CHAPTER II

**Historical and Ethnographic Data on the Organization of Craft Production**

According to Binford (1967) ethnographic analogies should not be used to directly interpret archaeological data, but should serve as a foundation on which a postulate could be based as to the relationship between archaeological forms and their behavioral context in the past. The successful use of analogies can be accomplished in various ways. One criterion is that if the initial resemblances are such that the inferred property would account for the resemblances, then the conclusion is more likely to be true. A smaller number of cases with a large number of common attributes is more useful than a large number of cases with a small number of common attributes (Binford 1967; Hodder 1982: 16, 18). The postulate should then be rejected or confirmed on the basis of testable hypotheses. In his specific example of smudge pits as used for hide smoking, Binford illustrates his use of ethnographic analogy. In a later article, Binford (1972: 52-58) pointed out that the presence of a valid alternative need not disprove the original postulate which could only be disproved through hypothesis testing. When faced with valid alternatives, one could evaluate the relative strength of alternatives in probabilistic terms.

The proper use of analogy in archaeology must take
care of the relevant context or the functional and ideological framework within which material items are used in everyday life.

It is significant and cautionary to realise that the portion of attention that is devoted to craft production in the ethnographic literature is very meagre when economies of individual societies are being studied. The bulk of the data comprises information on agricultural or other basic subsistence production activities. Even the discussion on established "guild" organized crafts among the Nupe occupies only a small part of the total thesis. It may also be obvious from this chapter that a great deal of attention has been given to ethnographic references to pottery production, which bias is due to the large amount of ethnographic field work done in this craft. Also a number of very early ethnographic histories are useful where organization and techniques of craft production are concerned but may not yield much information from an archaeological point of view. More recent work is undertaken from an ethnoarchaeological viewpoint, with the development of this branch of study in archaeology.

Our aim in this chapter is to approach the ethnographic data with the concept of specialization in mind, so as to gain an idea of the variations in all aspects of craft production and be able to understand the
archaeological data, realising that there can be no automatic generalisations about production, degree of specialization and location of working. The presence of specialization in an economy is a reflection of the complexity in the socioeconomic make-up of a community, though scholars have differed about the exact threshold for the emergence of specialization. But first, it is imperative to define the concept of a "specialist".

The concept of a specialist generally entails that of a person engaged in an activity not undertaken by other members of the population and from which he makes his living. In this, he is provided with goods needed for his own subsistence by the consumers of the specialized goods he produces, in one of many ways. The degree to which he is supported by the rest of the community involves a variant of specialization which will be discussed below.

The beginnings of specialization are more in the nature of a basic division of labour on the basis of age and sex. The latter dichotomy is evidenced in the most primitive societies, where men undertook tasks of hunting and butchering, and women of food gathering, and looking after the household and children. Within the fairly distinct divisions of labour between the sexes, all adults are expected to fulfil all roles (Fried 1967: 62). Differentiation in tasks on the basis of sex has survived into the present, with a number of crafts in various
contexts being worked only by men, where women are not involved in production and vice versa. For example, among the Zande (Kandert 1978), the Basuto (Ashton 1967) and the Yoruba (Bascom 1969), women are the potters. In other communities, crafts like weaving and potting are carried out only by men.

Another distinction lies in cases where within the same craft, some objects are produced by men and others by women. The most common example is of handmade pottery production done by women and sometimes also by men, while wheelmade pottery production is largely only undertaken by men, in Upper Egypt (Blackman 1968). Among potters in Uttar Pradesh and Bihar, parts of ritual terracottas which are wheelmade are manufactured only by men, on injunctions against women using the wheel, while hand moulded parts can be made by women. It should be noted that women often perform subsidiary tasks in pottery production, such as preparation of the clay, painting and decoration, but the operation of the wheel is done only by men (Jayaswal and Krishna 1986: 54, 66). Such examples are furnished by potters of Baradia village, Gujarat (Fischer and Shah 1970) and at Takouchtem, Morocco (Beckett 1958: 185).

If we were to trace the development of craft specialization, ethnographic references to incipient craft specialization in the form of limited craft production by
a few chiefship societies would be significant. In a chiefdom, superior workers can be subsidized by the elite or influential members of society, resulting in family lines of production (Service 1971: 138). Control of craft production by higher status individuals has been evidenced in the societies of Hawaii, Tonga, Mangareva and Easter Island (Sahlins 1958). The role of specialization in ranked/chiefdom societies is amply brought out by Earle (1987: 69), with examples from Hawaii and the Inca realm where he emphasizes that goods used only as prestige/wealth goods must be scarce if they are to maintain their restricted use and value. The limited availability of such goods is reflected in the rarity of raw materials utilized and amount of skilled labour required in manufacture.

Specialization as a concept involves itself with a number of different aspects. Muller (1984) has asserted that site specialization should be clearly differentiated from producer specialization, so as to make the concept clearer. He feels that regional specialization is often only site specialization, in that people may pursue ordinarily a full range of activities and still undertake only a single activity at a particular location. This in effect is true, but depends largely on the activity being carried out at a single location. The production of salt (with which Muller is concerned) may not be seen as a
specialized activity in the context of the utilized technology, as every single individual in a settlement could produce salt, but if metallurgy or ore smelting is carried out at a particular location, then we must think of this activity as a regionally specialized activity in which the technology involved ensures that this activity could not be engaged in by any and every individual. Often, we find that "site specialization" is not indicative of true specialization, in the context of activities such as butchering of animals for meat. Such activities may be done in a special quarter and may not indicate actual specialization, but just a desire to locate an unpleasant activity in a particular place. The basic idea to be confronted is the question of part-time craft production. In Muller's specific example of the Great Salt Spring, in Southern Illinois, he tends to favour the view of a part-time extraction of salt or an activity undertaken on a seasonal basis.

Part-Time Craft Production

Part-time craft production is very common where craftsmen work on their own fields and also engage in crafts for the rest of the time, a phenomenon seen often with potters (Balfet 1965: 170; Thurnwald 1969: 114; Horne 1982: 11). Among the Nupe, blacksmiths practice agriculture on farm plots close to their homes (Nadel
1942: 264). The Yoruba smith, too, cultivates land, to which he can retire after he gives up his craft (Rowlands 1971: 213). Among the Pangwe in Africa, the smith only plies his trade as a secondary occupation (Thurnwald 1969: 129). For a number of crafts, such as weaving, and basket-making, part-time working would seem to be the only method of production. Weaving in the Sultanate period in India, was carried out by weavers working in their homes on yarn purchased by themselves or given to them by customers. Where expensive materials such as silk or gold and silver wire were involved or where products were luxury garments, weaving was done in Karkhanas or royal workshops (Habib 1982: 80) the production of dyestuffs, the production of salt and saltpetre and iron smelting and charcoal production in late 18th century Bihar were also part-time peasant activities (Raychaudhuri 1982: 281). Thus, in medieval India too we find that "the line of demarcation between agricultural and manufacturing activities was not always clear." (Raychaudhuri 1982: 279). Weaving in some parts of Nigeria though, is a full-time occupation for men. Most crafts engaged in by women are necessarily undertaken on a part-time basis. It can be noted here that often crafts engaged in in cities are practised on a full-time basis, while crafts in villages are often part-time (Vansina 1978: 363).
Seasonality of Craft Production

