
A Study on the Painted Grey Ware

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Abstract: *This paper examines the morphological and technological features of the Painted Grey Ware (hereafter PGW) that characterises the Iron Age in North India in order to better understand its historical significance. While this diagnostic type of ceramics has been widely regarded as having a great potentiality for understanding the Iron Age society in North India, very few examinations on the ceramic evidence itself have been made in recent years, while there were vigorous discussions on PGW and relevant issues back in the 1960s and 1970s (Gaur ed. 1994; Dikshit 1969, 1973). Unless the origin, developments and decline of PGW are well examined based on the increasing data set, the historical significance of PGW cannot be elucidated. This paper attempts to present a starting point for further studies and researches.*

Keywords: Painted Grey Ware, Iron Age, North India, Excavation, Distribution, Morphology, Technology

Introduction

It is well known that PGW is a characteristic type of ceramics of the Iron Age in North India. This pottery, which was identified for the first time in the excavations at Ahichchhatra conducted between 1940 and 1944 (Ghosh and Panigrahi 1946), was retrieved from a secure stratigraphic context at Hastinapura (Lal 1954). B.B. Lal, the excavator of this site, gave a time bracket of 1100 BCE and 800 BCE to this pottery based on its stratigraphic position below the Northern Black Polished Ware (hereafter NBPW) level. After the excavations at Hastinapura, a number of sites including the ones in western Uttar Pradesh and northern Rajasthan have been excavated by various scholars adding a considerable amount of information about the chronology and material culture of this ceramic culture. The excavations at Bhagwanpura conducted by J.P. Joshi in 1975-76 uncovered deposits in which the Bara-style pottery and PGW were associated resulting in discussions about the origin of PGW in the late second millennium BCE (Joshi 1978a, 1978b; Joshi ed. 1993).

Apart from the controversy regarding the relation between PGW and the Aryans, the relationship between the Bara-style pottery and PGW is of great archaeological importance. The Bara-style pottery that has its root in the Harappan pottery and the

Sothi-Siswal pottery local to the Ghaggar Valley is apparently different from PGW showing a significant stylistic change between the two. The end of the Harappan ceramic tradition and the emergence of a new ceramic style represented by PGW are related not merely to a ceramic change but to the socio-cultural transformation from the Bronze Age society to the Iron Age society. The implication of the ceramic change is related to a number of important issues of the social transformation during the second millennium BCE. Hence, the examination on the ceramic evidence of PGW and the relation with the Bara-style pottery is crucial.

Another important issue is related to the end of PGW. Based on the stratigraphic evidence from Hastinapura, at which PGW was recovered from the deposits beneath the NBPW level with an intervening flood deposit, the terminal date of PGW was placed around 800 BCE. This date was given based on the date of the appearance of NBPW around 600 BCE, which was presumed by Krishna Deva and R.E.M. Wheeler (1946) and was widely accepted by scholars (e.g. Allchin and Allchin 1982: 320; Erdosy 1995: 80). Some scholars even argue that PGW was a prototype of NBPW (e.g. Allchin and Allchin 1982: 323; Shaffer and Lichtenstein 2005: 92). Therefore, it is apparent that PGW is one of the crucial keys for reconstructing the ceramic sequence in the Iron Age of North India and for understanding socio-cultural developments during this period.

To reveal the position of PGW in the ceramic sequence and to elucidate its historical significance, this article examines the basic features of PGW and its possible position in the Iron Age of North India.

Distribution of PGW

Figure 1 illustrates the distribution of the PGW sites whose coordinates have been reported (the coordinates were adopted from Bala 1992; Mughal 1997; Tripathi 2012; Dangi 2018). According to the gazetteers published by these four scholars, 1576 sites have been recorded, but 576 sites among them were not given coordinates resulting in a difficulty to understand the proper distribution pattern of PGW sites. Besides, there are many sites whose coordinates seem not to be correct as their coordinates give their positions on map far from their presumed locations. Increasing use of GNSS in recent years has been enabling more accurate recording of positions of archaeological sites, but the surveys conducted before the 1990s were based on the manual mapping method, which caused unignorable errors in recording the positions of sites. Usually, the district names were given for the sites surveyed even before the 1990s, which were recorded without coordinates. Figure 2 exhibits the district-wise number of sites in colour shades.

These two maps can provide us with an idea regarding the distribution of PGW sites. Figure 1 shows a dense distribution of sites over the eastern Ghaggar Valley and the western Ganga Valley. Also in the eastern Ganga Valley, there are some sites, such as Maheth (Sravasti) and Kaushambi, where PGW has been reported, but the number of PGW from these sites in this region is remarkably limited. Instead, NBPW is in a

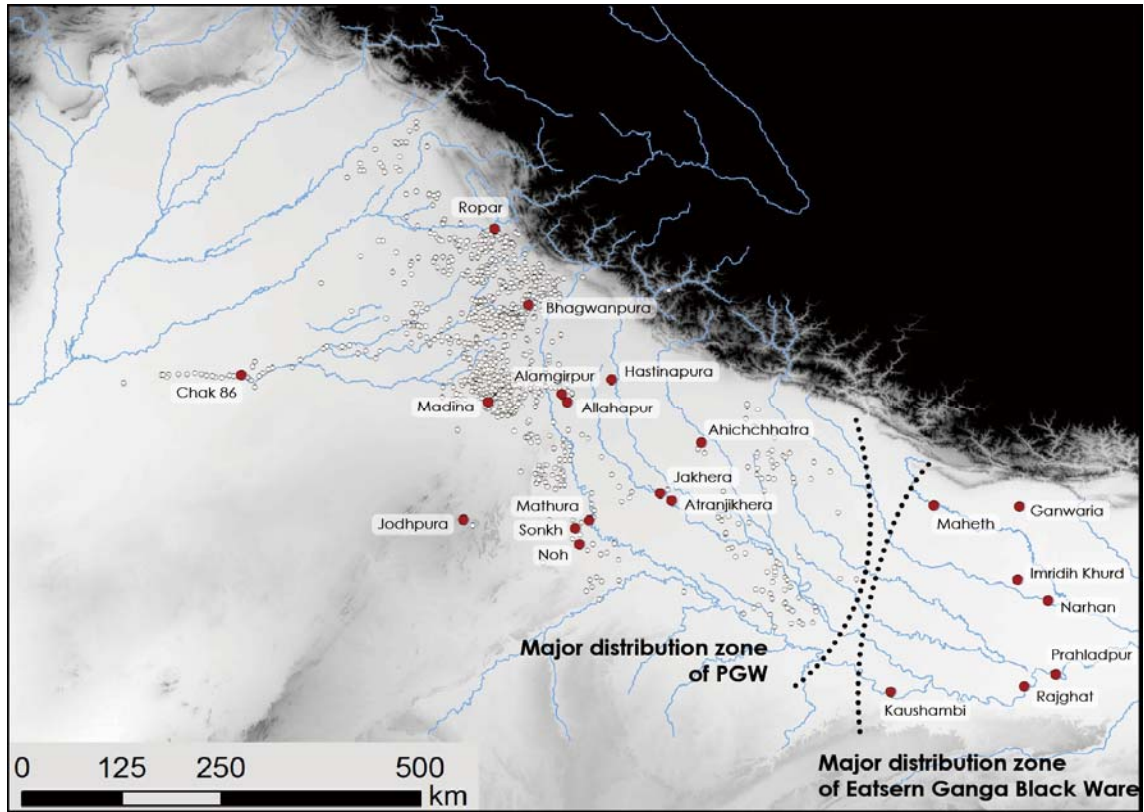


Figure 1: Distribution of Excavated PGW Sites and Other Relevant Sites

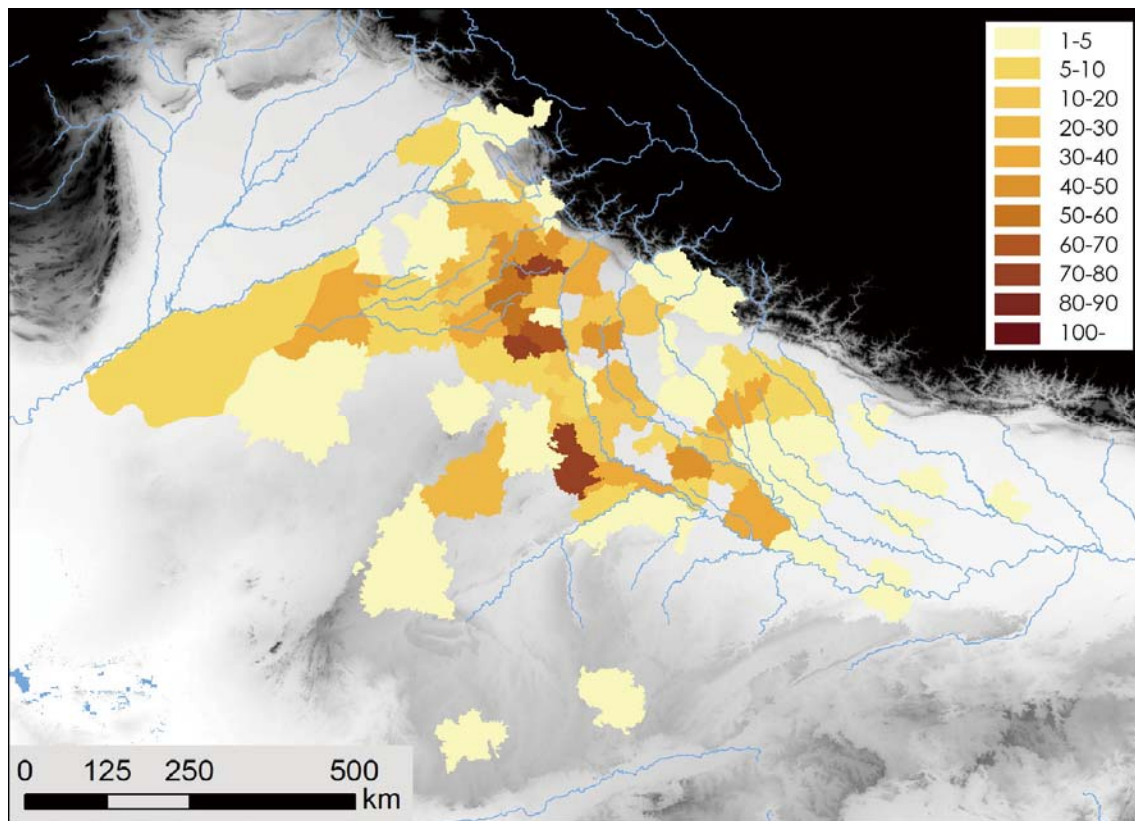


Figure 2: District-wise Distribution of Sites with PGW

predominant position in the ceramic assemblage at these sites. Further in the east of the Ganga Valley, no PGW sites have been reported. This decreasing occurrence of PGW towards east clearly indicates that the major distribution zone of PGW was confined to the eastern Ghaggar Valley and the western Ganga Valley and that the eastern Ganga Valley was occupied by the Eastern Ganga Black Ware Tradition including the Black-and-Red Ware (hereafter BRW), the Black-Slipped Ware (hereafter BSW) and NBPW.

