The meaning of projectile points in the Late Neolithic of the Northern Levant. A case study from the settlement of Shir, Syria

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ABSTRACT – *Our contribution explores the possibilities of inferring the functions of Late Neolithic projectile points from the settlement of Shir, Syria. Use-wear and metrical values are applied to differentiate between arrowheads, darts and thrusting spears, followed by a discussion of hints for use for hunting or as weapons for interpersonal conflict. Weapons get larger and more visible exactly in the moment when hunting declines as a basis for subsistence. This economical transformation would have produced considerable change for individuals who previously defined themselves as hunters. The social practice of hunting may (at least partially) have been substituted by prowess in interpersonal conflict.*

KEY WORDS – *Neolithic; Near East; projectile points; Shir; warfare*

Pomen projektilov v času poznega neolitika v severnem Levantu. Študijski primer iz najdišča Shir v Siriji

IZVLEČEK – *V prispevku raziskujemo možnosti, kako sklepamo o namenu pozno neolitskih projektilov iz najdišča Shir v Siriji. Za razlikovanje med puščičnimi konicami, puščicami in sulicami smo uporabili analizo sledov uporabe in metrične podatke, vse to pa nadgradili z razpravo o sledovih uporabe pri lovu ali kot orožje pri medosebnih spopadih. Orožje postane namreč večje in bolj opazno ravno v trenutku, ko se zmanjša vloga lova kot osnovnega sredstva za preživetje. Takšna gospodarska preobrazba bi pomenila znatno spremembo za posameznike, ki so se pred tem identificirali predvsem kot lovci. Družben običaj lova bi lahko bil (vsaj deloma) nadomeščen s spretnostjo v medosebnih spopadih.*

KLJUČNE BESEDE – *neolitik; Bližnji Vzhod; projektili; Shir; vojskovanje*

Introduction

Conflict and warfare studies have constituted important research focusses within archaeology in recent years (*Guilaine, Zammit 2005; Livingstone Smith 2009; Martin, Frayer 1997; Meller, Schefzik 2015; Thorpe 2005*). The origin and genesis of interpersonal conflicts, war, their forms and probable causes, and their traces in the archaeological record are much debated also for the Near Eastern Neolithic (*Clare 2010; Müller-Neuhof 2005; 2014a; 2014b*). Site structures, the existence of fortifications or of defensive buildings, phenomena of site abandonment, spatial analysis of site distribution and evidence for trauma in bones are among the proposed archaeological markers for conflict (*Ferguson 2013; Glencross, Boz 2014; Müller-Neuhof 2005.129–163; Müller-Neuhof 2014a*). Based on these finds or on ethnographic analogies, generalized as well as small-scale conflicts with mostly economic causes were proposed for this epoch and region (*Clare 2010; Müller-Neuhof 2014a*).

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Weapons as a conflict marker were taken into consideration to a lesser degree. This is partly due to the difficult differentiation between weapons used for conflict and those used for hunting (with the exception of maceheads, for which an use in hunting would be less likely) – in an epoch in which hunting still represents a major basis of subsistence (*Müller-Neuhof 2014a-b; Scheibner 2016*). This is particularly the case for the Early Neolithic (Pre-Pottery Neolithic (PPN), 9600–7000 BC) of the Levant. A stronger possibility of linking weapons and conflict seems to exist only toward the end of the Neolithic, in the Late PPNB and Early Pottery Neolithic (PN) (*c.* 7500 to 6000/5600 BC) (*Hours* et al. *1994*). A supra-regional, general change of the subsistence basis takes place during that period, marked by the declining importance of hunting (and therefore of the use of weapons in this scope) and the completion of the domestication processes both of animals and plants (*Abbo* et al. *2017; Asouti, Fuller 2013; Vigne 2015*), the extended cultivation of plants, animal husbandry and the exploitation of milk (*Evershed* et al. *2008; Russell 2010; Scheibner 2016.110–125, 210–218, with bibliography*), the invention of pottery (*Nieuwenhuyse 2009; Nieuwenhuyse* et al. *2010*) and the spread of food storage (*Bartl 2004*). Archaeozoological records show a decline in the number of bones of wild animals in the finds along with a simultaneous rise in the number of bones of domesticated animals (*Scheibner 2016.235, Fig. 4.47–48*).

