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## CHAPTER TWENTY ONE

# LATE MESOLITHIC NOTCHED BLADES FROM WESTERN EUROPE AND NORTH AFRICA: TECHNOLOGICAL AND FUNCTIONAL VARIABILITY

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### Abstract

During the 7th and 6th millenniums BC, major changes occurred over a widespread area in the lithic industries of the late Mesolithic. We focused our research on notched blades and bladelets knapped by pressure or indirect percussion. We managed to define this technical process by

showing that these notches result from voluntary retouch, with variability in retouch modes and in uses (different operating processes and worked materials). It is a simple technical concept, connected to the recurring mode of operation, but with varied functional purposes that comes out as a result of this survey carried out in France, Belgium, Spain, Morocco and Tunisia.

**Keywords:** Notched blades, late Mesolithic, experiments, retouch, scraping tools

## 1. Introduction

A wide technical change occurred during the 7th millennium BC amongst the Mesolithic groups in a large part of Europe and North Africa. Large and regular flint bladelets, removed by pressure or indirect percussion, became the basis of the lithic industries. They were transformed by retouch to produce two main tool types: geometric arrowheads (trapezes) and notched bladelets. The chronology of the expansion of these industries during the 7th and 6th Millenniums BC suggests that there is a shift from Mediterranean to Northern Europe (Perrin et al. 2009). Without any functional analysis, different hypotheses were proposed to explain the production and use of these notched blades: blank tools used to scrape wooden sticks in order to shape arrow shafts, the notches being created by the work itself (Rozoy 1978); tasks correlated with an intensification of plant processing (Rahmani and Lubell 2012). We began to explore this question in France and Belgium, as part of collective projects associating technologists and use-wear analysts (Gassin et al. 2013; Gassin et al. in press; Gueret in press). We recently enlarged our study with new sites in France, and with sites in Spain and Northern Africa, and we undertook a collective blind test in order to clarify our observation methods and our interpretation criteria.

## 2. Used notches: archaeological data set

We studied notched blades from 24 sites (Fig. 21-1), with a total of 175 used notched blades.

Notched blades are present in the majority of the late Mesolithic sites, but there are some exceptions, such as at the Castelnovian site of Châteauneuf-les-Martigues (Font des Pigeons). It is difficult to interpret differences in frequency, although we can suspect the existence of some functional variability amongst sites. For instance, notched blades represent

6% of the retouched tools at l'Essart (Marchand 2009), 31% at Dammartin-Marpain and 48% at Benàmer (Jover Maestre et al. 2012).

