



Ethnography Of Traditional Bell Metal Craft Technology Practiced In Bankura District

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Abstract:

Tradition of brass and bell metal work is still persisting in different parts of eastern India. *Rarh* Bengal is one of the most important traditional brass and bell-metal crafts region. These are non-industrial mode of technology and production, which is Practice by a number of hereditary groups. As example *Kangsbani*, *Karmakar*, *Kansari* and *Dhokra* Kamar etc. Pukhuria (22.9351°N, 86.9662°E) is one important traditional bell metal technology center of Bankura district as well as *Rarh* Bengal, West Bengal, India. The artisans of Pukhuria village are specialized in making different sizes bell metal bowl and followed cast and wrought metal technique. This is locally known as *Jam Bati*, *Ci Bati*, *Sada Bati* etc. In this paper an attempt has been made to discuss the technological aspect of contemporary brass and bell metal work, which is practiced by artisans of Pukhuria, Bankura district. It may also highlight the sources of raw material, different tools, processing, finishing of objects etc.



Fig. Raw metal



Fig. Complete craft (Bowl)

Keyword: Traditional Technology, Raw material, processing, Finishing, Bowl.

INTRODUCTION

Ethnography is the study of living culture. It is a qualitative method for collecting data often used in the social sciences. Data are collected through observations and interviews method. I would like to say that for this article I followed observations and interviews method for collecting data from Pukhuria craft village, Bankura, West Bengal, India. Tradition of brass and bell metal work is still persisting in different parts of *Rarh* Bengal, West Bengal and eastern India. The past history of brass and bell metal craft in Eastern India is very glorious. Harappan bronze dancing girls is first instance of fine metal craft in Indian subcontinent. In fifth century, CE, the Chinese traveler Fa-haien visited Bengal and notice many brass and bell metal musical instruments and called the country- the land of music and dance (Chattopadhyay, P. K. and Goutam. Sengupta. 131-61).

Copper is perhaps first metal discovered by human beings. It changed the civilization. From metallographic and chemical observation, it is not always possible to identify the manufacturing technology of any protohistoric metal object. Because of corrosion, natural decay and paucity of enough materials, the remnants of evidences of the manufacturing technology become impossible to be evaluated properly. The only alternative is to search seriously whether the

manufacturing techniques are still continuing in the present or not (Chattopadhyay, p. k.-347-57). Eminent Archaeologist Thompson opined that while studying a particular craft from the archaeological point of view, the entire culture with full context ought to be observed to draw any archaeological inference (Thompson, 231-45).

AREA OF STUDY

Village Pukhuria (22.9351° N, 86.9662°E) is most important bell metal sub cluster of Bankura district as well as *Rarh* Bengal. It is a small village of Bikrampur Gram Panchayat, Bankura district. The village is situated on the right bank of river Shilabati and Simlapal sub-division of Bankura district in west Bengal, India. It is located 15.5 km away from Sub-district headquarter Simlapal and 65 km away from district headquarter Bankura. According to Census 2011 information, the location code or village code of this village is 328756. Pin code of this village is 722160.

The artisans of Pukhuria used to make different sizes and weighted bell metal bowl (locally known as *Jam Bati*, *Ci Bati*, *Sada Bati* etc) and followed casting and hammering method. The artisan of Pukhuria at first followed casting technique. They melted the raw metals (copper and tin) and casted in a dies.

LITERATURE REVIEW

The major publications and studies on this line are scanty in number. To understand the ancient crafts, technology and its implication on human cultures, an ethnographic study and survey was conducted among the present day *Kansaris* and *Karmakar* of *Rarh* Bengal (especially among the artisans of Burdwan, Birbhum, Hooghly and Bankura district). The serious academic research works, monographs about brass and bell metal technology in eastern India as well as *Rarh* Bengal was done by Barapanda (2002), Singh, A. K. and P. K. Chattopadhyay (2001-2002), Basu (2002), Chattopadhyay, P. K. and G. Sengupta (2011), Chattopadhyay (2005), Mukherjee (1978), Mondal (2017) and Sen (1994). All those scholars have thrown light on the different aspects of traditional brass and bell metal crafts of this part of the country.

OBJECTIVE

Objective of the present research is to understand the casting and forging technology of brass and bell metal craft in *Rarh* Bengal as well as in West Bengal, Eastern India. We have very little idea of manufacturing techniques of brass and bell metal images, house hold utensils and religious utensils of ancient to modern India. So, an in-depth study of technology of making and shaping and finishing of the crafts of everyday use home hold utensils to be also highlighted through ethnographic route. An ethnographic study of communities who are still producing these objects will be studied. Raw materials, fuel, different equipment etc are also taken into account.

