CHAPTER V

Chanhudaro, Mohenjodaro and Lothal as Craft Centres

In the previous chapter, we attempted to study the production and distribution of manufactured objects through the Harappan map. It is clear that not all settlements engaged in craft production and that some settlements focused on a single craft. In contrast, some sites reveal that a number of crafts had been practised by their inhabitants. Sites belonging to this latter category are Mohenjodaro, Chanhudaro, Lothal and Harappa. In this chapter, we will focus on three craft centres, Mohenjodaro, Chanhudaro and Lothal. An intra-site survey may reveal the role and function of craft production within the three centres. In a larger context, the role of these centres within the Harappan region as a whole will be considered. The functions of the three centres will also help to explicate the place of craft production in the Harappan economy. First we will briefly go into details for craft activities for the three centres. This data has already been presented in the form of tables in the preceding chapter.

Before we begin with the Chanhudaro evidence for craft production, it may be noted that the preservation of structures at the site was particularly poor. Very few
house walls are left standing and it is primarily the paved bathrooms and privies that give an indication of the location of the former structures. Also, the settlement of Chanhu Daro did not die out with the Harappan occupation but was subsequently reoccupied by the Jhukar people followed by people of the Jhangar culture.

At Chanhu Daro the various processes incorporated in bead making appear to have been practised all over Mound II (See map I at the end of the chapter). Nodules of raw material are noted at loci 215, 125, 443 and 306 (Mackay 1943: 320, 49, 50, 209). Chalcedony and carnelian geode deposits were also found in Square 8/F in the surface survey (Vidale 1989: 175).

- Ample evidence of unfinished beads are available. In room 215, a number of unfinished disc-shaped carnelian beads were found in various stages of manufacture (at 215, no stone cylinder beads were found and presumably this variety of bead was produced elsewhere). Other loci for unfinished beads are 208, 259, 184, 160, 150, 136, 394, 31 in Trench D (I), 46 in Trench F (I) and 43 in Trench B (5) (Mackay 1943: 320, 314, 320, 320, 320, 204, 314, 201, 201). One unfinished bead was also found on Mound III (Majumdar 1934: 40, 44).

- Stone drills for the drilling of beads are noted at numerous loci - 215, 292, 293, 393, 450, 103, 108, 105,

- Hones probably used for grinding were picked up from 214, 393, 439, 145, 130 (Mackay 1943: 44, 40, 320, 318, 45) and from unspecified loci in Squares 8/F, 9/F and 10/G. 2 hones were found on Mound III (Majumdar 1934: Pl. XIX, 33, 34).

- The rejected bead found at 394 (Mackay 1943: 314) broken during drilling was near locus 450 where two stone drills were found.

- Apart from structure 215, some other loci give evidence of the practice of more than one process; these are 393 where stone drills were found along with sandstone hones for grinding; nearby, a rejected etched carnelian bead was found at 226. At 125, some raw material was found along with stone drills. A rejected etched carnelian bead was also found here. Thus, apart from these few loci, bead making processes appear to have been dispersed all over Mound II.

- Chalcedony and carnelian bead making wasters were found in Squares 10/D, 9/E, 9/F and 10/E (Vidale 1989: 175).

Steatite beads of various kinds were also produced at Chanhdaroo. The production of micro beads and wafer beads

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are definitely attested to. In Room 215, apart from stone beads, steatite beads too were produced. A concreted mass of micro beads found in an unglazed state has raised the issue of the heat facility leading from room 215 being used to glaze the beads (Mackay 1943: 42). It is conjectured that the copper/bronze bead tools found were used to produce the beads by forcing a steatite paste through the tools and cutting beads off as the paste emerged. Findspots of such bead tools could point to the locus of a steatite bead manufacturer. 10 specimens of such tools were found in room 215 (Mackay 1943: 187, 308) and two from 468 (Mackay 1943: 308). The production of wafer shaped beads is noted in room 215, where several were found in an unfinished state. Unfinished disc beads were also noted in courtyard 190, immediately southeast of 215 (Mackay 1943: 41). Steatite blocks were found from various unspecified loci on Mound II, bearing traces of cut marks and still in their original colours of yellow, grey and black (Mackay 1943: 209), but these could have been used for seal making too.

Copper/bronze working is noted largely in the eastern part of the mound II at Chanhudaro and that too in the vicinity of room 215 (Map II). To the northeast of 215 is courtyard 297, where two collections of copper/bronze tools and utensils were found which were not just hoards of metal objects but specifically hoards belonging to a
metal worker as an ingot was found with one collection in 297 (Mackay 1943: 43), an unfinished chisel at 228 (Mackay 1943: 43) and a chisel folded over to be re-used at 227 (Mackay 1943: 43). About 7.5 m away, at two loci, one near 213 and the other northeast of 212 revealed two collections of metal objects. The collection northeast of 212 (Mackay 1943: 41) included a casting. The two collections could belong to a metal worker whose house, but for the privy at 212, had disappeared, or they could have a connection with the metal working undertaken at and in the vicinity of 297. Southwest of 212 was found an unfinished bronze casting at 208 (Mackay 1943: 177). Apart from this seeming localization, other pieces of evidence point to a dispersed craft. At 284 may have been a metal worker's house for here metal objects and unfinished castings were found (Mackay 1943: 44). Apart from this, in the western portion of Mound II, an unfinished jar was found at locus 201 (Mackay 1943: 177).

In view of the concentration of metal at and near 297, it appears probable that metal working was practised in the courtyard 297. As for where the craftsmen may have lived, it is possible that room 183 which opened on to the courtyard could have been a dwelling of a metal worker. Mackay (1943: 44) feels that this room was the living area of the craftsman making beads and seals, but on account of the metal finds from 287, it seems more probable for the
No facilities such as furnaces have been uncovered at Chanhudaro. Nor do we have any evidence of ore smelting activities being undertaken at this site. The surface survey too revealed the absence of even a piece of slag or crucible (Vidale 1989: 178). On the available evidence, one could postulate that the Chanhudaro metal craftsmen worked on refined metal or in the absence of a heating facility, that the areas for metal working have not yet been uncovered at the site. In the latter case, the evidence from 297 could point to the dwelling area of a metal worker who hoarded the various collections of copper/bronze objects found here.

Seal making appears to have been dispersed over the periphery of Mound II (Map III). Except for locus 286 (Mackay 1943: 43) and 223 (Mackay 1943: 145), all other loci of unfinished seals are at places which skirt the periphery of the buildings at the centre of Mound II. Unfinished seals were found at unspecified loci in Squares 7/F and 9/F. Finds of unfinished seals at loci 459 and 240 (Mackay 1943: 145) probably belonged to the same craftsman, as 240 was the privy of 459. At another locus, 121, as many as three unfinished seals were found indicating the work of a seal cutter (Mackay 1943: 50), though we have no architectural correlations for the find.
to reconstruct this working area. Three other finds of unfinished seals are from Trenches E (1), F (2) and B (5) in the northern part of the mound (Mackay 1943: 145).

As with seal making, shell working debris was also dispersed over the mound (Map IV). Evidence of unfinished objects are available from loci 211, 297, 153, 226, 197, 171 and 181 (Mackay 1943: 316, 43, 40, 43, 45, 319, 48). Of these, four loci were near the centre of the mound. Evidence from each locus was limited to a single unfinished object, except for locus 181, where four bangles were recovered in an unfinished state. However it is likely that the major locus of shell working was in a different part of Chanhudaro. Earlier exploratory efforts by Majumdar (1934: 38) recovered numerous pieces of conch shells, namely columellae and cores, from his trenches I and II on Mound III. These could point to an area for bangle manufacture or to a hoard of columellae kept for further use. Shell manufacturing wasters were also found on the surface in squares 4/D, 5/D, 6/B and 10/C (Vidale 1989: 175).

