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Cover: Qalta location, El-Kowm, Syria, Jerf Ajla/Qalta-type core,
3342. Photo: A. Sanson

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RESEARCH ARTICLE

The Nubian Levallois technology in central Syria in the context of the Middle–Upper Palaeolithic transitional period and the IUP variability in the Eastern Mediterranean Levant

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Abstract. This article focuses on the Nubian Levallois technology first recognized in northeastern Africa in the 1960s. Now, sites of the Middle Stone Age (MSA) Nubian Complex associated with *Homo sapiens* are known to occupy vast areas in northeastern Africa and the Arabian Peninsula. Recently, proper Nubian Levallois technology has been recognized at sites in southern Africa and the southern part of the Eastern Mediterranean Levant as well. Here we report several sites with Nubian Levallois artefacts from central Syria, a Levantine region geographically closer to Arabia than Africa, where such technology had not been identified previously. The analyzed lithic assemblages share the same techno-typological characteristics. Technologically, they feature a newly recognized "developed Nubian Type 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core" or shortly, "Jerf Ajla/Qalta-type Nubian" cores and method. This method was geared towards the serial production of pointed blades and Levallois points on blades in a single core reduction cycle. This differs from other Nubian core reduction methods, which tend to focus on producing a single pointed flake or Levallois point on a flake in each reduction cycle of a core. Typologically, the investigated Syrian assemblages are dominated by Upper Palaeolithic tool classes and types, especially endscrapers and burins. Besides the lithic data, these assemblages are assumed to be older than 33–36 uncal ka BP measured at the sites Jerf al-Ajla and Umm el-Tlel. We argue that central Syrian assemblages with Nubian methods can be dated to the transitional period between the Middle Palaeolithic or Middle Stone Age and the Upper Palaeolithic, more precisely, to the Initial Upper Palaeolithic (IUP). Thus, the developed character of the Jerf Ajla/Qalta-type Nubian cores does not only adds to the variability of the Nubian Levallois technology but also explains its absence in MSA locations in Africa and Arabia, and its presence in the IUP Levant. Accepting this, we propose the name "Jerf Ajla/Qalta industry" for these particular Nubian-related IUP assemblages and sites in central Syria. In doing so, a second IUP industry is now recognized by us in the Levant, in addition to the Early Emiran, known for its improved Nubian 1 method with opposed-platform cores and a new hunting projectile type, the Emireh point. Both IUP industries appeared in the Levant as a result of *Homo sapiens* migration with different Nubian-related knapping traditions from Africa and Arabia into the neighbouring Eastern Mediterranean Levant. The Early Emiran is considered to be a successful IUP industry in the Levant, as a predecessor of the IUP Late Emiran and Early Upper Palaeolithic (EUP) Early Ahmarian industries. Moreover, parts of the population carrying this industry even spread beyond southwestern Asia to other Eurasian regions, heralded by new IUP and EUP industries there. However, the Jerf Ajla/Qalta industry and its makers did not continue to survive in the Levant.

Keywords: Nubian Levallois technology, Initial Upper Palaeolithic

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The present article is dedicated to the fond memory of Father Francis Hours (1921–1987), a great Levantine prehistorian, who co-directed the Palaeolithic research group in the El-Kowm area in the 1980s and invited one of us (J.-M Le Tensorer) to join Palaeolithic research in Syria in 1982.

At the end of the 1960s, after "*the work of the Combined Prehistoric Expedition to Egypt and the Sudan … questions were raised about possible cultural connections between Palestine and the Nile Valley during the Pleistocene. … The evidence for these connections, however, was often no more than gross typological or technological similarities between assemblage groups and in no case was there a continuously known distribution of any industry from the Levant to North Africa. If these postulated connections were to be verified or rejected, Prehistoric investigations would be necessary in the intervening areas – Northeast Egypt, the Sinai, and the Negev. In fact, this huge area, from the northern Nile to Beer Sheva, was almost a Prehistoric terra incognita.*" (Marks 1976, p. 3)

1. Introduction

This paper discusses recently recognized locations in central Syria, Eastern Mediterranean Levant (hereafter: Levant), that contain lithic artefacts related to the Nubian Levallois technology. Nubian sites had never been identified in Syria before. Until now, it was held that bearers of the Nubian lithic technological tradition migrated from Africa only to the southwestern corner of the Asian continent, the southern Levant, through the Nile Delta and the sole land bridge, the Sinai Peninsula. However, locations with Nubian-related finds in Syria were identified during the 2010 field season by a joint Syrian-Swiss Archaeological Mission for Palaeolithic studies in El-Kowm, under the direction of J.-M. Le Tensorer and S. Muhesen, that started as early as 1989. Unfortunately, amid escalating civil conflict in Syria, the Mission was discontinued from the following year (from 2011) up to the present day. The lack of research in this region explains the gaps and biases in our understanding of Nubian-related materials in Syria. In this context, the northern Levantine material presented here is hoped to be a valuable contribution to the much-discussed study of Nubian Levallois technology.

2. Northern Africa and the Levant: data for the post-Lower Palaeolithic, Middle Palaeolithic or Middle Stone Age period with a special emphasis on Nubian Levallois technology

The present article's epigraph succinctly explains why A. E. Marks initiated the "Central Negev Project" to study the southern Levant as early as 1969. After his excavations in Sudan, Marks hoped to find evidence of North African Palaeolithic industries (e.g. Nubian, Khormusan, Halfan, etc.) in the neighbouring Levantine region of the Negev desert. However, in the following 14 years, including his fieldwork completed in 1980, until the publication of the 3rd and last volume of the Negev Book Series in 1983, which summarized the excavations and artefacts of numerous sites, Marks concluded that, among other things, "*the Prehistory of the Central Negev, at least in post-Acheulean times, was a microcosm of the Levant as a whole*" (Marks 1983a, p. xi). He did not mention any direct archaeological connection between the neighbouring Levant and North Africa in the post-Lower Palaeolithic, because he found no Middle Palaeolithic (MP) or Middle Stone Age (MSA) industry present in both regions. This disconnect was indeed striking, considering the absence of any significant natural barrier between the regions, in contrast to the south where the Red Sea separates northeastern Africa from the Arabian Peninsula. We maintain the distinction between the MP and the MSA because MSA artefacts were manufactured by early *Homo sapiens*, and their potential presence in Asia would signal the dispersal of modern humans out of Africa. On the other hand, some Levantine Mousterian industries were produced by "European immigrants", newcomers to the Levant. The presence of these artefacts in Africa could potentially mark the entry of Neanderthals into the world of *Homo sapiens* in Africa.

One of Marks' Negev field crew members, H. Crew conducted his PhD research on the then newly discovered Negev Mousterian. To clarify "*the relationship between the Levantine and North African Mousterian Complexes*", Crew (1975) compared the variability of the Levallois methods represented in the various Levantine Mousterian assemblages to that of North African industries. To this end, "*Mousterian industries from Libya have been examined*", as well as "*the Middle*

Palaeolithic industries of the Nile Valley" including "*the Nubian Mousterian (Marks 1968)*" (Crew 1975, p. 2). The Nubian Mousterian, characterized as being "*between the North African and Levantine Mousterian Complexes*" was studied with the specific aim of examining a possible "*contact between the Levantine Mousterian and one or both of the other complexes in the period of question (whether by population movement or diffusion)*", noting that "*the Levantine Mousterian has to be the eastern donor or recipient*" (Crew 1975, p. 160). However, Crew's study of the artefacts showed that "*the Levallois flake methods of the Lybian and Nubian Mousterian complexes* [...] *are significantly different from those of the Levantine Mousterian*" and "*examination of the Levallois points and other methods of flake and blade manufacture* [...] *further supports the divergences between the complexes revealed in the execution of the Levallois flake methods*" (Crew 1975, p. 166). Based on this result, "*the summation of the evidence* [...] *argues against any direct relationship between the methods utilized by the Levantine and Libyan Mousterian*" and, regarding the Levantine and Nubian Mousterian, "*the similarities between the complexes, the length and the amount of dorsal scars, are not significant when judged in relation to the extent of the differences manifested between the methods practiced by the two complexes*" (Crew 1975, pp. 171–173). Regarding inter-regional differences and Nubian Levallois technology, Crew observed that "*the Nubian cores and the para-Levallois cores defined by the Guichards (1965: 97-99) are found in variable quantities in every Nubian assemblage, but they are lacking in the Levantine Mousterian*" (Crew 1975, p. 172). However, the Mousterian assemblage groups of the three regions in question were characterized by the same basic Levallois core reduction methods, and it is unclear what degree of similarity we should expect among them, even if there were cultural connections.

Crew's approach from the mid-1970s, primarily based on Levantine materials, suggests an absence of any post-Lower Palaeolithic industry encompassing both the Levant and Northern Africa. This observation was later supported by works starting in the 1980s by P. M. Vermeersch and P. Van Peer on North African materials, which noted limited similarities between Levantine and North African industries (e.g., Van Peer 1988; 1992; 1998; Van Peer & Vermeersch 2000; 2007; Vermeersch 2002). As a result, from the MP and MSA archaeological record, the two geographically neighbouring regions of Africa and Asia appear to belong to two archaeologically distinct worlds.

Before the recent recognition of Nubian technology in Israel (see e.g., Goder-Goldberger *et al.* 2016), major research breakthroughs regarding the "Nubian subject" over the past two decades did not occur in Africa or the Levant. Instead, they took place in the geographically adjacent Arabian Peninsula, where field research by M. Petraglia, H.-P. Uerpmann, A. Delagnes and H. Amirkhanov, as well as ongoing work in Oman, southern Arabia led by J. Rose with the participation of A. E. Marks (e.g., Rose 2006; Rose *et al.* 2011; 2018; Usik *et al.* 2013) contributed significantly to our understanding of the so-called "Nubian Complex". There has been a long tradition since the 1960s of naming all archaeological industries between the Lower and the Upper Palaeolithic as MP. Consequently, sites with Nubian Levallois technology have usually been gathered under the "MP umbrella" (Rose *et al.* 2018, pp. 53, 54–106), even up to the present day. However, we prefer to name all (!) African and Arabian lithic assemblages in this context as MSA reflect their African and early *Homo sapiens* affinity. Indeed, new anthropological and geochronological studies at Jebel Irhoud have demonstrated the presence of early *Homo sapiens* in Morocco as early as c. 300 thousand years ago, suggesting that "*the evolutionary processes behind the emergence of* H. sapiens *involved the whole African continent*" (Hublin *et al.* 2017, p. 289). Based on this view, we argue that an exclusive MSA association with early *Homo sapiens* in Africa is justified. On the other hand, we "reserve" MP status for describing archaeological materials associated exclusively with Eurasian Neanderthals.

By distinguishing the MSA *Homo sapiens* from MP Neanderthals, we also fully support the proposal by Rose and colleagues to use the term "*Afro-Arabian Nubian Complex*" to encompass sites with Nubian Levallois technology in both Africa and Arabia into a single archaeological complex/techno-complex (e.g., Rose *et al.* 2018, p. 55). However, the addition of "MSA" into the term, "Afro-Arabian MSA Nubian Complex", would further emphasize the African connection of this archaeological phenomenon. In fact, from our perspective, even some Levantine Mousterian assemblages that have traditionally been categorized under the Levant Tabun C-type

Middle Levantine Mousterian industry, such as those identified in northern Arabia (see data in Petraglia *et al.* 2012; Groucutt *et al.* 2015; Hilbert & Crassard 2020), should be designated as an Afro-Arabian MSA industry type with African origins. Indeed, archaeological research in the Arabian Peninsula over the last twenty years has increasingly demonstrated a close archaeological relationship of the region with Africa during the Lower Palaeolithic and the MSA. Therefore, an Afro-Arabian framework for discussing the Lower Palaeolithic and MSA of this region is useful, despite Arabia being categorized as part of Asia under the modern geographic nomenclature. In this context, the various newly discovered and studied sites with Nubian Levallois technology in Arabia are of prime interest to current discussions regarding human dispersal pathways from North Africa into the Levant. Thus, in two ways – through the Nile Valley and Arabia, the Levant was connected to Africa by the Nubian MSA.

3. Central Syria and its sites with Nubian Levallois technology

3.1. Central Syria and its geographical setting

All the sites with Nubian Levallois technology discussed in this article are situated in two regions of central Syria: Palmyra and El-Kowm. Separated by ca. 90 km, these two regions are considered oases in the Syrian desert, "*which is the northern extension of the Arabian desert*", and often referred to in the Arabic world as "*Badiet esh Sham, steppes of the north*" (Schroeder 1969, pp. 28–29). Both the Palmyra and El-Kowm oases are plateaus that belong to the northern part of the Syrian desert, within the "*Syrian interior steppe desert*" (Richter *et al.* 2001: 33). Geographical and environmental characteristics of these two oasis plateaus are well-described in the archaeological literature (e.g., Schroeder 1969; Jagher & Le Tensorer 2011; Jagher *et al.* 2015). They are located in the very centre of the modern state of Syria, between the Euphrates River and the desert highlands north of Damascus. Sitting in the heartland of the Fertile Crescent (**Fig. 1**), they occupy morphologically different landscapes within a short distance, featuring ecologically diverse hinterlands such as hills and cuestas, alluvial plains, *sabkha* areas and dry wadis. The two regions are characterized by perennial springs, waterholes, numerous sources of good-quality cherts and natural valley passages. These features make the oases' plateaus attractive to both humans and various ungulates. In a broad context, central Syria served as an important transitory passage between the northern lowlands near the Euphrates River and the Arabian Desert. Therefore, it is not surprising that central Syria, especially the El-Kowm region, contains a rich Palaeolithic record spanning from the Lower Palaeolithic up to the Epipalaeolithic. In this study, in addition to many traditionally defined Palaeolithic industries and their associated types in the Levant, we also propose to include a unified Nubian-related industry in the Palaeolithic record of the northern Levant.

3.2. Approach for identifying archaeological sites with Nubian Levallois technology

Before discussing Syrian Nubian technology, we outline the methods used to identify sites with Nubian Levallois technology during the 2010 field season in Syria. These methods were discussed in the field by J.-M. Le Tensorer, Th. Hauck and Yu.E. Demidenko (who was invited to join the project in Syria by Le Tensorer and Hauck). The methodology was based on observations made on numerous archaeological finds from the El-Kowm area (central Syria), which were recovered by a Syrian-Swiss Archaeological Mission. One of the primary goals of the collaboration was to examine lithics recovered at the Hummal site, which had been under systematic investigations by the Archaeological Mission since 1997. Additionally, finds from the Nadaouiyeh Aïn Askar site, excavated by the Archaeological Mission in 1989–2003, were also assessed. The joint research effort in 2010 led Demidenko, the "Ukrainian newcomer to Syria", to conclude that the El-Kowm area represents a sort of "Palaeolithic paradise". Based on his considerable prior research experience in Levantine Stone Age archaeology, he concurred with his University of Basel colleagues' opinion that the region is "*a key area for the Palaeolithic of the Levant in central Syria*" (Jagher & Le Tensorer 2011, p. 197). In particular, the region boasts a rich and *in situ* (!) industrial-chronological sequence from the Lower Palaeolithic up to the Epipalaeolithic (see Le Tensorer *et al.* 2001; 2007; 2011; Jagher *et al.* 2015). In addition to the above-noted and some other (e.g., Umm el-Tlel) *in situ* Palaeolithic sites, the research team also visited a

few Palaeolithic surface locations, with either MP or UP lithic scatters, as well as some rich surface primary flint outcrops and patchy flint sources (e.g. so-called Qdeir "flint fields") in El-Kowm. Among the surface locations visited, the site "Qalta" (also known as #28 among the identified Palaeolithic sites in El-Kowm) and its lithic artefacts have been known for a long time but are still considered to have an "enigmatic character". The lithics from this particular location totalled more than 1,000 items, with at least a quarter of them being core-like pieces. An examination of the Qalta lithics has led Demidenko to suggest that the assemblage is indeed unusual for the Levantine Palaeolithic, with no known industrial comparisons in the regional Palaeolithic record. At the same time, the lithic set appeared to be techno-typologically homogeneous, with only a few post-Palaeolithic "intrusive" additions. We remember what Demidenko told J.-M. Le Tensorer in El-Kowm about the Qalta artefacts: "it smells of Africa". Why was this non-Levantine suggestion proposed? It was primarily because of the following Qalta lithic features.

The most characteristic and unique feature of the Qalta assemblage is its cores, which have already been named "Qalta-type cores". They have triangular or convergent shapes, with faceted main wide striking platforms, and two lateral supplementary striking platforms from which short and steep flakes were detached to maintain the convexity of the cores' flaking surface. The flaking surface mostly exhibits several elongated, blade-like removal negatives originating from the main striking platform. In addition to the specific core type, the Qalta assemblage also features the presence of many blade elements the debitage (including bladelets) and some UP tool types. Because the edges of lithic artefacts were often abraded due to their exposure on the surface, it is not always straightforward to recognize true tools from pieces with simple retouch-like scars on their lateral edges. A preliminary review of the El-Kowm Palaeolithic after a survey conducted in 1980 includes a two-page discussion on the Qalta locus and its findings with one illustration (Besançon *et al.* 1981, pp. 51, 53, Fig. 9), the only published data on Qalta until now. According to the text, the site features the peculiar core type, now proposed to be called "Qalta-type core", serial blades, bladelets, and proper endscrapers. Sidescrapers were also noted, which is why the publication associated the site with the Middle–Upper Palaeolithic Transition period. The article concludes that lithic materials similar to those at the Qalta loci are known from Jerf al-Ajla Cave, specifically layer Brown 1, located in the Palmyra area, ca. 120 km from El-Kowm. In addition, two more surface find spots with Qalta-like lithics in El-Kowm were also noted but never published in detail. Thus, the Qalta loci do not appear to be "solitary places" with such specific finds.

The Qalta-type core reminded Demidenko of the North African Nubian and Halfan industries' cores from Sudan and Egypt. He had studied these African artefacts intensively at Southern Methodist University (Dallas, USA) in the 1990s, with the support of A. E. Marks and F. Wendorf, investigators of the respective sites in Africa (e.g., Wendorf 1968). To Demidenko, the Qalta-type core represents a combination of Nubian and Halfan core elements, with the dominating Nubian features being a triangular or convergent shape, a well-faceted main wide striking platform, and two lateral supplementary platforms. Meanwhile, Halfan characteristics were thought to be represented by a series of blade-like removals from core flaking surfaces, although these blades on the Qalta-type cores were detached as primary products rather than being used to supplement core shaping, as in the African industry. These observations, along with the fact that the Qalta-type core was unknown in the Levantine Palaeolithic record, led Demidenko to suspect an African technological association with the Qalta-type core. However, the main difficulty in further detailing the Qalta-type core in 2010 in Syria was the inability to access and view relevant publications on Nubian and Halfan assemblages. Instead, the preliminary observations were based on what Demidenko could recall from the last time he observed the African artefacts, which was 14 years ago in 1996.

After returning to Kyiv (Ukraine) following the 2010 field season in Syria, Demidenko contacted Ph. Van Peer (Leuven, Belgium) to seek his opinion on the "African impression" of the Qalta-type core. Based on illustrations of several Qalta-type cores, Van Peer concurred that the Qalta cores indeed resemble Nubian cores. After further consulting reference literature on Nubian Levallois technology in both Africa and Arabia, Demidenko believed that his initial "African smell test" of the Qalta-type cores in Syria was

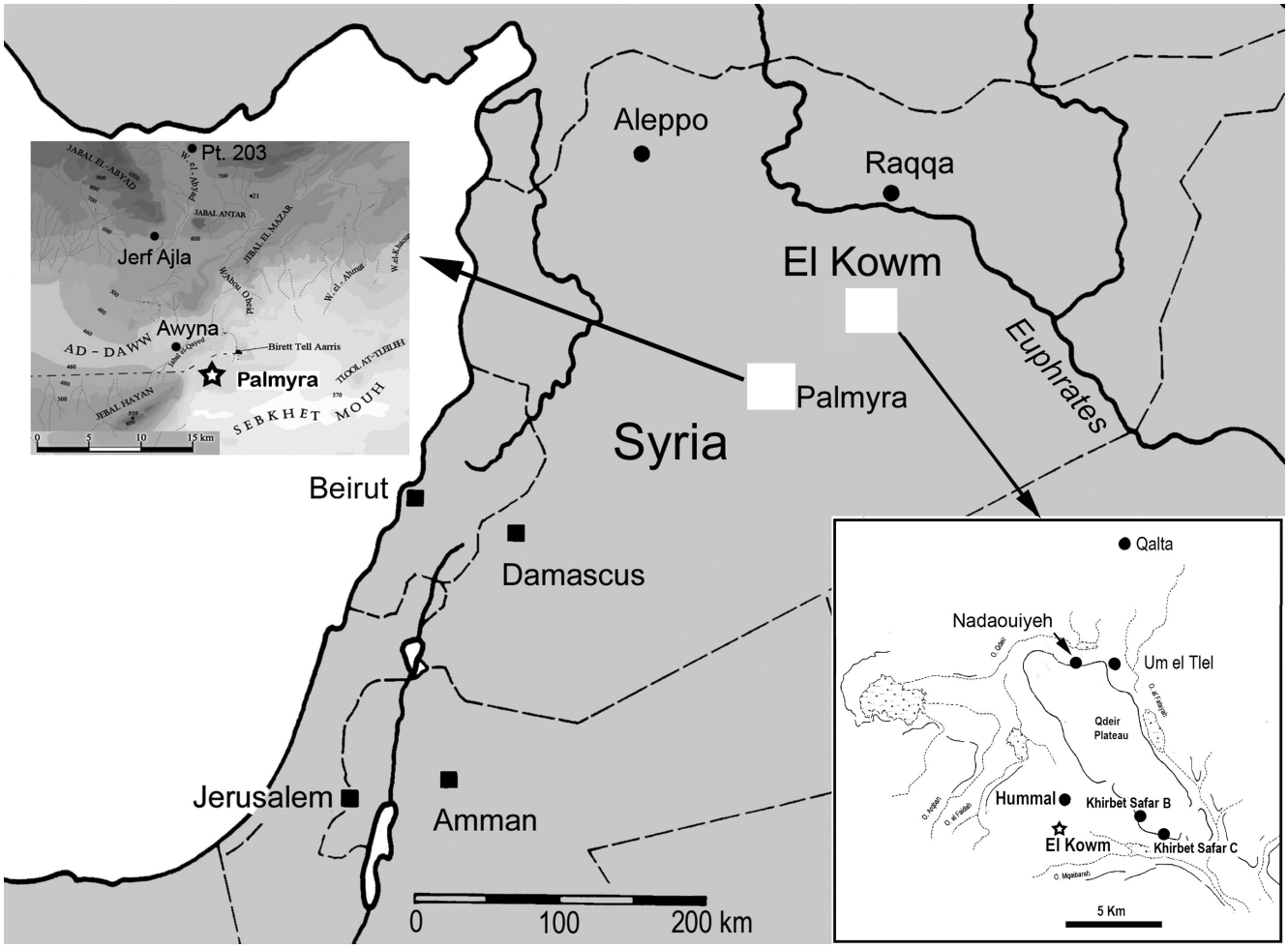

Figure 1. Map showing the location of the El-Kowm and Palmyra areas in Syria. A: The El-Kowm area with the location of the mentioned sites. B: The Palmyra region map with the location of the mentioned sites.

substantiated by existing empirical data. The Qalta-type core appears to be representing a developed Nubian core type designed to produce not a single Levallois point or triangular flake as in classic Nubian cores but rather a series of blade removals per core reduction cycle. Moreover, based on published data concerning the excavated lithic artefacts from layer Brown 1 of Jerf al-Ajla Cave, it was recognized that the Qalta-type core was also present in this assemblage, although these cores were designated as the "Jerf Ajla core type" in the late 1960s (Schroeder 1969; Richter *et al.* 2001). Similar to Qalta, definitive UP tool classes are also present in the Jerf al-Ajla assemblage. Notably, the two typological names, "Qalta-type core" and "Jerf Ajla core type", assigned to the same core type identified at two spatially disparate locations, separated by a distance of ca. 120 km, indicate that previous researchers (the French team in the early 1980s and H. B. Schroeder in the late 1960s) also recognized that this core form was hitherto unknown in Levantine Palaeolithic assemblages and warranted a new classification. Thermoluminescence (TL) dating of Jerf al-Ajla placing it around 33 000 BP, aligning with the MP to UP transitional period, the "developed" characteristics of Nubian cores, and the presence of UP tools. More recently, additional MP-UP transitional assemblages with lithic features resembling those at Qalta were identified at the Umm el-Tlel site and a couple of surface locations in the late 1990s and early 2000s by a Syrian-French archaeological team in El-Kowm, led by E. Boëda and H. Al-Sakhel (Boëda & Bonilauri 2006).

In sum, it appears that there are at least seven locations in Palmyra and El-Kowm, and even in the areas between them (**Fig. 1, 1a, 1b**), which exhibit similar basic yet specific techno-typological features in their lithic artefacts. These features are possibly related to the MP to UP transitional period, and thereby it should not come as a surprise to find a specific "developed" Nubian core type in these regions. Previous studies examining the Qalta-/Jerf Ajla-like materials in

central Syria either focused on classifying these materials as types or paid a special emphasis on bladelets. They took these different approaches instead of recognizing these assemblages as representative of African, or as we would now say Afro-Arabian IUP Nubian. This difference in approach can likely be attributed to the fact that these researchers had never encountered Nubian materials from Africa, particularly those with characteristic cores. Consequently, they did not associate the unusual materials in central Syria with an African affinity.

We had planned to analyze the lithics from Qalta and Jerf al-Ajla Cave at the Palmyra Archaeological Museum, including, Hummalian lithic materials that were still on exhibition in the museum in 2010. Unfortunately, we had to cancel our research in Syria due to the ongoing war in the country. This interruption means that our Nubian research project in central Syria was on halt right at the very beginning of the collaboration. As a result, the data presented in this article is limited to information about the presence and characteristics of various lithic types, as well as our impressions of each location and assemblage. However, despite their rudimentary nature, we believe the information presented here is valuable for serving as a foundation for future Palaeolithic research in central Syria, which we hope will resume soon.

3.3. Sites with Nubian-related finds: basic site data and lithic artefact characteristics

3.3.1. The Qalta site and its finds

The site (**Fig. 1a**) was discovered by a team of Palaeolithic archaeologists headed by L. Copeland and F. Hours in 1980. Following the advice of J. Cauvin, the founder and director of the French Permanent Mission in El-Kowm town, the team carried out an intensive and successful survey to find Stone Age sites in the El-Kowm area and quickly published a report in the following year (Besançon *et al.* 1981). The survey identified a total of 51 sites in the area. In the following twenty years, the Syrian-Swiss Archaeological Mission conducted further intensive surveys in 1985 and 1989–2001. As a result of these cumulative efforts, a total of 186 Stone Age sites and surface locations have been recorded in El-Kowm (Le Tensorer *et al.* 2001, p. 101). Among the 51 sites identified in 1980, three were described as "*un peu énigmatiques*" (Besançon *et al.* 1981, p. 51): Qalta (site #28), Khirbet Safar B (site #20), and Khirbet Safar C (site #35). Of the three enigmatic sites, which are all surface find spots, only Qalta were described more extensively in the report. Qalta appears to be the northernmost site found in the El-Kowm area at that time, it lay ca. 5–6 km from the sites of Nadaouiyeh Aïn Askar and Umm el-Tlel, and ca. 15 km north of the Hummal site (Besançon *et al.* 1981, Fig. 1 on p. 35). The site consisted of a 130×30-m surface artefact concentration, located on a slope in a hilly area with "*affleurement de silex*" (Besançon *et al.* 1981, Fig. 1 on p. 35). As such, the Qalta assemblage is likely associated with on-site lithic workshop knapping activities. Erosion of Pleistocene deposits was identified at the locality, which explains why no *in situ* artefact-bearing sediments were preserved there.

The Qalta lithic assemblage collected by the French archaeologists in 1980, stored at the El-Kowm French mission founded by Cauvin, can be briefly summarized based on the 1981 publication (Besançon *et al.* 1981, pp. 51, 53). The assemblage consists of 856 lithic items, of which 251 were classified as cores (29.3%), 536 as blades and flakes (62.6%), and 69 as tools (8.1%). The absence of chips is probably related to the secondary position of the assemblage, impacted by long-term erosion. The cores were subdivided into two basic groups each characterized by a significant reduction in variety. The first group is represented by cores having a triangular shape and a primary flaking surface for the production of points and blades (**Fig. 2: 1–3**). These cores, measuring mainly 5–8 cm in length and 3–6 cm in width, feature a radial or centripetal preparation pattern on the triangular flaking surface, a faceted striking platform and a non-volumetric reduction. These traits firmly place the cores in the MP "*tradition levallois*" category. The second group consists of various discoidal and rectangular cores discarded at different stages in the reduction sequence, with an overall size of 3.5–5.0 cm. The primary debitage products from these cores cannot be recognized. Some of the cores in this second group contain elements of a prismatic bidirectional core (**Fig. 2.4**), including a triangular shape resembling those of the first core group. However, these cores lack the prepared striking platform and hence cannot be regarded as a sub-type of the first group. Among the

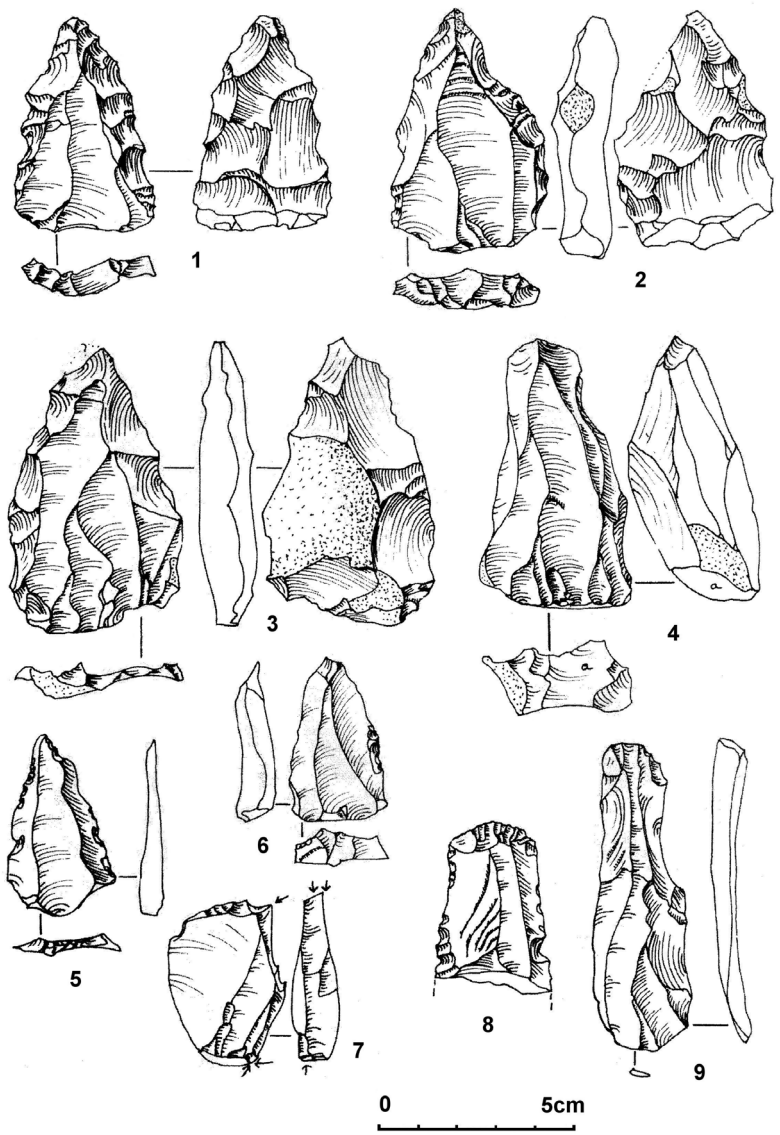

Figure 2. The Qalta location, El-Kowm area, central Syria, the 1980 lithic assemblage. 1–3: developed Nubian 2-method Jerf Ajla/Qalta-type cores. 4: a UP prismatic bidirectional core. 5–6: Levallois points. 7: dihedral angle burin. 8–9: endscrapers. Artefact illustrations modified after Besançon et al. 1981, Fig. 9.

debitage pieces, a few points resemble Levallois points with faceted butts (**Fig. 2.5–6**). Finally, the assemblage demonstrates a wide spectrum of tool classes in varying proportions: endscrapers (23.18%) (**Fig. 2.8–9**); burins (20.78%), mostly dihedral angled types (**Fig. 2.7**); denticulates and notches (13.03%); sidescrapers (8.69%); pointed pieces or "*pieces apointées*" and borers (5.79% each). Together, these tools make up 77.26% of the tool component of the assemblage. The remaining tools are blades and flakes with some retouch, which may have been grouped as debitage by the French researchers.