Closely associated with the above idea of part-time craft working is that of seasonality of production. We have many examples of the seasonal exit of labour, or a seasonal mobility between farming and craft working. Much of craft production is seasonal, that is, in the period of demand for craft products, the craftsman is busiest, while in the slack season, he turns to more usual economic activities such as farming. An important point to be noted here is that usually cultivation is the major occupation and craft production a seasonal one; the Hausa farmers in the dry season only work as blacksmiths (Hill 1972: 71). Seasonality of production could be for different reasons, according to demand or environmental considerations. Production and demand for new tools is often a seasonal factor, concentrated at a time when new tools are most needed, that is, at the start of the agricultural season, for example in the dry season in West Africa (Rowlands 1971: 212). The important point is that demand for products is such that it can be satisfied at the time of actual need. The craftsman finds little advantage in building up a stock of required goods, as he can fulfil the amount of demand at the required time. Furthermore, the scale of demand is such that the craftsman cannot afford to work full-time at his craft. In Sudan, men and women grow crops for six months and
after the harvest, move from their villages to market centres and work at potting, blacksmithing and aluminium casting (Tobert 1985: 278). Farmers of seven villages neighbouring Cambay in Gujarat, undertake drilling of beads which becomes a major occupation in the period after the agricultural season in the monsoons (Trivedi 1964: 17). Potters in Pakistan, especially in the North West Frontier Province, combine farming and potting (Rye & Evans 1976: 115).

Activities such as mining, too, are engaged in on a seasonal basis, as in Northern Nigeria, where temporary settlements are set up to smelt ore and make hoes, and among the Angas, where mining begins after the harvest (Meek 1971: 149-50; Rowlands 1971: 212). Among the Massa of Ghana, deep-shaft mining could be undertaken only in the dry season, due to climatic reasons and also coinciding with the low period of agricultural labour requirements, that is, after harvesting in December and before planting in April (Dumett 1987: 214). In Ratanpur, in Gujarat, agate and carnelian mining was done in the dry season, as such work could not be undertaken in the rainy season (Allchin 1979:100); the Yeke tribe in Zambia mine in the dry season only (Bisson 1976: 36); so also with copper ore extraction in Bambe in Angola (Birmingham 1970: 166-67).

Craft working on a seasonal basis was also sometimes
due to environmental factors. The iron working Agaria cannot work in the rainy season, as their smithies are in the open and unroofed (Elwin 1942: 195); baking of carnelian (in bead making) is also done in the dry season, making use of the hot weather (Arkell 1936: 302); floods prevent collection of clay for potting in Sokoto in the rainy months (Nicholson 1929: 46); shell diving in Kutch and South India is not undertaken in the rainy season (Kenoyer 1984 b: 102); among the Yoruba supply of products of weaving is low during July to September, as rain and lack of sunshine make dyeing difficult (Hodder 1967: 176-77). In the craft of potting, it is evident that work is slack during the rainy season.

Fig. I

SEASONALITY OF CRAFT PRODUCTION

| ENVIRONMENTAL FACTORS/CLIMATE | AGRICULTURAL OPERATIONS |

In the archaeological context, part-time or seasonal craft working would be very difficult to discern. Literary evidence rarely gives us information in this regard, and in contexts for which no literary evidence is available, the task of distinguishing a part-time craft worker from a full-time specialist would be near nigh impossible. Attempts to decipher such differentiation have largely focused on density of craft debris in a production locus,
such as that attempted by Spence (1981: 771). According to Brumfiel (1987: 107), at Huexotla, under the Aztecs, production debris was either ubiquitous, suggesting household craft working, or present in very light concentrations, suggesting part-time working. However, such inferences must remain largely conjectural. In the absence of an archaeologically detectable time-frame within which production was undertaken it would be difficult and valueless to differentiate between large and small amounts of debitage.

Seasonality of craft production, too, involves the important question of dichotomy or relations between farmers and craftsmen, which is invisible in the archaeological record. However, seasonal production can be inferred with some degree of confidence when we know that seasonality will place a halt on an activity for one season. Mining for ore or minerals, fishing for shell and pottery production, all require a dry season for such procedures. So we may then suppose that subsistence related activities were practised in periods not conducive for craft production or that craftsmen worked on stocks of raw materials. Working on raw material stocks is possible where craftsmen are separated from miners or procurers of raw material.

In the Harappan case, this variable, of the
seasonality of craft production can only be inferred and is not archaeologically detectable. For example, it can be inferred that the collection of shells for the craft of shell cutting could not be undertaken in certain months of the year when it would be dangerous to dive for shells. As for the claims of agricultural operations, in a period when agriculture would have been the mainstay of the economy, it is difficult to conceive of craft production being undertaken in agricultural peak seasons when labour would be required for operations such as sowing and harvesting.

Division of Labour

The division of labour concept is significant in a discussion of craft specialization. This can again be seen in different lights. The basic form of division of labour has been mentioned earlier, that is, between men and women. Division of labour on the basis of age is also evidenced, mostly centering on experience. In various crafts, young people are involved as apprentices, learning the craft from the specialist workers. In crafts such as potting, apprentice workers undertake subsidiary tasks for a number of years, till they are allowed to work the wheel. In a craftsman’s family, it is usual to find children helping with various tasks. Many crafts, following a familial mode of production, will find apprentices who are usually relatives, as with black-
Division of labour in crafts is often first noted where procurement and processing of raw material is done by individuals or groups other than the craftsmen who work up the finished goods. Though a number of potters obtain their own clay, quite a few potters import clay, hence relying on others to quarry it. Thus the miners of agate and carnelian in the Narmada valley are distinct from the actual bead workers at Cambay: mining is done by the Bhils from surrounding villages (Allchin 1979: 99). In archaeological contexts, such a form of procurement of raw material is easily discernible, where production debris is found of a material which is not locally available. The inference underlying this assumption is that craftsmen located near a suitable raw material source will usually exploit that, rather than move out to find other sources.

Archaeological inferences have been made of cases where raw materials were probably collected and processed by groups other than the craftsmen of finished goods. An interesting example is given by Thurnwald (1969: 130) of metal working among the Kitara in Central Africa, where quarrying and smelting of ore is done by one tribe, the ore being "bought" from them by pig iron workers, who
break up the iron into various sizes, which is then obtained by the actual smith for working up into objects. Dyeing among the Yoruba reveals similar differentiation between processing of raw material and craft working, where one group of women prepare the dyestuff which is given to another group of women who do the actual dyeing (Fadipe 1970: 152).

