Abstract  This paper regards the research carried out by the Italian Archaeological Mission in Sindh and Las Bela province of Balochistan (Pakistan). Until the mid ‘80s the prehistory of the two regions was known mainly from the impressive urban remains of the Bronze Age Indus Civilisation and the Palaeolithic assemblages discovered at the top of the limestone terraces that extend south of Rohri in Upper Sindh. Very little was known of other periods, their radiocarbon chronology, and the Arabian Sea coastal zone. Our knowledge radically changed thanks to the discoveries made during the last three decades by the Italian Archaeological Mission. Thanks to the results achieved in these years, the key role played by the north-western regions of the Indian Subcontinent in prehistory greatly improved.

Summary  1 Introduction. – 2 Archaeological Results. – 3 Discussion. – 3.1 The Chert Outcrops. – 3.2 The Late (Upper) Palaeolithic and Mesolithic sites. – 3.3 The Shell Middens of Las Bela Coast. – 3.4 The Indus Delta Country. – 4 Conclusion.

Keywords  Sindh. Las Bela. Indus delta. Prehistoric sites. Radiocarbon chronology.

1 Introduction

Due to its location midway between the Iranian uplands, in the west, and the Thar or Great Indian Desert, in the east, the Indus Valley and Sindh have always played a unique role in the prehistory of south Asia, and the Indian Subcontinent in particular: Crossed from north to south by the River Indus, Sindh is the natural route to follow to reach central Asia and the chains of the Himalaya and the Hindu Kush from the Arabian Sea (Burton 1976; Curzon 2012). Of major strategic importance during the British Empire (Eastwick 1989; Napier 2001), Sindh was brutally conquered during the Afghan wars. Its scope was to control the Indus waterway, and the increasing Tsarist interests in the Indian Ocean (Pathan 2017).

More than two thousand years before the British occupation, Sindh was invaded by another European army. To its conquest followed disastrous consequences that led Alexander the Great to the loss of ca. 60,000 Macedonian soldiers after crossing Las Bela plain (Minchin 1983), moving
along the barren, dry landscapes of Gedrosia, present-day Makran, which were inhabited by tribes of fish-eaters (*Ichthyophagoi*) (Hughes-Buller 1996; Holdich 2002), during their retreat toward Babylon (Romm 2010; Biagi 2017a).

The excavations carried out at Mohenjo-daro near Larkana, in Upper Sindh, by J. Marshall (1931), E.J.H. Mackay (1937-38), M. Wheeler (1976), and other British and Indian archaeologists during the last century (Lahiri 2005), uncovered the impressive remains of a huge metropolis all made from bricks with public and private structures and craftsmen quarters, from which just a few metal tools where recovered (Dikshit 1939).

Between 1927 and 1931 N.C. Majumdar carried out intensive surveys in Lower Sindh and part of the Indus delta (Majumdar 1981). During those years he revisited the Tharro Hills, a unique Chalcolithic Amri Culture site (Piggott 1950, 79) discovered by G.E.L. Carter just a few years before (Cousens 1998, 38).

The results achieved by the Italian Archaeological Mission in Sindh and Las Bela (Balochistan), led to significant changes in the prehistory of the two regions (Biagi 2011a). Until the end of the ’80s archaeology was almost exclusively related to the Copper and Bronze Age antiquities, and the study of the main characteristics, development, periodization and collapse of the Indus Civilisation (cf., e.g., Kenoyer 1991, 2015; Possehl 1997, 2002).

### 2 Archaeological Results

Since those years many things have changed, mainly thanks to the discoveries made by the Italian expedition. Following a chronological order they can be summarised as follows, starting from the oldest periods of prehistory to Buddhist times.

