Museu de Arte Pré-Histórica
e do Sagrado no Vale do Tejo,
Portugal

Laboratorio di Paletnologia
Dip. Fil, St. e Beni Culturali
Universitá di Trento, Italia

Workshop15

«Technological analysis on quartzite exploitation»

www.cm-macao.pt/~museu/indexws15.html

Organising Secretariat:
Sara Cura
Museu de Arte Pré-Histórica e do Sagrado no Vale do Tejo; Mação, Portugal. E-mail: saracura@portugalmail.pt

Stefano Grimaldi
Laboratorio di Paletnologia, Dipartimento di Filosofia, Storia e Beni Culturali, Università di Trento, Trento, Italia. E-mail: stefano.grimaldi@lett.unitn.it

Monday 4 of September
Room 6.1.47 Science Faculty, Lisbon University

- Each speaker has been allocated with 20 minutes:
- 15 minutes for the lecture and 5 minutes for questions.
- If you speak for 20 minutes there will be no time for questions.
- Session Chairs will be very strict on time keeping.

Time	Lecture	Author/s	Event
14h00min			Welcome to participants
14h10min	1	Chauhan	
14h20min	2	Guislain	
14h40min	3	Cura & Grimaldi	
15h00min	4	Colonge & Mourre	
15h20min	5	Sternke	
15h40min	6	Moncel, de Lombera Hermida & Deniaux	
16h00min			Coffee Break
16h20min	7	Tuffreau, Boroneant, Goval, Boroneant, Dobos, Lefevre & Popescu	
16h40min	8	Di Modica & Bonjean	
17h00min	9	Mester	
17h20min	10	Almeida, Cunha Ribeiro, Carrondo & Cura	
17h40min	11	Wiśniewski	
18h00min	12	Bourdin-Launay & Molines	
18h20min	13	Raposo	
18h40min	14	Pereira & Moitinho	
19h00min	**Final discussion**		

ABSTRACTS

Lecture 1

Palaeolithic exploitation of quartzite in the Indian subcontinent: some general observations

Parth R. CHAUHAN

Stone Age Institute & CRAFT Research Center, Indiana University (USA) P.O. Box 5097, Bloomington, IN 47407-5097 United States, E-mail: pchauhan@indiana.edu

In the Indian subcontinent, paleolithic assemblages are often produced on quartzite in varying environmental contexts. Both Acheulian and non-Acheulian assemblages as well as younger Middle and Upper Palaeolithic industries are results of different quarrying and reduction strategies. For example, biface production often relied on the acquisition of large clasts such as large cobbles and boulders to extract flakes or blanks large enough to allow considerable reduction to attain maximum symmetry and morphological preference. On the other hand, most non- and post-Acheulian assemblages relied on smaller cobbles and pebbles, rather than larger clasts, resulting in minimal cortex removal. Interestingly, most quartzite resources exploited in the Indian subcontinent during the Paleolithic were in the form of rounded, river-worn clasts. Very few sites exist where angular or tabular clasts were sought; some exceptions are specific Early Acheulian assemblages in central India. Depending on the palaeobiogeography, quartzite was the predominant raw material type preferred by and available to Pleistocene hunter-gatherer groups in South Asia and changes in preference are generally known to occur only during the later Pleistocene timeframe (e.g. Middle Palaeolithic and younger assemblages), but to variable degrees.

Lecture 2

Modes d'exploitation des grès quartzites au paléolithique inférieur dans le Sud-Est marocain

Stéphanie GUISLAIN

UMR 6636, Economie, Société et Environnements Préhistoriques. Maison Méditerranéenne des Sciences de l'Homme, E-mail : sguislain@yahoo.fr

