CHIPPED STONE TOOLS FROM THE MIDDLE BRONZE AGE SETTLEMENT IN SIDON. COLLEGE SITE, EXCAVATIONS 2000-2002

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It is generally believed that with the introduction of metal during the Early Bronze Age, the production of chipped stone tools witnessed a decline and ceased to represent a major component of the economic systems of historic societies. However, as it was evidenced by several studies on major sites dating back to the Early and Middle Bronze Age in the Levant, chipped stone tools continued to play an important role in the economic systems of these societies [1].
During the Early Bronze Age, these tools were characterized by a major craft specialization; that is the fabrication and spread of the Canaanean blade technology [2]. With the start of the Middle Bronze Age, more particularly with the Middle Bronze Age II, Canaanean blade technology disappears. The production of *ad hoc* tools persists and large geometric sickle segments slowly replace the "classically narrow" ones [3].

Chipped stone tools from historic periods are poorly documented in Lebanon and the Levant. If a few studies existed for the Early Bronze Age assemblages, no studies were undertaken on Middle Bronze Age ones. Moreover, if the technological and typological studies of these tools from Bronze Age periods are identical to those of prehistoric periods, the interpretation of such material cultures and their role in historic societies is much larger for it concerns complex and well-established societies or kingdoms. This contribution is meant to be a pilot study, consequently each stratum-phase will be treated separately in order to present a detailed analysis and to pinpoint a change or an evolutionary trend in the production and use of chipped stone tools.

The excavation of the Bronze Age College site of Sidon offers a rare opportunity to study the role and evolution of chipped stone tools starting with the Late-Chalcolithic/Early Bronze I, through to the Middle Bronze Age and probably the Iron Age.

The material presented here comprises all chipped stone artefacts recovered from Middle Bronze Age levels at Sidon (*). In a previous contribution, assemblages recovered from Early Bronze Age strata were studied [4]. The 212 sq. meters excavated surface of Middle Bronze Age levels delivered 232 artefacts, recovered from 8 different strata.

Table 1 : List of strata and corresponding time-periods [5]

SATRATUM	TIME-PERIOD	NUMBER OF ARTEFACTS
Phase 1	MB IIA	2
Phase 2	MB IIA	13
Phase 3	MB IIA	4
Stratum 4	MB IIA/B	44
Stratum 5	MB IIB	41
Stratum 6	MB IIB	44
Stratum 7	MB IIB/C	4
Stratum 8	End of MB IIB/C/Late Bronze Age	61

Condition: The condition of the artefacts is generally good; the number of burned artefacts is low.

Terminology and classification: In this analysis, the same criteria for the classification of segments will be used as in a previous study [6] ; every truncated and retouched blade will be classified as a "sickle segment" regardless of its dimensions [7] and every simple (absence of truncation) and complete blade showing characteristics such as retouch and/or silica sheen will be classified as a sickle blade. Although recent data based on microscopic analysis [8] has proved that many "sickle segments" from the Early Bronze were used as inserts in threshing sledges, the term "sickle segment" will be used in this contribution.

Phases 1, 2, 3: MB IIA

This assemblage consists of 19 artefacts where debitage – waste (see* below) and tools are almost equally represented.

Raw materials and blanks [9]

A wide variety of chert was used by the MB IIA knappers [10]. Nummulitic light brown chert and semi-coarse to coarse-grained brown chert are predominant and are represented by 50% of the total artefacts. The second type of raw material is a fine-grained brown chert with 21% (some items are of banded chert), and a fine-grained brown chert represented also by 21%. Interestingly, the segments were made on a semi-fine grained brown chert.
As previously discussed [11], these types or raw materials especially the nummulitic and the semi-fine grained chert exist in the Sidon region, mainly in the Cretaceous and Eocene strata.

Descriptive Typology

1-*Debitage and waste* [12]: 9 artefacts which represent 47% of the total artefacts.

a-Flakes: 7 artefacts. All are plain flakes, none have conserved any cortex. All with the exception of fragments have the large and thick bulbs characteristic of hard hammer technique, with no platform preparation.

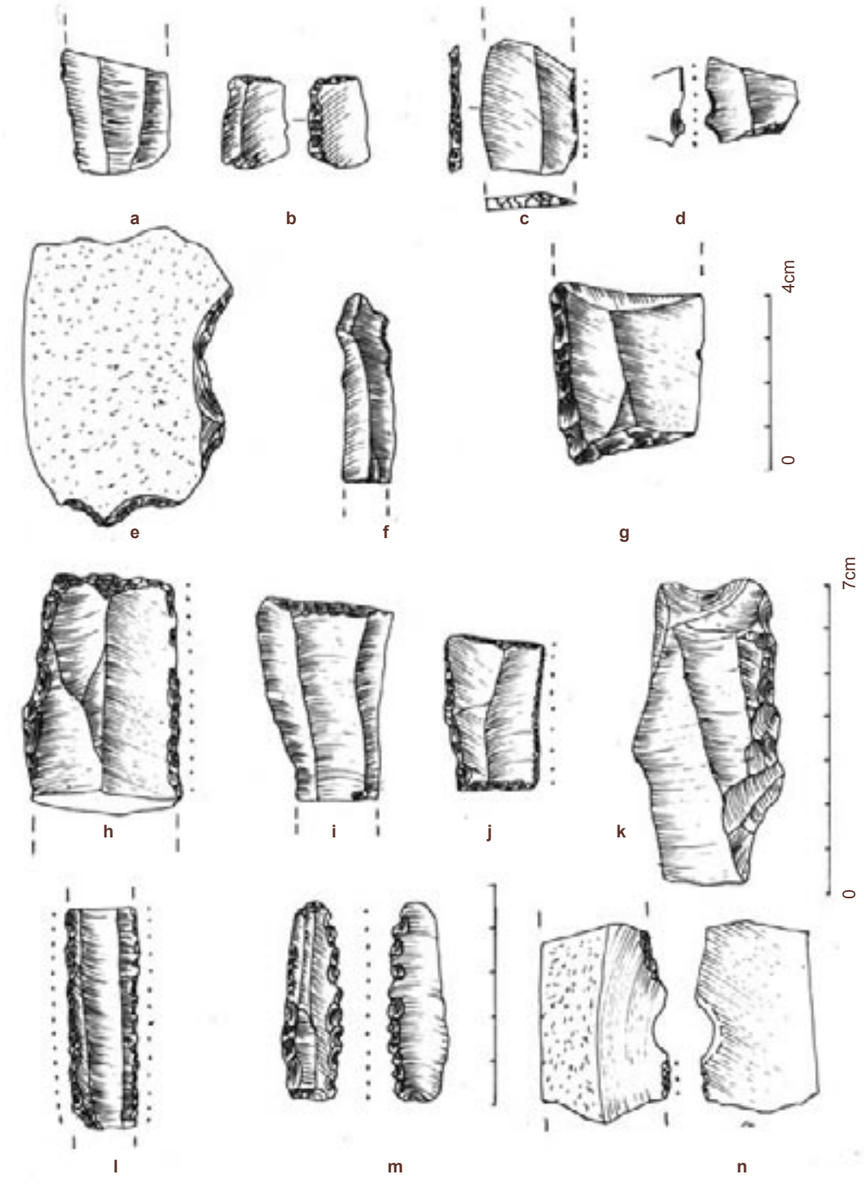
Pl. 1 a, e: Phases 1, 2, 3 (Middle Bronze Age IIA); f, g: stratum 4 (Middle Bronze Age II A/B; h-m: Stratum 5, 6 (Middle Bronze Age IIB).

