NEW EVIDENCE OF A STONE TOOL TECHNOLOGY IN NEW CALEDONIA

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ABSTRACT

The presence of a lithic industry in New Caledonia has apparently been ignored until now, because of the atypical and unaesthetic appearance of the raw material and its products. In addition, numerous authors have pointed out the difficulties in identifying the products of debitage on phtanite. Several issues now emerge for discussion and investigation; the existence of a lithic industry in New Caledonia, the identification of debitage methods, and the temporal relationship between ceramic and lithic material cultures.

INTRODUCTION: MATERIALS AND METHODS

The two sites of Ton 6 and Ton 7 in Naïa Bay, excavated by Colin Smart in 1966-67, display an interesting stratigraphy containing well-dated archaeological layers. This has made it possible to establish a chronological sequence of ceramic cultures in New Caledonia. In addition to the ceramic material, the Smart collection has provided the lithic material (641 pieces from Ton 6, 1315 from Ton 7) which is the object of this study. This material has allowed us to refine our knowledge of lithic tool production in different periods of New Caledonian prehistory. Several approaches have been applied. By carrying out a morpho-technological study of the debitage and evaluating the knapping properties of the local raw material, we have been able to identify the characteristics of flakes produced during different stages of the reduction sequence. Further, the study of the removal marks (negative flake scars) on the dorsal surfaces of these products has allowed us to determine the orientation of debitage. Lastly, examination of cores provides confirmatory evidence for the direction of flaking and form of the products as well as for the general orientation of debitage. The core is the artefact *par excellence* for characterising the lithic production system because all debitage production is governed by a structured ensemble of technical gestures for the intentional elaboration of products known to the knapper.

SITE CHARACTERISTICS OF TON 6 AND 7: GEOGRAPHY, STRATIGRAPHY, CULTURAL SETTING AND DATING

The two prehistoric sites, Ton 6 and Ton 7, are situated on the beach of Naïa Bay on the southwest coast of New Caledonia between the Engwé and Tiaré Bays, about 30 km north of Nouméa. Ton 7 is located in the middle of the bay. Its layers are 50 cm deep and comprise three archaeological strata, as well as a surface level (Level IV) which was very disturbed by agricultural activity. The lower levels, I and II, are dated respectively to 3165±120 BP (ANU 96) and 2020±110 BP (ANU 97) and are attributed to the Koné period: the pottery is decorated with stamped designs applied with a paddle marked by parallel or criss-crossed striations (Galipaud 1988). Level III may be dated to 1245 BP and belongs to the Naïa I period (characterised by pottery with handles). Levels III and IV were disturbed and contain a mixture of the two pottery types (Koné and Naïa I). Levels I and II of Ton 7, together with Level 14 at Tiwi (dated to 3240±220 BP) are both characterised by Podtanéan ceramics. Ton 7 and Tiwi include the oldest presently known traces of human presence in New Caledonia (Galipaud 1992).

The stratigraphy of Ton 6 is much more extensive, incorporating ten levels over a depth of one metre. The lowest levels, numbered one to five, have been dated to the time range 1745±117 BP (ANU 98) to 1635±110 BP (ANU 99). They are characterised by the presence of thick-walled pottery with handles and an incised pattern.

J.-C. Galipaud has attributed these five levels to the Naïa I cultural period. The upper levels, ranging from VI to X, correspond to the Naïa II period, i.e., to a style of pottery decorated by an embossing technique and a second style marked by incised patterns. The two styles are mixed, and both are present up to the surface. Two levels have been dated; level VII to 930±120 BP (ANU 284), and level VIII to 440±120 (ANU 285).

Given the limited quantity of material in the upper levels, only Levels I and II of each site will be subjected to lithic analysis.

RAW MATERIALS

The bulk of the raw material present on the southwest littoral of New Caledonia, and in particular in the Ton 6 and Ton 7 assemblages, is either phtanite (principally black; also grey, brown, blue or white) or red jasper. Bands of phtanite are found in flysch formations along the shore. The majority of the pieces from Ton 6 and Ton 7 are of black phtanite. The phtanite found in the littoral geosyncline is often very friable and fissured. It thus constitutes a raw material of mediocre quality for knapping.

An experimental approach has highlighted the poor quality of artefacts produced from phtanite in comparison with other raw materials. Upon knapping or upon cutting a block of phtanite with a saw, three zones may be distinguished by their colour, the degree of fissuring and the quantity of debris produced (Figure 1). The thickness of these three zones varies largely among blocks.

