A COI.TTARATIVE STUDY OF THE MIDDLE STOTTE AGE CORES FROM KENYA HIGHLANDS AND THE LAKE VICTORIA BASIIT SITES

OY

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Dedication

Special devotion goes to my beloved parentdf ITaftaJ-i Odalo Tombo and Gladys Aloo Ralik and their entire family. Their love, tolerance,, support? &nd encouragement helped me progress in my studies*

This study pr-^nts comparative analysis? of the Middle 3tone [1] -o Gores in two ^^o.^npJj.ic zones of Central Kenya High-1 >nds "til the Lake Victoria Basin sitoo oC Kenya. The study is based on cores excavated from Muguruk, bonghor, Prospect Farm •«rj'i J rolonaie'l Drift; sites that were stored in the Archaeology Inborotory of National Museum of Kenya, Nairobi. nirr.M. ni: attributes like shapes, sizes and production tech-ni {hos • r •> studied usin^ metrical methods '.'ith a viev? of >?•% t-iii iirtrr influence of accossibi1ity bo raw material • •onrces tk.1 nature of raw materials bo bhem. The sbudy also br i^l bo h-nv how function influenced the weights of the cores The fo.i lo'in?s conclusions vere drawn: that raw materials influenced the morphology of cores, that core shapes varies pvi* different geographic regions and were influenced by nature of r-T\7raI;Prials •

Acknowledgements

The final accomplishment of this dissertation rests in the hands of many people who helped me throughout the entire ten months of field, data collection, presentation and -naly^ia. To all of them I am sincerely grateful for their assistance ana support. My training in lithics analysis was provided by lecturers Dr. Henry Mutoro and Dr. Chris Koch. Dr. Lutoro tirelessly supervised me to the final point of the dissertation, while Dr. Koch was the first to provide me with the basic elementary knowledge in lithic studies. To them 1 am very grateful for their training.

The decision to research into the Middle Stone Age was inspired "by Dr. Helene Roche, the current head of Archaeology department at the museum, Nairobi. She tirelessly helped me in discussions of different aspects of Stone Age Industries. She also granted me permission to go to the field. To her I say '<u>Merci beaucoup</u>'. Dr. Sally McBreaty also intensified my interest in the Middle Stone Age Industries in Kenya. -As.a keen researcher in the Middle Stone Age Industries of the Lake Victoria Basin and Western Kenya, she strongly inspired me into the Middle Stone Age Industries of the lake basin. Thanks a lot Sally. Dr. Harry V. Merrick also did a lot to build Archaeology in me. He inspired me into the Middle Stone Age Industries of the Kenya highlands , and more especially the study of raw materials in the region. As a specialist in obsidian industries from the region he helped me with deep understanding of the nature, sources, and functions of lithic raw materials from the region. Harry asaute eana.

This work would, however, not have been successful if it were not for the assistance of Archaeology laboratory technicians, of Rational Museums, ITairobi. Through the tireless efforts of Samuel Munyiri, Msalendo-Kibujia, and the late Mr. Elijah Pftiittu the entire collection procedure proved fruitful and hospitable. The late Oguttu made available to me all relevant literature at his disposal,, I will miss you and may N.yasae oresi maber e polo, erokamano ahinya. To Mzalendo and Munyiri y th°nks in advance. My understanding of hominids in the regions of MY stii'ly WWS facilitated by the assistance of Paul Watenga anrl John Eimeng' icb of bbo laboratory. To you two I am grateful to deliver you my appreciation and thanks.

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As postgraduates who have passed the dissertation level they advised me and made everything sound easy to me regardless of how hard the matter was. Erokamano maduong ahinya. The same gratitude goes to iTiy friends and colleagues Messrs. George Ojuondo, Okoth-Guya, and 1 esliack Meyi, without also not forgetting my only classmates Mr. Caesar Kimaru and Isaac Were for bheir tireless efforts bo keep me going ahead with the project. I also owe thanks to the secretaries of the Department of History Mre. Nancy Thiong'o and Mrs. Kamau for their assistance, support and encouragements while I was undergoing process of working on blio dissertation.

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Chapter One

ITlTiiODUCTICN

INTRCYLUCTION

This introductory chapter presenbs a discussion of the ;*iddl? Stone Ago in general; the Middle Stone Age tool makers, rqn materials for shone tools and the significance of stone tools to archaeology. In addition to these, it also covers the scope of the project, the history of research, areas of abiv.Vy, bhe problem statement, bhe hypotheses and definitions of some of bhe terms used. This project is an attempt to compare hhe product of human technology in the Middle Stone Age period from about 200,000 bo 30,000 years ago between the Highlands i and the I°)'3 Victoria* Basin of Kenya.

Tool", nnde of sbones are relatively better preserved than hho^e m from or ganic materials such as bone and wood. In bhis wav, stone booIs are very important in Archaeology becaus[4] hh\y provide iinporbant cultural markers for certain chronologic 1 periods in the course of human technological a ••v'lopmivb (Leakey, 19&7) • Stone tools in general, provide »;ho[1] onge • I* and most detailed record of tool manufacture in hum"?! technology- This technology played an important role in hum-n ad 'pb••tion basrd upon intelligent innovations designed to m^nh [f]-h rv niir?-:v»pbs or the environment faced by our Stone Age " HC".a bora .

IliddleStons_Ase

The term Middle Stone Age refers to the second stage in a tripartite system of Early Stone Age, Middle Stone Age, and Late Stone Age for the African Shone ftge Archaeology. This term was coined by Goodwin and Van Hist Lowe in 1929 for South Africa (Goodwin, l')29). It was used to apply to the prepared-core and ^ore-axe industries such as stillbay, Bambata, and the Lupemban Industries, from the entire continent (Malan, 1955)* Originally the term included Late Stone Age industries which had been grouped into the "Eastern Variant" - this is an early classification of the South African Late Stone Age industries characterized, by the prepa red-c ore and core-axe industries w (7oIman, . The term Middle Stone Age was later separated frem th° L3to Stone Age industries of South Africa on both s tigrapM c evidence and absence of the microblade technology. Uh? Characteristic Middle Stone Age forms include Discoidal and i vallois type cores, Convergent Flakes with faceted striking platforms, Flake-blades, and a variety of tools such as side- •^r^rep.q, bifacial and unifacial points. Industries that ?ovib.ine prepared Fim-o Cores and microblade technologies were later placed in a separate transitional stage known as Second Infcsm-"T.?.-' I . Ttage, while h*\nd-axe industries with prepared k i -Mro tochnolc"; such as t]>° Fauresmith, were referred to .? • be inn; transitional First Intermediate Stage (Fhillipson, 1985)*

in,. term l'dddle Stone Ago was adopted by preliistorians sue}) as M^viUe Jones (1949), Clark J. J). (195zO, lay land E. J. (195'+) and Jenmart J. (1946)-

Neville attributed it to the impact of the arrival of mouL'bori .u influence which mixed with elements already present I o pi-ouo^ Fauresmith, bub whicii evolved and spread iu a purer .liato 1,0 lay the foundation for the Middle Stone Age (Neville, 19m9). Clarlc, on the other hand, introduced new conc^ ts to i.. definition of the term Middle Sbone Age. sb~xtod li, o n included the Levalloisian culture complex bogether v.j bh ultimate development inbo the Somaliland Stillbuy. AliCux'vl in u) him, the term Middle Stone Age is co-turmiuabud with u^oi Pleistocene (Clark, 1954).

During the First Pan-African Congress of Prehistory arid Quarternary Studies, held in Nairobi, Kenya, in 1947; and the Third Pan-African Congress of Prehistory and Quarternary Studio held at Livingstone, Northern Rhodesia, in 1955, the term Liid-die Stone Age was critisized by a number of scholars, no tab J i 1. S. B. Leakey, M. D. Malan and J. D. Clark (Malan, 19'j5). According to Malan, the term had been used as a sorb of cmnibu., form to embrace a whole series of cultures, the strati .gi a phi i and cultural inter-relationship of which was still far from full; worked out. The term Middle Stone Age had also been confused with the terms Mesolithic and Middle palaeolithic (Leakey, 19!)3) and finally both its chronological and cultural meaning wui, confusing to many scholars (Clark, 1954).

Since the term Middle Stone Age has been used to reIV.r bo any industry with prepared cores lacking both hand-axes and microliths, its use was formally discontinued by the Third Pan-African Congress of Prehistory and Quarternary Studies.

Until the definition and chronology of regional industries of the Early Middle and Late Pleistocene have been worked out, the congress recommended the use of the regionally specific industry names, combined with the Mode III designation of J. D. Clark, for the Flake Industries with prepared cores to avoid implications of chronological,stratigraphic and cultural uniformity across the African Continent (Volman, 1984; Fhillipson, 1985)*

Raw Material

A brief look at the raw material is very important in this study because it provides background information about the raw materials for the cores as cores are themselves raw materials from which Flakes are produced. Raw materials also determine ' the technologies applied on the cores, to produce Flakes or bools. Their locality, in relation to the sites, is also important because it determines the core size, quality and quantity. Raw materials for stone tool manufacture, such as Lava, Quartz, Quartzite and Flint can be found in primary geologic U context' or in secondary geological context (Hodges, 1976; Jones, 1979). Different stone technologies are influenced by bhe nature of the raw material from which the tool is made. The i?.nr[a] isotropic <[n] rock is, the "softer" the technique that is used, while the less isotropic a rock is the "harder" the technique that is used. For example, obsidan rocks were worked by sort hammer percussion technique compared to Quartz or Quartzite rocks which were flaked by the hard hammer percussion technique•

Wide variety of raw materials were used in either modified or unmodified forms for technological development during prehistoric times. The types of rocks from which flaked-stone artefacts were produced include the relatively fine-grained roeks which are hard, and fracture easily in any direction. These include sedimentary, metamorphic and igneous rocks.

Lithic Technology

The emergence of a flaked stone technology during the course of hominid evolution marks a significant behavioural departure .from the rest of the animal world (Oakley, 1967). It is also the first definitive evidence in the prehistoric record of a simple cultural tradition based upon Learning (Leakey, 1967 Although other animals such as Egyptian vultures, the Carlifornia sea otter, and Darwin's Gala.galos flinch (Goodall, 1976), use simple tools for termitting and nut-cracking behaviour (Spier, 1970; Kitahara-Frisch, 1930), fundamental aspect of human adaptation is a strong reliance upon technology for survival anrl adapt-ti.on (Clark, 1988). During the Stone Age, there were different flaking techniques used to produce different types of tools, flakes and debitage. Some of the techniques v/ere used in nor? than one specific age. For Example, the hard hammer percussion technique was used during the Early and Middle Stone Age.

Stone technology is very important in this project as it provider, 11 s with basic techniques used by the storie tool makers. It also gives information about re-use or re-shaping of stone artefacts and the adaptation to the environment by the tool makers*<

The different techniques of stone tool manufacture, used by Fiddle Stone Age tool makers are described by Bordaz (1970, Swanson (1976), Clark (1974) and Roche (1990) as follows:

(i) Hard Hammer Percussion

This is one of the most common flaking techniques used by the Early and Middle Stone Age tool makers. It i3 the method which involves striking a core with a stone hammer to induce flaking. The flakes produced tend to have large striking platforms and predominant bulb of percussion. The cores are characterized by deep flakescars and prominent ridgecbetween flakes. The techniques is also referred to as the Freehand Fercussion.

(ii) Anvil (Block-on-Block) Technique

This method involves striking a core against a stationary anvil to produce flakes. It was used by both Early and Middle Stone Arje tool makers. It is sometimes used to flake very large cores. Flakes produced are characterised by large striking platforms and prominent bulb of percussion, while the cores are characterized by deep flakescars and prominent ri'iges between flakes.

(i.ii) Soft Hammer Technique

This techniques was mainly used by the Middle Stone Age tool makers.

lb involves flaking a core with a hammer that is softer than the core itself, such as softer stones or wood, antler or hone. It usually produces flakes with relatively small platforms diffused bulb of percussion and flatter release surfaces. There is* often a prominent "lipping" at the intersection of the platform "«nd the release surfaces. Cores tend to have relatively shallow flakescars and subtle ridges between flakescars. This technique is particularly effective in the thinning of bifaces, for example, in the production of handaxes or projectile points. Often striking platforms are facetted with numerous flakescars, which is an indication of preparing the core by steepening and regularizing the edge with a hammer or abrader.

(iv) BJLpolar Technique

This method involves setting a core on an anvil and hitting it from above with a hammer-stone. It was often used for very small or intractable, hard to flake raw materials. FlaVes produced tend to have thin or punctiform platforms and very flat release surfaces with a little bulb of percussion. Cores tend to be barrel-shaped in their platforms and thin, with flakes removed from both ends. It was also used by the Middle Stone Age tool makers.

(v) Indirect Percussion

This is also known as the punch technique. It was often used for blade production.

It consists of setting a punch or indirect percussor on Lh^ core and detaching blades by hitting the punch with a hammer stone• Blades produced tend to have snail striking platfoi'iuS and diffused bulb of percussion, and are also regularly or slightly curved inside view. It was also used by the Lute Middle Stone Age tool makers for production of blades.

Middle Stone Age Tool Makers

Recent dates for initial Middle Stone Age occupations prior to late pleistocene are greater than 130k.y. Evidence from Tanzania, at Laetoli, and Ethiopia suggests technoucono^ic and social advances v/hich lack in the Middle palaeolithic of Eurasia (Leakey, 1967; Singer, 1982). These advances which include decorated stone slabs and incised ostrich-eggshell from Apollo II Gave, may be associated with what are presuu-ably the earliest examples of modem humans namely homo Sapi^i... Sapiens.

In East Africa, human skeletal remains associated wiuu tho Middle Stone Age assemblages are few and not well dated. The fossil evidence have been described in detail, particularly by Stringer and Andrews (1988), Brauar (I984), and Rightmire (1984). According to tiieir chronology, they show varying com-binations of archaic and modern traits between 400,000 and 200,000 years, B. P. After Oa. 100,000 years B. P. there is a dominance of essentially modern characteristics in skeletal remains.

This is suggested by the Lake Lyasi fragments (Oakley, 1977) which suggests the presence of Homo .Sapiens as early aa 130,000 B. P. (Iviehlman, 1964; 1987; tfjrnerth, 1^10; uee-.;, 1946; Leakey, 1946)• i'ho fossil remains i'rum baa uUuOv. Shelter (Brauer and mehlman 1988) represents an ^arl,, -i. co-mically modern Homo sapioLs* Q?hey were d-ibel ^oouivini^ ia uranium-series to between 109,000 and 130,0uG years b. ..i. Laetoli, Hominid 18 (Bay, 19b0; Rigntmire, 1^4) > La. i\,s«jj evidence suggests archaic features of lio.ao oapieiiS. al ^ ..u in the Kibish Formation (Butzer, 1969; Buy and Stringer, 1 >ua; Brauer, 1984) , IJodern Homo Sapiens were dated bj tu-ani Uji.-series to about Oa. 130,000 years B. 1. ^t Lajera fossil remains show anatomically modern features of noi.io (Olark, 1988)• IT Pore Epic and Bire Bawa sibes, uhe i..iaai„ Stone Age has been dated by obsidian hydration to about to 70,000 years B. P. (Vallois, 1951; Oakley 3 977, Brau...r, 1984)• Ab Singa site fossil remains are associated wi oh eiun.. i* late archaic Homo Sapiens or fully modern homo oapiens (Woodward, 1933; Wells, 1951; fobia, 1968; Stringer, 1977; Rightmire, 1984)* With the exception of Kajera, many Kenyan Lliddle Stone Age sites have not provided well documented human fossil remains of modern or archaic Homo Sapiens. Tnis means that sites studied in this project do not exhibit human fossil remains of the makers of the middle Stone Age tools.

Area of Study

'j?he sites being studied are found in bhe highlands and the Lake Victoria Basin of Kenya (i.ap 1).

X total of four sites from these regions were studied. The **Highland** sites included Prospect Farm and Prolonged Drift, **while** the Lake Victoria Basin sites comprised of Muguruk-and Songhor.

History of Research

The first systematic prehistoric research on Middle Stone Age in Kenya was done in the 1920s. In 1926, L.S.B. Leakey worked on the materials from Lakes Naivasha and Nakuru basins. These artefacts were made mostly from-obsidian. These artefacts included cores, flakes and blade tools (Leakey, 1931; 1936). In 1936, Leakey also found in sediments on top of the Kinangop plateau, an assemblage of small, unifacially and bifacially worked points of obsidian. He described this as "Pseudo-Sfcillbay" (Leakey, 1936) and believed it to be contemporary with the end of the Acheullean. In the same year he also recovered from Cartwright's Farm another Middle Stone Age industry consisting of a small assemblage of blades and blade tools. In 1945, Leakey and Owen published the results of their fieldwork in the Winam Gulf on the Norbh-V»rest side of Lake Victoria where they had found a sequence which they defined as the Middle Stone Age. However, both Leakey and Owen, did little in the comparison of the riddle Stone Age cores from the Highlands and the Lake Victoria Basin of Kenya.

It was not until 1960s and 1970s that the Middle Stone Age of Kenya begun to attract new interest.

In 1964 H. V. Merrick worked at Prolonged Drift in the lake Ifakuru Basin. In 1969 and 1971, he worked at Lukenya Hills. In 1975 he worked on Prospect Farm site. In all these sites he studied Middle Stone Age industries and their transition to Late Stone Age. He aimed at documentating changes within the Lithic industries of these regions. His studies v/ere published in 1975 and they show that no comparisons v/ere made in cores between the Highlands arid Lake Victoria Basin sites.

In 1972, Barbara Anthony studied the Middle Stone Age sites of Prolonged Drift and Prospect Farm. Her main aim was to establish their tool typologies and to show how they related to one another. She also studied core typologies and: showed their relationships at the two sites.

The most recent s tudy on the Middle' Stone Age was^ done by McBearty. She excavated Tuguruk and Songhor sites between 1979 and 19S0. Fuguruk site had previously been excavated by Leakey and Owen in 1945. McBearty studied Songhor and Muguruk materials and established that they were related to the Sangoan-Lupemban industries of Central Africa (McBearty, 1981$ 1986). She also studied core typologies and tools from these sites and showed that they were related to the Sangoan and Lupemban cores.

Opira-Odongo in 1981 excavated Muguruk';site but his work was interrupted by his untimely death.

From 1969 to 1990, Kithuka-Mwikali worked on the materials such as flakes, cores, points, outil ecailles and blades from the Cartwrights site for her dissertation. Her aim was to describe these artefacts in detail.

The Problem Statement

The Twiddle Stone Age industries in Kenya are not as well researched as Early and Late Stone Age industries. This is attributed to the fact that there was lack of hominid fossil evidence at the sites. There was also no well-stratified site belonging to this stage and as a result, most of the descriptions were based on surface collections. Sites like T'uguruk , Songhor, Prospect Farmland Prolonged Drift have been excavated ajid we can look afresh at their materials.

Though scholars established typologies of their concern, little comparative study of cores between the Lake Victoria Basin and Highland sites has been done. THy aim is to show core relationship between and within the sites in the two geographic regions. Emphasis is placed on their raw materials, technology and typology.

Hypotheses

The hypotheses to be tested are:

(i) That the core typology varies according to different sites in different regions.

(ii) That different raw materials were used in the production of cores in different regions.

Objective

The main objective of this study is to document the effect of raw materials on the technology and resultant morphological variations in the cores.

Operational Definition

The following operational definitions are derived from various sources, including Bordes (1968). Leakey (1967; 1971), Kleindienst (1959), Clark (1974; 1977; 1988), Gov/lett (lyttf), Roche (1990) and Witte (1985).

Acheullean

A lower and middle pleistocene tool tradion utilizing the direct percussion and soft hammer technique (Bordes, 1968).

Artifact

An object of any material that can be shown to have been made or used by Man. This includes retouched, modified Laid utilized pieces, unmodified wastes, and materials such as natural stones and pieces of bone or wood, which bears no obvious evidence of utilization (Leakey, 1967).

^.qomblage

An aggregate from an archaeological occurrence where the constituent artefacts can be shown to be contemporary, or nearly so (Clark, 1974).

Core

A nucleus that remains after flake(s) and blade(s) have been intentionally removed, cores and flakes can be correlated by means of the flakescars on the cores. Cores are divided into:

(i) Specialized or prepared cores, where the striking platform(s) shows special preparation. Prepared cores include Levallois, Levallois Flake, Levallois Foint, Levallois .Blade, Discoid and Prismatic Blade cores.

(ii) Unspecialized cores, which are classified according to the number and nature of their striking platform(s). Such cores include Single Platform, Double platform, Bipolar Cores, Polyhedral, Biconical and Prismatic Cores (Clark, 1974).

Culture, i

An arbitrary unit meaning similar assemblages of artefacts found at several sites defined in a precise context of time and space (Gowlett, 1985).

Data

A collection of observations from a survey or an experiment.

Types of Data are:

(i) Qualitative data - when the observations consist of words, or labels, or numerical codes.

(ii) Quantitative data - when the observations consist of numbers that indicate differences in an amount or a count (7/itte, 1985)*

N

Debitage Surface

This surface is opposite the butt end or striking platform of a core. It is also referred to as the Distal end or ventral surface. In cases where the lateral edges converge at a low angle this intersection is known as the point (Roche, 1990).

Flake

A scale-like chip removed from a larger rock fragment by percussion. Ib usually shows characteristics of conchoidal fracture such as bulb of percussion and concentric rings (Kleindienst, 1959).

Horninid

41

A member of the family Hominidae comprising I;lan and his ancestors distinct from the apes (Leakey, 1953)*

Homo Sapiens

A horninid species that lived from about 300,000 years ago (Cann, 1987).

They sre presumed to be related to anatomically modern people Homo Sa^ien Sapien. During the Middle Stone Age, the major form of Homo Sapien was referred to as the Archaic Homo Sapiens which had anatomically related features to modern Man (Brauer, 1-984)•

Horizon

An archaeological horizon or occurrence is the smallest cultural sbratigraphic unit that can be defined at any one place. The concept includes both the natural context and the artefacts that together form the aggregate(s) within this context (Clark, 1974).

Industry

An industry is represented by all the known objects that a -^roup of prehistoric people manufactured in one area over some span of time (Bishop and Clark, 1967)* Industry also co!nnr.1nes of groups of related artefact aggregates, whether or nob sub-divided into phases which share a large number of technical and typological features in recurrent associations, bub which are more diversified than the members of a phase (Clark, 1966).

Mean

The most common average found by adding all observations and then dividing by the number of observations (Witte, 1985)•

j\]ode

The value of the most frequently occurring observations V (;Yitte, 1985).

I.Ioroholo^y

The study of form usually involving the study of the relation between function, structure and form (Kleindiest, 1959)•

Phase

A grouping of similar artefact assemblages from Archaeological occurrences that can be shown to be related by typology, technology or recurrent associations and which have also specific spatial ana temporal limits. In cases where similar artefact aggregates, believed to relate to a single cultural stratigraphic entity are contemporaneous, such groupings are considered to be facies and may represent activity variants (Clark, 1974).

Platform Surface

This is the striking platform, or, where no evidence of the striking platform is preserved, it is the end opposed to that showing the most signs of utilization or retouch. It is referred to as the proximal or butt end of an artefact. (Roche, 1990; Clark, 1974)•

Fleistocone

A geological epoch dafeed to between 1.09 million and 10 000 years an:o, which coincides approximately with the nt'penranco and development of the Homo line (Bordcs, 1968).

Rani^e

The distance in a distribution from the largest observation (7/itte, 1985).

Standard Deviation

A rou^h indietor of the average or mean amount by which , observations deviate from their mean. It reflects the contributions of all observations, and it doesn't increase in value with I'-r^e sets of observations. It also describes variability in original units of measurements (l/itte, 1985)*

Technology

A combination of tools used by a group, their technique of manufacture, and raw material used for the manufacture by that group (Bordes, 1970).

ooloj^v

This refers to the major categories or types of artefacts. For example, major ty.es of Middle Stone Age cores are Discoid, levnliois and Prismatic cores (Clark, 1974; Kleindiest, 1975)*

• W ^ v and Conclusion

jn this chapter, discussions on the history of research on the Twiddle Stone Age researches in Kenya, the problem state merit, hypotheses and objectives of the study were outlined. **Operational** definitions of different terminologies used in the text were also given to put the reader in perspective.

i

Chapter Two

THE SITES

•mtroduction

This chapter presents the sites from which data were^ collected. Their location end environmental background are given* 15 ch geographic region with it3 sites is discussed separately, beginning v/ith the Highland sites.

