2. Short truncated bicone circular.
   From layer no.1 (Reg.no.178).
3. Short truncated bicone circular.
   From layer no.1 (Reg.no.217).
4. Short truncated bicone circular.
   From layer no.1 (Reg.no.388).
5. Short truncated bicone circular.
   From layer no.1 (Reg.no.232).
   From layer no.1 (Reg.no.127).
7. Short truncated bicone circular.
   From layer no.1 (Reg.no.138).
8. Short truncated bicone circular.
   From layer no.1 (Reg.no.201).
9. Short truncated bicone circular.
   From layer no.2 (Reg.no.413).
10. Short truncated bicone circular.
    From layer no.1 (Reg.no.241).
11. Short truncated bicone circular (unfinished).
    From layer no.2 (Reg.no.106).
    From layer no.1 (Reg.no.389).
13. Short truncated bicone circular (disc).
    From layer no.2 (Reg.no.265).
    From the surface (Reg.no.28).
15. Spherical.
    From layer no.1 (Reg.no.74).
16. Short truncated bicone circular.
    From layer no.1 (Reg.no.68).
17. Short truncated bicone circular (disc).
    From layer no.1 (Reg.no.358).
18. Cube(?) (unfinished).
    From layer no.1 (Reg.no.236).
    From layer no.2 (Reg.no.216).
    From layer no.1 (Reg.no.220).
    From layer no.1 (Reg.no.64).
22. Short bicone circular (disc).
    From the surface (Reg.no.21).
23. Short bicone circular (disc).
    From the surface (Reg.no.14).
24. Short truncated bicone circular.
    From layer no.2 (Reg.no.215).
    From layer no.2 (Reg.no.384).
    From layer no.1 (Reg.no.174).
27. Standard truncated bicone circular.
    From layer no.2 (Reg.no.111).

Pl. LIV

1. Etched carnelian standard barrel lenticular with single eye design.
   From layer no.2 (Reg.no.316).
2. Standard cylinder circular.
   From layer no.3 (Reg.no.336).
3. Short bicone circular.
   From layer no.2 (Reg.no.419).
4. Etched carnelian short barrel lenticular with single eye design.
   From layer no.1 (Reg.no.192).
5. Long barrel circular.
   From layer no.2 (Reg.no.204).
   From layer no.2 (Reg.no.406).
7. Long biconvex circular.
   From layer no.2 (Reg.no.198).
8. Long truncated cylinder circular.
   From layer no.2 (Reg.no.78).
   From layer no.2 (Reg.no.254).
10. Long truncated barrel circular.
    From the surface (Reg.no.25).
11. Long cylinder circular.
    From layer no.1 (Reg.no.236).
12. Long truncated barrel circular.
    From the surface (Reg.no.04).
Tarkhanewala-Dera

Pl. LIV Tarkhanewala-Dera : Carnelian beads. See p. 129
B. TERRACOTTA

This site yielded one hundred terracotta beads. The selected examples are described below:

Pl. LV

1. Long bicone circular.  
   From layer no.1 (Reg.no.169).
2. Short bicone circular.  
   From pit 2 sealed by layer no.2 (Reg.no.99).
3. Long bicone circular.  
   From layer no.1 (Reg.no.187).
   From layer no.2 (Reg.no.197).
5. Long bicone circular.  
   From layer no.3 (Reg.no.420).
   From layer no.2 (Reg.no.256).
7. Short bicone circular.  
   From layer no.2 (Reg.no.407).
8. Short bicone circular.  
   From layer no.1 (Reg.no.268).
   From layer no.1 (Reg.no.237).
10. Standard bicone circular.  
    From layer no.2 (Reg.no.414).
11. Long bicone circular.  
    From layer no.2 (Reg.no.108).
12. Short bicone circular.  
    From layer no.1 (Reg.no.240).
    From layer no.1 (Reg.no.357).
    From layer no.1 (Reg.no.390).
15. Long bicone circular.  
    From layer no.2 (Reg.no.270).
16. Short bicone circular.  
    From layer no.2 (Reg.no.196).
17. Short bicone circular.  
    From layer no.1 (Reg.no.239).
    From layer no.2 (Reg.no.396).
    From the surface (Reg.no.47).
20. Short bicone circular.  
    From the surface (Reg.no.24).
    From layer no.3 (Reg.no.327).
22. Long barrel circular.  
    From layer no.3 (Reg.no.381).
23. Long bicone circular.  
    From layer no.2 (Reg.no.260).
24. Short bicone circular.  
    From layer no.1 (Reg.no.291).
25. Short bicone circular.  
    From layer no.1 (Reg.no.152).
26. Short bicone circular.  
    From layer no.2 (Reg.no.107).
27. Short bicone circular.  
    From layer no.1 (Reg.no.360).
28. Short bicone circular.  
    From layer no.1 (Reg.no.173).
29. Short bicone circular.  
    From layer no.1 (Reg.no.153).
30. Short bicone circular.  
    From layer no.1 (Reg.no.275).
31. Short bicone circular.  
    From layer no.1 (Reg.no.346).
32. Short bicone circular.  
    From layer no.1 (Reg.no.160).

Pl. LVI

1. Short truncated bicone circular with impressed design.  
   From layer no.2 (Reg.no.333).
2. Short truncated bicone circular.  
   From layer no.2 (Reg.no.90).
3. Long truncated bicone circular.  
   From the surface (Reg.no.44).
Tarkhanewala-Dera

Pl. LVI. Tarkhanewala-Dera: Terracotta beads. See p. 132
4. Short truncated bicone circular.  
   From layer no.2 (Reg.no.427).
5. Short truncated bicone circular.  
   From layer no.2 (Reg.no.120).
6. Short biconvex circular with flat band along the periphery.  
   From layer no.2 (Reg.no.230).
7. Short bicone circular.  
   From layer no.1 (Reg.no.184).
8. Long bicone circular.  
   From layer no.1 (Reg.no.212).
   From layer no.2 (Reg.no.370).
10. Short truncated bicone circular.  
    From layer no.1 (Reg.no.296).
11. Short bicone circular.  
    From layer no.1 (Reg.no.98).
12. Long bicone circular.  
    From layer no.1 (Reg.no.342).
13. Long bicone circular.  
    From layer no.2 (Reg.no.284).
14. Short bicone circular.  
    From layer no.1 (Reg.no.149).
15. Long bicone circular.  
    From layer no.2 (Reg.no.305).
16. Short bicone circular.  
    From layer no.2 (Reg.no.330).

**Pl. LVII**

1. Spherical.  
   From layer no.1 (Reg.no.13).
2. Long barrel lenticular.  
   From layer no.1 (Reg.no.422).
   From layer no.1 (Reg.no.85).
4. Long biconvex lenticular.  
   From layer no.1 (Reg.no.410).
5. Disc  
   From layer no.2 (Reg.no.104).
   From layer no.1 (Reg.no.136).

**Pl. LVIII**

1. Long spacer, rectangular in plan and section.  
   Two perforations.  
   From the surface (Reg.no.32).
2. Long spacer, ellipsoid, elliptical. Three perforations.  
   From layer no.2 (Reg.no.348).
3. Long spacer, rectangular in plan and section.  
   Two perforations.  
   From pit 2 sealed by layer no.2 (Reg.no.100).
4. Long spacer, cylinder, rectangular with convex top. One complete and one broken perforation.  
   From layer no.1 (Reg.no.238).

**Pl. LIX**

1. Long cylinder circular.  
   From layer no.1 (Reg.no.176).
2. Long barrel circular.  
   From layer no.1 (Reg.no.359).
3. Long truncated barrel circular.  
   From layer no.2 (Reg.no.386).
4. Long barrel circular.  
   From layer no.1 (Reg.no.175).
5. Long barrel circular.  
   From layer no.2 (Reg.no.300).
   From layer no.1 (Reg.no.353).
7. Long bicone circular.  
   From layer no.1 (Reg.no.70).
8. Long bicone circular.  
   From layer no.1 (Reg.no.141).
9. Long barrel circular with incised spiral design.  
   From layer no.1 (Reg.no.124).
10. Long barrel circular with incised spiral design.  
    From layer no.2 (Reg.no.302).
11. Long truncated barrel circular with incised spiral design.  
    From layer no.2 (Reg.no.408).
Tarkhanewala-Dera

Pl. LIV. Tarkhanewala-Dera : Terracotta beads. See pp. 132, 134
Excavations at Tarkhanewala-Dera and Chak 86

Pl. LVII. Tarkhanewala-Dera: Terracotta beads. See p. 134
Pl. LVII. Tarkhanewala-Dera: Spacers. See p. 134
12. Long cylinder circular.
   From layer no.1 (Reg.no.181).
13. Long cylinder circular.
   From layer no.1 (Reg.no.186).
   From the surface (Reg.no.179).
15. Long barrel circular.
   From layer no.1 (Reg.no.221).
16. Long barrel circular with incised spiral design.
   From layer no.1 (Reg.no.132).
17. Long truncated barrel circular with incised spiral design.
   From layer no.1 (Reg.no.77).
18. Long barrel circular with incised spiral design.
   From layer no.1 (Reg.no.76).
19. Long barrel circular.
   From layer no.2 (Reg.no.375).
20. Long barrel circular.
   From layer no.1 (Reg.no.101).
   From layer no.2 (Reg.no.264).
22. Long cylinder circular.
   From layer no.1 (Reg.no.150).

C. STEATITE

This site yielded one hundred and eighty-one steatite beads. These are described below:

PI. LX

1. Standard truncated bicone circular.
   From the surface (Reg.no.23).
2. Standard truncated biconvex circular.
   From layer no.1 (Reg.no.210).
3. Short truncated bicone circular.
   From the surface (Reg.no.17).
4. Short truncated cylinder circular.
   From the surface (Reg.no.50).
5. Short truncated bicone circular.
   From the surface (Reg.no.55).
   From layer no.2 (Reg.no.373).
7. Standard truncated cylinder circular.
   From the surface (Reg.no.08).
   From layer no.2 (Reg.no.289).
9. Short truncated biconvex oval.
   From layer no.2 (Reg.no.282).
10. Short truncated cylinder circular.
    From layer no.2 (Reg.no.243).
11. Short cylinder circular (disc), with transverse perforation.
    From layer no.2 (Reg.no.272).
12. Short cylinder circular (disc), with transverse perforation.
    From the surface (Reg.no.15).
13. Short cylinder circular (disc), with transverse perforation.
    From layer no.2 (Reg.no.416).
    From layer no.1 (Reg.no.297).
15. Disc (wafer).
    From layer no.1 (Reg.no.343).
    From layer no.2 (Reg.no.292).
17. Short cylinder circular (disc), with transverse perforation.
    From layer no.1 (Reg.no.130).
18. Short cylinder circular (disc), with transverse perforation.
    From layer no.1 (Reg.no.95).
19. Short bicone circular (disc), with transverse perforation.
    From layer no.2 (Reg.no.417).
20. Short truncated bicone circular.
    From layer no.2 (Reg.no.263).
Tarkhanewala-Dera

Pl. LIX. Tarkhanewala-Dera : Terracotta beads. See pp. 134, 138
21. Short truncated bicone circular. 
From layer no.2 (Reg.no.244).
22. Short truncated cylinder circular. 
From the surface (Reg.no.19).
23. Short truncated cylinder circular. 
From layer no.1 (Reg.no.349).
24. Spherical 
From the surface (Reg.no.46).
25. Spherical 
From layer no.1 (Reg.no.84).
26. Spherical 
From layer no.1 (Reg.no.31).
27. Spherical 
From layer no.1 (Reg.no.162).
28. Spherical 
From layer no.1 (Reg.no.267).
29. Spherical 
From layer no.2 (Reg.no.229).
30. Spherical 
From layer no.3 (Reg.no.335).
31. Standard biconvex circular. 
From layer no.2 (Reg.no.421).
32. Standard biconvex circular. 
From layer no.2 (Reg.no.214).
33. Spherical 
From layer no.1 (Reg.no.361).
34. Spherical 
From layer no.1 (Reg.no.151).
35. Spherical 
From layer no.2 (Reg.no.323).
36. Spherical 
From layer no.1 (Reg.no.235).
37. Spherical 
From layer no.2 (Reg.no.271).

PI. LXI

1. Painted steatite: Standard barrel lenticular. 
From layer no.1 (Reg.no.82).
From layer no.2 (Reg.no.273).
From layer no.2 (Reg.no.372).
From layer no.1 (Reg.no.182).
7. Long truncated cylinder circular. 
From layer no.1 (Reg.no.401).
8. Long cylinder circular. 
From layer no.2 (Reg.no.280).
9. Short disc (wafer) circular. 
From layer no.2 (Reg.no.310).
10. Short disc (wafer) circular. 
From layer no.2 (Reg.no.409).
11. Short disc (wafer) circular. 
From layer no.3 (Reg.no.110).
12. Short disc (wafer) circular. 
From layer no.1 (Reg.no.170).
13. Short disc (wafer) circular. 
From layer no.2 (Reg.no.399).

PI. LXII

1. Micro beads, twelve in number. 
Standard truncated cylinder circular, four in number. 
Standard truncated bicone circular, four in number. 
Disc (wafer), twenty-four in number. 
From layer no.2 (Reg.no.429).
2. Micro beads, ten in number. 
Standard cylinder, four in number. 
Long cylinder, one in number. 
Short bicone, one in number. 
Standard truncated bicone circular, three in number. 
Disc (wafer), sixty-eight in number. 
From layer no.2 (Reg. no. 325).
Pl. LX. Tarkhanewala-Dera: Steatite beads. See pp. 138, 140.
PI. LXI. Tarkhanewala-Dera: Steatite beads. See p. 140
Pl. LXII. Tarkhanewala-Dera : Steatite beads. See p. 140
D. FAIENCE

This site yielded thirty faience beads. These are described below:

**Pl. LXIII**

1. Spherical  
   From layer no.1 (Reg.no.288).
2. Spherical  
   From layer no.2 (Reg.no.385).
3. Spherical  
   From layer no.1 (Reg.no.403).
4. Spherical  
   From layer no.1 (Reg.no.392).
5. Spherical  
   From layer no.2 (Reg.no.253).
6. Spherical  
   From layer no.1 (Reg.no.278).
7. Spherical  
   From layer no.3 (Reg.no.313).
8. Spherical  
   From layer no.1 (Reg.no.231).
9. Spherical  
   From layer no.2 (Reg.no.404).
10. Spherical  
    From layer no.1 (Reg.no.115).
11. Spherical  
    From layer no.2 (Reg.no.298).
12. Spherical  
    From layer no.3 (Reg.no.326).
13. Spherical  
    From layer no.1 (Reg.no.118).
14. Spherical  
    From layer no.2 (Reg.no.426).
15. Spherical  
    From the surface (Reg.no.57).
16. Spherical  
    From layer no.1 (Reg.no.412).
17. Spherical  
    From layer no.3 (Reg.no.309).
18. Spherical  
    From layer no.1 (Reg.no.424).
19. Spherical  
    From layer no.2 (Reg.no.304).
20. Spherical  
    From the surface (Reg.no.56).
21. Spherical  
    From layer no.2 (Reg.no.324).
22. Long barrel circular  
    From layer no.4 (Reg.no.195).
23. Spherical  
    From layer no.1 (Reg.no.154).
24. Spherical  
    From layer no.1 (Reg.no.295).
25. Long tubular circular.  
    From layer no.1 (Reg.no.189).
26. Long tubular circular.  
    From layer no.1 (Reg.no.226).
27. Long tubular circular.  
    From layer no.1 (Reg.no.185).
    From pit 1 sealed by layer no.2 (Reg.no.94).
29. Long tubular circular.  
    From layer no.1 (Reg.no.180).
30. Long tubular circular.  
    From layer no.1 (Reg.no.285).