This distribution pattern of PGW can also be confirmed in Figure 2. The densest distribution can be observed in the eastern Ghaggar Valley, the western bank of the Yamuna River, the Ganga-Yamuna Doab and the western Ganga Valley. To the east of Lucknow, the distribution remarkably becomes sparse.

It is also noteworthy that PGW has been recovered from the sites along the Hakra River in the Bahawalpur district of Pakistani Punjab (Mughal 1997). In the Punjab plain, no PGW site has been reported, but the quite dense distribution of PGW sites in the north Indian Punjab suggests that there would also be PGW sites in Pakistani Punjab. In neighbouring Khyber-Pakhtunkhwa, there is a spread of sites belonging to an Iron Age culture called the Gandhara Grave culture or the Protohistoric culture in Swat (Dani 1968; Antonini and Stacul 1972). Its easternmost site is known at Taxila (Hathial Mound) (Allchin 1982). As the relationship between these two contemporary Iron Age cultures, the PGW culture and the Gandhara Grave culture, is an important issue to be examined, further surveys in the northern part of Pakistani Punjab is awaited. Also in southeast Rajasthan and Madhya Pradesh of India, a few sites have been reported to yield PGW, but their sparse distribution indicates that these regions were not the part of the major distribution zone of PGW.

Morphological and Technological Features of PGW

In this section, the morphological and technological features of PGW are discussed mainly focusing on the evidence from Madina in the Rohtak district, Haryana, which the present author examined the ceramic evidence (Manmohan Kumar et al. eds. 2016).

Morphological Elements

The formal assemblage of PGW consists of bowls and shallow bowls/dishes. The bowls have morphological variations including straight-sided bowls, hemispherical bowls, shallow bowls with an out-turned rim and bowls with a collared rim (Figure 3).

Straight-sided Bowls: This type of bowl is comprised of a rounded base and a cylindrical body connecting to the base with a ridge. There are some variations; the ones having a straight mouth (Figure 3: 1, 2; Figure 4: 1 - 3), the ones with a slightly inturned rim (Figure 3: 3, Figure 4: 4, 5) and the ones with an out-turned rim (Figure 3: 4; Figure 4: 6). They have a range of the rim diameter of 10.0 - 20.0 cm.

Hemispherical Bowls: The classification between hemispherical bowls and shallow bowls/dishes are made based on the MD (max diameter)/H (height) index, as there are

examples that are difficult to be classified based on their shapes. Those with the MD/H index of >0.25 are classified as hemispherical bowls and those with the MD/H index of ≤ 0.25 as shallow bowls/dishes. Among the examples having the MD/H index are included the ones that are difficult to be discerned as a hemispherical bowl or a shallow bowl/dish suggesting that the shape and size are contiguous between hemispherical bowls and shallow bowls/dishes around this value.

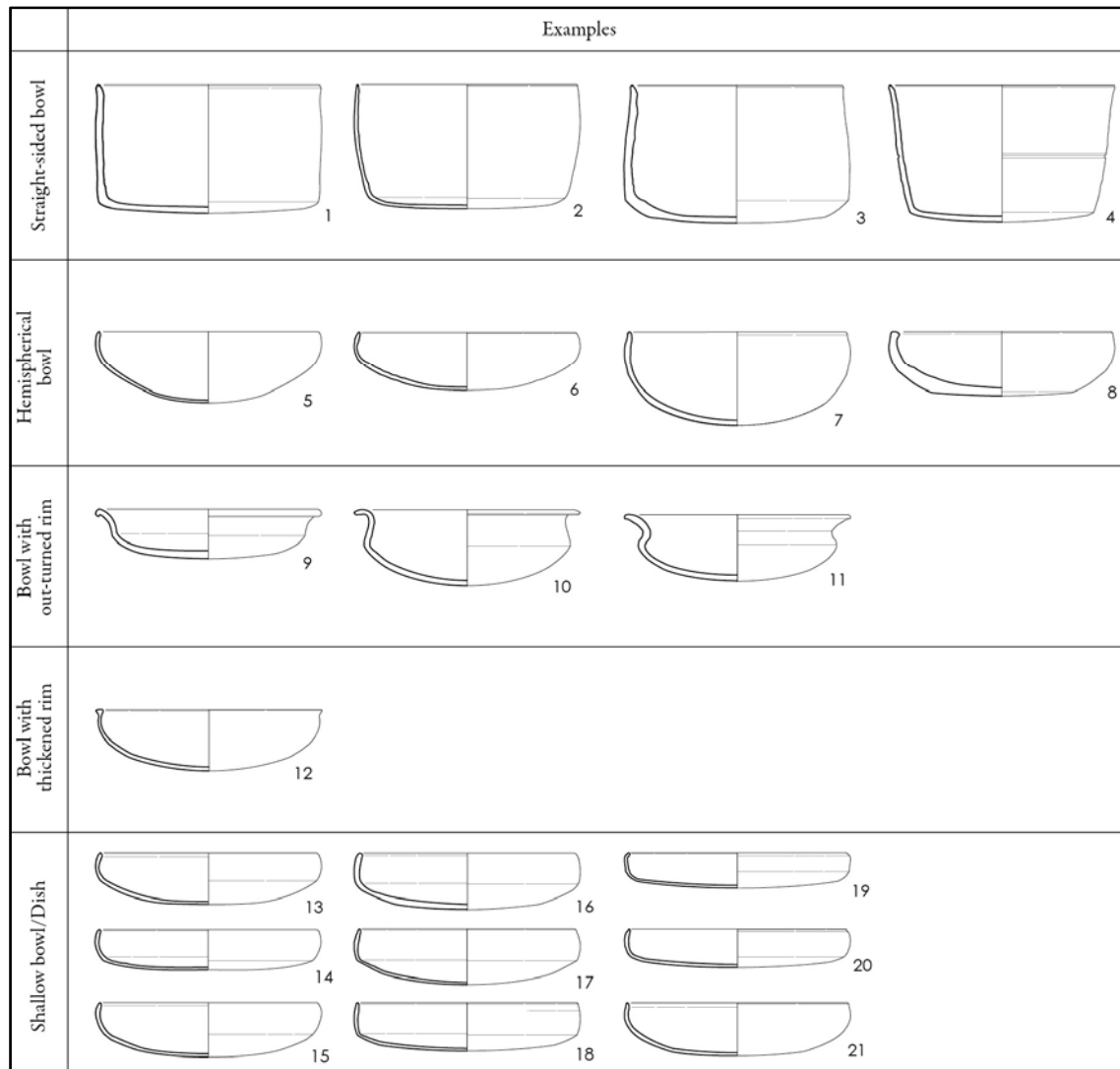


Figure 3: Morphological Classification of PGW/GW (It is noted that the drawings are adjusted to a uniform rim diameter to show the differences in the overall profiles between types)

The ones that can be classified as hemispherical bowls (Figure 3: 5 - 8) seem to have had a rounded base and a rounded body incurving to the rim. While the specimens have a range of the rim diameter between 15.0 cm and 26.0 cm, the ones between 15.0 cm and 25.0 cm are predominant. Among small examples are some specimens whose body connects to the base with a ridge (Figure 3: 8; Figure 4: 7, 8).

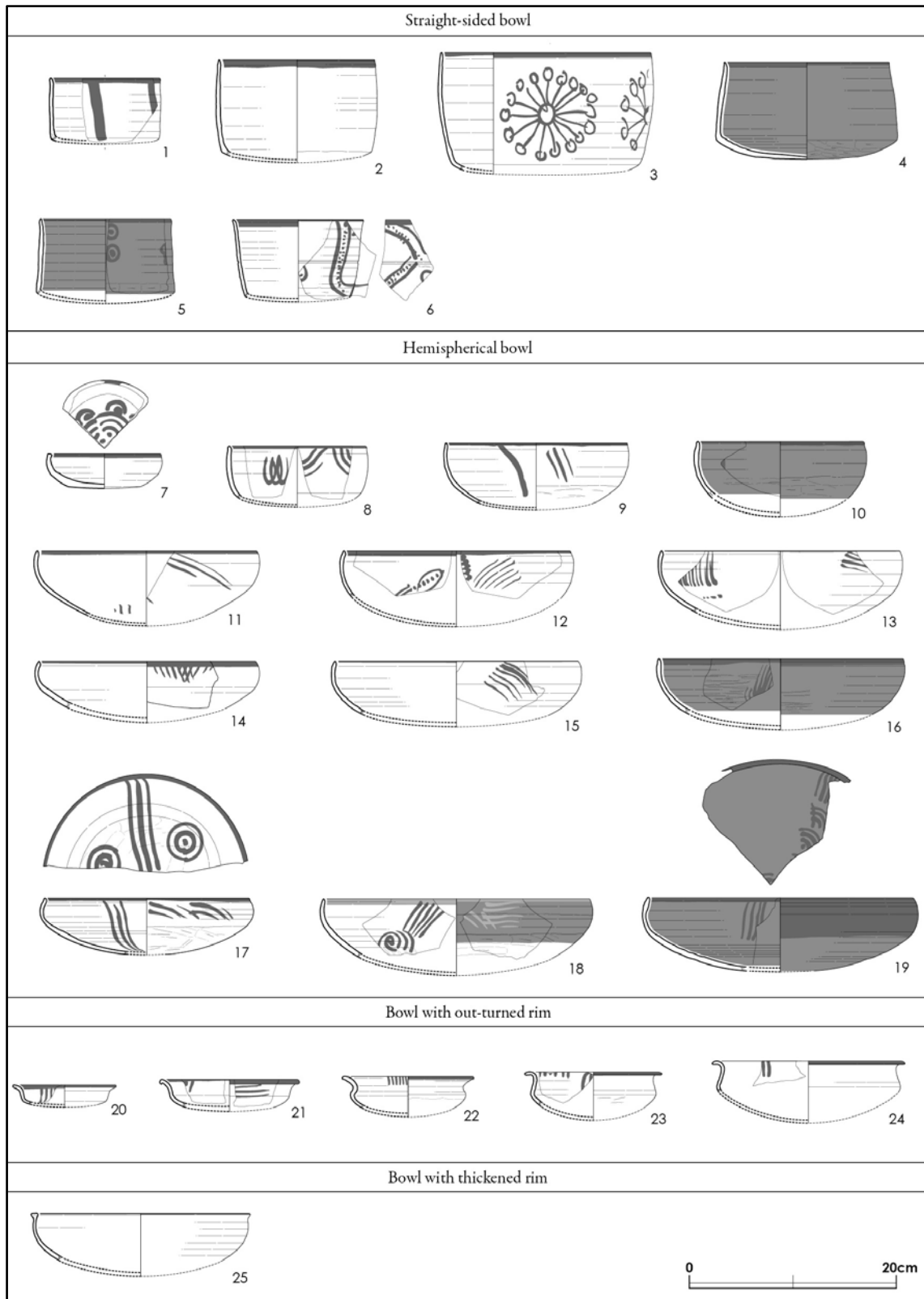


Figure 4: Examples of PGW (1: uncertain site in Jind; 2-4, 6-8, 11-16, 20-25: Madina; 5: Kharak Ramji - 3; 9: Iagra-3; 10: Jognakhera; 17: Agondh; 18: Bahelba - 3, 19: Ganganagar - 1)

