

# **The Knapped Stone Assemblage from the Late Neolithic Site of Jhandi Babar-I, Dera Ismail Khan (Pakistan): A Typological Analysis**

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## **Abstract**

*This study aimed to examine the typology of the knapped stone assemblage found at Jhandi Babar-I, a well-known site situated in the Gomal Valley, in the district of Dera Ismail Khan. The Department of Archaeology, University of Peshawar conducted excavations at the site in 1998. In addition to other artefacts, an abundance of stone tools was unearthed, both from the excavation and surface collection. These stone tools exhibit a diverse range of forms and shapes. The assemblage contains 134 lithic artefacts, which can be attributed to two distinct time periods: the Late Neolithic and the early Bronze Age.*

**Keywords:** Knapped Stone Tools, Lithic Artefacts, Jhandi Babar-I, Microliths, Gomal Valley, Neolithic, Chalcolithic, Bronze Age.

## **1. Introduction**

Knapped stone assemblages are collections of lithic artefacts that provide valuable insights into prehistoric human behaviour and technology. These assemblages typically consist of various stone tools, cores, and debitage produced through the knapping process, in which a hard hammer or soft hammer is used to strike flakes from the core. The composition of knapped stone assemblages can vary greatly, depending on factors such as raw material availability, cultural traditions, and intended tool functions. Archaeologists analyse these assemblages to understand tool production techniques, resource exploitation strategies, and patterns of human mobility and settlement. The Late Neolithic Era was characterized by the widespread use of microlithic tools manufacturing, which was prevalent at various sites in the Gomal Valley, Khyber Pakhtunkhwa, Province.

Microlithic tools were typically made from small blades or bladelets and were often retouched to enhance their functionality. These small pieces were frequently assembled and incorporated into a range of composite tools (e.g., Edmonds 2005: 224). The term “lithic” is derived from the Greek word “lithos”, which means rock or stone. It is commonly used in

archaeology to refer to prehistoric periods such as the Palaeolithic, Mesolithic, and Neolithic (Rapp 2014: 345–346). Stone is an incredibly durable material, making it the preferred choice for prehistoric tool and weapon creation. As a result, stone implements from various cultures are frequently discovered and studied (Leakey 1953: 29).

### ***1.1. Objective***

The objective of this study is to investigate the stone tools found at the Late Neolithic site of Jhandi Babar-I in the Gomal Valley. These tools were found during an excavation in 1998 and were later collected from the surface. The study will sort the tools by their shape and use, such as cores, blades, bladelets, points and scrapers. It will also examine the materials used and how the tools were made. The goal is to understand the cultural and historical context of these 134 stone tools, which show two periods of use: the Late Neolithic and the Early Bronze Age.

### ***1.2. Overview of Lithic Industries in Neighbouring Regions***

Previous research in neighbouring regions has documented a wide range of lithic industries relevant to the present study (for a much-detailed overview see Khan et al. 2010: 8-28). Early evidence comes from Baluchistan, where M. A. Stein recovered stone tools at the Periano Ghundai mound, including a large double-edged blade along with scrapers, knife blades, and an arrowhead, which he interpreted as Neolithic and comparable to the Sistan assemblages (Stein 1929: 38, 40). Excavations at Kot Diji revealed abundant lithic artefacts across all stratigraphic layers, dominated by elongated sharp blades and cores, scrapers, and micro-blades; notched and serrated blades suggest sickle/saw use, while lustrous edges indicate prolonged use, likely linked to harvesting, and leaf-shaped arrowheads were also noted (Khan 1965: 18, 31, 82-83). At Allahdino, Shaffer identified a distinct flint industry characterised by small geometric microlithic tools in the lowest occupation level (Fairservis 1973: 98). Kili Ghul Mohammad produced large thin blades made from chert, jasper, or chalcedony, generally curved and trapezoidal (with some triangular examples), often bearing fine serrations and occasional blunting on one edge (Fairservis 1956: 234-35). Excavations at Sarai Khola yielded microlithic tools including parallel-sided blades, scrapers, asymmetrical flakes, and arrowheads, with suggested hafting in bone handles (Halim, 1970-71: 23-

24; Halim 1972: 4-7). Jalilpur, an Early Harappan site, produced chert cores and blades with secondary retouching and glossy working edges (Mughal 1972: 117-118; Mughal 1972: 117-18, 22-24). At Mehrgarh, detailed technological analysis showed blades as the dominant tool type (over 80%), with Levels 5–8 characterised by truncated blades, drills, and trapezes, followed by a later decline in lunates and trapezes from Level 4 onwards (Jarrige et al. 2013: 125-127). Finally, analyses from Harappa demonstrated that ground and chipped stone artefacts were produced using raw materials obtained from geographically distant sources, including Potwar, Baluchistan, Rohri, Sindh Kohistan, and Jaisalmer, Rajasthan (Dales and Kenoyer 1991: 238).

## **2. Lithic Industries in the Gomal Plain and Bannu Basin**

Microlithic industries of the Gomal Plain and Bannu Basin have been recognised since early reports, including the discovery of Palaeolithic–Mesolithic flakes and cores from older alluvium near the Marwat Kundi hills in the Bannu Plain (Khan 1979: 377). Subsequent excavations at Gumla and Hathala confirmed the presence of microlithic tools, particularly in Period-I levels, where only microliths were recorded. The Gumla assemblage is especially significant because it provides an evolutionary sequence of microlithic forms, including parallel-sided blades, awls, scrapers, a burin and a tranchet, reflecting toolkits mainly related to hunting activities rather than food production (Dani 1970-71: 41-42, 92). Both Gumla and Hathala produced substantial quantities of microliths, made predominantly of chert and flint, with limited use of red jasper and rare chalcedony examples (Dani 1970-71: 97).

Farid Khan's pioneering research at Rahman Dheri documented one of the richest microlithic assemblages in the region, classified into diverse tool types such as lunates, trapezes, triangles, points, arrowheads, scrapers, burins, drills and knives, suggesting composite hafted weapons and tools (Khan 1979: 375-403). Excavations at Rahman Dheri (1976-81) yielded stone tools consistently, though later publications reported smaller documented samples, including flakes, blades, scrapers and microlithic elements (Durrani *et al.* 1991: 106-7; Durrani and Ali 1998). Similar microlithic abundance was recorded at Lewan (Bannu), where tools recovered from surface and excavations were largely made of crypto-crystalline silica, especially chert and jasper (Allechin *et al.* 1986: 65-67). Further evidence of regional lithic production comes from proto-historic

Gandi Umar Khan in DI Khan district, where excavation produced blades, bladelets, points, burins, scrapers and heavy debitage, indicating on-site manufacture using locally procured raw materials such as chert, agate, chalcedony and jasper (Ali and Jan 2009: 26). Recent excavations at Rahman Dheri and Sikandar Janubi have added further stone tool data, with Rahman Dheri yielding a wide variety of lithics, while Sikandar Janubi produced a small assemblage mainly of blades/flakes, bladelets and a core (Samad and Jan 2016: 1, Samad *et al.* 2019: 47, Samad *et al.* 2019: 65, 74, 75, Samad and Jan 2016: 70-76).

### **3. Jhandi Babar-I (JB-I)**

Jhandi Babar village in the Gomal Plain contains two distinct archaeological mounds, identified as JB-I and JB-II (Fig. 2), with Jhandi Babar-I representing the larger of the two (Khan *et al.* 2000: 51). The origin of the site name “Jhandi” has been interpreted in different ways: one explanation describes it as a thorny tree with small leaves, regarded as sacred by some Hindu communities, while “Babar” is identified as the name of an Afghan tribe (Rahman 1997: 40). A second interpretation, derived from a dictionary of the “Western Panjabi Language”, also defines Jhandi as a tree and records its association with ritual practices, including a pre-marriage ceremony and offerings linked to smallpox-related beliefs (Jukes 1900: 108).

The site lies in an extremely arid, hot plain approximately 60 km southwest of DI Khan city, near the Valheri nallah (a tributary of the Kausa Khad), and is accessed via a turnoff from the Paroa-Chaudwan road near Kauri Hout village. The modern environment lacks permanent water sources, and agriculture depends largely on rainfall, contributing to limited vegetation and low population density; overgrazing and climatic severity are also cited as major ecological constraints. JB-I and JB-II are separated by around one kilometre of wasteland, and the nearest recorded elevation is 629 feet above sea level (Ali and Khan 2001: 174, Rahman 1997: 38, Khan *et al.* 2000: 25). Morphologically, Jhandi Babar-I is a large, roughly square mound measuring about 666 m east–west and 585 m north–south, with an average height of roughly 4 m; its uneven surface includes several small peaks. The mound is sparsely vegetated and densely scattered with potsherds, stone tools, and other artefacts, and it has been described as the largest Neolithic settlement in Pakistan. A modern cemetery occupies the southwestern part of the mound (Ali and Khan 2001: 174, Khan *et al.* 2002: 105).

### **3.1 Discovery**

The site was first discovered by Taj Ali (former Chairman of the Department of Archaeology at the University of Peshawar) and F.A. Durrani (former Chairman and Vice Chancellor, University of Peshawar) during a brief archaeological survey between Paroa and Chaudhwan in the DI Khan district in 1997 (Swati and Ali 1998: 2, 5). Later, the research team from the Directorate of Archaeology and Museums, led by Abdur Rahman (former Chairman of the Department of Archaeology at the University of Peshawar), reported the site in 1997 during their survey of the DI Khan Division (Rahman 1997: 37).

### **3.2 Excavation**

After its discovery, Ihsan Ali and Gul Rahim Khan from the Department of Archaeology, University of Peshawar conducted a small-scale excavation of the site in 1998 (Fig. 6). The campaign lasted for eight weeks, from May to June, and a trench measuring 10 x 4 m was dug and documented through the Harris Matrix method. The excavation reached a depth of 5 m of occupation deposits and uncovered 56 layers. Additionally, 6 ovens, 6 pits, 4 hearths, 4 platforms, 16 walls, 9 floor-levels, 7 post-holes, 49 cuts and a kiln were discovered (Khan et al. 2010). The excavation revealed four main habitational and structural phases with two distinct periods. The lower three periods contain handmade and painted pottery, while the latter period produced finer, wheel-made and painted pottery (Ali and Khan 2001: 174; Khan et al. 2010: 383).

