Microtomography of a Palaeolithic Bead

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Introduction

In previous research on archaeological inventories from Upper Paleolithic Europe, the existence of weaving, basketry, and net making was documented to have occurred some 30,000 years ago. This evidence came from numerous impressions of these actual products in clay and on bone as well as from the depiction of these technologies on Upper Paleolithic imagery. Since prior information had suggested that weaving and basketry dated only to the Neolithic, these discoveries pushed back the antiquity of these technologies by at least 20,000 years.

These studies unambiguously showed that 30,000 years ago, the weavers and basket and net makers used a variety of plant materials to produce cordage and baskets. However, since we were working with impressions or depictions of these plant-based products rather than with the originals themselves, we were not able to state explicitly just what plants and woods were used. Although paleobotanical remains recovered from the European sites did offer a slew of potential candidates, including milkweed and nettle, we lacked direct evidence for this.

Soffer's cursory analysis of some dentalium beads taken with surrounding soil from the Brno II Upper Paleolithic burial site in Moravia, the Czech Republic, suggested that actual remains of string or cordage could be present inside the beads. The Brno II burial, which consists of the grave of a middle-aged male and an extremely rich collection of goods that includes more than 600 beads, engraved objects, and ivory figurines, has been radiocarbon-dated to about 25,000 years ago.

Methods and Materials

If we could determine that actual carbonized cordage still exists inside a few of these beads, we could study the actual cordage, rather than its impression, to identify just what plants were used to make it. In addition, and perhaps more importantly, state-of-the-art visual imaging via a computed tomography (CT) scan would permit us to study this specimen non-destructively. This was essential to because artifacts of such great antiquity are most rare, and extant study methods are destructive in nature.

The museum that owns the specimens specified that if any sample was taken, half would have to be preserved. This would be tricky because the beads are small: about 13 by 4.6 mm. Thus, our goal was to identify cordage by using imaging and computer enhancement prior to any destructive sampling.

Results and Discussion

Although preliminary examination and conventional CT scans made us fairly confident that cordage was present, the microtomography at the APS failed to clarify the images enough to be certain.

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