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BOOK REVIEW

Cornaline de l'Inde. Des pratiques techniques de Cambay aux techno-systèmes de l'Indus. Edited by Valentine Roux. Paris: Éditions de la Maison des Sciences de l'Homme 2000, pp. 557 + XXVI, numerous illustrations and tables, CD presentation in back pocket.

Reviewed by Paul Barford

This elegant and well-produced work presents the results of a multidisciplinary study of the techniques of stone bead production in the city of Khambhat (Cambay) north of Bombay in Gujerat province, northwestern India. This area is the most extensive source in southwestern Asia of high quality carnelian and agate which has been used since the third millennium BC to make numerous objects such as beads, but also seals and weights. These precious objects have a wide distribution and have long attracted the attention of collectors and archaeologists. The beads produced in this area in the Harrappan period (*c.* 2500–2000 BC) include a number of exceptional size (some being up to 12 cm long) and include some with white etched lines on their faces and are clearly the products of specialist workshops. The production of these objects included their preliminary shaping by skilled knapping, and then the laborious process of grinding, perforation, and polishing. It is these techniques which are the main subject of this study.

In recent times, the bead manufacturies of the Khambhat area were producing annually millions of beads utilising craft techniques (first described in 1884) which seem likely to differ little from those in use in Antiquity, hence the concept of conducting field observations on the workshops producing these items in order to better understand the manner of production of the ancient examples. This study was conducted by the authors (mostly affiliated with the CNRS) in association with the French Indian Archaeological Mission and the Institut Français in Pondicherry in 1988–9 and 1992–3. In these fieldtrips, the authors examined the extraction, selection and preparation of the raw material, and its heat treatment (to improve knapping qualities but also to impart the desired red colour). The preliminary knapping was studied in detail, and the grinding and polishing of the beads as well as the perforation were observed. Special attention was paid not only to the equipment necessary but also the logistics of the processes and the levels of skill each implies. The manufacture of the beads is studied with the aim of measuring the skills implied by the various techniques by the application of a variety of scientific methods such as microscopy and rugosimetry. The interpretation of the evidence is carried out in accordance with the tenets of the French Logicist school and as such the authors declare the operations which they have applied to the various types of data produced by the different types of studies incorporated in this project to obtain their final interpretative propositions.

This study therefore goes beyond the mere technical details which are the usual products of such "ethnoarchaeological" studies. It is also much more than just a bead report. The aims of the study included the creation of knowledge of various aspects of bead production which would allow the interpretation of excavated finds, but also to study the dynamics of craft-development in the Indus valley in the third millennium BC. It is argued that the beads shed light on the groups which used them and in particular might reveal the relationship between the development of a craft industry and the elite class which had an interest in objects of value and prestige. The distribution of these beads reveals information on the dynamics of exchange networks with obvious significance for the development of the urban techno-economic system and the relationships between the Indus and Mesopotamian societies.

The book has four main sections. After the historical and ethnographic introduction (V. Roux) setting the recent production into its historical context (bead manufacture is attested by written records as early as the seventeenth century and the products were widely distributed between Indonesia and Africa), the first part (pp. 53–204) considers the characterisation and identification of manufacturing techniques. J. Pelegrin considers the knapping methods and techniques, this is followed by a chapter (F. d'Enrico, V. Roux and Y. Dumond) on the identification of techniques of finishing (polishing) of the beads by microscopic and rugosimetric methods (measurement of roughness). This is followed by a chapter (A. Sala and V. Roux, pp. 171–204) on the drilling of Harappan beads examined from the technical point of view, and note that some Harrappan chalcedony beads had perforations 12cm long. The material (ernestite) and geometry of the bits was a determining factor in the effective drilling of this comparatively hard stone. The second section (B. Bril, V. Roux and G. Dietrich) looks at the motor and cognitive characteristics of the skills involved in the knapping of chalcedony beads (pp. 207–339). The third part (P. Matarasso and V. Roux) considers the techno-economic system of carnelian bead manufacture, the modelling of complex systems by the analysis of activities (pp. 333–410). The fourth portion of the book contains three chapters which consider the archaeological applications of the collected data. The first (V. Roux and P. Matarasso) takes the field data collected in Cambay and applies it to the study of Harrappan beads, taking into account technical differences (for example in the manner of polishing). An attempt was made to calculate the representativeness of the excavated sample of beads of the total number produced, and it was calculated that the number of specialists involved in this activity was in reality very small, representing not so much an industry but an "*ad hoc* productive system responding to a limited demand (religious, elites, *etc.*)". This is followed by an account by Blanche Barthélemy de Saizieu (pp. 439–471) of the beads from the site at Nausharo in Baluchistan (Pakistan) examined from the same viewpoint, and takes a closer look at the micro-scale of the phenomenon studied globally in the previous chapter. The several qualities of beads observed were thought to represent several different production centres, with the very high quality products coming from a single specialist centre. Some beads were of local production, reflecting 'diverse demands, and by extension, diverse functions and destinations'. The final chapter (Marie-Louise Inizan, pp. 475–503) considers the importation of carnelian and agate items from the Indus to Mesopotamia, based on a study of material (2600 beads, seals and weights) from Susa (Iran) and Tello (Iraq) now in the Louvre. This collection includes the characteristic long Harrappan beads and also those with white lines on the faces. These objects are imports from the Indus region. Other (mostly crude disc-shaped) beads are the products of less specialised workshops using techniques which can be classified (using the data from the Cambay study) as less advanced and seem likely to be of more local manufacture (using carnelian and agate deposits in southwestern Afghanistan and smaller scattered deposits on the Iranian Plain and in the Elborz mountains, as well as the upper reaches of the Euphrates). The epilogue (V. Roux, pp. 503–518) recounts that a return visit in 1988 found that half of the workshops studied in the previous visits had gone out of use and the author reflects on the implications of the concentration of the field study on the technical aspects of bead production rather than their social context (she argues that the archaeoethnographic study of phenomena must identify those features which are not culture-specific).