### **3.3 Stratigraphy**

The Department of Archaeology, University of Peshawar, conducted a systematic excavation of the site in 1998 to uncover its cultural profile and establish a chronological sequence. The site was dated to the late Neolithic and early Bronze Age periods (5th-3rd millennium BC) based on the recovered pottery. The excavation revealed a 5 m deep stratigraphy with two distinct cultural phases, with Period-I (lower) belonging to the late Neolithic period and Period-II (upper) belonging to the early Bronze Age (Fig. 7). However, the excavators incorrectly identified Period-II, the upper phase, as Kot Dijian, which is actually the Tochi-Gomal Phase.

Additionally, JB-I is associated with and serves as a type site for the Sheri Khan Tarakai in the Bannu district (Khan *et al.* 2002: 105).

### **3.4 Absolute Dating**

The Bannu Archaeological Project's members collected five charcoal samples at a later time to determine the absolute date of the site. These samples were collected from the exposed portion of the 1998 excavation. The calibrated results and probability ranges for the determinations were recorded between 3500 and 3000 BC. (Ali and Khan 2001: 175; Khan *et al.* 2010: 396-97) (Fig. 1).

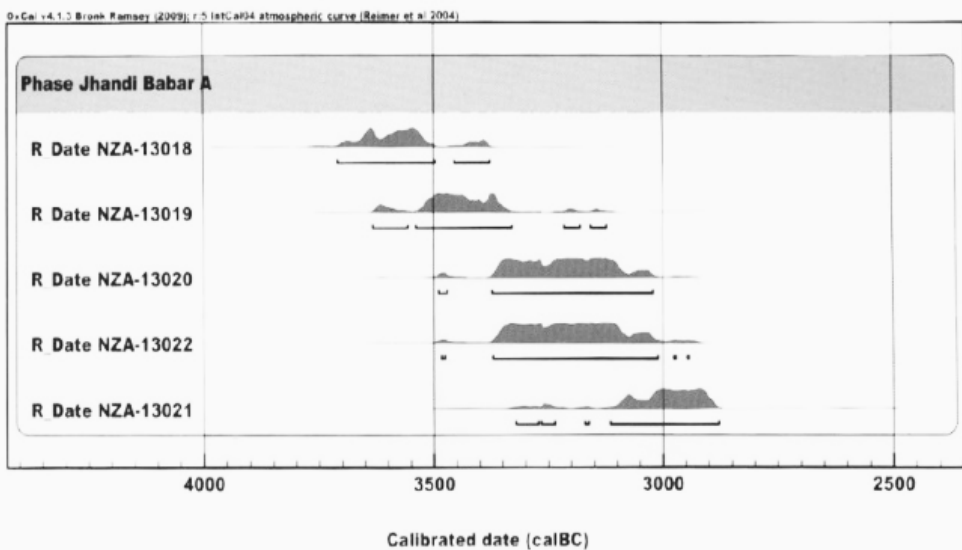


Fig. 1 - Radiocarbon probability ranges for all samples from Jhandi Babar-I (Courtesy: Khan *et al.* 2010: 397).

### **3.5. Raw Material**

The primary material utilized for producing knapped stone tools in Jhandi Babar-I is chert, as per the Bannu Archaeological Project's analysis of the area's raw materials. While chert is predominant, a limited amount of other stone materials, such as green Jasper, are also present. Chert is believed to have been eroded from the limestone bedrock in the nearby hills and mountains to the west of the Gomal Plain. Even now, people in Jhandi Babar village gather river stones from a stream about 20 km away to cover graves,

just like their ancestors did to get stone materials. As evidenced in Khan et al. (2010: 385-392) the raw materials consisted in small, river-worn pebbles of microcrystalline and cryptocrystalline quartz with a small amount of chemical impurities that produced a wide range of colours, including black chert, cream chert, brown chert, green jasper, grey chert, brecciated chalcedony and purple chert (see Khan *et al.* 2010: table 11.1). The length of the pebbles varied between 5 and 10 cm (Khan et al. 2010).

The raw materials of the tools utilized in the experimental study published in the book of Sheri Khan Tarakai and early village life in the borderlands of north-west Pakistan (Petrie *et al.* 2010), were all microcrystalline or cryptocrystalline quartzes, with a minimal quantity of impurities, which produced the various colours observed. Based on their sub-translucency, they have been classified as chert. The raw materials were obtained from the bed of the Tochi River, in the Bannu District. Two primary types of samples were selected: one a low-quality chert with numerous inclusions and fractures, and the other a high-quality chert that exhibited a significantly more homogeneous structure. Additionally, a sample was collected from Namal Gorge, north of Mianwali, Punjab, where a superior quality dark grey chert erodes from the limestone bedrock, closely resembling material observed in archaeological assemblages from Rehman Dheri and Harappa (Law 2008: 260-263, 712-714, Khan *et al.* 2010: 197).

### ***3.6 Source of the Raw Material***

The exact source of the raw materials used at the Jhandi Babar-I site is not clear, but it may have been transported to the site from a nearby stream or torrent in the hills (Khan *et al.* 2010: 385, Ali and Khan 2001: 177). Recent studies of lithic source areas suggest that many of the raw materials used at sites such as Harappa and others to the south may have originated from the Salt Range, the Suleiman Range, and the Hazara regions, which are all relatively close to the Gomal Valley (Kenoyer 2015: 32-33).

In 2000, Randall Law and Syed Rafiqul Hassan Baqri conducted some collaborative fieldwork to identify rock and mineral resources from the Salt Range in Punjab, Pakistan, that may have been used at the prehistoric site of Harappa (ca. 3300 to 1700 BC). Their research primarily focused on describing a source of black chert suitable for tool production that has been found in an Eocene limestone locally known as Sakesar Limestone exposed at Namal Gorge in the Western Salt Range. They

believe that this material is the same chert that is characteristic of the Kot Diji Period (2800-2600 BC) levels at Harappa (Fig. 2).

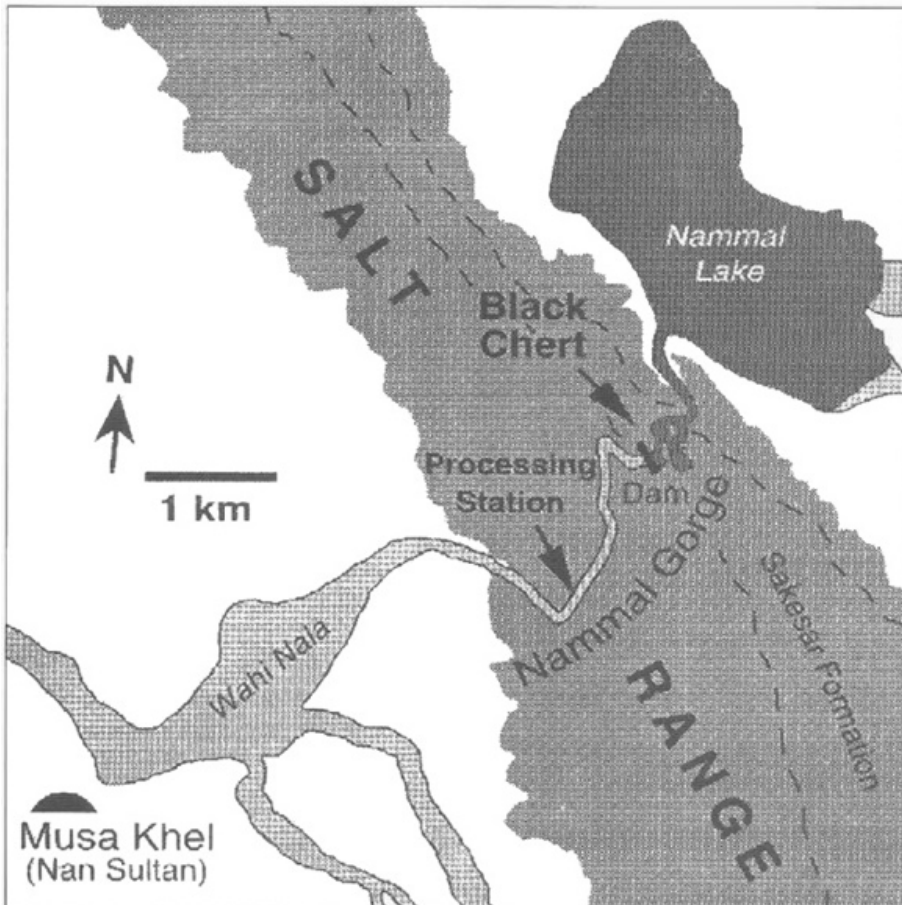


Fig. 2 - Musa Khel and Namal Gorge Area.

For further research on the topic, the researchers visited the SSAQ Museum of Archaeology and Ethnology, University of Peshawar to study their collection of artifacts from the Gomal Plain. Their findings revealed that black chert artifacts identical to the Sakesar variety are abundant in the surface collections from sites in the Gomal Plain. At Rehman Dheri, numerous examples of trimming flakes with cortex suggest that Sakesar chert nodules were transported to the site in their whole form and then processed there. Black chert resembling the Sakesar variety has also been

identified at Hissam Dheri and the late Neolithic/early Chalcolithic site of Jhandi Babar-I. Based on this evidence, it appears that the inhabitants of these and earlier sites in the region may have obtained black chert from the Western Salt Range (Law and Baqri 2001: 34, 36).

The raw materials were most likely sourced from quarries and transported in bulk to the production sites. These materials are subject to a standardized production method. Although the artefact designs and sizes may differ, their form and function are strongly related. The production workshops are typically located at or near habitation sites, providing context for their creation.

