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The Pointe de Saint-Colomban site (Carnac, France): redefinition of the Colombanian culture, in the framework of the European Acheuleans

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ABSTRACT
The technocomplexes of the European Lower Palaeolithic are often attributed to the so-called Acheulean. Through several prehistoric sites located in the South Armorican coast, a distinct and contemporary Acheulean cultural facies was proposed at the end of the 1980s. Based on the study of lithic industries at the Pointe de Saint-Colomban site in Carnac, it is called "Colombanian" and is characterised by the coexistence of macro-tools on pebbles and a variety of small tools on flakes. As is often the case, the presence or absence of handaxes is a determining criterion to qualify a lithic assemblage as "Acheulean". However, this categorial attribution loses all meaning when a technological analysis is conducted. Consequently, we used a techno-structural approach to illustrate the technological and functional variability of lithic artefacts from the early occupations of the Pointe de Saint-Colomban site (layers 5, 6 and 7). The application of the "chaîne opératoire" principle allowed us to reveal the processes and objectives of the lithic production system and to establish a homogeneous reading grid among the different pieces of the assemblage. We present here the data from our study which clearly shows that the "Colombanian" is no longer valid and that we need to initiate a change of definition. The lithic industry of the Pointe de Saint-Colomban site is dominated by the concept of flaking (débitage) represented by numerous cores and flake tools. The concept of shaping (façonnage) is illustrated by only two sandstone pebble tools. All this highlights the diversity and originality of the lithic technical systems of the Lower Palaeolithic of the Atlantic Armorican coastline.

KEY WORDS
Western Europe, middle Pleistocene, lithic technology, technical diversity, Colombanian culture.

RÉSUMÉ

Le site de la Pointe de Saint-Colomban (Carnac, France) : proposition de redéfinition du « Colombanien » au sein des Acheuléens européens.

Les technocomplexes du Paléolithique ancien européen sont souvent attribués à ce que l'on nomme « Acheuléen ». À travers plusieurs sites préhistoriques situés sur la côte sud-armoricaine, un faciès culturel distinct et contemporain de l'Acheuléen a été proposé à la fin des années 1980. Basé sur l'étude des industries lithiques du site de la Pointe de Saint-Colomban à Carnac, il se nomme « Colombanien » et se caractérise par la coexistence de macro-outils sur galet et d'une diversité de petits outils sur éclat. Comme souvent, la présence ou l'absence de pièces bifaciales est un critère déterminant pour qualifier un assemblage lithique d'Acheuléen. Cependant, cette attribution typologique perd tout son sens lorsque l'on mène une analyse technologique. Par conséquent, nous avons employé une approche techno-structurelle afin d'illustrer la variabilité technologique et de fonctionnement des artefacts lithiques des occupations anciennes du site de la Pointe de Saint-Colomban (couches 5, 6 et 7). L'application du principe de la chaîne opératoire nous a permis de révéler les processus et les objectifs du système de production lithique et d'établir une grille de lecture homogène entre les différentes pièces de l'assemblage. Nous présentons ici les données de notre étude qui montrent clairement que le « Colombanien » n'est plus valable et qu'il nous faut amorcer un changement de paradigme. L'industrie lithique du site de la Pointe de Saint-Colomban est dominée par le concept de débitage représenté par de nombreux nucléus et d'outils sur éclat. Le concept de façonnage est illustré par seulement deux outils sur galet en grès. Tout cela met en lumière la diversité et l'originalité des systèmes techniques lithiques du Paléolithique ancien de la façade atlantique armoricaine.

MOTS CLÉS
Europe de l'Ouest, Pléistocène moyen, technologie lithique, diversité technique, Colombanien.

INTRODUCTION

The unity and diversity of technical expressions of the so-called "Acheulean" in Western Europe is a much debated subject (Villa 1981; Tuffreau 2004; Santonja & Villa 2006; Nicoud 2011; Rocca 2013; Moncel *et al.* 2018). The first part of the Middle Pleistocene (MIS 16 to 9, i.e., approximately 676-300 ka before present) was marked by the emergence of a great variability of industrial assemblages. These are characterised by lithic series illustrating the exploitation of various environmental resources as well as the technical diversity of the populations through the lithic production. Since the first definition of the Acheulean technocomplex (Mortillet 1872) based on knapped stone industries found in the alluvial deposits of the Quaternary terraces of the Somme, its categorial meaning has changed very little despite the many paradigm shifts. The Acheulean is typologically characterised by the presence of macro-tools (handaxes, cleavers, picks, etc.) and a diversity of flake tools (scrapers, notches and denticulates) (Tuffreau 2004). Current research (Nicoud 2013; Rocca *et al.* 2016; Moncel *et al.* 2018; Méndez-Quintas *et al.* 2020; Ashton & Davis 2021; Capellari *et al.* 2021) combined with the rise of technological approaches (Dauvois 1976; Tixier *et al.* 1980; Geneste 1991; Boëda 1992, 2001, 2013; Lepot 1993) enhance the impression of a diversity of technical systems in the Lower Palaeolithic in Europe with numerous qualitative and quantitative changes in the stone tools.

Among the markers of this technical heterogeneity, several sites located on the Atlantic coastline of Brittany present singular technological assemblages in a coastal context organised around a dichotomy of raw material exploitation (Monnier & Le Cloirec 1979, 1985; Monnier 1980, 1981, 1982, 1983; Monnier *et al.* 2001, 2016; Ravon 2017a, b, 2019). The flaking scheme uses flint cobbles for the creation of flakes and small flake tools. The shaping scheme is materialised by the use of cobbles from more gritty rocks such as sandstone and sandstone-quartzite. From a categorical point of view (Bordes 1950, 1961), the lithic industry is represented by the association of small flake tools, a relatively large presence of macro-tools on pebbles and the absence of handaxes. This observation, identified in the early 1980s at the Pointe de Saint-Colomban site (Carnac, Morbihan), led to the creation of a cultural facies called "Colombanian" (Monnier & Molines 1993). Two salvage excavation campaigns were necessary to exhume several thousand remains of stone industries attributed to the Lower and Middle Palaeolithic that were discovered on a beach of hte Bay of Quiberon (Monnier & Le Cloirec 1985; Ravon 2017b). The chronostratigraphic sequence is articulated around five main levels (US 3 to 7). Layers 3 and 4 are attributed to the Middle Palaeolithic and layers 5, 6 and 7 to the Lower Palaeolithic. This distinction is based on a morphological classification of the lithic series from this site. The Colombanian facies as defined by J.-L. Monnier in the early 1980s is positioned as a cultural phenomenon contemporary with the Acheulean technocomplex. Since then, the thesis work of A.-L. Ravon (2017b) questioned this proposal while retaining some of its aspects, and in particular the presence of two technical traditions on the South Armorican coastline represented by populations that would have the bifacial technology and others that would not. In this article we will present a technological reappraisal of the Colombanian assemblage following a systemic perspective (Von Bertalanffy *et al.* 1973; Boëda 2013).

Fig. 1. — Location of the Pointe de Saint-Colomban site and the main sites mentioned. Source: géoportail, modified.

Abbreviations

ESR	electronic spin resonance;
IRSL	infrared stimulated luminescence;
SSDA	"système par surface de débitage alternée" (alternating platform system);
TFU-TC	Techno-Functional Units of Transformative Contact;
UTF-CT	"unités techno-fonctionnelles de contact transformatif".

THE POINTE DE SAINT-COLOMBAN SITE

Location of the site and its environmental context

The Pointe de Saint-Colomban open-air site (47°33'54.34"N, 3°5'51.24"W) is located near the town of Carnac, in the Morbihan department, 27 km south-west of the town of Vannes (Morbihan, France). The deposit is more precisely located at the place called "Pointe de Saint-Colomban" or "Pointe Keller" south of the beach of Saint-Colomban (Fig. 1). It is located in a marine erosion corridor at the bottom of an approximately 3 m high cliff (Monnier 1982). Facing south-west, the site is framed by two rocky points 40 m apart, and opens onto Quiberon Bay to the south of the Anse du Pô. The first human occupations were settled on an ancient sandy beach (layer 7) which rests on a granitic platform covered with large blocks and pebbles (Morzadec-Kerfourn & Monnier 1982). Excavations undertaken as part of a salvage operation in the early 1980s covered an area of 57 m². The actual surface area of the site is probably larger, since elements were discovered in the cliff cut above the excavated area (Monnier 1982; Monnier & Le Cloirec 1985).

History of excavation and research

"Archaic" industries on pebbles have been known for a long time in the Saint-Colomban sector, since they were reported at the end of the 19th century by Abbé Collet (Collet 1888), then at the end of the 1950s by J.-C. Sicard in an article entitled "Le Chelléo-acheuléen et Levalloisien de Saint-Colomban en Carnac" (Sicard 1957), who reports a bifacial piece "knapped on pebbles, with large removals, without secondary retouching, which was brought closer to the Early Acheulean" (Monnier & Le Cloirec 1985). At the end of the 1970s, Robert Le Cloirec, keeper of the Carnac Prehistory Museum, discovered a more important deposit at the Pointe de Saint-Colomban, nestled in a marine erosion corridor, on a fossil beach (Monnier & Le Cloirec 1979; Monnier 1983). A dig was then carried out in 1978 by Jean-Laurent Monnier who was pursuing his doctoral thesis on: "the Palaeolithic of Brittany in its geological setting" at the Laboratory of Anthropology, Prehistory, Protohistory and Quaternary of the University of Rennes I (Monnier 1980), and confirmed the potential of the site. Following this first operation, two campaigns of programmed salvage excavations took place between 1981 and 1982. These two excavation campaigns only uncovered numerous remains of lithic industries related to the Lower and Middle Palaeolithic from layers 3, 4 and 6 (Table 1). The azoic soil and the taphonomic processes did not allow the conservation of faunal remains in particular. Furthermore, the chronostratigraphic setting is established on the basis of geological correlations with reference coastal sections (Giot & Monnier 1972; Morzadec-Kerfourn & Monnier 1982) and sedimentological studies, in particular

Table 1. — Main categories of artifacts discovered in 1981-1982 (layers 5, 6 and 7).

Year of excavation	Number of artifacts by category								References
	Flakes	Flake tools	Pebble tools	Cores	Tested pebbles	Fragments	Hammerstones	Total	
1981-1982	2709	221	68	200	173	2545	16	5932	Monnier 1981, 1982

through granulometric and morphoscopic analyses of marine sand grains (Monnier & Le Cloirec 1985). A chronostratigraphic attribution based on these criteria proposes a deposition of the paleo-beach between the end of the Holsteinian interglacial (MIS 11-9) and the beginning of the following glacial period (MIS 8). In this context, the first occupations (layer 6) would have been installed at the foot of a cliff rising up to 12 m above a vast plain exuded by the major marine regression of the early Saalian glacial period (Monnier 1982).

The three individual archaeological layers (3, 4 and 6) did not have the same post-depositional history. Indeed, field observations showed that the artefacts of layers 3 and 4 had probably been slightly displaced by the action of solifluction (Monnier & Le Cloirec 1985). This process is illustrated by the numerous fillings that make up these two stratigraphic units and by the position of the artefacts within these levels. The archaeological finds from layer 6 are found on a fossil marine beach that was deposited on an ancient shingle bar. Unlike the industries of the upper layers (3 and 4), the pieces attributed to the Lower Palaeolithic have a yellowish-grey patina and sometimes an eolian bluntness.

The lithic series from the Pointe de Saint-Colomban studied according to typo-morphometric approaches (Monnier 1982, 1983; Monnier & Le Cloirec 1985; Monnier & Molines 1993; Molines 1999; Gallou 2017; Ravon 2017b) have made it possible to highlight typological groups made up of choppers, flake tools (scrapers, denticulates and notches), cores, tested pebbles, hammerstones and fragments (Table 1). On the basis of the artifacts of layer 6, characterised by the abundant presence of pebble tools associated with small flake tools, J.-L. Monnier proposes the creation of a regional cultural facies called "Colombanian" (Monnier & Molines 1993; Monnier 1996; Molines 1999; Molines *et al.* 2005). He specifies that this cultural phenomenon co-exists with the Acheulean technocomplex, with handaxes and flake tools, in the west of France and that it is located preferentially on coastal sites in the marine erosion corridors of the South Armorican shoreline. Recent academic work has re-examined these collections following a typo-technological approach (Gallou 2017; Ravon 2017b). Thus, A.-L. Ravon's doctoral thesis on Lower Palaeolithic industries calls into question the "Colombanian". This is no longer considered as a cultural facies but as a local adaptation of populations to the coastal environment. Two distinct operational sequences are identified: the shaping of tools on sandstone pebbles and the knapping of flake tools from small flint and quartz cobbles. These categorical and techno-economic characteristics are shared with the occupations of layers 8b and 7 of the emblematic site of Menez-Dregan I (Plouhinec, Finistère).