It is not entirely clear how demography and settlements evolved at the end of the PPNB in the Northern Levant, and most probably major regional differences in their development have to be assumed. Some reconstruction models include a reduction of settlement sizes and densities in the Late Neolithic (*Bocquet-Appel, Bar-Yosef 2008*). Furthermore, regionalization and an interruption of the long-distance trade networks of the PPNB (*Asouti 2006*) have been postulated (*e.g., Watkins 2008*). Severe climate change (the 8.2k-event: *Verheyden* et al. *2008; Weninger* et al. *2005*) was also suggested, followed by the development and spread of pastoralism as a subsistence strategy (*e.g., Russell 2010*). Climate change and subsequent lack of resources are assumed to have caused social stress, resulting in supra-regional, 'politically' motivated inter-group conflicts and large-scale migrations through Anatolia, to the West (*Clare* et al. *2008; Clare, Weninger 2016*).

The most representative weapons in Neolithic assemblages, including the Late Neolithic, are 'projectile points', *i.e.* pointed weapons, which have been addressed as arrows, darts and spears; sling stones are also numerous (*Borrell, Štefanisko 2016; Gopher 1994; Korfmann 1972; Müller-Neuhof 2005.167–207; Rosenberg 2009; Shea 2006; 2013.238–249*). The notion of 'projectile points' comprises triangular to biconical pieces of flint, usually between 2 to 10cm long and less than 3cm wide (*Shea 2013.238*). The development of the shapes of projectile points from the Epipaleolithic to the Late Neolithic in the Levant does not seem to follow one common, supra-regional line; major differences between the Southern and the Northern Levant were noticed (*Shea 2013.238–249*). These include discrepancies in shapes, which could have a functional or stylistic meaning (*Gopher 1994.22*), and a disparity in their sizes, with north Levantine points being generally larger (*Borrell, Štefanisko 2016.138*). Elongated points were usually associated with the Middle PPNB (*Borrell, Štefanisko 2016* with further reading), while for the PN a reduction in length was postulated (*Shea 2013.248–249*), following a short-time growth in the Late PPNB (*Cauvin 1978*). Regional and chronological variability and changes in the shapes of the projectile points have been explained either by major changes in hunting techniques, implying morphological and technological transformations, by shifts in weapon technologies and functions – or simply by stylistic reasons (*Gopher 1994.22; Müller-Neuhof 2005.177–181*). It has also been stressed that some objects, addressed as 'projectile points', were in fact used for different tasks based on their shapes (*Astruc, Russell 2013.338; Müller Neuhof 2014b with bibliography*) and use-wear analyses seem to confirm this hypothesis in some cases (*Coşkunsu, Lemorini 2001*). Multifunctionality (weapon-tools or tool-weapons: see *Chapman 1999*) is very likely, and exclusions of functions cannot be made easily through functional macro- and microscopic analyses of use-wear. These analyses reflect often only the last steps in the biography of an object. Previous analytical approaches focused on typological distinctions and metrical analysis. The latter were used to differentiate between different weapon categories like arrows, darts and spears by way of comparing the dimensions of archaeological finds to ethnographic data (*Hughes 1998; Shea 2006; Shott 1997; Sisk, Shea 2011; Thomas 1978*).

The present study aims to decipher possible functions and social roles of projectile points from the Late Neolithic site of Shir, Syria. The site is particularly suitable for this analysis due to its long stratigraphical and chronological sequence and a high quantity of projectile points. Also projectile points

made from bone, which seem to be very rare, constitute an important part of the analysis.