E. OTHER MATERIAL

This site yielded one black stone, one amethyst (?), one lapis lazuli and five shell beads. These are described below:

**Pl. LXIV**

   From layer no.1 (Reg.no.339).
2. Amethyst (?): Short cylinder circular.  
   From the surface (Reg.no.06).
Pl. LXIII. Tarkhanewala-Dera: Faience beads. See p. 144
3. Lapis lazuli: Short cylinder circular.  
   From layer no.2 (Reg.no.432).
   From layer no.1 (Reg.no.163).
5. Shell: Short cylinder circular.  
   From layer no.1 (Reg.no.121).
   From layer no.1 (Reg.no.340).
7. Shell: Short cylinder circular.  
   From layer no.1 (Reg.no.61).
   From layer no.2 (Reg.no.245).
DISTRICT, GANGANAGAR, RAJASTHAN
CONTOUR AND SITE PLAN

INDEX
CONTOUR IN METRES ~33.50~
EXCAVATED AREA ■
UNMETALLED ROAD ———
ROAD WITH CANAL 🛠️

Fig. 28
1. THE CUTTING AND STRATIGRAPHY

The oval shaped eroded mound sprawling in an area of 5.5 hectares in the dried up course of ancient Sarasvati, contains a 2.5 m deposit of Painted Grey Ware settlement (Pl. LXV). The site was excavated by laying out horizontal trenches viz. A1, A2 and ZA1 (Fig. 28; pl. LXVI). The selected area was divided into squares of 10 x 10m. The Trench ZA1 was sunk at the highest point of the mound. The stratigraphy is well represented in Trench ZA1 Qd 2 where the natural soil was reached showing an undisturbed accumulation of five layers. (Pl. LXVII). These layers were corroborated in two other quadrants, which yielded similar finds. The single culture site witnessed two structural phases. The structural activity of phase I is attested to by two mud-brick structures and an oval shaped hearth. Phase I was succeeded by phase II marked by huts. These circular huts are traceable on plan and are seven in number. They denote the phase II of the structural activities at the site (Table V).

Trench A1, Qd 1 and 4, Section Looking west (Fig. 29)

The Trench A1 was divided into four quadrants and all the four quadrants were excavated. Layer (1) is medium compact, sandy, light grey and its thickness varies from 18-20 cm. It contains brickbats and potsherds of red, black, grey and black and red ware. In Qd 4 layer (1) merges with layer (2). Layer (2) has an average thickness of 20-30cm. It is represented by brown loose earth containing patches of ash, potsherds of red, black, grey and black-and-red ware. Layer (3) composed of ashy and burnt patches of earth and pieces of Painted Grey Ware, black-and-red ware potsherds, is comparatively loose in texture. This layer has been cut by Pit no.1 sealed by layer (2). The pit contains loose earth and ash. It has an average thickness of 60 cm. On top of this deposit were raised the structures 4 and 5 represented by the circular huts (Pl. LXX). This structural activity of phase II is sealed by layer (2). Below this lies layer (4), which is compact, and clayey and light brown in colour. It contains potsherd and its maximum thickness is 60 cm. At this level a large Painted Grey Ware bowl was found. On the top of this layer structures 1 and 2 made of mud-bricks and a hearth of clay (Structure 3) attributed to Phase I were exposed. Structure 1 made of four mud-bricks, takes a right turn (south-east) and is embedded in the section. Its orientation is north-east-south-west. Structure 2 made of one course is roughly ‘L’ shaped on plan and runs in north-south direction (Pl. LXVIII). Structure 3 is an oval shaped hearth made of clay. It has retained the top edge (Pl. LXIX). Being embedded in the section and sealed by layer (3), nature of these three structures could not be precisely ascertained. Layer (5) is about 1m in thickness,
CHAK 86,2003-04
DISTRICT GANANAGAR, RAJASTHAN
TRENCH A1, Qd 1 AND 4
Section Looking West

Fig. 29
Pl. LXVI. Chak 86 : Layout of the trenches. See p. 151
Pl. LXVII. Chak 86: Trench ZA1, Qd2. See p. 151
hard clayey earth mixed with kankars and calcarete nodules and occasional tiny potsherds of red ware. The natural soil could not be reached.

Trench ZA1, Qd 1 and 4, Section Looking west (Fig. 30)

The Trench ZA1 was sunk on the top of the mound. The section gives a fair picture of the structural activity of phase II. Layer (1) is composed of loose and sandy, light brown soil. It yielded a large quantity of potsherds. It has a maximum thickness of 20 cm. Layer (2) represented by semi-compact brownish earth, is about 20 cm thick. It contains brickbats and potsherds. Layer (3) witnessed the structural activity of phase II of the Painted Grey Ware culture represented by circular huts (Structures 6, 7, 8, 9 and 10). The deposit is composed of loose ashy earth, charred bones and charcoal denoting burning activity. It has also yielded various ceramic types viz., Painted Grey Ware, red ware, black-and-red ware, black ware and grey ware. Layer (4) is sandy showing occasional patches of ash, bones and decreasing number of potsherds. It is about 65 cm in thickness. Layer (5) occurs below layer (4) and comprise hard clayey earth, kankars and calcarete nodules. Some tiny potsherds were also noticed in this level. Below this thick deposit was encountered the natural soil in Qd 2.

In addition to the above Qd 1, 2, 3 and 4 of Trench A2 were also excavated but no cultural remains were found.

2. STRUCTURES

As per the stratigraphy discussed in the previous chapter habitational deposit could be assigned to two structural phases as below:

Phase I : Mud-brick structures and an oval shaped hearth
Phase II : Hutments

The structural activity during phase I was witnessed on layer (4). Two irregular mud-brick structures and an oval shaped hearth were excavated. These were partly exposed and found embedded in the section.

Phase II is represented by seven circular huts, traceable on plan, periphery being marked by ash, plenty of charred bones and burnt clay lumps. Probably the folks were living in circular huts made of bamboo or wooden poles with thatched roof. The possibility of their being utilized for storing grains and livestock can not be ruled out. The diameters of these huts vary from 1.65 m to 2.50 m and the thickness of the perimeter of these circular huts varies from 17 cm to 38 cm. No evidence of bathroom or sanitary arrangement could be discerned. Notably not a single metal object or terracotta figurine was found from these structures. As per the cross section, the huts were represented by a deposit (35 cm — 40 cm) of burnt material. These structures exposed in trenches viz., A1, Qd 1 and 4; ZA1, Qd 1 and 4, are catalogued below:

Catalogue of Structures

Figs. 31-32; pls. LXVIII-LXXIII.

Structure 1
1. Location : Square A1, Quadrant no. 4
2. Type of structure : Mud-brick structure
Fig. 30
CHAK 86, 2003-04
DISTRICT GANGANAGAR, RAJASTHAN
TRENCH A1, Qd 1 AND 4
STRUCTURES
Scale: 0 1 2 m

PHASE I
PHASE II

STR - 1
STR - 2
STR - 3
STR - 4
STR - 5

Fig. 31
CHAK 86, 2003-04
DISTRICT GANANAGAR, RAJASTHAN
TRENCH ZA1, Qd 1 AND 4
STRUCTURES

Fig. 32
Table-V
Concordance of Layers of Painted Grey Ware Level
Maximum Deposit 2.50m
Square/Quadrant

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NATURAL
3. Stratigraphic position: Built on the top of layer (4) and sealed by layer (3)
4. Period and structural phase: Painted Grey Ware (phase I)
5. Measurement of structure: (a) length 0.55m (b) width 0.25m (c) height 0.10m
6. Number of courses: One course
7. Composition of mortar: Mud-mortar
8. Orientation of longer axis: North-south
9. Nature of bricks used: Mud-bricks
10. Dimension of bricks used: 27x20x10 cm
11. State of preservation: Damaged and partly exposed
12. Shape and other distinguishing feature: Roughly ‘L’ shaped structure is embedded in the section, hence its nature could not be completely worked out. Its other end has been robbed off.

Structure 2
1. Location: Square A1, Quadrant 4
2. Type of structure: Mud-brick structure
3. Stratigraphic position: Built on the top of layer (4) and sealed by layer (3)
4. Period and structural phase: Painted Grey Ware (phase I)
5. Measurement of structure: (a) length 0.65 m (b) width 0.20 m (c) height 0.10 m
6. Composition of mortar: Mud-mortar
7. Orientation of longer axis: Northeast-southwest
8. State of preservation: Incomplete and partly exposed
9. Shape and other distinguishing feature: Presumably oval shaped on plan, the hearth has retained its top edge.

Structure 3
1. Location: Square A1, Quadrant 4
2. Type of structure: Hearth
3. Stratigraphic position: Built on the top of layer (4) and sealed by layer (3)
4. Period and structural phase: Painted Grey Ware (phase I)
5. Measurement of structure: (a) length 0.95 m (b) width 0.25 m (c) height 0.30 m
6. Composition of mortar: Mud-mortar
7. Orientation of longer axis: Northeast-southwest
8. State of preservation: Incomplete and partly exposed
9. Shape and other distinguishing feature: Presumably oval shaped on plan, the hearth has retained its top edge.
Excavations at Tarkhanewala-Dera and Chak 86

PI. LXVIII. Chak 86: Structures 1 and 2, Phase I. See pp. 151, 156, 161.
Pl. LXIX. Chak 86 : Structure 3, Phase I. See pp. 151-161
### Structure 4

1. **Location**: Square A1, Quadrant 1  
2. **Type of structure**: Hut  
3. **Stratigraphic position**: Built on the top of layer (3) and sealed by layer (2)  
4. **Period and structural phase**: Painted Grey Ware (phase II)  
5. **Measurement of structure**: 1.80 m (diameter)  
6. **Thickness of perimeter**: 20 cm  
7. **State of preservation**: Traceable on plan and partly exposed.  
8. **Shape and other distinguishing feature**: The circular floor of hut contains ash, plenty of charred bones and burnt-clay lumps. The potsherds comprise Painted Grey Ware, black-and-red ware, black-slipped ware, grey ware, red ware etc.

### Structure 6

1. **Location**: Square ZA1, Quadrant 4  
2. **Type of structure**: Hut  
3. **Stratigraphic position**: Built on the top of layer (3) and sealed by layer (2)  
4. **Period and structural phase**: Painted Grey Ware (phase II)  
5. **Measurement of structure**: Approximately 2.0 m (diameter)  
6. **Thickness of perimeter**: 17 cm  
7. **State of preservation**: Traceable on plan and partly exposed.  
8. **Shape and other distinguishing feature**: The rammed floor of the partly excavated circular hut revealed the burnt clay lumps, charred bones and very small fragments of potsherds.

### Structure 5

1. **Location**: Square A1, Quadrant 1  
2. **Type of structure**: Hut  
3. **Stratigraphic position**: Built on the top of layer (3) and sealed by layer (2)  
4. **Period and structural phase**: Painted Grey Ware (phase II)  
5. **Measurement of structure**: 2.50 m (diameter)  
6. **Thickness of perimeter**: 20 cm  
7. **State of preservation**: Traceable on plan  
8. **Shape and other distinguishing feature**: The rammed floor of the partly excavated circular hut revealed the burnt clay lumps, charred bones and very small fragments of potsherds.
Chak 86

Pl. LXX. Chak 86: Structures 4 and 5, Phase II. See pp. 151, 164.
Structure 7
1. Location : Square ZA1, Quadrant 4
2. Type of structure : Hut
3. Stratigraphic position : Built on the top of layer (3) and sealed by layer (2)
4. Period and structural phase : Painted Grey Ware (phase II)
5. Measurement of structure : 2.0 m (diameter)
6. Thickness of perimeter : 18 cm
7. State of preservation : Traceable on plan and partly exposed
8. Shape and other distinguishing feature : Probably the hut was circular on plan. Charcoal and ash contents were found from it.

Structure 8
1. Location : Square ZA1, Quadrant 4
2. Type of structure : Hut
3. Stratigraphic position : Built on the top of layer (3) and sealed by layer (2)
4. Period and structural phase : Painted Grey Ware (phase II)
5. Measurement of structure : 2.20 m (diameter)
6. Thickness of perimeter : 20 cm
7. State of preservation : Traceable on plan
8. Shape and other distinguishing feature : The circular hut is marked by rammed burnt earth and ash. The floor appears to have been plastered with clay and cow dung. Some pieces of charred bones were also found.

Structure 9
1. Location : Square ZA1, Quadrant 1
2. Type of structure : Hut
3. Stratigraphic position : Built on the top of layer (3) and sealed by layer (2)
4. Period and structural phase : Painted Grey Ware (phase II)
5. Measurement of structure : 1.65 m (diameter)
6. Thickness of perimeter : 38 cm
7. State of preservation : Traceable on plan
8. Shape and other distinguishing feature : The periphery of the circular hut is marked by burnt clay and decomposed ashy material. Small pieces of Painted Grey Ware, black-and-red ware, black-slipped ware, grey ware, ash and charcoal etc were found.

Structure 10
1. Location : Square ZA1, Quadrant 1
2. Type of structure : Hut
3. Stratigraphic position : Built on the top of layer (3) and sealed by layer (2)
PI. LXXII. Chak 86: Structure 9, Phase II. See p. 166.
4. Period and structural phase: Painted Grey Ware (phase II)
5. Measurement of structure: 1.95 m (diameter)
6. Thickness of perimeter: 17 cm
7. State of preservation: Traceable on plan.
8. Shape and other distinguishing feature: The periphery of the circular hut is represented by burnt clay and decomposed ashy material. The potsherds of Painted Grey Ware, black-and-red-ware, black-slipped ware, grey ware, ash, charred bones and charcoal etc were also found.

