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Ongar: a Source of Chert in Lower Sindh (Pakistan) and Its Bronze Age Exploitation

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Abstract: This paper summarizes the results of twenty-six years of fieldwork carried out by the Italian Archaeological Expedition in Sindh in search for chert sources, and documenting their exploitation in prehistory at least since the Acheulian Palaeolithic to the Bronze Age, Indus Civilization mining areas and workshops. The explorations focused on three main chert sources: the Rohri Hills, Ongar, Daphro and Bekhain Hills, and Jhimpir. They are not the only ones known to date in Sindh that were intensively exploited especially during the development of the Indus Civilization. The economic importance of chert exploitation in the Indus Civilization has often been underestimated by most archaeologists. This fact is evident when reading the published narratives about its handicraft, trade and production, although there is little doubt that this raw material played a fundamental role in the economy of the Indus cities, also as main alternative to metal for making well-defined tools for specific handicrafts. The importance of chert exploitation is testified indeed by the impressive archaeological evidence left behind. It consists of chert mines, chipping floors and blade/bladelet workshops, whose preservation is unfortunately challenged by present-day industrial works still underway. Regretfully, the evidence is under a serious risk of disappearing before it can be fully documented and understood by archaeologists.

Keywords: Pakistan, Sindh, Indus Civilization, raw material sources, chert mines and workshops

Introduction

Until the end of the 1980s very little was known of the Bronze Age, Indus Civilization chipped stone assemblages of Sindh (Pakistan). The situation had not improved very much at the beginning of the 2000s *partly because of the emphasis given to other categories of objects made from bronze, semi-precious stone, shell etc.* (Bhan *et al.* 2002).

The scarcity of data regarding siliceous rock exploitation available at that time for the entire Indus Valley and its neighbouring regions is impressive. Most archaeologists working on the Indus Civilization in the Indian Subcontinent never paid much attention to the lithic factor even recently (see for instance Lahiri 1992; Ashtana 1993; Possehl 2002; Ratnagar 2001, 2004a, 2004b; Wright 2010), though Sindh is rich in chert outcrops (Starnini and Biagi 2011), and it is one of the regions with the highest density of Chalcolithic and Bronze Age settlements of the entire Indus Valley (Giosan *et al.* 2012: Fig. 3a; Khan and Lemmen 2014: Fig. 2).

Characteristic chert artefacts of the Indus Civilization are, besides chipped stone blades, bladelets and

microbladelets transformed into drill-micropoints and employed in different handicrafts (Vidale 1987, 2000; Méry 1994; Wheeler 1997: 77–78, 98; Méry *et al.* 2007; Vidale *et al.* 2013), and cubic, polished weights (Wheeler 1997: 83; Wright 2010: 189–192, Fig. 7.3).

In 1979 Bridget Allchin wrote the first important report on the Holocene blade assemblages of Sindh (Allchin 1979). She informed us of the discovery of Indus chert 'working floors' on the limestone terraces just south of Rohri, at the northern edge of the Rohri Hills, not far from the course of the Indus River (Allchin 1976, 1985; Allchin *et al.* 1978; Allchin 1999: 291).

More recently Randall William Law (2011) focused his work on the characterisation of the raw materials and provenance of all the stone/mineral artefacts of the Indus Civilization. Also chert samples from four well-defined regions of the Rohri Hills were sampled. This author pointed out the different appearance, colour and texture of the sources that were most probably exploited in different periods of development of the Indus Civilization (Law *et al.* 2002–2003).

The scope of this paper is to briefly present and discuss the Indus Civilization chert mines recently discovered