Highland Sites

These are sites found within the Highlands. These Highlands are the mountainous regions of the Central Kift Valley of Fenya, Fiddle Stone Age sites in this region were originally thought to be related bo Fauresmith and Stillbay industries of South Africa (Leakey, 1932). These industries are characterised by the dominance of obsidian as the raw material for the manufacture of tools (Merrick and Brown, I984). The sites studied are Prospect Farm and Prolonged Drift. %

(i) Prospect Farm (GsJjT)

This is a well-known Middle Stone Age site in the Rift Valley of Kenya. It is situated on the slopes of Mount Eburru overlooking Lakes Elementaita and Nakuru. This site was investigated by Barbara Anthony (1972; 1978) and Harry V. Merrick (1975).

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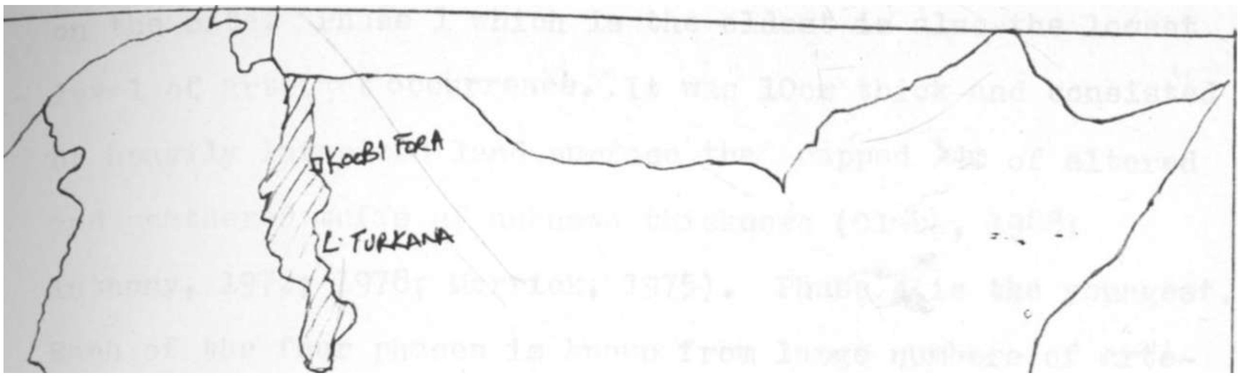

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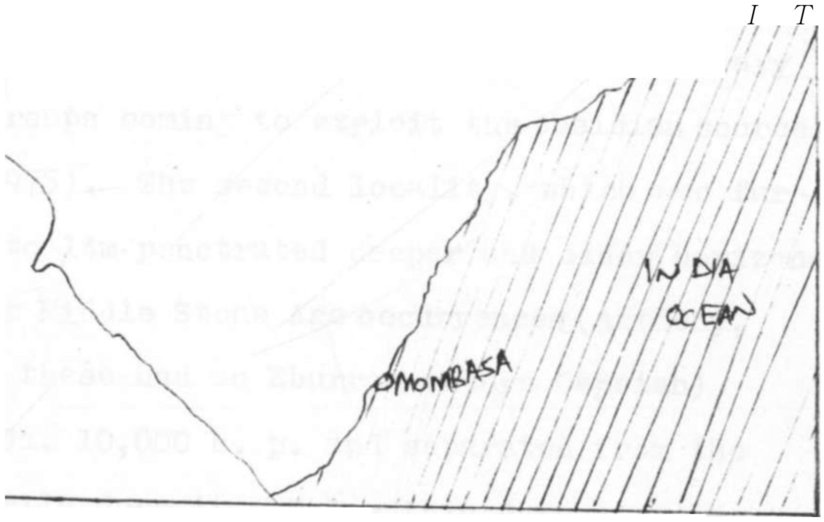
«* Scr^Voc



Inthony identified two localities and four phases or occurrences ' on the site. Phase 1 which is the oldest is also the lowest Ict^I af artefact occurrence. It Was 10cm thick and consisted or heavily laterized land surface that capped >4m of altered oli vnather^d tuffs of untoiown thickness (Clark, 1988; Anthony, 1972; 1978; Merrick, 1975). Phase 4 is the youngest. T3ach of the four- phases is known from large numbers of artefacts that are of one or more dominant form© Phase **4**, for instance, is characterized by imifacial and bifacial discdids made from thin Levnllois Fla)es. Phases 3 and **2** have a variety of retouched forms, particularly points. Phase 1 is characterized by thick, pointed scrapers , and have artefacts '. tiich are generally smaller, reduced dimensions than those of « other phases (Merrnckf 1975; Anthony, 1972; 1978).

The spatial and tempoi"'! distribution of artefacts on the rito su.g ;est a long sequence of occupation (Anthony, 1972; 1°7 8). T'vo localities excavated (Clark, **1988)** suggest that the H a *IU* \ T'id/lle Stone Age period here is of a long duration. Their hori zoii3 appear to he a combination of workshop and temporary doping places for groups coming to exploit the obsidian sources 0.1 ore by (Tier: ick, 1975). The second locality, which was further excavated down to 14m. penetrated deeper and older horizons^ "U'l exposed t—o other Fiddle Stone Age occurrences (Anthony, -'97'; 197^'). One of these had an Eburran (Kenya Capsian) 'r-pcr-hv^c dated to Ca. 10,000 b. pc arid separated from the oth -r b; ?.5n of sterile deposit. Below this deposit were -ounfl four Fiddle Stone Age horizons, separated one from the 0fT,1or by varying thick soil deposit which again points to an ' *- nclon.nont after a .long period of occupation.

I'orrick (1975) who made a metrical analysis of a sample of artefacts from each, of the three uppermost horizons (Phases Lv ^,-aid 2) at locality 1 ^Iso noted changes in typology and technology that could be considered stylistic. For example, the co-v-ivigu.ee of certain tool forms suggested functional equivalence of tools such as Levallois Flakes and side-scrapers fvmongst others within the three phases at locality 1 (Clark, io88). 3esjdes points and discoids, single and double side-scrappers are dominant forms in the uppermost occurrence* Fhase ? has casually retouched and modified pieces, convergent scrapers and sin~le side-scrappers. The assemblage from Fhase 3 is dominated with retouched forms of simple side-scrnpers , convergent scrapers , points covary between Phases 1 aid 2 (Anthony, 1972). As a whole the technology shows }it!*le ch-nnre except that core proportions in-Phases 1 and 3 are generally sj.mj.lar and typical of the Middle Stone Age 'vhar°a^ in rhase 2 cores have single and double platforms, a charanteristic that is common with t.he Late Stone Age types (Her^ick, 1975).

The Prosrect Farm site is in a distinct habitat zone r^Porred to as the Interior Plateau Proper. Its elevation varies between 1,370 and 370 metres. The vegetation consists nf Toirt -aid deciduous woodland comprising Brachystegio-. .i'Vlbe-r.^adia and Isoberlinia type in the higher rainfall areas and drier Acacia and Commiphora woodland steppe with thicket in the drier and lover parts (Clark, 1988).

The sequence of tuffs, pumices and old soil horizon in Prospect p'lrn formation is the lateral equivalent of Formation A at ITderit and Prolonged Drift (Clark, 1988). No example of any homJnid remains has been documented from this site (Leakey, I960; Clark, 1988).

(ii) Prolonged Drift (Grjill)

This site is on the lower reaches of the Nderit River in the Lake Nakuru Basin. The site is in a distinct habitat zone referred to as the Interior Plateau Proper. Its elevation varies between 1,370 and 370 metres. The vegetation consists of moist and deciduous woodland comprising Brachystegio-julbernadia and Iaoberlinia type, in the higher rainfall areas and drier Acacia and Commiphora, woodland steppe with thicket in the drier and lower parts (Clark, 1988). It is stratified in the lower of two major cycles of sedimentation beneath the T-Takalia Ash. The site has four Fluvio lacustrine sediments. The lowest consists of 5m of sandd, gravels, and silts capped by a'palaesol. The Middle Stone Age artefacts were concentrated mostly in three horizons within this 5m deposit. While the upper two are thought to have been fluvially concentrated, the lowest is t! iou[1]b l:o have been camping ajid workshop floor (Merrick, 1975). It had artefacts and fossil bones eroding laterally for a distance of >30m. The site was excavated by Merrick (1975) who sampled a series of test pits and recovered 9,634 artefacts [n]ade from obsidian, chert and lava. Debitage consisting of a number of blade-like forms and trimming flakes resulting from the manufacture of bifacial points were evident»

The majority of tools were unifacial and. bifacial points or Halves[1]''* irregular side-scrapers truncated blades, and a large number of modified edge-damaged pieces. Associated with these artefacts were 2,704 fragments of fossil bones representing **hippopotamous**, Equus, and **a** number of medium sized bovids. Also present was a fragment of a reed stem (Clark, 1988), The Middle Stone Age material remains come from the top part of the Formation A of Nderit Drift. The lowest levels of Formation B have a blade industry of Eburran type dated to 12,300 B.P. - 822 years (Merrick, 1975).

t J

It has been suggest on the basis of projectile points, that Prolonged Drift may have been a hunters[1] seasonal camp of short duration (Merrick, 1975). Like Prospect Farm, Prolonged Drift's Middle Stone Age occurrence does not have evidence of hominid occupation (Clark, 1988).

Lake Victoria Basin

This is a shallow basin occupying a depression on the Central Plateau between the Eastern and Western arms of Rift Valley. It is separated from the Rift Valley by areas of dissected highlands. The altitude of the plateau decreased rapidly along its western margin to the trough and lakes of the western Rift. This is a region of high rainfall, between 1,100mm and 1,300mm per annum. It is characterized by forest woodland and grassland u ,mossaic. The earliest artefact occurrence in the basin and its peripheral parts are technologically and typologically related to those of Central Tanzania. The sites covered in this basin include Muguruk and Songhor.

(i) Mufiuruk (Gq jcl)

This site is situated about 3km north of Lake Victoria .nd 4Om above the shore 011 the Muguruk river. It; wt<s discov^rua in 1936 by Archdeacon Owen and L. S. B. Leakey. They excav_;t^d it in 1936 -nd published findings in 1945 (Leakey and Owen, 1945). Earlier in 1926 Owen had found artefacts characterized as Sangoan and Lumpemb^n at localities on the north side of one Winam Gulf (formerly Kavirondo Gulf) of western Kenya. In 19/9 and 1980, Muguruk was re-excavated intermittently by i;eBru..ty who described and analysed artefacts, such as cores, awls, scrapers , and flakes from the site. According to ner studies, the bedrock consists of two superimposed phonolite lavas that provided the raw materials from which artof cts wore mude.

The sediments of Muguruk formation consist of six infori..~l members of fluvial origin. The basal member is a 2m thick conglomerate with clay lenses containing occasional artefacts. Above member 2 is a coarse to medium sand 1.5m thick with artefacts that have been named the 0 jolla industry. Overl./ing this sand is a mud-cracked gray clay measuring 2.5 m thick. This is member 3. It has a few artefacts in the upper part. Above member 4, is a red, clayey, sand deposit measuring 3m thick. It contains a dense concentration of artefacts and has been referred to as Pundo - Malcv/ar industry (McBrearty, I966). Above member 4 is member 5. This deposit is made up .of black cotton soils and contains Late Stone Age artefacts. The weathered lateritic soil of member 4 suggest a period of higher rainfall and humidity during the time of the middle Stone Age aensus stricto (Clark, 1988).

Soil acidity and cheiiiical weathering have removed all hone.
F'
MtfBrearty estimates that llugurulc beds may have accumulated over a long period of 30,000 to 170,000 years.

She described tiie lower industry u.t Kuguruk as SangOcai/ Lupemban and gave it a local name of <u>0jolla</u> industry® Although in secondary context, the assemblage does not appear uo have been significantly redistributed. The size range of aebj is also not very different from th..t of an experimental u.ssoiU-blage using phonolite. Retouched tools account for on'Lv 2.2.' the remainder being unmodified waste, so that tnese conouutiA*-
a
tions can be seem as*manufacturing place. Heavy duty tool^ comprise 41$, while light duty tools accounts for 51y. Of the former, 23$ of the total are large bifacial tools namely coro-axes, planoconvex sectioned picks and long finely made Lanceolate points with biconvex to lenticular cro3s secuiuns. These tools show considerable flaking skill and were probably-made from long, triangular sectioned flakes (li'cBreaty, 19&1). The number of fragments of broken Lanceolate suggests that thit may have occurred in the course of manufacture. Large tranche Is such as those found in the Orichinga Valley by O'Brien and illustrated by Leakey and Owen in 1945 are rare.

The overlying <u>Pundo-Makwar</u> Industry occurs in the over-bank sands and silts of the red clay sands. Artefacts are vertically distributed over some 40 - 50cm thickness'of deposit. The concentration of artefacts in this part was probably the result of termite activity. These artefacts consist mainly of flaking waste.

Only 1 to 0⋆ 1;iiese arG retouched pieces. Almost all the ortefacts were made from phonolite except five pieces of obqirl>n, probably derived from the Lake Najvasha area 190 - ig5 km bo the East, Rift Valley. This industry appears to be a local expression of a Hiddle Stone Age Industry with emphasis on use of local materials using, Levallois flake production. 7hil" the technology suggests some continuity, the disconti-nuity in retouched form shows the implication of a chronos-tratigraphic break. This is again evidenced in the Nsongezi sequence and once more demonstrates that the Middle Stone Age lasted for a long period of time (Clark, 1988). Kuguruk does not have any evidence of hominid remains (Leakey, I960; Olarkj 1988; IIcBrearty, 1981; 1988).

(ii) Songhor (Gq. Jc5)

It falls within the same habitat zone as the Muguruk site. The site falln within the eastern edge of the Lake Victoria Hasin ad foothills of the Nandi Escarpment some 50km east of the lai-eshoro from Kisumu. It was a short term activity site nn(1 the tools and fauna are in near-primary context within a 0.'5m thickness. The raw materials used were nephelinite lava fron a source l?l<m distant and quartz, which was locally avai-lable (Clark, 1988; McBrearty, I98I5I988). Also of interest are two ST-all chips of obsirjjan, the nearest source for which is Lai:e ITai vasha region of the Rift Valley.

Test excavation and surface eroded pieces introduced some 422 artefacts. Very few of these were retouched tools. These onsisted of modified or utilized pieces accounting for 5.4$ of total. The remainder consisted of unmodified flakes, cores and other flaking wastes and accounted for 1.4r . There were four scrapers, two Levallois points and two bifacial points. Discoid cores were prepared by radial[1] flaking to remove broad flakes. Bones and bone fragments (N - 112) from this site come from medium to large bovids like rhinocerous, waterbuck and wildebeest• Extinct animal species have not appeared on the site, confirming the suggestion that the artefact assemblage belongs to the later part of the Middle Stone Age (McBreaty, 1981;.1988).

Research Methodology

Data analysed from the four sites are available at the Archaeology laboratory of Nairobi National Museum. These materials were excavated fey Sally McBreaty and Barbara Anthony. McBrearty excavated Muguruk and Songhor sites while Anthony excavated Prospect Farm and Prolonged Drift Sites, The permis*-. to analyse these materials from the laboratory, was granted to ne by Mr. rbae, the then acting head of Archaeology department at the museum, while the permission to visit the sites was given to me by Dr. Hel&ne Roche, the current head of the department.

Boxes from different sites were withdrawn from the shelves in the laboratory.

started the analysis with Muguruk boxes by spreading the **con-n** tents on the table where I identified cores and isolated them fr0r **non**-cores. Contents of each box were analyzed at a time. Upon finishing with Muguruk boxes, I analyzed the Songhor boxes then Prospect Farm boxes and Prolonged Drift, in that order. From each site I picked as many cores as I could lay niy hands on for analysis. For example, ffom Muguruk I picked 168 cores, 42 cores from Songhor, 134 cores from Prospect Farm and 50 cores from Prolonged Drift. This was done in this way in order to avoid the problem of sample bias in the specimens to he studied.

The methodoloy used to study the attributes in this resealcfi wa.s used by Clark ?-nd Kleindienst for the study of KalamboFalls Stone Age Industries. Similar methods were used by V/ymer and Singer for the analysis of Middle Stone Age industries at TH.an_i.es River mouth in South Africa. Sampson also used these metltfds in the analysis of Stone Age industries of the Orange River scheme in South Africa. Kcbreaty used similar methods in the an:lysi3 of Songhor and Muguruk Kiddle Stone Age industries. Merrick also used this approach in the analysis of Prolonged Drift|^rrospect Farm Middle Stone Age sites using these methods.

Attribute studied on cores included length, breadth and thiclaiess. These together with McBreaty's size class scale (Figure 2), were used to determine the sizes of cores. They were measured by use of callipers to the nearest millimetre. I easurements above 1OOmmm were considered to represent heavy duty cores, while t^o^e below 100mm represented light duty cores. • • - •• - . 0j • • -i rirket}ier attributes such as number of platforms and flakescars, resence or absence of cortex, reduction intensity or size of initial block, direction of percussion, and organisation of flaking were measured by counting features which suggested 6r supported the evidence of respective attributes. For example, number of platforms were determined by physically counting the platforms.

The weights of cores were measured by using a manual tripple stand balance and an electrified balance weight. They were measured to the nearest gram and it was then established that cores with weight measurements above 100 grams were of heavy duty_ cores, while those below 100 grams were of light duty cores.

The shapes of cores were analysed by using a standardized ' * typology of Kleindienst and Clark, and by relating them to structures such as pyramids, coTV^s and triangles among others. Some shapes were identified by looking at features of the cores* For example, radial and subradial cores were identified by looking at radial or irregular patterns or direction to their percussion. Other cores, such as chopper and scrap&r cores, were identified by establishing their functions.

Technologies used to produce different types of cores were determined by looking at characteristic features of each core. This was then related to the technique which is believed to produce cores with similar features. For example, some cores were characterized by the presence of small striking platforms, diffused bulbs cf percussions or were slightly curved inwards.

These cores are believed to have been produced by the punch or indirect technique.

Honclusion

This chapter has shown that the sites under study had no evidence of hominid occupation. The only associated hominid remains were found at Kajera site which shares the same habitat .zone with Songhor and Muguruk, but falls outside the scope of my work. According to J. D. Clark, the Prospect Farm, Phases 1 and 3, and Muguruk of 0 .jo 11a industry are referred to as the ITiddle Stone Age industries of Sangoan/Lupemban relations. They thus belong to earlier Kiddle Stone Age; while Songhor site and the Kuguruk's Pundo-Kakwar industry are T'iddle Stone Age of uncertain Age. Prolonged Drift and Phase 4 of Prospect Farm, on the other hand, belong to the Late Middle .Stone Age.

Chapter Three

DATA ANALYSIS

Introductimi

This chapter presents the analysis of the data based on 394 cores from four sites. Each of the 3ites is studied separately. The following attributes were analysed on the cores: Raw material, shape, size, weight, length, breadth, thickness, number of platforms, number of flakescars, presence or absence of cortex, size of the initial block, direction of percussion, organisation of flaking and production technique.

Huguruk Site

(i) Raw materials. 168 cores from Fuguruk were analysed. Eight different types of raw materials were used in the production of ITuguruk cores. These were Quartz, Quartzite, Ombo Fhonolite, ITepheli.uibe, Ignimbrite, Basement Complex rock, Chalcedony, and Basalt (see table 3.2.1. below). The most 'lomin^.nt raw raberial was Ombo Fhonolite which had 152 cores accounting for 91f of bhe total cores. Basement complex rock and Chalcedony were each represented by 5 cores. Quartz, luartzite, nephelinite and basalt had one core each. These frequency percentages are not surprising because the most common rock at Huguruk was ombo phonolinite lava. They support the view that local raw materials were intensively used in the production of tools.

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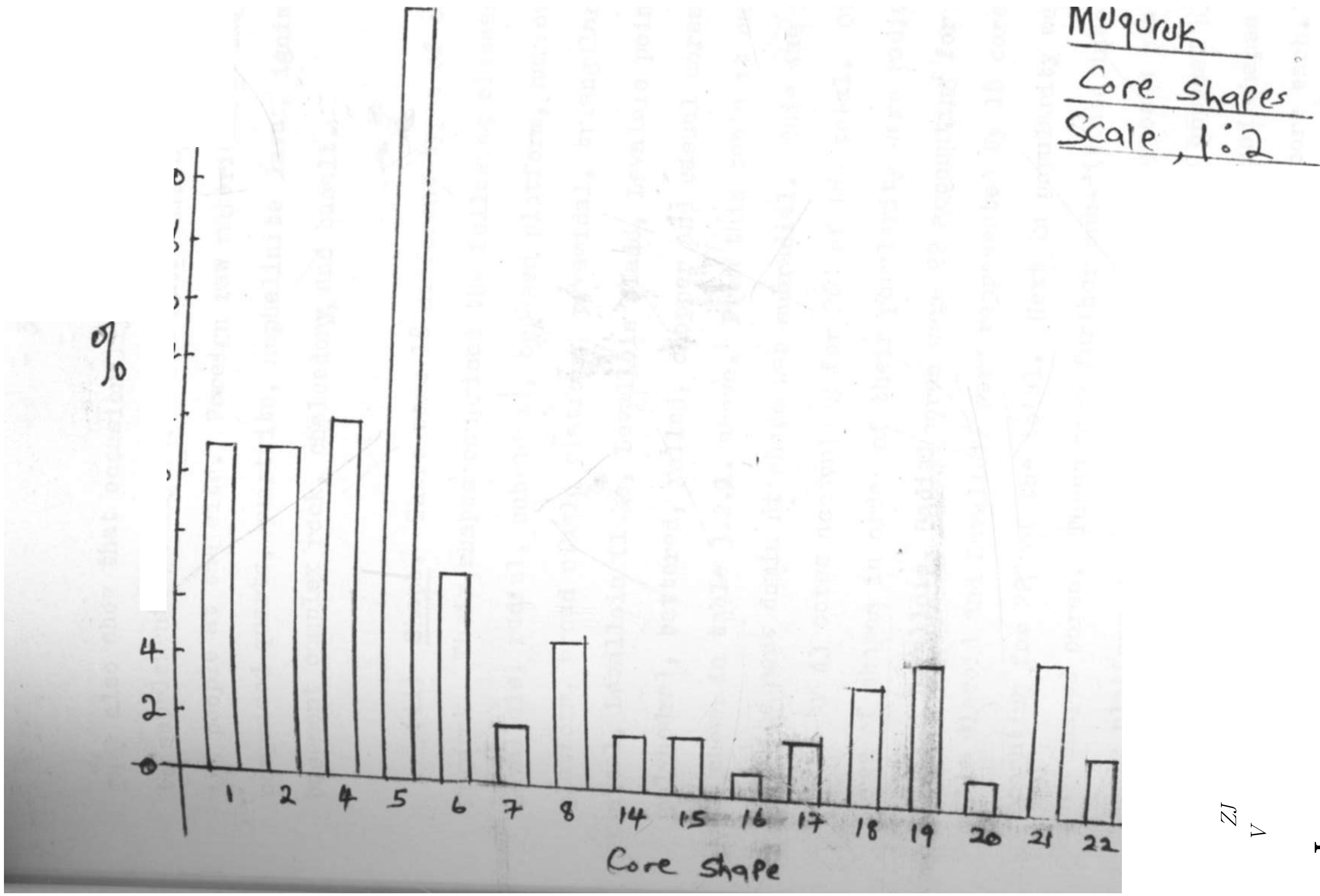
Muguruk
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Core Shape

They also show that occasionally foreign raw materials were used to supplement locally available materials by the Middle Stone ^ people at the site. Foreign raw materials at Muguruk site comprised quarts, quart site, nephelinite lava:., ignimbrite, basement complex rock, chalcedony, and basalt.

