

# Archaeological Problems with Specialization

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*Archaeologists study craft production as it provides information on the ways in which artefacts were produced. Craft specialization is, however, more complicated as it involves not only techniques but also organization. In contrast to anthropology where observation can reveal the scale of production or the amount of resources or time utilized for the practise of a craft, archaeology can make only tentative interpretations. Scale of production, standardization, and levels of expertise can be understood when certain variables are known. Archaeology is a discipline that understands the past in the context of the present and thus often uses the methods of production and the function of present-day artefacts to interpret ancient artefacts. However, there is also a tendency to use present-day organizational systems to understand past production mechanisms. This may be problematic especially where past systems varied greatly from modern ones. The particular socio-economic background of past systems must account for the forms that ancient specialization took. To explicate this, a case study of manufacture in a Harappan settlement is taken to understand the context of craft activities. The study shows that production in a large urban centre could be dispersed and episodic and yet be specialized.*

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The following two extracts provide the backdrop for the ground that will be traversed during the course of this article. One is an extract from Francis Buchanan who journeyed through parts of South India, richly detailing aspects of the administration, the people, their activities, and their lives. The other is a short extract from an archaeological excavation report.

## Extract 1

During the four months of heavy rains, four men are able to collect as much sand as a furnace can smelt in the remainder of the year. In order to separate the earth and sand, which are always mixed with it in the channel of the torrent, it requires to be washed .... During the remaining eight months of the year they work at the forge.

The smelting furnace is made in the front of a square mound of clay, sloping up gradually from behind upwards ... the mound is twenty-two inches high, and three feet broad. In this, from top to bottom, is made a semi-cylindrical cavity, about a foot in diameter. On the ground, in front of the cavity, is laid a

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stone six inches high, a foot long, and a foot broad. Contiguous to this is placed another stone a foot square and two inches thick. On the top of this is fixed a small piece of timber, behind which rises another mound of clay, sloping upwards gradually, and widening as it recedes from the furnace. On this rests the bellows, of which there are two. Each consists of a whole buffalo's hide, removed without cutting it lengthwise. Where it has been cut at the neck, it is sown up, so as to leave a small opening for a wooden muzzle, which is made fast [by] the piece of timber before-mentioned. The hinder part of the skin is slit vertically, and the one side is made to lie over the other. In the middle of this outer side is fastened a ring of leather, through which the workman passes his arm, and seizes the upper angle of the skin, which serves as a handle. When he draws back his arm, the opening in the hinder part of the skin is dilated, and admits the air; when he forces his arm forward, the opening is closed up, and the air is forced through the muzzle. The lower part of the bellows is retained in its place by a rope fastened to the lower angle, and supported by an elastic piece of timber, which is fastened to one of the posts of the hut, like a turner's lathe. The muzzles of both the bellows are inserted in one common tube, which is made of baked clay, and is placed in a sloping direction, so as to pass through a mass of moist clay, that occupies the front of the furnace above the first mentioned stone.... The furnace is ... cylindrical, and open at top, on which is placed a chimney, made of baked clay, in the form of two truncated cones joined together by the apices.

For smelting the black sand the following is the process. A quantity of sand is measured out, and divided into three parts ... Three baskets of charcoal are then set aside ... Two of the baskets of charcoal are then put in at the top of the chimney, and above these one third part of the sand. The fire is then kindled and urged with the bellows. When the fire subsides, one half of the remaining charcoal, and another third of the sand, are put in; and when those have again subsided, the remainder of the sand and charcoal is added, and the fire is urged six hours and a half from the commencement. The front of the furnace is then broken, and on removing the walls a mass of iron is found at the bottom, which is taken out with forceps, and cut into two blocks ...

In order to render this iron more pure, and to fit it for being wrought up into the implements of husbandry, it is taken to another house, and repeatedly forged ... A block of iron ... having been put into the centre of the furnace, it is filled with *Bamboo* charcoal, and strongly heated; while another block is put into the upper opening ... When the first block is properly heated, it is placed on an anvil and receives a few strokes of a large hammer from three workmen, who stand in three cavities formed around the anvil, to reduce them to a proper level, and who thus knock off some ill-smelted portions, and much of the adhering scoriae. With a kind of hatchet the block is then cut into three

wedges ... The second piece is then put into the centre of the furnace, and a third piece is placed in the upper opening of the furnace; while these are heating, the three wedges are again made red hot, and well beaten on the anvil by the three workmen with large hammers.<sup>1</sup>

### **Extract 2**

A trial trench (4 × 4 m) was ... excavated ... The archaeological remains like potsherds, slag and cinder were found buried below the ground surface at a depth of about 20 cm. The excavation which was further continued to a depth of 1.25 m gave the complete evidence of iron smelting ... The sections of the trench also showed pieces of slag, cinder and potsherds profusely. The soil had become extremely hard obviously due to smelting operations undertaken repeatedly for a considerably long period ... A short description of the Megalithic iron smelting is as follows:

- 1) Iron ore: The microscopic examination of the pieces of iron ore collected from the trench showed that the predominant ore type was crystalline to microcrystalline micaceous haematite quartzite which is generally associated with manganese ore ... The thickness of the pieces of iron ore was between 3 to 5 cms.
- 2) Smelting furnace: Circular clay bricks of 4 cms thickness were found scattered in the trench. A reconstruction of the dilapidated structure showed that the diameter and the height of [the] smelting furnace were 30 cms and 25 cms respectively. The bricks were piled one over the other; the upper surface of the lower brick was convex and the lower surface of the upper brick was concave. The cross section of the circular bricks showed that the inner side, of about 2 cms thickness, was turned black obviously due to firing in reducing conditions, while the outer side was brownish red. A hole at the bottom was provided for the tapped slag. A few bricks, forming the bottom of the furnace, were found fused with the slag and cinder.
- 3) Tuyere: Two tuyeres were recovered from the trench, out of which one was found in vitrified condition. It was 16 cms in length and 2.5 cms in diameter. Another tuyere [of] 3.6 cms in diameter was found broken in many fragments ... Both tuyeres were made of clay heavily admixed with quartz grains. The function of a tuyere is to pass air into the furnace from the bellows.
- 4) Slag and cinder: A large quantity of tapped slag and cinder weighing more than 40 kg was recovered from the trench ... A unique piece of tapped slag

<sup>1</sup> Buchanan (1807: 171–74).

was also found fused with bricks which formed the hole for the exit of the slag. On the other side cinder and partially reduced iron ore (micaceous haematite quartzite) were fused together.