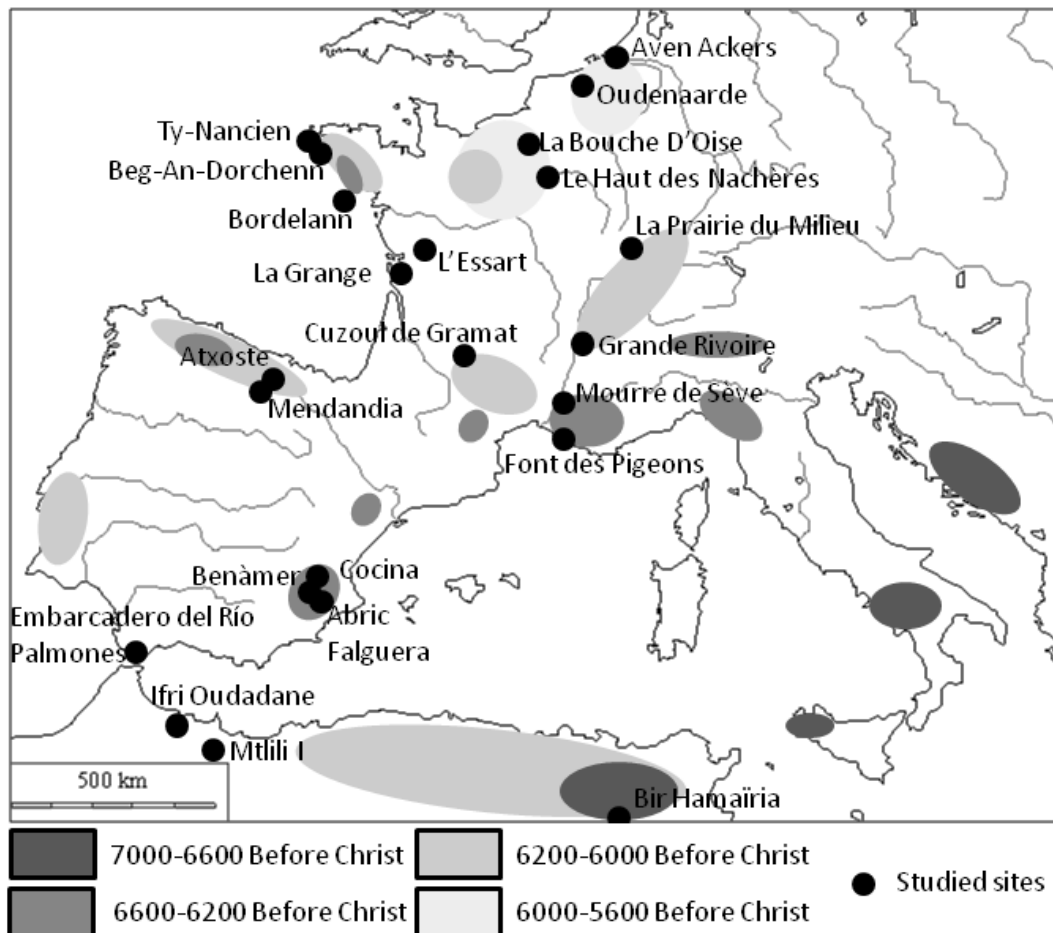


Fig. 1. Chronological stages of the spread of the blades and trapezes industries (from Perrin et alii, 2009).

Only a few notched flakes have been found (only one in Beg-an-Dorchenn, 4.2% of retouched tools of Benàmer). Notched or denticulated flakes are numerous at l'Essart, but most of them are Clactonian notches with a different shaping. These findings from l'Essart have not yet supported use-wear analysis, and the homogeneity of the layer is unknown. Notched blades are generally made on very regular blades. They are always on the dorsal face, except for a few blades from Cuzoul de Gramat. A large part of them only bears one or a few negatives in every notch; according to their morphology (no negative bulb, 90° fracture initiation), we interpret them as bending fractures, which can be produced when pressing the ventral face of the blade against a wooden cylinder. Less frequently, there is a superposition of negatives, which can result from the retouch against a harder wood or other material (hard animal

matter or harder material); it is more difficult to interpret the retouch technique. There can only be one notch, two opposed notches, creating a strangled blade (very frequent only in some Spanish sites, like in Benàmer, with 18% of the retouched tools, or Cocina), or numerous notches on both sides (up to 13 on a Capsian blade from Bir Hamāïria). Notches are sometimes very deep, considerably reducing the width of the blades, and, when there is a shift between left and right notches, the blade becomes sinuous. Most of them are clearly delimited, but in some instances, it is difficult to distinguish between contiguous notches and irregular continuous retouch.