For other crafts practised at Chanhudaro we have sparse evidence. Faience production was presumed to have been undertaken here on the basis of the finds of paste plaques and cylinders found at three or four loci - at 171, a number of these objects were found along with ash and dark coloured soil (Mackay 1943: 48). Apart from the
presence of ash, no actual facility for the glazing process was found. A number of long and slender rods were found in unspecified loci and are considered to have been the first step in the production of segmented faience beads (Mackay 1943: 205). An unbored faience bead was found at 244 (Mackay 1943: 210), quite separate from other loci where paste cylinders were found. At locus 174, a number of unfinished beads were found. Despite the report being unclear about the material of these beads, it is possible that they were of paste as the catalogue refers to a paste bead found at the same level. According to Mackay (1943: 63) some faience production was also undertaken on Hound I, for which no details are available. In the surface survey, faience smelting wasters were found in Squares 8/B and 8/E (Vidale 1989: 175).

As for the production of weights, about 6 unfinished examples were retrieved at Chanhudaro, though the loci of all are not known. There is a reference by Mackay (1943: 236) to a number of misshapen weights being found, which could point to a greater scale of weight manufacture than would appear from the catalogue.

Chanhudaro thus gives evidence of a localization as regards craft production. Craft activities are concentrated largely on what is termed Mound II, the easternmost of the three mounds all of which were part of
one mound originally. In this part of the site were noted evidence for all the major crafts of metallurgy, bead making (including etched carnelian and long barrel-cylinder carnelian beads), seal carving, weight making, faience production and some shell cutting.

Such a pattern of production could be due to various reasons. First it does appear, from the information in Chapter III, that separate processes within the craft of bead making required separate distinct skills. Some skills are specialized while some are not so technically exacting and can be undertaken as household work. Within the craft of bead making, very possibly flaking and shaping of the beads would have been done by one individual, while drilling would have been done by another, or by the first if he acquired the skill. The task of polishing the stone beads into their final form could be done anywhere and by anyone with no specialized skills involved. Also, since large facilities are not required for bead making, this craft could well be organized familially, with skilled household members coordinating with those performing tasks requiring little skill. Another reason, though difficult to establish archaeologically, could be that different production processes within a single craft could get embedded within separate social groups. This brings up the question of hereditary skills in particular crafts, even if we were to
rule out an organization on the lines of a guild which would not have existed in a non-market economy.

On the other hand, we can also have craft working largely within a compact area. This could indicate sponsorship of craft production by an interested authority. A number of production processes were practised in room 215, such as preliminary chipping and shaping of the raw material to form bead blanks, and drilling of beads as evidenced by a stone drill. A hone found just outside the northeastern doorway of the structure indicates that grinding too was undertaken inside room 215. As regards polishing, the possibilities of finding evidence for such a process are remote as non-durable materials such as leather or wood would have been used. The evidence of a number of activities concerning bead making found in this structure could indicate that this was a workshop.

Moreover structure 215 does not appear to have been of a residential nature. It seems to have a separate existence from the rooms and walls comprising loci 178, 190, 207 and 208, immediately to the southeast. Even room 183 which Mackay (1943: 44) thought belonged to the man in charge of the production of beads and seals, is not directly connected by a doorway with 215 but only through courtyard 297. In view of the large and varied contents of room 215, Vidale (1989: 177) conceived of this
structure and its environs as comprising "warehouses for stockpiling and regulating the flow of materials and commodities." Whatever be the use, this structure with its contents and suggested functions and location in a predominant place on a main street in the eastern part of the town (Mound II) clearly appears to have been non-residential in antiquity. In contrast, craft working in other parts of Mound II was probably practised in the dwelling areas and not in separate workshops. This is assumed in the face of evidence of craft activities being undertaken in residential structures with bathrooms and privies and the association of toys and domestic artifacts.

Continuing on the theme of architecture, we have little evidence of the facilities required for some crafts, primarily the heat facility. There is one exception. Leading northwestwards from room 215, were a series of flues and cross-flues which formed part of a heating facility, totally dissimilar to heating facilities from other Harappan sites. Over the flues, a layer of a single course of bricks was laid and over this were built three compartments of varying sizes probably originally having their doorways on the southwestern side. On the other side was a passage (286) leading by two steps to a pavement (287) at the opposite end of the building from 215. The absence of associated material in the facility.
gives no clue as to its probable use. It should be noted that a number of crafts need a heat facility at some stage in their manufacturing process. As for stone bead making, agate has to be heated at various stages of the production process to obtain the clear red of carnelian; steatite beads and seals require heat for the glazing process; metallurgy requires heat for annealing and for melting the metal for casting; and faience production requires heat for fusing of the raw materials. Now in the immediate vicinity of the heat facility are unfinished stone and steatite beads, an unfinished seal, and evidence for metal working. Metallurgy can be deleted from the list as this craft would require an open fire whose heat could be directed onto ingots or crucibles filled with metal. Heat treatment of agate too may require more direct heat than could be obtained through the flues. It appears more likely that the facility could have been used for the glazing of steatite.

Factors Involved in the Location of Chanhudaro

Having considered the evidence for various crafts obtained from Chanhudaro, the question of the location of Chanhudaro comes into focus. Why was Chanhudaro located where it is? By what factors was the location of Chanhudaro governed? Does the list of raw materials utilized at Chanhudaro give any clues towards its location?
Materials used in bead making were mainly agate and carnelian followed by faience/paste (primarily using silica) and steatite. Lapis lazuli, hornblende, crystal and Amazon stone are rare and found in restricted numbers. At Chanhudaro, two unfinished specimens of beads from lapis lazuli point to working of the material here. Actual source areas for lapis lazuli are far removed from Chanhudaro. Two lumps of amethyst were found, but no beads in the material. Other required raw materials were copper and shell. Possible source areas for copper, agate, carnelian, shell and steatite have been outlined in Chapter IV.

It appears that a number of raw materials were available at places in the Kirthar Range and from sources in Gujarat and Rajasthan to the east. The question would then arise as to which of the sources was exploited for production at Chanhudaro. The location of Chanhudaro to the east of the river Indus would seem to point to the exploitation of the eastern sources. If raw material sources in the Kirthars were being exploited, it would have been far more convenient for the craftsmen of Chanhudaro to have lived on the opposite bank of the river so as to avoid the issue of transporting raw materials across the Indus. In the event, it would have been more cost-efficient to transport finished goods, with less bulk
and weight, to settlements across the river. Moreover, it must not be forgotten that opposite Chanhu-daro on the right bank of the Indus lies Amri, a site with 'neolithic', Early Harappan, and Mature Harappan remains. This settlement would have been conveniently situated for exploitation of raw materials from the Kirthar hills. As it is, there is no evidence for raw materials passing through this site. Amri in fact reveals a reduction in size of the settlement in the Mature Harappan period probably as a result of the founding of Chanhu-daro on the opposite bank. The foundation of Chanhu-daro must have attracted a significant proportion of Amri's population (Casal 1979: 108).

Chanhu-daro could also have made use of the gallery forests along the Indus or a left bank overspill channel for its fuel requirements, heat being needed for a number of crafts. In its present situation, Chanhu-daro's link with other Harappan sites could be maintained. In view of the hypothesis that the majority of products of craft working carried out at Chanhu-daro were for outside consumption, then the location of Chanhu-daro near Mohenjodaro is quite significant. It is very likely that from Chanhu-daro, goods may have been carried over to the larger city. However, it is clear that Mohenjodaro was not the sole consumer of goods produced at Chanhu-daro. One example is a particular variety of bead that has not
been found at Mohenjodaro (Mackay 1943: Pl. LXXXII 14-22).

It is likely that much of the production undertaken at Chanhudaro was meant for nonlocal consumers. The number of metal hoards found and the plentiful evidence for bead making indicate that finished artifacts may have been taken out of the settlement. The production of etched carnelian beads meant for export is a good example of this. Moreover, Chanhudaro also reveals the production of long barrel-cylinder carnelian beads which in all likelihood had considerable value attached to them. The high proportion of unfinished seals to finished pieces established in the previous chapter also indicate that these artifacts were transported out to be used elsewhere.

