

10. Did Neanderthals make the Châtelperronian assemblage from La Grotte du Renne (Arcy-sur-Cure, France)?

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Abstract

Much debate has focused on the significance of the “modern” cultural elements found in European Late Middle Paleolithic (Châtelperronian, Uluzzian, and Szeletian) contexts. In light of evidence suggesting cultural interaction between the makers of these industries and the makers of the Aurignacian (presumably anatomically modern humans) it is imperative that the taxonomic affiliation of the hominins associated with these “transitional” industries be accurately identified. The fossil remains from the Châtelperronian levels (VIII-X) at the Grotte du Renne (Arcy-sur-Cure, France) comprise a series of isolated teeth, as well as a child’s temporal bone. While the temporal bone has been analyzed (and identified as having Neanderthal affinity), most of the 29 teeth from these levels have not been described. The Châtelperronian dental remains from the Grotte du Renne comprise both permanent and deciduous teeth. Fortunately, most are well preserved and relatively unworn. Simple dental dimensions are not particularly helpful in attempts to differentiate between Neanderthals and anatomically modern humans. The dimensions of the postcanine teeth in these two groups overlap completely. However, Neanderthals are known to have larger anterior teeth (on average), especially relative to their postcanine tooth size. Not surprisingly, we find that the crown dimensions for the postcanine teeth from the Grotte du Renne fall within the ranges of both hominin groups. The crown dimensions of the anterior teeth, however, strongly suggest that they belong to Neanderthal individuals. The buccolingual measurements of all but one tooth fall outside the range of Upper Paleolithic modern humans and

within the range of Neanderthals. Research by the first author has identified key dental morphological features that can be used to differentiate Neanderthals and anatomically modern humans. These key characters are found in the upper incisors, upper molars, P_4 and lower molars. Fortunately all but the upper molars are represented by the Châtelperronian remains at the Grotte du Renne. The strongly shoveled, labially convex lateral incisors with strong lingual tubercles, the asymmetrical P_4 with a strong, mesially placed metaconid and multiple lingual cusps, and the presence of the mid-trigonid crest on lower molars all point to a Neanderthal affinity of these individuals. In addition, the morphology of the deciduous teeth more closely resembles that of Neanderthals than it does that of anatomically modern humans. There is no single dental morphological character present exclusively in Neanderthals. Rather, it is the frequency with which certain characters occur and, more importantly, the combinations of morphological features that are important diagnostic tools. The distinctive combinations of features characteristic of Neanderthal teeth are all found in the Châtelperronian-associated teeth from the Grotte du Renne. Our analysis of both the permanent and deciduous teeth, therefore, is in agreement with the analysis of the temporal bone indicating the makers of the Châtelperronian at the Grotte du Renne were Neanderthals.

Introduction

The sites of Arcy-sur-Cure, located southeast of Paris in the Yonne department, consist of a network of caves carved out by the Cure River. These caves were excavated under the direction of André Leroi-Gourhan between 1946 and 1963 (Leroi-Gourhan, 1958, 1961). The Grande Grotte and the Grotte du Cheval are well known by Paleolithic art enthusiasts for their painted walls dating to between 24 and 32 ka. Other caves, the Grotte de l'Hyene, the Grotte du Renne and the Galerie Schoepflin, preserve evidence of Mousterian occupation, including fossils and/or artifacts.

The Grotte du Renne has been of particular interest because of the discovery of a Châtelperronian artifact assemblage, which is rich in bone tools and personal ornaments (d'Errico et al., 1998). Fourteen stratigraphic units were identified at the Grotte du Renne. The Châtelperronian artifacts are contained in three stratigraphic levels (VIII–X) that are sandwiched between an Aurignacian level (VII) and three Mousterian levels (XI–XIII). Gravettian levels (IV–VI) have also been identified (Figure 1). A child's temporal bone was recovered from the Châtelperronian level Xb, which has been dated by the ^{14}C method. If only the AMS dates are taken into consideration, the ages obtained are $33,820 \pm 720$ BP (OxA-3462), $34,450 \pm 750$ BP (OxA-8452/Ly-895)

and 33,400 (OxA-9122/Ly-1055) (David et al., 2001). An older date of $38,300 \pm 1300$ (OxA-8451/Ly-894) may result from a sample inversion (David et al., 2001). Although there has been some controversy regarding dates in the Arcy sequence where conventional ^{14}C dates show evidence of contamination (David et al., 2001; White, 2001), palynological and chronostratigraphical information, together with information from other Châtelperronian sites, suggests that the Châtelperronian began at the start of the des Cottés Interstadial (Interstade des Cottés), and lasted about 5000 years, which places it generally between 38,000 and 33,000 ^{14}C years BP.

Much debate has surrounded the significance of the Châtelperronian industry at Arcy-sur-Cure. Initially, conventional thought presumed that anatomically modern humans were the makers of the Châtelperronian, as well as of other early Upper Paleolithic-like assemblages. Doubts had already been raised about this view by Leroi-Gourhan himself, who claimed some teeth from Arcy could be non-modern (Leroi-Gourhan, 1958, 1961). After the discovery of a well-preserved partial Neanderthal skeleton clearly associated with the Châtelperronian at St. Césaire (Lévêque and Vandermeersch, 1980), attention turned to hypotheses regarding the explanation of Neanderthal remains with Upper Paleolithic artifacts. Several authors have supported the view that the cultural evolution of the very last