Here, we will proceed for the first time to a techno-morpho-functional re-reading (Boëda 1992, 2001, 2013; Lepot 1993) of the material from layers 5, 6 and 7 corresponding to a single occupation (n = 1024). This theoretical and methodological approach should allow us to study technical intentions through the study of lithic industries. The structure of the artifacts is analysed from a production and functional perspective according to the principle of "chaîne opératoire" (Leroi-Gourhan 1964; Tixier *et al.* 1980).

Stratigraphy and chronology

The dig carried out in September 1978, the two excavations in the early 1980s (Monnier 1981, 1982) and the laboratory work have shown that the Pointe de Saint-Colomban site is organised around a stratigraphy with a total thickness of about 3 m. The stratigraphic sequence is broken down into seven layers (Fig. 2), although the excavation operations that took place on the foreshore only allowed us to observe layers 3 to 7.

Following the order of deposition, layer 7 corresponds to an ancient beach composed of a very hardened reddish-brown compact sand resting on a bed of large pebbles (Fig. 1). Layer 6, with an average thickness of 0.65 m, is equivalent to the first level of human occupation and has a sedimentary composition similar to the previous layer, with reddish-brown sand that is not very hardened. Layer 5 is only present in the form of a flap of about 15 cm and corresponds to a paleosol represented by brownish-black friable sand. Layer 4, the second level to have yielded lithic industries, is in the form of a head with a sandy matrix and has a lens structure resulting from the reworking of the underlying sandy horizons. Layer 3 corresponds to the last level of occupation of the site and consists of a thick coarse head, up to 2 m, with a yellow sandy matrix punctuated by hardened beds of bright brown sandy material. Layer 2, in contrast to levels 3 and 4, has a relatively constant thickness of about 1 meter. From a sedimentological point of view, it is composed of a fairly compact, dull orange-yellow arenaceous silt that rests on a bed of large granite blocks. Finally, layer 1, 0.25 cm thick, consists of a bedded arenaceous sediment which rests on a discontinuous bed of blocks and stones at the base (Monnier 1982; Monnier & Le Cloirec 1985).

Chronostratigraphic interpretations resulting from sedimentological analyses (grain size and morphoscopy) and stratigraphic correlations have accepted that the ancient beach was deposited during a temperate interglacial phase related to the Holsteinian (MIS 11-9). A marine regression marked by the deposition of a sandy barrier beach (layer 7) most probably indicates the beginning of a cold phase and seems to be the equivalent of the Langueux Formation (Morzadec-Kerfourn & Monnier 1982; Van Vliet-Lanoë *et al.* 1997).

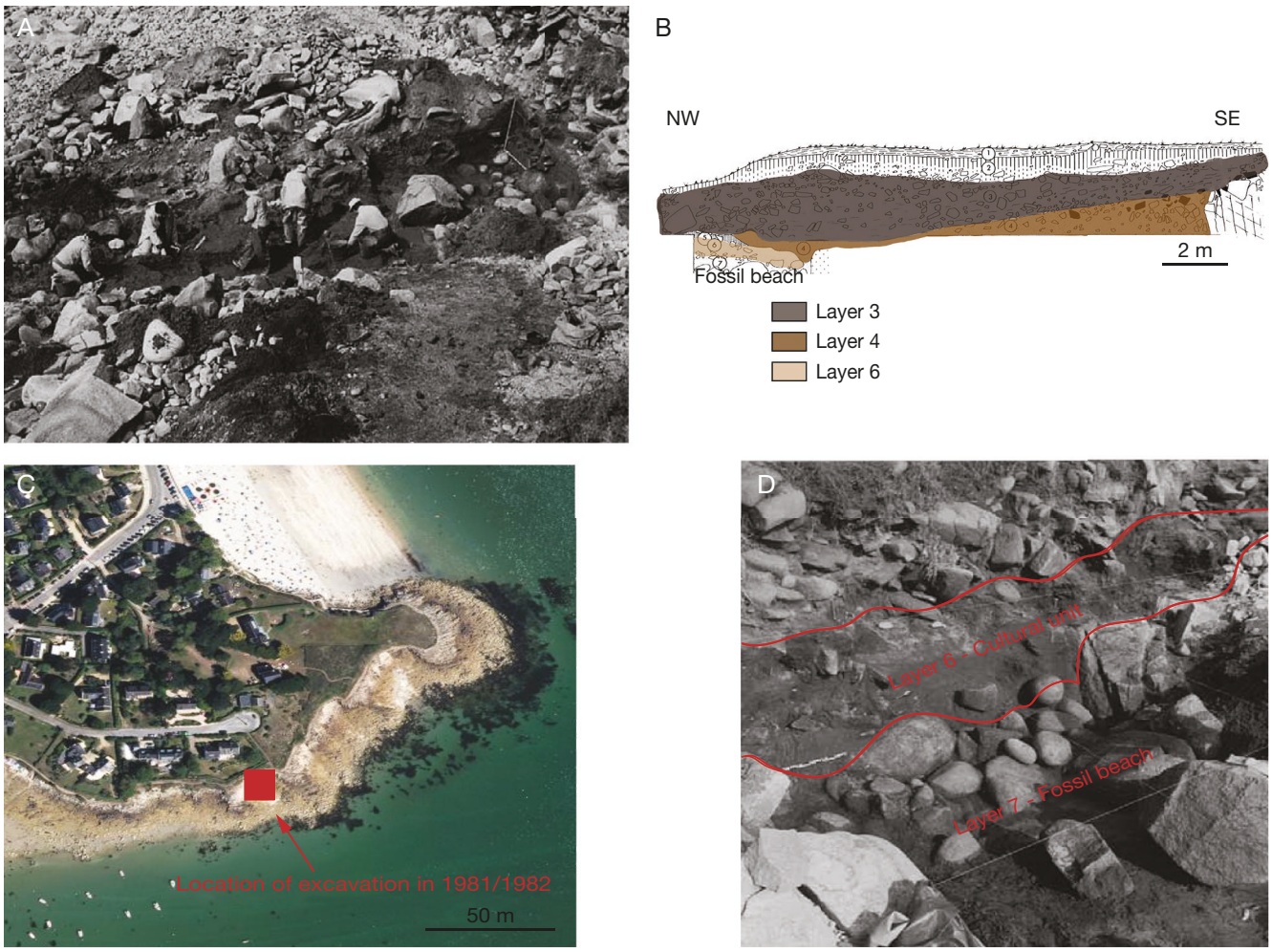

Fig. 2. — Excavation and stratigraphy of the Pointe de Saint-Colomban site: **A**, site being excavated at the bottom of the cliff in 1982; **B**, stratigraphy of the Pointe de Saint-Colomban at the end of the 1982 excavation; **C**, location and surface of the excavation on the foreshore between 1981 and 1982; **D**, squares G13, H13, I13 and J13 after the 1982 excavation. Credits: A, D, J.-L. Monnier, modified; B, modified after Monnier 1982; C, CAD J. Guibert; J.-L. Monnier, modified.

This glacial phase would have continued during the first occupation of the site (layer 6) and would be correlated with the Nantois Formation dated to the beginning of MIS 10. Then, between layers 5 and 4, an important erosive phase would have created a sedimentary and temporal hiatus until the beginning of layer 4. Layers 4 and 3 would be the markers of the Saalian glaciation (MIS 8-6). Finally, layer 2 would express a cold maximum with the presence of loessic periglacial material in the sedimentary unit (Monnier & Le Cloirec 1985).

Lithic material of this study

The lithic material for this study is kept by the Carnac Museum of Prehistory, which serves as a repository for the Pointe de Saint-Colomban site collections. We worked on a total of 1024 pieces, some of which came from layer 5 (n = 7) and others from layer 7 (n = 61). Nevertheless, given their position within the stratigraphic unit, their patina and their technical aspect, we will study them together with the pieces from layer 6 (n = 956), which is considered to be the only level of occupation of the lower layers (Monnier & Le Cloirec 1985; Monnier & Molines 1993). From a quantitative aspect, there are many fragments, debris and flakes which represent 65 % of the total of the assemblage. The tools are almost exclusively on flakes and several cores are present (Fig. 3). In contrast to previous studies on this material, only two pebble tools were identified.

TECHNOLOGICAL ANALYSIS OF THE LITHIC ASSEMBLAGE

The taphonomic aspect of the series studied is rather good and is expressed through the presence of a light yellowish-grey patina, good preservation of the edge threads and the edges of the industries which do not prevent a good technological reading. These observations point to a low level of remobilisation of the artefacts and argue in support of an assemblage in a primary position. The raw materials chosen for lithic production can be divided into two main groups. Firstly, small marine flint cobbles (64%) are selected from beaches near the site. Secondly, more massive pebbles, mainly quartz (27%), quartzite (4%) and sandstone (2%), are also collected from the surrounding shingle bars.

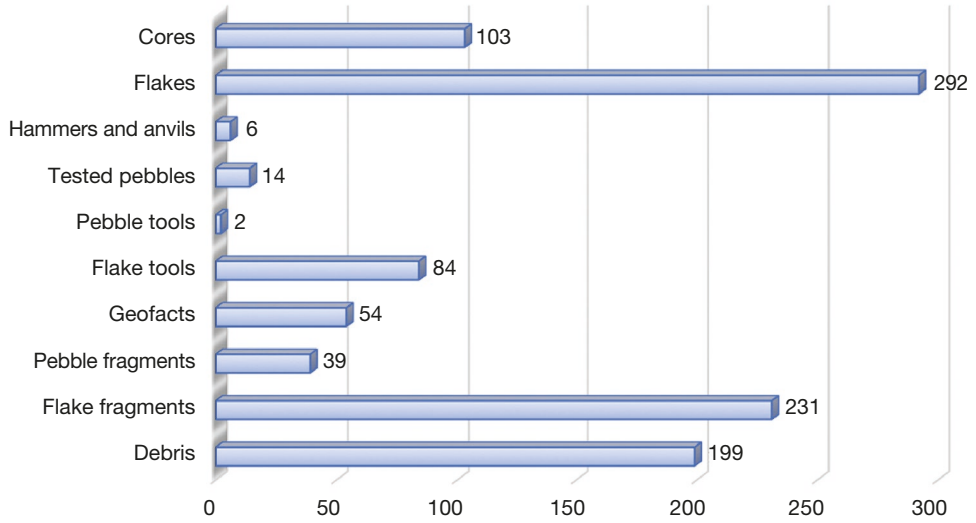

Fig. 3. — Counting of the studied pieces of the Pointe de Saint-Colomban site according to their technical category and their quantity.

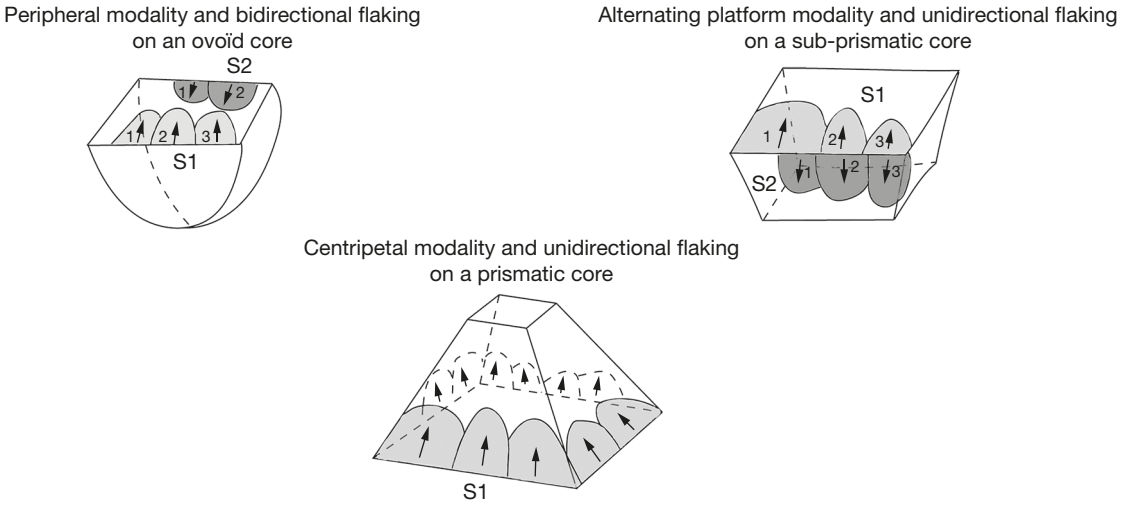

Fig. 4. — Sketch of the three different modalities of core exploitation of the Pointe de Saint-Colomban site.