In sum, the authors of the 1981 article concluded the Qalta assemblage as unusual. On the one hand, the core reduction pattern and blank types have a basic MP character, though some of their features are uncharacteristic of the MP. On the other hand, ca. 70% of the tools correspond to UP types. Respectively, it was suggested that Qalta and a few other sites in central Syria might be associated with an as yet unrecognized transitional facies between the MP and the UP (Besançon *et al.* 1981, p. 53).

The proportion of UP tool classes in the Qalta assemblage was possibly underestimated in the 1981 publication. First, a large proportion of the tool assemblage, including the denticulates and notches (ca. 13%), and the unspecified retouched pieces (over 20%), may represent simple edge-damaged blanks. Removing these elements from the tool assemblage would increase the overall frequency and proportion of the UP tool types. Second, MP tool classes, specifically sidescrapers, were not only less frequent than endscrapers and burins taken separately but were also not illustrated at all, which raises questions about the reliability of at least some of the data. On the

Figure 3. The Qalta location, El-Kowm area, central Syria. Photos of the loci in 1993 taken by J.-M. Le Tensorer and R. Jagher.

contrary, UP tool classes, particularly endscrapers and burins, not only are the most frequent but are also illustrated with proper examples (**Fig 2.7–9**). Thus, we suspect that the tool component of the 1981 Qalta assemblage is composed largely, if not completely, of UP tool classes. Returning to core reduction and debitage data, the Qalta-type cores truly demonstrate features that are beyond the characteristics of known traditional Nubian cores. In particular, instead of a reduction sequence focusing on the preferential flaking of singular triangular flakes or Levallois points, a pattern well documented across Afro-Arabian Nubian sites, the Qalta-type cores were designed to produce a series of elongated triangular blades in each reduction cycle. Overall, the typological and technological features of the Qalta assemblage indicate to us not an MP but rather an MSA industrial affinity with UP characteristics in retouched tool forms.

In the following section, we provide additional details on the cores and debitage of an artefact collection recovered by the Syrian-Swiss Archaeological Mission at Qalta, because the 1981 article did not describe or illustrate any triangular blades, which had been the primary product of the Qalta-type cores.

The Syrian-Swiss team conducted field studies in Qalta in 1989 and 1990 (**Fig. 3**). In addition to collecting a new surface lithic assemblage, the researchers also excavated sondages to examine the depositional profile. The results of the test excavation confirmed the absence of *in situ* archaeological layer(s) at the locality. The artefacts collected during the 1989–1990 field seasons were not published. However, one of us (V. von Falkenstein-Wirth) partially inventoried the assemblage between 1993 and 2006 and, one of the University of Basel team members, A. Sanson, photographed many artefacts from the collection in 2009 in Syria. As a result, there is an inventory list and some high-quality photographs of the artefact collection.

The 1989–1990 Qalta collection that has so far been inventoried contains 631 lithics, which can be classified into three basic artefact categories:

- *Cores*: 388 pieces (55.8%). The most numerous type is the Qalta-type core (n=353), besides, 15 UP prismatic cores, 6 bladelet cores and 14 uncharacteristic cores are encountered;
- *Debitage*: 209 pieces (30.0%), 195 blades and 14 bladelets;
- *Tools*: 99 pieces (14.2%), 38 endscrapers, 8 atypical endscrapers, 13 retouched blades, 7 burins, 3 borers, 16 sidescrapers, 6 points, 6 Levallois points and flakes, 2 denticulates.

The dominance of cores among the inventoried items is due to the workshop nature of the site and the presently incomplete inventory of flakes in the assemblage. During his visit to Syria, Demidenko estimated the entire Qalta 1989–1990 assemblage to be over 1,000 lithic items. If this estimate is correct and the remaining univentoried artefacts are mostly flakes, there could be no less than 400 flakes in the overall assemblage collection. Keeping in mind the workshop nature of the site and the presence of numerous cores with varying

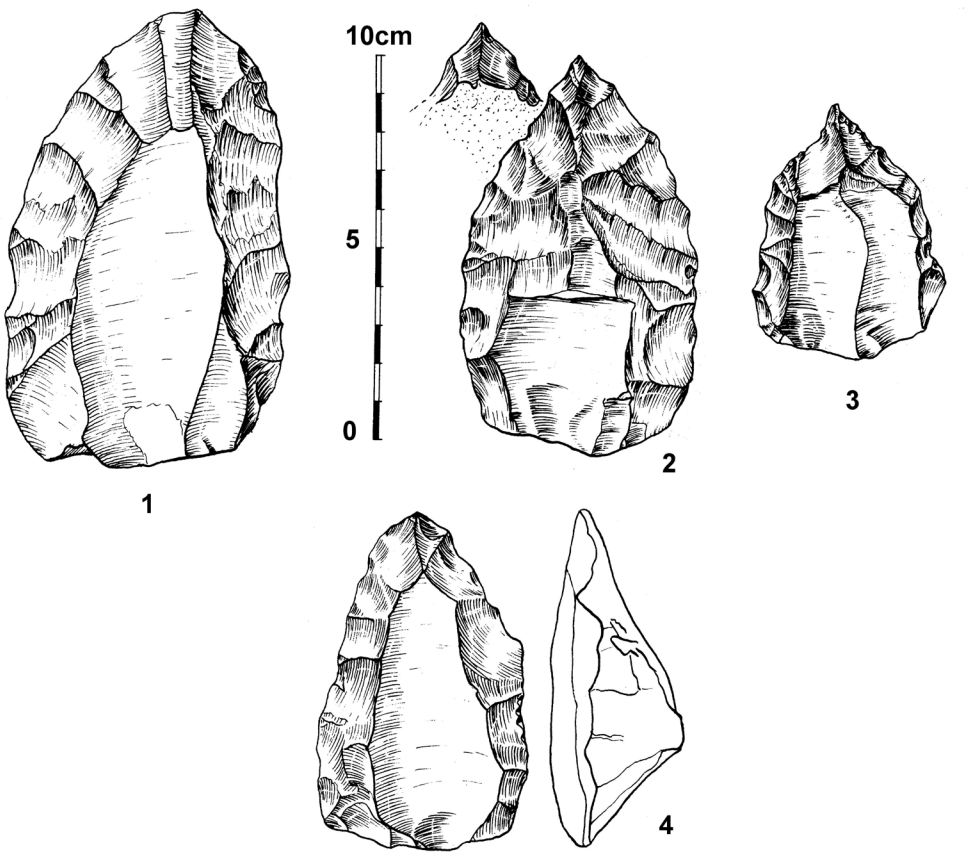

Figure 4. Nubian 2-method cores in MSA sites in Sudan. 1–2, 4: Site 420; 3: Brinikol. Artefact illustrations modified after Guichard & Guichard 1965, Fig. 22–23.

degrees of (re)preparation and reduction, the approximation of 400 flakes in the assemblage may still be a minimal estimate. Regardless, if we recalculate the artefact proportions by including this additional estimate of 400 flakes, the debitage sample would increase up to 609 specimens, and the three major artefact categories would be of the following shares: 35.4% for cores, 55.6% for debitage, and 9.0% for tools. This adjusted artefact category representation for the 1989–1990 assemblage corresponds well to the data of the 1980 assemblage, with a maximum deviation of c. 7% (also keeping in mind the absence of chips in both assemblage collections). As a result, we believe that the two Qalta collections exhibit similar primary (core) and secondary (tool) lithic treatments. These processes can be briefly summarized as follows. Lithic production was probably aimed at preparing and reducing Qalta-type cores to detach as many elongated triangular blades as possible. These blanks were then mostly "exported" from the workshop to other places, probably "living sites", such as Umm el-Tlel (see below).

Here, we will describe the cores, debitage and tools of the 1989–1990 Qalta assemblage collection in more detail. Our analysis is constrained by the available data recorded on these artefacts, which is limited to dimensional attributes.

Despite being located at a flint outcrop area, most of the Qalta cores (n=353) are relatively small, not one specimen is longer than 8 cm, the majority are 4.0–5.9 cm long (n=261, 73.9%). The Qalta-type cores fall into the following length intervals: 3.0–3.9 cm (n=14, 4.0%); 4.0–4.9 cm (n=104, 29.5%); 5.0–5.9 cm (n=157, 44.5%); 6.0–6.9 cm (n=68, 19.2%); 7.0–7.9 cm (n=10, 2.8%). The six bladelet cores have a narrower size range, their length varies between 4.0 and 5.9 cm. Possibly, medium-sized flint pieces were deliberately selected for a separate bladelet reduction. The majority of the 15 UP "prismatic cores" also fall into the 4.0–5.9-cm length interval (4.0–4.9 cm – n=1, 6.7%; 5.0–5.9 cm – n=11, 73.3%), although a few longer items are also present: 6.0–6.9 cm (n=2, 13.3%) and a single core that is 9.0 cm long (6.7%).

The core length data suggest that the cores became shorter through continued reduction conducted mostly on-site. This hypothesis has to be verified by more data on cores in the future. However, the length of blade blanks and point tools probably approximate the length of the cores from which they were detached. The 82 complete

blades in the assemblage can be classified by length as follows: 3.0–3.9 cm (n= 9, 11.0%); 4.0–4.9 cm (n=27, 32.9%); 5.0–5.9 cm (n=27, 32.9%); 6.0–6.9 cm (n=13, 15.9%); 7.0–7.9 cm (n=4, 4.9%). Two blades are longer than these, they are 8.0 cm and 10.4 cm (1.2% each). Although the 4.0–5.9 cm size range is dominant among blades with 65.8%, it is less pronounced than the corresponding 73.9% among Qalta-type cores within the same length interval. Moreover, 7.0 cm or longer blades (7.3%) are more frequent than the cores in the same size category (2.8%). Regarding the points, all six artefacts were made on blades, and they are usually longer than unretouched blades: 4.0–4.9 cm (n=1, 16.7%); 5.0–5.9 cm (n=2, 33.3%); 6.0–6.9 cm (n=3, 50.0%). Thus, there appears to be some empirical support for a trend where the cores are generally shorter than the blade products that were detached from them.

Finally, of the 14 bladelets in the collection, two are crested with a triangular profile at midpoint. These crested pieces have lengths of 5.0 and 6.0 cm respectively, matching the lengths of the bladelet cores, all of which fall within the 4.0–5.9 cm interval. The remaining "regular" bladelets have lengths of 3.0–3.9 cm (n=5, 41.7%), 4.0–4.9 cm (n=6, 50.0%), and 5.0–5.9 cm (n=1, 8.3%), the longest piece is 5.0 cm. Bladelet production was probably distinct from the Qalta-type core reduction at the site, and likely began with the detachment of a crested bladelet, followed by the removal of a series of bladelets from specially prepared bladelet cores.

Concerning the "*lamelle à crête technique*" for bladelet core reduction, there is currently no evidence that the same "*lame à crête technique*" was applied during the initial reduction phases of the Qalta-type cores. From a technological point of view, the technique does not appear to be suited for the preparation of the flaking surfaces on this core type. If crested blades are found in the future associated with Qalta-type cores, it would suggest a reduction sequence more technologically similar to genuine UP prismatic and bladelet core reduction.

Based on the Qalta core and debitage data presented, our current position regarding the relationship between the Qalta-type and Nubian cores is the following. The Qalta-type core is a kind of Nubian 2-method core, the latter of which was first recognized in the mid-1960s in assemblages from Sudan characterized today as MSA (see Guichard & Guichard 1965; **Fig. 4.1–4**), but with further technical development.

Initially, we considered describing the Qalta-type core by combining features of both Nubian 1 and 2 method cores. However, we found that this approach does not adequately capture the core type's essential characteristics. In Syria, the core type (**Fig. 5–8**) typically exhibits a few, if any, removal negatives coming from the core's distal end. When present, these removals tend to be small and short (resembling the size of chips), as are the serial abrupt or semi-abrupt removals of the two lateral supplementary platforms. Distal preparation thus constitutes only a small part of the overall core preparation process while in the Nubian 1 method, it is part of the definition (Guichard & Guichard 1965, pp. 68–69). Rather, it is the centripetal preparation of the entire core that results in the triangular shape and the convexity of the flaking surfaces. In our opinion, the use of the "*lame à crête technique*" in this centripetal preparation is unlikely.

Regarding the so-called preferred products, Qalta-type cores depart from proper African Nubian 2 cores. Some Qalta-type cores resemble proper Nubian 2 cores in bearing only a single removal negative of a Levallois point, and there are indeed a few Levallois points in the Qalta assemblage (as illustrated in Besançon *et al.* 1981 Fig. 2.5–6). However, the majority of the Qalta-type cores exhibit a series of blade removal negatives that originate from the wide, faceted striking platform on the flaking surface. These elongated triangular blades with convergent dorsal scar patterns and faceted butts were recognized as such only in 2010 by Demidenko in the assemblage (**Fig. 9**). Thus, we recognize a special Qalta-type Nubian 2 method, in which elongated pointed blades were detached from single-platform unidirectional convergent cores. The production pattern of these blade points can be considered "developed", as it typically involves the removal of not one but a series of predetermined points during each reduction cycle. Another aspect of the Qalta-type core reduction is that the centripetal preparation process typically involves the removal of small preparation flakes from the distal end of the core, while a unidirectional-convergent reduction pattern is generally used to detach debitage products, which mainly consists of pointed blades or blade points and a few Levallois points *sensu stricto*. In summary, all

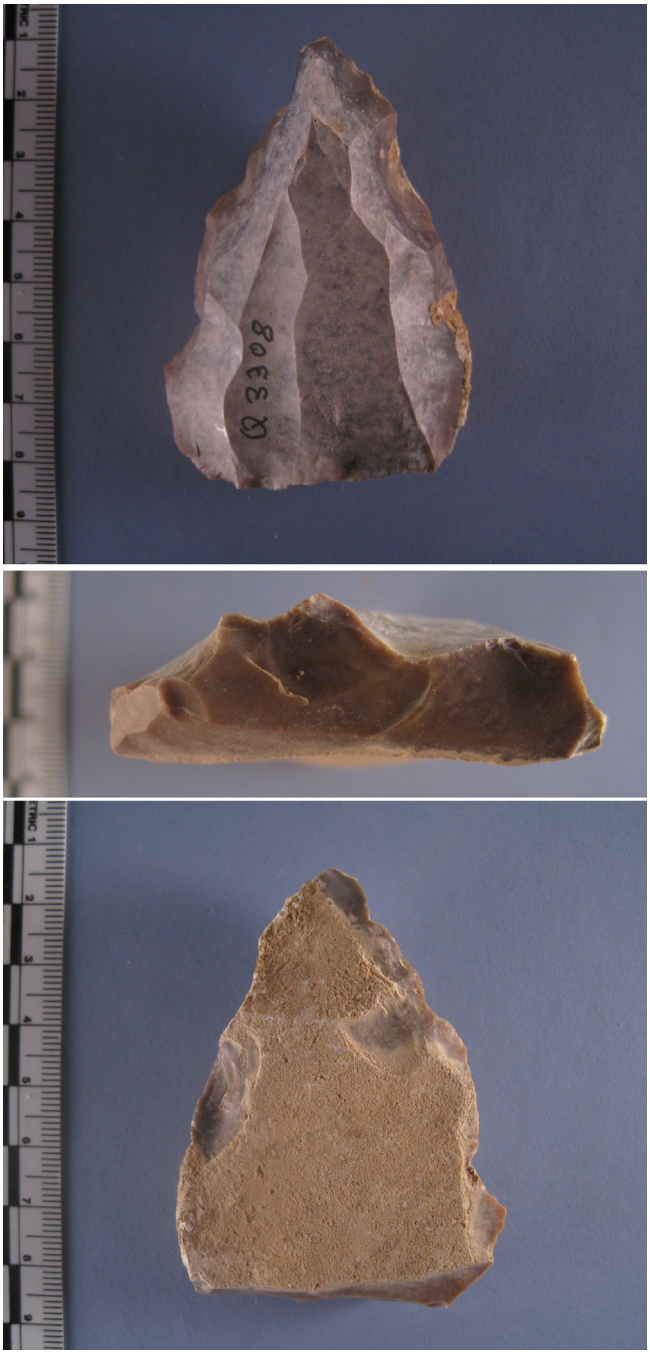

Figure 5 (left). The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3342. L: 5.7 cm, W: 3.3 cm, T: 1.0 cm. Photos: A. Sanson.

Figure 6 (right). The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3308. L: 6.6 cm, W: 4.8 cm, T: 2.0 cm. Photos: A. Sanson.

aspects of the Qalta core and debitage data point towards MSA (Nubian Levallois) rather than MP (Levallois proper) technological features, with developmental trends towards characteristics associated with the IUP.

Tools of the 1989–1990 assemblage are arguably less informative compared to those in the 1980 collection. Among the 99 tools identified in the 1989–1990 assemblage, endscrapers make up the majority. However, if we entertain the possibility that some of the tools are, in fact, edge-damaged pieces, the proportion of endscrapers in the overall tool assemblage of Qalta would be even more, exceeding 50%. Based on the photos of the pointed blades or blade points in the collection (**Fig. 9.1–3**), this kind of edge damage may be present in great proportions in the assemblage. Taking a more conservative approach, we may exclude the 8 atypical endscrapers, 13 blades with some retouch, 6 points, 6 Levallois points

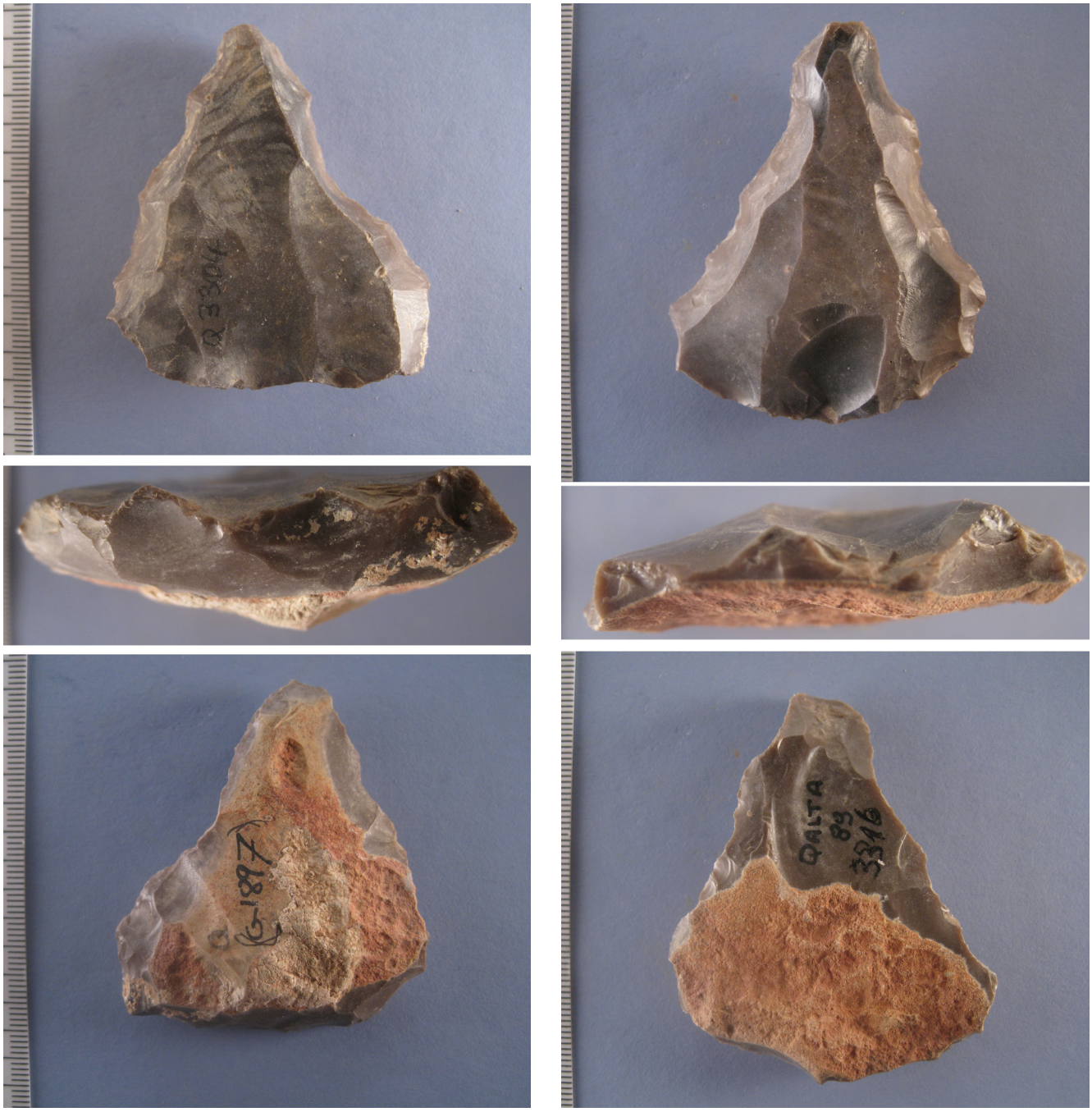

Figure 7 (left). The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3304. L: 5.7 cm, W: 5.0 cm, T: 1.6 cm. Photos: A. Sanson.

Figure 8 (right). The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Developed Nubian 2-method Jerf Ajla/Qalta-type core, # 3316. L: 6.1 cm, W: 5.0 cm, T: 1.3 cm. Photos: A. Sanson.

and flakes, and 2 denticulates from the tool kit. Likewise, we must exercise caution in assessing the authenticity of some of the 16 sidescrapers and 6 points. With this "tool hygiene" approach, the dominance of UP tool types in the 1989–1990 assemblage becomes evident, mirroring the composition of the 1980 collection. Considering the limited spatial distribution of the lithic artefacts collected from the site, Qalta appears to be a rare example of a Palaeolithic surface find spot characterized by numerous finds that upon examination, are industrially homogeneous.

By summing up the techno-typological features of the Qalta lithic artefacts, we are inclined to underline the IUP characteristics of the assemblage with "industrial roots" within the MSA.

Figure 9. The Qalta location, El-Kowm area, central Syria, the 1989–1990 lithic assemblage. Pointed blade or laminar point, the "desired debitage product" detached from developed Nubian 2-method Jerf Ajla/Qalta-type core # 3091. L: 3.6 cm, W: 1.5 cm, T: 0.7 cm. Photos: A. Sanson.

3.3.2. The Jerf al-Ajla Cave and its Qalta-like finds

This specific karstic site is of paramount importance in the present study because it is the only known and published *in situ* site in central Syria related to the discussion of Nubian-related locations. Jerf al-Ajla Cave is located ca. 10 km northwest of the oasis town of Palmyra/Tadmor, situated at the southern flanks of "*the Jebel M'qeitaa in Paleogene limestone bedrock*" that "*contains flint deposits of exceptional quality throughout the region*" (Richter *et al.* 2001, p. 33) (**Fig. 10**). The cave also has a "[…] *wide* […] *view to the south and southwest overlooking the plain of Feif el-Mazra'ah*" (Schroeder 1969, p. 48). This multi-layered Palaeolithic cave site was initially recognized and excavated by C. Coon in 1955, revealing a Pleistocene sedimentary deposit of ca. 6 m in thickness containing artefacts from the Lower Palaeolithic up to the UP (Coon 1957). Unfortunately, the relatively small cave (ca. 40 m² for the sheltered area) was completely excavated by Coon and his local Syrian workers in around three weeks. At that time, Coon defined five Pleistocene geological layers at the site, referred to "soils", each of which was no less than 1m thick (Schroeder 1969, Fig. 8). Only a small portion of the numerous Palaeolithic-related finds recovered during the excavation were preserved for analysis; this included, 4,962 of ca. 68,000 lithic artefacts and 526 of 5,668 animal bone remains (Schroeder 1969, p. 19).

In 1965, 10 years after Coon's original excavation, archaeological research at Jerf al-Ajla Cave was continued by B. Schroeder as part of his PhD project. The resulting study culminated in Schroeder's doctoral thesis, which he defended in 1969. Schroeder carried out a one-square-meter excavation at the front of the cave (Richter *et al.* 2001, Fig. 2). The excavation revealed the entire sedimentary sequence as identified by Coon, although the lowest sediments did not contain lithic artefacts. Schroeder reinterpreted Coon's five stratigraphic "soils" into eight "depositional units", consisting of 14 layers (**Fig. 11**) (Schroeder 1969, Fig. 9–10; Julig *et al.* 1999, Fig. 5; Richter *et al.* 2001, Fig. 3). The last archaeological investigation of the cave to date were carried out in 1995 and 1996 by Schroeder with a group of absolute dating specialists to apply thermoluminescence analysis to Pleistocene sediments at the site (Julig *et al.* 1999; Richter *et al.* 2001). At that time, seven more square meters were excavated to expose the upper part of the sedimentary sequence on the cave's terrace further down the southern slope (Richter *et al.* 2001, Fig. 2). In total, for the entire archaeological sequence at Jerf al-Ajla, Schroeder analyzed almost 5 000 lithics These artefacts include those recovered by Coon's 1955 excavations, stored at the archaeological museums of Palmyra and Damascus, as well as 3 337 lithics recovered from his own 1965 excavation (Schroeder 1969, pp. 20–21). For the most recent 1995-1996 excavations, it is unclear how many artefacts were recovered from the site, as the publication only included percentage data for some artefact categories and types (Richter *et al.* 2001, Fig. 2).

For this paper and our interest in Qalta-related artefacts, we focus on the lithic finds from the upper sedimentary layers at Jerf al-Ajla Cave. Despite having seemingly intact sediments, determining the association between the recovered artefacts and the artefact-bearing sedimentary deposits is not straightforward. The Nubian-related artefacts were recognized by Schroeder in Coon's layer "Brown 1", which corresponds to Schroeder's layers C and B, with a combined thickness of ca. 1.3 m. Schroeder defined the Jerf Ajla-type core based on 15 specimens (**Fig. 12: 1–4**) of the 68 he identified as Levallois cores in layer "Brown 1". Schroeder

(1969, pp. 221–222) defined the new core type as having: "*a triangular outline with a striking platform along the short side; lateral margins which are deeply indented by a series of more-or-less abrupt notches; a trapezoidal cross-section; a boat-shaped long section; bipolar removal scar on their flaking surface*". Schroeder further noted that "*frequently, the reverse surface* [of the core type] *is flattened by the removal of several flat, broad flakes across it from one of the abruptly prepared margins"* [...with...] *"the striking platforms exhibit preparation*" and "*examples of this* [core] *type can be seen in Figure 48: 2, 49, 50, 51, 62: 1*" (Schroeder 1969, pp. 221–222). In addition, Schroeder described the debitage products associated with the Jerf Ajla-type core: "*it is this type of core that undoubtedly yielded many of the regular Levallois blades found in this layer (Figure 54: 5, 6, 7, 8 and 10)*" (Schroeder 1969, p. 222) (**Fig. 10.5–9**). After the most recent 1995–1996 excavations, he further refined his formulation of the Jerf Ajla-type core, describing the artefacts as having: "*... flat, triangular-shaped surfaces which converge from wide platforms. They typically show notched and denticulated margins that have been shaped by the removal of a series of wide semi-abrupt flakes from transversally flat, longitudinally convex retouched undersides. It should be noted also that longitudinally the undersides slope gradually toward the striking platform and distal ends of the core, indicating that they serve as platforms for the removal of bidirectional flakes in the preparation of the flaking surfaces of the cores*" (Richter *et al.* 2001, p. 38). Note that the core illustrations used in the 2001 publication are the same as those used in his 1969 PhD dissertation.

Concerning the preparation of Jerf Ajla-type cores, while Schroeder noted a general bidirectional reduction pattern on the cores, his most recent published description highlighted a centripetal preparation of the cores' flaking surfaces. Indeed, as with the Qalta-type cores, the Jerf Ajla-type cores appear to show a bidirectional preparation pattern, but closer examination suggests a centripetal preparation pattern produced by removals from two lateral supplementary striking platforms and a few chip-like detachments from the cores' distal end. Certainly, what can be confusing here is the overall triangular or converging shape of the cores, which can make their flaking surfaces appear to have a bidirectional preparation due to the presence of distal removals. Here, it is important not to confuse a centripetal dorsal scar pattern with a seemingly bidirectional one for the production of pointed blades or blade points, which typically have faceted butts in association with the Jerf Ajla-type cores (**Fig. 12.5–9**). Thus, the two sites', Qalta and Jerf al-Ajla, share a single core type that we prefer to name the Jerf Ajla/

Figure 10. Jerf al-Ajla Cave, Palmyra area, central Syria. Various views of the cave, its terrace and the surrounding areas Photos: F. Wegmueller, Yu. E. Demidenko and M. Al Najjar in 2010 in Syria.

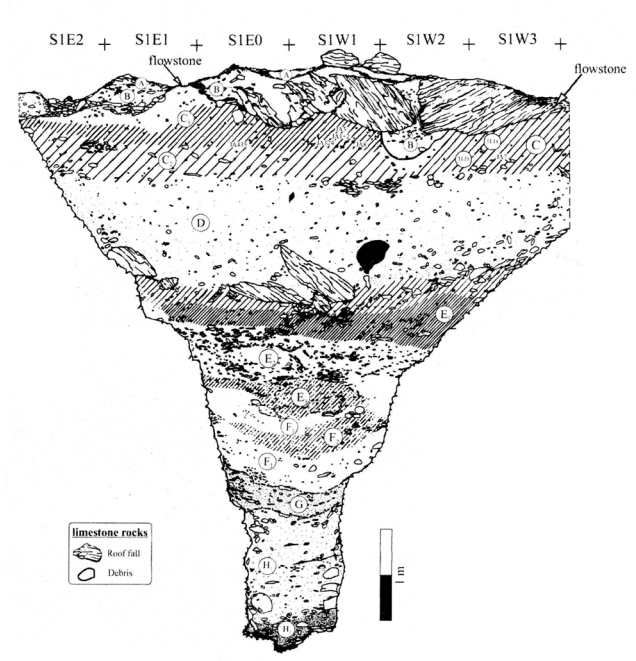

Figure 11. Jerf al-Ajla Cave, Palmyra area, central Syria. The cave's stratigraphy was established by Schroeder as such in the 1960s (Schroeder 1969, Fig. 9–10) and then clarified in the 1990s (Richter et al. 2001, Fig. 3). The stratigraphy was described in the following way: "*Lower Palaeolithic layers: G and H (Yabroudian ?); Middle Palaeolithic layers: F to D (Levantine Mousterian), C (Late Mousterian); Middle/Upper Palaeolithic: B (mixed); Upper Palaeolithic: A*" (Richter *et al*. 2001, Fig. 3, 34).

Qalta-type core. This core type, within the broader archaeological context, represents a developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core. Its primary aim is to produce a series of pointed blades or Levallois points on blades during each reduction cycle.

However, the Qalta-like artefacts found at Jerf al-Ajla Cave do not appear to constitute a single industrially homogeneous assemblage within the site's upper artefact-bearing sediments. On the one hand, Schroeder repeatedly noted the presence of UP elements in layers Brown 1/B and C, including even some Aurignacian types of prismatic blade and bladelet cores, endscrapers and burins (e.g. "steep core-endscrapers"). Based on this observation, he remarked the UP types were "*replacing the side-scraper as the dominant retouched tool class for the first time*" in the site's archaeological sequence (Schroeder 1969, p. 223). The dominant presence of UP tools in the upper artefact-bearing deposits at Jerf al-Ajla aligns with the previously mentioned IUP tools from the Qalta surface locus. However, the occurrence of Aurignacian-type lithics at Jerf al-Ajla *per contra* should be regarded as a later, intrusive Early UP component for the site.

On the other hand, Schroeder paid special attention to the presence of certain morphological peculiarities among the Levallois points recovered from Jerf al-Ajla:

"*Some Levallois points exhibit wide platforms associated with classic chapeaux de gendarme. It is significant that Layer C at Jerf al-Ajla has yielded examples of distinctive points, which are similar to Umm el-Tlel point types 1 (fig. 6.1-6.4) and 4 (fig. 6.5.-6.8) described for the "Intermediate" layers (Ilbase' and III2a') at Umm elTlel64. Point type 1 is a Levallois point, which has a series of bladelets (type 4) removed from the dorsal surface before the points were removed from the core. As a Late Mousterian technique for thinning proximal ends of Levallois points Umm el-Tlel points might be seen as a regional variation of the Emireh point*" (Richter *et al.* 2001, p. 38).

