

# Indian Philology and South Asian Studies

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Edited by  
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Volume 1



Walter de Gruyter · Berlin · New York  
1995

(13)

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## 10. Interaction systems, specialised crafts and culture change: The Indus Valley Tradition and the Indo-Gangetic Tradition in South Asia

### Introduction

Previous attempts to understand the complex transition between what is commonly referred to as the Indus Valley Civilisation (2600-1900 B.C.) and the Early Historical Period of South Asia (beginning around 600 B.C.) were limited by the nature of the collected data and the prevailing political and academic models for culture change. These earlier models portrayed the Indus Valley Civilisation as an enigmatic urban culture that sprang up and then disappeared, eventually to be followed by an alien and unrelated urban culture during the Early Historic period. Needless to say, the current state of research, including archaeological, anthropological, economic, historical and linguistic evidence no longer supports these simplistic models and they should be replaced.

In order to address the complex period of transition between the Indus Valley Civilisation and later urban cultures, it is necessary to develop a more useful theoretical framework and adopt new labels. The Indus Valley Cultural Tradition is a general concept (formulated most explicitly in Shaffer 1991: 442) which refers to the total phenomenon of human adaptations that resulted in the integration of diverse communities throughout the Greater Indus Valley and adjacent regions, the latter including Afghanistan to the northwest, the northern Gaṅgā-Yamunā Doab to the east and the regions of modern Gujarat to the southwest (Kenoyer 1991b) (Figure 1). The Indus Valley Cultural Tradition emerges around 6500 B.C. and continues until as late as 1500 B.C. or beyond. During the Integration Era of this Tradition, the Harappan Phase, datable from approximately 2600 B.C. to 1900 B.C., features what can be considered the earliest state level socio-political organisation in South Asia (Jacobson 1986; Kenoyer 1991b).

Based on the current state of research I feel that the Indus state was composed of several competing classes of elites who maintained different levels of

control over the vast regions of the Indus and Ghaggar-Hakra Valley. Instead of one social group with absolute control, the rulers or dominant members in the various cities would have included merchants, ritual specialists and individuals who controlled resources such as land, livestock and raw materials. These groups may have had different means of control, but they shared a common ideology and economic system as represented by seals, ornaments, ceramics and other artefacts. This ideology would have been shared by occupational specialists and service communities, who appear to have been organised in loosely stratified groups.

The multiple levels of control that are demonstrated from the archaeological remains reveal the unique in the ways by which the Harappan state controlled access to resources and maintained socio-economic and political hierarchies. It is probable that the cities were more rigidly stratified and segregated than the rural settlements, which would have included larger numbers of farmers, pastoralists, fishers, miners, hunters and gatherers, etc. The largest cities may have been relatively independent, possibly even small city states, with direct political control only over local settlements and lands. Political and economic integration of the cities may have been achieved through the trade and exchange of important socio-ritual status items.

In the past it was thought that this society disappeared, leaving only a vague and ill defined legacy, but continued excavations and analyses are revealing significant connections between the Harappan phase and later cultural developments (Shaffer 1988b). These connections can be traced in various aspects of society, including subsistence activities, technologies, economic networks, urban organisation and possibly socio-ritual as well as political structures.

Following the framework outlined by Shaffer (1991) I will propose the label Indo-Gangetic Tradition to refer to the major human adaptations that included the larger geographic region extending over both the Gaṅgā-Yamunā river valley as well as the Greater Indus river valley (Figure 2). This transformation is generally associated with the Early Historic states that arose between 600 B.C. and 300 B.C., primarily in the Gaṅgā-Yamunā river valley.

The Indo-Gangetic Tradition is a more complex phenomenon than the earlier Indus Tradition and results from the synthesis of cultural developments occurring over a larger geographical area of the northwestern subcontinent. It includes the early developmental phases of northern peninsular India (Sharma et al. 1980), which could be given other labels such as the Gangetic-Vindhyan Tradition, but not enough information has been obtained to define them in this way at present. These early cultures undoubtedly parallel the Early Food Producing Era of the Indus Valley Tradition, and their synthesis with the decentralised communities of the latest phase of the Indus Valley Tradition (Localisation Era - cf. Shaffer 1991) provides a unique opportunity to observe complex processes of culture change. Through careful study of different aspects of material culture it

is possible to isolate specific continuities from the Indus Valley Tradition and input from non-Indus communities (Kenoyer 1992).

The period during which these two trajectories of adaptations became synthesized can be described as the Regionalisation Era of the Indo-Gangetic Tradition. Dating from approximately 2000 B.C. to 300 B.C., this was a period during which the localised cultural networks of the Indus Valley Tradition (Shaffer 1991) overlapped with the regionalising processes occurring in the peripheral regions of the Gaṅgā-Yamunā Doab and the Malwa Plateau.

The geographical and cultural areas that were once core and periphery from the perspective of the Indus Valley Tradition, gradually become reversed with the establishment of new centres of ideological, economic, political, and military power (Mann 1986) in the more extensive Indo-Gangetic Tradition. Most of the present archaeological evidence for the Indo-Gangetic Tradition derives from the Gaṅgā-Yamunā region and the northernmost portion of the Indus Valley, around Taxila. We can assume that the vast area of the Indus valley itself continued to be inhabited and that most of the sites from this period were established along the newly stabilised rivers and lie buried under cities that have been occupied continuously since that time, i.e. Sehwan Sharif, Multan, Kamalia, Harappa, Pak Patan, Depalpur, Lahore, etc.

In this paper I will focus primarily on economic interaction networks and specialised crafts to show how they can provide a window on the other changes that may have been occurring. First I will examine specific varieties of specialised crafts and interaction networks that characterised the Harappan Phase and then compare these interaction systems with those of the subsequent cultural phases.

## The Indus Valley Tradition

### Environmental Setting

Interaction networks and the rise of specialised crafts is closely tied to the overall environmental setting and the natural distribution of specific resources (Figure 3). Based on the distribution of Harappan Phase archaeological materials it is evident that the total environmental setting of the Indus civilisation includes the highlands and plateaus of Baluchistan to the west, and the mountainous regions of northern Pakistan, Afghanistan, and India to the northwest and north (Figure 1). Two major river systems formerly watered the greater Indus plain, the Indus and the (now dry) Ghaggar-Hakra. They reached the sea in separate courses, the Indus delta extending into the Arabian Sea to the west and the Ghaggar-Hakra (called the Nara in Sindh) delta extending into the Greater Rann of

Kutch to the east (Flam 1986, 1992, in press; Lambrick 1964; Wilhelmy 1969). Their floodplains provided vast areas for grazing and agriculture. The chronology of changes in the rivers and the hydrological regime is not certain, particularly for the northern tributaries (Courty 1989; Francfort 1989b; Gentelle 1986), but the two rivers were probably quite different. The Ghaggar-Hakra had a lower gradient, so the floods would not have been so devastating (Fentress 1985; Ratnagar 1986). This is apparent from the number of sites preserved along the banks of, or in the plain adjacent to, the Ghaggar-Hakra (Mughal 1974, 1984, 1985), compared with the number associated with the Indus.

There is a significant division of the alluvial plain into northern and southern regions (Punjab and Sindh, respectively), approximately at the change in gradient, where the five major tributaries of the modern Indus become a single river. In the north, there is more rainfall from both the summer monsoon and the winter rains (200 mm or more) (Dutt and Gelb 1987), whereas rainfall in the south is unpredictable and, in bad years (as in 1986-1988), there is little or no rain at all. The relatively flat plains of the Punjab merge on the east with the drainages of the Yamunā and Gaṅgā Rivers, where many Indus Tradition sites are known. Further south, the course of the Ghaggar-Hakra is bordered on the east by the great Thar desert, which is itself bounded by the Aravalli ranges (Allchin, Goudie and Hegde 1978).

Along the coast, west of the Indus delta, is the arid and rugged mountainous region of the Makran. It is also important to note that the northern coast of Oman falls within the direct interaction systems of the Harappan Phase. East of the delta is the insular region of Kutch and the larger peninsula of Saurashtra, which itself may have been a prehistoric island. These two areas are often grouped with the coastal plains of Gujarat, but they are distinct sub-regions (Bhan 1989; Joshi 1972; Possehl and Raval 1989). The Gujarat plains are bordered on the north by the southern Aravalli ranges and on the east by the Vindhya and Satpura ranges.

#### Harappan Phase Specialised Crafts

Specialised crafts have long been noted as an important aspect of the integration observed during the Harappan Phase although there are different interpretations regarding aspects of segregation and standardisation (see Kenoyer 1991a; and Kenoyer, Vidale, et al. 1991 for more discussion). Recent studies have shown that some crafts may have been segregated to control production of status items, but others may have been segregated for more basic reasons related to access to materials and labour. Similarly, the standardisation of items such as weights or seals may be attributed to centralised control, while other objects, such as pottery and ornaments, may have been standardised by mechanisms that reflect a shared ideology and aesthetic. For example, kin-related learning pro-

cesses or the spread of kin-related artisans to different settlements can result in a high level of standardisation (Kenoyer 1989).

During the Integration Era, specialised crafts that had roots in the preceding Phases became more complex in terms of technology and in the varieties and combinations of materials processed. Styles also changed and, although there is a general similarity throughout the greater Indus region, detailed studies of specific types reveal the presence of important local variations (Dales and Kenoyer 1986; Kenoyer 1984a; Pande 1984). Certain sites may also have become primary manufacturing centres for items related to socio-economic or ritual status (Dales and Kenoyer 1977; Jarrige 1981; Kenoyer 1989; Rissman 1989; Vidale 1989; Vidale and Bondioli 1986; Wright 1989).

In order to understand the different roles of specialised crafts it is important to distinguish at least four categories of crafts practiced at Harappan sites; 1) those processing local materials using simple technologies; for example, wood-working, terracotta production and house-building; 2) those processing non-local materials using simple technologies; chipped, ground and pecked stone industries; 3) those processing local materials using more complex technologies; stoneware bangle manufacture, elaborate painted and specialised ceramics, inlaid woodwork, etc.; and 4) those processing non-local materials using more complex technologies; agate bead manufacture, seal production, copper/bronze metal working, precious metal working, shell working, faience manufacture, etc. In general, the first two show more regional variation, while the last two appear more standardised.

The organisation of craft production was probably varied, and included small and large scale kin-related production and more centrally controlled production of high-status items (painted pottery and stoneware bangles) for local or long-distance trade (Wright 1989).

During the Harappan Phase, some technologies reached very high levels of expertise, especially the manufacture of long carnelian beads (Kenoyer 1986), steatite seals (Rissman 1989), stoneware bangles (Halim and Vidale 1984), compact frit or faience (McCarthy and Vandiver 1990) and bronze objects (Agrawal 1971). This ability to create new substances out of mundane raw materials was highly developed and there is evidence for the trade of Indus objects as far as Mesopotamia and possibly Egypt (personal observations).

In summary, some crafts were apparently structured on the basis of kin networks and were decentralised in terms of state control. Others may have involved long-distance kin networks and alliances that could be decentralised in terms of direct political control, but required some centralised support to maintain long-distance trade relations. Crafts that were difficult to control directly may have been less important for the state economy, while easily controlled crafts could have been more so.

### Raw Material Source Areas and Interaction Networks

Specialised crafts use different types of raw materials, and through the sourcing of the latter it is possible to define specific resource areas that were exploited during the Harappan Phase. These raw materials were processed near the source areas or transported to distant manufacturing centres where they were modified using specific technologies. Special status objects, or tools that were produced from raw materials and specific technologies, were used in the vicinity of the production centre or redistributed to other regions.

Raw materials that were more commonly available, such as clay, can also be followed from specific workshops to more distant consumers through detailed chemical and technological studies. Through these various methods, it is possible to define specific interaction networks that existed during the Harappan Phase and document their changes in the following transitional periods. Although more sourcing studies need to be undertaken, the following examples provide much of the critical information needed for a comparison with later developments in the Regionalisation Era of the Indo-Gangetic Tradition.

