ACHEULEAN LITHIC TECHNOLOGY AND RAW MATERIALS IN SOUTHERN IBERIA

TECNOLOGÍA LÍTICA ACHELENSE Y MATERIAS PRIMAS EN EL SUR DE IBERIA

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1.- GEOGRAPHIC AND GEOMORPHOLOGICAL CONTEXT OF THE SITES

The area under study is located in the south of the Iberian Peninsula (FIG. 3), and is divided in three geographical sectors, coinciding with different geological unites: to the northeast, Sierra Morena, which presents metamorphic stones (quartzite and riodacites) and lacks karstic formations; in the center, the Guadalquivir Valley with sedimentary rocks from Sierra Morena, conforming fluvial terraces; and finally the Betic region in the South, characterized by siliceous sediments and many sites located in caves. The geological areas influence that the geomorphology of the settlements, as well as the catchment of different resources for the creation of lithic tools. The settlements are distributed in a way that the most archaic and massive Acheulean sites (mainly presenting quartzite and hard stones) are concentrated in open air terraces, while the more evolved Acheulean is located in more mountainous areas with caves, next to the use of flint.

FIG. 1: Yacimiento de Piedras Negras (Ronda, Málaga)

Piedras Negras, is being presented for the first time (and it is under study at present). This site represents a significant find for the understanding of the first occupation of this mountains region. Is located upon a mesa surrounded by two stream beds of the Guadalcobacín River, in the Serranía of Ronda (Ronda, Málaga) (FIG.1). The site was discovered in 2013 after carrying out a series of constructions works for public

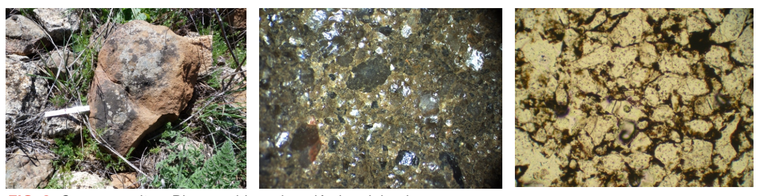


FIG. 2: Cuarzoarenitas; Bloques, binocular y lámina delgada

Quartz-sandstone (FIG. 2) is the only raw material used. It is very common in the area of the Campo de Gibraltar (were raw material is found in primary position), and was used from the Paleolithic up to Recent Prehistory. This sedimentary stone is composed of a sandstone matrix with small fragments of irregular quartz with patinas of iron oxides. It has a very porous and granular structure and presents a conchoidal fracture.

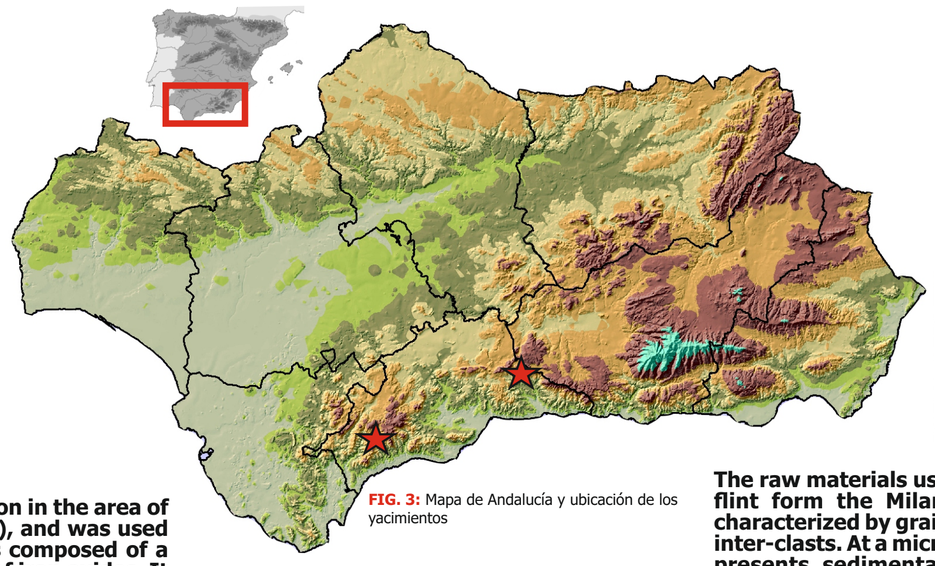


FIG. 3: Mapa de Andalucía y ubicación de los yacimientos

Cortijo del Calvillo (Loja, Granada) is a paleolithic site know in scientific literature since 1988 (Toro y Ramos, 1988)**. It is located near to a diapiric dome (FIG. 4) in the interior of Sierra Gorda where there is a contact between Triassic materials** (Sanz de Galdeano, Lozano & Puga, 2008) **that create salt water emergences, where biotic resources would concentrate.**