Yerkes (1983: 500, 502) mentions such division of labour in his discussion involving stone drills and shell beads at Cahokia, where he considers that individuals who worked the shell beads were possibly different from those who manufactured the microdrills on the evidence that microdrills and related artifacts are largely found associated with shell material. Arnold (1987) also indicates that specialist producers of shell bead money were different from the producers of chert drills among the Pomo Indians though each group worked towards the same final product. The knowledge for each activity was handed down in different family lines. In these examples, we have strayed from distinctions between craftsmen and procurers of raw materials into separation of groups, some which produce tools with which other craftsmen work at their craft. With increasing complexity in techniques of production, producers of tools and procurers of raw material tend to become separate from actual craft working groups.
Subspecialization

Specialization is also indicated by division of labour on the level of differentiation between craftsman and between workshops, amounting to subspecialization. Specialization is inherent when one workshop specializes in a particular production process or production of a particular object. This can be best illustrated by examples. Among the glassworkers of Bida, we find different workshops working at different products, where one makes black bangles, another coloured bangles or black beads, yet another coloured beads (Nadel 1942: 276). Rowlands (1971: 211) gives an example from Kerma, Nubia, of a customer who takes iron to a smith for a dagger to be made, then takes the dagger to another craftsman for hafting and to a third for a sheath to be fitted. Among the woodcarvers of the Kuba, some make bowls for pipes and others, stems (Vansina 1962: 191). Among the Akan-speaking peoples of the Gold Coast, too, woodcarvers sub-specialize into producers of stools, umbrella frames and drums (Manoukian 1950: 20). Smiths, leather workers and pottery manufacturers in Bida also subspecialize into separate product categories (Vernon-Jackson 1980: 53, 56, 58).

This discussion, however, largely centres around skill. Where particular craftsmen are skilled in production of an object, they concentrate in producing that
object. Thus, while we find that most smiths make and repair tools, only a few make artifacts like swords and spears (Rowlands 1971: 218). Similarly among the brass smiths of Bida, while bangles and ladles are produced by all, only a few smiths will specialize in sword hilts and daggers and others in figurines (Nadel 1942: 272); all Nupe potters make clay lamps and small pitchers, but large cooking pots, platters and tall pots are made by only some potters (Nadel 1942: 296). In the Fijian archipelago various islands specialize in the making of different kinds of mats (Sahlins 1962: 421-22). Ashton (1967: 159) mentions tanning and minor decorations in leatherwork as done by the owners of the skin, among the Basuto, but more elaborate work like matching skins, cutting, sewing and decorating is done by specialists. Differentiation among potters also arises between those who produce earthenware and those who make toys and images (Saraswati 1978: 32). Among the Dahomey, hoes and knives are made in most forges, but objects of a ceremonial nature are made by a special forge (Herskovits 1967: 44). Modern bead making at Cambay also reveals much division of labour between workshops. Looking at the map facing page 25 of Trivedi's (1964) book, we can see separate areas for 1) chiselling and shaping of beads; 2) grinding; 3) drilling and; 4) polishing. There are also areas where two or more processes are carried out in the same area, such as
chiselling, shaping and grinding; chiselling, shaping and drilling; and grinding and polishing. Incidentally, and interestingly, there is not a single workshop where every single process is undertaken from start to finish (Trivedi 1964: 25).

The significance behind this aspect of subspecialization is explicated by Chapple and Coon (1947: 255, 272), where they note that when a craftsman focuses on a single technique, he will develop more skill, as by "conditioning himself to a single motion or set of motions, he can acquire greater dexterity and greater speed." Here, the question of standardization is relevant, as the motions required to produce a particular object are used, as a matter of course, to produce a number of such objects. However, the issue of standardization becomes more relevant in later periods when mass production became a major mode of manufacture. In earlier periods uniformity would have been the result of particular requirements and the production of simplistic shapes and types. However variations in forms of artifacts reflect the skill of craftsmen.

Elaborations in standardized forms are very often a result of elite requirements. Hence, a more heavily decorated object, or a more richly embroidered garment will be produced for elite consumption. Thus, the issue of the nature of demand is relevant for our discussion on
subspecialization. As for quantum of demand, we find that if demand for products is low, then a craftsman would be forced to undertake the production of a range of products, rather than specialize in the making of a single product. This is well illustrated by Jayaswal and Krishna (1986: 60-62) where areas with sparse populations reveal centres of production on a low scale and production of ritual terracottas is undertaken along with production of pots and tiles, while religious centres and concentration of terra-cotta production in townships with high demand reveal a higher scale of production of only ritual terracottas.

Product specialization and division of labour between workshops would be clearly discernible in archaeological contexts. The latter would appear in differentiated loci for separate manufacturing stages of a single craft. Product specialization, too, would be evident from finds of a single artifact category being produced from a locus. This has possibly been evidenced at Mohenjodaro, with the find of a concentrated production area of the pointed goblet type (Bondioli et al 1984: 29).

Division of labour within a workshop is significant, as it indicates a high degree of specialization, where different tasks are allotted to different workers. A primitive form is noted with families of potters where
children collect raw materials, women prepare the clay and men shape products and fire them. In less primitive forms, there could be separate workshops, where various individuals work, not necessarily related to one another. An example of such differentiation in tasks is given by Nadel (1942: 276) of glassmaking among the Nupe. In individual workshops, tasks are divided between workers, for example, one prepares the liquid glass, another shapes bangles or beads, another adds coloured ornaments. Wulff et al (1968: 99) have given an example of similar organization of an industry at Qom, Iran, possibly related to ancient faience production, where within one observed workshop, three adults and six boys helped the master. One worker was responsible for collecting the raw material—blocks of quartz; another pounded and pulverized the stones; another mixed the gum; and others made the mixture into balls which were packed into containers and baked. Among the Cambay bead makers, division of labour on the basis of different tasks is indicated by different terms given to groups of workers. For example, those who cut the stones and remove the rough, outer layer are called "khondiya", those who smooth the surfaces of shaped stones "ghasiya", and drillers are called "vindhar" or "sari" (Trivedi 1964: 14-17). The modern shell workers of Bengal also work accordingly. A bag of shells is given to a sawer to cut; bangle blanks are given to a grinder to shape and finally are returned to the merchant who
commissioned the work (Kenoyer 1984a: 330). As mentioned earlier for differentiation between workshops, the basic idea behind the specialization of individuals in separate processes within a single craft is to achieve greater efficiency and skill in craft production, though one should not lose sight of the fact that despite specialization, each worker within a workshop can yet be an all-round craftsman, as seen by the Nupe glassmakers (Nadel 1942: 276). The scale of demand is also a factor which will determine this level of subspecialization.

A number of crafts are, however, individual in nature. Among the Nupe in Bida, indigo dyeing was an individual craft carried out by women, each of whom had her own pot and made her own dye (Nadel 1942: 295). Woodcarvers of Dahomey, too, worked individually (Herskovits 1967: 77). Crafts individually undertaken would be those for which very simple tools would be required. Crafts utilizing locally available raw materials would hence require no elaborate mechanisms for procuring raw materials. Thus, spinning and weaving are important individual crafts as they complement other subsistence strategies such as agricultural operations. Basket making and mat making would also be individually undertaken crafts. An example of independence among craft workers is given of the jewellers of Dahomey who may work together and share the same forge, but are not controlled
as to the time they work, what they produce, how they sell their produce, or what prices are obtained for their work (Herskovits 1967: 77).

Despite individuality, a large amount of cooperation is often found between separate workers. This is often seen among potters who fire their products on a communal basis. Perhaps the best example of cooperation is that of the ironworkers and weavers of Dahomey, among whom exists the practice for one smith/weaver to buy a quantity of raw material and keep it till such time as it is his turn to avail of the labour of his fellows for whom he has been working in the meantime. When his turn arrives, all the members convert the raw material into finished goods, which he sells and whose proceeds he keeps (Herskovits 1967: 75-76).

