An Upper Acheulian Industry from the Golan Heights

by N. Goren, Jerusalem [1])

1. Introduction

Since 1967 archaeological research in the Golan Heights has been intensive. Surveys, site mapping and surface collections have taken place in order to establish a general chrono-cultural framework. The resulting data indicated that this area was occupied from Neolithic/Chalcolithic times through the Roman Period, although there was little evidence for Palaeolithic sites.

In October 1973 Mr. R. Rotem informed the Institute of Archaeology of the Hebrew University, Jerusalem, of the existence of an Acheulian site in the Golan Heights, in an area between the villages of Joubbata el-Khachab and Trannje. In the ensuing months he collected surface material and made field observations which provided the location and distribution of the lithic material as well as the general geomorphological features of that area.

An additional collection was made by Mr. D. Ben-Ami and Prof. E. Tchernov, Department of Zoology, Hebrew University. Since the two collections derive from the vicinity of Joubbata el-Khachab, we will refer to the name of the site as Joubbata. These two collections form the basis of this study.

The boundaries of each major collection are shown in Fig. 1b. The topography shows that elevations in the vicinity range between 1070 and 1100 m. above sea level, with the highest elevation in the immediate area reaching 1150 m.; this peak was sterile indicating that it was not the source for lithic material.

Since there are two collections it was imperative to ascertain whether they represent a single assemblage, two contemporary but different assemblages, or two separate assemblages belonging to different industries. Preliminary observations indicated that handaxes are a prominent tool form and that the Levallois technique is strongly represented in both collections.

A further objective was to define the nature of the site as either an occupation site or a workshop. Initial observations revealed a high percentage of cores as opposed to flakes. In addition to these questions, there remained the broader problem of the relationship between the collections and known Acheulian industries in the Levant.

In order to better understand this site and its specific problems, the geographical region in which it is located is described below.

2. The Environment of the Golan Heights

The Golan Heights form a plateau about 60 km. long and 30 km. wide, framed by the Mt. Hermon range in the North, the Yarmuk Valley in the South, and the escarpmentfault of the northern and central Jordan Valley to the West. Only in the East does it grade topographically into the Damascus Basin.

[1] Institute of Archaeology, Hebrew University. This paper summarizes an M.A. Thesis presented to the Hebrew University and entitled "An Upper Acheulian Industry from the Golan Heights". The work was carried out under the supervision of Prof. O. Bar-Yosef, who was most helpful in his guidance and criticism during all the stages of research and presentation. I wish especially to thank Prof. G. Ll. Isaac for his valuable comments and criticism, and my collegues, Anna Belfer, A. N. Goring-Morris, P. Goldberg and S. Davis, and I am most grateful to Judy Ogden who prepared the illustrations.

The form and topography of the Golan Heights have been shaped by volcanic activity and tectonics. Two major volcanic cycles have been defined ; the earlier, "Cover Basalt" and the later "Golan Formation" (Mor, 1973). The major part of the northern Golan is covered with lavas of the younger cycle, some of which are called the "Little Leja". Mor (1973) and Michelson (per. comm.) consider that the younger basalts result from the Tel Hadar eruptions. Northeast of Hadar village there are five major and several smaller concentrations of volcanic craters, at elevations of ca. 1400 metres above sea level. The younger basalts remain undated, but they clearly belong to the Pleistocene, although some are considered by some geologists to be of historical age.

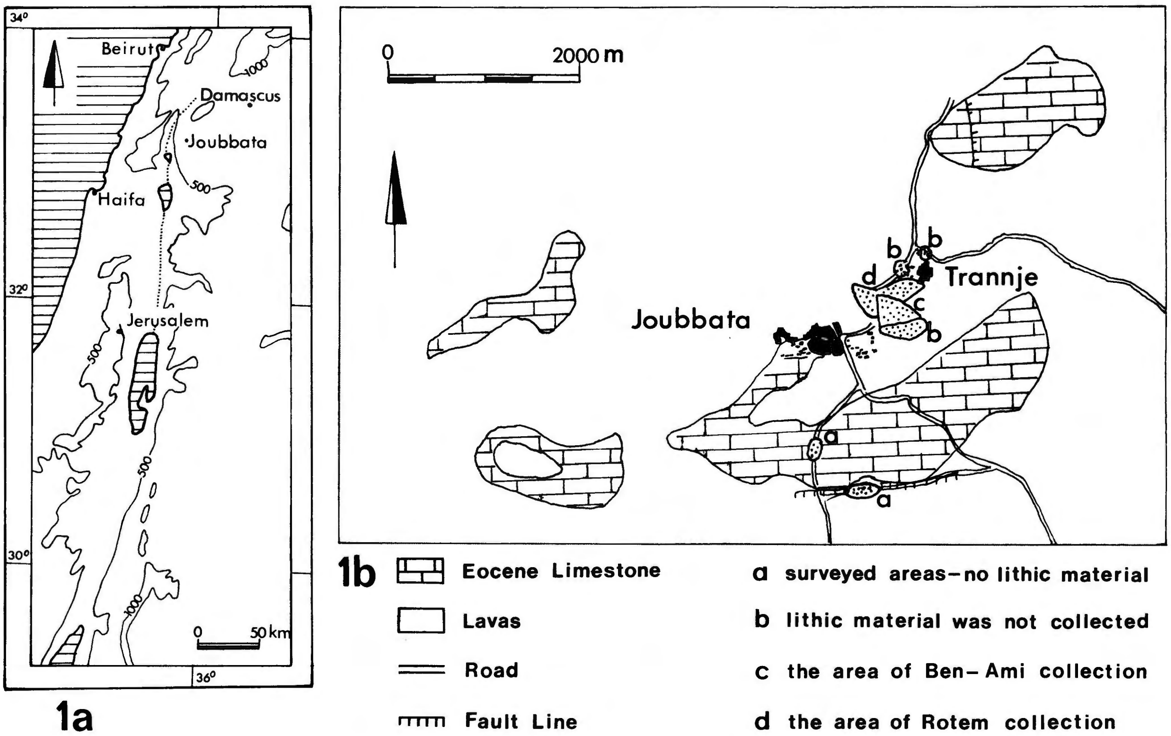

Fig. 1. a. Map Showing the Location of Joubbata. b. Map Showing the Major Geological Formations and the Collection.

Mor (1973, p. 13) has described a basalt flow northeast of Jebel Druze which covers a concentration of bones dated by C 14 to 4075–4160 years B.P. He suggested that the "Little Leja" is of similar age. Morphological observations support the hypothesis of a very young age; the terrain is undissected, and the wadis are shallow and display the features of a young poorly developed drainage system. In some parts drainage has not been established at all and water pools form in winter, and do not dry up until mid-summer (Mor, 1973; Michelson, per. comm.).

The lava cover is not complete so that limestone and dolomite inliers protrude as "islands". (Fig. 1b). The inliers in the Joubbata el-Khachab and Trannje area are of Eocene age. Nummulitic "Bar Kochba Limestone" constitutes the dominant Eocene facies in the Northern Golan. In the eastern part of the area the nummulitic limestone occurs above white powdered chalk, but in other places, such as Joubbata el-Khachab and Tel Manphucha, it overlies the Palaeocene "Taqiye" formation.

The soils of the Golan were formed from the deterioration of the Pleistocene lavas, and belong to the category of Mediterranean soils (Dan, 1972; Dan et alli, 1972). In some places thicker soils were subject to cultivation in historical times.