Here, the absence of comparative examples of such Levallois points at the Qalta site supports our interpretation that these artefacts represent "intrusive elements" at Jerf al-Ajla. Specifically, the short Levallois points with "*chapeau de gendarme*" butts are a well-known feature of the Late Levantine Mousterian of Tabun-B type found across the entire Eastern Mediterranean Levant. The type has also been identified within MP and MSA sequences at key sites in El-Kowm, Umm el-Tlel, level complexes V and VI (e.g., Boëda & Muhesen 1993, pp. 57–59, Fig. 19, 25–28), and in Hummal, in the HM-A1 industry from levels 5a1, 5AI–5AVI (e.g., Hauck 2013, pp. 141–142, Fig. 146–148). The other Levallois points, "*similar to Umm el-Tlel point types 1*" (see also **Fig. 11.6**), differ from the Mousterian examples mentioned above and are instead associated with what Boëda and colleagues referred to as the "*Intermediate Palaeolithic*" in facies 3, levels III 2a' and II base' at Umm el-Tlel (e.g., Boëda & Muhesen 1993, pp. 54–56, Fig. 11, 14–18; Boëda & Bonilauri 2006, pp. 77–81, Fig. 3–6), which has been dated to ca. 34.5 and 36.0 uncal ka BP based on ^{14}C and TL dates (on samples from level III 2a') (see Richter *et al.* 2001, Tab. 1). For us, this latter type of Levallois point belongs to the Late Emiran IUP industry (e.g., Boker Tachtit, layer 4; Ksar Akil rockshelter, levels XXIII–XXI; Antelias cave, layers VII–V; Abu Halka rockshelter, layers IVf–IVe; Üçağizli cave, layers I–F– *sensu* Demidenko 2013), which later

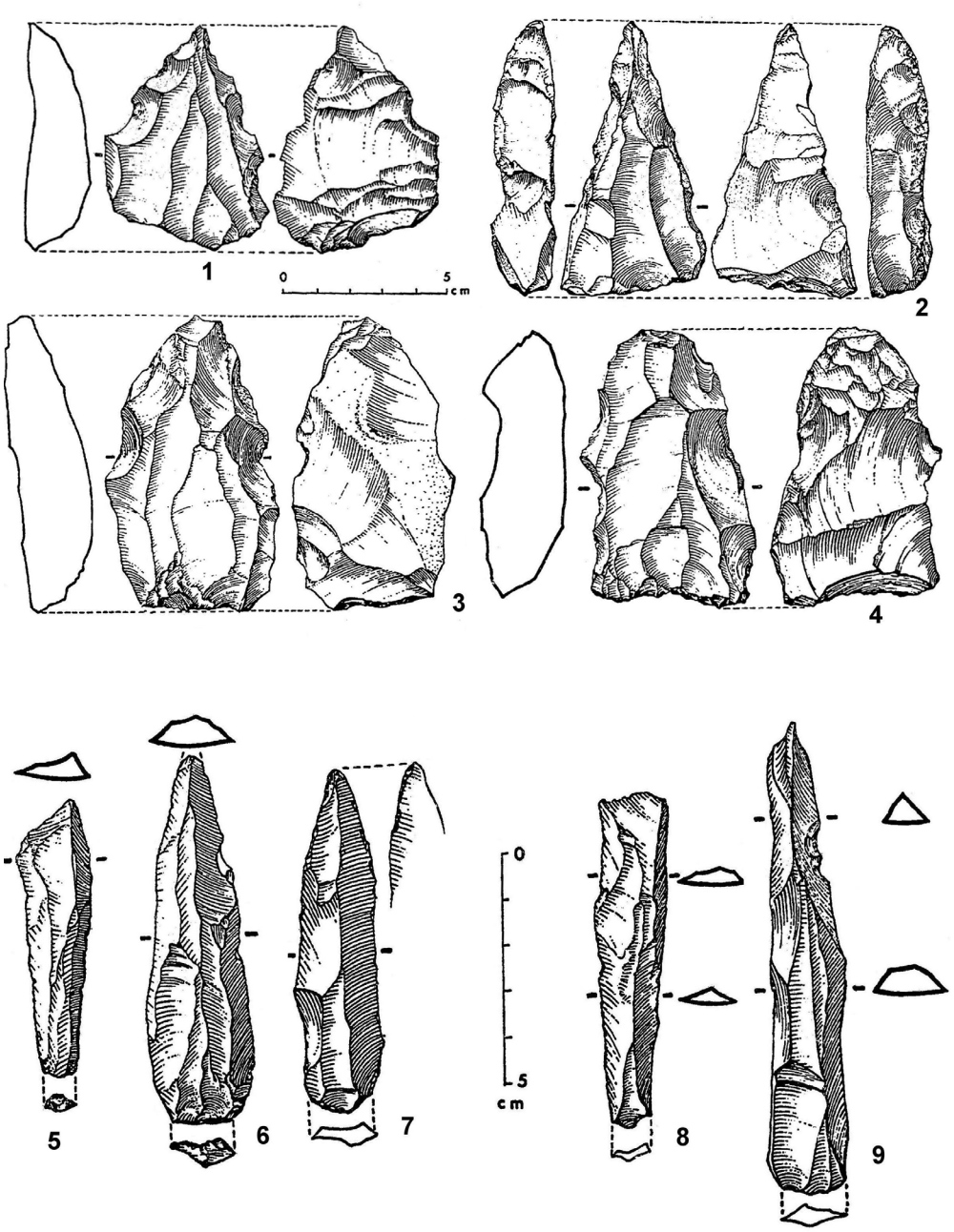

Figure 12. Layer Brown 1 in Jerf al-Ajla Cave, Palmyra area, central Syria. 1–4: Cores defined by B. Schroeder as "Jerf Ajla" cores. 5–9: Blades defined by B. Schroeder as "regular Levallois blades" detached from "Jerf Ajla" cores. Artefact illustrations modified after Schroeder 1969, Fig. 48–50, 54.

developed into the Early Ahmarian of Early Upper Palaeolithic (EUP).

In summary, the lithic artefacts recovered from layers Brown 1/B and C at Jerf al-Ajla, with a combined thickness of ca. 1.4 m (**Fig. 11**), represent at least four (!) industrial components. These four industries, outlined in geochronological order from the bottom to the top of the sequence, are Late Levantine Mousterian, IUP Nubian, IUP Late Emiran, and EUP Aurignacian.

Shifting our attention now to the lithic artefacts excavated from the 1.4-m thick deposits below layers Brown 1/B and C, specifically from Coon's layer Yellow 1 or Schroeder's layer D (**Fig. 11**), the assemblage is dominated by materials with typical MSA features associated with industries traditionally known as the Early Levantine Mousterian or Hummalian. Additionally, there are also some items related to both the Late Levantine Mousterian and the IUP Nubian.

Given the complex industrial-lithological picture for the upper and middle parts of the artefact-bearing sediments at Jerf al-Ajla Cave, it is not surprising that the TL dates for layer C, obtained in 1995–1996 at the cave's terrace and published in 2001, are regarded by us with caution. Of the eight TL dates, a mean value was calculated to ca. 33 ka BP based on "*the resulting TL ages for the heated flint samples from Jerf al-Ajla range from 29 to 38 ka (table 6)*" (Richter *et al.*

2001, p. 42). However, D. Richter remarked that the dispersion of dates *"... lacks significant outliers and shows no groupings within the age distribution. Neither the sample positions within the sediment nor the distances of samples to the points of dosimetry indicate any inconsistency in the dating results. The contamination with younger archaeological material is very unlikely, due to the presence of the flowstone above the sampled areas*" (Richter *et al.* 2001, p. 43). Indeed, the age estimate range of 38–29 ka is not large, but it can only be accepted as absolute dates derived from stratigraphically and industrially homogeneous samples of heated flint artefacts.

The dating situation at Jerf al-Ajla is not a homogeneous case. In addition to the previously mentioned Late Levantine Mousterian, IUP Nubian, Late Emiran of IUP, and Aurignacian of EUP archaeological components in layer C in Jerf al-Ajla, which can be placed within the dating range, there are also Epipalaeolithic finds in layer B. Layer B, which is above layer C, is unevenly distributed and pockets of it sometimes appears to extend into layer C (**Fig. 11**). Artefacts from layer B are mixed including both Aurignacian and Epipalaeolithic finds. Thus, the boundary between layers B and C cannot be easily distinguished, and layer C contains elements from layer B (Aurignacian) and *vice versa*. As such, we argue that the youngest TL date of ca. 28 ka, which is also the only age estimate younger than 30 ka, should be associated with the Aurignacian.

Moreover, according to Schroeder's cave stratigraphy profile (Richter *et al.* 2001, Fig. 3), layer C itself is composed of two lithological layers, C1 and C2. Of the seven illustrated heated flints in the profile, six pieces came from the upper lithological layer C1, while only a single piece originated from the lower lithological layer C2 (**Fig. 11**). However, both TL dosimeters in the profile were placed only within the lower lithological layer C2 (**Fig. 11**). Upon closer examination of Schroeder's stratigraphy, using "below datum cm" criteria for all eight dated heated flints (Richter *et al.* 2001, Tab. 3), it becomes evident that there is no consistent age-depth relationship, although the only dated sample from the lower layer C2, sample JA-7, produced an age estimate of ca. 34.3 ka BP. All in all, when dealing with Jerf al-Ajla Cave materials, there appears to be some mixing in the site stratigraphy and archaeological finds, including the dated TL flint samples. Therefore, the mean TL date ca. 33 ka BP should be considered as a *terminus ante quem* or minimum absolute date for the mixed layer C in Jerf al-Ajla.

In summary, Jerf al-Ajla Cave contains the same Nubian archaeological component as the Qalta site. However, there are some basic differences between the cave and the surface find spot. Qalta demonstrates an industrially homogeneous set of Nubian finds with no absolute age estimation. Jerf al-Ajla Cave, from the excavated context, shows the presence of Nubian artefacts within the upper artefact-bearing sediments, which are dated by TL to be no later than 33 ka BP. These Nubian artefacts were found in the upper find-bearing sediments with other lithic elements associated with the Late Levantine Mousterian, the IUP Late Emiran, and the EUP Aurignacian. Thus, quantitative evaluation is currently not possible for these Nubian artefacts. Besides, the assemblage from layers Brown 1/B and C in Jerf al-Ajla Cave, which was previously considered to be peculiar yet industrially homogeneous (e.g., Schroeder 1969; Leder 2018), is an industrially heterogeneous "archaeological package". This view aligns with the suggestion from some earlier researchers that the Qalta-like materials in layer Brown 1 of Jerf al-Ajla contain multi-industrial features: "*...contient un assemblage bizarre, avec des types habituellement incompatibles, comme un burin caréné plan, caractéristique de l'Aurignacien du Levant, ainsi que des éclats et des pointes levallois. Le niveau Brown 1 est épais d'un mètre et demi. Peut-être représente-t-il plusieurs unités archéologiques, avec du Paléolithique moyen final, un niveau de transition, et du Paléolithique supérieur*" (Besançon *et al.* 1981, p. 53). Finally, considering the similar morphological and technological features of both the Qalta-type and Jerf Ajla-type cores found at the two discussed archaeological sites in central Syria, it is proposed to name them "developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core", giving precedence to Jerf al-Ajla as the site where this distinctive core type was first recognized by B. Schroeder in the late 1960s.

In the remainder of this section, we describe five additional Nubian-related sites in central Syria. Due to the limited available published information, only summaries are provided for these sites.

3.3.3. Khirbet Safar B (site #20) and Khirbet Safar C (site #35) in the El-Kowm area

The two surface locations were discovered during the same 1980 field survey campaign in the El-Kowm region when the Qalta locus was found. In contrast to Qalta, which is situated in the northern part of the region, these two surface find spots were identified in the south, a few kilometres to the east of El-Kowm town (**Fig. 1a**). The lithics found in these two locations were only briefly described in a single paragraph, with no accompanying illustrations or artefact quantity data (Besançon *et al.* 1981, p. 53). It was noted that the two lithic assemblages exhibited similarities to the Qalta debitage (e.g. small-sized blades) and tools (the presence of sidescrapers, endscrapers, burins and borers), as well as artefact patina (light-brown colour with "*lustre d'éolisation*"). However, it was emphasized that statistical comparisons were impossible, implying that the number of artefacts at these sites may have been limited. Despite sharing several Qalta-like features, it was also pointed out that there was a nearly total absence of Qalta-type cores at the two localities, with only a single triangular core found at Khirbet Safar C and two "*disques*" at Khirbet Safar B. In the 1981 article, it was suggested that these two loci might represent short-term camps ("*haltes temporaires*") of the makers of Qalta-like artefacts in the El-Kowm area. The absence of Qalta-type cores at the two sites may be attributed to their larger distance from high-quality raw material areas than the Qalta site. In summary, Khirbet Safar B and C demonstrate potential for the recognition of Qalta-like Nubian materials, but as of now, this remains unverified.

3.3.4. Umm el-Tlel and other sites in the El-Kowm and Palmyra areas with facies 4 Qalta material from the so-called "Intermediate Palaeolithic" period

The Umm el-Tlel site, along with the Hummal site, represent the best-known industrial-chronological record for the MP and the MSA in the El-Kowm area. However, in contrast to the Hummal site, Umm el-Tlel includes almost the entire known Levantine UP sequence (see Ploux & Soriano 2003). The site is particularly noteworthy for materials directly related to the transitional period between the MP and the UP, as well as the IUP and EUP industries. The Umm el-Tlel sequence unequivocally contains the Late Emiran IUP industry within the *in situ* levels of III 2a' and II base', with absolute dates placing level III 2a' at ca. 34.5 and 36 uncal ka BP. On the other hand, in addition to this so-called facies 3 of "*Intermediate Palaeolithic*", three more facies were defined within this industrially unclear depositional unit. A particular focus was placed on identifying these facies through the analysis of bladelets and the various technological methods used for their production (Boëda & Bonilauri 2006). The industrial status of facies 1 and 2 are based exclusively on bladelet data is challenging, especially considering the absence of any published materials related to them for over the past 15 years. The proposed basic similarities and differences among the four facies do not contribute much to our understanding of their technology:

"*These four facies exhibit the following similarities: 1. the endscrapers and burins are the dominant types of retouched tools; 2. tools of these two categories are manufactured using laminar blanks; 3. blades are the primary predetermined product. At the same time, these facies differ in: 1. the nature of the blade production strategy, which differ from one facies to another; 2. the presence or absence of an associated Levallois reduction strategy; 3. the presence or absence of several Middle Palaeolithic type tools; 4. the presence or absence of bladelet production; 5. the presence or absence of elongated Levallois points*" (Boëda & Bonilauri 2006, p. 76).

Facies 4 was described as the "Qualta" facies ("Qualta" reflects the more Syrian way of pronunciation and writing, although the French archaeologists in 1980 initially called the site type "Qalta"). Facies 4 was said to be composed of materials originated from "*the sites of Qualta (surface site) (Besançon et al. 1981), of Jerf al-Ajla (in situ) (Coon 1957, Schroeder 1969), of Awyna (in situ) (Ifpo Expedition 2004, dir. Boëda E.), point 203 (Ifpo Expedition 2004, dir. Boëda E.) and of Umm el-Tlel (outside of the stratigraphy)*" (Boëda & Bonilauri 2006, p. 76). Accordingly, we believe that assemblages described by this facies must bear some features of Nubian core technology by definition, following our criteria for the Qalta site and Jerf al-Ajla Cave.

Based on the data published in 2006, there is, however, a basic problem with our current techno-typological understanding of the facies

4 Qualta artefacts. Artefacts associated with this facies were described in a general manner without any specific data provided for any particular site. Additionally, all three illustrations featuring artefacts from facies 4 were derived from Qualta (Boëda & Bonilauri 2006, Fig. 9–11). The focus on bladelet variation again hinders a comprehensive understanding of these materials as a unified industrial unit. Three core types were identified for the reduction of various bladelets: "*cores producing small straight or twisted bladelets; cores producing straight bladelets of varying dimensions, and cores producing large bladelets*" (Boëda & Bonilauri 2006, p. 83). If we take a closer look at modern bladelet-related technological studies, the three core types can be summarized as follows: the first type appears to be a multifaceted burin-core with some potentially carinated ones among them (Boëda & Bonilauri 2006, Fig. 10.1). However, in both the 1980 and 1989–1990 Qalta assemblages described earlier, no multifaceted or carinated burin-cores were found. They were not recognized among the Nubian-related finds in Jerf al-Ajla Cave. Therefore, the presence of multifaceted and carinated burin-cores presents an issue characterizing facies 4, though it was noted that they differ from "*Aurignacian bladelet production*" (Boëda & Bonilauri 2006, p. 83). The second core type was prepared on lithic natural objects, unlike the burin-cores mentioned above that were prepared on debitage pieces. The two illustrated examples of this core type (Boëda & Bonilauri 2006, Fig. 11.1–2) are blade/bladelet cores, but they do not show clearly intentional bladelet reduction, which may explain why some detached bladelets were of "*varying dimensions / dissimilar size*". The third core type again displays blade/bladelet core reduction (Boëda & Bonilauri 2006, Fig. 11.1–2) without a distinct bladelet reduction. In other words, as a whole, the second and third core types were likely associated with the production of a few bladelets in a mainly blade-oriented reduction sequence, yet there was no mentioning any Jerf Ajla/Qalta-type cores in the 2006 article focused on bladelet technology. Thus, although no Nubian core types are demonstrated from sites with Qualtan facies 4, they are probably present. It is especially unfortunate for three assemblages that were investigated by Boëda's team: from the Awyna *in situ* site, point 203 and the Umm el-Tlel non-stratified finds. These sites have never been described with any statistical and industrial data since then.

4. Concluding considerations: overall importance of locations with Nubian-related lithic assemblages in central Syria and variability of IUP origins in the Levant

The data presented about seven Palaeolithic locations in the Palmyra and El-Kowm areas of central Syria, allow us to propose a few suggestions regarding their significance in the Palaeolithic of the arid part of the northern Levant.

Most importantly, after the initial recognition of the unusual Levantine Palaeolithic Jerf Ajla/Qalta-type cores in the late 1960s from Jerf al-Ajla Cave and the early 1980s from the Qalta surface loci, the two type sites remain the most described and analyzed in central Syria in terms of lithic techno-typology. Since 2010, with our assignment of this core type to the Nubian Levallois technology, these sites have gained more scientific importance in understanding the spread of Afro-Arabian *Homo sapiens* communities into neighbouring Asian territories from north-eastern Africa and Arabia, which involves changes in primary and secondary treatment of lithic implements. The presence of five more locations discovered in the same region, namely Khirbet Safar B, Khirbet Safar C, Umm el-Tlel, point 203 and the Awyna *in situ* site, carries two significant implications. First, the limited data of these sites allow us to hypothesize a single industry with Nubian Levallois technology connected to the MP or MSA to UP transitional period in central Syria, and the absence of other industrially distinct Nubian-related materials in this part of the Levant. If this is the case, this industry may represent a single move of humans from Afro-Arabian regions into central Syria that from the perspective of lithic technology, occurred only once. Second, there are promising prospects for future Nubian-related Palaeolithic investigations in central Syria, aiming to enhance our better understanding of existing lithic assemblages, and excavations in *in situ* locations, including a terrace in front of Jerf al-Ajla Cave. Additionally, new surveys in central Syria may lead to the discovery of more locations with Nubian-related artefacts.

The most intriguing aspect of Nubian Levallois technology in central Syrian locations is the

presented "developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type core". These cores are designed for the primary production of a series of pointed blades or Levallois points on blades during one core reduction cycle. This core type differs from all other known Nubian cores from MSA Nubian assemblages in north-eastern Africa and Arabia, which typically aim at the detachment of a single pointed flake or Levallois point on flake during each core reduction cycle. However, what adds complexity to the new Nubian core type in central Syria is the occurrence, and even dominance, of typical UP endscrapers and burins in the tool component of the Qalta and Jerf al-Ajla assemblages. This suggests a UP "typological accent" with an age probably older than 33–36 uncal ka BP measured in Jerf al-Ajla and Umm el-Tlel. This leads us to argue for a relationship between the Nubian locations in central Syria and the transitional period between the MP or MSA and the UP, particularly the IUP. Therefore, the so-called "developed" character of Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type cores not only adds to the variability of Nubian Levallois technology. Besides, it helps to explain the absence of these cores from MSA locations in Africa and Arabia and their presence in the IUP Levant. Accepting this, we propose naming this particular Nubian-related set of sites and assemblages in central Syria as the IUP Jerf Ajla/Qalta industry. Thus, we now identify two IUP industries in the Levant.

Traditionally, the beginning of the IUP in the Levant is associated with the Early Emiran industry, with roots in the late MSA of Africa and Arabia (see recent summaries of sites and lithic artefact data in Marks & Rose 2014; Rose & Marks 2014). This industry is characterized by a distinct tool type known as the Emireh point with bifacial basal thinning, first defined in scientific terms by D. Garrod in the early 1950s (Garrod 1951, p. 124). However, it was not until the 1980s excavations of the Boker Tachtit open-air site and the finds from its *in situ* archaeological levels 1 to 3 in the Negev, Israel (Marks 1983b; Marks & Kaufman 1983; Volkman 1989) that the Emireh point gained its "*fossile directeur*" typological status of the Early Emiran. It was also linked technologically to a specific opposed-platform core type that produced mainly laminar Levallois points with a bidirectional dorsal scar pattern, serving as blanks for the manufacture of Emireh points (Volkman & Kaufman 1983). The significance of this Early Emiran opposed-platform core type is sometimes overlooked but, from our point of view, its appearance marked a key innovation that contributed to the formation of the entire IUP Early Emiran lithic artefact treatment tradition.

Regarding the origin of the IUP Early Emiran (e.g., Marks 1983b; Bar-Yosef 2000; 2002; Rose & Marks 2014), we currently suggest that some late MSA *Homo sapiens* from Africa and Arabia moved into the neighbouring Eastern Mediterranean Levant, forming, for the first time, a developed and lasting IUP industry there. They brought with them the Nubian 1-method Levallois pointed core technology with single-platform unidirectional convergent cores to the Levant. However, there was a radical development in core technology allowing the alternate use of the two opposed platforms as main striking platforms, instead of adhering to a strict order found in the Nubian 1-method core typical for the MSA. The latter usually had a permanent configuration of one main and one supplementary striking platform. With this technological development, the newly formed IUP industry could produce more Levallois bidirectional points with predetermined elongated blade proportions from each opposed-platform core, than the typical Afro-Arabian Nubian technology (see refitting data in Volkman 1989; Škrdla 2003; Usik *et al.* 2013).

The improved Nubian 1 core technology, now with the use of opposed-platform cores, likely led to the appearance of a new hunting projectile type known as the Emireh point. These techno-typological changes allowed the IUP Afro-Arabian *Homo sapiens* to undergo a rapid "artefact evolution" from the established Early Emiran to the IUP Late Emiran, which in turn evolved locally into the EUP Early Ahmarian (Marks & Ferring 1988). This transition occurred over just a few thousand years between ca. 50 and 45–42 ka cal BP (see absolute dates in Barzilai *et al.* 2016). Moreover, a portion of the Afro-Arabian IUP Early Emiran moved beyond the Levant, spreading throughout vast territories of Eurasia. This geographical range stretched from East-Central Europe in the west to Mongolia and northern China in East Asia. However, neither the Late Emiran nor its industrial successor, the EUP Early Ahmarian, is known outside of their industrial homeland, the Eastern Mediterranean

Levant. The same can be said for all other IUP and EUP industrial successors of the Early Emiran in all other regions of Eurasia where Early Emiran human groups penetrated. Consequently, a clear pattern emerges: there was a rapid spread of Early Emiran humans across many regions in Eurasia, followed by localized persistence of the industries that succeeded the IUP tradition.

Returning to the central Syrian IUP locations with Nubian-related lithic assemblages, it is possible to make a brief comparison between them and the IUP Early Emiran. The appearance of developed Nubian 2-method, single-platform unidirectional convergent, Jerf Ajla/Qalta-type cores can be explained in a similar way to what was suggested for the Early Emiran. Different groups of late MSA Afro-Abarian *Homo sapiens* moved into the Levant, giving rise to a new Nubian 2-method core type that allowed the production of a series of pointed blades. These blanks were then used to manufacture points with minimal additional retouching. Accordingly, we hypothesize at least two archaeologically visible cases of *Homo sapiens* dispersal into the Levant, originating from the Afro-Arabian homeland with a Nubian archaeological context.

In summary, the two proposed waves of Afro-Arabian *Homo sapiens* dispersal, each with Nubian-related lithic traditions, into the neighbouring territories of the Levant led to the emergence of two archaeologically distinct IUP industries – Early Emiran and Jerf Ajla/Qalta. The former industry, with its human populations, had achieved remarkable success, giving rise to the subsequent IUP Late Emiran and EUP Early Ahmarian industries in the Levant. Additionally, a part of this population then dispersed widely beyond the Middle East into Eurasia, where they originated further IUP and EUP industries. However, the IUP Jerf Ajla/Qalta industry and its makers disappeared, as evidenced by the absence of any IUP and EUP industries in the Levant and beyond that can be archaeologically connected to it. The disappearance of the Jerf Ajla/Qalta industry and the lack of success of its makers may be connected to the absence of a specialized hunting projectile point similar to the Emireh point used by Early Emirans. Nevertheless, the presence of the two IUP industries in the Levant offers a valuable case study regarding adaptive success associated with lithic traditions over time. Moreover, from our perspective, the study of the failed IUP industry is particularly interesting, as it can provide insights into the factors behind its archaeological demise. Finally, by analyzing the artefacts associated with the two IUP industries, we gain a glimpse into the human groups responsible for producing these diverse lithics and their respective "fates in Prehistory", which remains a fundamental aim of Palaeolithic archaeology.

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Postscriptum

When the article was about ready for submission, one of us (Demidenko) decided to look at Dirk Leder's 2013 PhD dissertation to see precisely Leder's position on the industrial integrity of lithic artefacts excavated from layers Brown 1/B and C at Jerf al-Ajla (Leder 2013, p. 209; see also Leder 2018, p. 32). It was done so late because, first, Demidenko does not agree with any of his ideas (!) on the "*many ways of transition from the MP to UP in the Levant*" and the "*Bokerian, Ksar Akilian, Emiran, Jerf Ajilian, Middle Palaeolithic Renaissance*" also proposed by him. Second, Leder has never seen personally either Jerf Ajla or proper Nubian lithic artefacts found in Africa or Arabia. However, the check ended in an unexpected result. On one hand, the respective artefact set was considered a homogeneous industrial character still having several "*lithic production systems*". On the other hand, Leder, using only published data, shortly wrote about the same Nubian attribution for Jerf Ajla/Qalta-type cores that Demidenko suggested, too. Such surprising observations deserve direct citation, especially given the relatively restricted publicity of Leder's dissertation:

"*The lithic production system in B&C was rather varied. One major reduction strategy was recurrent parallel and recurrent convergent flaking on along-axis cores aiming for blades and elongated points (15-20%). A particular core type within this concept group is the so-called Jerf Ajila core that makes up 5-10% of the entire core assemblage (compare Schroeder 1969; Richter et al. 2001). This core type produced blades and points in a recurrent manner and is of roughly triangular shape. The particular trait of this type is an intense core preparation originating from the core margins onto the core's upper side. Such treatment is comparable to Nubian 2 cores the only difference being that Jerf Ajila cores were geared towards recurrent parallel and convergent exploitation rather than a preferential convergent one*

(compare e.g. Marks 1968, Van Peer et al. 2007, Rose et al. 2011, Usik et al. 2013). … A similar industry that also produced Jerf Ajila cores and is dominated by endscrapers and burins can be seen in Qalta site in El-Kowm basin and possibly in Khirbet Safar B&C in the same area (Bescançon et al. 1981, 51-53, figs. 9-10)" (Leder 2013, p. 209).

He also mentions more Qalta-like materials defined in central Syria by Boëda & Bonilauri 2006 (Leder 2013, p. 210).

Statements

Data availability statement. The datasets generated during and analyzed in the current study are available from the authors at reasonable request. The paper has been compiled mostly by Yuri E. Demidenko in Kyiv during the current Russian war in Ukraine.

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REVIEW ARTICLE

Perforated Stone Objects in the Oceania Collection of the Museum of Ethnography in Budapest

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Abstract. The author of this paper studied 59 perforated stone objects in the Oceania collection of the Museum of Ethnography in Budapest. The items stem from the former British and German New Guinea colonies. For most objects, detailed information on the exact place of origin is not available. Therefore, the aim of the present review could be nothing more than a more or less complete description of the objects and an approximate assessment based on the abundant ethnographic literature available on the territory of Papua New Guinea. Since the studied objects are primarily club heads made of stone, it is, therefore, necessary to clarify the technological issues related to the manufacturing of these stones, their typological classification, and their morphometric measurements. Explanatory comments of any kind by the author and the free translation of quotations in the German language are enclosed in brackets. Each artefact in the text will be referred to by its inventory number (inv. no.). In Fig. 1, a sketch map of Papua New Guinea with some of the locations mentioned in the text can be seen.

Keywords: British and German New Guinea, ground stone artefacts, stone-headed clubs, Museum of Ethnography in Budapest

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1. Terminological issues

Before proceeding to the discussion of stone clubs, it is necessary to make some remarks on terminology. The reason for this is that the description below is based on information from many old Anglo-Saxon and German ethnographic literature, now considered classic. But even authors publishing in the same language often used different terms for the same concept. Not to mention the misunderstandings resulting from translations between languages, often done by non-professionals. At the same time, it should not be forgotten that the use of language has also undergone significant changes in the meantime. The author of this paper chose the workaround approach of attempting to unify the expressions found in the literature, with more or less success, in such a way that primarily the expressions of the latest literature dealing with the issue (Soukop, 2020) will be used. In this sense, the term club always means the whole object itself, which has a head made of stone (stone-head, stone club head) and has a haft. As a noun haft means the handle of the club, whereas handle means the part of the club which is held in the hand when used or moved. As a verb haft means to fit a handle to a club. The term perforate, which generally refers to making a hole in a material, describes the creation of the hole required to haft the stone club head.

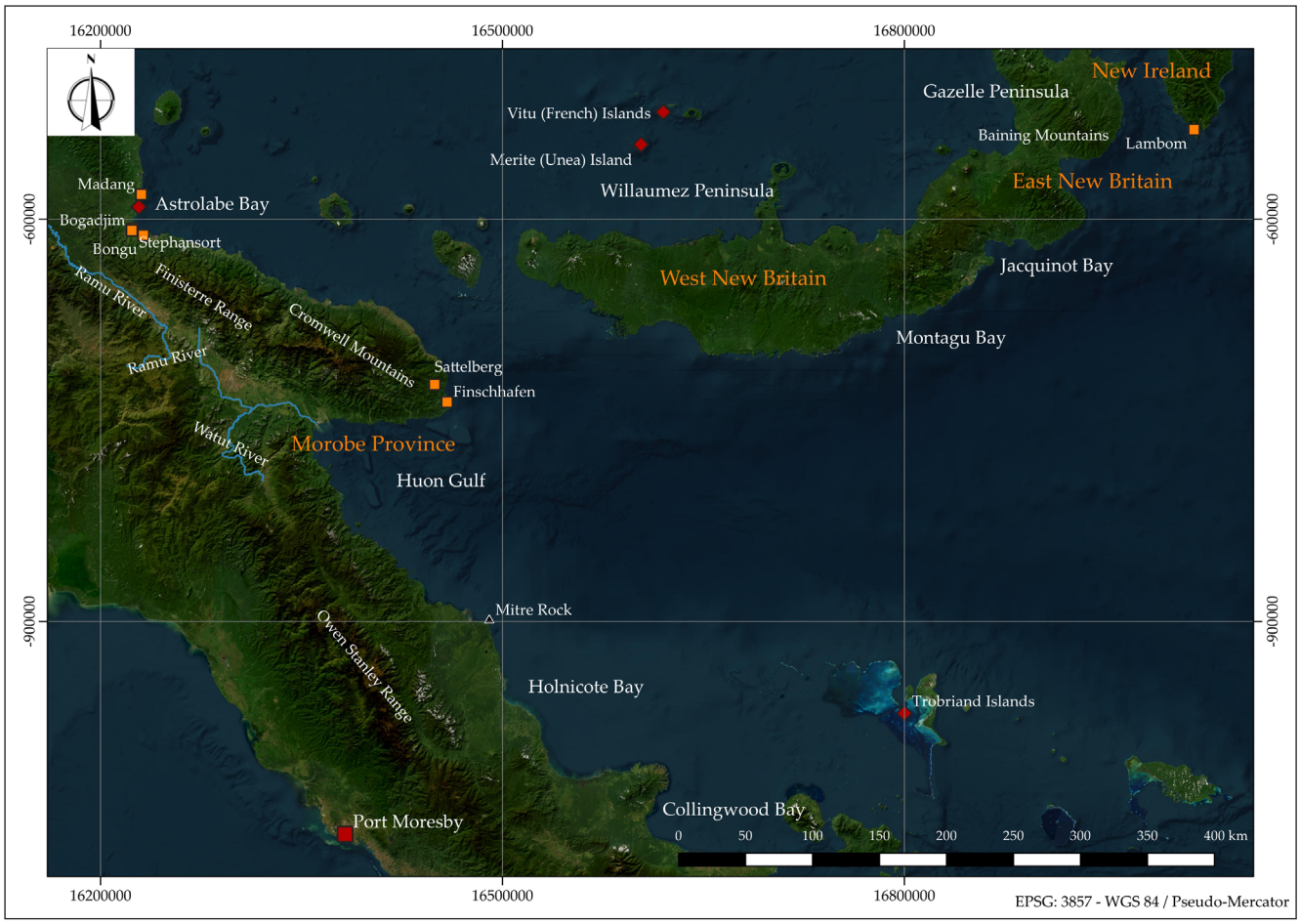

Figure 1. Sketch map of Papua New Guinea with some of the locations mentioned in the text. Map: Attila Péntek

2. The manufacturing technique of stone-headed clubs

As regards the manufacturing technique, in addition to the studies of Georg Höltker (1940–1941) and Beatrice Blackwood (1950), the publications of Katherine Wright (1992), John Darwent (1998), and Judit Antoni (2008a; 2012) could be used. First of all, it is important to briefly examine the method by which these stones were perforated and thereafter shaped. Generally, the technique seems to be the same everywhere, although individual manufacturing processes may vary depending on the different types of used stone raw materials. A pebble or a piece of rock of a relatively suitable shape and size was selected to facilitate the creation of the desired tool shape.