METHODOLOGY

For the present study field survey, direct observation and interview methodology was followed. Observation, interview, case study methods have been used for collection of data from the field. Melting the raw metal, making process of ingot, process of shaping the objects and finishing, all are studied by direct observation method. For present study data have been collected in interviewed with the artisans. Different tools for this craft are also study in detail by direct observation method. I used to make three days field survey to this crafts villages on 27/03/2022, 13.04.2022 and 25/04/2022. The making process was observed step by step from starting to finish and also interviewed with artisans. Occupational and technological changes were also taken in account.

ETHNOGRAPHIC OBSERVATION AT PUKHURIA VILLAGE

Village Pukhuria (22.9351° N, 86.9662°E) is most important bell metal craft sub cluster of Bankura district as well as *Rarh* Bengal. It is a small village of Bikrampur Gram Panchayat, Bankura district. The village is situated on the right bank of river Shilabati and Simlapal sub-division of Bankura district in west Bengal, India. It is located 15.5 km away from Sub-district headquarter Simlapal and 65 km away from district headquarter Bankura. According to Census 2011 information, the location code or village code of this village is 328756. Pin code of this village is 722160.

The artisans of Pukhuria used to make different sizes bell metal bowl (locally known as *Jam Bati*, *Ci Bati*, *Sada Bati* etc) and followed casting and hammering method. The artisan of Pukhuria at first followed casting technique and for making bowls followed hammering method. They melted the raw metals in a crucible (copper and tin) and casted in a dies.

An old artisans named Sunil Karmakar (Fig,1) aged 62 years has told that the village Pukhuria is important traditional bell metal craft centre and its bowl has special characteristic for its making technique, shape-size and design. Once upon a time it has great demand all over the Bengal, Bihar and Orissa specially among the tribal community. we can analyse the ethnographic study of this traditional bell metal craft under the following points.

A. Raw materials

At village Pukhuria, different sizes bowls are made from bell metal. So, the primary raw material for this craft is copper and tin. The artisans are melted the copper and tin in a crucible. Generally, ratio is 7:2 that is seven part of copper and two part of tin is melted. The foreign company or middlemen are generally supply the raw materials. The secondary raw materials required for these crafts are heating, melting, hammering, polishing materials and fuel and salt. Used engine oil is used during hammering. Other important raw materials necessary for the craft is red clay needed for making of dies.

B. Equipment

Variety of tools and equipment are used by the artisans of Pukhuria for these crafts. Except modern electronic scraping mechanic, all these tools are indigenous. Each tool has specific function, such as hammering, scraping and polishing etc.

I. Hammer (*humbar*)

Hammer is the main tool of this traditional bell metal work. The artisans are generally used here four type of hummer and each hummer has different function and name. Hammer with square rounded head, comparatively weighty is known as *HATORA*. It is 6 inches long, both side square round headed fixed to 12 inches to 14 inches wooden shaft. The diameter of the square working area is 1 to 1.5 inches. At first, the artisans heated the buns shape metal on *Garander Sal* (furnace) and hammering it on an iron anvil by tapering headed square hummer named *HATORA* (Fig.2). Another hammer names are *SHAMULI HATURI*, *MANNA HATURI* and Wooden Hammer (Fig. 3).

II. Pincers (*Sharasi*)

A pair of pincers is used for holding the buns shape raw metal or bowl during heating and hammering. The size varies from 12 to 18 inches in length. Small pincers are also used during leveling the bowl on stone slab with 8 to 12 inches in length Fig.4).

III. Anvil (*Lay*)

Irin anvil is used here for hammering and called it *lay* in local language. It is flat and circular face and inserted into the ground through a wooden block. At first shaping is done on this anvil by alternative hammering method. Anvils are 12 inches high and 6 inches in diameter (Fig.5).

IV. Hollow stone

One circular face middle concave hollow stone piece is set up near the *Garandar Shal* for hammering and making the proper shape of bowl Fig. 6).

V. Blower and fan

Modern hand operated blower machine is used for fanning the furnace specially *GARAN SAL*. It works for increase the heat. Modern electric fan is used for increase the heat mainly *GALAN SAL* (furnace).

VI. Iron pan

Pan is made of iron and locally called *Tawa*. It is look like cooking spud. It is 16 to 18 inches long fixed with in bamboo handles and used for pushing down the ash and poured the fuel to the furnace during work.

VII. Iron stick

Two type of iron stick with in bamboo handle are used here. One is large with 5 feet long used for pushing down the furnace. Its local name is *KOCH*. It is used to *GALAN SAL*. Other is small with 2 feet long used for turnover the heated bowl and coal. Its working end is slightly bent (Fig.7).