#### Marine Shell

The most detailed study of Harappan interaction networks has been conducted using shell objects (Kenoyer 1983, 1984b) (Figure 4). Through various distribution studies and interpretive models it has been possible to define several regional trade network systems and also hierarchical levels of interaction that encompassed the entire extent of the Harappan Phase settlements. Some of the trade in shell even extended beyond the Harappan cultural boundaries into the peripheral regions of peninsular India, northwest into Afghanistan, and north into Central Asia.

#### Carnelian

Carnelian nodules capable of producing long carnelian beads of deep red-orange colour are presently found only in the regions of Kutch and Gujarat (Figure 5). Only one major manufacturing centre for long carnelian beads has been defined at the site of Chanhu-daro, but limited evidence for carnelian bead production is also found at most major excavated sites, e.g. Lothal, Moenjo-Daro, Harappa, and possibly Kalibangan. There is one other possible source for large carnelian nodules in modern Yemen, but there is no evidence to indicate its use during the Harappan Phase.

#### Grey-Brown Chert

The major sources of grey-brown chert for the Harappan Phase were probably

the massive limestone outcrops at Rohri in central Pakistan (Figure 6). There are, however, sources of identical materials to the south and occasional nodules of similarly coloured cherts are found in the rivers flowing out of Baluchistan. Detailed studies of cherts and other materials used to make flaked stone need to be conducted to define more precisely this important network.

One of the most important categories of artefacts produced from grey-brown chert is the cubical weight used throughout the Harappan Phase, which has been found distributed far beyond the borders of Harappan cultural dominance. Cubical weights were also produced in agate and other hard stones, but in much smaller numbers. This could be explained by the specific gravity of the chert, which is different from agates, and by the availability of the raw material. It was much easier to make graded sizes from chert, whose weight distribution was much more even than that of agates, and which was also the more commonly available.

#### Lapis Lazuli

Although the amount of lapis lazuli used during the Harappan Phase may be less than that seen in Mesopotamia or even Egypt, this raw material has been found in most excavated sites and actual manufacture was definitely being conducted at Moenjo-daro, and Harappa. The major source areas for lapis lazuli can be isolated to very limited areas in the Chagai Hills of Southern Baluchistan (Jarrige 1988) and in the area of Badakshan, Northern Afghanistan (Francfort 1984, 1989a) (Figure 7). It is not possible to determine if either region was a primary source area; it is more probable that by the end of the Harappan Phase both areas were being used simultaneously.

#### Steatite

Numerous varieties of steatite and serpentine were being used at Harappan sites to make beads and other objects, including sculpture. The colours range from light greenish-white, to dark grey, to grey-black. Several different sources have been identified that could have been used exclusively or simultaneously (Figure 8). These include southern and northern Baluchistan, and the Aravalli range extending from Haryana to modern Gujarat. These two major resource areas provide extensive deposits along both edges of the Greater Indus Valley and it is not surprising that the evidence for steatite processing and firing of steatite to make hard beads, pendants or seals has been found at almost every excavated Harappan site.

However, specific objects made from steatite, for example seals or sculptures such as the "Priest King", were probably being produced only at specific sites and in specific workshops. Now that we have a more complete corpus of

high quality photographs of the seals and tokens (Joshi and Parpola 1987) it is possible to conduct more detailed studies of the possible schools of seal-making as proposed by Rissman (1989). Since seals are one of the most important indicators of status and power, this study will be extremely significant for defining networks for the distribution of seals themselves, as well as the goods that were being controlled most closely.

### Copper

Copper ore deposits can be divided into three major source areas, Baluchistan/Afghanistan, the Aravalli Hills in Rajasthan (Agrawal 1984; Agrawala 1984; Agrawala and Kumar 1982) and the major deposits in Oman to the south across the Gulf (Weisgerber 1983, 1984) (Figure 9). Although there is considerable evidence for third millennium smelting in the resource areas themselves, there is little evidence for smelting areas at sites that are distant from the ore sources (Kenoyer and Miller 1993). The earlier excavators at both Moenjo-daro (Marshall 1931; Mackay 1938) and Harappa (Vats 1940) suggest that copper may have been smelted at the site itself, but there is very little convincing evidence to support this interpretation. In our recent work at Harappa we have found tiny pieces of what appear to be copper ore, but this could have been used for faience manufacturing or for pigments. Several copper-working furnaces have been identified at sites along the Ghaggar-Hakra River valley (Mughal 1982), but again there is no concrete evidence for the specific act of smelting.

### Tin

One of the most important raw materials for the production of bronze during the Harappan Phase is tin, but it has only been quite recently that the probable sources of tin have been identified near the important site of Mundigak in Afghanistan and possibly near the lapis lazuli mining areas in northern Afghanistan (Stech and Pigott 1986) (Figure 9). Continued research into the mining or collection processes need to be undertaken, but it is not unlikely that the basic networks for tin will correspond with those resulting from copper working.

Numerous other raw materials and commodities need to be studied, including gold and silver, alabaster, coloured sandstones, quartzite grinding stones, fish and animal resources, etc. By combining all of these multiple lines of evidence it will be possible to establish specific patterns of interaction within the Greater Indus Valley and better understand the economic and socio-political framework within which the Harappan peoples functioned. Nevertheless, it is still possible to make a preliminary interpretation based on the present information.

### Harappan Phase Economic Interaction Systems

It is clear that one major mechanism for integrating the widely dispersed settlements of the Harappan Phase appears to have been the socio-ritual need for specific materials and products. These products were distributed through economic networks that have been discussed above. Through a careful study of specialised crafts and the resource areas that produced specific raw materials, it is possible to define various economic interaction systems that became established during the Harappan Phase. Conversely, the absence of such economic interaction systems is extremely important, because it indicates the lack of both political and kin relations between regions.

Based on the present data it appears that the economic interaction systems were highly stratified (Kenoyer 1989). The larger cities were directly connected with external regions and to each other by inter-regional networks. Intra-regional networks connected these cities to towns and villages. Local exchange systems redistributed locally produced items and essential commodities to villages, pastoralists, etc.

Three different systems of trade/exchange may have existed during the Harappan Phase. The first, based on the standardised weight system, may reflect a centralised authority or a coalition of merchants that maintained the standardised system to control the trade of specific commodities. The second system was probably regional, involving the exchange of grain for other commodities using generalised measures in baskets, bales or pottery vessels. Verification of the quantity or value may be represented by post-firing graffiti on pottery vessels (often consisting of what are thought to be numerical symbols) and the use of seals on bales and storage vessels (Joshi and Parpola 1987; Rao 1979). Platforms along the streets, special public structures and open areas in sites may have been market places similar to the bazaars in traditional southern Asian towns (Mackay 1938).

A third possible form that has not been defined archaeologically is the exchange of goods for services between occupational specialists and those controlling land, grain or livestock. Historically, these relationships are often hereditary and commonly function in a rural context (Harper 1959; Kenoyer 1989). On the other hand, ethnographic studies of shell trading and agate bead trading show that these types of relationships can also be established between resource areas and urban producers or consumers. In fact, long-distance trade networks often result from extended kin relations or hereditary alliances between producers and consumers (Kenoyer 1989).

Once the Harappan Phase urban phenomenon was established, internal and external trade was a critical factor in maintaining the hierarchical structure of Indus society. The fact that two or more sources were utilised for almost every known raw material must have presented a unique opportunity for competition

between merchants and suppliers and a major problem for elites who were trying to control access to potentially high status materials. For example, copper ore could have been processed in one of three regions each of which had the capabilities of supplying all of the copper needed for the entire Indus region. The use of the different resource area in Oman could reflect a period of confrontation with source areas in Baluchistan or the Aravallis (Cleuziou and Tosi 1989). Alternatively, entrepreneurs from Oman or from the Indus may have been trying to capture part of the Indus market by introducing new resources from Gulf.

The differentiation between similar raw materials from different source areas and the control of trade and production within the Indus region itself would have required a complex mechanism for documentation and identification. Harappan writing and the use of inscribed seals was undoubtedly a key element in this control mechanism and it was definitely used in documenting the access and distribution of key resources (Rao 1979, 1985) as well as in the production of specific status items (Halim and Vidale 1984; Vidale 1989).

The extensive use of writing differentiates the Harappan from preceding and immediately succeeding phases. Although the script has not been deciphered, careful examination of its use provides information on the socio-economic and ritual practices of the Harappan Phase (Lamberg-Karlovsky 1986). Its functions included the identification of ownership of goods or economic transactions, accounting, the recording of socio-political or ritual events and less formal graffiti (Fairservis 1983; Parpola 1986). The absence of long texts on clay and of bilingual texts cannot be explained by a lack of research. It might indicate that use of the script was confined to elites and that it was not used by the general populace or shared with foreign trading partners.

The script was written on a wide range of objects and in various media and styles. It was incised in negative for making positive impressions, incised in positive, moulded, scratched into wet or fired clay, stamped and painted (Fairservis 1983; Parpola 1986). The most common form of writing is on the intaglio seals, mostly made of carved and fired steatite (Figures 10.a-c). Impressions of seals have been found on pottery, lumps of wet clay or bullae for sealing containers or rope-tied bales. Sometimes only one seal was used (Dales and Kenoyer 1990b; Joshi and Parpola 1987) and sometimes two or more (Rao 1979). When a seal was not available or appropriate, signs were scratched into the wet clay lumps by hand (Dales and Kenoyer 1990a).

Inscriptions are also found on objects not intended for making impressions. These include incised steatite tablets with or without iconographic motifs, clay or faience tablets with moulded bas-relief script, and numerous incised tools and ornaments. The script was inscribed on pottery before or after firing, stamped on pottery, used in moulds to make raised symbols on the bases of large storage jars, and incised on potsherds, terracotta cakes or terracotta cones (Joshi and Parpola 1987). No inscriptions have been found on architecture or as painted

murals, though the recent discovery of large inlay script from Dholavira suggests that it may have been used in this manner on specific occasions. The script may well have been written on cloth, palm-leaves or carved into wooden objects, but the absence of long texts on permanent materials could indicate that such records were not kept at all.

The variety of contexts in which writing was used has led to the suggestion that those using it were dispersed throughout the population, rather than being isolated in certain parts of town (Lamberg-Karlovsky 1986). However, this dispersed pattern of writing could result from disturbance through erosion, rebuilding, etc. and may not represent the original locations of use. Recent excavations at Harappa (Dales and Kenoyer 1990b) have revealed a distribution of seals and inscribed objects that may indicate the restriction of seal-users to certain areas - along major access routes and main streets. Further evidence for the restricted use of writing is that only a few of the more common objects such as terracotta bangles, pottery, or copper tools are inscribed.

Whatever the meaning of the script, and regardless of who could read or write, it represents shared symbols and a shared ideology that was distributed over an extremely large area. These shared beliefs were undoubtedly a key factor in the integration of the urban and rural populations. Consequently, the disappearance of the common use of the Harappan script indicates a major break in ideological legitimation and in the need to control the access to raw materials or the production and distribution of finished goods. In other words, there was no need to use the script if it did not function to support and reinforce the interregional and supra-regional networks. These networks would have included socio-economic, ritual and political structures.

It is important to note that the discontinuity in the use of the script coincides primarily with a gradual breakdown in long distance trade and exchange, particularly between the coastal regions and the northern Indus and Gangetic plains. On the other hand, there are important continuities in craft traditions using locally available materials and new varieties of materials acquired through regional exchange networks.

### Indus Valley Tradition, Localisation Era

Shaffer (1991) has defined the Localisation Era as the final period of the Indus Valley Tradition (Figure 11). It is comprised of various Phases that have been tentatively defined as the Punjab Phase (= Cemetery H, Late Harappan), the Jhukar Phase (= Jhukar and Pirak) and the Rangpur Phase (= Late Harappan and Lustrous Red Ware) (Shaffer 1991).

While there is no time to go into detail regarding the changes occurring in each of these major traditions, it is important to note certain key points. Where-

ever Localisation Era sites are known, there is an apparent increase in settlement, a localisation of interaction networks and the development of regional cultural expression (Bhan 1989; Jarrige 1973, 1985; Mughal 1990, 1992; Possehl and Raval 1989; Shaffer 1987, 1991). These processes probably represent the rise of regional polities that were no longer integrated by a single ideological and economic system. The reasons for decentralisation or localisation are complex and regional in nature. The most important factors are summarised below.