Besides the evidence at Chanhudaro of production for outside consumption, it is also clear that a number of artifacts were used at Chanhudaro itself. One of the faience miniature jars gives evidence of having been used as it contained some substance in antiquity (Mackay 1943: Pl. XXIX 55). The large number of weights found at Chanhudaro - roughly 118 - may not be easily explained only by weight production here. The number of unfinished weights found at Chanhudaro are very few as seen in Chapter IV. It is also apparent that a number of weights were actually being used at Chanhudaro. In and around structure 215, a total of 22 weights (not one of which was unfinished) were found, which indicates that weighing was
definitely being undertaken at Chanhudaro. Moreover, a concreted mass of steatite beads were found here (Mackay 1937: 10) adhering to a scale pan, suggesting that these tiny beads were weighed at Chanhudaro.

These consumption patterns indicate that the settlement of Chanhudaro was not entirely composed of craftsmen. Moreover, the plan of Chanhudaro and the evidence of craft working indicators also gives this impression. Craft working appears to have been focused primarily on what is now designated as Mound II, with some amount of shell working and a little bead making also located on Mound III. Mound I reveals very little evidence of craft production. The absence at Chanhudaro, from the excavated evidence, of large public architecture does give credence to a hypothesis that the number of elite individuals residing at the settlement was very small. That some members of the elite were present is probable from the evidence of consumption as indicated earlier and the need for an overall organization of craft production at this centre.

The location of Chanhudaro seems to reveal a different principle from that of sites like Nageshwar and Balakot. The latter settlements were situated close to the source of raw materials, so as to exploit the sources and engage in production at the spot, thus avoiding the
problem of transport of raw material stocks. Hence, such small settlements must have had a dependent status on others in the Harappan culture for the distribution of the finished artifacts. Chanhudaro is not located close to any particular raw material source and the fact that raw materials are obviously being transported to this site along a variety of routes indicates the importance of Chanhudaro. Apart from being primarily engaged in production, it is possible that people here could also have handled the transfer of raw materials, such as copper or shell, from source areas to other craft centres such as Mohenjodaro. This appears so on the basis of the location of Chanhudaro within the Harappan area.

**Mohenjodaro as a Craft Centre**

More than a hundred km northwards from Chanhudaro, lies Mohenjodaro, in the western valley of the Indus. The latter site is very much larger than Chanhudaro, the comparative areas being some 125 ha and 6.5 ha respectively. Excavations revealed craft working in various parts of the site. At Mohenjodaro, various crafts are seen to have been practised in the Citadel and in the lower town area, though admittedly very much less in the Citadel (and often in the later periods). There is little localization of craft production at Mohenjodaro, either in the site as a whole or concentration in separate parts of the site as for example, in HR or DK/G areas. This can be
seen when one studies different crafts. Take for example, weight making.

For weight making, we have two separate loci indicating this craft in VS area, two in DK/G and one in DK/B section (Map V). As for seal making, unfinished seals are largely found from the southern portion of DK/G, along with two specimens from HR and one from VS (Map VI). As for tools possibly used for engraving seals, one was found in VS area and two in DK/G. None of the tools was found in association with any of the unfinished seals mentioned. One piece of evidence gives the probable location of a seal maker's working area. In Section B of HR, house X, room 127, was found debitage of sawn and partially worked steatite, along with a pointed bone tool. Among the other objects in association in the room was found a large dish containing a seal and a terra-cotta sealing (Marshall 1931: 184). Also of significance may be the kiln found in the next room, 135. This facility could have been used for glazing steatite seals. Thus, again we have seal making evidence from different parts of the site, though all the evidence is from the lower town area.

Evidence for bead making is somewhat scarce from the earlier excavations at Mohenjodaro. Exact details for raw materials for beads found are not given. Marshall (1931: 526) does mention that amethyst is found in the form of
rough beads and in nodules, but it is not clear exactly where. 4 beads are mentioned by Marshall as incomplete, largely being left unbored, and though we know from the registration numbers that 2 are from the DK area and 2 from SD, we do not know the exact findspots of these beads. 2 probable hones in the shape of animals are illustrated (Marshall 1931: Pl. CXXX 24; Pl. CLVII 54) similar to Chanhudaro specimens. Unfinished beads were found in Mackay's excavations. Out of 12 specimens, only 2 were found in the northern portion of DK/G, while all the rest were from the southern portion. Other evidence included a hone from the southern portion of DK/G (Map VII).

Evidence of steatite bead making from the excavations is rare. Marshall (1931: 526) mentions an unfinished steatite bead (drilled but unpolished). One unfinished steatite bead was found in Mackay's excavations (1938: 508), in the southern portion of DK/G between Blocks 4 and 5. The scarce nature of the Mohenjodaro evidence for bead making stands out in contrast with the variety of finished beads. Apart from some amethyst nodules, raw materials are not mentioned in the reports. Nowhere do we find evidence to indicate preliminary chipping of roughouts but this could be due to the excavation techniques where small pieces of debitage resulting from chipping and flaking were not collected. All unfinished beads found are in the
stage after roughouts were chipped into shape, and before they were ground to a finer shape and drilled. Hones for grinding beads into finer shapes are very few and it is significant that not a single drill has come to light in the excavations.

As for metallurgy, quite unlike Chanhudaro, at Mohenjodaro we do find evidence of smelting of unrefined ore apart from further metal working activities (Map VIII). In the HR area, we have one locus for the refining of copper ore, as lumps of ore, ashes and fragments of rough crucibles were found (Marshall 1931: 212). At another spot, whose exact location is unknown, a crucible fragment was found with metallic slag still sticking to the edges (Marshall 1931: 486). In the DK/G area, Mackay (1938: 54) found a rectangular pit containing an amount of copper ore in small pieces along with a little piece of lead. Though there is no kiln of the same 'level' nearby, this find could indicate some metal working activity. Marshall (1931: 485) mentions finding plano-convex lumps of crude copper but we do not know their exact location. Copper melts, possibly stored for working, were found in the southern portion of DK/G (Mackay 1938: 41, 129), and there are ingots in both northern and southern portions of DK/G. One locus in the southern portion of DK/G revealed two ingots. However, in all cases, no other associated material is available to prove they were loci of metal.
workers. There is still the possibility that the ingots could have been kept by customers who would get their requirements made by the metal craftsmen. Apart from the crucible fragments mentioned earlier, one other tool of a metal worker to be found is a possible blow-pipe used by a smith, located in HR area (Marshall 1931: 198). At another unspecified locus, discarded tools of copper and bronze in an unusable state were found in association with a group of three vessels, two of copper and one of bronze (Marshall 1931: 490). They could possibly represent the tools of a metal worker or could have been kept for recasting. Among unfinished objects were found a chisel in HR area (Marshall 1931: 200), a bronze jar, a sword and a chisel, all in DK/G south (Mackay 1938: 450, 467, 475). Other indicators are objects obviously kept for reuse such as a casting of copper, bent and rough in appearance (Marshall 1931: 506). Three castings and a copper blade were found in the southern portion of DK/G probably kept for reuse (Mackay 1938: 141, 452, 459). Thus, while looking for any localization within the excavated areas of Mohenjodaro as a whole, largely this craft appears to have been limited to the southern portion of DK/G, though one locus from the northern portion is known, along with one from DK/C and three from HR area. Apart from the general localization in the southern portion of DK/G, one particularly notes house I in Block 12 A, as a probable metal worker's craft area. Here, in room 15, a hoard of
metal objects was found, consisting of two copper axes, a copper mass, a copper ingot piece, two copper spearheads, two bronze axes, a copper casting, a bronze ingot, a bronze chisel, and a broken copper ingot (some of these objects were mentioned earlier) (Mackay 1938: 141). In room 11 of the same structure was found the unfinished sword mentioned earlier (Mackay 1938: 467).

