

**INTERVIEW WITH WOOTZ STEEL WORKER FROM KONAPURAM VILLAGE IN
NORTHERN TELANGANA***

The village of Konapuram is located in Kammarpalli Mandal of Nizamabad district of Northern Telangana region in Andhra Pradesh state. This village was a known centre of wootz steel production during the pre-modern period. This village is in very close proximity (15 kms away) to the famous wootz-producing centre of Konasamudram. In the village there is a famous blacksmith who possesses special skill in working of wootz steel related objects. In this historical note, an interview with this blacksmith is presented. Some back ground information on the blacksmith is first provided.

Mandaloji Gaṅgārām is the name of the blacksmith and he is the son of Mandaloji Rajaiah who is the son of Mandaloji Limbadri. All of them were blacksmiths who specialized in working in wootz steel and therefore Mandaloji Gaṅgārām's knowledge has directly come from his forefathers. Mandaloji Gaṅgārām is aged about 68 years. Although not formally educated, he is literate. His wife Suguna is about 60 years old. The Mandaloji family has lived in the village over several generations. They were involved in wootz steel making and processing industry till the beginning of early 20th century. Mandaloji Gaṅgārām is the one in the family continuing the wootz steel working tradition of his forefathers. His brothers are not blacksmiths.

Mandaloji Gaṅgārām is recognized as the smith of Konapuram village and he is a '*mirasidār*' (*mirasidār* = an artisan possessing hereditary right to perform the duty in the village). He caters to the needs of the agriculturists and other communities in the village. Apart from performing blacksmithy work, he is also involved in agriculture in his free time. Mandaloji Gaṅgārām mentioned that another smith from Athmakur village, called Narnula Kase Rarjam, has come to Konapuram village and has been working for the villagers since thirty-six years.

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Mandaloji Gaṅgārām is considered to be the expert smith in handling wootz steel and for forging wootz steel related objects. People who have to get their wootz steel objects worked (like, for example, toddy tapers whose traditional tools are made of wootz steel) come to him specially for working their wootz steel objects. Mandaloji Gaṅgārām mentioned that he was aware of another smith by name Donthi Hanmandlu from Athmakur village, who specialized in sharpening toddy tapers' wootz-steel derived knives. This is an important business to Donthi Hanmandlu who is handling toddy tapers' tools from the nearby about 10 surrounding villages. He is also a '*mirasidār*' in that village and handling the blacksmithy work of the agriculturist in the village.

Mandaloji Gaṅgārām mentioned that because of the old age, he is unable to do regular smithy work in the village. He is well aware of wootz making and told that he has seen wootz furnace remains at several places in his village during his earlier days. Nowadays, there are none left in the village due to development of agriculture around the village and increase of population in the village. The earlier casual dump locations are now occupied by people and most of the open space in the village has been occupied by constructions.

The villagers of Konapuram, on being interviewed about their knowledge of wootz steel making in their village in the past, pleaded their ignorance about the crucible heaps (which can still be seen in the village). They mentioned that several people visit the place, both from India and abroad, and take samples of crucibles. So far, they are not aware of the results of their research. Scientific analysis of a crucible remain from Konapuram is presented in this volume.

Mandaloji Gaṅgārām was kind enough to procure two wootz steel ingots and objects derived from wootz steel like three toddy tapers knives, one broken axe and a sickle. The collected ingots and two toddy tapers' knives are preserved in MME Department at IIT Kanpur. Some initial results of the analysis from one toddy taper's tool are available in this volume. The wootz steel ingots (without destroying the structure) will be sent to National Museum, New Delhi for their safe preservation.

The interview with Mr. Mandaloji Gaṅgārām revealed his experience and know-how of the wootz steel processing and trade. He revealed several

interesting facts about the process of wootz steel making and processing. The questions posed to him and the answers received are summarized below.

Q: What can you comment about iron making furnace?

A: Iron making furnace was a single time use furnace. Every time, they constructed a new furnace. They also preferred the same type of charcoal.

Q: What about wootz steel making furnace? Were they different? How different?

A: The wootz steel furnace was also constructed with wet clay in a circular shape. It can be used several times repeatedly after a gap of six to seven days, because once the furnace was fired for 24 hours, it needs to cool down for four to five days. In this manner, the same furnace can be used again and again.

