

SURVEY OF ACHEULEAN SITES IN THE WĀDĪ AS-SIRĤĀN BASIN, JORDAN, 1999

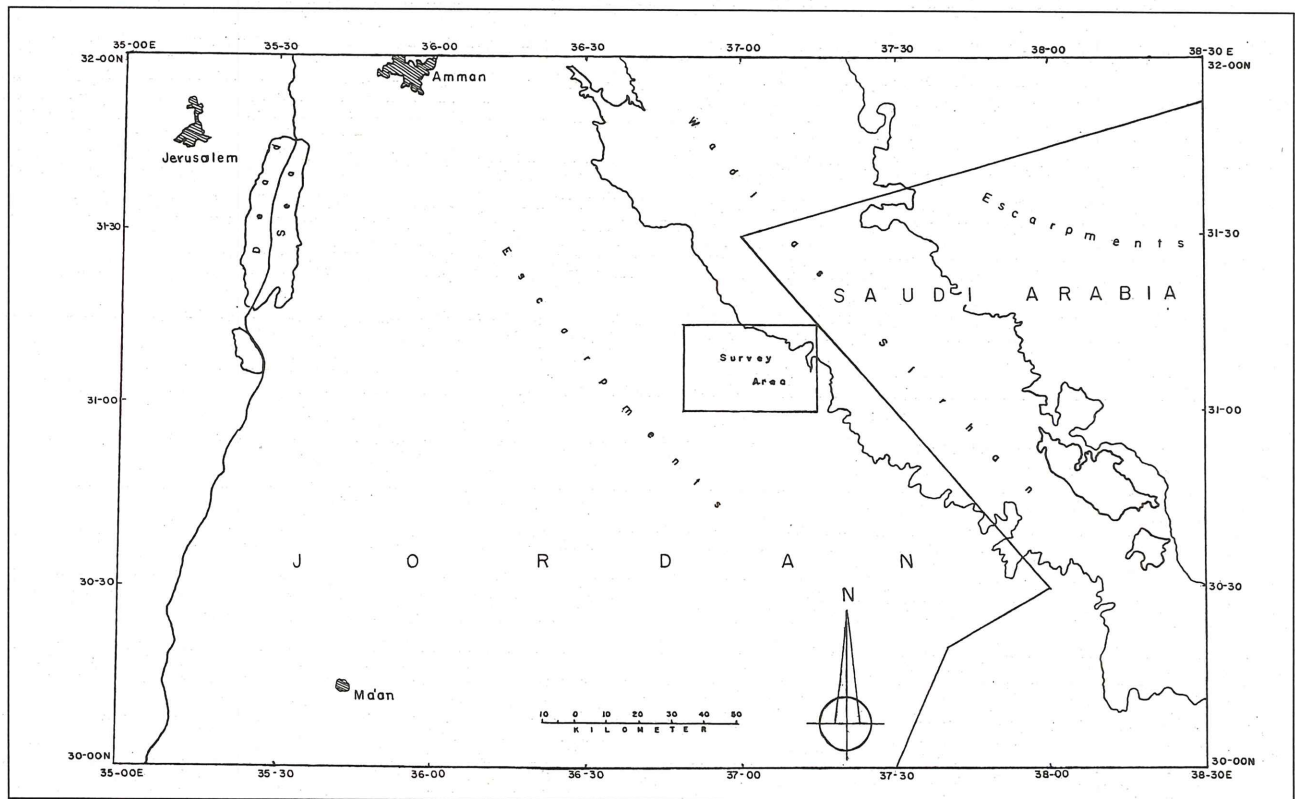
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Background

In the fall months of 1999 a small team undertook a survey of eastern Jordan on the west side of Wādī as-Sirḥān (وادي السرحان). The objective of the survey was to locate sites associated with the earliest human migration from Africa and across northern Arabia along the Wādī as-Sirḥān during Plio-Pleistocene times about 2.0 Myr. Wādī as-Sirḥān is a sedimentary basin consisting of limestone, gypsum and marl deposits of fluvial and lacustrine origin (Bender 1975). The age of these deposits ranges from Eocene, Oligocene and Miocene in some localities to Early Pleistocene in others. The wadi originates in Saudi Arabia. It parallels the Saudi-Jordanian border and extends near-

ly 400kms. from Dumat al-Jandal in northern Saudi Arabia to al-Azraq in Jordan. In Plio-Pleistocene times the present-day wadi was a huge lake spilling over into eastern Jordan, the surviving remnant today being the *sabkha* called Lake Hazawza. A fresh water lake of such dimensions attracted many forms of plant and animal life as evidenced by the thousands of fragments of petrified wood, seashell and fossil marine life that flourished there in the past (Al-Sudairi 1995).

