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### **Early Iron Age in India**

The beginning of Iron Age in India was at first dated to the 5th century BC, ascribing the diffusion of this metal to the contact with the Greek-Persian world (Wheeler 1959: 132). Subsequent excavations and researches have enriched our knowledge of the Indian proto-history, showing that iron working precedes by some centuries the date of 500 BC. An agreement on when and where iron technology was utilized for the first time is however lacking. Bridget and Raymond Allchin (1982: 345-46) divided the Iron Age in three stages: in a first one (1300-1000 BC) iron occurs in Rajasthan (Ahar and Noh) and in Karnataka (Hallur); in the upper Ganges valley, it appears in a second stage (1000-800 BC) and in the middle Ganges valley only in a third one (800-500 BC). Conversely, Roy (1983: 181) observed that iron objects were found during the same period in the Ganges valley, that is before the introduction of the Northern Black Polished Ware (NBPW) and Painted Grey Ware (PGW). Chakrabarti (1977; 1992) indicated Madhya Pradesh (Nagda and Eran sites) as the earlier region where iron smelting occurred (1100 BC). This view is maintained also by Erdosy (1995: 83). The settlements cited in these studies belong to different regions but they share the manufacture of a class of pottery, the Black-and-Red Ware (BRW). Tripathi (2002) has recently suggested that iron technology probably developed in more than one centre in the same period (1000-800 BC), from north-west India to Tamil Nadu. However, the early use of iron in the Ganges valley is credited to the 'PGW culture' of Doab. By contrast, Tewari (2003) on the basis of new excavations in Uttar Pradesh (BRW sites) and radiocarbon dates, has suggested that iron working was known in the middle Ganges valley at least from 1800 BC. The coming of the age of iron in India is therefore ascribed to the PGW period or more frequently to the BRW period. The chronology of the PGW and BRW settlements is anyway far from being established. A re-examination of this period could thus clarify the features of a crucial phase in the proto-history of India, during which the transition from the Indus to the Ganges civilization was completed.

*Central and Southern India*

The proto-history of Madhya Pradesh is marked by a gap going from the end of the Chalcolithic Period to the beginning of Iron Age. During the II millennium BC the chalcolithic sites<sup>1</sup> are characterized by a well defined ceramic horizon, consisting of: Black-and-Red Ware; Black-on-Red Ware, also called Malwa Ware; Buff Ware made by kaolin and Cream-slipped Ware, both decorated by black paintings or reserved-slipped designs. In some sites, fine grey sherds were also found.<sup>2</sup> At the end of the II millennium BC these sites were abandoned, being again populated during the Iron Age. On the basis of two radiocarbon dates from Eran IIA (TF-324: 1270±110 BC; TF-326: 1040±110 BC), this period was dated back to 1100 BC, in the sites of Ujjain, Nagda, Eran (Chakrabarti 1992; Erdosy 1995). However, in the Iron Age layers of these settlements, finds more recent than 1100 BC occur: a silver punch-marked coin and cast copper coins from Eran IIA;<sup>3</sup> a punch-marked coin from the upper layers of Nagda II (Banerjee 1986: pl. XXXVB); an ivory pendant<sup>4</sup> and backed brick structures from Ujjain I.<sup>5</sup> Even the presence of BRW in the Iron Age layers does not mean that this period is close to the Chalcolithic one. This pottery continued to be produced also during the Early Historic Period. Besides BRW, in Nagda II, a black table ware, called Black-Slipped Ware (BSW) is also present: both these classes follow the style of table potteries of the middle Ganges valley during the NBPW period.<sup>6</sup> Therefore, the Iron Age in this region goes back to the second half of the I millennium BC. The same dating may be assigned to Ahar (Rajasthan), where the levels producing iron objects yielded seal impressions and coins (Sankalia and Deo 1969; see also Erdosy 1995: 83).

Similar evidence is available also from northern Maharashtra (Tapti and Godavari valleys), where chalcolithic sites<sup>7</sup> marked by black or white painted wares<sup>8</sup> are present. These settlements were abandoned around the end of the II millennium BC and were populated again in the Early Historic Period (NBPW, BRW, coins). It was during this period that iron objects began to be employed.