Q: How was the wootz making furnace constructed?

A: I could see some wootz smelting furnaces in the village when I was young. Those were round in shape about three to four feet in diameter, but I do not remember the exact height. Even I don't know the top shape of the furnace.

Q: How were the crucible packed in the furnace? Did they have something put in the bottom? What was the typical time for making wootz steel?

A: The furnace was packed first with the bed of charcoal and the distance must be maintained between the crucibles when we place in the furnace, other wise it would be difficult to lift the crucible in between the intervals. Blasting time or running the furnace was 24 hours.

Q: How many tuyeres were used in the furnace?

A: Two to four in opposite directions. You can see some remains of the tuyeres in the remains of the crucible heaps.

Q: Was there any platform constructed inside the circular furnace?

A: No, there was no platform constructed inside the circular furnace. I have not found any such platform. But the furnace was filled with charcoal about two feet and the prepared crucibles were placed on the bed of charcoal.

Q: Do you know about the blasting process?

A: Yes, the blasting of heat was adopted for a day and night. After a gap of eight to ten hours, the hot crucibles were lifted with tongs by one person and another person pushed fresh charcoal beneath it. Because the crucibles were lifted and rotated, we obtain two to four impressions of

tongs on the top of the pinecone. Yes, you can see the impressions on remains of every pinecone crucible. Not only here in this village, in every wootz making centre in this region, we can see these impressions on all 'konampavulu' or pinecone crucibles.

Q: From where did they collect the clay for making wootz crucibles?

A: There is a place called 'vandu bonda' (*vandu* means plastering clay, *bonda* means a pit like pond or clay pond) about 1 kilometer from this village, nearby a stream called *Ralla Vagu*.

Q: How the clay was processed for making a crucible.

A: The dry clay was brought from *vandu bonda* and made into a liquid like bog with water. The liquid bog was poured in to a small earthen ditch. The water was allowed to sink down the earth. The heavy gravel like sand particles go to the bottom and the soft clay remains on the top. The soft clay appeared plaster-like. It was collected from the upper partition. The soft clay was mixed with rice husk and ground till it became soft. The rice husk was collected from pounded paddy. Sometimes, cotton was used instead of rice husk. Rice husk or cotton was mixed with clay and ground until it was very soft and this mixture was used for making crucibles. The crucibles are never cracked when they are dried because of the rice husk or the cotton. It also gives high heat to the metal inside while blasting in the furnace and helps in easy melting of charge. At first, the cylindrical base of the crucibles was made and it was kept in the shade. They did not keep the crucibles in hot sun light. Sun light should not fall on the crucibles. After a month or so, the crucible would have dried up. They were again prepared by filling with iron pieces and wood or ground leaves. These base crucibles were sealed with the same clay in a pinecone shape and kept for drying in shade for 30 to 40 days or till they are dried totally.

Q: Was there any hole on the top of the crucible?

A: No, there was no hole on it. If there is a hole, it does not serve any purpose. You can examine the remains of crucibles and you will not find any hole at the top.

Q: What was mixed with the iron pieces other than wet leaves in the crucible charge?

A: I don't know about other things, but they were not using the wood pieces but the wet bark of a tree and little quantity of 'veli-garamu' (borax) in the crucibles. It was told by my father, but I do not know what tree was exactly used. Some say it was 'thangedu' and some say it was 'paidi thengadu' tree.

Q: What types of blowers were used?

A: Those blowers were made of male buffalo's skin.

Q: Have you seen those?

A: Yes, I have seen these kind of blowers and I have also used them. Yes, I know how to make the buffalo skin blowers. I can even now make those buffalo skin blowers. We were also using those blowers in a big furnace, while making anvils and other big implements of iron. In this modern age, we are using only metal blowers. (Note: These metal blowers are hand operated and the wind is generated by rotation motion imparted with one hand to the handle of the blower) They are comparatively inferior to the buffalo-skin blowers. The old buffalo skin blowers could push larger quantity of wind in to the furnace at one time. This helped in faster heating of the material. Repeated blowing with short intervals was of great use for faster heating of the metal. The modern blowers which blow wind continuously give some cooling effect at the tuyeres inside and the required heat may not be provided by the wind from modern blowers. The intermittent blowing is more effective, I think so.