- 5) Iron objects: A piece of corroded iron rod of about 0.5 cms thickness and 5 cms length was recovered.<sup>2</sup>

The above extracts show two different situations: one, observations on craft workers, and two, the archaeological observations of recovered material and a tentative interpretation. The first comprises minutely documented data; the latter tries a reconstruction. There is information on what has been found: bricks, tuyeres, slag and so forth. What one gets are remnants, products of archaeological formation processes and recovery. Contextual information, such as a tuyere placed within a structure, is, however, lacking. Was the corroded iron object found produced in the furnace or was it a tool used in the metal working process? To be able to reconstruct a picture as in the first scenario, from archaeological data, is not easy. Part of the problem stems from the data—archaeology provides us with a necessarily incomplete picture. The absence of non-durable materials means that several crafts, for example textile production, would, in all likelihood, remain invisible. While some tools may be recovered, the final product, that is cloth, is in most cases irretrievable in archaeology. That this is a major disadvantage can be seen from historically documented evidence of the production of fine cloth. Further, the reliance of archaeology on the present for much of its interpretations (especially on function) is well accepted. Problems may hence arise with artefacts of a type that are no longer used or with technologies that have disappeared.

Let us see from Buchanan's account what the archaeologist may recover. The parts of the furnace made of clay (which probably would have burned due to heat) and stone would perhaps be recoverable. The parts of the furnace made of wood and leather (for the bellows) will most likely not remain. The end of the nozzles ('muzzles' according to Buchanan) of the bellows is a tube of clay, which again may be found. There are aspects of the production process that may be obtained—if, for example, part of the furnace was broken to remove the iron bloom. Analyses could also be done to determine the type of fuel used. What, however, cannot be known for sure would be the proportion of fuel used in relation to the ore, as also the firing time.<sup>3</sup> Buchanan points out that the forging of the bloom was the stage that followed smelting. Interestingly, here too bellows were used but ones slightly smaller than those used for smelting. Thus, if bellows' nozzles are archaeologically recovered, it may be kept in mind that they could have been used for both smelting and forging.

<sup>2</sup> Gogte (1982: 54–55).

<sup>3</sup> Some of these aspects can be gauged by undertaking experimental archaeology studies.

What would be difficult to recover would be the amount of time spent on a particular activity, such as the collection of ore. As for the number of men required to collect enough ore to work the furnace, the figure could be calculated by looking at modern figures of person-hours/days required for the job. Thus, we get to know from Buchanan that for four months, four men work at collecting the iron-bearing sand and work at the smelting forge for the remaining eight months of the year. He also notes that the smelting-house burns three times a day for about eight months. Thus, the scale of production, whether part-time or full-time, whether combined with other activities or not, is not information that is readily available to the archaeologist.

Quite apart from the issue of production is that of specialization. Usually, an extreme form of division of labour or the amount of time spent on a process or activity has come to be associated with the modern conception of specialization, even in discussions of ancient production. Many of the features of this form of division of labour arose only in the wake of capitalism, but we shall see how some of these features continue to be evoked in studies of past production. Would it perhaps be better to understand specialization very generally in terms of the possession of particular specific skills, those that may not be available to all?

A basic differentiation in allocation of work often occurs in terms of age and gender. The former implies that expertise comes with continuous and long years of practice. Gender differentiation in production is sometimes a feature of societal injunctions or rules against production, or certain aspects of production, being undertaken by women. This can be seen, for example, in the taboo against women using the potter's wheel. Particular tasks and, in turn, skills are thus divided on the basis of gender. While there is little formal division of labour in subsistence-level production, the extent of the difference in an industrial situation can be gauged from Adam Smith's example of the making of pins.<sup>4</sup> He pointed out that a workman, performing all the tasks, could scarcely make a single pin in a day, while the same object could in fact be made in thousands if several workmen combined their efforts. Hence,

one man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations; to put it on, is a peculiar business, to whiten the pin is another; it is even a trade by itself to put it then into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations.

<sup>4</sup> Smith (1961 [1904]: 8).

He also pointed out that the immediate result of this division of labour would be 'a proportionate increase of the productive powers of labour'.<sup>5</sup> Thus, even if a single craftsperson can achieve a scale of mass production, it cannot be compared to the work of several workers combining to produce a single object. Not only is there an increase of production, there would also be a saving of time in that the worker need not waste time in moving from one process to another.

This form of division of labour in turn also leads to, dichotomously, a separation of processes and an independence of workers on the one hand and a dependence on each other on the other hand. Independence results from the concentration on only a sub-process, a sub-specialization, where, to take Adam Smith's example, a worker who draws out the wire for the pins does only that. Dependence, however, arises, as each sub-process is like a cog in a wheel and all sub-processes mesh together to produce the object.

The separation of skilled from unskilled processes was not automatic and probably developed over time, resulting in differentiation of labour. We can identify two different scenarios. In one, a craftsperson would have had the knowledge of several processes ranging from skilled to unskilled. It has been pointed out elsewhere that there was in Antiquity a far greater ability among craftspersons to work at several processes and with varied materials.<sup>6</sup> Epigraphic and textual evidence testifies to the versatility of craftspersons and, in particular, of master craftsperson. Modern-day distinctions between skilled and unskilled work may not have been so strongly demarcated in the past, with master craftspersons being fully capable of performing seemingly mundane craft activities. In the second, there would have been a system of a division of labour, with skilled processes limited to certain individuals and groups. It is in the latter situation that a hierarchy of tasks must have become inevitable.

When production tasks are separated and allocated to different workers, the overall production is usually undertaken in designated work areas, often called 'workshops', and more often than not in urban rather than rural situations. This also saves time. As will be detailed ahead, the advantages of specialization would be negated if too much time elapsed between various sub-processes if these were not undertaken in close proximity to one another.

Such forms of division of labour as described above may be necessitated by the context of production. Specialization can broadly be understood as the possession of specific skills, those not possessed by all. This article shows that specialization can exist in societies at different stages of development, a recognition of which can be achieved only if we acknowledge the various facets of specialization.

<sup>5</sup> Ibid., p. 9.

<sup>6</sup> Menon (2003).

The specific aim here is to explore how archaeologists have looked at craft specialization and the difficulties that can arise in their attempt to understand this aspect of production.