b-Waste and debris: 1 artefact, a piece of debris.

c-Undetermined: 1. This is an undetermined item made in a cherty limestone.

2-*Tools*: 10 artefacts which represent 53% of the total assemblage.

a-Blades/bladelets: 3 artefacts.One is a cortex primary and the 2 others are middle sections (pl. 1, a); all three show irregular edges and sections. Each artefact was made in a different type of chert.



b-Scrapers: 1 implement

This is a denticulated side-scraper made on a cortex flake of semi-fine grained nummulitic chert. *Ad hoc* tool. (pl. 1: e).

Length: 4. 2 cm. Width: 6. 1 cm. Thickness: 1 cm.

c- blades and segments: 6 implements which represent 31% of the total artefacts.

Backed-truncated blades/bladelets: 2.

-The first blade is made from a fine-grained brown chert. It is truncated on one of its ends and has semi-abrupt retouch on one edge (back). This specimen has sickle sheen [13] along one of its edges (pl. 1, d).

Dimensions are: 4. 7 cm X 1. 6 cm X 0. 4 cm.

-The second one is a large bladelet made from a light brown fine-grained chert. It is backed and truncated on one of its ends. This one lacks the silica sheen (pl. 1: b).

Dimensions are: 1. 8 cm X 1. 3 cm X 0. 2 cm.

Sickle Segments: 4 (retouched, backed, with gloss)

-The first one is made on a semi-fine grained brown chert; it is backed and truncated on both ends and has silica sheen on one of its edges.

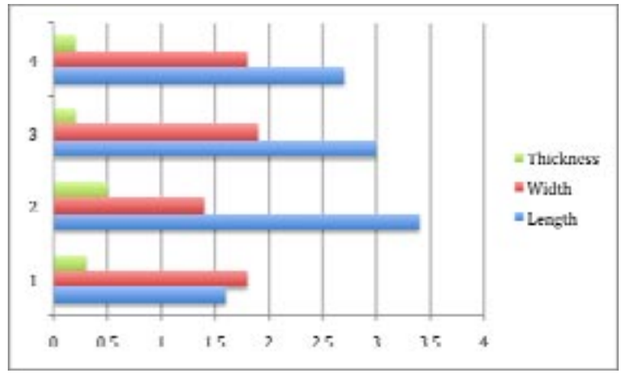
-The second one is made from an undetermined type of chert; it is backed and truncated on both ends and has slight nibbling on one of its edges; this item is heavily burnt.

-The third one is made from a nummulitic brown chert; it has one truncation opposed to one fracture; it is not backed, instead both edges are retouched by small denticulations. This one was recovered from the fill of burial 19.

-The fourth one is made from a semi-fine grained brown chert; it is backed with one truncation; the opposite edge has very small denticulations and shows a well-developed silica sheen along one of its edges (pl. 1, c).

Although there is no uniformity in the use of raw materials, there is standardization in the dimensions, as can be seen from the graphic below.

Fig. 1 Dimensions of segments.



Discussion

Although the sample is too small sized to allow any technological or typological analysis, some observations can be made.

As concerns the knapping process, the absence of artefacts indicative of primary stages of the debitage sequence such as cortex flakes and the absence of cores, coupled with the scarcity of plain flakes strongly suggests that no knapping activities took place on the site during this phase. Finished items, here the sickle segments were probably introduced to the site as blanks (blades), half-finished (middle sections) or finished tools (sickle segments).

On the other hand, sickle segments represent practically the only tools from this period (with the exception of the unique side-scraper). The 4 items do not represent a cluster for they have been recovered from 3 different contexts; the third one was recovered from the fill of burial 19, the first and the fourth ones were recovered from sq. 29, while the second was recovered from sq. 36. Their dimensions are slightly different from those recovered from the Early Bronze Age stratums [14]. However, despite the small size of the sample the typological and technological characteristics of these items are similar to those recovered from the Early Bronze Age strata.

Stratum 4: MB IIA/B

A bigger assemblage available from this period were 44 lithic artefacts. Debitage and waste represent 56% while tools represent 44%.