The Neolithic settlement of Shir

Shir is located *c.* 12km northwest of the city of Hama on a 30m high, natural terrace above the Orontes tributary Sarut. The site, with an overall size of 4ha, was discovered in 2005 during the Orontes survey conducted by the Damascus Branch of the German Archaeological Institute under the direction of Karin Bartl in cooperation with the Syrian Department of Antiquities. Excavations were undertaken in three areas of the site between 2006 and 2010, accumulating to a total of 2350m² excavated (*Bartl* et al. *2008; 2009; 2012; Nieuwenhuyse 2009; Rokitta-Krumnow 2012*). Settlement activities date exclusively to the 7th millennium BC. An earlier settlement phase was excavated in the southern area (7000 to 6600 BC), a later phase in the central and northern areas (6600 to 6200/6100 BC). As far as could be reconstructed from the excavations and the geophysical prospections, Shir represents a typical Late Neolithic village from the Northern Levant with several clusters of houses. The site's special importance arises from an exceptionally long settlement history of nearly 800 years, covering the Late Neolithic period, its very well preserved stratigraphy, the very early occurrence of pottery on site (dark faced burnished ware and later coarse ware: *Nieuwenhuyse 2009*), and evidence for significant changes in architecture with the appearance of large, specialized buildings for storage (*Bartl 2014; 2017; Dietrich in prep.; Dietrich, Lelek Tvetmarken 2015*).

The Southern Area was excavated most extensively. Here, six subsequent layers were noticed, ranging from the early to middle 7th millennium. The earlier layers (I-III) are mainly characterized by single-room buildings, sometimes with annexes and much of the daily activities going on outside the houses. The later layers (IV-VI) yielded multi-room buildings with inner courtyards (*Bartl 2017; Pfeiffer in print*).

The functional interpretation of projectile points

More than 190 projectile points have been found in this area. Most of them were made of flint. Only 48 items are fully preserved of the total number of 172 flint points. Most of the broken pieces show signs of impact, *e.g.*, burin-like blows, hinting at an interpretation as projectile points and not as awls or drills. The types are dominated by large 'Amuq-1 and 'Amuq-2 points followed by Ugarit and Byblos points; one Bouqras point and three Levallois points complete the assemblage (*Rokitta-Krumnow 2012*) (Fig. 1). The persistence of PPN lithic reduction techniques in the PN period is noticeable, and, for example, naviform core-and-blade technology producing long bidirectional blades is present at all stages of occupation (*Rokitta-Krumnow 2011*). Projectiles of flint show a high variability in size and weight (Fig. 2), ranging from 3.3g to 26.4g weight and 4.2cm to 11.8cm size.

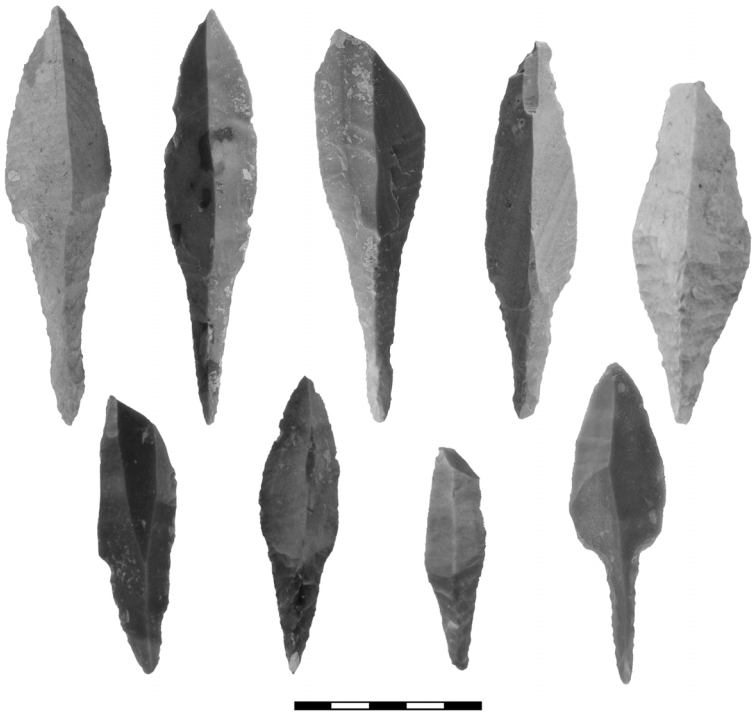

Fig. 1. Flint projectile points from the Neolithic settlement of Shir (© German Archaeological Institute, photos by K. Bartl, T. Urban).