The modern blowers are rotated by one hand; this is a disadvantage because the labor involving one single hand is more painful. The old method involved only two laborers at each side of the furnace. Moreover, it was easy to handle the blowers which were pushed with two hands.

Q: What kind of charcoal was used in the furnace?

A: The charcoal was made from '*ippa*' (*Bassia Latifolia*), '*sandrugu*' (not known) and '*thumma*' (*Acacia Arabica*). The charcoal made from these woods was preferred in old days as it could provide heat for longer time than the charcoal made of teak and tamarind wood. The charcoal from these wood generally turns into ashes soon and used only by smiths in their small working furnace.

Q: How was charcoal prepared?

A: First, we collect the required type of wood for making the charcoal from the forest nearby. The length of the wood pieces must be about three feet. The big stumps were broken into two or four pieces. The wood pieces were heaped or piled in a round structure, in the form of a pinecone. A small cavity on the ground was made to light the fire. Once the flames start, the heap was immediately covered with dry clay without any hole on it. Within 12 hours or so, we can obtain the charcoal.

Q: Are there any interesting facts you can share regarding the charcoal used?

A: Based on the heat one obtains, we can differentiate the type of wood charcoal.

Q: How can you make a distinction between wootz steel and iron?

A: Experienced smiths can distinguish the difference between wootz steel and bloomery iron, by their blind fold eyes. The thick red in black color of the wootz is different from iron and its glowing nature (i.e. shine) is also different. Even by the beat of the finger tips on the metal or with a mild hit of small hammer on the metal, one can easily identify the metal by its characteristic sound. Another method is that iron is soft when it is cut in to pieces with iron chisel and hammer, whereas wootz steel is quite brittle and breaks easily. Another method to differentiate is if you put iron in the fire, it needs high degree of temperature where as wootz steel needs very little temperature. If the wootz steel is put in the ordinary smith's furnace for long time it splits into small pieces. It needs very little temperature to handle the metal. One must be an expert to handle the metal, other wise it will go waste. Generally, the implements made of original wootz look little black and shiny. It will not rust easily, especially if it is kept in the shade without touching the water and earth.

Q: How much temperature does it require for working wootz steel?

A: I do not know exactly, but it needs very little heat than what iron requires. If it is little red hot, when we keep in our ordinary furnace, it can be slowly handled to make implements. Sharpening of the cutlery items is very easy because it needs very ordinary heat to handle, but needs lot of concentration.

Q: What is the difference between the two operations that you mentioned just now: working and sharpening? In what way are they different? Can you please elaborate this?

A: Working operation stands for making a new implement, where as sharpening of cutlery items implies sharpening of the implements. For working or making tools, a relatively higher degree of temperature is needed whereas sharpening needs lower temperature. The sharpening tools were kept in hot sunlight or in hot sand, which would be sufficient for sharpening the tools without using any furnace heat. (Note: This is interesting because temperature of the order of 50 to 60 degree centigrade is attainable on hot days.)

Q: How do you forge wootz steel?

A: While forging wootz pieces, generally we use '*veli-garamu*' (borax), which is a kind of salt used by gold smiths. The piece is held with tong in the furnace for little time. It is then taken out and hammered carefully. In case of forging of iron, we use silicon powder in the forging operation.

Q: What about the process of wootz forging and making time of an implement?

A: Wootz handling is very simple. One needs to know most important the temperature at which to forge. Further, wootz cannot be forged quickly and it takes time for forging because it needs a certain degree of temperature to forge wootz steel. It would take about two hours to make a toddy tapper's knife or a sickle or an axe. The blowing of heat must be slow and not like that used in forging iron implements.

Q: Are there any interesting and unknown aspects of wootz steel that you would like to share with the readers?

A: The physical cuts on the body from wootz steel cuts never get infected. The cuts heal very quickly without much pain. You can also ask the people who use wootz steel implements and they will tell you the same thing. The wootz steel making operation was also a religious affair. At every crucible site or furnace site, there is a statue of Lord Hunuman. Come, I will show you these sites here and in the nearby villages.

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