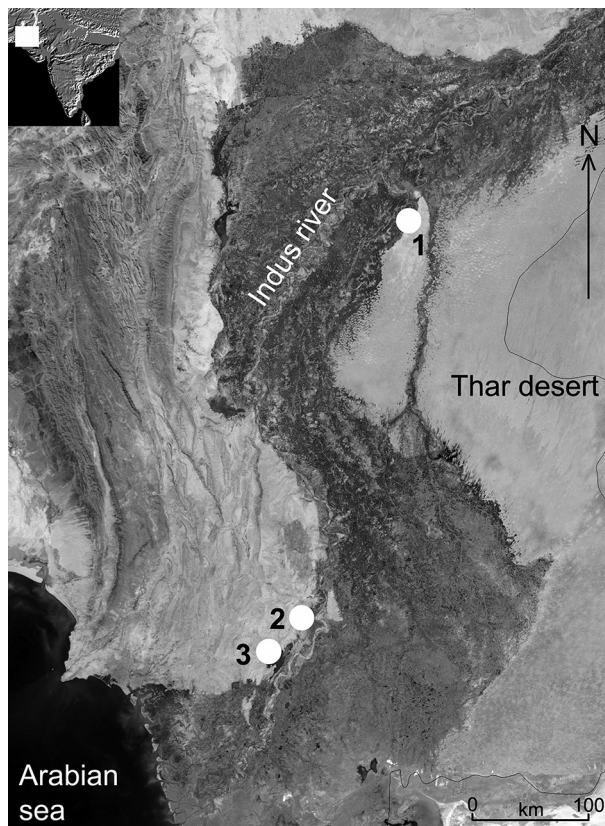


Fig. 1. Location of the Indus Civilization chert mining sites in Sindh: Rohri Hills (1), Ongar, Daphro and Bekhain Hills (2), and Jhimpir (3). Drawn: P. Biagi.

at Ongar and the other terraces that elongate west of it, within the general pattern of data collected by the Italian Archaeological Expedition during almost three decades of fieldwork devoted to the discovery and interpretation of the chert/flint sources and workshops in Sindh (Fig. 1).

Prehistoric chert mines in Sindh

Sindh is very rich in chert sources. Many of them outcrop from the limestone mesas that border the right, western side of the Indus Valley, at least from Ranikot, in the north (Blanford 1867), to Allahdino near Karachi, in the south (Fairservis 1993: 111). Although many sources have never been mentioned by archaeologists, they are all described in the most important volume ever written on the geology of the country more than a century ago by William Thomas Blanford (1880).

In his work Blanford accurately reported not only the outcrops, but also the presence of chert/flint artefacts, both cores and flakes, covering a large area of the northern Rohri Hills terraces south of Rohri (Blanford 1880: 103). A similar situation he described at Ongar. From this later area he reported the presence of flint

in the Kirthar limestone beds that characterise the easternmost hill (Blanford 1880: 149). Near Jhimpir he described flinty and cherty Kirthar limestone rocks near the railway station of the small town (Blanford 1880: 152).

All the above three regions were systematically surveyed by the Italian Archaeological Mission in Sindh between 1985 and 2011 (Starnini and Biagi 2011).

Ongar, Daphro and Bekhain

Ongar is a flat-topped Kirthar limestone formation terrace located ca. 25km south of Hyderabad, and 8km north of Jerruck, west of the national road to Karachi in front of the homonymous village just east of the road. The site was discovered in 1959 (Fairservis 1975: 77) though it had already been described in detail by Blanford (1880).

Professor A. Rauf Khan of Karachi University visited the area in the summer of 1972–73, when the industrial exploitation of the limestone deposits of the hill, containing large chert nodules of light brownish grey colour (Munsell 10YR6/2) was already underway. From Ongar and its surroundings he collected an impressive number of chipped stone tools that he attributed to four main assemblages spanning from the Early to the Upper Palaeolithic (Khan 1979).

The easternmost horseshoe-shaped terrace of the Ongar hill was revisited by B. Allchin in 1975–76 (Allchin 1976). This author called the site Milestone 101 following the indications of an officer of the Pakistan Archaeological Department (Allchin *et al.* 1978: 295). On the top of the mesa she collected chert tools that she attributed to the Lower, Middle and Upper Palaeolithic periods.

Further investigations were undertaken by one of the authors (Paolo Biagi) between 2004 and 2008 (Biagi 2005; Biagi and Franco 2008). In contrast with the reports written by the aforementioned authors, the new surveys demonstrated that the limestone formations rich in chert seams of Ongar, and those of the neighbouring Daphro and Bekhain Hills, were exploited not only during the Palaeolithic period, but also during the Indus Civilization (Fig. 2: 1).