3. OTHER FINDS

A. Stone Objects

i. Pounder-cum-pestle

The excavation yielded two pounder-cum-pestle, both are having multiple sides. They belong to phase II of Painted Grey Ware period.

Fig. 33; pl. LXXIV

1. Pounder-cum-pestle, sandstone, roughly round with pitted surface, one side is smooth and flat due to use.
   From layer no. 1 (Reg. no. 33)
2. Pounder-cum-pestle, sandstone, with multiple sides due to use.
   From the surface (Reg. no. 63)

B. Terracotta Objects

i. Animal figurines

Three animal figurines are reported from the site and they belong to phase II.

Fig. 34; pl. LXXV

1. Broken, red in colour, well-fired figurine. The head, hump and legs are missing.
   From the surface (Reg. no. 79)
2. Handmade, red coloured but ill-fired figurine. Its head, hump, protrusions on the back and the three legs are badly damaged.
   From the surface (Reg. no. 29)
3. Handmade, red, well-fired figurine, head is mutilated and two curved projections towards left and right have been damaged.
   From the surface (Reg. no. 11)

ii. Sling balls

In all twelve balls were recovered during the excavation, of these eleven are of terracotta and one is of faience. Their size varies from small to large. One of the terracotta balls has graffiti mark on it and another has intersecting lines. The faience ball is divided into four parts and is decorated. Except one (Reg. no. 104) all belong to phase II.

Pl. LXXVI

1. Small, spheroid, grey in colour, damaged.
   From layer no. 1 (Reg. no. 62)
2. Small, spheroid, grey in colour.
   From layer no. 1 (Reg. no. 55)
3. Small ovaloid, dull red in colour.
   From layer no. 2 (Reg. no. 93)
4. Small, spheroid, dull red in colour.
   From layer no. 1 (Reg. no. 70)
Excavations at Tarkhanewala-Dera and Chak 86

PL. LXIII. Chak 86: Structure 10, Phase II. See pp. 166, 169

STR. 10
Fig. 33. Pounder-cum-pestle
Excavations at Tarkhanewala-Dera and Chak 86

Fig. 34. Animal figurines
PI. LXXV. Chak 86: Animal figurines. See p. 169
5. Small, spheroid, dull red in colour, divided into four parts by two intersecting incised lines around the circumference.
   From layer no. 2 (Reg. no. 78)
6. Medium sized spheroid, red in colour.
   From layer no. 2 (Reg. no. 96)
7. Medium sized spheroid, well-fired and red in colour, partly broken.
   From the surface (Reg. no. 103)
8. Medium sized, roughly circular, dull red in colour, bearing graffiti marks, partly damaged.
   From layer no. 4 (Reg. no. 104)
9. Small, spheroid of faience divided into four parts by two intersecting incised lines. It bears parallel and oblique incisions.
   From layer no. 1 (Reg. no. 67)
10. Large, spheroid, red in colour.
    From the surface (Reg. no. 3)
11. Large, roughly circular, dull red in colour, ill-fired.
    From layer no. 1 (Reg. no. 41)
12. Large spheroid, red in colour.
    From the surface (Reg. no. 25)

iii. Hopscotch

Six hopscotches made from potsherds were obtained. All are from phase II. The maximum and minimum measurements of them are as below:-
Max. diameter 5 cm; Min. diameter 2.7 cm
Max. thickness 1.5 cm; Min. thickness 0.3 cm
They are described below: -

Pl. LXXVII

1. Small, prepared from well-fired red-ware. Rubbed and smoothened to impart circular shape. The striation marks are visible on the surface.
   From layer no. 2 (Reg. no. 89)

2. Small, prepared from dull red ware, the edges are chipped hence it is not completely circular.
   From layer no. 2 (Reg. no. 81)
3. Small, prepared from dull red ware, the edges are uneven.
   From layer no. 2 (Reg. no. 76)
4. Prepared from red ware, ill-fired, gritty surface, the edge is rubbed to impart circular shape.
   From the surface (Reg. no. 7)
5. Small, prepared from ill-fired thin red ware. The edge is rubbed to give it a circular shape.
   From layer no. 1 (Reg. no. 51)
6. Prepared from dull red ware, the edge is chipped, rubbed and smoothened to a circular shape. The surface is gritty.
   From layer no. 1 (Reg. no. 34)

iv. Wheels

In all four wheels belonging to phase II were unearthed, of these one is incomplete and the other three are damaged.

Pl. LXXVIII

1. Damaged wheel, having prominent hub with a hole.
   From layer no. 2 (Reg. no. 83)
2. Broken part of a wheel. It has retained a prominent hub bearing a hole and is badly weathered.
   From layer no. 1 (Reg. no. 39)
3. Prepared from thin potsherd. Due to improper chipping, the wheel is not completely circular but the edge is made smooth by rubbing. An incised circle around the central perforation denotes the hub.
   From layer no. 1 (Reg. no. 64)
PL. LXXVI. Chak 86: Sling balls. See pp. 169, 175
4. Prepared from a part of an ill-fired potsherd. It bears small blind holes on both the surfaces. Its surface and edge have not been finished. From the surface (Reg. no. 9)

v. Toycart frames

The site yielded two toycart frames belonging to phase II.

Fig. 35; pl. LXXIX

1. Brick red thick solid chassis of the box type card provided with one cross bar hole for fixing the axle. It bears four see-through perforations on the corners. The lower surface of the narrower ends has deep triangular cuttings probably for fixing the frame.
   From the surface (Reg. no. 45)

2. Broken part of a chassis bearing two lateral holes for crossbar and four see-through perforations meant for holding the sidebars.
   From layer no. 1 (Reg. no. 24)

C. Bone Objects

Six bone objects recovered from the excavation are made out of ribs of mammals viz. ox, buffalo etc. Their paucity may be due to their friable nature. The implements include sharp edge or pointed arrowheads, awl, stylus, borer, socket etc.

Fig. 36; pl. LXXX

1. Fragment of a buff-coloured awl with a broken sharp point; broken butt and polished surface is circular in section.
   From layer no. 1 (Reg.no.42)

2. Fragment of a grey-coloured borer with a sharp point obtained by chipping and grinding. The polished surface is circular in section. Its butt end is broken.
   From layer no. 1 (Reg.no.40)

3. Buff-coloured point with a single pointed tip and the polished surface is oval in section. It has a circular socket at the butt end, possibly for hafting.
   From the humus (Reg. no. 22)

4. Fragment of a buff-coloured arrowhead with broken working end, circular in section and the butt end is having a chiselled tang for hafting.
   From layer no. 2 (Reg.no.88)

5. White-coloured stylus is circular in section. The tip is polished and the butt end is broken.
   From layer no.3 (Reg.no.100)

6. Buff-coloured bud shaped socket (probably a cap to secure the working point of the stylus).
   From layer no.2 (Reg.no.91)

D. Bangles

A total of thirteen bangle fragments made of glass, shell, terracotta and faience were recovered. They are described as under:

Pl. LXXXI

1. Fragment of a glass bangle, translucent blue greenish, pentagonal in section.
   From the surface (Reg. no. 12)

2. Fragment of a terracotta bangle, black in colour, it is quadrangular in section with convex upper part, decorated with incised parallel and wavy lines.
   From layer no. 2 (Reg. no. 77)

3. Fragment of a terracotta bangle, grey in colour and circular in section.
   From layer no. 2 (Reg. no. 85)
Excavations at Tarkhanewala-Dera and Chak 86

Fig. 35. Toy cart frames
Chak 86: Toy cart frames. See p. 178.
Fig. 36. Bone objects
PL LXXX. Chak 86: Bone objects. See p. 178
4. Fragment of a terracotta bangle, grey in colour, it is roughly circular in section.
   From layer no. 2 (Reg. no. 90)
5. Fragment of a faience bangle, plano-convex in section.
   From the surface (Reg. no. 68)
6. Fragment of a faience bangle, plano-convex in section. Decorated with neatly worked pattern of four deep oblique grooves alternating with corresponding ridges, converging at the centre, so as to form a raised triangular design.
   From layer no. 2 (Reg. no. 84)
7. Fragment of a faience bangle, convexo-concave in section. Decorated with three deep channels.
   From layer no. 2 (Reg. no. 82)
8. Fragment of a faience bangle, quadrangular in section, with flat top and convex interior, it is decorated with oblique incised lines between parallel grooved borders.
   From layer no. 1 (Reg. no. 28)
9. Fragment of a faience bangle, quadrangular in section with flat top and convex base. Decorated with incised rhomboid designs between parallel lines.
   From the surface (Reg. no. 6)
10. Fragment of a faience bangle, quadrangular in section with flat top and convex interior. It is incised with oblique lines and bears an incised single border.
    From layer no. 1 (Reg. no. 43)
11. Fragment of a faience bangle, biconvex in section. Decorated with incised oblique and parallel lines.
    From the surface (Reg. no. 8)
12. Fragment of a shell bangle, pentagonal in section.
    From layer no. 2 (Reg. no. 75)
13. Fragment of a shell bangle, rectangular in section and decorated with five shallow channels to simulate six ridges of varying thickness.
    From layer no. 1 (Reg. no. 54)

E. Miscellaneous Objects

The miscellaneous objects made of terracotta, faience, shell and chert are described below.

Pl. LXXXII

1. Small, triangular, well-baked terracotta cake.
   From layer no. 1 (Reg. no. 13)
2. Discoid, convexo-concave inlay piece made of shell.
   From layer no. 1 (Reg. no. 14)
3. Fragment of a parallel-sided blade of chert, light brown in colour, having trapezoid transverse section. Both the margins are retouched; one of them has steep blunting. It is broken at both the ends.
   From the surface (Reg. no. 13)

4. BEADS

The excavations yielded fifty-one beads of which terracotta accounts for twenty-nine. Of the remaining twenty-two, eleven are of carnelian, five of shell, three of lapis lazuli and one each of chert, agate and quartz (see table VI and fig.37). The beads are distributed as follows: layer (1), thirty; layer (2), six; layer (3), three; layer (4), one and rest eleven were found from the surface (Fig. 38). The represented shapes\(^1\) of the beads are barrel, cylinder, tubular, flat

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\(^1\) H.C. Beck, 'Classification and Nomenclature of Beads and Pendants,' Archaeologia, No. LXXVII, (1928), pp. 1 ff.
Pl. LXXXI. Chak 86: Bangles. See pp. 178, 184
PI. LXXII. Chak 86: Miscellaneous objects. See p. 184
MATERIAL-WISE CLASSIFICATION OF BEADS
CHAK 86

Fig. 37
Excavations at Tarkhanewala-Dera and Chak 86

Layer-Wise Distribution of Beads

Chak 86

Fig. 38
triangular, toggle shaped, biconvex, bicone, spherical, pear shaped and vase shaped (see table VII and fig. 39). The following beads are illustrated:

A. Stone

Carnelian

This site yielded eleven carnelian beads. Those are described below:

**Fig. 40; pl. LXXXIII**

1. Toggle shaped  
   From layer no. 1 (Reg. no. 74)  
2. Long truncated barrel circular  
   From layer no. 1 (Reg. no. 27)  
3. Long truncated barrel circular  
   From layer no. 1 (Reg. no. 32)  
4. Etched carnelian: Flat triangular  
   From layer no. 1 (Reg. no. 56)  
5. Short truncated cylinder circular  
   From layer no. 1 (Reg. no. 48)  
6. Standard truncated bicone square faceted  
   From layer no. 1 (Reg. no. 66)  
7. Short truncated biconvex circular  
   From layer no. 1 (Reg. no. 17)  
8. Standard truncated bicone circular  
   From layer no. 4 (Reg. no. 102)  
9. Spherical  
   From layer no. 1 (Reg. no. 58)  
10. Truncated spherical (unfinished)  
   From layer no. 1 (Reg. no. 20)  
11. Truncated spherical  
   From layer no. 2 (Reg. no. 73)

B. Terracotta

This site has yielded twenty-nine terracotta beads. These are described below:

**Pl. LXXXIV**

1. Standard bicone circular  
   From layer no. 1 (Reg. no. 44)  
2. Short cylinder circular (disc)  
   From layer no. 2 (Reg. no. 99)  
3. Long chamfered barrel circular  
   From layer no. 2 (Reg. no. 80)  
4. Standard bicone circular  
   From the surface (Reg. no. 10)  
5. Standard truncated bicone circular  
   From the surface (Reg. no. 01)  
6. Standard truncated bicone circular  
   From layer no. 1 (Reg. no. 49)  
7. Short truncated bicone circular  
   From layer no. 2 (Reg. no. 92)  
8. Short truncated bicone circular  
   From layer no. 1 (Reg. no. 30)  
9. Standard bicone circular  
   From layer no. 1 (Reg. no. 46)  
10. Short bicone circular  
    From layer no. 1 (Reg. no. 53)  
11. Short truncated bicone circular  
    From the surface (Reg. no. 04)  
12. Short truncated bicone circular  
    From the surface (Reg. no. 23)  
13. Standard truncated bicone circular  
    From layer no. 1 (Reg. no. 72)  
14. Standard truncated bicone circular  
    From layer no. 1 (Reg. no. 71)  
15. Standard bicone circular  
    From layer no. 2 (Reg. no. 87)

**Pl. LXXXV**

1. Short bicone circular  
   From layer no. 1 (Reg. no. 52)  
2. Standard truncated bicone circular with incised strokes.  
   From the surface (Reg. no. 36)
Fig. 40. Carnelian beads
PI. LXXXIII. Chak 86: Carnelian beads. See p. 189
Pl. LXXXIV. Chak 86: Terracotta beads. See p. 189
Table VI

LAYERSWISE DISTRIBUTION OF BEADS CLASSIFIED ACCORDING TO MATERIAL

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<th>Material</th>
<th>Layer 1</th>
<th>Layer 2</th>
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<th>Layer 4</th>
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# Table-VII

## LAYER-WISE DISTRIBUTION OF BEADS
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3. Standard truncated bicone circular
   From the surface (Reg. no. 37)
4. Truncated pear-shaped
   From layer no. 1 (Reg. no. 94)
5. Standard truncated bicone circular, weathered.
   From layer no. 1 (Reg. no. 50)
6. Standard vase-shaped circular
   From the surface (Reg. no. 60)
7. Standard biconvex circular
   From layer no. 1 (Reg. no. 26)
8. Standard vase-shaped circular
   From the surface (Reg. no. 61)
9. Standard truncated bicone circular
   From layer no. 1 (Reg. no. 59)
10. Standard cylinder circular
    From the surface (Reg. no. 69)
11. Standard cylinder circular, weathered
    From layer no. 3 (Reg. no. 97)
12. Short bicone circular
    From layer no. 3 (Reg. no. 98)
13. Long cylinder circular, incised with two rows of dots and one row of notches.
    From layer no. 3 (Reg. no. 101)
14. Short bicone circular.
    From the surface (Reg. no. 2)

C. Other Material

This site has yielded five shell, one chert (?), one agate, one quartz and three lapis lazuli beads. They are described as below:

Fig. 41; pl. LXXXVI

1. Shell: Short truncated cylinder circular
   From layer no. 1 (Reg. no. 38)
4. Shell: Long tubular circular
   From layer no. 1 (Reg. no. 19)
5. Shell: Short cylinder circular (disc)
   From layer no. 1 (Reg. no. 16)
6. Shell: Long tubular circular
   From layer no. 1 (Reg. no. 65)
7. Lapis lazuli: Toggle-shaped
   From layer no. 2 (Reg. no. 86)
   From layer no. 1 (Reg. no. 15)
9. Agate: Long truncated barrel circular
   From layer no. 1 (Reg. no. 57)
10. Lapis lazuli: Standard bicone circular
    From layer no. 1 (Reg. no. 18)
11. Quartz: Toggle-shaped
    From layer no. 1 (Reg. no. 31)

5. THE POTTERY

The excavation at Chak 86 yielded the well-known Painted Grey Ware ceramic assemblage divisible into eight major groups viz., Red ware, Red-slipped ware, Black on Red ware, Black-and-red ware, Grey ware, Painted Grey Ware, Black ware and other decorated ware. Each of these forms a diagnostic trait in the cultural assemblage of the period (Fig. 42). Table VIII shows the frequency, distribution and percentage of each industry in each layer. Pottery yield is recorded maximum from layer (1). Industry-wise red ware accounts for more than 65% of total assemblage (Fig. 43).