1. The preliminary periodization of the Palaeolithic of Sindh, from the Early Acheulian onward. It was made possible thanks to the discoveries made on the Rohri Hills, and the excavations carried out at two lithic sites named ZPS-1 and ZPS-2 (Ziārāt Pir Shābān) (Biagi, Kazi, Negrino 1996; Biagi et al. 1998-2000). The first is a workshops for the manufacture of early Palaeolithic Acheulian hand-axes is located in a unique part of the northern terraces of the Shadee Shaheed hills. The site is not paralleled with any other of the same age so far discovered in Sindh (Biagi, Negrino, Kazi 1996; Biagi 2008c).

2. The study of the Levallois Mousterian Middle Palaeolithic chipped stone assemblages. During the late ’70s industries and isolated tools of this period were found for the first time in the north-westernmost region of the Indian Subcontinent. Though their chronology is still inaccurately defined, they are suggested to mark the presence of
Neanderthal groups that spread from the Iranian uplands down to the Indus river course, most probably during the OIS-5 (Biagi, Starnini 2018a). The first Levallois Mousterian tools were collected by Professor A.R. Khan at Ongar and other Karachi region sites, during the intensive geoarchaeological surveys carried out in the late ’70s (Khan 1979a; Biagi 2007a; Biagi, Starnini 2011, 2018a).

3. The discovery of early and middle Holocene Mesolithic hunter-gatherers sites in the Thar Desert lake district of Upper Sindh. The first chipped stone assemblages with characteristic trapezoidal geometric microliths and lunates, sometimes obtained with the microburin technique, were recovered in the ’90s from the top of stabilised sand dunes that elevate east of the caravan town of Thari, close to the border that separates Sindh from Rajasthan in India (Biagi, Kazi 1995; Shar, Negrino, Starnini 1997; Biagi, Veesar 1998-99; Biagi 2003-04, 2008b, 2018).

4. The typological analysis of the Late (Upper) Palaeolithic and Mesolithic industries of Lower Sindh. Chipped stone assemblages of the two periods were discovered by Professor A.R. Khan in the Mulri Hills in front of Karachi University campus (Zaidi et al. 1999), and many other sites located within a radius of ca. 40 miles east and west of Karachi in the late ’70s (Khan 1979b; Biagi 2003-04, 2004, 2017b, 2018). Following the results achieved by Professor A.R. Khan, it was possible to establish a preliminary sequence of the Early Holocene assemblages of Sindh and compare it with those from other territories of north-western India, mainly Rajasthan and Gujarat (Misra 2013).

5. The discovery of Final Palaeolithic chipped stone assemblages at the top of the limestone terraces that extend south-west of Jhimpir in the Thatta district of Lower Sindh (Biagi 2011b). Lithic scatters of this period were found in situ close to a freshwater spring and outcrops of good-quality chert. The typological analysis of the artefacts and the presence of impact traces on two microlithic lunates show that some of the sites acted as hunting camps.

6. The radiocarbon dating of at present disappeared Mangrove Environments that had been exploited seasonally by Neolithic communities since the middle Holocene, Atlantic period. The radiocarbon dates were systematically AMS processed at Groningen laboratory on single specimens of *Terebralia palustris* and *Telescopium telescopium* mangrove gastropods recovered from the top of the limestone outcrops raising from the alluvial plain of the Indus delta (Blanford 1880; Lambrick 1986; Biagi 2010, 2017a). Thanks to the new radiocarbon results we can suggest that seafaring along the northern coasts of the Arabian Sea started around the beginning of the seventh millennium BP, if not before (Biagi 2011a). Moreover,
the results could be compared with those obtained from other sites discovered along the coast of the Arabian Sea and the Persian (Arabian) Gulf (Cleuziou 2004; Biagi, Nisbet 2006; Biagi 2008a; Boivin, Fuller 2009; Biagi, Nisbet, Fantuzzi 2017, 2018).