Some other raw materials are also used in small proportions, such as microgranite, limestone or adinole (Table 2).

The technological analysis of this series reveals that the lithic production of the Pointe de Saint-Colomban site is mainly oriented towards a flaking concept represented by a diversity of flake tools. The small flint and quartz cobbles are used extensively for the creation of tool supports. This diversity is expressed through the five techno-types of flake tools identified. The flaking scheme begins with the selection of cobbles that possess morphological characteristics and a volumetric structure in accordance with the artisan intentions, which Boëda (Boëda & Ramos 2017; Boëda *et al.* 2021) calls "affordance". This term "refers to the selection of techno-functional criteria naturally present in the initial block and which will be maintained in the final product" (Boëda *et al.* 2021). After the selection of the matrices, the debitage is structured around different modalities in order to make the best use of the raw materials. Moreover, the shaping pattern is only represented by the presence of two sandstone pebble tools (Table 2).

In accordance with the dynamic and structural reading of prehistoric lithic industries (Dauvois 1976; Tixier *et al.* 1980; Geneste 1991) but also with the "artisanal" approach of the tool proposed by Lepot (1993) and Boëda (1992, 2001, 2013), we will discuss the lithic artifacts of this series according to qualitative and quantitative criteria. The study of the function of the tools will be carried out by highlighting the Techno-Functional Units of Transformative Contact (TFU-TC) or called in French "Unités Techno-Fonctionnelles de Contact Transformatif (UTF-CT)", which will allow us to describe the active cutting parts morpho-structurally.

Cores and production scheme

The flaking scheme is represented by a total of 103 cores and several hundred flakes, flake fragments and debris (Fig. 3).

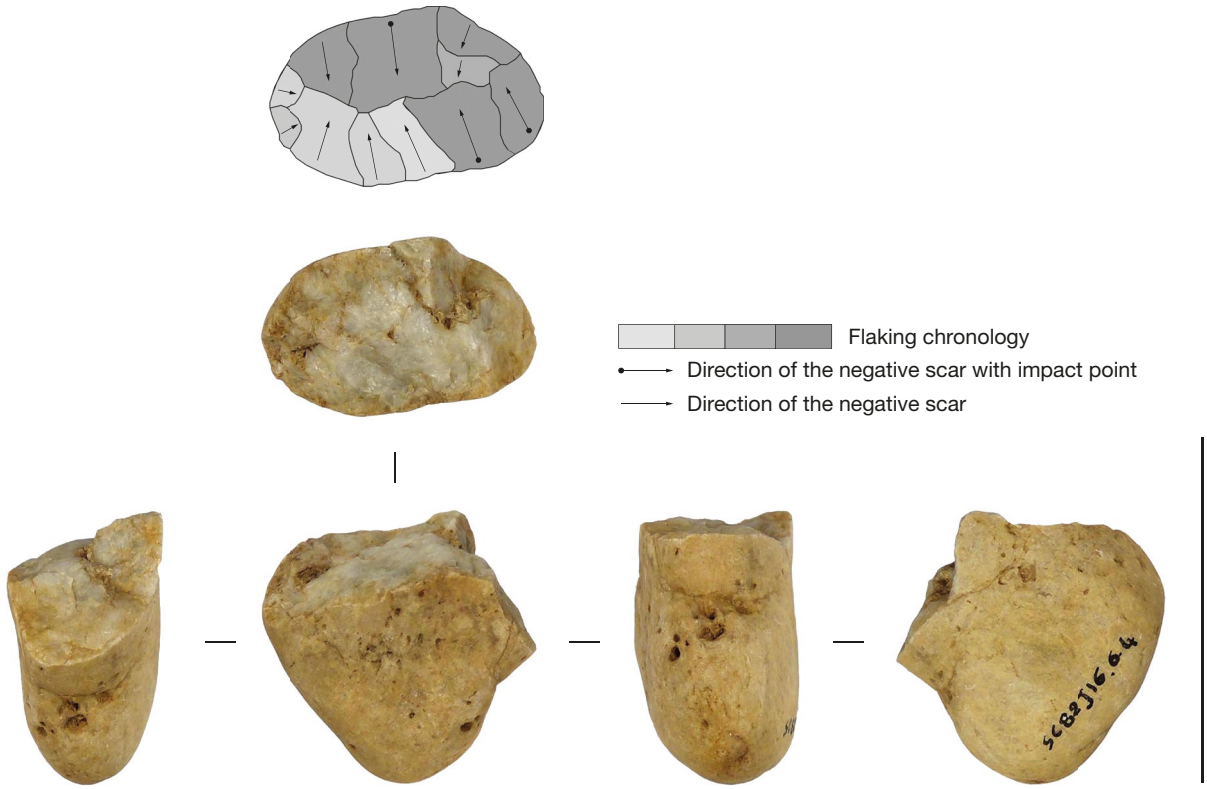

FIG. 5. — Peripheral exploitation of an ovoid core (no. SC82.J16.6.4). **Arrows**, negative scars orientation. Scale bar: 5 cm.

TABLE 2. — Lithic tools groups from La Pointe de Saint-Colomban site.

Category of raw material	Techno-types of tools	Number (%)	Total
Flint/quartz cobbles or pebbles	Group 1: Flake tools with transversal cutting edge	7 (8%)	84
	Group 2: Side scrapers	12 (14%)	
	Group 3: Side denticulate	36 (42%)	
	Group 4: Side notches	16 (19%)	
	Group 5: Flake tools with a cutting edge-point	13 (15%)	
Sandstone pebbles	Group 6: End choppers	2 (2%)	2
Total			86

The exploitation of the useful volumes of the flaking matrices is organised around a method with a series of recurrent removals per useful volume (Boëda 2013) and following different modalities (peripheral, alternating platform and centripetal). Through our analysis, we described for each piece, its morphology in three dimensions (frontal, transversal and sagittal), the type of support (pebble, cobble, flake, block and other), the nature of the section of the matrices (convex, plano-convex, abrupt and secant), the number of removals per cores and the presence or absence of a potentially useful cutting edge (indication of a functionality). From these observations we know that the morphologies of the selected matrices are mainly quadrangular (57%), ovoid (41%) and slightly triangular (2%). The selection of supports is structured around two main types: cobbles (43%) and pebbles (42%). In addition, the nature of the cross-section of the matrices is predominantly secant (54%) but also plano-convex (36%) and abrupt (10%). The average number of removals per core is about five flakes and none of the production matrices has a cutting part. Finally, the methods of exploitation are distributed as follows: peripheral (44%), alternating platform (43%) and centripetal (13%).

In the following sections, we will illustrate the different methods of exploitation of these raw materials.

Peripheral modality (n = 45)

This modality of exploitation is one of the most represented within the cores of the ancient lithic series of the Pointe de Saint-Colomban. It is characterised by the selection of small (48 mm long, 37 mm wide and 24 mm thick) marine quartz cobbles (n = 26) and flints (n = 15). Their morphology is mainly ovoid (n = 25) but also quadrangular (n = 20). The knapping pattern is organised around a series of recurrent removals by useful volumes. These useful volumes may be natural

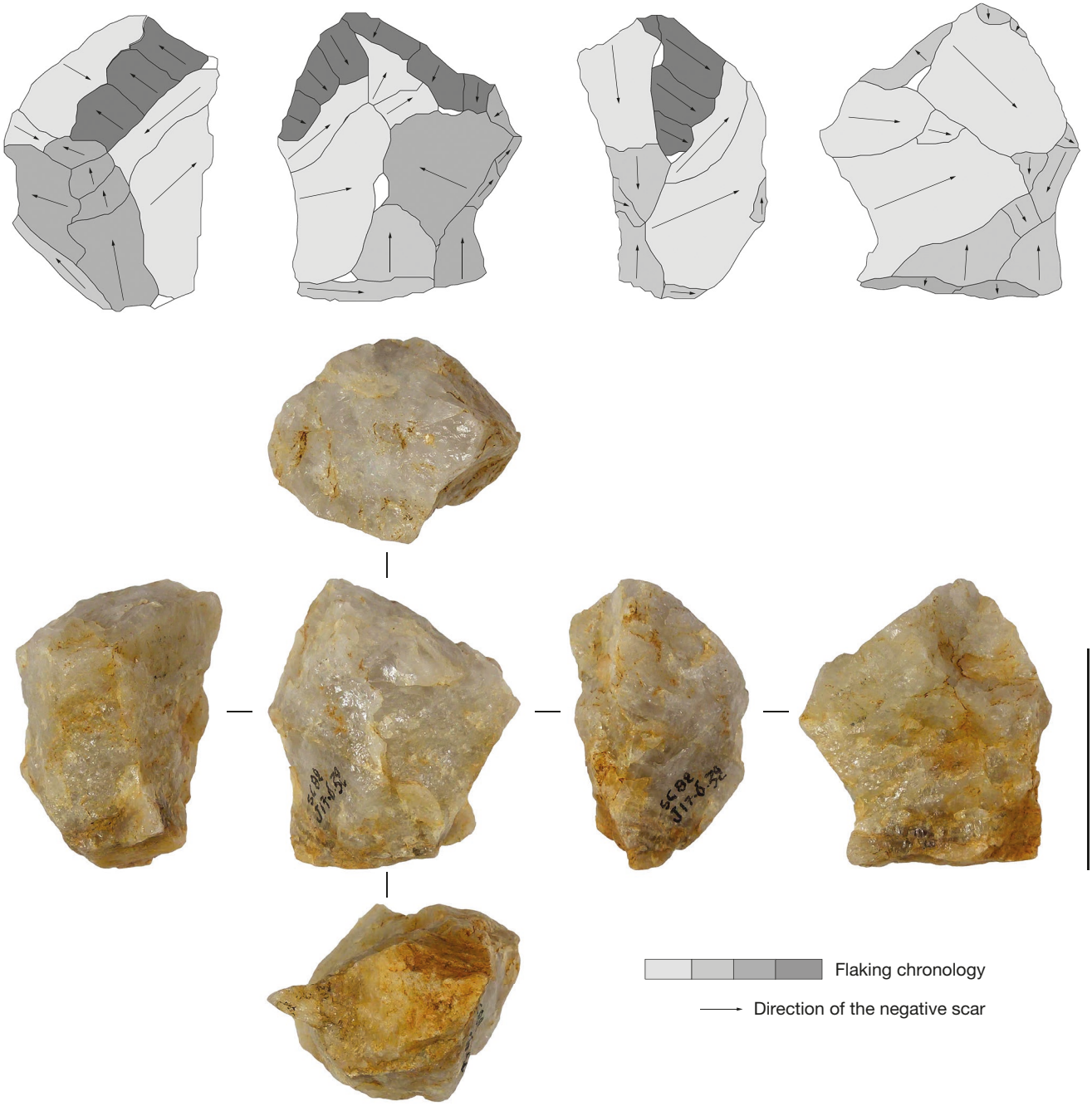

Fig. 6. — Alternating platform exploitation of a quadrangular core (no. SC82.J17.6.32). **Arrows**, negative scars orientation. Scale bar: 5 cm.

convexities on the edges of the core, adjacent to flat surfaces (Fig. 5). In this case, the process of initiating the flaking does not require a preparation of the striking plane following one or more start removals since the natural flat surface becomes the striking platform (affordance). The selection of morphologies and volumetric structures of the cores partly replaces this phase of flaking. This modality allows for a recurrent series of flakes on the periphery of the core (Fig. 4). The succession of removals also allows the creation of guide arris for the following removals. Moreover, the series of flakes are mostly short and rarely exceed four removals. Nevertheless, the flexibility of this modality allows a repetition of the flaking and thus of the series of removals as long as the volumetric structure of the production matrix allows it. Finally, the cores from this modality produce an average of four flakes.

Alternating platform modality (n = 45)

This second flaking modality is also well represented within this lithic assemblage (Fig. 6). It can be called Clactonian flaking (Ashton *et al.* 1992), but also SSDA (Forestier 1993) or type C operating scheme (Boëda 2013). This modality, as defined (Forestier 1993), is based on the implementation of a basic algorithm known as the "système par surface de débitage alternée" (SSDA/Alternating platform system).