<sup>1</sup> Major excavations include Chichali (IAR 1998-99), Kayatha (IAR 1964-65; 1965-66; Ansari and Dhawalikar 1975), Nagda (Banerjee 1986), Eran (IAR 1960-61), Navdatoli (Sankalia *et al.* 1971).

<sup>2</sup> For instance, at Eran (IAR 1960-61: 18).

<sup>3</sup> IAR 1960-61: 18.

<sup>4</sup> Similar pendants have been found for instance at Mathura II dated 400-200 BC (Joshi 1989), Sonkh II dated 500-120 BC (Härtel 1993), Atranjikhera IVA dated 600-500 BC (Gaur 1983) and Navdatoli, Early Historic Period (Sankalia *et al.* 1971: 406).

<sup>5</sup> IAR (1956-57: 23, figs.11 and 24).

<sup>6</sup> Vaisali (Sinha and Roy 1969), Sravasti (Sinha 1967), Pataliputra (Sinha and Narain 1970).

<sup>7</sup> Major excavations include Prakash (Thapar 1967), Nasik (Sankalia and Deo 1955), Nevasa (Sankalia *et al.* 1960).

<sup>8</sup> At Prakash (Thapar 1967: 28) white painted grey ware was found.

In southern Maharashtra (upper reaches of Bhima river), carinated bowls of BRW make their appearance after 1000 BC in a chalcolithic horizon.<sup>9</sup> Instead, in Karnataka, the introduction of BRW was joined by the presence of iron objects (Hallur II; Nagaraja Rao 1971). On the basis of two radiocarbon dates (TF-570: 1105±105 BC; TF-573: 995±100 BC), this period was dated to 1000-800 BC. However, BRW from Hallur II shows a wider typology than that of southern Maharashtra sites. Types as the funnel-shaped conical bowl, coming from the same layers that yielded the iron objects, look like the early historic pottery of the region.<sup>10</sup> These data restricted to a single site do not allow to confirm whether in this region the age of iron may go back to the beginning of the I millennium BC.

### *Upper Ganges Valley*

The earliest iron objects (borers and arrow-heads) in the Doab are present in some PGW period settlements.<sup>11</sup> However, scholars do not agree on the chronology of this period. Its dating has been mainly based on radiocarbon measurements. Most of the dates (above all those having a quadratic error lower than ±100) refer to a period subsequent to 800 BC;<sup>12</sup> three samples from Noh (UCLA-703 A and B; TF-993) have a range so extensive (up to ±250) to include a very long period (between pre-1000 BC and post-500 BC); one sample from Atranjikhhera (TF-191) falls between 1300 and 800 BC. Different conjectures have been formulated from these data. Some scholars, making reference to Atranjikhhera and Noh, suggested a dating before 1000 BC (Sharma 1982; Gaur 1983; Lal 1990; Chakrabarti 1990; Magee 2004); some others preferred a less forced chronology (from 1000 BC on; Allchin and Allchin 1982: 318; Erdosy 1995; Tripathi 2002: 293); a few, taking together all the radiometric dates, maintained a lower horizon (from 7th-6th century BC on; Roy 1983<sup>13</sup>). The radiocarbon dating of the PGW period is in fact very difficult because between 750 and 400 BC the calibration curve is irregular (Verardi 2002: 29). Therefore, before making use of C14 dates, the relative chronology should be clearly fixed. Two phases precede the PGW period at Atranjikhhera, one of the few sites that has been reported on in detail (Gaur 1983). The first

<sup>9</sup> Inamgaon (Dhavalikar *et al.* 1988), Songaon (Deo 1969).

<sup>10</sup> See Hallur itself (Nagaraja Rao 1971: fig. 13), Brahmagiri (Wheeler 1947: fig. 25) and Maski (Thapar 1957: fig. 23). Similar evidence is available also at Komaranahalli (IAR 1980-81).

<sup>11</sup> Hastinapura (Lal 1954-55), Hulas (IAR from 1978-79 to 1982-83), Jakhera (IAR 1974-75; 1975-76), Atranjikhhera (Gaur 1983). At Noh, the layers with iron are mentioned as «very disturbed strata» (IAR 1970-71).

<sup>12</sup> TF-317 from Ahicchatra; PRL-198 from Bateswar; TF-1144 and TF-994 from Noh; TF-1228 from Kalahua; TF-112 from Hastinapura; PRL-81 and PRL-83 from Bateswar.