The climate is also Mediterranean, with hot, dry summers and cold, wet winters. The annual precipitation ranges between 700 to 1000 mm., (around heights of 940 m. a.s.l. annual precipitation is 900 mm.) and the annual mean temperature ranges from 15° to 17° (the range for the coldest month is 6° to 8° C, the range of temperature for the warmest months is between 22° and 24° C).

The higher parts of the Golan (north) are characterized by the plant association of *Quercus calliprinos* and *Quercus boissieri*. It is assumed that in the past, this vegetation covered all the north and northeastern Golan Heights from elevations above 600 m., although it presently appears only in three main localities around 900–1100 m. a.s.l. (Waisel et alli, 1975).

3. General Characteristics of the Lithic Industry

a. Raw Material

The entire assamblage is made on flint, most probably derived from the Eocene inliers described above. Petrological examination of several artefacts showed all to be of Eocene flint (G. Steinitz, per. comm.).

In some areas of collection all visible flints were collected, providing information on the form of the unflaked, primary material. In part, at least, these consisted of nodules with a chalky exterior rind grading into siliceous flint in the interior. Some pieces show the chalky rind, chalky-flint transition, and flint. The character of the raw material influences certain aspects of the industry, such as the state of preservation and patination.

b. State of Preservation

Three grades of preservation were considered: fresh, slightly abraded, and abraded. The abrasion does not necessitate fluvial transport. On the soft chalky parts of some tools, mechanical forces and vertical movement within the soil has been sufficient to cause slight abrasion, and in additon, metal plough blades have left rusty marks on some artefacts.

c. Patination

Three states of this attribute were recognized: without patination, with patina and with double patina. With its high chalk content, the flint is light coloured. The porous surfaces of every artefact have absorbed a brownish-red pigmentation, apparently the result of lying on basaltic soil for an extended period of time.

d. Typological and Technological Methods

Since handaxes from the Near East are closest typologically to those from Europe, and many of the flakes and flake tools exhibit the Levallois technique, Bordes' type list for the Lower and Middle Palaeolithic has been used (1961). Additional qualitative and quantitative attributes were noted, including amount of cortex, angle of striking platform, flake form, type of striking platform, flake curvature, location of retouch, type of retouch and form of retouched edge.

Various metrical attributes such as length, width, thickness, etc. were also used. The data were transferred to punch cards and analysed by programs contained in the Statistical Package for the Social Sciences (SPSS) (Nie et alli, 1975). The results of the detailed analysis are presented here.

Throughout the various stages of analysis the two different collections were processed separately, for obvious reasons. Subsequent statistical tests and other observations eventually proved the homogeneity of the two collections. Since this article is a short summary of the original research the major characteristics of this Acheulian assemblage are given, and only when essential are the two collections presented separately in tables. The composition of the entire assemblage is presented in Table 1.

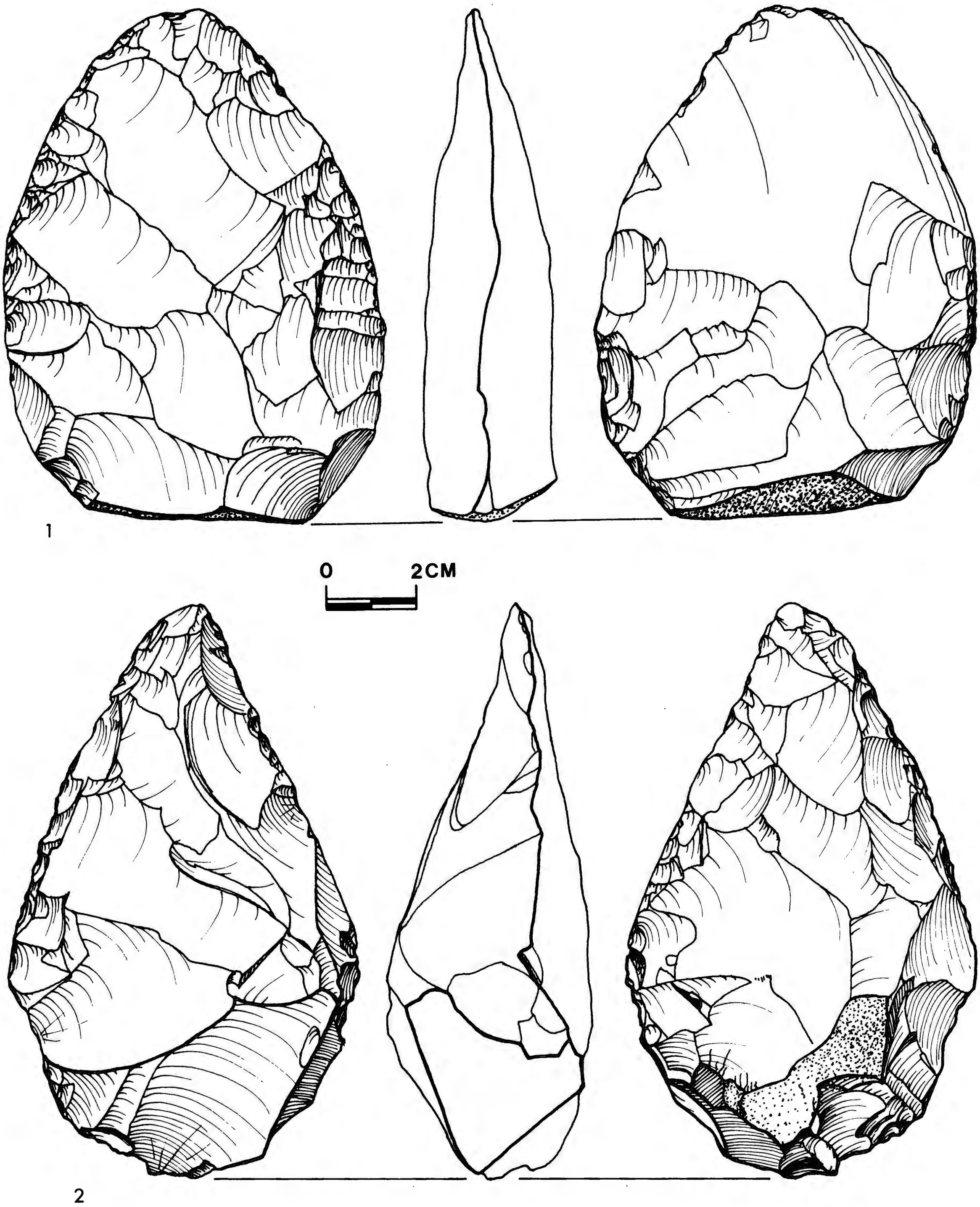

Fig. 2. Bifaces from Joubbata: 1. Cordiform; 2. Amygdaloid.