Dans le Sud-Est marocain, les formations sédimentaires à grès quartzites sont très nombreuses. Les dépôts sédimentaires ordoviciens se présentent sous forme de massifs résiduels fortement déprimés ; les formations récentes du Crétacé constituent les hamadas. Les grès quartzites infra-cénomaniens sont présents à la base des dépôts hamadiens et sont présents sur toute la bordure des plateaux hamadiens crétacés. Les hommes préhistoriques du paléolithique inférieur ont presque exclusivement exploité cette roche abondante et d'excellente qualité. Plusieurs sites de surface de cette région ont fait l'objet d'études techno-typologiques. L'analyse a permis de mettre en évidence des modes d'acquisition des supports inhérents la morphologie des blocs à l'état naturel. Les deux systèmes de débitage sont le débitage Kombewa et le débitage Levallois. Ils sont orientés vers la production de bifaces et de hachereaux avec une forte prédétermination. En confrontant les résultats de cette région du Sahara nord-occidental à celles des régions limitrophes (Saoura, vallée du Draâ, et Mauritanie) et de l'ensemble du Sahara on note une grande homogénéité des comportements des tailleurs préhistoriques du Paléolithique inférieur.

Lecture 3

The quartzite exploitation in a middle pleistocene open air site: Ribeira da Ponte da Pedra (Portugal)

Sara CURA * & Stefano GRIMALDI **

** Museu de Arte Pré-Histórica e do Sagrado no Vale do Tejo; Largo Infante D. Henrique, 6120-750 Mação (Portugal) E-mail: saracura@portugalmail.pt*
*** Laboratorio di Paletnologia, Dipartimento di Filosofia, Storia e Beni Culturali, Università di Trento, via S.Croce 65, I-38100 Trento (Italy). Email: stefano.grimaldi@lett.unitn.it*

The archaeological site of Ribeira da Ponte da Pedra is located in the slope of an ancient valley where tertiary deposits, quaternary fluvial terraces and coluvial deposits alternate. Since 1999 we have been excavating the middle terrace (lower Palaeolithic) and the lower terrace (Middle Palaeolithic). Recently, absolute datings have been obtained for the middle terrace (300 000 BP) and for the lower terrace (90 000 BP). The archaeological remains from both terraces are exclusively lithic artefacts and more then 95% of these are made from fluvial quartzite pebbles. Middle terrace lithic assemblages are morphologically similar to what is considered archaic or pre-acheulean, while as those from the lower terrace lack Levallois and typical Mousterian retouched implements. Authors, while stressing the weakness of typological studies, suggest more attention as to be given to the technology of quartzite pebbles exploitation considering features such as raw material constraints and/or advantages, variable volumetric shape and texture, their large availability in this region. Nevertheless, even if the use of quartzite pebbles influences both technological and economical behavioural patterns, the choice for this or that implement may be determined by contextual adaptative strategies adopted within a given time and place.

Lecture 4

Quartzite et quartzites: aspects pétrographiques, économiques et technologiques des matériaux majoritaires du Paléolithique ancien et moyen du Sud-Ouest de la France

David COLONGE * & Vincent MOURRE **

** INRAP Grand Sud Ouest et Unité Toulousaine d'Archéologie et d'Histoire / UMR 5608, Dardenne, 46 300 Le Vigan (France), Email: david.colonge@wanadoo.fr*
*** Unité Toulousaine d'Archéologie et d'Histoire / UMR 5608, Les Hauts Arthèmes, 84560 Ménerbes (France), Email: vincent.mourre@wanadoo.fr*

Le Sud-Ouest de la France est encadré par deux importants massifs montagneux, le Massif Central et les Pyrénées. Leur érosion a fourni d'énormes quantités de fraction grossière facilement accessible dans les formations détritiques et alluviales qui en sont issues. Ces dépôts ont constitué des sources de matières premières massivement mises à profit par les artisans du Paléolithique ancien et moyen, en premier lieu pour les quartzites. Sous ce terme unique sont en fait rassemblées des familles de matériaux aux caractéristiques pétrographiques et mécaniques diverses : les domaines liés aux Pyrénées ou au Massif Central en sont les deux principales. De plus, au-delà des différences intrinsèques, un même matériaux peut être disponible sous la forme de blocs ou galets aux qualités et contraintes propres. Ainsi, dans une apparente monotonie de nombreuses séries lithiques, des circulations et économies de matières premières ont pu être mises en évidence dans l'Acheuléen pyrénéen ou tarnais, le moustérien pyrénéen, … par exemples. Ainsi, selon la nature et la morphologie des différents blocs disponibles ou transportés, des chaînes opératoires sont adaptées à ces paramètres de ce qui reste une même matière première.