The survey in Jordan along the western flank of the Wādī as-Sirḥān valley lasted three months (Fig. 1). Paralleling the as-Sirḥān valley on its western or Jordanian side were a series of escarpments and hills composed mainly of limestone which was the



1. Map of Jordan and Wādī as-Sirḥān basin.

source of chert nodules, the raw material used in the production of artefacts. From the Jordanian side, the Wādī as-Sirḥān basin dips gently to the northeast. In the remote past it served as a natural corridor in northern Arabia for human groups moving ever eastward in an odyssey that would culminate in the colonization of eastern and south-eastern Asia.

Paleoanthropology

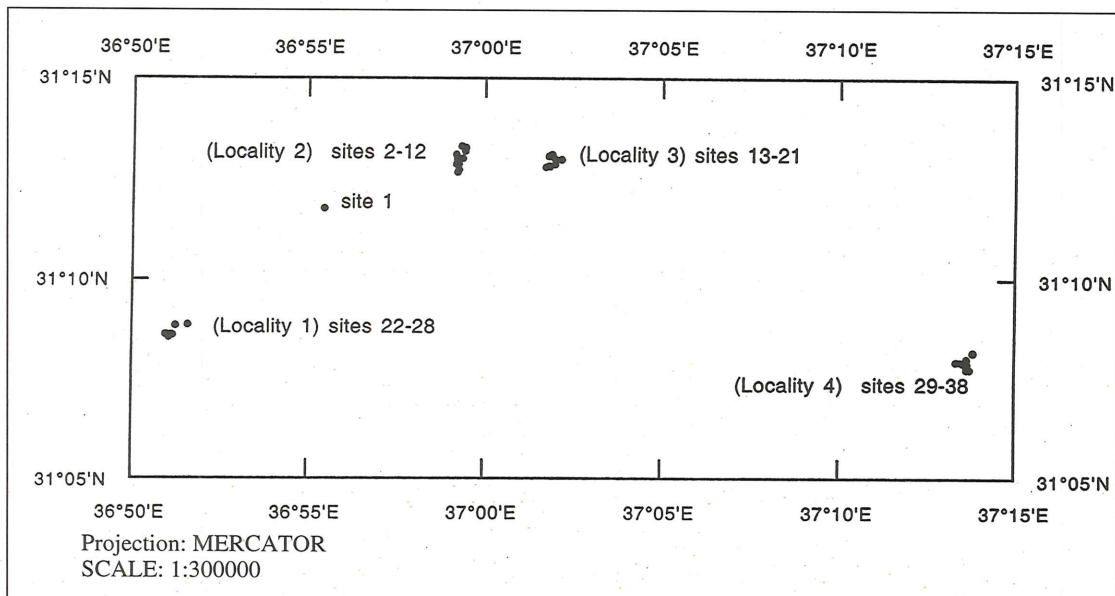
During the past decade extraordinary finds and revised assessments have been made in paleo-anthropology relevant to migration into Asia. Human remains and stone tools have been uncovered at Longgupo cave in south central China from deposits dated 1.9 Myr (Wanpo *et al.* 1995). At Mojokerto in Java, a child's skull, unearthed in 1936, was redated to 1.81 Myr. At two sites in the Sangiran area of Java west of Mojokerto, a skull from each site was dated 1.81 Myr and 1.66 Myr respectively, the latter date derived from a level 2m above that of the skull (Swisher *et al.* 1994). Early migrants most likely consisted of small bands infiltrating ever deeper into Asia and encountering along the way a kaleidoscope of environments — desert, mountain, steppe, rain forest — each requiring a substantial period of adaptation before moving on across the seemingly limitless expanse of territory separating East Africa from East Asia. Halfway along the way lies Dmanisi in Georgia, where investigators in 1999 uncovered two skulls, identified as *H. ergaster* and dated 1.77 Myr. In association with the skulls were more than one thousand Oldowan artefacts (Gabunia *et al.* 2000). The presence of humans in eastern Asia 1.8 Myr pre-

supposes a departure from East Africa many thousands of years earlier (Larick and Ciochon 1996). As a natural and attractive corridor across northern Arabia at that time, the Wādī as-Sirḥān warranted a search for sites contemporary with the first human penetration into Asia.