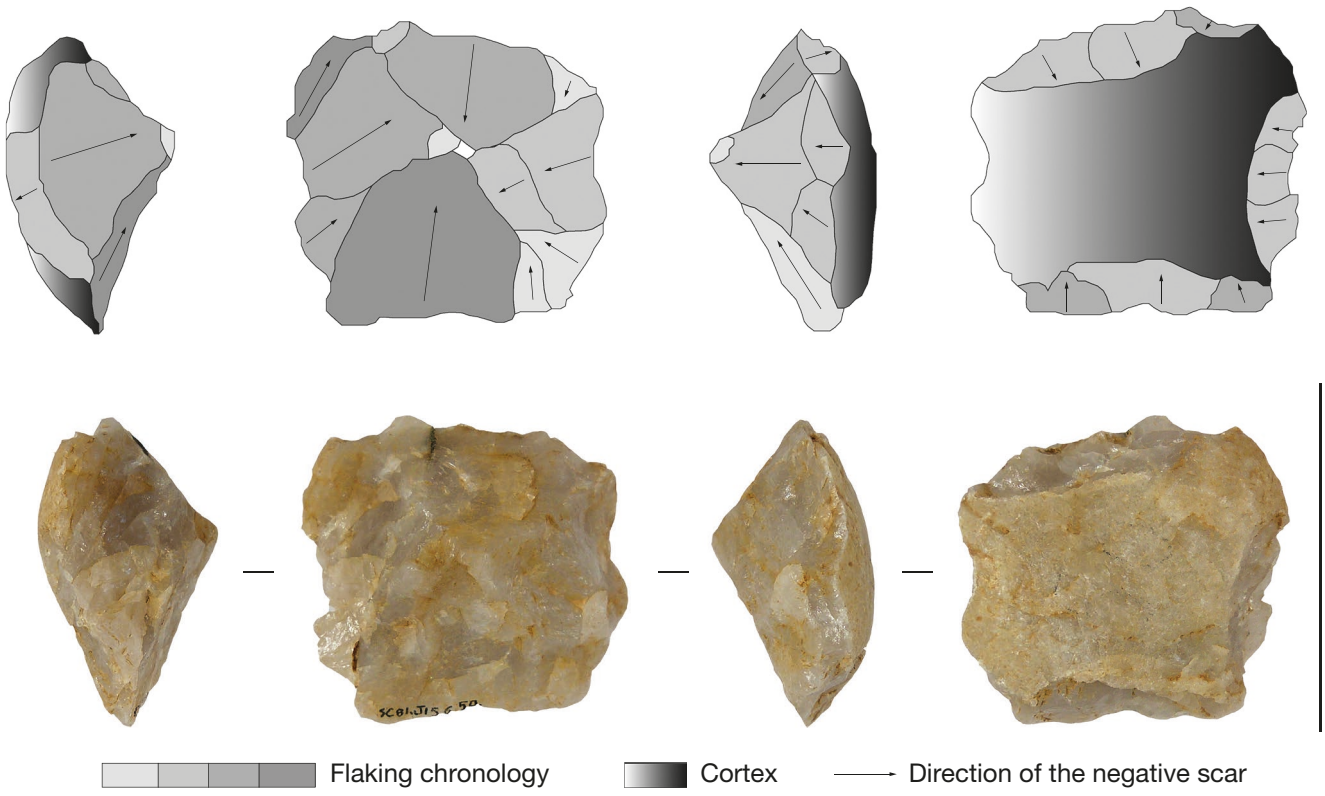

Fig. 7. — Centripetal exploitation of a quadrangular core (no. SC81.J15.6.50). **Arrows**, negative scars orientation. Scale bar: 5 cm.

Thus, each series of removals begins with a first flake that creates a flaking surface that will in turn become the striking surface (Fig. 4). This alternation between these two planes creates a series of independent removals and results morphologically in a great heterogeneity of cores and flaking products. In the series we studied, the cores from this modality are marine flint cobbles (n = 30) and quartz (n = 12) of small dimensions (41 mm long, 31 mm wide and 22 mm thick). The morphologies of the cores are quite diverse, although quadrangular and ovoid cores predominate (90%). The choice of implementation of this modality allows for the creation of (cortical) first flakes, flakes with a cortical back opposite a cutting edge (first or second generation of flakes) or full debitage flakes (non-cortical with almost parallel sides). Finally, the technical plasticity of this modality adapted to different types of morphologies and volumetric structures produces an average of five flakes per core.

Centripetal modality (n = 13)

This last flaking modality is the least represented within the Saint-Colomban lithic assemblage (Fig. 7). It is expressed through the preferential selection of marine flint cobbles (n = 11) and more rarely quartz (n = 2). From a dimensional point of view, the cores are as small as those of the other modalities (43 mm long, 39 mm wide and 23 mm thick). Their morphology is mainly quadrangular and some ovoid. The flaking pattern is based on a recurrence of removals and the multiplication of the series of flakes. This modality exploits a convex surface from a striking platform located on the periphery of the core. The repetition of secant removals is acquired as long as the volumetric and structural characters required for the exploitation are persistent. Sometimes, the flaking surface is transformed into a striking surface in order to allow a re-establishment of the morphological criteria necessary for the good progress of the series of removals. As for the other modalities, the recurrent centripetal flaking (débitage) results in the creation of flakes with varied morphologies and on average one core produces five flakes.

Flake tools

The lithic assemblage from the Pointe de Saint-Colomban site yielded a total of 84 flake tools. The technological and structural analysis of these artifacts led us to create five groups of tools techno-types that we present in the following sections.

Group 1: Flake tools with a transversal cutting edge (n = 7)

This first techno-type of flake tool has a transverse cutting edge on the distal and/or proximal parts. The quadrangular supports are on average small (31 mm long, 27 mm wide and 8 mm thick) and are made exclusively of flint. The flakes in this series are of the second and third generation in the setting of the flaking scheme and have exclusively non-cortical butts. The cutting edge of the flakes in this group is concave and straight in frontal view, while the cutting edge is notch-shaped or linear in transverse view. The UTF-CT is made from a mainly scalariform retouch that allows the creation of a concave cutting edge and an angulation that varies between 45° and 60° (Fig. 8).

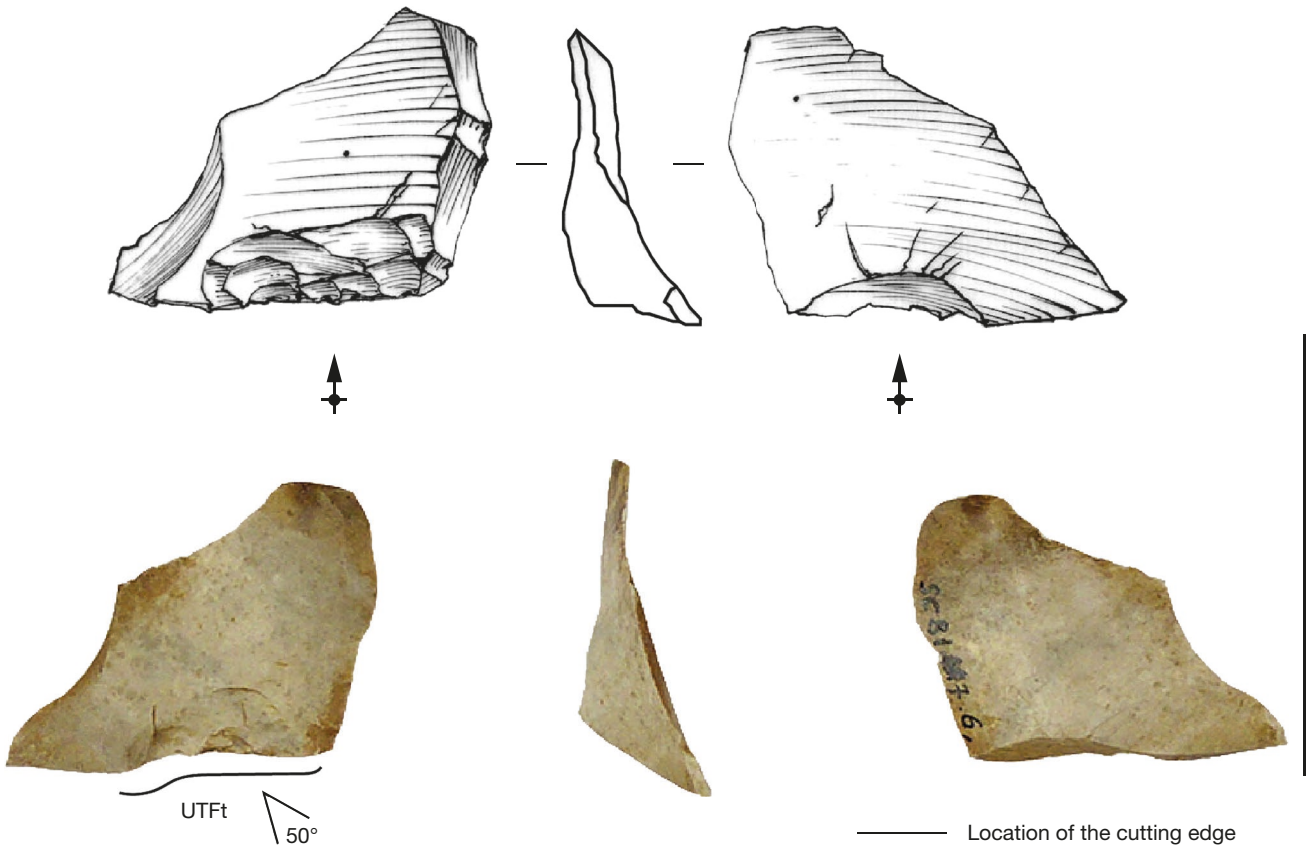

Fig. 8. — Flake tool with a proximal cutting edge from the Pointe de Saint-Colomban site (no. SC81.N17.6.M59). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

Group 2: Side scrapers (n = 12)
This second techno-type of flake tools is characterised by pieces that have a lateral cutting edge. These flint artifacts are mainly quadrangular with parallel or jagged edges. They are on average small in size (40 mm long, 26 mm wide and 11 mm thick) and have mixed or non-cortical butts (Fig. 9). Within the flaking operational sequence, they are in the first and second generation with flakes that have a cortical back opposite the cutting edge (SSDA débitage). Ordinary reworking allows the creation of a Techno-functional Unit of Transformative Contact (UTF-CT) which is linear in frontal view and rectilinear in transverse view. Finally, the cutting dihedral is flat with an angulation that varies between 40° and 50°.

Group 3: Side denticulate (n = 36)
This techno-type of flake tools is the most important of the lithic assemblage at the Pointe de Saint-Colomban site. It is characterised by pieces that have a denticulated lateral edge with a natural back opposite to the cutting edge. The tools in this group are made of flint and quartz and have a fairly varied quadrangular morphology. The average dimensions are small (35 mm in length, 30 mm in width and 11 mm in thickness) as for the flakes of other techno-types. They fall between the second and fourth generation of removals within the flaking pattern and have mixed, non-cortical butts. The cutting part is set by an ordinary and sometimes scalariform retouch of the lateral edge which allows the creation of a denticulated UTF-CT in frontal delineation and rectilinear/concave in transverse delineation (Fig. 10). The cutting edge is convex and has an angle that varies between 45° and 60°.

Group 4: Side notches (n = 16)
The fourth techno-type of tools on flake is composed of pieces that have a notch on the side. Their general morphology is quadrangular with jagged and parallel edges. The artifacts in this group are also small (34 mm long, 31 mm wide and 12 mm thick) and are made of flint and quartz. The majority of the flakes are of second and third generation and have non-cortical and mixed butts. The active part developed by an invasive retouch is represented by a concave UTF-CT in frontal delineation and as a notch in transverse delineation. Finally, the concave cutting edge varies between 40° and 50° (Fig. 11).