Unfortunately, already in 2004 most of the Ongar archaeological sites had been destroyed by limestone quarrying still underway. Just a few intact areas were discovered during the surveys carried out in the following years. In particular the narrow terrace that elongates between Ongar, in the north-east, and Daphro, in the west (25°09'36"N – 68°12'56"E/25°09'38"N – 68°12'01"E), was found still in a very good state of preservation (Fig. 2: 2 and 3). Indus mining trenches,

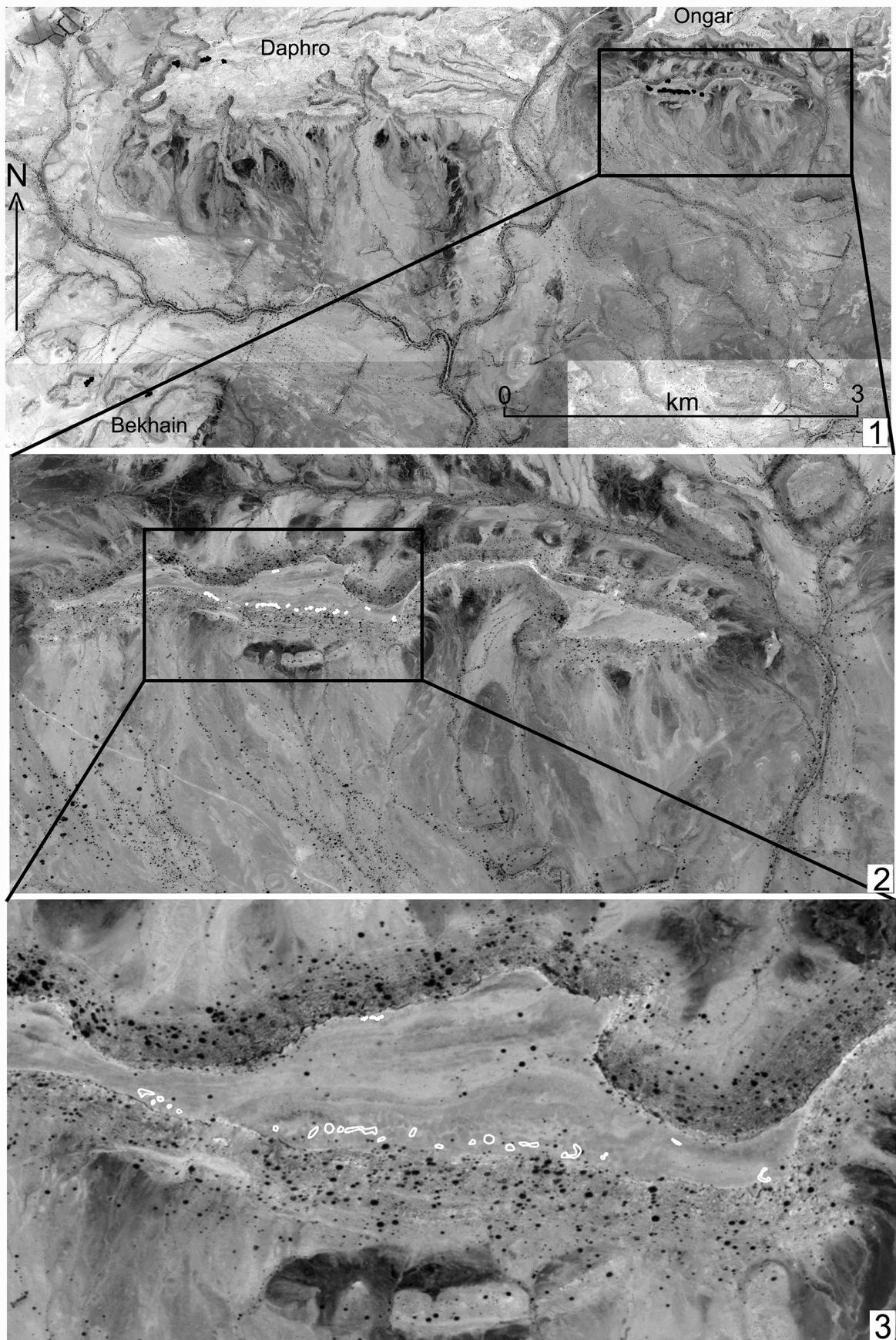


Fig. 2. Ongar, Daphro and Bekhain Hills: Location of the Indus chert mines and workshops (1: black dots), along the edges of the hill between Ongar, in the east, and Daphro, in the west (2 and 3: white marks). Maps C. Franco.