The degree of independence as enjoyed by the jewellers of Dahomey is rarely seen in most established crafts. A large number of craft groups are organized under a "chief". Occupations undertaken by the Kanuri of Bornu, are organized under headmen in each settlement and under an overall headman for the entire occupation who lives in the capital city (Cohen 1967: 80). Dahomey weavers were strictly controlled by a chief heading the principal group from whom permission was required even to reproduce a design (Herskovits 1967: 76). In a number of
cases crafts are organized on the basis of guilds (prevalent only in market economies), concentrated in different families. Most artisans belong to groups of families and in many examples, all male members of the family work at the same craft. In such organization, we see the survival of societies structured on lines of kinship. Apprentices are usually relatives and rarely outsiders. Examples are of the brassworkers, iron workers and weavers of Dahomey (Herskovits 1967: 45, 48, 103); blacksmiths among the Zande (Kandert 1978: 513); bead workers of Bida (Nadel 1942: 283).

Fig. II

DIVISION OF LABOUR (NON-MARKET ECONOMY)

INDIVIDUAL
CRAFT
PRODUCTION

GROUP
CRAFT
PRODUCTION

RAW MATERIAL
PROCUREMENT

DISTRIBUTION
WITHIN A
WORKSHOP

BETWEEN
WORKSHOPS

PRODUCTION
RAW MATERIAL
PROCUREMENT

DISTRIBUTION

SELF MEMBERS
OF FAMILY

* AGE SEX SEPARATE
PROCESSES

* SKILL CUSTOM /
RITUAL INJUNCTIONS

PRODUCTION UNDER-
TAking
OF DIFFERENT
ARTIFACT
CATEGORIES
CRAFT
PROCESSES*

+ RAW MATERIAL
PROCUREMENT
+ RAW MATERIAL
PROCUREMENT
AND DISTRIBUTION
AND DISTRIBUTION

*: Archaeologically detectable
Archaeological clues to decipher organizational complexity in craft production lie in estimates of size of activity areas and the number of manufacturing stages performed in close spatial proximity (Tosi 1984: 24). Household crafts can perhaps be discerned by finds of spindle whorls in dispersed contexts. Finds of a specific production activity at a single locus could indicate individual working of a single stage of production in a craft distinguished by different stages. Such finds would obviously differ from individual crafts such as basket making or weaving. The basic point of difference lies in crafts such as basket making, as a single process, engaged in by a single person and probably for use by that person. In more complex crafts, where different processes and skills are involved, each process may be engaged in on an individual basis, but is not independent of the final product. Examples of the latter are seen at Cambay, where different stages of production in bead making are engaged in by different groups or individuals. To fully explicate the above, we may consider the case of farmers outside Cambay town, engaged in drilling beads on an individual basis (Trivedi 1984: 17).

Most data regarding Harappan craft production appears to relate to individual craft working. Bead making indicators at Chanhudaro indicate much work done on an individual level with possibly some amount of differen-
tiation between separate processes. Thus a person may flake or shape beads or grind them and polish them or drill holes in them. Most craft production indicators that we have such as, of unfinished objects in various stages of completion, indicate a particular process being undertaken there. Thus a seal found unshaped or uninscribed indicates the shaping or carving process was underway, or a seal found unglazed suggests the seal had to be glazed next. A bead found roughly flaked suggests further grinding to be done while unbored beads suggest this stage had to be undertaken. Beads broken while boring could imply the locus of a bead driller. There are numerous such examples in the Harappan culture which will be detailed in the following chapters.

Skill on the part of craftsmen as dependent on age and experience is best delineated in the craft of seal making. Here skill and expertise and the lack of it are exemplified by technically perfect seals and those seals suggesting the work of an apprentice. Seals where outlines are drawn first could indicate the work of novices.

Separate processes within a single craft undertaken in a single workshop could be archaeologically detectable as would be separate craft processes and manufacture of separate artifact categories between different workshops.
In the Harappan culture, we have hardly any such examples. In the first place, we have few examples of workshop production and where we may have them, as in the bead workshop at Lothal, it is not clear whether different craftsmen worked at separate processes. This is inferred so, on the basis of individual craft workers at other Harappan sites working on separate craft processes. At Balakot, it is possible that separate craftsmen or workshops worked at the cutting and shaping of *Turbinella pyrum* bangles and these differed from the craftsmen working with *Tivela damoides*. The two species of shell involved different technologies in dealing with them.

What next comes up for discussion are the concepts of independent and attached specialists, which according to Brumfiel and Earle (1987) are central to a consideration of specialization and complex societies. The major difference between the two kinds of specialists is seen to lie in the consumers. Independent specialists provide goods/services for an “unspecified demand crowd that varies according to economic, social and political conditions” while attached specialists undertake production for a patron, either a social elite or a governing institution. The concepts of independent and attached specialists are important as they can provide a fulcrum on which a number of aspects depend, right from procurement of raw material to consumption of finished
producers' outputs by merchants became widespread. Cloth, yarn, wool, agricultural products, saltpetre, and indigo were bought by middlemen (Chicherov 1971: 162-64). Thus merchants and entrepreneurs were buying the labour of craftsmen rather than buying their products (Chicherov 1971: 173). Artisan-entrepreneurs are a rare group in medieval feudal societies given the difficulties for upward economic and social mobility of craftsmen. However there are examples where some craftsmen were able to get ahead of their fellow workers as noted in a sixteenth century inscription of the Vijaynagar period. The inscription mentions, in the context of the number of taxable looms, that Gurivi Setti of the weavers' caste had 65 looms and another weaver had 12 looms. This must indicate that there would have been dependent artisans (Chicherov 1971: 166).

**Regional Specialization**

One form of specialization-regional specialization—which was partly discussed earlier in Muller's site specialization, should not be neglected. This concept involves the idea of a locality, a unit of area, focusing on a single production process or product. In a large number of cases, reasons for such localization depend on proximity to a raw material source, as noted by Blouet (1972: 7). Examples are pottery production among the
Arikuyu of British East Africa (Thurnwald 1969: 123); the Kuba (Vansina 1978: 362); the Yoruba (Bascom 1969: 102); in the kingdom of Dahomey (Herskovits 1967: 46); in Ibadan (Callaway 1967: 158) and with charcoal production in Iran (Horne 1982: 10). However, we can neither accept that proximity to a raw material source implied craft production nor that all crafts were located near raw material sources. Differential loci for production could also depend on custom, restricting manufacture of a particular product to a certain area and of another to a different group and area (Herskovits 1974 [1940]: 150). We have the example of the inhabitants of Fergusson Island who do not manufacture pottery, despite having good local clays which are exploited by the Amphlett Islanders. We also have the example of shell diving for the discs or kaloma in the Trobriand Islands. Fishing of the shell and manufacture of the discs is forbidden to the inhabitants of nearby villages, while the inhabitants of Sinaketa alone can undertake these activities (Malinowski 1964 [1922]: 367).

In other cases, we find different villages given over to different crafts, such as among the Ashanti, where different settlements concentrated on cloth weaving, cloth dyeing, pottery production, wood working and metal working (Arhin 1983: 473). An interesting situation comes up when a whole village is given over to a single craft. Then one
may, in all fairness, ask as to what could be the source of subsistence of the craftsmen. To answer that question, one must first locate the consumers of goods produced by that particular settlement. On the other hand, we must speculate that craftsmen had their own fields, which are worked by themselves or their family members. Ideally, such specialized settlements must be suburbs of a larger settlement which functioned as a consumer base of goods produced by the smaller satellite settlement.