(ii) Shape. There were 18 different types of cores from T'u^uruk. Their shapes comprised the following classes: Discoids Levallois, radial, subradial, opposed platform, narrow single platform, broad single platform, pyramidal, triangular, bico- • nical, Levallois flake, Levallois blade, Levalois point, polyhedral, battered, rolled, chopper and casual cores. This in shown in table 3.2.p.. above. From this table it can be seen h'lfit the most dominant shape was subradial. This was repre-rented by 43 cores accounting for 2W of the total. Other tynes of shapes in order of their popularity were radial, dis-coid and Levallois. Radial cores were 22 accounting for 13$, while discoid and Levallois were represented by 18 cores each accounting for 22? of the total. Next in popularity were plat-form shaped cores. These were further sub-divided into broad rinrle platform, narrow single platform and opposed platform shapes. Cf these, the most; popular shape was opposed platform nhape which had 12 cores. The least represented shapes were lolyhedral, chopper and casual with only one core each.

The analysis of the relationship between core types and ' v' trials s'iov; that core shapes were influenced mainly by accessibility to sources of raw materials (Table 3.2.2. ii)

Qjpb0 I TiimnoHite lava which wore locally available were extensively sed tlie production of different shapes of cores such as nfljal, narrow single platform, Levallois blade, biconical, T,evallois flake, polyhedral^ battered,chopper and casual cores. These accounted for 33? of the cores in the assemblage. The data in table also suggest that-foreign raw materials were imported to supplement local raw materials. Such raw materials included quartz, quartsite, nephelinite, ignimbrite, basement complex rocks, chalcedony and basalt. These were used in the production of discoid, Levallois, subradial, opposed platform, broad single platform, triangular, pyramidal, Levallois point and Rolled cores.

I

(iii) Size. Kuguruk core sizes ranged from 3 to 18 according to McBrearty's size class scale (Figure 2). The most dominant was size eight. This was represented by 33 cores accounting for 20;' of the total. There were 32 cores under sise seven, and 27 cores under size six. Size five was represented by 20 cores while size nine had 21 cores. Eight cores •'ore under size ten, while 4 end 3 cores were under sizes eleven ami three respectively. Size thirteen had three cores while sizes twelve, fourteen and eighteen had 2 cores each. Sines fifteen and sixteen had only one core each (see table 3.2.3. below).

Analysis of the relationship between sizes of cores and raw materials show t'r^t core sizes were influenced mainly by the accesibility of raw materials sources (table 3.2.3* iibelow)

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2»n» example there were 144 ombo phonolite lava cores ranging between sizes five and eighteen, while there were only 3 *CO-RES OF* chacedony under sizes three and four. There was only one quartzite core under size four. This suggests that local raw materials were extensively exploited, while the foreign raw materials were more economically used to supplement local sources.

(iv) Weight

Muguruk core v/eight ranged between 3 and 866 grains with the lightest core measuring 3.39 grams while the heaviest measuring 866.90 grans. Their mean was 166.38 grams. Kuguruk cores were divided into nine classes of weight (see table 3.2.4. above). The most dominant class, one, had weight measurements of less than 100 grams. This had 76 cores accounting for 45f* of the total. 46 cores were in class tv/o with measurements of between 101 2nd 200 grams. Class three, that is 201 to 300 grams, was represented by J_8 cores while class four (301 to 400 grains) was represented by 14 cores. 5 cores were found under class five with measurements ranging between 401 and 500 grans. Classes six (501 to 600 grans) and eight (701 to 800 grans) had 3 cores each. 2 cores were found under class seven whose range was 601 to 700 grams. There was only one core with weight measurements of between 801 and 900 grans, falling under class nine. From these neasurenents it can be suggested that the accessibility and types of raw materials influenced the weight of these cores. For example, 88 out off 152 ombo phonolite lava cores weighed more than 100 grams. These were considered "to be heavy duty cores. Imported raw materials such as chalce-
quartzite, nephelinite and ignimbrite produced cores with

weight measurements of less than 100 grams, considered to be for lighter duty purposes. Of these, the lightest core was made of chalcedony. These frequences suggest that the imported raw materials were economically exploited compared to local raw materials from the site. However, some imported raw materials such as quartz and one basement complex rock from Muguruk weighed 663.SO and 173.28 grams respectively. Both quartz and basement complex rocks were less isotropic compared to ombo phono lite lava and thus their demand was relatively low. (Table 3.2.4 ii)] . The heaviest core was made from ombo phonolite lava which was locally available at the site.

T

(v) Length. The mean length of Iluguruk cores was 74.85 mm. They ranged between 27 and 178 mm with the shortest core measuring 27.40 and the longest core 178.50mm. These lengths were divided into eight classes with interval of 20 mm each (see table 3.2.5 below). Glass one had 10 cores accounting for of the total. These cores measured between 21 and 40 mm. Class two of 41 to 60 mm had 38 cores, while class three (61 to 80 am) had 63 cores accounting for38$ of the total. Class three was the modal class. Class four, 81 to 100mm had 34 cores while 15 cores were under class five with a range oi 101 to 120mm. Classes six and seven of 121 to 140 mm and 141 to 160mm respectively had 3 cores each. The least represented was class eight with only 2 cores measuring between 161 to 180 mm. ?rom the measurements it can be suggested that the length of Muguruk cores were influenced by raw materials.

Mugaruk Core Length (mm)

Scale, 1:4

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Liferent raw materials produced cores of different measurement! (^able 3«2*5. ii)* There were only 20 cores from this site that had length measurements of above 100mm and thus were considered 1onger cores. Of these, 19 cores were made of ombo phonolite lava while only one core was jade of quartz. The longest and shortest cores in the assemblage were made of ombo phonolite lava. This suggests that local raw materials wore exuenslvelo- used. Both basement complex rocl: cores, chalcedony, quartjit^, nephelinite and ignimbrite cores in the assemblage measured les than 100mm. These measurements show that ombo phonolite cores were generally longer than cores made from the imported raw materials. This support the views that locally available raw-materials were extravagantly exploited at Muguruk site because they were readily available, while the foreign raw materials were economically exploited as they were scarce.

(vi) Breadth. The mean breadth of these cores was 68.14 mm. Their breadth measurements ranged from 16 to 163mm with the narrowest core measuring 16.60min and the widest core measuring 163.80mm. The breadth measurements were divided into 8 classes with an interval of 10mm each (see table 3«2.6. above). The modal was class six of-61 to 70mw. This class v/as represented by 33 cores accounting for 20^ of the total. This was followed by class seven (71 to 80mm) which had 31 cores. Class four (41 to 50mm) had 23 cores while class five (51 to 60mm) had 23 cores and class three .of 31 to 40mia was represented by 18 corts Class tv/o had 6 cores, while class eight had 10 cores and class ten had 5 cores. There were 4 cores under class nine (91 to 100mm). Class one, eleven and thirteen had one core each.

<jh.e9e measurements suggest that the breadth **of** Muguruk cores ere influenced by different raw materials. The 'Jocal raw material* ombo phonolite lava, had both the narrowest and widest cores in the assemblage, while imported raw rnatu.. ialti such as quarts, basalt, quartzite and nephelinite lava had cores measuring between 26.40mm and 105.00mm (Table 3.2.6. ii) . prom the table it can be seem that cores ir^tde from imported r~w materials were siiort in breadth compared to those made from local raw materials. It can thus be deduced that imported rav. materials were economically exploited compared to local IW<W7 materials from the site. These frequencies also aupport the view that foreign rav/ materials were used to supplement local raw materials.

(vii) Thickness. Thickness of these cores range a between 6 to 89 .-25mm. 9 clashes of cores were identified in t^rus ox thickness (Table 3.2.7. below). 'The modal class had measurements ranging between 21 to 30inm. This class was represented by 51 cores, accounting for 30$ of the total. Glasses two (11 to 20mm) and four (31 to 40mm) had 36 cores each, while class five (41 to 50mm) had 20 cores. The least represented class was nine (81 to 90mm). It had only one core. These frequencies suggest that the thickness of Muguruk cores were influenced by various factors such as accessibility to rav/ materials and the functions to which the cores were put. The thickest core in the assemblage was made of ombo phonolite lava, while the thinnest core was made of chalcedony. Generally, ombo phonolite cores were thicker than those of imported rav/ materials like chalcedony.

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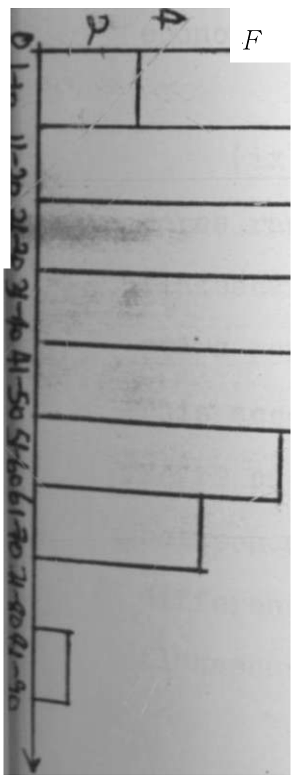


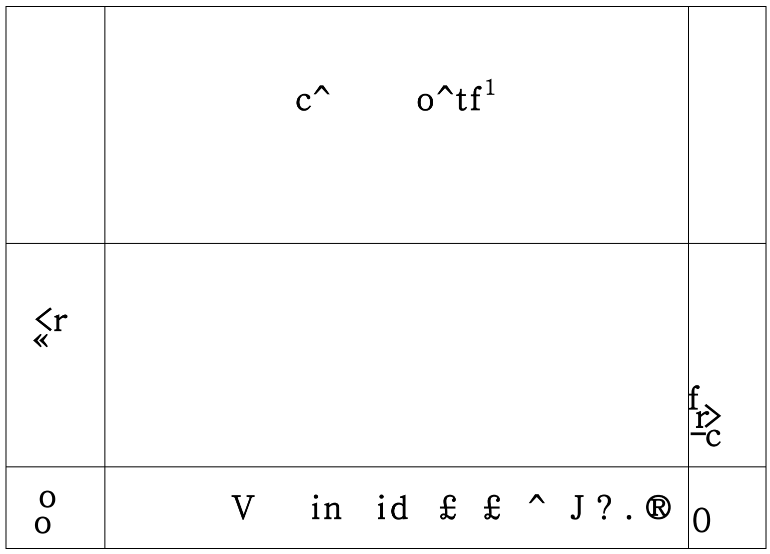
kis means that chalcedony was the most isotropic rock in the assemblage.

(viii) Platforms. There were nine classes of platforms in the Ku^-iruk cores. The maximum number of platforms per core was 9» while the least was only one per core. The most represented number was four, which had 30 cores accounting for 18$ of the total. 16 cores had one platform each while 26 cores had two platforms each, to name just a few (Table 3.2.8 below). These frequencies show that the number of platforms per core was influenced by the functions to which the cores v/ere put. This also suggest that ITuguruk's ombo phonolite lava were more extensively exploited while the imported raw materials were , economically used.

t

(ix) Flakescars. The number of flakescars on the Muguruk cores ranged from 1 to 12 (according to numerical counting of flakesca?(s) per core) with the maximum number being 12 flakescars per core. There were 35 cores with 12 flakescars each. This accounted for 2.1? of the total. 19 cores had three flakepcpr!? °ach (Table 3.2.9. below). Analysis of the relationship between number of flakescars and raw materials showed that different raw materials produced cores with different numbers of flakescars (Table 3.2.9. ii below).

Presence or Absence of Cortex. There were 64 cores, accounting for 3$f of tie total that had no cortex on either °f their surfaces. 13? of the total had cortex on some parts °f their debitage surfaces, as their platform surfaces had no cortex cover (Table 3.2.10).



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I here v/ere orabo phonolite lava cores that had no cortex on their surfaces, while the only quartzite and nephelinite cores j_n the assemblage also had no cortex cover on their surfaces, **(Table** 3.2.10 ii). This shows that many cores in the assemblage were worked on. There were 21 ombo phonolite cores that had cortex cover on some parts of both surfaces. This support the view that imported raw materials were economically worked on compared to locally a.vailable raw materials.

(xi) Initial Size of the Block. This refers to the size of an initial block before it was reduced by either flaking or backing. In this work, this was estimated by the intensity of reduction on a core. It indicates how cores were exploited. I-'uguruk cores were primarily reduced, as many cores in the assemblage were not wholly flaked or backed. This is shown in » * Table 3.2.11. below. There were 57 cores, accounting for 34$ of the total, that were primarily reduced on both surfaces. 19 cores were reduced on their debitage surfaces only, while 16 cores v/ere reduced on their platform surfaces only. These reductions were probably due to type and nature of raw materials and the choice of stone tools knappers of the time.

(xii) Direction of Percussion. This refers to the pattern flaking. It reflected different patterning techniques used "'hen fla>ing. The most frequent patterns were radial and irregular flaking. 35 cores accounting for 21^ of the total, were radially flaked on their debitage surfaces, while 12 cores were radially flaked on their surfaces. From these frequencies it can be suggest that the dominant pattern of -liking was radial.

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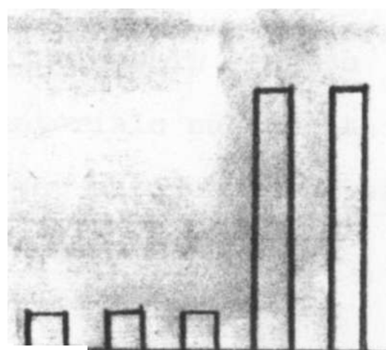

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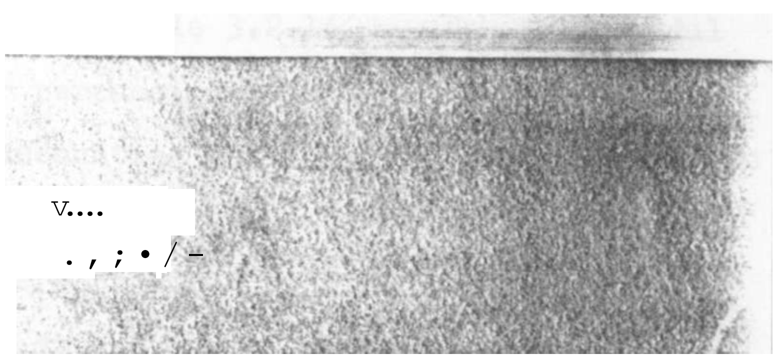

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relationship between direction of percussion and raw materials suggest ti at different factors such a3 accessibility of materials and function of cores influenced the patterns of percussion. This explains why diffe, cut patterns were represented in different raw materials, (Table 3.2.12. ii).

(xiii) Organisation of Flaking. This refers to the intensity of flaking on a core. It, reflected the utilization of cores. Muguruk cores, as shown in table 3.2.13 below were intensively flaked on both surfaces. 43 cores, accounting for 26$ of the total, were intensively flaked on both surfaces, while 17 cores were primarily flaked on both surfaces. There were 13 cores that were intensively flaked on their platform surfaces while 16 cores were intensively flaked on their debitage surfaces only. The analysis of the relationship between organisation of flaking on a core and raw materials suggest that the intensity of flaking was influenced by the nature and ty^es of raw materials available.

(xiv) Production Techniques. Five techniques were identified from the analysis of Muguruk cores. These were anvil, bipolar, hard hammer percussion, soft hammer percussion and punch or indirect techniques (Table 3.2.14. t>eio.u>). The modal technique was hard hammer percussion. Tiiis technique was represented by 92 cores accounting for 55$ of the total. It was followed by the soft hammer technique which was represented by 25 cores, while 9 cores were produced by biploar techniques, and 3 cores by punch or indirect techniques. It can be suggested from these frequencies that production techniques depended on the nature of the raw materials from which tools v/ere made. (Table 3.2.14. ii).

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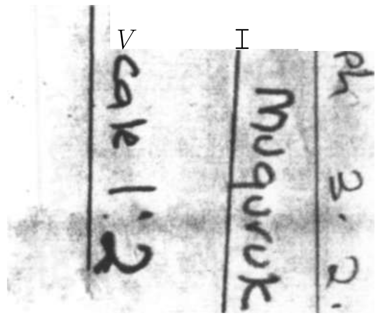

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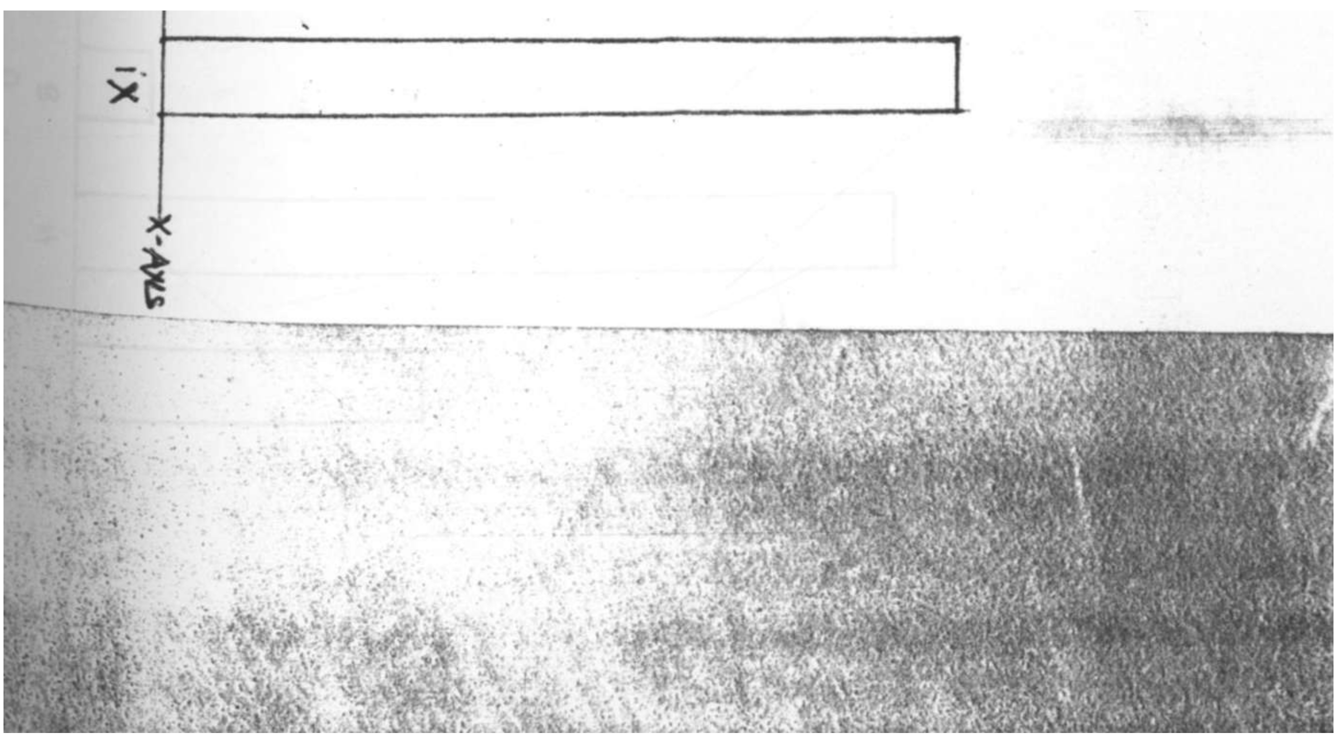

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Raw Material, 4-2 cores were analysed from this siio. your different types of raw materials were used in the px'odu'j- -tion of Scnghor cores. These were Obsidian nephelinite lava, uartz and basement complex rocks (Table 3o*l* below). The ost dominant raw material was nephelinite lav- which iiaJ 21 cores, accounting for 50% of the total, quarts was ro^iv.seated "by 19 cores accounting for 45V<J of the total, while Obsidian am basement complex rocks were represented by one core .. accounting for Lv-/o of the total. Foreign raw uiatex'ialo uood at the site were Obsidian basement basement rocks and nopheliaite lava. These frequencies support the view that less isotropic raw materials, such as quartz, were not intensively used. The limply that imported raw materials were intensively used in the production of tools. They also show that occasionally foreign raw materials were used to supplement locally available materials by the Liddle Stone Age people at the site. The local raw material at Son dior was quartz.

(ii.) Shape. There were ten different shapes of cores that were identified. These were discoid, Levallois, radial, Levallois flake, Levallois point, battered, subradial, narrow single platform, Broad single platform and scrapper cores as shown in table 3*3*2. From this table it can be seen that the most dominant shape was broad single platform. This was represented by 16 cores accounting for 38/6 of the total. Other shapes in order of their popularity were Levallois flake, subradial and Levallois point.

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ere were eight Levallois flake cores, while subradial and *evallois point were represented by 5 and 4 cores respeeLively, fhe shapes of Levallois radial and battered had 2 cores each, njhe least represented shapes v/ere discoid, narrow sin 1., A/i in-form and acrappor which had one core each. The shapes oi Songhor cores were influenced by different; types of raw materials (Table 3.3.2. ii) • As can be seem from the ta ile iihu tail, discoid core was produced from nephelinite lavu, while the onlj single platform, battered and scraper cores were made from quartz. The Broad single platform cores were produced from four different raw materials,obsidian* nephelinite lava, yiurUz and basement complex rock. Thi3 means that the sane techniques of percussions that were used to produce Broad single platform cores v/ere used on the four raw materials. There \/ere C Levallois flake cores produced from nephelinite lava, while two Levallois flake cores v/ere produced from quartz rocks. This suggest that nephelinite lava and obsidian were more isotropic than quarts and hence the use of soft hammer techniques in the production of tools.

(iii) Size. Gore sizes ranged from 3 to 8. This was according to McBreaty's size class scale (Figure 2). The most dominant was size four with Vj> cores accounting for 3o-,o of the total. There were 10 cores under size six, while 7 cores v/ere uadersize five, and 4 cor^s were under size seven. Sizes three eight had 3 cores each. The core sizes were influenced the nearness to raw materials. The more closer a source was the bigger the sizes of cores.

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FOT eJ * there were 14 nephelinite lava cores of sizes M^-eeii five oi/rht while obsidian^ basement complex rock and I ^ quarts cores V/ere under sizes three and four* This supports ^eV7 that raw materials which were closer, or very accessible, the site were more extensively exploited compared to rav/ materials which were f;?r from the site.

(iv) height• Core weight from Songhor ranged between 4 and 109grams• The lightest core Tieasured 4.75 grams while the heaviest core was 109.61 gr?ns. Their mean v/as 24.23 grams. This is shown in table 3.3.4. These weight measurements were •'. divided into eleven classes with an interval of 1Ograms each. The '\ortal olasn was two with a range of 11 to 20 grams. This cla-:>n had 11 cores accounting for 36^ of the total. This was followed by class one (1 to 10 grams) which had 8 cores. Class three (21 to 30 grams) had 6 cores while class four (31 to 40 grains) had 4 cofes. Classes five and eight (41 to 50 grams) •m»X (71 to 80 grams) respectively had 3 cores each. Classes ^ix, seven °nd eleven had 2 cores each. Only one core v/as '.mder class ten. Prom these measurements it can be suggested the nature and types of raw materials influenced the the weight of those cores. 5?' of Songhor cores were considered heavy as they weighed more than 100 grams. These were one nephelinite lava core and one quartz core which weighed 109.61 ^nd 106.no grams respectively. (Table 3.2.4. ii).

(v) Length. The lengths of Songhor cores ranged from 24 to 80nm. The shortest core v/as 24.00mm while the longest core neasured 80.00mm.