Sites and Artefacts

While the area selected for survey was large, the area actually covered was much smaller due to a limitation of time. The area with archaeological sites canvassed by the research team extended from 37 degrees 7 minutes North to 37 degrees 13 minutes North and from 36 degrees 54 minutes East to 37 degrees 14 minutes East, a total of 407kms² or 161 sq. mi. (Fig. 1). Within that area the research team found 38 sites located at the base of escarpments, on the surface of terraces below escarpments, and on the descending slopes of small mountains. The sites were clustered into four localities except for site 1 which was isolated by itself with no other site in the vicinity (Fig. 2). All sites were oriented to the north or northeast facing the as-Sirḥān or bordering a major wadi (e.g. Wādī Maḥrūq محروق وادي, Wādī Ḥusaydāt/ Jilāt وادي جيلات, etc.) emptying into the as-Sirḥān.

Sites appeared on surfaces of gravel blackened by desert varnish. The oldest gravels had evidently endured episodes of severe weathering reducing some pieces to porous and corroded black fragments. The degree of desert varnish covering the gravel, including some scattered artefacts, varied from none for the most recently exposed to a heavy encrustation for the oldest and longest exposed. Since this was not a general survey; but a search for



2. Site localities.

sites related to early human expansion into Asia, the team focused only on early sites (Acheulean) falling more closely within the framework of our research design. To do otherwise we would dissipate our time and effort on sites unrelated to our objective.

The sites were multicomponent with more than one cultural period represented, usually Early and Middle Acheulean. Only rarely did artefacts of the Mousterian period appear and even more rarely did tools of the Upper Palaeolithic. No Upper Acheulean artefacts were identified in the survey. A total of 1,872 artefacts were recovered from the 38 sites (Figs. 3-5), of which 1,306 were classified Early Acheulean and 566 Middle Acheulean. They were partitioned into Finished and Manufacturing, the former category representing tool types, the latter referring to items used to make the tools (Table 1). The typological classification of artefacts followed the guidelines set down by Mary Leakey (1971) in the Olduvai Gorge series and by Francis Bordes (1981) in his *Typologie*. The Levallois technique was nowhere in evidence regardless of the cultural period.

The distinction between Early and Middle Acheulean was based upon the following criteria:

- (1) The intensity of weathering. Some artefacts had apparently undergone long periods of exposure to climatic fluctuations and to chemicals in the soil. In some cases the degree of corrosion, forming a multitude of cavities in the chert, was so pervasive that despite faint evidence of flake scars, some artefacts could not be classified and had to be discarded. Other samples, in a less advanced a stage of weathering, were identifiable and collected. The extent of weathering varied from intense to mild with intense regarded as older.
- (2) The degree of patination. This is a tricky criterion since a patina of desert varnish can erode if reburied and reform if subsequently exposed (Dorn 1991). Nevertheless, the artefacts with evidence of intense weathering invariably displayed the deepest coat of black varnish. Moderate or milder coats of varnish characterized artefacts classified Middle Acheulean.
- (3) Technology of manufacture. Artefacts identified as Lower Acheulean exhibited evidence of hard hammer percussion producing short, wide and deep flake scars. The longer and more shallow flake scars suggestive of soft hammer percussion appeared on Middle Acheulean artefacts.