Regional specialization is also indicated in situations where craft goods are exchanged against agricultural goods. People in areas that are less fertile and unable to support themselves in subsistence goods, divert their energies toward manufacture of craft goods which are exchanged with areas that are more fertile and concentrate on agricultural production. Such a situation is clearly brought out by Sahlin's (1962: 420) study of Moala and inter-island trade between the Fijian islands, where infertile islands concentrated on craft production and fertile islands such as Moala on cultivation of yams. A precautionary note in accepting this information lies, however, in the realization that Moala and other islands were largely kinship oriented societies and such cooperation seen in regional specialization and exchange was largely accomplished through various kin transactions. The significance of kinship was noted in cooperation
between islands which mitigated ecological differences between islands, resulting in a situation where fertile islands which could produce craft goods, did not do so, in fact, thus sustaining the trading potential of agriculturally poor islands (Sahlins 1962: 420-22). Such a situation may not, however, occur in more complex societies and especially in a money economy, where competition will not allow such cooperation.

Fig. III

**REGIONAL SPECIALIZATION**

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<th>LOCATION NEAR RAW MATERIAL SOURCES</th>
<th>CUSTOM</th>
<th>BETWEEN SEPARATE SETTLEMENTS</th>
<th>BETWEEN AGRICULTURALLY RICH SETTLEMENTS AND THOSE RICH IN NON-AGRICULTURAL PRODUCTS</th>
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Archaeological investigations into regional specialization are possible when raw material sources can be located and when settlements are noted in proximity to the source of raw material, along with evidence of craft working in the settlement. With recent scientific advances, it has been possible to pin down sources of a number of raw materials. Source areas of materials, like lapis lazuli, can be pointed out, as their occurrence in nature is limited. Even without being located close to raw material sources, a number of settlements which show through their occupation assemblages, adherence to a single craft would
qualify for regional specialization in craft production.

Regional specialization as resulting from location of a population near a required raw material source, is exemplified in the Harappan culture in the craft of shell working. At Nageshwar and Balakot, the population appears to have primarily focused on the production of shell objects. At Shortughai too, the settlement revealed evidence of the working of lapis lazuli which is locally available. Regional specialization between separate settlements in concentration on a single craft is also exemplified by the sites of Nageshwar and Balakot, but more so at Balakot, as at Nageshwar some pottery production was also undertaken.

Itinerancy

Before we go on to various aspects of craft production and the ethnographic evidence in that regard, we can discuss one more type of craft worker, that is, an itinerant craft worker. Itinerancy in craft working is by no means rare. We have various examples of craftsmen, who are highly mobile and who generally undertake a single craft working activity. Rowlands (1971: 214) is, however, of the opinion that there is no real itinerancy and that the itinerant smith divorced from any social context is rarely found in simple societies and gives an example that though smiths are dispersed in Tonga, each, however, has a
fixed workshop in one village and travels to other villages in the vicinity. We have a few examples of itinerancy in craft working, but in a money economy: the Gadulia Lohars in India are semi-nomadic and have no regular base of working in any village (Mishra 1977); and dhokras or itinerant casters who set up foundries on the roadside, where they produce their wares (Saraf 1982: 10). Kenoyer’s (1984a: 331-32) study of shell working in Bengal has revealed that some amount of itinerancy is present though mostly secondary work is done by the craftsmen. It appears that one or two members of most families go to outlying villages to sell their wares. They carry a few basic tools and sometimes bangle blanks to make a few quick bangles. The output must be very low as they undertake mainly repairs and little manufacture. Nicklin’s (1979: 443-44) perusal of ethnographic literature concerning the location of pottery manufacture has revealed a number of cases of potters travelling to areas away from their village and in some cases to remote areas to produce pots. It should be noted that itinerancy would largely be noted only in complex societies with a money economy. In simpler societies, it is difficult to conceive of craftsmen travelling distances to produce and dispose of manufactured products to people not known to them. The attachment to land which is an important feature of these societies would also preclude such movement. The diffi-
culty of obtaining raw materials in the absence of money and a market situation and of customers who are not directly or socially related will prevent much movement of craftsmen. The products they manufacture may be transported, but rarely the craftsmen themselves. Travelling craftsmen sent to work under the aegis of a political authority are known of, but these would be attached specialists, not independent itinerant craftsmen.

In any case, itinerancy would be very difficult to detect archaeologically. The mobility of these craftsmen would not leave too many traces and to presume itinerancy from scale of working, that is, from scarce remains of craft working would be too conjectural. Such an archaeological pattern could be the result of other kinds of behaviour, perhaps part time craft working, perhaps a household scale of working.

What is left for discussion are the various aspects of craft production itself. These are procurement of raw materials, types of goods produced, the quantum of production, and the location of craft activities. The various forms that these aspects will take will depend on the economic structure of society, on the presence or absence of a money economy and the market, and on the nature of the consuming group. Raw material procurement for a number of crafts undertaken at an individual level will be by the craft producers themselves. Thus, raw
materials for basket and mat making, clay for potting may be procured by the craftsmen. Procurement of rare or exotic raw materials will be difficult for individual craft workers, especially when source areas of the raw materials are distantly located. In less developed societies, craftsmen requiring exotic raw materials will be dependent on the elite members of society to obtain these materials on exchange expeditions or have them brought in as tribute. An example of elite procurement of raw material is given in the context of the feathered cloaks worn only by high-ranking males in Hawaii (Earle 1987: 70-71). Initial procurement of the feathers for the cloaks indicates the control manifest in the system to preserve the special nature of such cloaks. The skins of feather bunches were valuables apparently used in exchange, but specially used as tribute payments. Feathers were an important annual tributary payment made to the paramount chief by communities where the birds were found. In more developed cases, one may find that raw materials are brought in by a separate group, engaged solely in trade, transporting raw materials and finished goods (Meek 1971: 149; Nadel 1942: 200), or through the efforts of craftsmen themselves when they are organized in guilds, such as among the Nupe (Nadel 1942; Vernon-Jackson 1960: 52). A good example of raw material procurement dependent on the structure of the economy is of the glazed
ware potters from Quetta, Multan and Hala who purchase clay from contractors, so as to spend more time on actual production (Rye & Evans 1976: 127).

Procurement of Raw Material

Potters often use clay dug in the vicinity of the work area (Nicholson 1929: 45-46; Rye & Evans 1976: 127; Shah 1985: 21; Dietler & Herbich 1989: 150). In fact, Arnold (1985: 50) found that exploitation of clay sources within a territory of 1 km accounted for 33% of his sample, and taking a larger area, exploitation within 7 km occupied 84% of his sample. It should, however, be remembered that proximity to clay sources by no means implies location of pottery production, as mentioned earlier for regional specialization. The best example is of the clay resource at Yayawana on Fergusson Island in Melanesia, which is not used by the people in the vicinity for pottery production, but instead, the Amphlett Islanders come to fetch supplies of clay from here (Nicklin 1979: 442). Rye and Evans (1976: 127) mention a potter in the Chitral valley, Pakistan, who used a distant clay source, but instead of importing it, travelled a full day for clay gathering. There are numerous other examples of import of clay from far areas, such as brought to the Yoruba towns of Abeokuta; potters from a quarter of Bida obtain clay from itinerant vendors bringing supplies from Badeggi, 10 miles away; the Kutchi Kumhar potters of Poona
who import clay from 3 miles away; in a potter's establishment at Lahore, clay is brought from three different sources, one 80 miles away, white clay from a source 200 miles away and China clay from 300 miles away (Nicklin 1979: 445).

