

NEWS AND NOTES

Report on Conference cum Workshop on History, Science and Technology of Ancient Indian Glass, held at IIT-Gandhinagar – Alok Kumar Kanungo, Archaeological Sciences Centre, Indian Institute of Technology Gandhinagar, Palaj, Gandhinagar 382355; (E: kanungo71@gmail.com) and Mudit Trivedi, Department of Anthropology, University of Chicago, 1126 E 59th St, Chicago, IL 60637; (E: mudit.trivedi@gmail.com).

The Archaeological Sciences Centre (ASC) at the Indian Institute of Technology Gandhinagar (IITGN) has pursued a program of organizing History, Science and Technology workshops that focus upon a selected archaeological artifact class or material. The aim of these events has been to expose a selected group of students with an acute sense of the specific problems and opportunities that are involved in the study of that material. This has taken shape in the motivation to host a conversation between the leading experts of the field, and equally to provide hands on training in the ethnoarchaeological, experimental and scientific prospects of that particular field of archaeological research.

After publishing the result of the first workshop of the series on stone beads (Kanungo 2017) which was held between the 10th and 14th of August 2015, the second workshop was held from the 21st to the 25th of January 2019 in IIT Gandhinagar on Ancient Indian Glass. The experts included archaeologists who have had extensive experience of south Asian glass, and archaeological chemists with expertise in the elemental analysis of glass. In addition, it included established ethnohistorians and ethnoarchaeologists of south Asian glass and vitreous materials, alongside craftsmen who brought their lifelong and inherited skill, expertise and knowledge.

These five days of the conference cum workshop involved four days of academic presentations and two field trips, together that covered veritably all aspects of the study of glass. These ranged from the origin of glass and faience, to the manufacturing techniques developed at different times in south Asia and the regional distribution of key artifacts both within and as traded far outside the region. Valuably, the talks also included detailed introductions and extended examples of the analytical chemistry of ancient glasses. Finally the field trips gave exposure to the contemporary traditional glass working and a world famous archaeological heritage site of India.

This wide range was organized into the several panels, the first of these 'Glass in General' included a series of foundational introductions to the study of glass. Prior to this, Prof. Thilo Rehren's keynote introduced the chemistry of glass as a matter of three different components: the Sand/Quartz base to which a flux is added alongside the third component - a variety of "spices" to colour, opacify and lend it special qualities. Prof. Rehren's talk provided an overview of the complexity involved in the study of trace element contributions from both the flux and colourants. His talk also stressed the need to locate all archaeometric analysis within a sense of the contemporary glass cultures and elite networks of political economy that sustained them.

Dr. Laure Dussubieux's talk "Elemental Compositions and Glass Recipes" provided a synoptic overview of the kinds of questions which can be chemically asked of glass artifacts. Dr. Dussubieux very usefully organized these into three kinds of questions. First come questions that can be asked of Glass making: (who made glass, where, with what technology, which ingredients, and what was the organization of primary production). Second come questions that we can ask of trade

in glass: (who traded what, what trade in raw glass existed, how networks sustained varied trade) and finally questions of the use of glass. Dr. Thomas Fenn presented a third introductory foundational talk - which covered the prospects and challenges of using isotope systems to understand glass provenance networks. Dr. Bernard Gratuze's talk addressed the issue of the specificities of the transition from Natron glasses to Plant Ash flux glasses and "Forest" glasses in the connected spheres of the Middle East and Western Europe at the end of the first millennium. Dr. Gratuze's talk was a lesson in the kinds of detailed analysis that careful and innovative sample selection from well-dated assemblages that combined with the precision of Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) can reveal. Dr. Stephen Koob, provided an introduction to the kinds of care which are demanded in the handling of glass. He provided a very useful and detailed discussion of the preferred binders (Paraloid B 72) that should be used in the conservation of glass. The last talk of the first day was that of Dr. Joanna Then-Obluska, who provided a tour-de-force survey of the issues, challenges and attention to detail which the typological study of ancient glass beads demands. Dr. Then-Obluska's talk admirably summarized the different methods by which ancient glass beads were made and provided excellent illustrations of their visible traces on artifacts.

