

PROJECT REPORTS

MINOR METAL CRAFTS IN BENGAL: TRADITION AND CHANGES FROM THE MEDIEVAL TIMES TO THE PRESENT*

Nupur Dasgupta**

The project focused on the history of copper alloy craft technology as the 'minor metal craft', practiced in rural, suburban and tribal environs in the state of West Bengal between early medieval to the present. It comprised only of the handicraft sector in household items and did not dwell on military or mint technologies. Though there are preponderance of studies on the dokra craft, very few researches have been carried out on this aspect of the regional craft, however the social and knowledge – base of this production sector is undoubtedly significant. The handicraft has survived the rigours of technological changes by adapting to innovations and modification.

The investigation was carried out in few temporal and schematic chapters as listed below:

- I. Copper Alloy Handicraft in Early Medieval Bengal: An Introduction
- II. Copper, Brass and Bronze Craft: Knowledge and Practice in the Medieval Period.
- III. Social Ambiance in Medieval Bengal and the New Directions in Copper Alloy Handicraft.
- IV. Medieval Metal Image Crafting and Utensil Manufacture.
- V. Copper Alloy Craft in Colonial Bengal.
- VI. The Contemporary Environs for the Craft.

The Survey of the minor metal craft from the medieval times onwards reveals a complex picture with multiple stylistic, technical and social paradigms. The products were categorized into two broad components: (a) Effigies / Figurines / Cast Images, and (b) Utensils, the first marked by two distinct orientations: tribal

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**Department of History, Jadavpur University, Kolkata. Email: nupurdasgupta@yahoo.com

and suburban – rural. The temporal context begins with the medieval period and continues to the present.

The medieval society witnessed the rise in socially relevant and profligate household metal craft along with the rise of the *Karmakāra* and *Kānsakāra* occupation castes. The demography of both artisans and clientele have changed significantly within the given temporal context. Features of continuity and changes were observed in a peculiar complex way in technology and product designs.

The Pala - Sena bronze images of Buddhist and Brahmanical deities have been objects of serious and interesting studies. These are exhibited and stored in the Indian Museum, Kolkata, the Bangladesh National Museum, Dhaka and the State Museum of the Directorate of Archaeology, West Bengal, which illuminate upon the foundations of the regional handicraft. General literary data besides scientific reports throw light on technology of medieval image making. The primary and secondary records provide the socio-economic contexts during the medieval times in which these metal crafts profligated. The economic scene was busy with activity. Urban centres and ports developed rapidly into market centres and administrative headquarters, including the emergence of mint towns. Notable urban nodes were Lakhnauti, Pandua, Sonargaon, Satgaon, Chatgaon, etc. While there was a rise in economic activities and the evolution of a court and aristocratic culture, influenced by Islamic trends, there was also a growth of landed class of both Brahmanical and Islamic communities with increasing patronage to religion, art and architecture. This rich background has fortunately been found to be resonating with the artefacts that are located in museums.

Archival as well as archaeological and anthropological data throw some light on actual sources of metals for the medieval artisans and the personnel requirement for transferring the raw material to production center. The development and proliferation of the brass production has an interesting phenomenon. Excavations and investigations conducted at the Zawar mine of Rajasthan reveal that it was worked since the beginning of the first millennium, which definitely increased in terms of extraction since the 13th century. The excavation also revealed a series of structural remains, which were actually furnaces used for distillation of zinc. It is a great possibility that by the medieval times the raw material found its way to the itinerant tribes who were involved in the craft in eastern India. Geological Survey reports from the early 19th century have been consulted about the copper deposits in regions nearer to Bengal. It also yielded the information for minor tin, zinc and lead veins in the vicinity of these copper deposits.