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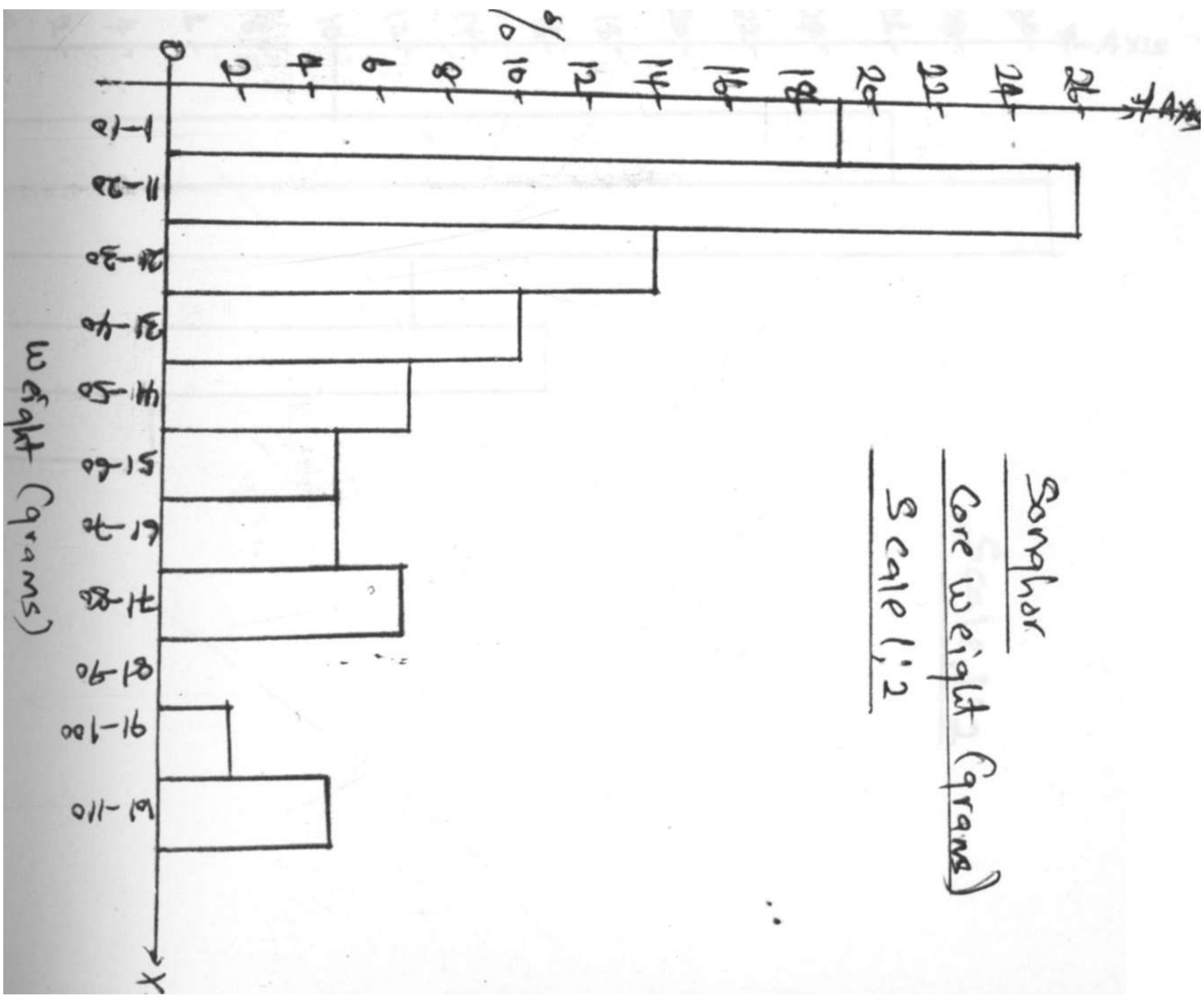

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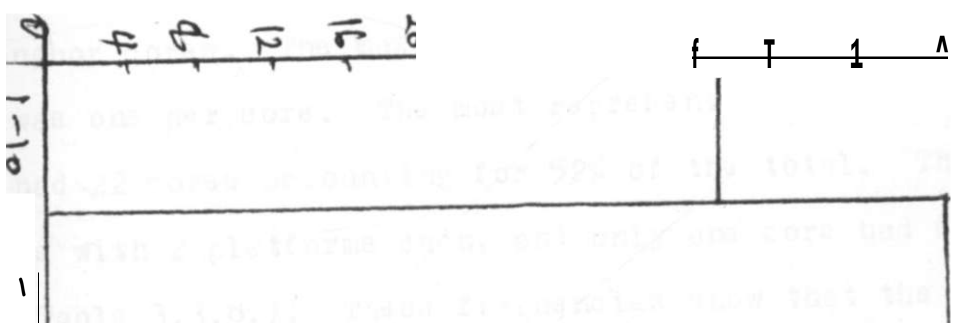
^ lamths ware divided into b classes with an interval of locd each (Tabl-e 3.3.5.). The first class of 21 to 30mm had 4 fore9 accounting for 10^ of the total, while class two (31 to OamO ^ corea* Gia33 three was the modal class and it QQ represented by 13 cores accounting for 31/' of the totil. •Phis c133s had length measurements of between 41 and 50mm. Class four (51 to 60 mm) had 5 cores while claos fi^e had 7 core- Clasa six (71 to OOmm) was the least represented. It had only ^ cores which accounted for 5^ of the total. Prom these measurements it can be suggested that the nature of the raw materials influenced the lengths of cores (Table 3.3.>. ii).

(vi) Bre ad th. The breadth of ma cores ranged between 21 and 71mm with the narrowest core measuring 21.^j0mm and the widest core measured 71.90mm. They were diviuad into b clusaes with an interval or 10mm each (Table 3.3.6). The modal clues W3S two (31 to 40mm). This class 'had 13 cores accounting for 31> of the total. This was followed by class three which had 12 cores, while class one (21 to 30mm) had y cores and clas^i four (51 to 60mm) had 6 core a. The least represented classes were rive and six (bl to 70mm) and 71 to bUmrn) respectively. These measurements suggest that the nature of the raw materials influenced the breadth of Songtior cores. For example, the widest core was made of NepheUnite lava rock while tne narrowest core was made of Quartz. 5 Nephe linite lava cores and 2 Quartz cores had measurements exceeding 50mm. This suggests t that local raw materials was least exploited compared to import- raw materials. This was due to the nature and texture of the local raw material, Quartz.



Tt was lass isotropic compared to Nephelinite lava, Obsidian, and Basement Complex rocks.

(vii) Thickneaa. The thickness of Songhor core ranged from 5 to 33mm. with ihe thinnest core measuring 5.50mm, while the thickest core measured 33.80mm. Their Die an was 13.98mm. These thichneaaea were divided into 4 classes with ana interval of 10mm each (Table 3.3.7.). The most domiiunt claaa was two of 11 to 20mui. This claaa had 20 corea accounting for 4b> of the total. There were 15 corea which measured lesa than 1.0mm and thus falling under ciaaa one. There were 6 cores under claaa three of 21 to 30mm, while the least represented class waa^four. This claaa had only one core which measured between 31 ana 40mm. The thickneaa of these corea were imluenced by the nature and typea of raw materials and the functions to which the corea were put.

(viii) Pla t forma. There were aix claaaea of platforms in the Son^hor corea. The maximum number per core was 6, while the leaat was one per core. The moat represented number was one which had 22 corea accounting for 52> of the total. There were 12 corea with 2 platforms each, and only one core had 6 platforms (Taole 3.3.8.). These frequencies a how that the number ox platforms per core were influenced by the functiona to which the corea were put. This alao auggeata that Songhor's quartz were not extensively exploited, while the imported raw materiala such as nephelinite lava, obaidian and basement complex rocks were economically uaed. Theae raw materiala were more iaotropic than the quartz which waa locally available at Songhor.

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(ix) Flakescars. The number of flakescars of these cores A between 2 and b (according to numerical counting of flake-Boar(g) per core. The modal number was two which was represented by ^ cores accounting for }6°/C of the total. This was followed by the flakescar number of three. There were 11 cores with three f^kescars each, while 5 cores had four flakescars each (Table 3 3.9.)« 4 cor" had six flakescars each, while 3 cores had eight flikescars each, and only one core had seven flakescars. These measurements suggest that the distribution of flakescars per core were influenced by isotropic nature of raw materials. There were 4 nephelinite lava cores and 10 quartz cores that had two flake-scars each. 8 nephelinite lava cores and 3 quartz cores had three flakescars eich, while 5 nephelinite cores had four flakescars each The only Obsidian cores, one nephelinite lava core 3nd one quartz core had 5 flakescars each, while two nephelinite lava cores had < » flakescars. (Table 3.3.9. ii). These measurements support the view that accessibility of raw materials had significant impact on the distribution of numbers of flikescasrs per core.

(x) Presence or Absence of Cortex. There were 29 cores accounting for 69/' of the total thit had no cortex on either of their surfaces, while 11 cores hid cortex on some parts of their platform surfaces. Two cores had cortex cover on some parts of their debitage surfaces. No core had complete cortex cover on eitl.er individual or both surfaces (Table 3.3.10). Analysis of th relationship between absence or presence of cortex and raw materia 9how that only one nephalinite lava core and one quartz core had cortex cover on some parts of their debitage .surfaces, while 5 nephelinite lava cores, the only basement complex rocks core and * euartz cores had cortex cover on some parts of their platform surfaces.

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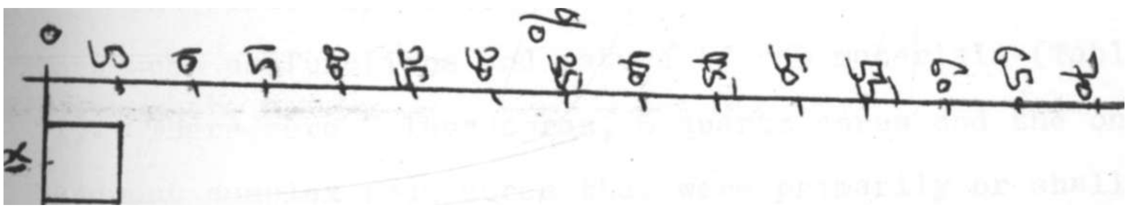

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There were 15 nepheUnite lava cores, 13 quartz cores and the I- obsidian cove that had no cortex cover on their surfaces OFT)v J,. 10 ii). This means that the absence or presence of q0-"" on a core was influenced by the nature and types of raw

(xi) Initial 3ize of the. Block. This refers to the size of an initial block before it was reduced by either flaking or backing* In this work, it was estimated by the intensity of total that were intensively reduced on both surfaces while the game number of cores in the assemblage were primarily reduced on both -urfeces. Four cores were only reduced on their debit surfaces than their platform surfaces and only three cores ;-ere Intensively reduced on their platform Surfaces than their debitage sur.fac.es (Table 3*3*11 below).

The reduction of Songhor cores were much influenced by factor's such as functions and nature of raw materials (Table 3*3*11 ii). There were 8 lava cores, 6 quartz cores and the only basemen I; complex rock, cores that were primarily or shallowly r-^uced on both surfaces while ^ nephelinite lava cores, 10 plants cvrt'S nnd the only obsidian cores were intensively reduce! on both surface:?. There were 3 lava cores and one quartz core b!r>t '/ere mainly reduced on their debitage surfaces. 3 nephplinite lava cores were more reduced on their platform faces than i;hcir debitage surfaces, while 2 quartz cores rn ' ^ nophel initr lava cores -ere intensively reduced on their debitage surface than their platform surfaces.. These frequencies suggest that tjbe more isotropic materials.

(xii) Direction of Percussion. This refers to the pattern of flaking.

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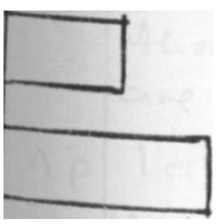

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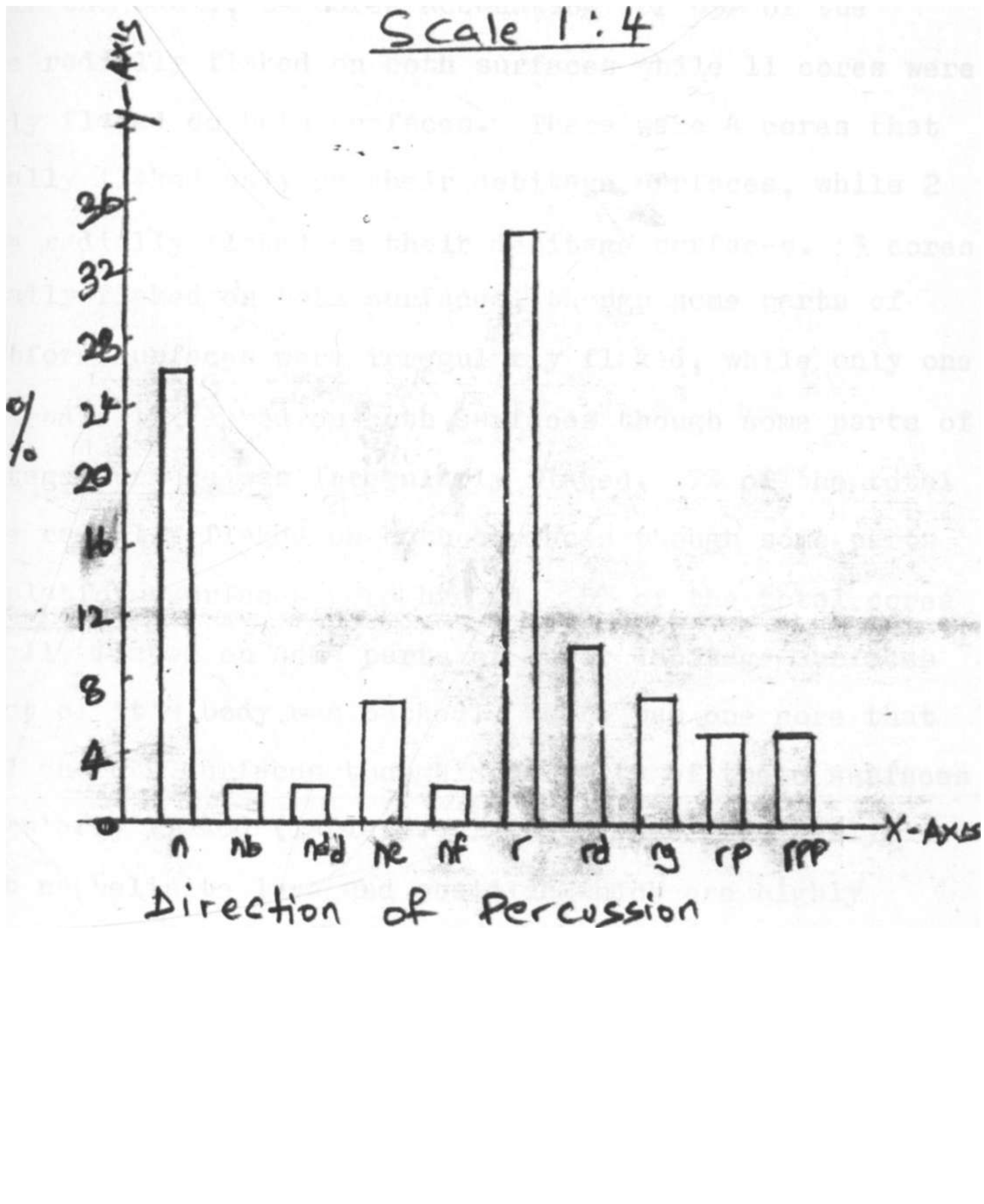
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on' Son^hor cores were mainly flaked radially (Table 3*3*12).

m shown in the table, 14 cores accounting for 33% of the hot^l were radially finked on both surfaces while 11 cores were ^r1.prrul^nrly flaked on bob" surfaces. There were 4 cores that radially risked only on their debit age surfaces, while 2 c0ves were radially flaked on their debitage surfaces. 3 cores ...xQ rad ally flaked on both surfaces, though some parts of •hlia' pk'.vtfonn sur Paces were irregularly flaked, while only one ,.cr.nr. v.'aa radially fl'ked on both surfaces though some parts of It'a deb:i tage surface was irregularly flaked. 7% of the total coi'e- wave radially flaked on both surfaces though some parts nf tVir '-l.a t form a/irfaces - ore b^c'./'d. of the total cores v /i n o ly flaked on io'ne parts of their debitage surfaces I fill -> pot of it'a body waa bac.ked. There was on» core that v" n on both aurfracea though soma parts of these surfaces aern -i rr'-v-y.i arly fr»ked (Table 3* 3*12. abovp). This analysis r-ho-r-g t) it no | 'he lin it a 'awn nrid obsidian which are highly i :o''op? a than qun^bjs, -and basement complex rocks were x>referred to the latter two.

(:in) Organisation of Flaking. This .refers to the inten- of flaking on a cere. It reflects the intensity of core i 1 isat}on. Songhor cor s were intensively flaked as can be fl^duc vi from Table 3*3*13 below. There were 14 cores accoun- ting r0r 33/' of the total t)vt were intensively flaked on both a ix-f iqor^ --bile 9 co^es were primarily flaked on both surfaces. 2.1- or (,7-0 total wore intensively flaked on the platform sur- faces than their debitage surfaces, while 8 cores were inten- sively floVed. on their debitage surfaces than their platform ''i,'rfaco a •

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Jf I 0 ,,Pre ? cores thot were intensively flaked on their debi-l^faces only, while one core was primarily flaked on its l-g^itage surface;, The analysis shows that nephelinite lava Iwere intensively flaked compared to the less isotropic rocks like quartz.

(xiv) Pro due tion Technigue. There were 3 techniques that wore identified from the analysis of Songhor cores. These techniques were hrrd hammer percussion, soft hammer percussion and bipolar techniques (Table 3.3.14) • There were 21 cores that had features suggesting that they were solely flaked by the bard hammer percussion technique* While 12 cores v/ere mainly worked on by the soft hammer technique and only 9 cores were produced by the bipolar technique.

Different raw materials influenced the different core production techniques (Table 3»3«14 ii) • There v/ere 8 nephelinite lava cores end 13 quarts cores that v/ere produced by the hard hammer percussion technique. 9 nephelinite lava cores, 2 quarts cores, and the only obsidian core in the assemblage were produced by the soft hammer technique. 21 quarts cores, 19$ or nepb.nlinite lava cores and the only basement complex rock cove, e»'e produced by the bipolar technique. These^analyses show bh^t nature and type of raw materials had heaVy impact on t!m diCforent techniques used for core production. The less isotropic rocks such as quartz were mainly worked on by the bard hamper percussion technique compared to more isotropic rocks s"ch an obsidianand nephelinite lava rocks. As shorn in "the table , GC? of quarts cores were produced by the hard ham-mer technique compared to 3V of nephelinite lava cores.

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was further supported by the fact that °f nephelinite cores and the only obsidiancore in the assemblage were pro- y the soft harver technique, compared bo only Hf of quartz cores. of quarts cores were small and hard to flake, and 4-jnis were produced by bipolar techniques compared to 19**A** of nephelinite lava cores. The hard hammer produced cores were characterised by deep flakescars and prominent ridges between flakescars, while the cores produced by soft hammer techniques v/ere characterized by relatively shallow flakescars, and the bipolar produced cores were characterised by thin and barrel-flhaped platforms with flakescars on both ends.

prospect Farm
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(i) Rav/ material. 134 cores were analysed from this site. Five different types of raw materials were usee! in the production of Prospect Farm cores. These are shown in Table 3.4.1. below. These were obsidian nephelinite lava, ignimbrite, chalcedony and basalt. The most dominant raw material was obsidian v.hich had 108 cores accounting for 81$ of the total. Lava cores accounted for 14;' of the total, while there were 3 chalcedony cores, rnd 2 basalt cores. 2f of the total we re made of ignimbrite rocks. These frequencies are not surprising because the most common rock at the site was obsidian. They support the view th '.t local raw materials were extensively used the production of toolr. They also shown that occasionally foreign rav-r materials were used to supplement locally available notarial* by tlie Middle Stone Age tool makers at Prospect Farm.

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(ii) Shape. There were 14 different types of cores that were identified. Their shapes comprised the following classes: discoid, Levallois, radial, broad single platform, pyramidal, ^evallois blade, Levcillois point, levallois fl. l:e, baotored, scraper « chopper, casual, block and chunk cores, us shown in Table 3.4.2. above. From this table it can be seen that the most dominant shape was Levallois flake. This was represented by 19 cores each. Next; in popularity were chunk, Levallois ui.iL discoid shaped cores. Chunk in shape were 17 cores accounting for 13/' of the total, while discoid and Levallois were rei»re-sented by 14 cores each. The shapes of radial and scraper had 2 cores each, while the shape of battered iiad 4 cores, nia block-shaped cores were 12. The least represented shapes were pyramidal, chopper,- and casual with only one core each.

Analysis of the relationship between raw materials and core shapes show that the J ost common TO oka were used to produce dif-ferent shapes. 86}' of the total cores were produced from obsi-dian rocks, while 64/" of the total cores were produced from nephelinite lava rocks and 42$ of the total shades \/ere pro-duced from Ignimbrite, chalcedony and basalt rocks (Table 3.4.2. ii). These percentages show that the local raw materials; obsidan, were extensively used to produced cores in the assem-blages This also support the view that obsidan rocks were the most isotropic on the site. The .iiost dominant type in the assemblage, Levallois flake cores were produced from both imported and local raw materials at the assemblage as follows:

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,vere °r obsidian,? wotx« of nephelinite lava core, v/hile the K^jning three were made from ignimbrite, chalcedony and basalt. HLailois, broad single platform, and block cores were mainly B duced from obsidian, nephelinite lava, chalcedony and j^nimbrite rocks which accounted for 75? of the raw materials. jeValloifl cores were produced from obsidian rocks, nephelinite 1 nnri chalcedony; while broad single platform cores were produced from obsidian, nephelinite lava, and basalt rocks; and block cores were produced from obsidian, nephelinite lava and ignimbrite rock?. Discoid, Levallois point and chunk cores were produced Crori obsidian and nephelinite lava rocks. On the other hand, radial opposed nlatfomi, battered, scraper and casual cores i-Rpo produced from obsidian rocks, and pyramidal nd chopper i

nn v/ere producer! From nephelinite lava. These frequencies fho 7 th it. different shajies of ceres were influenced by raw materials•

(iii) Size. Prospect Farm core sizes ranged from 3 to 11, according to rcBreaty's size class scale (Figure 2). The most dominant was size four which was represented by 36 cores aecounfcin'; ror 27? °r the total. There were 28 cores under ri.ze five, while size six bad 27 cores, *md size seven had 22 cores. Sizes three, eight, and nine, had 10, 7, and 2 cores respectively, while sizes ten and eleven had one core each (Table 3.4.3. below). These sizes wore influenced by accessi- bility, functional demand and nature of raw materials® For example, there v/ere 64 odsidian cores under sizes ranging from f.vve to eleven, while 14 nephelinite lava cores were of sizes ranging from six to eleven (Table 3.4.3. ii).

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Bjygidian. are more isotropic and were of higher demand than nephelinite lava.

(iv) 7/eight. Prospect Farm core weights ranged from 2 to 496 grams with the lightest core weighing 2.11 grams while the heaviest core weighed 496.60 grams. Their mean was 46.95 grams. These weights were divided into 10 classes with an interval of 50 grams each. (Table 3.4.4.). 93 cores accounting for of the total had weight measurements of less than 50 grams, falling under class one. There were 32 cores under class two, weighing between 51 and 100 grams. Classes three and five of 101 bo 150 grams and 201 to 250 grams residectively had 3 cores each. Classes four (151 bo 200 grams), six (251 to 300 grams) and ten (451 to 500 grams) had one core each. Prom these measurements it can be suggested that the accessibility, functional demand, nature and types of raw materials directly influenced the weighbs of different cores. Different raw materials had distinct weights as seen in bable 3.4.4. ii. Eight cores from the assemblage weighed more than 100 grams. 5 of these

cores were of nephelinite lava while 2 cores were of obsidian, and the remaining one was of ignimbrite rocks. These v;ere considered heavy cores in the assemblage. The heaviest core was of nephelinite lava while the lightest core was made of obsidian. 98^ of obsidian 68f of nephelinite lava, and all the chalcedony nnd basalt cores in the assemblage weighed less than 100 gr-rns. This analysis shows that local raw materials, obsidlan,v/Cj-'e extensively exploited. These rocks are the most isotropic "t the site and thus produced cores which were relatively lighter compared to nephelinite, ignibrite,chalcedony and basalt.