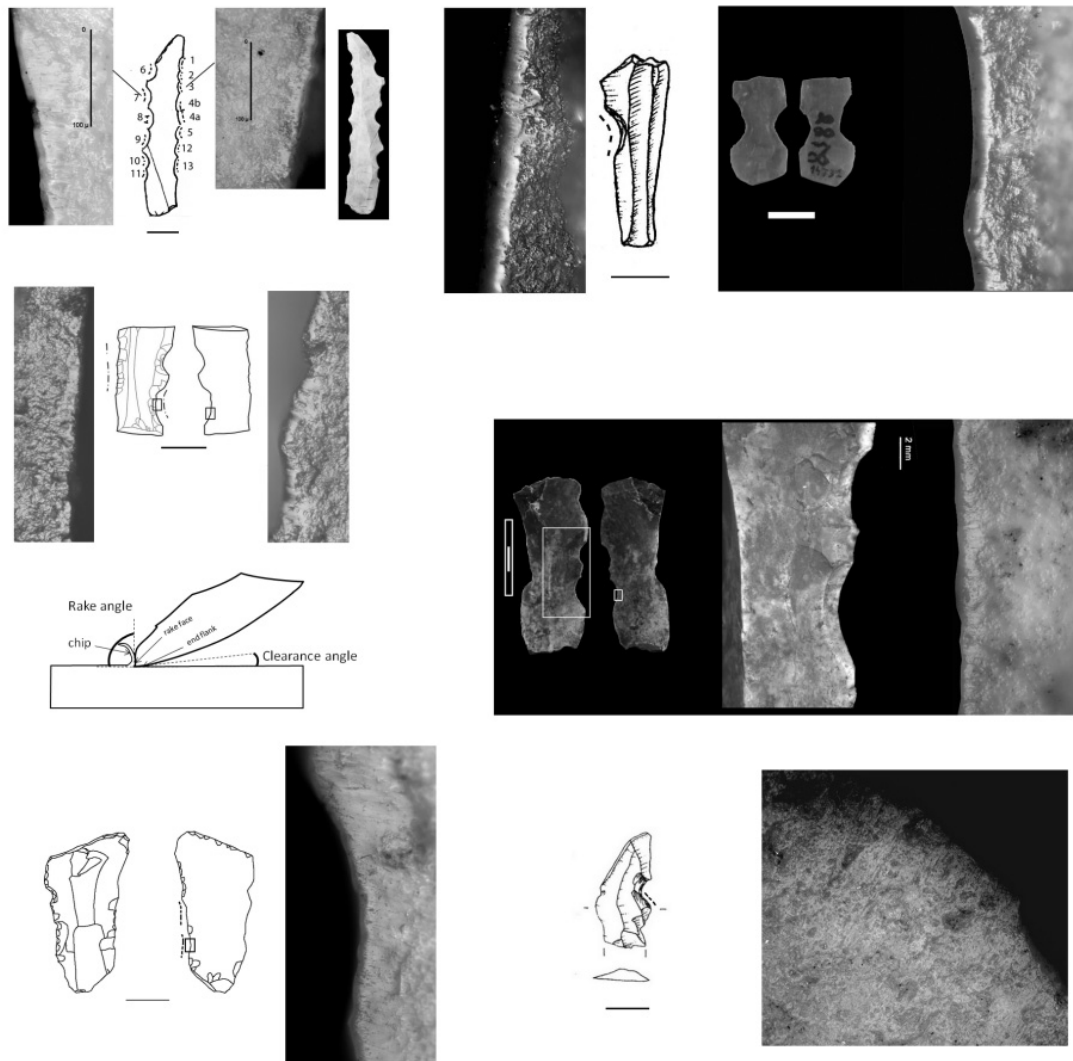


Fig. 2. Notched blades. 1: Bir Hamāïria (wood / plant?). 2: Benàmer (wood / bone?). 3: Cocina (bone?). 4: Cuzoul de Gramat (wood?). 5: Ifri Oudadane (bone?). 6: position of the tools during the work. 7: Beg-an-Dorchenn (plant?). 8: Beg-an-Dorchenn (fibrous plant?). All microscope photographs taken at 200 x, excepted 2 (400 x). Scales in cm. All photographs on the ventral face.

### **3. Use-wear observations and interpretations**

#### **3.1 A single way of use**

In the new sites of our corpus, we found the same use as in the previously studied samples. The used zones are always the concave part of the notches. Edge damage is very limited or absent (see *infra*). The polish is always dissymmetric, with a bevel on the ventral face, characterized by a compact domed polish: on the retouched dorsal face, the polish is sometimes weaker, sometimes compact and shiny. This dissymmetry results from a negative rake-cutting of different materials. The end flank is always the ventral face; the dorsal face is the rake face, with a rake angle near 90°.