As with the evidence for metallurgy and quite unlike that for seal making and weight production, one finds some amount of localization in the craft of shell working (Map IX). A number of loci for raw materials, that is shell, have been found. Marshall's report (1931: 159, 162, 170, 171, 173, 174, 580) indicates many findspots of groups of chank shells, all in the L area of the site, some with as many as 23 and 35 shells. In yet another locus in VS area, a hoard of 41 shell cores was found, from which all usable parts for bangles were removed (Marshall 1931: 219). This could represent the locus of a bangle maker or a dump near a bangle maker's workshop or could indicate cores kept for storage before being sent on to a craftsman for further processing of the columellae. In any case, it must indicate that a craftsman worked here unless we are to presume a state of economy where the shell cores were in the possession of an organiser of the craft who got different objects, such as bangles, ladles and inlay made by different craftsmen. Unfinished objects have been
found in various parts of the site with a number of isolated specimens from DK/G area and others from HR, VS and DK/C. One locus in the HR area reveals a find of 15 unfinished bangles in a pot (Marshall 1931: 181). This could have been the locus of a shell bangle maker. One locus for the production of inlay was found in HR area where along with a mass of inlay were found waste pieces of shells (Marshall 1931: 195). If one takes each findspot of an indicator of craft production as the actual locus of a craftsman, then each find of groups of shells as raw material would qualify as a place of shell cutting. Apart from the finds of raw materials in L area, some groups of chank shells have been found along withdebitage. Thus, Marshall (1931: 162) mentions a find of 23 shells of which 16 were in perfect condition, implying that 7 had probably been cut up or worked; in another part of L area, 35 shells were found, some whole, some partly sawn up (Marshall 1931: 170); and a find of 5 whole shells and pieces of unfinished inlay (Marshall 1931: 170). Definite localization of the shell industry on L area of the Citadel mound would seem to be the case, with isolated working in other parts of the site.

The evidence as per the reports on the excavations at Mohenjodaro reveals no localization of seal making and weight production. From the point of view of all crafts, we get numerous pieces of evidence from the DK/G area.
excavated by Mackay but that could be the result of a later and more methodical excavation. The evidence from the excavated areas of Mohenjodaro gives us much the same sort of information of the spread of craft production in a site, as does the record from a site like Harappa. However, craft working evidence from Mohenjodaro is amplified by the Surface Evaluation Project undertaken by an Italian team which gives us a different picture of craft production from Mohenjodaro. The project (Bondioli et al 1984) undertook a detailed survey of the unexcavated areas of Mohenjodaro, keeping in mind various indicators of craft activities, such as raw materials, unfinished objects, tools, debitage of craft working and rejects. It does appear that the primary craft activity areas of Mohenjodaro lie in the still unexcavated areas. It also seems that though the entire eastern and southeastern portions of Mohenjodaro recorded significant evidence of craft activity areas, we still do not have evidence of separate areas for separate crafts. Thus, in this sense, Mohenjodaro follows Chanhu-daro in displaying a pattern of juxtaposed craft working. The map comprising Figure 9 of Bondioli et al's report (1984) confirms this assertion.

The evidence for ore refining activities in the context of metallurgy are dispersed. We have one locus immediately south of the ridge extending eastwards from HR; two loci, 20 m apart, both about 50 m west of the
Honeer site; one locus about 100 m northwest of these two; another locus about 15 m to the east of Honeer; one about 50 m south of DK/C; and a solitary locus about 30 m north of L area. Shell debitage is found in about four loci to the east of HR; one locus immediately west of the southern portion of VS; one locus about 30 m north of L (right next to a findspot of copper slags and crucibles); two loci about 75 m northeast of DK/G; and a solitary locus about 50 m southeast of the last two mentioned. Some crafts such as lapis lazuli working, faience production and steatite working are so rare that their working areas really stand out. Thus, we find working of lapis lazuli at a solitary locus in Honeer southeast and yet another isolated locus between SD and L areas. Faience wasters, largely drops of glassy material attached to straw-tempered sherds, have been noted at only one area, about 20 m south of DK/C. Steatite debitage is also noted rarely with one locus about 50 m south of DK/A and two loci 15 m apart on the extreme western edge of the excavated area of DK/G. Other crafts such as chalcedony bead making are noted in many more loci. We find chalcedony debitage and bead blanks among evidence for other crafts east of HR south of the ridge; both to the west and east of VS Area; to the west of the Honeer site; and to the northeast and east of DK/G. But by far the largest concentration of chalcedony bead making is noted
in the Moneer southeast area, where flakes, drills, anvil stones and finished beads practically sprout all over (Bondioli et al 1984: Figure 8). In this area, chalcedony bead making is also spatially associated with the manufacture of chert drills, though whether the drills were manufactured by the bead makers is not definitely known (See Maps V-X). Chert tools and debitage are also found in numerous loci to the east of HR area; about 25 m to the west of VS; and to the north and west of Moneer.

The emerging picture shows that at Mohenjodaro we find no one area where a separate craft was practised. A study of the accompanying maps will make this clear. For bead making, there are a number of craft indicators dispersed all over the site, but no indicators from HR, DK/A, B and C areas and from the excavated portions of VS. Metallurgy is more dispersed, with only the VS revealing not a single metal working indicator. As for shell, we find no indicators in DK/A, B and C areas. Seal making indicators were not found on the Citadel mound and in DK/A, B and C areas; weight making indicators were not found from the Citadel mound or from DK/A and C areas.

The evidence from the surface survey for lapis lazuli working is as expected. Considering the rarity of artifacts in this raw material in the Harappan culture, we cannot expect to find a large area or a number of areas devoted to this craft. But the picture for steatite
working and metallurgy is surprising. Keeping in mind the number of steatite and metal objects unearthed at Mohenjodaro, the scarcity of their production areas is difficult to explain. The only inference that can be offered is that the craft working areas may have been outside the present limits of Mohenjodaro or that the inhabitants of this settlement depended on other craft production centres.

Some details on the production processes within each craft can be gleaned from the report. It is also to be noted that there is limited localization of different processes within a single craft. The surface survey report emphasizes that the weight and shape of metallurgical wasters do not attest to primary smelting operations, but that mostly secondary refining work was undertaken (Bondioli et al 1984: 30). Vidale (1989: 172) indicates that some copper ore smelting may have taken place on a mound well to the east of the excavated area. However, we know that ore smelting was not undertaken only at this locus, due to the evidence from the excavations. As for stone bead making, the debitage from the Moneer southeast area points mainly to the preliminary chipping and flaking of roughouts being done here. Though this area is associated with the manufacture of chert drills, very few beads broken during perforation are found here, perhaps suggesting that this work was done elsewhere.
Marshall's finds of shaped, but unbored, beads is mainly revealed from the SD and DK areas. Mackay's finds of unfinished beads all fall into the stage of stone bead making between the preliminary flaking and before the perforating process. Out of 11 beads, 8 were in this stage, 3 were partly bored and left incomplete. It is possible that in the DK/G area, beads were brought in a roughly flaked shape to be drilled. Since some beads are found in a smooth (but unpolished) state, it is possible that grinding of bead roughouts was also undertaken here, prior to drilling. This could indicate that separate processes within the craft of bead making may have been undertaken in different areas of Mohenjodaro. Similarly we have the evidence of shell working. We note the preliminary stage of perforation and chipping of the apex portion of Turbinella pyrum on an isolated mound northeast of the Moneer site (Kenoyer 1984b: 107) indicating localization of a separate process within this craft, probably for environmental reasons. We have no evidence of this stage having been done in other parts of Mohenjodaro, but this could also be due to inadequate collection of material in excavations. Thus, only the Moneer southeast area shows the concentration of a single production process, which is the preliminary shaping of beads.

As regards architectural units, we gather that most
crafts were practised in houses and living areas and that no separate workshops or an industrial area for craftsmen were available. Even kilns are seen in regular residential units such as the one in HR area, Block 2, House VII (Marshall 1931: Pl. XXXIX). The kiln is located in a courtyard, which is bounded by Lane I to the north, hence preventing smoke going into the neighbours' houses. This pattern is similar to that found in villages in the present, where heat producing industrial activities are carried out in the courtyard. Other craft activities are seen carried out in rooms of residential structures. South of House VII in HR is house X, where in one room probable evidence for steatite seal making is noted. To the west in House XII, were found in one room, two pieces of a copper blow-pipe. Lumps of unrefined copper were found along with ash and crucible fragments in a house in the southwestern sector of HR. A mass of shell inlay and waste products occurred in a house just southwest of House VII mentioned earlier. The attempt being made here is to bring out the fact that several crafts were practised in what were essentially residential areas. We have no means to determine what was the position of craft location in the Honeer southeast area, declared during the survey as a "craftsmen's quarter" (Bondioli et al 1984: 31). Since the project involved only a surface survey, we have no idea with what architecture were the different crafts here.
correlated.