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(v) Length. The length of Frospect Farm cores ranged between 18 and 114 mn with the shortest core measuring 18.80 mm End the longest core measuring 114.90mm. These lengths were ajyided into 11 classes with an interval of 10mm each (Table 3 4.^. below). The most dominant class v/as three of 31 to 40mm vibh 32 cores accounting for 2Af of the total. This was followed hy class nine (51 to 60mm). This class had 30 cores. rj]3 3S four (41 to 50mm) had 25 cores while class six had 17 cores, rind class seven had 15 cores. There were 9 cores under class two (21 to 30mm), while class eight had 2 cores. The least represented classes wore one, nine, ten and eleven (11 to 20mm, qi to 100mm, and 111 to 120mm respectively.). These classes had one core each. From, these measurements it can be suggested that the nature of raw materials influenced the lengths of these cores (Table 3.4.5. ii). There were only two obsidan cores » that measured more than 100 grams and thus were considered the Tersest in the assemblage. 44 obsidan cores, 15 nephelinite lava cores and all the ignimbrite and basalt cores in the assemblage had lengths measurements of between 50 and 97.20mm. There were 62 obsidian cores, 4 nephelinite lava cores, °nd one chalcedony c <'ic!i ?'ensured losr than 50mm. These frequencies support the view fchnfc locally available raw materials were c;:ten-'ively exploited while the imported raw materials were Economically exploited.

(vi) Breadth . The .breadth of these cores ranged between 10 and 88mm. The narrowest core measured 10.10mm, while the widest core measured 08.10mm.

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• eir mean was 38.62mnu The breadth measurements were divided into 9 classes with an interval of 10m each (Table 3.4.6.). ,r nhown in the table the modal class was four, rath measure-', ents of 31 40mm. This class had 42 cores accounting for 31^ of the total. This was followed by classes three and four with measurements of 21 to 30mm pnd 31 to 40r™ respectively. These classes had 28 cores each. Glass six (51 to 60mm) had 10 cores and class two of 11 to 20mm, had 9 cores. There were two cores im^er class nine, while the least represented classes were one and eight (of 1 to 10mm and 71 to 80mm respectively). These o7asr*en had on° core each. "Breadth of these cores were influen-mnS) by nature of raw materials (Table 3.4.6. ii) and function of tools.-

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(vii) Thickness. The thickness of these cores ranged between 4 and 68mm, v/ith the thinnest core measuring 4-.OQmm, while the thickest core measured 68.90mm. Their mean was 17.00mm# Those t-ickness measurements were divided into 7 classes with an. interval of 10mm each (Table 3.4-7. below). The most rlomin'int was class two with measurements ranging between 11 and °0TT'. Thi3 class had 24 cores accounting for 40^ of the total. This vrvn followed by class one which had 41 cores. This class had measurements ranging from 1 to 10mm. From these measurements '}.•• can be suggested that t!ie thickness of these cores were influenced by raw materials (Table 3.4.7. ii). The thinnest co e was nade from obsidan. while the thickest core was of nerhelini tc lava. 91F ofobsidian cores and 74F of nephelinite lava cores measured less than 30mm.. This support the view that locally available raw materials were extensively utilised.

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a also supports the views that imported raw materials were isotropic than obsidian and were used to supplement local materials. Thus they comprised of thicker cores than obsidian.

(viii) Platforms, There were seven classes of platform in the Frospect Farm cores. The irtaxiirum number per core was 7 while the least was one platform per core. The modal number was three and was represented by 32 cores accounting for 24$ of the total. There were 25 cores with one platform each, while 17 cores had five platforms each (Table 3.4.8.). The frequencies show that the number of platforms per core were influenced by the functions to which the cores were put. This also suggests that obsidian which was the local raw material at Prospect Farm was extensively and economically used. The imported raw materials, into the site, such as nephelinite lava, ignimbrite, chalcedony and basalt were less isotropic than obsidian, and thus cores ?"ade from these imported raw materials were characterized by few platforms.

(ix) Flakescars. The number of flakescars of the Prospect Farm ranged from 1 to 13 (according to numerical counting of flakescar(s) per core). The modal number was three which was represented by 25 cores accounting for 19$ of the total. There were 22 cores with five flakescars each while 19 cores had six flake scars each and 15 cores had seven flakes each. 11$ of the total had four fla.kescars, while 9$. of the total had two flakescars, and of the total had eight flakescars. There were only 2 cores with twelve flakescars each, while 4 cores had thirteen flakescars each.

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fpkere v/cre 3 cores with one flakescar each. 5 cores had nine -^escars each, while only of the total had ten flakescars (Table 3.4.9- below). Analysis on the relationship between flakescar numbers and raw materials show that that the distribution of flakescars per core were influenced by the accessibility, functional demand, nature and types of rocks. Only one obsidian and 2 nephelinite lava cores had one flakescar each. This suggests that nephelinite lava rocks, which were imported into the assemblage were relatively less isotropic compared to the obsidian rocks which were primarily available at the site. 75^ of the obsidian cores and 32f of nephelinite lava cores had more than four flakescars. There were 3 obsidian cores and one nephelinite lava core, with thirteen flcakescars each, the maximum number of flakescars per corc at the assemblage. All the ignimbrite, chalcedony, and basalt cores had flakescar>numbers ranging from 4 to 10. These observations suggest that local raw materials were extensively used while the foreign raw materials were imported to supplement local raw materials.

(x) Presence or Absence of Cortex. Table 3.4.10 shows that there were 87 cores accounting 65^ of the total that had no cortex on their surfaces, while 12 cores had cortex cover on some parts of tiieir platform surfaces. Analysis of the relationship between the presence or absence of cortex and raw materials show that there were 76 obsidian cores, 5 nephelinite lava cores, 3 chalcedony cores, 2 basalt cores and one ignimbrite core that bad no cortex on their surfaces. There v/ere 15 obsidian cores, 3 nephelinite lava cores and one ignimbrite core that had cortex on some parts of their debitage surfaces as their platform surfaces had no cortex cover.

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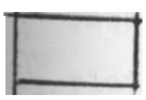

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11 obsidian cores and 5 nephelinite lava cores had cortex on some parts of their platform surfaces as their debitage surfaces bad no cortex at all. There were 6 obsidan cores and 6 nephelinite lava cores that had cortex on some parts of their surfaces (Table 3.4.10 ii). These frequencies suggest that the absence or presence of cortex on a core was influenced by the functional demand, nature and types of raw materials. 70$ of obsidian cores had no cover at all compared to 26c/o of nephelinite lava cores. This support the view that obsidian were more isotropic and thus were easily flaked or backed.

(xi) Initial Size of the Block. This refers to the original size of rock or block before it was reduced by either flaking or backing techniques. In this work, the initial size of the block was estimated by the intensity of reduction on either both or individual surfaces of a core, (Table 3.4.11. below). There were 42 cores that were intensively reduced on both surfaces. 19 cores were primarily reduced on both surfaces . 32 cores were intensively reduced on their platform surfaces than their debitage surfaces compared to their platform surfaces. There were 18 cores that v/ere only reduced on their platform surfaces, while 9 cores were only reduced on their debitage surfaces. These obseivations suggest that the intensity of reduction per core was influenced by raw materials. There were 15obsidian cores, 3 nephelinite lava cores, and one ignimbrite core that were primarily reduced on both surfaces, while 40 obsidian cores one chalcedony, and one ignimbrite core were reduced on both surfaces.

Index	Size of the initial block	freq.	%
Rb	Primarily reduced on both surfaces	19	14
Rbi	Intensively reduced on both surfaces	42	31
Rd	Reduced on debitage only	9	7
Rp	Reduced on Platform only	18	13
Rs	Reduced more on Platform than debitage	32	24
Rt	Reduced more on debitage than Platform	14	11
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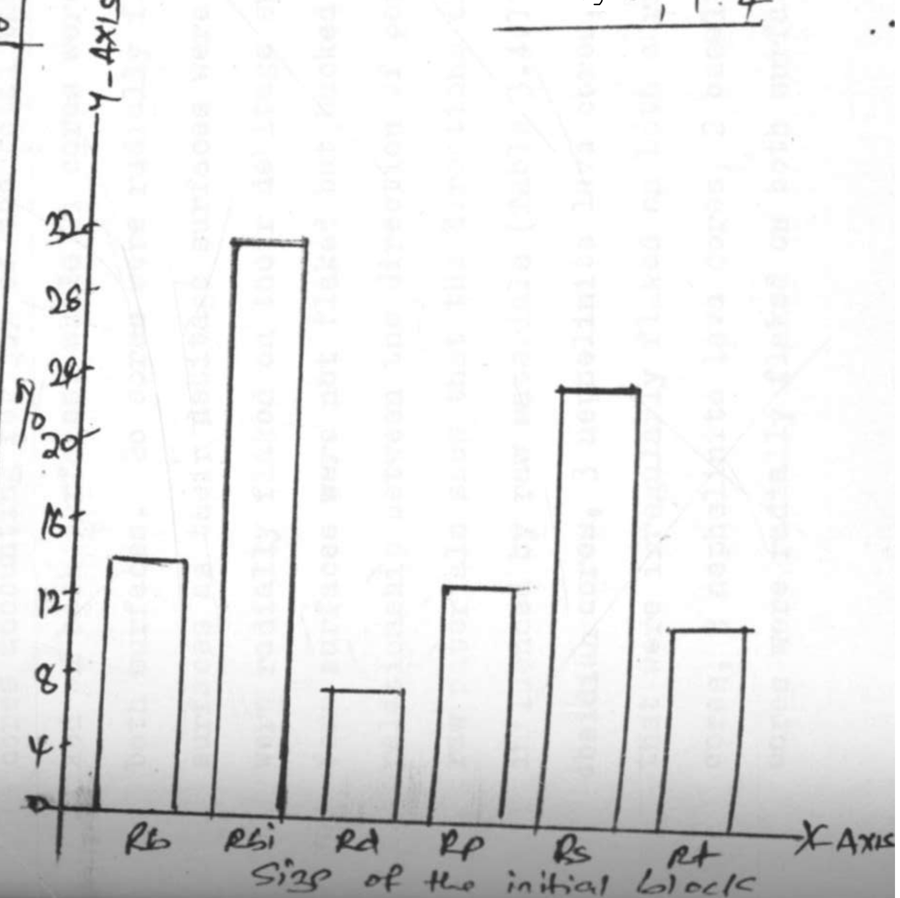

<phere were 5 nephelinite lava cores, and 4 obsidian cores that were intensively reduced on their debitage surfaces only, while H obsidian cores and 7 nephelinite lava cores were intensively reduced on their platform surfaces only. These frequencies suggest that the functional demand and nature of raw materials influenced the intensity of reduction pei* core. 86£ of obsidian cores were intensively reduced. This support the view that obsidian rocks were extensively used, at the site, because they were locally available, easily flaked and thus highly demnded compared to nephelinite lava, basalt, ignimbrite .aid chalcedony.

(xii) Direction of Percussion. This refers to the pattern of flaking. It indicated the patterning technique of flaking that was used. The Prospect Farm cores were characterised by the radial pattern of flaking (Table 3.4.12). There were 45 cores accounting for 35$ of the total that were radially flaked on both surfaces, while 21 corus were irregularly flaked on both surfaces. 2o cores were radially flaked on their platform surfaces as their debitage surfaces were backed, while 5 cores were radially flaked on their debitage surfaces as their platform surfaces were not flaked but backed. Analysis of the relationship between the direction of percussion on a core and raw materials show that the directions of percussions were influenced by raw materials (Table 3.4.12 ii). There were 17 obsidian cores, 3 nephelinite lava cores, and one ignimbrite core that were irregularly flaked on both surfaces while 38 obsidian cores, 3 nephelinite lava cores, 2 basalt and 2 chalcedony cores were radially flaked on both surfaces.

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15 obei^^ cores and 5 nephelinite cores were radially flaked on their platform surfaces as their debitage surfaces were tacked, while 3 obsidian cores and 2 nephelinite lava cores were radially flaked on their debitage surfaces as their platform surfaces were only backed. This analysis shows that 35?' of obsidian cores and 16$ of nephelinite ..lava cores were radially flaked on both surfaces. This support the view that obsidan were the most isotropic rocks in the assemblage and since they were primarily available they were used extensively.

(xiii) Organization of Flaking. This refers to the intensity of flaking on a core. It indicates the intensity of core utilization. Prospect Farm cores were extensively utilised as shown in Table 3.4.13. below. 42 cores accounting for 31^ of the total were intensively flaked on both surfaces while 19 cores were primarily flaked on both surfaces. 14$ of the total were highly flaked on their platform surfaces only, while 5?° of the total cores were intensively flaked on their debitage surfaces only. There were 9 cores that were intensively flaked on their debitage surfaces comijared to their debitage surfaces. Analysis of the relationship between organisation of flaking and raw materials show that 40obsidian cores, one ignimbrite core and one chalcedony core were intensively flaked on both surfaces. 26 obsidian cores, 2 nephelinite lava cores, one chalcedony and the 2 basalt cores were intensively flaked on "their platform surfaces than their debitage surfaces, while 10 obsidian cores, one nephelinite lava core and one chalcedony core were intensively flaked on their debitage surfaces than their platform surfaces.

(xiv) production Technique. Four different techniques •L.0 used in the production of Prospect Farm cores. These were ripolar, hard hammer percussion, soft hammer percussion and pun or indirect technique (Table 3.4.14.)• The most dominant •technique was soft hammer percussion. It v/as represented by 62 cores accounting for 46$ of the total cores. There were 57 cores produced by hard hammer percussion technique, while 9 cores were produced by bipolar technique and 6 cores were produced by punch or indirect percussion technique.

The analysis of relationship between far materials and core production techniques suggest that these techniques were more influenced by the nature and types of raw materials (Table 3.4.14 ii). There were only 9 obsidian cores that were produced by bipolar technique. These were the smallest cores in the assemblage. They were characterized by thin and barrel-shaped platforms with flakescars on both ends, 33 obsidian cores, 17 nephelinite lava cores, 2 ignimbrite cores, 3 chalcedony cores and 2 basalt cores were produced by the hard hammer percussion technique. These cores were characterized by deep flakescars and prominent ridges between the flakescars. There were 6 obsidian cores that were produced by the punch technique. These cores were produced by soft hammer technique. They were characterised by small striking platforms, diffused bulbs of percussion^, and were characterized by shallow flakds and subtle ridges between flakescars.

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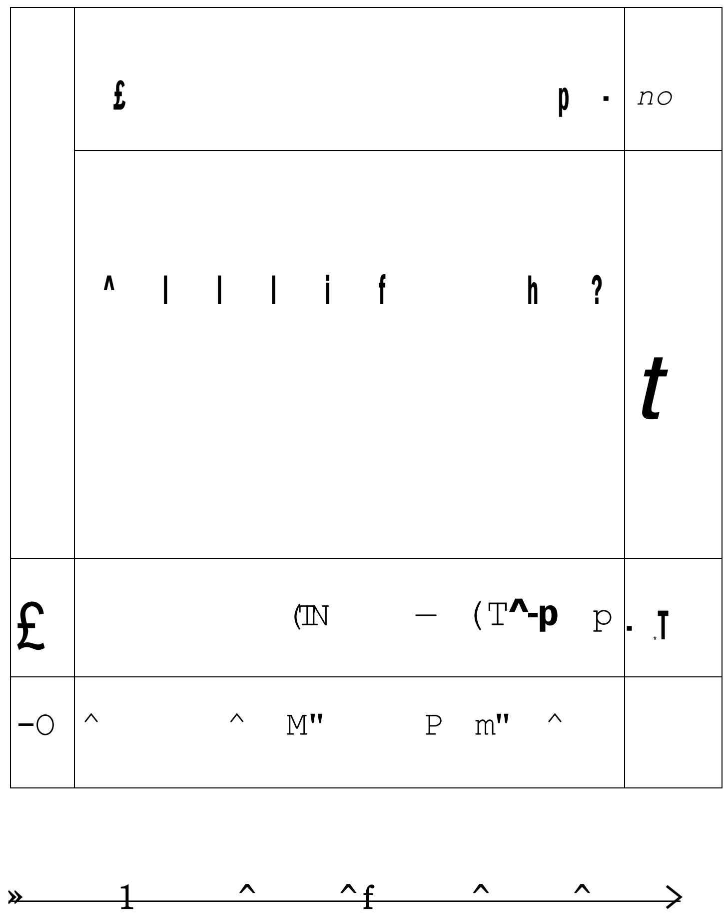
Prolonged Drift

(i) Raw Material 50 cores from Prolonged Drift were analysed. Only one type of raw material was used in the production of these cores. This was Obsidian.

(ii) Shape There were different types of cores that were identified in this site. Their shapes comprised the following classes: Discoid, Levallois Blade, Levallois Point, Levallois Flake, Battered and Block cores (Table 3.5.2.). From this table it can be seen that the most dominant shape was Levallois Flake. This was represented by 16 cores accounting for 32% of the total. Other types of shapes in the order of their popularity were Block, Levallois Point and Broad Single Flatform. Block in shape were 7 cores, while Levallois Point and Broad single Platform were represented by 6 cores each. Next in popularity were Levallois, Levallois Flake and Battered Shaped cores. These were represented by 4 cores each. There were 2 discoid shaped cores. The least represented shape was Pyramidal with only one core. It can be deduced that Obsidian rocks were extensively utilized in the production of different types of cores.

(iii) Size Prolonged Drift core sizes ranged from 3 to 6, according to McBrearty's size class scale (figure 2). The most dominant was size 4, which was represented by 30 cores accounting for 60% of the total. Sizes three and six had 6 cores each, while size 5 had 8 cores. Since these cores were produced from Obsidian rocks which were locally available and highly isotropic, their sizes were generally smaller. (Tables i end 3.5<>3. i.i).



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(i^v) Weight Prolonged Drift core weight ranged from 3 to •to gr^ws with the lightest core measuring 3*44 grams and the easiest core measuring 47.11 grams. Their mean was 10.53 iitNims. These weights were divided into classes with an inter-al of 5 grains each (Table 3.5*4-0 • The most dominant was r ciass two of 6 to 10 grams. This class had 23 cores accounting f ror 46% of the total. There were 9 cores, under class one, -vith weight measurements of less than 5 grams. There 10 cores under class three (11 to 15 grams), whild class fcur, of 16 to 20 grams, had 4 cores. Glasses five, six, eight and ten, with v/eight measurements of 21 to 25 grams: 26 to 30 grams: 36 to 40 grams and 46 to 50 grams respectively, had one core each, nhese Frequencies show that weights of Prolonged Drift cores were influenced by the only raw material,Obsidian. i

(v) Length Length of Prolonged Drift 'cores range from 23 to 62 mm. The shortest core measured 23-70 ram. While the longest core measured 62.80 mm. These lengths were divided into 5 classes with an interval of 10 mm. each (Table 3*5*5»)* The most represented class was two, that is 31 to 40 mm. This class was represented by 23 cores accounting for 46% of the tot?l. It was followed by class one of 21 to 30 mm. with 11 cores. Glass three (41 to 50 ram.) had 8 cores, while class four (51 to 60 mm.) had 7 cores and class five was the least represented. This class had one core measuring between 61 and 70 mm. From these measurements it can be suggested that the accsssibility and nature of Obsidian influences the lengths of these cores. The source of Obsidian was very accessible to the site and thus it war, exploited intensively.

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(vi) Breadth The "breadth of cores ranged between 15 to 4.2 mm- narrowest core measured 15.4-0 mm. while the widest re measured 42.00 mm. The breadth of these cores were divided into 4 classes with an interval of 3 0 mm. each (Table 3«5*6). rpke modal class was two of 21 to 30 mm. It was represented by 23 cores accounting for 46% of the total. This was followed by class three which had breadth measurements ranging jroui 31 to 40 mm. It was represented by 16 cores accounting for 52/o of the total. Class one was represented by 9 core with breadth measurements ranging from 1.1 to 20 nun. The least represented class was four with only 2 cores measuring between 41 and mui. Breadth of these cores were influenced by nature of r av material, Obsidian. (Table 3.4.6. i^).

(vii) Thickness The thickne.sss of these cores ranged irum 4 to 26 mm. with the thinnest core measuring 4.60 mm. while the thickest core measured 26.30,mm. Their mean was 10.65 mm. These thickness measurements were divided into 6 classes with -n interval of 3 mm. each (Table 3*5*7)» Class two of 6 to 10 iuia. was the modal class. It was represented by 23 cores accounting for 30% of the tctal cores. It was followed by class three of 11 to 15 mm. with 11 cores, while class four (16 to 20 mm.) had 6 cores. There were 5 cores measuring between 26 and 3^ ima. These measurements suggest that Obsidian was intensively and economically exploited.

(viii) Platforms The number of platform of these cores ranged between 1 and 6 with the modal number being three. There were 14 cores, accounting for 28% of the total, with 3 platforms each.

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/ptiere were 11 cores with one platform each, and only 8 cores kad four platforms each. Four had five platforms while 11 cores had two platforms each. The frequency of platforms on cores indicated the degree of exploitation on cores toward production of tools,

(ix) Flakescars The number of flakescars of Prolonged Drift cores ranged from 2 to 12 (according to numerical counting of flakescars(s) per core). There were 15 cores, accounting for 30t of the total that had four flakescars each. There were 14 cores with three flakescars each, while 7 cores had five flakescars each. Six percent of the total had 7 flakescars, while 2/ of the total had 8 flakescars. There was one core with 10 flakescars while 2i of the total had twelve flakescars. (Table 3.5.9.). Analysis on the relationship between the number of flakescars per core and raw material show that Obsidian rock which was locally available and isotropically suitable was extensively used for production of tools.

(x) Presence or Absence of Cortex Table and graph 3.5.10. shows that there were 46 cores, accounting for 92^ of the total that had no Cortex on both surfaces while no core was covered by Cortex on both surfaces. Two cores had Cortex on some parts of their debitage surfaces while 4>' of the total cores had Cortex on some parts of their platform surfaces. A3 can be deduced from the table Obsidian, which was the only raw material used for core production, was economically exploited.

(xi) <u>Initial size of the Block</u> This refers to the size of original block before it was reduced by either flaking or backing technique. In this study it was estimated by the intensity of v/ork done on either both or individual surfaces of a core. There were 22 cores accounting for 44. of the tot^l th^t were intensively reduced on botii surfaces, while only 18 cores were primarily reduced on both surfaces. 10; of the total were intensively reduced on their debitage surfaces only. 12 cores were intensively reduced on their platform surfaces than their debitage surfaces while only one core was intensively reduced on its debitage surface than its platform surface. (Table 3.5.11. below). These observations suggest that the intensity *of* reduction per core was was influenced by Obsidian.

(xii) <u>Direction of Percussion</u> This refers to tuu pattern of flaking. It indicates the patterning technique of flaking that was used. The prolonged drift cores were radially flaked. There were 21 cores accounting for 42?' of the total that were radially flaked on both surfaces while 11 cores were irregularly flaked on both surfaces. There were 6 cores that were radially flaked on their platform surfaces while only 2 cores were flaked on their debitage surfaces. 8*f of* the total were radially flaked on both surfaces. Though some parts of their platform surfaces v/ere irregularly flaked, while only one core was radially flaked on both surfaces though some parts of its debitage surface was irregularly flaked. There were 5 cores that were radially flaked on some parts of both surfaces though some parts of these surfaces were also irregularly flaked (Table 3.5.12.).

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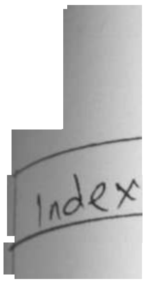

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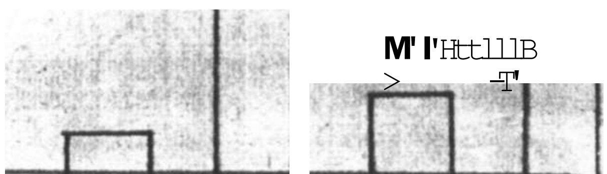

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analysis of the relationship between the direction of Percussion on a core and Obsidian in the assemblage show tiiat the direction of percussion on these cores were influenced by the accessibility functional demand and nature of Obsidian rocks. Since Obsidian was the only raw material at the site, and was isotropic, it was intensively exploited.

(xiii) Organisation of Flaking This refers to the intensity of flaking on a core. It is among the best indicators of core utilization. The Prolonged Drift cores were dominated by the intensive flaking. There were 16 cores accounting for 32. of the total that were intensively flaked on both surfaces while only one core was intensively flaked on its debitage surface ^s its platform surface had no evidence of flaking but suggested th. t it was backed. 28f. of the total cores were intensively flaked on their platform surfaces than their debitage surfaces on their debitage surfaces compared to their platform demand and nature of Obsidian influenced the organization of flaking. Since Obsidian was more isotropic and readily available many cores in the assemblage were radially flaked.