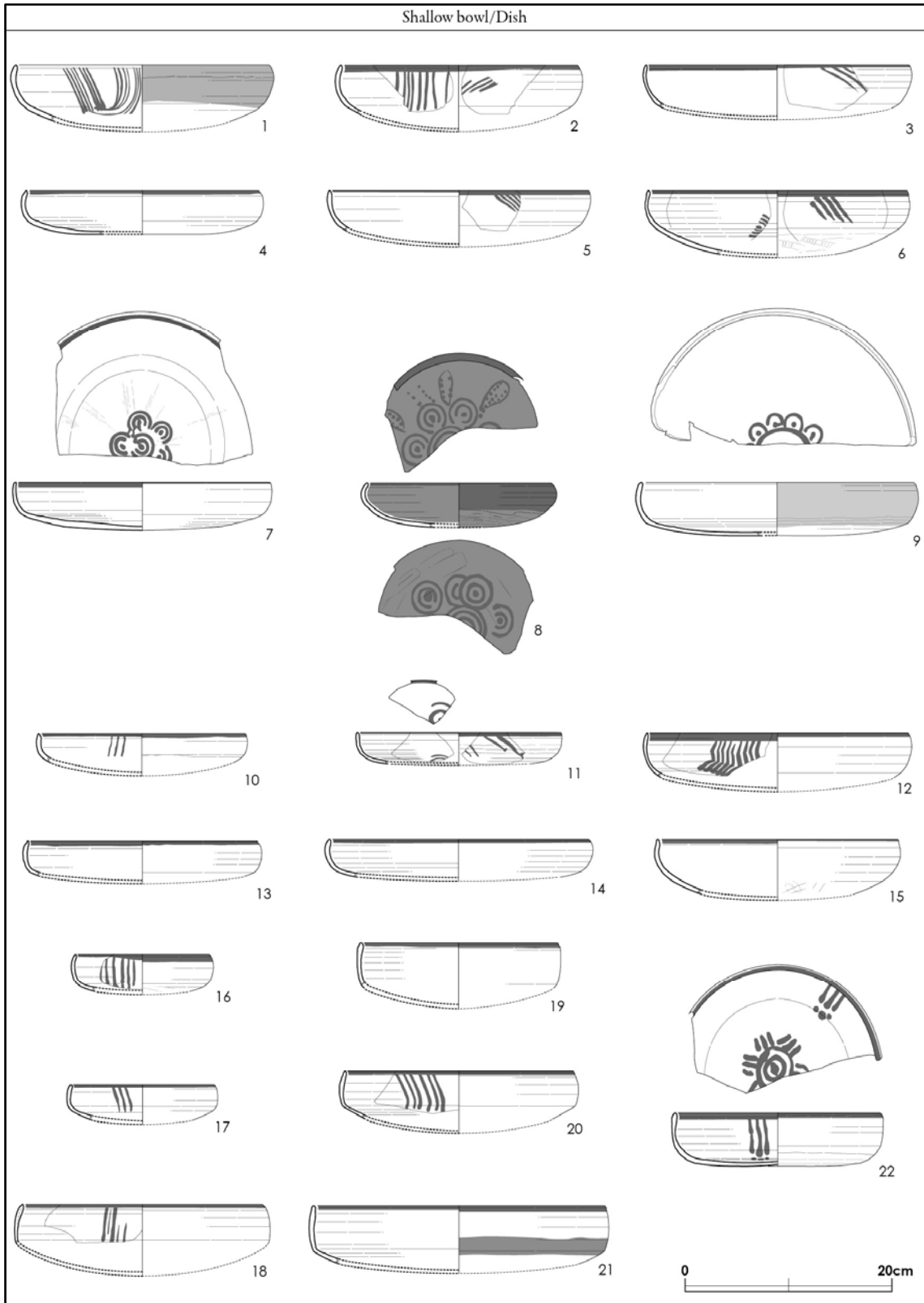


Figure 5: Examples of PGW (1-4, 9, 10, 13, 15, 17-19: Madina; 5: Bahelba-3; 6: Bari Kalan; 7: Daulatpur; 8: Gausai Khera - 1; 11: Ram Kali; 12: Bhagwanpura; 14: Untsel; 16: Theh Polar; 20, 22: Kasital; 21: uncertain site in Jind)

Shallow Bowls with an Out-turned Rim: This type of bowls is distinct in having an out-turned rim along with a shallow body and a rounded base (Figure 3: 9 - 11; Figure 4: 20 - 24).

Bowls with a Collared Rim: This type of bowls consists of a shortened globular body and a thickened collared rim (Figure 3: 12; Figure 4: 25). As discussed later, this type of bowls has parallels in BRW and red ware.

Shallow Bowls/Dishes: Based on the MD/H index mentioned above, the ones with a value of ≤ 0.25 can clearly be distinguished from hemispherical bowls (Figure 6). Their bodies exhibit gently incurved profiles connecting to the rounded base. Many examples have a ridge at the juncture between the body and the base. The profiles of the rim-body part includes the ones having an incurved rim connecting to the rounded body (Figure 3: 13 - 15; Figure 5: 1 - 12, 16), the ones with a straight body profile and a slightly inturned rim connecting to the base with a ridge (Figure 3: 16 - 18; Figure 5: 17 - 22), the ones with an out-turned body and an inturned rim (Figure 3: 19), and the ones with a rounded body and a shortly out-turned rim (Figure 3: 20, 21; Figure 5: 13 - 15).

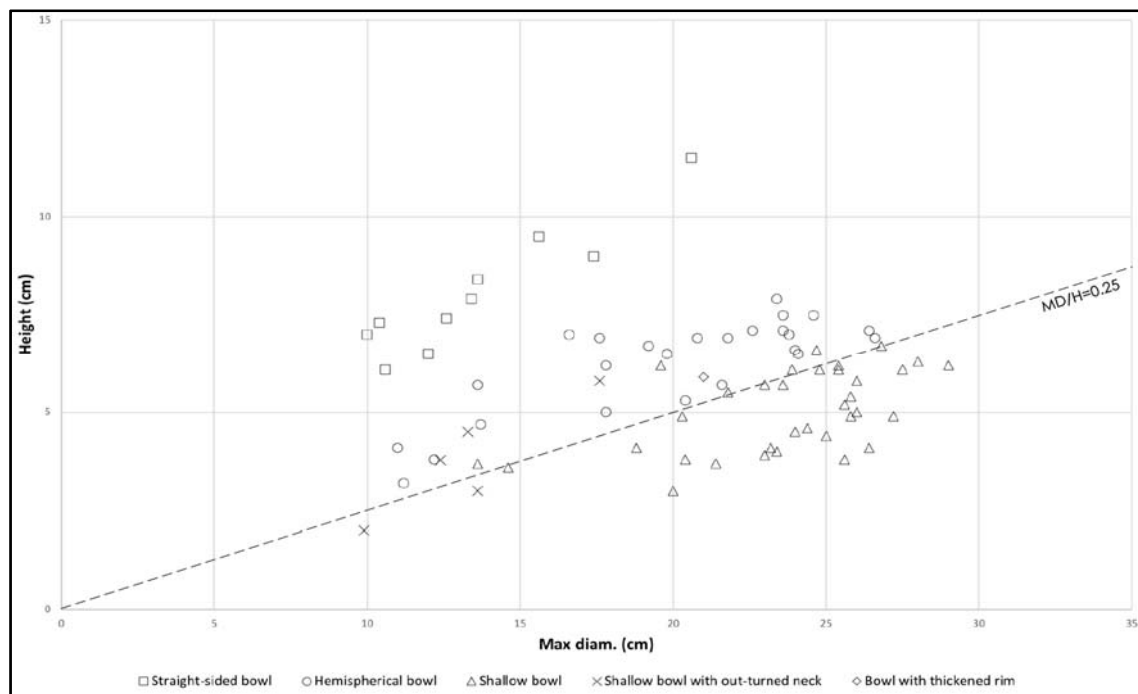


Figure 6: Metrical Classification of Forms of PGW

Modelling Techniques

Regardless of its forms, subtle striations running parallel in a horizontal direction can be observed on the surface of PGW (Figure 7: 1-2). These parallel striations indicate the use of fast rotation using a wheel. Scraping or trimming are observable on the external surface of the lower body. In some cases, the scraping was done with rotation. In the others, sharp striations made by scraping are seen in irregular directions suggesting the scraping without rotation (Figure 7: 3-4).

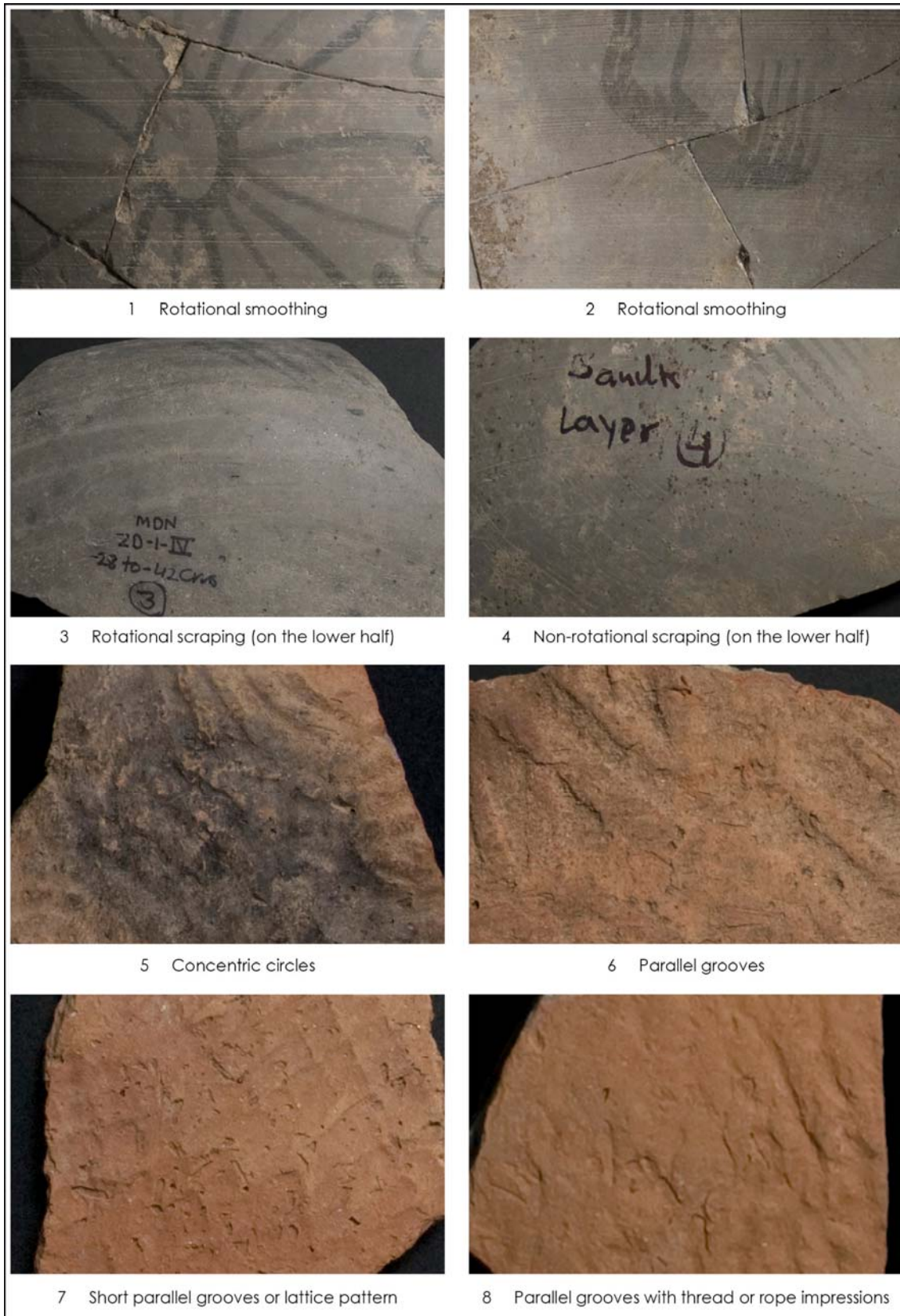


Figure 7: Manufacturing Techniques used on the PGW and Associated Red Ware
(Examples from Madina)