#### **4. Preliminary study of the lithic collection from Jhandi Babar-I**

The lithic collection analysed in the current study consists of lithics discovered both during the excavations carried out at Jhandi Babar-I in 1998-99 by Khan *et al.* (2010) and during the survey carried out in 2015-2017 within the framework of a collaborative archaeological project between the Department of Archaeology of the University of Peshawar and the Directorate General of Archaeology and Museums KP, Peshawar. The collection is presently housed in the Sir Sahibzada Abdul Qayyum Museum of Archaeology and Ethnology, University of Peshawar.

The knapped stone tools were carefully selected following a thorough examination that distinguishes between diagnostic and non-diagnostic artefacts. The selected cores consist of trimmed specimens exhibiting at least one distinct flake scar. They were further grouped according to shape, including rectangular, triangular, trapeze-rectangle, pointed, lunates, as well as regular and irregular forms. Flakes were selected based on the character of their working edges and classified into types such as blades, bladelets, points, flakelet fragments, and scrapers. Accordingly, in the following section we propose tentative functional interpretations based primarily on macroscopic attributes and morphological criteria, as neither detailed technological assessment nor traceological (use-wear) analysis was undertaken at this stage. While recognising that robust functional determinations ideally require technological and traceological investigation, the present study should therefore be considered preliminary. Consequently, the functional assignments offered here remain temporary and should be treated as working hypotheses rather than definitive conclusions. Future research integrating technological analysis with

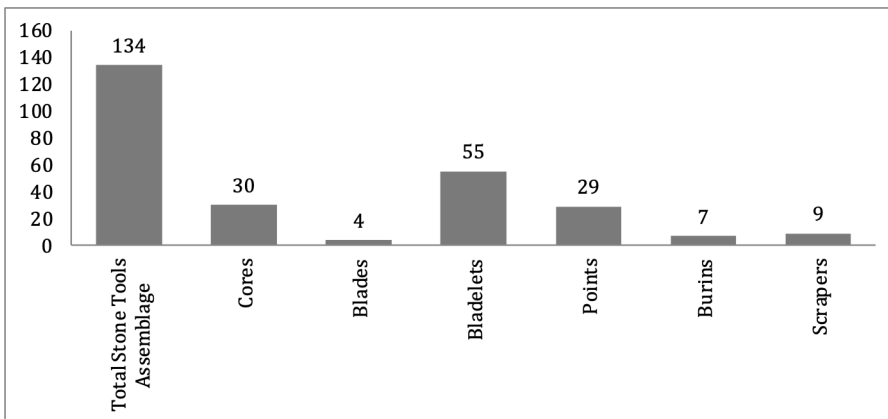
microscopic use-wear and residue studies will be essential to refine these interpretations and strengthen understanding of the assemblage.

#### **4.1. Knapped Stone Assemblage**

The stone tools of the collection are made of chert flakes with variations such as flakes, blades, bladelets, borers, flakelets, end-scrapers of side scrapers, points, lunettes, trapezes, triangles and cores. The material belonged to a variety of cryptocrystalline silica, such as mainly jasper, plain and banded chalcedony and brown and black chert (Khan *et al.* 2010: 385; Ali and Khan 2001: 177).

Out of the original collection, 134 diagnostic knapped stone artefacts were selected according to the process described above. Among them, 106 come from the exploration and excavation of the DI Khan project in 2015 to 2017 and 28 lithic tools are from the 1998 excavation of the Jhandi Babar-I site. The selected lithic collection is classified according to the geometrical shape of tools.

First, they were sorted into the following main types: cores, blades, bladelets, points, flakelets, end-scrapers of side-scrapers, and débitage. Each type is further divided into its particular shapes or forms. For proper documentation, these lithics are recorded according to their serial number, type, context, weight, length, width, and description. This lithic collection is classified into the following categories:

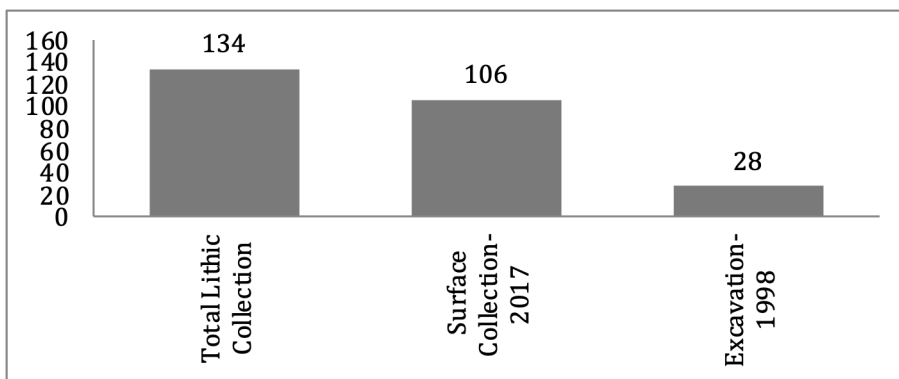


Tab. 1 - Total knapped lithic assemblage and classification.

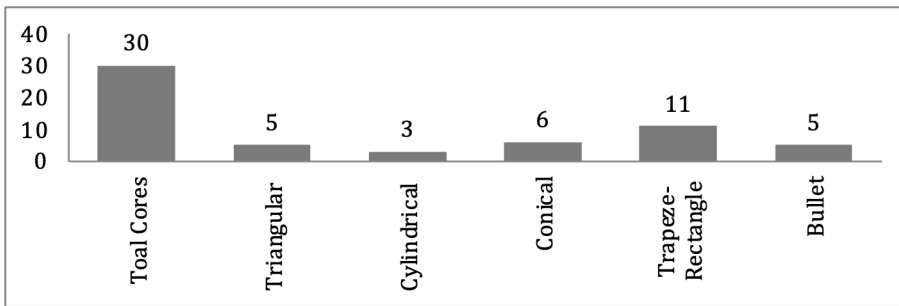
#### **4.1.1. Cores**

To discuss stone tool industries, it would be better to start from cores, as it is the primary medium from which blanks for knapping tools are detached. A core is a part of raw material from which flakes have been struck off. It yielded a variety of forms, from well-prepared and specialized examples (such as blade cores) through to “bashed lumps”, which have been worked in a more-or-less specific purpose and unmethodical way. Other artefacts such as axes or chisels which are not made on flakes are occasionally referred to as “core tools” (Edmonds 2005: 223). A “chunk or nodule of stone from which flakes have been detached carefully for further use or modification” (Delson et al. 2017: 194). According to Debénath, “cores” are among the most difficult artefacts to classify in the Palaeolithic industry. It is because there are around 50 different types of cores, distinguished by the variety of their attributes. From a typological perspective, the principal problem with cores stems from their variability. The only consistent feature of cores is that they show one or more platform surfaces and one or more faces from which flakes are detached (Debénath and Dibble 1991: 12).

The present lithic collection consists of 30 cores of different type and shape. These are of several types and shapes. Their dimensions range is as follows weight 1.5 to 18.6 g; length 12.30 to 37.95 cm; width 6.62 to 16.14 cm.



Tab. 2 - Distribution of total knapped stone artefacts.



Tab. 3 - Cores and their classification.

Five main shapes are identified, i.e., triangular, cylindrical, conical, trapeze-rectangle, and bullet. Each shape is briefly discussed below:

#### *Triangular*

The first category of triangular shaped cores consisted of JB-72, JB-75, JB-80, JB-82, and JB-110. All these cores show a slightly narrow tapered end on one side and a broad oblique end on the other.

#### *Cylindrical*

This category of cores consists of three examples with the numbers JB-81, JB-86 and JB-111. These cores are thick with a round shape and oblique ends. They represent regular truncations on their surface.

#### *Conical*

This category represents the following cores, i.e., JB-83, JB-85, JB-87, JB-89, JB-95 and JB-99. These cores are slightly different from triangular cores. They have a pointed top and a broad platform.

#### *Trapeze-Rectangle*

This category represents the following cores, i.e., JB-76, JB-88, JB-90, JB-91, JB-92, JB-94, JB-97, JB-105, JB-106, JB-108 and JB-109. Trapeze-rectangle is the most common shape found in the present collection of stone tools.

#### *Bullet*

This category consists of the following cores, i.e., JB-93, JB-98, JB-103, JB-104 and JB-107. Morphologically, these cores are fairly wide with one end being slightly thinner or narrower.

These cores are further subdivided according to their ends. These are briefly discussed below:

*Pointed-Ended*

The first category contains 9 cores, i.e., JB-72, JB-75, JB-80, JB-82, JB-85, JB-87, JB-89, JB-99, and JB-103. This category included distal edges that were slightly tapered and broad proximal edges.

*Oblique-Ended*

The second category consists of the following lithic cores: JB-81, JB-83, JB-86, JB-90, JB-91, JB-93, JB-94, JB-95 and JB-104. This category's lithic cores come in a variety of shapes, but their proximal ends are generally oblique in shape.

*Flat-Based*

The final category consists of the following lithic cores, i.e., JB-88, JB-92, JB-97, JB-98, JB-105 and JB-106. Mostly, lithic cores in this category have flat-based proximal-edges. Furthermore, these main types are sub-classified on the basis of their shapes.

**4.1.2. Blades**

A more commonly used but often confusing term, blades are more or less parallel-sided flakes with a length to width ratio of more than 2:1. Although blades may be produced incidentally in the working of a variety of tools and cores, systematic blade production can often be differentiated by the existence of a number of attributes. These include parallel scars or ridges on the dorsal surfaces of flakes and blades or on the faces of blade cores. Other common features include small "retouch" scars created during the careful trimming and maintenance of core platforms (Edmonds 2005: 222). A blade is defined as a flake which is more than double as long as it is wide, with equivalent or considerably touching ends and one or more edges similar to its long axis, giving it a triangular or trapezoidal cross-section. This explanation suggests one basic technological limitation—that all blades are removed from cores with longitudinal ridges on their surfaces (Cochrane 2008: 430).