Projectile points made from bone are generally rare in Neolithic assemblages, or they have not been recognized as such so far. Experimental studies as well as ethnographic examples have pointed out the high effectivity of bone projectiles (*Letourneux, Pétillon 2008; Waguespack* et al. *2009*), which lends some probability to the latter explanation. At Shir, fifteen bone projectile points were identified, and an additional twelve objects may possibly be addressed as such. Osseous points imitate the lithic projectiles in shape (Fig. 3). Use-wear traces like broken tips hint at their use as projectiles. This specific use-wear was also ob-

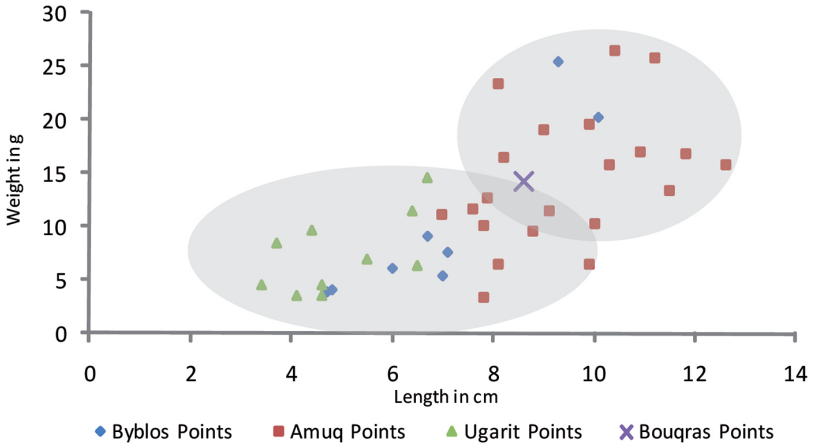

Fig. 2. Size and weight of flint projectile points from the Neolithic settlement of Shir (chart by D. Rokitta-Krumnow).

served with objects classified as awls based on their shapes, but is not typical for that category of tools. Other traces of use-wear include splinters on one end and to a lesser extent fissures along the shaft. Bone projectile points have relatively symmetrical shapes and are well-balanced through their wide blade with pointed ends. Hence, the shape displays aerodynamic characteristics. This is not the case with objects classified as awls, so we consider this specific shape as being diagnostic for an interpretation as projectile points. Typical awls in Shir have tubular shafts, made from an entire or half hollow long bone with one pointed end. It is however difficult to differentiate between fragmented projectile points and awl fragments. It is therefore assumed that among the objects classified as awls several projectile points are hidden. This is again tentative evidence for the original number of bone projectile points being higher.

We are aware that our identification of the tools' functions as projectile points is based on shapes and macroscopic use-wear analysis and is missing microscopic analyses. Microscopic examination was planned but then not possible because of the political situation in Syria. Also, as mentioned above, observable traces often only reflect the last of a long series of uses of any given tool. However, the great quantity of other pointed osseous tools used as drills in Shir and a certain standardization of their forms may constitute arguments to exclude the differently shaped lithic and aerodynamic bone points from this category.

As mentioned above, size and weight have been used as indicators to distinguish between different kinds of projectile points. In some mechanical calculations, mass is an important parameter for the distinction between arrowhead and spear (*Borrell, Štefanisko 2016; Sisk, Shea 2011*). These calculations are based on the assumption that, in the case of a bow and arrow, there is a firm relationship between the arrow shaft, the arrowhead, and the bow. Accordingly, the arrowhead should not exceed 12% of the total weight of the arrow shaft (*Beckhoff 1966*) in order to hit the target. Korfmann (*1972.33–35*) confirmed these estimates by applying a relation of 1:7 between arrow and arrowhead. There is also a firm relationship between a bow and the weight of an arrow, with the consequence that the weight of an arrowhead can be estimated, too. The most practical weight for an arrowhead is estimated at *c.* 8g, although this applies only to modern-day bows with complex designs. A weight up to 5g may be estimated for prehistoric arrowheads; ethnographic studies and calculations have affirmed such approximations (*Bretzke* et al. *2006; Cattelain 1997*). This value will also be applied in the following discussion.