<sup>13</sup> Also for a general discussion of PGW chronology.

phase yielded few sherds of Ochre Coloured Pottery (OCP), which represent the only traces of the Late-Harappa communities that lived mainly in temporary encampments.<sup>14</sup> During Period II the settlement became stable and deluxe wares began to be produced (BSW, BRW). In the excavations report, this phase is called chalcolithic and is dated to 1450-1200 BC.<sup>15</sup> However, BRW and BSW style of Atranjikhhera II (fig. 1) has many affinities with the middle Ganges valley types of pre-NBPW period (fig. 2).<sup>16</sup> The presence of dishes is indicative of a more recent chronology than the half of the II millennium BC.<sup>17</sup> Furthermore, at Atranjikhhera II, the dish on stand, a crucial feature of the Chalcolithic Period, is not attested. Period II of Atranjikhhera, corresponding to the pre-NBPW phase of middle Ganges plain, may be expected to date from the first half of the I millennium BC. Period III develops without discontinuities from the previous one. Middle Ganges valley influenced again the history of the site: deluxe artefacts and some important materials created during the pre-NBPW period of the middle Ganges valley,<sup>18</sup> as glass and terracotta discs, finally appeared. PGW joined gradually BSW as table ware.<sup>19</sup> This new class of pottery shares the features of both middle Ganges valley table wares (BSW, NBPW) and central India painted potteries. From BSW and NBPW it takes the typology of the vessels<sup>20</sup> and the reducing firing condition;

<sup>14</sup> In north-western Doab alone stable settlements were present (Hulas, Alamgirpur).

<sup>15</sup> In the years during which the site was excavated, BRW was found only in Rajasthan. Gaur (1983: 19) admits that BRW of Atranjikhhera «seems to be different from the ware in the Ahar and Gilund complexes» but still refers to the Chalcolithic Period of Rajasthan to fix Atranjikhhera II chronology.

<sup>16</sup> Rajghat IA (Narain and Roy 1977), Prahladpur IA (Narain and Roy 1967).

<sup>17</sup> In the middle Ganges valley, dishes appeared during the pre-NBPW period: see for instance Senuwar II (Singh 1997: 23) and Rajghat IA (Narain and Roy 1977).

<sup>18</sup> Rajghat (Narain and Singh 1977), Prahladpur (Narain and Roy 1967).

<sup>19</sup> During Period III, PGW rises from 3.4% to 9.7% and then falls to 2.9% while BSW goes from 15.6% to 2.8%.

<sup>20</sup> See the various types of bowls (straight sides, convex sides, tapering sides, tapering sides carinated to a saggar-base, corrugated sides) and dishes (straight sides, carinated sides, etc.): Narain and Roy (1967: fig. 6. T1A; 1977: fig. 3, nos. 8, 12, 18, 23); Lal (1954-55: figs. 6.3, 6.13, 7.28, 8.41-42, 9.45, 9.50).

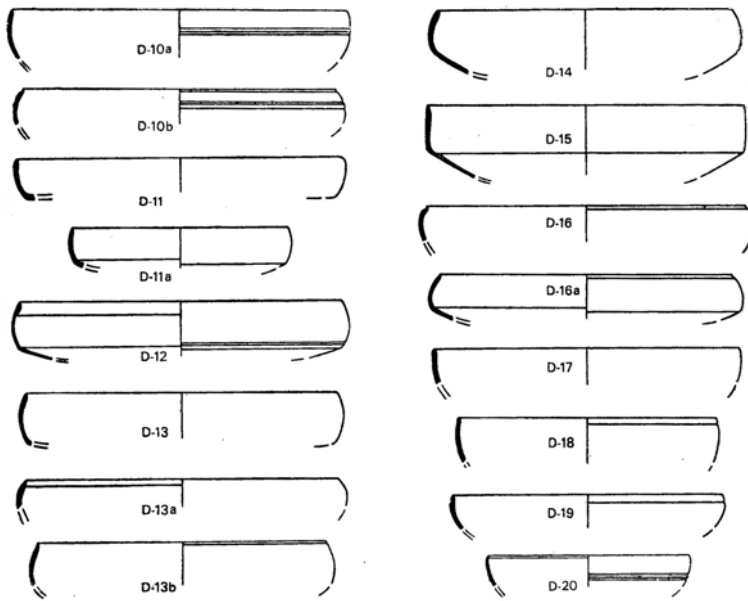


Fig. 1 – Atranjikhhera, period II: Black Slipped Ware. (After Gaur 1983: fig. 34).