The present collection of lithic tools comprises 4 blades, i.e., JB-20, JB-73, JB-74, and JB-113. Their sizes range from (weight 3.6 to 40.0 g; length 77.20 to 49.0 cm; width 4.90 to 13.30 cm). These blades are often

retouched either on one side or on both sides. Generally, these blades are obtained through pressure-flaking. They are rectangular and trapezoidal in shape, while their distal ends can be round, piercing, and slanted. In particular, these blades have unevenly parallel lateral edges, dorsal flake scar edges aligned with the blade's technological long axis, and approximately triangular or trapezoidal cross sections. These blades can be classified into different types depending on their shape and size. They are discussed below:

*Rectangular*

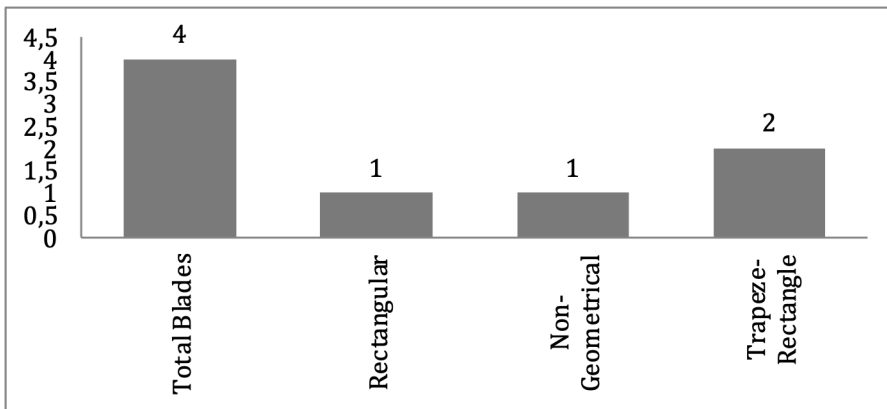
JB-20 is a long, thin, parallel-sided prismatic blade. Typologically, it is a true blade and commonly found in the Neolithic and Chalcolithic periods.

*Non-Geometrical*

JB-73 is an irregular notch-edged retouched flake.

*Trapeze-Rectangle*

This category consists of the following numbers, i.e., JB-74 and JB-113. JB-74, which is the large and thick patina blade tool, has a narrow, pointed tip. JB-113 has a slightly wavy body and narrows to the top.



Tab. 4 - Total blades and their classification.

**4.1.3. Bladelets**

The term “bladelet” is employed for a small, generally narrow and thin flake detached from a nucleus. The distinction between a blade and a bladelet is

one of size, and any length limit is arbitrary, but in general, the bulk of bladelets fall into the “microlithic” category. This distinguishes between blades and bladelets by arbitrarily limiting bladelet length at 1.0 to 5.0 cm. and blade from 5.0 to 30.0 cm. or more in length (Heizer and Kelley 1962: 94). Bladelet is the developed form of blade with a smaller size. In a broad sense, any piece of material struck conchoidally from a block of material is rightly called a flake. Some distinctions are made, however, based on the form of the piece and its completeness. The distinction between a flake and a blade and between a blade and a bladelet has been a source of confusion for certain periods. For blades, which are flakes whose length is at least two times greater than their width, the distinction between blades and bladelets is based on absolute size: bladelets are smaller than 50 mm in length or 12 mm in width (Debénath and Dibble 1991: 11-12). The present collection of bladelet tools represents the largest percentage, with 56 in numbers. Their dimensions range from (weight 0.1 to 3.1 g; length 1.6 to 37.62 mm; width 1.60 to 5.50 cm). Classification of these bladelets on their shape and form is discussed below:

#### *Trapeze-Rectangle*

This is the most common shape found in the present lithic artefacts. This category represented a large quantity of bladelet tools totalling 38 in number, i.e., JB-1, JB-2, JB-3, JB-4, JB-5, JB-6, JB-9, JB-10, JB-11, JB-12, JB-13, JB-17, JB-18, JB-21, JB-26, JB-28, JB-30, JB-31, JB-32, JB-33, JB-34, JB-35, JB-36, JB-37, JB-38, JB-39, JB-41, JB-59, JB-100, JB-101, JB-114, JB-115, JB-117, JB-119, JB -120, JB-122, JB-125 and JB-133. Mostly, this form of tool represented similar features such as cross section, retouched working edges and trapezoidal dorsal surfaces, etc.

#### *Triangular*

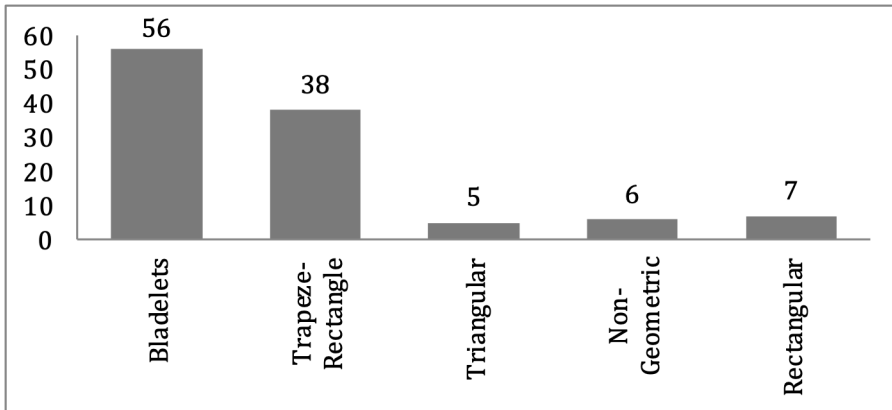
The second group consists of 5 bladelet tools, i.e., JB-16, JB-25, JB-29, JB-46 and JB-58. These tools have slightly different features, having narrow distal and proximal ends, or in some cases, only one end is narrow and pointed with a triangular dorsal surface. These tools have also been retouched edges.

#### *Non-Geometric*

The third group belonged to the non-geometric or irregular bladelets. Overall, 6 in numbers, i.e., JB-8, JB-24, JB-27, JB-40, JB-53 and JB-123.

*Rectangular*

The fourth group consisted of 7 rectangular bladelet tools, i.e., JB-7, JB-14, JB-15, JB-22, JB-116, JB-118 and JB-121. It has one long retouched side and two short ones, but their shapes are not always even. Its dorsal surface contains both triangular and trapezoidal sections.



Tab. 5 - Total bladelets tools and their classification.

**4.1.4. Points**

“Flake fragment on which two retouched edges converge to form a sharp triangular projection” (Shea 2017: 202). Several kinds of knives and points have long been recognized in Palaeolithic contexts, and the term “point” has been in the literature since the eighteenth century. However, they have also been poorly defined, with nothing approaching a clear definition. Later, it was defined as “a point was any blade or flake for which an extremity was made pointed by bilateral retouching” (Debénath and Dibble 1991: 58). The present collection of lithics contains 29 points. Their dimensions range are as follows weight 0.1 to 5.1 g; length 13.70 to 42.30 cm; width 1.55 to 9.28 cm.

*Triangular*

This form comprises 6 tools, i.e., JB-19, JB-23, JB-42, JB-50, JB-43, JB-78, JB-124, JB-126 and JB-131. Most of the pointed tools are triangular in shape. They have a long, tapered, pointed distal edge. Such types of tools are also called asymmetrical points.

### *Trapeze-Rectangle*

This form comprises of 3 tools, i.e., JB-49, JB-51 and JB-56.

### *Non-Geometric*

This non-geometric form represented 6 tools, i.e., JB-44, JB-45, JB-52, JB-55, JB-47, JB-70, JB-71, JB-112, JB-129, JB-130 and JB-132. These are irregular and notched, with narrow distal edges. These are possibly used as drills, awls, or borers, etc.

### *Lanceolate*

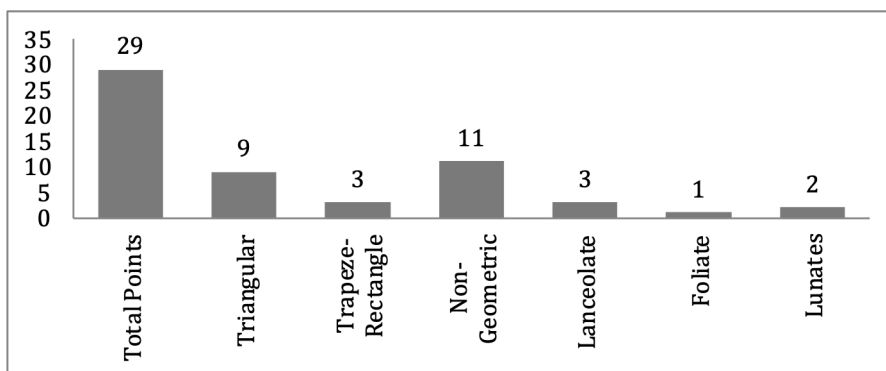
This category consists of the following tools: JB-48, JB-127, and JB-128. The distal edge is narrow and pointed. Due to its shape, it was probably used as an arrowhead.

### *Foliate*

It is only one in number (JB-102) but is an interesting tool, showing a long-narrow and slightly curved pointed-tip. Most probably, it was used as a borer-cum-bladelet tool.

### *Lunates*

Only two examples are found in the present lithic collection, i.e., JB-66 and JB-96. It is also termed as crescent shaped. It is a single-sided tool. It is obtained from a massive blade through hard or semi-hard-hammer percussion, which is later perpendicular retouched. Such types of tools are used for hafting etc.



Tab. 6 - Total points and their classification.

#### **4.1.5. Flakelets**

A flakelet is a tiny flake. These flakelet fragments are obtained through conchoidal fracture (Shea 2013: 28). We have various flakelet fragment types in this group. Most of these fragments have been modified with both symmetrical and asymmetrical shapes. Their retouched traces may take a variety of forms, ranging from small, regular scars.