7. The discovery and radiocarbon dating of many seventh and fifth millennium BP shell middens distributed along the coast of the small bay of Daun and the marine terraces that surround it (fig. 1) (Biagi 2004, 2008a, 2013; Biagi, Franco 2008; Biagi, Fantuzzi, Franco 2012). The bay opens south of Gadani headland in Las Bela province of Balochistan. Cape Gadani itself played an important role in prehistory because of the presence of dark red chert outcrops on its top that were exploited at least since the Mesolithic (Khan 1979b; Naseem, Sheikh, Qadeeruddin 1996-97). Other prehistoric and historic shell middens were discovered and radiocarbon-dated at both Gadani and neighbouring Phuari headlands (Biagi, Nisbet, Girod 2013).

8. The surveys carried out along the ancient shores of the almost dry basin called lake Siranda (fig. 2), described by Snead (1966, 58) as “a desert depression with no normal outlet to the sea”. The depres-
sion stretches from north to south. It is bordered by the Holocene
dunes of the Sonmiani Hills in the west, and the Pleistocene sand
plain that extends to the east (Snead, Frishman 1968). It is delim-
ited, in the south, by the Khurkera plain, which is formed by the
silting of the Winder River flowing from the Pab Range (Pithawalla
1952, 33). Lake Siranda, ca. 14 km long and 3 km wide, only 0.30-0.45 m above the present sea level, is located in the southernmost
part of Las Bela province (Snead 1969). It is seasonally fed by mon-
soon rains draining into the basin mainly by the Watto River, an east-
ernmost branch of the Porali (Stein 1943, 198). Research in the area
was resumed by the Italian Archaeological Mission between 2011
and 2014. Its scope was to verify the presence of prehistoric shell
middens along its ancient shores, to establish a radiocarbon chro-

Figure 2. The dry depression of Lake Siranda from the south eastern shore from site SRN-63
(photograph by Paolo Biagi, January 2013)
adult specimen of mangrove gastropod either *Terebralia palustris* or *Telescopium telescopium* (Biagi, Nisbet, Fantuzzi 2017, 2018).

9. The definition of the main typological characteristics of the Chalcolithic Amri Culture (Casal 1964) chipped stone assemblages (Lechevallier 1979). This was made possible thanks to the typological and technological study of the Tharro Hills lithic industries collected by Professor A.R. Khan in the ’70s, and the precise mapping of different spots of chipped stones on the surface of the aforementioned, fortified Chalcolithic site, defined during an intensive survey carried out in 2008 (Biagi 2005, 2010). Moreover, the data obtained from the surveys and the radiocarbon dating of samples of marine and mangrove shells showed that the Tharro Hills were an island surrounded by Arabian Sea waters and mangrove swamps during the Copper age, and that the landscape around them was still roughly the same in Hellenistic times (Biagi 2017a).

10. The surveys and excavations promoted by the Italo-Pakistani Joint Rohri Hills Project, a programme of archaeological research launched by Ca’ Foscari University and the Department of Archae-
ology of Shah Abdul Latif University in Khairpur. The research was conducted between 1993 and 2002. It led to the discovery of hundreds of archaeological sites located on the hilltops (Biagi, Shaikh 1994). Its main scope was to record the impressive number of Indus chert mines discovered in the central-western part of the Hills since 1986, and to excavate a few lithic sites by trial trenches and, whenever possible, date them (fig. 3). Following this experience, the research was resumed at Ongar in cooperation with the University of Sindh, Jamshoro. The new project led to the discovery, recording and mapping of dozens of unknown Bronze Age Indus Civilisation chert mines on the hills of Ongar, Daphro (fig. 4) and Bekhain, south of Kotri in Hyderabad province (Biagi 2007b). The exploitation of the chert resources in the area is marked by the recurrence of mining trenches that border the edges of the limestone mesas, as well as heaps of debitage flakes, on the top of which typical Indus Civilisation subconical blade cores were collected (Biagi, Cremašchi 1991; Biagi, Franco 2008; Biagi, Starnini 2008, 2018b; Starnini, Biagi 2006). Other new chert mining complexes were later found close to
Jhimpir in Thatta province (Biagi, Nisbet 2010), a territory that was exploited mainly around the end of the Palaeolithic period.