Concerning the raw materials used, it should be noted that earlier ethnographic literature mentioned many different raw materials. According to Luigi M. d'Albertis (1881, pp. 85–87), in the Fly River area, the clubs were made of a "*green stone*". The oval-shaped clubs, however, were of limestone. Ernest W. P. Chinnery (1919, p. 276) mentioned some stone clubs from British New Guinea, made of rarely-used raw materials such as granite, alabaster, and white quartz. Leo Austen (1923b, p. 344) wrote of the tribe along the Tedi River (Ok Tedi, also known as Alice River; a right tributary of the Upper Fly River) that the disc-shaped clubs were made of the intrusive igneous rock named diorite and the egg-shaped ones probably of quartz. Rev. V. H. Sherwin (1938) described two knobbed club heads from the Upper Watut River area, made of andesite and schist respectively. Theodore F. Bevan (1890, p. 90) wrote about the natives living around Milne Bay, a large bay in the southeastern part of Papua New Guinea, in Milne Bay province, that: *„... they make and use ... hatchets with smooth even blades of silica (a prettily veined greenstone slate), and clubs with star-shaped heads of chalcedonic quartz.*"

The observations of Blackwood (1950, p. 14) relate to the area of the Upper Watut River (Morobe Province, Papua New Guinea), but can be generalised with more or less certainty to the whole area of New Guinea. In practice, Blackwood distinguished three basic rock groups: (1)

Sedimentary rocks: greywacke, greywacke with quartzite veins, and various types of consolidated mudstone, some approximating slate. (2) Volcanic rock: basalt. (3) Metamorphic rocks: phyllite and schistose grit, fine-grained schistose grit, chlorite schist, chlorite sericite schist, serpentine, and banded rock, possibly gneiss.

2.1. Perforation of the hole

The holes were not usually made by drilling, although this process is generally known for soft rocks, but by pecking and reaming. The preparation of the biconical bores ("hour-glass perforation") was started by pecking and gently tapping the surface with a pecker to create smaller cavities on the two opposite sides. In terms of its shape, the pecker was rather a pointed stone, simply a blunt-angled natural or shaped stone drill-like piece. Care was taken to ensure that the cavities were of approximate depth. After the two bore initiations met in the middle of the stone, the resulting opening was usually widened with a stone (possibly coral) reamer, also known as a rimer. A long natural or shaped reamer was used, which was manually inserted into the bore, and they rotated it with circular movements until the bore was wide enough. Bores with an inclined axis or an elongated cross-section were mostly created because the two bore initiations did not meet exactly in the middle of the stone. In this case, the bore was corrected by the inner walls grinding together.

Richard Parkinson (1907 [2010], pp. 126–127), regarding perforation techniques of the Baining tribe living on the Gazelle Peninsula, though without mentioning the rock on which it was used, referred to the fact that "*I was introduced to another type of stone drilling years ago at Berlinhafen in Kaiser Wilhelmsland. There the stone is drilled regularly by a bamboo tube with the help of moist sand, and this type of boring is easily recognisable because the bore walls are completely regular and of the same diameter throughout*." Richard Neuhauss (1911, p. 304) mentioned concerning the stone clubs around the Huon Bay that "*Nicht nur die zylinderförmige Durchbohrung des 10 bis 15 cm langen Steins nötigt uns größte Bewunderung ab; auch die beiden Ende (Fig. 201 e) sind wie auf der Drehbank abgedreht*..." Translation: It is not only the cylindrical piercing of the 10 to 15 cm long stone that demands our greatest admiration; the two ends (Fig. 201e) also look as if they were turned on a turning-lathe... (Biskup, 1974, p. 71)] Austen (1923b, p. 344; see also, Austen, 1923a, p. 137) wrote of the tribe along the Tedi River that "*The clubs seen were made of stone, some disc-shaped (dum) seemed to be of diorite, while others were egg-shaped (iub), and these were possibly made of quartz. In the dum the handle fits tightly into the hole in the centre of the stone and in the iub the handle is fitted in with a cement of resins and gums. The iub are the more valuable, as they take several months to make, for the hole through the centre is drilled with pieces of bamboo*." (All German texts in the paper are translated by the author.)

2.2. Designing the shape of the club head

After successful boring, the desired shape was created. The primary shaping of the form was often done with a hammerstone made of mostly hard rock. There are many English language technical terms for the treatment of the external surface, which in terms of their semantic content are often identical, almost synonymous, or at least similar. Pecking (also known as hammer dressing) means that a hammerstone is used to remove small material particles from the stone to be worked. Simple grinding is usually done with water, which acts as a lubricating or cooling fluid and serves as a mechanism to remove protruding particles. Sand grit can also be used in the grinding process. In the case of simple grinding, a grinding stone, usually made of some sandstone type, is used. Other types of stone such as granite, siltstone or coarse-grained volcanic stones can also be used. Grinding stones usually contain very hard particles in their matrix. When making club heads, the battering technique was used most often, the essence of which is to hit a moving tool with angular edges blunted by impact against a stable target. Impact scars are small internal fractures caused by the impact force of the moving tool. They are usually wedge-shaped and slightly hollow. Small "dimples" are created ("pitting"), the removal of which means laborious rubbing (abrading, crumbling) of the entire surface.

2.3. Attaching the club heads to the handle

A "rattan" plaiting was usually used to secure the club heads (rattan palm, rotang palm,

Malacca cane, Manila cane, see Haddon, 1900, p. 223: ...*(coarse) cane plaiting*"; Soukup 2020, p. 60: "*crisscross rattan pattern*"). Blackwood (1950, p. 35) mentioned the use of bark cloth too. A black adhesive, probably "resin" was used to strengthen the attachment. Regarding the stone clubs of the tribes of Huon Bay and Huon Peninsula, Bernhard Hagen (1899, p. 178) noted that they are perforated in the middle and the wood haft is fixed with dark resin ("*Alle Steinkeulen sind central ... durchbohrt, der Holzstiel ist mit einer Art dunklen Harzes befestigt* ..."). Concerning the Kukukuku (also known as Anga, Angu) tribe, living around the Upper Watut River, Blackwood (1939, p. 22) wrote "*The haft is fixed in with the resinous gum of a pine*...").

Martin Soukup (2020, pp. 60–62, partly following Blackwood, 1950, p. 35) briefly described the three basic types of club head attachment (hafting). Of these, only two types were found in the studied material:

(1) A specially shaped handle was used for hafting without fixation instruments. The fixation of the club head was ensured by the fact that the handle widened along its length and ended with a wide tip part. This solution did not allow the club head to fall during a blow (Soukup, 2020, p. 61, Fig. 3).

(2) The combined fastening design used a wedge and crisscross pattern rattan braid, which held the stone in place using a different principle. The club head was pulled onto the handle, moved to one end, and then the wedge was hammered into the handle forming a split. Finally, the club head was fixed with the rattan braid and clamped onto the handle (Soukup, 2020, p. 61, Fig. 4). The bore mouths were often filled with resin.

3. Typological classification of club heads

Regarding the typological classification, Alfred C. Haddon's (1900, pp. 221–250) study on the stone clubs of British New Guinea is of fundamental importance due to the detail of the type- descriptions, the illustrations and the geographical occurrence of each type. According to Haddon's phylogenetic view, the development of stone clubs began with a raw stone that was originally used without modifications. After that, the natives started making more complicated shapes (discs, spheres, ovals and knobbed or "pineapple" shapes). According to Haddon's classification; if the stone chosen as raw material was oval, it made it possible to make disc-shaped clubs, and discs with grooved/notched rims were suitable for making pickaxe clubs and star clubs. Haddon distinguished between the "pickaxe" and the "star", classifying both into different groups. The distinction between the two types was based on the fact that there were two larger peaks on the longitudinal axis and two smaller peaks perpendicularly to it, which formed a four-pointed star together. Thus, the current classification considers the pickaxe as a sub-type of the star. In short, Haddon's system tried to create order where such was not necessary; since the final appearance of the heads of the stone clubs was determined by the shape of the raw stone before working.

Felix Speiser (1932, pp. 74–105) provided a comprehensive account of the various club types found in Melanesia, including New Guinea as well. Höltker's (1940–1941, pp. 681–736) study dealt with the stone clubs and stone axes of New Guinea, including the territory of former British New Guinea. His typological list, apart from minor differences, is practically the same as Haddon's list, but Höltker's study is more detailed and up-to-date regarding the distribution of each type. The recent article by Soukup (2020, pp. 55–70) should be mentioned, which is not significant from a typological point of view, but due to the detailed processing of the literature and the study of the collections of Czech private collections, it is an important addition to the question of stone clubs. Finally, mainly motivated by a medical approach, but in the context of hand-held percussion weapons that cause head injuries, Cyril B. Courville's study (1948, pp. 85–111) provides a thorough cultural-historical overview of the various types of clubs.

4. Methodology of the measurements

For the linear measurement of the specimens, the so-called "box method" (Debénath & Dibble, 1994, p. 19), by measuring the maximum length, maximum width and maximum height (thickness) (see also Dogandžić *et al.*, 2015, p. 7, Fig. 3b) have been used. The maximum length in the top view means the distance between the endpoints furthest from each other on the longitudinal axis of the object. The maximum width is the largest distance measured perpendicular to the

longitudinal axis. The greatest height (thickness) is the value measured at the highest (thickest) point in the third dimension. In the following, only abbreviated references are made to the measured maximum dimensions; length (L), width (W) and height (H).

Astley J. H. Goodwin (1947) developed a morphometric method for perforated stones from South Africa. The method proved to be suitable for the statistical analysis of the shape characteristics of perforated stones. Different from Goodwin's method, in addition, the minimum height (H2) of the objects was also measured, and the "average height" of the object was calculated (avgH = (H + H2) / 2) as well. Goodwin considered those with an L/W ratio ≤ 1.08 as nearly regular "circular" objects in the top view; objects with an L/W ratio > 1.08 were considered as "elongated". With the help of the "maximum diameter" (D = L, actually the maximal length) and the "average height" a percentage "index" (I = (100 × avgH) / D) was calculated for all objects. Based on this "index", the approximate shape of the objects in the side view (in fact, the degree of the "average oblateness") can be determined. For objects circular in the top view, the forms are prolate spheroid, spheroid, sub-spheroid, oblate spheroid, oblate sub-spheroid, disc, and oblate disc; in the case of pieces elongated in the top view, the increasingly flattened shapes of an ellipsoid. In the case of the bores, the size of the bore mouths (length and width, or diameter on both faces) and the bore diameter were measured in the middle, at the junction of the two conical bores.

5. Characterization of the studied objects

5.1. Typological evaluation

A detailed typological evaluation of the club heads is problematic from two points of view. On the one hand, due to the extensive trade relations between the various tribes, the occurrence of each type cannot practically be limited to a specific area. In particular, there are significant overlaps between the distribution areas of the more common types. On the other hand, as mentioned in the introduction, more detailed information on the exact place of origin of the objects is missing. Most of the types (H-I–H-IX) defined by Haddon (1900, p. 222) are present in the studied material. Types H-I ("NATURAL STONE CLUBS, OR CLUBS WITH A SLIGHT AMOUNT OF WORKING"), H-II ("RING CLUBS"), and H-VI ("FLAT CLUBS WITH NOTCHED EDGES") are missing.

Among the present types, type H-III ("BALL CLUBS"; "*Kugelförmige Keulenköpfe*" *sensu* Höltker (1940–1941); Flattened spheres (sub-spheroids) and ellipsoids) dominate with 27 specimens. This type is followed by the H-V type ("DISC CLUBS"; "*Scheibenförmige Keulenköpfe*" *sensu* Höltker) with 19 specimens. Eight objects belong to type H-VII ("KNOBBED CLUBS"; "*Ananasförmige Keulenköpfe*" *sensu* Höltker). Two pieces represent the type H-IX ("STAR CLUBS"; "*Sternförmige Keulenköpfe*" *sensu* Höltker) and one each represents the types H-IV ("OVOID CLUBS"; "*Eiförmige Keulenköpfe*" *sensu* Höltker) and H-VIII ("PICKAXE CLUBS"; Höltker does not distinguish it as an independent type).

5.2. Evaluation according to collectors

Partly due to their quantity and partly due to the existence of relatively reliable information on their provenance, it is only possible to give any meaningful details of the pieces collected by Lajos Bíró, Count Rudolf Festetics, or purchased from the dealer Giovanni Bettanin. However, we must briefly refer to the well-known Hungarian ethnographer Sámuel Fenichel.

Sámuel Fenichel (Nagyenyed, August 25, 1868 – Stephansort, Papua New Guinea, March 12, 1893, was a student at the Bethlen College in Nagyenyed, where he received an excellent natural science education. His interest initially drew him to archaeology. In the summer of 1888, he went to Bucharest, where he professionally furnished the neglected archaeological museum there. During an excavation of a Roman castle in Dobrudja, he met Albert Grubauer, the wealthy German ornithologist, who invited Fenichel to be a preparer for his expedition to New Guinea. He also received commissions from the Hungarian National Museum for animals and ethnographic objects His further life and collecting activities in New Guinea are well known (Bodrogi, 1954; Bakó, 1993; Vargyas, 2021; all articles contain additional references related to Fenichel). In the Oceania collection of the Hungarian Ethnographic Museum, 2,619 items come from his collection, mainly from around Astrolabe Bay. From the village of Bongu, he made small exploratory expeditions in different directions

Figure 2. Selected clubs of the studied collection. 1: inv. no. 13452, Bismarck Islands, bought from Giovanni Bettanin, diameter=81.0 mm, height=49.0 mm, weight with the handle=988 g; 2: inv. no. 127526, British New Guinea, collected by S. K. Verebélyi, 191.0 × 181.0 mm, height=16.0 mm, weight with the handle=1,324 g; 3: inv. no. 142208, New Guinea, MAORT (Hungarian-American Oil Company Limited), diameter=106.0 mm, height=107.0 mm, weight=1,096 g; 4: inv. no. 13400, Bismarck Islands, bought from Giovanni Bettanin, 80.0 × 71.0 mm, height=77.0 mm, weight with the handle=938 g. Photos: Museum of Ethnography in Budapest.

to study the inhabitants of the surrounding area and the Finisterre Mountain Range that stretches to the southeast of the village. Among the collected ethnographic objects, there were only three stone clubs, two of which undoubtedly come from Astrolabe Bay. The reason that his collection contains so few clubs may be that, as Speiser (1932, p. 96) wrote, clubs are very rare from the westernmost part of the northern coast to Madang (van der Sande 1907, p. 241). Another explanation can be that Jan S. Kubary, a naturalist and ethnographer of Polish origin (1846–1896) lived in the same village and collected in its vicinity between 1871 and 1872 and between 1876 and 1877 (Paszkowski, 1969–1970; Stocking, 1991). Nikolay N. Miklouho-Maclay (1846–1888), a Russian traveller, anthropologist, ethnographer, biologist, and humanistic naturalist in 1883 (Webster, 1984; Stocking, 1991) lived and collected also in Bongu and the neighbourhood. It should be noted, however, that Miklouho-Maclay, in his diary entries, stone axes, bows and arrows as weapons of the natives of the surrounding areas were mentioned only in general terms (Sentinella, 1975). For this reason, it is more likely that the club was unknown or no longer used as a weapon in the second half of the 19th century. Miklouho-Maclay, on his second visit to the Maclay Coast (the present day "Rai Coast") in April 1877, wrote in connection with his expedition to Bill Bill, Yambombi and other islands of the "*Archipelago of Contented people*" that "*On Yambombi I received a very hearty welcome. Everybody, it appeared, was glad of my arrival. Biramor accompanied me to his darem (in the Yambombi dialect buambramra is called darem). I saw here an axe, the handle of which was an example of Papuan carving. It was the first and only example seen by me on the Maclay Coast. I noticed also, hanging on a string, a flat round stone with a hole bored through it. On my asking where it came from and who made it, the natives answered, „from the sea," and „we don't know," or „it was not made by men." However, I found one man who explained, that „name-name" (a long time ago) the people of Yambombi brought this stone from the island of Korogu, which is a long way from Yambombi; that now the people of Yambombi not only do not sail there but don't even know where it is. The people of Yambombi did not know what this stone was used for*." As regards the island of Korogu, Miklouho-Maclay noted that "*I had often heard the name Karagu from others, but I could not find out where the island was. I believe that none of the current residents of the Maklai coast have been to the mysterious island, they only know it by hearsay from their father*." As regards the stone, hanging on a string, Miklouho-Maclay wrote "*This stone is essentially the head of a Papuan club; similar club is used on the southern coast of New Guinea and on some islands of the Louisada group* [correctly *Louisiade Archipelago,* a string of ten larger volcanic *islands* frequently fringed by coral reefs, and 90 smaller coral *islands* in Papua New Guinea]."

Regarding the Astrolabe Bay, Bíró (1901, p. 104) also noted "*The clubs on the mainland itself seem to be completely missing, only about Bilibili Island does Finsch mention that, although rarely, a piece is found there*." (Finsch, 1893, Vol. 2, p. 215; Hagen, 1899, p. 178)

5.2.1. The stone clubs collected by Lajos Bíró

Lajos Bíró (August 29, 1856 – September 2, 1931) was a Hungarian natural historian (entomologist) by training turned into an ethnographer. Between 1896 and 1902 he made natural history and ethnographic collections in German New Guinea. His collecting activities in New Guinea are also well known (Bíró, 1899; 1901; Bodrogi, 1953; Biró, 2006; 2008; Vargyas, 2021). Based on the Appendix of the volume edited by János Gyarmati (2008, p. 368), the number of ethnographic objects collected by Bíró in various areas of north-eastern New Guinea is 5,519 items. There are 15 club heads in the Bíró collection, among which the H-V type dominates with 12 specimens. Eight of these (inv. no. 63892, 63893, 63894, 63895, 63896, 63897, 66947, and 67224) have an approximate provenance of Sattelberg, Huon Peninsula. Four pieces come from the Bismarck Islands (Merite Island (also known as Unea or Bali Island): inv. no. 66124, French Islands (also known as Witu or Vitu Islands): inv. no. 66126, 66127, and 66946). Of the two H-VII type club heads, that with inv. no. 63898 is from Sattelberg, Huon Peninsula; the place of origin of the other piece (inv. no. 7994 is unknown. Regarding the latter piece, it should be noted that the clubs with inv. no. 7992 and 7993 in the studied material come from the collection of Fenichel (1895/0142). An H-IX-type club head originates from Sattelberg, Huon Peninsula.

There is no information regarding the stone club heads collected by Bíró on the Bismarck Islands. The club from the Merite Island (inv. no.

66124) is a large-sized (181.0 × 178.0 × 28.0 mm), medium-thick, unflanged, heavy (1,238 g) disc, sub-circular in the top view. Its raw material is an unknown, marble-like patterned, yellowish-grey-black-coloured sedimentary rock. The striking characteristic of the club head is the very narrow bore (8.5 mm) and bore mouths (21.4 mm). In this condition, the club head could not be very suitable for practical purposes. The bore may have not been completed (it was not widened enough), however, it is also a conceivable possibility that the club was made for some kind of ceremonial, ritual function. Two of the three clubs from the French Islands (inv. no. 66126, and 66127) are thick disks, almost similar in size (134.0 × 127.0 × 35.1 mm and 140.0 × 127.0 × 37.0 mm) and weight (652 g and 558 g). Their raw material is a greenish-black sedimentary rock of unknown origin. The third specimen (inv. no. 66946) is an oval-shaped, thick, relatively small (91.0 × 83.0 × 38.0 mm), flanged disc. The weight including the hardwood handle is 498 g, and its raw material is a greyish-black volcanic rock (likely basalt). Since the Bismarck Islands primarily include islands of volcanic origin (Löffler, 1977; Davies, 2012), the clubs made of sedimentary rock may have come most likely to the Merite and French Islands through exchange relationships.

Regarding the barter trade between the individual islands, reference should be made to the article by Neuhauss (1909), who reported a number of archaeological artefacts on Umboi Island. Umboi (also known as Rooke or Siassi) is a volcanic island between Papua New Guinea and the island of New Britain. " ... *Topfscherben und Fragmenten von Steingeräten, die er bei der Anlage seiner Station an einer unbewohnten Stelle des Urwaldes, ungefähr 25 cm unter der Oberfläche, fand. Die zumeist aus Lava bestehenden Steingeräte (Gemüsestampfer; in der Durchbohrung nicht vollendete, kugelförmige Steinkeulen; einige Bruchstücke von Flachkeulen usw.) zeigen fast durchgängig eine so hochgradige Verwitterung, dass man diesen Gegenständen ein sehr hohes Alter zuschreiben muss. Wir haben es daher jedenfalls mit den Werkzeugen einer Vorbevölkerung zu tun, von der ich in Kaiser-Wilhelmsland so zahlreiche Spuren entdeckte (vgl. Neuhauss, Deutsch-Neu-Guinea, Bd. 1, S. 136).*" [Translation: ... potsherds and fragments of stone implements that he [viz. missionary Bamler] found, while setting up his station in an uninhabited part of the primeval forest, about 25 cm below the surface. The stone implements (vegetable mashers; spherical stone clubs not completed in the boring; some fragments of flat clubs, etc.), mostly consisting of lava, show such a high degree of weathering that one must ascribe a very high age to these objects. In any case, we are dealing with the tools of a pre-population of which I discovered so many traces in Kaiser-Wilhelmsland (Neuhauss, 1911, p. 136).

Alfred Bühler (1946, p. 233, p. 238, Abb. 4a–b) described a stone club head with a biconvex cross-section in the collection of the "*Museum für Völkerkunde in Basel*". The piece was collected by Felix Speiser in 1930 on the island of Umboi. It is circular in plain view, 13 cm in diameter and 3.3 cm thick at its thickest point. The mouths of the biconical bore are 3.2 and 3.4 cm in diameter, with a minimum diameter of 1.8 cm. The weight is 630 g, and the raw material is very fine-grained volcanic rock.

More information is available regarding the origin of ten club heads from the Huon Peninsula, around Sattelberg (Bodrogi, 1953; Biró, 2006; 2008). Bíró collected here in the territory of the Kai [also known as Kate] and Bukaua tribes. The amount of other ethnographic information related to the stone clubs of the area is also significantly greater. The above-mentioned tribes and other tribes of the Morobe district were discussed in detail among others by Christian Keysser (1911), Stephan Lehner (1911; 1935), James G. Frazer (1913, pp. 238–323), and Bruce A. Hooley (1964).

According to Hagen (1899, p. 178, pp. 174–175, Tafel 27), in the surroundings of Finschhafen and the Huon Bay area, clubs are used which are very similar in shape to those used in British New Guinea, in the Owen-Stanley Range and the Astrolabe Range. Just as these forms reached the southern coast through the above-mentioned mountains of the central mountain range of Papua New Guinea, they could also have been transferred to the northern coast. The occurrence of these clubs indirectly proves the existence of cultural and trade relations and established transport routes between the southern and northern coasts. Concerning the Yabem (also known as Jabêm, Jabim, or Yabim) tribe around Finschhafen, Joachim Graf Pfeil (1899, p. 314) wrote that "*Zuweilen findet man noch eine Keule, die entweder platt aus hartem Holze gefertigt ist oder aus einem runden Stock besteht, auf dessen Ende ein durchlocherter Stein gezogen ist.*

Im Allgemeinen sind die Waffen der Jabim kunstlos gearbeitet." [Translation: Sometimes one still finds a club, which is either flat, made from hardwood or consists of a round stick, on the end of which a perforated stone is drawn. In general, the weapons of the Jabim are made plainly, inartistic.] Regarding the commercial and cultural relations of the Huon Gulf, the Huon Peninsula and its surroundings, the article of Pamela Swadling (2005) with a significant number of literary references on the subject should be mentioned.

The most common form of the club in the Sattelberg area is a flat, sharp-edged stone disc that thickens towards the middle (type H-V). Otto Finsch (1893, p. 118, Tafel XX, 6) described and illustrated such a club ("*Gahi*") from the Astrolabe Mountains. "*Gahi (Nr. 757, 1 Stück), Steinkeule (Taf. XX [12], Fig. 6) vom Astrolabe-Gebirge. Ein circa 70 Cm. langer Stock, an dem eine flache, runde, scharfkantige Steinscheibe (? Basalt) von 14 Cm. Durchmesser und 16 Mm. Dicke (Fig. 6, a) befestigt ist. Gewicht 35o Gramm. Diese Form ist, weil am leichtesten anzufertigen, die häufigste. Gewöhnlich beträgt der Durchmesser 10 Cm., die grösste von mir gemessene hatte 18 Cm. Diameter.*" [Translation: *Gahi* (No. 757, 1 piece), stone club (Plate XX [12], Fig. 6) from the Astrolabe Mountains. A circa 70 cm. long stick on which a flat, round, sharp-edged stone disk (? basalt) of 14 cm diameter and 16 mm thickness (Fig. 6, a) is fixed. Weight 350 grams. This form is the most common because it is the easiest to make. The diameter is usually 10 cm, the largest I measured had a diameter of 18 cm.]

Around Sattelberg, "*morgensternartige*" and "*seeigelförmig gezackte*" ["morning star-like" and "sea urchin shaped, serrated"] club heads also occurred. In the terminology of Höltker (1940–1941, p. 685) the first type is "... *kolbenartige Keulenköpfe, die auf der Overfläche meistens unregelmäßig verteilte Zacken oder Höcker zeigen.*" [... knobkerry-like club heads, with mostly irregularly distributed peaks or humps on their surface.] Actually, it is the H-VII knobbed club type. Hagen mentioned such a piece, which Finsch (1893, p. 118, Tafel XX, 9) described and presented such a club from the Astrolabe Mountains and described as extremely rare. "*Gahi (Nr. 756, 1 Stück), Steinkeule (Taf. XX [1 2], Fig. 9) vom Astrolabe-Gebirge, mit kugelförmigem, glatten Steinknauf, der bei einem Querdurchmesser von 8 1/2, Cm. in der Längsachse circa 7 Cm. (Fig. 9 bis a) durchbohrt ist (Gewicht 650 Gramm). An der einen Seite ist, wahrscheinlich in Folge von Aufschlagen auf einen Stein, ein Stück ausgesprungen, welches unebene Bruchfläche zeigt. Das Material ist von den vorigen verschieden und ein gemengtes Gestein, das an Granit erinnert und der näheren Untersuchung werth scheint. Der Stock, an welchen dieser Knauf gesteckt ist, hat eine Länge von circa 125 Cm. Diese Form, welche am meisten mit den Palau von Neu-Britannien (1, Seite 106) übereinstimmt, ist äusserst selten, und es sind mir nur wenige Stücke vorgekommen. Die Sammlungen in der Colonial-Exhibition in London (1886) enthielten nur ein derartiges Stück.*" [Translation: *Gahi* (No. 756, 1 piece), stone club (Plate XX [1 2], Fig. 9) from the Astrolabe Mountains, with a spherical, smooth stone knob, which has a transverse diameter of 8 1/2 cm; in the longitudinal axis about 7 cm (Fig. 9 to a), it is perforated (weight 650 grams). On one side, a piece has cracked off, probably as a result of hitting a stone, which shows an uneven fracture surface. The material is different from the previous ones, and is a mixed rock reminiscent of granite, and seems worthy of closer examination. The stick to which this knob is attached has a length of about 125 cm. This form, which most closely matches with the Palau of New Britain (Vol 1, p. 106), is extremely rare, and few specimens have come across to me. The collections at the Colonial Exhibition in London (1886) contained only one such piece.]

Neuhauss (1911, pp. 302–305, Abb. 201) described and presented in a photo appendix the club types of the Cromwell Mountains, Sattelberg and Waria on the Huon Peninsula. The most common are the 201.a, relatively thick (high) disc-shaped (H-V type) and the 201.d "star-shaped" (H-IX type) types; a five-pointed "star-shaped" type is visible in Fig. 174 (Neuhaus, 1911, p. 259) in the middle. At the same time, Neuhauss also made some remarkable observations from a culture-historical point of view. According to him, no one knew who made the stone clubs, and when they were made. The natives always said they had obtained the clubs from far away but could not give any information about their origin. Also, the natives did not consider clubs as their weapons. Neuhauss considered it most astonishing that no clubs of more recent origin existed; each club bore the unmistakable marks of antiquity. In connection with the stone axes, he indicated that "*Wir wissen, daß Steinbeile bis in die Gegenwart hinein angefertigt wurden und kennen*

die Produktionsorte derselben. In bezug auf Keulen ließ sich nichts dergleichen ermitteln. Ich habe die Überzeugung, daß sämtliche Steinkeulen von einer Vorbevölkerung herstammen; bei den Ananaskeulen dürfte hierüber kaum ein Zweifel bestehen." [Translation: We know that stone axes have been made up to the present day and we know where they were made. Concerning clubs, nothing of the kind could be determined. I am convinced that all stone clubs originate from a pre-population; in the case of the pineapple clubs there can hardly be any doubt about this.] (Wirz, 1952, p. 51).

Concerning the Kai tribe, Keysser (1911) wrote the following: "*Kai ist ein Wort der Jabim, der Küstenbevölkerung bei Finschhafen, und bedeutet Wald oder Inland im Gegensatz zum Meeresstrand. Es werden mit dem Wort Kai ganz allgemein die Bewohner des wald - und bergreichen Hinterlandes jenes Küstenstriches bezeichnet.*" [Translation: Kai is a word of the Jabim, the coastal population of Finschhafen, and means forest or inland in contrast to the seashore. The word Kai is generally used to describe the inhabitants of the wooded and mountainous hinterland of that stretch of coast.] As regards the weapons of the Kai: "*Die Kugel-, Rund-, Stern- und Spitzkeulen, welche die Kaileute früher besaßen, und die sich im Inlande noch jetzt finden, sollen fern aus dem Westen kommen. Der Ort ihrer Herstellung war bis jetzt noch nicht in Erfahrung zu bringen. Das Zurechtschleifen und Durchbohren stellt ohne Zweifel eine ansehnliche Leistung dar, weshalb auch die Keulen von den Eingeborenen unter einander teuer bezahlt werden. Der Wert einer Keule ist 1 1/2 bis 3 Mark. Am seltensten sind die Spitzkeulen.*" (Keysser, 1911, p. 22). [Translation: The spherical, round, star-shaped and pointed clubs, which the Kai people used to have, and which can still be found inland, are said to come from far away in the west. It has not yet been possible to find out where they were made. The grinding and boring of the clubs is undoubtedly a considerable achievement, which is why the natives pay a high price for them. The value of a club is 1 1/2 to 3 marks. The rarest are the pointed clubs." (Keysser, 1911, p. 22).] Concerning the tribes living in the Cape King William area between the Huon Peninsula and Astrolabe Bay and at the foot of the Cromwell Mountains, the German missionary Michael Stolz (1911) reported on his three-year experience in the villages of Lamatkebolo and Quambu (Sialum and Kwamkwam). Regarding their weapons, he wrote "*Für den Nahkampf ist die Steinkeule (Flachkeule und Sternkeule) die wichtigste Waffe.*" (Stolz, 1911, p. 259), that is "In close combat, the stone club (flat or disc-shaped club and star-shaped club) is the most important weapon".