The book is superbly illustrated by a series of exemplary and extremely attractive maps and drawings of the various processes and the equipment used of great interest to any interested in ancient technologies, there are also a number of scanning electron microphotographs of the results of the processes as well as excavated objects. There are also 24 colour plates showing the workshops and the types of beads discussed in the work. The volume is completed by a fifteen-page bibliography (in which one notes however the almost absolute predominance of references in French and English rather than any in the languages of the areas being studied). The chapters have either substantial English abstracts or are bilingual (in two columns), all the figures have both French and English captions.

Part of the discussion of the book (Introduction and epilogue) concentrates on the issue of the nature of ethnoarchaeological research. The preface of the book contains an essay (pp. XIII–XXVI) by Professor Jean-Claude Gardin in which in characteristic succinct and eloquent manner he covers a wide spectrum of issues connected with the relationship of different types of empirical observation involved in the creation of knowledge on the human past and the degree to which the book discussed here reflects the ideal of a well-conceived research programme. The book is an attempt to amalgamate the sort of work usually referred to as "archaeometry" (the application of pure science methodology to the study of ancient materials) and pure archaeology, the study of the social past. He notes that the questions asked concerning the mode of production of beads in the Indus civilization, numbers of craftsmen, degrees of specialisation, distribution of workshops are deceptively simple. The attempts to provide answers to these questions however have involved the designing of a series of carefully-designed technical studies reducing the attractive multicoloured objects into a number of alpha-numeric values which are then analysed by a variety of means.

In accordance with certain tendencies in the Logicist school, the book is also conceived as a contribution to the debate on the development of modes of publication as a consequence of the new information technologies (pp. 508-17). The editor of the volume, Valentine Roux has not only produced a publication which incorporates some of these new ideas and technologies, but attempts to make its content available in other forms than traditional discourse and in other media. A pocket in the back cover contains a CD-ROM (McIntosh and PC format); like the book it is bilingual. This sets out the main conclusions in the form of tabulated propositions and supporting arguments and data linked into a whole by hyperlinks. The four case studies (corpora) consist of Indus valley beads in general, cases studies of beads from the Harappan sites at Nausharo and Kalibangan and beads from Mesopotamia. The presentations are richly illustrated with colour photos (slide show) and linked hierarchically in a manner which provides a good introduction to the characteristics of the material being discussed and its archaeological context. The second part of the presentation consists of four reference bases concerning the rules of interpretation applied to the methods of manufacture presented in a similar manner. In this section there are a number of animations and films to explain the knapping, finishing and perforation techniques. This section is completed by a section on modelling the techno-system. This attractively-produced and relatively easily navigable CD provides both a summary of the conclusions volume as well as supplementing the material it contains in new media and provides a good illustration of the many advantages of this type of approach to the publication of the results of archaeological research.

The book is therefore not only of interest for the valuable insight it provides into the subject it directly concerns, but is an interesting addition to the growing number of works concerning the discussion on the manner in which archaeological data can be presented and used.