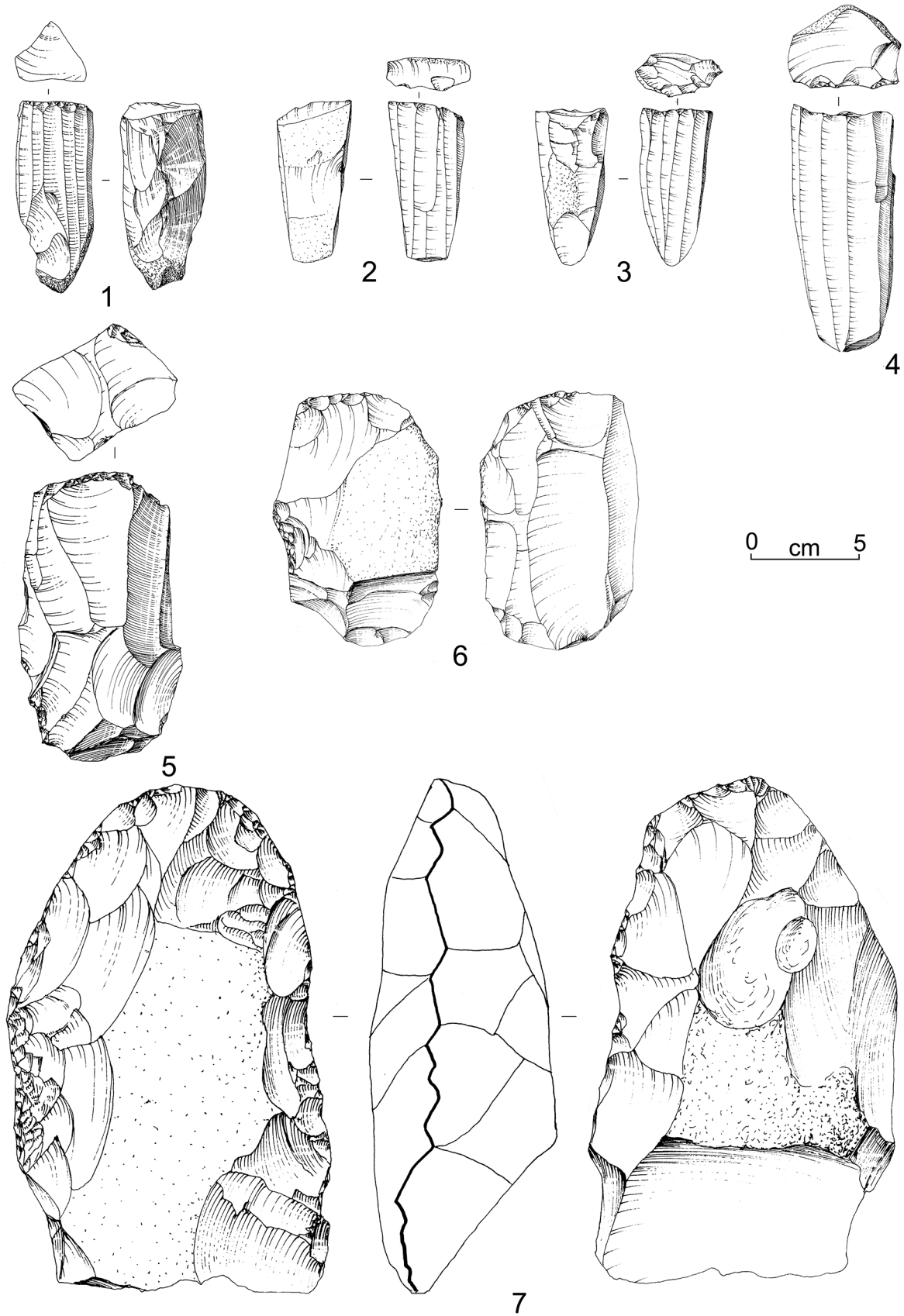


Fig. 3. Ongar, Daphro and Bekhain Hills: Indus Civilization chert artefacts: Subconical blade core from Ongar (1), subconical blade cores (2-4) and pre-cores (5 and 6) from Daphro, and large pre-core from Bekhain (7).
Drawn: P. Biagi, inked: G. Almerigogna.

small debitage flake clusters, and diagnostic chert artefacts, among which is a subconical blade core (Fig. 3: 1), were recorded mainly along the southern edge of the central part of the aforementioned mesa along a strip some 460m long and 20m wide (25°09'39"N – 68°12'14"E/25°09'37"N – 68°12'30"E: 63–80m asl; Fig. 2: 1–3).

More evidence of Indus chert mining and knapping activities areas was found still intact also in a restricted zone located at the north-westernmost edge of Daphro, facing the alluvial plain toward Meting (Fig. 4: 1 and 2). The first group of structures recorded from this region consists of five aligned, parallel mining trenches and chert knapping workshops located between 25°09'45"N – 68°09'54"E and 25°09'47"N – 68°09'56"E (Fig. 4:1). A second group of six parallel, C-shaped mining trenches and debitage workshops from which a pre-core and a subconical blade cores and potsherds were also recovered, lies at ca. 25°09'47"N – 68°10'05"E (Fig. 3:2–6; Fig. 4:2–6).

The survey was later extended to the Bekhain Hills, a group of low and small terraces raising from the alluvial plain located at 60m asl some 2.5km south of Daphro (Fig. 2:1). Although most of the hills had already been heavily damaged by modern, illegal limestone quarrying, a few areas were recovered in 2008. Some of the Indus mining trenches and chert knapping workshops discovered at Bekhain are shown in Fig. 5, nn. 1–4. Of major importance is the discovery of a large chert pre-core along the eastern edge of the westernmost hill at 25°08'09"N – 68°09'27"E, together with two large decortication flakes (Fig. 