In the core regions of the Indus and Ghaggar-Hakra valley, the overextension of socio-economic and ritual networks and the fatal disruption of the agricultural base were major contributors to decline. Due to sedimentation and tectonic movement, the Ghaggar-Hakra system was captured by the River Sutlej of the Indus system and the River Yamunā of the Gangetic system (Misra 1984). The Indus itself began to swing east, flooding many settlements in the process (Flam 1981, 1991; Mackay 1938, 1943). The mounds of Moenjo-daro survived because they are on slightly higher land and were protected by massive mudbrick platforms. Sites such as Harappa continued to be inhabited and are still important cities today. However, many less fortunate settlements along the dry bed of the Ghaggar-Hakra system were abandoned and their inhabitants were forced to develop new subsistence strategies or move to more stable agricultural regions.

The details of change during the Localisation Era are difficult to evaluate due to inadequate excavations and what I feel are interpretive biases by the excavators. We need more detailed reports on the types of agate beads, the varieties of chert, metallographic studies of the copper or bronze objects and the careful stratigraphic assessment of specific artefacts. For example chert tools referred to as microliths may be reported, but we do not know if the chert is locally available or obtained through trade with a distant resource area. Occasional shell bangles are reported from excavations, but we do not know if the excavator was careful to note the precise stratigraphic location and confirm that it is associated with a specific chronological phase. Modern shell bangle fragments can drop through cracks or rodent holes, and earlier shell ornaments can be mixed with later deposits. Even more problematic is the fact that cubical weights and inscribed steatite seals are generally assigned to the Harappan phase without consideration of specific stratigraphic or chronological context. While this type of bias is more applicable to surface surveyed sites it is probably occurring in excavated sites as well.

Because there are a few examples of writing in the Late Harappan sites in the Gaṅgā-Yamunā Doab (Dikshit 1984; Joshi 1978) and Gujarat (Rao 1979, 1985), it is not unlikely that the use of weights and writing continued for some time into the Localisation Era. Excavations of Late Harappan Phase settlements with the specific goal of defining the changing patterns of raw material access, production and distribution are needed to fill in this critical period of transition. Nevertheless, by looking at the subsequent periods in both the Gaṅgā-Yamunā

and Indus regions, it is possible to define the general pattern of change that was occurring.

During the Localisation Era the major changes can be defined as a decline in urbanism and in the control of long distance trade. Economic exchange systems become more localised in each of the major regions defined by Shaffer.

#### Punjab Phase

Although the Cemetery H culture may have been contemporary with, or derived from, the Harappan Phase, recent excavations at Harappa combined with the extensive surveys of Mughal in Cholistan indicate that it became a distinctive phase and continued later than the Harappan Phase, possibly down to 1700 B.C. (Dikshit 1984). The chronological extent of more generally defined "Late Harappan" levels at sites in the Indian Punjab, Haryana, and Uttar Pradesh appear to continue even later, to 1300 - 1000 B.C..

While many sites, including Harappa, continued to be occupied in the Punjab Phase, the number of sites reported from the Cholistan region decreases by two-thirds (Mughal 1982, 1990). On the other hand, there is an increase in Late Harappan settlements in northwestern India that may represent a migration from Cholistan to the Doab region. According to Mughal, even with these shifts there is a 3-tiered settlement system during the Punjab Phase, though on a relatively smaller scale.

The use of writing and weights in the Punjab Phase is unclear due to a bias in reporting, whereby seals and writing are used to identify the Harappan Phase. If they are found, then the site is dated to the Mature Harappan, and if they are not found then it is classed as Late Harappan. Nevertheless, it is quite likely that there was no need for writing or weights during this phase, because we see a gradual decline in long distance trade. This decline is documented primarily by the absence or rare occurrence of marine shell objects. No shell bangles have been reported between northern Punjab and Uttar Pradesh during the Late Harappan, or in the following Painted Grey Ware Phases, except possibly at one site - Manda (Joshi and Bala 1982). There is also very little use of steatite, lapis lazuli, turquoise, serpentine, etc. These reflect a breakdown in the internal trade networks and a lack of inter regional integration.

On the other hand there is an apparent increase in the use of faience and terracotta, possibly to replace shell and steatite. Copper objects continue to be manufactured, but it is not clear if tin bronzes continued to be produced. This is an important point that needs to be addressed in future research, as it would indicate whether or not there were connections between the highland tin resource areas and the northern plains.

During the Punjab Phase in the Doab region there is no detailed report on the types of chert being used, and it is possible that they were still obtaining

cherts from Rohri, but they could also have been utilising the closer agate and chert resources from the Vindhya to the South. While there is a continuity in the production of stone beads from coloured cherts and agate, we do not have any evidence for the production of long carnelian beads that would have been made from nodules coming from Gujarat. It is probable that the agates and other rocks used to make beads during the Punjab Phase were limited to what was locally available. The detailed reporting of these small finds is crucial to understanding the changing interaction networks during this transition period.

The general pattern seen during the Punjab Phase is one of expansion into the Doab accompanied by rural dispersal and the localisation of interaction networks to the exclusion of marine and western mountain resources. The dominant raw materials needed to make tools and ornaments would have been locally available: copper from the Aravalli, faience, clays, and local cherts (of unknown type).

#### Jhukar Phase and Pirak Phase

The Jhukar Phase overlaps with the Harappan Phase, but evidently continues much later (Mughal 1992). Unfortunately, no good radiocarbon dates have been obtained for the latest levels of Jhukar occupations. Sites such as Jhukar and the presence of other settlements with similar types of pottery, including Chanhu-daro, Moenjo-daro and Amri, would indicate the continued presence of regional interaction and, possibly, of urban centres. Most of the material culture shows continuities with the preceding Harappan phase, but there is a change in the shape of seals to round forms with geometric designs and an absence of writing. However, Jhukar circular seals are similar to the seals found at Pirak, a site that is located on the Kachi plain to the northwest of Jhukar.

Shaffer (1991) groups the Pirak Phase with the Localisation Era of the Baluchistan Tradition, but it could also be grouped with the Indus Valley Tradition. The site of Pirak is dated to 1700-700 B.C. (Jarrige and Santoni 1979) or 2000-1300 B.C. (Shaffer 1991). Pirak is 9 hectares in size (a town). In comparison, Lothal is 7.5 hectares. Other sites similar to Pirak have been found in the Kachi plain as well as in the highland valleys, indicating a continued integration between the plains and the hills (Jarrige 1985).

Important new aspects of material culture include horses, horsemen and camels with riders (Pirak I and II). By the end of Pirak II they are painted with trappings and are wheeled. There are human figurines with pinched features, and applique coiffures and ornaments similar to the figurines of 3rd millennium B.C. Mehrgarh and Shahr-i-Sokhta.

Other important artefacts include terracotta compartmented seals - square and circular with geometric forms - copper compartmented seals and buttons. Beads of terracotta are relatively common, but lapis lazuli and carnelian beads are

reported as quite rare. It is important to note that when visiting the site in 1983 I found several lapis lazuli beads, one of which was unfinished, indicating its continued production locally.

Conch shell bangles have been reported from period II and would indicate some continued contact with the coast. Copper artefacts are common in periods I and II, including copper crucibles that are interpreted as relating to copper smelting. The copper artefacts include points, axes/chisels, rods and possible drills. The first iron objects were found in period III and probably derive from iron resources in Baluchistan rather than from the Aravalli hills to the east.

At Pirak the presence of the camel is significant because it links the site to the western highland regions. The Bactrian camel was the most common in figurines, and possibly some Dromedary were present. Its importance could be linked to use in transport (Shaffer 1988) - or the development of what can be called the *modern style of pastoral nomadism*, with camels as the principal beasts of burden. Horse figurines with riders indicate a new form of transportation, and donkeys were also present. New cereals such as sorghum and millets provided fodder for animals not adapted to the arid Kachi plain (horse and possibly some cattle) (Jarrige 1985).

The overall picture from the Kachi region and, by extension, the southern Indus Valley depicts the continued dynamic relationship between agriculturalists and pastoralists who exploited both the plains and the highlands to the west (Jarrige 1985). There is evidence for the intensification of subsistence practices, multicropping and the adoption of new forms of transportation (camel and horse). These changes were made by the indigenous inhabitants, and were not the result of new people streaming into the region. The horse and camel would indicate connections with Central Asia. The cultivation of rice would connect with either the Late Harappan in the Gaṅgā-Yamunā region or Gujarat.

#### Rangpur Phase

As has been seen in both the southern and northern regions of the Greater Indus Valley, the transition from Harappan to Late Harappan in Gujarat witnesses an increase in the number of settlements (Bhan 1989; Joshi 1972; Possehl 1977, 1980). Corresponding to this expansion, we see the loss of most of the typical Harappan Phase artefacts: weights, perforated vessels, terracotta cakes, Indus goblets. Grey-brown chert is replaced almost entirely by local silicates, indicating a break in exchange networks with the central Indus and southern Sindh.

Steatite doesn't seem to have been very important and remains rare, though it would have been available just to the north in the Aravalli mountains. Other local stones such as amazonite, agate and carnelian are quite common and continue to be used for making beads with the same techniques that were being practiced in the Harappan Phase. Shell bangle manufacture and the production of

faience beads and ornaments continues. The use of writing continues for some time in the form of graffiti, but there is a noticeable absence of square steatite intaglio seals.

The overall pattern reflects a continuity in most craft traditions using locally available materials, but a break in exchange networks linked to the Indus Valley and the highland regions of the west. The fact that local pottery types include the peninsular varieties of Black and Red ware, suggests more interaction with the east than with the west.

After 1400 B.C. there is a break until the emergence of NBP ware sites in 600 B.C., but the manufacture of agate beads, shell working and metallurgy indicate some important continuities in craft traditions. In Gujarat we should be able to define the continuity from the Late Harappan through to the Early Historic period soon.

The processes described above can be interpreted as the establishment of regional polities which may have remained as small city states or chiefdoms. Whatever their specific internal organisation, these regional polities destroyed the integration achieved by the Harappan Phase cities, and allowed the establishment of new peripheral polities in the Gaṅgā-Yamunā Doab. Shaffer (1993; cf. Shaffer and Lichtenstein 1989) has suggested that this period be conceived as a phase in the development of the Early Historic city states and militaristic territorial states. In other words the Localisation Era coincides with the Regionalisation Era of the Indo-Gangetic Tradition. The later Early Historic cities reflect the development of a socio-political system that was on a completely different level of integration than that possible in the Indus period. The difference may be due in part to the vast area involved, and to the diverse populations and new resources that were controlled.

## The Indo-Gangetic Tradition

### Regionalisation Era

The overall environmental setting of the Regionalisation Era includes the total area described above for the Indus Valley Tradition, with the addition of the remaining portions of the Gaṅgā-Yamunā Valley, the Malwa Plateau, the Vindhya and Satpura Ranges of central India and the Chota Nagpur Plateau (Figure 2). The inclusion of these regions provides new areas of expansion and new resources that could be exploited in the localised economic systems.

Based on our understanding of the Localisation Era of the Indus Valley Tradition, we can define a vast crescent of agricultural and pastoral settlements extending from the Gaṅgā-Yamunā Doab, down through the Indus-Ghaggar-

Hakra Valley and around into Gujarat. The central regions of the Malwa Plateau, and the hilly jungle regions extending from the western Vindhyas to the Chota Nagpur Plateau, would have been only sparsely populated at the beginning of the Regionalisation Era of the Indo-Gangetic Tradition.

It is in this setting that we see the development of what is commonly referred to as the Painted Grey Ware (PGW) Culture (1200-800 B.C.) (Dikshit 1981, 1984; Mughal 1984, 1992) (Figure 12). The main settlements are located at the northern edge of this large crescent, along the northern Gangetic plain and down the Ghaggar-Hakra river, though there is some possibility of PGW expansion into the Malwa Plateau. Most scholars agree that the PGW represents an indigenous cultural development from local chalcolithic communities in the northern subcontinent and that it does not reflect an intrusive culture from the northwest. This interpretation is supported to some extent by the localised pattern of exchange that is documented for the preceding Punjab Phase.