FIG. 4: Yacimiento del Cortijo del Calvillo (Fuente Camacho, Loja, Granada)

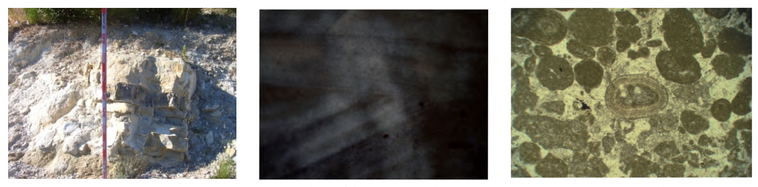


FIG. 5: Sílex Formación Milanos; plaquetas, binocular y lámina delgada

The raw materials used can be found in the immediate surroundings, and mainly consists in flint form the Milanos formation (FIG. 5) (Morgado, Lozano & Pelegrin, 2011)**. This flint is characterized by grains non-skeletal and skeletal remains of ooids, peloids, foraminifers and inter-clasts. At a microscopic level, its colour can vary (blue, gray, dark brown or black) and it presents sedimentary structures consisting in flat-parallel, crossed and tempestites lamination. Shallow and energetic facies give it a clearly visible rounded oolithic texture.**

2.- THE LITHIC ASSEMBLAGES AND METHOLOGY OF ANALYSIS: TECHNOLOGY AND DIACRITHIC SCHEMAS

The classic typological methodology of lithic assemblages have provided information about paleolithic human behavior in sens of morphological types, but the technological approaches in present times has bring much details about technical evolution, abilities (knowledge and know-how) and cultural behaviour. The theoretical-methodological background of our analysis is based on the proposals of Tixier, Inizan & Roche (1980)**, Boëda** (1989, 2005) **, Pelegrin** (1990)**, Dauvois** (1976) **and Baena Preysler & Cuartero** (2006)**, Chevrier** (2012)**, Claud** (2012)**, centered on the technological lecture of knapping techniques and methods. The elaboration of diacritic schemas is fundamental for the analysis of knapped tools, which global lecture as a whole allows us to interpret the chaine operatoire at a large scale. Diacritic schemas represent the hierarchical chain of the scars preserved on the tool, and are grouped into a chromatic series where each colour defines different actions during knapping.**

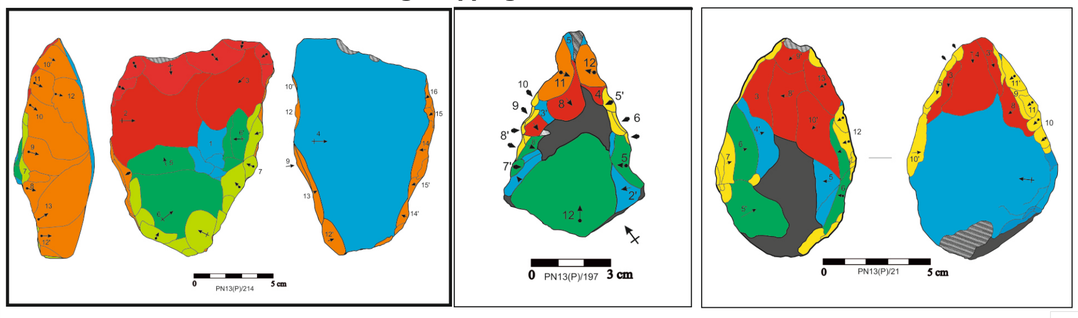
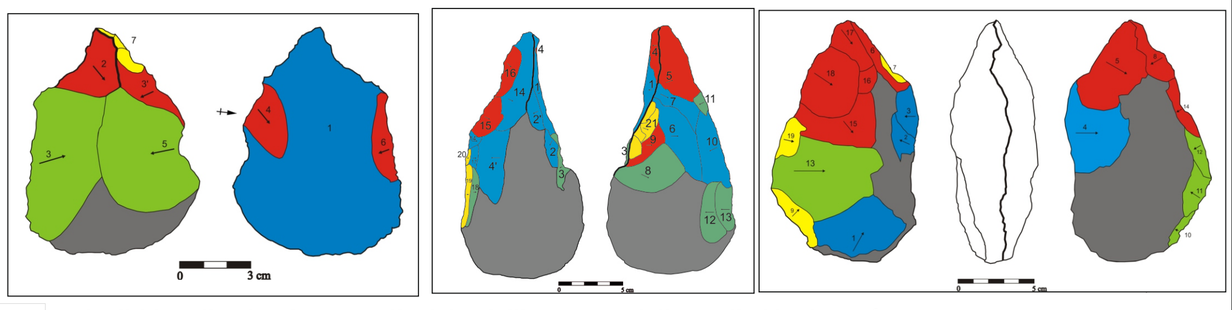