Groupe 5: Flake tools with a cutting edge-point (n = 13)
This last techno-type of flake tools from the Pointe de Saint-Colomban site includes flakes that have one or more cutting edges on the latero-distal sides. Flint is exclusive within this group except for one piece in jasper (Fig. 13) and the general morphology is triangular (converging edges) and quadrangular (parallel edges). Moreover, their dimensions are similar to the pieces of the other techno-types (37 mm long, 28 mm wide and 11 mm thick). Most of the flakes are third and fourth generation within the flaking process and have cortical and non-cortical butts. The UTF-CT can be linear or denticulated

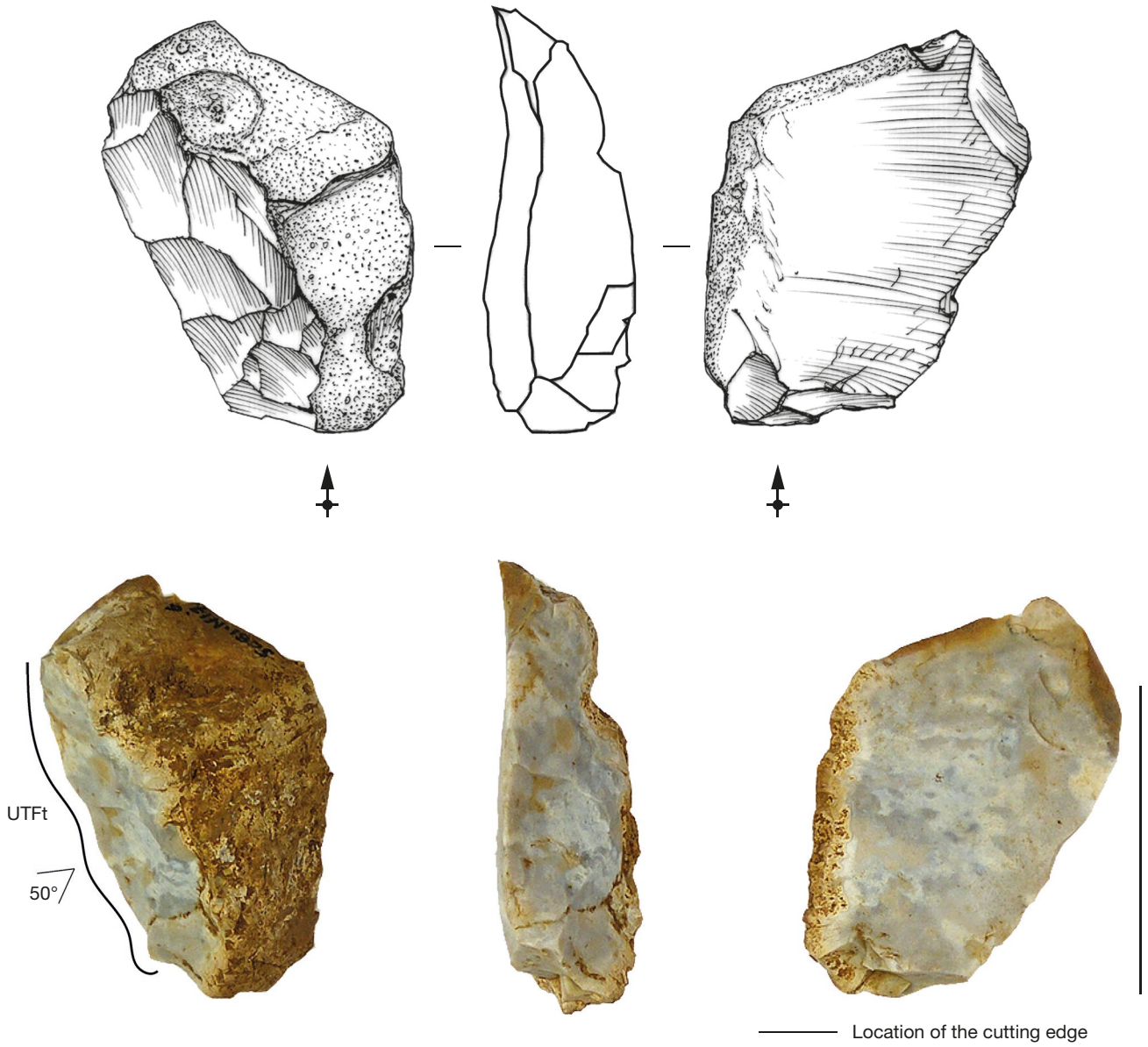

Fig. 9. — Flake tool with a straight lateral cutting edge opposite a cortical back (no. SC81.N17.6.M246). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

in frontal view and straight or convex in transverse view. It is either rough or fitted with an ordinary retouch. Finally, the cutting dihedral is flat or convex and varies between 45° and 60° (Fig. 12).

Pebble tools

Among the 1024 lithic artifacts studied, only two cobbles tools were identified. These two macro-tools are made from ovoid sandstone cobbles/pebbles and have a unifacial transverse cutting edge. These two cobbles/pebbles have the following dimensions. The first one (Fig. 14) is smaller with 85 mm length, 77 mm width and 35 mm thickness. While the second (Fig. 15) is more oblong with 126 mm length, 85 mm width and 38 mm thickness. Their weights are 335 and 500 g respectively. From a technological point of view, the shaping of their cutting parts (UTF-CT) was done following recurrent removals from a flat surface adjacent to peripheral convexities. The morphology of their cutting edges (UTF-CT) is different even though the shaping is only unifacial and their cutting dihedrals are plane-convex. The first cobble tool has a linear cutting edge in frontal view and a rectilinear one in transverse view. The cutting dihedral is approximately 70°. The second chopper has a "UTF" of Transformative Contact, convex in frontal view and curved in transverse view. The cutting edge varies between 75° and 80°. On both choppers, the prehensile parts are exclusively cortical (Figs 14; 15). Finally, no sandstone flakes were identified in the series, only these two artifacts illustrate the concept of shaping (façonnage) at the Pointe de Saint-Colomban site.

Synthesis of the lithic analysis

The lithic production strategy at the Pointe de Saint-Colomban site (layers 5, 6 and 7) is dominated by the concept of flaking (débitage), whereas the concept of shaping (façonnage)

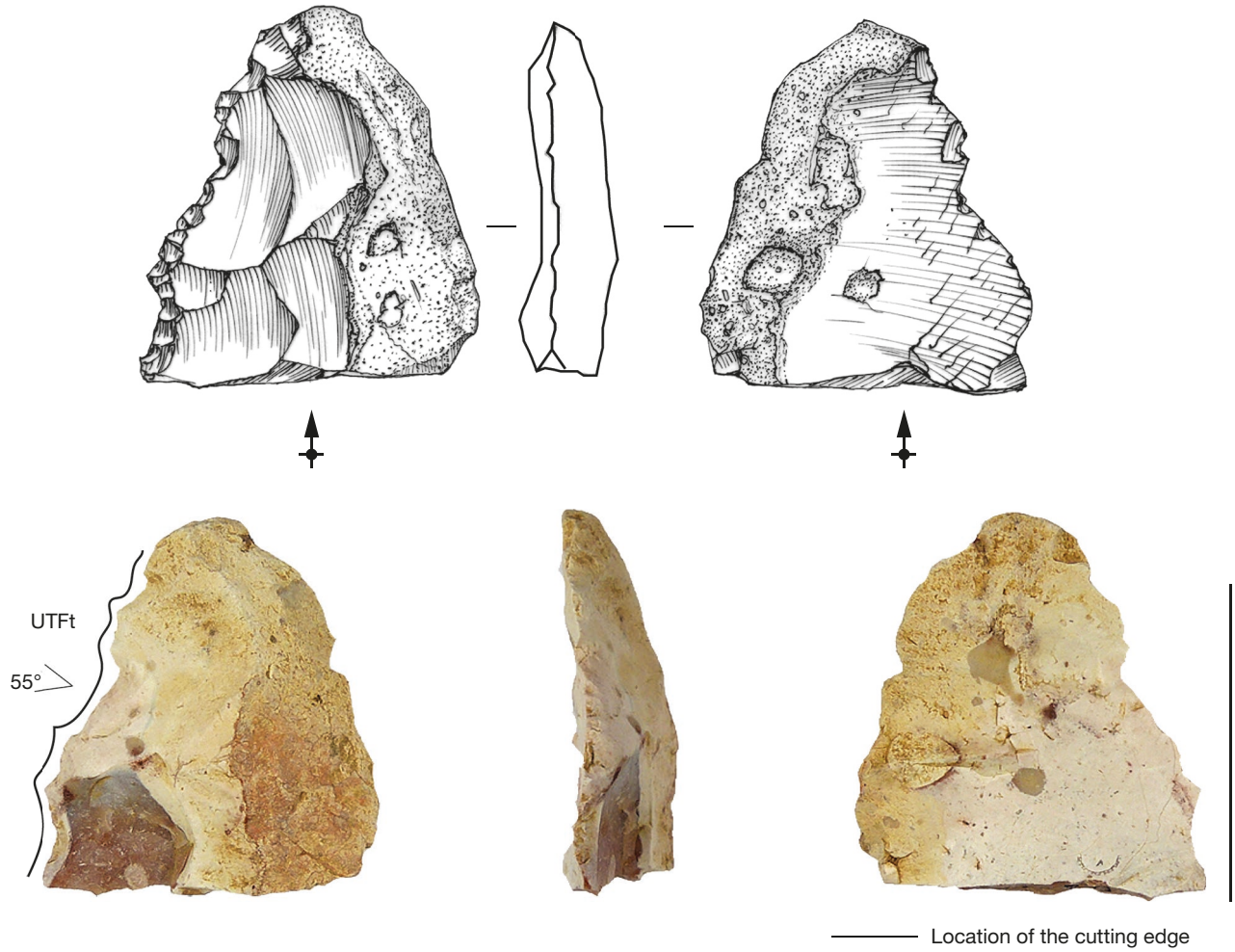

Fig. 10. — Flake tool with a denticulated lateral cutting edge opposite a cortical back (no. SC81.J15.6.48). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

is only represented by two end choppers (Fig. 16). The flaking operational sequence is represented by the exploitation of small flint, quartz and quartzite cobbles/pebbles in three different modalities: alternating platform modality, peripheral modality and centripetal modality. These different strategies have in common the search for cores/matrices with specific volumetric characteristics, namely: a flat surface adjacent to convexities (affordance). The production sequence ends with the functional objectives of the prehistoric knappers illustrated by the five techno-types of flake tools. The other typological elements of the lithic series studied (fragments and debris) are never selected to be crafted as tools.

DISCUSSION

The results of this study show that the lithic production system of the Pointe de Saint-Colomban site is mainly focused on the exploitation of small flint, quartz and quartzite cobbles/pebbles collected on the paleo-shingle bar (Lefort *et al.* 2011). The selection of these raw materials is conditioned by the good aptitude for knapping and by particular volumetric and morphological criteria, such as the presence of natural flat surfaces adjacent to convexities. The predominance of the flaking (débitage) operational scheme is aimed at the production of small flake tools, as shown by the technological analysis and structural reading of lithic industries (Dauvois 1976; Tixier *et al.* 1980; Lepot 1993; Boëda 2001, 2013). Three methods of exploitation of the cores have been selected by the prehistoric knappers: the peripheral method, which affects the thickness of the matrix through a series of recurrent uni or bi-directional removals, the method of a basic "alternating striking platforms" or SSDA (Forestier 1993) which adapts to the volume of the cobble/pebble by the succession of alternating removals between the striking surface and the flaking surface, and the centripetal modality which takes place according to a recurrence of convergent removals from the periphery of the matrix. Moreover, the concept of shaping (façonnage) is hardly used, since it is only represented by two sandstone cobble/pebble tools (Figs 14; 15).

In view of these data, what about the "Colombanian" as it was defined during the 1980s (Monnier & Le Cloirec 1985; Monnier 1989; Monnier & Molines 1993; Monnier *et al.* 1994)? Is its definition still valid? Should it still be seen as a "regional facies of the Lower Palaeolithic" (Monnier *et al.* 1994)? Finally, what should we do with the Colombanian?

