

LETTERS AND NOTES

REPORT ON THE PREHISTORIC QUARRIES AND MINES SESSION AT THE SOCIETY AMERICAN ARCHAEOLOGY ANNUAL MEETING IN ST LOUIS, 2010

Several thousand archaeologists gather annually to attend the Meeting of the Society of American Archaeology (SAA) and discuss an enormous range of issues relating to the American continent and further afield. Among the various interest groups is one on Prehistoric Quarries and Mines set up in 2006 to further the study of prehistoric extraction. The group has hosted sessions on mining and quarrying ever since with one aim being the construction of an international inventory of prehistoric quarry and mine sites that should assist researchers with their search for comparative information. While such data from within Europe on flint extraction sites is reasonably well documented as a result of the Bochum conferences and the work of the International Flint Symposium (e.g. Weisgerber 1981; Lech 1995; Schild & Sulgostowska 1997; Korlin & Weisgerber 2006) it is more difficult to compare data with sites elsewhere in the world where they are often known by obscure references or sometimes simply by word of mouth. Following the success of the meeting in 2009, where a dozen presentations from eight countries were discussed, the group held a further session at the Society of American Archaeology meeting in St Louis in 2010 with the aim of broadening and establishing the database and encouraging regional interpretations and syntheses. Included on this occasion were contributions from Canada, the US, Romania, Mexico, Spain and Israel.

Central to the session was the nature of any database and how it could be presented and resourced. *Neil Hauser* discussed the form and practicalities of setting up a **Web-based lithic source database** and described experience in Colorado. This allowed those in the region to compare materials found on site with artefacts from known sources using high quality photographs and Munsell color codes. He canvassed views about other information that might be usefully incorporated such as reflective spectra, laser spectroscopy profiles and thin section data.

Others presented regional assessments or described new quarry sites. *Adrian Burke* advised of explorations in the Quebec arctic at

The Naparutalik siltstone quarry, Nunavik, Canada where exploitation may date to around 3000 BP. The outcrops display remarkable evidence of extraction, with enormous flake scars along the bedded layers for some 200 m, coupled with deposits of waste flakes, preforms and quarry tools. Elsewhere in Canada, the highly distinctive Ramah chert from Labrador has received some recent attention with attempts to provide a geochemical signature (Leblanc *et al.* 2010), but distribution of this material is widespread and *Jenneth Curtis* described an attempt to document **the Ramah chert quarries in Torngat Mountains National Park of Canada**, where fieldwork over a considerable geographical area has provided details of the geology of the outcrops as well as finer points of the extraction process.

Among recent excavations in the United States, prehistoric extraction of a fine grained volcanic material with an associated chert deposit all dating no earlier than 3,500 BP has been identified. In **The development of lithic extraction areas in the Okanogan Highlands during the Late Holocene: evidence from Curlew Lake, Washington** *Christopher Noll* outlined examination of this material found in areas away from the source indicating that it can be used to study group mobility and interaction, and demonstrate how foraging activity away from a home base on the Columbia River may have informed knowledge of localities containing high quality stone. Further south, work by *Paul Katz* steadily cataloguing **Extraction sites on the southern High Plains of North America** continued with description of surface pits used to extract a variety of materials in the Oklahoma and Texas Panhandles.

In Mexico, work by *Olaf Jaime-Riveron* on **Jade quarries of Mesoamerica used by the Olmecs** mirrors that of Pierre Petrequin in Europe. *Jaime-Riveron* uses multiple geochemical techniques on samples obtained from excavated sites on fieldwork expeditions to mountainous areas and compares them with known Olmec artefacts. He listed the results of the use of a suite of serpentinite rocks such as jadeteite, eclogite, omphacite and albite used in



Figure 1. The Crescent Hills quarry site. Note the metre high scarp on the on the right of the photograph leaving a 5m wide ledge that extends into the distance and within which are set a series of shallow depressions that mark individual extraction episodes.



Figure 2. Brad Koldehoff holding a block of flint at the Crescent Hills quarry site.

the Formative Period by the Olmecs and described how GIS assisted with the plotting of supply routes.

For Europe, *John Rissotto described the process of Establishing an inventory of Middle and Upper Palaeolithic chert quarries across north-central Spain*. He used GIS as a tool to incorporate contemporary or chronological data in order to integrate chert quarries into programmes of Palaeolithic investigation and provide a base for characterisation and survey of the extraction site.

The precise source of much of the flint found on sites in the Balkans remains problematic. Hoards of thin blades of extreme length, longer than 200 mm, and found in excavation of Neolithic house sites in Romania have been studied by *Ivan Gatsov*, but problems posed by the origins of the raw material were addressed in his contribution on **Pietrele, Romania and the problem of raw material procurement**.

Flint and chert extraction in Israel is well documented as a result of the work of *Avi Gopher and Ron Barkai* (e.g. *Gopher & Barkai 2006*) but a method of documentation using 3D laser scanning a high-density complex at Nahal Galim was outlined by *Dani Nadel, Sagi Filin, Danny Rosenburg and Reuma Arav* in a **Detailed three-dimensional characterization of a flint quarrying complex in Mt. Carmel, Israel**. Terrestrial scanning is a perfect method of recording sites where traditional methods are difficult to apply, witness for example the application in Greenwell's shaft at Grimes Graves (*Tuck & Topping 2005*) and as *Nadel and colleagues* point out, additionally provides an extremely useful tool for analysis of location, and of volumes and dimensions of extracted material etc.