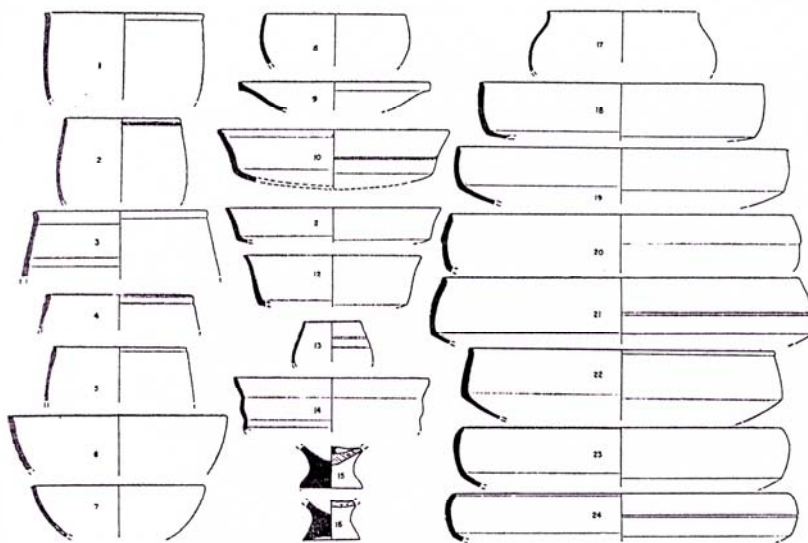


Fig. 2 – Rajghat, period IA: Black Slipped Ware.  
(After Narain and Roy 1977: fig.3).

from Malwa Ware and Cream-slipped Ware it copies the decoration style (painted designs and reserved-slip designs; figs. 3-4).<sup>21</sup> Therefore, two different movements probably led to the development of this period:<sup>22</sup> one, of expansion, from the middle Ganges valley, the other from Madhya Pradesh and Rajasthan, following the abandonment of settlements in these regions. As T.N. Roy proposed (1983), the PGW period is contemporary to the middle Ganges valley NBPW phase.

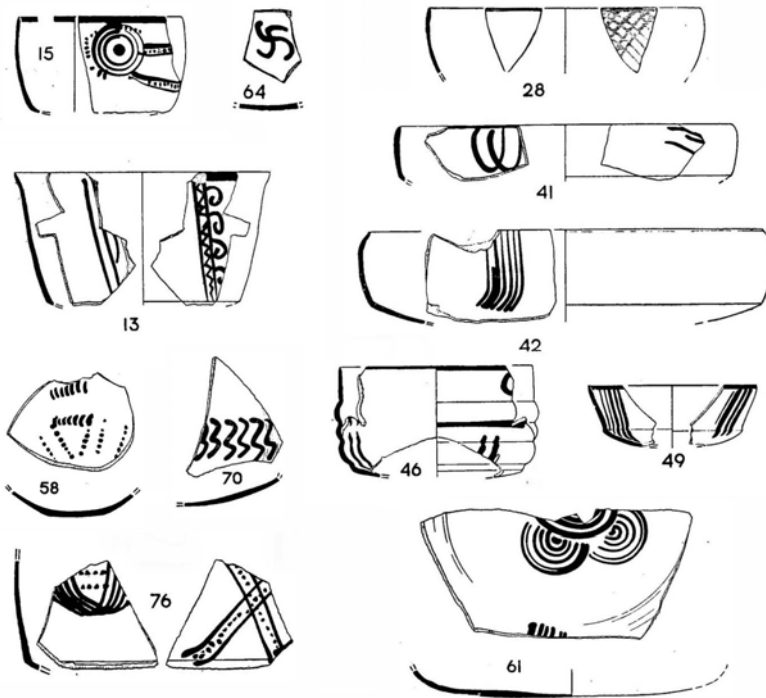


Fig. 3 – Hastinapura, period II: Painted Grey Ware. (After Lal 1954-55: figs. 6-9).