Fig. 3. Bone (left) and flint (right) projectile points from the Neolithic settlement of Shir (© German Archaeological Institute, photos by K. Bartl, T. Urban).

As for projectiles catapulted with spear-throwers, ethnographic studies and experiments on weights define an ideal weight-range between 9g and 70g (*Bretzke* et al. *2006; Hughes 1998*). By adding feathers, the weight of a dart can be reduced (*Hughes 1998*).

Following these schemes for interpreting projectile weights, a total of 21 points made from bone and 45

from stone from Shir were analysed (Figs. 4 and 5). Despite the small numerical basis, an interesting picture emerged about the development of the projectile points. It can be recognized that in the early Layers III and IV as well as in Layer V the weights noticeably locate within the lower (especially bone projectile points) as well as median zones, that is, within the range of possible arrowheads and darts for spear-throwers. The weight values for spear-throwers increase already in Layer Vb and even more so in Layer VI (Fig. 4).

In order to clarify this picture, reference was also made to size parameters in the analysis. Various studies on projectiles do not pay sole regard to the length, but far more to the surface area of the cross-section. This 'area' is referred to as the 'tip cross-sectional surface' (TCSA), a parameter which basically links size and shape of the projectile with the behaviour at the moment of its penetration into animal or human tissue, and the thus expended energy (*Borrell, Štefanisko 2016; Sisk, Shea 2011; Hughes 1998; Shea 2006; Thomas 1978*). The TCSA value is calculated with the formula 0.5 x maximum width x thickness. Points with a low value are smaller, thinner and penetrate tissue more quickly. A higher value, on the other hand, is indicative of wider and thicker points. Based on ethnographic metric data from North America and Australia (*Borrell, Štefanisko 2016.140, Tab. 1; Bretzke* et al. *2006.70; Shott 1997; Thomas 1978*), TCSA values between 13 and 53 for arrows and 20 and 174, *e.g.*, an average between 57 and 103 for darts can be expected (*Borrell, Štefanisko 2016.140, Tab. 1*). Values for thrusting spears range between 79 and 257 (*Bretzke* et al. *2006.70; Shea 2006*) and between 7 and 222 for experimentally produced spears (*Borrell, Štefanisko 2016.Tab. 1*). Cycles of recycling and reshaping could not be taken into consideration in the present analysis.

The development of TCSA-values for Shir results in a pattern similar to that of the development of weights (Fig. 5). Smaller, thinner projectiles that would usually be used as arrowheads and spear-thrower darts appear mainly in Layers III-IV and less so in Layer V, while larger, wider projectiles are represented predominantly in Layer VI.

Prestige weapons in a changing world

One possible way of interpreting this result based on the above mentioned weight differences among the darts with and without feathers is to view the lighter, smaller projectiles in the early layers as arrowheads and feathered spear-thrower darts, and the heavier ones in Layer VI and the later settlement as spear-thrower darts without feathers or as spearheads. They are already present in the early layers, albeit only in small numbers, but markedly increase in Layer VI. According to Shea's experiments, the values shown in Figures 3 and 4 (11g or 79mm) may represent the lower boundary of the value zone for thrusting spears (*Bretzke* et al. *2006.70; Shea 2006*), while by contrast throwing spears may weigh less (*Bretzke* et al. *2006.73*). These considerations lead to two more interpretational possibilities:

❶ During the periods of the earlier layers at Shir (III–IV, partly V), arrowheads, darts and feathered darts were produced. Thrusting spears were either rarely made, or made from perishable material, such as wood.