Raw materials and blanks

Six types of raw materials were evidenced for the lithic artefacts. As during the MB IIA, nummulitic chert is again dominant with 40% of the total. The second type is a brown semi-coarse to coarse-grained chert and the third is a fine-grained brown chert. There seems to be no selection of a particular type of chert for the production of tools, namely the sickle segments. These were made into 7 types; the larger variety of raw materials seem to be more related to the size of the sample rather than to a wider choice during this period. Nummulitic chert is predominant with 18%, followed by a fine-grained brown chert (8%), and a semi-fine grained brown chert (6%). Other types are a semi-fine grained beige chert, a fine-grained toffee chert and a fine-grained beige chert.

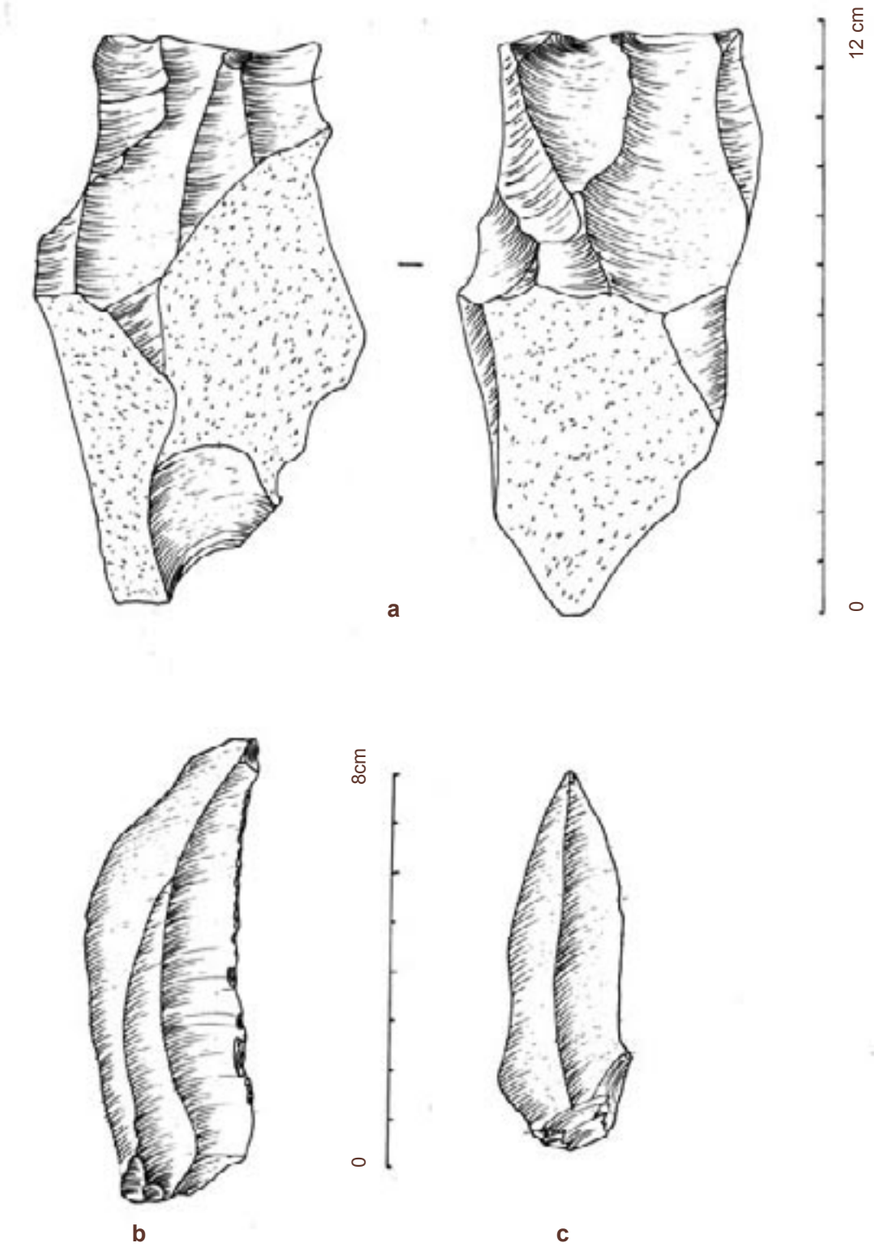
Descriptive Typology

1-Debitage and waste: 25 artefacts, which represent 56% of the total assemblage.

a-Flakes: 23 artefacts. All are plain flakes (with the exception of 2 with conserved cortex remnants). All (with the exception of fragments) have the large and thick bulbs characteristic of hard hammer technique, with no platform preparation. Three are core-trimming elements.The scarcity of primary flakes suggest that the first stages of the knapping process did not take place on site; however the presence of core-trimming elements suggests that rejuvenation did.

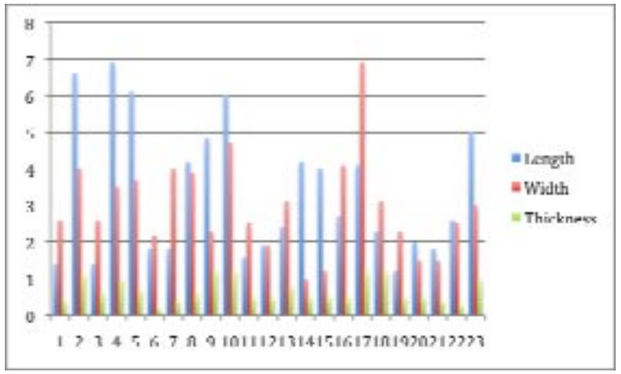
Dimensions of flakes are shown in the table below; average length is

Pl. 2 Stratum 5-6 (Middle Bronze Age II). a: prismatic core for blades; b, c: pointed blades.



situated around 3. 3 cm; average width around 2. 9 cm and average thickness around 0. 68 cm.