<sup>21</sup> The main patterns are swastika, trident, sun, sigmas, spirals, rows of dots, dots and dashes, wavy lines, concentric circles. See for example the pottery from Navdatoli (Sankalia *et al.* 1971: figs. 38-49, 53-55, 67, 69, 71, especially the designs number D54, D108, D156, D167, D175, D215, D227, D420, D429), Hastinapura (Lal 1954-55: figs. 6, 9, 10) and Atranjikhhera (Gaur 1983: figs. 42, 47, 59). See also Ansari (1994). Interestingly, a red-buff ware similar to PGW (but heated in oxidizing conditions) is very prominent in the lower phase of Atranjikhhera III (Gaur 1983: 130).

<sup>22</sup> The so-called 'PGW culture' probably developed in central Doab and then spread to north-western Doab and Punjab. See also Mukherjee (1997).

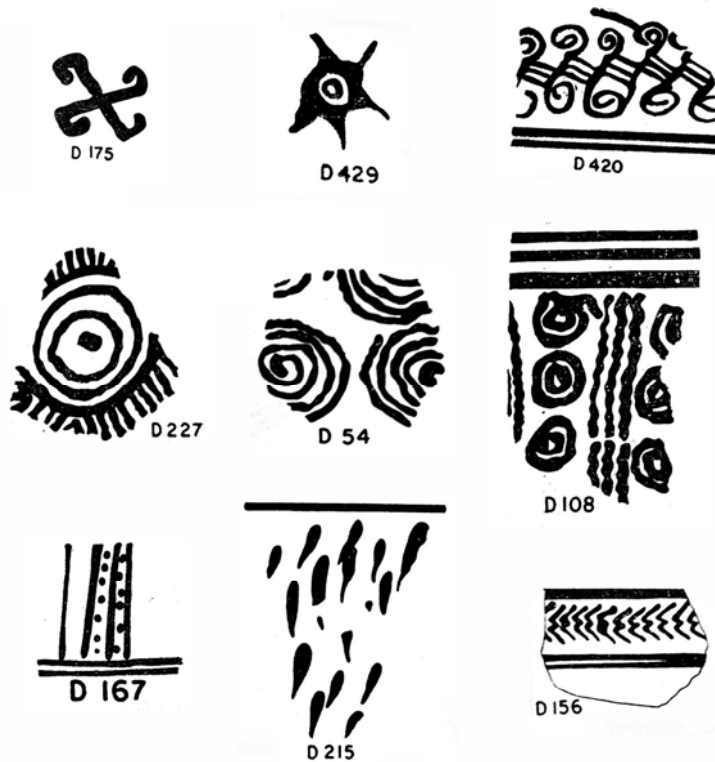


Fig. 4 – Navdatoli: Malwa Ware and Cream-slipped Ware painted designs.  
(After Sankalia *et al.* 1971: figs. 38-71).

#### *The Question of Bhagwanpura*

In the excavations report of Bhagwanpura (Joshi 1993), the hypothesis of a connection between the Late-Harappa and the PGW periods has been suggested.<sup>23</sup> The arrival of the so-called ‘PGW people’ in Punjab around 1500 BC has been asserted, giving to the region the priority in the production of this class of pottery. The overlap between the two horizons has been attributed to Phase IB. However, Late-Harappa ware and PGW clearly appear in different strata: in the early levels (*ibid.*: figs. 16, 18 and 19), PGW is not present and the Red Ware shows Late-Harappa affinities; in the late levels (*ibid.*: figs. 20, 21 and 22), PGW appears, but in this case the Red Ware shows new typologies, resembling those of Hastinapura III (late-NBPW period).<sup>24</sup> Other materi-

<sup>23</sup> See also Shaffer (1992: 451); for a criticism see instead Mukherjee (1997).

<sup>24</sup> See especially the pear-shaped vase, the vase with clubbed rim, the carinated dish, the bowl with flat base, the basin with round-collared rim, the vase with multi-grooved rim (Lal 1954-55: figs. 15.1, 16.XXII, 18.XXI, 18.XXV, 18.XXXIIIb, 19.LI; Joshi 1993: figs. 20.1, 20.16,

als of Phase IB, as backed bricks and an ivory pendant, appear in other sites during the late-NBPW period. Therefore, two different assemblages have been put together in Phase IB, but in the layers pertaining to this phase they do not show any interlocking. Only in two deposits Late-Harappa pottery and PGW were found mixed together: one caused by a flood (*flood II*) which destroyed the site; the other formed by oval structures of the PGW period, that cut into the Late-Harappa layers. In both cases, the overlap of the two wares is due to processes occurred after the setting up of the deposits. Other settlements of Punjab and northern Doab<sup>25</sup> were abandoned between the Late-Harappa horizon and the PGW period. Therefore, PGW makers from central Doab arrived in these regions many centuries after the Late-Harappa communities. Finally, the thermoluminescence dates available for Bhagwanpura IB are very erratic, going from 2060 BC to 1667 AD and they cannot be used to support any chronology.