The evidence from the surface survey confirms the picture revealed from the excavations. Examples of faience smelting, steatite working, metallurgy and lapis lazuli working all indicate small working areas. 25 out of 49 clusters of craft indicators extend over less than 30 m (Bondioli et al 1984: 28). For example, AA 11, representing steatite bead making, extends over 25 to 30m, while AA 19A, where copper slags, prills and crucibles were found, is spread over 10 to 12 m (Bondioli et al 1984: 30). Only in the Moneer southeast area do we find an extensive area, with a spread of almost 1200 m² (Bondioli et al 1984: 30) covered with evidence of stone bead making and the production of stone drills. This area just may represent a large workshop, geared primarily towards bead manufacture. If this hypothesis is proved correct in the future, it will imply that at Mohenjodaro, workshop craft production functioned alongside that of domestic craft working. Similarly, we must note the isolated mound northeast of the Moneer site where a single process within the craft of shell cutting was noted. It is not clear if this mound, roughly 4 ha in area (Vidale 1989: 172), was entirely or mostly given over to shell processing. Vidale (1989: 172) did note a little metallic ore smelting also undertaken here. However, rather than this area being a workshop, this localization is seemingly more a reflection
of an unpleasant and polluting activity being undertaken outside the residential limits of the ancient settlement.

It would be worthwhile to sift the evidence of craft production in the SD and L areas of the Citadel to figure out if facilities or working areas for craftsmen differed here from those in the lower town. Largely we find evidence for shell working and that too, in the late period. In the SD area, a few unfinished beads, a hone, some spindle whorls were revealed. The Surface Evaluation Project indicates limited spreads for metal working, shell cutting, lapis lazuli working and some vitrified nodules in the area between SD and L. The surface survey gives no architectural correlations for this area. As for the published information on the excavations, shell working indicators were found in large structures in the northern portion of L area, that is, in the C and D sections. However, since most shell cutting here took place in late periods, the buildings may not have been fulfilling their original functions, at the same time as the shell workers were practising their craft. Hence it is difficult to delineate the role of craft working in this part of the site.

The Focus of Craft Producing Activities at Mohenjodaro

The question then arises as to who were the consumers of the craft products manufactured at Mohenjodaro. Each
craft must be studied separately to understand this aspect. First we will note what impressions are obtained about quantity of products produced by a particular craft and the scale of production if available. Finally, we will give our estimate of the consumption groups involved.

If we were to study steatite working, we would observe that a number of artifacts at Mohenjodaro were made out of steatite, as noted below:

<table>
<thead>
<tr>
<th>Boxes</th>
<th>Terminals</th>
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</thead>
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<tr>
<td>Vessels</td>
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<td>Roundel</td>
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<td>Beads</td>
<td>Pectoral</td>
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<tr>
<td>Spacers</td>
<td>Model Animals</td>
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<tr>
<td>Hairpins</td>
<td>Human Figurines</td>
</tr>
<tr>
<td>Gamesmen</td>
<td>Spindle Whorl</td>
</tr>
<tr>
<td>Buttons</td>
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It further appears that steatite was the most favoured material for beads [Mackay (1938: 495) emphasizes that three-fourths of the beads found at Mohenjodaro were made out of steatite]. In this context we must note the steatite bead making area found in the surface survey, about 25 to 30 m in extent. Some unfinished objects such as beads are found in other areas of the site (Mackay 1938: 506, 508).

In the case of lapis lazuli working, we have both limited number of objects found made of this material and limited indicators for lapis lazuli working. Apart from 6 beads found in the earlier excavations (Marshall 1931: 542-43) and 2 beads found in the later excavations at
Hohenjodaro (Mackay 1938: 499), other objects found were a gamesman (Mackay 1938: Pl. CXXXIX 18) and part of a toilet vase (Mackay 1938: 500). The evidence for lapis lazuli working, albeit very rare, is only attested in the surface survey. According to Vidale (1987) a couple of flakes and a small roughout were found in the Moneer southeast area.

The variety of metal objects found has already been indicated in Table III.2, where most of the artifacts are represented at Hohenjodaro. The quantity of metal artifacts found is equally impressive. In the light of this, we must re-emphasize the scarce evidence for smelting.

The previous chapter brought out that 1.4% of weights unearthed at Hohenjodaro were unfinished while the corresponding percentage for seals was as low as 0.7% (out of the total number available for discussion). The evidence for the surface survey and the excavated areas highlights the difference between the evidence for craft production and the evidence of the quantity of respective artifacts found. Only in the case of bead making is it possible that we may get relatively proportional figures for bead making and for quantities of finished artifacts. We must, however, note that little evidence of carnelian working is obtained - agate in other varieties is reported. The surface survey also shows very limited
working of carnelian - sardonyx and chalcedony are more commonly worked (Bondioli et al 1984: 24).

From the available evidence outlined above, it does appear that the scale of craft production as inferred from craft activity indicators was either small or just enough to fulfil the requirements of the settlement of Mohenjodaro itself. In the case of metallurgy the evidence is definitely too little to justify the quantities of metal objects found. In the case of bead making the evidence of working may just satisfy the picture of quantities unearthed, except for carnelian which may have fallen to the responsibility and expertise of the Chanhudaro craftsmen. In the same connection, one can question the role of the manufacture of drills in the Moneer southeast area. According to Bondioli et al (1984: 24), this area revealed "several hundred chert microdrills". It is difficult to credit that these stone drills were made only for the use of the craftsmen of Mohenjodaro. It is possible that the chert outcrops in the Sukkur-Rohri region may have been exploited for the making of these drills which could have been sent to other bead making centres, much as the long chert blades were sent to a number of Harappan sites from their production centres. No stone drills however are mentioned as having been found at Lothal.

It appears likely that Mohenjodaro was primarily a
consuming centre. Production was for the needs of its own inhabitants. In some cases, the craftsmen were probably not able to satisfy the needs of the inhabitants. Thus in the case of seal and weight making, it is probable that the artifacts were brought into the settlement to make up the requirements. Some crafts were probably not practised at all, such as the production of etched carnelian beads and of steatite microbeads. Here, the requirements were fulfilled by other production centres. In other cases, some rare crafts, such as stoneware bangle production, may have been undertaken to fulfil local needs.

Finished goods as well as raw materials were coming into Mohenjodaro. We have already mentioned etched carnelian beads and steatite microbeads. Shell ladles must have been procured from Nageshwar. Apart from finished goods, raw materials such as shell, semi-precious stones and refined metal were being brought into Mohenjodaro. Most of the materials were being brought from considerable distances, as emphasized a number of times. These consumption patterns indicate that the inhabitants of Mohenjodaro were not obtaining their requirements from within their immediate hinterland but were able to make use of mechanisms for long-distance procurement and distribution.
The Evidence for Craft Production from Lothal

We shift our focus now from the Sind plain to Gujarat, to a discussion of the site of Lothal. Lothal like Chanhudaro, is a single-mound settlement but the physical resemblance ends there. The first structural feature of difference is the "dock", a large burnt brick enclosure on the eastern part of the mound. Lothal covers an area of about 6.4 ha. and is now more than 16 km away from the sea. Originally the settlement was on the left bank of a river as seen by a depression marking the bed of an ancient river to the west of the settlement.

Our discussion on Lothal in this chapter focuses on its role in craft working in the Harappan culture (Map XI). One difference noted at Lothal from Chanhudaro is that most of the walls of structures here are still standing and we can obtain a good idea of the architectural context in which craft activity indicators are found. We get ample evidence for metal working at Lothal, in loci, some of which are termed "factories" or "workshops". These workshops or smithies differ among themselves.