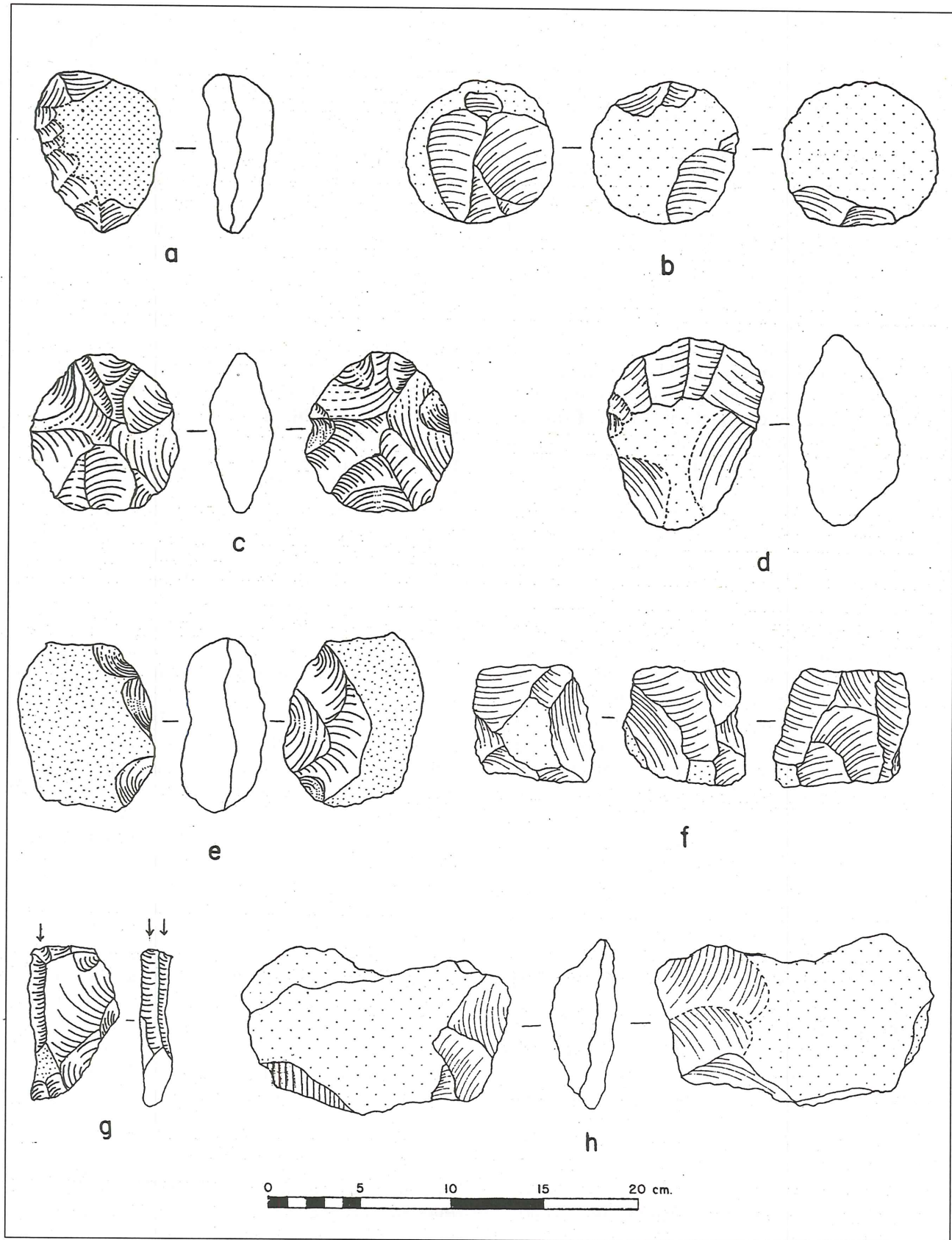
In the absence of excavation and clearly defined stratigraphic sequence, it is difficult to isolate and

identify two cultural periods from surface collections alone. The above criteria are subjective guidelines not inflexible tenets. For an objective analysis of the distinction between the two Acheulean periods, a chi-square test was applied using frequency percentage of choppers and scrapers, the most abundant tool forms in both periods. The test revealed a significant difference between the two classifications — Early and Middle Acheulean — at the .01 to .001 level of significance (Table 2).