### Views on Specialization

Archaeologists deduce the existence of craft production on the basis of certain kinds of evidence: for example, the presence of raw materials, installations or facilities (such as furnaces, kilns or dye vats), craft tools, production debitage, unfinished objects, stocked or unworn products and materials kept for recycling.<sup>7</sup> Certain indicators, such as stocks of finished material, found in isolation, may not indicate production, particularly if production was separate from distribution. However, these are often used to deduce manufacture of craft objects.<sup>8</sup> Generally, the co-occurrence of indicators is considered more reliable as opposed to finding isolated indicators. From a purely archaeological point of view, the identification of the *specialization* of craft is considerably more difficult than that of *production*.

'Specialization' has been variously understood by different archaeologists. Brumfiel and Earle took the term to imply 'economic differentiation and interdependence'<sup>9</sup>—in a context where individuals produce goods or services for a broader consuming population. For Clark and Parry, craft specialization is the production of alienable, durable goods for non-dependent consumption.<sup>10</sup> In marked contrast to these generalized definitions is Costin's: 'differentiated, regularized, permanent, and perhaps institutionalized production system in which producers depend on extra-household exchange relationships at least in part for their livelihood, and consumers depend on them for acquisition of goods they do not produce themselves'.<sup>11</sup> For Stein and Blackman, specialization can be seen 'as the investment of labor and capital towards the production of a particular good or service, such that a person produces *more* of that commodity and *less* of others than he/she consumes' (emphases in original).<sup>12</sup> Cross and Stark focus on specialization in non-stratified and community contexts respectively.<sup>13</sup> Milliken too rejects the notion of specialization as being applicable only to complex societies.<sup>14</sup> In her

<sup>7</sup> Tosi (1984: 25).

<sup>8</sup> Thus, for example, usually the find of an unfinished object is taken as evidence for its manufacture, as it becomes difficult to explain its presence otherwise. Yet, this is not universally true. For example, the find of ingots need not necessarily imply their production at the spot. Ingots could well have been transported to production sites. Similarly, one could take the case of modern Nagara in Gujarat where undrilled beads were brought from Khambhat for perforation.

<sup>9</sup> Brumfiel and Earle (1987: 5).

<sup>10</sup> Clark and Parry (1990: 297).

<sup>11</sup> Costin (1991: 4).

<sup>12</sup> Stein and Blackman (1993: 29).

<sup>13</sup> See Cross (1993) and Stark (1995).

<sup>14</sup> Milliken (1998: 2).

view, we are dealing with specialists if artefacts are found in a relatively restricted set of contexts, or the mode of production is relatively uncommon, or if the level of skill involved is above that required for mundane production activities. Thus, as pointed out by her, specialization can also be a feature of Palaeolithic societies.

The archaeologist who first brought specialization to centre-stage was V. Gordon Childe. That scholars still acknowledge Childe's contribution is made clear from an entire volume dedicated to the subject.<sup>15</sup> Bronson understands the term 'specialist' in three senses:

all of which were used and sometimes mixed together by Childe. The first meaning relates to the extent of an individual's involvement in an economic activity ... [T]he second meaning focuses on how important the activity is to individuals' livelihoods: they are specialists if they derive the bulk of their income from that activity, even though the activity may occupy only a small part of their time. The third meaning brings in the element of skill: to be a specialist, one must master a particular set of knowledge and motor habits which confer special ability to perform an economic activity, with the implication that the activity cannot be performed with equal success by a nonspecialist.<sup>16</sup>

Many anthropologists, according to Bronson, consider the first meaning to be primary and while Childe accepted all three, he often emphasized the third. Childe, in fact, clearly contrasted craft working in urban situations with that in Neolithic societies.<sup>17</sup> While in the latter there was a gendered division of work, there were also the beginnings of the accumulation of skills of dealing with materials like clay. Neolithic crafts were household industries, the result of collective craft traditions. The beginnings of metallurgy were a different case altogether. According to Childe,

the smith's task was more complicated and exacting [than the potter's], the knowledge he required more specialized. It is very doubtful whether metallurgy could be practised as a domestic industry in the intervals of agricultural work ... and metal-working has probably always been a full-time job. The smith's may therefore be the oldest specialized craft save the magician's.<sup>18</sup>

We must also note that archaeologists make a fundamental distinction between attached and independent specialization. According to Brumfiel and Earle, independent specialists 'produce goods and services for an unspecified demand crowd

<sup>15</sup> Wailes (1996).

<sup>16</sup> Bronson (1996: 177).

<sup>17</sup> Childe (1981[1956]: 87).

<sup>18</sup> *Ibid.*, p. 103.



that varies according to economic, social and political conditions' while attached specialists work for a patron. 'Attached specialists are contractually bound ... and the patrons insure that all the specialists' basic needs are met.'<sup>19</sup> There have been dissenting voices over the straitjacketing implied in these concepts.<sup>20</sup> As Clark points out, though independent and attached specializations are usually seen as mutually exclusive categories, in reality, an individual artisan could have worked in both capacities. Thus, a craftsperson may have been bound to work for another for a certain number of days per year, apart from which he/she might have worked independently.

There are further variations: production undertaken at a locus physically close to elites is often assumed as performed under control. But the obverse is not necessarily true, that all attached production was undertaken near elites. It could well be that it was the distribution of output rather than production itself that was actually supervised. For instance, Arnold and Munns found that shell beads were manufactured in the Channel Islands of California and not on the mainland where the elites were located.<sup>21</sup> The use of shell beads by only the elites in the Channel Islands meant the presence of mechanisms for controlling the use of these objects. However, the production of these objects itself was not supervised.

### **Standardization and Sub-specialization**

There has often been an emphasis on scale of production, the implicit idea being that specialization involves large-scale or mass production. This is no doubt a feature of specialization in its modern form and our concern would be to investigate the issue from the archaeological context.

When purely dependent on archaeological evidence and primarily on quantification of data, scale of production cannot be automatically inferred. For one, the issue of part-time or full-time work would have to be taken into consideration. As we have seen from Buchanan's extract, the exact amount of time spent by persons on either recovering the ore or working it was easily ascertained from informants through queries or through observation. However, in the absence of strict temporal controls, it may be difficult to archaeologically deduce whether craft work was performed on a part-time or full-time basis. Childe essentially understood specialization as implying full-time occupation,<sup>22</sup> an idea considered restricted as early as 1978 by Evans.<sup>23</sup> Ethnographic records are replete with instances of a movement between craft and subsistence activities. The reasons behind the shifts

<sup>19</sup> Brumfiel and Earle (1987: 5)

<sup>20</sup> Arnold and Munns (1995) and Clark (1995).