Religious Image Crafting

To solve the starting point of metallurgical details for image crafting in this region, survey of the catalogues of seven museums in West Bengal and Assam and the Bangladesh National Museum, Dhaka with reference to the reports on Pala – Sena bronzes were undertaken. Reports reveal that the metallurgical process or inputs were not standardized in the Early Medieval times, which was the heyday of religious image crafting. Reports by Riederer and B.B. Lal on the metal composition of Pala images inform of various permutations of metal use, lead brass, lead – tin – brass, tin – bronze as well as brass and copper with traces of tin, lead, nickel and iron. Most of the specimens contained appreciable amount of lead, which helps the process of casting. Moreover, the possibilities of metal use standardization for the medieval religious image crafting remains an extremely doubtful factor till the late sixteenth and seventeenth centuries when organization of the Vaisnavite *matha* might have lent some amount of grammar and institutional setting for religious image crafting.

Since scientific analysis of the artefacts for metal content could not be done therefore the methodology of ethno-archaeology and observation of the modern day ethnographic data on religious image crafting were conducted. Some of the districts reputed in the medieval and colonial times for the craft were Nadia, East Midnapur and Dhamrai and Dhaka in Bangladesh. It did throw some light on possible processes adopted by the medieval artisans. Similarity in traditional and modern practices traced back at least to the early modern times (Late 17th and 18th centuries).

Besides the ethnographic data contemporary related literature were also looked into. The regional mints set up by the Bengal Sultans added to the scene of metal works in the region. The *Ā'in-i-Akbarī* provides information on the processes of refining gold and silver and copper as well as minting coins of these metals. Very valuable information on the metal content of brass at the time is available in the text. In *Ā'in*, Abul Fazl speaks about three types of brass depending on the zinc content. The copper – zinc alloys had zinc content of 28%, 33% and 42% respectively. In the 19th century the zinc content rose further to 50% even. The complex process of minting, requiring an expert handling of the different metals and refined alloying techniques, is important to keep in sight if one is to rightly understand the degree of expertise required and achieved by the smiths. But one may go a little further back in time to the Sultanate period in Bengal when

mint operations flourished. The evidence of the *Ā'in* therefore actually throws light on the past operations too. The tradition might have rubbed off on the household manufacturers and this is evident not so much in religious image manufacture as in the case of utensils and miscellany household items.

Another new genre of medieval texts accessed by the researcher comprise of the *Rasavidyā/Rasaśāstra* texts. These throw some light on the contemporary knowledge of metallurgy and chemical processes. The most illuminating and referred text of this genre is the *Rasaratnasamuccaya* of the 14th century, a *Rasāyaṇa* text, now quite popular among the historians of Indian science heritage, which contains two detailed accounts of distillation of zinc. A few unpublished manuscripts on *Rasāyaṇa* were collected of which one or two have been partially described by late Acharya P. C. Ray. Of these one, *Sūvarṇatantram* has been analyzed to some extent by the present researcher. These texts provide the information on knowledge base in the medieval times.

The colonial records reflect that in Bengal images were principally being made in Nabadwip, Krishnanagar and Kolkata. These images were principally of Hindu Gods and Goddesses. Although they are now mostly made of brass, earlier they were made of *aṣṭadhātu*, an alloy of eight metals. This genre represents the more classic of the metal works in Bengal. The case of *aṣṭadhātu* has to be resolved through chemical analysis of the relevant artifact. The current practice in case of specially ordered images for religious purpose is to pierce a hole on the right chest of the semi – completed image and pour down some mercury. A small piece each of silver and gold are added to the main ingredients of copper and zinc to which sometimes a little tin is added. It is quite probable that the image artisans were actually using *pañcaloha*, as the South Indian artisans of the medieval times did. However, references to gold plating or washing has not yet been confirmed with hard scientific data, but this is a possibility in the colonial period image crafting as C. M. Birdwood, in his nineteenth century work, refers to it. So far the processing is concerned there are no lab – based data as yet on the phases of techniques employed. However, apparently both lost wax and sand casting were in vogue as the details of modeling were getting simpler. A recurrent modeling style is found in the images made in Navadvip (17th – 18th cent.), where some amount of standardisation is evident. Not only that, observation reveals that a number of additional treatments like channeling, adding runners, piecemeal casting, brazing and soldering, grooving or engraving and lastly polishing were done in case of sand casting. In many cases, the imperfections in modeling were sought

to be covered by secondary treatments like additional ornamentation by engraving and soldering appendages. Few rural artisans are able to create such fine models as existed in the Early Medieval or Medieval times.