It should be noted that these traces observable on the surface are from the finishing stage of the modelling process. Therefore, the primary modelling technique cannot be identified from these traces. In general, PGW is a fine ware having a thin wall of less than 5 mm and is distinctively finished with care. Consequently, the traces of the primary modelling are not left on the surface. The ridged profile (carination) seen at the juncture between the base and the body implies that a jointing technique of different parts was used for creating this ridged profile. Still, no conclusive remark on the primary modelling technique used for making shapes of PGW can be made. Further examination using microscopy on the thin sections to observe the feature of the fabrics of PGW must be made for understanding the modelling process of PGW.

The use of the burnishing technique is rarely observed on PGW. The surface is finely finished by rotational smoothing in most examples. The limited use of the burnishing technique on PGW is a contrast with the Eastern Ganga Black Wares on which the burnishing technique is predominantly used.

Firing Technique

PGW is a hard ware fired in a grey colour. This feature highly indicates the firing technique using a closed kiln, in which pots were fired at a high temperature in a reduced condition in the final stage of firing. Although no kiln has been found at PGW sites, it seems likely that PGW was fired not in the open kiln but in the closed kiln, in which a high temperature could be attained. The updraft kiln, which was common during the Indus period, might have been used for firing PGW.

The Emergence and Developments of PGW

The Chronological Positions of PGW and NBPW: With respect to the date of PGW, the evidence from Hastinapura (Lal 1954) has been widely used. At this site, the deposits of PGW (Period II) were stratigraphically found beneath the NBPW deposits (Period III) with an intervening flood deposit between the two. As the date for NBPW of the fifth to second centuries BCE (Krishna Deva and Wheeler 1946: 56) was widely accepted at the time of the excavation at Hastinapura, Period III at Hastinapura was assigned to a slightly modified date between the early sixth and early third centuries BCE (Lal 1954: 21-23). Based on this presumed date for Period III, the PGW deposits of Period II were dated to the period between 1100 BCE and 800 BCE taking the presence of a flood deposit between Period II and Period III and the thickness of the deposits of Period II (about 2.1 m) into consideration (Lal 1954: 23). However, the date given to the NBPW deposits (Period III) at Hastinapura was subjected to revision, when further evidence from the excavations at sites in the Ganga Valley conducted in the following decades became available. T.N. Roy examined the evidence from a number of sites in the Ganga Valley available in the early 1980s and reached a conclusion that the NBPW period can stylistically and stratigraphically be divided into the Early phase (c. sixth to third centuries BCE) and Late phase (c. third century BCE to the beginning of the Christian Era) in the entire Ganga Valley (Roy 1983, 1986). His observation can be proved even with the currently available evidence across the Ganga Valley. Hence, the

comparative stratigraphic dating made by B.B. Lal for PGW must be reexamined based on the stylistic feature of NBPW from Hastinapura and other relevant sites, especially in the western Ganga Valley and the Ghaggar Valley. In connection to this chronological issue of PGW, it is also noteworthy that K.N. Dikshit (1973) argued based on the evidence from Allahapur that PGW continued to the Late NBPW phase.

In fact, the number of sites yielding NBPW is limited in the western Ganga Valley showing a contrast to its dense distribution over the eastern Ganga Valley where NBPW occupies the dominant position in the ceramic assemblage. In the latter region, a black ware industry (called the Eastern Ganga Black Ware Tradition in this paper), which continuously developed likely since the fifth millennium BCE (Tewari et al. 2006), was a stylistic and technological foundation of NBPW which emerged around the sixth century BCE or earlier. This black ware industry represented by BRW and BSW dispersed over the western Ganga Valley during the late second millennium BCE replacing the earlier Bara-OCP (Ochre-Coloured Pottery) ceramics in the region. After this event, PGW became predominant in the ceramic assemblage in this region as attested by the stratigraphic evidence from Atranjikhhera (Gaur 1983), Noh (IAR 1963-64, 1964-65, 1965-66, 1966-67, 1968-69, 1970-71, 1971-72) and so on. In the Ghaggar Valley, BRW/BSW deposits have not been identified, and PGW emerged directly following the Bara phase. These pieces of evidence indicate that it was in the eastern Ganga Valley where NBPW evolved out of the Eastern Ganga Black Ware Tradition and that PGW was not a prototype of NBPW.

The specimens of NBPW recovered from Hastinapura, Rupar, Bhir Mound (Taxila) and so on in the Ghaggar Valley and its west can be considered belonging to the Late NBPW phase based on their stylistic features (this remark is based on my examination of materials from these sites). The specimens from Atranjikhhera also seem to be affiliated to the Late NBPW phase as the published drawings exhibit. Hence, it seems that the spread of NBPW over the western Ganga Valley and the Ghaggar Valley occurred predominantly during the Late NBPW phase, which can be dated between the fourth/third century BCE and the beginning of the Christian Era. This chronological identification of NBPW in the western Ganga Valley and the Ghaggar valley can be corroborated by the widespread presence of so-called pear-shaped vases and incurved-rim bowls in association with NBPW in these regions.

The Relationship between Bara-Style Pottery and PGW: The stratigraphic association of the Bara-style pottery and PGW at some sites in the Ghaggar Valley has been considered a crucial chronological key for the emergence of PGW since the excavation at Bhagwanpura (Joshi 1978a, 1978b, 1993; Manmohan Kumar et al. eds. 2016). Based on this evidence, it has been argued that there was an 'overlapping' phase of the Bara-style pottery and PGW and that PGW appeared somewhere in the late second millennium BCE when the Bara-style pottery was still surviving. To date, five excavated sites in the Ghaggar Valley have yielded the evidence of stratigraphic association of the Bara-style pottery and PGW. They are Bhagwanpura, Dadheri,

Nagar, Katpalon (Joshi 1993) and Madina (Manmohan Kumar et al. eds. 2016). However, the stratigraphic association of the Bara-style pottery and PGW at these sites is entirely represented by the concurrent retrievals of the fragments of these two ceramics from occupational deposits, which cannot be regarded as the firm evidence of the actual coexistence of two different styles of pottery in one single time-period. In terms of the site formation process, any occupational deposits can contain potsherds from different contexts and periods. For example, when soil was brought to the settlement to make floor levels from some adjacent area that was earlier occupied by people of different periods, a mixture of potsherds from different periods can happen in the floor levels or occupational deposits. Therefore, the stratigraphic association of potsherds of different cultures or periods cannot simply be the firm evidence to prove their actual coexistence.

To prove the actual coexistence of pottery of two or more different styles, the evidence should be recovered from primary contexts, ideally in the form of condition of complete preservation not in the form of fragments. The association of different types of pottery and artefacts in a grave can be the perfect evidence for their actual coexistence. Thus, to justify the actual coexistence of the Bara-style pottery and PGW, such firm evidence is needed, which have not been obtained at any sites. Especially in the Ghaggar Valley, which was densely occupied by the Bara culture people and PGW-using people, secondary association or mixture of potsherds of these two cultures is likely to easily happen.

In connection to this issue, J. Shaffer (1984, 1986, 1993; Shaffer and Lichtenstein 2005) argues the 'cultural continuity' between the Bara culture and PGW culture in the Ghaggar Valley based on the association of the pottery belonging to these two cultures at sites in the Ghaggar Valley, but the concurrent presence of these two types of pottery cannot be interpreted as the evidence for the actual coexistence and the development of PGW from the Bara-style pottery. The repeated occupations of one site by people of different periods generally happen, but it does not mean the cultural continuity between them.

In terms of the morphological and technological features of ceramics, PGW is apparently distinguished from the Bara-style pottery (Figure 8). The Bara-style pottery is composed of pots, bowls and dish-on-stands whose proto-types can be found in the Harappa-style and Sothi-Siswal pottery of the Urban Indus period (Uesugi and Dangi 2017). They were fired in an oxidised condition. The painting motifs of this pottery are also derived from the Harappa-style and Sothi-Siswal-style pottery. PGW is comprised of straight-sided bowls, hemispherical bowls and shallow bowls/dishes which are totally absent in the Bara assemblage. The firing technique in a reduced condition using closed kilns is also an element showing a difference between PGW and the Bara-style pottery. The painting motifs of PGW, which consist of geometric motifs, also exhibit a clear difference from the Bara-style pottery. Therefore, these two styles of pottery have no stylistic and technological similarities. As examined in the later