Zone 1 (with cortex), is desilicified, with extensive micro-fissuring, and is generally much lighter coloured than zones 2 and 3. Rock from zone 1 produces very angular products, which do not display the classic stigmata of knapping (conchoidal fracture with butt, bulb impact point and ripples on the ventral surface). These products, gathered under the label "debris," do not show characteristics identifiable as the result of human activity. While they may in fact result from knapping, this is obscured by the great degree of fracturing of the base material.

Products obtained from zone 2, a base material less fissured than zone 1, show debitage marks (i.e., ripples) on the ventral surface, but neither butt, nor bulb, nor impact point. These products, here called "flake 2", look more like flakes than fragments, but are nonetheless difficult to read.

Zone 3, the core of the nodule, appears more silicious; fissuring is much reduced but still observed. Our visual observation of greater homogeneity in composition is presently being tested by chemical analyses. When knapped, zone 3 renders flakes (called "flake 1") which show all the marks of their production.

The typical flakes resulting from percussion on phtanite are here called "flake 1 Ph": they have no bulb, but clearly show a concavity; the impact point often remains difficult to read. Flakes 1 Ph may be obtained from all three zones of the block.

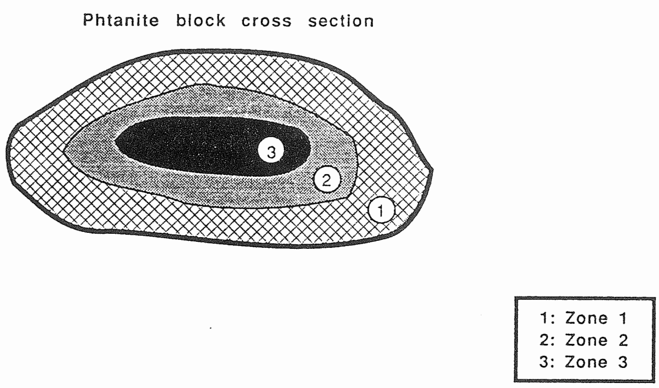

Figure 1: Cross-section of a block pf phtanite

FLAKES AND FLAKE TOOLS

Five principal types of flakes are observed (Figure 2) as a function of the progression of the debitage and of the exploited zone of the rock (zones 1 to 3). These are termed flake 1, flake 1 Ph and flake 2, with bladelets (*lamelles*) being referred to as flake 1 la or flake 2 1a. Their shape morphologies are variable (square, square with rounded corners, trapezoidal, rectangular or diamond-shaped) but the majority are triangular. The flakes have an average length of 23.8 mm, an average width of 16.0 mm, and an average thickness of 4.2 mm. When present, butts were observed to be unprepared (either flat, linear or punctiform). A direct percussion technique was employed using a hard hammer. The axis of debitage of many of the triangular flakes is significantly deviant from the morphological axis. We will return to this observation for the morphological and technological reading of cores.

Numerous flake tools were observed (Ton 6, Level I: 89; Level II: 15; Ton 7, Level I: 44, Level II: 13); they may be categorised as notched flakes, scrapers, endscrapers, or flakes with a natural cutting edge.

Cores

We previously pointed out the value of analysis of core forms for identifying the reduction sequence. Such analysis must determine the direction and ordering of