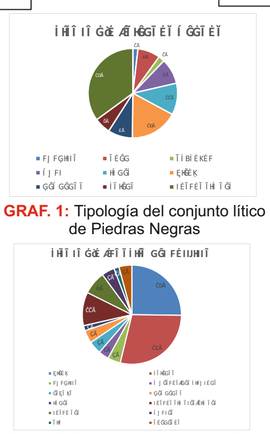
FIG. 6: Esquemas diacríticos y metodología cromática de análisis empleada (IZQ. Piedras Negras- DCHA. Cortijo del Calvillo)



The site Piedras Negras (Ronda, Málaga) is characterized by the presence of unfinished tools and finished bifacial objects of small size, cleavers and discoid and centripetal cores. The only material used for the creation of these objects is quartzite sandstones.

The lithic collection consists in 247 objects (GRAF. 1), and dew to the large number of unfinished objects and cores, the site has been interpreted as an open air workshop of about 500 m^2. The sample is mainly dominated by non-finished objects and simple (cortical or not) flakes, little bifaces, cleavers and Tayac points (FIG. 6-IZQ). There are an important percentage of discoidal cores that evidences a highly developed knapping method. The tools are elaborated (FIG.7) from large pebbles or cortical flakes, which appear in situ. The absence of trihedral knapping schemas and knapped pebbles is important, though the bifacial reduction schemas are simple. The tools that present signs of use are low, and drafts are discarded in the same area. The technique used for the obtaining of flakes-supports is direct percussion with a hard hammer (possibly thrown percussion for large flakes), and the reduction and conformation of the tools is done with a soft hammer, due to the characteristics present in the scars at discarded tools.

In Piedras Negras (Ronda, Málaga) we can distinguish an evolved Acheulean tecno-complex, having dominated by different methods and techniques for creating these objects, elements which in many occasions are non-finished or are at a mid-stage.



GRAF. 1: Tipología del conjunto lítico de Piedras Negras

GRAF. 2: Tipología del conjunto lítico de Cortijo del Calvillo

The lithic collection from Cortijo del Calvillo was partially studied in the 80´s. In 2013 (Jiménez-Cobos & Morgado, 2013) **more than 70 lithic objects were revised of which 40% belong to large tools made in flint trihedral and bifacial tools). We have included the study of the full collection (129 pieces) (GRÁF. 2).**

Cortijo del Calvillo has been technologically studied for the first time by applying by applying diacritic analysis (FIG.6-DCHA). Its studies have emphasized some features that are technologically poorly developed within the European Acheulean techno-complex, similar to those documented in Tafesa (Madrid) (Baena Preysler, Baquedano & Carrión, 2010)**.**

The principal raw materials are flint and siliceous limestone. The sample is mainly dominated by trihedral picks and hand-axes, abandoned after use, which should be related to the common use of his place. We have identified simple and expeditious chaines operatoires, though there are also some "recycled" objects identified due to the presence of double patina.The technique used is always direct percussion using a hard hammer (thrown percussion for obtaining of large flakes) and no sign of soft hammers has been identified.

The main characteristics is the rudimentary aspect of these objects, due to the fact that they used trihedral, uni-polar and centripetal methods for knapping. The series of recycling are simple and almost exclusively consist in the re-shaping of the edges or the extraction of small support-flakes. From a technical viewpoint (FIG. 8), this assemblage is composed by an importat percentage of massive picks and bifacial tools, developed by a trihedric knapping concept that produces "hybrid" tools with a common morphology.