- House 154, in Block A, was judged to be a coppersmiths' workshop on the basis of a furnace, a stone anvil and fragments of two terracotta crucibles found here. Other finds were copper fragments, a muffle, a few other

- Another smithy located near the nullah was of a different plan, where four separate burnt brick pavements interconnected with drains and associated with pot furnaces were revealed. The walls of the structure have not completely survived and we are left with two burnt brick walls and a burnt brick pavement (Rao 1979: 98-100). Associated material consisted of two terracotta crucibles, small copper lumps and a crescentic sleeved axe bearing hammer marks (Rao 1985: 522).

- In Block C another probable smithy is indicated by the finds of pot furnaces, crucibles and slag dumps, but the walls of the structure have not survived (Rao 1979: 122).

- Another metal working area was noted in the southernmost structure in the lower town where a furnace was found along with copper slag (Rao 1979: 55). Since the area has not been illustrated in the detailed plans, we are not able to delineate the plan of the workshop.

- Yet another metal working area lay at the extreme northern edge of Block A near the nullah, which is identifiable largely on the basis of a furnace with associated metallic remains. In the furnace were found a bowl of thick grey ware with traces of copper and
fragments of a copper chisel, slag and cinders. Large copper sheets were found near the furnace (Rao 1979:83, 90-91; Rao 1985: 522). According to the archaeological chemist, however, the terracotta crucible revealed no trace of copper but a substance representing clay rich in iron (Lal 1985: 661). But on the basis of a copper sheet found nearby, it is possible that metal working was practised here.

The moulds were suggested to have been used for pressing metal foil over their depressions rather than for pouring molten metal in and casting objects. One stone object has been asserted to have been used to cast pins (Rao 1985: 557) but it is possible that this object may have been a bead hone; at least quite probably the object illustrated in the top portion of Pl. CCLII B (Rao 1985). A single ingot was found at Lothal, bun-shaped and of pure copper (Rao 1985:552, 652).

The evidence for metal working from Lothal consists primarily of furnaces with associated crucibles, slag and copper metal. We have no record of unfinished objects which are some of our primary evidence from Mohenjodaro and Chanhu-daro. Again, differing from the other two sites, are the structural facilities for metal working, in other words, the furnace. At Chanhu-daro we have no such heat facilities save the one found in room 215, which could have been associated with steatite bead manufacture or
faience production. At Mohenjodaro, various kilns have been found mostly without associated material to suggest their function. At Lothal, the furnaces found largely give an idea of their use. The heat facilities differ considerably. In one metal working area, a rectangular brick furnace is found (Rao 1979: 95; Rao 1985: 522). In another workshop, an oval furnace with a rectangular projection for fuel is noted (Rao 1979: 83), much like furnaces at other Harappan sites. In yet another area, one comes across pot furnaces of jars cut in half, containing ash (Rao 1979: 98-100). What is also significant and differing from Chanhudaro and Mohenjodaro are the definite contexts in which these furnaces are found. In some cases, such as the smithy near the nullah, they are entirely separate from other structures and hence are identifiable as an independent unit for craft working. This is unlike the slightly ambiguous situation at Chanhudaro where metal hoards are found but no exact locus for the metal craftsman's working and living area.

Bead making at Lothal appears to have been mainly concentrated in a single structure in Block F, to the west of the Acropolis in Block B. The justification for judging this structure to have comprised a bead making unit rested on the following pieces of evidence:

- a central courtyard to the structure which had a mud
brick platform in which were found two jars one containing 600 finished beads (Rao 1979: 118). Other beads in various stages of manufacture were embedded in the platform;  
- agate pebbles, unfinished beads in various stages of manufacture, rejected cores and flakes were found in the courtyard and the rest of the structure;  
- a flanged drill was found in one of the rooms;  
- a kiln was noted to the northeast of the structure, suspected to be a bead kiln (Rao 1979: 118);  
- a mud brick platform between the structure and the kiln could perhaps have been used to dry agate pebbles or to sort out stones and beads after removal from the kiln.

It is not immediately clear whether the bead factory in Block F was the sole bead making area in Lothal. Unfinished beads, drills, and other tools are described and illustrated in the report, but we have no clue as to their precise findspots. Hundreds of carnelian beads were found in an unfinished state (Rao 1979: 118), but not one is described. The unfinished beads described comprise 2 of jasper, 3 of onyx, 2 of opal, 1 each of bloodstone, agate and chert and 3 of copper. Thus, if we find that at Lothal, apart from the bead factory, there were other individual and separate craft loci then we may get a picture akin to that from both Chanhu-daro and Mohenjodaro. At the latter site, for example, the Moneer southeast area
may have been the principal bead making area, though individual operations were also undertaken in the rest of the site. We shall go into this aspect again later.

It is interesting that not a single stone drill is mentioned as recovered from the site. If this site is a significant bead making centre, it is indeed surprising that no drills of stone, which would be easily replaceable, are found. As for other requirements, one can discuss the bead kiln found in the vicinity of the bead making establishment. This construction is quite unlike the structure found in room 215 at Chanhudaro. The kiln at Lothal consists of a circular structure with an elongated stoking hole, the heat from the fuel moving round a lower chamber which was connected to the upper chamber by a series of four interconnecting flues. It was in the upper chamber that the objects or materials which required heat treatment were placed. The Chanhudaro facility, as described earlier, is entirely different from kilns found at Mohenjodaro and the Lothal furnace in the general plan of its outer appearance.

Seal making appears to have been extensively practised at Lothal judging from the number of unfinished seals found here. However, we are handicapped by not knowing the exact findspots of unfinished specimens. Out of 14 unfinished seals mentioned, 3 were found in SRG 1; 4 in SRG 2; 3 in SRG 3; and the location of 4 specimens is
unknown. This does not clarify matters as trenches such as SRG 2 and 3 are very large and we do not know in which part of them the seals were found. We are faced with the same inadequacy when we study possible tools for seal making such as engravers, for we are not told where they were found or even if they were associated with unfinished seals or raw materials. Uncut and partially cut blocks of steatite have also been found (Rao 1985: 306) from unspecified loci.

We are slightly better off where shell cutting is concerned. Three separate areas can be delineated for shell working activities. One locus is doubtful and has been conjectured to be a place of worship (Rao 1979: 93-94). Here, in a house, a mud brick enclosure was found to contain a broken pot, 2 stone grinders and a large chank shell. Roughly between 10-15 m to the north of this structure is house 157 which can definitely be attributed to a shell worker, on the basis of a shell dump found in one of the rooms. Unfinished bangles and used cores of Turbinella pyrum were found here (Rao 1979: 96). It is quite possible that the platform next to the shell dump and one found in the adjoining room could have been used in the activity. A large house (159) roughly 15 m to the north-west of the last mentioned structure was revealed in Block G. In the structure were found chank shells, columellae and unfinished bangles, suggesting definite
shell cutting activities being undertaken here. Other pieces of evidence indicate shell working being practised at Lothal, such as unfinished gamesmen, inlay and pendants (Rao 1985: 617), an unfinished bangle (Rao 1985: 619), an unfinished inlay piece (Rao 1985: 620), production of dentalium beads (Rao 1985: 584) and production of ladles, indicated by the presence of more wasters and reject pieces than finished objects (Rao 1985: 615). The findspots of none of these objects is known.

There do not appear to be any finds of unfinished steatite beads at Lothal. Rao (1985: 582) mentions the find of a dump of dehydrated lime near the kiln used for baking agate and suggests that limestone was used for dehydrating steatite. He further suggests that steatite beads along with those of other stones were baked in the kiln. Manufacture of steatite microbeads is suggested by the recovery of 3 copper tools (Rao 1985: Figure 12, 2, 3 4), similar to the specimens found at Chanhudaro. The report terms these tools as flanged drills (Rao 1985: 532, 543) and one of these, as mentioned earlier, was found in the bead factory. However, it may just be that these tools were used to produce steatite microbeads.