3:7; Fig. 5:5 and 6). This type of pre-core is quite uncommon. Similar specimens are known only from Mohenjo-Daro (Marshall 1931: Plate CXXXI: 17–19), the Rohri Hills around Ziārāt Pir Shābān, and Nuhato in Badin *taluka* (unpublished Jamshoro Museum; Baloch 1973). They probably represent rough-out or chert 'blocks' ready to be transported elsewhere.

Moving west, no traces of prehistoric settlements were recorded all across the alluvial plain that separates Daphro from Meting railway station, some 5km to the west. The terraces west of Meting were also surveyed. They consist of fossiliferous limestones containing very small chert nodules unsuitable for knapping due to their dimensions. Evidence of systematic limestone quarrying, most probably related to the construction of the railway in British times, were observed at the top of the flat mesas ca. 100m high, that extend just west of Meting.

At present the illegal exploitation of the Ongar Hill has shifted from limestone to chert mining, a resource that abounds on the hills (Biagi and Nisbet 2011). This

latter is utilized for house building and decoration, irrespective of the government strict protection rules aimed at the preservation of the archaeological and national heritage of the country that are systematically unattended (Biagi 2006).

Discussion

As already pointed out mines, quarries and chert knapping workshops are the most important components of a lithic production system (Ericson 1984; Purdy 1984). The Sindhi Bronze Age extractive and knapping complexes provide us with an exceptional chance to shed light on this unique aspect of the Indus Civilization.

Until a few decades ago, systematic surveys had never been undertaken in Sindh after the killing of the first explorer, Nani Gopal Majumdar (1934), with the exception of those conducted by Louis Flam mainly in Sindh Kohistan and part of the Kirthar range (Flam 1987, 2006).