The present lot of lithic tools consists of 7 fragments of flakelets . Their measurements range are as follows weight 0.2 to 4.2 g; length 13.20 to 21.50 cm; width 2.45 to 10.60 cm.

##### *Trapeze-Rectangle*

It includes JB-54 and JB-60. It is tinny and trapezoidal in shape.

##### *Triangular*

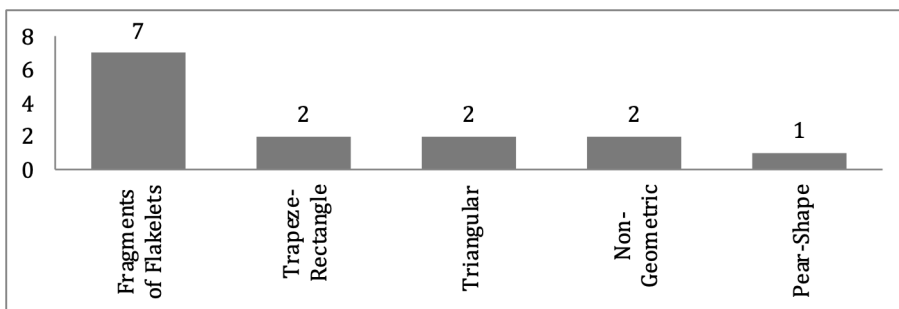
These types of tools include JB-77 and JB-84. Both of these tools show an oblique notched pointed tip.

##### *Non-Geometric*

This category includes the JB-8 and JB-57. These are irregularly notched, single-sided pointed tools.

##### *Pear-Shape*

This category includes only one example, i.e., JB-134.



Tab. 7 - Total flakelets and their classification.

#### **4.1.6. Scrapers**

The term “scraper” is used in prehistoric archaeology to define fragments of stone, usually flakes or blades, with retouched one or more edges or ends.

Mostly, this retouch process is semi-abrupt in nature, steepening the tool edge or making it less acute than a natural flake edge, thus making it more suitable for scraping rather than cutting activities (Delson et al. 2017: 627). As the name indicates, these are ordinarily meant for scraping such things as barks of trees, dressing of thin wooden or bamboo shafts, and skins of animals, as well as for various cutlery purposes. The tool is named according to the shape of a particular piece and the position and nature of the edge for scraping (Sankalia 1964: 61).

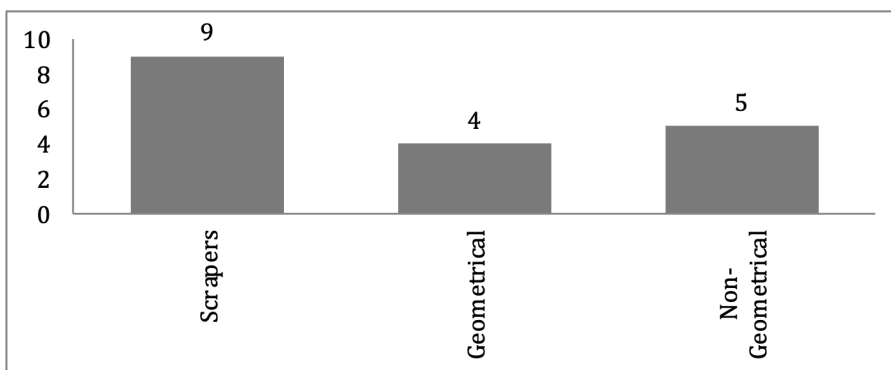
The present collection of lithic tools comprises nine scrapers. Among them JB-65 and Jb-67 are best specimen of end-scrapers. Their measurements range are as follows weight 1.6 to 14.9 g; length 6.0 to 37.80 cm; width 2.90 to 17.96 cm. These scrapers can be divided into two main groups on the basis of their shapes.

#### *Geometrical*

It includes JB-64, JB-65, JB-67 and JB-68. These tools are also called end-scrapers. They are either broad-waist or wide, which distinguishes them as compared with other tools. Most likely, such types of tools are used for scraping.

#### *Non-Geometrical*

It includes JB-61, JB-62, JB-63, JB-69 and JB-79. Most of these are irregular in shape with concave or hallow notched edges.



Tab. 8 - Total scrapers and their classification.

## **5. A Comparison**

As highlighted in Khan *et al.* 2010 (381), the stone tools found at Jhandi Babar-I are similar to those from the Late Neolithic period in the Bannu Basin, especially at the Sheri Khan Tarakai (SKT) site. The study further highlights that Jhandi Babar-I and SKT share many features, suggesting they are part of the same cultural area that includes Bannu, the Gomal Plain and northern Baluchistan. Jhandi Babar-I is near the Danasar Pass, which was likely used as a route. Both sites have tools made from blades and small, shaped stones used in composite tools, which are common in the SKT. They also used similar materials, such as chert and jasper, indicating that they obtained their raw materials from the same places and used similar techniques. The main difference between Jhandi Babar-I and SKT is the number of artifacts found at each site. Jhandi Babar-I has less artefacts because of limited excavation, while SKT has more due to extensive field work. Jhandi Babar-I also shares features with other sites like Gumla, Hathala and Rahman Dheri, where small blades and tools are common. Compared to other Neolithic sites further south and west, which have larger tools, Jhandi Babar-I and SKT focus on small, easily attached tools, showing that they belong to a unique northern borderland's tradition.

## **6. Conclusions**

The knapped tool assemblage from Jhandi Babar-I holds significant potential for explaining the cultural evolution of the Gomal Plain. Based on the current analyses of this assemblage, it is evident that Neolithic and Chalcolithic cultural activities were present in the Gomal Valley during the 5th millennium BCE. The chert knapped tool industry at Jhandi Babar-I includes a variety of forms, such as cores with multiple platforms (both fluted and irregular), parallel-sided blades and diverse scraper types (hollow, steep and round). Retouched tools are classified into two primary categories based on their characteristics: geometric and non-geometric. The selected lithic assemblage displays a range of physical appearances. These tools are predominantly characterized by short lengths and low-thickened bodies, with parallel flake scars on their upper surfaces. Furthermore, their edges are blunt, indicating that they were crafted for specific purposes.

In comparison to contemporary lithic industries in the Gomal Plain and Bannu Basin, the knapped tool industry from Jhandi Babar-I exhibits superior craftsmanship despite the relatively limited typological diversity.

The prominent features of lithic manufacturing are evident, as documented at other similar sites in the region. The environment of the site is characterized by abundant access to high-quality lithic raw materials, which the inhabitants effectively utilized. As observed in the current study, a diverse range of raw materials was employed, all of which were obtained from the immediate vicinity of the site.

This assemblage is characterized by small, thin stone blades, called bladelets. Most of these bladelets were not modified or sharpened after being made. These tools have distinct features in terms of their making and appearance. They often have a particular type of sharpening called a semi-abrupt retouch. There are specific shapes of triangular tools that differ from those found in later periods. This assemblage is very different from the Mesolithic tool sets, despite some similarities. An important observation is that most of the tools found were broken or fragmented. These characteristics help us identify and classify this particular group of stone tools, distinguishing them from other tool traditions.

This study is the first to systematically study the stone tools from Jhandi Babar-I in the Gomal Plain, Dera Ismail Khan. It shows that this site was a key Late Neolithic settlement that continued into the Early Bronze Age. The study examines 34 stone tools found both in excavation and on the surface. Most tools were made from chert and similar stones, with some made from jasper, chalcedony and others. The tools were sorted into main types: cores (30), blades (4), bladelets (56), points (29), burins (7) and scrapers (9). This shows that toolmaking at the site was not random but followed specific methods typical of Neolithic and Chalcolithic periods in north-west Pakistan. The many bladelets and points, along with other shapes like lunates and trapezes, suggest the tools were used for hunting, processing and crafts. Different core shapes (triangular, conical, cylindrical, trapeze-rectangular and bullet) indicate the use of small river stones and careful planning to make the most tools possible, suitable with microlithic techniques. The findings also support the idea that the Gomal Plain was a cultural link between the Bannu Basin, Gomal phases and northern Baluchistan, showing Jhandi Babar-I as a key site in Late Neolithic/Early Bronze Age settlement patterns. The study concludes that the tools from Jhandi Babar-I show (i) a structured way of making tools, (ii) a focus on small blade/bladelet tools, (iii) a variety of tool uses and (iv) similarities with nearby Neolithic and Chalcolithic industries. While the findings are informative, they are limited by the focus on tool types and the small number of tools from excavations. Future research should look at how the

tools were made used and sourced to better understand the economy, movement and cultural connections.

## **7. Future Scope**

Future research on Jhandi Babar-I's lithic industry should integrate technological, functional, and contextual approaches to understand the site economy and cultural behaviour. A techno-typological study is needed to reconstruct the reduction sequences and production systems for bladelet and point manufacture. Use-wear and residue analyses of tools should determine their function and test for composite hafting systems. Raw material characterization studies should identify procurement zones and evaluate lithic supply routes across the Gomal Plain to determine the source of the raw materials. Future excavations should ensure proper stratigraphic recovery to separate Late Neolithic and Bronze Age assemblages and evaluate changes in lithic tradition.