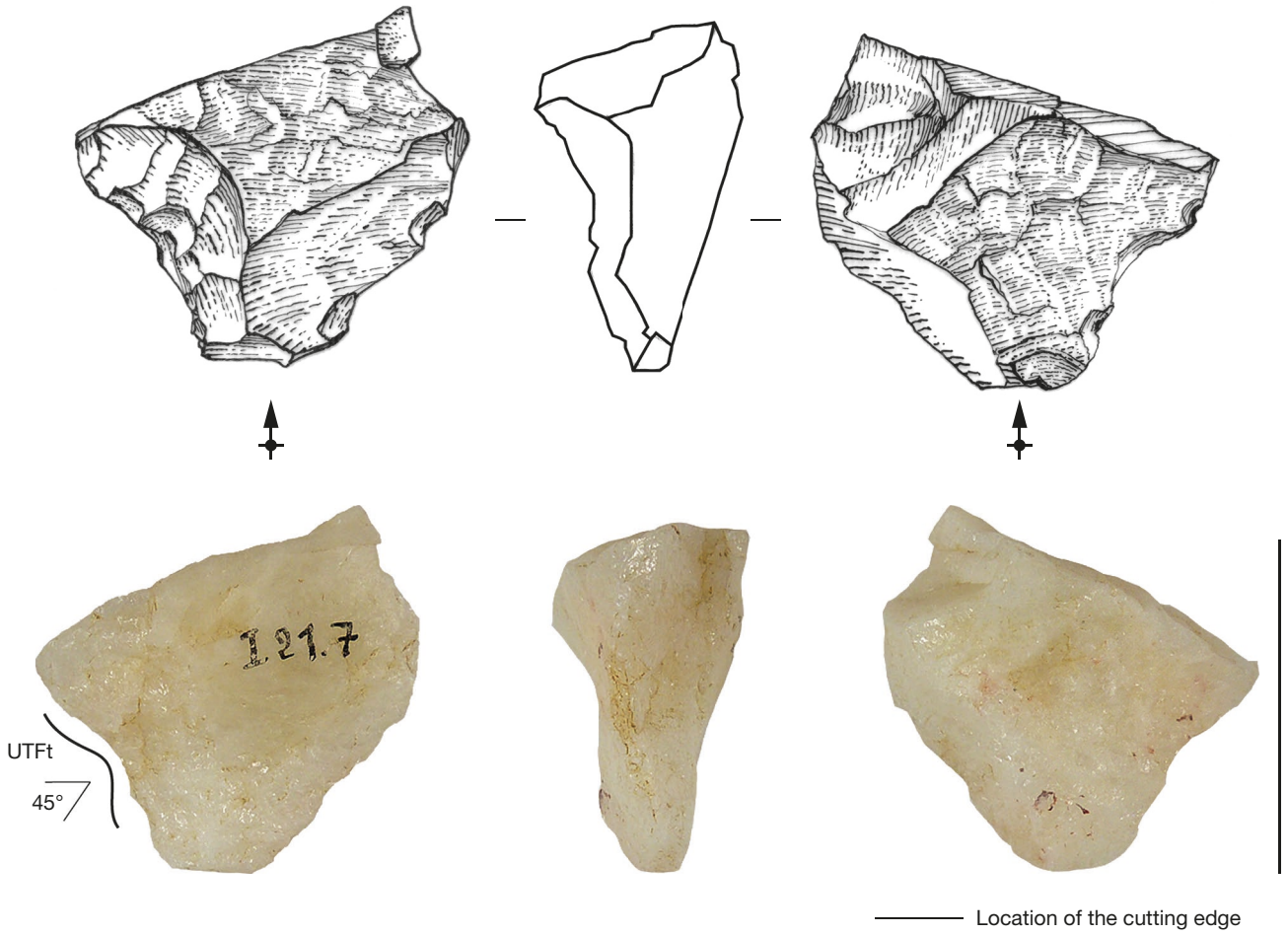

Fig. 11. — Flake tool on quartz with lateral notch (no. SC82.I21.7.M33). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

The "Colombanian" as it is defined today covers several coastal sites of the South Armorican coastline characterised by the presence of two shaping (façonnage) and flaking (débitage) operational sequences using different local raw materials (flint, quartz and quartzite/sandstone), as well as by the fairly high proportion of choppers within the assemblages (Ravon 2017b). Recent work carried out on the Menez-Dregan I site (Plouhinec, Finistère), also attributed to the Colombanian, by A.-L. Ravon suggests that this "cultural facies" is not so different from the Acheulean and that it is the result of an "adaptation to environmental constraints". According to this work (Ravon & Monnier 2013; Ravon *et al.* 2016, 2018; Ravon 2017a, b, 2019), a new definition of the Colombanian must be based on differences in technical traditions between human groups that possess handaxes in their technical systems and those that do not. This definition of the Colombanian facies ultimately amounts to naming "Acheulean" only lithic assemblages with handaxes, and thus to relapse on a purely typological logic.

Although the coexistence during the Middle Pleistocene of lithic assemblages with handaxes and others without handaxes is attested (Moncel *et al.* 2016), the Colombanian typological facies defined by the joint presence of flake tools and numerous macro-tools on cobbles/pebbles is no longer valid. The techno-structural analysis of the series from the Pointe de Saint-Colomban site has shown us that the shaping scheme is almost non-existent (n = 2; 2%) and that the technical system of the early occupation is characterised by small flake tools (n = 84; 98%).

The technological rereading of these lithic industries leads us to ask several questions. Firstly, is the chronostratigraphic attribution of the site currently connected to the end of MIS 11 (for layer 6) valid? Similarly, is the stratigraphic division between the different occupation levels correct? Or could it be a single occupation more recent than MIS 10?

Given the technical data and the initial attribution of layer 6 to the end of the Holsteinian interglacial and the beginning of the Saalian glacial, an occupation of the Pointe de Saint-Colomban between MIS 11 and 8 is probable without further precision. A re-study of the deposits and sampling for numerical dating are essential to better define the local chronostratigraphic context. Then, with what other assemblages of the Lower Palaeolithic can we compare the Saint-Colomban industries? How can it be positioned within the technical variability of the industrial complexes of this period in Western Europe? And finally, what are the research perspectives for understanding the diversity of technical expressions of the Lower Palaeolithic in Brittany?

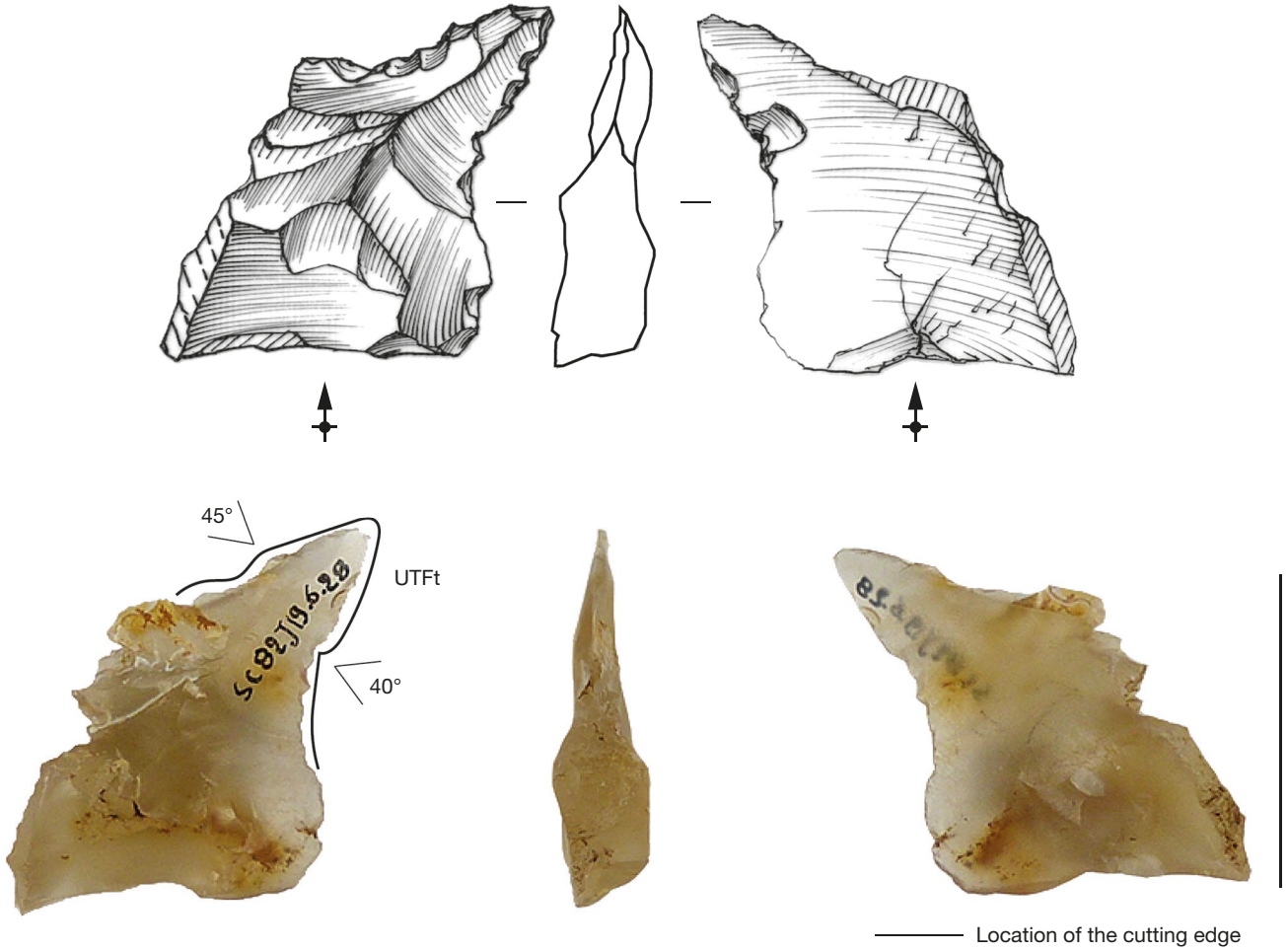

Fig. 12. — Flint flake tool with a cutting edge-point (no. SC82.J19.6.28). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

The Pointe de Saint-Colomban site in its regional context

The technocomplex of the Pointe de Saint-Colomban can be situated in a regional context through comparisons with other emblematic sites of the Lower Palaeolithic in Brittany such as the Pen Hat assemblage (Crozon, Finistère) and the reference site of Menez-Dregan I (Plouhinec, Finistère) in the Bay of Audierne. Recently, the lithic industries of the Pen Hat site, whose occupation is dated to the end of MIS 11 (Van Vliet-Lanoë *et al.* 2000, 2021), have been the subject of a technological analysis as well as a chronostratigraphic positioning based on the dating of Pleistocene formations. Dating of the Pen Hat and Trez Rouz littoral formations on the Crozon peninsula and of Trégana on the south coast of Léon was carried out by electronic spin resonance (ESR), infrared stimulated luminescence (IRSL) and radiocarbon (14C) methods. The lithic assemblage discovered during the 1990s was located in a primary position at the top of unit PH4a. A series of archaeological operations has brought to light more than a hundred lithic industries (Molines 1997) which were the subject of this study. The technological analysis (Van Vliet-Lanoë *et al.* 2021) focused on a series of 169 artifacts in a well-preserved state. This highlighted the exploitation of small flint cobble/pebbles (measuring between 40 and 80 mm) selected for the creation of flake tools with a rough retouch edge. The flaking scheme is organised in three modalities: a parallel unipolar modality which is the majority within the assemblage (69%); an orthogonal modality (17%) and a centripetal modality (11%). The shaping scheme is almost absent with potentially three pieces that could be shaping activity (Van Vliet-Lanoë *et al.* 2021). These results show great similarities with the ancient occupation of the Pointe de Saint-Colomban site. We find a preferential selection of small ovoid flint cobbles/pebbles exploited in short series of removals through three modalities. On these two sites, macro-tools made on sandstone cobbles/pebbles are almost absent with a maximum of three macro-tools for Pen Hat and two for the Pointe de Saint-Colomban. The flake tools are numerous and retouched for Saint-Colomban, whereas at Pen Hat, the cutting edges of the flakes are unretouched. Similarly, quartz is present in the Saint-Colomban assemblage whereas it is absent from the Pen Hat series.

The occupation of the Pointe de Saint-Colomban can also be compared to some levels of the Menez-Dregan I site (Plouhinec, Finistère). Located in the Bay of Audierne at the end of the Pointe du Souc'h, it was the subject of 30 excavation campaigns between 1991 and 2020, which enabled a total of 159 605 archaeological objects to be recorded (Monnier 1996;

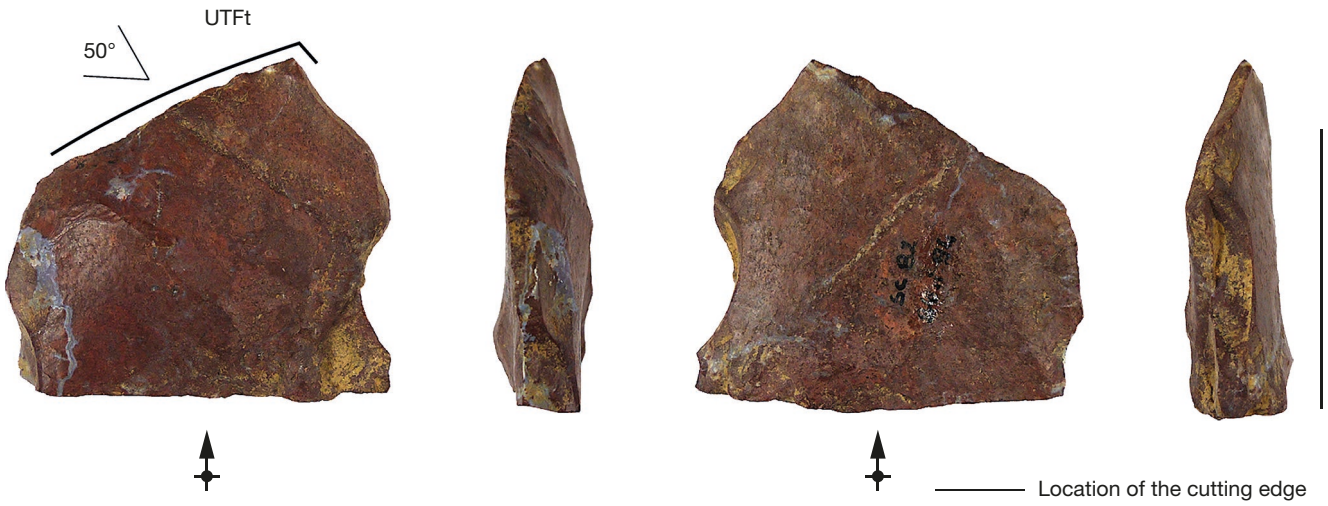

Fig. 13. — Jasper flake tool with a cutting edge-point (no. SC82.84.1.94). **Arrows**, debitage axis with butt. Scale bar: 3 cm.