The second panel focused on 'Protoglass and Faience'. Prof. Mark Kenoyer summarised the results of more than twenty years of the study of Harappan Glazed steatite and faience technologies. He provided the participants with a sense of the pyrotechnical virtuosity and playfulness with which they excelled at the manipulation of this material. Prof. Kenoyer, summarized not only the use of a range of instrumental techniques [ICP-MS, Scanning Electron Microscope (SEM), and others] but also from his extensive replication studies. Dr. Ivana Angelini provided a second study of faience that involved small samples from both Harappa and Mohenjo-daro using Confocal Stereomicroscopy, X-Ray Powder Diffraction (XRPD) alongside using the latter method with SEM for the study of vitreous slags. Dr. Bhuvan Vikrama, communicated the interesting finds from the recently excavated site of Sakatpur Mustakil, Dist. Saharanpur, where a series of faience working furnaces and extensive faience artifacts of the Harappan style were found.

Three panels organized the discussion of 'Glass in South Asia', Part 1 addressed Ethnography and Literature. Part 2 provided analytical surveys from 'Glass in different parts of South Asia'. Part 3 focused upon the present state of our understanding of the 'Circulation of South Asian Glass beyond South Asia'. In Part 1 Dr. Alok Kanungo began by dismantling the unhelpful debates over the origins of glass, glass making and widespread use in south Asia. He relativized a series of otherwise difficult to understand textual references (in the Satapatha Brahmana, the Arthashastra and other texts) by pointing to how the metaphorical and allusive use of glass and glass making must presume at least a few centuries of familiarity with the material. Turning to the



evidence for production, he, argued that the problem in Indian archaeology persisted on account of our expectations both on account of the forms of evidence and a misunderstanding of the taphonomic processes that are active. As a result, the distinctive debris of both glass production and glass working are likely often misrecognized.

In the same vein, Dr. V. Selvakumar's talk provided a thorough and thought-provoking review of the evidence for the production, use and status of glass in Tamil Nadu. His talk also provided a very rich account of the historical evidence on glass-makers and especially the caste of bangle traders and makers known from Tamil inscriptions. Dr. Jan Kock and Torben Sode presented over two papers a precis of their work over the last several decades on Indian glass crafts - of primary glass production, beading and bead-work and mirror-making.

Dr. Kanungo's talk on 'Glass crafts in Northern India' in 'Glass in South Asia - Part II : Glass in Different parts of South Asia' exhorted participants to be attentive to the 'when and why' of changes in Indian glass crafts traditions. Dr. Shinu Abraham's talk concentrated on the revisions that the analysis of a sample of c. 5000 beads from Pattanam have afforded into the complex which since Peter Francis Jr.'s formulation has been known as the "Indo-Pacific beads complex". Dr. Sharmi Chakraborty's talk addressed the important issue of how do we assess the scenario of glass beads and their use in a regional perspective using new methods such as cluster analysis in the case of early historic Bengal. Mudit Trivedi's paper sought to revisit the questions of chronological change, typological diversity and cultural significance of the glass bangle as an artifact type of a much-neglected point of entry into the study of south Asian glass.

Talking about the cultural specificity of the site of Sanjan, especially in light of its association with the Parsi community, Dr. Kurush Dalal and Rhea-Mitra Dalal detailed the range and density of 10th to 12th century glass tableware that they had recovered during excavations including bottles, vials, footed plates, distillation apparatus, goblets and other items such as buttons. Prof. Massimo Vidale and Dr. Angelini

provided a detailed account of the development and origin of glassy materials at the site of Barikot, in Swat valley, Pakistan over the first millennium BCE, through to Kusana times. Similarly, Dr. Wijerathne Bohingamuwa presented both a synthetic review of the voluminous evidence of glass production and use in ancient Sri Lanka. He provided first a site-wise and period-wise appraisal of the evidence and an equally valuable evaluation of the present state of evidence for the temporal shifts in glass intensity in Sri Lanka and its place within the Indo-Pacific beads phenomenon.

In the "Glass in South Asia - Part III : Circulation of South Asian Glass beyond South Asia" Dr. Maninder Singh Gill presented the results of his study investigating early Mughal architectural tile-work. He presented his work as a case study of the interaction of indigenous Indian glass tradition in the context of a cosmopolitan court culture, which drew equally in its political and material cultures on central and south Asian traditions. Dr. Gratuze spoke about the recent discovery and identification of a range of Indian glass beads in early medieval Europe in two distinct clusters. The first group of finds were from Western Europe and France in the period between 500-800 CE and as recovered from Merovingian era elite burials. The second and more puzzling group was that as recovered from Northern Germany, Denmark and Sweden in the 7th and 8th centuries. Dr. Fenn's case study of Indian glass beads in Eastern and Southern Africa added another layer of complexity by addressing the challenges of trying to identify the provenance of glass. Dr. Dussubieux' paper drew on her decade long study of the compositional groups of glass in South East Asia (especially sites in Thailand, Vietnam and Myanmar). She demonstrated how influential models such as the Arikamedu centric story advanced by Peter Francis Jr. of technology transfer and /or the movement of craftsmen were in need of re-evaluation in light of the elemental analysis of glass from these sites. The last paper of the conference, by Dr. Then-Obluska, similarly presented new evidence to the south Asian audience of Indian beads as traded to northeast Africa in the period between the 1st and 6th centuries CE.