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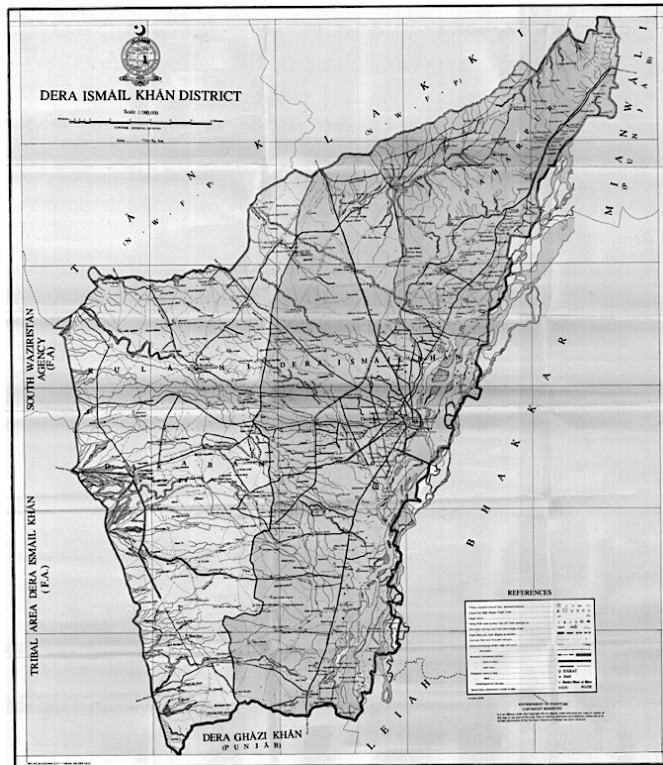


Fig. 1- Map of Dera Ismail Khan District (Courtesy: Published, Surveyor General of Pakistan, 2004).

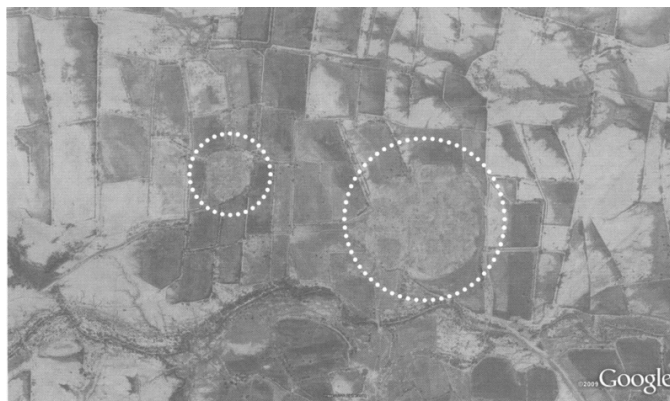


Fig. 2 - Google Earth™ image showing Jhandi Babar A (circled right) and B (circled left) 2009, Courtesy: ‘Sheri Khan Tarakai and early village life in the borderlands of north-west Pakistan 2010.



Fig. 3 - General view of the site of Jhandi Babar-I from south (Photo by the Authors).

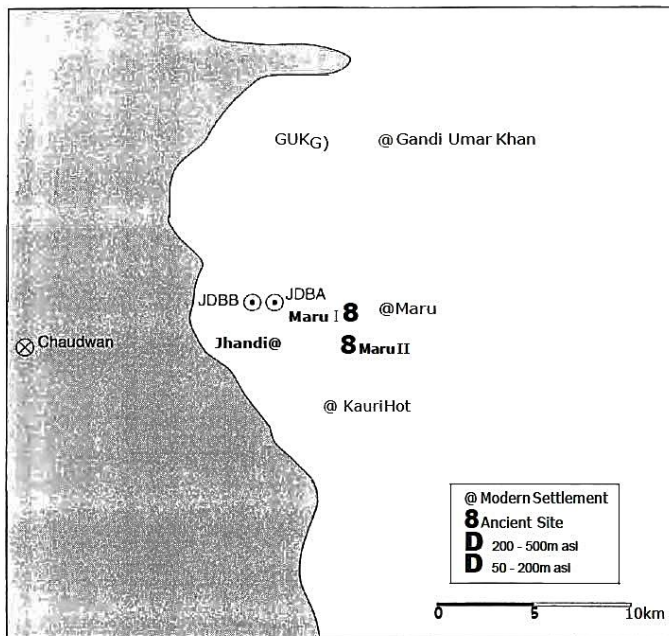


Fig. 4 - Jhandi Babar A & B, Maru, Gandhi Umar Khan sites. Courtesy: After (Khan, Knox and Thomas 2002: 108).

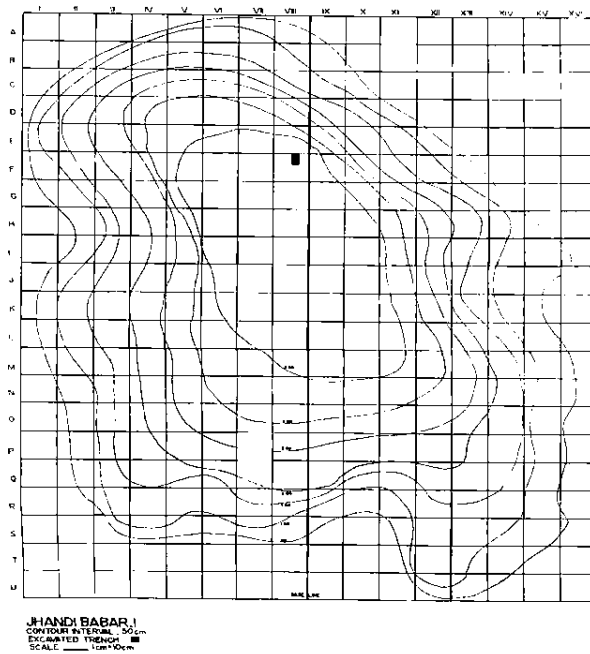


Fig. 5 - Contour Plan of the site of Jhandi Babar-I  
(Courtesy: After the Excavation 1998: 193).



Fig. 6 - Left: Section in the trench; right: detail of the virgin soil  
(Courtesy: Jhandi Babar-I Excavation 1998).

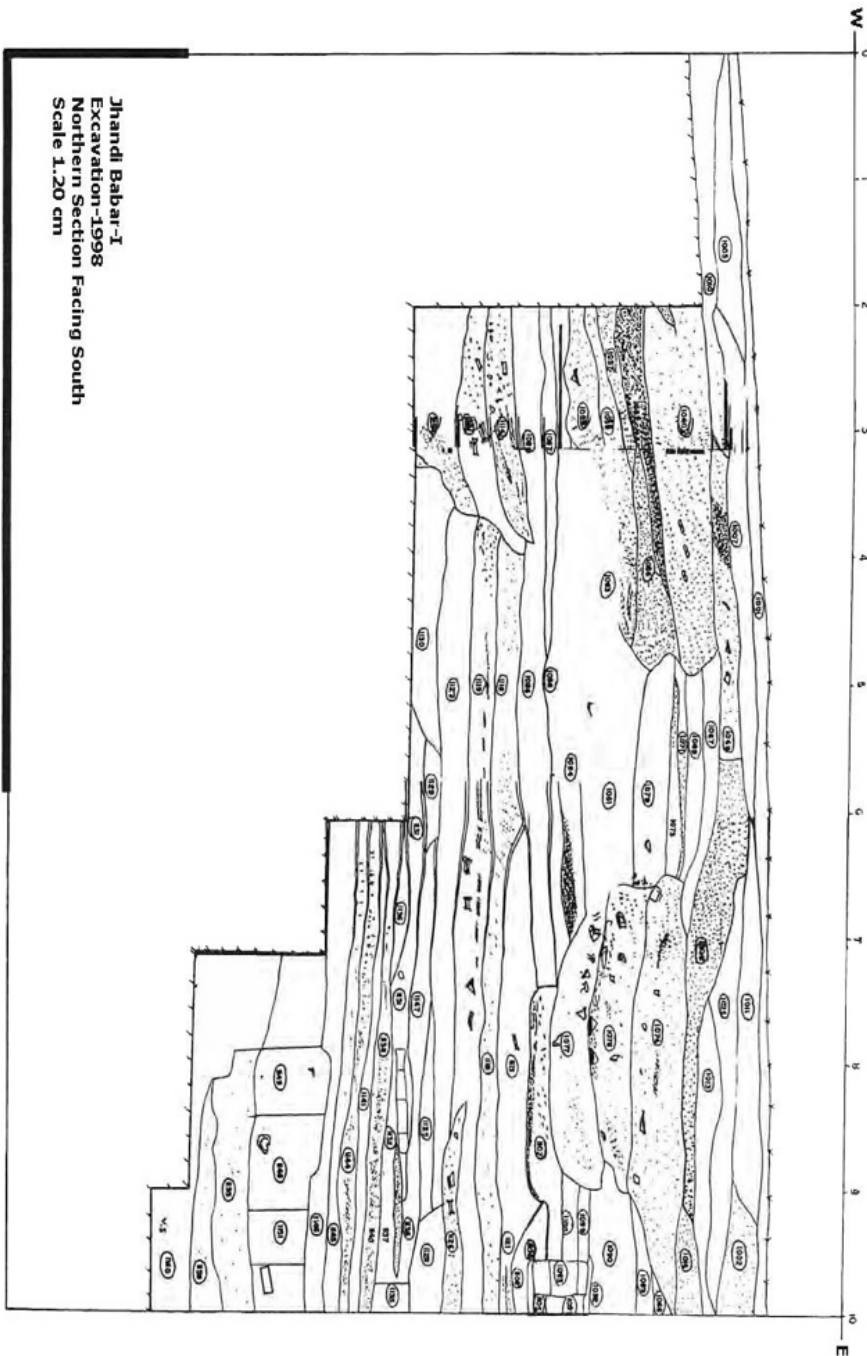













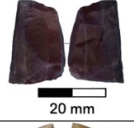















Fig. 7 - Trench, Northern section facing south  
(Courtesy: Jhandi Babar-I Excavation 1998).