The repertoire of the pottery has regular horizontal striation marks indicating to be prepared on fast wheel but some of the pots are handmade only to a modified degree since the rims thereof are invariably wheel made. A majority of the pottery is with a reddish oxidized core. In a few cases, however, a faint greyish
Pl. LXXXV: Chak 86: Terracotta beads. See pp. 189, 196
Fig. 41. Beads of other material
PERCENTAGE-WISE DISTRIBUTION OF CERAMIC INDUSTRIES

CHAK 86

Excavations at Tarkhanewala-Dera and Chak 86
zone is visible in the core; possibly, they were fired at a lower temperature or for shorter duration. Surface of these potteries varies from red, drab to blotchy grey. Though majority of them are devoid of any surface dressing, a few are treated with a wash or slip. Husk, fine sand and mica have been freely employed as degraisants, in case of red ware, and the fabric being medium. The commonly met shapes of the red ware are vase, dish, bowl, storage, jar, basin etc. A few of them are also painted, mostly executed before firing. The colour scheme normally adopted is black on a red background. Among the motifs, mention may be made of horizontal lines, arches, chain motifs, rim bands etc. The other decorated ware includes incised and appliqué variety of pottery. The designs were executed during the leather hard condition. The decorations are found both on the interior and exterior of the vessels consist of horizontal lines, diamonds, wavy line, vertical lines, slashes, dots, concentric circles, mat pattern, etc.

The black-and-red ware has a wholly individualistic appearance distinct alike in fabric and form. Throughout made on wheel and slipped, it shows a lustre as a result of continuous horizontal burnishing, the texture varies from fine to medium consisting of fine sand, husk and straw. As a result of inverted firing, it shows black inside and red outside, the rim portion being black. The ware is fired at different temperature as indicated from the core viz., half black half red, maximum black on the interior and maximum red on the exterior. The shapes include mostly dishes and bowls.

The black ware is characterized by its medium fabric, wheel made and fired at reduced condition and most of them are slipped and burnished. The characteristic shapes of this ware are very few indeed and include bowl and dish only.

The grey ware forms a homogenous group belonging to a well-defined industry. The distinctive features of this group are the superior quality of the paste formed of well-levigated clay and fine thin well burnt fabric achieved with an equally distributed heat in the kiln agreeably fired in reducing condition. In case of large bowls and dishes, it was observed that they were first made on wheel but in order to expand or enlarge the surface, both interior and exterior were beaten with a dabber when it was in leather hard condition. The types include bowls and dishes. In case of Painted Grey Ware, the surface of the body is painted in black before firing. Instances of bi-chrome painted designs are also met with i.e., black and brown and black and chocolate. The common patterns are formed by groups of vertical or oblique strokes below the horizontal rim band. The strokes are sometimes of unequal thickness and thickened towards the end from where the paint brush started. The designs are executed both on the inside and outside of the pot. It includes intersecting lines, dots, dashes, wavy lines, concentric circles, sigma, radiating lines, spiral designs etc. A careful study of the technique of the paintings reveals that the outlines of some of the designs were first drawn in a thin deep black line and the gap is filled later on.

Following select types are illustrated:

**Red Ware**

**Figs. 44-47**

1. Fragment of a bowl of red ware with a flat topped thickened rim, roughly convex sides and button base. Of medium fabric showing a completely oxidized core, it is treated with a wash on both sides.
2. Fragment of a deep bowl with a vertical externally clubbed rim, straight sides mildly carinated towards the base. Of medium fabric showing an oxidized core, it is washed on both sides whereas the exterior is executed with two incised horizontal bands at the waist.

3. Fragment of a basin with an incurved, externally collared rim, roughly straight sides mildly carinated towards the base. Of medium fabric, showing an oxidized core, it is treated with a wash on both sides but the exterior is decorated with an incised horizontal band below the rim and similar two parallel bands towards the base.

4. Fragment of a bowl with a featureless rim, roughly tapering sides having externally wavy profile. Of medium fabric showing an oxidized core, it is devoid of any surface dressing.

5. Fragment of a basin with an incurved, externally thickened rim and corrugated sides. Of medium fabric showing a completely oxidized core, it is treated with a wash on both sides.

6. Fragment of a basin with an elliptical collared rim and tapering sides. Of medium fabric showing an unoxidized grey core, its interior is treated with a wash.

7. Fragment of a basin with an incurved, externally thickened rim, mildly carinated to straight sides. Of medium fabric showing a completely oxidized core, the interior is treated with a deep red wash.

8. Fragment of a basin with an incurved, elliptical collared rim having a horizontal groove below, on the exterior and tapering sides. Of medium fabric showing an oxidized core, it is treated with a red wash on the exterior.

9. Fragment of a basin with flat-topped rim and a grooved exterior. Of medium fabric showing a perfectly oxidized core, it is treated with a deep red wash on both sides.

10. Fragment of a basin with an vertical featureless rim mildly carinated to tapering sides. Of medium fabric showing a semi oxidized smoky core, it is devoid of any wash.

11. Fragment of a vase with an out-turned featureless rim, concave neck and bulging profile. Of medium fabric, showing a perfectly oxidized core, it is devoid of any slip or wash.

12. Fragment of a vase with a splayed out, externally thickened rim and mildly carinated neck. Of medium fabric showing an oxidized core, it is treated with a wash on the exterior and decorated with a horizontal groove on the shouler.

13. Fragment of a vase with a splayed out, featureless rim, mildly carinated neck and bulging profile. Of medium fabric, showing a semi oxidized core, it is treated with a red wash on the exterior.

14. Fragment of a vase with an out-turned thickened rim having a medial groove on the top and concave neck. Of medium fabric, showing a perfectly oxidized core, it is treated with an ochre coloured wash.

15. Fragment of a vase with an externally clubbed rim and a bluntly carinated neck. Of medium fabric, showing an unoxidized portion in the lower section of the core, it is treated with a wash.

16. Fragment of a vase with an out-turned featureless rim and a concave neck. Of fine fabric, showing an oxidized core, it is treated with a red wash.

17. Fragment of a vase with an externally clubbed rim and tapering neck. Of medium fabric, showing an oxidized core, it is treated with a wash.
Fig. 44. Red ware
Table-VIII
FREQUENCIES AND PERCENTAGES (FIGURES IN ITALICS) OF SHERDS OF THE CERAMIC INDUSTRIES IN EACH LAYER

<table>
<thead>
<tr>
<th>Industry Layer</th>
<th>Red Ware</th>
<th>Red-Slipped Ware</th>
<th>Black On Red Ware</th>
<th>Black-And-Red Ware</th>
<th>Grey Ware</th>
<th>Painted Grey Ware</th>
<th>Black Ware</th>
<th>Other Decorated Ware</th>
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18. Fragment of a vase with an externally thickened rim with ledged profile. Of medium fabric, showing an oxidized core, it is treated with an ochre coloured wash.

19. Fragment of a vase with a vertical, externally thickened rim, mildly carinated to a convex base. Of medium fabric, showing an oxidized core, it is treated with a deep red wash and decorated with an irregular incised line below the rim on the exterior.

20. Fragment of a jar with a splayed out thickened rim, roughly concave neck and weakly carinated shoulder. Of medium fabric, showing a completely oxidized core, it is treated with a deep red wash and decorated with a horizontal groove on the shoulder.

21. Fragment of a vase with an externally oval collared rim, a carinated neck and an expanding shoulder. Of medium fabric, showing an oxidized core, it is treated with a wash and the shoulder is decorated with two horizontal grooves.

22. Fragment of a vase with an externally thickened rim and a concave neck. Of medium fabric, showing an unoxidized smoky core, it is treated with a red wash on both sides.

23. Fragment of a vase with an everted rim and a tapering neck. Of medium fabric, showing an oxidized core, it is treated with red wash.

24. Fragment of a vase with an out-turned, externally thickened rim and concave neck. Of medium fabric, showing an oxidized core, it is treated with a deep red wash.

25. Fragment of a jar with an out-turned, externally thickened rim and concave neck and bulging profile. Of medium fabric, showing an oxidized core, it is treated with a red wash on both sides.

26. Fragment of a jar with an out-turned oval collared rim and concave neck. Of medium fabric, showing an oxidized core, it is treated with red wash on both sides.

27. Fragment of a jar with a vertical clubbed, externally grooved rim with a long vertical neck. Of medium fabric, showing a perfectly oxidized core, it is treated with an ochre wash on the exterior.

28. Fragment of a basin with a nail headed rim and a prominent ridge on the neck. Of medium fabric, showing an oxidized core, it is treated with a wash.

29. Fragment of a vase with an out-turned, externally collared rim and vertical neck. Of medium fabric, showing an oxidized core, it is treated with a red wash.

30. Fragment of a vase with an out-turned externally thickened rim and a concave neck. Of medium fabric, showing an oxidized core, it is treated with a deep red wash.

31. Fragment of a jar with an out-turned, undercut rim, concave neck and expanding profile. Of medium fabric, showing an oxidized core, it is treated with a deep red wash on the exterior.

32. Fragment of a vase with an out-turned, externally thickened rim, concave neck and bulging shoulder. Of medium fabric, showing an unoxidized grey core, it is devoid of any slip or wash but the shoulder is decorated with two horizontal grooves.

33. Fragment of a vase with an out-turned, externally thickened rim and grooved neck. Of fine fabric and thin in section, showing an oxidized core, it is treated with an ochre wash.

34. Fragment of a dish with a thickened featureless rim and tapering sides. Of medium fabric, showing an oxidized core, it is treated with an ochre wash on the exterior.
Fig. 45. Red ware
Excavations at Tarkhanewala-Dera and Chak 86

exterior and decorated with a horizontal groove below the rim.

35. Fragment of a large trough with a featureless rim and tapering sides. Of coarse fabric and thick in section, showing a semi oxidized smoky core, it is treated with a wash on the exterior.

36. Fragment of a jar with a vertical clubbed rim, concave neck and bulging shoulder. Of medium fabric, showing a perfectly oxidized core, it is devoid of any slip or wash but it is decorated with three horizontal grooves on the shoulder and below it, executed with impressed pattern consisting of intersecting oblique and horizontal lines.

37. Fragment of a jar with an out-turned featureless rim, concave neck and bulging profile. Of medium fabric, showing a semi oxidized smoky core and blotchy surface, it is devoid of any slip or wash but decorated with two horizontal grooves on the shoulder and below it, executed with pressed designs consisting of intersecting concentric circles and other indeterminate pattern.

38. Fragment of a vase, with an out-turned thickened rim and concave neck. Of medium fabric, showing a perfectly oxidized core, it is treated with an ochre wash.

39. Fragment of a basin with an incurved multiple grooved collared-rim. Of medium fabric, showing a completely oxidized core, it is treated with a wash on both sides.

40. Fragment of a storage-jar with an intumed, flat topped rim and convex sides. Of coarse fabric and thick in section, showing a semi oxidized smoky core, it is devoid of any slip or wash but decorated with a shallow groove below the rim on the exterior and an appliqué horizontal band with incised chain pattern.

Red-slipped Ware

Figs. 48-49

1. Fragment of dish with an inturned featureless rim and roughly straight sides carinated mildly for the base. Of fine fabric, showing a fully oxidized core, it is treated with slip on both sides.

2. Fragment of a dish with a vertical sharpened rim and flaring sides. Of fine fabric, showing a fully oxidized core, it is treated with a deep red slip on both sides.

3. Fragment of a dish with an incurved featureless rim with convex sides carinated mildly for the base. Of fine fabric, showing a perfectly oxidized core, it is treated with a slip on both sides and decorated with a shallow groove on the exterior.

4. Fragment of a dish with an inturned internally thickened rim, convex sides and carinated mildly at the base. Of fine fabric, showing an oxidized core. It is treated with an ochre slip on both sides.

5. Fragment of a bowl with an obliquely splayed featureless rim and tapering sides with a mild carination towards exterior. Of medium fabric, showing a perfectly oxidized core, it is treated with a deep red slip on both sides.

6. Fragment of a dish with a flat-topped rim and straight sides, sharply carinated towards the base. Of medium fabric, showing a perfectly oxidized core, it is treated with a deep red slip and the exterior is decorated with multiple horizontal grooves.

7. Fragment of a dish with a flat-topped externally thickened rim with straight sides. Of fine fabric, showing an oxidized core, it is treated with a deep red slip on both sides.

8. Fragment of a dish with flat-topped rim with rounded sides. Slipped on both sides, the
Fig. 46. Red ware
Fig. 47. Red ware
exterior is decorated with two horizontal grooves below the rim and similar grooves towards the base. Of medium fabric, it has an oxidized core.

9. Fragment of a bowl with a vertical featureless rim with roughly rounded sides. Of fine fabric, showing an oxidized core, it is treated with a slip on both sides.