The discoveries made at Ongar, Daphro, Bekhain and also Jhampir demonstrate that, apart from the Rohri Hills, other rich chert outcrops and mining centres did exist in the Indus Valley. Furthermore the probable presence of other still unidentified mining sites on top of the limestone terraces along the right, western bank of the Indus River, make the problem much more complex than formerly suggested. They greatly complicate our comprehension of the exploitation and circulation of the chert resources within the territory covered by the Indus Civilisation throughout its different stages of development that lasted some 1000 years (Possehl 1988).

As already suggested (Biagi and Starnini 2008), these aspects are to be investigated at least at two levels. In particular: a) at a micro-regional scale, i.e. by identifying the eventual presence of settlements at the foothills involved in the exploitation of the chert outcrops, if any, b) macro-regional scale, studying the distribution pattern of the workshop products at longer distances, either as semi-finished raw material items, or blades ready for use. As regards point a), Indus settlements do exist close to the Rohri Hills (Shaikh *et al.* 2004–2005; Mallah 2010) although none of them seems to have been involved in trade and exchange of lithic material; while point b) is still too badly known to rely on the oversimplified maps so far published by other authors (Kenoyer 1998: Fig. 5.20a; see also Gupta 1996: Fig. 15).

The present evidence shows that the siliceous raw material of the Rohri Hills was transported in various forms, either as finished standardized blades and bladelets, or as unworked nodules, rough-outs, pre-