**CATALOGUE**



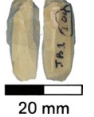
S. No	Reg. No.	Material	Shape	CORES		Context	Plate
				Weight (gm)	Dimensions (mm)		
1	JB-72	Calcareous Siltstone (760 Quartz), Dark-Greyish color layers	Triangular	12.4	L: 36.30 Wd: 12.50	+/2017	
2	JB-75	Chert, Dark-Greyish	Triangular	5.2	L: 33.45 Wd: 9.14	+/2017	
3	JB-76	Flint, Blackish	Triangular	2.9	L: 26.28 Wd: 7.08	+/2017	
4	JB-80	Chert, Pale and Greyish bands	Lanceolate	6.0	L: 36.80 Wd: 9.60	+/2017	
5	JB-81	Chert, Cream	Cylindrical	11.6	L: 28.80 Wd: 14.60	+/2017	
6	JB-82	Chert, Brownish	Triangular	9.0	L: 33.08 Wd: 11.30	+/2017	
7	JB-83	Chert, Brownish	Geometric	8.1	L: 23.30 Wd: 14.00	+/2017	
8	JB-85	Chert, Dark-Pinkish	Geometric	2.8	L: 24.25 Wd: 8.95	+/2017	

*The Knapped Stone Assemblage of Jhandi Babar-I...*




9	JB-86	Chert, Dark- Pinkish	Cylindrical	12.8	L: 26.00 Wd: 15.60	+/2017	
10	JB-87	Jasper, Banded	Geometric	8.7	L: 31.50 Wd: 10.00	+/2017	
11	JB-88	Jasper, Maroon	Trapeze- Rectangle	18.6	L: 37.50 Wd: 12.62	+/2017	
12	JB-89	Jasper, Maroon	Conical	4.1	L: 26.15 Wd: 8.88	+/2017	
13	JB-90	Jasper, Ferruginous Chert banded	Trapeze- Rectangle	17.7	L: 37.95 Wd: 15.86	+/2017	
14	JB-91	Jasper, White and Greyish colour bands	Trapeze- Rectangle	5.1	L: 24.70 Wd: 8.45	+/2017	
15	JB-92	Chert, Cream	Non- Geometrical	9.7	L: 31.35 Wd: 13.72	+/2017	
16	JB-93	Chert, Brownish	Bullet	11.4	L: 28.60 Wd: 12.85	+/2017	
17	JB-94	Chert, Cream	Rectangular	3.2	L: 21.10 Wd: 9.78	+/2017	
18	JB-95	Chert, Greyish in colour with small pores left after some black minerals got dissolved out, Calcite coating on a surface.	Non- Geometric	12.4	L: 36.05 Wd: 12.70	+/2017	


19	JB-97	Flint, Dark- Greyish with White bands	Trapeze- Rectangle	1.5	L: 12.30 Wd: 6.90	+/2017	
20	JB-98	Flint, Blackish	Bullet	2.4	L: 18.00 Wd: 6.62	+/2017	
21	JB-99	Chert, Greyish	Conical	4.3	L: 23.65 Wd: 8.18	+/2017	
22	JB-103	Flint, white band, Calcite layer is also occurring on a surface	Bullet	3.0	L: 18.15 Wd: 10.22	+/2017	
23	JB-104	Jasper, Banded	Bullet	12.2	L: 24.20 Wd: 16.14	+/2017	
24	JB-105	Flint (Chert), Maroon	Flat	12.0	L: 31.60 Wd: 15.10	+/2017	
25	JB-106	Jasper, Reddish	Flat	17.6	L: 30.44 Wd: 14.74	+/2017	
26	JB-107	Jasper, Reddish	Bullet	16.8	L: 30.10 Wd: 12.15	JB-1- 1998 564	
27	JB-108	Chert, White- Greyish bands	Rectangular	3.1	L: 21.60 Wd: 12.40	JB-1- 1998 220	

*The Knapped Stone Assemblage of Jhandi Babar-I...*









28	JB-109	Chert, White-Greyish bands	Trapeze-Rectangle	7.2	L: 28.05 Wd: 14.15	JB-1-1998 133	
29	JB-110	Jasper, Reddish-Greyish composition	Conical	5.1	L: 24.80 Wd: 15.20	JB-1-1998 412	
30	JB-111	Chert, White-Greyish bands	Rectangular	1.5	L: 20.15 Wd: 10.15	JB-1-1998 304	

**BLADES**











S. No.	Reg. No.	Material	Shape	Weight (gm)	Dimensions (mm)	Context	Plate
31	JB-20	Quartzite, Grey (90% Quartz)	Rectangular	4.9	L: 71.80 Wd: 4.90	+/2017	
32	JB-73	Chert, Brownish with Greyish bands	Non-Geometric (Retouched-Flake)	6.0	L: 50.00 Wd: 6.18	+/2017	
33	JB-74	Limestone (Calcite, Hardness =3 CaCO <sub>3</sub> )	Trapeze-Rectangle	40.0	L: 77.20 Wd: 13.30	+/2017	

34	JB-113	Chert, Reddish	Trapeze-Rectangle	3.6	L: 57.45 Wd: 4.90	JB-1-1998 57	
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**BLADELETS**

S. No.	Reg. No.	Material/Composition	Shape	Weight (gm)	Dimensions (mm)	Context	Plate
35	JB-01	Flint, Blackish	Trapeze-Rectangle (Bladelet-cum-Scraper)	0.5	L: 16.60 Wd: 2.60	+/2017	
36	JB-02	Chert (Jasper)	Trapeze	0.4	L: 12.50 Wd: 2.70	+/2017	
37	JB-03	Chert, Dark-Greyish	Trapeze-Rectangle	0.3	L: 12.92 Wd: 2.20	+/2017	
38	JB-04	Chert, Brownish	Trapeze-Rectangle	0.3	L: 11.90 Wd: 2.30	+/2017	
39	JB-05	Chert, Pale	Trapeze-Rectangle	0.6	L: 16.30 Wd: 3.00	+/2017	
40	JB-06	Chert, Greyish	Trapeze-Rectangle	0.5	L: 22.40 Wd: 1.90	+/2017	
41	JB-07	Chert, Light-Brown	Rectangular	0.5	L: 25.75 Wd: 2.90	+/2017	
42	JB-08	Chert, Light-Brown	Non-Geometric	0.8	L: 22.90 Wd: 2.60	+/2017	

*The Knapped Stone Assemblage of Jhandi Babar-I...*

43	JB-09	Chert, Cream	Trapeze- Rectangle	0.9	L: 25.44 Wd: 2.15	+/2017	
44	JB-10	Chert, Brownish	Trapeze- Rectangle	0.8	L: 26.96 Wd: 2.17	+/2017	
45	JB-11	Chert, Yellowish	Trapeze- Rectangle	0.7	L: 30.80 Wd: 1.60	+/2017	
46	JB-12	Chert, Light-Brown	Trapeze- Rectangle	1.0	L: 23.65 Wd: 3.05	+/2017	
47	JB-13	Chert, Greyish	Rectangula r	0.6	L: 26.30 Wd: 1.80	+/2017	
48	JB-14	Quartzite (90% Quartz), Greyish	Geometric	1.2	L: 35.70 Wd: 2.45	+/2017	
49	JB-15	Chert, Yellowish	Geometric	1.6	L: 31.95 Wd: 3.15	+/2017	
50	JB-16	Chert, Greyish	Geometric	0.9	L: 26.00 Wd: 2.38	+/2017	
51	JB-17	Chert, Yellowish and Reddish patches	Trapeze- Rectangle	1.7	L: 23.75 Wd: 4.45	+/2017	
52	JB-18	Chert, Brownish	Non- Geometric	1.5	L: 36.65 Wd: 3.45	+/2017	





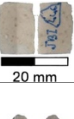
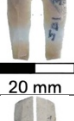


53	JB-21	Jasper, Maroon with White band	Trapeze- Rectangle	1.9	L: 35.25 Wd: 3.90	+/2017	
54	JB-22	Jasper	Rectangular	3.1	L: 37.25 Wd: 5.50	+/2017	
55	JB-24	Chert, Greyish	Non- Geometric (Flake- Bladelet)	1.4	L: 37.62 Wd: 2.60	+/2017	
56	JB-25	Jasper, Maroon	Triangular	0.9	L: 25.32 Wd: 3.40	+/2017	
57	JB-26	Jasper, Maroon	Trapeze- Rectangle	1.7	L: 31.20 Wd: 2.90	+/2017	
58	JB-27	Jasper, Maroon	Non- Geometric	0.9	L: 26.82 Wd: 2.65	+/2017	
59	JB-28	Flint	Trapeze- Rectangle (Bladelet - cum-Point)	1.0	L: 33.46 Wd: 1.78	+/2017	
60	JB-29	Chert, Yellowish	Geometric (Bladelet - cum-Point)	0.3	L: 18.54 Wd: 2.40	+/2017	
61	JB-30	Chert, Brownish	Trapeze- Rectangle	0.7	L: 22.00 Wd: 2.54	+/2017	
62	JB-31	Chert, Greyish to Pinkish	Trapeze- Rectangle	1.0	L: 21.33 Wd: 3.72	+/2017	

*The Knapped Stone Assemblage of Jhandi Babar-I...*

63	JB-32	Chert, Greyish to Pinkish	Trapeze- Rectangle	1.1	L: 25.58 Wd: 2.82	+/2017	
64	JB-33	Chert, Dark-Greyish	Trapeze- Rectangle	1.3	L: 24.25 Wd: 3.25	+/2017	
65	JB-34	Chert, Dark-Greyish	Trapeze- Rectangle	1.3	L: 20.42 Wd: 4.03	+/2017	
66	JB-35	Chert, Greyish	Trapeze- Rectangle	0.4	L: 19.16 Wd: 2.05	+/2017	
67	JB-36	Quartzite (90% Quartz)	Trapeze- Rectangle (Notched- Bladelet)	0.5	L: 21.30 Wd: 2.82	+/2017	
68	JB-37	Chert, Greyish and Cream color bands	Trapeze- Rectangle (Notched- Bladelet)	0.8	L: 21.25 Wd: 2.65	+/2017	
69	JB-38	Chert, Greyish	Trapeze- Rectangle	0.4	L: 17.35 Wd: 2.30	+/2017	
70	JB-39	Chert, Light-Brown to Pinkish	Trapeze- Rectangle	1.7	L: 24.53 Wd: 4.70	+/2017	
71	JB-40	Chert, Brownish	Geometric	0.6	L: 19.54 Wd: 2.60	+/2017	
72	JB-41	Chert, Brownish	Trapeze- Rectangle	0.5	L: 14.75 Wd: 3.05	+/2017	
73	JB-46	Chert, Yellowish	Geometric (Bladelet or Burin?)	0.3	L: 14.80 Wd: 2.24	+/2017	