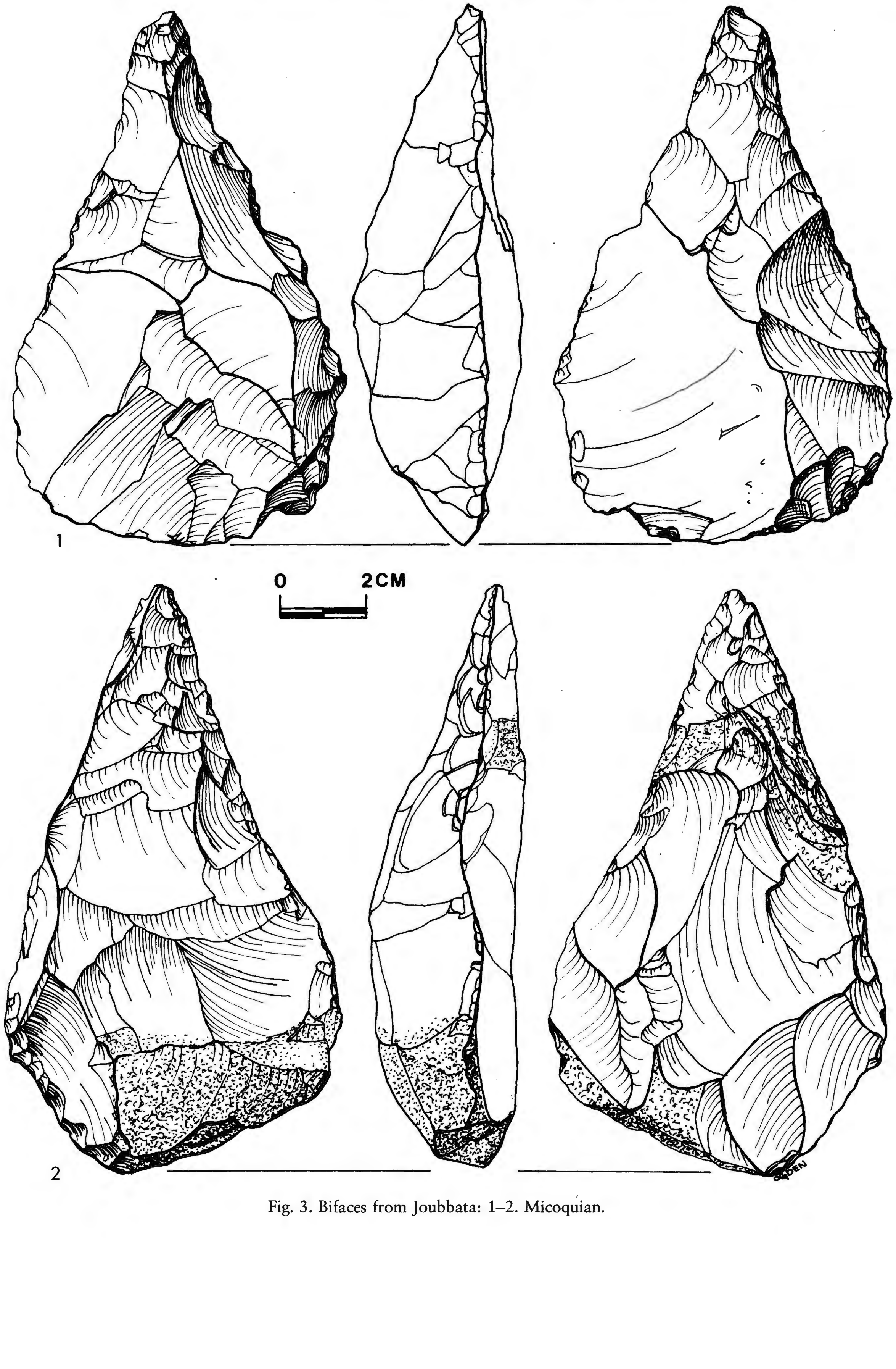

Fig. 3. Bifaces from Joubbata: 1–2. Micoquian.

Table 1. Total Inventories of the Joubbata Assemblage

	Rotem collection	Ben-Ami collection	Both collections
handaxes	108	47	155
flake & blade tools	75	21	96
flakes & blades	34	11	45
cores	199	18	217
TOTAL	416	97	513

4. Quantitative and Descriptive Analysis of the Joubbata Assemblage

a. Bifaces

All of the handaxes in the collection were shaped with a soft hammer, creating very shallow scars and frequent straight edges. Another distinct feature is the high intensity of flaking on the distal end (the upper fifth portion). Unfinished specimens are usually worked at this end, with completely shaped tips. Homogeneity is particularly pronounced for the metrical measurements taken for the thickness of the upper fifth segment. The result were that 73 % of the total of 150 bifaces have a thickness of 10–20 mm., 20 % between 30–40 mm., and only very rare cases are either thinner or thicker.

Table 2. Amount of Cortex left on Handaxes

% cortex	%	N°
0	32	48
0–25	53·3	80
25–50	10	15
50–75	4	6
75–100	·7	1
	100	150

The high percentage of non-cortical elements evident in Table 2, might be explained by the fact that 12 % of the handaxes were made on flakes.

The natural non-cortical surfaces of the flint, as found bedded and patinated within the Eocene formation, were intensively used (26 %) as striking platforms for the handaxes.

Table 3 shows that rounded aspect handaxes are dominant, with a high frequency of ovaloids, and a lower frequency for amygdaloids. However, a notable characteristic of the site is the presence of Micoquian handaxes (8.5 %).

An interesting type is the "chisel-ended" handaxe whose tip is modified by bifacial removals from the distal end along the longitudinal axis.

Table 3. Frequencies of Handaxes Types at Joubbata in the two Collections

	Both Collections		Rotem		Ben-Ami	
	N°	%	N°	%	N°	%
Triangular	1	·67	1	·92		
Sub-triangular	3	2·01	2	1·85	1	2·12
Elongated triangular	1	·67	1	·92		
Cordiform	1	·67	1	·92		
Sub-cordiform	9	6·04	8	7·40	1	2·12

	Both Collections		Rotem		Ben-Ami	
	N°	%	N°	%	N°	%
Elongated sub-cordiform	1	·67	1	·92		
Discoid	20	13·42	13	12·03	7	14·89
Ovaloid	34	22·81	21	19·44	13	27·65
Limande	2	1·34	2	1·85		
Proto-limande	3	2·01	3	2·77		
Ficron	2	1·34	2	1·85		
Lanceolate	2	1·34	1	·92	1	2·12
Micoquian	12	8·05	9	8·33	3	6·38
Amigdaloid	10	6·71	8	7·40	2	4·25
Short amigdaloid	17	11·40	9	8·33	8	17·02
"Chisel-End"	6	4·02	4	3·70	2	4·25
Varia	25	16·77	18	16·66	7	17·02
Broken specimens			4	3·70	2	4·25
TOTAL	155	99·94	108	99·91	47	99·94

Although we noted above that handaxes from the Near East are similar to those from Western Europe, there are some exceptions. The similarities and dissimilarities are expressed by the various indices (Bordes, 1961, pp. 54–55; Brezillon, 1968, p. 154). Thus amygdaloids, short amygdaloids, and micoquian forms are similar, while cordiforms, discoids and the ovaloids differ (Figs. 2, 3). This principal difference is expressed by the width/thickness ratio (m/e); Joubbata handaxes are thicker than those found in Europe.

A second difference is revealed when plotting handaxe ratio values in Bordes' plot diagram of the two axes; L/a and n/M x 100 (Bordes, 1961). Here many tools fall on the boundary lines between classes III and IV. The same phenomenon was observed by Gilead and Ronen (1977) at Evron (Zinnat) which indicated that there may be an intermediate type.

b. Flakes and Flake Tools

In addtion to the typological study of the flakes and flake tools, qualitative and quantitative attributes were also taken. These technological observations included direction of blow (after Isaac and Keller, 1968), type of striking platform, scar pattern on the dorsal face, and angle of striking platform. A selection of these attributes (Fig. 4) clearly indicates that both collections display a great degree of uniformity.