We find other interesting means of procurement of raw material, for example, where the customer gives a smith, raw material and often along with it, fuel and even his labour for production of the tool he requires (Rowlands 1971: 211; Thurnwald 1969: 124). We have already mentioned earlier a means of procurement of raw material in a cooperative manner, among iron workers and weavers of Dahomey where raw material is obtained in turn by each member of a group worked by the labour of the whole group. The glassworkers of Bida also have a system where raw glass can be obtained by a workshop from another workshop where glass is being made. In return, soda and sometimes firewood or money for firewood is contributed (Nadel 1942: 276).

With the introduction of money and the market, raw material procurement becomes a matter of purchasing the required materials, like the Gadulia Lohars who purchase scrap iron from the market (Mishra 1977: 63). Modern examples of cooperation between workers for the purpose of obtaining raw materials is seen in the Cambay bead making
industry, where dealers or middlemen obtain materials, store them and pass them on to craftsmen for further processing (Trivedi 1964: 25).

Fig. IV

RAW MATERIAL PROCUREMENT

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<th>NON-MARKET ECONOMY</th>
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<td>COOPERATIVE EFFORT</td>
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*: Archaeologically detectable

Procurement of raw material would only be archaeologically discernible when stocks of raw material are kept in elite areas or residences unassociated with other craft production indicators. Similarly, in market economies, the presence of raw material stocks in the actual marketplace or in residences of middlemen or traders or entrepreneurs, that is, in contexts divorced from actual craft working indicators would specify the mechanisms for the procurement of raw materials. The only form that would be archaeologically visible in non-market situations, which is procurement through the elite members
of society, has no examples from the Harappan culture.

**Production and Demand**

The question of what objects are produced depends on demand. Utilitarian objects of daily use are produced by craftsmen on direct demand by consumers. It is not really correct to say that independent specialists produce for an unspecified demand crowd (Brumfiel & Earle 1987: 5-6). In primitive societies, we are not dealing with a market economy, where goods are produced large scale for marketing. In such societies, manufacturing is done largely on directly expressed demand.

Thus, agricultural tools are produced only in the period of their requirement. No stocks of finished products are manufactured and stored by the smiths among the Pangwe in Africa (Thurnwald 1969: 129) and the Wabena potters of Tanganyika (Culwick 1935: 169). Among the Nupe blacksmiths, it is interesting to note that a store of hoe and axe blades will be manufactured by blacksmiths, but this is done in the busiest time of the year for blacksmithy in May and June, and not in the slack season. Products are disposed of in nearby villages (Nadel 1942: 264). In some cases, we find a different pattern as in Gujarat, where some potters produce a stock for the monsoon period, during which work cannot be done (Fischer & Shah 1970: 124).
Even in a developed society, as discussed by Jayaswal and Krishna (1986), in modern-day Uttar Pradesh and Bihar, in the context of terra-cotta figurine production, we find that such products are manufactured on direct demand, a result of transactions between craftsmen and the jajmana; similarly with the Yoruba weavers (Hodder 1967: 176). The work of what one would call "attached specialists" will also be according to a specific demand. Thus we find that the craft of bead making by the Yoruba of Southwest Nigeria, where the products such as crowns, caps and other solidly beaded pieces were used by kings and hence, much work was done under royal patronage (Bascom 1969: 102). Another example is that of the Aollakuna - women given over by their local community to the Inca for working at textile manufacturing and maize beer production (D'Altroy & Earle 1985: 190); so also silversmiths from Chimu, working for the Inca (Murra 1980: 157, 163); and craftsmen sent to work in distant villages for high chiefs in the Fijian Islands (Sahlins 1962: 354). Manufactured products were also given as tribute, such as rough cloth woven by commoners' households and given to the state (Murra 1962: 716). Archaeological interpretation of manufactured products brought as tribute would be difficult to discern, in some cases such as cloth, but would be easier with more durable materials, found in contexts such as temples, palaces or royal mausolea.
Thus, what we do find is that production becomes divided into two categories, depending on the nature of the products manufactured. While discussing craftsmen groups in Dahomey, Herskovits (1967: 47, 48) mentions that most of them deal in luxury goods (brass, gold and silver objects, clothes for chiefs, stitched designs on ritual cloths), and only the wood carvers make both utilitarian and ritual-associated articles. Similarly, the work of the brass and silver smiths among the Nupe is located only in Bida as products manufactured are solely luxury products, and though these are also taken to outlying settlements, only in Bida is a constant demand ensured (Nadel 1942: 270).

The quantum of demand that made the work of the Bida brass smiths lucrative is not something which is decipherable in an archaeological context. Archaeologically, the quantum of demand would translate into the scale of production, which in itself is not easily realized. Some indicators may, however, give a hint in a relative fashion. It could be said that the construction of permanent facilities to aid craft working could indicate that the proceeds from craft production may be substantial. This is especially so in the case of a craft like pottery production, as firing of pots could easily be done in temporary installations. (With other crafts such as metallurgy, permanent facilities would be needed, as
higher temperatures are required which would be difficult to obtain for sustained periods in open fires.) Ethnographic inferences suggest that unspecialized craftsmen and those consuming the products they manufacture are likely to use temporary facilities, such as open fires for baking pots, as contrasted with specialized potters who will use more permanent facilities (Alden 1982: 99-100; Balfet 1965: 166). We have a number of references to the use of open fires/bonfires for baking pottery (Thomas 1910: 98; Birmingham 1975: 381; Rye & Evans 1976: 165-66; Hegde 1977-78: 110; Tobert 1984: 141). Thus, the only way to detect pottery production with temporary facilities, could be through scatters of vitrified sherds. Rye and Evans (1976: 164) also mention that for open fires and bonfires, the fuel used (in the context of Pakistan) was largely dung mixed with straw, while wood was used for divided firing, where fuel and pots are kept in separate parts of a furnace. Thus, the use of dung for open fires indicates the use of a fuel commonly available in a domestic context, while wood used for fuel would have to be specifically collected or brought for the purpose. The use of dung for fuel instead of wood could also reflect a scarcity of wood due to deforestation.

It is also clear that where kilns are constructed for firing pottery, the purpose is to fire a large quantity of
pots; otherwise, the firing would be wasteful. In open fires, a much smaller number of pots could be fired. In the Kathmandu valley, most potters lit small bonfires once or twice a week as required (Birmingham 1975: 381). In updraught kilns used in Upper Egypt, 500 to 700 vessels could be baked at each firing (Nicholson & Patterson 1985: 230). Kramer (1985: 80-81) mentions that potters working on a large scale must have enough space (specially restricted in an urban context) for storage of finished vessels or must be able to dispose of pots on a regular basis. The scale of production may be more directly identified if we find a large (in a spatial context) production locus in a settlement, with the replication of a number of production processes.