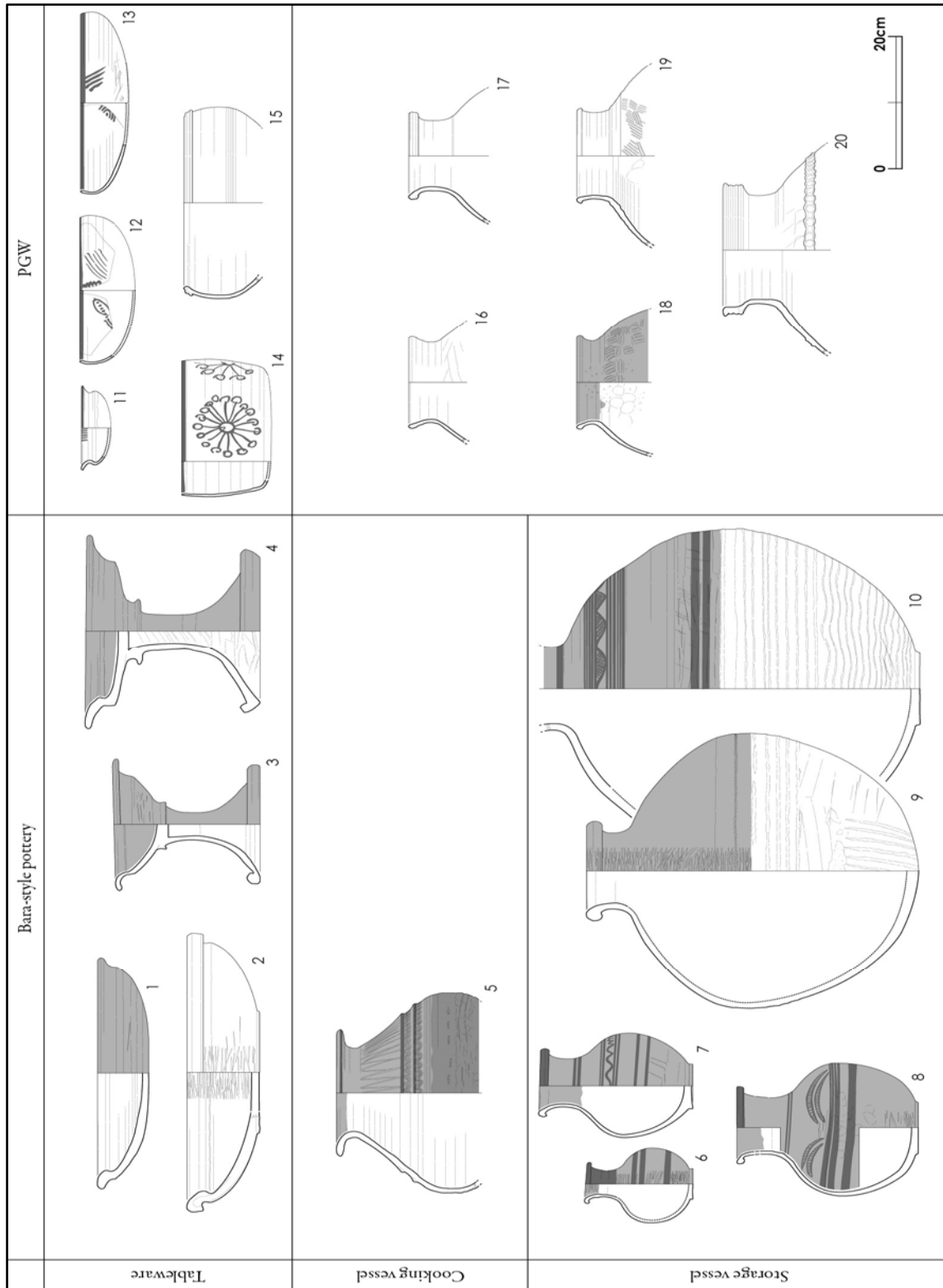


Figure 8: Morphological and Functional Differences between the Bara-Style Pottery and PGW (1: Kheri Meham; 2: Shamlo Kalan-2; 3, 4, 7, 8: Bedwa-2; 5: Balu; 6: Kharar Alipur; 9: Shamlo Kalan-2; 10: Ganganagar-1; 11, 12, 14, 15, 16, 17, 20: Madina; 13: Bari Kalan; 18: Manoharpur; 19: 48GB)

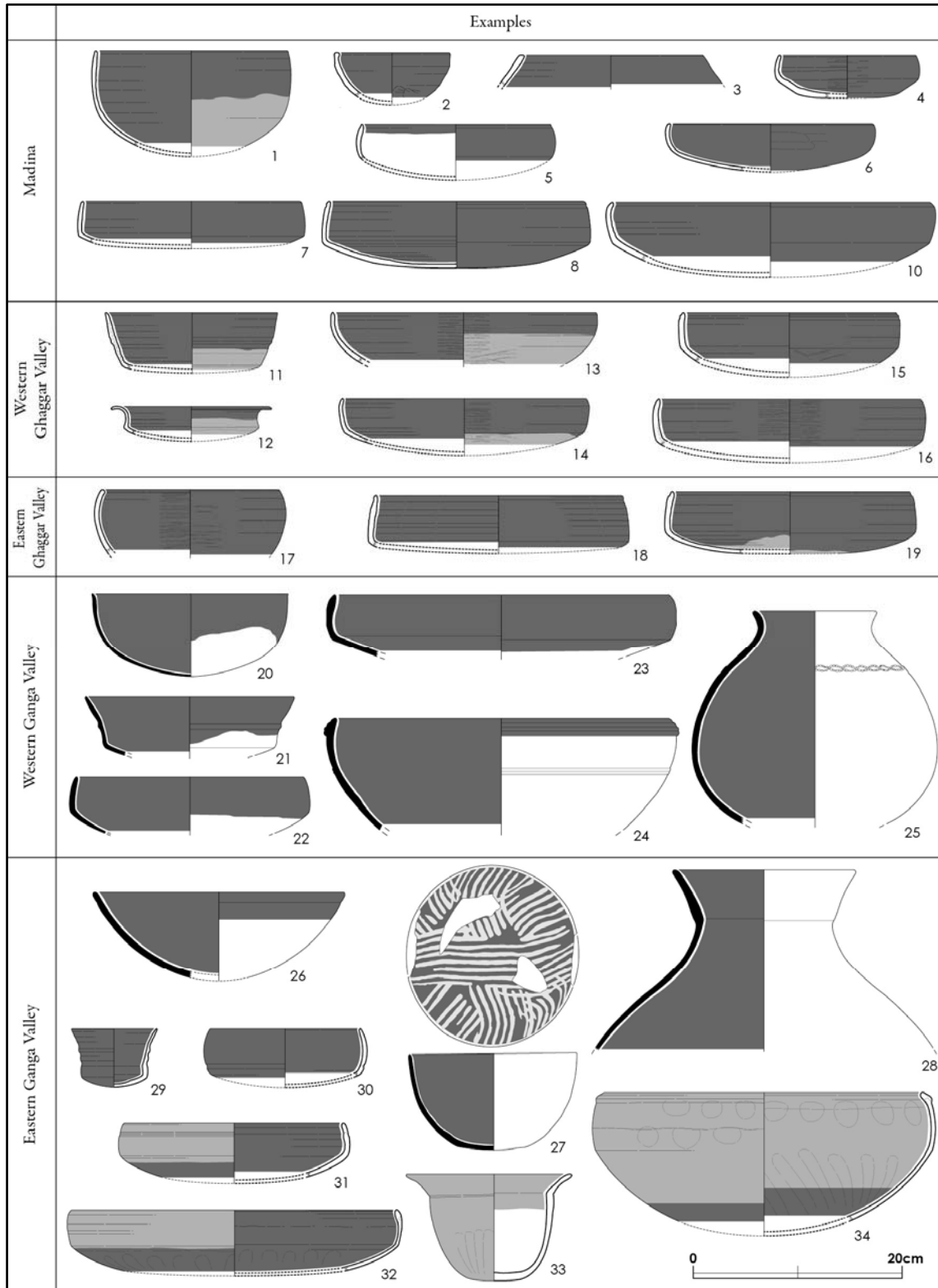


Figure 9: Examples of BRW/BSW (1-10: Madina; 11, 13: Shivpurigarh; 12: 15GB-4; 14: 5GB-B; 15, 16: Chak-86; 17: Rasulpur; 18: Jamalpur-2; 19: Kandela; 20-25: Atrnajikhera (redrawn from Gaur 1983); 26-28: Narhan (Redrawn from Singh 1994); 29-34: Maheth (Aboshi et al. 1999))

section, the red ware associated with PGW also exhibits features different from the Bara-style pottery, especially exemplified by the predominant use of the paddle-and-anvil technique in the PGW-associated red ware. Hence, the origin of the entire PGW assemblage must be sought in a ceramic tradition other than the Bara-style pottery.

The Relationship between PGW and the Eastern Ganga Black Ware Tradition: The black ware industry has a long history in the eastern half of the Ganga Valley. The evidence from Lahuradewa in Uttar Pradesh (Tewari et al. 2006) indicates that the black ware tradition represented by BRW and BSW has its origin in the fifth millennium BCE or even earlier. Its continuous developments to the later periods are exemplified by the evidence from a number of sites such as Chirand (Verma 1969, 1970-71; IAR 1969-70, 1970-71, 1971-72, 1980-81, 1981-82), Sonpur (Sinha and Verma 1977), Taradhi (IAR 1981-82, 1982-83, 1983-84, 1984-85, 1985-86, 1986-87, 1987-88) and Senuwar (Singh 2004) in Bihar, and Imlidih Khurd (Singh 1996) and Narhan (Singh 1994) in Uttar Pradesh. This black ware tradition evolved into NBPW during the first millennium BCE. These pieces of evidence indicate the coexistence of PGW and the black ware industry in the Ganga Valley for some time. Therefore, the black ware industry is of importance for the understanding of the development of PGW.

Both BRW, which has a black surface on the internal surface and the upper part of the external surface and a red colour on the lower half of the external surface, and BSW having a black colour over the entire surface belong to one single ceramic group that is characterised by the carbonising technique to create the black colour. In the final stage of the firing process, the surface of pots was carbonised using plants. In the case of BRW, the area of carbonisation was controlled to create black and red surfaces, probably by placing pots over others. The use of carbonisation process indicates that the black ware vessels were fired in some open kiln, because the heated pots must be taken out from the kiln for carbonisation process in the final stage of the firing process. Thus, it can be concluded that the black ware industry is distinguished from PGW in using a different firing technique.

As widely acknowledged, black ware industries are known from different regions of South Asia and from different periods. The earliest example has been known from the eastern Ganga Valley (Tewari et al. 2006). In southern Rajasthan, BRW and BSW developed by 3000 BCE (Misra et al. 1995; Misra 2005), and the black ware industry in this region expanded its distribution over Gujarat by the end of the third millennium BCE. In the Ghaggar Valley, the Indus Valley and Balochistan, there was no black ware tradition. During the second millennium BCE, the black ware industry was present in the Ganga Valley and southern Rajasthan and made its appearance in the western Ganga Valley and northern Rajasthan (Figure 9: 20 - 25), to which the black ware industry was introduced either from the eastern Ganga Valley or from southern Rajasthan, as this region was widely occupied by the Bara-OCP complex during the early second millennium BCE. There is no conclusive evidence for determining from which region the black ware industry introduced to the western half of the Ganga

Valley, but the morphological features of BRW and BSW from this region suggest their introduction from the eastern Ganga Valley (Figure 9: 26 - 34) rather than from southern Rajasthan. Similar remarks were made by K.N. Dikshit back in 1969 (Dikshit 1969).

In the western Ganga Valley and northern Rajasthan, the black ware industry is identifiable as having an independent phase between the Bara-OCP phase and the PGW phase and as continuing to the following PGW-dominant phase (Gaur 1983). Even in the Ghaggar Valley, BRW and BSW are known to be associated with PGW (Figure 9: 1-19), although there is no independent phase of BRW and BSW in this region. These pieces of evidence imply that the black ware industry and PGW had some relations.