10. Fragment of a bowl with a vertical, progressively sharpened rim and roughly straight sides. Of fine fabric, showing a semi oxidized grey core, it is treated with a chocolate slip on both sides.

11. Fragment of a basin with an incurved externally oval-collared grooved-rim and tapering sides. Of medium fabric, showing an oxidized core, it is treated with a deep red slip internally.

12. Fragment of a jar with an incurved featureless rim and rounded sides. Of medium fabric, showing an oxidized core, it is treated with a slip both externally and internally.

13. Fragment of a basin with an oblique, nail-headed rim and tapering sides. Of medium fabric, showing an oxidized core, it is treated with a deep red slip on the exterior and decorated with a horizontal groove below the rim as well as on the shoulder.

14. Fragment of a vase with an externally clubbed rim and a bluntly carinated neck. Of medium fabric, showing a perfectly oxidized core, its exterior is treated with a slip and painted in black with a broad horizontal band with suspended double arches.

15. Fragment of a jar with a vertical collared rim exterior of which is treated with a dark red slip. Of medium fabric, it has an oxidized core.

16. Fragment of a vase with a flanged featureless rim, a pronounced ridge below it and a concave neck. Of medium fabric, showing an oxidized core, it is treated with a red slip on outside.

17. Fragment of a vase with an out-turned, externally thickened rim and concave neck. Of comparatively fine fabric, showing an oxidized core, it is treated with a slip.

18. Fragment of a vase with an externally thickened featureless rim and concave neck. Of medium fabric, showing an unoxidized grey core, it is treated with an ochre slip.

19. Fragment of a vase with an out-turned externally thickened rim and long vertical neck. Of fine fabric, showing a semi oxidized smoky core, it is treated with a chocolate slip on the exterior.

20. Fragment of a jar with a flaring, incipiently flanged rim and concave neck. Of medium fabric, showing a perfectly oxidized core, it is treated with a deep red slip on both sides.

**Black on red ware**

**Pls. LXXXVII-LXXXVIII**

1. Fragment of a jar with mild carination at shoulder and globular body. Of medium fabric, showing an oxidized core, its exterior is treated with a slip and painted in black with a broad horizontal band with suspended double arches.

2. Fragment of a dish with an incurved, thickened rim with weakly carinated sides. Of medium fabric, showing an oxidized core, it is slipped and painted in black on rim with a horizontal band on the exterior whereas on the interior, below the rim, a shallow but wide horizontal groove is executed.

3. Fragment of a shoulder portion of a jar of red ware, treated with a red slip on the exterior and painted in black with a thin and broad band. Of medium fabric, it has an oxidized core.
Fig. 48. Red-slipped ware
Fig. 49. Red-slipped ware
4. Fragment of a vase with a carinated neck, treated on the exterior with a red slip and painted in black with a broad and a thin band. Of fine fabric, it has an oxidized core.

5. Fragment of a red ware. Of medium fabric, showing an oxidized core, it is treated with a red slip on the exterior and painted in black with two paralleled horizontal bands.

6. Fragment of a vase with a mild carination at belly. Of fine fabric, showing an oxidized core, its exterior is treated with a slip and painted in black with a horizontally placed chain motif within a double lined border.

7. Fragment of a jar with a splayed out, externally bevelled rim and carinated neck. Of medium fabric, showing an oxidized core, it is slipped on both sides but exterior is painted in black on rim and neck with a broad horizontal band.

8. Fragment of a vase with an out-turned thickened rim and internally carinated neck. Of medium fabric, showing an oxidized core, it is treated with a wash and painted in black with horizontal band on the rim.

9. Fragment of a wide-mouthed jar with a short out-turned rim and concave neck. Of medium fabric, showing an oxidized core, it is slipped on the exterior and painted in black on rim with a horizontal band.

10. Fragment of a vase with an out-turned rim and concave neck. Of medium fabric, showing an oxidized core, it is slipped on the exterior and rim is painted in black.

11. Fragment of a sharply carinated neck portion of a jar, treated with a wash, exterior of which is painted in black with a broad horizontal band. Of medium fabric, it has an oxidized core.

12. Fragment of a jar with a splayed out externally bevelled rim. Of medium fabric, showing an oxidized core, it is slipped on the interior whereas the exterior is painted in black on rim and neck portion. A horizontal groove is executed below the rim on the interior.

**Black-and-red ware**

**Figs. 50-51**

1. Fragment of a bowl with convex sides and featureless rim. It is slipped, polished and burnished on both sides. Of medium fabric, it has a partially oxidized core.

2. Fragment of a dish with roughly vertical sides mildly carinated towards the base and sharpened rim. It is slipped and burnished on both sides. Of medium fabric, it has a partially oxidized core.

3. Fragment of a dish with expanding mouth and featureless rim, mildly carinated towards the base. Of medium fabric, it has a partially oxidized core.

4. Fragment of a dish with an inturned sharpened rim and convex sides, carinated to a flat base. Of medium fabric, it has a partially oxidized core.

5. Fragment of a dish with out-curved featureless rim and convex sides, mildly carinated to a rounded base. Of medium fabric, it has a partially oxidized core.

6. Fragment of a bowl with everted rim with roughly straight sides, having a mild horizontal groove on the exterior at belly. Of medium fabric, it has a partially oxidized core.

7. Fragment of a bowl with an inturned, featureless rim and convex sides. Of medium fabric, it has a partially oxidized core.

8. Fragment of a bowl with tapering sides and progressively sharpened rim. Of medium fabric, it has a partially oxidized core.
Chak 86

Pl. LXXXVII. Chak 86: Black on red ware. See pp. 211, 214.
Pl. LXXXVIII. Chak 86: Black on red ware. See p. 214
9. Fragment of a bowl with convex sides and incurved featureless rim with a shallow carination towards the base. Of medium fabric, it has a partially oxidized core.

10. Fragment of a dish with convex sides and internally thickened inturned rim carinated to a flat base. On the exterior, a post-firing vertical line is incised below the rim. Of medium fabric, it has a partially oxidized core.

11. Fragment of a dish with tapering sides and slightly internally thickened rim. Of medium fabric, it has a partially oxidized core.

12. Fragment of a bowl with roughly straight sides and incurved featureless rim. Of medium fabric, it has a partially oxidized core.

13. Fragment of a dish with roughly straight sides and sharpened rim. A shallow groove is found on the exterior towards the base. Of medium fabric, it has a partially oxidized core.

14. Fragment of a dish with concave sides and sharpened rim, carinated mildly to a sagger base. Of medium fabric, it has a partially oxidized core.

15. Fragment of a dish with convex sides and internally thickened rim. Of medium fabric, it has a partially oxidized core.

16. Fragment of bowl with tapering sides and progressively sharpened rim. Of medium fabric, it has a partially oxidized core.

17. Fragment of a bowl with concave sides and incurved featureless rim. Of medium fabric, it has a partially oxidized core.

18. Fragment of a bowl with tapering sides with incurved featureless rim. Of medium fabric, it has a partially oxidized core.

19. Base fragment of a roughly straight-sided bowl with a featureless rim, increaved to a shallow base. Of medium fabric, it has a partially oxidized core.

20. Base fragment of a bowl with straight sides, carinated towards a flat base. Of medium fabric, it has a partially oxidized core.

21. Fragment of a roughly straight-sided bowl with an incurved internally thickened rim. Of medium fabric, it has a partially oxidized core.

22. Base fragment of a concave-sided bowl with a flaring rim carinated to a rounded base. Of medium fabric, it has a partially oxidized core.

23. Base fragment of a concave-sided bowl mildly carinated to a rounded base. It is slipped and burnished. Of medium fabric, it has a partially oxidized core.

24. Fragment of a dish with an incurved thickened rim and convex sides sharply carinated for a sagger base. On the exterior, above the carination a horizontal shallow groove is executed. Of medium fabric, showing a partially oxidized core, it is treated with a slip and heavily burnished on both sides.

25. Fragment of a shallow bowl with convex sides and featureless rim, carinated to a rounded base. On the exterior, below the carination, a horizontal shallow groove is executed at the base. The base on both interior and exterior is heavily burnished with irregular patterns obliterating all striation marks. The base was rounded with a dabber when it was in leather hard condition.

26. Fragment of a dish with a vertical featureless rim with convex sides, mildly carinated for a sagger base. Of medium fabric, showing a partially oxidized core, it is treated with a slip and heavily burnished at the base.
Fig. 50. Black-and-red ware
Fig. 51. Black-and-red ware
Grey ware

Fig. 52

1. Fragment of a dish with an inturned, featureless rim and rounded sides, mildly carinated to a sagger base. Of fine fabric, showing a reduced grey core, it is treated with a dark slip internally.

2. Fragment of a bowl with convex sides and featureless rim. Of fine fabric, it has reduced grey core.

3. Fragment of a dish with a vertical sharpened rim and roughly straight sides, bluntly carinated to a convex base. The exterior is treated with a dark slip. Of medium fabric, it has a reduced grey core.

4. Fragment of a bowl with a featureless rim and roughly convex sides treated externally and internally with a wash. Of medium fabric, it has a reduced grey core.

5. Fragment of a bowl with a flat-topped rim and roughly tapering sides, treated internally with a wash. Of medium fabric, it has a reduced core.

6. Ring-footed base fragment of a dish with tapering sides. Of fine fabric, it has a reduced grey core.

7. Fragment of a dish with a mild carination towards the base. Of fine fabric, it has a reduced grey core.

8. Fragment of a dish with an inturned featureless rim and convex sides bluntly carinated to a convex base. Treated with chocolate slip on both sides, the exterior is executed with horizontal grooves. Of fine fabric, it has a reduced grey core.

9. Fragment of a bowl with a featureless rim and convex sides treated externally with a dark slip. Of fine fabric, it has a reduced grey core.

10. Fragment of a bowl with a vertical featureless rim and roughly straight sides, treated with a slip on both sides. Of fine fabric, it has a reduced grey core.

Painted Grey Ware

Pls. LXXXIX-XCI

1. Base-fragment of a dish of grey ware. It is painted in black on the inside with a group of vertical strokes having thickened ends. Of fine fabric, it has a reduced grey core.

2. Fragment of a grey ware painted in black on the inside with three dots running parallel to a straight line. Of fine fabric, it has a reduced grey core.

3. Fragment of a grey ware, painted in black forming rows of grouped oblique dashes inside. Of fine fabric, it has a reduced grey core.

4. Base fragment of a mica dusted grey ware painted in black on the inside with groups of wavy lines. Of fine fabric, it has a reduced grey core.

5. Fragment of a grey ware painted in black on the inside with a group of wavy lines. Of fine fabric, it has a reduced grey core.

6. Fragment of a grey ware painted in black on the inside with groups of vertical and horizontal lines. Of fine fabric, it has a reduced grey core.

7. Fragment of a grey ware painted in black on the inside with a group of oblique strokes
Fig. 52. Grey ware
PI. LXXXIX. Chak 86: Painted Grey Ware. See pp. 220, 223
and traces of indeterminate design are found on the outside also. Of fine fabric, it has a reduced grey core.

8. Fragment of a grey ware, painted in black on the inside with six parallel lines joined at one end and traces of similar design are found adjacent to it. On the exterior, a ghost impression of black painting is found. Of fine fabric, it has a reduced grey core.

9. Base fragment of a grey ware painted in black on the inside with two grouped oblique dashes and two thick strokes while the exterior is having a darker slip. Of fine fabric, it has a reduced grey core.

10. Fragment of a grey ware painted in black on the inside with an indeterminate design. Of fine fabric, it has a reduced grey core.

11. Fragment of a grey ware painted in black on the inside with four vertical strokes with thickened ends. Of fine fabric, it has a reduced grey core.

12. Fragment of a straight-sided bowl with an internally grooved rim. The inner side is painted in black with a thick horizontal rim band and two oblique lines below it. The outer rim is painted in brown below which two intersecting oblique strokes are painted in black. Of fine fabric, it has a reduced grey core.

13. Fragment of a grey ware with weak carination on the outside and painted in black with four vertical lines having thickened ends. Of fine fabric, it has a reduced core.

14. Fragment of a grey ware inner side of which is painted in black with a series of eight wavy vertical lines while outside is washed with pale chocolate colour. Of fine fabric, it has a reduced grey core.

15. Fragment of a convex-sided bowl with a vertical internally sharpened rim. It is painted in black on the inside with seven vertical lines below a horizontal rim-band and on the outside with a thick brown rim-band. Of fine fabric, it has a reduced grey core.

16. Fragment of a convex-sided bowl with a vertical featureless rim. It is painted in black on the inside with a thick horizontal rim-band and nine vertically paralleled lines generated from the band. The outer rim is painted with a thick horizontal brown band and the body part is painted in black having seven vertical strokes four of which are intersected with three horizontal lines. Of fine fabric, it has a reduced grey core.

17. Fragment of a grey ware painted in black with a group of seven vertically hyperbolic strokes on the outside and two vertical strokes on the inner side. Of fine fabric, it has a reduced grey core.

18. Fragment of an incurved bowl with an incurved featureless rim. It is painted in black at rim with a thick horizontal band spreading upto top edge of outer rim, while at the outside are a group of seven oblique strokes. Of fine fabric, it has a reduced grey core.

19. Fragment of a convex-sided bowl with a vertical featureless rim, inner side of which is painted in black with a thick horizontal rim-band having five oblique strokes generated from it. The outer rim-band is thicker with brown-pigmented painting. Of fine fabric, it has a reduced grey core.

20. Fragment of a grey ware painted in black on the inside with a group of vertically parallel lines across a mild carination and the outside with three vertical strokes above a horizontal groove. Of fine fabric, it has a reduced grey core.

21. Fragment of a bowl with sides slightly carinated towards the base. It is painted in
Excavations at Tarkhanewala-Dera and Chak 86

Pl. XC. Chak 86: Painted Grey Ware. See p. 223
black on the inside with two groups of diametrical strokes separated at the point of carination and on the outside, with a thick rim-band in pale-chocolate colour below which intersecting strokes are painted in black. Of fine fabric, it has a reduced core.

22. Base fragment of a grey ware painted in black on the inside within two groups of diametrical strokes and outside is painted in black with four parallel lines. Of fine fabric, it has a reduced grey core.

23. Fragment of a grey ware painted in black on the inside with three parallel lines and the outside with a group of five oblique strokes having thickened ends. Of fine fabric, it has a reduced grey core.

24. Base fragment of a dish of grey ware, painted in black on the inside with two groups of diametrical strokes and the outside with a group of three hyperbolic lines. Of fine fabric, it has a reduced core.

