 11.4-15.0	4068	a	6-95	Granite.	
J12	a	13-08	Chert.		5451	a	7-0	Chert.	
12248	a	13-2	Chert.		16522	a	7-9	Chert.	
11934	a	13-5	Cherty limestone.		Af359	a	3-25	Limestone	D 3-25-4.3
996	a	13-5	Chert.		5505	a	3-3	Limestone.	
10742	a	13-55	Chert.		4912	a	3-3	Chert.	
Bg26	a	13-55	Chert.		120	a	3-35	Chert.	
185	a	13-6	Chert.		19738	a	3-4	Chert.	
4836	a	13-6	Chert.		5461	a	3-4	Chert.	
J13	a	13-65	Chert.		10073	a	3-4	Chert.	
7587	a	13-67	Chert.						

No.	Type.	Weight in grammes.	Substance.	Designation and limits of weights in grammes.	No.	Type.	Weight in grammes.	Substance.	Designation and limits of weights in grammes.
4373	a	3.4	Chert.	C 2.5—2.9	19885B	a	1.15	Soapstone	B 1.15—1.92
A67	a	3.4	Chert.		Bg23	a	1.3	Chert.	
1959	a	3.4	Slate.		9046	a	1.65	Jade.	
8919	a	3.45	Chert.		3101	a	1.65	Chert.	
Ae155	a	3.45	Grey soapstone.		8400	a	1.65	Chert.	
J495	a	3.45	Chert.		J451	a	1.7	Chert.	
1706	a	3.5	Chert.		12711	a	1.7	Jade.	
5580	a	3.5	Chert.		A11	a	1.75	Chert.	
7569	a	3.55	Chert.		3831	a	1.75	Chert.	
4620	a	3.6	Chert.		8877	a	1.8	Chert.	
Ae159	a	3.65	Chert.		3993	a	1.85	Chert.	
1184	a	3.95	Chert.		11896	a	1.92	Chert.	
86501	a	4.3	Banded greystone.		10443	a	0.95	..	A 0.95
J2	a	2.5	Chert		B82	b	9.6	Hornblende	
J88	a	2.5	Chert.		PIV-124	b	39.4	Greystone	Uncommon.
5012	a	2.75	Limestone.		A333	b	80.7	Hornblende	
J598	a	2.9	Limestone.		PIV-48	b	86.2	Greystone	
					A334	b	89.7	Hornblende	

Khan Bahadur Mohammed Sana Ullah, Archæological Chemist in India, has furnished the following interesting note on a bronze rod found at Harappā which he takes to be a linear measure used in the Indus Valley:—

“Dr. E. Mackay has discovered a linear measure at Mohenjo-daro, which now preserves nine definite divisions, the average length of one space being 0.264 in. It is neatly finished out of a piece of shell and bears the marks and ⊕ five divisions apart, thus indicating a decimal scale of 1.32 ins. rising probably to a foot of 13.2 ins. Sir Flinders Petrie has identified this scale with the widespread standard which had been found hitherto, first in Egypt and subsequently, in Asia Minor, Greece, Lachish, Syria, etc. Therefore, the discovery of this scale at Mohenjo-daro at the earliest period, is of great significance. However, Dr. Mackay has remarked that there may possibly have been also a second system for few of the doorways are actual multiples of the unit marked on the scale that has been found.<sup>1</sup>”

Mohenjo-daro Measure.

13.2" foot.

Another fragmentary measure has been discovered at Harappā (Pl. CXXV, 39a). This is in the form of a bronze rod, 1.5 ins. long, broken at both ends, a little over  $\frac{1}{8}$ " in diameter, but bearing, unfortunately, only four complete divisions which are marked off by V-shaped indentations. The values of the divisions as determined with the aid of a travelling microscope, reading up to .001 cm., were:—

Harappā Measure.

0.960; 0.905; 0.945; 0.925; average, 0.934 cm. = 0.3676 in. It is obvious that the value of a division of this scale, 0.3676 in. is half of the digit 0.737 (correct within .3 per cent) or  $\frac{1}{2}$ th of the palm (2.947 ins.) of an early Egyptian system which ran thus:—

0.3676" Digit.

Zebo,	4 = shep,	7 = meh	100 = khet,	120 = ater or
digit	palm	cubit	reel	skhoinos
.737.	2.947.	20.62.	2060.	3.9 miles.

<sup>1</sup> Mackay's *Further Excavations at Mohenjo-daro*, p. 405.

20·6" Cubit.

Checks on  
Buildings.

This ancient system is based on the standard cubit of 20·62 ins. which "was termed the 'Royal Cubit' throughout history" and occurs far and wide. It was used in Egypt from the time of the Predynastic royal tombs onwards; in Babylonia, as 20·89 of Gudea; in Asia Minor, as 20·55 to 20·94; in tombs at Jerusalem, as 20·57; in six English stone circles, as 20·55; and in New Mexico, as 20·68.<sup>1</sup> Therefore, the occurrence of this widespread standard in the Indus Valley also, is quite understandable, but the question cannot be settled definitely until complete measures are also found. However, evidence of the actual use of this system in the Indus Valley has been inferred as a result of over 150 checks which have been applied on the buildings at Harappā and Mohenjo-daro, comprising measurements of various well-planned houses, rooms, courtyards, streets and platforms. The value of the cubit seems to vary between 20·3 and 20·8 ins. while that of the foot, between 13·0 and 13·2 ins. For instance in the most important group of buildings, known as 'the Great Granary' at Harappā,

(a) length of main walls . . . . .	51'-9" = 621" = 30 × 20·7
(b) width of main halls . . . . .	17'-3" = 207" = 10 × 20·7
(c) width of corridors . . . . .	5'-6" = 66" = 5 × 13·2
(d) width of central aisle . . . . .	23' = 276" = 21 × 13·2

The diameter of the circular platforms at Harappā is 11 ft. = 132" = 10 × 13·2. It is interesting that the width of the High Street, the principal highway of Mohenjo-daro, is 30'-9" or 18 cubits of 20·5 ins. The well-planned house No. XIX (Vs. A, 3) measures 23 × 33 cubits of 20·5 ins. House No. XXIII (Hr. B, 5) measures 29 × 36 cubits of 20·7 ins. House No. LIV (Hr. B, 7) measures 17 × 19 cubits of 20·7 ins. The Great Bath is 36 × 21 ft. of 13·1 ins. The width of the doorways, referred to by Dr. Mackay,<sup>2</sup> include apparently  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  fractions as at the present day, the value of the foot varying between 13·0 and 13·16 ins. The average width of the windows is 66 ins. or exactly five feet. These results indicate that several of these are simple multiples of either the cubit or the foot mentioned above.

It, therefore, appears very probable that both these systems, one based on the foot and the other on the cubit, were simultaneously in use in the Indus Valley. The value of the Harappā cubit, as determined from the well-planned 'Great Granary', is 20·7 ins., but in accordance with the bronze scale, it should be  $·3676 \times 8 \times 7 = 20·58$  ins. On the other hand if we take ten palms ( $·376 \times 8 \times 10 = 29·408$ ) as the diagonal, then the length of the side of its square is equal to 20·79 ins.; but the value obtained from the measurements of the various buildings varies between 20·3 and 20·8. The standard of accuracy could not be expected to be better in the case of buildings anywhere.

<sup>1</sup> *Encyclopaedia Britannica*, 14th edition, Vol. XV, pp. 142-5, Article on Ancient Measures and Weights by Sir Flinders Petrie.

<sup>2</sup> *M. I. C.*, pp. 274-5.