(xiv) Production Technique Pour different techniques were employed in the production of Prolonged Drift cores. These were Bipolar, Hard hammer Percussion, Punch or indirect and Soft hammer Percussion technique (Table 3.5.14.). The most dominated technique was Bipolar which was represented by 28 cores accounting for 56^f of the total. The second in popularity was Soft hammer technique which was represented by 15 cores. There were 4 cores that were solely produced by Hard hammer Percussion technique.

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This study presents the typological ... previous chapter. It summarizes core similarities ...

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... The most dominant type was obsidian ... 50% of the total number of cores studied ...

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This explains why obsidian was the most ... compared to other types within the region.

... Lake Baringo South on the other hand is within the ... of some isolated patches of dry tropical forest. This ... a region of high rainfall, between 1000 and 1200 mm per annum.

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DATa SYWTHtfSId

Introuuclion

This chapter presents the synthesis *oi* d ata jnaly^jn in tne previous chapter. It summarises core similarities and differences in each environmental cone by showing trie difie-~ e nt environments had on the core production. Conclusions to the study are also discussed.

Snv ironme ntal Zones

The Highland region is charac terizea by the Interior Plateau Propar of the Kirtvalley comprising moist and deciduous woodland. This zone had five differnt types of raw materials. . These are obsidian, I jva, igniubrite, chalcedony, and basalt rocks. The most dominant type **WJS** obsidian rock which accounted for 86yi of the total number of cores studied. The least represented were igumbrite and basalt rocks, e.cn accounting for of the total cores analyzed. The source of obsidian are found within the Mt. a burru anj lake Naivasn, Basin. This explains why obsidian waa the most popular raw material compared to other types within the region.

Lake victoria Basin on the other hand is within the habitat zone of isolated patclies of moist tropical forest. This is a region of high rainfall, between 1100 ani 1300 mm per a nnum.

r^ is characterized by forest woodland, and grassland mosaic. •The geographic region accomodated different types of rocks which ,vpye used as raw materials for the manufature of stone tools, jhese included Quartz, Quartzite, Ignimbrite, Basement Complex 3ock, Chalcedony, Basalt, nnd Phonolite and Nephelite Lava ro'cks. The most dominant type was the Ombo Phonolite lava •v/hich accounted for 70?' of the total cores studied from the region.

In comparison bhs two regions had five raw materials in common. Those were Obsidian, Ignimbrite, Chalcedony, Basalt, and Nephelinite lava (table 4.1 below). Obsidian, which was local at ';he Highland zone was also found in the Lake Victoria Bo.:.?in zone suggesting early links between the two regions rhiring the Middle Stone Age Period, some 200,000 to 30,000 ye?rp ago. Obsidian were imported from the Highlands which is the nearest source to the Lake Victoria Basin.

Shapes

There wer-.» 21 different types of cores from the two geographic -regions. These were Discoid, Levallois, Radial, Levallois Blade, Levallois Point, Battered, Chopper, Casual, Scraper, Subr^dial, Opposed Platform, Narrow Single Platform, Broad. .single Platform, Triangular, Pyramidal, Biconical, Polyhedral, Levallois Flake, Rolled, Block and Chunk cores. The Lako Victoria Basin had 19 cores while the highlands had 14 cores. The Lake Basin had seven shapes which were not found in the Highlands.

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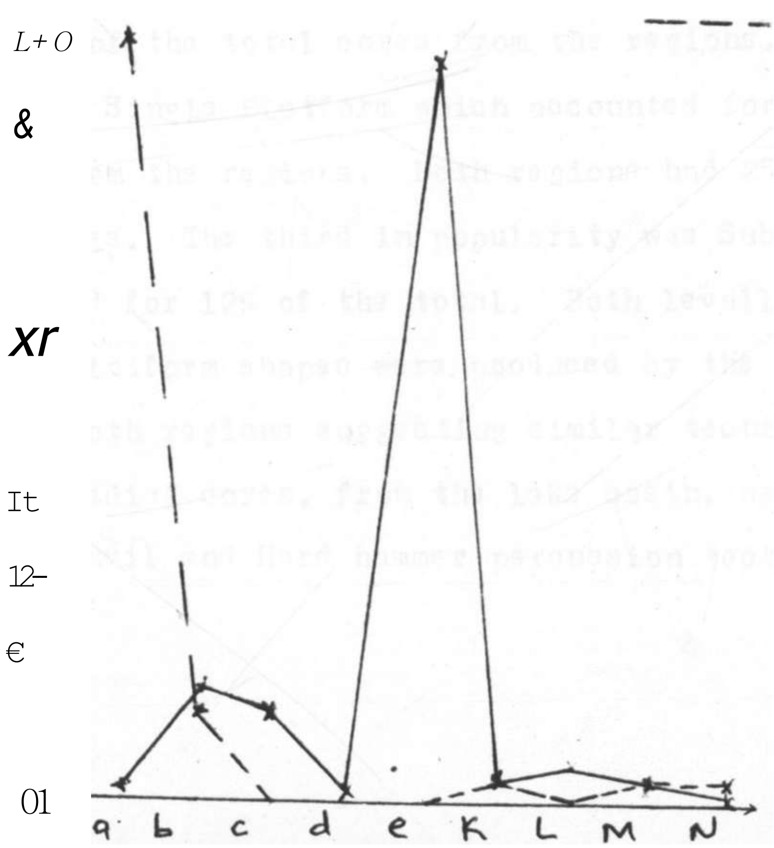

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These shapes comprised Subradial, Opposed Platform, Narrow Single Platform, Triangular, Biconical, Polyhedral, and Rollea cores while the Highlands had Block and Chunk cores which were not found within the Lake Victoria Basin assemblages at Mugurok and Songhor site3 (table 4.2 below). This means that the Lake Basin Middle Stone Afe tool makers extensively exploitted the raw materials within their reach. It also means that since miny raw materials from the Lake Basin were less isoropiQ than raw materials from the Highlands, they produced a wide range of shaper compared to the more isotropic raw materials which were very specialized in production of individual or specific shapes.

t

The most represented shape from the two regions was Levaloi3 Flake. There were 36 Levallois Flake corea from the Highlands and 17 cores from the lake basin. These accounted for 14?' of the total cores from the regions. This was follower by Broad Single Platform which accounted for 13^ of the total core? from the regions. Both regions had 25 Broad Single Platform cores. The third in popularity was Subradial cores. Thig accounted for 12^ of the total. Both levallios flake and broad single plitform shapes were produced by the soft hammer technique in both regions suggesting similir techniques of production The subiadi^l cores, from the lake ba3in, were mainly produced by the }nvil and Hard hammer percussion techniques.

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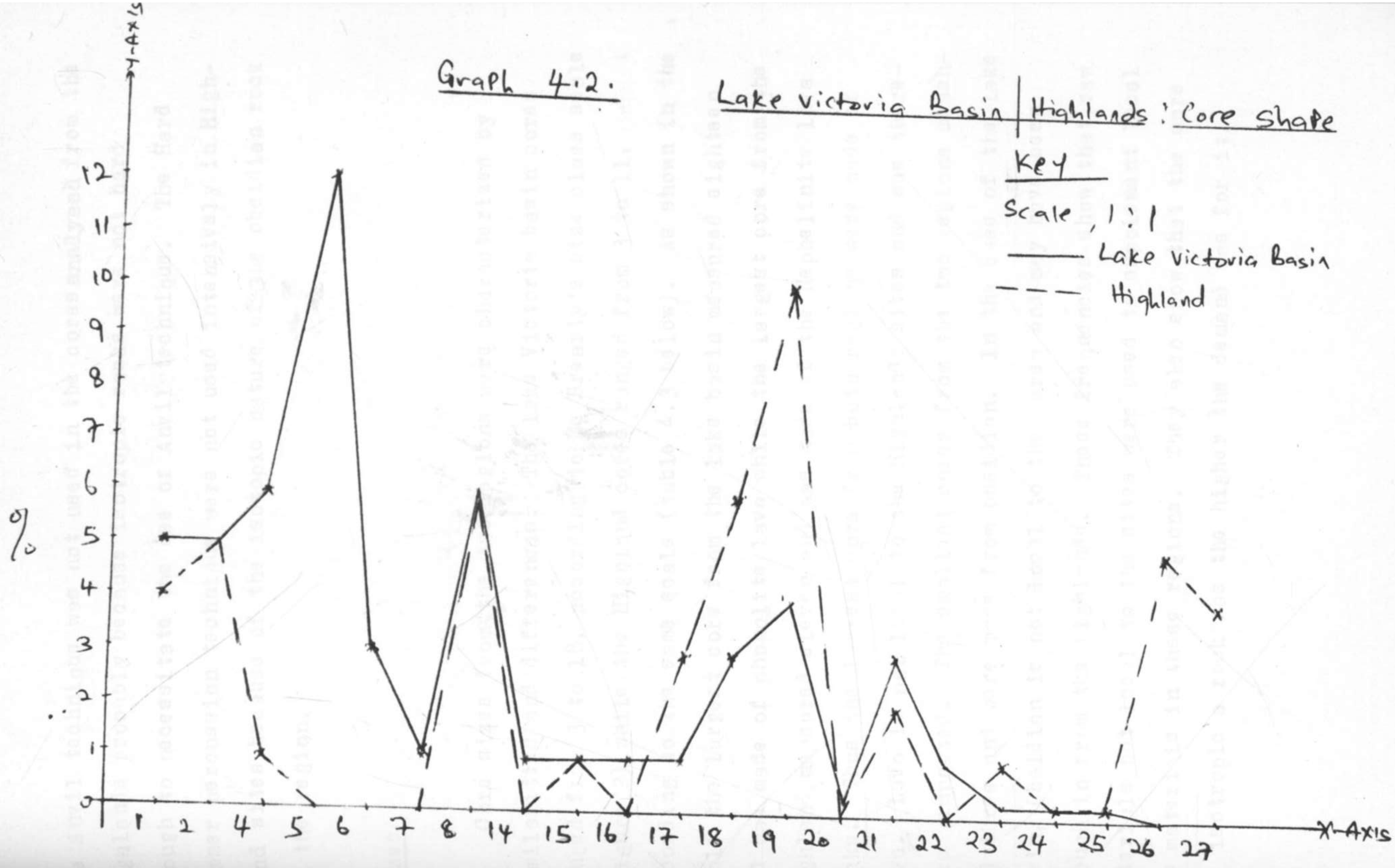
Graph 4.2. Lake Victoria Basin | Highlands : Core Shape



The Anvil technique was not used in the cores analysed from the Highlands probably because isotropic rocks were not hard enough to necessitate the use ot Anvil technique. The Hard hammer percussion technique were not used intensively in Highland sites because of the isotopic nature of the obsidian rock, in the region.

S<u>izes</u>

Gore sizes from the two regions were characterized by similarities and differences. The lake Victoria basin core9 ranjed from 3 to 18, according to Mc Brearty's size class scale (figure 2) while the Highland cores ranged from 3 to 11, i according to the sam§ scale (table 4.3 below). As shown in the table the largest core from the lake basin measured eighteen and was made of nhonolite lava while the largest core from the Highland measured eleven and was made of the Nephelinite lava rocks. Thus the largest core from both regions were made of lava. Lava is nofc local to the Highlands sites and was therefore imported. The smallest cores from the two regions measured three and were made from obsidian. In the c 3se of the lake basin, Obsidian is not local to the area and may have been brough in trom the highlands. These frequencies show that raw materials not local to the sites were used to supplement local raw materials in these regions. They also show that the more the isotropic a rock was the higher the demand was for it.

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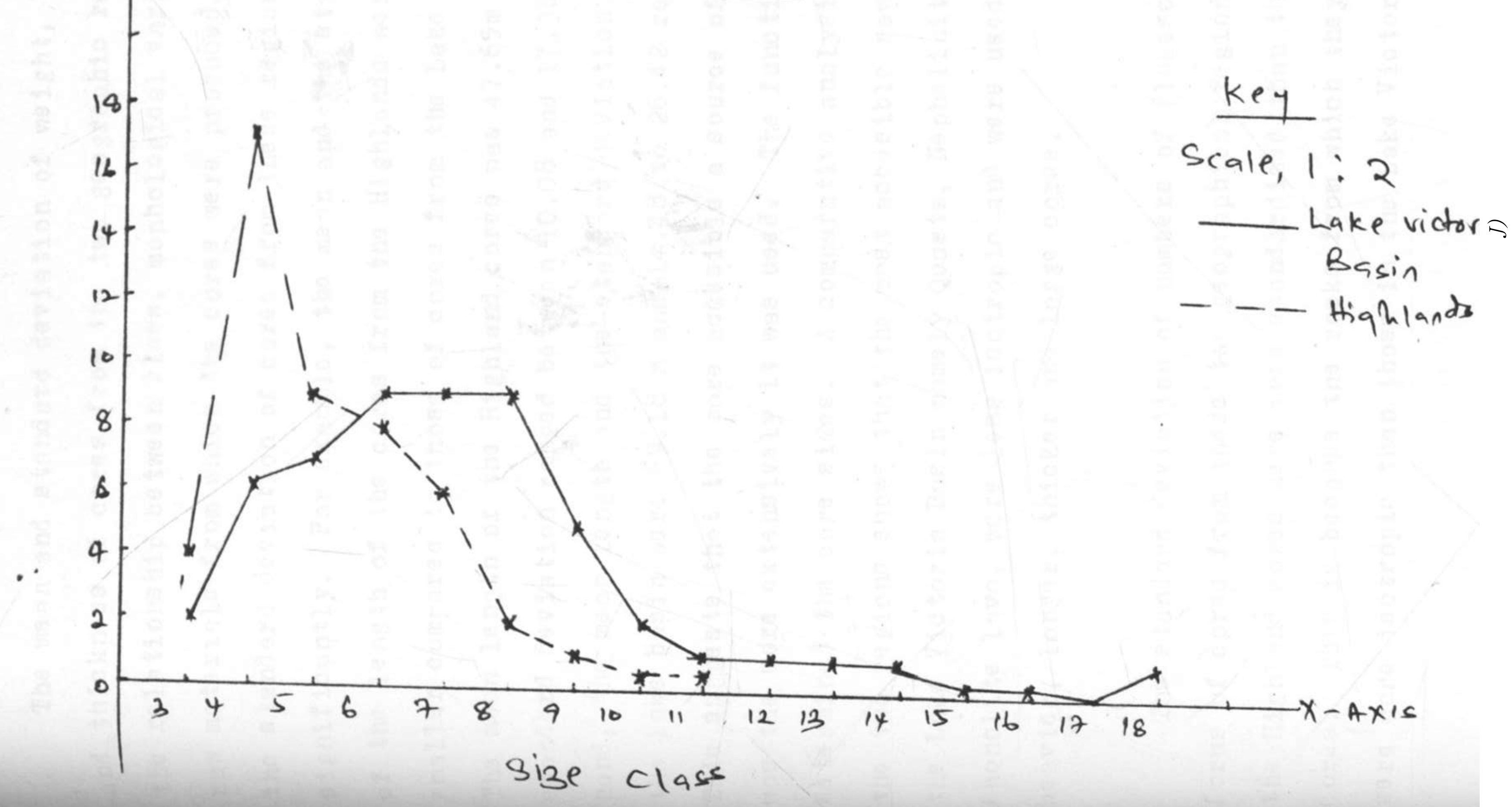
Graph 4.3.

Lake victoria Basin / Highlands

Size Class



The mean and standard deviation of weight, length, breadth and thickness of cores from the two geographic regions show the relationship between sizes, mophological variabilities, and ra',v materials from which the cores were produced. The mean and the standard deviation of cores from these regions differed significantly. For example, the mean and the standard deviation of the length of the cores from the Highlands were relatively smaller compared to those of cores from the Lake Victoria Basin. The mean length of the Highland cores was 47.65m while their standard deviation ranged between 10.08 and 17.38. On the other hand, the mean length and the standard deviation of cores from tha lake basin were 69.18 m and 14.48 to 26.42 respectively. This suggests that the more accssible a source of raw material % was the more extensively it was used. The function of tools determined the core sizes. A comparative analysis of cores from the two regions shows that the most accesible raw materials to the Lake Victoria Basin namely Quartz, Nephelinite lava, and Ihonolite lava, were less isotropic and were usecl to produce heavier, longer, thicker and large cores.

The standard deviation of numbers of flakescars and platforms of cores from these two geographical regions suggest that the Highland cores were more standardized than the lake basin cores. This is because the rocks from which they were produced were more isotropic than those in the Lake Victoria Basin

Sizes of the Highland cores were much reduced than those of the lake Victoria basin.

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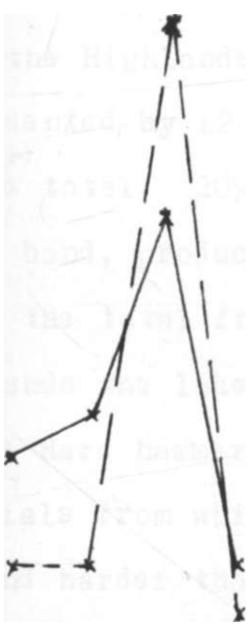

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iia is supported by the presence or the absence of cortex on tjje samples - (table 4.4). There were for Instance, 133 core^ from the highlands which had no cortex cover compared to ^cj3 cores from the lake basin. The presence or absence of cortex oD cores was determined by the function the tool was going to serve. Gores that had no cortex cover were mainly made of obsidian rocks. Obsidian is easy to flake or back.

production Technique

Five different techniques were used in the production of cores from both regions. These were anvil, Bipolar, Hard-hammer percussion techniques (tabla4.5). As shown in table Uie hard hammer percussion technique was represented by r/q. core^ from both regions accounting for 44^ of the total. The ILrd hammer percussion technique was tne. most popular percussion technique used at the lake oaain comp nred to 1 o f ti.e totul from tne Highlands. The soft hammer percussion technique represented by 12ti cores, from ooth regions, accounting for 33;. of the total. 20'/» of the cores from the Highlands were, on the ot! e r hand, produced by the soft hammer technique compared to 13$of the total from the lake basin. In comparison to the Highlands the lake Victoria basin cores were mainly prociuced by by the Hard hammer percussion technique because most of the raw materials from which they were made were relatively less i3oro-pic and harder than tuose in the Highlands. Most of the Highland cores were small and intractable, and were thus produced by Bipolar, puch, and soft hammer percussion techniques.

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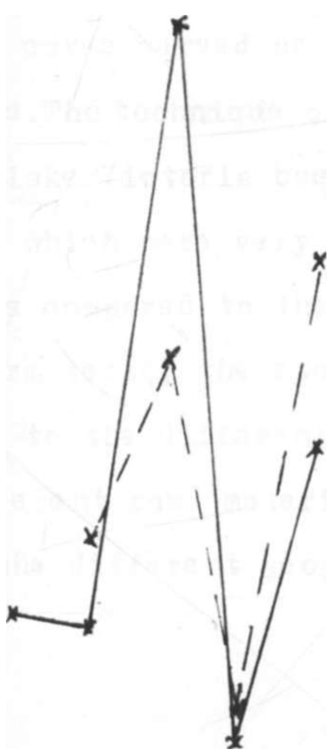

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q&y of cores produced by the Hard hammer percussion technique from the Highlands were made of less isotropic rocks, basically flephelinite lava, Basement Complex rock, Chalcedony, Ignimbrite gnd Basalt rocks which were imported into the region.

Summary 3nd Conclusion

This study aimed at comparing different attributes on Middle Stone Age cores botween Highlands and Lake Victoria Basin gites of Kenya. Different methods were used in the analysis of those cores in the archeology laboratory ol National Museums of Kenya, Nairobi. This study shows that cores in the two geographic regions had both similarities and differences. It ; was for instance established that the nature of raw materials i influenced the 3hape, morphology of the tools,' and the techniques used in their production. The study also established that none cores served as heavy duty while others aa light duty t ools .The tochiiique'of core produc tion also varied per region. The lake Victoria basin was, for instance, dominated by techniques which were very suitable for production of less isotopic rocks compared to the highland site3. Supported by the chi-Snuare tests, the stu'Jy showed that core typology varies according to the different sites in different regions , and that different raw materials were used in the production of cores in the different geographic regions studied.

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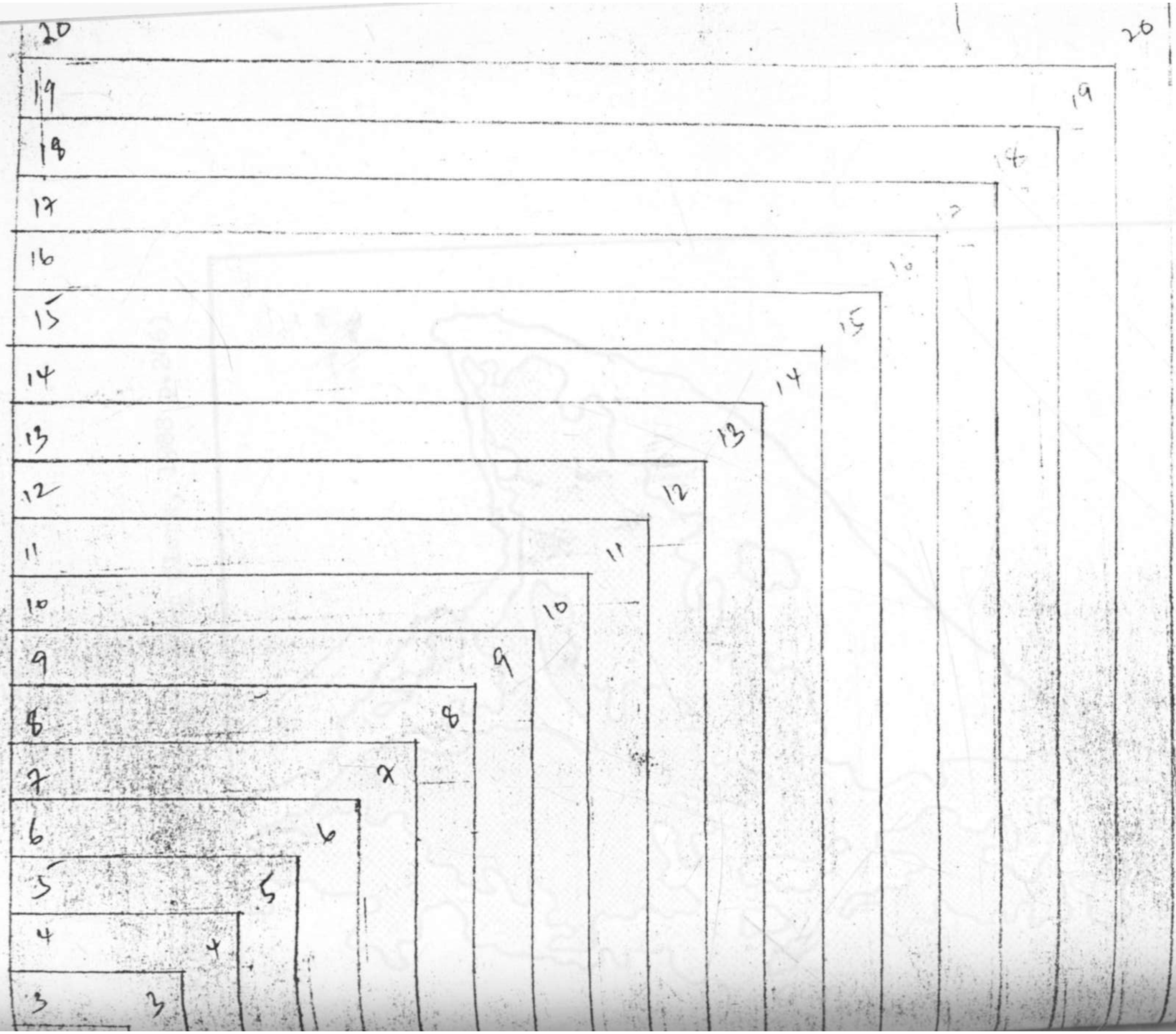
A PPUDIX

Catalogue No.	Provenance	Raw Material	Colour	Size Class	Weight (grams)	Breadth (mm)	Thickness (mm)	RATIOS L/B	T/B	T/L	Cortex Cover Platform Surface	Debitage surface	No. of Platforms	No. of Flakescars	Direction of Percussion	Organization of Flaking	Size of the initial block	Core type (shape)	Production Technique