Lecture 5

The Quartzite Palaeolithic of Germany: New Approaches to the Study of Late Middle Pleistocene Lithic Technology

Farina STERNKE

Centre for the Study of the Archaeology of Human Origins, School of Humanities, University of Southampton, Highfield, Southampton, SO171BJ. E-mail: f.sternke@soton.ac.uk

The study of raw material is now a central concern in Palaeolithic archaeology. Such studies have provided information on transportation patterns as well as manufacturing choices. Attention has focused almost exclusively on flint. However, in many European countries the Palaeolithic use of quartzite in the absence of good quality flint is well documented. But, how are we to interpret the choice of non-flint raw materials such as quartzite as the dominant raw materials for lithic production in terms of the technological and social behaviour of Middle Pleistocene hominids? The Quartzite Palaeolithic of Germany serves as a regional case study for the exploration of the relationship between hominids and their choice of lithic raw materials. The use of quartzite at four Middle Palaeolithic sites in two regions, which are divided by a differential distribution of flint as a result of glacial conditions, are examined. The focus is on the study of quartzite through time and within geographical and social space to demonstrate that quartzite was differentially exploited throughout prehistory in the two study regions and to explore the reasons for the absence of flint at these sites. The issue of preference versus necessity in terms of Middle Palaeolithic raw material use and mobility is central to the discussion. This results in a new interpretation of Middle Pleistocene hominid behaviour in relation to mobility and lithic raw material procurement. Further, it will be shown how this study has benefited from the use of comparative experimental replication to resolve questions associated with the technological aspects of the assemblages in the case study.

Lecture 6

Quartz et quartzite dans les niveaux d'occupation OIS 5 à 7 du site de Payre (France): un exemple de l'utilisation de ces roches pour une fonction spécifique et complémentaire

Marie Heléne MONCEL *, Arturo de Lombera HERMIDA **, Brigitte DENIAUX ***

** Institut de paléontologie Humaine, 1 rue René Panhard, 75013 Paris, France, E-mail : moncel@mnhn.fr*
***Aera de Prehistoria, URV, Tarragona, Spain, E-mail:*
***(CERP Tautavel, France), *Email:* deniaux@tautavel.univ-perp.fr

Le site de Payre livre plusieurs niveaux d'occupation sur un promontoir en bordure de la vallée du Rhône. Le silex est la roche la plus utilisée pour le débitage dans toutes les phases d'occupation, disponible en abondance dans un périmètre peu éloigné du site. Le basalte vient en seconde position, prélevé dans la rivière au pied du site. Il est destiné à un gros outillage sur galet, brut ou aménagé. Le quartz (2 à 12%) et le quartzite (0,5 à 4%) ne représentent qu'une petite partie des artefacts mais leur traitement indique un choix, non pas pour des raisons de manque de matériaux dans l'environnement, mais pour des fonctions spécifiques. Le quartz fournit des éclats épais laissés souvent bruts. Ils sont débités en grande partie sur place. La quartzite arrive avant tout sous forme de grands éclats bruts ou retouchés. Ces éclats sont des entames extraites de volumineux galets que l'on peut trouver en bordure de la vallée du Rhône toute proche. Les tranchants, très écrasés, indiquent un usage intense de ces outils. Quelques petits éclats en quartzite témoignent d'un possible ravivage d'outils qui n'ont pas été découverts dans l'habitat. Le matériel sur quartzite serait un outillage mobile de grande dimension et de module aplati. Le matériel en quartz serait complémentaire au silex en

fournissant des produits épais et de dureté différente. L'association du quartz et du quartzite au silex et au basalte montre une gestion du territoire dans différentes directions et un traitement différentiel de matériaux variés pour des fonctions spécifiques.