Fig. 2 Dimensions of flakes.



b-Waste and debris: 2 artefacts
2-*Tools*: 19 artefacts which represent 43% of the total assemblage.
a-Blades/bladelets: 11 implements.

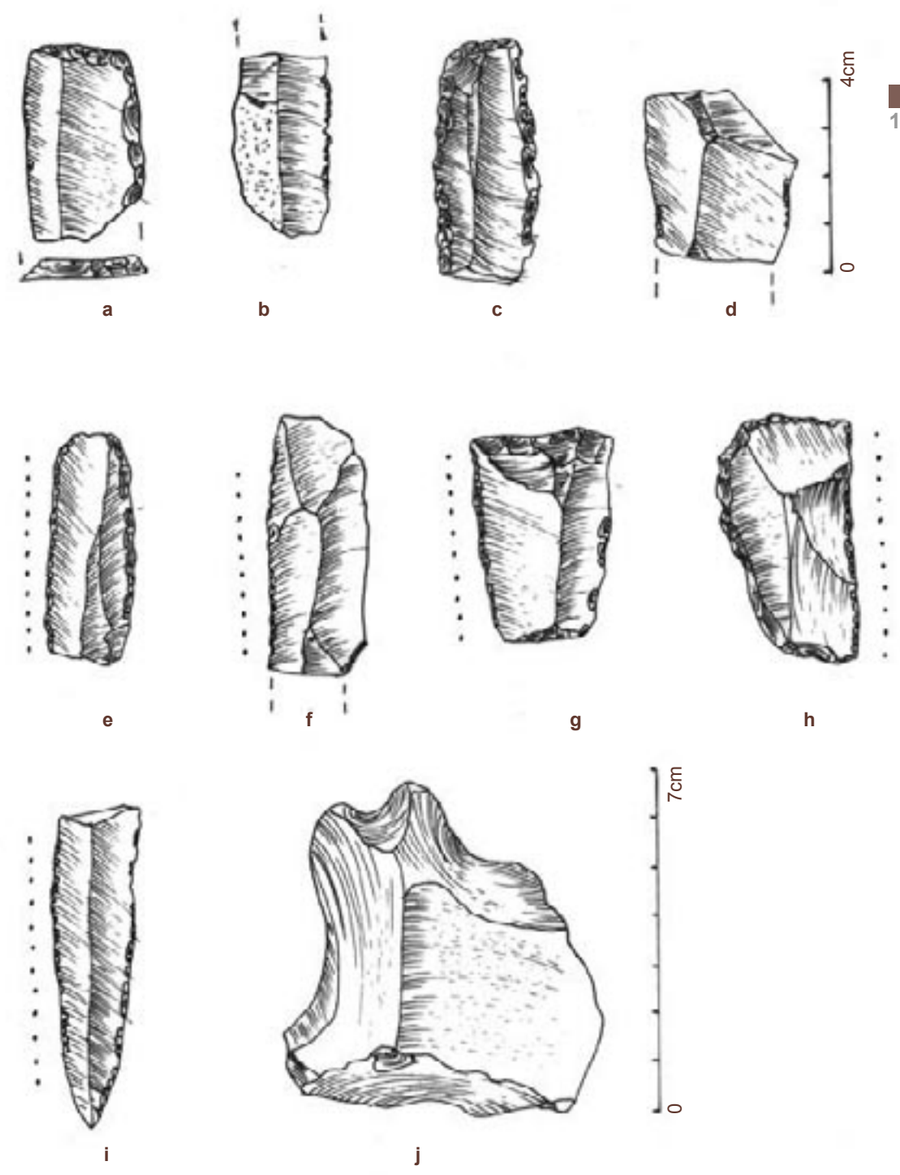
Table 2 : blades

Plain blades	Middle sections	Distal ends	Truncated
4	3	1	1

There is no standardization as regards the raw materials used; 5 types of chert were used of fine or semi-fine texture, light brown, beige and greyish. Length is situated between 6. 3 cm and 4. 9 cm and width varies between 2. 9 cm and 1. 7 cm.
Bladelets: 2
These are plain bladelets, irregular in their morphology. One is made from a fine-grained brown chert (pl. 1: f) and the other one is made from a coarse grained but homogeneous nummulitic light brown chert.

b-Sickle segments: 5 implements. These represent 26% of the total tools and 11% of the total assemblage.

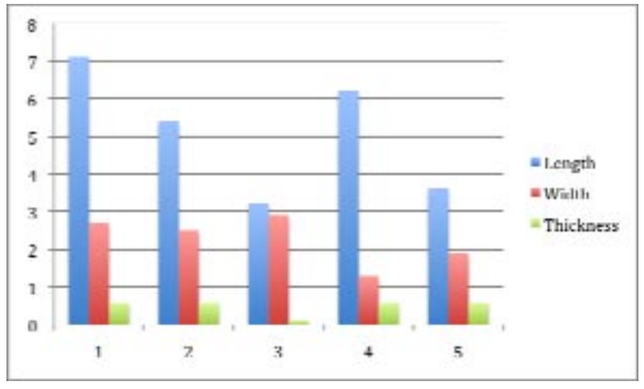
Truncated segments: 2.
One is made from a light beige coarse-grained chert; it is a large blade truncated at one end, fractured at the other end. The edges are not retouched. One is a segment, naturally backed with a truncation at one end and a fracture at the other; denticulations are present on one of its edges but without traces of silica sheen.
Backed-truncated segments: 3. All three items are made from a light brown semi-fine grained nummulitic chert.
One is backed with small denticulations, more likely nibbling at both edges but silica sheen is present on one of its edges.
The second is backed, slightly arched, with small denticulations on the opposite edge and silica sheen.
The third is a large segment, backed and truncated on one edge with a fracture on the opposed (*) edge. This one does not show traces of



Pl. 3 Stratum 8 (end of Middle Bronze Age IIB/C-Late Bronze Age). a, b: segments; c: side-scraper on a blade; d: segment; e-l: glossy "sickle segments"; d: *ad hoc* scraper.

silica sheen; but it can be considered as a segment in the operational sequence of the fabrication of segments. This can also be considered as the first appearance of large geometric sickles ready to be used (pl. 2: g).
Dimensions seem to be standardized, in particular the width and the thickness. For instance, 3 of 4 items have the exact same thickness, 0. 6 cm. The width is comprised between 2. 7 cm and 1. 9 cm; It is of interest to note that backed elements present the maximum width. Is the standardization in the width related to the hafting and the tool they were destined to be inserted in? The answer to this can be given by microscopic use-wear analysis of the segments.