11. The study of a Bronze Age fishermen village at Sonari. The site is located a few km north-east of Cape Monze (Ras Mauri), west of Karachi, in Sindh. It faces the Hab River mouth. Professor A.R. Khan discovered Sonari in the late ‘70s, though he never published or even mentioned it in his papers. The site is well-sheltered inside a saddle that opens at ca. 30 m of altitude in the limestone Miocene Gaj formation that characterises the area (Biagi, Nisbet 2014). The settlement structures cover a roughly semi-circular area, ca. 30 m long and 35 m wide. They consist of at least 5, rectangular, stone-walled features 2 by 3 m wide, arranged in north-south and east-west direction, filled with marine bivalves. They are surrounded by 4 small heaps of marine and mangrove shells that were all AMS-dated. The presence of beached stone net-weights shows that fishing, and the collection of marine and mangrove shells, played a fundamental role in the subsistence economy of the small site that was settled during the first half of the third millennium BC. Sonari is the only prehistoric fishermen village so far discovered all along the northern coast of the Arabian Sea.

12. The first traceological study ever made to interpret the function of the chipped stone tools of the Chalcolithic and Bronze Age industries of Sindh. Though our knowledge of this aspect of Lithic Studies is still very poorly developed in Sindh and Las Bela prehistory, new results have been achieved thanks to the aforementioned analyses. They regard the definition of a) a unique type of denticulated blade sickles, utilised in the Indus Valley during the early Bronze Age Kot Diji period, and b) the elongated, scalene triangles that characterise the Chalcolithic Amri Culture assemblages that were employed as straight perforators (Voytek 1994; Biagi 2005).

13. The thin-section and SEM analyses of two Early Bronze Age Kot Diji pottery assemblages of the Thar Desert (Spataro 1998-99, 2003), the scientific study of the ceramics from the Buddhist city of Seerajji-Takri in the Rohri Hills (Biagi, Spataro, Nisbet 2002), and the analysis of the characteristics and variability of the protohistoric and historic bangles of Sindh (Spataro 2013). Moreover, Ethnographic Studies have been conducted on the present-day pottery manufacture in three villages of Lower Sindh: Hindwari, Pir Chebo and Hingorja (Spataro 2005).

14. The first archaeobotanical analysis of prehistoric (Castelletti, Madella, Mahar 1994) and historic (Biagi, Nisbet 2009) macrobotanical and phytoliths remains (Madella 1997), and present-day ethnographic structures of Sindh (Nisbet 2010).
15. The first soil micromorphological thin-section analyses of prehistoric and historic sites of Upper Sindh, among which are those from the city of Aror, the capital of Musicanus in Hellenistic times (Biagi, Cremaschi 1988; Biagi, Kazi 1995; Biagi et al. 1998-00; Ottomano 1995; Ottomano, Biagi 1997).

16. The radiocarbon dating of a few famous historical sites of Sindh. They have been obtained from identified charcoals collected from the Buddhist city of Seeraj-ji-Takri (or Shiraz) in the Rohri Hills (Jafri 1980; Verardi 1987; Biagi, Spataro, Nisbet 2002; Biagi 2004) that was totally destroyed by the opening of a new illegal limestone quarry in the early 2000s; three other Buddhist sites in Lower Sindh (unpublished results 2017), Aror (Ottomano, Biagi 1997) and Ranikot Fort (Hasan 2006; Biagi, Nisbet 2009). This aspect is particularly important because almost nothing is known of the chronology of the Buddhist sites of Sindh and the events that followed the Arab conquest of the country (Pathan 1978).

17. The reconstruction of the route followed by Alexander and Nearchos during their retreat toward Babylon in Sindh and Las Bela (Stein 1943; Eggermont 1975; Holdich 2002; Biagi 2017a).