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FIGURtf **3:** Topography (after Clark, 1988 p.246)

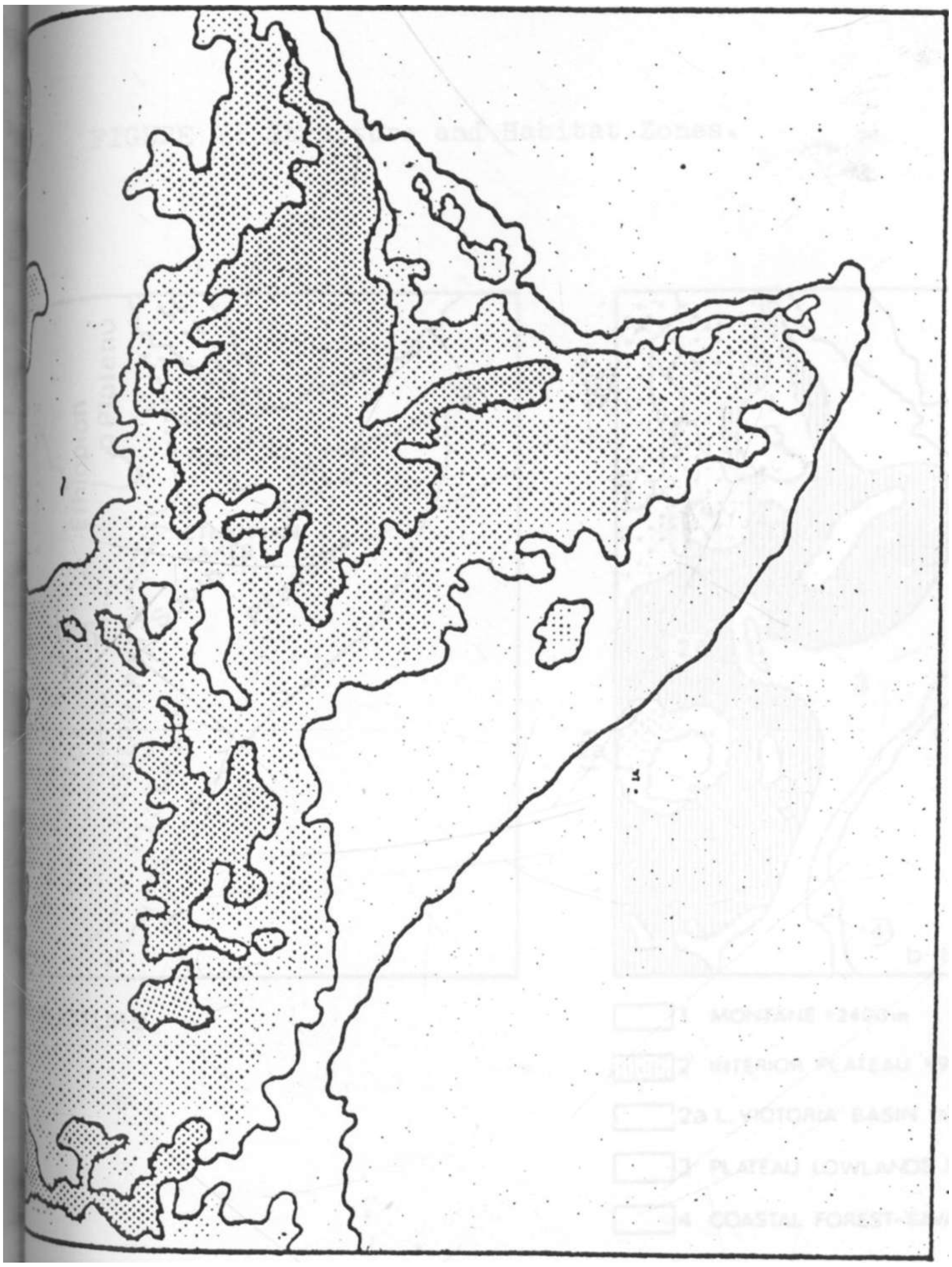

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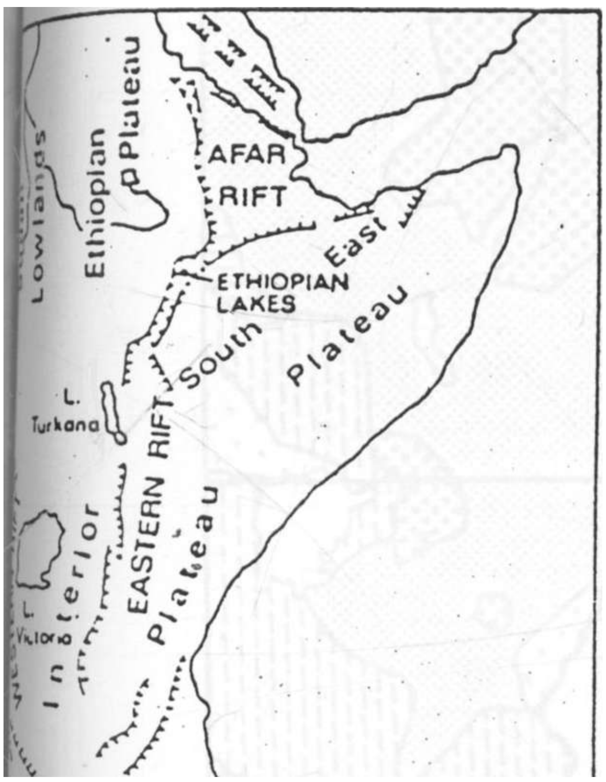
FIGURE 4 : Structure and Habitat Zones.



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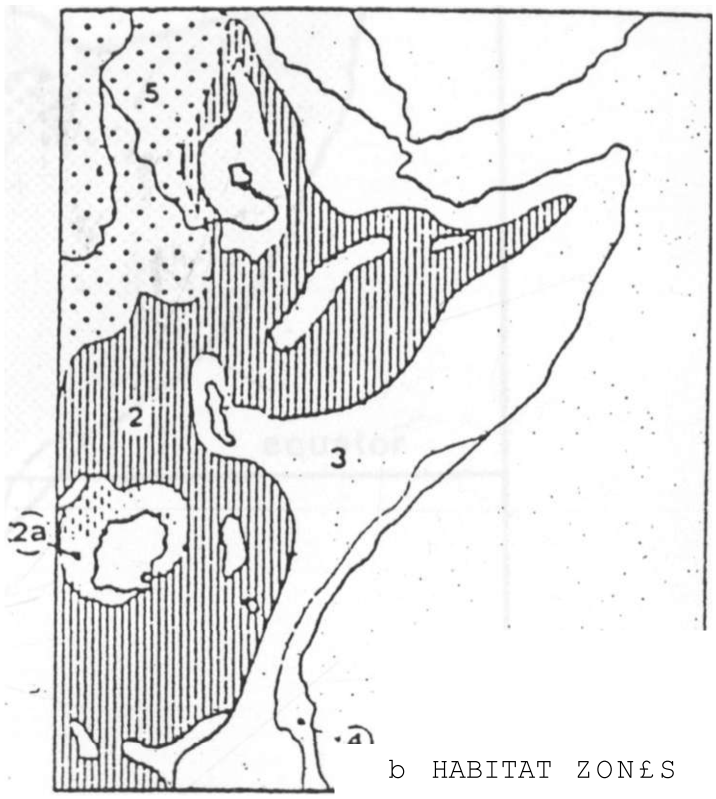


b HABITAT ZONES

1 MONTANE >2400M

5 CLAY PLAINS

2 INTERIOR PLATEAU >900M

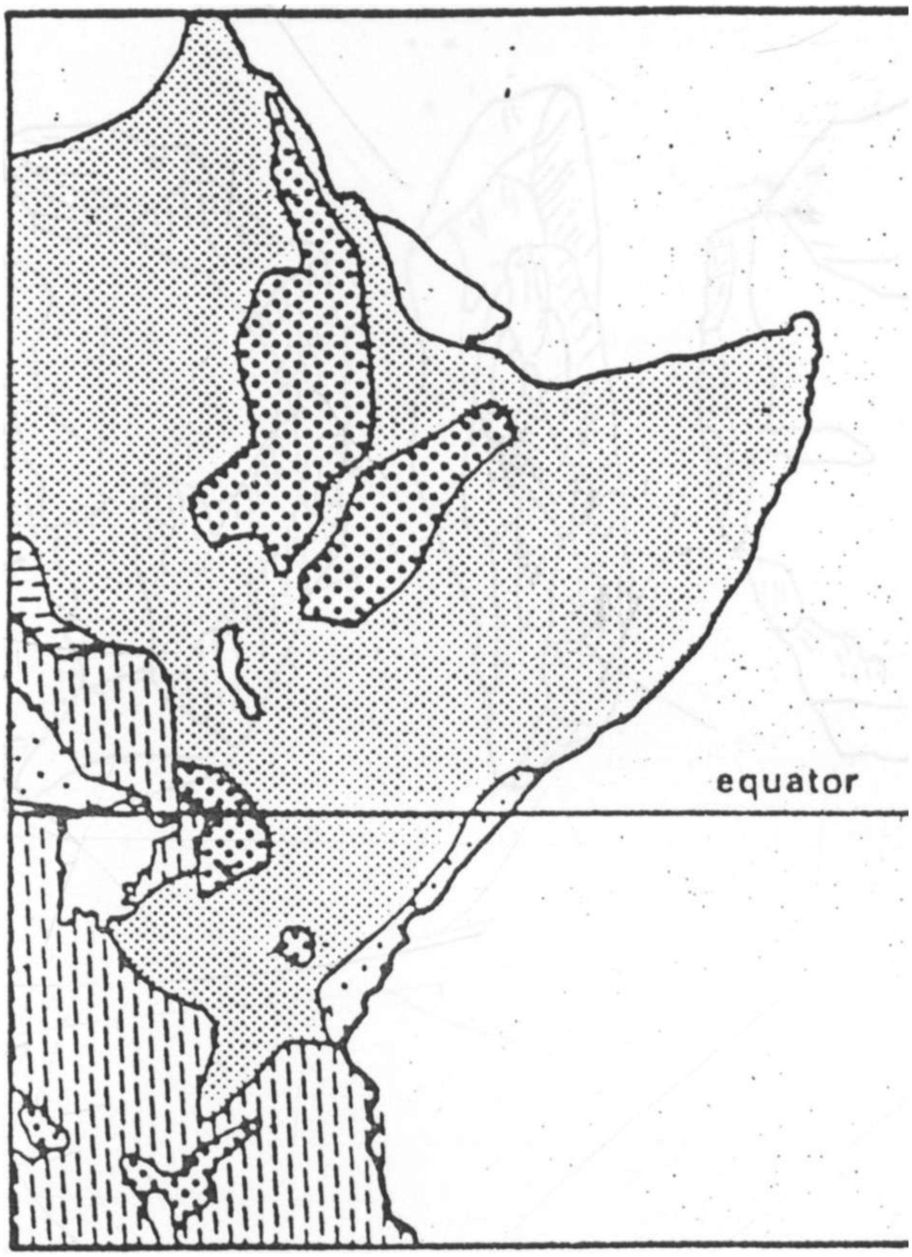
2a L. VICTORIA BASIN 1000-1500M

3 PLATEAU LOWLANDS \ COASTAL STEPPE < 900M

4 COASTAL FOREST-SAVANNA MOSAIC

FIGURE 5: Vegetation (after Clark, 1988, p.24-7)

Stone Age of East Africa



Desert

Sudan Savannas & Woodlands

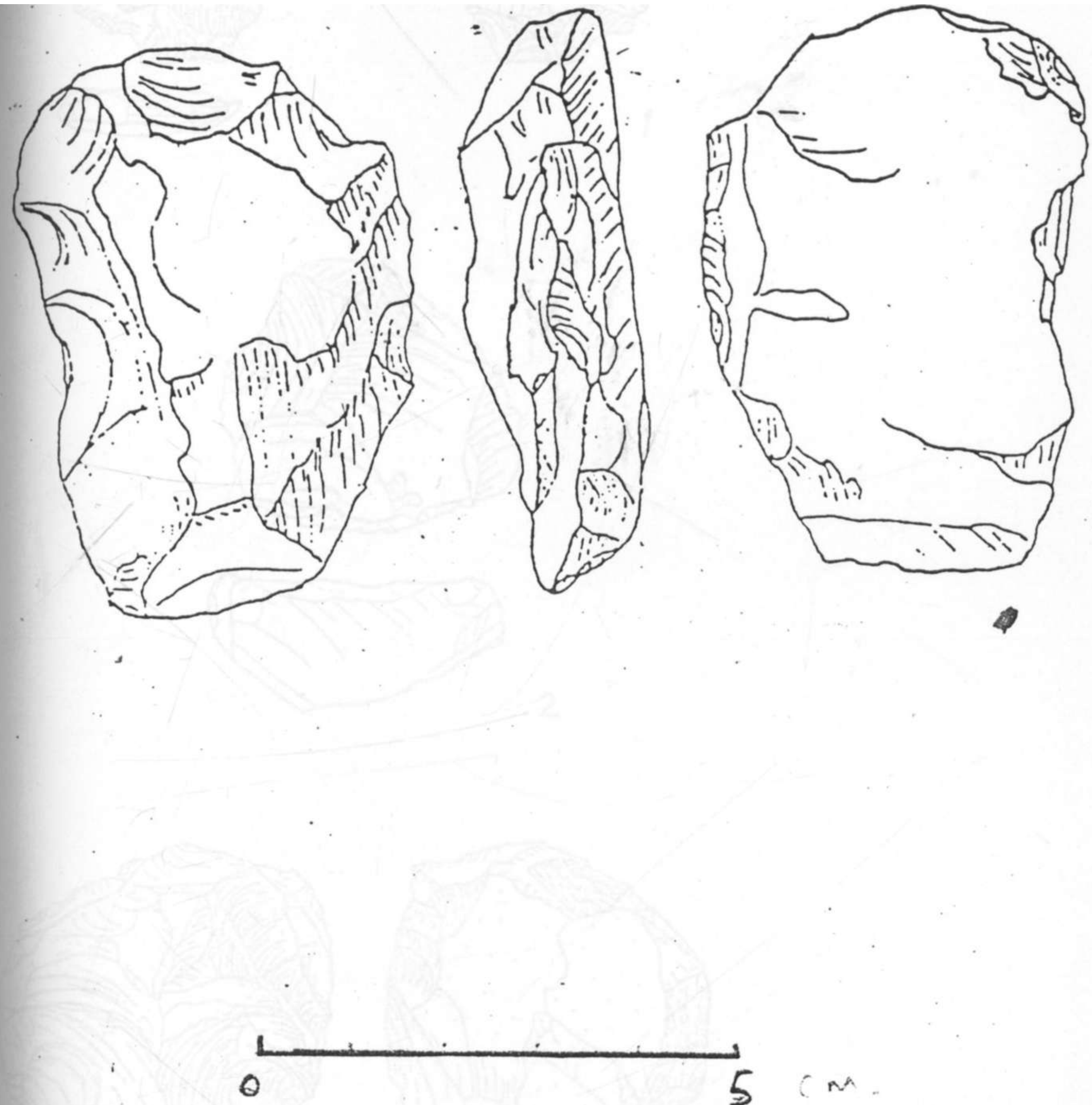
Grata Savanna

Guinea Savannas & Woodlands

Forest - Savanna Mosaic

Montane Habitats

FIGURE 6: Scraper cores, obsidian, Prospect Farm, (after, Anthony-, 1972, p. 122)



PIGURE 7i Discoidal cores, obsidian, Prospect ?arm, (after Anthony, 1972, p.159)

FIGURE 8: Pyramidal cores, obsidian, Prospect Farm, (after Anthony, 19KLP-169)

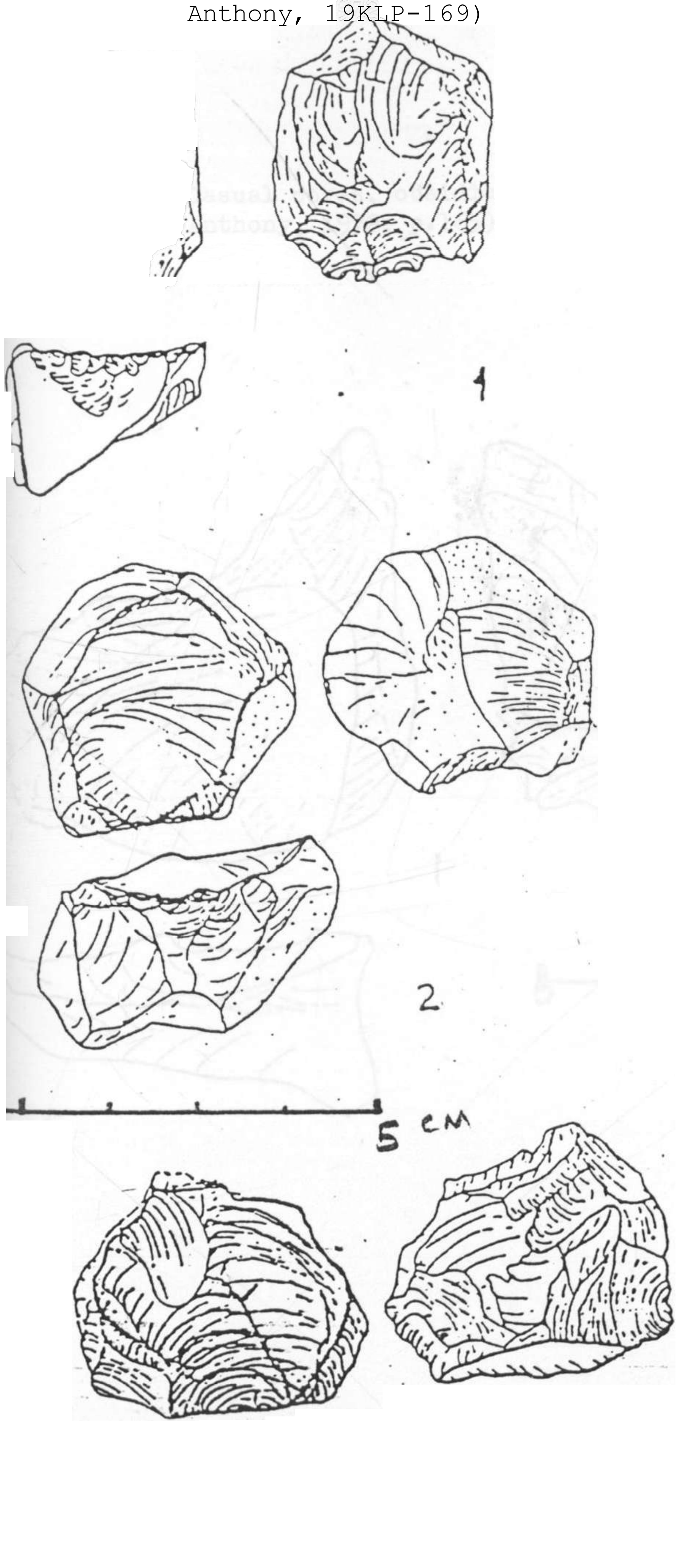


FIGURE 9:- Casual cores, obsidian, Prospect Farm, (after Anthony, 1972, p.16'5)

FIGURE 10: Levallois cores, obsidian, Prospect Farm, (after Anthony, 1972, p.163)

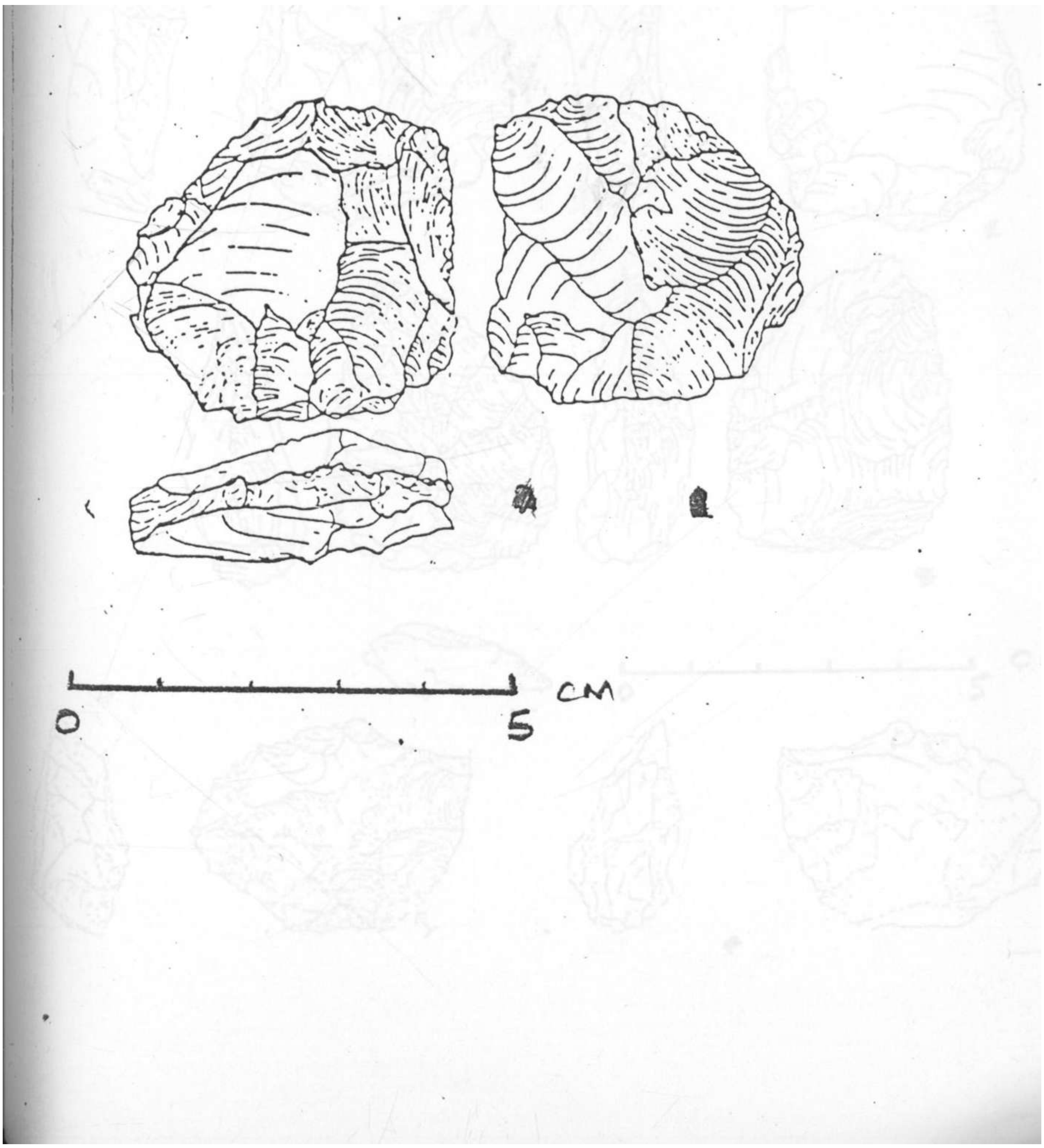
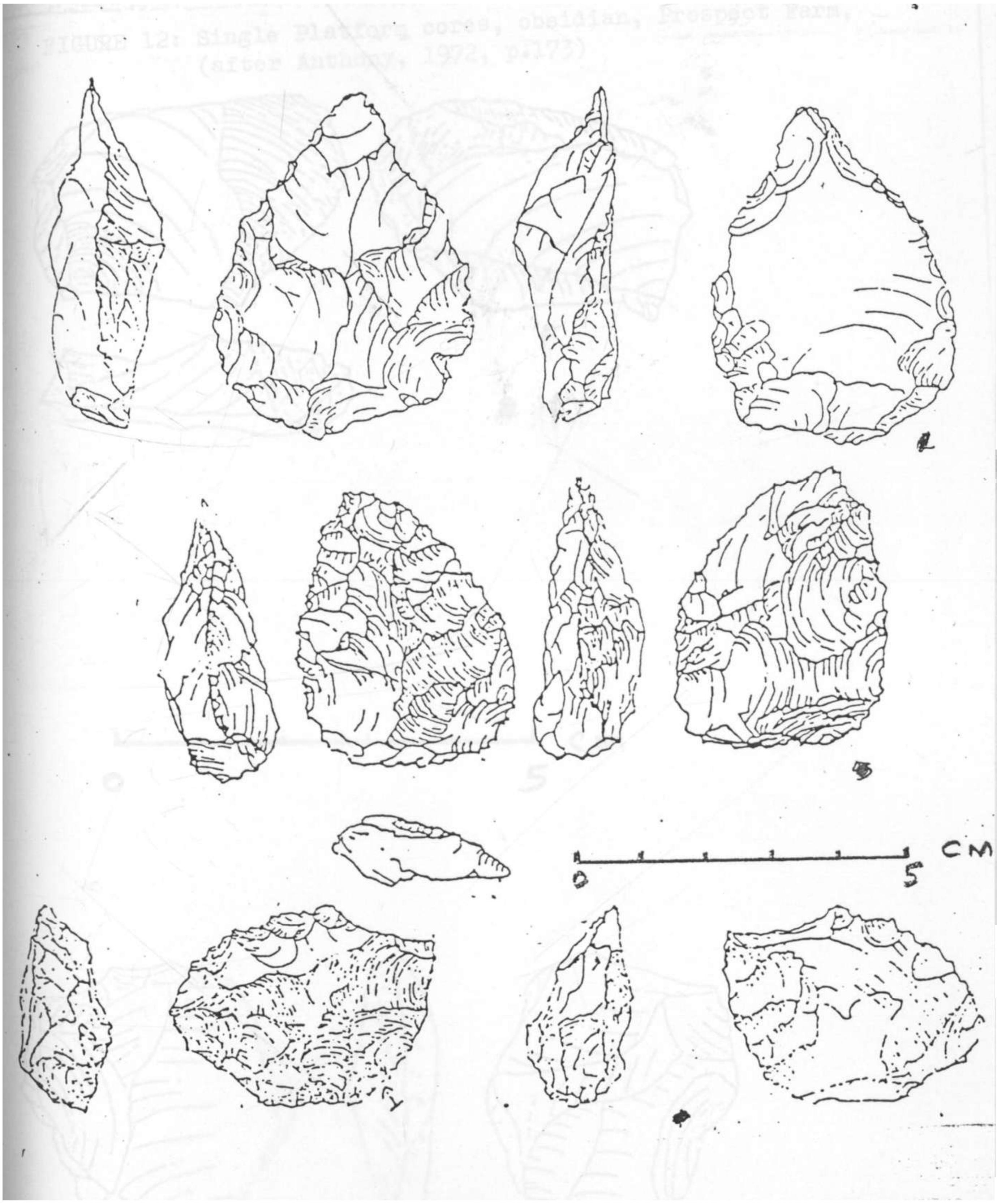