### *Middle Ganges Valley*

The stratigraphic sequence in this region (eastern Uttar Pradesh<sup>26</sup> and Bihar) develops gradually and without discontinuities. A number of settlements rose up and an expansion firstly to the whole middle Ganges plain and after toward Doab and Bengal took place. During the Neolithic Period,<sup>27</sup> small communities of farmers were producing coarse potteries and stone tools. In the Chalcolithic Period,<sup>28</sup> the technology highly improved, the main innovation being copper smelting. Other new artefacts also include a variety of ornaments made from faience, shell and steatite, BRW (already diffused in central India<sup>29</sup>) and a fine ware (well levigated clay and high temperature firing), the Black Slipped Ware (BSW). In the following period, the artefacts categories remained the same, but some innovations appeared: the crucial one being the production of iron tools (arrow-heads, knives, nails and not-identified objects).<sup>30</sup> The period from 1800 to 1000 BC has been recently indicated as the

20.28, 21.7, 21.11, 21.22).

<sup>25</sup> For instance Brass (IAR from 1990-91 to 1997-98) and Hulas (IAR from 1978-79 to 1982-83).

<sup>26</sup> Divisions of Devipatan, Lucknow, Allahabad, Faizabad, Basti, Gorakhpur, Varanasi, Mirzapur and Azamgarh.

<sup>27</sup> Mahagara (Sharma *et al.* 1980), Koldihwa (Misra 1977), Senuwar (Singh 1988-89; 1989-90).

<sup>28</sup> Major excavations include Koldihwa (Misra 1977), Senuwar (Singh 1988-89; 1989-90), Agiabir (IAR 1998-99), Chirand (IAR 1981-82), Khairadih (IAR from 1980-81 to 1983-84 and 1996-97), Ramchaura (IAR 1996-97), Taradih (IAR 1997-98).

<sup>29</sup> At Senuwar, sherds of Malwa Ware were also found (Singh 1997).

<sup>30</sup> Rajghat IA (Narain and Roy 1977), Prahladpur IA (Narain and Roy 1967), Jhusi IB (IAR 1998-99), Narhan I (Singh 1994), Manjhi I (Roy 1985-86), Ayodhya I (IAR from 1969-70 to 1979-80), Kausambi I (Sharma 1969), Malhar II (Tewari 2003), Raja Nala-ka-tila II (IAR 1996-97; Tewari 2003), Lahuradewa III (Tewari 2003), Dadupur I (Tewari 2003).



beginning of iron in this region, being based on C14 dates from Malhar, Raja Nala-ka-tila, Lahuradewa and Dadupur (Tewari 2003). The excavations of these sites confirm the importance, until now underestimated, of the middle Ganges valley during the Proto-historic Period. However, the use of radiometric measurements alone, without a comparison among materials from different sites to establish a relative chronology, does not seem to give convincing results. It is acceptable that objects of wrought iron (iron containing less than 0.3% carbon)<sup>31</sup> could have been obtained during the Chalcolithic Period as experimental or accidental products.<sup>32</sup> The techniques utilized in the production of wrought iron are the same as that of copper metallurgy: reduction of the metal (mining and smelting from ore) and forging (casting in mould, hammering). However, chemical and metallographic analyses to confirm this hypothesis are not available. Moreover, a chronology prior to the mid-II millennium BC seems unlikely because the subsequent period is marked in these sites by the introduction of NBPW.<sup>33</sup> The other sites which yielded iron objects in the pre-NBPW phase<sup>34</sup> have been dated back to the first half of the I millennium BC. The analyses from Rajghat (Bhardwaj 1979: 143-65) show that wrought iron was produced in this phase, while the practice of carburization (heating iron in a charcoal fire) to make steel (iron with 0.3-1.2% carbon) came in vogue only from the NBPW period on.<sup>35</sup> Other important innovations can be observed in the pre-NBPW settlements. Glass ornaments,<sup>36</sup> beads of lapis-lazuli<sup>37</sup> and terracotta discs<sup>38</sup> were found; BSW assemblage develops widely and is now distinguished by a variety of dishes and bowls (particularly the bowl with corrugated sides). The same types will be used to make NBPW. Rectangular huts are going to be built.<sup>39</sup> All these changes<sup>40</sup> witness the rise