VIII. Ladle

Big ladle is much closed to this craft. They used this during casting molten metal. It is used for pouring the molten metal on earthen dies.

IX. Crucible

Crucible is used for molten the raw metal copper and tin (*RANG*). It is like a container made of China clay. The size of the crucible varies in high from 12 inches to 18 inches and from 6 inches to 9 inches in mouth diameter. Thickness is consistently 1 inch. An earthen lid is used to covered the crucible during firing. It also can preserve the heat created within the crucible (Fig.8).

X. Water tub

One water tub or bucket is kept near the suitable position that the head artisans can easily use the water as necessary. Generally, water is used for tempering the product during heating and hammering.

XI. Lathe

Two types of lathes are used here for scraping the bowl. One is modern electronic operated machine and other is leg operated machine. Modern scraping machine is operated by electronic motor and other is operated by both legs of a person and one person are scraping the jobs (Fig.9).

XII. Iron farm

One square but something curved iron farms are used for this craft. It is used for supporting the iron scraper at the time of scraping. Some scraped centres are used square iron farm (Fig.10).

XIII. Iron scraper (*Noalis*)

Different sizes iron scraper is used for scraping various sizes bowls. The sizes of various iron scraper are from 1.5 feet to 2 feet and all are with wooden handle. The working end is slightly bent. Artisans are called it *noalis* (Fig.11).

XIV. Iron files (*Ret*)

Square shape iron files of different sizes are used for rubbing the edged of the bowls. The size ranges from 1 foot to 1.5 feet with a shaft measuring 4th inches to 6th inches. Widths of the files are ranges from .5 inch to 1 inch. Width iron files are also used for scraping the bottom portion of bowl. Both has the wooden handle.

C. Furnace (*SAL*)

Two types of furnaces are used at village Pukhuria for this traditional crafting. One furnace, name is *HAWAYA SAL* or or *GALAN SAL* (Fig. 12). It is common shape furnace like used all-over *Rarh* Bengal and made of bricks and clay partly in underground and partly raising above the ground. It is round in shape with 25 to 30 inches in diameter and raising about 12 to 16 inches above the floor level. A round about 10 by 12 inches diameter air duct is connecting with underground portion of the furnace for fanning. Casting is done on this furnace.

Others furnace name is *GARAN SAL*. It has special character in the form of shape. The oven is circular underground projection and placed at the middle of the furnace. Its shape is round cylindrical and height varies 5 feet to 10 feet from the ground level. One round or square hole is there in one site of furnace for work. A hand operated blower machine is set up left site of this hole for fanning. Bun shape metal ingot (local name *RUYA*) and alternative heating and hammering of bowl is done on this furnace.

D. Mould (*Chhanch*)

Red soil mixed with paddy husk is used for making the mould of ingot and used it permanently. Different sizes moulds are made and used various sizes moulds for making different size's ingot which used to made different sizes bowls. These are round in shape and look like flat bowl. Metal ingots are round and look like bun shape.

E. Workshop

Workshops are generally situated far distance or opposite site of their living house due to smoke and hammering sound. Most of the workshops are mud build house with *asbestos* or straw roofing. Generally, workshop's two sides are closed and two sides are open for ventilation of smokes during hammering and heating of bowls. Furnace named *GARAN SAL* are set up middle in the workshop. Workshop's floor is earthen, because mud is suitable for hammering. The iron anvil and hollow stone piece (local name is *THASA*) are set up just opposite of the *GARAN SAL*. Generally, scraping is done separate small room or courtyard. *HAWAYA* or *GALAN SAL* is situated in the opposite site of *GARAN SAL*.

F. Process of making bell metal bowl (casting and hammering method)

Different sizes bell metal bowls are produced by alternative hammering method from bell metal ingots. The whole process of bell metal bowls work is divided into three stages. These are making of ingots, shaping and finishing of bell metal bowls.

I. Making of ingots

The first stage for making bell metal bowls is making of metal ingots (Fig. 13). Local name of ingot is *RUYA*. It is done on big furnace called *GALA* or *GALAN SAL*. At first the *GALAN SAL* is half fill up with coal and cow dung cake and fired. It is done as early as morning. Then a China clay crucible is filled up with raw copper and tin. When the flame came out from the furnace, the filled-up crucible is placed on the middle of furnace and full fill up the furnace and covered it up with a perforated earthen lid.

The furnace is fanning some time for increase the heat. After three or four hours, when it attains the temperature of 1100°C to 1200°C, metals are beginning to melt. When all the metal are melted, the crucible becomes crimson red. It is checked with an iron stick and dregs are separated with a big ladle.