25. Bowl of a grey ware with featureless rim, convex sides and sagger base. It is painted in black on inside with five groups (each group having seven strokes) of vertically aligned wavy strokes across the pot, intersected at the base with four groups of similar strokes. Each of the four gaps is painted with a group of seven wavy lines. In each case, the strokes are painted starting from the base (thick end) towards the rim (thinner) over a sharp black outline. The base portion is heavily burnished. The exterior is also painted in black with six groups of hyperbolic and oblique strokes having thickened lower ends wherein many cases, more than two strokes are clubbed together. The outer base is also heavily burnished. Of fine fabric, it has a reduced grey core (Pl. XCI).

**Black ware**

**Fig. 53**

1. Fragment of a bowl of black-slipped ware with an inturned thickened rim and roughly straight sides. The exterior is treated with a shallow groove below the rim, and two similar horizontal grooves are found at the belly. Of medium fabric, it has a reduced dark grey core.

2. Fragment of a bowl of black burnished ware with an internally sharpened rim and convex sides. Slipped on both sides, it has a heavily burnished interior. Of medium fabric, it has a reduced grey core.

3. Fragment of a bowl of black polished ware with an internally sharpened rim and convex sides. Of fine fabric, it has a reduced grey core.

4. Fragment of a dish of black ware with sharpened, roughly tapering sides, carinated to a sagger base. Of medium fabric, showing a reduced dark grey core, it is devoid of any slip.

5. Fragment of a bowl of black ware with an inturned sharpened rim and tapering sides. Of medium fabric, showing a reduced grey core, it is devoid of any slip.

6. Fragment of a dish of black-slipped ware with a vertical, featureless rim, and convex sides, carinated to a rounded base. Of medium fabric, showing a reduced core, it is treated with a slip on both sides.

7. Fragment of a bowl of black polished ware with an incurved featureless rim and convex sides. Slipped on both sides, interior is darker with a smooth finish. Of medium fabric, it has a reduced grey core.

8. Fragment of a bowl of black polished ware with an inturned featureless rim and convex sides.
Pl. XCI B. Chak 86: Painted Grey Ware, exterior decoration. See pp. 220, 223, 225
Pl. XCI. Chak 86: Painted Grey Ware bowl. See p. 225
Fig. 53. Black ware
sides. Of medium fabric, showing a reduced grey core, it is slipped on both sides.

9. Fragment of a bowl of black-slipped ware with a vertical, internally sharpened rim and straight sides. Exterior is treated with a thin slip and a horizontal groove below the rim. Of medium fabric, it has a reduced grey core.

10. Fragment of a bowl of black-slipped ware with a vertical sharpened rim and rounded sides. Slipped on both sides, the exterior is treated with two horizontal grooves below the rim. Of medium fabric, it has a reduced grey core.

11. Fragment of a bowl of black-slipped ware with vertical featureless rim and convex sides. Of medium fabric, it has a reduced grey core.

12. Fragment of a bowl of black-slipped ware with a vertical featureless rim and convex sides. Of fine fabric, showing a reduced grey core, it is treated with a dark slip both externally and internally.

13. Fragment of a bowl of black-slipped ware with vertical featureless rim and convex sides. Of medium fabric, showing a reduced grey core.

14. Fragment of a bowl of black burnished ware with a sharpened rim and convex sides. Of fine fabric, showing a reduced dark grey core, it is treated with a dark wash and burnished on both sides.

15. Fragment of a bowl of black polished ware with an incurved featureless rim and roughly straight sides. Of fine fabric, showing a reduced grey core, it is slipped and polished on both sides.

16. Fragment of a bowl of black burnished ware with a vertical sharpened rim and convex sides. Of fine fabric, showing a reduced grey core, it is treated with a wash and burnished on both sides.

17. Fragment of a bowl of black-slipped ware with an outcurved featureless rim and roughly straight sides. Of fine fabric showing a reduced grey core, it is slipped on both sides.

18. Fragment of a bowl of black-slipped ware with an out-turned, featureless rim and rounded sides. Of fine fabric, showing a reduced grey core, it is slipped on both sides.

19. Fragment of a bowl of black-slipped ware with an internally thickened rim and roughly straight sides. Of fine fabric, it has a reduced grey core.

20. Fragment of a rounded base of a vase of black ware. Of medium fabric, showing a reduced grey core, husk and chopped storms are used as filler with coarse sand as tempering material. Having a rough finish on the exterior, the interior is treated with a mica powdered darker wash.

21. Fragment of a convex base of a dish of black ware with a carination on the exterior towards the base, distinguished by a groove at carination. Of fine fabric, showing a reduced grey core, it is treated with a wash on the interior.

Other Decorated Ware

Pls. XCI-IXCV

1. Fragment of a middle portion of a red ware. Of medium fabric, showing a completely oxidized core, its exterior is decorated with irregularly incised criss-cross lines.

2. Fragment of a middle portion of a red ware. Of medium fabric, showing an unoxidized grey core, its exterior is impressed with zig-zag designs enclosed between vertical lines.
3. Fragment of a middle portion of a black and red ware. Of medium fabric, showing an incompletely oxidized core, its exterior is decorated with an impressed panel consisting of concentric circles, sun motif, and other indeterminate pattern.

4. Fragment of a middle portion of a black-and-red ware. Of medium fabric, showing an incompletely oxidized core, its exterior is decorated with an impressed design consisting of sun motif, concentric circles and other fragmentary pattern.

5. Fragment of a middle portion of a red ware. Of medium fabric, showing a fully oxidized brick-red core, its exterior is decorated with an impressed design formed by intersecting concentric circles.

6. Fragment of a middle portion of a red ware. Of medium fabric, showing a completely oxidized core, its exterior is decorated with irregular intersecting strokes.

7. Fragment of a middle portion of a red ware. Of medium fabric, showing a semioxidized core, its exterior is decorated with an impressed design consisting of leaf pattern.

8. Fragment of a middle portion of a red ware. Of medium fabric, showing a semioxidized core, its exterior is decorated with regularly produced horizontal grooves.

9. Fragment of an upper portion of a red ware. Of medium fabric, showing a fully oxidized core, its exterior is decorated with an impressed panel consisting of regularly produced vertical lines.

10. Fragment of an upper portion of a red ware. Of medium fabric, showing an oxidized core, its exterior is impressed with mesh pattern below a horizontal groove.

11. Fragment of a middle portion of a black and red ware. Of medium fabric, showing an incompletely oxidized core, its exterior is decorated with impressed design consisting of horizontal lines.

12. Fragment of a middle portion of a black and red ware. Of medium fabric, showing an incompletely oxidized core, its exterior is decorated with an impressed panel formed by concentric circles with radiating lines and other indeterminate pattern.

13. Fragment of a middle portion of a red ware. Of medium fabric, showing an oxidized core, its exterior is impressed with mat pattern.

14. Fragment of a middle portion of a red ware. Of medium fabric, showing an unoxidized smoky grey core, its exterior is decorated with an impressed panel consisting of roughly horizontal lines above a shallow groove and slanting strokes.

15. Fragment of an upper portion of a red ware. Of medium fabric, showing a semioxidized core, its exterior is decorated with a horizontal band of incised zig-zag strokes.

16. Fragment of a middle portion of a red ware. Of medium fabric, showing a semioxidized core, its exterior is roughened with incrustations whereas interior is impressed with mesh pattern.

17. Fragment of a middle portion of a red ware. Of medium fabric, showing fully oxidized core, its rib on the exterior is incised with roughly vertical short strokes.

18. Fragment of an upper portion of a red ware. Of coarse fabric, showing a semoxidized core, its shoulder is decorated with regularly produced oblique slashes above irregular horizontal incisions.

19. Fragment of an upper portion of a red ware with a flat topped, grooved rim. Of medium fabric, showing an oxidized core, its exterior is decorated with a horizontal row of finger pressed design.
Pl. XCIII. Chak 86: Other decorated ware. See pp. 230, 231
PL. XCVII. Chak 86: Other decorated ware. See p. 231.
20. Fragment of a basin of red ware with an inturned, featureless rim. Of medium fabric, showing an oxidized core, its exterior is decorated with incised criss-cross lines below a horizontal groove.

21. Fragment of a middle portion of a red ware. Of medium fabric, showing a semioxidized core, it is decorated with a horizontally placed appliqué ribbing with short vertical incised strokes.

22. Fragment of a middle portion of a red ware. Of coarse fabric and thick section, showing an unoxidized core, its exterior is decorated with an appliqué horizontal ribbing with a series of oblique slashes.
Pl. XCV. Chak 86: Other decorated ware. See pp. 231, 234
Summary of Results

Discovery

The first survey of the Bikaner area was conducted by James Tod and subsequently followed by Malik Muhammad Din, L.P. Tessitori and Aurel Stein, resulting in the discovery of a large number of mounds in the region. It was in 1950-53, A. Ghosh combed through the area and discovered many Harappan, PGW and Early Historical sites including Tarkhanewala-Dera and Chak 86 along the palaeo-channels of River Sarasvati. He had taken up sondages at Tarkhanewala-Dera and Chak 86 respectively unveiling the remains of Mature Harappan and PGW matrices.

Location

Tarkhanewala-Dera and Chak 86 (Lat. 29° 14' N, Long 73° 14' E) are individual mounds located in the dried up bed of river Sarasvati in Anupgarh tehsil, District Ganganagar of Bikaner division of Rajasthan. Both these centrally protected sites are located at a distance of about 6 km north of Anupgarh on the State Highway No. 3 leading to Ganganagar. They are situated at a distance of 250 m from each other.

Objective of the Excavation

In 2004, the Ministry of Culture approved ‘Sarasvati Heritage Project’ and decided to conduct excavations at Adi Badri, Hansi and Bhirrana in Haryana; Juni Kuran in Gujarat and Baror, Tarkhanewala-Dera and Chak 86 in Rajasthan. The present field work was taken up on a large scale to:

1) Ascertain the cultural sequence of subterranean deposits.
2) Determine settlement pattern and habitational expanse.
3) Establish the network of relationship through near-neighbourhood analysis among the sites located in the ancient dried up course of River Sarasvati.

TARKHANEWALA-DERA

Stratigraphy

Originally the ancient mound was about 4 m high. Due to cultivation and brick manufacturing the site has been reduced to the present ground level. Approximately the site extends over an area of 4.5 hectares. In all the 11 trenches (A1, B1, C1, XA1, AB1, XC1, XD1, YA1, YB1, YC1 and YD1) of 10 X 10 m were excavated. The excavations have revealed a single cultured site, i.e., Mature phase of the Harappan Culture and has preserved only one structural phase. The cultural deposit ranges from 1.90 m to 1.95 m. which has
been divided into 5 layers. All the structures are resting on layer 3 and are sealed by layer 1. Layer 2 is contemporary to the structures.

Structures

In all twenty-two structures were unearthed during the course of the excavation. Save for two pyriform potter’s kilns lined with single course of sun-dried bricks and two fire altars lined with mud-bricks, a mud floor and one mud wall structure, all remaining sixteen structures are made of mud-bricks. The bricks used measure 28 x 14 x 7 cm and 32 x 16 x 8 cm (4:2:1) and all of them are sun-dried. The structures are north-south and east-west oriented mainly but some even run obliquely. The bricks were laid in English bond. The structures are either square or rectangular in shape and were used for residential purpose. The width of the walls is of 1, 2, and 3 bricks. Plaster was not found on any of the structures except for the mud-walls (STR 18A and B) plastered with greyish mortar.

Pottery

The excavation at Tarkhanewala-Dera has yielded a Mature Harappan ceramic assemblage. It falls into five major group’s viz., red ware, grey ware, red slipped ware, black on red ware and other decorated ware. Pottery yield diminishes gradually from layer (1) to layer (5), layer (1) recording the maximum. Industry-wise, red ware accounts for more than 78% of total assemblage. And less than 10% of pottery is either painted or decorated which occurs largely in the upper level. The common shapes are beaker, goblet, perforated jar, storage-jar, dish-on-stand, basin, dish, bowl etc. Few red ware is also painted, mostly executed before firing. The colour scheme normally adopted is black on a red background. The repertoire of painting comprises naturalistic, seminaturalistic and geometric designs. Among the motifs, mention may be made of pipal leaf, palm tree, acacia tree, banana, fish motif, fish scale, sun symbol, circle, parallel lines and other indeterminate patterns. The other decorated ware includes incised and appliqué variety. The decoration was executed during the plastic or leather-hard condition. The designs, executed both on the interior and exterior of the vessel, consists of wavy lines, parallel lines, herring bone pattern, slashes, intersecting lines, criss-cross etc.

Antiquities

The antiquities made of stone, terracotta, shell, bone and copper were unearthed. The stone objects included blades of chert, touchstone, tablets, sling balls, amulets, weights, drill-bits, and beads of agate, black stone, amethyst, lapis lazuli and carnelian; terracotta objects included animal and human figurines, sling balls, marbles, earrings, crucibles, baby feeder cup, pyramidal objects, discoids, tablets, hopscotch, toy cart frames, spinning tops, spindle whorls, spools, amulets, gamesman, castle, pendant; faience bangles; bone objects comprising awl, engravers and stylus; shell bangles and spearhead, bangle, chisel, rods, antimony rod, earrings, fish-hooks, needles and rings made of copper. Besides the above, one seal and a sealing were also reported.
Summary of Results

CHAK 86

Stratigraphy

Chak 86 is spread over an area of 5.5 hectares. Here also the horizontal method of excavation was adopted and three trenches (A1, A2 and ZA1) of 10 x 10 m were excavated. This is a single cultured site of PGW settlement, with a total deposit of 2.5 m, marked into five layers. Unlike Tarkhanewala-Dera this site revealed two structural phases.

Structures

In all ten structures were exposed, of these three belong to Phase I and seven to Phase II. In Phase I two mud-brick structures and an oval-shaped hearth of clay were exposed. The nature of the structures could not be ascertained as they are embedded in the section. In Structures 1 and 2 mud-bricks and mud-mortar were used, the brick size was 28 x 20 x 10 cm and they were made of one course only. These structures are on the top of layer 4 and sealed by layer 3.

In Phase II seven circular hutments were traced on plan. They vary in size from 1.65 m to 2.05 m whereas the thickness of the perimeter of these huts varies from 17 to 38 cm. The cross section of these huts revealed a 35 to 40 cm deposit of charred material. The structures rest on the top of layer 3 and are sealed by layer 2.