Fig. 3 Dimensions of segments.



There seems to be some standardization as concerns backed-truncated segments; indeed 3 out of 4 are made from a brown nummulitic chert.

c-Side-scrapers: 3 implements. All three are *ad hoc* tools made on primary flakes (the first two items) and on a blade (the third item).
One is made from a nummulitic beige chert, on a large flake with a cortex butt; retouch is on the ventral face.
The second one is made from a fine-grained brown chert, on a small debitage flake.
The third one is made from a coarse-grained greyish chert, on a plain blade. This item has thermal fractures indicating its exposure to fire or possibly the practice of heat treatment .

Discussion

Although numerous types of chert were used, there is a clear preference for the nummulitic and the coarse to semi-coarse grained brown chert. This predominance is also observed on the flakes component whereby 56% of the flakes were made from nummulitic and coarse to semi-coarse chert.
Also, there seems to be standardization as concerns the segments as 3 out of 4 items were made from nummulitic chert; this is in favour of a local production.
Tools, other than sickle segments, are represented by *ad hoc* scrapers on flakes.

The high percentage of blades can be explained by the larger sample of the assemblage. The presence of entire blades, sections and finished tools in the same type of chert strongly suggests that a knapping process took place on the site. If an entire operational sequence is not evidenced on the site (scarcity of primary flakes, absence of cores), at least one sequence is clearly evidenced, namely that is the segmentation of blades and their transformation into finished segments. Moreover the presence of silica sheen on many items strongly points towards their use by the inhabitants of the site.

Stratum 5 & 6: MB IIB

This assemblage consists of 87 artefacts.

Raw materials and blanks

A wide variety of chert was used; more than 10 types were identified, but the main ones are six. As during the MB IIA/B, nummulitic chert (brown and beige) is predominant with 28%, followed by a semi-fine grained brown chert (13%) and by a fine-grained brown chert (11%). Other types include fine-grained dark brown (chocolate), fine-grained toffee, fine-grained beige and cherty limestone. These are represented by 20% of the total of the assemblage.

Descriptive Typology

1-*Debitage and waste:* 48 which represent 55% of the total artefacts.
a-Flakes: 45 artefacts.
These can be broken into 4 categories as can be seen in the table below:

Table 3: flakes

Primary flake (cortex flake)	Debitage flake	Fragments	Retouched flakes
4	29	9	2

The majority of flakes were made from nummulitic chert (brown or beige). All stages of the operational sequence seem to be present on the site. However, primary flakes, which usually indicate the first stages of debitage, are scarce. Besides, core-trimming elements are absent. A unique core for blades was recovered, indicating that at least one sequence for blade production did take place on the site; it concerned one type of local raw material, the nummulitic chert.
b-Waste and debris: 1 chip
Various: One stone hammer made from limestone; percussion traces are visible on one of its ends.
c-Cores: 2
One is a prismatic core for blades, made from a light brown nummulitic chert. Dimensions are: Length: 10. 8 cm. Width: 6. 1 cm. Thickness: 4. 5 cm.
This is a single platform core showing a unipolar method of extraction; the platform does not seem to have been heavily prepared (pl. 2: a).

This core was clearly destined for the production of large blades.
The second one is a multiplatform core for flakes, made from a semi-fine grained brown chert. Dimensions are: Length: 8. 2 cm. Width: 7 cm. Thickness: 7 cm.

2-*Tools*: 28 artefacts which represent 31% of the total assemblage.

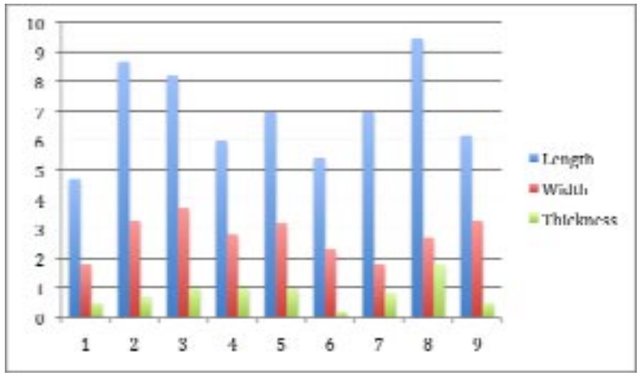
a-Blades/bladelets: 19 implements which represent 21% of the total assemblage and 70% of the total tools.

Table 4: blades

Plain blades	Middle sections	Distal ends	Pointed blades	Bladelets
9	3	1	5	1

Various types of chert were used for the production of blades; however nummulitic chert is predominant. There seems to be no standardization in the dimensions as can be seen in the chart below. Length varies between 4. 7 cm and 9. 5 cm; width varies between 1. 8 cm and 3. 7 cm while thickness varies between 0. 5 cm and 1. 8 cm. On a morphological basis, these blades are relatively large and short. As regards the technological attributes, most blades have a central ridge and therefore a triangular section; one is naturally backed. A variant can be noted, namely that is pointed blades. Five implements were recorded; all exhibit a plain butt indicative of soft hammer percussion (direct or indirect) and a triangular section (pl. 2: b, c). These blades can be obtained from unipolar prismatic cores such as the one in (pl. 2: a).
Observation shows that the majority of the items have a plain butt indicative of direct or indirect soft hammer percussion; there are no technical attributes indicating the use of the technique of pressure

Fig. 4 Dimensions of segments.