Fig. V

*Archaeologically Discernible*
The use of valuables or elite goods by elite members of society could be exemplified by the find of two identical faience spindle whorls in the Great Bath area on the Citadel mound at Mohenjodaro (Marshall 1931: 469). The use of elite goods in non-local trade could be inferred from the finds of etched carnelian beads and long barrel-cylinder carnelian beads at Mesopotamian sites. The use of utilitarian goods is seen from finds of querns, mortars, pounders, and stone tools. Goods for further production are primarily tools used by farmers such as sickle blades, hoes or ploughs; by craftsmen such as engravers and awls for seal carving, drills for perforating beads and hones for grinding beads; heavy duty tools would be used by miners; weights would be used for weighing objects and materials and seals for sealing packages and for identity. All these goods are visible in the Harappan culture, except for heavy duty miners' tools and hoes and ploughs for farming.

There has been a suggestion that the work of "attached specialists" resulted in products that were higher in labour investment, as compared to the work of "independent specialists" (Earle, Costin & Russel 1986: 4). It is possible that products manufactured for consumers who could afford superior workmanship will be more carefully manufactured. High labour investment may be, but not entirely, due to the nature of the products
manufactured. Sometimes, the utilized technology may be such that even utilitarian products may require a considerable amount of labour.

**Location of Craft Production**

We next go on to the location of craft working. We have a number of examples of what we would call household craft working. In fact, we have overwhelming evidence of craft specialists working in domestic contexts, in workshops attached to the home, or in the home itself. Such a pattern has been termed a "household industry" by Santley and Arnold (1986: 9-12), where they consider all aspects of production activity to have taken place within a 50 m radius of a craftsman's (in their case, a potter) residence. Potters appear to have been particularly suited towards a domestic pattern of production location and activity, as is seen in the case of the Pakistani potters (Rye and Evans 1976: 168), women potters in Sudan working in their compounds (Tobert 1985: 279) and potters in Bailen, Spain (Curtis 1962: 488). Pottery firing is often also done within the potter's homestead (Saraswati 1978: 111). Of other crafts, too, we have significant similar information - among the Hausa at Batagarawa, forges are attached to the houses of blacksmiths (Hill 1972: 212); the Asur of India engage in metal working within their own compounds (Leuva 1963: 32); weaving and
cloth making are other crafts carried out in the family compound itself, in Ibadan (Callaway 1967: 158). In the Nupe kingdom of Nigeria, in the presence of a money and market economy, we find that a number of established crafts are carried out in the home itself. Bead working is carried out in the entrance hut of the craftsman's compound, brass smiths worked in their house compound, and workshops of glassmakers are in the living quarters of the craftsmen (Nadel 1942: 283, 270, 278).

In some cases, a separate shed is built for craft activity, but which is merely an adjunct to the house, as is seen in Takouchtem, Morocco, where a shed is attached to each house, equipped with the tools of the potter's trade (Beckett 1958: 185). Weavers in Dahomey, too, have separate shelters for their looms near their compounds (Herskovits 1967: 45). Buhari potters in South Gujarat have a studio directly across the road from their houses (Shah 1985: 98). Distinct workshop activity is noted among the Yoruba, where occupations of blacksmiths, potters and cloth dyers are carried out in locations separate from the home (Habdigunje 1967: 40) and among the Kafficho in Abyssinia, where smiths undertake their occupations in workshops (Thurnwald 1969: 122). Nadel (1942: 259) also notes that though in some cases a blacksmith's forge is located in the entrance hall of the residence compound usually the forge is in a separate hut.
which stands at a short distance away.

Where archaeological evidence gives information of craft related activity in conjunction with domestic artifacts, inferences of a craft on the scale of a household industry are not too far fetched. However, to deduce household industry as being of small scale or catering to a local demand or being unspecialized, would be erroneous, as Nadel's example of glassmakers and bead makers would show. Such crafts as noted earlier were specialized to an extent of depicting considerable division of labour in production and yet were located in household contexts. In Cambay, various bead making processes were centred in homes (Trivedi 1964: 25). In fact, a survey found that 89% of 446 units saw bead making carried out in the front/verandah/upper portion of the craftsman's residence (Trivedi 1964: 29-30). At Tikal, Guatemala, evidence of flint and obsidian workshops were found in groups of dwellings in the central zone (Haviland 1974: 194).

Proximity of a production locus to a patron's residence has been an archaeological indicator of attached specialization, so long as elite residences can be distinguished. Where craftsmen are attached to "ceremonial centres", the evidence is even more direct. In Shang China, some craftsmen certainly worked within the precincts of sacred enclaves. In the An-yang core, two
bronze-casting and working areas, a jade and stone workshop and a bone working area were discovered at the important site of Hsiao-t’un (Chang 1980: 98-99, 233-235), though there were dispersed workshop areas surrounding the palace area (Chang 1980: 124, 126; Wheatley 1971: 74). Out of the three Shang crafts, bronze working, pottery production, and stone and jade working, only bronze working seems to have solely focused on elite consumption. In both pottery production and stone and jade working, we find the production of a variety of products such as slate harvesting knives aimed at different consumption groups. Spence (1981: 760, 771-72) noted that some obsidian workers were engaged periodically within the precincts of major structures and were probably overseen by the state. This settling of craftsmen close to their source of consumption is conceivable, though in the Shang, as in the Inca case (Rowe 1982: 103), such settling could be instituted at the instance of those in authority. The production of utilitarian items in such contexts could also indicate the interests of the elite in such activity.

Differences in the location of craft production in the centre of settlements or in the outskirts are quite significant. Such locations could depend on diverse factors, such as security for production of a wealth good to environmental reasons. An example of the first is evidenced from five sites, Uruk, Shahdad, Shahr-i Sokhta,
Altyn Depe and Tepe Hissar, where areas for semi-precious stone working were concentrated in residential areas within urban boundaries, perhaps because the raw materials used in the craft were procured from distant sources and were valuable (Mariani 1984: 122). However, from the same sites, we find other crafts located at the periphery of the settlement, largely due to environmental reasons. Crafts such as pottery production and metal working were often relegated to such locations to prevent air pollution in residential areas. However, such locations could also be a result of the scale of production. Large residential workshops and establishments would probably not be located in central areas of habitations as such areas were generally the most densely populated.

A number of ethnographic references are, however, available on potters firing their pots in their own courtyards, which could be understood in terms of the scale of their operations, where if craftsmen baked pots in open fires and where no facilities were constructed, little discomfort to the community can be envisaged, and requirements of space would also not be large. Also, since most firings were individual in nature, not much pollution would have been produced. Where communal firing of pottery is resorted to, this is done in an open area outside the living space. Sometimes pottery production was so displaced from the centre, that a separate suburban complex
existed solely for the craft. Such seems to have been the case at Shahr-i Sokhta, where the suburban settlements of Tepe Dash and three other loci to the east and south of Shahr-i Sokhta were founded (Tosi 1984: 31, 42). Similar locations for purely environmental reasons can be adduced with tanning activities (Nicholson & Patterson 1985: 226) and with shell working, due to the stench emanating from decaying organisms in shells. Shell working in modern contexts, too, is located on the periphery of settlements for precisely this reason (Kenoyer 1984 b: 107).

