Following the Garnet's Trail: From South Asia to Europe

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Gemstones, valued as markers of wealth, status and beauty or for their sacred and medical properties, have, for millennia, fascinated mankind across all cultures. Their study has recently seen an increase in academia, especially for earlier historical periods. Among them, red garnets seem to have played an important role around the world during medieval times. Indeed, between 300 BC and 700 AD, what Noël Adams (2011) termed the "garnet millennium", this gemstone was used in large quantities in the Hellenistic, Graeco-Roman and Byzantine periods of the West, the Sasanian empire in greater Persia as well as in the Indo-Greek, Indo-Parthian, Kushan and Hunnic dynasties in Central and South Asia. Red garnets adorned a variety of objects ranging from rings, brooches and cameos to belt buckles, scabbard bosses, seals and many more.

In Western Europe, the Merovingian used red garnets in a special type of setting known as cloisonné, which requires very thin plates of garnet set in tiny box-like structures. Analysis undertaken on the excavated ornaments revealed that the majority belongs to the almandine type (dark red, purplish colour) and stemmed from South Asia, most particularly India and Sri Lanka. Interestingly, after a period of widespread use since the 5th century, the almandine garnet processing suddenly came to a stop in the late 7th century. Ornaments featuring garnet inlays beyond this date became scarce and used garnets of the pyrope kind, which could be found in the nearby region of Bohemia.

Fig. 1: Saucer Brooch from Hürth-Kalscheuren (NRW) with almandine garnets in cloisonné style. Photo: J. Vogel, © LVR-Landesmuseum Bonn

The reasons behind this widespread use of imported exotic red gems during nearly two centuries and its sudden disappearance remain unclear. In order to answer these and other questions, in January 2014, a research cooperation network ("Weltweites Zellwerk") was funded by the Federal Ministry of Education and Research (BMBF) for a duration of three years. This research network was established between the Römisch-Germanisches Zentralmuseum in Mainz, the LVR-LandesMuseum Bonn and Heidelberg University, along with affiliated scholars from Sweden, Spain, Hungary and England.

The interdisciplinary subproject directed by Prof. Dr. Jörg Gengnagel at the South Asia Institute in Heidelberg is mainly centred on the region of South Asia. Project members are Borayin Larios and research assistant Julie Pusch, as well as Kerstin Herglotz who will be joining the project at a later stage. The project has a three-fold focus: first is the study and translation of textual sources yielding information about pre-modern knowledge on gemstones so as to gain insight into the cultural capital of garnets in medieval South Asia. The second focus is the systematic survey of historical and archaeological evidence in these regions in order to correlate the extraction of garnet with its treatment and subsequent commercialization and eventually trace the path of garnets from the mine to the harbour. Finally, a third area of study revolves around ethnological fieldwork on site (Rajasthan, India) to source garnet localities and collect information regarding both traditional and contemporary lapidary techniques. Beyond the acquisition of rough stones from local mines to be used for comparison purposes, the fieldwork may be able to fill the gap between the normative textual sources at our disposal and the actual lapidary practices in place in medieval South Asia.
Garnet is one of the most common gemstones around the world and while there are many varieties, the red kind is the most widespread one. The identification of garnet is difficult without specific analysis of their chemical composition, which means that stones labelled as garnets in historical sources could actually have been other types of gemstones altogether. In order to integrate this possibility in our philological analysis of Sanskrit and eventually Prakrit texts, we consider all references from red stones and have started an index of potential termini referring to garnets, currently hosting over 50 terms. The many genres at our disposal range from scientific normative texts such as the *śāstras*, passages from the *purāṇas* with reference to gemstones in religious and mythological contexts to documents on statecraft and treasuries as well as medical treatises and are all crucial to decipher the multiple roles that red garnets endorsed in this particular period and within different spheres of social life.

We gain a clearer picture of the actual 'garnet situation' within the first millennium AD based on the limited archaeological finds in the subcontinent. Almandine garnet beads discovered at Arikamedu and in the Kongu region of Tamil Nadu dating from the Iron Age not only suggest early usage of garnet and developed lapidary techniques in this region, but may also hint to an active trade with the Romans, per sea and land, based on the many artefacts found at these and other sites. Simultaneously, garnet seals depicting a confluence of Hellenistic, Persian and Brahmi styles discovered in the northern region of Gandhara further attest to trade routes and contacts between East and West as well as to the status of garnets as valuable gemstone.