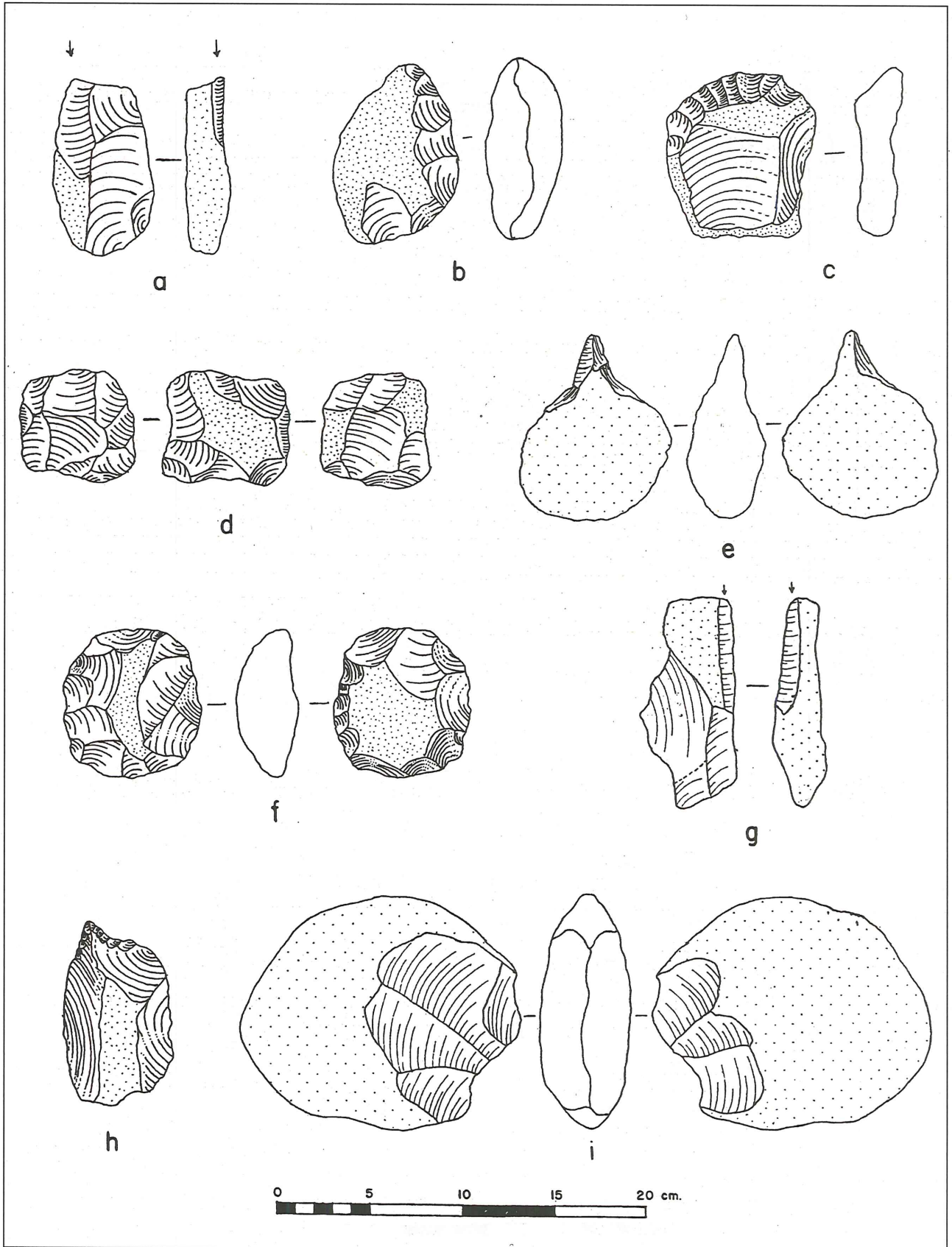
Artefacts of both periods were collected randomly making the percentages of tool types truly representative of each period. Handaxes, hallmark of the Acheulean, were absent in the Early Acheulean, but that was not unusual; they were also missing in the lowest levels of the Early Acheulean at al-'Ubaydiyya/ Ubeidiya (Bar-Yosef and Goren-Inbar 1993). Table 1 shows that among Small Tools, notches were twice as frequent and burins five times more frequent in the Early Acheulean than in the Middle. Those tools imply a greater use of soft materials in the earlier period than later, reflecting, perhaps, the abundance of biotic life in the as-Sirhān basin in early times and the need to fashion tools made from wood, bone and antler in coping with the environment.

The absence of any manifestation of the Upper Acheulean and the rarity of Mousterian and Upper Palaeolithic artefacts suggests a regression of the lake and the biota it supported beginning some time during the Middle Acheulean. As a consequence it seems the area was abandoned with only occasional occupation by passersby. The as-Sirhān valley could not compete with the Jordan Valley in surface water resources where plant domestication and agriculture took hold and continues to this day. The preponderance of limestone in the area had its advantages and drawbacks. Limestone was everywhere and the natural source for chert nodules used to make stone tools; it was also soluble in water and often, when malleable, it adhered as a concretion on artefacts rendering identification and measurement difficult or impossible.

