HISTORICAL NOTE

WOOTZ STEEL RECEIVED BY ALEXANDER*

It is normally stated in any general books or articles on wootz steel that the great warrior of Greece, Alexander of Macedonia, received gifts of Indian steel during his foray into the sub-continent. This tale is often recounted to show the high esteem in which Indian steel was held in days of yore. For example, Heath\(^1\) quotes, “we can hardly believe that a matter of about thirty pounds weight of steel would have been considered a present worth~ of the acceptance of the conqueror of the world, had the manufacture of that substance been practiced by any of the nations of the West in the days of Alexander.” We shall soon learn that the amount stated by Heath is incorrect and he underestimates it by a huge margin. The Indian steel that was gifted to Alexander is the subject of this historical study. We will explore the gift of Indian steel to Alexander in greater detail. A lively image showing a Indian chief Paurava (or as the Greeks called him, Porus), the ruler of the territory between Jhelum (Hydaspes) and Ravi (Hydraoates) gifting wootz steel to Alexander is seen in Fig. 1. This image is from a recent book called *The Ferrum Hunters* by Das and Ray\(^2\) in which several aspects of Indian iron and steel making traditions through the ages have been explained in a simple manner, ideal for the lay reader.

We possess Greek accounts of Alexander’s march into India. Alexander’s invasion is mentioned in the reports of Arrian, Nearchus, Ptolemy, Diodorus, Strabo and Plutarch\(^3,4\). We may note here that accounts about Alexander’s advance are mainly based on western versions and unfortunately, we do not have any eastern versions of Alexander’s entry (or non-entry) into proper Indian sub-continent. We have to utilize the available material to arrive at some logical conclusion. It was in the spring of 326 BC that the Macedonian invader first set foot on Indian soil proper by crossing over river Indus (Sindhu). In September 326 BC, Alexander left the large city of

* Prepared by R. Balasubramaniam, Department of Materials and Metallurgical Engineering, Indian Institute of Technology, Kanpur 208016, India; email: bala@iitk.ac.in
Pattala (where the Indus divided into two branches) on his homeward journey and proceeded towards Babylon through Gedrosia. Two years later he died at Babylon.

McCrindle in his *Invasion of India by Alexander the Great* gives the translation of Qintus Curtius Rufus account of Alexander’s campaigns. Interestingly, Curtius compiled this treatise on Alexander in the first century AD using earlier sources, based on the testimonies of the companions of the Greek monarch. In chapter VIII, the submission of Malli (or Malloi, perhaps a Greek adaptation of the Sanskrit tribal name Malava) is first recorded. The text reads “The Indian ambassadors were dismissed to their several homes, but in a few days they returned with presents for Alexander which consisted of 300 horsemen, 1030 chariots each drawn by four horses, 1000 Indian bucklers, a great quantity of linen-cloth, 100 talents of steel, some tame lions
and tigers of extraordinary size, the skins also of very large lizards, and a quantity of tortoise shells.” While referring to “100 talents of steel,” the following material has been noted in the footnote. “The sword blades of India had a great fame over the East and Indian steel, according to esteemed authorities, continued to be imported into Persia till days quite recent. Its fame goes back to very old times. Ktesias mentions two wonderful swords of such material that he got from the King of Persia and his mother. It is perhaps the *ferrum candidum* of which the Malli and Oxydraceae sent 100 talents weight as a present to Alexander. Indian iron and steel are mentioned in the *Periplus* as imports into the Abyssinian ports.”

In a most recent translation of Curtius’ accounts, we find the following statements about the same event: “The Indian ambassadors were sent home, and returned a few days later with the following gifts: 300 horsemen; 1,030 chariots drawn by teams of horses yoked four abreast; a quantity of linen: 1,000 Indian shields: 100 talents of white iron; lions of extraordinary size and tigers, both species thoroughly tamed; and, in addition, skins from huge lizards and the shells of turtles.” It is interesting here that the gifted iron material is mentioned as “white iron” in this works and not as “steel” like in the account translated by McCrindle.

Given the two different names mentioned by these two sources, let us look at the original version of Curtius who provided the text in Latin. The image of the page in which the term “ferrum candidi” appears is shown in Fig. 2. In the Latin text, observe, when an “s” is inside the word it “looks” like an “f” (like in old German). Further, the letter “æ” is the combination of “a” and “e” which is present in some European languages like Danish, unlike English and German. The original Latin text reads,

- Indorum legati dimissi domos, paucis post diebus cum donis revertuntur.
- trecenti erant equi. mille triginta currus, quos
- quadrijugi equi ducebant. linere vestis aliquantum, mille scuta
- Indica et (&) ferri candidi talenta centum: leones rarre
- magnitudines et (&) tigres, utrumque animal ad man-

Apart from the main text mentioned above, there are several interesting details mentioned in the footnote to “ferrum candidi,” and particular note of the reference to Pliny’s work is to be noted? We shall here concern ourselves with the term “*ferrum candidi talenta centum.*” This translates as “a hundred
Cap. VIII.

Argumentum.

Ab historiarum legatis denua accipitur. Salutium, Mucius, Heracles, absque dubio, Polybos dux urbem per quattuor tabulas sive adrasone oblatas cum eo remedium impusit Alexander.

Nelurum legati dum suffos domus, paucis post diebus, cum domo revenerunt, recercati egei, multa tinta catarctae, quos quadrupes equi ducere, hinges, et inquireretum, multa fata ludis, et ferre conatus et talen tit centum. Iamque, non magnitudinis et tiges, utraque animal ad

Fig. 2. Image of the page in original Latin version of Curtius in which the term “ferrum candidum” appears.

talents of white iron.” Therefore the original reference is to white iron and not steel, specifically.

On a related note, the amount mentioned in the record is “100 talents.” There are references to this unit of weight (talent) at other locations in the same book by Curtius. For example, Curtius mentions that Omphis, the king
of Taxila, presented Alexander and his friends with a gift 80 talents of “marked silver” (signati argenti), which is supposed to indicate silver punch-marked coins. The talent was an important unit of weight among the Greeks, who borrowed it from the eastern neighbors. The Attic talent, which equaled 60 Attic minas, is estimated to have weighed about 56.9 pounds (25.8 kgs). Therefore, the amount of “white iron” gifted to Alexander was 2580 kgs, almost three tonnes!

What is “white iron”? We need to seek the answer in the known descriptions of different varieties of Indian iron. Three principle varieties of iron were recognized based on the carbon content. Each of these principle varieties was further sub-divided into other varieties depending on the composition and properties. Prakash and Biswas have discussed descriptions of Indian steel as per classical Indian texts (for example, Rasaratnasamuccaya and Rasendrasāra Samgraha) in terms of modern terminology. In all these descriptions, one of the characteristic features noted for high carbon steels is their bright fracture surface and lustrous nature (see also article by Balasubramaniam and Kalyanaraman in this issue for detailed discussion on wootz steel properties as per Rasaratnasamuccaya). This allows us to conclude that “white iron” specifically refers to carburized steel of higher carbon contents than wrought iron. It was not just plain iron. It was the shining quality of “white iron” that sets it apart from other types of iron. In fact, the bright colored nature of wootz cake is reflected in some other names for wootz steel like hinduwānī and pulad. For example, the most recent translation proposed for hinduwānī is bright object of trade from India.

References