Of the ten clubs collected by Bíró in the Sattelberg area, eight are of the H-V type, disc-shaped. Based on their more important statistical characteristics, despite the small number of pieces, they are quite diverse. In the top view, one specimen is regular circular, five are sub-circular and two are elongated. Two specimens have flanges, five are without flanges. In the case of a piece (inv. no. 63892), there is a flange around the bore mouth on the upper face, but none on the lower face. The length, width and height (thickness) are within fairly wide limits (98.0–139.0 mm, 94.0–138.0 mm, 24.4–43.0 mm). The average values are respectively 126.6, 120.4 and 32.1 mm. The standard deviation and the coefficient of variation (also known as relative standard deviation) values are not low and do not point to any "standardisation" of manufacturing. Based on the "average flatness index", six discs are very strongly medium-thick (the value of the index is between 20–35%). One club is considered a flat disk (inv. no. 66947). There is one "outlier" specimen below the average values (inv. no. 63896), its dimensions are 98.0 × 94.0 × 43.0 mm. It is a relatively small, thick (high) piece. The weight data of three club heads (inv. no. 63896, 66947, and 67224) are 418, 522, and 598 grams, respectively. The raw material of all three pieces is a grey-black, greenish-black sedimentary rock of unknown origin, and with a similar specific weight because the weight of the clubs made from them is proportionate. Five clubs could be weighed together with the handle. For three pieces (inv. no. 63894, 63895, and 63897), the handle lengths are 540.0, 645.0, and 740.0 mm, and the weight data are 528, 576, and 868 grams. In the case of these, it can also be established that the data seem realistic based on their greenish-grey sedimentary raw material. In all probability, it is the same sedimentary rock. In the case of one piece (inv. no. 63892), the length of the hardwood handle is 910.0 mm, and the weight of the piece is 1,162 grams. Another piece (inv. no. 63893) has a hardwood handle length of 675.0 mm, and the weight of the piece is 1,206 grams. The macroscopic determination of their raw material was not uniform. Based on the weight of the

pieces, it is probably greyish-black volcanic rock, the assumed specific gravity of which is higher than that of sedimentary rocks. As regards the hafting of the club heads, the average values of the bore and the upper and lower bore mouth are 20.2, 35.0 and 33.2 mm, respectively. The values of standard deviation and coefficient of variation (relative standard deviation) are minimal, which may indicate a sort of "standardization" related to hafting. Comparing the dimensions (length, width, thickness) of H-V type disc-shaped clubs from the Sattelberg area with the dimensions given by Haddon (1900) for 63 disc-shaped clubs, it can be concluded that the circular and elongated pieces studied by Haddon are larger, but at the same time thinner (lower). The data on the length of the handle is quite similar, in Haddon's material there are some specimens with outstanding lengths, but the average length is between 70.0 and 85.0 cm.

The H-IX type club collected by Bíró (inv. no. 63899) is circular in top view, a six-pointed, "star-shaped" club without flange. Its diameter is 168.0 mm, and its thickness is 46.0 mm. The weight including the handle is 1,202 g. Its raw material is a grey-black volcanic rock (basalt). The length of the brown hardwood handle is 1,120.0 mm.

Following Hagen (1899, p. 178), it was pointed out above, that around Finschhafen and Huon Bay stone clubs are used which are very similar in form to those used in British New Guinea.

Finsch (1893, p. 118, Tafel XX, 7) described and illustrated a four-pointed "*morgensternartige*" club from the vicinity of Port Moresby. The term "*morgensternartige*" used by Finsch here refers to a club with two greater points along its longitudinal axis and two smaller points on a transverse axis perpendicular to the longitudinal axis. This corresponds to type H-VIII, "PICKAXE CLUBS", which can be considered a subtype of the H-IX type ("STAR CLUBS", "star-shaped") clubs.

D'Albertis (1881, pp. 85–87) presented several "star-shaped", disk-shaped and spherical stone club heads from the vicinity of the Fly River in western Papua New Guinea. The group of "star-shaped" club heads is particularly rich in form. According to his findings, the stone clubs were made of a sort of "greenstone", except for the oval ones, which were made of limestone. Almost all the objects he saw resembled the objects used by the eastern tribes.

Robert W. Williamson (1912, p. 184, Plate 75, Figs. 1–2) made a similar statement regarding stone clubs seen among the Mafulu mountain tribe, whose communities are located in the sparsely populated Auga, Vanapa, Dilava and Chirima river valleys in British New Guinea: "*The clubs (Plate 75, Figs. 1 and 2) are stoneheaded, the heads being of the pineapple and disc types stone; but these heads are the same as those used on the plains and coast, whose people, in fact, get them from the mountains, and as these are so well-known, it is not necessary for me to describe them.*"

Octavius C. Stone (1876, p. 57) wrote concerning the stone clubs used by the tribes around Port Moresby and the neighbourhood that "*Stone clubs, or gahi and tomahawks, or ila, are universal. They are made from green stone found in the interior. The clubs of the Koiari are sometimes star-shaped, much time and patience evidently being bestowed upon them. The more common ones in use are hammered and ground into the shape of a flat round plate, 6 inches* [15.24 cm] *diameter, sharpened at the periphery, and generally bedecked with feathers. Those of the Ilema form a solid oval ball, roughened on the surface.*"

Stone (1880, pp. 57–58), concerning the Motu tribe around Port Moresby, partially repeated what he stated previously: "*The stone of which their club and hatchet-heads are made somewhat resembles the more common kind of greenstone found in New Zealand, and is brought chiefly from the interior, by the mountain or Koiari tribe. Sometimes they bring the stone in an unfinished state, and being tough and capable of a high degree of polish, it is much prized. It requires some weeks to work one into the required shape, for their manner of doing it is of the most primitive description. A flint or some harder stone is obtained, and with this, they hammer the greenstone incessantly until it is worn to a point, and then rub the surface to grind it smooth. The most common form of club used by the Motu (or Port Moresby) tribe, is that of a flat stone 6 inches* [15.24 cm] *in diameter, with a hole in the centre into which is fastened a handle 3 ft. 6 in. long* [106.68 cm]. *A sling is attached to carry it by, and the head is decorated with many coloured feathers.*"

Stone also mentioned and presented the stone clubs of the Ilema tribe. "*The Ilema stone club is peculiar to the tribe. The head resembles a large blackberry, 6 inches* [15.24 cm] *long, and is fastened firmly to a wooden handle. That used by the Koiari is a more deadly-looking weapon, and in every sense more striking. The stone head is cut or rather ground*

with immense labour, into four long sharp points, with two small points between each long one. A blow dealt with a comparatively small force by this star-shaped instrument is sufficient to cause severe suffering, if not immediate death. Another plainer form is also used."

Arthur P. Lyons (1926, p. 337), regarding the Gogodara (also known as Gogodala) tribe living in the area between the Fly and Aramia rivers, reported that "*The Gogodara men do not make stone clubs; those in use have been brought from the Fly River villages. ... Gaua is the name by which all stone-headed clubs are known. Of the two that I have seen, one had a plain disc head, 2 1/4 in.* [5.715 cm] *in diameter, with a hole in the centre for inserting the wooden handle. From the centre to the periphery the disc tapers to a sharp edge. The other club had a disc-shaped head 3 1/2 in.* [8.89 cm] *in diameter, and was of uniform thickness throughout. The edge was grooved like a pulley-sheave, and two transverse grooves were cut across both the bottom and the top of the disc.*"]

Heinrich Aufenanger (1960, p. 461, Fig. 12) described in great detail the "double disc" shaped stone club, which he found in the Central Highlands of New Guinea: "*No. 12 is a biconically bored double disc. The bore hole is about 1 inch and 4 points* [2.68 cm] *deep. The stone, which is heavily patinated, shows a greyish white colour. I collected it in the Nauru area from a war-magic house. The stone is very heavy. The groove, which marks the stone as a double disc, runs all round it. The stone is thickest in its middle. On both sides of the disc the stone has been carved in such a way that from its middle towards the periphery ridges and grooves are running alternately. So two different „cog-wheels" are formed, which stand parallel to one another, the little knobs around the wheels representing their teeth. What was this stone used for? If it is a stone club head it required a very strong man to handle it. There is a possibility that it was used for smashing wooden war-shields. In the Gende area big stones were used to break such shields up to recent times. The disc has a rather rough surface.*"

J. Peter White (1965) reviewed the results of the excavations carried out in 1964 in the Eastern Highlands District, New Guinea. In the Aibura Cave, Lamari River Valley polished stones were also found (White, 1965, p. 45). "*Three fragments of stone annuli. Two are made of marble. The inner hole in both cases is ground or pecked-and-ground from both faces, while the outer edge is semi-sharp. In cross-section both approximate to a right-angled triangle. Internal radii are 40 and 61 mm., while the external radius of both is 72 mm. These are possibly fragments of flat circular stone club heads* [(15)]. *15. Cf. Bulmer 1964c: 69* [Bulmer & Bulmer, 1964]." (White, 1965, p. 45)

From the Niobe Shelter, near Chuave, White (White, 1965, p. 53) mentioned a club head. "*A piece of triangular-sectioned club head was found in B7, 48 cm. below the surface. The hole for the handle has been worked from both sides, and the circumference of this hole at each end is 12.5 and 11.9 cm. The segment stands at 5.5 cms. high. It is clear from the segment that the club was not symmetrical about its handle, but must have been considerably off balance.*"

Virginia D. Watson & David Cole (1978) carried out archaeological fieldwork in the Eastern Highlands of New Guinea, in the area between the Lamari and Ramu rivers, during which they also excavated several sites. In one of the sites near Noreikora Swamp, a fragment of a stone club head shaped like a pulley sheave was found as a surface find (Watson & Cole, 1978, Fig. 14a), the interesting feature of is that there is a double groove on its edge.

David Lawrence (2010) has described in detail the work of Gunnar Landtman (1878–1940), a Finnish anthropologist who conducted fieldwork in the Kiwai region of Papua New Guinea between 1910 and 1912. Kiwai Island is the largest island in the Fly River delta, which flows into the Gulf of Papua. The Landtman collection contains several smooth stone-headed clubs of biconvex cross-section and one star-shaped stone-headed club (Lawrence, 2010, pp. 167–168). For the description of the clubs, he relied primarily on the monograph by Haddon (1912) and the book by Landtman (1927). The most widely used weapon of the Kiwa tribe used to be the stone-headed club (named *gabagaba*, or *gobagoba*). The most commonly used form was biconvex and disc-shaped with a central bore. "*They are often somewhat irregular in outline, but are meant to be circular. They vary in diameter from about 103 to 150 mm.*" (Haddon, 1912, pp. 191–192, Fig. 193). Another characteristic form collected by Haddon was the star-shaped, stone-headed club. "*Unflanged star-shaped heads are characteristic; some are of rather rude workmanship, others are well made with a polished surface. The number of rays varies from four to about a dozen (pl. XXIX. fig. 3); the latter variety practically merges into the class of disc-shaped heads with a notched*

rim, examples of which occur on the mainland, more particularly in the Gulf district." (Haddon, 1912, p. 192).

Among the stone clubs collected by Bíró, there is an H-VII type knobbed and flanged club head, sub-circular in the top view. On the surface, there are 7–7 knobs in three rows (inv. no. 63898). Its dimensions are 86.0 × 83.0 × 58.0 mm. The weight with the handle is 910 g. Its raw material is a grey-black volcanic rock, likely basalt. The length of the dark brown hardwood handle is 1,050.0 mm. The special feature of the piece is the specific arrangement of the knobs, for which no ethnographic analogue could be found. Based on the "average flatness index", the piece is a pressed sub-spheroid/sub-ellipsoid (the value of the index is 67.44%).

Finsch (1893, Vol. 2, p. 118, Tafel XX, 8) described and illustrated a knobbed club. "*Gahi (Nr. 759, 1 Stück), Steinkeule (Taf. XX [12], Fig. 8) von Keräma in Freshwater-Bai, in der für dieses Gebiet charakteristischen Form des Steinknaufs, der zehn vierreihig übereinanderstehende, gerundete Buckel zählt und dadurch in der Gestalt an gewisse Seeigel erinnert (Gewicht 600 Gramm). Das Bohrloch hat eine Tiefe von circa 7 Cm. und ist (Fig. 8, a) in der Mitte verengt. Das Material ist anscheinend ein grober Basalt.*" [Translation: Gahi (No. 759, 1 piece), stone club (Plate XX [12], Fig. 8) from Kerama in Freshwater-Bai, in the shape of the stone clubs characteristic of this area, which has ten rounded knobs standing one above the other in four rows and thus in shape reminiscent of certain sea urchins (weight 600 grams). The bore has a depth of about 7 cm and is (Fig. 8, a) narrowed in the middle. The material appears to be a coarse basalt.]

Concerning the last two clubs, the unusually long handles of the clubs should be mentioned. We will briefly return to this question later, in connection with the clubs from the Bismarck Islands.

Although it is far from our main study area (about 300–350 km to the west-northwest of Sattelberg), it is worth referring from several points of view to the study of Ronald M. Berndt (1954). The study deals with the contemporary significance of prehistoric stone objects found in the Eastern Central Highlands of New Guinea. A separate paragraph deals in detail with stone clubs (Berndt, 1954, pp. 567–570, Plate 4, Plate 5). Berndt also provided the most important dimensions of the depicted clubs and their raw materials (Berndt, 1954, p. 585). In the conclusion of the study, practically identical to the opinion of Neuhauss (1911, p. 303), Berndt stated "*From these examples, we may observe that the eastern Highlanders themselves have no knowledge of the real use or actual origin of these pre-historic stone relics. For example, there was no hint that the stone club heads were in reality club heads - no awareness that they could be used for that purpose (61), nor knowledge of people who did use them. This is surprising, since one would have expected some knowledge of the so-called Kuku Kuku, who employ such weapons, to filter into this region*. (61): "*Knobbed wooden clubs were used, but were not common, in certain Jate and Usurufa districts. It seems unusual that the Fɔ:re people had no idea of the use of stone club heads for they lived in relatively close proximity to the Kuku Kuku people who made and used them*. ..." As regards the Kuku Kuku tribe, Blackwood, 1939; 1950.

Ralph Bulmer & Susan Bulmer (1964, p. 68), in their paper on the prehistory of the Central Mountain Range of Papua New Guinea, indicated that the largest concentrations of stone clubs were found in the valleys of the Wahgi (also known as Waghi) and Baiyer Rivers. "*A wide range of designs is present, most of which have been reported in the collections of artifacts in contemporary use in southern Papua surveyed by Haddon (1900). Plain discs, flanged discs, „pineapples," „sunflowers," and discs or rings with single or double rows of knobs round the rim, are all numerous. There are also examples of double-ended picks, and of objects which could equally be interpreted as perforated adze-blades. There are at least eight examples of narrow perforated adzes or „battle-adzes," with flared sides, which strongly suggest a bronze prototype. Nearly all club heads are made of hard volcanic stones. Collections from the Wahgi and Baiyer Valleys include a number of unfinished specimens*." Golson *et al.* (2017) reported in detail the results of fieldwork and excavations in the Kuk Swamp area in the wide basin of the Wahgi River floodplain. During the excavations, a fragmentary head of a stone club made of basalt was found under the so-called "Phase 6" residential area, in the archaeological layer "Phase 5" (Golson *et al.*, 2017, p. 385, Fig. 20.11, D, p. 400, Table 20.6). Radiocarbon dating of the layer provided a date of AD 1250–1660.

With regard to the lack of knowledge of the origin and makers of the stone clubs of the indigenous people, in addition to the above

statements by Neuhauss (1911, p. 303) and Berndt (1954, p. 570), it is worth quoting Höltker (1940–1941, pp. 686–689). "*Die Verwendungsart als wirkliche Keulenköpfe findet sich heute nur im südlichen Holländisch Neuguinea (abgesehen von Mimika River und Etna Bay, wohin diese Steinkeulen wohl importiert wurden), in Britisch Neuguinea und im südlichen Deutsch Neuguinea bis einschließlich Kukukuku-Gebiet. … Im übrigen Deutsch Neuguinea außerhalb der genannten Zone werden heute sicher keine Steinkeulenköpfe mehr hergestellt. Dort haben diese Keulenköpfe heute eine ganz andere Bedeutung; sie werden dort nirgends mehr als Waffen gebraucht, ja nicht einmal mehr als solche erkannt.*" [Translation: The use as real club heads is found today only in southern Dutch New Guinea (apart from Mimika River and Etna Bay, where these stone clubs were probably imported), in British New Guinea and southern German New Guinea up to and including the Kukukuku area. … In the rest of German New Guinea outside of the zone mentioned, stone club heads are certainly no longer made today. There these club heads have a completely different meaning today; they are no longer used as weapons anywhere and are no longer even recognized as such.]

Primarily from a typological and morphometric point of view, in connection with Haddon's (1900) classification, James Edge-Partington (1902) made some interesting statements regarding the clubs found in British New Guinea. "*I think it advisable that all the types from the outer coast should, as far as possible, be figured so as to give an opportunity to compare them with specimens from the inner coast and other tribes. On doing this, I think there can be little doubt that the greater number have a common origin. As far as one can judge by comparison, not only are the heads identical, but the hafting is also similar; the various forms found on the outer coast being seen in clubs, more especially from the central and Rigo districts.*" Edge-Partington also presented and described the more important metrical data of some common club types from the coastal area between Mitre Rock, Holnicote Bay and Collingwood Bay in the British Museum collection. Among the clubs, an unusually large disc-shaped club, measuring 8 inches (20.32 cm) in diameter, is worth mentioning. Edge-Partington did not refer to the function of the clubs, and although all clubs are decorated with a large feather bush, which is not justified from a practical point of view in the case of weapons, his data on total length (91–123 cm) can certainly be understood without this decoration.

5.2.2. Stone clubs collected by Count Rudolf Festetics

Count Rudolf Festetics (de Tolna) was born on September 15, 1865, in Paris. He graduated from the *Theresianum* in Vienna and served in Hungary as a hussar lieutenant for several years. He was demobilized and then went to America, where in 1892 he married Ella Haggin, the daughter of a millionaire, in San Francisco. He used the dowry to build a sailing yacht, which he named "Tolna". Together with his wife, he set off on a journey lasting eight years. He reported on his travel experiences in several books (Festetics 1903; 1904; 1905 [1926]). Divorced and then remarried. His second wife was Alice Wertherbee, also the daughter of a millionaire. From his dowry, Festetics built the sailing yacht "Tolna II". He went to sea again. Two mutinies broke out on his ship, but the count put down both. However, his wife had enough of the adventures and divorced him. In 1931, he married for the third time. No child was born. His death occurred in 1943, but the exact date, place and cause are unknown. The number of ethnographic finds from the Oceania collection of Count Rudolf Festetics of the Budapest Ethnographic Museum is very significant. Jankó (1902, p. 60) mentioned 1,460 objects and 361 original photographs as gifts from Festetics. The Festetics collection was processed by Judit Antoni. In the description of Antoni (2008b, p. 290), the number of objects in the Festetics collection is 1,630. The same number is also included in the Appendix of the volume edited by Gyarmati (2008, p. 368). 94 pieces of the Festetics collection come from the Bismarck Islands (Neu-Pommern (New Britain), Neu-Mecklenburg (New Ireland), Neu-Hannover (New Hannover) (Jankó 1902, p. 60; Antoni 2008b, p. 302). The objects in the collection include a total of four stone clubs (inv. no. 36227, 36228, 36229, and 36230. His account of his travels spanning eight years between 1893–1902, originally written in French (Festetics, 1905 [1926]) did not mention stone clubs at all.

All four stone clubs are H-III type, spheroid or ellipsoid. Two pieces are regularly circular in the top view (inv. no. 36228 and 36230), and two pieces are sub-circular and quasi-circular. Due to the small sample, the statistical data can only

be considered indicative. The length, width and height (thickness) data are within very wide limits (77.0–104.0 mm, 75.0–101.0 mm, 43.5–69.0 mm). The average values are respectively 88.8, 87.5 and 59.9 mm. The values of standard deviation and coefficient of variation (relative standard deviation) are not low. The "average flatness index" also varies within wide limits (56.49–81.18%). One club (inv. no. 36228) has a high index value (81.18%) and can be considered almost spherical. The raw material of the clubs is a grey-black volcanic rock (basalt). The weights of the clubs either without a handle (330–938 g) or with a handle (800–1,482 g) are proportional to the size of the clubs due to the same raw material. The length of the dark brown hardwood handle of the clubs varies between 1,120.0 and 1,285.0 mm. In all cases, the handle of the clubs is without fixation instruments, the handle widens along its length and ends with a wide handle part Soukup (2020, pp. 60–62).

5.2.3. Stone clubs purchased from Giovanni Bettanin

Between 1897 and 1904, the Museum of Ethnography in Budapest purchased 1,257 ethnographic objects from various areas of Melanesia and Polynesia from the private collector and art dealer Giovanni Bettanin. Bettanin almost certainly belonged to a class of Italian "antiquities dealers" within the Austro-Hungarian Monarchy whose commercial activities spanned not only the entire Asian continent but Oceania as well.

Among the purchased items, there are 19 stone clubs from the Bismarck Islands. A single piece (inv. no. 13400, Fig. 2, 4) is an H-VII type knobbed club, the other pieces are H-III type, spheroidal or ellipsoidal clubs. Of the 18 clubs of H-III type, 10 specimens are regular circular in the top view, five are sub-circular, quasi-circular, and three are elongated. The length, width and height (thickness) data are within very wide limits (74.0–119.0 mm, 68.0–116.0 mm, 37.0–99.0 mm). The average values are respectively 90.8, 87.8 and 58.8 mm. The values of the standard deviation and the coefficient of variation (relative standard deviation) are not low, but rather high in the case of the thickness (height). The "average flatness index" also varies within wide limits (50.00–97.06%). One piece (inv. no. 13456) has an exceptionally high index value (97.06%) and can be practically considered spherical. Two additional pieces (inv. no. 67.134.3 and 67.134.4) have significantly high index values (80.52%, 84.69%); they are almost spherical.

The raw material of all clubs is a grey-black volcanic rock (likely basalt). The weight of the clubs either without a handle (212–1,322 g) or with a handle (720–2,232 g) is proportional to the size of the clubs due to the same raw material. The length of the dark brown hardwood handle of the clubs varies between 990.0–1,290.0 mm. In all cases, the handle of the clubs is without a fixation instrument, the handle widens along its length and ends with a wide handle part Soukup (2020, pp. 60–62).

Blackwood (1950, pp. 35–36) described the ball-headed [H-III "BALL CLUBS"] stone clubs of the Kukukuku tribe living along the Upper Watut River. "*There is considerable variation in the size of the club head, in the length of the shaft, and in the weight of the finished weapon. Analysis of eleven clubs collected shows that the heads vary from an almost perfect sphere measuring 3 9/32 in. (8.3 cm.) x 3 7/32 in. (8.2 cm.) x 2 3/4 in. (7.0 cm.) to a flattish oval, measuring 3 1/2 in. (8.9 cm.) x 2 11/16 in. (6.8 cm.) x 1 3/8 in. (3.5 cm.), the majority being more or less spherical. The total length of the club from the proximal end of the shaft to the distal end of the piece which projects beyond the club head varies between 2 ft. 4 3/4 in. (73 cm.) and 1 ft. 8 1/2 in. (52 cm.), the majority falling between 2 ft. and 2 ft. 4 in. Each of the three heaviest weighs 2 lb. 8 oz. (1.2 kg.) and the lightest 15 oz. (0.4 kg.), with the others fairly evenly spaced between. The villages known to me make only ball-headed clubs, but other related groups on the other side of the Watut range make also disk-headed, star-headed, and 'pineapple' clubs.*"

Except for the handle lengths, these statistical values given by Blackwood are more or less the same as those of the clubs from the Bismarck Islands above.

5.3. Some notes on stone clubs from the Bismarck Islands

Although the number of clubs collected by both Festetics and Bettanin is small, it is striking that they are very similar in all of their forms, manufacturing characteristics and the used raw materials. Even without knowing the specific place or places of origin of the objects, it is very likely that they were collected in the same area,

or at least made by the same indigenous tribe. There is a relatively large amount of ethnographic information available about the stone and wooden clubs of the Bismarck Islands.

Johann D. E. Schmeltz & Rudolf Krause (1881, pp. 47–48) described several stone clubs from Neu-Bitannien in the ethnographic collection of the "*Museum Godeffroy in Hamburg*". "*Auf einen Stiel derselben Form wie bei 1293 und 1878 beschrieben [aus einem runden Stück braunen, polirten Holzes; conisch zum Schlagende gegen den Handgriff zu verjüngt, jedoch nicht spitz, sondern stumpf auslaufend. Ungefähr 30 cm vor dem Griff-Ende eine schwache Verdickung unterhalb welcher bei 1293 ein geflochtener Bastring liegt], ist ein durchbohrter, runder, entweder kugel- oder scheibenförmiger Stein, in einigen Fällen Syenit, in anderen Andesit, aufgeschoben und mittelst kittartiger Masse, in die als Verzierung Plättchen aus der Basis einer Nassa und in einem Fall auch rothe Früchte einer Leguminose (Abrus precatorius) eingelegt sind, befestigt. Das über die Kugel hervorstehende dickere Ende des Stieles von ca. 6–8 cm zeigt in vielen Fällen eine Verzierung durch eingegraben Punkte oder eingeritzte Linien, die in einem Falle das Bild einer menschlichen Gestalt roh nachahmen und bei einigen mit Kalk ausgerieben sind. Unterhalb der Verdickung vor dem Handgriff finden sich an einigen Exemplaren Ringe aus Bastgeflecht oder aus Faserschnur, an einem Keule sind ausserdem an einer Schnur einige aufgereihte Platten aus Nassa *) befestigt. *) Nach einer unverbürgten Angabe sollen diese Bastringe etc. Erinnerungszeichen and erschlagene Feinde sein."* [Translation: On a handle of the same shape as described at the clubs No. 1293 and No. 1878 [made of a round piece of brown, polished wood; tapering conically towards the end of the handle, but not pointed but blunt. About 30 cm in front of the end of the handle there is a slight thickening below which, at the club No. 1293, there is a woven/plaited ring of bast], a pierced, round, either spherical or disc-shaped stone, in some cases made of syenite [a coarse-grained intrusive igneous rock], in others made of andesite, is pushed on and fixed by means of a putty-like mass, in which, as decoration, small plates from the Nassa snail and, in one case, also red fruits of a legume (*Abrus precatorius*) are inserted. The thicker end of the stem, which protrudes above the sphere and is about 6–8 cm long, shows in many cases a decoration of engraved dots or incised lines, which in one case roughly imitate the image of a human figure and in some cases are rubbed out with lime. Below the thickening in front of the handle, there are rings of bast (raffia) or fibre cord on some specimens, and on one club there are also a few plates of Nassa snail *) attached to a cord. *) According to an unattributed statement, these bast rings etc. are supposed to be reminders of slain, killed enemies.]

Wilfred Powell (1883, pp. 159 ff.) also discussed the weapons of the Kininigunun district and Blanche Bay at the northeastern end of the Gazelle Peninsula and presented some stone clubs. Among them, one can also find the stone club with a long handle with a widening end (Powell, 1883, p. 160, the second from the left in the figure), as well as a disc-shaped club (Powell, 1883, p. 161). According to Powell (1881, p. 87) "*From Ruluanna to Gazelle Point is known as the Kininigunun district,...*" Cape Gazelle is the easternmost point of New Britain. Ruluanna is a mission near Rabaul, on the north-eastern isthmus of the Gazelle Peninsula. Peter Biskup (1974, p. 70, footnote N°. 48.) wrote in his study of the memoirs of Mouton, quoting him that "*Today's Vunanami, referred to as Kinigunan in most early records. Powell (1884: 79) uses Kininigunun and Parkinson (1887: 78), Kininigunan. Note that it is an area, not a village; thus 'Kinigunan is the area that I will call Vunanami' (Salisbury 1970: 21).*"

Biskup (1974) published the manuscript biography of Jean Baptiste Octave Mouton (1866–1946), a New Guinean merchant and plantation owner. The Moutons settled on the Gazelle Peninsula as copra traders in 1882, and in the following year, they moved to Kinigunan (Vunanami), east of Kokopo. The manuscript contained some ethnographic data, including data on the clubs used by the natives. "*... one of their clubs is made of a round stone the size of an orange, in the middle is a hole large enough to take an ordinary stick of about one and a half inch* [3.81 cm] *diameter of hard wood, the stick is fixed into the hole the top of the stick is thicker at the head so as to keep the stone secure and finally it is kept solid with putty made of native plant one of them is a fruit like a chestnut the kernel of which is scraped and when this is dry it become very hard, in fact the smell is very much like linseed oil, with this putty they manage to make a very good solid job and the stone remain firm, the stone is generally found in river bed, the stick is about four feet* [121.92 cm] *long, it must be the work of patience to drill the hole, and it is made stone against stone, a small stone is secured by putty and*

string to an [sic!] *handle and this is manipulated by a bow, it is of very slow progress but they have plenty patience, and this implement is very efficient I can assure you, the handle being a little flexible give it powerful impetus*." (Biskup, 1974, p. 71).

Parkinson (1887) reported on his observations on Neu-Pommern (New Britain), the largest island of the Bismarck Islands. In his book, he dealt in detail with the stone and wooden clubs found on the Gazelle Peninsula in the north-eastern end of the island (Parkinson, 1887, pp. 122–124). "*Keulen sieht man von mannichfacher Art und Form. Früher hatte wahrscheinlich jeder District seine eigenthümlich gestaltete Keule, jetzt aber sind alle die verschiedenen Formen durch Tauschhandel über die ganze Gazelle-Halbinsel verbreitet und außerdem noch eine Menge aus Neu-Irland eingeführter Formen. Die hier abgebildeten Keulen sind nachweisbar neubritannischen Ursprungs. Die Palao-Keule ist ein circa 1 m langer Knüttel von hartem Holz, dessen unteres Ende in einem durchbohrten und mit Harz fest angekitteten runden Stein von der Größe einer Orange steckt; in das Harz sind gewöhnlich als Zierath kleine Dewarramuscheln eingepreßt . Diese höchst gefährliche Waffe stammt aus den westlichen Districten, aus Beining und Kabaira her.*" [Translation: One sees clubs of many kinds and shapes. Formerly each district probably had its peculiar club of design, but now all the various forms are spread throughout the Gazelle Peninsula by barter, and a multitude of forms introduced from New Ireland. The clubs shown here are demonstrably of New British origin. The *palao* club is a stick of hard wood about 1 m long, the lower end of which is stuck in a perforated and with resin cemented round stone the size of an orange; Small Dewarra shells are usually pressed into the resin as ornaments. This highly dangerous weapon comes from the western districts, from Beining and Kabaira.]. A *palao* club of this kind, with a long handle and widening end, was shown in the accompanying illustration by Parkinson (Parkinson, 1887, p. 123, fig. 14).

Parkinson (1899, pp. 1–2), in his short article on the tribes of Neu-Pommern (New Britain), wrote about the tribe living on the Gazelle Peninsula, known for its volcanic activity, and called "Baining" by their neighbours living on the plateau, that they differed from the neighbouring tribes not only in their physique, but they also differ in their language, traditions and customs. "*Sie fertigen Keulen an mit durchbohrten oder richtiger durchbrochenen Steinknäufen, eine Fertigkeit, die ihnen von einigen ihrer Nachbarn auf der Hochebene abgelauscht worden ist.*", that is, "the people of the tribe make clubs with perforated, or more precisely broken-through, stone heads; they learned this skill from some of their mountain neighbours".

Finsch (1893, Vol. 1, p. 106) described the Palau club used around Blanche Bay as follows. "*Palau (Nr. 763, 764, 765, 3 Stück, Taf. IV [2], Fig. 5, 6), einfache, runde, nach unten spitz zulaufende Stöcke von Hartholz, die mit einem durchbohrten runden Steinring bewehrt sind und somit eine wuchtige Schlagwaffe abgeben. Fig. 5 zeigt den Steinknauf von der Seite mit a dem Bohrloch, ferner den Stock, der oben 7 Cm. vorragt und stumpf abgeschnitten ist, unten 1.20 M. lang in eine stumpfe Spitze ausläuft; Fig. 6 zeigt die Hälfte eines Steinknaufes von oben: a das Bohrloch, dasselbe rundum einfassend eine Verzierung aus Diwara, auf einen schwarzen Kitt aufgeklebt.*" [Translation: Palau (No. 763, 764, 765, 3 pieces, plate IV [2], Fig. 5, 6), simple, round sticks of hardwood tapering downwards, which are reinforced with a perforated round stone ring and thus making a powerful striking weapon. Fig. 5 shows the stone club from the side with a perforated hole, also the stick, which protrudes above 7 cm and is bluntly cut off; below it is 1.20 meters long and ends in a blunt point; Fig. 6 shows half of a stone club from above: a the perforated hole, enclosing it all around with a Diwara shell ornament glued to a black binder (putty).] Finsch further noted that their isolated occurrence makes these Palau clubs among the most interesting products of the Melanesian Stone Age, as they are known to be found in a similar manner only on the south-eastern coast of New Guinea. In any case, the stone clubs (discs) depicted by Powell (1883, p. 161) come from there and not from Blanche Bay, thus, Finsch's statement is unwarranted. At the same time, Finsch quite rightly considered Powell's description of the boring through the stone heads to be incorrect and considered it likely that the perforation was done with another piece of stone, pecking and grinding, like that in New Guinea.