Dokra: A few examples of *Dokra* craft of the region from the 18th century onwards were found in the different museums in West Bengal. The survey of the Gurusaday Museum, Ashutosh Museum and the State Archaeological Museum showed that the oldest collected items date from the 18th century. However, we could discern a changing shift from regular religious imagery to Dokra style of modeling as well as strip casting in a few older medieval pieces in the store of the State Archaeological Museum, West Bengal. This may date the transition from regular religious image making into tribal castings probably sometimes in the 17th century. Or this might have been a result of the extension of the Sanskritization of some peripheral tribes towards the end of the Medieval times, due to which the tribal artisans began to emulate the rural counterpart and provided with new styles of modeling giving new twist to the subjects. This report is based on older reports, a scientific Project Report conducted by the School of Material Science and Technology, Jadavpur University, and our own surveys in Bankura and Burdwan.

Utensil Manufacture

There was a profusion of brass and bell metal utensil production from the medieval times, probably under the influence of Islamic court and elite lifestyle, for a number of new forms of shapes with new uses comes into vogue. A survey of the Bangladesh National Museum, Dhaka, the Indian Museum, Kolkata and the Hazarduary Museum, Murshidabad, throws light on these new forms that emerged. New forms like *Pāndān*, *Itr dān*, *Pikdān*, *Maslādān*, *Gulābdān*, *Aftābā* (octagonal compartmented trays), *pān ḍābar* etc. emerged for regular use in a syncretistic society, while special items like *jalidar alam*, *cawar* (flags for royal processions), brass and bronze fitted weaponry and furniture were part of court life. The work of the *Kānsāris* was cut out for them in the medieval towns of Sonargaon, Pandua, Gaur, and Jessore between 13th and 15th centuries, and 16th – 18th century townships of Navadvip, Dhaka, Murshidabad – Kasimbazaar, Hooghly, Cattagram, which appear to have flourished with influx of the aristocracy and wealthy inhabitants having a high standard of life and demand for luxury items. In fact bronze and brass were of everyday, mundane use. The Regionally located Persian literature (in translations), and vernacular genres like the *Maṅgal*

*Kāvya*s, *Gītikā* or ballads of Medieval Bengal throw interesting light on general lifestyle borne out by other findings. The colonial records really illuminate on the caste *Kānsāri* and Hunter's accounts provide facts and figures which reveal that the *Kānsāris* and *Kāmārs* were producing the usual brass and bell metal/bronze items for all classes: well – to – do and the peasants. The eighteenth century survey records on Bengal, Bihar and Orissa provide population and occupation data. Hunter's accounts mention the *Kānsāris* and the *Kāmārs* of Bengal. As already mentioned a section of the tribal *Karmakāras* have gone into producing *Dokra* items. But the *Kānsāris* are age – old workers in brass and bronze/bell metal. These identities were formed in the Early Medieval Bengal and medieval period literature makes passing mention of the craft and the artisans. Now many of them retain their old occupation. But this is now mostly restricted to making of utensils in case of bell metal although brass is used for several new shapes.

In the late medieval and initial days of colonization Bengal images and other bronze and brass items – utensils, etc., were principally made in Bisnupur in Bankura, Krishnagar, Nabadwip and Shantipur in Nadia, Khagda, Bahrapur in Murshidabad, Dhamrai in Bikrampur. Dhaka was another, probably older centre of artisans. In Bardhaman, Natunganj and Dainhat were centres of *Kānsārs*.