Pottery

The present excavation at Chak 86 yielded a Painted Grey Ware ceramic assemblage. It falls into eight major groups viz. red ware, red slipped ware, black on red ware, black and red ware, grey ware, Painted Grey Ware, black ware and other decorated ware. Each of these forms a diagnostic trait in the cultural assemblage of the period. The commonly met shapes of the red ware are vase, dish, bowl, storage-jar, basin etc. A few of them are also painted, mostly executed before firing. The colour scheme normally adopted is black on a red background. Among the motifs, mention may be made of horizontal lines, arches, chain motifs, rim bands etc. The other decorated wares include incised and appliqué variety of pottery. The decorations are found both on the interior and exterior of the vessels which consist of horizontal lines, diamonds, wavy lines, vertical lines, slashes, dots, concentric circles, mat pattern, etc. The black-and-red ware has a wholly individualistic appearance distinct alike in fabric and form. The shapes include mostly dishes and bowls.

The black ware is characterized by its medium fabric, being wheel made and fired at reduced condition; most of them are slipped and burnished. The characteristic shapes of this ware are very few indeed and include bowl and dish only. The grey ware forms a homogenous group belonging to a well-defined industry.

In case of Painted Grey Ware, the surface of the body is painted in black before firing. Instances of bichrome designs are also met with, i.e., black and brown and black and chocolate. The common pattern is represented by groups of vertical or oblique strokes below the horizontal rim-band. Other motifs include intersecting lines, dots,
Excavations at Tarkhanewala-Dera and Chak 86

Antiquities

The antiquities were made on stone, terracotta, bone, glass, shell and faience. The stone objects included pounder-cum-pestle, blade of chert and beads of carnelian, lapis lazuli, chert, agate and quartz; terracotta objects included animal figurines, sling balls, hopscotch, wheels, toy-cart frames, bangles, triangular cake and beads. The bone objects included awl, borer, point, arrowhead, stylus and bud-shaped socket. The other finds comprise beads of terracotta and semiprecious material, fragments of bangles made of faience, terracotta, glass, etc.

The foregoing discussions on the excavated finds suggest the following-

1. Both these sites exhibit a single phase of cultural deposits, i.e., Tarkhanewala-Dera by Mature Harappans and Chak 86 by PGW culture. Though these sites are located at a distance about 250 m from each other, they show no sign of reoccupation. The mature Harappan people of Tarkhanewala-Dera did not inhabit the areas later on occupied by the PGW people of Chak 86 nor did the later PGW people settled on the earlier habitational deposits of Tarkhanewala-Dera.

   This is a common feature in this area along the River Sarasvati where the PGW culture did not overlap the Harappan. They existed independently. In stratigraphic context the excavated remains of Harappa and PGW display three types of relationship.

   (a) At sites like Bhagwanpura, Dadheri, Katpalon and Manda, PGW is found interlocked with the Harappan depicting contemporaneity of both the cultures.

   (b) At sites like Ropar PGW culture succeeded the Harappan but with a hiatus in between.

   (c) As observed in Sarasvati valley like Tarkhanewala-Dera, Chak 86, Binjor I, II, III and IV, Chak-15/3 and 15/4, Chak 71, 74 and 75 etc. Harappan and PGW culture sites exist independently.

2. No iron is reported from the PGW level.

3. The appearance of glass in the PGW level denotes technological development from faience to glass.

\( ^{14} \text{C} \) Dates.- Eight samples were sent to the Institute of Physics, Bhubaneswar for analysis. From the Mature Harappan levels of Tarkhanewala-Dera, the \( ^{14} \text{C} \) dates do not fall within the established time bracket (2350-1750 BC) hence not mentioned here. The reason may be contamination or due to decomposition of collagen. On the other hand Chak 86 provided two dates viz., 650±130 BC and 215 ± 185 BC.

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\[ ^{1} \text{Jagatpati Joshi, Excavation at Bhagwanpura, 1975-76, MASI, No.89 (New Delhi, 1993), pp. 23-26.} \]

\[ ^{2} \text{A.Ghosh, (ed.), An Encyclopaedia of Indian Archaeology, Vol. II (New Delhi, 1989), pp.377-79, 433} \]

\[ ^{3} \text{Ibid., Vol. I, pp.78,91.} \]

\[ ^{4} \text{This is based on the analysis done by Dr. G.V.Ravi Prasad and Dr. Kaushika Dutta, AMS Radio Carbon Laboratory, Institute of Physics, Bhubaneswar as per their letter dated 31st January, 2007. See, Appendix A.} \]
APPENDIX-A

Chronology of archeological samples from Tarkhanewala-Dera and Chak 86, Ganganagar District, Rajasthan
Koushik Dutta, Dinesh K. Ray, G.V. Ravi Prasad
AMS$^{14}$C Laboratory, Institute of Physics, Sachivalaya Marg, Bhabaneswar-751 005

Introduction

To determine the chronology of the protohistoric settlements at Tarkhanewala-Dera and Chak 86 (29° 14'N, 73° 14'E), a number of charred bone and soil samples collected from both sites were dated by radiocarbon ($^{14}$C) method. The usual procedure for $^{14}$C analysis in bone samples involve separation of the collagen protein from the bone matrix after demineralizing the bone (removing the carbonate and apatite structure) and measuring $^{14}$C in the purified collagen. Extraction of collagen is essential, since the inorganic carbonates of bones are often contaminated by post burial processes. However, in case of charred bones collagen extraction is not possible, as most of the collagen decomposes during combustion. All bone samples collected from the two sites were charred. Both the surface and the interior of the bones were carbonized. The samples were chemically pretreated as described below before their $^{14}$C analysis.

Methods

The bone samples were first cleaned of soil and other adhering objects by thoroughly scrapping the surface, and washing with deionized water. The samples were then dried and pulverized to 1-2 mm pieces. The crushed bones were then subjected to acid-alkali-acid (AAA) treatment, to remove extraneous carbonates and humic material. The soil samples were thoroughly inspected for fragments of modern fine rootlets, which were hand-picked and removed. About 500 mg of soil samples were taken for AAA pretreatment. To obtain CO$_2$ for $^{14}$C analysis, -150mg of pretreated bone and -400mg of pretreated soil samples were combusted with CuO and fine Ag wires in evacuated and sealed quartz tubes, and heated at 900°C for 2-3hrs. The CO$_2$ obtained by combustion of the samples were purified in a vacuum line, and converted into graphite by reducing with hydrogen (H$_2$) gas in presence of iron (Fe) catalyst. The graphite samples thus formed were pressed into cathode targets for AMS $^{14}$C analysis. $^{14}$C measurements were done by accelerator mass spectrometry (AMS) method, using NEC 3MV 9SDH-2 pelletron accelerator at Institute of Physics, Bhubaneswar (Ravi Prasad et al, 2006). All $^{14}$C ages were normalized with uniform $\delta^{13}$C of -25%.

Results

The $^{14}$C results are given in Table IX. The $^{14}$C -ages of the unknown samples were calibrated with OxCa13.10 calibration program (Bronik Ramsey, 2001), using INTCAL04 atmospheric $^{14}$C data (Reimer et al, 2004). Both conventional $^{14}$C -ages (BP) and calibrated ages (calendar BC/AD) are reported in Table 1 with ±1σ errors.
Table IX

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The detailed calibrated age ranges of the bone and soil samples are shown in Figs. 1 and 2. The $^{14}$C dates fall broadly between 1100 BC to 200 BC, however, one bone sample from Chak 86 yielded much younger date, 720±90 AD.

References
APPENDIX-B

A Report on the Animal bones from the Excavations at Tarkhanewala-Dera
District Ganganagar, Rajasthan, 2003-2004

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Tarkhanewala-Dera is an ancient mound (Lat.29° 14' N; Long.73° 14’ E) located in the dried bed of River Sarasvati in Anupgarh tehsil, District Sri Ganganagar of Bikaner division of Rajasthan. It was first excavated by Shri A. Ghosh of the ASI who brought to light the remains of a Mature Harappan site. The site was once again excavated by Shri P.K. Trivedi and his colleagues in 2003-2004. The excavation yielded residential structures with mud-bricks, terracotta sealings, beads, animal and human figurines, bangles, objects of stone, copper and bone. Along with typical Harappan ceramics, animal bones were also revealed. This report deals with the analysis of mainly animal bones which were recovered from the excavations in 2003-2004. A total of ninety-four animal bone fragments were studied at the archaeozoology laboratory of the Deccan College, Pune. Bone samples from the following locus, stratum and depth were taken up for a detailed study.

1) XA1Qd2 layer 1, depth —23 cm.
2) XA1Qd3 layer 3, depth 38 cm to 42 cm.
3) YC1Qd3 layer 1, depth 17 cm to 19 cm.
4) XD1Qd4 layer 2, depth 16 cm to 18 cm.
5) XA1Qd3 layer 1, depth 10 cm.
6) XA1Qd2 layer 2, depth 28 cm to 30 cm.
7) B1Qd3 layer 2, depth 41 cm to 46 cm.
8) XD1Qd4 layer 1, depth 4 cm to 9 cm.

All the bone fragments were recorded, weighed and identified following standard procedures of faunal analysis. Each bone fragment was examined for cut and chop marks, modifications, chemical alteration, weathering, burning activity, discolouration, etc. Dimensional measurements were taken of all the measurable bones.

Bone identification was attempted to the species level by comparison with the reference skeletal collection of modern animals housed in the archaeozoology laboratory. The Schimdt’s Atlas of Animal bones was also consulted while carrying out the species identification. Even though the bones are in a fragmented condition yet show fairly good preservation and could be easily identified.

Bone analysis

1) Sample: 1
Locus: B1Qd3
Stratum: 2
Depth: 41-46 cm
Bone identification: A complete fused head of femur belonging to Bos indicus (Plate XCVI:2)

2) Sample: 2
Locus: XA1Qd2
Stratum: 1
Depth: 23 cm
Bone identification: A complete astragalus of Bos indicus (Plate XCVI:1)
3) Sample: 3  
   Locus: XA1Qd2  
   Stratum: 1  
   Depth: 23cm  
   Bone identification: A lower basal portion of horizontal ramus of mandible of a small ruminant.

4) Sample: 4  
   Locus: XA1Qd2  
   Stratum: 1  
   Depth: 23cm  
   Bone identification: One fragment from shaft of metatarsal of domestic cow/buffalo (Bos/Bubalus).

5) Sample: 5  
   Locus: XA1Qd2  
   Stratum: 1  
   Depth: 23cm  
   Bone identification: One thoracic bifid spine of Bos indicus (Plate XCVI: 6).

6) Sample: 6  
   Locus: XA1Qd2  
   Stratum: 2  
   Depth: 23-30cm  
   Bone identification: Eight medium sized bone fragments unidentifiable.

7) Sample: 7  
   Locus: XA1Qd2  
   Stratum: 2  
   Depth: 23-30cm  
   Bone identification: One rib fragment of Bos/Bubalus.

8) Sample: 8  
   Locus: XA1Qd2  
   Stratum: 2  
   Depth: 23-30cm  
   Bone identification: A part of vertebrae of Bos/Bubalus with a cut mark.

9) Sample: 9  
   Locus: XA1Qd2  
   Stratum: 2  
   Depth: 23-30cm  
   Bone identification: A part of humerus shaft of Bos/Bubalus with a cut mark.

10) Sample: 10  
    Locus: XD1Qd4  
    Stratum: 1  
    Depth: 4-9cm  
    Bone identification: A part of centrum of vertebrae of Bos/Bubalus with slight charring (Plate XCVI: 5).

11) Sample: 11  
    Locus: XD1Qd4  
    Stratum: 1  
    Depth: 4-9cm  
    Bone identification: A part of centrum of vertebrae of Bos/Bubalus showing slight charring.

12) Sample: 12  
    Locus: XD1Qd4  
    Stratum: 1  
    Depth: 4-9cm  
    Bone identification: Proximal portion of metapodial of Bos/Bubalus.

13) Sample: 13  
    Locus: XA1Qd3  
    Stratum: 3  
    Depth: 38-42cm.  
    Bone identification: A fragment from mid shaft of humerus of Bos indicus.

14) Sample: 14  
    Locus: XA1Qd3  
    Stratum: 3  
    Depth: 38-42cm  
    Bone identification: A part of spine of vertebra of Bos indicus.
15) Sample: 15
   Locus: XA1Qd3
   Stratum: 3
   Depth: 38-42cm
   Bone identification: A fragment of a turtle carapace belonging to *Trionyx gangeticus* sp (Plate XCVII: 2).

16) Sample: 16
   Locus: YC1Qd3
   Stratum: 1
   Depth: 17-19cm
   Bone identification: A fragment of a plastron of turtle belonging to *Trionyx gangeticus* sp (Plate XCVII: 1).

17) Sample: 17
   Locus: XD1Qd4
   Stratum: 2
   Depth: 16-18cm
   Bone identification: One small spine of a freshwater fish species which is tentatively identified as cat fish.

18) Sample: 18
   Locus: XD1Qd4
   Stratum: 2
   Depth: 16-18cm
   Bone identification: One long bone fragment from femur of a very young sheep/goat (*Ovis/Capra*).

19) Sample: 19
   Locus: XD1Qd4
   Stratum: 2
   Depth: 16-18cm
   Bone identification: Eight rib fragments of very young sheep/goat (*Ovis/Capra*).

20) Sample: 20
   Locus: XD1Qd4
   Stratum: 2
   Depth: 16-18cm
   Bone identification: One dental fragment of *Bos indicus*.

21) Sample: 21
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: One complete second phalanx of *Capra hircus*.

22) Sample: 22
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: Proximal part of metapodial of *Bos indicus* (Plate XCVI: 3).

23) Sample: 23
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: One fragment from shaft of metacarpal of *Bos indicus* (Plate XCVI: 3).

24) Sample: 24
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: One fragment of a vertebrae of *Bos indicus*.

25) Sample: 25
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: One fragment of a centrotarsal of *Bos indicus*.

26) Sample: 26
   Locus: XA1Qd3
   Stratum: 1
   Depth: 10cm
   Bone identification: One fragment of trochlea from distal portion of metapodial of *Capra hircus*. 
27) Sample: 27  
Locus: B1Qd1  
Stratum: 4  
Depth: 50-53 cm  
**Bone identification**: One shaft fragment from humerus of *Bos indicus*.

28) Sample: 28  
Locus: B1Qd1  
Stratum: 4  
Depth: 50-53 cm  
**Bone identification**: A complete astragalus of *Bos indicus*.

29) Sample: 29  
Locus: B1Qd1  
Stratum: 4  
Depth: 50-53 cm  
**Bone identification**: A distal portion of metacarpal of *Ovis aries* with fused trochlea having a width of 23.20 mm (Plate XCVII: 3).

30) Sample: 30  
Locus: B1Qd1  
Stratum: 4  
Depth: 50-53 cm  
**Bone identification**: One complete axis vertebra of *Capra hircus* (Plate XCVII: 4).