<sup>21</sup> Arnold and Munns (1995).

<sup>22</sup> Childe (1981 [1956]: 103, 108).

<sup>23</sup> See Evans (1978).

between these activities may have varied from inadequate demand to seasonality of activities where crafts can be practised only in certain seasons. It is true that part-time craft workers can often ill afford to manufacture on a mass scale, as they may be responsible not only for the production but also for the distribution of their output. The point being emphasized here is that these can still be considered cases of specialization as Stark noted during work among the Kalinga of the Philippines, where intensive potting is accompanied by intensive agriculture.<sup>24</sup> If we accept a broader conception of specialization from the point of view of the skills involved, a craftsman can be seen as specialized even if he spends part of the year in the performance of basic subsistence activities.

Archaeological inferences of mass production are often made on the basis of the permanence and size of facilities used in manufacture. Take the example of pottery kilns. It is commonly assumed that the larger and more permanent the kiln, the more likely that it was used on a full-time basis and for mass-scale production. Conversely, the more temporary the facility, the more likely that production was not full-time. Yet, as noted later, this interpretation leaves out the possibility of the sharing of facilities among craftsmen. Inferences of large-scale production can also be made on the basis of simplification of style, especially as compared to earlier, more elaborate styles. The latter would require greater investment of time as compared to the former. Designs (particularly paintings on pottery) show a distinct tendency towards simplification over time. Some of the earliest paintings on pottery were often the most diverse—for example, at Mehrgarh in Baluchistan, where the complexity of Faiz Mohammed grey ware paintings was far superior to later styles. One naturally tends to think of simplification as one of the criteria of mass production, because in many ways simplification is taken to imply standardization.

A desired feature of modern industry is efficiency in time taken in production, which generally involves standardization of not only technique but also product. Let us briefly deal with the issue of standardized output. Standardization of output is often assumed to be integral to specialization, as can be seen from the sub-specialization of tasks inherent in Adam Smith's example. Division of labour is inevitable when an individual/workshop concentrates on a particular process or production of a particular category of objects or even part of an object. Once the motor actions for craft processes to produce a particular type of object have been mastered, production time would be less than if highly variable types of objects were to be produced one after the other. The logic of sub-specialization is that if specialists worked at a given craft or process to the exclusion of other processes or activities, the result would be production on a greater scale due to constant replicability. Thus, a potter would be able to produce far more if he or she concentrated on making one type of object, rather than shifting from object to object

<sup>24</sup> Stark (1995).

(such as from a pot to a dish). In fact, one of the ways in which potters maximize production is by dividing their workday into blocks of time meant for different processes. Chapple and Coon noted that, 'by conditioning himself to a single motion or set of motions ... [the craftsperson] can acquire greater dexterity and greater speed'.<sup>25</sup> Yet, it must be made clear, that mass production and standardization can be expected only of utilitarian classes of objects rather than of special-purpose objects. Thus, pottery production is more likely to take place on a large scale, due to the greater consumption of pots, unlike, for example, luxury or special-purpose objects.<sup>26</sup> Standardization of output is also far easier with the use of particular tools such as moulds. But the lack of standardization should not be taken to imply a lack of specialization as is clear from the production of luxuries. The very definition of luxuries, as objects used in restricted contexts, made perhaps of exotic materials and with complex technologies, and above all, with a high investment of labour, is antithetical to the notion of standardization. Yet the fact that luxuries were produced by specialists cannot be denied. Hence, one must make a distinction between objects produced for an 'unspecified demand crowd' and those produced for patrons or even as personal gifts or dowries. Simplification is more likely a feature of the former scenario.

The concept of mass production should also be used with care in a pre-industrial situation. In such contexts, objects may often be produced in connection with directly expressed requirements. One of Tosi's archaeological indicators of craft activity, the stocking of unworn or unused products, may perhaps largely be found in market situations.<sup>27</sup> This is obviously not the case in the production of luxuries, where in any case the output would be used only by a few and would not be mass-produced. But even with utilitarian objects, production is often related to requirement. Ethnographic evidence related to crafts shows that stocks of finished products are rarely manufactured and stored. There may be seasonal demands for objects such as agricultural implements like ploughshares at the beginning of the agricultural season or sickles at harvest time. Similarly, objects used for ritual purposes such as votive terracottas are produced only during the period when they are actually required, such as during festivals.

Archaeologically, the detection of full-time work or mass production depends on actual quantification. The problem is not that we may not have quantified data,

<sup>25</sup> Chapple and Coon (1947: 255, 272).

<sup>26</sup> One must, however, be cautioned that not all pots were ordinary artefacts. Fine classes of pottery (often called 'tableware') would be in a different category as far as production and consumption were concerned.

<sup>27</sup> This can be seen in one of the rare archaeological examples of a workplace, that of a pottery producing area in the first phase of the Harappan period (c. 2500–2400 BC) at Nausharo in Baluchistan. Twenty-five formed and finished, but unfired, clay vessels were found together and possibly had been originally kept standing on a shelf. However, no stock of fired vessels was found. See Mery (1994: 473).

but that there may be certain factors that can have an impact on the interpretation of the data.

- 1) Often we find references to 'greater' or 'larger' scales of production. Clearly, here there is an emphasis on relativity, that production in one case is considered 'greater' or 'larger' as compared to another. What does this mean for the archaeologist? Can we, with any justification, compare the scale of working of different crafts with each other? For example, to say that there is a lot of evidence for pottery production as opposed to gold or ivory working may be meaningless as potting necessarily results in huge amounts of debitage.<sup>28</sup> Moreover, debitage from crafts such as gold working will in all likelihood be reused because of the value of the material.
- 2) While relating production debris to the identification of scale of production, we must bear in mind that craft areas would have been regularly cleared. This would be particularly so with shortage of work areas for urban crafts-persons. On the other hand, there might have been less of a constraint with craft production taking place on the outskirts of settlements. Thus, debitage from pottery production at such locations would rarely have been removed. But one may also find that craft work using precious materials, or those resulting in less debitage, would take place within settlements.
- 3) Often, we do not get much evidence of primary work areas. We may get craft working indicators from slope or wash deposits such as at Mohenjodaro. We may also get evidence from secondary situations such as dumps. This is clearly related to the point that the clearing out of craft areas meant that production debitage was dumped elsewhere. Dumps clearly indicate that crafts were practised, but they reveal very little about the magnitude or location of production.
- 4) Craft working debitage was sometimes reused or re-utilized. Sinopoli shows that household and industrial waste was often used to fertilize fields, in which case one would rarely find such debitage at production points.<sup>29</sup> Ethnographic records indicate that broken pots and sherds were put to secondary uses as well as grog for making new pots. Likewise, bead-making debitage (stone flakes) at Khambhat was used to make mosaics or powdered for use as abrasives. It is very likely that in the Harappan case the waste resulting from the making of steatite objects such as seals would have been reused.<sup>30</sup> Steatite debitage and flakes could have been powdered, made

<sup>28</sup> It is a completely separate point that small amounts of production debris, perhaps implying a lesser intensity of production, should not be taken as lack of specialization. See Lewis (1996: 378).