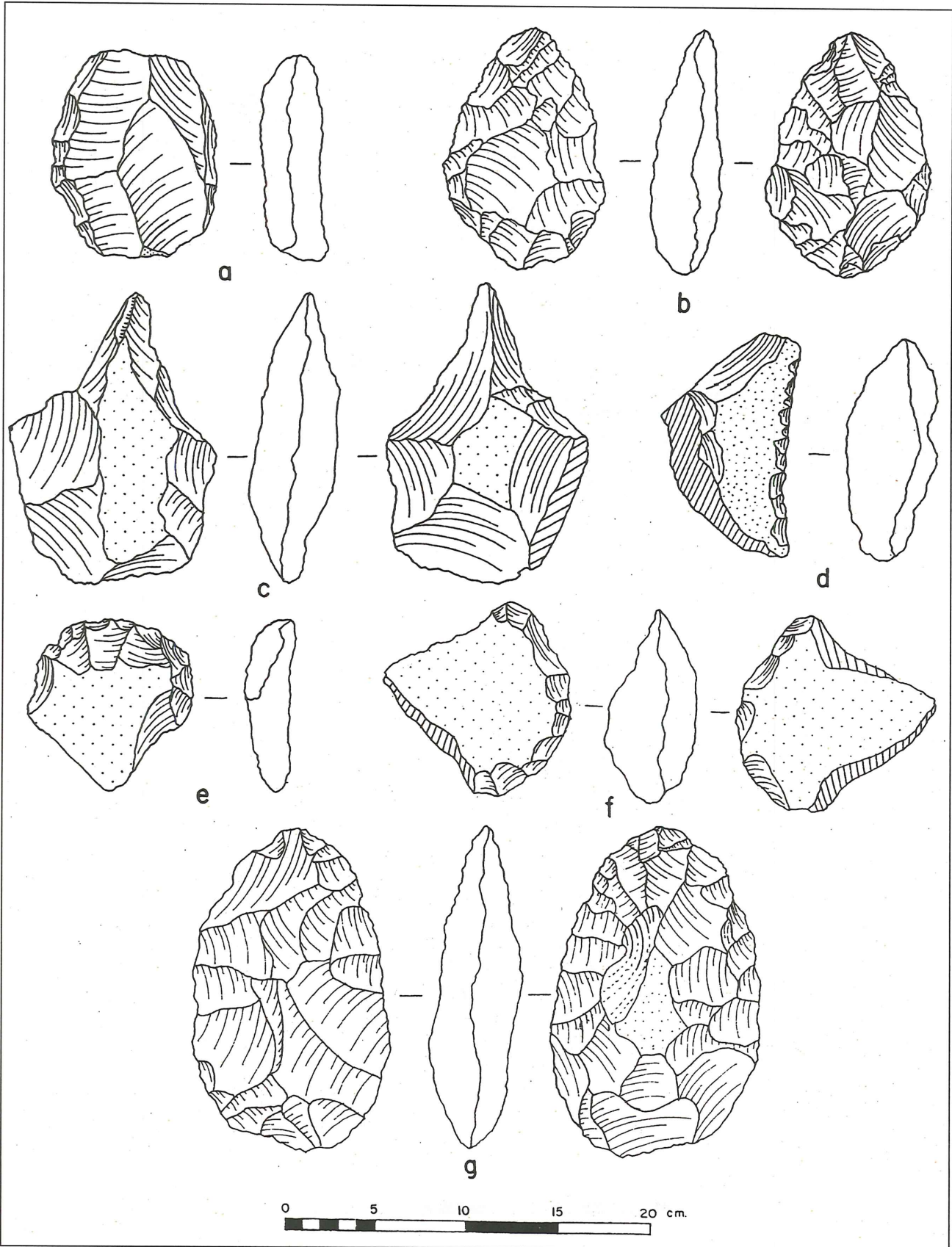
Hallmark of the Acheulean is the handaxe which occurred at only six sites, all in a Middle Acheulean context and clustered in a single locality (Loc. 2, Fig. 2). Twenty handaxes and six bifaces (non-symmetrical forms bifacially flaked and crudely resembling a handaxe) were recovered. They were mainly lanceolate and cordiform in outline. Handaxes diagnostic of the Upper Acheulean — triangular, micoquian, or ovate, and symmetrical and thin in form — were missing. The Levallois technique did not appear on any artefact



3. Early Acheulean artefacts: a. side scraper (Site 18); b. spheroid (Site 22); c. discoid (Site 6); d. end scraper (Site 34); e. side chopper (Site 29); f. polyhedron (Site 27); g. burin (Site 14); h. end chopper (Site 22).