3 Discussion

3.1 The Chert Outcrops

Until the end of the ‘80s very little was known of the distribution of the knappable raw material sources in Sindh. The surveys and excavations carried out by the Joint Rohri Hills Project in the Rohri Hills between 1993 and 2003 led to the discovery of an impressive number of chert mining complexes attributed to the Bronze Age Mature Indus Civilisation that were opened at the top of the limestone terraces located just to the east of the shrine of Shadee Shaheed (Biagi, Negrino, Starnini 1997). Following their discovery a few test-trenches were opened and a few workshops excavated (Biagi, Pessina 1994; Negrino, Starnini 1995, 1996; Biagi 1995; Starnini, Biagi 2006, 2011; Biagi, Starnini, Michniak 2018c).

Nevertheless, most Indus archaeologists always underestimated the role played by chert during the Indus Bronze Age (Kenoyer 1991, 2015; Lahiri 1992; Wright 2010). Their importance is remarked by the evidence retrieved from the Rohri Hills and other chert mining sites discovered at Ongar and Jhimpir in Lower Sindh (Biagi, Starnini, Michniak 2018c), the craftsmen quarters of Mohenjo-daro (Tosi, Bondioli, Vidale 1984; Vidale 1992, 2000), and the dark red chert outcrops of Cape Gadani (Biagi, Nisbet, Girot 2013).
3.2 The Late (Upper) Palaeolithic and Mesolithic Sites

The surveys carried out by Professor A.R. Khan in the ’70s have shown the presence of sites of these ages near Karachi and the Arabian Sea coast. Chipped stone assemblages with microlithic geometrics were collected also from the Thar Desert lake district of Upper Sindh since the ’90s. These discoveries show that Late (Upper) Palaeolithic and Mesolithic hunter-gatherers inhabited both Upper and Lower Sindh. In most cases their chronology cannot be ascertained because of the absence of stratigraphic sequences and organic material to be dated, with the exception of site KDJ-1, along the southern banks of the Kadeji river (Biagi 2018). Their cultural attribution and chronology can be suggested mainly because of the presence of specific geometric microliths.

3.3 The Shell Middens of Las Bela Coast

The first shell middens were discovered in January 2000 along the shores of the bay of Daun, south of Gadani promontory, in Las Bela province of Balochistan (Biagi 2004). The area was revisited and accurately surveyed in 2004 and 2008 (Biagi, Franco 2008). The Daun shell middens consist mainly of heaps of Terebralia palustris and Telescopium telescopium mangrove shells inside which few material culture remains were recorded. From a chronological point of view the sites are grouped in two main clusters, the first of which falls into the seventh, while the second is of roughly the first half of the fifth millennium BP (Biagi, Fantuzzi, Franco 2012).

The discoveries reported above are complemented by those made a few years later along the shore of Lake Siranda basin (Biagi 2013; Biagi, Nisbet, Fantuzzi 2017, 2018) and also Cape Gadani and Phuari. The amount of data obtained from the aforementioned sites and the radiocarbon dates obtained from these sites have contributed to a new interpretation of the prehistory of Balochistan (Shaffer 1978) and the coastal changes that took place between the middle Atlantic and the Subboreal. According to the new data, they can be compared to those of the coast of Oman during the same periods (Berger et al. 2013).

3.4 The Indus Delta Country

This region is of basic importance for the study of the advance of the Indus fan, the formation of the river plain, and the changes that took place along the northern coast of the Arabian Sea during the Holocene (Wilhelmy 1968; Harvey, Schumm 1999; Giosan et al. 2006; Inam et al. 2007).
At present we know that at the time of Alexander’s invasion (327 BC) “the sea extended up to Gujo area” (Panhwar 1964, 100). This idea is generally accepted by both geologists (Bender 1995, fig. 10.18) and historians (Eggermont 1975, 30, map 2), within the picture of the movements of the Indus river throughout the ages (Flam 1984, 1987).