The Northern Black Polished Ware (NBPW) culture (700-300 B.C.) (Roy 1983, 1986) is the term given to the next major cultural development (Figure 13). Although the PGW and the early NBPW can be considered as distinct phases within the Regionalisation Era, the present evidence suggests that they reflect an interconnected sequence of cultural changes that precede the development of the urban states in the Indo-Gangetic region. It is significant that the core area for the second urbanism was on the periphery of the regional polities remaining from the Localisation Era of the Indus Tradition.

During the Regionalisation Era, we see the gradual expansion of populations into new ecosystems, the introduction of new technologies, and the establishment of new economic networks. These various factors of environment, population, technology, and social organisation were all interrelated and the cumulative changes that occurred during this time fulfilled important preconditions that were necessary for the later establishment of an integrated state level society. A brief outline of the major preconditions and the ways in which they were fulfilled are presented below.

**Precondition #1.** *Diversity of the subsistence base and resource variability, which have the potential for the production of surplus.*

All of the major varieties of subsistence items and grains that became important during the subsequent phase of integration were already being cultivated during the Localisation Era of the Indus Valley Tradition. Nevertheless, a more complex process of seasonal agriculture and multicropping, using the recently exploited summer crops of sorghum, millet and rice, would have allowed the production of a considerable surplus (Weber 1991, 1992). This surplus could have been used for human consumption as well as for animal husbandry, resulting in changing patterns of land use and possibly the development of more localised pastoralism. The use of summer or monsoon crops appears to have spread throughout

the northern subcontinent and allowed expansion into regions that may have been less habitable during the Harappan Period.

The copper resources of the Aravallis continued to be utilised, but there is little concrete evidence for tin bronzes either in the Copper Hoards (Agrawal 1974), or in the copper items from PGW sites (Agrawal 1971). Some tin bronzes are reported from the earlier peninsular sites of Jorwe, Nevasa and Navdatoli (possibly derived from trade with the Indus region), but it is important to note that no tin bronzes have been found at Ahar or Kayatha (Agrawal 1971). Such a long break in tin acquisition is important because it would reflect the lack of contact with the regions of Baluchistan and Northern Afghanistan, and the development of a distinctive copper technology that was not closely tied to the northwestern regions of the subcontinent.

In earlier models, the northwestern regions were the source of the so-called movements of Indo-Aryan speaking peoples. Yet, if there were such movements, why were the migrants not supplying one of the most important raw materials for bronze production, i.e. tin? This cannot be answered simply by saying that iron was replacing copper and bronze, because the prominent use of iron does not occur until much later, in the late NBP period, after the full establishment of the Integration Era of the Indo-Gangetic Tradition. While no bronzes of the late NBPW period have been analysed, it would not be surprising to see the reappearance of tin bronzes.

New resources that came to be exploited included iron and a variety of minerals that were not utilised during the Indus Valley Tradition. The major iron sources exploited during the PGW Phase would have been those in the northern Aravallis and close to the important sites of Mathura, Noh, Bairat, Indrapat (Delhi), etc. Later, during the early NBPW Phase, a second major source area was exploited in the Chota Nagpur Plateau and adjacent to the most important sites of the Middle and Lower Gaṅgā plain, namely Rajgir, Pataliputra, Champa, and so on (Chakrabarti 1977, 1984-85).

The other important minerals include various colours of banded and dendritic agates from the Vindhya and the Chota Nagpur Plateau, and gemstones such as garnet, amethyst, moonstone, diamond, emerald and ruby. There are two major sources of gemstones that became important; one was the Deccan plateau of peninsular India and the other the mountainous valleys north of Taxila.

Marine shell, particularly the conch shell or *Turbinella pyrum*, would have been collected in the coastal regions of Kutch, or the Makran coast near modern Karachi. In the NBPW phase this species of marine shell becomes quite common at inland sites in the Gangetic region, and even as far north as Taxila. It was used for making ornaments, trumpets and ritual libation vessels (Kenoyer 1983).

The presence of alternative sources for raw materials that were important for economic exchange and the manufacture of status objects was undoubtedly a significant stimulus for market competition and control.

**Precondition #2.** *The development of social and economic interaction networks between major ecosystems and resource areas.*

During the PGW and early NBPW Phases we see the establishment of regional interaction networks within what would later become the core area of urbanism. The first stage of expansion or consolidation was seen in the distribution of PGW sites throughout the northern Gaṅgā-Yamunā Doab, and the extension into the central Indus Valley along the bed of the Ghaggar-Hakra (ancient Saraswati) River. There is also an expansion of PGW sites into the Middle Gaṅgā Valley and the western Vindhyan region, around Ujjain (Erdosy 1987, 1988; Lal 1985). During the following NBPW phase the expansion continues to the east as far as the Chota Nagpur Plateau, to the northwest as far as Taxila, and to the southwest across the Malwa Plateau to the coastal regions of Gujarat (Roy 1983 1986). The coastal contacts during the NBPW Phase are documented by the presence of NBPW at sites in Gujarat as well as by the presence of marine shell ornaments and complete conch shells (*T. pyrum*) at inland sites (Kenoyer 1983).

It is important to understand that these trade networks add to, and build from, the earlier interaction networks of the Indus Valley Tradition. As such, they undoubtedly incorporate many of the remnant polities and economic structures of the latter's Localisation Era.

**Precondition 3.** *Technological capability to fill specific needs of urban and state-level society.*

With the expansion into new regions and the acquisition of new resources it was necessary to develop appropriate technologies that would efficiently transform resources into commodities. The earlier theories about the spread of iron technology and the need to clear vast tracts of forests to inhabit the Gaṅgā-Yamunā region must be discarded in the face of recent studies, and consequently the major argument for the spread of iron technology must be reevaluated. Iron objects have been found in the later levels of PGW sites (800 B.C.) (Lal 1979-80) and throughout the early NBPW phase, but the majority are objects of adornment (bangles, pins), along with some weapons (Lal 1985, 1986).

Other scholars have argued that the development of iron technology in peninsular India may represent an indigenous process and not be the result of diffusion, through the northwest, from West Asia (Chakrabarti 1984-85; Shaffer 1993). The lack of evidence for economic connections during the preceding Localisation Era would support this interpretation. There really is no need for direct diffusion of iron technology because the artisans producing copper objects

were undoubtedly quite familiar with the properties of iron which would have been present in the slags of their copper furnaces. It is quite possible that the need for iron was stimulated by the need for new metal ornaments and harder tools, since tin for bronze production was not available.

Other technologies that appear to have been developing are associated with the need for status items such as beads and other ornaments (Bharadwaj 1979, 1985). New techniques for colouring and bleaching beads with black and white designs were developed. The earliest use of the diamond drill-bit is evidenced in the NBPW period sites of Gujarat (Kenoyer, Bhan, et al. 1993). At sites such as Taxila and Kausambi we see evidence for the faceting of translucent stones, which in turn stimulated the use of a new range of minerals for producing high status objects. Faience manufacture continued to be practiced, but alongside we see the development of a vigorous glass technology, used for the production of bangles, beads, ear-discs, seals and containers (Singh 1989).

Shell working technology shows important continuities with the earlier Indus Tradition, but new styles of ornaments and new decorative motifs become widespread (Kenoyer 1983). Ceramic technology became highly specialised, first in the production of grey ware ceramics and then in the famous black polished wares. While there has been no concerted study of the manufacturing centres for PGW and NBPW ceramics, it is not unlikely that regional production centres will be discovered, as these techniques required high temperature kilns and skilled artisans.

Water management for agriculture and drinking water is reflected in the construction of numerous wells and, in some sites (e.g. Śringaverpur), massive tanks for capturing water at the high flood levels (Nagaraja Rao 1985: 91-92).

The technology of war and the construction of massive fortified settlements is not evidenced during the PGW Phase, but it becomes more apparent in the early NBPW Phase. Shaffer (1993) has tried to compare the number of weapons found from specific sites of the Indus Tradition and compare them to those found in the sites of the NBPW Phase. While there is undoubtedly a sampling problem, there is a definite increase in the amount of weapons found in the latter. When combined with the evidence for massive walls, gateways and towers, and thousands of sling stones, there is little doubt that military technology was on the upswing. This interpretation is further supported by the literary accounts for this period, including the Epics of the Ramayana, the Mahabharata and the later Buddhist texts.

**Precondition 4.** *Differentiation in status on the basis of access to essential resources and the ability to control the distribution of essential resources.*

Status differentiation based on access to essential resources results from cultural choices about which resources are necessary for subsistence on the one hand, and for ideological purposes of social identity and value on the other. The

new categories of raw materials that were being used, and the new technologies that developed to produce iron, glass and coloured stone objects, demonstrate that such cultural choices were being made.

The development of major cities at the important crossroads leading from the resource areas to the agricultural hinterland demonstrate the fact that these resources were being heavily exploited. Textual evidence from the epics, the Śāstras and various Buddhist texts outline the complex manner in which specific resources were controlled both directly and indirectly by the state (Prasad 1984; Roy 1986). On the basis of excavations at later sites and literary texts we know that raw materials, such as shell, stone and ores were being brought from distant resource areas and worked in the major urban settlements. Furthermore, hierarchies of specialists and administrative structures were developed to monitor and control production and distribution. (Thakur 1972)

The presence of fine pottery in contrast to plain wares indicates a hierarchy in materials used to produce what are equally functional vessels (Roy 1983). The relatively low percentage of fine painted grey wares and polished black wares can be interpreted as the restricted use of certain varieties of vessels. Although there have been no detailed studies of the ornaments or tools, it is not unlikely that similar patterns will be seen in beads, bangles and other objects.

Most important is the reappearance during the early NBPW ware phase of writing, weights and measures. While there is still no convincing evidence to indicate a continuity between the Indus script and the first *Brahmi lipi*, the connection between the Indus and Early Historic weight systems seems quite clear (Mainkar 1984; Srinivasan 1979). The latter is also used in the punch-marked coins that become common in the NBP ware phase (Prasad 1984; Singh 1986); the weight of the coins corresponds to the system described in the Arthaśāstra of Kautilya (Mainkar 1984).

1 gunja ( <i>Abrus precatorius</i> seed)	= .109 grams		
8 gunja	= the smallest Indus weight of .871 grams		
32 gunja	= the 4th Indus weight category of 3.4 grams		
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1 coin	= 32 (4 x 8) gunja	= 3.4 grams	= 1 dharana
10 dharana	= 320 gunja	= 34.8 grams	= 1 pala

The correspondence of the two weight systems could simply mean that the distinctive red and black seed, that may have been used by the Indus Tradition for defining weights, was selected independently at a later time for the same purpose. On the other hand, given the continuity in technologies such as agate bead making, faience working and copper metalurgy, it is more probable that the use of the seed as a weight category continued along with other aspects of technology and regional trade.

The establishment of a monetary system and the increased use of seals and other insignia demonstrate the capability to control the access and distribution of essential resources, both subsistence items as well as items of socio-ritual status. It is important to note however, that the use of writing does not first appear in association with coins or with seals used for trade, but is seen in edicts aimed at establishing a new social order in defiance of the Brāhmanical monopoly on ritual and technical knowledge. Correspondingly, the disappearance of writing at the end of the Indus Tradition in the north can perhaps be correlated to an increase in the dominance of Vedic ritual elites, who are referred to as brahmins.

The ultimate ability to reinforce the social and economic order is reflected in the massive fortifications around the NBPW phase sites and an increase in iron weapons. The most convincing evidence for conflict and aggression is seen in the Epic and Shastric literature, where there are also references to the use of espionage and other methods of observation.

Other aspects of status differentiation can be documented in the organisation of settlements into different sectors. Although relatively little horizontal excavation has been conducted at key sites, ritual structures and what have been called palace arcas have been identified. Further evidence from literary texts indicate that the settlements were divided into sectors according to the system of *varnas* and occupational specialisation.