#### **3.2 Voluntariness of the retouch**

The scars shaping the notches cannot, according to our experiments, result from the scraping process itself. A scraping motion with the ventral face as a rake face would produce similar notches, but a different distribution of use polishes (the bevel would be on the dorsal retouched face). A positive rake scraping motion, with a blank blade presenting initially an acute edge angle, and the ventral face as end flank, produces damage scars which only partially match the patterns observed on archaeological tools. Scraping soft wood produces short bifacial scars; scraping hard wood, during intensive work, produces large bending fractures, most of them on the dorsal face, but this edge damage does not create regular notches. Only a few blades (those with irregular retouch) in our Mesolithic corpus could match this use process. So, we think that the notches are the result of a voluntary retouch, creating a very short concave active zone with a robust straight angle edge.

#### **3.3 Different worked materials**

Some notches bear on the dorsal face a bright smooth polish, and on the ventral face either an invasive pitted and striated polish or a smooth polish with few striations; they could have been used to work certain plant materials. On other notches, polish on the ventral face is limited to a band along the edge, creating a domed bevel, with some striations. On the retouched dorsal face, the polish is not very developed. These notches have probably been used to scrape wood or rigid plants. Some notches with a rather flat bevel on the ventral face, with some striations and

microfractures, could have been used to scrape bone or antler. Different uses are associated in most sites, if there are enough analyzed tools to observe this diversity.

#### 4. Discussion

It is often difficult to establish the exact nature of the worked material, because of the overlaps between use-wear traces. A collective blind test performed in Barcelona in October 2012 allowed greater care to be taken with our interpretations, as we saw some mistakes while interpreting experimental tools used to work wood. Our interpretative abilities are also limited by a short number of experiments with plant working. So we have to improve our knowledge basis with new experiments involving the use of notched blades to process plant materials.

We are sure now that these phenomena—retouching regular blades, via bending fracture or other retouch techniques in order to shape notches, used to scrape different materials—has some consistency, as we have found similar used notched blades in almost all studied sites from the late Mesolithic. The recurrent choice of regular blades, and the scarcity or absence of notched flakes or flakes with naturally straight angle edges used to scrape the same materials (but this is still to be demonstrated on a larger sample), point to a well-established technical tradition. However, we know that these notched blades are absent from Font des Pigeons—Châteauneuf-lès-Martigues; they are probably absent in other sites which are yet to be analysed, such as Lallo in the Rhône Valley. In the sites with notched blades, some differences can be seen: for instance, the strangled blades are numerous in Spanish sites only. What is the meaning of these differences? One difference could be stylistic/cultural (strangled blades?), and the other is maybe functional (Font-des-Pigeons?).

Making notches to scrape different materials does not need a high level of know-how, and has probably been invented independently in several places and times. For instance, a few notched blades used to scrape bone or silica rich plants are known in the Middle Neolithic of Southern France and Eastern of Spain; but it is not a systematic way of doing things, unlike the burins in the Chasséen of Southern France. Making direct notches on regular blades, as the dominant tools in the lithic industries, is quite different. Is it a distinctive feature of late Mesolithic, or is there some continuity with previous or later cultures? The lithic industries from earlier Mesolithic sites (early or middle Mesolithic, particularly Sauveterrian) comprise a few notched blades used to scrape bone or antler, wood or plants, as in Vionaz in Switzerland (Pignat and Plisson 2000), Fontfaurès,

L'Abeurador, Balma Margineda in SouthWestern France (Philibert 2002), Le Sansonnet, Pey de Durance (Provence), Baume d'Ogens, Château d'Oex (Switzerland) (Khedhaier 2003), or in some "muescas y denticulados" sites from Spain like in Collado (Alicante). None have been found in Northern France and Belgium. Some early Neolithic sites, like Mendandia and Atxoste in the Basque country (Alday et al. 2012), and Peiro Signado in Languedoc (Philibert, this volume), show a few notched blades used to scrape different materials. However, we think that more similarities are needed to suspect some continuity or some heritage of a traditional way of doing things.

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