Lecture 7

The use of the quartzite in the mousterian industry of Zabrani (Banat, Romania)

Alain TUFFREAU *, Vasile BORONEANT **, Emilie GOVAL *, Adina BORONEANT *, Adrian DOBOS ***, Bertrand LEFEVRE * & Gabi POPESCU *****

** Laboratoire de Préhistoire et Quaternaire, Université des Sciences et Technologies de Lille, 59655 Villeneuve d'Ascq cedex, France. Email:* alain.tuffreau@univ-lille1.fr
*** Museul de Istoria si Arta al Municipiuliu Bucaresti, Bd I.C. Bratinuz, 70058, Bucuresti, Romania. Email:*
**** Institut d'Archéologie Vasile Parvan, Académie roumaine, 11, rue Henri Coanda, sector 1, 71119 Bucuresti 22, Romania. Email:*

More than the half of the raw material knapped in the open air site of Zabrani dated in the Last Early Glacial is represented by the quartzite in spite the presence of other raw materials. The majority of the flake-tools are in quartzite. The analysis of the reducing sequences according to the different raw materials gives informations concerning the use of the quartzite (debitage, blanks, end-products).

Lecture 8

Exploitation du quartzite dans la couche moustérienne 5 de la grotte Scladina

Kévin DI MODICA * & Dominique BONJEAN **

**Archéologie Andennaise asbl, rue Fond des Vaux 339d ,5300 Sclayn-Andenne, Belgium. E-mail : kevin_dimodica@yahoo.fr*
***Archéologie Andennaise asbl, rue Fond des Vaux 339d ,5300 Sclayn-Andenne, Belgium. E-mail : scladina@swing.be*

La couche 5 de la grotte Scladina (Wallonie, Belgique) livre depuis 1978 une industrie lithique moustérienne de plus de 10.000 artefacts, caractérisée par la coexistence de quatre chaînes opératoires sur neuf matières premières d'origines et de natures diverses. Cette étude concerne la gestion des galets de quartzite qui ont été récoltés à proximité du site et exploités intégralement dans le gisement. Une cinquantaine de remontages, dont certains quasi complets, permettent de reconstituer la morphologie du bloc de départ et de décrypter le traitement technologique qui lui fut appliqué. La série se caractérise par un débitage centré sur l'obtention de supports courts et peu élaborés qui tirent avantageusement parti de la morphologie naturelle du galet. Les éclats, souvent corticaux et asymétriques, présentent un dos et/ou un talon large qui facilitent la préhension. De plus, l'aspect grenu de la matière confère au tranchant une micro-denticulation naturelle propice à une action de sciage. La collection de Scladina est particulièrement intéressante car le quartzite fait l'objet d'un traitement spécifique, non seulement en fonction de la nature de la matière première et de critères ergonomiques, mais aussi de contraintes économiques. Celles-ci, liées à l'absence de silex dans l'environnement local, ont généré un système original de gestion des ressources lithiques régionales.

Lecture 9

Exploitation du quartzite à la station d'Érd (Hongrie)

Zsolt MESTER

E-mail : h8009mes@ella.hu

La station d'Érd, fouillée par Veronika Gábori-Csánk en 1963 et 1964, est un site particulier du Paléolithique moyen de la Hongrie. Deux zones d'habitat ont été mises au jour et six niveaux d'occupation ont été identifiés dont le matériel archéologique représentait la même industrie lithique. L'étude de la faune prédominée par l'ours des cavernes a fourni nombreuses observations palethnologiques concernant la chasse des habitants préhistoriques. Les résultats des études pluridisciplinaires ont été publiés en 1968 dans une monographie à renommé international. L'industrie de la station a été attribuée au Charentien d'Europe sud-orientale. L'utilisation dominante des galets de quartzite pour la confection des outils donne le caractéristique le plus important du faciès moustérien installé à Érd. V. Gábori-Csánk a comparé la technologie appliquée à celle du Pontinien en Italie. L'étude technologique de l'indusrie d'Érd a révélé que les hommes ont appliqué plusieurs méthodes de débitage pour l'exploitation des galets de quartzite. Les méthodes ont été choisies en fonction de formes de galets et de paramètres souhaités des produits recherchés.