### Discussion and Conclusion

At the end of the Regionalisation Era the foundations for a new phase of urbanism had been established and we see the emergence of numerous competing polities and city states throughout the Indo-Gangetic Region, eventually extending to Gujarat and the Deccan (Figure 14). This period of transition in the Gangetic region can be dated from around 1300/1000 B.C. to approximately 600/300 B.C., depending on how one defines the beginning of the Integration Era. Based on the archaeological evidence, it is clear that this period of more than 700 years was not a chaotic "Dark Age", but rather a time of reorganisation and expansion (Shaffer 1993). The data presented above, even though still incomplete, clearly demonstrate that no model of diffusion, migration or multiple waves can be used to explain the transition between the Indus Valley Tradition and the Indo-Gangetic Tradition.

The process of transition can be summarised as follows. First, the Harappan socio-ritual elites had lost their legitimation, and the vast regions that had once been integrated were split into different localised polities. Second, other cultural groups in the Gaṅgā-Yamunā Doab, who had been on the periphery of the Indus Tradition, began to build up regional networks of alliances, probably

based on kin related hereditary elites. These elites controlled land and cattle and eventually specific villages became centres of ritual and political power. Some of these villages began to control the trade of important resources such as iron and other minerals as well as agricultural produce. Over time we see the emergence of competing towns that become the capitals of new regional polities that are referred to as *janapada*. These *janapadas* were eventually integrated through political, economic and military action under Magadhan, and eventually Mauryan, rule.

The change of focus from the Indus to the Gangetic plains is a pattern that can be explained through core-periphery relations. A new social hierarchy based on a different set of belief systems, ritual practices, and language could not have developed within the surviving, but weakened infrastructure of Late Harappan towns and cities. On the other hand, the peripheral regions of the Gaṅgā-Yamunā and eventually the Middle to Lower Gaṅgā provided the necessary setting for the establishment of a new urban infrastructure. After the Gangetic cities had become strong they expanded trade networks back towards the Indus and across the Malwa plateau (Figure 15). The latter was not an important trade route until we see the establishment of cities in the Middle and Lower Gaṅgā, that needed to have more direct access to the important coastal cities of Gujarat and the sea routes to Arabia and the Horn of Africa.

The later historical events, the organisation of these cities and most importantly the socio-political, religious and linguistic aspects of the Indo-Gangetic Tradition are relatively well known (Prasad 1984; Roy 1983; Scharfe 1989; Thapar 1984). However, I feel that the processes through which the Indo-Gangetic Tradition evolves have been poorly understood and inadequately studied. The archaeological evidence can no longer be ignored and new models for cultural, religious and linguistic change need to be developed through a dialogue between linguists, archaeologists and historians.

### References

- Agrawal, D.P.  
1971 *The Copper Bronze Age in India*. New Delhi, Munshiram Manoharlal.  
1974 Alloying in the Copper Hoards. *Bulletin of Museums and Archaeology in Uttar Pradesh* 14, 13-18.  
1984 Metal technology of the Harappans. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 163-168. New Delhi, Archaeological Survey of India.
- Agrawala, R.C.  
1984 Aravalli, the major source of copper for the Indus Civilisation and Indus related cultures. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 157-162. New Delhi, Archaeological Survey of India.

- Agrawala, R.C. and Kumar, V.  
1982 Ganeshwar-Jodhpura Culture: new traits in Indian archaeology. In *Harappan Civilisation*, edited by G.L. Possehl, 125-134. New Delhi, Oxford University Press and IBH Publishing Co.
- Allchin, B.; Goudie, A.; and Hegde, K.T.M.  
1978 *The Prehistory and Palaeogeography of the Great Indian Desert*. New York, Academic Press.
- Bhan, K.K.  
1989 Late Harappan settlements of Western India, with specific reference to Gujarat. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 219-242. Madison, Wisconsin Archaeological Reports 2.
- Bharadwaj, H.C.  
1979 *Aspects of Ancient Indian Technology*. Delhi, Motilal Banarsidas.  
1985 Studies in ancient Indian technology: a review. *Puratattva* 13-14, 139-148.
- Chakrabarti, D.K.  
1977 Distribution of iron ores and the evidence of early iron in India. *Journal of the Economic and Social History of the Orient* 20.2, 166-184.  
1984-85 Iron and urbanisation: an examination of the Indian context. *Puratattva* 15, 68-74.
- Cleuziou, S. and Tosi, M.  
1989 The southeastern frontier of the ancient Near East. In *South Asian Archaeology 1985*, edited by K. Frifelt and P. Sørensen, 15-48. London, Curzon Press.
- Courty, M.A.  
1989 Integration of sediment and soil formation in the reconstruction of protohistoric and historic landscapes of the the Ghaggar plain, northwest India. In *South Asian Archaeology 1985*, edited by K. Frifelt and P. Sørensen, 255-259. London, Curzon Press.
- Dales, G.F. and Kenoyer, J.M.  
1977 Shell working at ancient Balakot, Pakistan. *Expedition* 19, 13-19.  
1986 *Excavations at Moenjo Daro, Pakistan: The Pottery*. Philadelphia, University Museum, University of Pennsylvania.  
1990a Excavation at Harappa-1988. *Pakistan Archaeology* 24, 68-176.  
1990b *Preliminary Report on the Fifth Season at Harappa, Pakistan, January 1 - March 31 1990*. University of California (Berkeley) and University of Wisconsin (Madison). Typescript.
- Dikshit, K. N.  
1981 The excavations at Hulas and further explorations of the upper Gaṅgā-Yamunā Doab. *Man and Environment* 5, 70-76.  
1984 Late Harappan in northern India. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 253-270. New Delhi, Archaeological Survey of India.
- Dutt, A.K. and Gelb, M.M.  
1987 *Atlas of South Asia*. Boulder (CO), Westview Press.
- Erdosy, G.  
1987 Early historic cities of northern India. *South Asian Studies* 3, 1-23.  
1988 *Urbanisation in Early Historic India*. BAR International Series S430. Oxford, B.A.R. Publications.
- Fairservis, W.A. Jr.  
1983 The script of the Indus Valley civilisation. *Scientific American* 248.3, 58-66.
- Fentress, M.A.  
1985 Water resources and double cropping in Harappan food production. In *Recent*

- Advances in Indo-Pacific Prehistory*, edited by V.N. Misra and P. Bellwood, 359-368. New Delhi, Oxford University Press and IBH Publishing Co.
- Flam, L.  
1981 *The Paleography and Prehistoric Settlement Patterns in Sind, Pakistan (ca. 4000-2000 B.C.)*. PhD dissertation. University of Pennsylvania.  
1986 Recent explorations in Sind: paleography, regional ecology and prehistoric settlement patterns. In *Studies in the Archaeology of India and Pakistan*, edited by J. Jacobson, 65-89. New Delhi, Oxford University Press and IBH Publishing Co.  
1991 Fluvial geomorphology of the lower Indus Basin (Sindh, Pakistan) and the Indus Civilisation. In *Himalayas to the Sea: Geology, Geomorphology and the Quaternary*, edited by J.F.J. Shroder. London, Routledge.  
1992 Excavations at Ghazi Shah, Sindh, Pakistan. In *Harappan Civilisation*. 2nd edition, edited by G.L. Possehl, New Delhi, Oxford University Press and IBH Publishing Co..
- Francfort, H.-P.  
1984 The early periods of Shortugai (Harappan) and the Western Bactrian culture of Dashly. In *South Asian Archaeology 1981*, edited by B. Allchin, 170-175. Cambridge, Cambridge University Press.  
1989a *Fouilles de Shortugai: Recherches sur L'Asie Centrale Protohistorique*. Paris, Diffusion de Boccard.  
1989b The Indo-French archaeological project in Haryana and Rajasthan. In *South Asian Archaeology 1985*, edited by K. Frifelt and P. Sørensen, 260-270. London, Curzon Press.
- Gentelle, P.  
1986 Landscapes, environments and irrigation: hypotheses for the study of the 3rd and 2nd millennia B.C.. *Man and Environment* 10, 101-110.
- Halim, M.A. and Vidale, M.  
1984 Kilns, bangles and coated vessels: ceramic production in closed containers at Moenjodaro. In *Interim Reports. Volume 1*, edited by M. Jansen and G. Urban, 63-97. Aachen and Rome, Rheinisch-Westfälische Technische Hochschule and Istituto Italiano per il Medio ed Estremo Oriente.
- Harper, E.B.  
1959 Two systems of economic exchange in village India. *American Anthropologist* 61, 760-778.
- Jacobson, J.  
1986 The Harappan Civilisation: an early state. In *Studies in the Archaeology of India and Pakistan*, edited by J. Jacobson, 137-174. New Delhi, Oxford University Press and IBH Publishing Co.
- Jarrige, J.-F.  
1973 La fin de la civilisation Harappéenne. *Paléorient* 1.2, 263-287.  
1981 Economy and society in the Early Chalcolithic/Bronze Age of Baluchistan: new perspectives from recent excavations at Mehrgarh. In *South Asian Archaeology 1979*, edited by H. Härtel, 93-114. Berlin, Dietrich Reimer Verlag.  
1985 Continuity and change in the North Kachi Plain (Baluchistan, Pakistan) at the beginning of the second millennium B.C.. In *South Asian Archaeology 1983*, edited by J. Shotsmans and M. Taddei, 35-68. Naples, Istituto Universitario Orientale.  
1988 Les cités oubliées de l'Indus: introduction. In *Les cités oubliées de l'Indus*, edited by J.-F. Jarrige, 13-37. Paris, Musée National des Arts Asiatiques Guimet.

- Jarrige, J.-F. and Santoni, M.  
1979 *Fouilles de Pirak*. 2 volumes. Paris, Diffusion de Boccard.
- Joshi, J.P.  
1972 Exploration in Kutch and excavation at Surkotada and new light on Harappan migration. *Journal of the Oriental Institute, MS University of Baroda* 22.1-2, 98-144.  
1978 Interlocking of Late Harappan culture and Painted Grey Ware culture in the light of recent excavations. *Man and Environment* 2, 98-101.
- Joshi, J.P. and Bala, M.  
1982 Manda: A Harappan site in Jammu and Kashmir. In *Harappan Civilisation*, edited by G.L. Possehl, 185-196. New Delhi, Oxford University Press and IBH Publishing Co.
- Joshi, J.P. and Parpola, A. (ed.)  
1987 *Corpus of Indus Seals and Inscriptions*. *Annales Academiae Scientiarum Fennicae, Sarja - Ser. B, Nide - Tom. 239 & Memoirs of the Archaeological Survey of India, No. 86*. Helsinki, Suomalainen Tiedeakatemia.
- Kenoyer, J.M.  
1983 *Shell Working Industries of the Indus Civilisation: An Archaeological and Ethnographic Perspective*. PhD dissertation. University of California-Berkeley.  
1984a Chipped stone tools from Moenjodaro. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 118-131. New Delhi, Archaeological Survey of India.  
1984b Shell working industries of the Indus Civilisation. *Paléorient* 10, 49-63.  
1986 The Indus bead industry: contributions to bead technology. *Ornamet* 10, 18-23.  
1989 Socio-economic structures of the Indus Civilisation as reflected in specialised crafts and the question of ritual segregation. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 183-192. Madison, Wisconsin Archaeological Reports 2.  
1991a Harappan craft specialisation and the question of urban segregation and stratification. *Eastern Anthropologist* 44.3-4.  
1991b The Indus Valley tradition of Pakistan and western India. *Journal of World Prehistory* 5, 331-385.  
1992 Socio-ritual artefacts of Upper Palaeolithic hunter-gatherers in South Asia. In *South Asian Archaeological Studies*, edited by G.L. Possehl, 227-240. New Delhi, IBH Publishing Co.
- Kenoyer, J.M.; Bhan, K.K.; and Vidale, M.  
1993 *Agate Beadmaking: An Ethnoarchaeological Study*. In Preparation.
- Kenoyer, J.M. and Miller, H.M.-L.  
1993 Metal technologies of the Indus Valley tradition in Pakistan and Western India. In *The Emergence and Development of Metallurgy*, edited by V.C. Pigott, Philadelphia, University Museum.
- Kenoyer, J.M.; Vidale, M.; and Bhan, K.K.  
1991 Contemporary stone bead making in Khambhat, India: patterns of craft specialisation and organisation of production as reflected in the archaeological record. *World Archaeology* 23.1, 44-63.
- Lal, M.  
1979-80 The date of Painted Grey Ware culture. *Bulletin of the Deccan College* 39, 65-77.  
1985 The settlement pattern of the Painted Grey Ware culture of the Gaṅgā Valley. In *Recent Advances in Indo-Pacific Prehistory*, edited by V.N. Misra and P. Bellwood, 373-379. New Delhi, Oxford University Press and IBH Publishing Co.