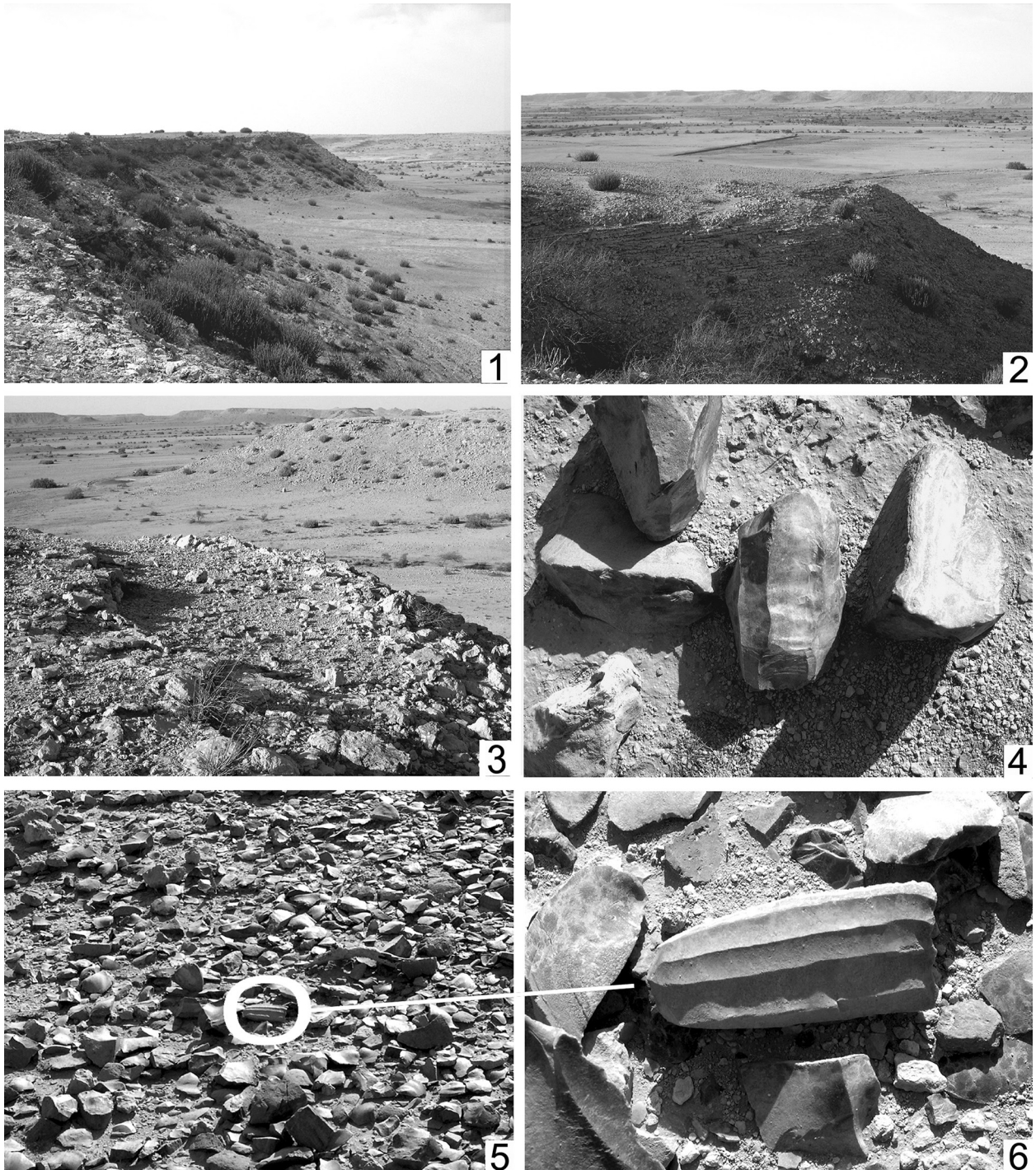


Fig. 4. Daphro Hill: The north-westernmost terrace on which Indus Civilization mining trenches have been recorded at $29^{\circ}09'46''\text{N} - 68^{\circ}09'55''\text{E}$ (1); parallel mining trenches at the aforementioned location (2); the northernmost mining trench (3); blade core (4); chert workshop (5), and long, subconical blade core from the centre of the same structure associated with two potsherds at $25^{\circ}09'47''\text{N} - 68^{\circ}10'05''\text{E}$ (6). Photo: P. Biagi.

cores and finished cores, from which we can infer a multiform demand, and the complexity of the procurement systems of which at present we know very little. We can suggest that also the rich, good-quality chert sources available from Ongar played a similar role in the Indus Civilization economic system.

Since chert demand can essentially be viewed as a function of three variables, namely 1) the number and frequency of activities requiring stone tools, 2) the stone tool production techniques and, 3) stone tool efficiency (Luedtke 1984), to fully understand and quantify the scale of demand for lithic material in the