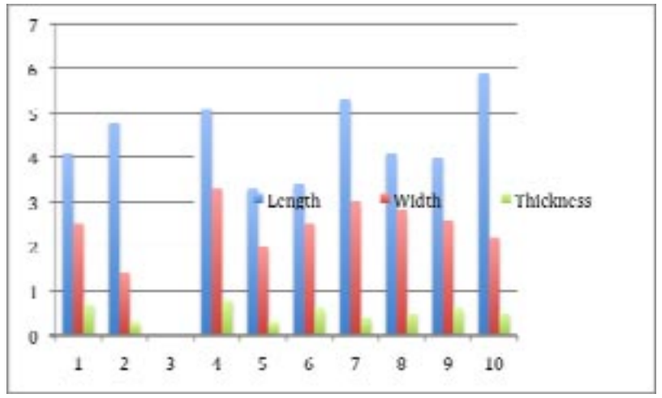


debitage with a lever and point.

-Sickle segments [15]: 9 which represent 33 % of the total tools and 10 % of the total assemblage.
Three different types of retouch should be considered here. The most common is the small, regular and narrow denticulations (made on the dorsal face) rather like nibbling. Occasionally, some segments have

large denticulations such as the glossed item in (pl. 1: m). The third type is the regular but medium-sized denticulation, mostly on large segments as can be seen on the item in (pl. 1: l).
Out of the 9 segments, one is the middle section of a part-cortex blade, without back or truncations, but with silica sheen partially on the edge (pl. 1: n).
All other segments (8) are backed and truncated.
Only four have sickle gloss; three have sickle gloss along one edge and one has sickle gloss along both edges. Five have a truncation opposed to a fracture (pl. 1: h, i), one has a truncation opposed to the natural butt of the blade (pl. m) and two have double truncations (pl. 1: j).
There is no standardization in the choice of raw materials; nummulitic brown chert is again predominant with 28%, followed by a semi-fine grained brown chert (13%) and by a light brown fine-grained chert (11%). Other types are a coarse-grained brown chert and a coarse-grained beige chert.
Pl. 1: m shows a segment with large and narrow denticulations made on both edges and a well-developed silica sheen whereas (pl. 1: l) shows a sickle segment made on a very regular blade segment with parallel ridges on a fine-grained brown chert. With its parallel ridges and trapezoidal section, (pl. 1: l) shows resemblance with the Canaanean sickle segments of the Early Bronze. This item has clearly been reused as it is indicated by the well-developed silica sheen on both edges. One can note for the first time in the sequence the appearance of large segments with gloss, very typical of the Middle Bronze (pl. 1: h, i, j).
There is no standardization as regards dimensions of the segments as

Fig. 5 Dimensions of segments.



can be seen in the chart below.

c-Scrapers: 6.

-End-scrapers : 4. All end-scrapers are *ad hoc* tools made on debitage flakes.
One is made from a semi-fine grained brown chert on a part cortex flake.
One is made from a coarse-grained brown chert on a plain flake.

One is from a coarse-grained brown chert on a plain flake.
One is made from a greyish brown fine-grained chert on a plain flake.
-Side-scrapers: 2 tools.
One is made from a coarse-grained light brown chert; it is simple, straight and made on a plain blade (pl. 1: k) .
One is an *ad hoc* tool made from a light brown nummulitic chert; it is simple, straight and made on a debitage flake, with retouch on the ventral face.

Typological and technological characteristics of the assemblage (pl 2):

Firstly debitage and tools are equally represented in the assemblage; there is an absence of standardization in the morphology, the technology and the raw materials.
Tools represent a high percentage in the assemblage and *ad hoc* tools are more numerous than during the previous phase. This is also true as regards the segments. Segments show variety in the fabrication; besides the use of a unique blank type, namely blades, segments show variety in their morphology, position of retouch, baking and denticulations.
Also, there is evidence of a local blade production from prismatic cores. Part of the blade component was made locally from nummulitic chert available in Sidon's region. Most tools, mainly sickle segments, do not seem to have been heavily used; all except one do not display evidence of resharpening or maximum use. However, one item made from a fine-grained brown chert was heavily used as can be seen from the sickle gloss on both of its edges (pl. 1: l). It is quite possible that imported items such as this were heavily used contrary to what is observed for locally-made items precisely from nummulitic brown chert. On the other hand, none seem to have preserved traces of any sort of adhesive such as bitumen to indicate the type of hafting or the mode of insertion; but it is certain that these items were hafted (or inserted in a threshing sedge). It is significant to note that large geometric segments (backed or glossed) make their first appearance as finished and used tools in the sequence.

Stratum 7: MB IIB/C

This is the smallest assemblage and consists of 4 artefacts.
Three are plain flakes made from three types of chert; nummulitic brown, semi-fine grained brown and fine-grained chocolate.
One is a sickle segment [16]: it is made from a semi-fine grained brown chert, backed, and has a truncation opposed to a fracture. It also shows silica sheen along one edge.
Dimensions are: Length: 4. 5 cm. Width: 21. 7 cm. Thickness: 0. 4 cm.
No further observation can be made on such a small sample.

Stratum 8: End of MB IIB/C-Late Bronze

This assemblage consists of 65 artefacts.

Raw materials and blanks

This assemblage is characterized by the highest variability in raw materials. More than 10 types of chert were used but the main types are 6. One can note for the first time in this sequence the predominance of semi-fine grained brown chert representing 18%, followed by the nummulitic brown chert (13%) and by a fine-grained brown (chocolate) chert (13%). Other types are cherty limestone and a fine-grained toffee chert.