At a more advanced stage the material was studied as one unit, since, among other reasons (see discussion), the number of flakes and flake tools in the Ben-Ami collection was very limited (Table 1). All of the flakes have pronounced bulbs of percussion and appear to have been made with a hard hammer. Not a single "biface flake" was found. Table 4 presents some of the metrical measurements taken on the flake tools. Table 5 presents the real and essential typological frequencies. The assemblage is characterized by high percentages of notches and denticulates and especially burins, but scrapers are conspicuously rare (Fig. 5).

Table 4. Metrical Measurements of Flakes and Blades at Joubbata

dimension	mean	st. error	s.d.
length	74·25	2·16	25·71
width	57·44	1·61	19·14
thickness	19·45	·59	7·10

N° = 141 without tool-types nos. 47–49 in Bordes' type-list

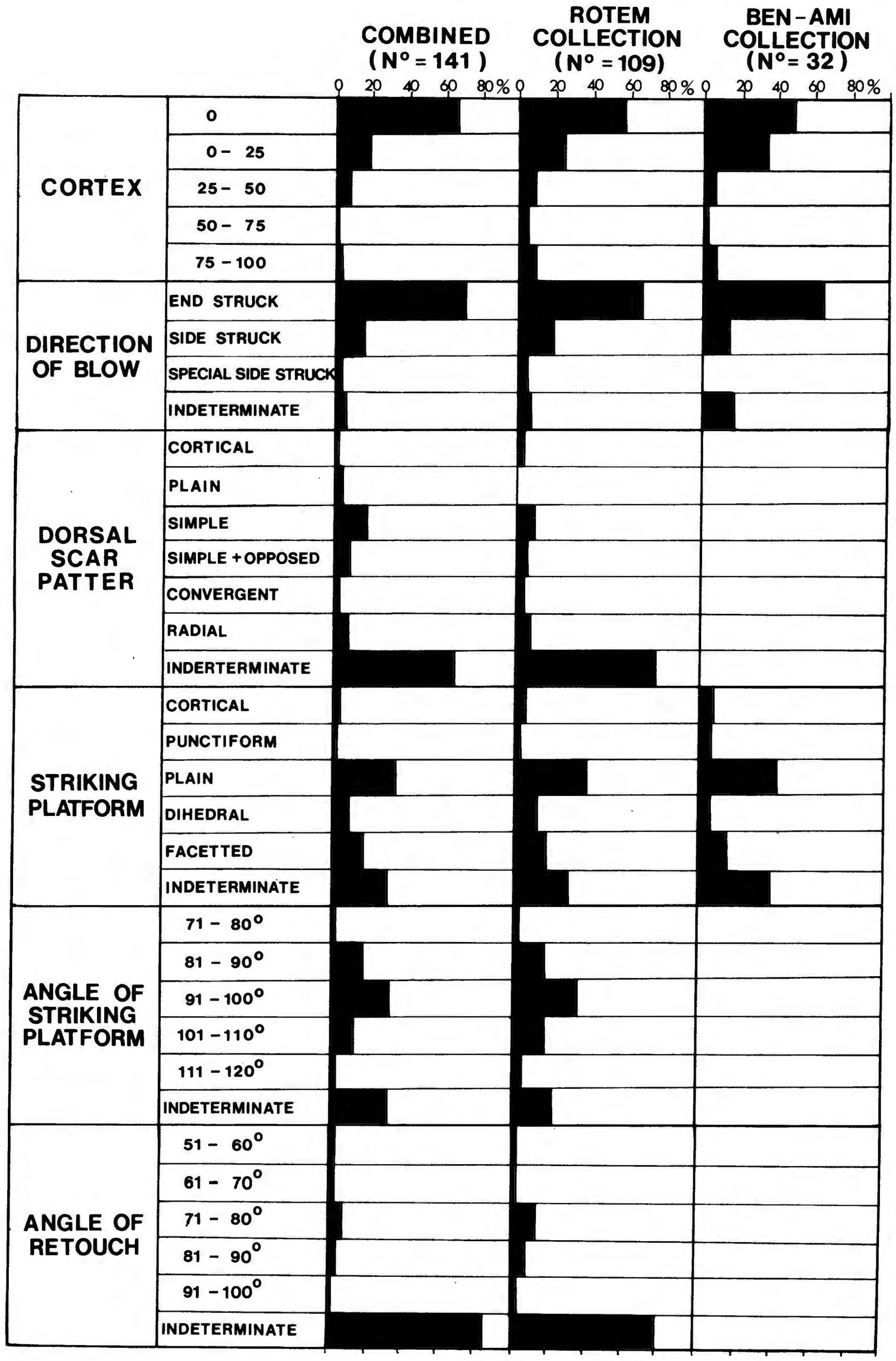

Fig. 4. Histograms of Selected Technological Attributes of Flakes from the Collections of Joubbata (without nos. 47–49 of Bordes' type-list).