After that the plate shape earthen moulds are smeared with used engine oil. Then molten metal is poured into the moulds by the help of big ladle. One artisan then paddy husk is spread on it. The molten metal became brownish with the contact of air. Size of the moulds varies in respect to the size of bowls. After cooling the metal ingots are taken out from the moulds.

II. Shaping the bowls

Shaping is done by alternate heating and hammering method. At first the master artisans heated few bell metal bun shape ingots and flattened these slightly by hammering one by one. Sometimes they cut off extra weight or projection with the help of iron chisel. Then a pair or two pair flattened ingots is hammered together. This is done by alternative heating and hammering in six or seven successive stages. The process is done by one head craftsman and three

hammerman. The head craftsman is called *Garandar* and he is holding the flattened ingots on the iron anvil with the help of long pincers. Three hammerman called *Barandar*, hammer it in a circular fashion. After proper shape they separated the bowl ingot from each other and finally shape is given one at a time by one head craftsman and two or three hammerman. Finally head craftsman is given its final shape. He labeled it sometime on circular iron slab or mud flower or hallow stone with the help of wooden hammer.

III. Finishing

Third or final stage is finishing which consisted in three sub stages, like labeling, rubbing and scraping. After one craftsman is very efficiently label the bowls all sites with the help of one headed rounded hammer on iron anvil. It is called in local language *mather kaj* and hammer is called *matha haturi*. After labeling, the edges are rubbing by a square shape iron file. Sometime inner bottom portion of bowls are scraping by hand with the help of flat shape iron file.

Finally scraping is done by modern electronic scraping machine. Some crafts centers are used leg operated traditional indigenous lathe for scraping the bowls. Modern electronic scraping machine has two parts. Both are axial type, but one axial is setup with motors with a strip of belt and other axial is sued for adjust the bowl during scraping. They fixed the bowl middle of both axial and scraping is done by a long iron scraper (Fig.14).

At village Pukhuria, artisans are scraping the bowls only inner portion and some edge of outer portion only. Finally scraping is done by hand with iron files. Now the bowl is ready for marketing Fig.15).

Conclusion

It has been found from the present study that the bell metal traditional craft of village Pukhuria (22.9351°N, 86.9662°E) is developed day by day. Here the artisans are used to make different sizes bowl of bell metal and followed traditional casting and hammering method. Pukhuria is the only village of Bankura district as well as *Rarh* Bengal that we found here different kind of traditional craft sceneries than the other traditional craft carters of *Rarh* Bengal. Sunil Karmakar, an old artisan, aged 62 years old has says that its main causes is foreign trade relation. He also says that there is no burden of collection of raw materials and sale of new production (bowl). The merchant groups of Australia are directly provided us the raw metal and collected the complect bowls. He told that only the artisans of village Pukhuria are enjoyed this privilege. There is at present more than 100 Sal (Furnace). Young generation are also showing keen interest and engaged to this craft.

In spite of these problems the brass craft is being sustained at present among the brass making artisans of *Rarh* Bengal. They made various brass and bell metal utensils and followed traditional cast and hammer technology. Governmental help and modernizations of technology may improve this traditional craft and development.

So, the present traditional craft knowledge is helpful for reconstructing the past craft and technology. An ethnographical study is helpful and needed for the study of present traditional technology and reconstructing the past technology as well as different aspect of past metal technology.

FIGURES:



Fig.1. Sunil Karmakar, an old artisan, Pukhuria, Dated 27/03/2022



Fig. 2. Hatora



Fig. 3. Wooden hammer



Fig. 4. Pincer



Fig. 5. Iron anvil



Fig.6. Worked on stone piece



Fig.7. Used of iron stick

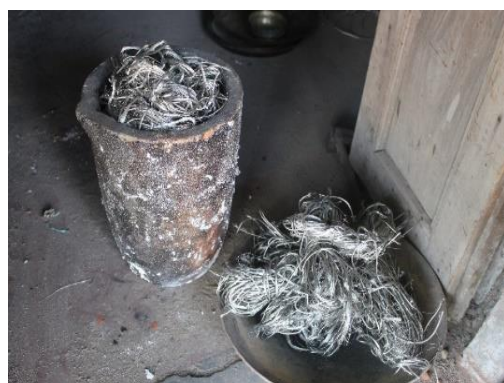


Fig. 8. Crucible



Fig.9. Modern electronic scraping machine



Fig. 10. Used of iron farm



Fig. 11. Iron scraper



Fig.12. HAWAYA or GALAN SAL



Fig.13. Bell metal ingot (RUYA)



Fig.14. Modern scraping machine



Fig.15. Complete big bowl weight 18 kg.

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