❷ During the periods corresponding to the later layers, especially Layer VI, arrowheads declined, while darts and/or throwing spears continued to be utilized. A change in the basic procurement of raw materials cannot be assumed, as the often-employed flint was locally available. This 'enlargement' of spears could therefore signal an increased utilization of thrusting spears. Thrusting spears can be used both as short-range as well as long-range weapons. If the coeval development of daggers and maceheads – appearing only in the later layers (Fig. 6) – is considered, which served primarily as short-range weapons and probably had social implications, being used as prestige-weapons (*Müller-Neuhof 2005.196*), then the development of large projectile points, possibly for spears, may be linked to this process.

Surprisingly, this development is opposed to the general development of other formal lithic tools, which decrease in size (*Rokitta-Krumnow 2011*) (Fig. 7). Apparently, the projectile points seem to have played an important role in the community, since their development follows the opposite direction. Comparisons to other sites in the Northern Levant with several occupational phases show a general development toward longer points at the End of the Early PN (*Rokitta-Krumnow 2011.222, Fig. 12*; Mezraa Teleilat: *Coşkunsu 2007*; Tell el-Kerkh: *Arimura 2004*; Ain el-Kerkh: *Arimura 2007*; Tell Halula: *Borrell 2006*). This is accompanied by a loss of formal tools in favour of ad-hoc and expedient tools (*Rokitta-Krumnow 2011.290*).

How can we interpret the possible appearance of large, probably prestige weapons in Shir? The deve-

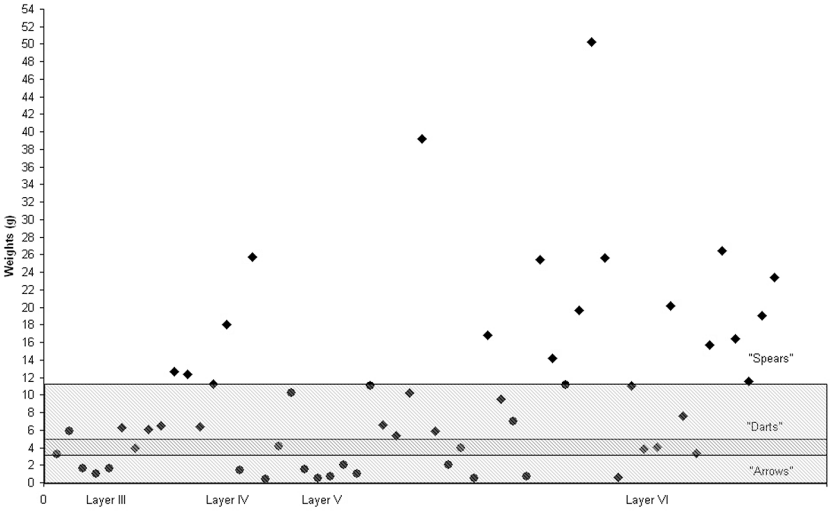

Fig. 4. Weight of projectile points from the Neolithic settlement of Shir (© German Archaeological Institute, chart by L. Dietrich).

lopment of larger projectile points in the Late PPNB in the Northern Levant has been linked with the (possible ritual) hunting of larger animals like aurochs (*Cauvin 1978*). Deposits of auroch bones in archaeological finds seem to confirm the special significance of the hunting and consumption of these animals in social activities like feasting (*Pöllath* et al. *2018; Russell, Martin 2005; Russell* et al. *2009*). The archaeozoological analyses from Shir are still in progress, but some deposits of aurochs bones were observed.