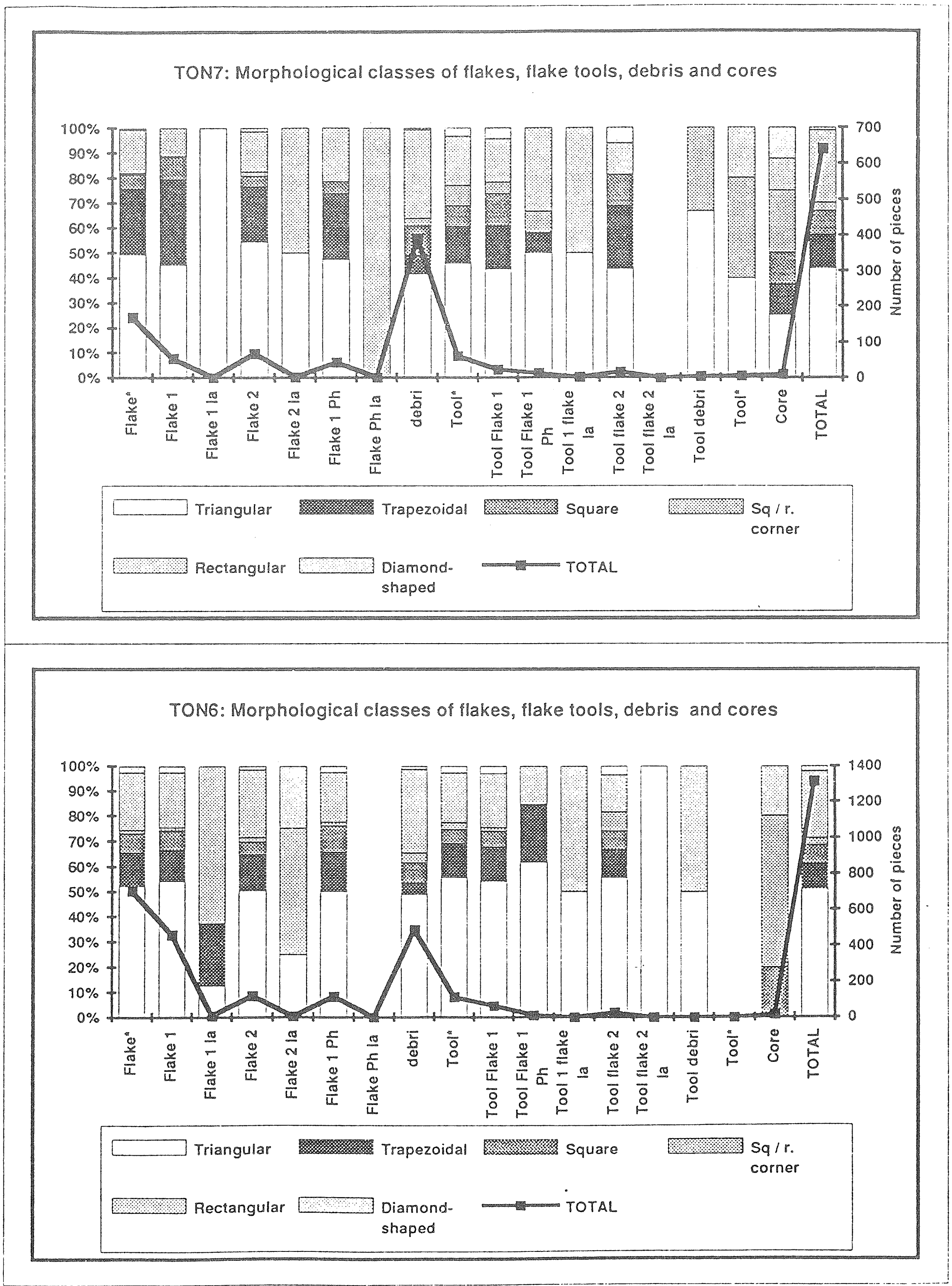

Figure 2: Morphological classes of flakes, flake tools, debris and cores at TON 7 (above) and TON 6 (below).

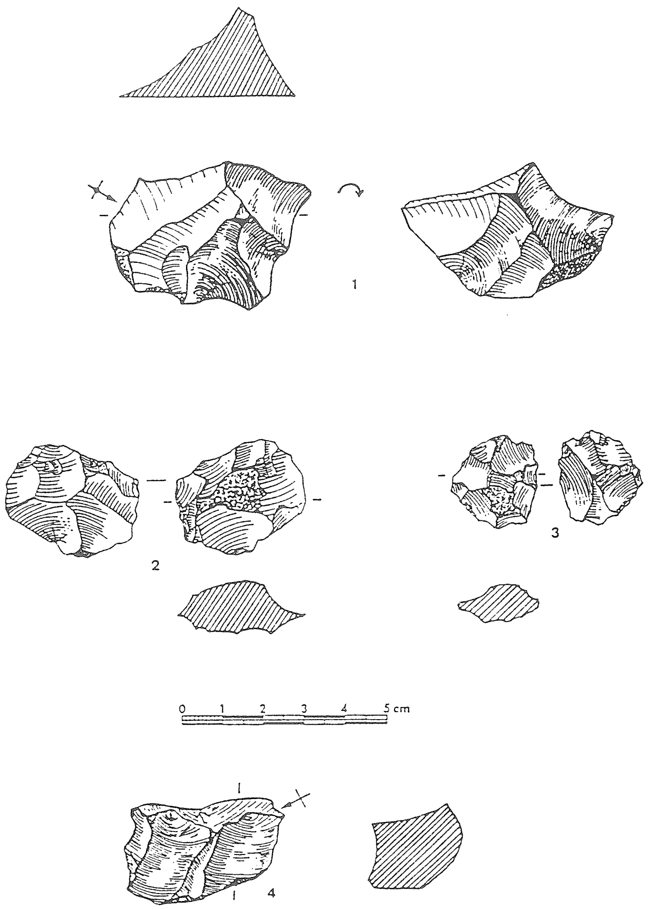

Figure 3: Cores: 1, plano-pyramidal; 2-3, bi-pyramidal; 4, polyhedric.