Noteworthy is that BRW and BSW in the western Ganga Valley include shallow bowls/dishes in their formal assemblage (Figure 9: 22, 23). The origin of this form cannot be revealed with the currently available evidence in the Ganga Valley, but as it was absent in the assemblage of the eastern Ganga Valley during the early second millennium BCE (Purushottam Singh 1994, 1996), it can be presumed that this form emerged during the late second millennium BCE in the Ganga Valley. As the formal assemblage consisting of bowls and shallow bowls/dishes is also common to the PGW and NBPW assemblages, it can be presumed that the emergence of shallow bowls/dishes was an epoch in the ceramic sequence of the Iron Age North India. The presence of shallow bowls/dishes commonly in PGW and BRW/BSW indicates that PGW was closely related to the black ware industry of the late second millennium BCE. Hemispherical bowls also indicate the connection between the two ceramic groups. Straight-sided bowls characterising the PGW assemblage is conspicuously absent in the black ware industry, even in NBPW. It suggests that PGW was generated not by the straightforward influence from the black ware industry but by the interaction with the black ware industry in the Ganga Valley.

In terms of the manufacturing technique, the black ware industry is characterised by the burnishing technique to finish the surface along with the use of a luting technique for primary modelling and the partial use of rotational techniques for secondary modelling or finishing, while PGW was exclusively finished by the rotational smoothing and scraping. Although its statistical evidence cannot be shown here, the dependency on the use of fast rotation in the modelling process differs between PGW and BRW/BSW as evidenced by the difference in the areas of the application of fast rotational smoothing technique between these two ceramic groups; in the case of PGW, a wide area of the surface of vessels was finished by the fast rotational smoothing, while the vessels of BRW/BSW were applied with rotational smoothing only to the rim part or to the upper part of the vessels. This technological differences between PGW and the black ware industry must be examined in detail with further evidence. Also in the firing technique, these two ceramic groups are distinguished from each other as examined above.

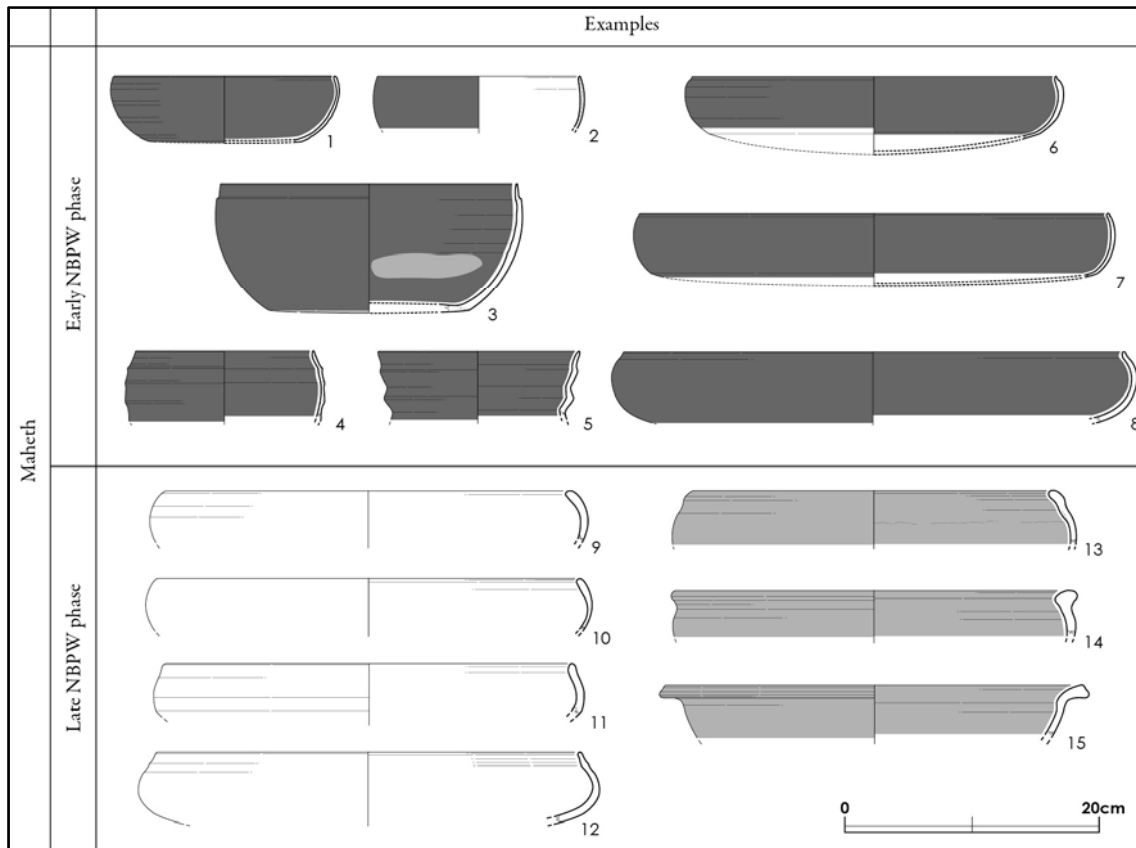


Figure 10: Examples of Pottery of the Early and Late NBPW Periods from Maheth
(Aboshi et al. 1999)

The examinations made above indicate that PGW and BRW/BSW share some common traits in the formal assemblages and have different features in the morphological and technological aspects. The morphological similarity between some of the shallow bowls/dishes of PGW having straight sides (Figure 3: 16 - 18; Figure 5: 17 - 22) and that of BRW/BSW (Figure 9: 7 - 10, 14 - 16, 22, 23, 31, 32) exhibits the interaction between these two types of ceramics and the influence from BRW/BSW to PGW. The region of origin of PGW has not been specified, but the dense distribution of PGW sites in the Ghaggar Valley and the cultural sequences in different parts of North India suggest that PGW developed in the Ghaggar Valley. However, it is important to repeat that PGW did not have direct relations with the Bara-style pottery which was widespread in the preceding period but had connections with the black ware industry in the Ganga Valley. Therefore, the origin of PGW must be searched in its relations with the black ware industry in the east, that is in the connection between the Ghaggar Valley and the Ganga Valley during the second millennium BCE. This is a hypothesis to be tested against more evidence in future studies.

The Relationship between PGW and NBPW: NBPW, which characterise the mid- and late first millennium BCE (its absolute date must be carefully examined based on ^{14}C dates, but its relative position in the ceramic sequence in North India has been firmly

established), consists of bowls and shallow bowls/dishes as BRW, BSW and PGW. As summarised above, the study made by T.N. Roy (1983, 1986) established its internal chronology in which two distinctive phases were demarcated based on the stylistic features of NBPW. While the Early phase is characterised by the fine NBPW, the Late phase is distinguished from the former by the emergence of the coarse variety of NBPW (Roy 1983, 1986). The two phases, Early and Late, were dated by him respectively to the sixth to third centuries BCE and the third to first centuries BCE. Not only in NBPW but also in the associated pottery, stylistic changes can be observed in the Late phase. Pear-shaped vases (Figure 12: 6, 7) and incurved-rim bowls (Figure 12: 12) are distinctive elements in the Late phase. This internal chronology can stratigraphically be confirmed at many sites across North India.

NBPW has been known not only from North India but also different parts of South Asia, but the Early phase can be attested only in the eastern Ganga Valley. As discussed in the preceding sections, the eastern Ganga Valley is a region where the black ware tradition developed for several millennia, and NBPW was part of this black ware tradition of this region. The excavations at Rajghat (Narain and Roy 1976) and Prahladpur (Narain and Roy 1968) stratigraphically exhibit the predominance of BSW just before the emergence of NBPW indicating the process of the generation of NBPW.

At the site of Maheth in Uttar Pradesh, a thin deposit without NBPW was confirmed in the lowest level (Period I) (Aboshi et al. 1999; Takahashi et al. 2000). This lowest level is characterised by a variety of BRW, which does not have the typical colour variation consisting of black and red, but exhibit reddish and dark reddish colours, and BSW (Figure 9: 29 - 34). These two ceramic types continuously occur maintaining their distinctive morphological features, along with NBPW in the following period (Period II). NBPW from Period II, which are predominantly of the fine quality, exhibits a difference from BRW and BSW and the diversification of fine wares in this period.

The specimens of the fine variety of NBPW of the Early phase are distinctively comprised of hemispherical bowls and shallow bowls/dishes along with some exceptional shapes such as corrugated bowls and inturned-rim bowls (Figure 10: 1 - 8). All specimens of NBPW of this phase have a thin wall of 2 - 3 mm showing a grey colour and a hard fabric suggesting that they were fired at a high temperature in a reduced condition of closed kilns. In terms of the modelling and firing techniques, NBPW differs from BRW and BSW exhibiting technological innovations for its production. The firing technique using closed kilns, which enabled firing at a high temperature in a reduced condition, indicates an introduction of this firing technique from the PGW zone. Thus, it can be summarised that NBPW belonging to the Eastern Ganga Black Ware Tradition has features differentiating this pottery from its predecessors BRW and BSW and showing some common traits with PGW.

As mentioned above, the stratigraphic relation between PGW (Period II) and NBPW (Period III) attested at Hastinapura was regarded as the evidence of chronological

relations between these two ceramics (Lal 1954), which has been widely accepted among scholars, while there were some important studies against this theory, especially the one by T.N. Roy. However, the specimens of NBPW from Hastinapura dominantly belong to the 'coarse specimen' of the Late phase suggesting that the dating of the NBPW deposit at Hastinapura can be revised to c. third to first centuries BCE (Dikshit 1973). Therefore, it must be recognised that the stratigraphic evidence from this site does not represent the ceramic sequence of entire North India. Rather, the evidence from Hastinapura is important for the fact that the Late NBPW phase follows the PGW phase. Although the duration of the affection of the flood that happened between Periods II and III to the occupation at the site cannot be surmised, the terminal date of Period II around 800 BCE that B.B. Lal proposed is unlikely.

At the site of Sonkh located 20 km southwest of Mathura, the PGW phase (Period I) was followed by the Late NBPW phase (Period II) without any stratigraphic break (Härtel 1994). Period II yielded a coarse variety of grey ware and red ware including the examples of incurved-rim bowls and pear-shaped vases. This assemblage is identical with the one from Hastinapura Period III.

At Atranjikhhera in the western Ganga Valley, the excavations exposed a series of occupational levels from the PGW phase (Period III) to the NBPW phase (Period IV) (Gaur 1983). Period IV was divided by the excavator into four sub-phases (A - D). In Phase B, incurved-rim bowls and pear-shaped vases were recovered, and Phases C and D yielded carinate *handis*, all of which are distinctive elements of the Late NBPW phase. These examples indicate that Period IV at Atranjikhhera can be equated with Hastinapura Period III and Sonkh Period II, that is the Late NBPW phase. R.C. Gaur gave dates of 600 - 500 BCE to Phase A, 500 - 350 BCE to Phase B, 350 - 200 BCE to Phase C and 200 - 50 BCE to Phase D, but the ceramic evidence indicates that Period IV can approximately be assigned to the Late NBPW phase and the terminal date of Period III should be placed just before the beginning of the Late NBPW phase, that is around fourth/third centuries BCE.

Also at Rupar in Punjab, a ceramic assemblage including NBPW, incurved-rim bowls, pear-shaped vases and carinated *handis* was recovered in Period III following the PGW deposits of Period II (Sharma 1953), although the details of the ceramic evidence from this site have not been fully published.