<sup>31</sup> It can be easily shaped, but is only moderately hard.

<sup>32</sup> In Mesopotamia, Anatolia and Egypt, iron objects were found during the Bronze Age: jewellery and ceremonial weapons from 3000 BC to 1600 BC; few tools and weapons from 1600 to 1200 BC (Waldbaum 1980).

<sup>33</sup> The NBPW dating has been carefully examined by Roy (1983: 94-118).

<sup>34</sup> Rajghat, Prahadpur, Narhan, Ayodhya.

<sup>35</sup> See analyses from Rajghat (Bhardwaj 1979), Atranjikhera (Gaur 1983) and Prakash (Thapar 1967).

<sup>36</sup> Rajghat IA (Narain and Singh 1977: 37). Interestingly, at Sravasti, during the late-NBPW period, iron working and production of glass were placed side by side (Aboshi *et al.* 1999: 138).

<sup>37</sup> Rajghat IA (Narain and Singh 1977: 44).

<sup>38</sup> Rajghat IA (Narain and Singh 1977: pl. IX, no. 2), Prahadpur IA (Narain and Roy 1967: 48-50, pl. XX).

<sup>39</sup> Narhan IA (Singh 1994).

<sup>40</sup> Wrought iron could be an independent discovery, while for the introduction of steel a diffusion from outside is more likely (see also Habib and Takur 2003: 86). Glass production probably developed from that of faience. Faience was imported in the middle Ganges valley during the Chalcolithic Period and soon locally manufactured (Singh 1988-89: 17; 1989-90: 90).

of a new epoch. Actually, the pre-NBPW phase of middle Ganges valley could be called Early Iron Age. Here, as in the western world (Waldbaum 1980: 83), after the collapse of the Bronze Age civilizations, the crucial hallmark was the need to develop new resources and new forms of power. In India, this process has firm roots in the middle Ganges valley: iron working first appears in the only region of the Subcontinent in which a strong continuity between the Early Iron Age and the preceding phases is attested.

### *Concluding Remarks*

During the II millennium BC, the Indian subcontinent was rich of villages and cultures. This period was rightly called Era of Movements (Subbarao 1958), because many communities, due to the collapse of the Indus urban system, moved out looking for new resources. In the settlements of central India, some materials remind the Indus valley style. However, the most advanced technologies, as bronze and stoneware productions or the use of backed bricks, seals and weights disappeared. These settlements were finally abandoned, while in northern India the villages were growing up and spreading along the major river valleys. The fertility of the soil was one of the factors of development of the middle Ganges plain. Crop rotation was practiced from the Neolithic Period on and cultivation of rice found its ideal environment. The middle Ganges valley actually became, at least from the half of the II millennium BC, the new 'area of attraction' of India, absorbing people from other regions of the Subcontinent. Other factors which characterize the Ganges Civilization are better shown by literary sources (for instance, the caste system). Archaeological data reveal that while in the rest of the Subcontinent permanent villages were lacking, in this region some important sites, which will become urban centres (as Sravasti, Ayodhya, Vaisali, Rajghat, Kausambi), were established during the Early Iron Age. At the same time, the first building of rectangular huts indicates a major stability of some settlements. The beginning of the use of terracotta discs may signify a control over production. The development of pyrotechnologic techniques (iron, glass, pottery) allowed the creation of some new artefacts. The presence (even if rare) of lapislazuli ornaments involved the opening of the major routes of communication. At last, the Early Iron Age led to the urbanization in the Ganges plain, which was propulsive to the establishment of permanent settlements in the other regions of India. In the last centuries of the I millennium BC, the villages abandoned during the Chalcolithic period were inhabited again and new sites were settled. They rapidly achieved a full urban development.

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