1-*Debitage and waste*: 42 artefacts, which represent 64 % of the total artefacts.

a-Flakes: 33 artefacts. These can be broken down into 6 categories as in the table below.

Cortex flakes	Débitage flakes	Fragments	Truncations	CTE's	Naturally backed
2	24	3	1	2	1

Table 5: flakes

Primary flakes are scarce suggesting that the first stages of the operational sequence probably did not take place on the site. Most debitage is represented by plain flakes, which form 72% of the total debitage. Two core-trimming elements were recorded, indicating that the rejuvenation sequence was not frequent on the site. The production sequence is substantiated by flakes of various types of chert; however, nummulitic and fine or semi-fine grained brown types are predominant.

b-Waste: 9 artefacts.
Chips: 1
Chunk and debris: 6.

c-Cores: 2.
One is a pyramidal core with a single platform for bladelets, made from a fine-grained brown chert (chocolate colour). Dimensions are: Length: 3. 6 cm. Width: 3 cm. Thickness: 3. 4 cm
One is a fragment of a multiplatform core for flakes made on a greyish cherty limestone. Dimensions are: Length: 10. 2 cm. Width: 6. 7 cm. Thickness: 3. 4 cm.

2-*Tools:* 15 artefacts which represent 23% of the total assemblage.

-Blades: 3.
Two are whole blades, the third is a distal end. All three can be classified as small blades.
One is made from a semi-fine grained beige chert and is naturally backed. Dimensions are: Length: 5 cm. Width: 1. 4 cm. Thickness: 0. 5 cm
The second is made from a fine-grained banded chocolate chert. Dimensions are: Length: 2. 8 cm. Width: 1. 4 cm. Thickness: 0. 5 cm.
-Sickle segments: 9 artefacts.
These can be broken into 5 categories as can be seen in the table

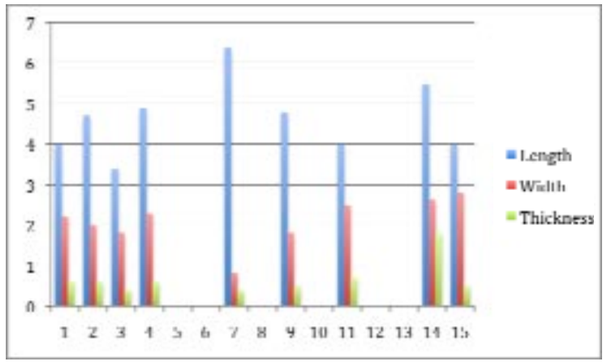
below:

Fractured segments (with gloss)	1 fracture opposed to 1 truncation with a back	Double truncations with a back	Two truncations without a back	Pointed
1	4	2	1	1

Table 6: Dimentions of sickle segments.

The type of chert used is varied and reflects the categories underlined above for the totality of the assemblage. Only one segment was made from the coarse-grained nummulitic chert (pl. 3: g). Others are mainly made from a fine or semi-fine grained brown chert.
Besides, there seems to be no standardization in the dimensions. Length varies between 6. 4 and 3. 4 cm. Width varies between 0. 8 and

Fig. 6 Dimensions of sickle segments.



2. 8 cm, and thickness varies between 0. 4 and 1.8 cm.

Out of 9 items, 5 show well-developed silica sheen along one of their edges.
Three morphological types are recorded here; the first one is the classical more or less narrow segments made on irregular blades (pl. 3: e, f). The second type is the large geometric segments (pl. 3: g, h). One of the large sickles is made on a blade (pl. 3: g) while the other is most probably made on a flake (pl. 3: h). The third type is represented by a pointed glossy segment clearly made on a blade (pl. 3: i). Pointed blades make their first appearance in the sequence, probably as blanks, in stratums 5-6; however plain (as blanks) pointed blades were not recorded in stratum 8.

-Scrapers: 3
One is a denticulated core-scraper and the two others are simple straight side-scrapers.
The core-scraper is made from a light brown semi-fine grained chert. Dimensions are: Length: 5. 7 cm. Width: 5. 9 cm. Thickness: 3. 9 cm (pl. 3: j).
Side-scrapers: one is made from a cherty limestone on a truncated flake/blade. Dimensions are: Length: 3. 7 cm. Width: 2. 3 cm. Thickness: 0. 6 cm.

The other is made from a semi-fine grained beige chert on a core-trimming element. Dimensions are: Length: 5. 7 cm. Width: 5. 9 cm. Thickness: 3. 9 cm.

Typological and technological characteristics of the assemblage:

This assemblage shows characteristics very similar to those observed for the MB IIB assemblage. Firstly the variety of raw material encountered here is practically similar to that of the previous period. Secondly, there does not seem to be any preferential use for one type of chert as was observed for stratums 5/6 where nummulitic chert was predominant. Also, there is no uniformity in the use of certain types of raw materials for the fabrication of tools, mainly segments. Again, there is no standardization in the dimensions as regards the segments.
Tools represent 23% of the total assemblage; the decrease in the number relative to stratums 5-6 is probably connected to the smaller size of the sample. The typological and technological characteristics of the segments show that there is no uniformity; various types of blanks were used to produce these tools. For instance, for the first time in the sequence, blanks other than blades were used to produce segments [17] (pl 3: h).
On the other hand, the proportion of sickle segments to the total assemblage (13%) is higher here relative to Stratum 5-6 (10%).
Segments show variety in their morphology; for the first time in the sequence three morphological types are identified. *Ad hoc* tools such as scrapers are rare relative to the previous period.