Thus the excavations at several sites in the western Ganga Valley and the Ghaggar Valley demonstrate that the NBPW phase in these regions distinctively belongs to the Late NBPW phase and that the PGW phase continued to the beginning of the Late NBPW phase. It further suggests that the Early NBPW phase in the eastern Ganga Valley was chronologically parallel to the late part of the PGW phase in the west.

Regarding the relationships between PGW and NBPW (Early phase), the introduction of the firing technology using closed kilns in the Early NBPW phase might have been the result of the interaction with the western Ganga Valley and the Ghaggar Valley

where the firing technology using closed kilns had already developed. Neither at PGW site nor NBPW site, pottery kilns have been reported, but it is not unlikely that the technological transfer occurred at the time of the emergence of NBPW in the eastern Ganga Valley as the result of the interaction between PGW and BRW/BSW.

At the morphological level, the shortly out-turned rim predominantly seen on the bowls and shallow bowls/dishes of NBPW (Figure 10: 6 - 8) can be found on PGW (Figure 5: 13 - 15) in a limited scale. The distinct corrugated bowls (Figure 10: 4, 5), which is an element of NBPW, can also be found on some specimens of PGW (Lal 1954: 41, Fig. 9: 46; Gaur 1983: 44, Fig. 44: B-41, 41a). These pieces of evidence can be regarded as exhibiting the relationship between PGW and NBPW during the mid-first millennium BCE. In any case, it is apparent that PGW and the Eastern Ganga Black Ware Tradition developed across space and time with interactions with each other and that holistic view towards these ceramics in North India must be developed for further examinations of the ceramic sequence in this region.

Examination of the Red Wares Associated with PGW

As examined above, both PGW and the Eastern Ganga Black Wares are all composed of tableware including bowls and shallow bowls/dishes. They are associated with the red ware pottery consisting of pots and bowls. In this section, the specimens of the red ware from the excavations at Madina (Manmohan Kumar et al. eds. 2016) are mainly examined.

The bowls of red ware, which is part of tableware, include a distinctive type of globular bowls (Figure 11: 16 - 19, 32, 32) having a collared rim. This type of bowl also occurs in the PGW assemblage in the Ghaggar Valley (Figure 4: 25; Figure 11: 16 - 19), but it is rare in this region. The predominance of this type of bowls in BRW and the red ware in the eastern Ganga Valley (Figure 9: 24, 34) may suggest its origin in this region. At Madina, several specimens of large hemispherical bowls (Figure 11: 22, 23) containing a number of husks in their fabric were recovered, but their exact function is uncertain. Overall, the quantity of bowls in the PGW-associated red ware is limited.

The specimen (Figure 11: 20) is a rim fragment can be an incurved-rim bowl, although its entire shape cannot be understood. As mentioned above, the incurved-rim bowl, which was exclusively made on a fast wheel, is regarded as a diagnostic element of the Late NBPW phase (Figure 12: 12, 13). This example from Madina poses some question on the chronological position of this type of bowl or on the chronological assessment of the occupations at Madina. Unfortunately, the ill preservation of the example from Madina cannot give any conclusion to these questions. For pots, various types having short and taller necks and sizes ranging from small to large were recovered at Madina. It is quite certain that most of the pots were used as storage vessels, but it seems that some of the pots were used as cooking vessels as no other type of cooking vessels was identified. The same situation can be observed at sites in the eastern Ganga Valley (Figure 12). It appears that the pots of identical shapes were used for both storage and cooking.

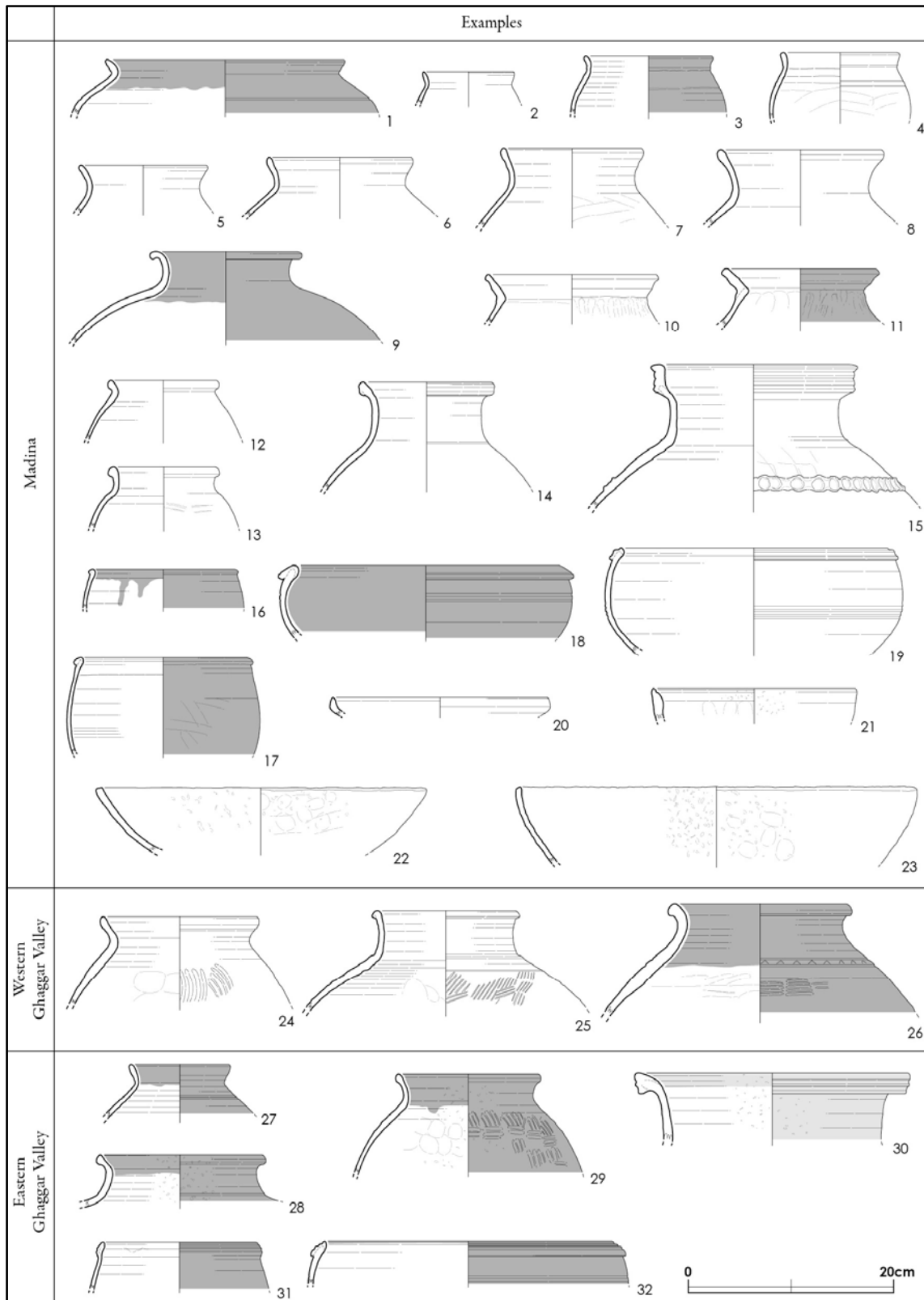


Figure 11: Examples of Red Ware Associated with the PGW (1-23: Madina; 24: Shivpurigarh; 25: 48GB; 26: Chak-86; 27: Nindani; 28: Girawad-2; 29, 30: Manoharpur; 31: Mokhra-5; 32: uncertain site in Jind)

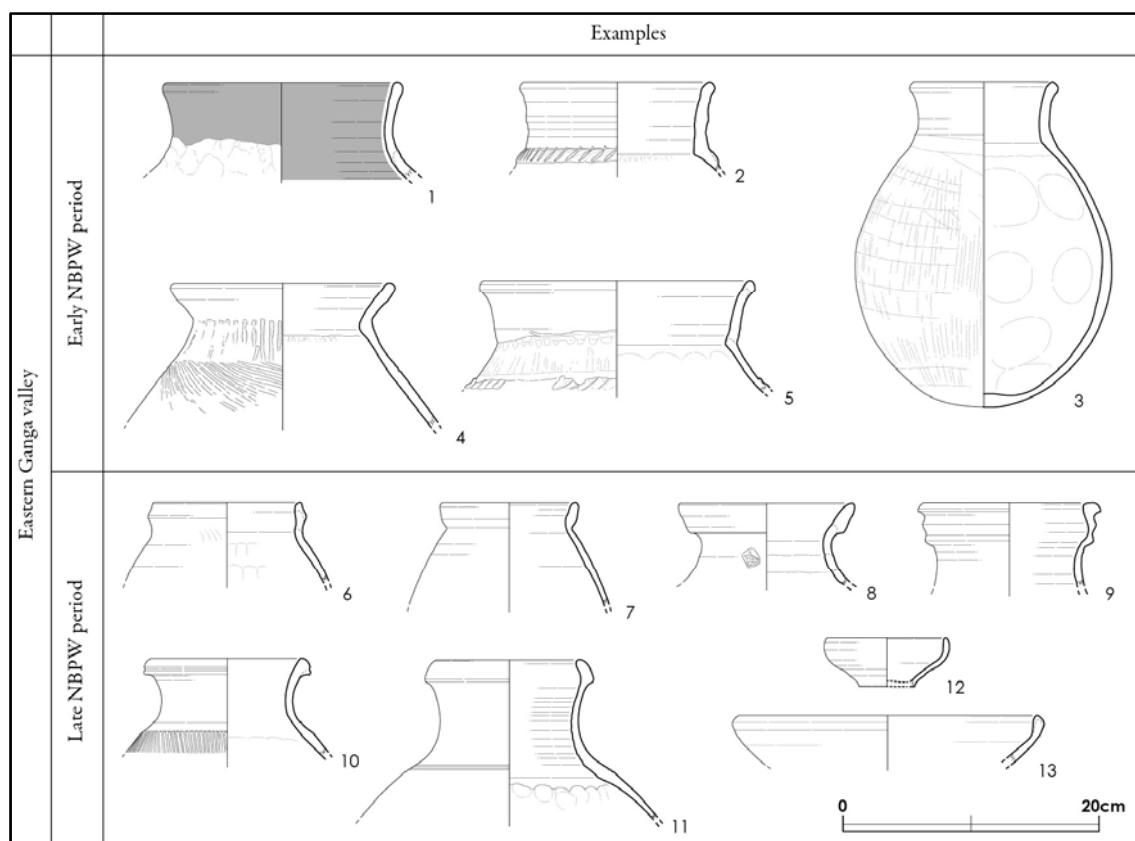


Figure 12: Examples of Red Ware from the Eastern Ganga Valley (Maheth)

At the morphological level, many examples having a gently outcurved neck and a simply rounded rim were retrieved in the excavations at Madina (Figure 11: 5 - 8). This type of pots has been identified at sites not only in the eastern Ghaggar Valley where Madina is located but also at sites in western Ghaggar Valley (Figure 11: 24, 29) and in the eastern Ganga Valley (Figure 12: 1) suggesting that this type was a common trait widely shared in North India. The example from Maheth (Figure 12: 1) has a slurry on the external surface of the body suggesting its use as a cooking pot.