Pfeil (1899, p. 102) mentioned that "... *Die vorhin erwähnten Keulen mit steinernem Knauf stammen fast ausnahmslos aus Beyning, wo man anscheinend das Bohren der Löcher besser versteht und betreibt, als an anderen Orten, auch kommt hier*

allein das erforderliche Gestein vor, welches natürlich auf rein korallinischen Inselgebilden nicht gefunden wird." [Translation: ... Almost without exception, the clubs with a stone head mentioned above come from Beyning, where the boring of holes is apparently understood and practiced better than in other places, and the necessary rock is found here alone, which of course is not found on purely coralline island formations.] The latter reference is primarily related to the Kanakas (the collective name for Melanesian natives).

Parkinson (1907, pp. 51–52; Parkinson, 1907 [2010], p. 38), regarding the Baining tribe inhabiting the Gazelle Peninsula, stated "... *wir es hier mit einem Stamm zu tun haben, der wenig mit den Nachbarstämmen im Norden gemein hat und geistig auf einer höheren Stufe steht. Er besitzt vorzüglich gearbeitete Keulen, teils mit runden oder eiförmigen Knäufen, teils mit einem Schlagende in Form einer Ananas, ...*". [Translation: ...we are dealing with a tribe that has little in common with the neighbouring tribes in the north and is spiritually on a higher level. The tribe has exquisitely made clubs, some with round or egg-shaped heads, and some with a striking end in the shape of a pineapple ...]. Parkinson (1907, p. 131; Parkinson, 1907 [2010], p. 99) described the stone club called *Palau* as follows: "*Palau besteht aus einem am unteren Ende verdichten Stab mit einem darauf gestülpten durchbohrten Steinknauf. Diese Keule ist ursprünglich aus Baining importiert, worauf dann nach und nach die Anfertigung der Steinknäufe durch Bainingsklaven in den Distrikten am Barzin bekannt wurde. Hier habe ich vor Jahren die Anfertigung der Steinknäufe beobachten können und die Methode stimmt genau überein mit der heute noch in Baining angewendeten.*" [Translation: *Palau* consists of a rod becoming thicker at the lower end with a perforated stone knob placed on top. This club was originally imported from Baining, whereupon the production of the stone knobs, by Baining slaves, in the districts on the Varzin gradually became known. Here I was able to observe the making of the stone knobs years ago and the method is exactly the same as that still used in Baining today.]

Parkinson (1907, pp. 168–170; Parkinson, 1907 [2010], pp. 126–127) described in detail the boring of club heads by double-sided pecking, which results a biconical, hourglass-like hole. He established furthermore that "*Die Keulenknäufe der Baining haben niemals die flache, fast scheibenartige Gestalt, wie wir sie aus einzelnen Gegenden Neuguineas kennen. Es kommen stark abgeplattete Knäufe vor, aber niemals mit scharfem Außenrand. Die Knäufe findet man in allen Stadien, vom stark abgeplatteten Sphäroid bis zur Kugelform und darüber hinaus bis zur Eiform.*" That is, "the Baining club heads never have the flat, almost disc-like shape that we know from some areas of New Guinea. Strongly flattened club heads occur, but never with a sharp outer edge. They can be found in all variations, from highly flattened spheres to spherical and beyond, to egg-shaped."

Emil Stephan & Fritz Graebner (1907, pp. 49–51), regarding the weapons used in the area of southern Neu-Mecklenburg (New Ireland) wrote that: "*Keulen 1) sind wenigstens heute eine seltene Erscheinung. Außer rohen, an einem Ende schlecht ornamentierten Knütteln wurden in King und Kalil nur je zwei Exemplare der Doppelkegelkeule (Abb. 38,1) gesehen. 2) Sie sind durch die lange Axt rāma mit der europäischen Klinge ersetzt, die sich aber den alten Keulengriff bewahrt hat (Abb. 38,2). Zwei Steinkeulen, deren Knäufe ganz den bekannten der Gazelle-Halbinsel gleichen, aber an ganz rohen Stielen befestigt sind (Abb. 38, 3 und 4), behauptete Tongilam von Leuten den Innern erworben zu haben, eine an sich unwahrscheinliche Angabe, die außerdem von Seliku aus Lamassa bestritten wurde.* 1) *Ganz andere Formen, als die hier erworbenen, abgeb. bei Duperrey, Partie histor. Atlas. Taf. 19, 6–8 und Taf. 24; vgl. auch die Duke-of-York-Keule bei Hunter, taf. Zu S. 233. 2) King 'silla', Kalil 'libai' (aus Holz vom Baume aiāre).*" [Translation: Clubs 1) are a rare phenomenon, at least today. Apart from crude jerks badly ornamented at one end, only two specimens of the double-cone club (Fig. 38, 1) were seen in King and Kalil. 2) They are replaced by the long axe *rāma* with the European blade, which has retained the old club handle (Fig. 38, 2). Two stone clubs, the knobs of which are very similar to those known from the Gazelle Peninsula, but are attached to very crude handles (Figs. 38, 3 and 4), Tongilam [viz. a native from the village of King] claimed to have acquired from people of the interior of the island, an improbable statement in itself, which also Seliku from the village Lamassa was denied. 1) Completely different forms than the ones acquired here were represented by *Duperrey Partie histor. Atlas. Taf. 19, 6–8 und Taf. 24*; see also the club from Duke of York Island in Hunter, Table to page 233. — 2) King *silla*, Kalil *libai* (made of *aiāre* wood). – Kalil, King

and Lamassa are villages along the west coast of the island.]

Friedrich Burger (1913, p. 77) briefly hinted that "*Gewisse Erzeugnisse der Baininger, z. B. die Steinknaufkeule, sind weit über die über die Baininggrenzen hinaus in Neupommern verbreitet. … Die Steinknaufkeule ist eine typisch bainingische Waffe. Der runde Knauf wird lediglich durch Schlagen mit einem anderen spitzen Steine durchlocht und dann mit Hilfe eines untergelegten Ringes von gespaltenen Lianen auf dem Stiel befestigt und in den Fugen mit Bienenwachs (a museichi) ausgefüllt und mit kleinen Muscheln verziert. Außer der Steinknaufkeule kennt der Baininger noch Schwertkeulen, Keulen in konischer Form, in Ananasform und die Kugelkopfkeule. Im übrigen ist die Schnitzerei bei diesem Berg – und Waldvolke wunderbarerweise gänzlich vernachlässigt.*" [Translation: Certain products of the Baining, e.g. the stone-headed clubs, are distributed far beyond the Baining borders in New Pomerania. … The stone-headed club is a typically Baining weapon. The round ball is perforated simply by hitting it with another pointed stone and then attached to the handle with the help of a ring of split lianas underneath and filled with beeswax (a museichi) in the joints and decorated with small shells. In addition to the stone-headed clubs, people from Baining also know sword clubs, conical clubs, pineapple-shaped clubs and the ball-headed club. Incidentally, the carving of this mountain and forest people is miraculously completely neglected.] The latter clubs were made of wood, see Parkinson, 1907, p. 170, 1907 [2010], p. 127. Carl Laufer (1959, p. 917, p. 918, p. 934) mentioned flat, disc-like clubs, apparently made of wood, in connection with the initiation of young boys and the Baining sacred dances.

William Churchill (1917, p. 108) cited Parkinson's (1907, p. 112, Tafel 8, fig. 9) statement that the stone clubs with the name *palau* were associated with magical rites by the coastal inhabitants of the Gazelle Peninsula as belonging to an old and somewhat foreign culture. They trace their origins to the Baining people of the mountainous hinterland. In terms of their type, they are more similar to the Sulka and O Mengen peoples of the Nakanai coast on the north coast of the island, west of the Gazelle Peninsula. He also explained the hafting of the Palau stone clubs. "*In the Baining palau (Fig. 18) we may readily dissect out the structural detail. The drilled stone being prepared, the clubwright must mount it upon its handle in order that it may be made into a weapon of utility. He prepares a stick of such diameter as to admit the possibility of sliding the stone disk over it to a point where it will satisfactorily engage with the wood. At this point, the distance being governed by the length normal to the type of club, he carves the stick into a cone attaining a diameter by a certain amount larger than the perforation of the stone. He sets the stone home by driving the distal end sharply upon a fixed rock, exactly as a navvy seats his pick-axe on a handle by utilizing the same principle.*"

Speiser (1932, pp. 77–78) wrote about the Baining tribe of the Gazelle Peninsula that they only knew clubs of the spherical (spheroid) type. "*… man darf deswegen die Bainingkeulen als die primitiveren bezeichnen in bezug auf die Steintechnik, nicht aber in bezug auf die Konstruktion im ganzen: denn bei den Bainingkeulen wird der Kopf von unten her and den Schaft gesteckt, er kann sich beim Schlage also unmöglich vom Schafte trennen, und es genügt eine leichte Verkeilung und Verklebung unter dem Kopf, un ihn am Herabrutschen am Schafte zu hindern (Abb. 29). Weitaus die meisten Bainingkeulen weisen zudem unten am Schafte eine ausgesprochene Zuspitzung auf, die gewöhnlich mit einer geringen Verdickung beginnt, dies, damit man die Keule bei der Rast aufrecht in die Erde stecken kann ((vgl. Hocart, S. 301 auch für die Salomonen). Wir können diesen Teil der Keule auch als Keulenschuh bezeichnen. Die Bainingkeulen unterscheien sich also sehr stark von den Steinkopfkeulen Neu-Guineas.*" [Translation: one can therefore describe the Baining clubs as the more primitive ones, regarding the stone technique, but not, regarding the construction as a whole. With the Baining clubs, the head is stuck onto the haft from below, so it is impossible for it to detach from the haft when struck, and a slight wedging and gluing under the head is sufficient to prevent it from slipping down the haft (fig. 29). By far the most Baining clubs also have a pronounced taper at the bottom of the haft, which usually begins with a slight thickening, so that the club can be stuck upright in the ground when resting (Hocart 1931, p. 301, also for the Solomon Islands). We can also call this part of the club the "club shoe". The Baining clubs are therefore very different from the stone-headed clubs of New Guinea.]

Bühler (1946, pp. 237–238, Abb. 4, c, d, Tafel II, d) described a stone disc with a biconvex cross-section in the collection of the "*Museum für*

Völkerkunde in Basel", one face of which shows the beginnings of a perforated hole. The piece was collected by Felix Speiser in 1930 in Jacquinot Bay, in the southwestern part of eastern New Britain, and he considered it to be an incipient stone club from the island of New Guinea. In the top view, the piece has an oval shape (11.1 × 9.8 cm), and its maximum thickness is 3.2 cm. The diameter of the started hole is 2 cm and the depth is 1 cm. Its weight is 375 g, and its raw material is grey-green diabase porphyrite (subvolcanic, intrusive igneous rock). Bühler (1946, p. 592) considered the origin of the piece from the island of New Guinea unlikely because the shortest distance of Jacquinot Bay from the island of New Guinea is about 350 km. "*Sollte es sich hier wirklich um ein an Ort und Stelle gefundenes und nicht auch um ein von Neuguinea in moderner Zeit importiertes Exemplar handeln, so fällt also eine lokale Anfertigung desselben in Frage, und da die Herstellung solcher scheibenförmiger Stücke in Neubritannien für historische Kulturen nicht belegt ist, wäre dies von größtem Interesse… Daß übrigens flache Keulenköpfe aus Stein auch auf Neuirland bekannt waren, finde ich in meinem Notizen (1931) belegt durch Angaben über zwei solche Stücke in Komalu (Südwestküste, Nordgrenze des Distriktes Namatanai) und Konobin (Inland, nördlicher Teil des Schleinitz-Gebirges).*" [Translation: If this is a specimen found on the spot and not also one imported from New Guinea in modern times, then a local production of the same is in question, and since the production of such disc-shaped pieces in New Britain is not documented for historical cultures, this would be of the greatest interest… That, by the way, flat stone club heads were also known in New Ireland, I find in my notes (1931) supported by information about two such pieces in Komalu (south-western coast, northern border of the Namatanai district) and Konobin (inland, the northern part of the Schleinitz Mountains).]

The origin of the only "knobbed" stone club of type H-VII from Bettanin (inv. no. 13400, Fig. 2, 4) does not seem to be uncertain either. Parkinson (1907, pp. 51–52; Parkinson 1907 [2010], p. 38), in addition to the spherical or egg-shaped stone clubs of the Baining tribe, mentioned the pineapple-shaped headed clubs as well. "… *Keule, teils mit runden oder eiförmigen Knäufen, teils mit einem Schlagende in Form einer Ananas…*"; "… *clubs, some with round or oval heads, some with the striking end in the shape of a pineapple …*"

Based on the above-mentioned literary references, it is quite obvious that primarily the Baining tribe living on the Gazella Peninsula made stone clubs on the Bismarck Islands, and traded with them. It can be considered almost certain that the stone clubs of the Festetics and Bettanin assemblages also come from the Gazelle Peninsula.

5.4. Some notes on the function of stone clubs

Regarding the two stone clubs collected by Lajos Bíró (inv. no. 63899 and 63898), the unusually long handles of the clubs (1120.0 and 1050.0 mm) were mentioned above. The same phenomenon also applies to specimens from the Bismarck Islands (990.0–1290.0 mm). Haddon (1900) gave the length of the handle for most of the described different club types. Among the data, the handle length ranges for the most common types also found in the studied material of the Museum of Ethnography in Budapest are as follows. For the six H-III type (spheroid or ellipsoid) clubs, 763.0–1400.0 mm; and 503.0–1357.0 mm for the specimens of H-V type clubs (discs). In the case of the latter, Haddon also provided additional summary data, the handle length of six specimens was 803.0–854.0 mm, for 16 specimens 687.0–982.0 mm, for 12 specimens 710.0–1200.0 mm and finally for 15 specimens 666.0–865 mm. In the case of the 37 specimens of H-VII type knobbed clubs, the interval is 600.0–1462.0 mm. These extremely wide ranges do not show any trend in handle length.

The length of the clubs in the collection of the British Museum from south-eastern British New Guinea, from the coast between Holnicote Bay and Collingwood Bay, varied between 908.05–1231.9 mm based on the measurement data of Edge-Partington (1902). However, according to Höltker (1940–1941, pp. 686–689), stone clubs were no longer made and used as weapons in this area. Based on the judgement of other ethnographers, it is likely that in the second half of the 19th century and at the beginning of the 20th century, clubs were no longer considered weapons, and the natives were not even aware of their origin (their makers) or their former use as weapons (Strauch, 1892; Williams, 1940, p. 145; McCarthy, 1949, p. 155; Wirz, 1952, p. 32, p. 51; Berndt, 1954, p. 556).

Bulmer & Bulmer (1964, 69) wrote about the inhabitants of the Central Mountain Range of Papua New Guinea "*Mortars, pestles and clubheads… Many have been found antiquities in native possession. Some present-day Highlands people treat these objects as things of no account, but most generally they are kept as magical charms or cult objects*."

Bryan A. L. Cranstone (1968, p. 610) noted regarding the Tifalmin tribe living around the confluence of the western Sepik River and the Fly River that "*Stone-headed clubs, the heads of which were imported from the south by the Tifalmin but, apparently, from the east by the Telefolmin, occur in the sub-district, but their importance was mainly ritual and they seem to have been rarely used in war*. Cranstone (1971, p. 137) wrote that "*The clubs, of the type associated with the southern lowlands, are ritual objects, not weapons. A number of the stone heads, painted with red ochre, were piled outside the cult-house at Telefolip in the Telefomin valley, the main cult centre for the whole district, and these as far as I know were never hafted or removed. Boys and men were progressively admitted to the secrets of the cult by a series of initiation rites, after which certain food taboos were lifted and others imposed*." Cranstone noted, however, that "*Some tribes (e.g. Telefolmin, but not Tifalmin) had spatulate palmwood clubs*." (Cranstone, 1968, p. 610). "*For internecine quarrels, in which the use of the bow was not permitted, formidable-looking wooden clubs were employed; but these were not normally used in warfare*." (Cranstone, 1971, p. 136).

Since clubs were previously effective weapons used in close combat, from a practical point of view the ideal handle length, depending on the person (body height, arm length), was between 600.0–750.0 mm (60–75 cm) (Blackwood, 1950, pp. 35–36, along the Upper Watut River stone clubs were still used as weapons by the Kukukuku tribe; Chinnery, 1934, p. 115; Leahy, 1936, p. 241; Goodenough, 1952, p. 34; Fischer, 1959, pp. 101–102).

From a practical point of view, it is difficult to imagine the use of a club with a length of 900.0–1500.0 mm as a hand weapon. Several authors have indicated that the stone club clubs were of old manufacture (Neuhauss, 1911, pp. 302–305; Berndt, 1954, pp. 567–570). It is very likely that, like many other ceremonial and ritual objects, the stone club heads were passed down from generation to generation, and sometimes they were necessarily re-hafted. It seems reasonable to assume that the appearance of long club handles could have already taken place at the stage when the clubs lost their original weapon function. Although it was impossible to find sufficient ethnographic data from the territory of New Guinea, based on indirect evidence, it can be assumed that clubs with 90–150 cm long handles may have been ceremonial or ritual objects or status symbols and objects indicating dignity.

Regarding the ceremonial function of stone clubs and their wooden imitations, ethnographic data are available from many areas of New Guinea.

Parkinson (1899, p. 13, Fig. 6) described a knobbed wooden club from the Weite Bucht, otherwise known as Große Bai (Wide Bay or Spacious Bay), a bay on the south-eastern coast of New Britain, in the collection of the "*Museum von Dresden*". "*Aus schwarzpoliertem Holze, 11,5 cm von der Spitze entfernt morgensternartig mit einer grösseren Partie spitzer, zeilig angeordneter Buckeln in mehreren umlaufenden Reihen, und zwar bilden je 4 Buckeln eine Reihe, und die Buckeln der einen Reihe stehen immer auf den Lücken der andern. Nach beiden Enden verjüngt. Vor dem Beginne der Buckeln mit einem und 23,5 cm vom Griffende entfernt mit zwei umlaufenden Ringen in Relief. 60,5 cm l, Buckelpartie 19,5 cm l; Griffende 2,3 cm, Spitzende 1,4 cm, Buckelpartie c. 10 cm Diam. – Vgl. Anmerkung [4]*." "[4] *Über die Eingebornen der Weiten Bucht siehe auch: G. Brown, JRGS. London XLVII 1877, S. 145 und Powell, Wanderings 1883, S. 103-111, 195, 215 … Ferner führt Powell a. a. O. Keulen an, „with knobs all round the end*". [Translation: Made of black polished wood, 11.5 cm from the tip, like a morning star, with a larger number of pointed, linearly arranged knobs in several circumferential rows, with 4 knobs forming a row, and the knobs in one row always fill the gaps in the other. Tapered at both ends. Before the beginning of the humps with one, and 23.5 cm from the end of the handle with two circumferential rings in relief. Length is 60.5 cm, hump section is 19.5 cm long; Diameter of the handle end is 2.3 cm, and of the pointed end is 1.4 cm. The hump section has a diameter of c. 10 cm. – Cf. note [4]." "[4] On the natives of the Far Bay G. Brown, JRGS. London XLVII 1877, p. 145 [Brown 1877, p. 145] and Powell, Wanderings 1883, pp. 103-111, 195, 215 [Powell 1883, pp. 103–111, p. 195, p. 215] … Furthermore, Powell

also cited clubs at the location indicated, "*with knobs all round the end*".]

Neuhauss (1911, pp. 304–305) mentioned in connection with the clubs of the Huon Bay that "*Ein Kuriosum bleibt die in Figur 196 c abgebildete Holz-Ananaskeule, welche ich in Peihowa (Huongolf) erwarb. Die Leute gaben ihren alten Besitz längst fort uns schnitzten nun, um sie für Tänze verwenden zu können, eine gleich geformte Keule aus Holz — ein Beweis, daß sie nicht imstande sind, Steinkeulen herzustellen*." [Translation: A curiosity remains the wooden pineapple club shown in figure 196c, which I acquired in Peihowa (Huon Gulf). The people gave away their old belongings long ago and now, in order to be able to use them for dances, they carved a similarly shaped club out of wood - proof that they are not able to make stone clubs.]

Haddon (1912, p. 192) described a stone club obtained on the island of Mer (Murray Island, also known as Mer Island or Maer Island) which is located in the Torres Strait Island Region of Australia. The island is inhabited by the Meriam tribe of Melanesian origin. "*We obtained a club with a short, thick, recent handle, the plano-convex disc head is made of fine-grained volcanic ash and coloured black so as to resemble the ordinary dark stone of which club heads are made (17 cm. in diam., 29 mm. thick. I doubt if this was ever a fighting weapon, probably it was made for dance purposes*." As regards wooden imitations of stone-headed clubs, Haddon mentioned "*I collected two or three specimens which are obvious imitations of the ordinary disc-shaped stone-headed club. One obtained at Mabuiag in 1888 and not in the Brit. Mus. Is cut out of one piece of dark heavy wood; it is 725 mm. (28 1/2 in.) long, and the head, 145 mm. in diameter, is a good imitation of a biconvex stone disc (cf. Album, 1. pl. 346, No. 3). We collected another at Mabuiag in 1898, the disc of which is flattened and measures 175 mm. in diameter. We collected at Mer a sekerseker gobagoba, which is a wooden imitation of a star-shaped stone-headed club with six rays (fig. 198), and the total diameter of which is about 105 mm.; it is all in one piece. It is probable that all these were used in dances and not for fighting*." Imitations may have been used especially in ceremonies or dances related to the Bomai-Malu cult in the eastern islands (Haddon 1908, pp. 281–313).

According to Burger (1913, p. 77), in the Bismarck Islands, the Baining tribe, in addition to the stone-headed club, also knew the wooden sword club, the conical club, the pineapple-shaped club and the ball-headed club.

Haddon (1916, p. 340, Fig. 5 A, D) described two wooden fighting clubs from the Kabiri or Girara district, a low-lying area between the Fly River and the Aramia River, the latter of which flows into the Bamu River (Beaver, 1914). One of the pieces (Fig. 5D) is probably a wooden imitation of a knobbed (pineapple-shaped) club. "*D, gabira pira, is of dark heavy wood, length 121 m. (47 3/4 inches); head 122 mm. long, 61 mm. diameter, round in section, with five whorls of six teeth; a conical swelling at the handle-end with convex base. Sling loop of red calico*."

Wilfred N. Beaver (1914, p. 413) wrote about the weapons of the Girara tribe inhabiting the Girara district. Another name for the tribe is Kabiri or Gogodara (Gogodala) after the Kabiri stream. "*Three varieties of stone club have been seen, the star, the disc, and the pineapple; but stone clubs are rare in a region where one may travel for many miles without seeing a stone. A wooden club, usually of the pine-apple type, and made of very hard brown wood, is in more general use.*"

Lyons (1926, p. 337) reported the wooden clubs used by the Gogodara tribe. "*Some of the wooden-headed clubs they use are made by the Gogodara men from alien patterns. … Buga-buga is a name applied to certain detachable wooden-headed clubs, which are strobiliform, believed to be patterned on the fruit of the nipa palm, or pineapple shape. Sometimes the head is not detachable.*"

A brief mention should be made of an extract from the opinion of Speiser (1932, pp. 78–79) on the relationship between stone-headed clubs and wooden clubs. "*Bei den Marind, auch am Fly-River, stoßen wir gelegentlich auf Imitationen von Steinkeulen in Holz. Sie sind aber peinliche Holzimitationen der Steinkeulen und stellen keine neuen Keulentypen dar. Anders ist nun in Neu-Britannien: da wären zu nennen die Keulen der Sulka, Mengen und Tumuip. Wenn man bei Parkinson, Abb. 32, die Keulen 2, 3, und 8 ansieht, so ist es durchaus klar, daß die hölzerne Abkömmlinge der Bainingkeulen sind. Daß die Vorbilder der wundervollen Keulen: Abb. 4, 5, 6, 7 ebenfalls Steinkopfkeulen sind, ist auch nicht anzuzweifeln, die Schwierigkeit liegt nur darin, daß die Vorbilder gezackte Neu-Guinea-Keulen gewesen sein müssen, denn bis jetzt kennt man von dem Baining skulpierte Steinköpfe nicht. … Die genannten Stämme sind nun auch Papua (am wenigsten die Mengen), sie sind Nachbarn der Baining, vielleicht*

sogar mit ihnen verwandt, so daß also die steinernen Vorbilder ihrer Keulen den Papua zubeschrieben werden können, aber eben denen Neu-Guineas." [Translation: Among the Marind, also on the Fly River, we occasionally come across imitations of stone clubs in wood. However, they are meticulous wooden imitations of stone clubs and do not represent new types of clubs. The situation is different in New Britain: the clubs of the Sulka, Mengen and Tumuip are worthy of mention. If we look at Parkinson, Fig. 32, at clubs 2, 3 and 8, it is quite clear that they are wooden descendants of the Baining clubs. That the prototypes of the wonderful clubs: Figs. 4, 5, 6, and 7 are also stone-headed clubs, is also not in doubt, the difficulty lies only in the fact that the prototypes must have been serrated(saw-toothed) New Guinea clubs, because until now stone heads sculpted by the Baining have not been known.... The tribes mentioned are now also Papuans (least of all the Mengen), they are neighbours of the Baining, perhaps even related to them, so that the stone prototypes of their clubs can be ascribed to the Papuans, but to those of New Guinea.] The Marind (also known as Marind-Anim) tribe inhabits the Merauke district in the southern part of the former Dutch New Guinea, in the South Papua province of Indonesia. The Sulka tribe resides in the Pomio district of the province of Eastern New Britain. They originally migrated from New Ireland to New Britain. Their ethnolinguistic affiliation is not clear. According to some experts, the Sulka language has ancient Papuan (non-Austronesian) roots with Austronesian linguistic elements, while others relate it to the language of the Koi and Baining tribes living in the province of East New Britain. Finally, some treat it as a linguistic isolate. The Sulka language has some influences from the Austronesian language of the Mengen (also known as Maenge) tribe of the Pomio district of eastern New Britain. Regarding the possible New Guinea connection (Bühler 1946, p. 592).

Haddon (1920, p. 238), in his study of the migration of cultures in the territory of British New Guinea, wrote about the Kaia-kaia tribe living along the Merauke River in the southern part of former Dutch New Guinea. They were also known as Tugeri; Garrick Hitchcock (2009, p. 89) noted that "*The question of the territorial origin and responsibility for pacifying the Tugeri(1) (Marind-Anim) was among the most contentious issues of the Anglo-Dutch relationship in colonial New Guinea, ... (1) Tugeri was the term used by the British to refer to the Marind-Anim in this period; it was the name by which they were known among the Torres Strait Islanders and some Trans-Fly peoples.*" Haddon noted that "*The inhabitants of several villages assemble at initiation ceremonies at which bullroarers are swung, but the bullroarer is not known elsewhere in Netherlands New Guinea. ... There are several indications high up the Fly of people who bear some resemblance to the Kaia-kaia, and there is figured in the Leiden Rijks Ethnogr. Mus. Verslag, 1902-3, Plate VIII, a disc-shaped stone-headed club, surmount, from the Tugeri, which precisely resembles those collected by D'Albertis from the Middle Fly. There are also other cultural connections between these two areas, ...*"

Leopold A. Flint (1926, p. 47), in his review of the Kokoda District (Oro Province, Papua New Guinea) mentioned, that "*The mourners hit themselves with stone clubs, scratch their faces until they bleed, throw themselves on to the ground, and knock themselves about. An old man informs me that some time ago a woman held a tomahawk above her head and brought it down with such force that her skull was fractured. She died three days later from the effects of the injury. This woman had evidently been in the habit of hitting herself with a stone club and, to use my informant's words, 'Did not savvy the white man's axe.'*"

Höltker (1940–1941, p. 708) wrote the following regarding the imitation of stone clubs. „*... Aber auch in Neuguinea selbst tauchen hier und da solche Holzkeulen auf, die offenbar Imitationen von Steinkopfkeulen sind. Es sind zahlenmäßig aber immer nur wenige Exemplare. Der Form nach sind es meistens ananasförmige Keulenköpfe, die mit dem Stiel zusammen aus einem Stück Holz geschnitzt wurden. Doch sind auch separate Keulenköpfe dieser Art bekannt.*" [Translation: ... But also in New Guinea itself, such wooden clubs appear here and there, which are apparent imitations of stone-headed clubs. In terms of numbers, however, there are always only a few specimens. In terms of shape, they are mostly pineapple-shaped club heads, which have been carved together with the handle from one piece of wood. However, separate clubheads of this type are also known.]

Based on the ethnographic literature known to him, Höltker also mentioned several specific examples of imitations made of wood and clay.

Haddon (1900, p. 238) devoted a separate paragraph to wooden pieces when discussing knobbed clubs. "... *I cannot refrain from referring to certain wooden clubs which resemble in form some flanged knobbed clubs.*" The wooden clubs described by him came from the village of Kerema in the Gulf of Papua.

Charles G. Seligmann & Thomas A. Joyce (1907, p. 335, Pl. 9, 3) mentioned in connection with the finds found during the excavation of the Rainu site in Collingwood Bay that. "*In pi. ix, figs. 4 and 6, are shown two pottery club heads which also come from the Rainu site. These are presumably ceremonial, as is the modern wooden club cut from the solid, of which the head is shown for purposes of comparison in fig. 3 of the same plate. The latter, although obtained at Port Moresby, was said to come from the mountains far inland.*"

Some ethnographers did not mention the purpose of wooden imitations, while others considered imitations, including those made of other materials (clay, fragile rock), as for various rituals.

Höltker (1940–1941, pp. 690–693) devoted a subchapter to the relationship of stone club heads to symbolism, cults and myths. By way of introduction, he wrote that "*Bei der Kostbarkeit und Wertschätzung der Steinknaufkeulen als Waffen wundern wir uns nicht, diese Keulen bei den Neuguinea-Leuten, die solche Waffen noch praktisch verwenden, gleichsam als symbolhaftes Würdezeichen des wehrfähigen Mannes und tapferen Kriegers zu finden.*" [Translation: Given the preciousness and value of the stone-headed clubs as weapons, we are not surprised to find these clubs among the New Guinea people, who still practically use such weapons, as a symbolic mark of the dignity of the man fit for war and the brave warrior.] He cited several examples to illustrate this. In the next subsection (Höltker, 1940–1941, pp. 693–698), Höltker discussed the role of prehistoric club heads as "magic stones". "... *und zwar sind es vornehmlich drei Zauberarten, die in Frage kommen: Fruchtbarkeitszauber, Regenzauber und Abwehrzauber gegen böse Einflüsse. Vielleicht hängen diese drei Arten innerlich zusammen.*" [Translation: ...namely, there are primarily three types of magic that come into question: fertility magic, rain magic and defensive magic against evil influences. Perhaps these three types are intrinsically (internally) related.] Höltker, based mainly on information from missionaries, cited several examples of stone club heads being used as some kind of "magic tool".