Fig. VI

* : Archaeologically detectable

Data from the Harappan culture exemplifies most of
the forms delineated by the above discussion on the location of craft production. Evidence of domestic craft production are plentiful, with innumerable cases of unfinished objects, found in houses such as beads, seals, metal objects, shell objects and weights. Other examples are of waste products of craft working fragments of sawn and partially worked steatite and a bone object like a stylus in room 127 in House X, HR Area of Mohenjodaro (Marshall 1931: 184); chank shells, columellae and unfinished bangles in house 159, Block G of Lothal (Rao 1979: 122). Evidence of working in a courtyard could the kiln in House VII of HR Area at Mohenjodaro (Marshall 1931: Pl. XXXIX). Craft working in an attached shed or adjacent to the house is not so clear in Harappan settlements, but the kiln located in an enclosed area between houses XXII and XXIV in Section A of VS Area at Mohenjodaro (Marshall 1931: Pl LVII) could indicate craft production undertaken not inside, but near the home. Craft production in elite areas is also not very common, but there are a few examples. The surface survey at Mohenjodaro revealed small spreads of the working of lapis lazuli and metal working along with some shell debitge and pottery production on the Citadel mound (Bondioli et al 1984: 27).

Non-domestic workshop production would be archaeologically discernible, but is not quite common in the
Harappan culture. Room 215 with its adjacent furnace on Mound II at Chanhu-daro could represent a workshop; so also the bead factory in Block G at Lothal. Evidence of craft production in the centre of settlements due to the little space required is evident from the myriad examples of indicators of craft production in the form of unfinished objects, tools anddebitage that is revealed from within houses in the centre of settlements such as Mohenjodaro, Harappa and Chanhu-daro. Crafts requiring little space for production purposes are mostly bead making, seal making, weight making and the production of shell objects. Craft production undertaken in the centre of settlements on account of the high value of raw materials utilized is not so clear from Harappan sites. Craft working in the outskirts of settlements due to requirements of space is probably exemplified by the large spreads of kilns and pottery wasters that are noted on the edges of the settlement of Mohenjodaro (Bondioli et al 1984: 27). Craft production undertaken in the outskirts to prevent polluting the environment is to be noted in the location of the initial processes of shell working on an isolated mound to the northeast of the main mounds of Mohenjodaro (Kenoyer 1984b: 107).

The best example of the location of craft production near a raw material source is the production of beads from lapis lazuli at Shortughai. Apart from shell working at
Nageshwar and Balakot, we have no other examples of craft production undertaken near raw material and fuel sources but it is inferred that much of the initial ore-smelting operations were probably undertaken near the source of ore and fuel. There are not many examples of the proximity of craft production to water sources save the smithy at Lothal located near the river (Rao 1978: Pl. XXXVIII).

Another point discussed earlier under regional specialization is also of relevance here: the source of the inputs. The location of craft working is sometimes dependent on the location of the required raw materials. Numerous examples of pottery being produced near the source of good clay were mentioned earlier; so also imports of clay from distant sources. Water is essential for some crafts as seen in the case of the dyers' workshops in Persia (Wulff 1966: 193). Some scholars note that proximity to fuel sources is not essential as any combustible material can be used to bake pots. This is likely as much pottery firing can be done in open fires. However, where metallurgy is concerned, a comparatively large amount of fuel would be required. Nadel (1942: 269) given an example of the work of iron workers being interrupted when they ran out of raw material; a similar situation could arise with fuel. However, much appears to hinges on the particular craft and the scale of work undertaken. With a craft such as bead making, it is
conceivable that nodules of raw material could be transported to the producers, rather than it being necessary for the producers to settle near the source of raw material. With metallurgy, large amounts of ore are required for objects, but again, ingots of refined metal can be transported to producers. As regards the scale of work, it is possible that if a metal-worker's furnace is not worked on a regular basis, then it would be possible to set in a store of fuel.

Payment for Craftsmen

Forms of payment for the work of craftsmen differ in various ways. Goods given in exchange appears to be the most common form. Among the Bantu (Nicklin 1971: 13) and the Kpelle of West Africa (Thurnwald 1969: 124), subsistence goods are given in exchange. In a money economy, we find that ritual terracottas produced for a patron (jajmana) are "paid" for by conventional items like clothing, cereals and some money. Agricultural products are given periodically for supply of utilitarian items such as earthen pots (Jayaswal & Krishna 1986: 70). In the context of "attached specialists", Brumfiel (1987: 106) considers the most basic form of patronage as the awards of agricultural lands to specialists, to sustain themselves through subsistence agriculture. In the Aztec state, specialists were given a share of tribute cloth,
received by the ruler, which freed the specialist from subsistence agriculture. Here, however, the presence of the market made possible the conversion of non-agricultural goods into subsistence goods. Other forms of "payment" for craft goods are mentioned in the literature. This need not be in subsistence goods, but could take the form of part of the raw materials obtained from a customer (Rowlands 1971: 211). There are cases where the customer worked in the fields of the craftsman as "payment", this form being found among the Nupe (Nadel 1942: 265), the Ewe (Thurnwald 1969: 133) and in Northern Nigeria (Meek 1971: 150).

Recycling and Archaeological Recoverability

The question of re-use of products of by-products of craft activity are also significant for our discussion, especially from an archaeological viewpoint. How products are used and re-used will affect our interpretation of the archaeological record. Hence, ethnographic evidence in this regard is valuable. Thus, Sheets (1975: 101-102) makes a valid point when he notes that the most common artifact found in a workshop need not be the aim of the activity, but a by-product of the craft process. In the craft of shell working, it is noted that even tiny chips and shell dust are sold to lime makers, who produce a lime plaster or whitewash (Kenoyer 1984 a: 343). Specific types of manufacturing waste like columella and body whorls of shells are taken to distant regions and
processed into small objects (Kenoyer 1984 a: 346). Debitage resulting from the chipping process of bead making is sorted and large pieces of nodules are utilized to make smaller beads or smaller debitage is sold to be ground into a powder which is used in the grinding and polishing processes. We have a number of references to the re-use of pottery wasters-old cracked pots are sometimes riveted with banana fibre and used as moulds for new ones in Uganda (O’Brien and Hastings 1933: 191); potsherds are pulverized and used as temper; a broken pot can act as a base for a new pot; cracked pots are used as tripods for cooking; a big sherd can be used as a water/food dish for animals; a potsherd can be used as a receptacle for sacrifices (Ikechukwu 1987: 453). Potsherds could be used to cover and protect pottery in firing; to block holes in walls and window frames; and in ovens, instead of stones (Stanislawski 1955: 83). In an archaeological context, it was noted at Shahr-i Sokhta, that wasters in alabaster stone working were re-used as a raw material to produce smaller objects (Ciarla 1981: 53).

To conclude, it can be mentioned that specialization is dependent on technology of the craft in the context of the required skill. Cleland (1986: 99) gives the example of stone tool production vis-a-vis metal working, where the latter craft would require more complex supportive industries, greater inputs of time and exploitation of
distantly located raw material sources. Chapple and Coon (1947: 101) refer to the same point when they reiterate that few people know where to find deposits of copper or tin or are able to recognise these minerals when they see the ore, how to extract the metal from the ore and how to blend metals and cast tools. Thus, one should not lose sight of this aspect, as on whatever scale of operation the craftsman works, he still will be a specialist. The following chapter attempts to study the technological attainments of craftsmen in the Harappan period.