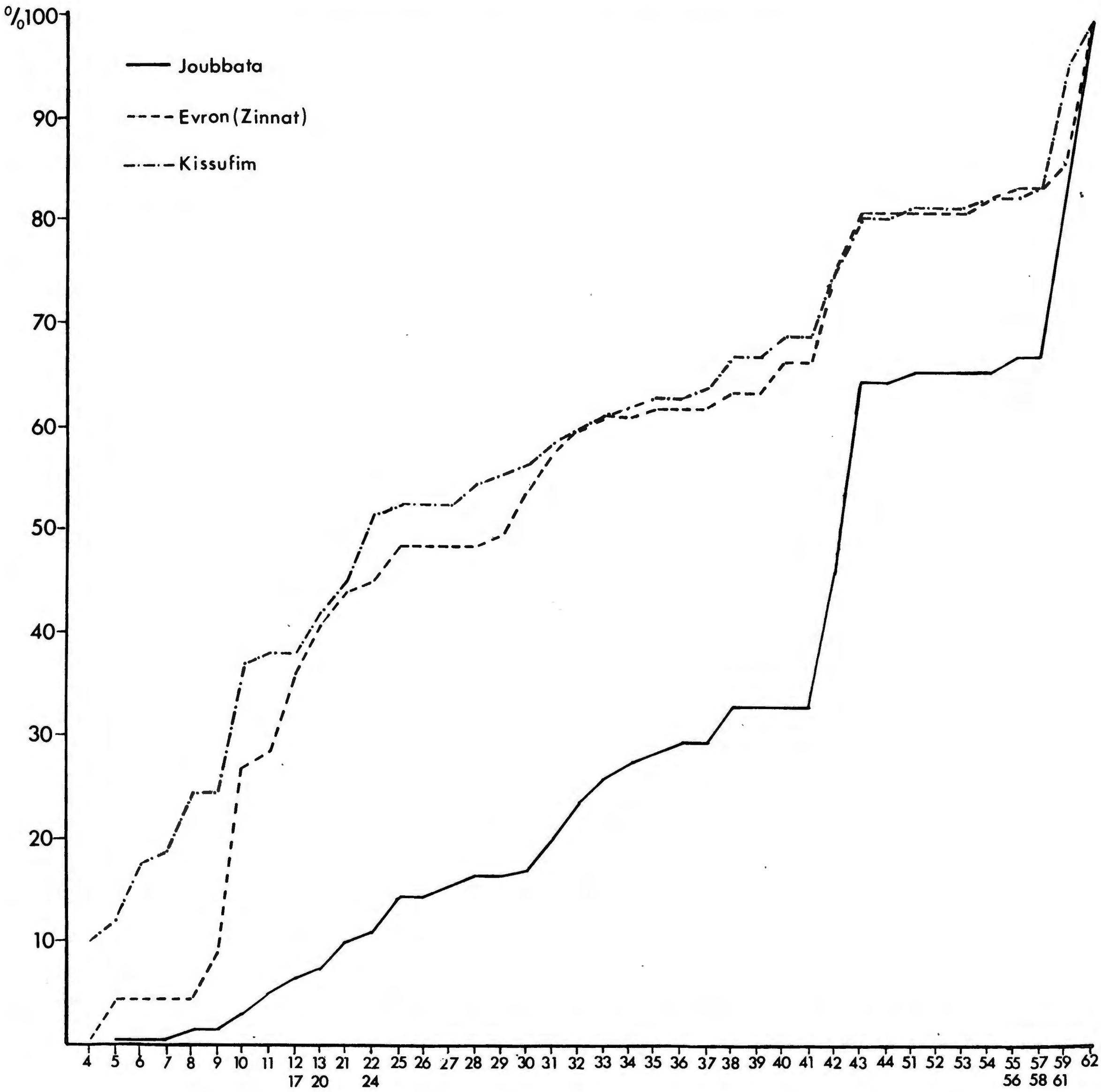

Fig. 5. Essential Typological Frequencies of Joubbata (N° = 114), Evron (Zinnat; N° = 111) and Kissufim (N° = 97).

Table 5. Technological and Typological Indices of Flake Tools at Joubbata

technological indices		typological indices			characteristic groups		
			"real"	"essential"		"real"	"essential"
IL	72·02	ILty	13·40	0	I	13·40	0
IF	42·40	IR	9·49	14·91	II	10·05	15·78
IF^s	28·80	Iau	0·55	0·87	III	8·37	13·15
Ilam	14·12	IB	46·40	57·62	IV	11·73	18·42

Of special interest is the appearance of the "truncated-facetted" or "Nahar-Ibrahim" Technique, which was first described by B. Schroeder (1969) at Jerf-Ajla. Similar characteristics were described by Solecki (1970) at

Nahar Ibrahim. This technique appears on 9.3 % of all flakes from the Joubbata assemblage, and most of these flakes show signs of removals at the distal end. Since this specific phenomenon has been observed from the Acheulian through to the Upper Palaeolithic, it is reasonable to view it as a technological feature only.

The detailed typological list is presented in Table 6 and selected tools are shown in Figs. 6 and 7.

Table 6. Tool Type Frequencies at Joubbata following Bordes' Type List

Tool Type	N°	"real" %	% cumul.	"essential" %	% cumul. (N° = 114)	
1	17	9·49	9·49			
2	5	2·79	12·28			
3	2	1·11	13·39			
5	1	0·55	13·94	0·87	0·87	
8	1	0·55	14·49	0·87	1·74	1
10	2	1·11	15·60	1·75	3·49	
11	2	1·11	16·71	1·75	5·24	
15	1	0·55	17·26	0·87	6·11	
16	1	0·55	17·81	0·87	6·98	
19	1	0·55	18·36	0·87	7·85	
21	3	1·67	20·03	2·63	10·48	
23	1	0·55	20·58	0·87	11·35	
25	4	2·23	22·81	3·50	14·85	
27	1	0·55	23·36	0·87	15·72	
28	1	0·55	23·91	0·87	16·59	
30	1	0·55	24·46	0·87	17·46	
31	3	1·67	26·13	2·63	20·09	
32	4	2·23	28·36	3·50	23·59	
33	3	1·67	30·03	2·63	26·22	
34	2	1·11	31·14	1·75	27·97	
35	1	0·55	31·69	0·87	28·84	
36	1	0·55	32·24	0·87	29·71	
38	4	2·23	34·47	3·50	33·21	
42	15	8·37	42·84	13·15	46·36	
43	21	11·73	54·57	18·42	64·78	
49	41	22·90	77·47			
51	1	0·55	78·02	0·87	65·65	
56	2	1·11	79·13	1·75	67·40	
60	18	10·05	89·18	15·78	83·18	
62	19	10·61	99·79	16·66	99·84	
TOTAL	179	99·79	99·79	99·84	99·84	

Discussion of certain typological features follows:

8) Limace: (1) The dorsal face is retouched along both the edges. 1/3 of the ventral surface has retouch, including the striking platform and the bulb.

10) Simple convex side scraper: (2) One is a Levallois flake and the other on a non-Levallois flake.

11) Simple concave side scraper: (2) One tool displays the "Nahar Ibrahim" technique on the ventral distal face and signs of utilization on the dorsal face. The second tool is made on an atypical Levallois flake; the striking platform was removed, and there is a notch on the distal part of the dorsal side.

15) Double convex side-scraper: (1) This composite tool comprising a convex side-scraper and a burin was made on a non-Levallois flake. The burin blow is located on the proximal part of the ventral face. The striking platform and the bulb were removed.