Aufenanger, an S. V. D. (Society of the Divine Word) missionary, found the following "magic tool" among the Nombri tribesmen of the Bundikara village, near the Guago River, a small river in the Middle Ramu River water network, in the Bismarck Mountains. *Die Scheibe hat einen flachlinsenförmigen Querschnitt mit mäßig sich wölbenden Seitenflächen und einem scharfen Rand. Der Durchmesser der fast runden Scheibe aus hartem, grauen Stein beträgt 7 : 7 ½ cm, die größte Dicke 2 cm. Sie ist in der Mitte bikonisch durchbohrt; der Durchmesser des Bohrloches beträgt außen je 2 ½ cm, in der Mitte 2 cm. Die Kante der Scheibe, die auf der Mittellinie des Objektes liegt, ist an den vier, sich gegenüber liegenden Stellen eingekerbt. Außerdem erscheint der Rand auf der einen Hälfte durch kleinere Einkerbungen wie gezähnt. Diese vier größeren Einkerbungen und die vielen „Zähne" sind offenbar der Steinscheibe später erst beigebracht worden, sie gehören nicht ursprünglich zu dem Keulenkopf. Der kegelförmige Stein von rötlichgelber Farbe ist 6 ½ cm lang, hat einen größten Durchmesser von 5 cm, einen kleinsten von 3 cm und besitzt rundum glatt polierte Seitenflächen. ... Diese beiden Steine sind nun durch Rotangstreifen fest miteinander verbunden, derart, daß der kegelförmige Stein mit seiner Spitze in dem Bohrloch der Keulenscheibe steht. Die Eingebornen sehen die durchbohrte Keulenscheibe als weiblich, den kegelförmigen Stein als männlich an. Die charakteristische Art der Zusammenbindung zeigt, daß die Leute dabei an den Begattungsakt dachten.*" (Höltker, 1940–1941, p. 694) [Translation: The tool consists of two stones bound together: a "prehistoric" club head disc and a small cone-like stone. The disc has a flat lenticular cross-section with moderately curving sides and a sharp edge. The diameter of the almost round disc of hard grey stone is 7–7 ½ cm, the greatest thickness is 2 cm. It is biconically perforated in the middle; the diameter of the perforated hole is 2 ½ cm on the outside and "*Das Gerät besteht aus zwei zusammengebundenen Steinen: einer „prähistorischen" Keulenkopfscheibe und einem kleinen kegelartigen Stein*" (Höltker, 1940–1941, pp. 693–694). 2 cm in the middle. The edge of the disc, which lies on the centre line of the object, is notched at four opposite places. In addition, the edge on one half appears to be serrated (saw-toothed) due to smaller indentations. These four larger notches and the many "teeths" were

obviously added to the stone disc later; they do not originally belong to the club head. The cone-shaped stone of reddish-yellow colour is 6 ½ cm long, has the largest diameter of 5 cm, a smallest of 3 cm and has smoothly polished sides all around. ...These two stones are now firmly connected to each other by rotang strips, in such a way that the conical stone stands with its tip in the hole perforated in the club. The natives regard the perforated club disc as feminine, the cone-shaped stone as masculine. The characteristic way in which the stones are tied together shows that the people had the act of copulation in mind.] According to Aufenanger "*Über den früheren (eigentlichen) Gebrauch und die Herkunft der Steine wissen die Leute nichts. Aber die beiden Steine sind nach deren Anschauung die Genitalien von Mann und Frau. Eine Mythe zu diesen Steinen besteht nicht. Die Steine in dieser Verbindung sind ein Zaubergerät, mit dem man einen Dieb ausfindig machen kann.*" (Höltker, 1940–1941, p. 694) [Translation: The people know nothing about the earlier (actual) use and origin of the stones. But according to their view, the two stones are the genitals of man and woman. There is no myth about these stones. The stones in this connection are a magic tool that can be used to track down a thief.]

Höltker described a "magic tool" quite similar to the previous one, found by J. Much, S. V. D. missionary, in the Bismarck Mountains, among the inhabitants of the Guyebi tribe of Koipakoro village. "... *eine Keulenscheibe in Sternform (Zahnradform) und ein penisförmiger Stein, der sicher künstlich so geformt ist. Beide Steine sind aus dem gleichen, im Bruch rötlichgelben, lehmartigen und sehr bröckeligen Material. Darum können beide Steine nicht für Arbeitszwecke gebraucht worden sein. ... Zweifellos ist es also ein gleiches Zaubergerät, wie das vorhin beschriebene von den Nombri. Daß es ein Zaubergerät ist, steht durch die Aussagen der Eingebornen fest. Über die Art des Zaubers ist aber noch nichts bekannt.*" [Translation: a star-haped (gear wheel shaped) and a penis-shaped stone, which is certainly artificially formed in this way. Both stones are made of the same material, which is reddish-yellow when broken, clay-like and very friable. Therefore, both stones could not have been used for working purposes. ... There is no doubt that this is the same magic tool as the one described earlier by the Nombri. That it is a magic tool is certain from the testimony of the natives. But nothing is yet known about the nature of the magic.]

Much, S. V. D. missionary, also found a similar stone complex in the Gegeru tribe, close to the Guyebi tribe. "*Die Keulenscheibe aus festem, rötlichgrauen Gestein ist fast kreisrund und mißt im Durchmesser 13 ½ : 14 ½ cm. Ohne Zweifel ist es ein echter „prähistorischer" Keulenkopf. Die Scheibe ist im ganzen ziemlich dünn (etwa 1 cm dick), verdickt sich nur rund um das zentrale Bohrloch bis zu 2 ½ cm im Längsschnitt. Das bikonisch gebohrte Loch hat an den Außenseiten 2 ½ cm, in der Mitte 1,7 cm Durchmesser. Der Scheibenrand ist nicht in üblicher Weise geschärft, sondern zu einer flachen Fläche von etwa 0,8 cm Breite abgeschliften. Während sonst Scheibe und Bohrloch glatt polierte Flächen zeigen, ist dieser Rand im Vergleich dazu eher rauh zu nennen (21) . Der zu dieser Scheibe gehörige Stein ist vermutlich kein Artefakt, sondern ein längliches, beiläufig dreikantiges Zufallsprodukt der Natur. Er ist 12 cm lang und etwa 2 ½ cm dick. Wiederum sind diese beiden Steine nach der spontanen Aussage der Eingebornen, „Mann und Frau", obwohl sie jetzt nicht zusammengebunden sind, aber sie gehören zusammen. (21) ... Vielleicht ist der scharfe Rand auch erst später abgeschliffen worden, worauf die rauhe Fläche hindeuten könnte. ...*" [Translation: The club disc made of solid, reddish-grey rock is almost circular and measures 13 ½–14 ½ cm in diameter. Without doubt it is a real "prehistoric" club head. The disc is fairly thin overall (about 1 cm thick), thickening only around the central bore up to 2 ½ cm in longitudinal section. The biconically drilled bore has a diameter of 2 ½ cm on the outer sides and 1.7 cm in the centre. The edge of the disc is not sharpened in the usual way but ground down to a flat surface about 0.8 cm wide. While otherwise the disc and the borehole show smoothly polished surfaces, this edge is rather rough in comparison (21). The stone belonging to this disc is probably not an artefact, but an elongated, incidentally triangular product of nature. It is 12 cm long and about 2 ½ cm thick. Again, according to the spontaneous statement of the natives, these two stones are "male and female", although they are not tied together now, but they belong together. (21) ... Perhaps the sharp edge was also ground off only later, which the rough surface could indicate. ...] Much indicated that "*Der Besitzer dieser Steine hatte sie früher in seinem Hause als Abwehrzauber aufbewahrt, um sich und seine Familie besonders gegen den bösen*

Einfluß des Todeszauberers zu schützen. Es soll hier in der Gegend noch viele Steine dieser Art und zu diesem Zweck geben." [Translation: The owner of these stones used to keep them in his house as a protective charm to protect himself and his family especially against the evil influence of the magician of death. It is said that there are still many stones of this kind and for this purpose in the area.]

Höltker, based on the information of the missionary J. Much, described a peculiar stone assemblage from the village of Yandara (Yandera) in the Bismarck Mountains, near the above-mentioned Bundikara settlement. "*Es sind sechs „Keulenscheiben" in Sternform (Zahnradform), die nach Größe, Form und Material ganz der vorhin genannten Scheibe der Guyebi gleichen, demnach auch Imitationen darstellen. Der „männliche" Stein dazu fehlt, aber alle 6 Exemplare sind zusammen auf ein Stöckchen gesteckt und so festgebunden. Vielleicht ist dieses Stöckchen das männliche Genitale, dann allerdings in sehr starker Betonung: ein Mann zugleich für sechs Frauen.*" [Translation: There are six "club discs" in the shape of a star (gear-wheel shaped), which are very similar in size, shape and material to the aforementioned Guyebi disc, and are therefore also imitations. The "male" stone is missing, but all 6 specimens are stuck together on a small stick and tied in this way. Perhaps this little stick is the male genitals, but then with a very strong emphasis: one man for six women at the same time.] According to the natives, it is a piece from "ancient times". Such a magical device is buried outside the settlement, in front of the so-called "ghost gate" or "spirit gate", to keep all evil away from the inhabitants of the settlement.

Höltker further noted that clubs, either as a whole or as decorative details, are also associated with sexual symbolism (the phallic cult) in other areas of New Guinea.

According to Höltker, the fact that "prehistoric" stone club heads were actually used for practical fertility magic was explicitly confirmed by the missionary P. Johann Gehberger (1939, pp. 408–409). The village of Kaiep is located about 90 km west of the mouth of the Sepik River, directly on the coast near Nightingale Bay. Gehberger described a peculiar stone object found in the village. "*Im Dorfflecken Baragarum des Dorfes Kaiep wurde eine kreisrunde Steinscheibe gefunden (Abb. 2), deren Durchmesser 16 cm und deren durchschnittliche Dicke 16 mm beträgt. Die Scheibe ist durchbohrt; der Durchmesser des Bohrloches beträgt in der Mitte 27 mm. Oben und unten ist der Durchmesser etwas größer. Das Bohrloch verläuft also zur Mitte des Steines hin konisch zu, d. h. das Loch wurde von beiden Seiten der Scheibe aus gebohrt. Auf der einen Seite der Steinscheibe ist rings um das Bohrloch noch ein Wulst stehen geblieben, so daß an dieser Stelle der Durchmesser der Steinscheibe 24 mm beträgt. Die Steinscheibe ist dunkelgrau. Woher diese Steinscheibe gekommen ist, weiß niemand. Zweifelsohne handelt es sich um einen „prähistorischen" Stein, d. h. um ein Produkt einer früheren Kulturperiode, die jedenfalls hier an Ort und Stelle älter war als die heutige. … Früher spielte dieser Stein (heute ist er in der Sammlung Höltker) bei den Kaiep-Leuten eine Rolle im Fruchtbarkeitszauber für Yam. Der Yamzauberer durfte nämlich keine Schildkröte essen. Wenn er aber dieses Verbot übertrat und trotzdem beim Zauber diesen Stein berührte, so entstanden an seinem Körper viele Wunden.*" [Translation: A circular stone disc was found in the Baragarum part of Kaiep village (Fig. 2), with a diameter of 16 cm and an average thickness of 16 mm. The disc is perforated; the diameter of the bore is 27 mm in the middle. The diameter is slightly larger at the top and bottom. The bore thus tapers towards the centre of the stone, *i.e.* the bore was perforated from both sides of the disc. On one side of the stone disc a flange or rim has been left around the bore, so that at this point the diameter of the stone disc is 24 mm [obvious typo, it's probably about the thickness of the disc]. The stone disc is dark grey. Nobody knows where this stone came from. It is undoubtedly a "prehistoric" stone, *i.e.* a product of an earlier cultural period, which was at any rate older here on the spot than the present one. … In former times this stone (today it is in the Höltker Collection) played a role in the fertility magic for yam [an edible tuber] among the Kaiep people. The yam sorcerer was not allowed to eat turtle. If, however, he transgressed this prohibition and nevertheless touched this stone during the magic, many wounds appeared on his body.]

"Prehistoric" club heads are very common in New Guinea as stones associated with "rain magic". Missionary P. Andreas Gerstner (1937, p. 968) wrote the following about the But people (Buteim is a small settlement on the coast, the surrounding villages are But, Butaim, Baripen, Kuminim) of the Wewak district of eastern Sepik province on the northern coast of New Guinea. "*Im Dorfe Gauk brachten mir die Leute eines Tages*

drei „Regensteine", die aus sehr alter Zeit stammen und mit Hilfe derer die Vorfahren Regen gemacht haben sollen. Die heutigen Kanaken wissen mit diesen Steinen nichts mehr anzufangen. Es handelt sich nämlich um Steinköpfe der sogenannten „prähistorischen" Steinscheibenkeulen. Die runden Steinscheiben, deren Durchmesser etwa 15 cm beträgt, haben in der Mitte ein Loch und verjüngen sich beiderseitig zum Rande hin." [Translation: In the village of Gauk, the people brought me three "rain stones" one day, which date back to very old times and with the help of which the ancestors are said to have made rain. Today's Kanak [indigenous Melanesian inhabitants] no longer know what to do with these stones. They are in fact stone heads of the so-called "prehistoric" stone disc clubs. The round stone discs, which are about 15 cm in diameter, have a bore in the middle and taper towards the edge on both sides.]

Nevermann (1942, p. 131) mentioned the club as one of the weapons of the Je-nan (also Jei, Yei, Yey, Yei-Nan; -nan meaning people, community) tribe living in the southern part of Dutch New Guinea, along the Upper and Middle Maro River, in the immediate vicinity of the Marind-anim tribe. "*Keulen mit durchlochten Steinknäufen sind neben Pfeil und Bogen die wichtigste Waffe der Je-nan und werden auch beim Tanz an einer Bastschnur um die Schulter gehängt getragen. Man kennt Keulen mit diskusförmigem Stein (Dong. pāngkāī, pānke, pāngāī) und solche mit kugeligem oder eiförmigem Stein (kūpă wie im Marind). Der durchgeschobene Keulenstock besteht gewöhnlich aus dickem Rotan, kann aber auch aus Holz bestehen. … Die Steine stammen vom oberen Digul, von woher sie als Beutestücke kamen, … Selten kommen durch das Gabgab-Gebiet auch sternförmige Keulenknäufe mit fünf Zacken und sanduhrförmiger Durchbohrung vom oberen Fly zu den Je-nan. Sonst ist die Durchbohrung gewöhnlich gerade, nicht nur bei den importierten Steinen. Zum Tanz werden aus leichtem Holz auch kūpă-Keulen aus einem Stück nachgeschnitzt, die keinen wirklichen Wert als Waffe haben.*" [Translation: Clubs with perforated stone heads are the most important weapon of the Je-nan, along with the bow and arrow, and are also carried at dances hung on a bast cord around the shoulder. There are clubs with disc-shaped stones (Dongeab faluban *pāngkāī, pānke, pāngāī*) and those with spherical or egg-shaped stones (*kūpă*, as in the Marind language). The club stick, which is pushed through, is usually made of thick rotan, but can also be made of wood. … The stones come from the Upper Digul River, from where they came as loot pieces, … Rarely, star-shaped club heads with five rays and hourglass-shaped boring also come from the Upper Fly River to the Je-nan through the Gabgab area. Otherwise, the boring is usually straight, not only in the imported stones. For dancing, *kūpă* clubs are also re-carved from light wood in one piece, which have no real value as a weapon.]

Jan van Baal (1982; 1966, pp. 715–745), based on a Catholic missionary P. Jan Verschueren M. S. C. (*Missionarii Sacratissimi Cordis*), has also dealt in detail with the material culture of the Yéi-nan. On the rites of the head-hunter tribe, he wrote "*Although in a headhunter society like that of the Yéi-nan the headman is primarily a war-leader and the group's chief fighter, he is also the custodian of the group's rights, and their defender against outsiders whom he must prevent from entering the territory. … the gab-elul is also the settlement's ceremonial and ritual leader who fixes the day and place of the group's celebrations, who arranges hunting and fishing parties, and who plays a role in its religious activities. His ritual function is reflected by the fact that he - and he alone - may hold the pöggul, the ceremonial club. This object resembles a staff which ends in a beautifully carved fretwork blade. Immediately below the blade a disc-shaped stone ring (kupe) has been passed over the staff. During a war raid the gab-elul is supposed to smash the fretwork blade on the victim first and then kill him with a blow of the club (Chapter IV, Section 7). On ceremonial occasions the gab-elul carries the pöggul as a sign of his office, holding the weapon (suspended from a short sling across his shoulder) under his arm. When he wishes to sit, he puts the pöggul on a low forked post next to his sleeping-place.*"

Vinigi L. Grottanelli (1951, Plate Ha-c; van Baal, 1966, Plate XVI, Figs. 1–3) has dealt in detail with the four large clubs, called *baratu* by the natives, found by d'Albertis (1881, Vol II, pp. 135–136) in an abandoned village near the Middle Fly River. According to Grottanelli, the objects are clubs between 112 and 154 cm long, with a flat, round or star-shaped stone disc attached to the handle just below the beautifully carved decoration (a wooden fretwork surmounting the head), which is about 36–57 cm long and about 7–10 cm wide (Grottanelli, 1951, Plate Ha-b; van Baal, 1966, Plate XV, Figs. 1–2). In one case, the carved decoration is not flat but cylindrical, the lower part includes an egg-shaped, phallus-like projection, and the

top ends in a peak, just like the flat specimens (Grottanelli, 1951, Plate Ha; van Baal, 1966, Plate XV, Fig. 1). The English edition of d'Albertis's (1880) book in Italian, published in the same year, caused a serious misunderstanding. In the English translation, the word "*wood*" was accidentally omitted, so the sentence reads "*gives some idea of the ability of these beasts to work and carve very hard stone*". This mistranslation led readers to assume that not only the club head but also the upper part of the handle was made of stone. The incorrect translation was already corrected in the 1881 edition. Grottanelli mentioned two reasons for the relative rarity of *baratu* clubs: "*... they were used in connexion with head-hunting, a custom which has been rapidly declining in Papua since the end of last century; and they were customarily destroyed by their owners when they had once been used.*" In any case, this applies to the nearly identical *parasi* weapons from the Kerak and Wiram areas [south-western Papua New Guinea, immediately east of the Morehead River], described in detail by Francis E. Williams (1936, pp. 265 *ff.*; van Baal, 1966, Plate XVI, Fig. 3), from which the main points are highlighted below. During the head-hunting expeditions led by the Keraki tribe, "*The first blow was delivered with the parasi, which will be presently described. This, however, was not the death-blow. The club was the weapon par excellence of the raider. ... Clubs were commonly hafted stones, either 'disk' or 'star', but wooden shillelaghs of various shapes were carried by those who did not possess the imported stones; ... The mysterious parasi (fig. 3) calls for some further description. It is a highly ornamental object resembling a wand rather than a club. The upper end (by which is meant a length of about 10 in. out of a total of some 3 ft. 6 in.) is flat and 3 or 4 in. in width. This is carved into a sometimes delicate fretwork; it is painted; and a number of feathers and streamers of Job's tears and red seeds are attached at various points* [Job's tears (*Coix lacryma-jobi*), also known as Adlay or Adlay millet, is a tall grain-bearing perennial tropical plant of the family *Poaceae* (grass family).]. *The remainder of the length of the parasi takes the ordinary form of a club handle. ... No man, I have been assured, would have the face to return from an expedition bearing a parasi intact.*"

Grottanelli (1951, p. 106) found that the technical similarity of the general design and the carving of the decoration shows beyond doubt that the clubs collected by d'Albertis and the *parasi* described by Williams belong to the same class of weapons. There is, however, one noticeable difference between them: the latter lacks the stone head altogether; it is a simplified, purely magical weapon, whereas the *baratu*, apart from their symbolical use, might also have served to kill the victim. Grottanelli also mentioned two other wooden clubs known to him. A specimen collected under the name of *hayam* by the Dutch steamship captain W. de Jong in the southern part of the former Dutch New Guinea, in the Merauke district, among the Tugeri (Marind-anim) tribe, is in Leiden. Van Baal (1966, p. 734) noted in footnote 215 that the name *hayam* used by W. de Jong is the name of a tree (*Inocarpus edulis*; Tahitian or Polynesian chestnut tree), and the term thus clearly refers not to the object but to the wood of which it is made. The other specimen, found in Rome, was collected by Scottish missionary S. MacFarlane along the Fly River in 1885 (Grottanelli, 1951, Fig. 1). The specimen is said to have come from the Saliraka Tugeri tribe, who lived in the area between the Bensbach River and the Fly River.

Gerstner (1952, pp. 184–185), in his article on the hunting habits of the Wewak-Boikin people of north-eastern New Guinea, described a number of magic stones promoting "hunting luck". "*Auch im Dorfe Orindagon war ein Zauberstein, der zu Jagdglück verhalf. Er hieß Masaijauraga. ... Der Stein war aus grau-blauem Basalt, hatte in der Mitte ein Loch und war etwa so groß wie eine Faust. (Es handelte sich offenbar um einen sog. „prähistorischen" Steinkeulenkopf in Kugelform.) Tjembaijoge bewahrte ihn im Männerhause auf. Keine Frau durfte ihn sehen, sondern nur die Männer und Jungen, die bereits in den Geister kult eingeführt waren. waren. Wenn ein Mann im Busch Schweinespuren entdeckt hatte, so gab er seinen Dorfgenossen davon Nachricht. Dann beschlossen die Männer, auf die Jagd zu gehen. War dieser Beschluß gefaßt, so wurde am Nachmittag vorher auf dem Dorfplatz ein Essen veranstaltet. Man aß Yams, Taro, Sago und Gemüse. Der Eigentümer des Zaubersteines saß bei seinem Stein Masaijauraga im Männerhaus. Die übrigen Männer waren auf dem Dorfplatz. Eine Holzschüssel voll Essen, und zwar Sago mit Fleisch, wurde ins Männerhaus getragen und Masaijauraga vorgesetzt. Der Eigentümer redete den Stein an: „Masaijauraga, wir Männer wollen mit den Netzen auf die Jagd gehen, wir wollen auch Schweinefallen machen. Sorge dann du dafür, daß die Schweine in die Fallen gehen und daß wir auch noch Schweine mit den Netzen fangen können. Verschaff*

uns Schweine ! Töte du sie !". [Translation: Also in the village of Orindagon, there was a magic stone that helped to bring hunting luck. Its name was *Masaijauraga*. … The stone was made of grey-blue basalt, had a bore in the middle and was about the size of a fist. (It was evidently a so-called "prehistoric" spherical stone club head.) Tjembaijoge kept it in the men's house. No woman was allowed to see it, only the men and boys who had already been introduced to the cult of the spirits. If a man discovered traces of pigs in the bush, he informed his fellow villagers. Then the men decided to go hunting. Once this decision had been made, a meal was held in the village square the afternoon before. Yams, taro, sago and vegetables were eaten. The owner of the magic stone sat by his stone *Masaijauraga* in the men's house. The remaining men were in the village square. A wooden bowl full of food, namely sago with meat, was carried into the men's house and set in front of *Masaijauraga*. The owner addressed the stone: "*Masaijauraga*, we men want to go hunting with nets, we also want to make pig traps. Then make sure that the pigs go into the traps and that we can also catch pigs with the nets. Get us pigs! Kill them!"]

Simon Kooijman (1952) dealt with the function and significance of some ceremonial clubs of the Marind-anim tribe of Dutch New Guinea. Referring to Grottanelli's (1951) article, he presented the 180 cm long club, founded by W. de Jong, which under the 60 cm high carved decoration is a wooden imitation of a stone club (Koojiman, 1952, Plate Ga). In the collection of the "*Rijksmuseum voor Volkenkunde, Leiden*", there are other pieces completely similar in shape and decoration to this specimen, although the stone disc imitation is missing. "*These discs, in this case actually made of stone, also occur on the clubs used by the Marind as real weapons. The disc can slide up and down part of the shaft. In battle the warrior brandishes the club over his head, making the stone slip backwards; when he delivers a blow, the disc shoots forward, greatly adding to the impact. The disc is prevented from flying off the shaft or slipping too far back by a cord of plaited fibre, running parallel to the shaft, and fastened to it by two nooses knotted round the shaft, one at the front end and the other further back. The wooden disc of the first-mentioned hayam proves to be an exact replica of the stone discs belonging to the battle clubs. This hayam is also still equipped with the cord, although this has quite lost its function, the wooden ring being firmly attached to the shaft by a strip of split rattan wound round the latter.*"

Kooijman also mentioned two additional specimens which are in the museum of the "*Koninklijk Instituut voor de Tropen*" in Amsterdam. He noted, however, that although several such *baratu*-like objects are known from the Marind Anim area, we have no direct information about their purpose and function in the Marind culture. Van Baal (1966; 1982) dealt in detail with the ceremonial objects of the Marind-anim and the Yéi-anim (Yei-nan) tribes.

Hitchcock's (2004) article should be mentioned regarding stone club imitations made of wood and other materials. In this paper, he presented the results of a surface petrological examination of three stone-headed clubs collected from the Torassi or Bensbach River area in the Morehead District, Western Province, Papua New Guinea (the "Torasi Estuary" is the estuary of the Bensbach River). In the Morehead area, as in the central-southern plains of New Guinea, there is a lack of suitable hard stones (van Baal, 1966, p. 16). Hitchcock stated "*Given the scarcity of stone in central-southern New Guinea, rough wooden clubs, and various substitutes for stone club heads, appear to have been common. Club heads made of wood and dried clay have been reported among the Marind-Anim (Nevermann, 1941: 13; 1939: 33; Speiser 1932: 78) and fungal club heads from the Gogodala (Price et al., 1978).*" Nevermann (1942, p. 92) also referred to the lack of stone in the area inhabited by the Je-nan tribe.

T. V. Price *et al.* (1978) reported in their article *„… sclerotia of Lentinus tuber-regium are made into club-heads by the Gogodala people who live mostly along the swampy middle reaches of the Aramia River in the Western Province of Papua New Guinea. … The fungal material (called utiyani) is dried and then carved into either a smoothly rounded (Fig. 1) or a toothed disk always with a central hole to facilitate attachment to the wooden club. The carved club-heads vary from 15 cm to less than 7 cm in diameter. … There is a lack of stone in the area where the Gogodala live and the sclerotia seem to be used as a substitute. … the primary use of these club-heads is to adorn clubs carried during dance activities, although clubs with fungal club-heads attached are sometimes taken on hunting expeditions and, according to older informants, were also once carried into war.*" *Pleurotus tuber-regium*, the "king tuber

mushroom", also known as *Pachyma tuber-regium* Fr. 1822, or *Lentinus tuber-regium* Fr. 1836; is an edible gilled fungus native to the tropics. The fungus is a saprotroph (decomposing organism) found on dead wood. As the fungus consumes the wood, it produces a sclerotium (a compact mass of hardened fungal root-like structure), or storage tuber.

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SHORT COMMUNICATION

In memoriam Sándor Béres (1956–2023)

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On September 13, 2023, at the age of 67, our colleague and friend, whom everyone only called Szása, passed away. He was born in Moscow on September 12, 1956, his father is Hungarian, and his mother is Russian. He was brought up in the Russian capital by his grandparents, and he also finished elementary school there. He owes not only his nickname to this circumstance but also fundamentally influenced his career. He completed his secondary school studies in Budapest at the Budai Nagy Antal High School, but as a native Russian speaker, he had a hard time with humanities subjects. On the other hand, he had particularly good results in mathematics, physics and chemistry, and already in high school, his excellent technical sense stood out. His excellent language skills, probably inherited from his German language teacher mother, enabled him to speak Hungarian without an accent in his adult years, as well as English at a conversational level. He graduated from the Faculty of Electrical Engineering of the Budapest University of Technology in 1980 as an electrical engineer. He only worked for a short time in his original profession, but this interest lived on even longer in his passion as a radio amateur. However, his adult life was further determined by his other passion, sports caving. He was a member of "Group Six" of the Red Meteor Caving Association, and he met his wife there. The group set several records. He utilized his skills as an industrial alpinist in the renovation of monuments, and in the construction of high platforms, and also took part in the dismantling of the red star on the top of the Hungarian Parliament.

His interest turned to prehistoric archaeology in the mid-1990s. He began his field surveys in and around his place of residence based on the data of the Hungarian Archaeological Topography. He made detailed notes about his collections in his diary with sketch maps and drawings of interesting finds. His diaries document his research on 522 pages from January 28, 1995, to May 22, 2022. At first, he was interested in all prehistoric periods, collecting pottery sherds and stone tools in numerous Neolithic, Copper Age and Bronze Age sites around Budakalász and Üröm. At the end of January 1999, he visited Palaeolithic sites in the Danube Bend for the first time, which permanently attracted him to this era. From then on, his research extended to the entire area of the North Hungarian Range, from Börzsöny to the Tokaj (Zemplén) Mountains. He coded the researched sites and also wrote the codes on the finds to be identifiable. His field activity was not motivated by the desire to find and collect artefacts but by his thirst for scientific knowledge. To this end, he read the literature related to the sites and maintained personal contact with researchers and museum specialists. He handed over a significant part of his finds to the respective museums during his career. He has been an active member of the Society of Ancient Archeology, founded in 2000, since 2001, and was a regular participant in academic events and conferences. In recent years, he has also been involved in community archaeology to pass on his unparalleled experience.

With his activity, he primarily wanted to serve Hungarian Palaeolithic research. At already known sites, such as Eger-Kőporos-tető, he

collected regularly to enrich our knowledge with the archaeological material brought to the surface by agriculture. Concerning sites discovered by experts but not studied further, such as Nagyréde or many sites around Eger, his collections laid the foundation for later excavations and publications. And, of course, he also discovered new sites during his surveys. In addition to field research, he was also passionately interested in the scientific study of knapped stone tools, and the problems of Palaeolithic cultures. Since 2002, he has published numerous publications both as an independent author and as a co-author. He actively participated in Hungarian research, worked on numerous excavations, and regularly presented at the annual Lithic Roundtable conferences since 2010. He enjoyed working together and thinking together. He gladly supported young students and professionals, and he was happy to give them his collections to be processed for a thesis or an article. He was still full of plans for materials to be studied and articles to be written. These tasks are now waiting for us. His family entrusted his collection to the care of the Hungarian National Museum. We will always cherish his memory.

Field research conducted by Sándor "Szása" Béres, according to his journals

- MRT Pest 3/9, 3/8, 3/6, 3/1, Taván-dűlő Budakalász
- MRT Pest 6/8, 6/9, 6/15 Csobánka
- MRT Pest 21/12, 21/20 Pilisvörösvár
- MRT Pest 22/1 Pócsmegyer
- MRT Pest 30/12 Tahitótfalu
- MRT Pest 37/1, 37/2, 37/3 Üröm
- MRT Komárom-Esztergom 6/13, 6/14 Dömös
- MRT Komárom-Esztergom 17/18, 17/19, 17/20, 17/29 Pilismarót
- Acsa-Rovnya (Ac1), plató Püspökhatvan felé (Ac2)
- Andornaktálya 25-ös út mellett (At2), Pünkösd-tető és Gyilkos-tető (At1), Rózsás-hegy (At3), Zúgó-dűlő (At4), Derék-hegy [Cserpák Ferenc szerint, hivatalosan Marinka]
- Arka (Ar1, Ar2, Ar3, Ar4, Ar5, Ar6)
- Boldogkőváralja-Őr-hegy (Bv1), Szamár út mentén (Bv2)
- Budakalász temető mellett (Bk1), Berdó alatt (Bk3), Kőbánya (Bk4)
- Bükkmogyorósd-Cserge-tető (Bm1), Hosszú-bérc (Bm2)
- Csővár (Cv1, Cv2, Cv3, Cv4)
- Demjén-Hegyeskőbérc (De3), -Szőlőhegy (De1 – később De4, De4A, De4B, De5, De7)
- Dömös-Köves-patak (Dm2), Piroska-dűlő (Dm3), Pattantyússal szemben (Dm4), Pattantyús (Dm1)
- Edelény (Ed1, Ed2)
- Eger műút mentén (Pünkösd-hegy) (Eg3) [Demjénhez tartozik]
- Eger-Kőporos-tető (Eg1)
- Eger-Tihamér (Eg2)
- Egerszalók-Egerlátó-tető (Ek1), Kővágó (Ek3, Ek4)
- Galgagyörk (Gg1, Gg2, Gg3, Gg4, Gg7, Gg8, Gg9, Gg10), Csontos-hegy (Gg12)
- Gyöngyöstarján [Gutay Mónika ásatása alatt]
- Hont-Parassapuszta 1, 2, 3
- Jászberény (Jb1A), Zsombékos (Jb3)
- Jászdózsa (Jd1)
- Jászfelsőszentgyörgy-Szúnyogos (Js1, Js2)
- Jászjákóhalma „Kanyar" (Jj1)
- Jásztelek (Jt1)
- Kisgyőr-Kecskehát (Kg1)
- Korlát-Ravaszlyuk-tető (Ko1, Ko2)
- Legénd (Lg88 – Péntek Attila szerint)
- Ludányhalászi (Lh1)
- Mályi-Öreg-hegy (Ml1, Ml2)
- Megyaszó-Szeles-tető (Me1)
- Miskolc-Szabadka-tető (Mi1), Bábonyi bérc (Mi4), Rózsás-hegy (Mi5), Kiskőbánya felett (Mi2), Hősök temetője felett (Mi7)
- Mogyorósbánya (Mb1)
- Nagyréde-Sárosberek (Nr1), Vájsz (Nr2)
- Nógrádkövesd-Kis-Ferenc-hegy (Nk1) [Péntek Attila szerint Szécsénke]
- Ostoros-Herman-tető/Rácpa (Os1), előtte fekvő domb (Os2), Os2-vel szemben (Os3)
- Pilismarót korábban Pm19A4 terület (Pm2), Tetves-tető (Pm1)
- Püspökhatvan-Öreg-szőlő (Ph3), Takács-hegy (Ph5), Ph2, Ph6, Ph1, Ph11
- Sajóbábony-Méhész-dűlő (Sb1), Lakótelep feletti domb (Sb2), Tóth Béla szőlője/Szakál-völgy/Köves-oldal (Sb3)
- Sajószentpéter-Nagykorcsolás (Sp1)
- Sóskút MRT szerinti 4-es (Sk1)
- Szendrő-Temető-domb (Se1)
- Tard (Ta1)
- Tarnaörs (Tö1, Tö2, Tö3, Tö4, Tö5)
- Tibolddaróc (Ti1)
- Üröm a telep központi legintenzívebb területe (Ür1), Ür2
- Vác-Somos/Tatár-dűlő (Vc1, Vc2), Cindró-

ka-tető (Vc3)
- Vadna temető felett (Vd1)
- Vanyarc-Makói-oldal (Va-M)
- Verseg-Tatár-domb (Ve1)
- Vöröstó-Ragonya (Vt1, Vt3, Vt4)

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Statements

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Conflict of Interest. The author declares no conflict of interest.