- 1986 Iron tools, forest clearance and urbanisation in the Gangetic plains. *Man and Environment* 10, 83-90.
- Lamberg-Karlovsky, C.C.  
1986 The emergence of writing: Mesopotamia, Egypt and the Indus Civilisation. *Middle American Research Institute* 57, 149-158.
- Lambrick, H.T.  
1964 *Sind: A General Introduction*. Hyderabad, Sindhi Adabi Board.
- Mackay, E.J.H.  
1938 *Further Excavations at Mohenjodaro*. New Delhi, Government of India.  
1943 *Chanhu-Daro Excavations 1935-36*. New Haven, American Oriental Society.
- Mainkar, V.B.  
1984 Metrology in the Indus Civilisation. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 141-151. New Delhi, Archaeological Survey of India.
- Mann, M.  
1986 *The Sources of Social Power: A History of Power from the Beginning to AD. 1760*. Cambridge, Cambridge University Press.
- Marshall, J.H.  
1931 *Mohenjo-daro and the Indus Civilisation*. 3 volumes. London, A. Probsthain.
- McCarthy, B. and Vandiver, P.B.  
1990 Ancient high-strength ceramics: fritted faience bangle manufacture at Harappa. In *Materials Issues in Art and Archaeology, Vol. 2*, edited by P.B. Vandiver, J. Druzik and G.S. Wheeler, 495-510. Pittsburgh, Materials Research Society.
- Misra, V.N.  
1984 Climate, a factor in the rise and fall of the Indus Civilisation: evidence from Rajasthan and beyond. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 461-490. New Delhi, Archaeological Survey of India.
- Mughal, M.R.  
1974 New evidence of the Early Harappan culture from Jalilpur, Pakistan. *Archaeology* 27, 106-113.  
1982 Recent archaeological research in the Cholistan desert. In *Harappan Civilisation*, edited by G.L. Possehl, 86-95. New Delhi, Oxford University Press and IBH Publishing Co.  
1984 The post-Harappan phase in Bahawalpur District, Pakistan. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 499-504. New Delhi, Archaeological Survey of India.  
1985 The significance of some pre- and protohistoric discoveries in the Karakorum Region. *Journal of Central Asia* 8.2, 213-235.  
1990 The decline of the Indus Civilisation and the late Harappan period in the Indus Valley. *Lahore Museum Bulletin* 3.2: 1-18.  
1992 Jhukar and the Late Harappan cultural mosaic of the Greater Indus Valley. In *South Asian Archaeology 1989*, edited by C. Jarrige, 213-231. Madison, Prehistory Press.
- Nagaraja Rao, M.S. (ed.)  
1985 *Indian Archaeology - A Review 1982-83*. Delhi, Archaeological Survey of India.
- Pande, B.M.  
1984 Harappan art: an experiment in third dimension. In *Frontiers of the Indus Civilisation*, edited by B.B. Lal and S.P. Gupta, 105-108. New Delhi, Archaeological Survey of India.
- Parpola, A.  
1986 The Indus script: a challenging puzzle. *World Archaeology* 17.3, 399-419.

- Possehl, G.L.  
1977 The end of a state and continuity of a tradition. In *Realm and Region in Traditional India*, edited by R.G. Fox, 234-254. Durham, Duke University Program in South Asian Studies.
- 1980 *Indus Civilisation in Saurashtra*. Delhi, B.R. Publishing Co.
- Possehl, G.L. and Raval, M.H.  
1989 *Harappan Civilisation and Rojdi*. New Delhi, Oxford University Press & IBH and AHS.
- Prasad, K.  
1984 *Cities, Crafts and Commerce under the Kusanas*. Delhi, Agam Kala Prakashan.
- Rao, S.R.  
1979 *Lothal: A Harappan Port town (1955-62)*. Volume 1. Memoirs of the Archaeological Survey of India 78. New Delhi, Archaeological Survey of India.
- 1985 *Lothal: A Harappan Port town (1955-62)*. Volume 2. Memoirs of the Archaeological Survey of India 78. New Delhi, Archaeological Survey of India.
- Ratnagar, S.  
1986 An aspect of Harappan agriculture production. *Studies in History* NS 2, 137-153.
- Rissman, P.C.  
1989 The organisation of seal production in the Harappan Civilisation. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 159-170. Madison, Wisconsin Archaeological Reports 2.
- Roy, T.N.  
1983 *The Ganges Civilisation: A Critical Archaeological Study of the Painted Grey Ware and Northern Black Polished Ware Periods of the Gaṅgā Plains of India*. New Delhi, Ramanand Vidya Bhawan.
- 1986 *A Study of Northern Black Polished Ware Culture: An Iron Age Culture of India*. New Delhi, Ramanand Vidya Bhawan.
- Scharfe, H.  
1989 *The State in Indian Tradition*. Leiden, E. J. Brill.
- Shaffer, J.G.  
1987 Cultural development in the eastern Punjab. In *Studies in the Archaeology of India and Pakistan*, edited by J. Jacobson, 195-236. New Delhi, Oxford University Press and IBH Publishing Co.
- 1988a One Hump or Two: The Impact of the Camel on Harappan Society. In *Orientalia Josephi Tucci Memoriae Dicata*. Volume 3, edited by G. Gnoli and L. Lanciotti, 1315-1328. Rome, Istituto Italiano per il Medio ed Estremo Oriente.
- 1988b Reurbanisation: the eastern Punjab and beyond. In *Urban Form and Meaning in South Asia: The Shaping of Cities from Prehistoric to Precolonial Times*, edited by H. Spodek and D.M. Srinivasan, 53-68. Washington, D.C, National Gallery of Art.
- 1991 The Indus Valley, Baluchistan and Helmand Traditions: Neolithic through Bronze Age. In *Chronologies in Old World Archaeology*. 3rd Edition. Volume 1, edited by R. Ehrlich, 441-464. Chicago, University of Chicago Press.
- Shaffer, J.G. and Lichtenstein, D.A.  
1989 Ethnicity and change in the Indus Valley cultural tradition. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 117-126. Madison, Wisconsin Archaeological Reports 2.
- Sharma, G.R.; Misra, V.D.; Mandal, D.; Misra, B.B.; and Pal, J.N.  
1980 *Beginnings of Agriculture*. Allahabad, Abinash Prakashan.

- Singh, P.  
1986 The Narhar hoard of punch marked coins: a preliminary report. *The 10th International Congress of Numismatics*. London, International Association of Professional Numismatists, 465-469.
- Singh, R.N.  
1989 *Ancient Indian Glass: Archaeology and Technology*. Delhi, Parimal Publications.
- Srinivasan, S.  
1979 *Mensuration in Ancient India*. Delhi, Ajanta Publications.
- Stech, T. and Pigott, V.  
1986 The metals trade in southwest Asia in the third millennium B.C.. *Iraq* 48, 39-64.
- Thakur, U.  
1972 A study of barter and exchange in ancient India. *Journal of the Economic and Social History of the Orient* 15,3: 297-315.
- Thapar, B.K.  
1986 *Recent Archaeological Discoveries in India*. Paris, UNESCO.
- Thapar, R.  
1984 *From Lineage to State: Social Formations in the Mid-First Millennium B.C. in the Gaṅgā Valley*. Bombay, Oxford University Press.
- Vats, M.S.  
1940 *Excavations at Harappa*. Delhi, Government of India Press.
- Vidale, M.  
1989 Specialised producers and urban elites: on the role of craft industries in Mature Harappan urban contexts. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 171-182. Madison, Wisconsin Archaeological Reports 2.
- Vidale, M. and Bondioli, L.  
1986 Architecture and craft production across the surface palimpsest of Moenjodaro: some processual perspectives. *Arqueologia Espacial* 8, 115-138.
- Weber, S.A.  
1991 *Plants and Harappan Subsistence: An Example of Stability and Change from Rojdi*. New Delhi, Oxford University Press & IBH Publishing Co.
- 1992 South Asian archaeobotanical variability. In *South Asian Archaeology 1989*, edited by C. Jarrige, 283-290. Madison, Prehistory Press.
- Weisgerber, G.  
1983 Copper production during the third millennium B.C. in Oman and the question of Makkah. *Journal of Oman Studies* 6,2, 269-276.
- 1984 Makkah and Meluhha: Third millennium B.C. copper production in Oman and the evidence of contact with the Indus Valley. In *South Asian Archaeology 1981*, edited by B. Allchin, 196-201. Cambridge, Cambridge University Press.
- Wilhelmy, H.  
1969 Das Urstromtal am Ostrand der Indusebene und das Saraswati Problem. *Zeitschrift für Geomorphologie* Sup. Bund 8, 76-91.
- Wright, R.P.  
1989 The Indus Valley and Mesopotamian civilisations: a comparative view of ceramic technology. In *Old Problems and New Perspectives in the Archaeology of South Asia*, edited by J.M. Kenoyer, 145-156. Madison, Wisconsin Archaeological Reports 2.





