
Introduction: Beyond the reduction sequence and new insights in lithic technology

Stefano Grimaldi ^{1,2}, Sara Cura ^{2,3}

1. Quaternary and Prehistory Group of Geosciences Center Unit (uID73 - FCT) Largo Infante D. Henrique 6120 -450, Mação, Portugal. Email: stefano.grimaldi@unitn.it
 2. Dipartimento di Lettere e Filosofia, Università degli studi di Trento, Trento, Italy. Via Calepina, 14 - I-38122 Trento, Italy.
 3. Earth and Memory Institute, Largo Infante D. Henrique 6120 -450, Mação, Portugal. Email: osaracura0@gmail.com
-

The proceedings of the B23 Session held during the XVII UISPP/IUPPS conference (1-7 September 2014, Burgos, Spain) are published in this issue of the Journal of Lithic Studies. The title of the session, "Beyond the reduction sequence: new insights in lithic technology", aimed to increase awareness about current methods in studies on stone assemblages.

The organizers (Sara Cura and Stefano Grimaldi), in collaboration with Fabio Santaniello (Trento University, Italy and CEPAM, Nice University, France) and Eric Boëda (UMR 7041 ArScAn-AnTET, Nanterre University, France), chose this topic for a number of reasons. We wished to shift emphasis away from the "simple" reconstruction of the reduction sequence, and to explore the methodological complexity in analysing stone tools with the final aim of elucidating the human behaviour. In fact, we believe that, despite the application of numerous and diverse types of research technologies, the behavioural significance of lithic production variability has remained mostly unsolved. One of the main reasons may be due to the current studies on lithic technology which tend to be more and more oriented toward a new "technological typology", replacing the traditional morphological one. The reduction sequence approach is mainly related to the reconstruction of the core life, with poor justification or interpretation in terms of behavioural variability. This tendency leads – similarly to the typological approach - to discard all the contextual peculiarities of a lithic industry. The lithic artefact is the marker of an individual knowledge shared by a community. Then, a lithic artefact should be considered as a direct reflection of its cultural and natural environments. The technological approach – with its reconstruction of the "*chaîne opératoire*" - should consider a prehistoric lithic assemblage as a residual trace of the human behaviour; a lithic industry has to be analysed as a whole of technical choices and economical purposes which satisfy the needs of that human group living in that site in a given time. Then, we have to go further the simple reconstruction of the core life: we have to justify it. Without this identification, any reconstructed reduction sequence remains an empirical description just useful to better visualize collected data through a simple terminology. Analogously, the use wear analyses –focusing on the functional life of the lithics – is lacking to observe an



anthropological reality which goes beyond the artefact use and it is part of a larger technical system anchored in a regional scale. Our working hypothesis is based on the following assumptions: a) if reduction sequences are a real adaptive tool elaborated by a human group, differences in environmental conditions should be involving technical variability; b) technical variability, leading to differences in the pursued objectives, is related to functional purposes which vary from site to site and in time according to variations in settlement/mobility strategies; c) technical objectives could differ from those items traditionally identified as "predetermined" by typological or technological analyses: a technical objective could be represented even by one or more techno-functional features characterizing different kinds of blank, whether technologically predetermined or not. A true technological-functional approach is our goal to increase our perception on the adaptive significance of the lithics. We try to synthesize different but interconnected features such as Production and Preparation of the lithics as well as their Prehensile and Transformative edges. If we missed this scale of observation, we risk to simplify our interpretation. For this reason, in this session, we hope to raise reflections on the mentioned issues through the presentation of few but interesting study cases.

The papers

Carmignani (in this volume) addresses the issue of the technological complexity that characterizes Middle Palaeolithic reduction systems and investigates the role of elongated products within Neanderthal techno-cultural baggage. His study case is the Riparo Tagliente (Tagliente rock shelter) in north-east Italy.

Two different approaches were used for analysing the lithic assemblages from Riparo Tagliente (VR). A first analysis focused on the identification of the reduction systems by determining the techniques, methods and concepts underlying the entire *chaîne opératoire*. The second approach concentrated on analysing blade production in order to identify the transformative and maintenance parts of tools linked to the grade of predetermination of the reduction systems.

By repositioning the sequence of Riparo Tagliente in the Italian context the study concludes that at the end of the Mousterian cycle the technological patterns differ greatly, in which laminar production is one of the most evident expressions. The origin of this fragmentation is questionable.

De Weyer (in this volume) deal with lithic industry unearthed in the lowest levels of the Ounjougou stratigraphic sequence, the most complete record in Western Africa for the Middle Pleistocene. The techno-functional approach performed to study polyhedrons, spheroids and bolas, abundant in the collection, demonstrates that those artefacts were shaped from independent *chaînes opératoires* to realize specific tasks, giving the first evidence of an Early Sone Age in stratigraphy in Western Africa.

Cura and Grimaldi (in this volume), addresses the question of technological choices in the exploitation of fluvial quartzite pebbles in the Final Middle Pleistocene of Western Iberia presenting the case study of the lithic assemblage of Ribeira da Ponte da Pedra site in Central Portugal. From a techno-typological point of view, two main reduction sequences have been identified; final products are worked pebbles, retouched pebbles, cortical and semi-cortical flakes, retouched flakes, a few cores and rare bifacial artefacts. Some artefacts present irregular and variable edge modifications described as «informal» retouch that could be, in fact, edge damage resultant from their utilization and/or post-depositional of these blanks. From a strictly technical point of view the assemblage can be described as quite simple, however we can envisage an inherent complexity starting in an accurate exploitation of the

quartzite pebbles, whose regular morphology allows a «predetermined» production of regular blanks through simple actions.