CAHOKIA AND ITS RAW MATERIALS

The location of the meeting at St Louis alongside the Mississippi was perfect for visiting the mounds at Cahokia. Indeed, St Louis is so close that the city can be seen from the summit of one of them. Of all the North American mound sites, Cahokia is certainly the most remarkable. It is also the closest parallel on that continent to the United Kingdom prehistoric complex at Avebury. Both contain palisaded enclosures, timber circles, round and

long mounds and both contain the largest ancient mounds on the respective continents. Whereas Silbury Hill is circular, some 150 m in diameter and reaches a height of 31 m, Monk's Mound at Cahokia is of greater bulk; like many others in the complex it is square, 255 m by 290 m and reaches 30.5 m in height. It is just one of well over 100 mounds situated in the immediate environs and the population of the site between AD 1050 and 1250 is thought to have been larger than London at that date and is considered to represent North America's first city (*Cahokia Visitor Centre: Iseminger 2010, 15*). Particularly intriguing and of particular interest in the present context are the flint tools along with the source of the raw material.

Raw materials serving this centre were drawn from an extremely wide area, but the greater part of the flint derives from regional sources among which two; the Mill Creek Quarries further south in southern Illinois and the Crescent Hills, Missouri, to the west of St Louis are prominent and mentioned here. The Crescent Hills flint appears to have served domestic consumption of flake tools, while the Mill Creek material was often used for specialist pieces, notably ovoid hoe blades (*Koldehoff 1987*).

The Mill Creek quarries consists of several clusters of pits in the hilly, well-wooded countryside around the village of Mill Creek and focus on the Mill Creek itself and its tributaries (*Phillips 1900*). Here a considerable deposit (8 m) of red clay overlies limestone bearing chert seams comprising broad flat nodules of various size. Samples of the chert kindly supplied by *Brad Koldehoff*, Cultural Resources Co-ordinator of the Illinois Department of Transportation, display a variable, coarse to fine light grey flint with a coarse, heavily pitted, light brown cortex. The largest group of pits, thought to number several hundred, covers an area of some 5–7 ha situated either side of a valley to the west of the village, while a further group is located within a confluence of tributary streams a little to the north.

According to *Phillips (1900)* the extraction pits appear on the surface as part backfilled and silted depressions often reaching 12 m in diameter and 1.2 m in depth and these are closely placed along the slopes and across the

summit of the hill. At one point on the western slope extended diggings may mark direct extraction of the seam. Excavation by Phillips across two of these depressions revealed a pit or shaft 3 m wide and cut 3 m deep into the red clay which had been left to silt up naturally. A second depression resolved into two separate shafts dug within the same hollow, one of which reached a depth of over 5 m and where parallels with the dual extraction hollows at Grimes Graves, Norfolk, UK immediately spring to mind. As at Grimes Graves, spoil was placed around the lip of each shaft. Excavation of a further depression, revealed a further dual pit arrangement, one of which, over 3 m deep, was deliberately backfilled following extraction while the other was left to silt up naturally.

The Crescent Hills quarries are situated a short distance to the west of St Louis and lie within an ecological nature reserve run by Washington University's Tyson Research Centre. Within this, they form a series of steep ridges whose valleys drain into the Meramec River, a tributary of the Mississippi. The limestone is of the wider Burlington Formation and exposures of the chert within it are widespread to both north and south beyond the Crescent Hills (Koldehoff 1987), the chert being utilised by Clovis and Dalton communities early in the Holocene and moved for considerable distances. Among these, points from Sloan, a Dalton cemetery site situated over 250 km downstream in the Mississippi Valley is considered to derive specifically from the Crescent Hills source (Koldehoff & Loebel 2009). Koldehoff (1987, 181) indicates that while Burlington chert from the various sources is often indistinguishable macroscopically, there are colour and texture arrangements that allow them to be identified.

A visit to the quarries following the SAA Annual Meeting was kindly arranged and conducted by Brad Koldehoff in order to allow individuals to inspect the site. The site is largely unexplored archaeologically, no plan is available and its full extent unknown, but the earthworks survive in excellent condition and potential for investigation and analysis is extremely high. Despite a cover of coniferous woodland (with an attendant colony of timber rattlesnakes), the earthworks are clearly visible (Figure 1). The quarries form a linear arrangement of scoops and hollows leaving a

ledge some 5 m wide along the contour of the ridge just below the summit and these are likely to represent separate extraction episodes which follow the seam of chert. Each scoop is of c. 4–5 m across and usually less than 0.4 m deep and separated by a shallow mound or bank, presumably of spoil, from its neighbour, while further debris lies in trails downslope. No trace of mine shafts is visible across the summit, but the ridge is extremely narrow and a second, similar linear quarry arrangement on the reverse slope mirrors the first. It seems likely that many of the sharp cuts on the upper side of the quarry depressions, now weathered and covered with scree, mask adits or galleries that followed the seam for a considerable distance into the hillside allowing as much as possible of the raw material to be extracted. The flint itself occurs in blocks rather than nodules, presumably from a debased tabular seam, with a thin brown or ochreous iron stained cortex which is less pitted than that from Mill Creek. The material is smooth and fine grained, generally of light grey colour but frequently displaying lighter banded foliations with some pieces attaining a pink colour (Figure 2).

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