These diverse contributions brought together the challenges of studying the history, science and technology of ancient Indian glass in vivid detail. Considered together, they provided the best introduction to the complexities of regional diversity in glass traditions, the archaeometric challenges that stand before the field and the prospects of all we stand to learn from further investigations.

Live Workshops with Craftspersons

Throughout the conference a range of other resource persons were present and vital to the learning of all participants without making any paper presentations. These involved three sets of master craftspersons which included two craftspersons (Nandlalji and Krishan-ji) from Banaras Beads Limited (BBL). The second group was of stone-bead craftspersons from Khambat, Anwar Husain (chipping-grinding-polishing master) and Pratap-bhai (drilling master). The third were a group of women from the Rabari (Asha and Megha-ben) and Miri (Sakina, Madina and Zanab) communities, who demonstrated the care, attention and detail that the traditional beading work typical of the Kutch area requires and demands.

For many of the participants observing the lamp-wound beads was their first experience of the working of glass at close quarters. At once, interaction with the master craftspersons from BBL covered a range of topics and conversations. These ranged from the specificities of melting canes, combining colours, the clay separators used on the wires beads were wound around, the rates and kinds of failures, to the kinds of innovations in design they are regularly challenged to make.

In a similar vein, the presence of the stone bead master craftspersons allowed the students to witness, interact and experiment with the craftspersons and come to grasp the complexities of working with and drilling stones. Engagements with them moved from the basics of stone-identification to the reduction process and its complexities as well as the bow-drill apparatus used for drilling and its body-techniques.

Faience Workshop

All the participants also benefited from a specially invited workshop conducted by Profs. Mark Kenoyer and Massimo Vidale on the replication of Indus Valley faience technologies. The faience reproduction workshop was a truly unique component of the conference. It introduced and engaged all participants in the care and systematic outlook and planning which experimental archaeology demands, and especially to the infrastructural, fuel and labor demands which the pyrotechnological products demand. In demonstrating the care and attention needed in both making frit and faience artifacts the workshop made clear how much the glassy phase demands of craftspersons, and a renewed appreciation of the extraordinary excellence of the Harappan artifacts. In addition, the detailed demonstration of all parts of the process, the hands on experience

with all the raw materials and the ability to witness raw materials at various stages, as well as the transformation in them and the crucibles was invaluable.

Field Trips

The first of two field trips, took participants to the last surviving tank furnace and traditional hot lead mirror workshop in Kapadwanj similarly provided the kind of hands-on and on-site training that is impossible by any other means. Ahmed Basir Sisgar, proprietor of the workshop, who had also attended the conference, led the group to his workshop that continues to produce convex hot-lead coated traditional mirrors, the find extensive use in local crafts, especially in textiles. The field trip to Kapadwanj was especially useful as it brought together many of the complexities which presentations had alluded to: the attrition in capacities for traditional crafts to sustain themselves and reproduce and a first hand sense (for the first time for most participants) of the skill, technical excellence and physical endurance which glasswork demands. The final component of the event was a field trip to the Archaeological Survey of India (ASI) excavations underway at Vadnagar.

Conclusion

The experts and participants at this truly international event were from eleven countries including United States of America, United Kingdom, France, Italy, Denmark, Cyprus, Poland, Malaysia, Thailand, Sri Lanka, and India. It was gratifying to see that participants represented 54 universities, research institutes, laboratories, museums and state departments.

The last major collective evaluation of the state of scientific interdisciplinary research on ancient Indian glass had been made in 1987 (Bhardwaj 1987). Similarly, the last monograph that had synthesized the available data on the history of Indian glass was written a generation still earlier (Dikshit 1969). The conference cum workshop on the history, science and technology of Ancient Indian Glass aimed at filling precisely this gap. The description above has communicated the efforts made to provide as multi-faceted, thorough and valuable an experience to the next generation of researchers, who will, hopefully pose research questions and pursue methods of analysis that will build on, extend and exceed those reported here.

Select References

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