Most authors suggest that the rocky rises of the Indus delta were in fact islands in Hellenistic times. This is the case for the Tharro Hills. The surveys carried out in the delta between 2009 and 2013 confirmed this view because of the discovery of archaeological finds, marine and mangrove shells from all the above outcrops from which we have now a good set of radiocarbon dates (Biagi 2010; Biagi, Nisbet, Fantuzzi 2017, 2018).

4 Conclusion

Thirty years of research and excavations carried out by the Italian Archaeological Mission in Sindh and Las Bela led to dramatic changes in the archaeology of the two regions of present-day Pakistan.

The Rohri Hills have shown an unknown aspect of the Indus Civilisation, i.e. the presence of huge chert mining centres that undoubtedly played a very important role in its economic system. Impressive examples are known from the Shadee Shaheed Hills, on which more than 2,000 flint mines and workshops have been discovered (Maifreni 1995).

The study of the material culture assemblages collected by Professor Khan in the ’70s drastically changed our view of the Pleistocene and Early Holocene prehistory of Sindh. Before his discoveries nothing was known of the Mesolithic settlement pattern and the characteristics of the chipped stone assemblages of this period. At present we know that groups of Mesolithic hunter-gatherers systematically settled close to freshwater springs and high-quality sources of knappable raw material, and inhabited coastal zones, river banks and desert sand dunes close to freshwater basins. Dozens of sites of this period are currently known in Sindh, making the Mesolithic prehistory of the country one of the richest of the Indian Subcontinent.

The surveys conducted along the coast of Las Bela in Balochistan and the Indus delta in Sindh showed the archaeological importance of both these territories. From the radiocarbon results obtained from Las Bela shell middens and the Indus delta rocky outcrops we know that the northern coast of the Arabian Sea started to be inhabited around the last centuries of the eighth millennium BP, and that seafaring along the coastline also began around this period (Biagi 2011a). The radiocarbon results obtained from the above-mentioned sites helped interpret the changes that took place along the Arabian Sea coast throughout the Holocene. From many
points of view they can be compared with those that took place along the coast of the Oman peninsula.

To conclude, thanks to the results achieved by the Italian Archaeological Mission, now we can state that the prehistory of this part of the Indian Subcontinent has drastically changed during the last thirty years. Most of the data available only a few years ago are no longer acceptable and their complete updating is absolutely necessary.

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Bibliography


Biagi, Paolo; Fantuzzi, Tiziano; Franco, Carlo (2012). “The Shell Middens of the Bay of Daun. Environmental Changes and Human Impact along the Coast of Las Bela (Balochistan, Pakistan) Between the 8th and the 5th Millennium BP”. Eurasian Prehistory, 9(1-2), 29-49.


Biagi, Paolo; Nisbet, Renato; Girod, Alberto (2013). “The Archaeological Sites of Gadani and Phuari Headlands (Las Bela, Balochistan, Pakistan)”. *Journal of Indian Ocean Archaeology*, 9, 75-86.


Biagi, Paolo; Starnini, Elisabetta (2008). “The Bronze Age Indus Quarries of the Rohri hills and Ongar in Sindh (Pakistan)”. Kostov, Ruslav Ivanov; Gaydarska, Bisserka; Gurova, Maria (eds.), *Geoarchaeology and Archaeomineralogy*. Sofia: St. Ivan Rilski, 77-82.

Biagi, Paolo; Starnini, Elisabetta (2011). “Neanderthals at the South-Easternmost Edge. The Spread of Levalloisian Mousterian in the Indian


Negrino, Fabio; Starnini, Elisabetta (1996). “Notes on the Technology of the Pre-Core and Blade-Core Preparation in Harappan Times. Observations from Site ZPS3 (Rohri Hills, Sindh, Pakistan)”. Ancient Sindh, 3, 105-16.