3.- KNAPPING METHODS AND TECHNIQUES: PIEDRAS NEGRAS AND CORTIJO DEL CALVILLO

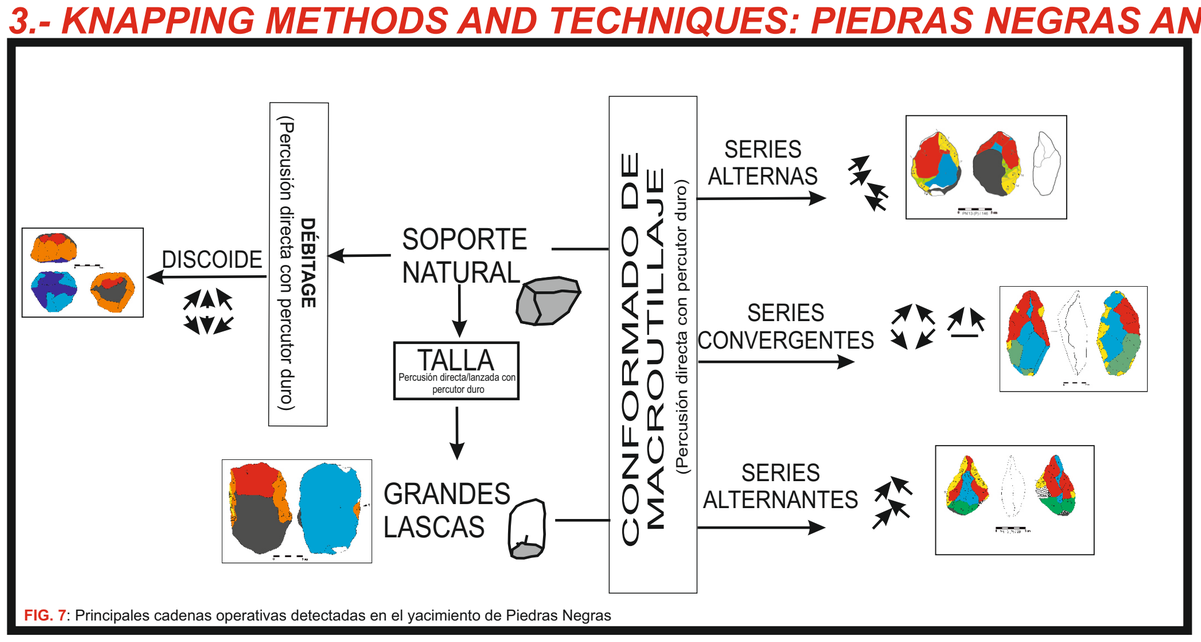


FIG. 7: Principales cadenas operativas detectadas en el yacimiento de Piedras Negras

- **Catchment of raw material in the immediate area: Pebbles and big flakes.**
- **Drafting of the primary supports, discarding the ones that do not present optimal conditions.**
- **Testing of large nodules and obtaining of large flake supports, mainly being cortical or semi-cortical flakes.**
- **Use of altering and centripetal schemas for the creation of bifacial tools, creating symmetrical and balanced supports, though they may be discarded (FIG.9).**
- **Absence of retouch and regularization in 90% of the collection. The tools that present signs of use de visu are small bifacial objects with retouches of scrapers on the edges and cleavers with flaking on the active area.**
- **They discard the drafts that do not present food characteristics for knapping or that are impossible to re-configure.**