During his six-week trip to Rajasthan, Borayin Larios was successful in finding different garnet sources in the region and got different hints for the location of other possible sources of red garnet in various parts of India. Despite the discouragement from most of his informants to go in search of the mines, either because of climatic reasons (mines closed due to the rain), to their inexistence or due to them being closed or abandoned, he decided to venture himself in search of red garnet mines based on our textual material. The evidence he brings from the field proves that garnet mining in Rajasthan is not only still active in the region, but also that most of the mines are illegal and people are often reluctant to show where the mines are or talk about the subject. Villagers may even say that they are "digging a well" for water, when in reality they are illegal miners looking for various gems. Despite these constraints in his fieldwork, he was nonetheless able to document the mining practices of garnet in Rajasthan and brought with him a rich collection of hand-picked samples of rough stones directly from different garnet sources in Rajmahal and Tordi in the Tonk district and Sarwar in the Ajmer district.

Fig. 2: Rough surface garnet samples from Tordi, Tonk district, Rajasthan.
Photo: B. Larios, © Weltweites Zellwerk

These samples will be analysed for their chemical composition, inclusions and other physical properties and correlated with the ancient jewellery studied by our colleagues in Mainz and Bonn. While Borayin Larios only found one active garnet mine, he was still able to find other localities where garnet is extracted at other times of the year. He collected rough garnet samples from the terrain's surface, from abandoned mines and from villagers who pick up loose garnets from their fields. He was able to obtain cut pieces supposedly stemming from other specific locations in India that can also be used for cross analysis.

Fig. 3 and 4: Miners at work in Rajmahal, Tonk district and villager holding rough garnets from Sarwar, Ajmer district. Photo: B. Larios, © Weltweites Zellwerk

As part of his research agenda, he documented traditional and artisanal lapidary techniques in different gem cutting workshops of Johari Bazaar in old Jaipur that do not employ electricity, which, while becoming rarer and rarer, are still in use in several parts of the subcontinent. Nowadays, most of the gem manufacturing process is done with electrically operated machines, but in an artisanal way, each stone needing to be carefully examined and handled with the best mastery possible. The process consists of mainly 6 steps once the rough stone has been obtained from the mine / quarry:

1) Sorting the rough
2) Sawing or slicing the stone
3) Pre-shaping
4) Shaping / Faceting
5) Grinding / Lapping
6) Polishing

Fig. 5 and 6: Almandine garnets from Sarwar, Ajmer district in rough and in cabochon form processed at a workshop in Jaipur.
Photo: B. Larios, © Weltweites Zellwerk

For centuries these steps were carried out in the same workshop by different people or sometimes accomplished by different communities or workshops in the business depending on each other's skills and work. This continues to be the case even today and while some communities are still guarding their best techniques only for family/clan members, different communities have now started to learn the trade from each other. Cutters have become polishers; traders have taken up the manufacturing business by learning to grind the stones themselves, and so on.
The tools that were used previous to the arrival of electricity are still used today, especially for grinding and polishing the stones. The main tool, which is a manually grinding wheel with a bamboo-stick is called in Hindi: *jindrā*.

Fig. 7: Artisan processing a garnet using a jindrā in a workshop in Johari Bazaar, Jaipur.
Photo: B. Larios, © Weltweites Zellwerk

The old grinding disk (*sāna*) made of a mixture of shellac and a combination of grinding powders was employed in the *jindrā* is nowadays very difficult to find, not only because the manual *jindrā* has been replaced by the modern grinding wheel, but because even this machine nowadays uses an aluminum disk with a diamond-powder coating rather than the artisanal *sāna* that was often handcrafted locally in the lapidary workshops of Jaipur. Nonetheless, Borayin Larios was able to find a small emerald manufacturing workshop that still uses the old *sāna* thereby documenting a technique which is quickly being replaced by modern tools.

Besides this documentation, he acquired an important Jain text as well as other textual references on the significance of gemstones in ancient India and addressed the question of the terminology of garnet in Hindi and Sanskrit during his fieldwork. These findings raise new questions and hypotheses on the traditional classification of gemstones. Finally, he created and strengthened a network in and outside India of a variety of individuals from jewelers, gem manufacturers and mine owners to geologists and historians of religion. Good contacts with several institutions related to the research project with different backgrounds and interests around gemstones and garnets in particular were also established. All these results could be of great relevance for the overall success of the research project. The material gathered will not only be of great value for the analytical and comparative work of our colleagues, but also an important visual resource for the dissemination to the wider public. In order to enhance the visitor's learning experience photographs, videos and the stones in different stages of manufacture can be used to showcase the research results in the exhibition planned after the completion of the research phase.

The direct empirical data collected through fieldwork provides a solid ground for the future contextualisation of medieval ornaments and is an important contribution to the interdisciplinary approach of the project. Indeed, by combining historical sources (both textual and archaeological) with ethnographic observation, we intend to "follow the garnet's trail" by focussing not only on the material transfer of objects (garnet as minerals and ornaments) but also on the transfer of lapidary knowledge and processing techniques between East and West. By this, we hope to identify the social value of garnets in South Asia and their trade with other parts of the world in the first millennium AD, thus re-examining their origins and transmission as well as their uses and occurrence in the ancient world.