Some amount of faience production was undertaken at Lothal on the basis of an unfinished, partly perforated faience pendant (Rao 1985: 610) and from a piece of
vitreous paste probably improperly fired (Rao 1985: 663). Bone working is suggested by a find of 26 pins and awls found with a stone anvil in the Acropolis in a late occupation (Rao 1985: 624). Ivory working is suggested after a find of 2 pieces of an elephant's tusk along with 2 other fragments with saw marks on them (Rao 1979: 108-110). One other craft activity is thought to have been practised at Lothal - that of dyeing. Facilities consisting of 2 interconnecting jars at different levels and connecting with a drain are thought to have functioned as dye vats (Rao 1979: 81).

Apart from bead making, it is not really clear if different production processes within a single craft were concentrated in separate areas. The report gives no specific details on the location of different indicators of craft activities, such as whether shell was initially chipped in one area and bangles cut in another. It is known that the bead factory revealed nodules of raw material, finished and unfinished beads in various stages of manufacture and a metal drill. Despite the fact that the report mentions other drills and unfinished beads at unspecified loci, the picture at Lothal does indicate that at this site there was at least one major concentration of bead production indicators. Metal working evidence from Lothal is in the form of furnaces with associated crucibles. Another clue is the ingot find. From the
available data, one can speak of some casting being undertaken here and an anvil stone in a workshop indicates its use for hammering objects into shape. No information on ore refining is available to us suggesting that only refined metal was brought to the site and worked. The heat facilities must primarily have been used for annealing and casting activities. Where seal making is concerned, we know at what stages the seals were left incomplete giving us an idea of the different stages of the craft. Largely, unfinished seals are of the type where the inscription is carved but the motif not started; where the motif is carved but the inscription is left; seals which have unperforated bosses; and seals which have not been coated with the slip. However, in the absence of data on loci, we do not know whether particular production processes were localized within the site. As regards shell working, we have no idea where preliminary cleaning and chipping of shells were done; the data we have indicate loci for the cutting of artifacts.

As mentioned earlier, Lothal can give us much information on architectural provisions for craft activities. A number of working areas or "workshops" have been uncovered which allow us to study the context in which craft activities were undertaken. The coppersmith's workshop, 154 in Block A, has been reported to have two rooms, one with a furnace in it. According to the plan on
Pl. XLIX (Rao 1979), there seems no reason why house 153, consisting of two partially exposed rooms, should not be considered part of 154. The whole seems to form a unit, if quite large, though corresponding in size to a shell worker's workshop to the southwest. Houses 154 and 153 consist of a unit bounded on the south by Lane 3, on the west by Street I, on the north by Lane 2 and the east by Lane 4. Thus the unit with a furnace is well isolated, even within the habitation area. Another furnace is found near the nullah which again is a location distinct from the habitation area. The structure designated as a bead factory is also in a locus separate from the structures oriented north-south along Street I. It is very likely that more structures will come to light in the still unexcavated areas to the north and south of the bead factory and end its present arbitrarily isolated appearance and situation.

In the lower town at Lothal, house units are well-delineated and streets and lanes are many. Separate structures are unearthed in one room of which metal working or shell cutting activities are noted. If these are workshops, they probably also are residential structures. It is very likely that there is no clear demarcating line between workshops and living spaces, but rather what we have are crafts being practised in the house of the craftsmen. This is a pattern which survives
very much into the present, as we saw in Chapter II. A number of crafts do not require heavy facilities or tools which cannot be shifted and hence the crafts can be undertaken anywhere. Such seems to be the case with the flaking, drilling, grinding and polishing of beads, shell bangle cutting, seal carving and weight making which can be undertaken anywhere. Only metal working requires facilities which cannot be easily moved. But here too a residential pattern of working can be easily established.

The archaeological evidence from Lothal of bead making brings to light a very large structure of about 11 rooms, including a courtyard. This structure could not have been the home of a single bead craftsman. Moreover, if this structure was the principal bead making area at Lothal, implying some amount of concentration of the craft, it becomes more difficult to conceive of this structure as a living area-cum-workshop. Rao (1979: 118) has delineated some rooms as workers’ quarters. What is significant and has not been discussed is the absence of any household artifacts such as querns or hearths in the structure. Also to be noted is the absence of any baths in the structure and of any drains or soakpits in the vicinity of the structure. No domestic facilities are noted from what have been termed the workers’ quarters either. The whole structure appears to have been surrounded by a mud brick wall, implying considerable
protection given to this structure.

Differences between the Acropolis and the lower town can be studied to note distinctions in architecture, in view of the fact that very little craft working is noted in the Acropolis. Only some late period dyeing activities are revealed in one house in Block B. A structure with two small chambers having corbelled roofs in the Acropolis is said to have been used to make paste beads (Rao 1979: 108).

The plan of the lower town where most crafts are concentrated seems well suited for craft working activities. Working areas using heat facilities are situated away from the habitation area or in house units which are segregated from others by lanes and streets. Such is, however, not the case with all crafts. If the facilities delineated as dyeing units are really so, then the location of one unit in the Acropolis is surprising. Dyeing activities would surely have been better located near ample sources of water.

Consumers of Products Manufactured at Lothal

In the face of the data that we have in relation to craft working at Lothal the question comes up as towards whom was production geared. It is doubtful that the population of Lothal would have been large. Houses in the lower town are large and widely spaced apart revealing
little trace of congestion. A large portion of the site is taken up by non-residential structures such as the Acropolis, the warehouse and the dock. The population definitely does not seem so large as to justify the production of hundreds of carnelian beads. 1200 carnelian beads were found in Period A (Rao 1985: 587). In the bead factory, 2 jars were found embedded in the platform in the courtyard one containing 600 finished carnelian beads and the other, beads in various stages of manufacture (Rao 1979: 118). It is probable that finished beads were kept carefully in pots to be sent out of Lothal to other sites. Beads of onyx and opal are much rarer in the Indus valley sites than at Lothal and at the latter site we have evidence of the production of beads in these materials. Onyx, jasper and carnelian were probably obtained from sources in Gujarat and taken to other Harappan sites. The number of metal working loci also appears to be in excess of what the inhabitants of Lothal would have required. The high proportion of unfinished seals (16% of the whole as established in the last chapter), second only to Chanhudaro, also does appear excessive for the needs of Lothal. The number of etched carnelian beads found at Lothal (12) again second only to Chanhudaro, highlights the number of objects found at the site which must have been meant for outside consumption.

What could have been the factors responsible for the
location of Lothal within the Harappan region? What was
the importance of the site in relation to other Harappan
sites? One fact that strikes us is the comparative
proximity of raw material sources, such as carnelian and
agate for bead making from the Rajpipla hills, of steatite
and copper from extreme north Gujarat and Rajasthan.
Roughly 40 km to the southeast is the modern town of
Cambay or Khambhat where bead making is still carried on
as an industry which obtains its raw materials from the
Rajpipla hills near Ratanpur. The situation of Lothal
then would be understandable for the purpose of obtaining
raw materials, processing some part of the raw materials
and sending them on to other Harappan settlements. Lothal
would have taken advantage of its location in a frontier
area and its proximity to the coast. No Harappan sites
have been located in the central part of Rajasthan. While
there are a number of small sites in central Gujarat,
Lothal is closer to the carnelian sources in Jhagadia
taluka. There are very few Harappan settlements in the
Gujarat plain, while the majority of them are in Kutch and
Saurashtra. The construction of a dock at the site
assumes significance in view of the proximity of Lothal to
the sea. It is thought that ships and boats could enter
the Lothal dock through an arm of the sea. Lothal's
participation in the Harappan economic networks can be
seen in the presence of certain materials here which are
not locally available. Such seems to have been the case with lapis lazuli. 3 such beads were found in the Harappan period (Rao 1985: 587). Apart from this, long chert blades found at Lothal must have been brought from the production centres in the Indus valley.