Conclusion

As observed in other sites dating back to the Middle Bronze, lithic exploitation is on a lower level than during the Early Bronze Age strata [18]. However, this study shows continuity in the system of production of stone tools. Typological and technological characteristics show a developmental trend as regards the tools and more particularly sickle segments; main characteristics can be summarised as follows:

-Abundant debitage. - Significant proportions of tools, in particular sickle segments (see table 7) contrary to what was observed during the Early Bronze.
-Typological and technological shift in the production of sickle segments starting with the MB IIA/B.
-Absence of sickle blades, frequent during the Early Bronze.
-Absence of arrowheads or projectile points.
-A peak in the production of tools and sickle segments during the MB IIA - despite the small size of the sample - and the MB IIB/C-Late Bronze. The dichotomy observed as regards a local production sequence (*ad hoc* tools) versus half-finished or finished imported segments observed during the Early Bronze is more or less valid in the case of the Middle Bronze Age levels. However, there seems to be a third production sequence, a local one destined to the fabrication of

blades from prismatic cores using nummulitic brown chert. The blanks obtained were destined to be fractioned on site and later transformed into tools, such as the large glossy segments. This is clearly evidenced during the MB IIB where a prismatic core, blades and segments made from nummulitic chert were recovered. Nevertheless, the presence of one -or a few- cores during the MB IIB and the MB IIB/C-Late Bronze does not demonstrate the existence of a craft specialization. It rather suggests an occasional local production of blades and sickle segments probably due to economic and social factors. This "demise" is supported by the opportunistic use of flakes as blanks in the fabrication of sickle segments at the end of the stratigraphic sequence during the MB IIB/C-Late Bronze; the flakes used as blanks to manufacture sickle segments probably came from the preparation of cores on site.

Throughout the whole sequence, there is a complete absence of the Canaanean blade technology; this is in agreement with data obtained from other sites in the Levant as regards the fading of this craft specialization with the start of the Middle Bronze.

The glossy segments recovered from all the levels in Sidon were certainly used for agricultural purposes. Previous studies on the function of Canaanean blades recovered from Early Bronze sites suggested that sickle segments were probably used, as during the Neolithic period, for harvesting cereals. But recent studies based on microscopic analysis of wear traces strongly suggest that many of the "sickle segments" were used as inserts in the Tribulum or threshing sledge. The sledge not only threshed large quantities of grain, it also produced straw [19]. Besides the role of grain in the economic and social system, chopped straw (chaff), a by-product of this operation, was also used as fuel, temper material for mud brick, plaster and pottery [20]. Were the glossy segments from Sidon's Middle Bronze levels used as inserts in a threshing sledge? The answer to this can be given by microscopic analysis of wear traces of the glossy segments. In any case, the sledge formed an integral part of the economic system of villages during the Bronze Age.

Amongst the chipped stone tools, many were recovered from funerary contexts, such as burials [21]. It is unclear if these can be considered as grave goods or intrusive elements brought there by the sediments filling the graves. In the Middle Bronze Age burials of Megiddo, Canaanean sickle segments were reported but considered intrusive [22].

To sum up, the available data strongly suggests that chipped stone tools were mostly destined to agricultural purposes and were not part of a specialized network of production or trade despite the probable presence of a few imported tools (pl. 1: l).

It is hoped that this study will contribute to the understanding of the economic and social role of chipped stone tools in the Middle Bronze Age societies of Sidon [23].

Table 7: Evolution of chipped stone tools during the Early and Middle Bronze Age.

Phase	Number of artefacts	Number of tools	Percentage of tools to total assemblage	Number of Sickle segments	Percentage to tools
Chalcolithic/Early Bronze Age I	146	26	17%	6	23%
Early Bronze Age I/ Early Bronze Age II	68	21	30%	9	42%
Early Bronze Age IIA	43	15	34%	3	20%
Middle Bronze Age IIA	19	10	52%	4	40%
Middle Bronze Age IIA/B	44	19	43%	5	26%
Middle Bronze Age IIB	87	28	32%	9	32%
Middle Bronze Age IIB/C	4	1	25%	1	100%
Middle Bronze Age IIB/C-Late Bronze	65	15	23%	9	60%

NOTES

1 S. A. Rosen, 1997; J. Chabot, 2004.

2 S. A. Rosen, 1997; J. Chabot, 2004.

3 S. A. Rosen, 1997.

4 See C. Yazbeck, 2006.

5 These levels were assigned to the Middle Bronze Age on the basis of ceramic typology.

6 C. Yazbeck, 2006.

7 M.-C. Cauvin, 1983.

8 P. Anderson *et al.*

9 This simplified presentation is restricted to the visible properties of the raw materials. In order to provide precise information, more detailed analysis would be required involving provenance studies, mineralogical examination etc.

10-11 C. Yazbeck, 2006.

12 Chips are practically absent and this is probably due to recovery techniques as sieving was not systematically practised during the excavations.

13 The presence of silica sheen or gloss is based here on a visual examination.

14 See C. Yazbeck, 2006.

15 All backed and/or truncated segments are considered as segments regardless of the presence of silica sheen.

16 The provenance of the sickle segments is unclear; they were collected from stratum 7-8. stratum 7 dates back to the MB IIB

while Stratum 8 dates back to the end of MB IIB-Late Bronze Age.
17 Sickle segments made on flakes were identified in the Bronze Age of Lerna in Greece, B. Hartenberger and R. Curtis, 2001.

18 S. A. Rosen, 1997.

19 P. Anderson *et al.*, 2004.

20 P. Anderson et al., 2004.

21 From Stratum 1-2-3 (MB IIA), 2 sickle segments were recovered from burial 19 and 70. From Stratum 5-6 (MB IIB): a blade was recovered from burial 67; a sickle segment was recovered from burial 58; 2 pointed blades were recovered from burial 68; a blade was recovered from burial 86; an end-scraper was recovered from burial 54 and a core (pl. 2: a) from burial 84.

22 P. Anderson *et al.*, 2004.

23 Comparisons with contemporary assemblages will not be presented here, as so far, Middle Bronze Age industries have never been studied in Lebanon.

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