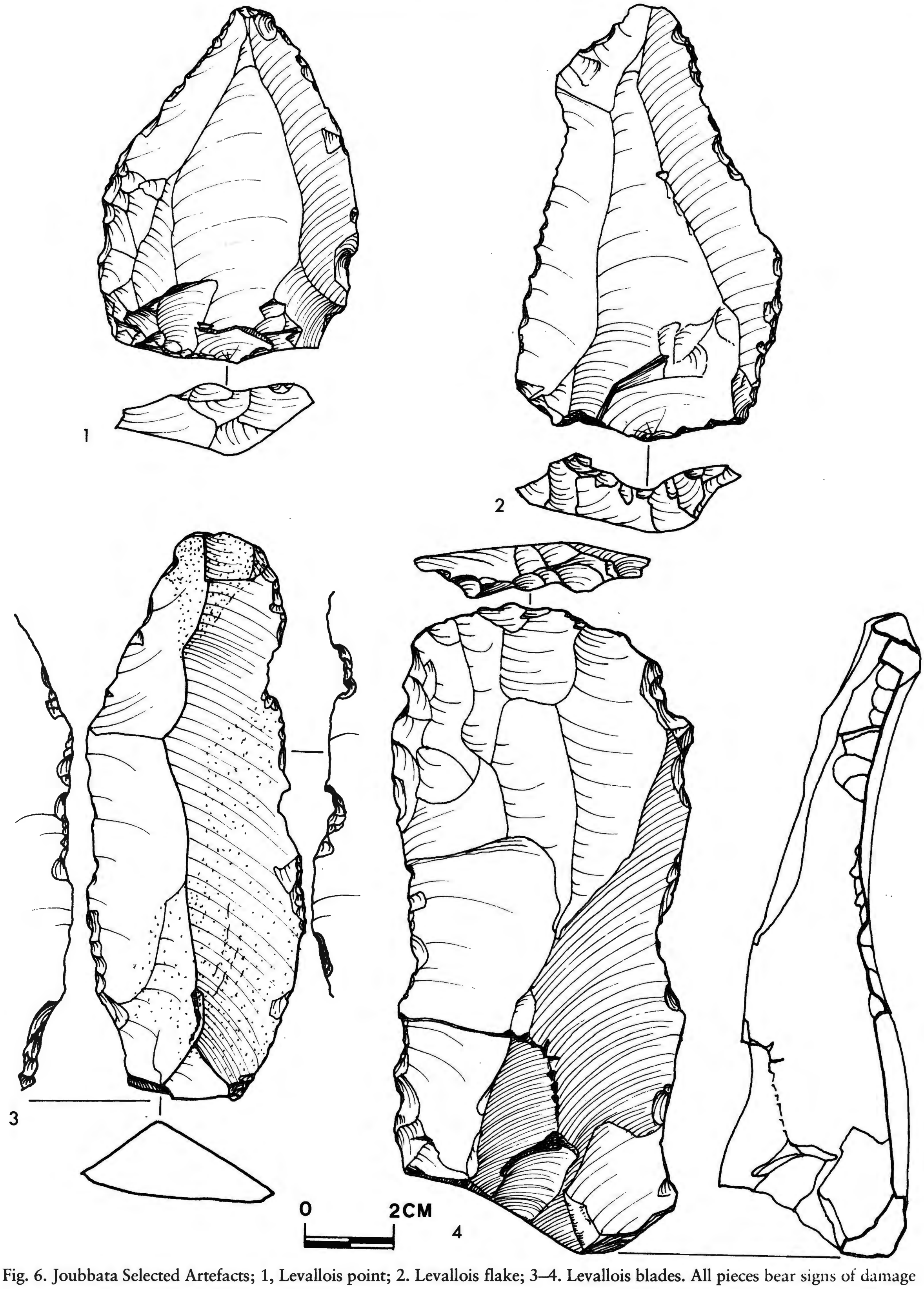

Fig. 6. Joubbata Selected Artefacts; 1, Levallois point; 2. Levallois flake; 3–4. Levallois blades. All pieces bear signs of damage on their.

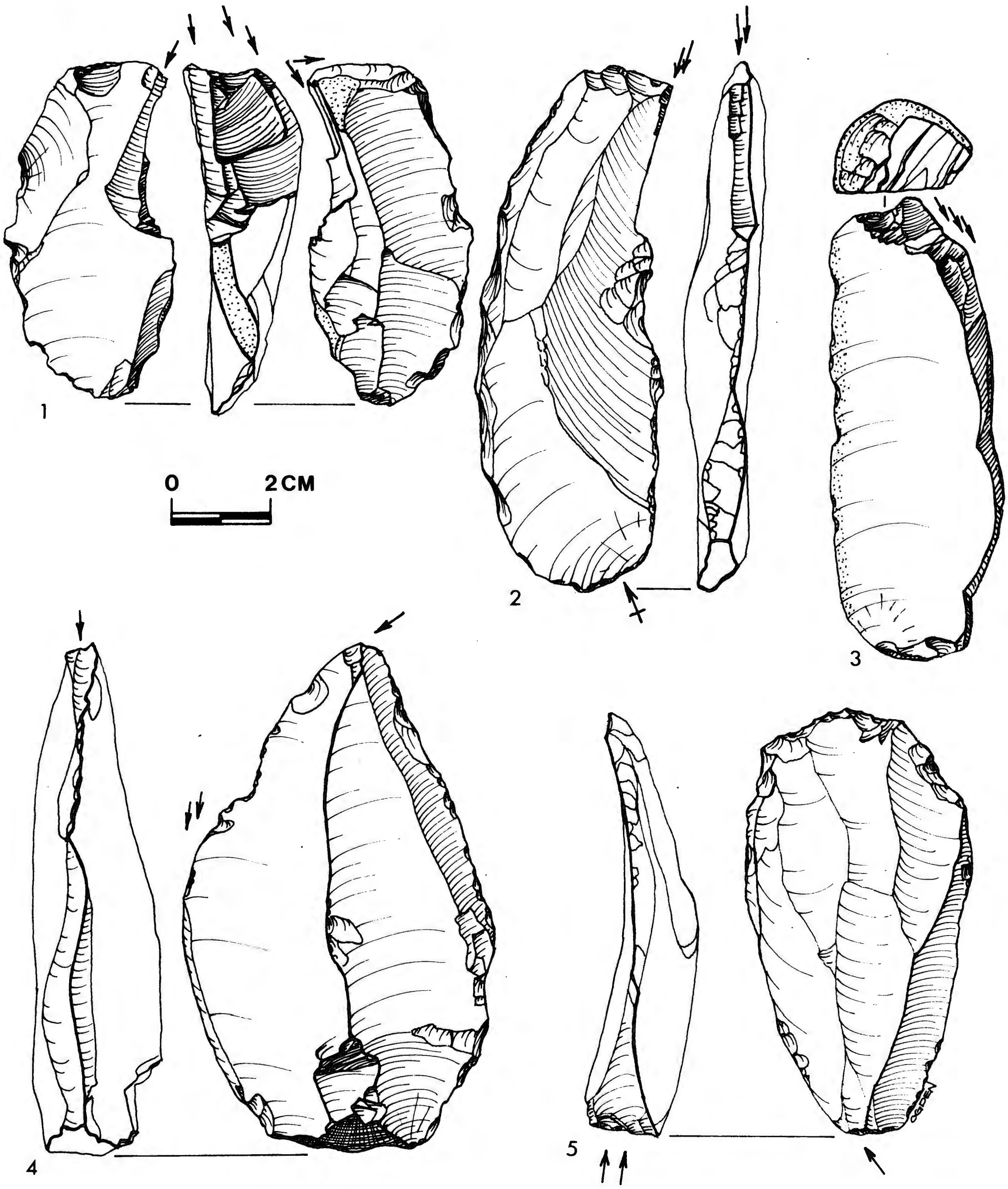

Fig. 7. Joubbata Selected Artefacts: 1–4. burins; burin-scraper.

21) Déjeté side-scraper: (3) One of these tools is made on a relatively large flake (79 x 111 x 43 mm.) and appears to be a biface in a primary stage of manufacture.
25) Side-scraper on the ventral face: (4) All are on Levallois flakes. On two tools the striking platforms and bulbs were removed. On another the scraper retouch appears at the distal end.
28) Bifacial scraper: (1) The left dorsal edge is more intensively retouched. The retouch on the ventral side is restricted to the right edge and includes the striking platform. Only half of the ventral side is retouched including the distal part.
30) Typical end-scraper: (1) On a Levallois flake.
31) Atypical end-scraper: (3) Two are on non-Levallois flakes and the third on a Levallois flake. The "Nahar--Ibrahim" technique occurs on the ventral face of one of these pieces.
32) Typical burin: (4) These include an angle burin on a non-Levallois blade (Fig. 7:1); a truncated burin on a retouched Levallois blade, with a notch to stop the blow (Fig. 7:2); an obliquely truncated burin with the burin blow located on the ventral side (Fig. 7:4) and the fourth is a dihedral burin on a non-Levallois blade.
33) Atypical burin: (3) There is a burin on a Levallois core; a composite tool including a transversal burin on the ventral face and an end-scraper on the dorsal face (Fig. 7:5); the third item is a burin on a primary blade (Fig. 7:3).
35) Atypical borer: (1) The borer is made on the ventral face, with scraper-like retouch on the distal part.
36) Backed knife: (1) This is on a non-Levallois flake. The retouch is semi-abrupt and continues for only 3.5 cm.
38) Naturally backed knife: (4) All are made with the Levallois technique. One displays intensive signs of utilization.

c. Cores

Typology: Core typology was based on Bordes' type list with minor alternations as follows (see Table 7):
1. Varia and unshaped cores were grouped together.
2. Chopping tools were omitted from the typological list and placed with other types of cores.
3. Two typological classes were added: "Large" cores, including Bordes' "Acheulian cores"; and cores in primary stages of preparation. Again both collections were considered as one for the following presentation.