<sup>29</sup> Sinopoli (2003: 248).

<sup>30</sup> The issue of reuse was dealt with by M.B. Schiffer (1972: 158–59) as part of his understanding of the systemic context. According to him, reuse took place only after the use of an object. Reuse was seen in two ways: one, as recycling, where an element after use was routed to the manufacturing

into a paste and transformed into moulded objects or used to make stoneware. Similarly, shell cores or columellae could have been used to make solid shell objects. Hoards of columellae, evidently kept for reuse, have been recovered at Harappan shell working sites. Thus, reuse of debitage would provide us with less data for the study of production.

- 5) Quantification problems are associated with part-time or full-time work. For instance, is there necessarily a correlation between large amounts of debitage and full-time work? Pottery production may result in large amounts of waste but the craft may still be practised on a part-time basis.
- 6) Quantification can be complicated by the fact that craftspersons often work cooperatively. For example, the firing of pottery is sometimes a group effort with several potters firing their pots together. The archaeological recovery of a large permanent kiln may lead to an assumption of a full-time craftsperson using the facility. However, such a structure could also have been used by a group of potters working cooperatively. Accepting only the former possibility and ignoring the latter can skew archaeological interpretations of scale and intensity of production.
- 7) Sinopoli also points out that an increased scale of production can often be achieved by increasing the number of producers rather than by intensification of production.<sup>31</sup> For example, this can be done by establishing adult sons of potters as independent workers or by getting potters in from elsewhere.

In the modern context, production on a mass scale is enabled by sub-specialization of tasks. Elementary forms of sub-specialization can be found in relatively uncomplicated crafts. Thus, in pottery production there may be some amount of sub-specialization on the basis of gender: women collecting and preparing the clay or doing the decoration or attaching parts to wheel-made pots while men concentrate on the wheel work. However, the more complicated the craft and its organization, the more invariable is sub-specialization on the basis of process and artefact. Ethnographically one finds that while most craftspersons produce a varied range of objects, only a few craftspersons may produce a restricted range. For example, one often finds differences between metal craftspersons who make bangles and beads and those who make figurines or more complicated objects. This can also be the case with potters who make pottery and a few who diversify into the production

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process of the same or different element; for example, the reuse of a broken gold object. In the second, or what he called lateral cycling, he referred to the 'termination of an element's use (use-life) in one set of activities and its resumption in another', as for example with the reuse of clothing or furniture. Schiffer's idea of reuse thus dealt with objects being reused after their primary function had been completed. Here, the issue of reuse deals with the by-products of manufacture (stone chips, shell cores, and so forth) being routed to the manufacture of other kinds of objects.

<sup>31</sup> Sinopoli (2003: 247).

of terracottas. Extreme cases of sub-specialization on the basis of different artefact types are often noted in workshop situations, such as among the glass workers of Bida in Africa, where we find different workshops producing different objects: one making black bangles, another coloured bangles or black beads, and yet another coloured beads.<sup>32</sup> The Bida glass workers also sub-specialize within each workshop on the basis of processes: one worker produces the liquid glass, another shapes bangles or beads, another adds coloured ornaments.

Extreme specialization is common in industrial and pre-industrial situations with an increased incidence of wage labour. In a pre-modern situation, despite this division of labour, each Nupe glass maker can be an all-round craftsman. This is not surprising as skills arise from the learning context. Most crafts are learned through prolonged periods of apprenticeship through the simplest to the most complex stages. The most difficult craft procedures are usually undertaken by master craftsmen. Thus, in workshop situations where tasks are divided, it is likely that, when required, craftsmen could undertake tasks at any stage of the process.

### Craft Location

The sub-specialization of craft has often been interpreted archaeologically by identifying the location of craft processes. Archaeologically, one may find evidence for only a single stage within a craft, which implies that other stages were undertaken elsewhere and hence one hypothesizes a division of labour across tasks. As a parallel, let us recall the bead polishers of Khambhat who concentrate on only one stage in the bead-making craft process. They are specialists, but part-time specialists, for often alongside drilling beads they also look after their crops in the field.

In general, the location of production has been used to analytically separate craft activities as belonging to workshop/workplace or household situations. There is usually no ambiguity with the former context,<sup>33</sup> where residential and craft loci are separated. But one cannot assume that specialization was limited to situations of workplace production. There are innumerable documented ethnographic cases of both urban and rural craftsmen working in their own homes. Trivedi, in his survey of modern Khambhat, found that in 89 per cent of the 446 units involved in bead making, work was carried out in the front/veranda/upper portion of the craftsman's residence.<sup>34</sup> In some cases, individuals were working in their own

<sup>32</sup> Nadel (1942: 276).

<sup>33</sup> It is assumed that in workshop contexts one would not find archaeological evidence of, say, household implements for cooking or other activities, toys and so forth. Ideal workshop situations would be like the medieval *karkhanas*, attached to royal/noble establishments.

<sup>34</sup> Trivedi (1964: 29–30).

homes, in others, part of homes functioned as workplaces where several crafts-persons congregated to work. The Khambhat bead makers are clearly participating in an economy where income was procured either through a salary or on a piece-rate basis. One could use the term 'household industry' to characterize such modern work patterns. But to consider this kind of household industry as small-scale or as catering to local demand or as unspecialized would be erroneous as production is market-driven. There are sound archaeological examples of craftspersons working within residences. At Harappan Lothal, craftspersons such as metal workers or shell workers evidently worked in their own homes. The same seems to have been the case with Nageshwar. The establishment of Harappan settlements such as Nageshwar in Saurashtra or Shortughai in Afghanistan, both located in proximity to particular raw materials, seems to have been deliberate. Both settlements fulfilled specialized functions. Therefore, the fact that craftspersons worked in their own homes has to be studied in a particular context.