4. Early Acheulean artefacts: a. burin (Site 22); b. side scraper (Site 25); c. end scraper (Site 32); d. polyhedron (Site 31); e. pick (Site 24); f. discoid (Site 32); g. burin (Site 23); h. borer (awl) (Site 22); i. end chopper (Site 23).



5. Middle Acheulean artefacts: a. side scraper (Site 14); b. handaxe (Site 8); c. trihedral (Site 16); d. side scraper (Site 12); e. end scraper (Site 12); f. side chopper (Site 12); g. handaxe (Site 2).

Table 1: Wādī as-Sirhān artefacts.

	Early Acheulean		Middle Acheulean	
	N	%	N	%
Heavy Duty				
Choppers				
End	242	36.7	68	22.3
Side	141	21.4	41	13.5
Pointed	<u>40</u>	<u>6.1</u>	<u>9</u>	<u>3.0</u>
Total Choppers	423	64.2	118	38.8
Polyhedron	13	1.9	2	0.6
Spheroid	3	0.4	0	---
Discoid	<u>12</u>	<u>1.8</u>	<u>5</u>	<u>1.7</u>
Subtotal Heavy Duty	451	68.3	125	41.1
Biface				
Biface	0	---	26	8.5
Cleaver	4	0.6	0	---
Pick	<u>13</u>	<u>1.9</u>	<u>3</u>	<u>1.0</u>
Subtotal Bifaces	17	2.5	29	9.5
Scrapers				
End	66	10.0	30	9.9
Side	59	9.0	56	18.4
Misc.	<u>9</u>	<u>1.4</u>	<u>18</u>	<u>6.0</u>
Subtotal Scrapers	134	20.4	104	34.3
Small Tools				
Notch	13	1.9	3	1.0
Burin	10	1.5	1	0.3
Borer	3	0.4	1	0.3
Knife	25	3.8	15	5.0
Chisel	5	0.8	1	0.3
Blade	<u>3</u>	<u>0.4</u>	<u>25</u>	<u>8.2</u>
Subtot Small	59	8.8	46	15.1
TOTAL FINISHED	661	100.0	304	100.0
Manufacturing				
Core	76	11.8	10	3.8
Hammerstone	1	0.1	---	---
Chunk	195	30.2	65	24.8
Flake	<u>373</u>	<u>57.9</u>	<u>187</u>	<u>71.4</u>
TOTAL MFTRG.	645	100.0	262	100.0
GRAND TOTAL	1306	+	566	= 1872

found in the survey regardless of its cultural period.

Conclusion

It is probable that a series of waves of migration

emanating out of Africa crossed over into Arabia by either the Sinai or the Bāb al-Mandab into Yemen or both, during many tens of thousands of years of the Pleistocene (Goren-Inbar and Saragusti 1996). From what has been documented in

Table 2: Chi-square test of Acheulean choppers and scrapers.

	Choppers		Scrapers		Total
	O	E	O	E	
Early Acheulean	64.2	55.25	20.4	28.968	84.6
Middle Acheulean	<u>38.8</u>	47.74	<u>34.3</u>	25.355	<u>73.1</u>
	103.0		54.7		157.7

$\chi^2 = 8.117$ df = 1 significant difference at .01 - .001 level.

eastern Asia, the earliest wave must have left Africa two million years ago and the latest, excluding modern sapiens, perhaps as recently as Middle Pleistocene. The discovery of 38 Lower and Middle Acheulean sites in the Wādī as-Sirḥān basin shows that the area was accommodating as a stage in the route across Arabia eastward in early times. Continued investigation along this critical waterway should disclose much earlier sites in the time range of the Plio-Pleistocene commensurate with the first human dispersal into the continent of Asia.

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