Lecture 10

The Middle Paleolithic quartzite exploitation in the south interior of Portugal

Francisco ALMEIDA *, João Pedro CUNHA RIBEIRO **, Joana CARRONDO * & Sara CURA ******

** Centro de Investigação em Paleoecologia Humana e Arqueociências, Avenida da Índia,136, 1300 Lisboa (Portugal). E-mail: falmeida@ipa.min-cultura.pt*
*** Faculdade de Letras da Universidade de Lisboa Alameda da Universidade 1600 – 214, Lisboa (Portugal)., E-mail:jpcunharibeiro@netcabo.pt*
**** Instituto Politécnico de Tomar / Universidade de Trás os Montese Alto Douro, Rua Dissay nº13 RC esq. 2260-400 Vila Nova da Barquinha, E-mail: joanacarrondo@portugalmail.pt*
***** Museu de Arte Pré-Histórica e do Sagrado no Vale do Tejo; Largo Infante D. Henrique, 6120-750 Mação (Portugal) E-mail: saracura@portugalmail.pt*

Due to the construction of the Alqueva dam in the south interior of Portugal emergence archeological works were carried out and two Middle Palaeolithic open air sites – Porto Meirinho e Sapateiros 2, were excavated and studied. This was an area where almost none evidences of this chronology were so far found. These two sites, situated along the Guadiana river terraces, present some similarities and differences that we find quite interesting. We aim to discuss some issues related to the methodology applied to the study of quartzite industries coming from fluvial terraces, i.e. secondary contexts, with none or rare refittings and no faunal remains. According to the characteristics of these two archaeological sites and their lithic industries, we also aspire to raise some questions related to the use of quartzite pebbles, their availability and their variable morfovolumetry and granulometry.

Lecture 11

Bečov I, A-III-6 - Middle Palaeolithic quartzite assemblage from Central Europe

Andrzej WIŚNIEWSKI

Institute of Archaeology, University of Wroclaw, Poland, Email: anwis@rubikon.pl

The NW Bohemian site Bečov I lies on an elevation known as Písečny vrch (Sandy Elevation) built ia of characteristic paleogen quartzite. Regular excavation carried out in the area started in the 1960s and 70s by a team led by J. Fridrich (Archaeology Institute, Czech Academy of Sciences Prague) resulted in discovery of several large sites, one of which, the multi-level (Bečov site I) produced evidence of Neanderthal occupation, among them, numerous lithic artefacts fashioned from Bečov quartzite. Bečov site I was revisited for the technological re-examination of the largest inventory recovered from Layer 7 (Bečov I, A-III-6). The age of the layer is synchronized with OIS 7, which corresponds to the interglacial period at the close of the Middle Pleistocene. Czech geologists frequently referred to it as “Postsaale”. Some 3000 lithic artefacts were examined for better understanding of the main scheme of blank and retouched tool production. Most artefacts were in local Bečov quartzite which occurs locally in many different variations. The more fine-grained varieties apparently have the best technological properties characterised as they are by generally good cleavage. A much smaller number of artefacts were from a different variety of quartzite referred to as type Skršín, most probably brought to the site at Bečov from a distance of several kilometres. Finally, a just a few pieces were fashioned from porcelanite and quartz, rocks known to occur in the area of the elevation. Raw material of different size were selected for working. Typically, the quartzite had the form of blocks (slabs, irregular polyhedrons) and pebbles were used much less frequently. Perhaps knappers selected blocks because they were more weathered than pebbles and more easy for organising the working process. The inventory from Bečov represents the flake technology; reduction based on cores without developed preparation and was target on obtaining unifacial tools. It appears from analysis that the main object of the knapping process was to obtain heavy flakes, frequently triangular or rectangular in cross-section. We noted that flakes of this type were subsequently worked into side scrapers. Other categories of blanks, much less frequently fashioned into tools, included elongated flakes or blades. Blanks were produced using two main groups of methods. Group I is represented by centripetal uni- or discoidal cores, Group II, by a smaller number of parallel uni- or bi-directional (single or double platform) cores. It appears from studies done so far that selection of blank and tool production strategies was not dictated by properties of the raw material. This is suggested by, on the one hand, the consistent adherence to specific production methods, on the other, by the presence in the region of Písečny vrch elevation of older and younger lithic inventories, produced from the same type of quartzite using entirely different methods (bifacial method, Levallois method). All of which suggests that the artefacts from Layer 7 at Bečov may represent a discrete taxonomic unit, similar in formal terms to the Quina facies of Mousterian industry. It seems that the application of this particular strategy of working the raw material resource may have resulted from deliberate selection.