Table 7. Core Type Frequencies at Joubbata

Core Type	N°	%
Levallois flake core	68	31·33
Levallois point core	23	10·59
Levallois blade core	10	4·60
flake core	2	0·92
blade core	6	2·76
discoidal core	15	6·91
globular core	12	5·52
prismatic core	23	5·99
pyramidal core	2	0·92
varia	28	12·90
choppers	18	8·29
"big core"	14	6·45
"primary stage" core	6	2·76
TOTAL	217	99·94
Levallois cores	101	46·54
non-Levallois cores	116	53·94
TOTAL	217	99·99

The length and width of the last flake removed were included among the metrical measurements taken on cores. Table 8 gives the mean values of the above described scar, and those which relate to flake dimensions.

Table 8. Size of Largest Flake Scars on Cores compared to Size of Flakes*

	Cores (N° = 174)		Flakes (N° = 141)**		
	x	s.d.	x	s.d.	st.err.
mean length	48·89	15·29	74·24	25·71	2·16
mean width	37·43	31·32	57·44	19·14	1·61

*(in mm)
**without types nos. 47–49 in Bordes' type list

Similar results are known from other sites where mean flake dimensions are larger than those of the cores; for example, the results from the nearby site of Jerf-Ajla in Syria. Schroeder (1969) suggested two possible explanations for this phenomenon; either the flakes were made at a workshop site and were then brought to the site or, alternatively, intensive core use resulted in their small size.

5. Discussion

Although not all of the data is presented in this paper, there are several reasons to believe that both of the Joubbata collections from the Golan Heights represent a sample from a single Acheulian assemblage. Various observations, both qualitative and quantitative, from each collection gave very similar results. The length, width and thickness of handaxes from both collections were tested with the two tailed Kolmogorov-Smirnov test, with a 99 % confidence interval, which indicates that the tools derive from the same population (Siegel, 1956). The same procedure was applied to flakes and flake tools and gave similar results. Both typological and technological considerations support this evidence; 85.3 % of the handaxes and 82.7 % of the flake tools and flakes have less than 25 % cortex, clearly indicating that the assemblage does not represent a quarry-type workshop, inspite of the proximity to raw material.

Certain problems could not be solved by this analysis, one being the high proportions of cores in relation to other tool types. The possibility that the site was a workshop has been rejected, so that the only other explanation for this high proportion would be that the method of collection was at fault.

The geomorphological location of the artefacts seems to support the assumption that there was no major transportation factor. From the topographic situation it is evident that there are no higher areas in the immediate vicinity which could have been the origin of the artefacts. Although abraded pieces are quite common, we believe that variation in the texture of the raw material is responsible for this feature. We cannot in this instance, consider broken elements as indicators of transportation, as only 2 % of the handaxes and 7.8 % of the flakes and flake tools are broken.

There is an extremely high density of Upper Acheulian sites and find-spots in Israel, interpreted by many workers as indicating a period of intensive occupation (Gilead, 1970 a, b; Bar-Yosef, 1975). It appears that such an interpretation is also valid for other regions of the Levant including Lebanon and Syria. F. Hours (1975) has summarized the evidence for the Lower Palaeolithic in these countries, and noted some 130 Acheulian sites which he referred to the Middle/Upper Acheulian. Of these sites, only Jerf-Ajla has been published while four other sites at Ras Beirut have been the subjects of preliminary reports only. Lower Acheulian sites were published by Besançon (et alli, 1970), Hours (1975) and Clark (1967 a, b).

This lack of published information has thus necessitated comparison of the Joubbata assemblage with data from Israeli sites. Israeli sites, however, present two major problems; firstly, most of the available material comes from surface sites, and secondly, data from these surface sites do not necessarily present the real fre-

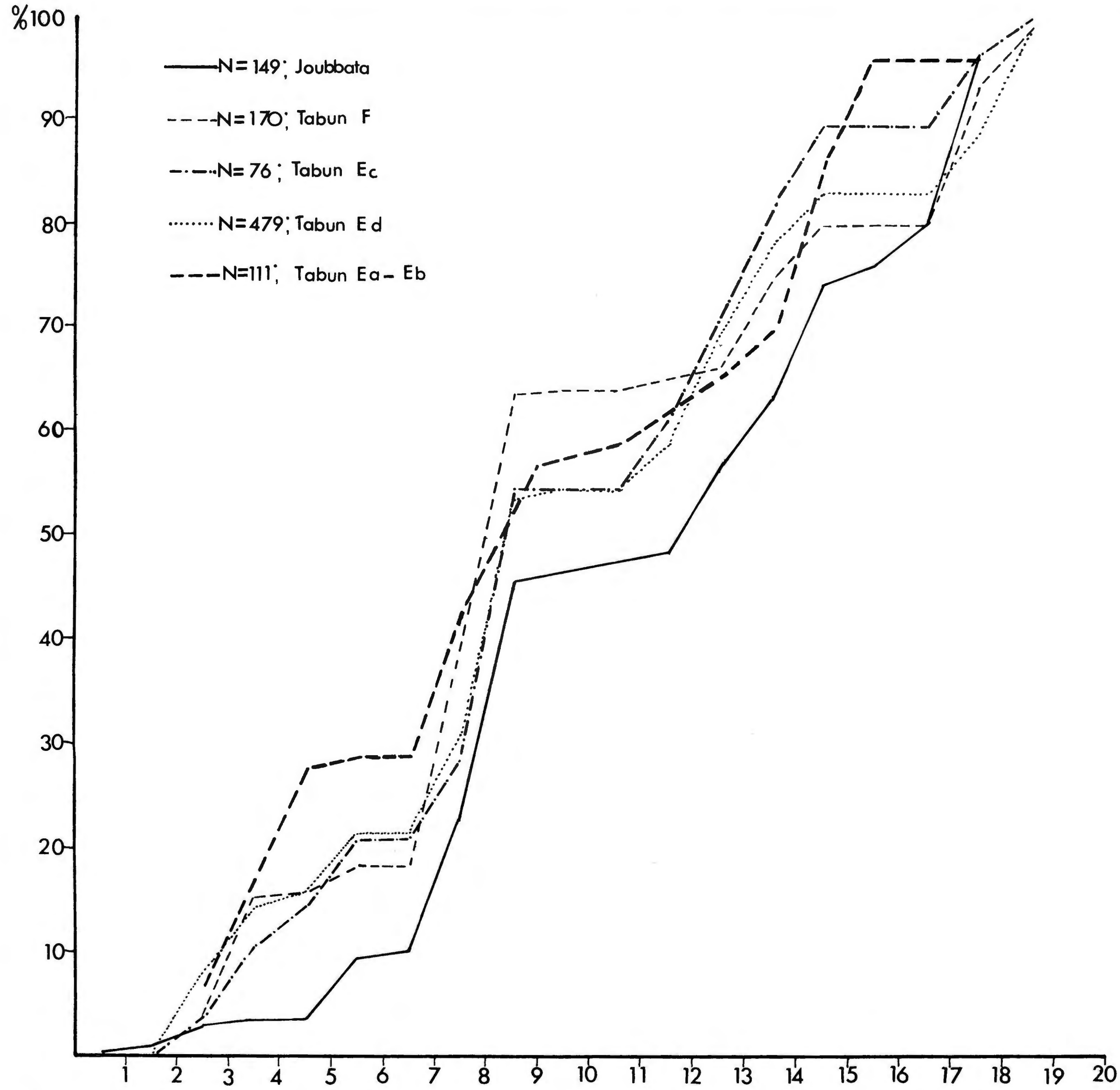

Fig. 8. Cumulative graphs comparing the frequencies of bifaces from Joubbata to the Tabun assemblages (the later after Gilead, 1970 b). Handaxe types: 1. triangular; 2. elongated triangular; 3. sub-triangular; 4. cordiform; 5. elongated cordiform; 6. sub-cordiform; 7. elongated sub-cordiform; 8. discoid; 9. ovaloid; 10. limande; 11. ficron; 12. lanceolate; 13. micoquian; 14. amygdaloid; 15. short amygdaloid; 16. proto limande; 17. "chisel-end"; 18. varia; 19. cleaver; 20. naviform.

quencies, since many sites were collected by amateurs, resulting in a dominance of handaxes, and absence of other typological classes. As a result of these limitations, it was deemed essential to break down the typological components for inter-site comparison, tretaing handaxes, flakes and flake tools separately.