The archaeological evidence for later periods, for which we also have texts as sources, is interesting. These texts indicate the existence of specialized groups of craftspersons, often living in segregated parts of urban settlements. However, as pointed out by Coningham,<sup>35</sup> in urban settlements such as Anuradhapura in Sri Lanka and Bhita and Taxila further north there is no evidence that craft work was carried out in demarcated parts of the settlements. It appears that texts such as the Arthashastra may have tried to project a desired ideal rather than reality.

The location of production may depend on certain factors. Archaeologically, as pointed out earlier, production undertaken near elites or in the centre of settlements is presumed to have been done by specialists, while production on the outskirts or further away is considered to have been undertaken by non-specialists or independent craftspersons. However, there may be various reasons for the location of production or sub-processes of crafts. Crafts may be practised on the outskirts of settlements due to requirements of space or to reduce environmental pollution. Crafts may be practised far from elites because of the need to locate near sources of raw materials or other inputs.

The concept of specialization sometimes assumes a separation between crafts and the independence of craftspersons. We have seen that modern industry visualizes just such a separation but at the same time also necessitates dependence due to sub-specialization. In ancient contexts, it seems there was a far more dependent relationship between craftspersons, even among different crafts. That there existed in the past a level of flexibility of craftspersons to shift between crafts and between materials is also reflected by the nature of craft tools. To suggest a rigid separation between different crafts implies that craftspersons working on individual crafts would organize their own raw material procurement networks, build their individual

<sup>35</sup> Coningham (1997).

facilities, and produce or obtain specialized tools for their work. The actual picture may not have been so simple in the past. To take a specific case: is there a specialization among craft tools such that a particular craft would use only a particular set of tools? A number of crafts in the Harappan case appear to depend on tools that do not differ from those used for other crafts. Chisels, for example, could be used for metal working, for working wood, and for carving objects from soft stones such as steatite. Similarly, tools such as saws could be used to cut wood or shell or blocks of stones. Abrasives were necessary for various crafts such as wood working, for drilling with tubular drills as well as with stone and metal points, for polishing stone, and so forth. It would also appear that certain craft tools could be used on varied materials, as the functions performed by these tools such as scraping, turning, trimming, perforating, gouging, smoothing, polishing, etc., are similar across materials. It is probably with the introduction of iron that the full potential of the metal to produce varied and 'specialized' types of craft tools could be met.

Rarely do we archaeologically find tools associated with other craft-working indicators (such as along with debitage or raw materials), which may inform us about their actual use.<sup>36</sup> Very generally, only a few tool types are unambiguous: these could be sandstone hones for grinding beads, drills, or moulds for casting plastic materials. Similarly, facilities such as furnaces or kilns are required for various craft processes. The numerous furnaces found at Mohenjodaro, devoid of material *in situ*, could theoretically have been used for firing pottery or terracottas, for finishing steatite objects, for making faience objects or for heating carnelian.

### **Production and Specialization: An Archaeological Case Study**

To understand production and specialization, let us take a concrete archaeological example of the Harappan site of Mohenjodaro in Sind. To preface the discussion with a brief note on the character of the ancient settlement, the presumption that Mohenjodaro was urban can be qualified by its density of population and size, its special purpose architecture, its use of varied artefacts and raw materials, both of which were not necessarily locally produced or available, and the practice of several occupations of a non-agricultural character. Mohenjodaro was also a spatially divided settlement, with two distinct units: one a smaller, more functionally specialized unit on the west (called the Citadel), and the other, a much larger and primarily residential part on the east (called the Lower Town). It has long been assumed that the smaller unit was the locus of activities of a public, and possibly ceremonial, nature.

The archaeological evidence for craft production comprises indicators such as unfinished or semi-finished objects, pieces of raw materials, tools and waste. There

<sup>36</sup> This discussion leaves out, but does not ignore, the obvious relevance of craft tools that may have been made out of non-durable materials such as wood. Similarly, metal objects cast in sand moulds may retain no evidence of the moulds themselves.



are scattered craft indicators in most of the excavated areas. What is striking is that the smaller mound reveals negligible evidence for craft and that too belongs to the late period, by which time the structures there had probably fallen into disuse. Thus, most craft-working evidence was recovered from the Lower Town. There is at Mohenjodaro evidence for metal working, stone bead making, shell working, faience production, seal cutting and the production of weights as well as a few other rare crafts. Without going into the specifics of where each craft indicator was found, it must be said that the evidence for craft working is largely scattered or dispersed. However, one of the areas that may provide evidence for some amount of concentration of craft is the area immediately southeast of the so-called Moneer Area (or DK-I/DK-J) on the eastern side of the vast city.<sup>37</sup> It is the area southeast of the Moneer site that was extensively surveyed in a Surface Evaluation Project (SEP) undertaken by an Italian team that was working alongside the German Research Project on Mohenjodaro at the Technical University of Aachen headed by Michael Jansen that was primarily concerned with documentation and re-analysis of the remains of the ancient city. The consensus of the SEP was that the entire southeastern segment of Mohenjodaro was a 'craftsmen quarter',<sup>38</sup> with possibly numerous small workplaces.

What is striking is that no craft at Mohenjodaro was practised in a single area. Instead, there are numerous loci for the same craft; for example, shell working was traced in the VS, HR and DK-G areas of the Lower Town (named respectively after Vats, Hargreaves and Dikshit, who assisted John Marshall in his excavations), as also at a few findspots in the southeastern sector of Mohenjodaro, east of the HR area. Similarly, as we shall see later, though the preliminary flaking of stone beads was undertaken in the Moneer Area, beads were drilled in the DK-G sector. Thus, an expectation of concentration of craft in the context of specialized production is not met at Mohenjodaro. Further, the DK-G sector in the northern part of the Lower Town at Mohenjodaro gives interesting information on 'houses' or structural units that show the working of more than one craft. For example, evidence was found from Block 1, House VI, in Rooms 52 and 64 for metal and faience working; from Block 7, House III, Rooms 44 and 52 for shell and metal working respectively; from Block 7, House I, Rooms 15 and 19 for bead making and shell working respectively; from Block 9, House VIII, Rooms 15 and 16 for seal making and metal working; and from Block 4, Rooms 12 and 15 for shell and metal working. Thus, there clearly is evidence for multiple crafts being practised in single 'house units'.