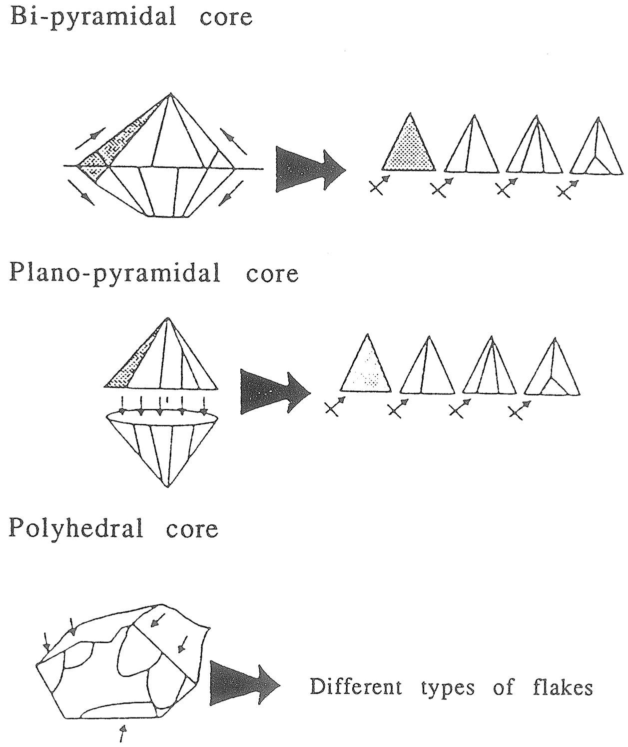

Figure 4: Flaking directions involved in the manufacture of the different core types.

flake removal. The total number of cores analysed is 12 in Level I and 3 in Level II of Ton 6, and 6 in Level I and 2 in Level II in Ton 7. The specific form of a core will, of course, be largely determined by the quality of the phtanite nodule from which it was produced and by the size of zone 3, the silicious and relatively un-microfissured portion of the block.

There are three principal shapes of cores, all generally of small size: bi-pyramidal (discoidal), plano-pyramidal and polyhedral (Figures 3 and 4). These core types, although different in form, were elaborated on the basis of the same volumetric concept, producing similar debitage products (flakes or points). The surface of exploitation offered by the plano-pyramidal cores is generally rather triangular. The reduction sequence is circular in motion, centripetal and unidirectional, applied to a single striking platform. The large majority of products from such cores, with the exception of the first cortical flakes, are triangular, with a debitage axis deviating from the morphological axis.

The bi-pyramidal cores render the same debitage products, but show a particular variant on the same basic volumetric conception: the fracture planes are always secant to the principal plane of the core (Boëda 1991). The polyhedral cores are characterised by a less organised debitage surface than those of the two previous types, with a series of multiple striking platforms which result in multi-directional removal traces.

CONCLUSION

These first analyses allow optimism for a technological and typological perspective. A lithic industry clearly existed in the prehistoric period in New Caledonia. These findings constitute extensive, coherent evidence for a technology of production (points with one, two or more ridges; pseudo-Levallois points; etc.). The analysis of the materials from Colin Smart's excavations confirms the contemporaneity of lithic and ceramic assemblages. No major differences were observed between lithic materials from the Koné and the Naïa I periods. New excavations under way in New Caledonia and the additional archaeological data to be recovered should shed light on the issues raised here, and extend our knowledge of technological systems in New Caledonia and their variability.

Although we do not yet have data on prehistoric technology from other sites in New Caledonia, an initial comparison has been undertaken with the lithic assemblage excavated by D. Frimigacci at Koumac and with the material exhumed in July 1993 by the Indo-Pacific Archaeological Laboratory, based at ORSTOM-Nouméa, at another Koumac site, NKM 004. In both cases, we hypothesize that an identical debitage method was employed, producing an assemblage in which points associated with plano-pyramidal and bi-pyramidal cores are largely dominant. These initial results, when compared with technological data from other sites in the Southwest Pacific, should offer new perspectives on the evolution of technological behaviour of the Melanesians over the last five millennia.

ACKNOWLEDGEMENTS

Sincere thanks to J.-C. Galipaud and A.-M. Sémah, of ORSTOM Laboratories of Prehistory in Port Vila and Nouméa, for their encouragement to synthesize the lithic data from our joint work; and to D. Guillaud for her careful criticism of this text; to P. Gingerich for assistance with the English translation; and to F. Mathieu for assistance with analysis and graphic presentation of the results.

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