It was found appropriate to use information published by D. Gilead (1970 a, b) who isolated five different groups of Lower Palaeolithic (Acheulian) assemblages and so sites representing those five categories were chosen for comparison with Joubbata. These comprised Gesher Benot Yaakov, Zuttiyeh, Tabun F, Ed, Ec, and Ea to Eb, Oumm Quatafa D1 and D2, Sahel el-Koussin, Yiron, Maayan Baruch, Kissufim and Evron (Zinnat).

Using cumulative graphs based on the data from these sites, Joubbata can be seen to be the most similar to Tabun Ec, Ed and F (Fig. 8); and also, but to a lesser extent, with Oumm Quatafa D2 and Sahel el-Koussin.

Since this method of comparison has certain limitations, an initial attempt was made to use a non-metric multidimensional scaling technique known as "Smallest Space Analysis-I" (Guttman, 1968). With the help of Mr. A. Rave (Department of Statistics, Hebrew University, Jerusalem) this program was run using the common type-list. The statistically acceptable (two dimensional) results indicated that the closest similarity of the Joubbata assemblage is with that of Tabun Ed. Other means of comparison based on metrical measurements revealed that the mean length of the Joubbata handaxes (96·75 ± 16·7 mm.) is between those for Holon and Evron (Zinnat) (Bar-Yosef, 1975, Table 4). The refinement index (thickness/width) for Joubbata is ·51 ± ·09 which is closest to that of Tabun Ec (·51 ± ·11).

The only available flake tool collections for comparison come from two similar Upper Acheulian sites at Evron (Gilead and Ronen 1977) and Kissufim, (Ronen et alli 1972), both of which differ typologically from the Joubbata material. The main difference can be seen in the various flake tool types; Kissufim and Evron have high percentages of various side-scrapers as opposed to very high percentages of notches, denticulates and burins at Joubbata.

To summarize the chronological aspect, it seems that the proposal by Mor (1973) that the lavas of the Northern Golan Heights are of very young age (ca. 4100 B. P.) does not hold, in the light of the information now available form the site of Joubbata.

Deriviation of the artefacts form Mediterranean soils originating in the local lavas, the poorly developed drainage system, the absence of any other topographic source for the lithic material, and the minimal signs of transportation, all exclude the suggestion of an historical date for the site and its vicinity.

The various characteristics of the Joubbata assemblage clearly indicate that it should be assigned to the Acheulian complex of industries as known in the Near East. More specifically, it should be dated to the final stages of the Acheulian. Since Tabun E. Kissufim and Evron (Zinnat) are all dated to the last Interglacial (Gilead 1970 a; Gilead and Ronen 1977; Jelinek et alli 1973), we suggest that Joubbata also be placed within the same chronological frame. From the evidence presently available it is not possible to be more specific about the date.

Bibliography

BAR-YOSEF, O. 1975: Stratigraphy and Patterns of Cultural Change in the Middle Pleistocene in: BUTZER, K., G. Ll. ISAAC (eds.), After the Australopithecines Mouton Publishers, the Hague, pp. 571–604.

BESANCON, J., L. COPLAND, F. HOURS 1970: L'Acheuléen de Joub Jannine II Compte Rendu d'un Sondage Effective en 1968. Bulletin du Musée de Beyrouth, 23:9–24.

BORDES, F. 1961: Typologie du Paléolithique Ancien et Moyen. Delmas, Bordeaux.

BRÉZILLION, M. 1968: La Dénomination des Objets de Pierre Taillée. IV Supplément à "Gallia Préhistoire", Centre National de la Recherche Scientifique.

CLARK, J. D. 1967:The Middle Acheulian Occupation Site at Latamne, Northern Syria (first paper). Quaternaria, 9:1–68.

CLARK, J. D. 1967: The Middle Acheulian Occupation Site at Latamne, Northern Syria (second paper). Quaternaria, 10:1–47.

DAN, J. 1972: Golan Soils, Teva VeAretz, a (16):12–18 (in Hebrew).

DAN, J., H. YAALON, H. KOYUMDJISKY, Z. RAZ 1972: The Soil Association Map of Israel (1:1 000 000). Israel Journal of Earth Sciences, 21:29-49.

GILEAD, D. 1970 a: Handaxe Industries in Israel and Near East. World Archaeology, 2, 1:1–11.

GILEAD, D. 1970 b: Early Palaeolithic Cultures in Israel and the Near East. Unpublished Ph. D. Thesis, Hebrew University, Jerusalem.

GILEAD, D., A. RONEN 1977: Acheulian Industries from Evron, Western Galilee Coastal Plain. Eretz Israel, 13:56–86.

GUTTMAN, L. 1968: General Non-Metric Technique for Finding the Smallest Coordinates Space for a Configuration of Points. Psychometrika, 33, 4:469–506.

HOURS, F. 1975: The Lower Paleolithic of Lebanon and Syria in: WENDORF, F., A. E. MARKS (eds.), Problems in Prehistory: North Africa and the Levant. SMU Press, Dallas, pp. 249–271.

ISAAC, G. Ll., C. KELLER 1968: Note on the Proportinal Frequency of side and end struck Flakes. South African Archaeological Bulletin, 23:17–19.

JELINEK, A., W. FARRAND, G. HAAS, A. HOROWITZ, P. GOLDBERG 1973: New Excavations at the Tabun Cave, Mount Carmel, Israel 1967–1972, a Preleminary Report. Paleorient, 1,2:151–183.

MOR, D. 1973: The Volcanism of the Central Golan Heights T.H.L. Ltd., Tel-Aviv (in Hebrew).

NIE, N. H., C. H. HULL, J. G. JENKINS, K. STEINBRENNER, D. H. BENT 1975: SPSS - Statistical Package for the Social Sciences (second edition). McGraw-Hill, New-York.

SCHROEDER, H. 1969: The Lithic Industries from Jerf Ajla and their Bearing on the Problem of a Middle to Upper Paleolithic Transition. Ph. D. Thesis. University Microfilms, a Xerox Company, Ann-Arbor, Michigan.

SIEGEL, S. 1956: Non Parametric Statistics for the Behavioreal Sciences McGraw-Hill, Koga Kusha.

SOLECKI, R. L., R. SOLECKI 1970: A New Secondary Flaking Technique at the Nahar Ibraaim Cave Site, Lebanon. Bulletin du Musée de Beyrouth, 23:137-142.

WAISEL, Y., G. POLEG, Y. COHEN 1975: The Ecology of Israeli Flora. Depart. of Botany, Tel-Aviv University Press, Tel-Aviv.