Craft working was probably not the primary reason for the existence of Lothal. The site in all likelihood functioned as a centre for the receipt of raw materials which were sent on to other sites. What craft working was carried on here was probably undertaken because considerable stocks of raw materials were transported from this centre. It was convenient to have craftsmen here at Lothal working on raw materials so that some costs of raw material transportation would have been eliminated from goods produced here. It is also possible that Lothal originally functioned solely to transport raw materials to other settlements and at a later stage craft working was added to the functions of the site. Such an hypothesis could gain credence from the fact that most craft production workshops and facilities were established in Phase IV or a later phase of the Harappan culture. Thus the coppersmith's workshop 154 in Block A is found constructed in Phase IV; so also the smithy on a different plan, consisting of pot furnaces and pavements for cooling the metal. Similarly the smithy in H 28 of Block G was worked in the same phase. The bead making factory in
Block F was established in phase IV and in the same phase, the shell worker's house with associated shell craft and shell working indicators undertaken in 159 in Block G, was uncovered. Despite the late appearance of craft working at Lothal, the importance attached to these activities is clear from the number of craft loci and the establishment of a walled, separately constituted workshop for bead making.

The settlement of Lothal appears to have been laid out on a predetermined pattern and the impression received from the excavation report is of a planned settlement. The lower town is clearly occupied by the general mass of population while the Acropolis probably housed the elite, and was separated from the lower town both socially and functionally. Workshops of craftsmen were located in the lower town and there were some attempts to localize certain crafts such as bead making. The general appearance of the "bead making workshop" does seem to point to the particular nature of the complex in its separate identity as a large unifunctional structure and in the protection afforded to it in the form of an enclosing wall. It is very probable that the products - beads of carnelian and other stones were of special value, possibly to the elite of the settlement but more probably transported by them to other Harappan settlements or exported outside the Harappan region. In the case of
metallurgy too the number of workshops appears to be too many for a settlement such as Lothal. Metal objects too may have been transported outside Lothal to other consuming centres. Thus the laying out of the settlement of Lothal according to a preconceived plan does indicate the interest and the involvement of the Harappans in safeguarding the transportation routes for raw materials and the supervision of production at this craft centre.

Conclusion

From the evidence outlined above it is clear that there was more than one mode of organizing craft production. One mode envisages craft production as an activity undertaken in domestic contexts while the other visualizes craft production undertaken in a special locus and concentrated within a certain area. In the latter context, all or nearly all the processes within a single craft can be practised: this could imply workshop organization. From Mohenjodaro the information brought to light from the excavations gave no indication of a workshop for any of the crafts. However the Moneer southeast revealed in the surface survey two related activities of stone bead and drill making. As mentioned earlier, and discussed also in Chapter II, a workshop need not reveal that all processes within a craft were practised. Similarly, in AA 40, in Moneer southeast, only the preliminary flaking and shaping of beads into
roughouts and some drilling is noted apart from the production of stone drills. All other stages of bead making—grinding and drilling—were undertaken in domestic contexts as seen from individual finds of unfinished beads in various stages of manufacture. It is also the size of AA 40 that suggests a workshop rather than a residential mode of manufacture; separate loci for working of steatite and lapis lazuli are also found in the surface survey but their size indicates domestic production. It should also be realized that we have no idea of the architectural correlations of the Moneer southeast area. If later excavations reveal a number of houses rather than a single structure, then the hypothesis of a workshop would have to be discarded in favour of a number of residences in close proximity practising a single craft.

At Lothal we have the evidence of a bead factory suggesting a workshop organization, as also individual craft loci suggesting domestic craft production. At Chanhudaro the evidence is not so simple. On one hand we know that structure 215 on Mound II revealed in excavation the evidence of carnelian disc-bead manufacture as well as steatite microbead and wafer bead production. Thus at this site as distinct from the other two, we have the evidence of the working of two different materials within a single locus. The Chanhudaro workshop, if structure 215
was such, was then definitely more complex. Apart from structure 215 we also have evidence of bead-making all over Mound II which gives the impression of separate processes being undertaken in domestic contexts. In some cases, such as at locus 125 and 383, more than one process was undertaken in domestic contexts.

It is also significant that the only common craft in the context of workshops from all three centres is the craft of bead-making. At Mohenjodaro and Chanhu-daro, metallurgy, shell-cutting and seal-making are not thus organized. At Lothal "workshops" for metallurgy and shell working have been uncovered but they are all in domestic contexts. In effect, the shell cutting "workshops" at Lothal are no different from, for example, the locus of shell inlay production (shell inlay found along with waste products) uncovered in the HR area of Mohenjodaro.

Data regarding the location of craft activities within each craft centre indicated that in most cases craft production was spatially separated from elite residential areas. At Mohenjodaro craft production activities are concentrated in the lower town and primarily in the eastern portion. A few sparse indicators for craft working, such as lapis lazuli working, some copper working and shell cutting were noted in the surface survey of the Citadel mound. The excavation report
indicates a considerable amount of shell working to have been practised in the L area of the Citadel mound but these indicators belong to the late period of occupation at the site. At Chanhudaro, we are not quite sure where the elite members of the population lived; if the elite or supervisory personnel lived in the now-demarcated Mound I, then it is clear that they were separated from the craft working area. Most craft activities were undertaken on Mound II with some shell cutting undertaken on Mound III. At Lothal, the probable seat of power, the Acropolis, revealed no craft working indicators apart from some dyeing vats.

Yet the picture that is obtained shows differences between Mohenjodaro and the other two craft centres. At Lothal and Chanhudaro, supervision had to be present as a number of crafted objects were probably leaving the centres for consumption outside. At Lothal the situation of the Acropolis and its elevation ensured the necessary supervision not only over craft production but also over operations concerning the warehouse and the dock. Despite superficial similarities, the data for Mohenjodaro does differentiate this settlement from the other two craft centres. Craft working at Mohenjodaro concentrated in the eastern portion of the lower town could not be directly supervised from the Citadel mound. Production may not have been for very limited consumption. This picture may
explain why Mohenjodaro reveals finds of elite goods from all over the site. The only anomaly to this pattern is the evidence for seal cutting and weight manufacture. As noted earlier we find not one craft indicator for seal and weight production on the Citadel mound. One would expect these crafts at least to have been undertaken under close supervision at Mohenjodaro. But again it must be realized that these craft objects were found and probably used all over the site of Mohenjodaro.

At Mohenjodaro craft working is just one of the many activities undertaken as part of city life and the evidence of the location of such activities within the site points to the overall lack of direct supervision and of the probability of a number of consumers for various craft products. At Chanhudaro, in the entire portion of Mound II we find extensive evidence of different indicators of craft production. It appears very likely that Chanhudaro functioned almost solely as a craft centre and that too for the purpose of manufacturing craft products and sending them on to other areas of the Harappan culture. At Lothal, craft production was one of the major functions, but probably not the reason for establishing the site. Craft working was probably engaged in to complement the function of obtaining raw materials.

Mohenjodaro was then primarily a consuming centre. In view of the location of Chanhudaro and Lothal and the
nature of the activities performed there, it appears that the two craft centres were instituted to perform these particular activities. This appears clearer in the case of Lothal where we have the evidence of an earlier settlement which performed few of these activities and functioned purely as a village settlement. We have no knowledge of the nature of the earliest settlement at Chanhudaro but it does seem that the settlement became prominent with its specialized functions in the Harappan period. This appears so from the changes in the size of the settlement of Amri on the opposite bank of the Indus. Dating from the Early Harappan period, Amri reveals a reduction in its size in the Mature Harappan period when probably its inhabitants were attracted to the settlement of Chanhudaro. It is this evidence which gives a clue to the probable Mature Harappan origins of Chanhudaro. This aspect concerning the three craft centres will be highlighted in the following chapter.
Key for Maps I - IX

Raw material
Unfinished object
Copper/bronze bead tool
Stone drill
Hone
Reject
Objects kept for reuse
Hoard of metal objects
Craft debitage
Chert tools and debitage
Furnace
SITE PLAN
OF
MOHENJO-DARO

SCALE

1/2

THE SCALE DISTANCE OF 1 FOOT

Every fifth centimetre is shown thick

Everything shown in outline

Flows shown as bold above this

MAP IX
SHELL WORKING

Frontispiece.