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Figure 1. Szása during the dismantling of the red star from the top of the Hungarian parliament building, 1990.

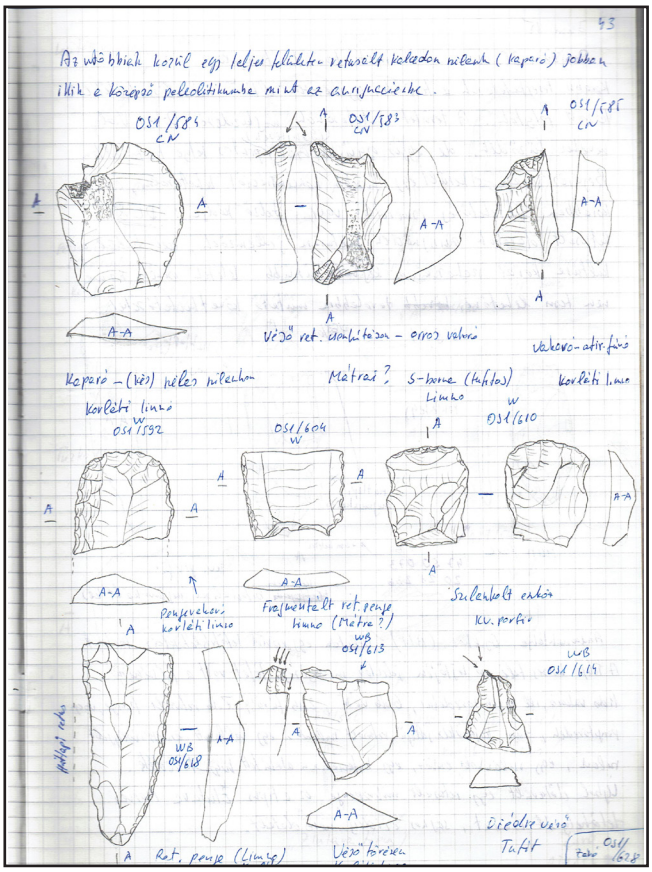

Figure 2 (top left). Szása with his caver group. **Figure 3 (top right)**. At Püspökhatvan in 2022. **Figure 4 (bottom left)**. A page from Szása's journal, August 2016. **Figure 5 (bottom right)**. A page from Szása's journal, May 2017.

Figure 6. With Agnès Lamotte in Demjén, 2018.

Figure 7. Lithic Research Roundtanble, 2021.

Figure 8. Excavation in Sajóbábony, 2021.

Figure 9. At the ELTE Institute of Archaeological Sciences, (l–r): Y. E. Demidenko, Zs. Mester and Sándor "Szása" Béres, 2019.

Figure 10. In the Zöld Cave with Ferenc Cserpák, 2018.

Figure 11. Andornaktálya-Marinka, 2018.

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SHORT COMMUNICATION

In memoriam Katalin Simán (1955–2023)

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At the beginning of December 2023, another colleague of ours left us, Katalin Simán, at the age of 68. Since he no longer actively participated in the research of the Hungarian Paleolithic in the last decade and a half, the younger generation of researchers may know her name through her much-quoted works, covering the entire spectrum of Palaeolithic research, from site surveys and excavations, museum collection revisions, to the historiographical questions and methodological problems of the Palaeolithic period.

She began her career at the Herman Ottó Museum in Miskolc, where she was the first archaeologist specializing in the Palaeolithic, although the museum was created in 1899 precisely by the case of the "Bársony-ház handaxes" and the question of the "Miskolc prehistoric man". Already her first significant work presented her with a difficult task, she clarified the question of the Avas limnosilicite quarry in Miskolc based on the 1977–1978 excavations and the analysis of the documentation from the 1930s. She also dealt with the issue of flint mines during her later research, exploring the prehistoric quarrying sites of Ravaszlyuk-tetö in Korlát. In this field, she carried out fundamental research with Erzsébet Bácskay and Katalin T. Biró, the summary of which was published in the thematic volume of Archaeologia Polona in 1995.

In addition to obtaining and extracting lithic raw material, she was more interested in the topic of production and use of lithic implements. She was familiar with novel approaches that appeared in the international literature in the 1980s and applied them to the Hungarian finds. Based on the relationship between raw material sources and settlements, she tried to interpret the role played by the individual sites in the subsistence strategies of prehistoric communities. For this, it was necessary to understand and reconstruct the process of stone tool production. She was the first in Hungary to apply the approach and methods of new technological research, and also mastered stone knapping in practice, so in the video shown at the Hungarian National Museum's permanent archaeological exhibition "On the Border of East and West" that opened in 2002, she presents to the visitors how ancient people made stone tools. She was also the first to carry out refitting studies in domestic research on the rich lithic assemblage unearthed during the construction of the housing estate in Avas Alsó-Szentgyörgy, Miskolc. She presented her spectacular results in a lecture at the Tata conference in 2003 but unfortunately did not publish them. As a continuation of her technological research, her article describing the relevant technical terms was published in 2000.

She returned to Budapest in the mid-1980s, and worked at the Institute of Archeology of the Hungarian Academy of Sciences, then became the director of the Kubinyi Ferenc Museum in Szécsény, where previously there was also no

archaeologist specializing in the Palaeolithic. From this time, important research with Viola T. Dobosi in the Ipoly Valley stands out. Thanks to her excellent language skills, she also made her mark as an English translator. Her work is preserved, among others, in the Vértesszőlős monograph edited by Miklós Kretzoi and Viola T. Dobosi (Akadémiai Kiadó 1990) and Luu Tran Tieu's book on European pebble industries (Akadémiai Kiadó, 1991).

Although she stopped her research in paleoarchaeology in the mid-2000s, her excavations, publications, and innovative ideas have written her name into Palaeolithic research history.

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REVIEW ARTICLE

Lithic Research Roundtable 13, 2023

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Abstract. The 13th annual meeting of Hungarian lithic specialists was held on December 8, 2023, from 9:00 a.m. to 5:00 p.m. at the Eötvös József Collegium's Tibor Mendöl Geography-Earth Science-Environmental Science Workshop, Budapest, organized by Tamás Sági and Attila Király. The abstracts of the presentations and posters are as follows.

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A re-evaluation of the Szekszárd-Palánk industry

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The paucity of Late Glacial archaeological sites in the territory of Hungary presents a significant gap in knowledge about the busy settlement history of East-Central Europe following the Last Glacial Maximum. Szekszárd-Palánk is one of the handful of in situ excavated sites from this period and region which is also supported by radiometric dating. However, the considerable time that has passed since its discovery and publication by László Vértes, necessitates a revision of his findings according to our current knowledge, a topic of this paper. Szekszárd-Palánk was located on the edge of the gallery forests accompanying the Danube and a more open hilly region, at the intersection of several ecological niches, which ensured multifaceted resource utilization. The excavated phenomena display a coherent spatial organization, and traces of several activities, based on which we consider Palánk as a base camp of a residentially mobile community. The lithic toolkit contains mostly processing tools, among them, end-scrapers. In addition, armatures are present, although the types suitable for cultural comparative studies are underrepresented. The microlithic industry was opportunistic, exploiting the available raw materials exhaustively. The technotypological analogues of the assemblage are Late Epigravettian - Early Mesolithic sites of the Northern Balkans to the south, and the small number of Epimagdalenian sites of the Moravian Basin in the Czech Republic to the north. The pronounced presence of Bakony, Cserhát and other northern lithic raw materials also draws attention to the connections to this direction. The southern location of the site and the northern raw materials of the collection support two previous hypotheses: the survival of the Epigravettian traditions in the northern part of the Balkans and the southern part of the Carpathian Basin, and the pivotal role of the Danube in the communication between East-Central Europe and the Balkans in the Late Glacial–early postglacial. The site is

thus identified as a regional Final Epigravettan Late Palaeolithic or Early Mesolithic transitional industry.

The results of the year 2023's archaeological research of the Szekszárd–Palánk site

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Szekszárd-Palánk is an iconic site of the Hungarian Old Stone Age research. Based on the stratigraphy of excavation conducted in the 1950s and his typological observations, László Vértes placed the lithic assemblage at the very end of the Palaeolithic, while by later research it was classified as early Mesolithic based on its stone raw material and techno-typological composition. However, the absolute chronological date reported by László Vértes (calibrated 13.2–10.7 thousand years ago) gives the site too broad a time frame. Based on this date, it was not possible to decide whether the human presence can be attributed to the late glacial period or to the beginning of the Holocene, which began 11.7 thousand years ago. To solve the chronological questions, the chipped stone material was reevaluated from a typological point of view, an AMS radiocarbon measurement was performed on the remains of animal bones from the excavation of the 1950s, and then the layer sequence of the site was verified during excavation in 2023. Our new data will be presented during the presentation.

Red sandstone groundstone tools along the Danube River

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Red sandstone research in Hungary goes back to the end of the 1800s, but at that time such investigations were carried out mainly from a geological perspective. At first, the Permotriassic material of the Balaton Uplands and the Mecsek Mountains, from which the first analysis was mapped and geologically investigated. Later, from the middle of the 20th century, ore and radioactive material research also became a focus of interest, under the leadership of the 'Mecseki Ércbányászati Vállalat' ('MÉV'). Thanks to this, numerous research boreholes were prepared to study the appearance and occurrence of sandstones, their stratigraphical positions and composition. Later, the investigation of surface occurrences of red sandstone also began (Majoros, 1983; Csernussi, 1984; Fazekas, 1987; Barabás & Barabás-Stuhl, 1998). The archaeometric examination of the material started only much later (Szakmány & Nagy, 2005; Palágyi et al., 2006; Péterdi, 2012) and continues today (Péterdi, 2020; Miklós et al., 2021, 2022a, 2022b).

When the term 'red sandstone' comes up in archaeological research, everyone thinks of one of the previously mentioned locations, within which two sandstone occurrences are usually highlighted, as potential raw material for stone tools. These are the 'Balatonfelvidék Sandstone', 'Kővágószőlős Sandstone' and the 'Jakabhegy Sandstone' Formations. By "suitability" we mean that the material must be sufficiently solid, i.e. resistant to the mechanical effects that the tool experiences during processing and use-wear, i.e. human activity and work (e.g. grinding, polishing,

milling). Our ancestors had an extremely high level of knowledge regarding the quality of possible raw materials, but at the same time, the general belief that tool stones always come from nearby raw material deposits is not true in all cases. This is influenced by many factors, such as the location of the settlement (in a geographic sense), as well as the distance and quality of the available raw materials, etc.

In this work, five sites will be investigated. Out of these four sites are located along the Danube: 1) 'Perkáta, sand mine'; 2) 'Paks-Gyapa, Szelelő-hegy, TO-16'; 3) 'Palotabozsok, Szarvas-hegy' and 4) 'Lánycsók, Gata-Csotola, TO-67 Site'. Additionally, a more distant one, located on the southern shore of Lake Balaton, 5) 'Balatonendréd, Öreghegy, Vaklápa'was also chosen. During the macroscopic observation, a selection of different sandstone types was made from each site. Our goal was to set up a selection of different types of sandstone raw materials, so thin sections were prepared from the selected nearly 40 samples. Based on our petrographic tests, 68% of the selected finds were classified as 'red sandstone', which term expresses the origin of the raw material and not the actual colour of the sandstone. Four different 'red sandstone' types could be differentiated, out of which three correspond to the Permotriassic material of the previously presented areas and can be classified into the 'Balatonfelvidék'-, 'Kővágószőlős'-, and 'Jakabhegy Sandstone' Formations. The fourth raw material type is a significantly younger one. It can be associated with the material of the 'Hárshegy Sandstone' Formation, formed 34-23 million years ago.

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Exploring a grinding stone concentration in a ditch at the Late Bronze Age enclosed settlement of Gradište Iđoš

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The fortified settlements in the Southern Great Plain are the imprint of the changes in settlement structure that occurred in the middle phase of the Late Bronze Age (ca. 1400-1200 BC). Nearly 100 are known in the Serbian part of the Banat alone, according to recent research. Among the fortified settlements, the so-called mega-forts are outstanding in size, being at the top of the settlement hierarchy and covering hundreds of hectares. Gradište Iđoš (Tiszahegyes) is the largest settlement of the Serbian system of fortifications. Systematic research at the settlement, surrounded by multiple ditches, started in 2014 and is ongoing. Excavation in 2021 revealed a deposit of 106 macrolithic objects at the terminal of a ditch surrounding a small enclosure in the centre of the fort. The stone tools were recovered from several layers, from the bottom to the top of the ditch, in the same location. In this presentation, we will discuss the primary results of the study of the macroliths, the possibility of interpreting the stone tool finds as a structured deposit and the next steps in the investigation of the tool stones.

Szirák-/Vanyarc-Balogi-tábla: an open-air Palaeolithic site in the Cserhát Mountains (Northern Hungary)

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The site, crossed by a about 10 m wide line of trees planted on the border of the settlements of Szirák and Vanyarc, was located by PA in the summer of 2003 after the previously fallow area had been ploughed deeply. The site was available for surface collection for four years, until 2007. Afterwards, the western part of the site (BT01), belonging to Vanyarc, was fenced off and turned into pasture, while the eastern part (BT02), belonging to Szirák, became a neglected, weedy mowing field. In 2009, part of the collected finds was transferred to the Kubinyi Ferenc Museum in Szécsény, where they were studied for the first time in autumn this year, thanks to the kindness of archaeologist Szilvia Guba. Near the site, at a distance of 2.5–3 km, two smaller Palaeolithic

concentrations are known (Vanyarc 8, Vanyarc-Kis-Újság-hegy), but these were inhabited and partly disturbed by younger prehistoric, Neolithic sites. In the area of the Balogi-tábla (Balogi Plateau) itself, there are also several smaller Neolithic concentrations. Of these, a Neolithic concentration was settled on the Palaeolithic concentration marked BT05, located about 100–150 m from BT01.

The archaeological material of the site consists only of flaked stones, the number of which is 890. The raw material use is dominated by the local limnic silicite of relatively poor quality, resulting in a very high number of fragments and sherds, but an unusually low number of tools. Local limnic silicite is followed by erratic flint, a long-distance raw material, of which the proportion of tools is much higher compared to the local limnic silicite. Based on the small number of cores found, technological conclusions cannot be drawn, but blades and retouched blades are also present among the finds. From a typological point of view, based on the bifacially worked pieces and side-scrapers, the lithic assemblage of the site can be considered relatively Early Upper Paleolithic, in our opinion, a manifestation of the sensu lato Aurignacian technocomplex. Although few, similar lithic finds characterize the above-mentioned smaller Palaeolithic concentrations as well.

Lower Palaeolithic artefacts from the Castle Cave at Buda (poster presentation)

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In the 1930s Ottokár Kadić and Mária Mottl were the first to report about manufactured pebbles of the Mosbachian age, according to the terminology of that time, from the Castle cave (Vár-barlang) in Buda. In the 1960s, when the only authentic site complex securely dated to the Lower Palaeolithic in Hungary was discovered in Vértesszőlős, due to the priority, the excavator László Vértes proposed the name of 'Buda industry' for the archaeological entity dating back to the Middle Pleistocene, using small pebbles.

In the following decades, partly during the complex investigations of the Castle Cave, partly as part of paleontological studies or during speleological investigations, seemingly chipped stone artefacts were reported from several places.

In the summer of 2023, we had the opportunity to document the locations of the lithics known from the cave. The classical Uri and Országház utca occurrences are no longer accessible, however, based on the published data, the pieces were collected from alluvial sediments. Moreover, no clear traces of manufacture can be recognized on the rolled fragments made of hornstone and dolomite stored in the collections.

In the ceiling limestone of the 'Elephant-tooth chamber' Mihály Gasparik found several lithic artefacts. During our work, we were able to identify the site in the ceiling of cellar No. 137, lying beneath house No. 21 on Uri Street, from a topographical point of view.

During the 2000s, the Ariadne cave research group mentioned bone remains and chipped stone tools from the 'Turkish well chamber' of the cellar under houses 151 and 153 Szentháromság Street. Perhaps the same site was identified in 1964 by Péter Szablyár and János Haas, then students at the Tata Geological Technical College, and Kálmán Barátosi, who collected siliceous pebbles embedded in limestone tuff. (According to the data of the inventory book, however, the site was located at the northern end of Castle, at the cellar nr. 200 under 20 Országház street).

The occurrences of stone tools documented this year will enable further investigation of the archaeological sites below the surface in the central part of Buda's Vár-hegy in the future.

Preliminary Results Of The Petrological Examination Of A Gneiss Grinding Stone (Boleráz Culture, Mödling–Jennyberg, Austria) (poster presentation)

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In our poster, we present the results of the petrological (polarization microscopic) examinations of the orthogneiss grinding stone found at the previously presented Mödling–Jennyberg site, comparing the characteristic microscopic features of the raw material with similar features of a probable raw material source, the orthogneiss belonging to the Grobgneis series of the Lower Eastern Alps.

Mödling–Jennyberg (Péterdi et al., 2022; Horváth et al., 2023) is a hilltop settlement of the Boleráz culture in the vicinity of Vienna, located about 2 km from the hilltop settlement of the Jevišovice culture (Maria Enzersdorf–Hirschkogel). The two sites have settlement layers of the same age (from 3400/3300 BC to 2900/2800 BC) (Horváth et al., 2023).

The only gneiss grinding stone found in the material we examined was discovered during the 1970-1971 excavations in Jennyberg and is kept in the Natural History Museum in Vienna (Naturhistorisches Museum Wien, Inv. number: 77952).

The large lower grinding plate found in two matching pieces (445x300x70 mm, grinding surface: 410x280 mm) has a slightly convex, worn grinding surface, the lower part is smooth, while the upper side plate is only roughly carved.

During the examination of the artefacts, we did not use destructive techniques, however, the cutting remains of the samples taken in the first half of the 1970s were available, so we managed to make a new thin section from the material of the studied grinding stone, which is examined with a polarizing microscope (Nikon ECLIPSE LV100N POL). Microscopic images were taken with NIS Elements software.

The raw material of the grinding stone is macroscopically white, pinkish (with a light red weathering colour), coarse-grained, with a deformational fabric (foliation). Its main constituents can be identified with the naked eye: quartz, feldspars and mica (muscovite).

Based on its microscopic characteristics, the raw material of the grinding stone is orthogneiss, its main rock constituents are quartz, feldspars (potassium feldspars and plagioclase) and mica (muscovite). In addition to traces of metamorphic transformation (deformational fabric, polycrystalline quartz grains, albitization), signs of the original magmatic formation (euhedral quartz grains, perthitic potassium feldspars, rutile forming a sagenite lattice, myrmekites) are also preserved.

Orthogneisses, similar in texture and mineral composition to the studied find, are also found relatively close to Mödling–Jennyberg, primarily in the Sopron Mountains and Lower Austria (Grobgneis series, e.g. Draganits 1998; Török 1998). Determining the exact raw material source requires further investigations.

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Preliminary results of the archaeometric examination of metadolerite polished stone tools (Mödling–Jennyberg (Boleráz culture) and Maria Enzersdorf–Hirschkogel (Jevišovice culture) sites, Austria) (poster presentation)

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In our poster, we present the results of the archaeometric investigation of kaersutite-bearing metadolerite polished stone artefacts found in the previously presented (Péterdi et al., 2022; Horváth et al., 2023) two hilltop settlements near Vienna: Mödling–Jennyberg (Boleráz culture) and Maria Enzersdorf–Hirschkogel (Jevišovice culture). The two sites located about two km apart have settlement layers of the same age (from 3400/3300 BC to 2900/2800 BC), Horváth et al., 2023). Systematic excavation took place at the Hirschkogel site in 1926 and at Jennyberg in 1970-71, but the material of the long-researched sites mainly comes from undocumented, sporadic, amateur excavation activities.

Most of the macrolith finds in Maria Enzersdorf–Hirschkogel are polished stone tools, while in Mödling–Jennyberg mostly ground stone tools and pebbles have come to light.

The number of artefacts with metadolerite raw material is small at both sites: 6 pieces at the Maria Enzersdorf–Hirschkogel site (out of the 67 macroliths we examined), 1 piece at the Mödling–Jennyberg site (out of the 59 macroliths we examined).

No destructive techniques were used during the examination of the finds: in addition to macroscopic inspection, the magnetic susceptibility of the finds was measured (with a kappameter (type KT-5), see Bradák et al., 2005, 2009 for necessary corrections), as well as with scanning electron microscopy and energy dispersive X-ray spectrometry from the original surface (OS-SEM-EDX, Bendő et al., 2013) we determined the mineral composition and the texture of the rock.

Macroscopically, the findings classified as metadolerites are made of dark grey, black, fine or very fine-grained rock, in which feldspars and mafic constituents can also be identified with the naked eye. In the case of several finds, the grouping is made uncertain by the advanced surface weathering.

The magnetic susceptibility (MS) of the studied finds is varied, lower than serpentinites and higher than contact metabasites: 0.790-15.435 SI units.

Based on the OS-SEM-EDX results, the main rock constituents are feldspars and amphiboles. In addition to feldspars of varied composition (andesine, anorthoclase and albite), the rock contains cummingtonite (already started to transform), cummingtonite with a high titanium content and ferri-kaersutite. Ferri-kaersutite appears both independently and on the rim of cummingtonite (already started to transform). In addition to the main components, quartz, ilmenite and a small amount of biotite are also found in the rock, as well as ulvöspinel and apatite as accessories.

Kaersutite-bearing metadolerites can be found in several areas further away from the studied archaeological sites (e.g. in the Western Sudetes in Poland, and the Juvavic Nappe System of the central and eastern Northern Calcareous Alps), but a more precise definition of the source area of the examined raw material requires further investigations.

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Magyarnándor: evaluation of a Late Middle Palaeolithic site and the assemblage (poster presentation)

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During the spring of 2021, a new Late Middle Paleolithic open-air site was identified near Magyarnándor, in the northern part of the Cserhát Mountains. The agricultural cultivation of the area was abandoned that year, so further surface collection was essentially not possible. During the summer of the present year, the Béla Dornyay Museum, the Ferenczy Museum Center and the University of Szeged carried out a stratigraphic sound excavation on the site.

Rather unexpectedly, the layer-sequence observed on the hilltop proved to be intensively eroded. In the present-day brown forest soil, only very scattered Palaeolithic artefacts and a feature, dated to the Neolithic was observed. In the Pleistocene level with loam of reddish colour, dated probably to the Pleistocene, several natural fragments of siliceous pebbles were found, and finally, the yellow loamy loess proved to be sterile in archaeological point of view too.

The lowermost layer of the extremely reduced sequence, a chalk-white/ash-grey shallow-sea or brackish water laminated sediment (most probably "Budafok Sand Formation") without fossils dated to the Paleogene was documented. Our stratigraphic data can be compared with surface observations made at the nearby Debercsény–Mogyorós site, where the ploughing brought to the surface both the small number of lithic artefacts dated to the same period as the Magyarnándor tools and the coarse gravels, of Paleogene age.

The small surface-collected assemblage from Magyarnándor contains several interesting technological features: leaf-shaped implements with opposite orientation and alternating retouch, as well as end-scrapers made on transversal flakes and core-edge flakes, also known from the Debercsény site. As a total, the distribution of tool types shows connections with the industry rich in end-scrapers found in the artefact-bearing layer of the Szécsénke-Kis-Ferenc-hegy site.

Concerning the raw material types used on the site, the assemblage shows similarities with the "pioneer community" found in the artefact-bearing layer of the Galgagyörk-Csonkás-hegy site, In the case of the Magyarnándor assemblage, siliceous pebbles of local provenance was used in larger quantities instead of andesite, known from the southern part of the Cserhát region.

Archaeological research in Demjén-Szőlőhegy

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The site of Demjén-Szőlő-hegy, discovered in 1974 by Viola T. Dobosi, is mostly known to the profession thanks to the tireless field research work of Sándor Béres starting from the 2000s. During the research carried out in cooperation with Krisztián Zandler and Dalma Kerekes, the Szőlő-hegy area was divided into three separate sites marked with different numbers, based on the density of surface scatters. Based on the collected lithic material, Demjén - Szőlőhegy I and III sites are dated to the early period of the Aurignacian cultural complex, while Szőlőhegy II site was classified as the initial phase of the Upper Paleolithic. During August of 2023, we tried to learn and clarify the stratigraphic conditions of the site within the framework of a test pit excavation. We opened trenches close to all three sites to the best of our ability, however, we were unable to observe or identify the cultural layers of the sites, mainly due to soil erosion. During the fieldwork, soil and charcoal samples were taken from the strata for OSL dating, C14 dating, and micromorphological evaluation. In the absence of find material from the archaeological context, the results of the sample measurements are expected to give us clues about the stratigraphic and chronological relationships of the sites, from which we can conclude a palaeolithic settlement.

The lithic assemblage of Andornaktálya-Marinka

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The region of Eger became the subject of palaeolithic research after World War II, but more significant results emerged with the onset of intensive field surveys in the 1980s-1990s onwards. Thanks to these efforts, numerous archaeological sites of different periods and cultures are known around the area, such as Andornaktálya-Marinka. The site is located southeast of Eger at a distance of 7 kilometres, on the top of a 234-meter-high elevation between the villages of Andornaktálya and Ostoros. It was discovered in 2014 by Cserpák Ferenc, who conducted continuous field surveys in the area. Subsequently, in the summer of 2018, a two-week-long excavation was carried out at the site, primarily prompted by the raw material composition of the continuously increasing assemblage. Our research began in December 2020, which included both the surface findings and the excavated artefacts. A variety of methods were used to document each lithic artefact, including raw material, typological, and technological examinations. Based on our research and the previous results, the site yielded two kinds of archaeological material distinguished by the use of different raw material sources. One is predominantly composed of quartz porphyry (metarhyolite), while the other is characterized by Silesian erratic flint. The technological and typological differences further substantiate the existence of these two materials on the site. In our presentation, we aim to provide a detailed overview of the assemblage, complemented by previous information.

Analysis of the obsidian blade from Csongrád-Kettőshalom, Southeastern Hungary

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In 1962, Katalin Nagy, archaeologist of the János Tornyai Museum, Hódmezővásárhely, excavated a grave in the Kettőshalom sand pit near Csongrád. Gyula Gazdapusztai compared the

burial with the Yamnaya circle. István Ecsedy, who analysed the archaeological material in detail, compared to the finds known from the cemetery of Decea Mureşului (Marosdécse, County Alba, Romania). This classification was later supported by the results of the radiocarbon dating (5470 ± 40 BP, 4442–4243 cal BCE).

Next to the skeleton, a lump of red ochre, several shell and copper beads as well as an obsidian blade was found. The first non-destructive, but, due to the facilities of the eighties, not completely accurate examination, of this later piece made probable that its provenance can be traced in the Carpathian Basin.

Recently, it has become possible to obtain more accurate data concerning the raw material provenance with the help of the non-destructive prompt-gamma activation analysis (PGAA) and later, hand-held X-ray fluorescence (pXRF). As a result, the Central European origin of the obsidian having a distinct brown shade and translucent material, different from each variant known from the Carpathian basin, can be ruled out.

The burial rite and the composition of the grave goods of the Csongrád grave point to the area lying north of the Black Sea and the Caucasus. As the raw material is macroscopically similar to the obsidian varieties known from Georgia (Gruzia in Russian), but based on the recent analyses, the chemical composition of the samples is different too. The provenance studies carried out in a wider geographical range, suggested that the possible source area of the raw material is found at the lava flow of Göllü dağ East (Kömörcü) in Anatolia with the greatest reliability.

Thus, the recent results based on independent raw material analyses suggest a clear connection between an Early Copper Age site in Hungary and the source of raw material over a distance of more than 1,700 km.

Pebble Gravettian locality at Vác

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The Palaeolithic research of the Danube bend goes back a century and a half. However, the majority of the known and excavated sites are mostly located along the right bank of the river, between Esztergom and Csillaghegy. At the same time, along the opposite bank scattered finds were collected by a teacher from Nagymaros, János Adolf Horváth mainly before World War II, and until now only two localities have been excavated.

The third site, which potentially can also be examined by excavations, was identified on the hilltop near Vác by our friend and colleague, Sándor Béres. The lithic assemblage collected by himself has already been published; in the presentation, we will discuss the material that was found partly together with Szása but has not been published yet. Importantly, during the surface collections, we found a relatively large number of fossil reindeer or wild horse long bone fragments, as well as a few fragments of young mammoth tooth lamellae.

During the field surveys, two find concentrations could be documented until now. Among the lithic raw material groups, the presence of the limnic silicite and silicified limestone variants of (largely) local origin, as well as the presence of the siliceous pebble and radiolarite also collected from secondary sources, and, finally, the obsidian and especially a long-distance lithic raw material, erratic flint from present-day Poland are noteworthy.

Among the formal tools, end-scrapers made on blades, variants of retouched blades and bladelets, as well as burins are characteristic. In the collected assemblage, the cores and the characteristic burin-cores are also found.

Finally, a fossil Dentalium sp. and Melanopsis sp. shell-trinket were also found.

Overall, the stone material from Vác is compared to the typical pebble-working assemblages known from the Mogyorósbánya-Újfalusi-dombok and Szob-Ipolypart sites.

Middle Palaeolithic tools from the Ostoros site in the collection of Sándor Béres

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Thanks to its viticulture, many Palaeolithic sites were discovered in the vicinity of Eger since the end of the 1940s. One among them is Ostoros-Rácpa, which became known in 1966 when László Vértes and József Korek carried out a small excavation, but no cultural layer was found. The find material was published by Viola T Dobosi in 1971, following the perception of the time, as the industry of the Mesolithic Eger culture. During the revisions of the Eger culture in the 1990s, she interpreted the same material as an industry belonging to the Middle-Upper Paleolithic transition. However, the revision only assessed the finds previously included in the museum collection. Field research was not carried out at the site until April 1999, when Sándor Béres visited it for the first time, and then collected there regularly until November 2005. Then, Krisztián Zandler processed the find material that had been found in his MA thesis completed in 2006. Based on typological, technological and raw material usage characteristics, Ostoros-Rácpa was defined as an open-air site of the Szeletian culture. In the following decade, Sándor Béres turned his attention to other Palaeolithic sites, and only from 2016 on did he deal with Ostoros again. From his more recent observations, he concluded that the site contains assemblages of an Aurignacian and an early Upper Paleolithic leaf-tool industry. He was primarily occupied with the separation of the pieces belonging to the two cultural units within the collection. At first, he also considered Middle Paleolithic tools to belong to the leaf-tool industry. He gave these finds with a Middle Palaeolithic character to me for study and review, which I now fulfil as an old debt.

Bulk chemical characterization of Prehistoric polished stone tools: what for? An overview of the interpretation of PGAA data at the end of a 4-year project

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Bulk chemical composition analysis is a key component in the provenance research of archaeological finds. It is known, though, that different methods (due to their different sensitivities) show variable effectivity on different rock types. Our presentation summarizes the interpretation possibilities and the success of prompt gamma activation-based (PGAA) chemical data in material characterization (i.e., the type of the matter) and provenance identification (i.e., the source of the matter). Thus, we provide an overview of experiences collected in a 4-year project (OTKA K-131814) and previous long-term ones (OTKA T 013638; T 023784; T 025068; K 62874; K 100385).

This presentation focuses on the material characterization and provenance identification levels of PGAA data in the case of different rock types. There are cases when they are not possible exclusively based on bulk major and minor element composition. Consequently, further – usually destructive – investigations might be necessary to come to provenance conclusions. PGAA is especially appropriate to characterize the rock type in the case of serpentinite and 'white stone' (discriminative elements are Si, Ti, Al, Fe and Mg). However, clusters of 'greenish metamorphic rocks' and basic volcanic-subvolcanic rocks

cannot be segmented properly. For basalt and nephrite, PGAA can discard some of the potential sources (based on concentrations of alkali metals, Al, Fe and Ti) but is not able to exactly determine the locality. Successful provenance research could be done for hornfels, contact metabasite and HP-metamorphites. When investigating other rock types, the methodology has to be completed with further techniques (e.g. magnetic susceptibility, microscopic petrography, scanning electron microscopy).

As a result of the experiences of our more long-term research projects, PGAA got its irreplaceable role in the provenance investigations of polished stone tools. Taking advantage of the rock type characterization, more exact geographic and temporal raw material distribution of polished stone tools can be outlined which is a useful tool in archaeology. By exact determination of the sources, directions of raw material transport can be further understood.

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