31) Sample: 31  
Locus: B1Qd1  
Stratum: 4  
Depth: 50-53 cm  
**Bone identification**: Proximal portion of metatarsal of *Capra hircus* having a width of 21.15 mm (Plate XCVII: 3).

32) Sample: 32  
Locus: XA1Qd3  
Stratum: 1  
Depth: 10 cm  
**Bone identification**: Two carpals of *Bos indicus*.

33) Sample: 33  
Locus: XA1Qd3  
Stratum: 1  
Depth: 10 cm  
**Bone identification**: Twelve longbone fragments of *Bos indicus* (Plate XCVI: 4).

34) Sample: 34  
Locus: XA1Qd3  
Stratum: 1  
Depth: 10 cm  
**Bone identification**: Thirty three medium sized unidentifiable fragments of which three are charred.

35) Sample: 35  
Locus: XA1Qd3  
Stratum: 1  
Depth: 10 cm  
**Bone identification**: Two dental fragments of *Bos/Bubalus*

Results

The following animals were identified at Tarkhanewala-Dera (Table X) mammals (6), birds (0), reptile (1), fish (1). In the collection very few wild animals are represented.

The entire collection is dominated by the bones of cattle mostly the domestic cow *Bos indicus*. Some of the cattle bones because of their fragmentary nature and absence of skeletal markers could not be identified specifically as cow or buffalo. Hence these are collectively grouped under *Bos/Bubalus*. Almost all body parts like humerus, femur, metapodials, vertebrae, ribs, astragalus, are represented. However a limited representation of teeth in the bone assemblage is observed. Many of the bones have traces of charring and
Excavations at Tarkhanewala-Dera and Chak 86

cut marks on them suggesting butchering and meat processing activity associated with dietary use. One bifid thoracic spine is present in the collection. This is a characteristic skeletal feature which is found only in the humped cattle Zebu hence its presence is noted with certainty at the site.

A few bones fall in the size range of sheep, goat and deer but again due to their fragmented nature could not also be separated species wise. Hence were collectively grouped as small ruminants. Among these some could be further grouped under sheep/goat category. Presence of bones of a young goat with cut marks indicates its use in the food economy.

Among wild fauna, a general absence of both herbivores like deer, antelopes and carnivores along with smaller mammals is observed. The reptile group of animals is represented by shell fragments of turtle species (Trionyx gangeticus). Presence of these indicates the additional exploitation of aquatic animal resources for food purposes at the site. Occurrence of a fish spine provides further evidence for this particular aspect.

List of Figures from Tarkhanewala-Dera

Plate XCVI
1. A complete astragalus of Bos indicus
2. A complete femur head of Bos indicus
3. Left fragment from shaft of metacarpal of Bos indicus
   Right proximal portion of metapodial of Bos indicus
4. Long bone fragments of Bos/Bubalus sp.
5. Left centrum of Bos/Bubalus sp.
   Right proximal portion of radius of Bos/Bubalus sp.
6. One thoracic bifid spine of Bos indicus

Plate XCVII.
1. Plastron from shell of turtle Trionyx gangeticus
2. Turtle Carapace of Trionyx gangeticus
3. Left Proximal portion of metatarsal of Capra hircus
   Right A distal portion of metacarpal of Ovis aries with fused Trochlea.
4. One complete axis vertebra of Capra hircus.

Table X: List of Animals identified at Tarkhanewala-Dera

<table>
<thead>
<tr>
<th>No.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bos indicus (domestic cow/ox)</td>
</tr>
<tr>
<td>2</td>
<td>Bos/Bubalus (domestic cow/ox/buffalo)</td>
</tr>
<tr>
<td>3</td>
<td>Capra hircus (goat)</td>
</tr>
<tr>
<td>4</td>
<td>Capra/Ovis (goat/sheep)</td>
</tr>
<tr>
<td>5</td>
<td>Ovis aries (sheep)</td>
</tr>
<tr>
<td>6</td>
<td>Small ruminant</td>
</tr>
<tr>
<td>7</td>
<td>Trionyx gangeticus (Turtle)</td>
</tr>
<tr>
<td>8</td>
<td>Fish species unidentified</td>
</tr>
</tbody>
</table>
Pl. XCVII: Tarkhanewala-Dera: Animal bones. See pp. 245, 246, 247
Chak 86 is another ancient mound located close to Tarkhanewala-Dera (Lat.29° 15’N; Long.73° 14’ E) in the dried bed of River Sarasvati in Anupgarh tehsil, District Ganganagar of Bikaner division of Rajasthan. It was previously excavated by Shri A. Ghosh of the ASI who brought to light the remains of a PGW culture. Recent excavations at this site by Shri P.K. Trivedi and his colleagues in 2003-2004 also revealed cultural remains belonging to this particular period. Antiquities such as terracotta objects, beads, objects of bone, shell and stone were recovered along with pottery and animal bones. In this report results of the analysis carried out on the animal remains from Chak 86 are presented.

A total of sixty-four animal bones were studied at the archaeozoology laboratory of the Deccan college, Pune following similar procedure of faunal analysis as was done for bones from Tarkhanewala-Dera. Bone identification showed that the entire assemblage is dominated by bones of cattle mostly of the domestic cow/ox (Bos indicus). These are represented by fragments of the vertebrae, long bones, teeth, astragalus and phalanges. All these show traces of butchering activity for food purpose in the form of charring and cut marks. The domestic goat (Capra hircus) is represented by a few teeth, ribs, vertebrae, calcaneum and long bones. Fragmented condition of these bones also suggests the use of sheep/goat in the food economy. Occurrence of a second phalanx of the domestic ass (Equus asinus) indicates its presence at the settlement and probable use as a beast of burden. A negligible representation of wild animals is observed. From the fused nature of some of the bones, it is inferred that mostly adult sized animals were present in the collection.

1) Sample: 1
Locus: ZA1Qd2
Stratum: 2
Depth: 33-40cm
Bone identification: A complete calcaneum of Capra hircus having a length of 57.66mm (Plate XCIX: 2).

2) Sample: 2
Locus: ZA1Qd2
Stratum: 2
Depth: 33-40cm
Bone identification: An isolated first phalanx of Bos indicus whose proximal portion is broken.

3) Sample: 3
Locus: ZA1Qd2
Stratum: 2
Depth: 33-40cm
Bone identification: One carpal of Bos/Bubalus quite large with traces of charring (Plate XCVIII: 3).
4) Sample: 4  
Locus: ZA1Qd2  
Stratum: 2  
Depth: 33-40cm  
**Bone identification:** One vertebral fragment of *Bos/Bubalus* with slight traces of charring (Plate XCVIII: 1).

5) Sample: 5  
Locus: ZA1Qd2  
Stratum: 2  
Depth: 33-40cm  
**Bone identification:** Distal portion of metapodial of *Bos/Bubalus* with a part of the trochlea attached.

6) Sample: 6  
Locus: ZA1Qd2  
Stratum: 2  
Depth: 33-40cm  
**Bone identification:** One unidentified long bone fragment of cattle.

7) Sample: 7  
Locus: ZA1Qd2  
Stratum: 2  
Depth: 33-40cm  
**Bone identification:** A part of centrum of lumbar vertebra belonging to a small ruminant.

8) Sample: 8  
Locus: ZA1Qd3  
Stratum: 2  
Depth: 30-50cm  
**Bone identification:** A partially broken astragalus of *Bos indicus* with charring.

9) Sample: 9  
Locus: ZA1Qd3  
Stratum: 2  
Depth: 30-50cm  
**Bone identification:** Distal portion of metacarpal with a just fused trochlea of *Bos/Bubalus* (Plate XCVIII: 4).

10) Sample: 10  
Locus: A1Qd1  
Stratum: 4  
Depth: 35-51cm  
**Bone identification:** A complete first phalanx of *Bos indicus* with traces of charring on it (Plate XCVIII: 6).

11) Sample: 11  
Locus: A1Qd1  
Stratum: 4  
Depth: 35-51cm  
**Bone identification:** A broken head of a femur of *Bos/Bubalus*.

12) Sample: 12  
Locus: A1Qd1  
Stratum: 4  
Depth: 35-51cm  
**Bone identification:** Portion of pelvis with pubis of *Bos/Bubalus*.

13) Sample: 13  
Locus: A1Qd1  
Stratum: 4  
Depth: 35-51cm  
**Bone identification:** An unfused distal portion of radius of a young *Bos/Bubalus*.

14) Sample: 14  
Locus: A1Qd1  
Stratum: 4  
Depth: 35-51cm  
**Bone identification:** One dental fragment of *Bos/Bubalus*.

15) Sample: 15  
Locus: A1Qd1  
Stratum: 4  
Depth: 51-60 cm  
**Bone identification:** A part of centrum and transverse processes of vertebra of *Bos/Bubalus*.
16) Sample: 16
   Locus: A1Qd1
   Stratum: 4
   Depth: 51-60 cm
   Bone identification: A vertically broken astragalus of *Bos/Bubalus* with traces of charring on its sides (Plate XCVIII: 5).

17) Sample: 17
   Locus: A1Qd1
   Stratum: 4
   Depth: 51-60 cm
   Bone identification: Distal portion of metacarpal with fused trochlea of *Bos/Bubalus*.

18) Sample not numbered
   Locus: A1Qd1
   Stratum: 4
   Depth: 51-60 cm
   Bone identification: Nine medium sized long bone fragments of *Bos/Bubalus*.

19) Sample: 18
   Locus: A1Qd3
   Stratum: 1
   Depth: 36-38 cm
   Bone identification: Portion of pelvis with a part of the ischium and acetabulum of *Bos indicus*. The fragment has a cutmark (Plate XCVIII: 2).

20) Sample not numbered *
   Locus: A1Qd3
   Stratum: 1
   Depth: 36-38 cm
   Bone identification: Nine flat bone fragments unidentified.

21) Sample: 19
   Locus: ZA1Qd1
   Stratum: 2
   Depth: 10-44 cm
   Bone identification: One complete second phalanx of *Bos indicus* (Plate XCVIII: 6).

22) Sample: 20
   Locus: ZA1Qd1
   Stratum: 2
   Depth 10-44 cm
   Bone identification: A part of axis vertebrae of *Bos indicus* (Plate XCVIII: 1).

23) Sample: 21
   Locus: ZA1Qd1
   Stratum: 2
   Depth: 10-44 cm
   Bone identification: One broken first phalanx of *Bos indicus*.

24) Sample: 22
   Locus: A1Qd1
   Stratum: 4
   Depth: 1.22 m to 1.35 m
   Bone identification: A complete second phalanx of *Equus asinus* (Plate XCIX: 3).

25) Sample: 23
   Locus: A1Qd1
   Stratum: 4
   Depth: 1.22 m to 1.35 m
   Bone identification: An isolated second phalanx of *Bos indicus* with its distal end broken.

26) Sample: 24
   Locus: A1Qd1
   Stratum: 4
   Depth: 1.22 m to 1.35 m
   Bone identification: Partially broken astragalus of *Bos indicus* (Plate XCVIII: 5).

27) Sample: 25
   Locus: A1Qd1
   Stratum: 4
   Depth: 1.22 m to 1.35 m
   Bone identification: One broken and completely charred astragalus of *Bos indicus* (Plate XCVIII: 5).
28) Sample: 26
  Locus: A1Qd1
  Stratum: 4
  Depth: 1.22 m to 1.35 m
  Bone identification: Distal portion of metatarsal of Bos/Bubalus with slight traces of charring.

29) Sample: 27
  Locus: A1Qd1
  Stratum: 4
  Depth: 37 to 50 cm
  Bone identification: Complete astragalus of Bos indicus.

30) Sample: 28
  Locus: A1Qd1
  Stratum: 4
  Depth: 37 to 50 cm
  Bone identification: Petrous temporal of Bos indicus.

31) Sample
  Locus: A1Qd1
  Stratum: 4
  Depth: 37 to 50 cm
  Bone identification: Five unidentified medium sized fragments.

32) Sample: 29
  Locus: A1Qd1
  Stratum: 2
  Depth: 42 to 52 cm
  Bone identification: One complete astragalus of Bos indicus.

33) Sample: 30
  Locus: A1Qd1
  Stratum: 2
  Depth: 42 to 52 cm
  Bone identification: One complete second phalanx of Bos indicus (Plate XCVIII: 6).

34) Sample: 31
  Locus: A1Qd1
  Stratum: 2
  Depth: 42 to 52 cm
  Bone identification: Complete first/second mandibular molar tooth of Capra hircus (Plate XCIX: 1).

35) Sample: 32
  Locus: ZA1Qd3
  Stratum: 2
  Depth: 50 to 56 cm
  Bone identification: Isolated first/second mandibular molar tooth of Capra hircus (Plate XCIX: 1).

36) Sample not numbered*
  Locus: ZA1Qd3
  Stratum: 2
  Depth: 50 to 56 cm
  Bone identification: Six unidentified fragments.

37) Sample: 33
  Locus: A1Qd1
  Stratum: 4
  Depth: 1.22 m to 1.35 m
  Bone identification: Portion of a pelvis with ischium of Bos indicus.

38) Sample: 34
  Locus: ZA1Qd1
  Stratum: 2
  Depth: 10 to 44 cm
  Bone identification: One caudal vertebra of Bos/Bubalus.

39) Sample: 35
  Locus: ZA1Qd1
  Stratum: 2
  Depth: 10 to 44 cm
  Bone identification: Parts of trochlea of metapodial of Bos/Bubalus.

Plate XCVIII:
1. Left fragment of axis vertebrae of *Bos indicus*
   Right fragment of vertebrae of *Bos indicus*
2. Portion of pelvis with acetabulum of *Bos indicus*
3. Carpal of *Bos/Bubalus sp.*
4. Two distal portions of trochlea of *Bos/Bubalus*
5. Broken astragalus of *Bos/Bubalus* with cut marks and charring
6. Left complete first phalanx of *Bos indicus* showing charring
   Middle complete second phalanx of *Bos indicus*
   Right complete second phalanx of *Bos indicus*

Plate XCIX:
1. Molar teeth of *Capra hircus*
2. Complete calcaneum of *Capra hircus*
3. Complete second phalanx of *Equus asinus*

Acknowledgements

I wish to thank Shri P.K.Trivedi, Superintending Archaeologist, ASI for inviting me to study the animal bones from both Tarkhanewala-Dera and Chak 86. The Deccan College, Pune is duly acknowledged for providing the necessary facilities for carrying out the analysis. Lastly, would also like to thank Shri Milan Chauley for his help and kind cooperation in initiating this particular study.
Pl. XCVIII: Chak 86: Animal bones. See pp. 250, 251, 252, 253, 254
Pl. XCLX : Chak 86 : Animal bones. See pp. 250, 252, 253, 254