Ravon 2017b, 2019). The important stratigraphy preserved at Menez-Dregan presents an alternation of 17 occupation levels and four marine deposits, dated between approximately 500 and 150 000 years ago (Monnier *et al.* 1994; Yokoyama *et al.* 1996). In view of the published data on this site (Hallegouët *et al.* 1992; Monnier 1996; Ravon 2017a, b, 2019; Ravon & Monnier 2013; Ravon *et al.* 2016) and the old chronostratigraphic attribution of the Pointe de Saint-Colomban (Monnier & Le Cloirec 1985), we can compare the stratigraphic units (SU) 8b (MIS 11) and 7 (MIS 10) from Menez-Dregan I with the lithic assemblage studied. First of all, SU 8b corresponds to the second human occupation of the site on an ancient beach. It yielded an abundant lithic industry (n = 5269) mainly on flint, quartz and sandstone. The flaking (débitage) scheme dominates the lithic production system with the exploitation of small ovoid flint and quartz cobbles/pebbles following short series of removals, including orthogonal/SSDA (Forestier 1993). The purpose of the flaking scheme is the creation of thick flakes with cortical backs opposite an edge left rough or retouched (n = 297). The flake tools are largely geared towards the production of denticulates (n = 153) and scrapers (n = 100). Similarly, the cobbles/pebble tools are quite important (n = 142) and is the result of an independent shaping process that begins with the selection of ovoid sandstone cobbles/pebbles. Then, SU 7, which corresponds to the third occupation of the site, also yielded an abundant lithic serie (n = 16440). This is also characterised by the predominance of the flaking (débitage) scheme, which is expressed through the selection of small ovoid flint and quartz cobbles/pebbles. These raw materials are exploited in short series of flaking and in an orthogonal/SSDA modality allowing the creation of thick flakes with cortical backs. As for SU 8b, the flake tools are mainly denticulated (n = 256) and scrapers (n = 201). While the concept of shaping (façonnage) begins with the selection of sandstone cobbles/pebbles directly from the fossil beach or from the shingle bar near the site (Ravon *et al.* 2016). Here too, the shaping takes place through an independent operational sequence that ends with the production of cobble/pebble tools (n = 243). These two levels of occupation also yielded artifacts emblematic of what is known as "Acheulean", notably cleavers and a few handaxes. This preliminary data from a classification of part of the Menez-Dregan I assemblage does not give us enough information on the technical behaviour of these populations, but it does give us some trends. We can see that from the point of view of the selection of raw materials, the assemblage of the Pointe de Saint-Colomban is close to these two levels of the Menez-Dregan I site (US 8b and 7). The debitage operational sequence also seems to be similar to that of the Pointe de Saint-Colomban with short series of removals without preparation of the striking platform surface. A notable difference is the important presence of sandstone pebble tools within the two comparison levels of Menez-Dregan I, whereas they are almost absent from the Saint-Colomban series.

The observation of these technical data concerning the Pen Hat (layer PH4a), Menez-Dregan (US 8b and 7) and Pointe de Saint-Colomban (layers 7, 6 and 5) deposits show that these assemblages are similar in the implementation of an operation sequence of flaking (débitage) on small ovoid flint and quartz cobbles/pebbles allowing the creation of a diversity of small flake tools. The concept of shaping, symbolised by the presence of numerous sandstone choppers, is no longer as prominent as it was in the Colombanian attribution of these Armorican coastal sites. The Colombanian facies is only a shadow of its former self, or rather a shadow of the macro-tools over-represented by the typological studies of these old sites on the Brittany coast. We will now place the Saint-Colomban lithic assemblage within the Lower Palaeolithic industrial Core-flakes complexes in Europe.

The Pointe de Saint-Colomban site within the European Lower Palaeolithic core-flake industries

On another scale, how does the Pointe de Saint-Colomban fit into the European archaeological environment between MIS 11 and 9?

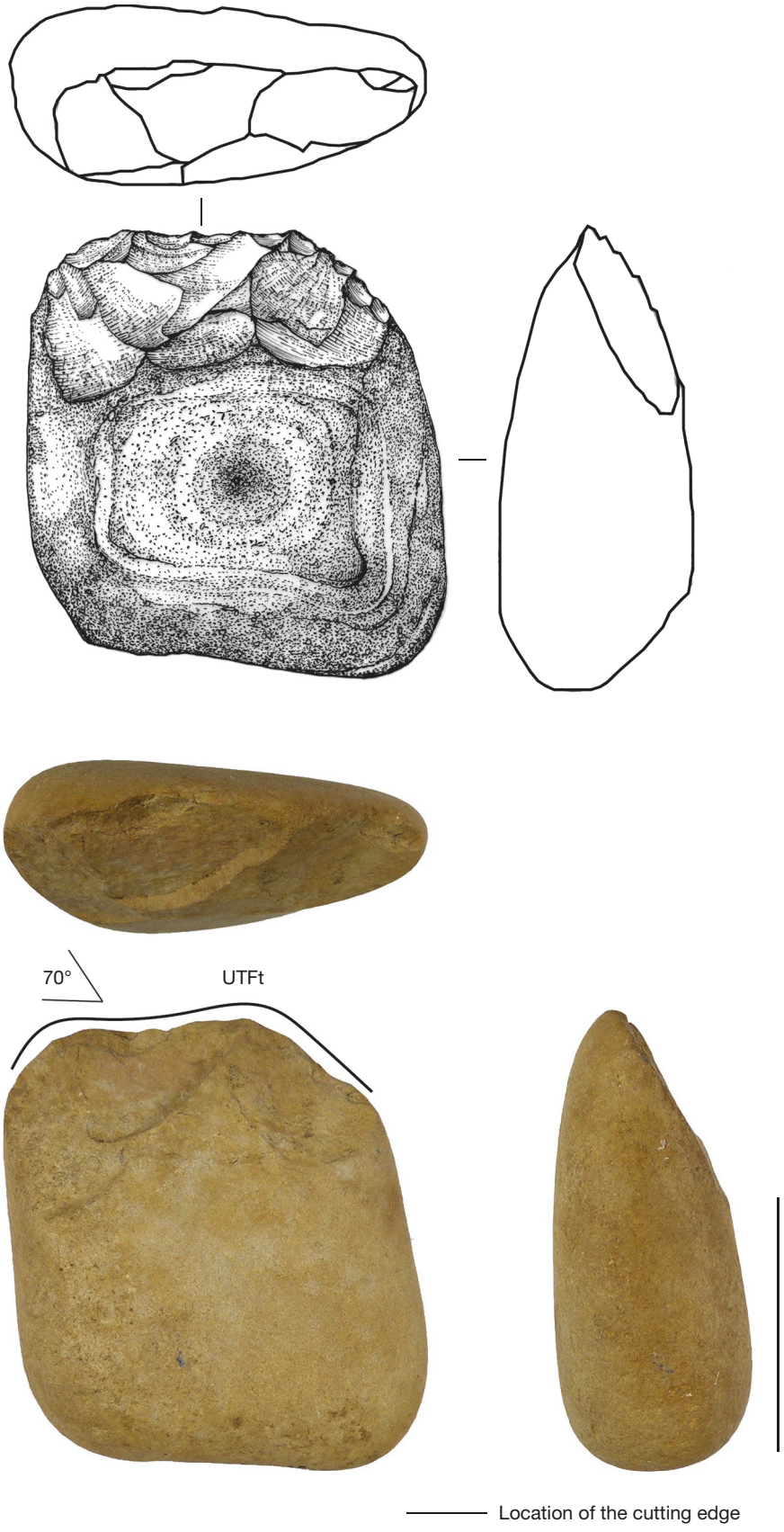

Fig. 14. — Sandstone cobble/pebble tool with a unifacial rectilinear transversal cutting edge (no. SC81.84.1.73). Scale bar: 5 cm.

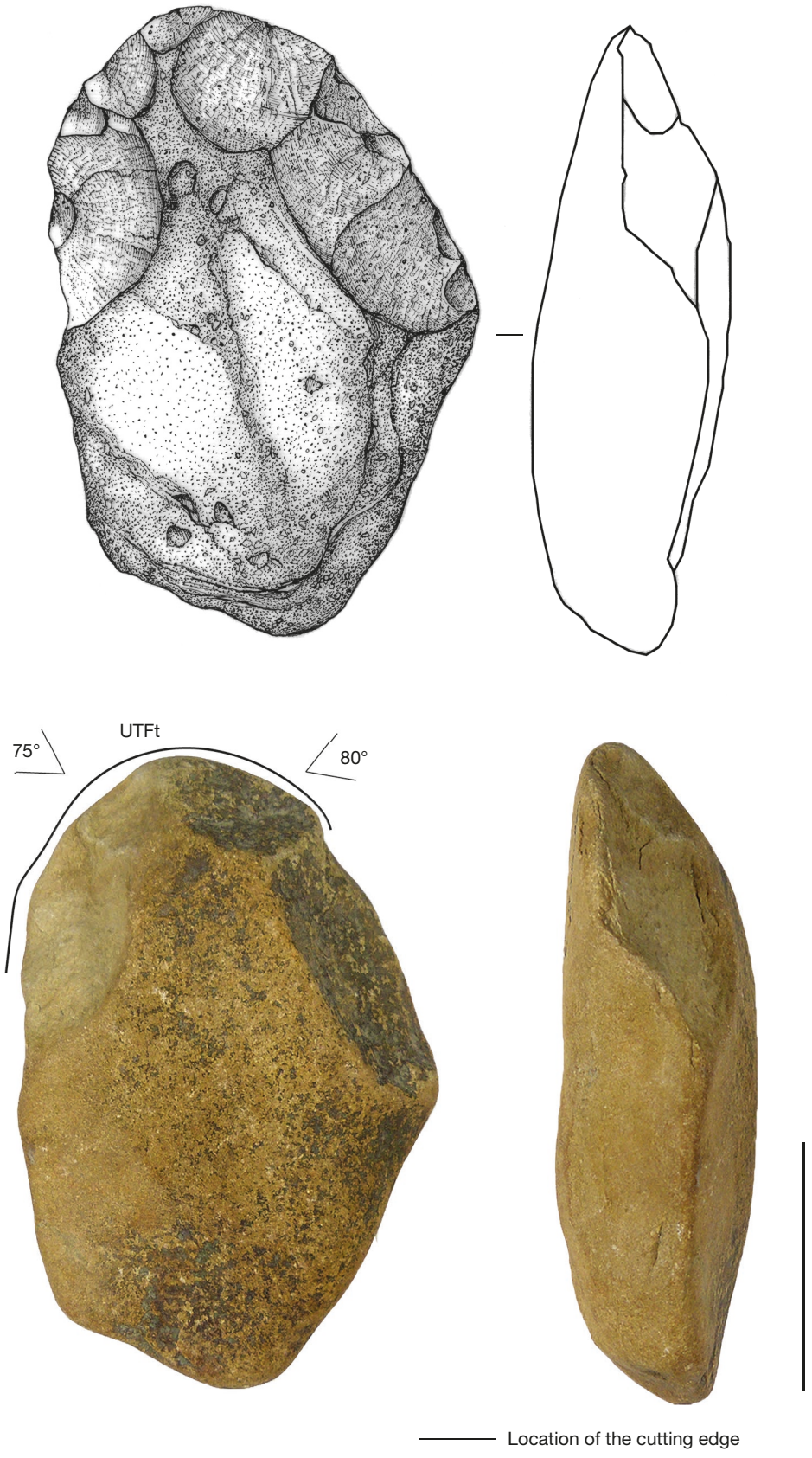

Fig. 15. — Sandstone cobble/pebble tool with a unifacial convex transversal cutting edge (no. SC82.5.26). Scale bar: 5 cm.