The most significant change in technology, repertoire of craft and modeling as well as metal use was witnessed in the colonial period in this particular sector. The urban market had boosted the production of quality bell metal utensils. The Bengal gazetteers reveal that metal utensils had become part and parcel of household possession in well to do families in rural areas too. The demography of artisan caste was quite substantial in many of the Bengal districts, as surveyed. However, what is most interesting, both for aesthetic as well as for the technological aspects of the craft was the emergence of the new genre of ornaments and knick knacks for ostentatious living rooms, imitated from the colonial rulers and aristocracy by the upper – middle classes in Bengal urban centres, notably Calcutta and Dacca. Surveys conducted in the regional museums in West Bengal and Bangladesh has yielded rich repertoire for the colonial period and this has been corroborated by the evidence gathered from colonial records as well as from fictional literature. This particular genre required the innovation of new techniques both for modeling, metal uses and processes of manufacture. This is evident from the study of artifacts surveyed. The project also included photo documentations and this goes a long way in recording technological innovations, changes and modifications.

Contemporary Environs for the Craft

Surveys revealed that although the tradition of typical religious image crafting is maintained in its technical aspects, the artisan identity has changed. The medium as well as style has changed due to factors like availability of raw material, market demand and financial arrangements. Though significant similarities were noted between current practices and processes mentioned in *Śilpaśāstra* texts, however, it was also found that there were parallel induction of newer processes and styles. Portrait modeling was observed as well as mass produced images, cast part – by – part. The roots of these new forms and processes do not go very far back in time.

As regards brass and bronze utensil works the main items manufactured comprise the different varieties of *thālā* (dinner plates), *bāṭi* (small bowls), glass, jug, *ghaṭī* (tumbler), pail, tray, *kalsi*, gongs, utensils for religious purpose like small *ghaṭis*, *ghaṇṭā* or bells, *rekābi*, *pradīp* or small lamps. Surveys were conducted in six districts of West Bengal: Murshidabad, Malda, Bankura, 24 Parganas, Midnapore, Burdwan, Nadia. In most of these districts the traditional centres are languishing, except for Midnapore, Nadia and parts of Murshidabad. So far as technique is concerned it is a mixture of the traditional and the comparatively new facilities indirectly brought to them by other industries operating nearby, for example the supply of copper and brass sheets, cutting, grinding and polishing machines, often handed down from colonial days but with small innovations.

The findings were corroborated with those of Meera Mukherjee who conducted extensive as well as intensive fieldwork – based research throughout India, including West Bengal in the 1970s. Quite significant changes have taken place since then. The number of units in Calcutta as well as in the districts has reduced substantially. The variety of items being produced now has thinned down, as has the market. So far as technology is concerned the major change that has taken place is in simple mechanization with blower, buffing machine etc. The use of fuel has probably also seen a paradigm change with more and more cost effective methods applied. In many cases government institutions have introduced innovations. But the survey reveals that these aids have only reached the tip of the larger group of artisans working in this unorganized sector.

Dokra: This is the one sector which has made its way into the viable market trading in urban regions. So far as technology is concerned, patterns of economic

readjustment and geographic relocation are visible just at the present moment. The age - old processes continue in majority of stages but the art forms, designs, icons etc. have undergone paradigm changes. In case of suburban artisans there is a clear indication of moving out into areas of innovations to fit into the market structure. The recent efforts of NISTADS, India and Metallurgical Engineering Department of Jadavpur University in the area of furnace designs and training have helped the rural - tribal artisans to handle the firing techniques. This has resulted into subtle changes in production also. Fieldwork surveys conducted by the researcher yielded signs of changes in production technology and icons among the *dokra* craftsmen from Burdwan and Bankura. Survey at the 2003 – 2005 Crafts Fairs organized by the State government and co – operatives in Kolkata provided evidence of new directions in the offing, hindered only by economic organization and funding.

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