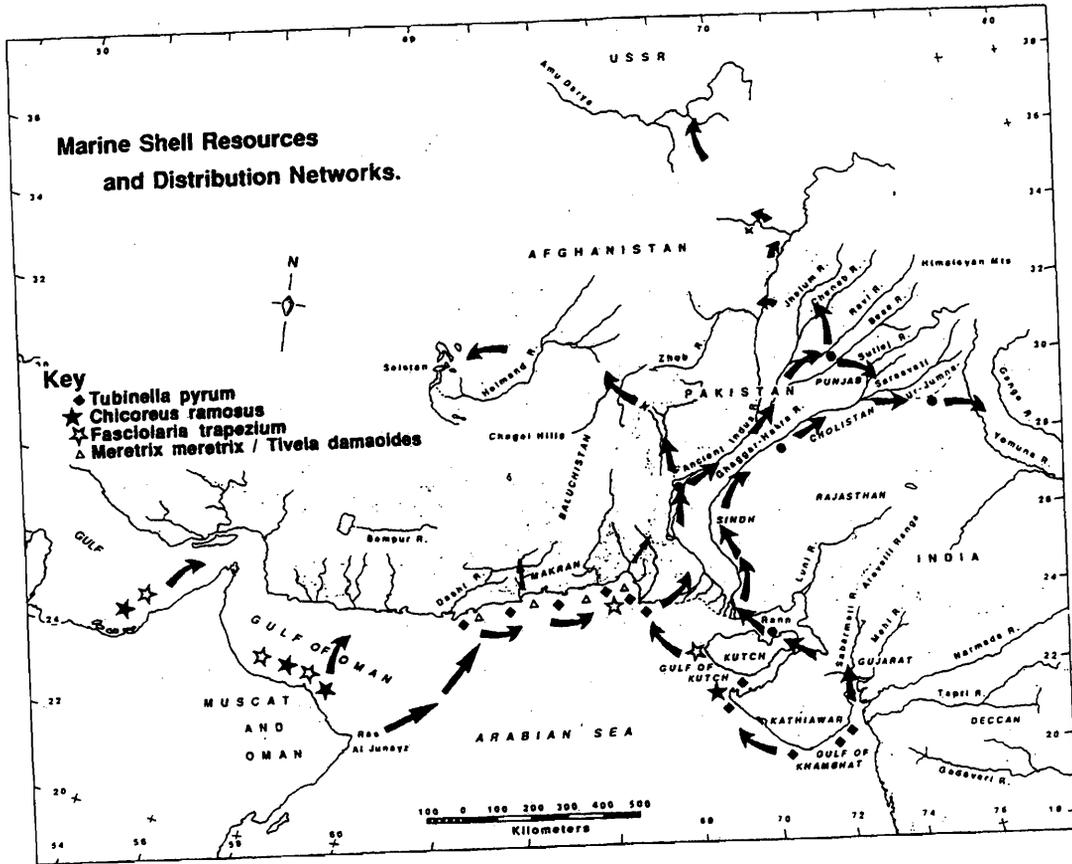


Figure 4

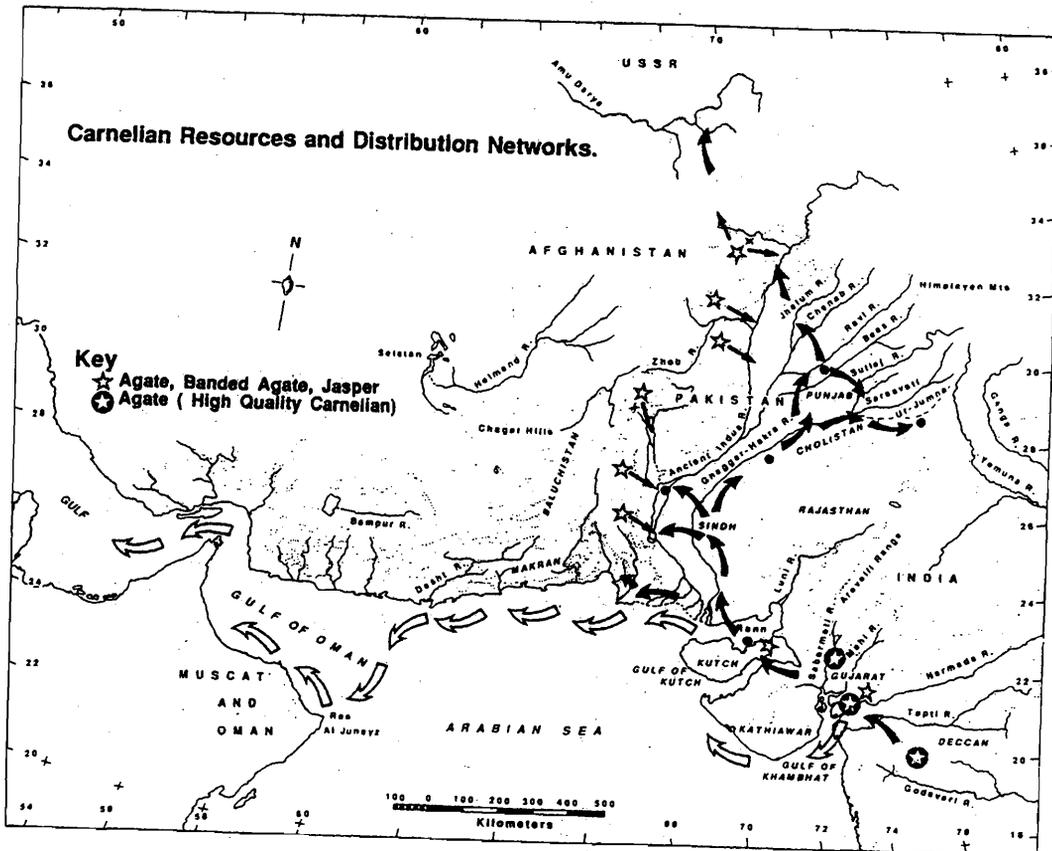


Figure 5

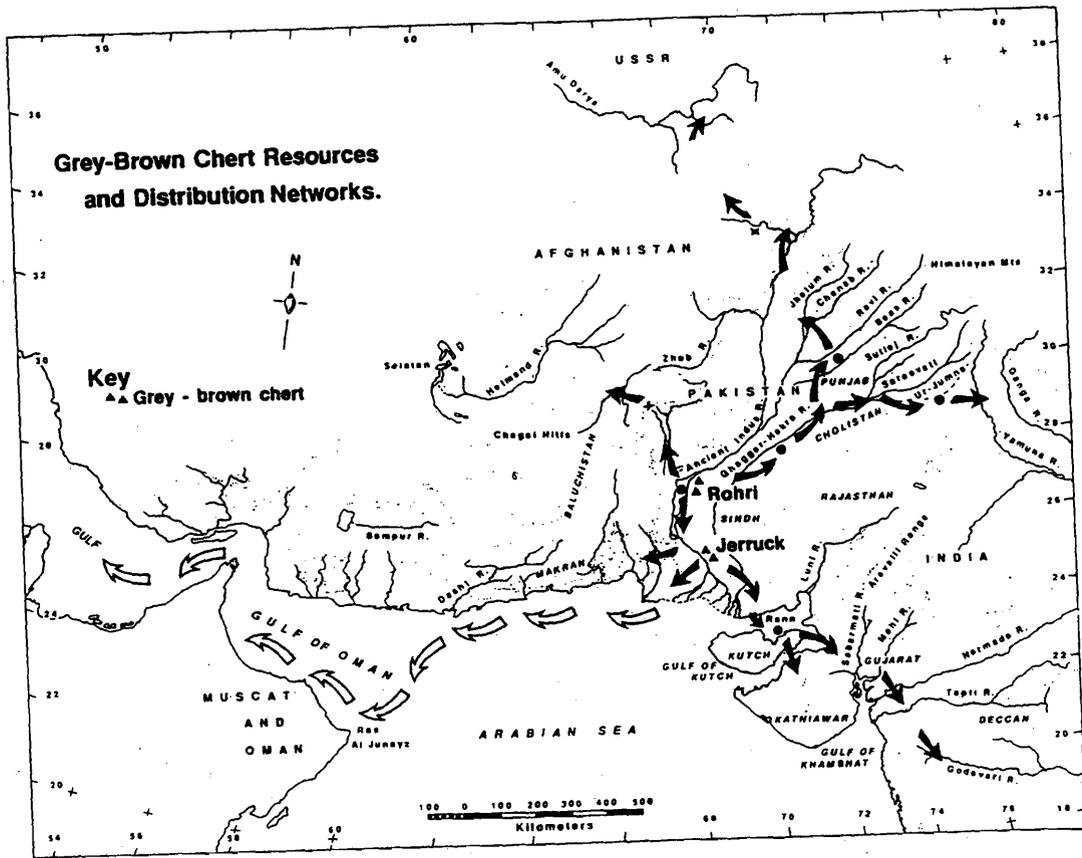


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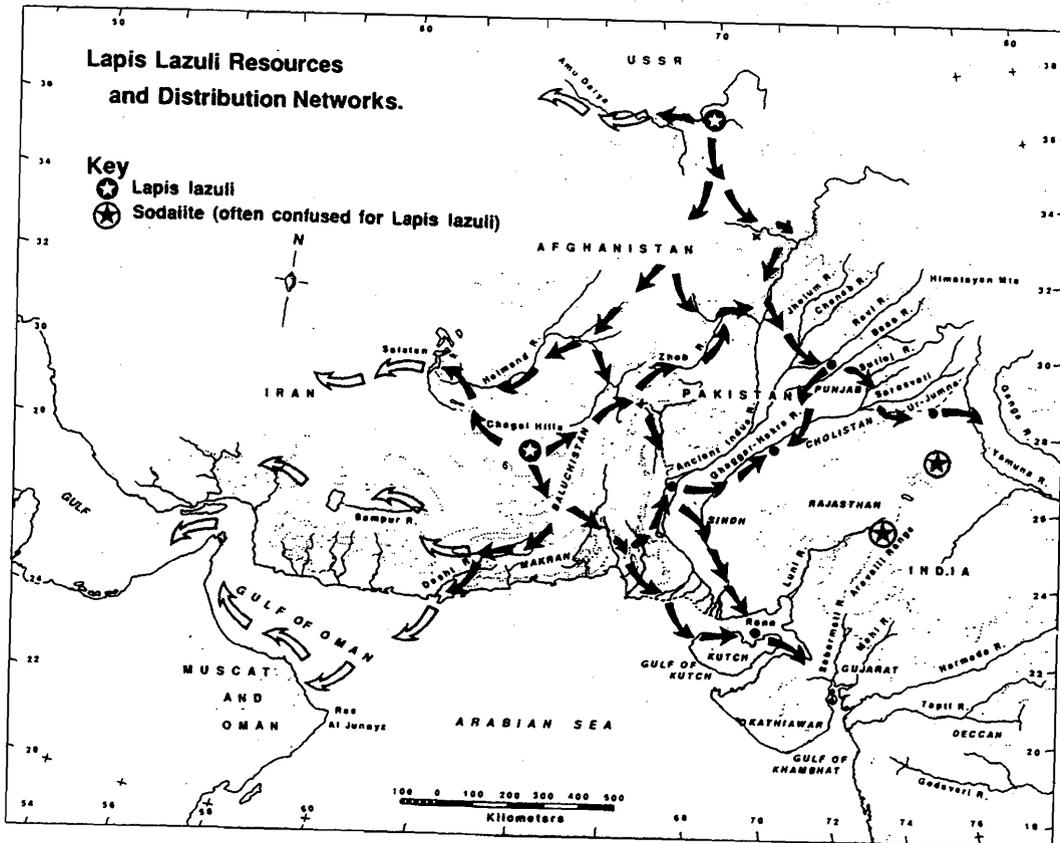


