represent a conscious decision to preserve on the surface of the beads the different processes that brought them to life. This is reminiscent of the production and appearance of flint daggers at Neolithic Çatalhöyük (Nazaroff *et al.* 2016). Variation is also evident in the degree of wear exhibited in the anklet (22623.x5), which has a fresh appearance suggesting no or limited use prior to deposition, and anklet (22623.x3) as well as the carnelian bracelets that exhibit moderate degree of wear. Considering that both limestone and phyllite beads that form anklet (22623.x5) show the same degree of wear, we could associate this with confidence to the amount of time the anklet had been used before it was taken out of circulation and not to the effect weathering processes have on different raw materials. The fresh appearance of anklet (22623.x5) may suggest that this anklet did not see much use between the moment of its manufacture and the event of its deposition raising the possibility that its production may have been deliberately commissioned for the event of the burial. In that respect, the bracelets and anklets accompanying the interred in F.7714 can be perceived as an assemblage of materials of distinct origin and appearance, but also of technological skill and temporalities.

Research project:
Perforating prehistory: an experimental project investigating bead technologies at Neolithic Çatalhöyük

Matilda Siebrecht

Adopting an experimental perspective the research aim of the *Perforating Prehistory* project is to investigate the technological choices expressed in prehistoric bead-making and to consider how variability in raw material properties may have influenced the selection of techniques and tool-kits employed for the production of beads made from different materials (for example, whether bone and stone disc beads were created using a similar production process). While previous studies of the Çatalhöyük bead collections focused on individual raw materials (*cf.* Bains *et al.* 2013), this project looks across materials ––mainly bone and stone–– with the aim to shed light on crafting practices and the interconnectivity of materials and technologies. The project has received funding from the Catherine van Tussenbroek foundation, the Netherlands, the Prehistoric Society, UK (Research Fund), and the Leids Universiteit Fonds, Leiden University which facilitated three weeks of intensive study at the site of Çatalhöyük in July 2017 and the execution of a series of experiments replicating different bead production techniques.

Figure 4. *Experimental drilling.*

Prior to the on-site study of material at Çatalhöyük preliminary experiments were conducted using bone and different types of stone known to have been used by the inhabitants of Neolithic Çatalhöyük (Fig. 4). These materials were cut and drilled as part of a bead production process, using flint tools and different combinations of abrasive and lubricating additives such as water and sand. The experiments were designed to provide a better understanding of the properties of the tested materials in terms of workability (e.g., ease of cutting and drilling), but also to create a reference collection for the subsequent stage of microwear analysis identifying distinct microwear traces that could be associated with particular motions or materials.

Due to the large size of the Çatalhöyük bead assemblage material from priority units for the final publication volumes along with beads from occupational levels that were underrepresented during the previous round of publications were selected. This will enable the integration of results of the bead project with the studies conducted by other material specialists at Çatalhöyük. Analyzed material included finished beads, but also preforms and material from intermediate production stages. Technological analysis was conducted using a NIKON SMZ645 stereomicroscope under magnifications up to 50x, while dental silicone casts for study under metallographic microscopes were also taken.

Preliminary observations from the microwear analysis conducted on site suggest some variations in the treatment different materials received during production in terms of the perforation technique used, and the size and shape of the finished bead, particularly in disc beads, the most common type on site. This variation can be seen between bone and stone materials, but also within the stone bead sub-assemblage. Stone beads made from tufa, limestone, carnelian, and phyllite exhibit differences in perforation characteristics that seem to correlate to their raw material, such as type (biconical versus straight perforation), perforating angle in relation to the surface of the bead, amount of edge removals around the perforation, and entrance shape. For example, while all limestone and the majority of tufa beads have biconical perforations, the latter were not as misaligned and angled relatively to the bead surface as the limestone equivalents (Figs. 5 and 6). Carnelian beads (e.g. (22623.K2)) (Fig. 7), have more flake removals around the perforation and on the bead surfaces than tufa and limestone beads do. Similarly, many of the smaller phyllite beads tend to have more of a 'teardrop' shaped perforation, which may also relate to the degree of wear and the suspension method. One hypothesis for this variation is that it represents an intentional differentiation in the treatment of different materials during the bead-making process. The alternative hypothesis is that variation in the raw material properties resulted in these differences. Further experiments will be conducted to explore the reasons behind this variation.

Figure 5. *Limestone disc beads from (30038) exhibiting angled perforations.*

Figure 6. *Tufa disc beads from (30038) exhibiting straight perforations.*

Figure 7. *Carnelian beads 22623.k2 with visible flake removals around the perforation.*

Figure 8. *Examples of interlocking beads made from bone (left) and stone (right).*

When comparing stone and bone disc beads, clear differences could be seen in the average bead size, as well as the ratio of the perforation diameter compared to the bead diameter. Interlocking beads made from bone and stone (Fig. 8), however, indicate that at least for this bead type a similar production process has been used. Interlocking beads are mainly made from bone and have been carved from small pieces of much larger long bones (Faunal Team pers. comm.). Two finished interlocking beads made from stone were discovered in (20450), and preforms for the smaller interlocking beads were found in varying stages in both bone and stone, providing insights into the manufacturing process (Fig. 9). First, a long section of the chosen raw material was shaped into a thin, flattened cylinder/rod through grinding. This ground rod was then divided into sections—usually three according to the studied performs, although longer rods with more sections may have also been created—through the creation of deep grooves on the surface of the preform. The sectioned areas were then perforated and further shaped to create the characteristic dip evident in the finished beads, and the grooves were used to snap the rod into separate sections. These sections were then ground further to create the finished beads. Moreover, use-wear analysis of stone and bone interlocking beads suggests strong similarities in the way they were worn.

Through systematic experimentation the *Perforating Prehistory* project has the potential to broaden our understanding of how bead technologies were embedded in the wider social and technological developments the settlement of Neolithic Çatalhöyük witnessed in its long history and more broadly to enrich our understanding of prehistoric technological choices.

Figure 9. *Example of a preform for interlocking beads made from stone.*

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