However, as a general trend a reduction in the percentage of hunted animals is noticeable between the Early and the Late Neolithic in the Levant (*Scheibner 2016.235–237, Fig. 4.47; 4.48*). Bones of domesticated animals constitute about 70% of the assemblages in the Late Neolithic, and hint at a maximum use of domestic animals in this time and a decrease of the contribution of wild animals to the food spectrum. Also, a constant reduction of game size from the Upper Palaeolithic to Late Neolithic is noticeable (*Scheibner 2016.212–217*). This general development apparently does not coincide with the development of the length of arrowheads and spears. The most characteristic weapon and one of the most characteristic objects of the Early Neolithic (PPNB) are large tanged points made on bidirectional blades (*Abbès 2003; Borrell, Štefanisko 2016*), used for middle-sized game, while for example during the Natufian small lithic-tipped projectiles coincide with large game in archaeozoological assemblages (*Bocquentin, Bar-Yosef 2004; Yeshurun, Yaroshevich 2014*). Thus, there is no simple correlation between small projectile points and small animals on one side, and large projectile points and large animals on the other. Additionally, assuming that the large points actually represent darts and/or spears, then their exclusive use for subsistence hunting would signify a lower range in variation and a lesser ability to adapt hunting techniques than with the combined utilization of spears/sling shots and the bow and arrow, as the latter are far more versatile and possess several technical advantages (*Churchill 1993; Whittaker 2013*). Taking the association of larger projectile points with other weapons in the later layers from Shir into account, a more complex significance is proposed, centring on representation within (ritual) hunting and interpersonal conflict.

In the numerous murals at the contemporary settlement of Çatalhöyük, Anatolia, wild animals and hunting scenes predominate (*Hodder 2006.195–204*). Depictions at Çatalhöyük show large dangerous animals surrounded by small hunters, who attack them with different kinds of weapons (bows

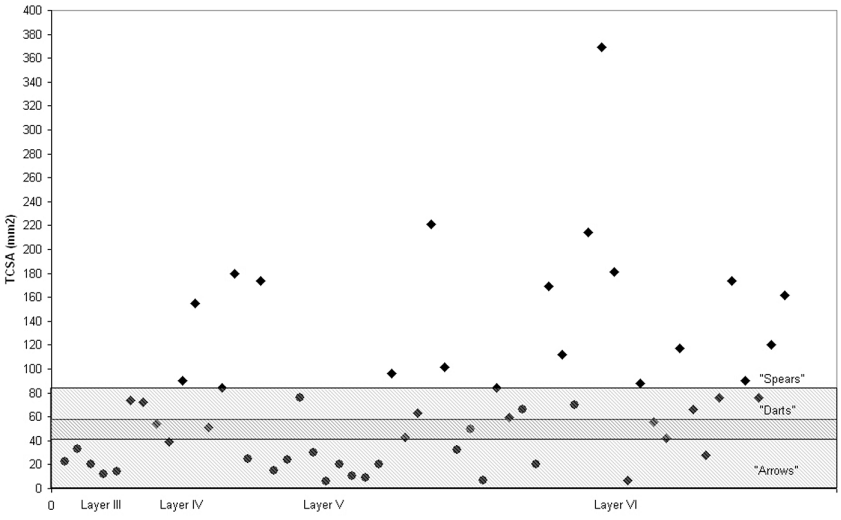

Fig. 5. TCSA values for projectile points from the Neolithic settlement of Shir (© German Archaeological Institute, chart by L. Dietrich).

and possibly bolas are visible, spears and other projectile weapons like boomerangs are also present: *Hodder 2006.197, Fig. 84, 94, Fig. 38*). Such scenes have occasionally been interpreted as attempts to transfer the strength of the large dangerous animals to human beings (*Hodder 2006.197–198; Lewis-Williams 2004*), or from a perspective of ritually acquiring hunting skills (*Hodder 2006.197, Fig. 84*), as a successful hunt not only would have an important symbolic meaning but would also bear the bonus for individuals or even dominant groups of gaining social prestige (*Hodder 2006.203–204*). The weapons depicted at Çatalhöyük (*Hodder 2006.94, Fig. 38*) are clearly recognizable, as the individuals are habitually shown with their hands raised and their weapons aiming at the animals. Such representations denote a conscious manner of depicting the action as the main subject. Along the same lines, it is likewise conceivable that at Shir weapons were made larger in order to render them more visible. Symbolically, an amplification of human strength in battle with wild animals or human opponents would thus be achieved through an enlargement of the size of the weapons. The later projectile points from Shir would consequently not only reveal specific activities, but also specific groups of agents, with regard to age/stage of initiation, gender, clan, *etc.* (*Carter 2011*).