<sup>37</sup> The Moneer Area was excavated by Q.M. Moneer and K.N. Puri around the time of the publication of John Marshall's three-volume excavation report on Mohenjodaro. Curiously, no draftsman or photographer was delegated for the work on the Moneer Area, which hence lay undiscovered till recently. It was the discovery of artefacts labelled DK-J that prompted the search for the area they originated from. Dales and Jansen were the first to research this area, which on ground study gave significant information.

<sup>38</sup> Bondioli et al. (1984: 31).

The Moneer Southeast Area is equally interesting in this respect. A large activity area (AA), No. 40, gave evidence for varied crafts. The northern part revealed extensive lithic material in the form of stone tools (mostly unretouched bladelets and blades, drills and hammer stones) and also debitage of chert, agate, chalcedony and other stones as also flakes and chips of sedimentary and metamorphic rocks like limestone, sandstone and quartzite. Among the lithic tools were also several hundred chert micro-drills, as also drills of a rare stone termed phtanite that was used in several sites in West Asia too. The ratio of drills of phtanite to drills of chert was about 1:25.<sup>39</sup> Clearly, drills were being made here, but what is striking is that there is little evidence for the actual drilling of beads at this spot. Instead, there is considerable evidence for the chipping of lumps and nodules into rough-outs that would be formed into beads. Quite possibly the production of chert weights too was being undertaken here.<sup>40</sup> The southern part of AA 40 now shows evidence of a completely separate craft, the highly complex one of stoneware bangle production undertaken in closed containers.

That the production of micro-drills, blades and weights of chert and the preliminary flaking of stone beads was being done simultaneously in a part of AA 40 is quite understandable as all these crafts used the same basic technology for working stone. What is surprising is that drills were made here but the actual drilling of beads was not done here. Interestingly, numerous undrilled beads or beads broken during drilling have been recovered from the DK-G sector, further north of the Lower Town. Thus, it is apparent that a craft such as bead making (as well as other crafts) was not concentrated in a single area, in that all processes of the craft were practised in the same spot. What seems more the pattern is that a particular material was worked to yield diverse end products.

Dispersed craft indicators found during excavations at Mohenjodaro reveal that craft working was practised within houses. Would the picture change if the southeastern sector of Mohenjodaro were to be excavated? It has been suggested that the line of indicators stretching eastwards from the HR Area may possibly represent small workshops.<sup>41</sup> There is even a suggestion that the image is that of 'an oriental bazaar, a quarter combining small manufactures and distribution units in shop-like arrangements'.<sup>42</sup> Is the Moneer Southeast Area and the southeastern sector of Mohenjodaro a specialized non-residential area? Only excavation may provide an answer.

What is also relevant is the possibility or otherwise of mass production. It has been pointed out that more than 60 per cent of the craft activity areas discerned in the SEP is smaller than 100 sq. m (and 25 out of 49 clusters of craft indicators

<sup>39</sup> Vidale (1987: 128).

<sup>40</sup> *Ibid.*, p. 119.

<sup>41</sup> Bondioli et al. (1984: 30).

<sup>42</sup> Pracchia et al. (1985: 242).

occupy an area each of less than 30 m) and more than 80 per cent are less than 500 sq. m. The large activity areas are given over mainly to ceramic production (including the separate area where stoneware bangles were produced), and the lithic working area in the Moneer Southeast Sector. What is, however, surprising is the small-scale nature of evidence for certain crafts like steatite working. Steatite was perhaps the most popular material used for Harappan ornaments and was used for other artefacts like seals, but the scale of working does not seem commensurate with the vast numbers of beads and seals found in that material. Perhaps this needs to be explained by the reuse of steatite debitage. The small scale for lapis lazuli working is, on the contrary, expected due to the rarity of the material. Another inexplicable aspect is the negligible evidence for metal working, given the number of metal objects recovered at Mohenjodaro and the fact that at several West Asian sites metal smelting and working were largely practised on the periphery of settlements. Is one then to expect a scenario such as that of pottery production at Shahr-i Sokhta where manufacturing took place at a suburban settlement, Tepe Dash, 2.5 km away?

It is also interesting that craft production at Mohenjodaro shows little correlation with elite areas, if we assume that the Citadel was a prime site of elite activity. The only craft evidence there was late-period shell working and a small spread of lapis lazuli working. Weights and seals, artefacts that would have needed supervised production, were manufactured not in the Citadel, but in the Lower Town. In fact, chert weights were produced in the Moneer Southeast Area along with other chert artefacts.

A craft that has given some evidence of control is that of stoneware bangle manufacture. Studies of the remains of production in the Moneer Southeast Area suggest a highly complex labour-intensive craft with evidence of control in the form of sealing of saggars after closing their lids, with the obvious intention of preventing the removal of the contents. Stoneware bangles were found mainly from Mohenjodaro and Harappa, with a few specimens from Balakot. These are not common artefacts and despite the material, their rarity and probably elite function arises from the complexity of their manufacture.<sup>43</sup> These were produced in a part of Mohenjodaro far from the Citadel mound alongside other craft activities. It appears then that the production of elite artefacts at Mohenjodaro and other Harappan centres was supervised and products restricted in usage, but not necessarily produced in areas occupied by elites.

<sup>43</sup> Stoneware bangle production exhibits a feature of Harappan craft, namely, high labour utilization. The manner of firing the bangles in smaller saggars within larger outer and inner jars to ensure a highly regulated reducing condition shows the level of labour involved. Also, the production of bangles themselves in several clay refining steps and turning processes is illustrative of the effort entailed in producing high-status artefacts.

Another aspect that comes into focus is that of long-term usage of an area. Vidale on studying the Moneer site of Mohenjodaro suggested a possible chronology of craft in the area.<sup>44</sup> He suggested that steatite bead making was the earliest activity practised among well-maintained houses. The abandonment of this area was followed by those manufacturing stoneware bangles. Eventually, in the late-urban period, the area was occupied by bead makers, shell workers and other craftspersons. Finally, potters occupied the area in the post-urban period. Vidale's intention was to indicate a possible hierarchization or ranking of craft, in that steatite working had the highest rank and pottery production the lowest, but what is more significant is that the evidence indicates that production was of a type that was fluctuating and not necessarily fixed in space.