Figure 7





Figure 10a

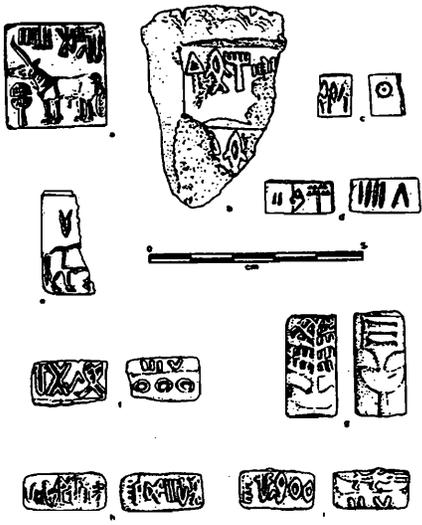


Figure 10b

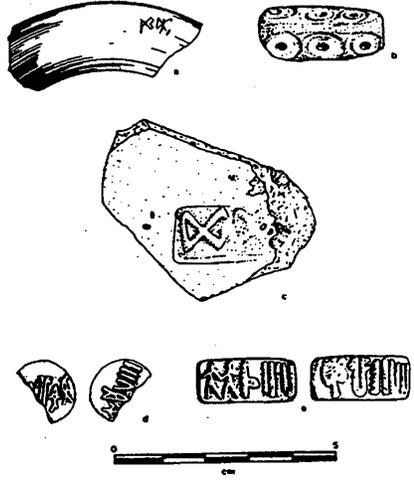


Figure 10c

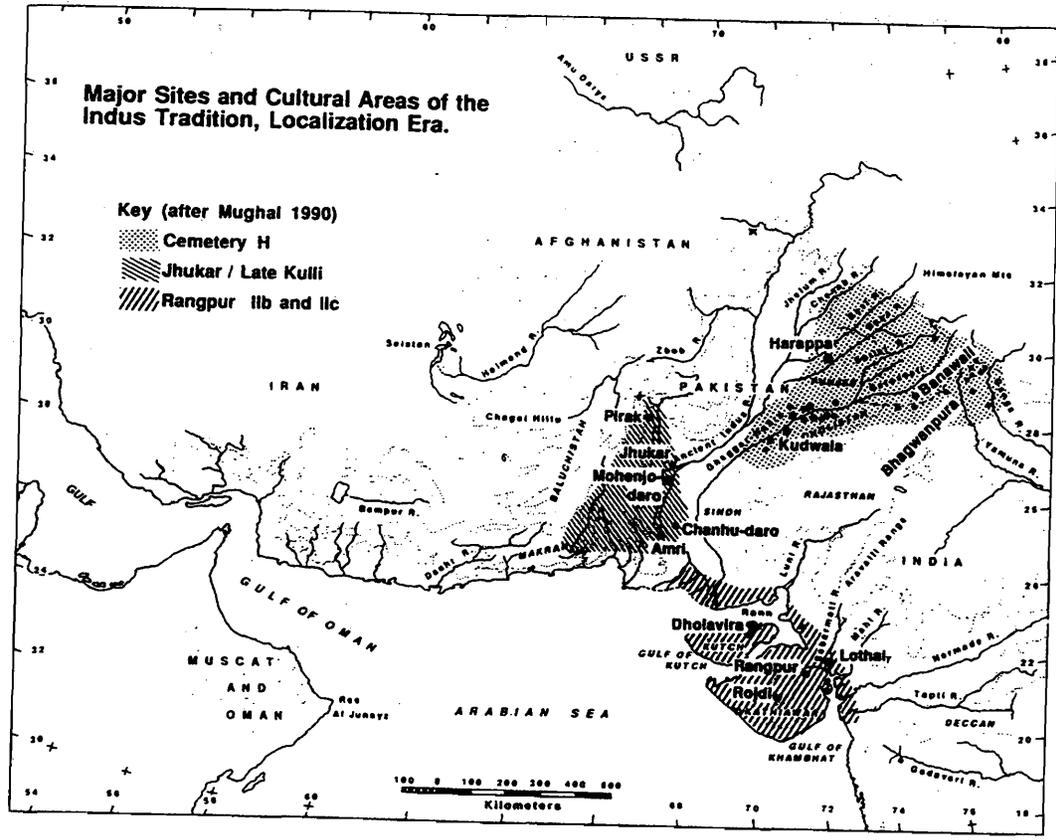


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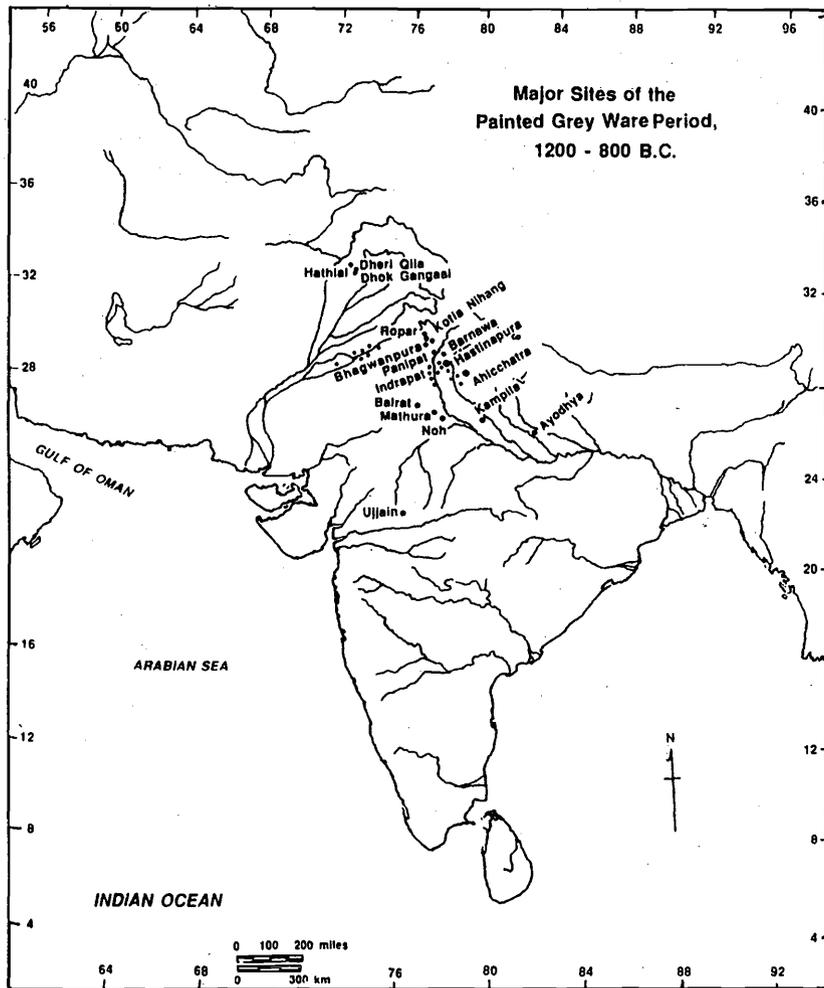


Figure 12

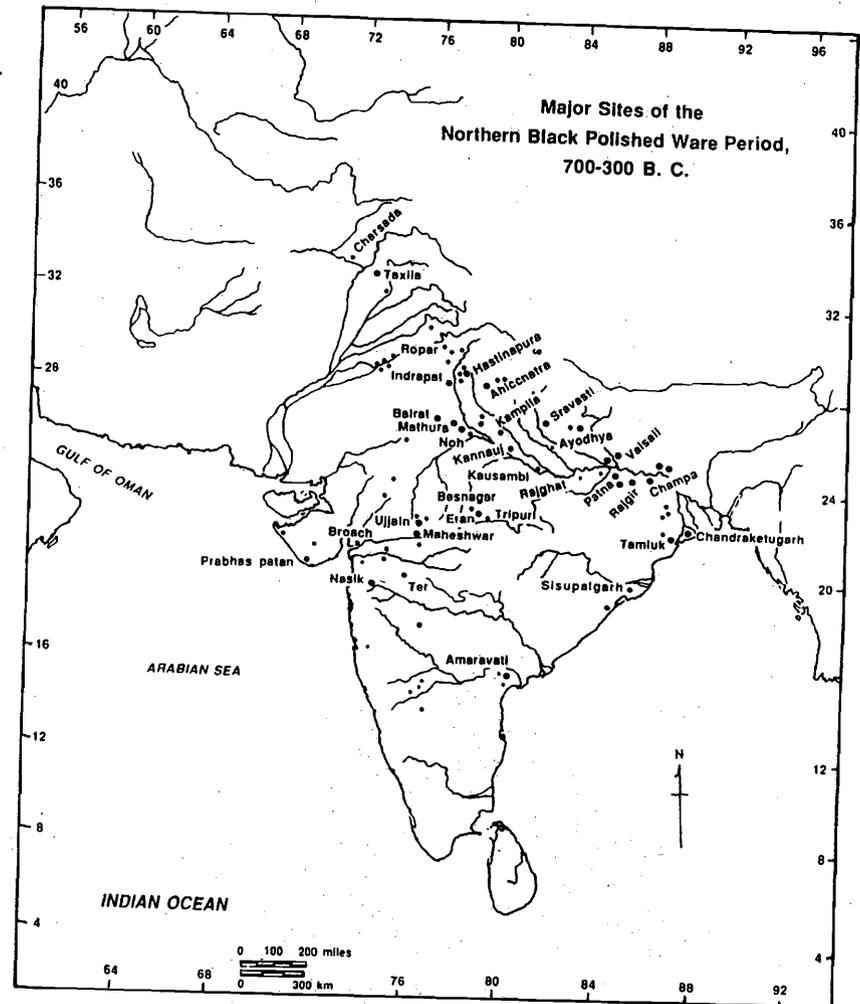


Figure 13

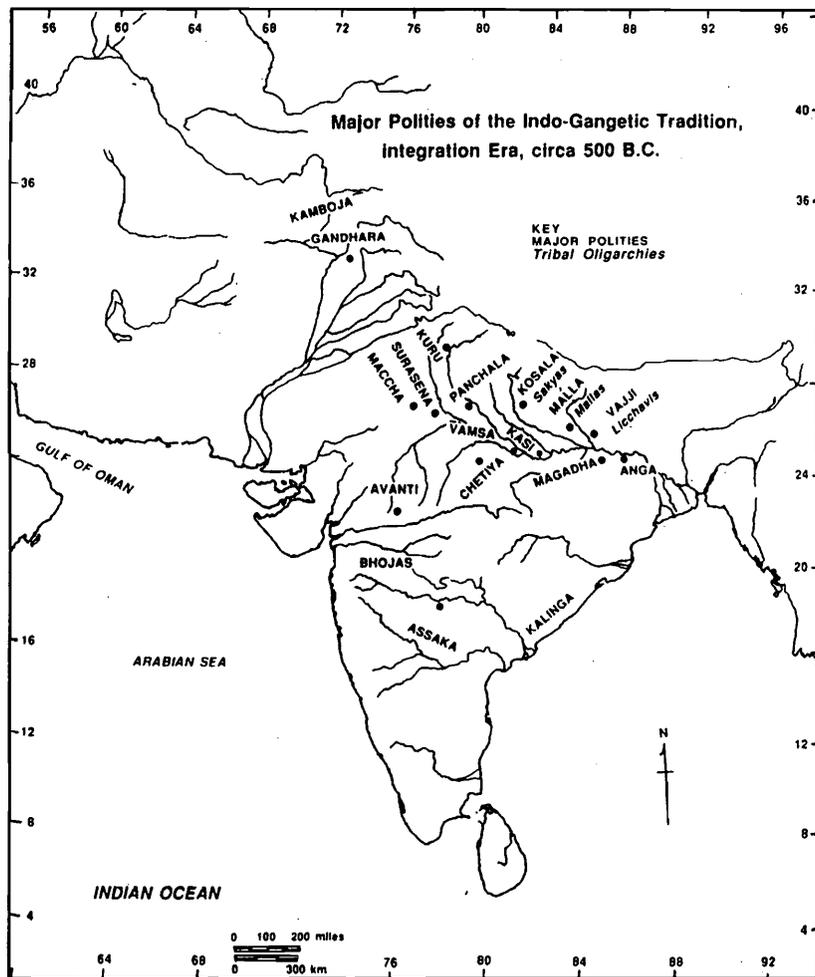


Figure 14

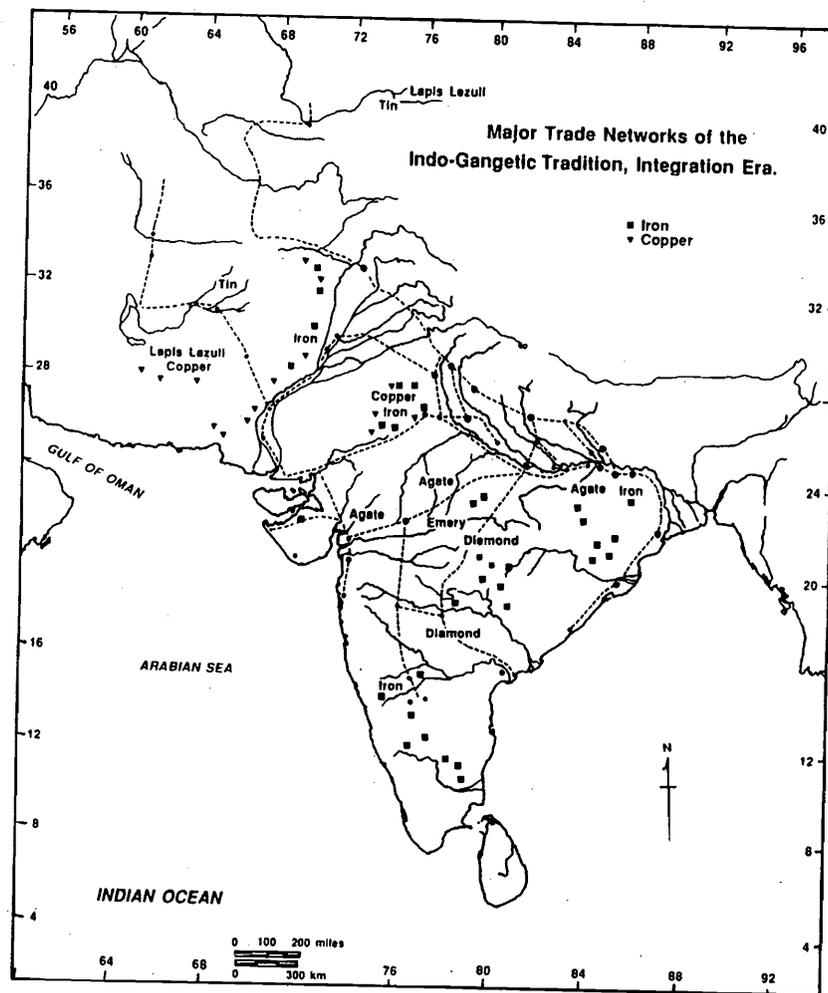


Figure 15