74	JB-53	Flint, Blackish	Geometric (Bladelet/ Scraper)	0.6	L: 19.05 Wd: 2.90	+/2017	
75	JB-58	Chert, Milky-White or Pale	Geometric	0.3	L: 15.45 Wd: 2.04	+/2017	
76	JB-59	Quartzite (90% Quartz)	Trapeze- Rectangle	1.1	L: 16.98 Wd: 3.50	+/2017	
77	JB- 100	Jasper	Trapeze- Rectangle	0.6	L: 19.60 Wd: 2.20	+/2017	
78	JB- 101	Jasper	Trapeze- Rectangle	1.3	L: 27.60 Wd: 3.01	+/2017	
79	JB- 114	Chert, Light-Brown	Trapeze- Rectangle	0.8	L: 33.60 Wd: 2.90	JB-1- 1998 54	
80	JB- 115	Chert, Brown- Greyish bands	Trapeze- Rectangle	1.3	L: 28.15 Wd: 3.50	JB-1- 1998 48	
81	JB- 116	Chert, Greyish	Rectangula r	0.8	L: 33.75 Wd: 2.85	JB-1- 1998 47	
82	JB- 117	Chert, Cream- Yellowish	Trapeze- Rectangle	0.7	L: 26.66 Wd: 3.30	JB-1- 1998 49	



*The Knapped Stone Assemblage of Jhandi Babar-I...*

83	JB-118	Chert, Brown-Greyish	Rectangular	0.5	L: 28.75 Wd: 2.70	JB-1-1998 310	
84	JB-119	Jasper, Reddish with White dots	Trapezoidal	0.6	L: 28.25 Wd: 3.35	JB-1-1998 75	
85	JB-120	Jasper, Light-Brown	Trapezoidal	0.7	L: 23.80 Wd: 3.20	JB-1-1998 52	
86	JB-121	Chert, Greyish	Rectangular	0.6	L: 26.22 Wd: 2.50	JB-1-1998 43	
87	JB-122	Chert, Greyish	Trapezoidal	0.10	L: 18.90 Wd: 3.10	JB-1-1998 44	
88	JB-123	Chert, Greyish	Non-Geometric	0.3	L: 22.10 Wd: 2.80	JB-1-1998 340	
89	JB-125	Chert, Light-Greyish	Trapezoidal	0.4	L: 18.20 Wd: 3.10	JB-1-1998 341	
90	JB-133	Jasper, Reddish with White bands	Trapezoidal	0.1	L: 12.35 Wd: 3.80	JB-1-1998 392	



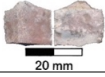



POINTS							
S. No.	Reg. No.	Material/ Composition	Shape	Weight (gm)	Dimensions (mm)	Context	Plate
91	JB-19	Chert, Greyish	Triangular (Point or Drill)	1.4	L: 38.30 Wd: 2.90	+/2017	
92	JB-23	Jasper	Triangular (Point-cum-Bladelet)	0.4	L: 24.85 Wd: 1.90	+/2017	
93	JB-42	Chert (Agate), banded	Geometric (Point-cum-Bladelet)	2.8	L: 33.80 Wd: 7.30	+/2017	
94	JB-43	Siltstone (Quartz 70%), Greyish sedimentary rock	Triangular (Point-cum-Bladelet)	5.1	L: 40.06 Wd: 7.35	+/2017	
95	JB-44	Limestone (90% CaCO <sub>3</sub> , Calcite, Hardness = 3)	Non-Geometric (Point-cum-Bladelet)	4.7	L: 42.30 Wd: 6.85	+/2017	
96	JB-45	Chert, Greyish with Pinkish hue	Non-Geometric (Point-cum-Bladelet/ Borer)	1.4	L: 34.75 Wd: 2.80	+/2017	
97	JB-47	Chert, Greyish with Pinkish hue	Non-Geometric (Point-cum-Awl or Drill)	0.5	L: 21.38 Wd: 2.28	+/2017	
98	JB-48	Chert, Brownish	Lanceolate (Point-cum-Arrowhead / Awl or Drill?)	0.8	L: 22.72 Wd: 4.45	+/2017	



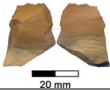

*The Knapped Stone Assemblage of Jhandi Babar-I...*

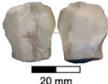



99	JB-49	Chert, Reddish- Brownish	Trapeze- Rectangle (Point- cum- Bladelet)	0.6	L: 23.05 Wd: 2.30	+/2017	
100	JB-50	Chert, Greyish	Geometric (Awl or Drill)	0.4	L: 16.75 Wd: 2.80	+/2017	
101	JB-51	Chert, Greyish	Geometric (Point- cum- Bladelet or burin)	1.4	L: 27.35 Wd: 3.40	+/2017	
102	JB-52	Chert, Greyish (banded)	Non- Geometric (Point- cum- Bladelet)	2.5	L: 35.20 Wd: 4.80	+/2017	
103	JB-55	Flint, Dark-Greyish	Non- Geometric (Point- cum- Bladelet)	1.0	L: 24.24 Wd: 3.54	+/2017	
104	JB-56	Jasper, Maroon with Greyish band	Trapeze- Rectangle (Point- cum- Bladelet)	0.7	L: 24.95 Wd: 2.54	+/2017	
105	JB-66	Agate	Lunate or Crescent (Point- cum- Bladelet)	3.6	L: 30.60 Wd: 5.70	+/2017	
106	JB-70	Jasper	Non- Geometric (Borer or Drill)	2.5	L: 28.15 Wd: 5.80	+/2017	
107	JB-71	Chert, Greenish	Non- Geometric (Borer or Drill-cum- Bladelet)	9.5	L: 50.90 Wd: 9.10	+/2017	

<b>108</b>	JB-78	Chert, Greyish	Triangular	3.6	L: 31.10 Wd: 6.75	+/2017	
<b>109</b>	JB-96	Flint	Lunate	3.8	L: 24.29 Wd: 9.28	+/2017	
<b>110</b>	JB-102	Jasper	Foliate (Point-cum-Blade)	1.1	L: 35.04 Wd: 1.55	+/2017	
<b>111</b>	JB-112	Chert, Greyish	Hexagonal	0.4	L: 16.60 Wd: 4.10	JB-1- 1998 20	
<b>112</b>	JB-124	Jasper	Triangular	0.2	L: 21.10 Wd: 4.60	JB-1- 1998 504	
<b>113</b>	JB-126	Chert, Brownish	Triangular	0.1	L: 15.10 Wd: 5.00	JB-1- 1998 503	
<b>114</b>	JB-127	Chert, Brownish	Non- Geometric	0.2	L: 17.85 Wd: 4.30	JB-1- 1998 382	
<b>115</b>	JB-128	Chert, Greyish	Triangular	0.3	L: 23.34 Wd: 5.10	JB-1- 1998 296	
<b>116</b>	JB-129	Chert, Brownish/ Reddish	Hexagonal	0.1	L: 16.85 Wd: 3.50	JB-1- 1998 401	
<b>117</b>	JB-130	Chert, Greyish	Non- Geometric	0.2	L: 18.87 Wd: 4.10	JB-1- 1998 12	
<b>118</b>	JB-131	Chert, Light-Greyish	Triangular	0.2	L: 16.40 Wd: 4.30	JB-1- 1998 366	
<b>119</b>	JB-132	Chert, Light-Greyish	Non- Geometric	0.2	L: 13.70 Wd: 4.80	JB-1- 1998 364	

*The Knapped Stone Assemblage of Jhandi Babar-I...*

FLAKELETS							
S. No.	Reg. No.	Material/ Composition	Shape	Weight (gm)	Dimensions (mm)	Context	Plate
120	JB-54	Flint, Blackish	Trapeze-Rectangle	0.4	L: 16.00 Wd: 2.45	+/2017	
121	JB-57	Chert, Milky-White or Pale	Non-Geometric	0.8	L: 15.40 Wd: 3.80	+/2017	
122	JB-60	Chert, Pinkish	Geometric	1.7	L: 15.70 Wd: 4.90	+/2017	
123	JB-77	Chert, Greyish and White color bands	Triangular (Flakelet-cum-Core)	4.2	L: 21.50 Wd: 10.60	+/2017	
124	JB-84	Chert, Reddish and Pinkish hue	Triangular	3.7	L: 18.00 Wd: 9.50	+/2017	
125	JB-134	Chert, Light-Greyish	Pear	0.2	L: 13.20 Wd: 3.50	JB-1-1998 507	

SCRAPERS							
S. No.	Reg. No.	Material/ Composition	Shape	Weight (gm)	Dimensions (mm)	Context	Plate
126	JB-61	Chert	Non-Geometric	3.5	L: 23.05 Wd: 5.65	+/2017	
127	JB-62	Chert, Pinkish	Non-Geometric	6.3	L: 30.60 Wd: 7.45	+/2017	
128	JB-63	Chert, Brownish	Non-Geometric	4.5	L: 27.14 Wd: 7.15	+/2017	
129	JB-64	Chert	Geometric	1.6	L: 19.40 Wd: 4.40	+/2017	

<b>130</b>	JB-65	Agate	Geometric (End- Scraper)	4.7	L: 23.26 Wd: 6.20	+/2017	
<b>131</b>	JB-67	Flint	Geometric (End- Scraper)	4.0	L: 24.60 Wd: 6.14	+/2017	
<b>132</b>	JB-68	Chert, Light- Brownish	Geometric	3.0	L: 24.80 Wd: 7.20	+/2017	
<b>133</b>	JB-69	Flint	Non- Geometric	2.6	L: 37.80 Wd: 2.90	+/2017	
<b>134</b>	JB-79	Chert, Greyish and Cream color bands	Non- Geometric	14.9	L: 34.20 Wd: 17.96	+/2017	