Thus our interpretation of specialization has to be in tandem with an understanding of the particular society and economy involved. Craft production at Mohenjodaro was dispersed, fluctuating, and in several cases of a small-scale nature (in some cases almost negligible), located in the home and yet it was specialized and some of its specialized products served as a means of social differentiation. Craft activity in Harappan society and economy was in a context where the production and use of elite artefacts were not governed by market forces. That consumption at Mohenjodaro was met not only by its own craftspersons but also by the produce of specialized craft centres, such as Chanhudaro, is also indicative of the peculiar focus of society on manufacture. As pointed out earlier, problems arise when it is assumed that specialization is associated with mass production, economizing behaviour, sponsored work, workshop production, sub-specialization and so forth. The patchiness of the archaeological data can inhibit a complete understanding of ancient production, but far more problematic is that a disregard of the context of production can lead to misinterpretation.

## References

- Arnold, J.E. and A. Munns (1995), 'Independent or Attached Specialization: The Organization of Shell Bead Production in California', *Journal of Field Archaeology*, Vol. 21:4, pp. 473–89.
- Bondioli, L., M. Tosi and M. Vidale (1984), 'Craft Activity Areas and Surface Survey at Moenjodaro', in M. Jansen and G. Urban, eds, *Reports of Field Work Carried Out at Moenjodaro. Interim Reports Vol. 1*, Aachen and Rome, pp. 9–37.
- Bronson, B. (1996), 'Metals, Specialization, and Development in Early Eastern and Southern Asia', in B. Wailes, ed., *Craft Specialization and Social Evolution*, Philadelphia, pp. 177–84.
- Brumfiel, E.H. and T.K. Earle (1987), 'Specialization, Exchange and Complex Societies. An Introduction', in E.H. Brumfiel and T.K. Earle, eds, *Specialization, Exchange and Complex Societies*, Cambridge, pp. 1–9.
- Buchanan, F. (1807), *A Journey from Madras through the Countries of Mysore, Canara, and Malabar*, Vol. I, London.
- Chapple, E.D. and C.S. Coon (1947), *Principles of Anthropology*, London.
- Childe, V.G. (1981[1956]), *Man Makes Himself*, London.

<sup>44</sup> Vidale (1990; 2000: 53).

- Clark, J.E. (1995), 'Craft Specialization as an Archaeological Category', *Research in Economic Anthropology*, Vol. 16, Greenwich, pp. 267–94.
- Clark, J.E. and W.J. Parry (1990), 'Craft Specialization and Cultural Complexity', *Research in Economic Anthropology*, Vol. 12, pp. 289–346.
- Coningham, R. (1997), 'The Spatial Distribution of Craft Activities in Early Historic Cities and their Social Implications', in R. Allchin and B. Allchin, eds, *South Asian Archaeology, 1995*, Cambridge, pp. 351–63.
- Costin, C. (1991), 'Craft Specialization: Issues in Defining, Documenting, and Explaining the Organization of Production', in M.B. Schiffer, ed., *Archaeological Method and Theory*, Vol. 3, Tucson, pp. 1–56.
- Cross, J.R. (1993), 'Craft Specialization in Nonstratified Societies', *Research in Economic Anthropology*, Vol. 14, pp. 61–84.
- Evans, R.K. (1978), 'Early Craft Specialization: An Example from the Balkan Chalcolithic', in C.L. Redman, ed., *Social Archaeology: Beyond Subsistence and Dating*, New York, pp. 113–29.
- Gogte, V.D. (1982), 'Megalithic Iron Smelting at Naikund (Part-I). Discovery by Three-probe Resistivity Survey', in S.B. Deo and A.P. Jamkhedkar, *Naikund Excavations 1978–80*, Bombay, pp. 52–55.
- Lewis, B.S. (1996), 'The Role of Attached and Independent Specialists in the Development of Sociopolitical Complexity', *Research in Economic Anthropology*, Vol. 17, Greenwich, pp. 357–88.
- Menon, J. (2003), 'Mobility and Craft Production', in R.C. Heredia and S.F. Ratnagar, eds, *Mobile and Marginalized Peoples. Perspectives from the Past*, New Delhi, pp. 89–120.
- Mery, S. (1994), 'Excavation of an Indus Potter's Workshop at Nausharo (Baluchistan), Period II', in A. Parpola and P. Koskikallio, eds, *South Asian Archaeology 1993*, Helsinki, pp. 471–82.
- Milliken, S. (1998), 'The Ghost of Childe and the Question of Craft Specialization in the Palaeolithic', in S. Milliken and M. Vidale, eds, *Craft Specialization: Operational Sequences and Beyond*, Oxford, pp. 1–8.
- Nadel, S.F. (1942), *A Black Byzantium. The Kingdom of Nupe in Nigeria*, London.
- Pracchia, S., M. Tosi and M. Vidale (1985) 'On the Type, Distribution and Extent of Craft Industries at Moenjodaro', in J. Schotsman and M. Taddei, eds, *South Asian Archaeology 1983*, Vol. I, Naples, pp. 207–47.
- Schiffer, M.B. (1972), 'Archaeological Context and Systemic Context', *American Antiquity*, Vol. 37:2, pp. 156–65.
- Sinopoli, C. (2003), *The Political Economy of Craft Production. Crafting Empire in South India, c. 1350–1650*, Cambridge.
- Smith, A. (1961 [1904]), *The Wealth of Nations*, Vol. I, London.
- Stark, M.T. (1995), 'Economic Intensification and Ceramic Specialization in the Philippines. A View from Kalinga', *Research in Economic Anthropology*, Vol. 16, Greenwich, pp. 179–226.
- Stein, G.J. and M.J. Blackman (1993), 'Introduction: The Context of Craft Specialization', *Research in Economic Anthropology*, Vol. 14, pp. 29–59.
- Tosi, M. (1984), 'The Notion of Craft Specialization and its Representation in the Archaeological Record of Early States in the Turanian Basin', in M. Spriggs, ed., *Marxist Perspectives in Archaeology*, Cambridge, pp. 22–52.
- Trivedi, R.K. (1964), *Agate Industry of Cambay*, Delhi.
- Vidale, M. (1987) 'Some Aspects of Lapidary Craft at Moenjodaro in the Light of the Surface Record of the Moneer South East Area', in M. Jansen and G. Urban, eds, *Reports of Field Work Carried Out at Moenjodaro. Interim Reports Vol. 2*, Aachen and Rome, pp. 113–49.
- Vidale, M. (1990) 'On the Structure and Relative Chronology of an Harappan Industrial Site', in M. Taddei, ed., *South Asian Archaeology 1987*, Part 1, Rome, pp. 203–44.
- Vidale, M. (2000), *The Archaeology of Indus Crafts*, Rome.
- Wailes, B., ed. (1996), *Craft Specialization and Social Evolution: In Memory of V. Gordon Childe*, Philadelphia.