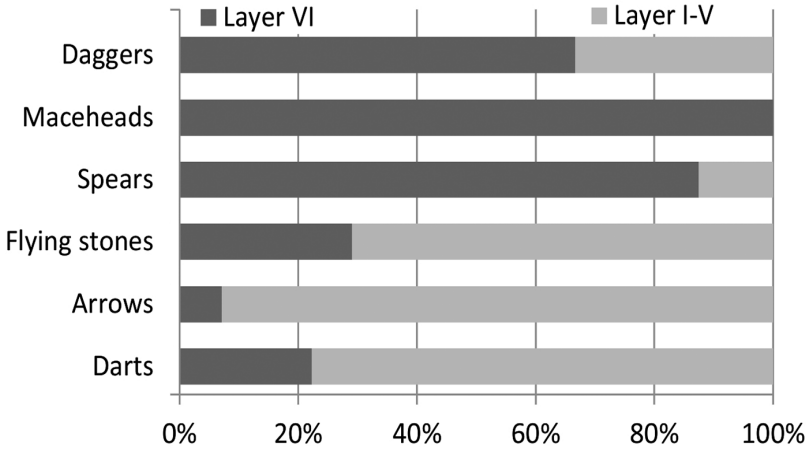

Fig. 6. Stratigraphical distribution of daggers, maceheads and projectile points at the Neolithic settlement of Shir (© German Archaeological Institute, chart by L. Dietrich).

Armed conflict between human beings is not directly archaeologically attested at Shir (for example through burnt layers, fortified complexes, large depots of sling stones). However, conflict and demonstrations of power by small groups or individuals can be assumed for the period in question on a supra-regional echelon (*Clare 2010; Clare* et al. *2008*).

To sum up, at the end of the PPNB and Early PN in the Northern Levant, large visible weapons appear. This phenomenon could have a connection to hunting, but it appears exactly at the moment when hunting declines as a basis for subsistence. This transformation would have produced considerable change regarding the social roles of individuals, who previously defined themselves as hunters. It seems possible that the social practice of hunting was (at least partially) substituted by prowess in interpersonal conflict as a means to perpetuate and reinforce identities in this situation of change, or transform aspects of them into a new one, that of the warrior, defending the new settlements and their agriculturally used hinterlands. Symbolically charged weapons of impressive size could have played a significant role here. Large-scale conflict on a supra-regional level does not need to be proposed or proven for this scenario, rather an interpretation of the use of these weapons especially for conflict on the local level within smaller groups seems probable. These conflicts might be individually motivated and may have had a denotation in the individual development of a single person, generating social status and (new) social identities.

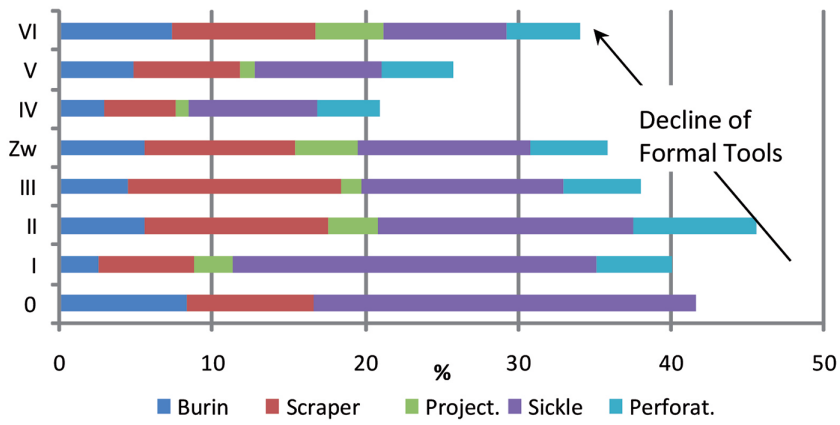

Fig. 7. Chronological development of percentage of formal tools at the Neolithic settlement of Shir (chart by D. Rokitta-Krumnow).

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