Lecture 12

Mousterian industries in western France : bifacial technique, producing sites and consumed tools.

Solène BOURDIN-LAUNAY & Nathalie MOLINES

UMR 6566 du CNRS, Laboratoire d'Archéologie-Archéométrie, Université de Rennes 1, France, E-mail : sbourdin@yahoo.fr

Several surface sites shared out in Western France provide lithic industries revealing numerous bifacial tools, they characterize regional Mousterian dating from Upper Pleistocene. These open sites providing abundant lithic artefacts always deal with local raw material disposability (glossy sandstone or flint). This study enter a large problematic of technological analysis about industries within bifacial treatment of blanks is a fundamental characteristic. Remains attest that all the producing system, from acquisition to abandonment, takes place in the site. Numerous tools, including handaxes, enter a reducing process combining resharpening, refiting, and technical status changing. These transformations indicate tools consumption, sign of their use near the site. Recycled artefacts give evidence of a will of expanding consumption cycle. The association of production and using of tools suggests a shared gestion of space during the settlement, between organisation of specifical

activities, still unknown, and flaking areas. Technical strategy of producing numerous handaxes needs a more important technological investment towards others tools, but these shaped supports integrate long-term gestion with more important recycling capacities. Glossy sandstone (or "quartzite") exploitation answers here a choice, and can not be considered as a palliative strategy dealing with the flint deficit of large module, specific of this region. The study finds an outward-looking with comparaison possibilities with same 'facies' industries, known form occidental to oriental Europe. These new datas obtained from Western France contribute to the vaste debate about filiations of industries including bifacial component.

Lecture 13

O uso do Quartzito e de outras rochas locais nas indústrias paleolíticas e epipaleolíticas em Portugal: constrangimentos ou potencialidades?

Luís RAPOSO

Museu Nacional de Arqueologia; Edifício dos Jerónimos, Praça do Império, P-1400-206 Lisboa (Portugal); E-mail: 3raposos@mail.telepac.pt

Not Available

Lecture 14

3D analysis on quartzite industries: a study case

Telmo PEREIRA * & Vera MOITINHO **

** Instituto Português de Arqueologia, Avenida da Índia, 136, 1300 Lisboa (Portugal), E-mail: telmo@ipa.min-cultura.pt*
*** Instituto Português de Arqueologia, Avenida da Índia, 136, 1300 Lisboa (Portugal), E-mail: moitinho@ipa.min-cultura.pt*

Quartzite industries collections are macro-like. The volume and weight of each artefact makes the transportation of collections difficult. In one hand, this situation directly affects the study, mainly when it occurs outside the research centres and universities. On the other hand, this transport increases the deterioration of crucial stigma analysis. In this session we will show how the use of 3D technologies can assist on Virtual Archaeology. 3D Reconstruction may help the study, analysis, interpretation and preservation of artefacts, complementing the traditional archaeological alpha-numeric data and illustrations, with new digital forms of visual registration and virtual manipulation. Here we will present a first application test of these technologies in some Palaeolithic cobbles from Granho-Vale Coelheiro.