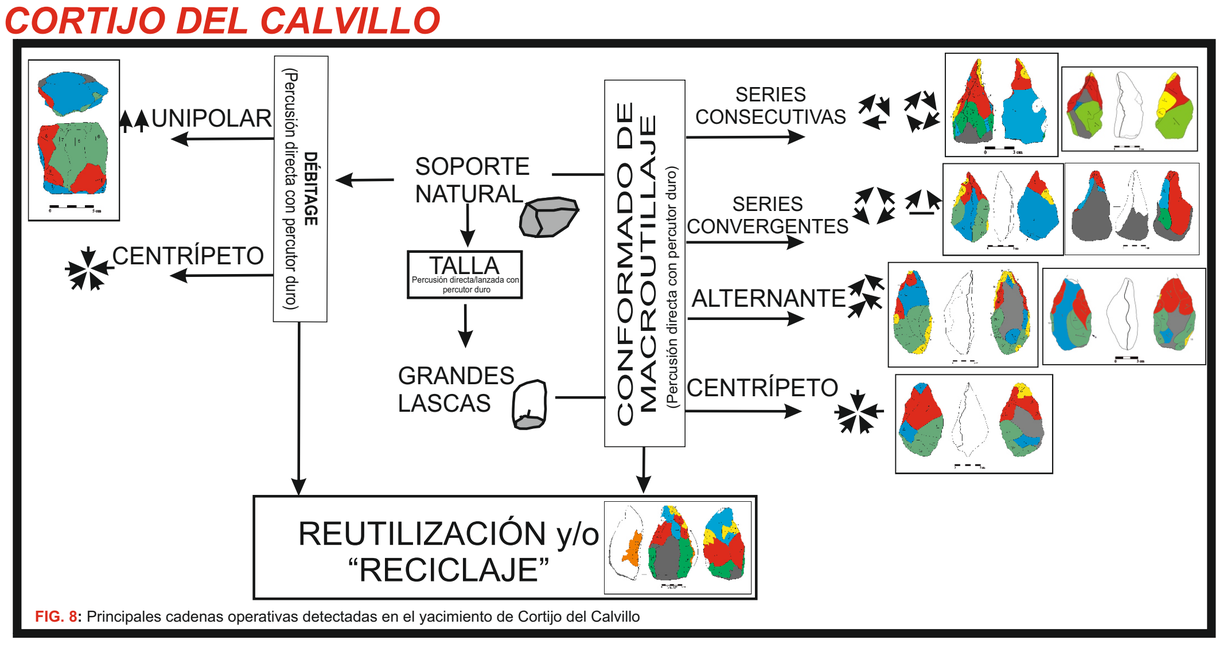


FIG. 8: Principales cadenas operativas detectadas en el yacimiento de Cortijo del Calvillo

- **Local catchment of raw materials (flint and limestone). Pebbles and big flakes**
- **The first phases of the chaine operatoire are not represented.**
- **Primary support: large nodules and chips with scarce prior preparation**
- **Re-knapping of the edges (double patina).**
- **Trihedral knapping schemas. The edges are knapped independently with scarce alternation in the reduction of bifacial tools, producing sinuous edges (FIG. 10).**
- **The active edges of the bifacial tools are neither symmetric nor balanced.**

4.- DISCUSSION AND CONCLUSION: TECHNO-SEQUENTIAL AND CONTEXTUAL DIFFERENCES

- **We can observe a different use of reduction methods: alternate in the case of Piedras Negras (with the predominance of bifacial tools, and consecutive and convergent series) and in the case of Cortijo del Calvillo (with the predominance of trihedral objects and schemas).**
- **Exploitation of cores using expeditious, uni-polar and orthogonal series (Cortijo del Calvillo) and discoid and centripetal schemas (Piedras Negras) which are very standardized and recurrent.**
- **These differences are not united to the characteristics of the raw materials, buy to the different knapping schemas and concepts.**
- **The differences in the chaine operatoire; its use, abandon, and reuse prove contextual and technological differences between both sites.**

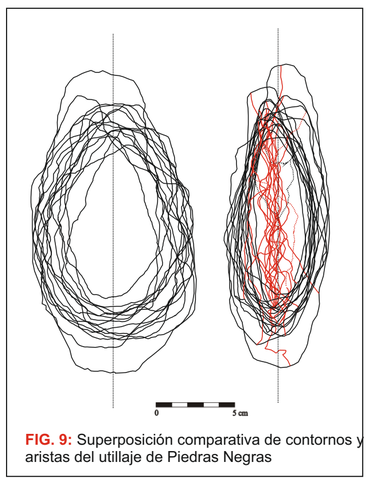


FIG. 9: Superposición comparativa de contornos y aristas del utillaje de Piedras Negras

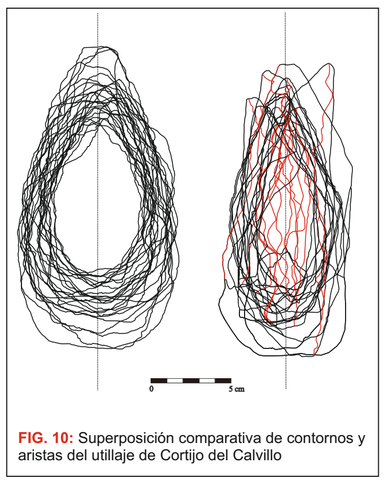


FIG. 10: Superposición comparativa de contornos y aristas del utillaje de Cortijo del Calvillo

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