The type of pots having an everted neck (Figure 11: 10, 11), which distinctively exhibits traces of vertical scrapings at the juncture between the neck and the body, has a wide distribution over the Ganga Valley (Figure 12: 4, 5). A few examples of this type from Madina may have been imported from the east. Hastinapura also yielded this type (Lal 1954: 45, Fig. 11: I, Ia). At Atranjikhhera, this type occurs as early as Period II (BRW/BSW phase dating to the late second millennium BCE) continuously to Periods III and IV (Gaur 1983). Also at Narhan in the eastern Ganga Valley, this type of pots has been reported from the second millennium levels of Period I in association with BRW and BSW and the following periods of the first millennium BCE (Singh 1994). The excavations at Maheth yielded many specimens of this type from the Early NBPW level (Aboshi et al. 1999). Thus, this type of pots can be regarded as a type whose origin was in the Ganga Valley and imported or introduced in the Ghaggar Valley as a result of the interaction between the regions.

Tall-necked pots (Figure 11: 14, 15), which became predominant in the Late NBPW phase in the eastern Ganga Valley (Figure 12: 8 - 11), were recovered in association with PGW at Madina indicating that this element made its appearance in the PGW assemblage earlier than the eastern Ganga Valley, although its exact date is uncertain. The examples of this type of pots from Hastinapura Period II (Lal 1954: Fig. 11) also strengthen the possibility of the early occurrence of this type in the PGW assemblage. The appliqué band on the shoulder of the specimen from Madina (Figure 11: 15) has parallels in the Early NBPW assemblage in the eastern Ganga Valley (Figure 12: 2, 3). It may be another evidence for the interaction between the eastern Ganga Valley and the Ghaggar Valley.

The widespread use of the paddle-and-anvil technique on red ware pots is noteworthy. At Madina, a number of body sherds have traces of the application of this technique (Figure 7: 5 - 8; Figure 11: 13). This paddle-and-anvil technique can widely be attested at a number of sites in the Ganga Valley and also in the PGW-associated red ware in the Ghaggar Valley (Figure 11: 24 - 26, 29). As stated earlier, the presence of this technique clearly indicates a technological gap between the Bara-style pottery and the PGW-associated red ware. It seems likely that the paddle-and-anvil technique has its origin in the eastern Ganga Valley dating back to the fifth millennium BCE or earlier as attested by the evidence from Lahuradewa (Tewari et al. 2006). Thus, the widespread introduction of this technique in the PGW-associated red ware clearly suggests that the PGW-associated red ware had a strong connection with the one in the eastern Ganga Valley as other elements of red ware also demonstrate.

Summary

The discussions made above can be summarised as follows (Figure 13).

The overlapping phase or actual coexistence of the Bara-style pottery and PGW cannot entirely be ruled out, but their ceramic elements, morphological and technological, clearly indicate that they belong to different ceramic traditions. PGW notably shares many elements with BRW and BSW of the Eastern Ganga Black Ware Tradition. The formal assemblage consisting of bowls and shallow bowls/dishes commonly adopted by PGW and BRW/BSW implies not only the ceramic change but also a significant change in the custom of serving food from that of the preceding period or traditions.

The black ware industry, which has its origin in the eastern Ganga Valley, spread over the western Ganga Valley and northern Rajasthan during the late second millennium BCE in prior to the spread of PGW over these regions. It is not unlikely that the emergence of PGW was related to this phenomenon. There is no BRW/BSW site in the Ghaggar Valley, but these black ware pottery are widely found in the region in association with PGW. Therefore, the emergence and spread of PGW must be examined from the viewpoint of its association with the black ware industry. It is noteworthy that PGW and BRW/BSW have a common formal assemblage and morphological elements but are distinguished from each other in their production

technologies. The coexistence of these two groups of ceramics in the western Ganga Valley and the Ghaggar Valley indicates a presence of highly complex ceramic production and distribution systems during the late second and early first millennia BCE.

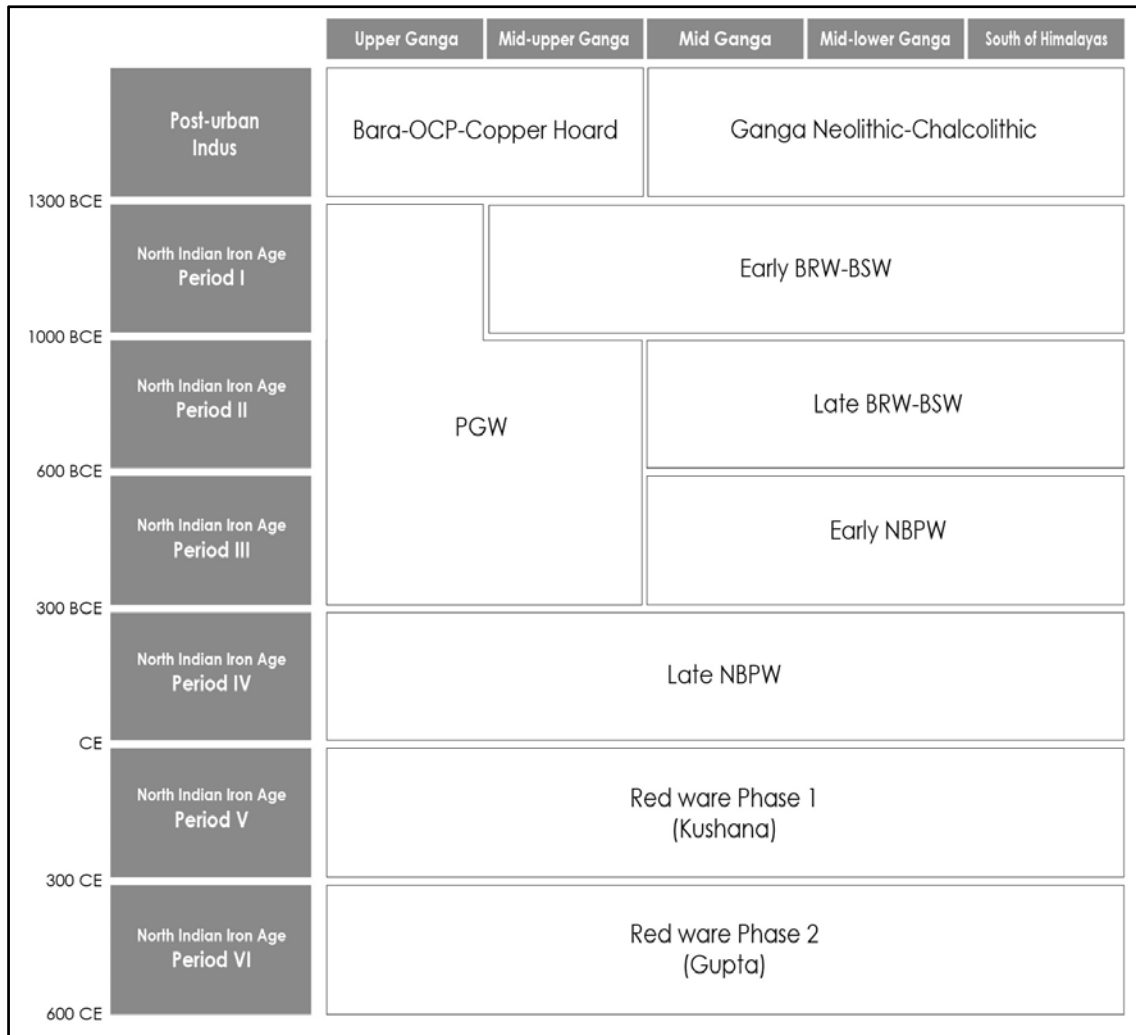


Figure 13: Ceramic Sequence and Chronology in the Iron Age North India

The evidence examined in this paper strongly exhibits that PGW continued to the mid-first millennium BCE and had a relationship with NBPW in the eastern Ganga Valley. While further examination must be made to fully understand the relationships between PGW and NBPW, it is evident that a wide area including the Ganga Valley and the Ghaggar Valley formed an interaction system in this period as in the preceding period.

During the late first millennium BCE, PGW faded out from North India, and the 'coarse' variety of NBPW and its associated red ware penetrated the Ghaggar Valley. Although the process of disappearance of PGW cannot be fully traced by the currently available evidence, it is worth noting that the Late NBPW assemblage includes coarse grey ware having no painting. The appearance of coarse grey ware might have been a

part of the process of decline of PGW. As a whole, the Late NBPW phase is a period in which the fine ware industries of the preceding period was in decline and a new ceramic style was emerging. Therefore, the disappearance of PGW must be regarded as a part of such an extensive transformation of ceramics in North India.

Thus, PGW can be regarded as one of the ceramics of the Iron Age North India which emerged, developed and declined in the socio-cultural contexts during the late second and early first millennia BCE. However, there are many problems to be solved for better understanding the significance of PGW.

One of the serious problems we are facing is the scarcity of chronometric dates from PGW sites. Some ^{14}C dates have been published for the PGW culture (Magee 2004), but they do not cover the entire time span and the entire distribution area of PGW making it difficult to assess the origin and decline of PGW. This problem is also true of the black ware industry. The future excavations at PGW sites must provide a series of ^{14}C dates on systematically collected samples.

Related to this chronological issue, the internal chronology of PGW has not been adequately established, and diachronic stylistic changes in PGW and its associated red ware cannot be traced. It is also likely that the relationship between PGW and the black ware industry in the eastern Ganga Valley was changing across time, but it cannot be examined with the currently available evidence. The interactions between PGW and the black ware industry are likely to have been connected to the emergence of regional societies and an interregional interaction system over North India towards the formation of urban centres in this region by the mid-first millennium BCE. A broad area of North India was incorporated into the interaction system, which became a foundation of the urbanisation in this region. It is likely that dynamic socio-cultural changes were in progress under the urbanisation process, but it cannot be well traced in the archaeological records available to date. The ceramic evidence of this period is crucial for understanding the socio-cultural transformation after the decline of the Indus Civilization, the emergence of a new social system centring on the Ganga Valley and the urbanisation process. Further studies must be made on ceramic evidence to better understand this period of the dynamic socio-cultural transformation.

It is noted that the drawings of pottery used in this paper were made by the present author except for the ones from Atranjikhhera (Gaur 1983) and Narhan (Singh 1994), and the illustrations in this article were also produced by the present author. The specimens from Rajasthan are from the collection of Mandeep Balhara who conducted a survey in northern Rajasthan for his M. Phil. dissertation (Balhara 2013). The specimens from Haryana belong to the collection of Dr. Vivek Dangi for his Ph.D. dissertation (Dangi 2010). The present author owes much to their efforts in the field and generosity to provide their collections for his study. The details of the PGW sites of which the ceramic evidence was examined in this article can be found in the article written by Vivek Dangi (2010, 2018).

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