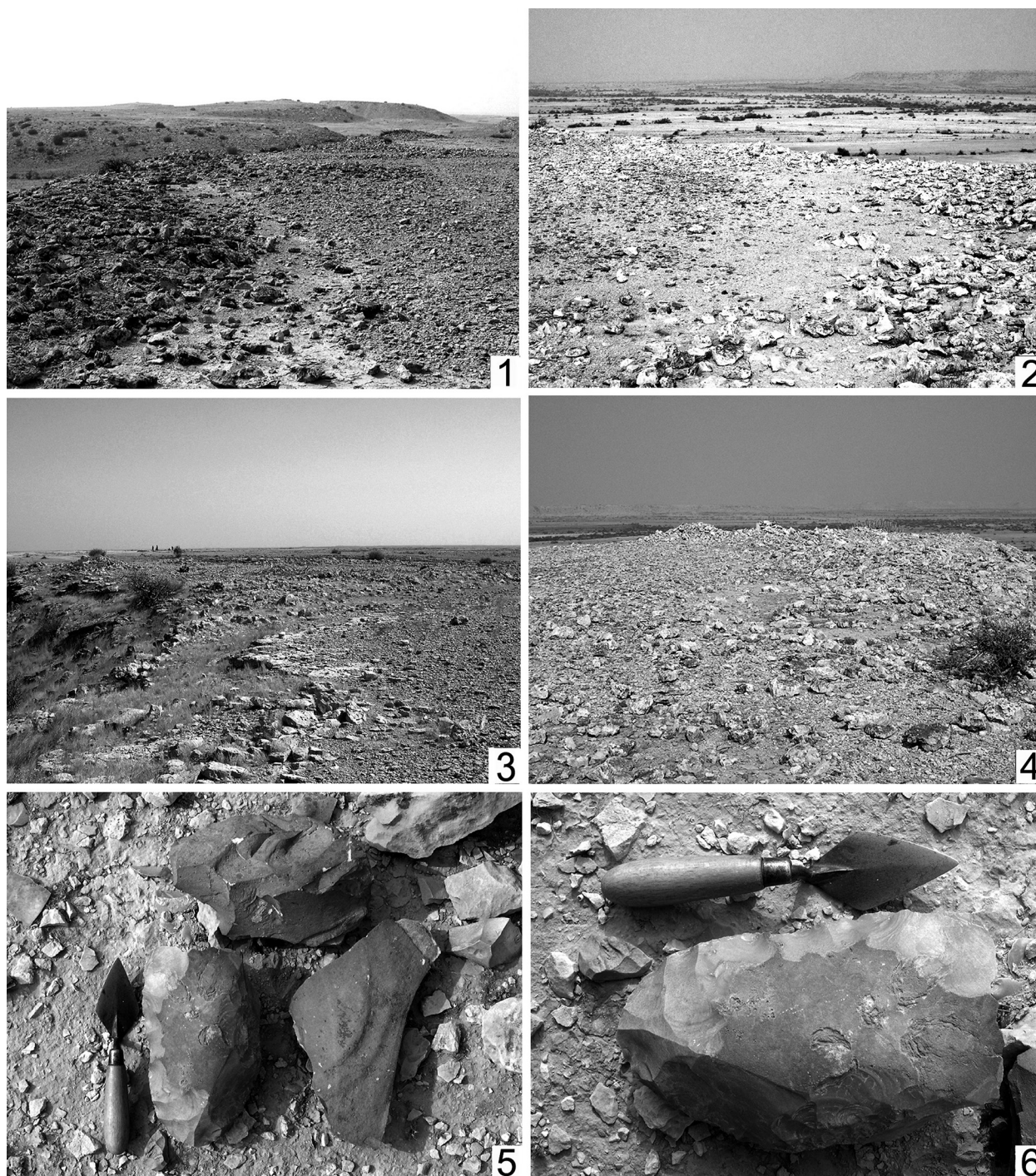


Fig. 5. Bekhain Hill: Mining trenches discovered along the eastern edge of the westernmost hill between 25°08'13'N - 68°09'30'E and 25°08'09'N - 68°09'27'E (1 and 3); mining trench with a chert workshop along the eastern edge of the central hill at 25°08'09'N - 68°09'48'E (2); mining system at the north-easternmost edge of the central hill at 25°08'09'N - 68°09'37'E (4); huge chert pre-core and limestone decortication flakes from the eastern edge of the westernmost hill at 25°08'09'N - 68°09'27'E (5 and 6). Photo: P. Biagi.

Indus Civilization a future research objective will be to better understand the many socio-economic and craft activities in which stone tools were involved and utilised. The few evidences at present available show that chert artefacts were employed in the operative chain of pottery and semi-precious stone beads

production (Vidale 1987, 2000; Méry 1994; Méry *et al.* 2007).

To conclude, several problems and questions regarding chert extraction and distribution during the Indus

Civilization are still open and unanswered due to absence of proper information, among which are:

1. The existence, in Sindh, of other chert outcrops visually very 'similar' to those of the Rohri Hills, with clear evidences of exploitation during the Indus period, challenges the current, suggested hypothesis of one single procurement area;
2. The difficulty of characterizing siliceous rocks with scientific methods (Barfield 1999; Bressy *et al.* 2006), does not enable us to indisputably discriminate the sources in the same ways as for example obsidian;
3. The scarcity of systematic analyses (typological, technological and functional) of the chipped stone assemblages recovered from the urban centres of the Indus Civilization.

The study of chert exploitation shows that this resource played indeed a crucial role in the operative chain of several handicrafts during the Indus Civilization. The strategic and economic importance of this raw material can be inferred in the impressive traces left on the landscape of Sindh in form of extraction and mining districts, knapping floors and workshops, where tons of chert have been extracted and millions of blades have been produced.

It is regrettable that most of the archaeological sites discussed in this paper have already been destroyed by illegal industrial limestone and chert mining still underway, and no attention has ever been paid to their protection by international, national and local authorities despite their importance as a unique prehistoric heritage of the country (Biagi 2006; Dennell 2014: 99).

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