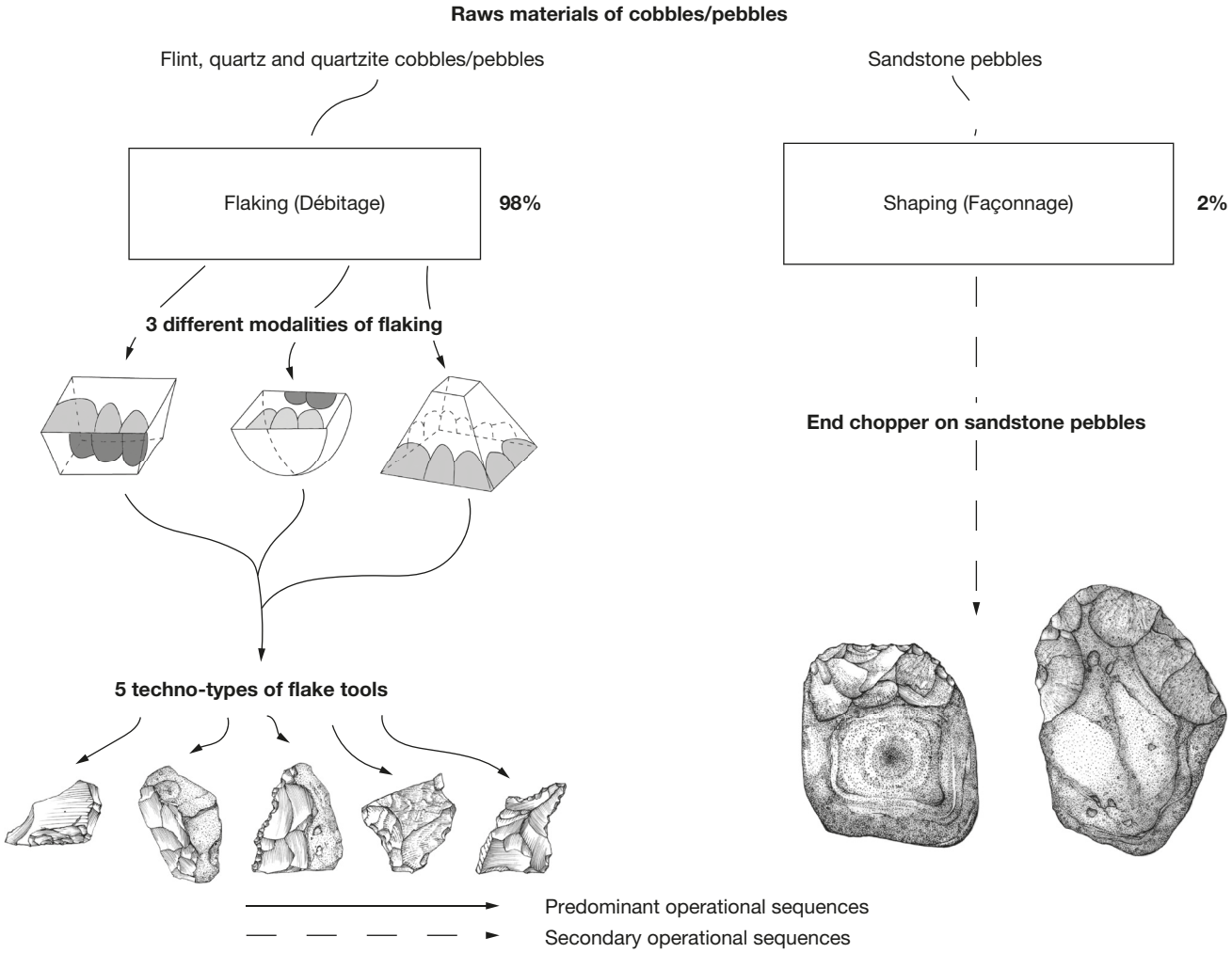

Fig. 16. — Synthetic diagram of the lithic production system of the Pointe de Saint-Colomban site.

As we have seen previously, the Saint-Colomban industries are characterised by a clear predominance of the flaking operational sequence and the production of a diversity of flake tools. On the Brittany coastline, the sites of Menez-Dregan I (US 8b and 7) and Pen Hat (PH4a) share similar technical trends. In Central & Eastern Europe, some works (Rocca 2013; Rocca *et al.* 2016; Rocca & Serangeli 2020) have shown that Lower Palaeolithic sites are mainly composed of small-sized flake and support industries such as gelifacts. Typical Acheulean artifacts (handaxes, cleavers, choppers, etc.) are in most cases absent. The sites of Vértesszölös (Hungary) and Bilzingsleben (Germany) are representative of these technocomplexes of Core-Flake industries (Kretzoi & Dobosi 1990; Beck *et al.* 2007; Rocca 2013, 2016). The sites in Brittany, the flaking (débitage) "chaîne opératoire" following short removal series start with the preferential selection of raw materials with particular volumetric and morphological characteristics. This selection of cores and their exploitation according to series of two to three removals maximum by independent useful volumes link them to what Boëda calls the type C flaking family (Boëda 2013). The useful volume corresponds only to a part of the core and several flaking scheme can thus follow one another without any relation between them. Nevertheless, the useful volumes can be added together, as is the case for orthogonal/SSDA exploitation (Forestier 1993).

In northwest Europe, this type of production is also found in the British assemblages of Barnham (area I / IV), Swanscombe (LMG/LL) and Boxgrove (4c/Qz/c) (Conway *et al.* 1996; Ashton *et al.* 1998; Roberts *et al.* 1999; Nicoud 2011), as well as in the alluvium of the Quaternary terraces of the Somme at the Cagny Ferme de l'Épinette site (Tuffreau *et al.* 1997; Lamotte 1999). In addition, the Londigny site located in a karstic plateau near the Charente River has yielded a similar core-flake industry dated to MIS 11 (Connet *et al.* 2020).

In southern Europe and particularly in the circum-Mediterranean, several lithic series have technical similarities with Armorican technocomplexes. Some of these assemblages are older and could be connected to MIS 14-12 such as levels D (MIS 12) and L (MIS 14) of the Arago Cave (Barsky *et al.* 2019; Capellari *et al.* 2021). Recent studies show a recurrence in the selection of raw materials and a standardisation in the production of supports in order to produce thick flakes with a linear cutting edge and open cutting angle (Capellari *et al.*

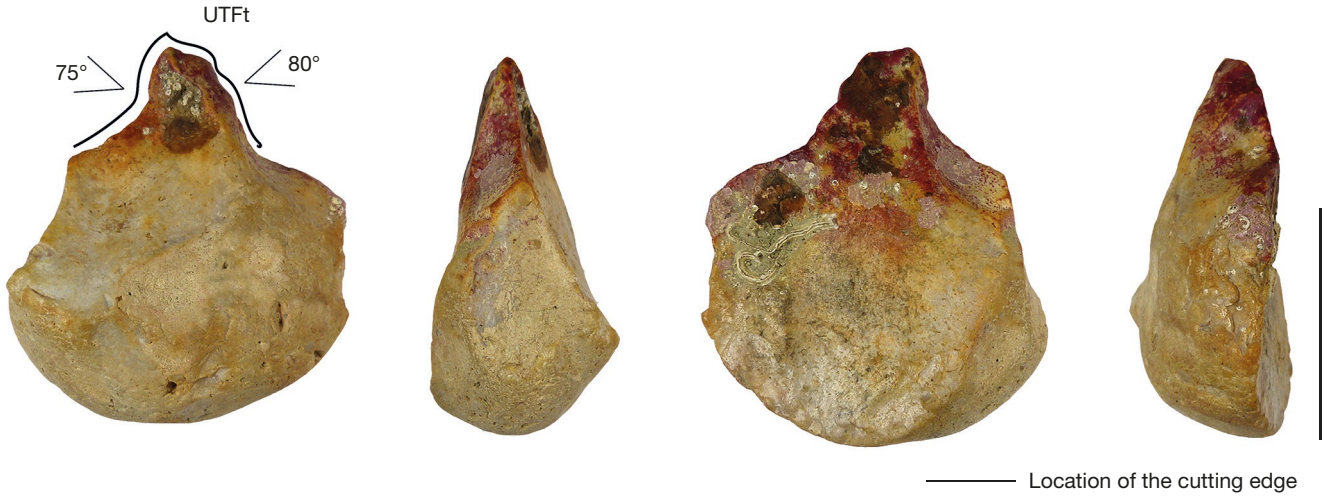

FIG. 17. — Flint cobble/pebble tool (rostrum) discovered on the foreshore of the Îlot du Grand Huernic (Morbihan). Scale bar: 5 cm.

2021). In many cases, these small products are associated with macro-tools on a pebble or block.

Moreover, we have not mentioned here the importance of the handaxe phenomenon in defining what is attached to the Acheulean technocomplex, although some works have addressed this issue (Boëda 2005; Nicoud 2013; Gallotti & Peretto 2015; Mosquera *et al.* 2016; Moncel & Ashton 2018). In this context, "Acheulean" should be defined by the presence or absence of the handaxe? Whereas the share of the flake tools often composes the majority of the lithic assemblages known as "Acheulean". These questions highlight the evanescence of the definition of Acheulean and its extreme fragility (Nicoud 2011).

Despite all these comparisons and questions, it is not easy to establish a precise synthesis of sites sharing the same technical trends (between MIS 11 and 9) since very often a techno-structural analysis has not been carried out and the exploitable data is mainly derived from a typological approach.

CONCLUSION AND PERSPECTIVES

The industrial assemblage of the Pointe de Saint-Colomban is one of the markers of the presence of populations during the Lower Palaeolithic in Brittany. The technological and structural rereading has enabled us to highlight that the lithic production system was mainly focused on the exploitation of small marine flint and quartz cobbles/pebbles. This was organised around short sequences of flaking by useful volumes allowing the creation of thick flakes with a natural cortical back. However, a diversity of operation is illustrated by the five techno-types of flake tools. The part of the shaping (façonnage) scheme is almost non-existent since it is represented by only two sandstone pebble tools. These observations, in conjunction with data from other Armorican coastal deposits (Menez-Dregan I and Pen Hat), lead us to propose a change of paradigm concerning the so-called "Colombanian". Its current definition as a local variant of the "Acheulean" (Monnier & Molines 1993; Ravon 2017b, 2019) is obsolete since it does not reflect the variability of the technical system of these technocomplexes of extreme western Europe. The comparison of technologies (Table 3) shows the difference in results between a morphological classification (Monnier & Le Cloirec 1985; Ravon 2017b) and a techno-structural classification. Perhaps, the part of the macro-tools that is supposed to represent this category of facies does not exist, so does the Colombanian exist?

TABLE 3. — Comparison of the techno-typological results obtained between previous work and our study.

	After Monnier & Le Cloirec (1985) and Ravon (2017b)	Our study
Techno-type	**Number**	**Number**
Cores	99	103
Flakes	119	292
Flake tools	190	84
Hammers and anvils	6	6
Tested pebbles	3	14
Pebble tools	41	2
Geofacts / various	2	54
Pebble fragments	15	39
Flake fragments	447	231
Debris	130	199
Total	1052	1024

We propose to define this lithic assemblage as a reflection of the diversity and technical plasticity of the populations of the Lower Palaeolithic of Western Europe, while ceasing to consider the Colombanian as a valid denomination. This proposal should allow us to go beyond *this Colombanian* to try to understand *the Colombanian* as a marker of the technical alterity of the human populations of ancient prehistory.

The archaeological potential around the Middle Pleistocene occupations of the Brittany coastline is significant and can be seen in the isolated findings of archaeological artifacts between the Crozon Peninsula and Noirmoutier (Ravon 2017b). Climatic variations during the Quaternary have caused the shoreline of the Brittany coastline to oscillate (Lefort *et al.* 2007, 2011). As a result, some of Brittany's bays are shallow,

such as Quiberon Bay, which during periods of marine regression was transformed into a vast herbaceous plain. Some of the islets in Quiberon Bay yield flint industries at low tide levels (Fig. 17). The flint cobble/pebble artifact below was discovered in 2019 on the foreshore of the Îlot du Grand Huernic by K. Le Fur which will make it possible to open future research and perspectives.

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