FIGURE lis Levallois point cores, obsidian, Prospect Farm, after-Anthony, 1972, p.209)



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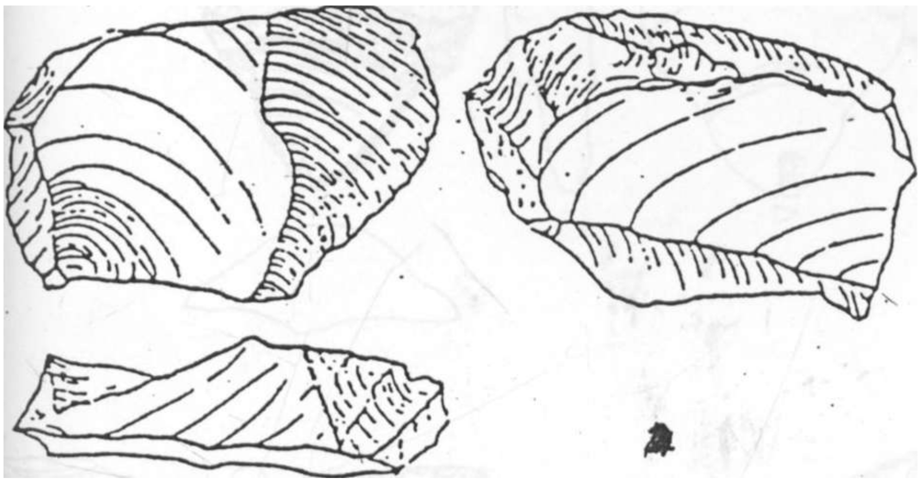

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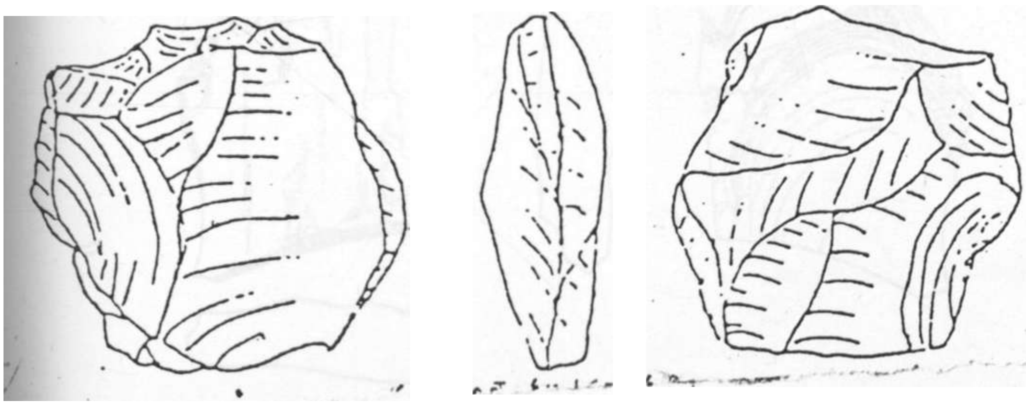
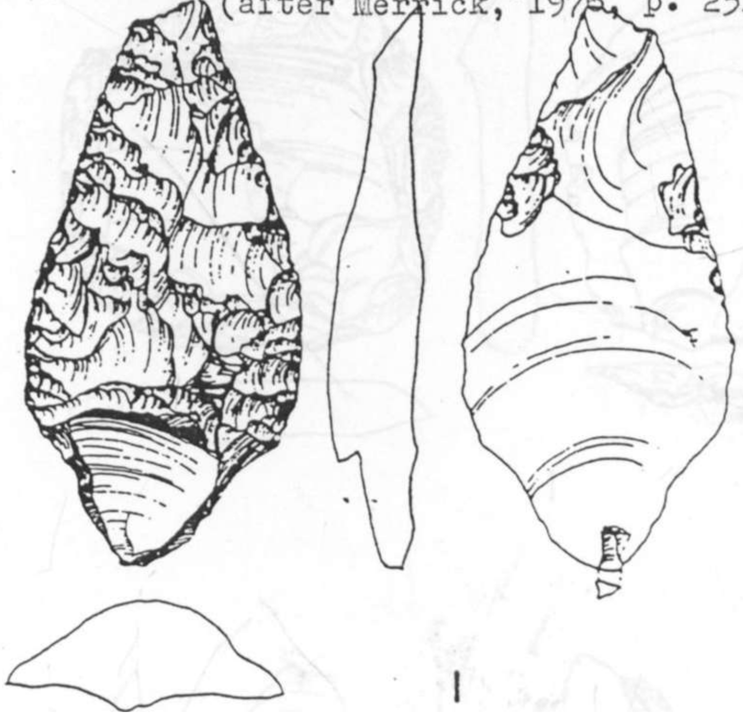


FIGURE 13: Levallois point cores, obsidian, Prolonged Drift, (after Merrick, 1976, p. 251)



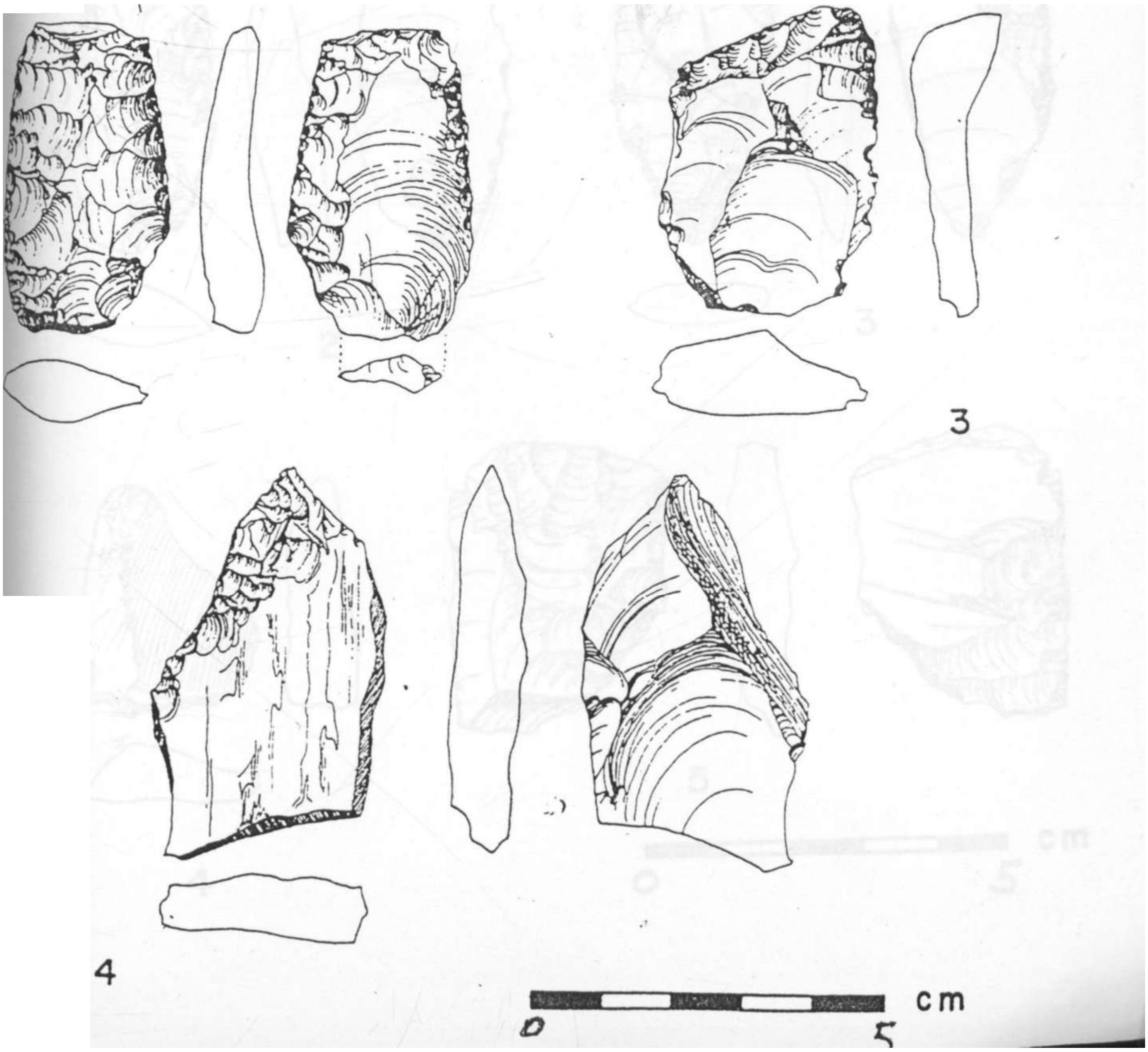
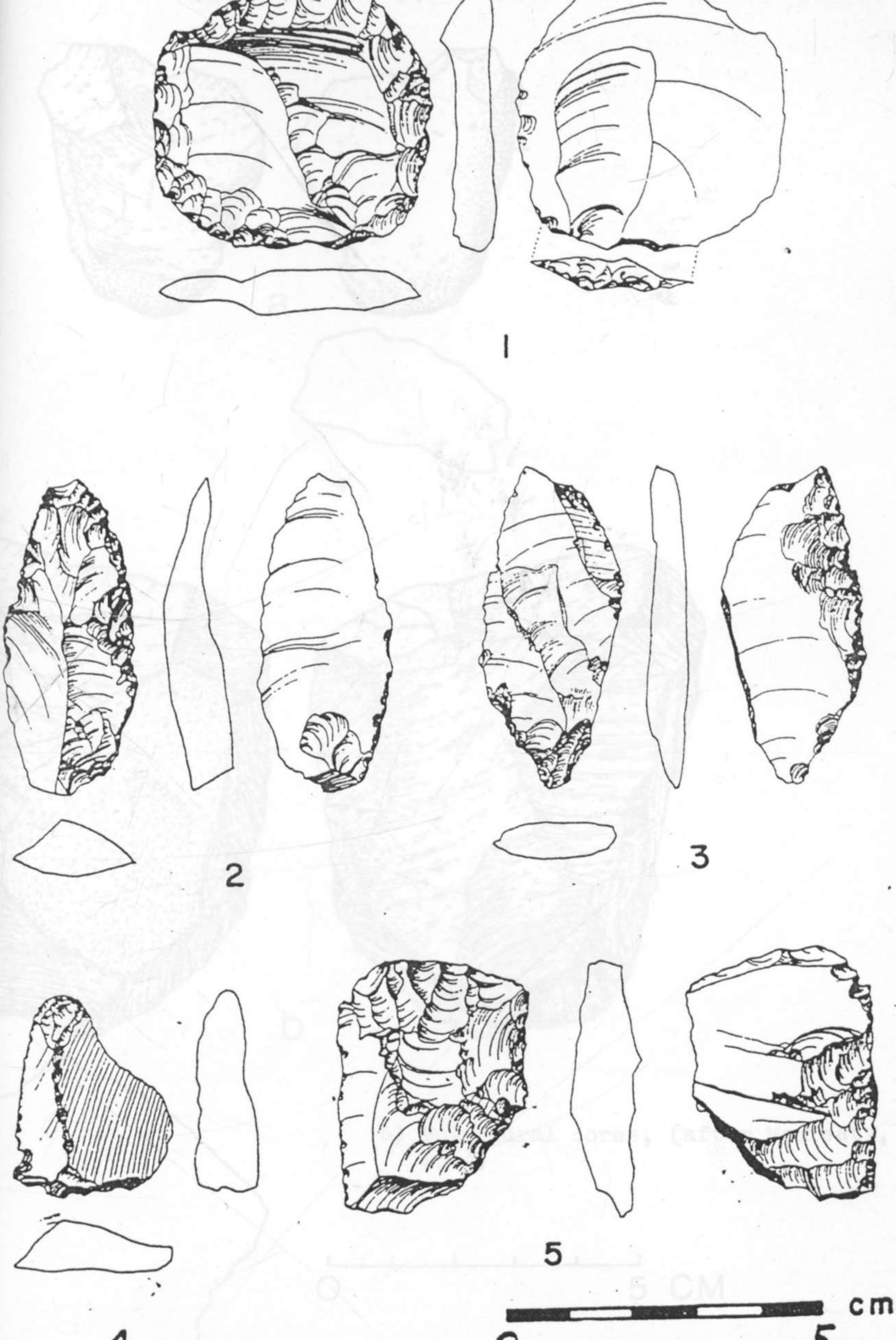
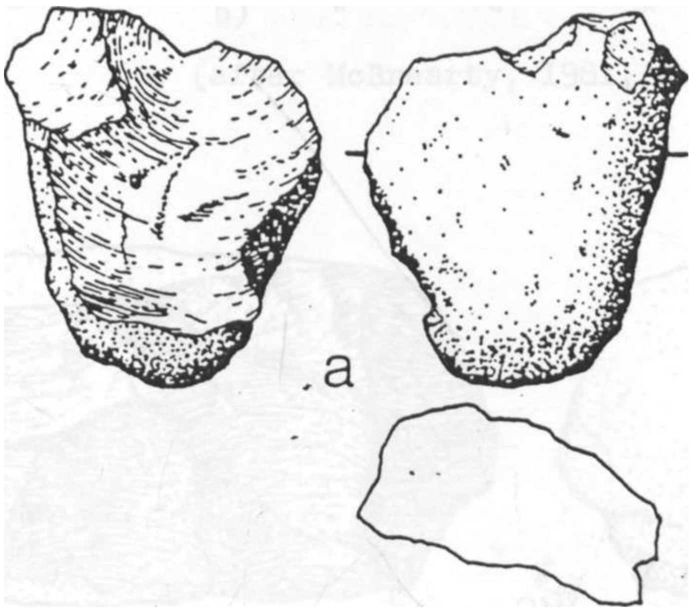
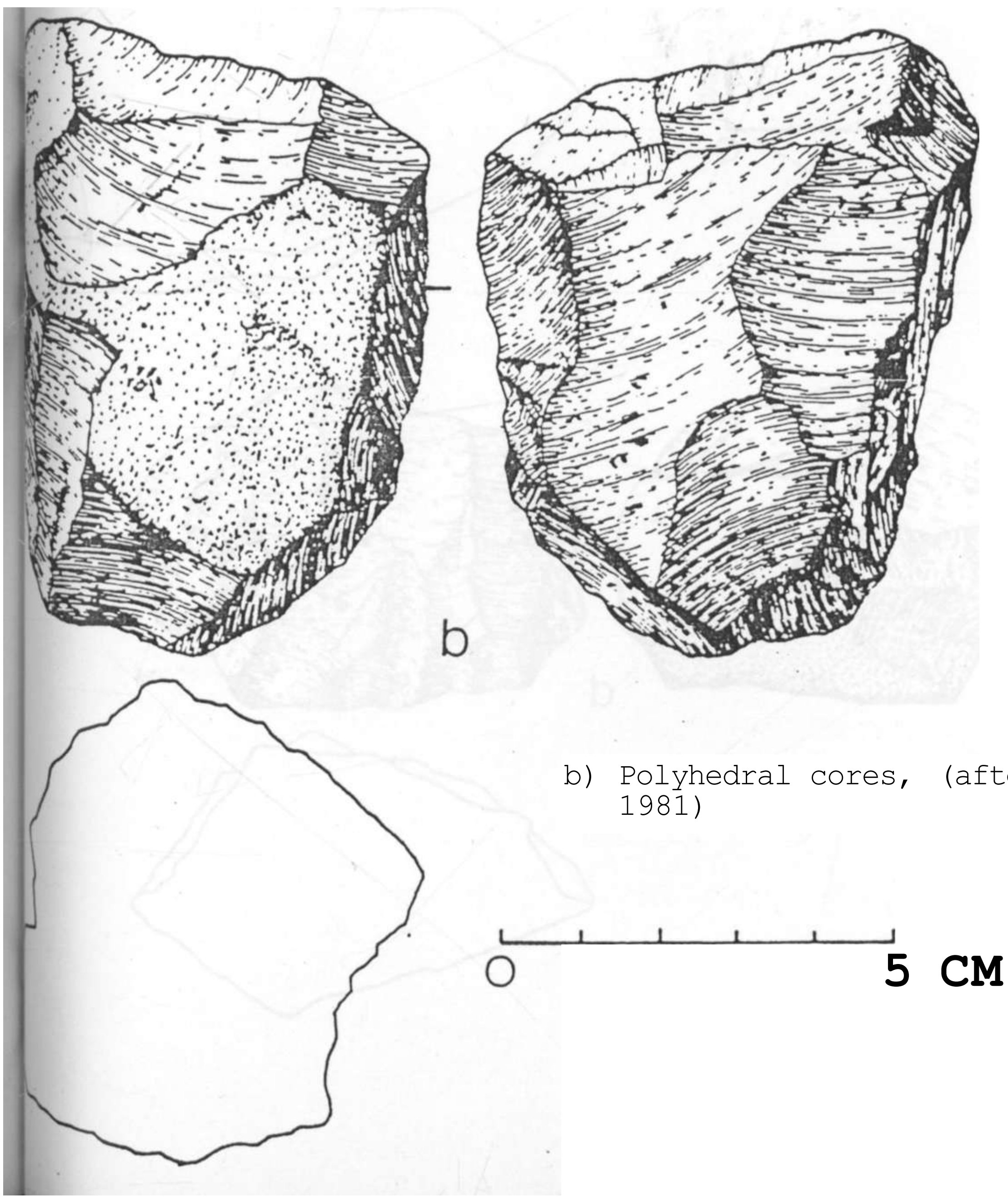


FIGURE 14: Scraper cores, obsidian, Prolonged Drift, (after Merrick 1976, p.252)



FIGUHE 15^)Casual/end chopper cores, Ombo phonolite, Muguruk
(After McBrearty, 1981)





b) Polyhedral cores, (after McBreaty, 1981)

FIGURE 16: a) Opposed platform cores, Basement Complex Rock,

b) " " " Ombo Phonolite lava

(after McBrearty, 1981, p.226)

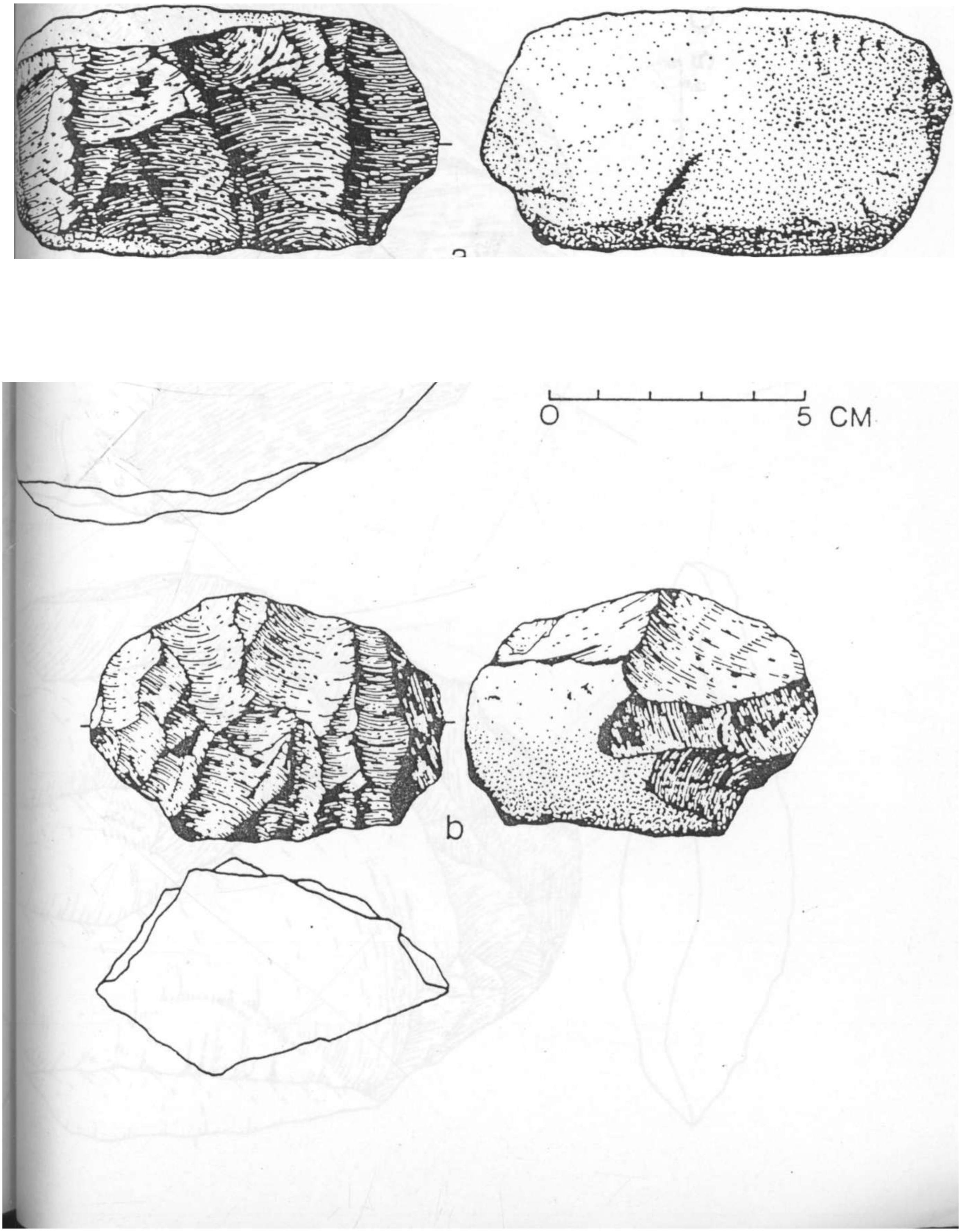
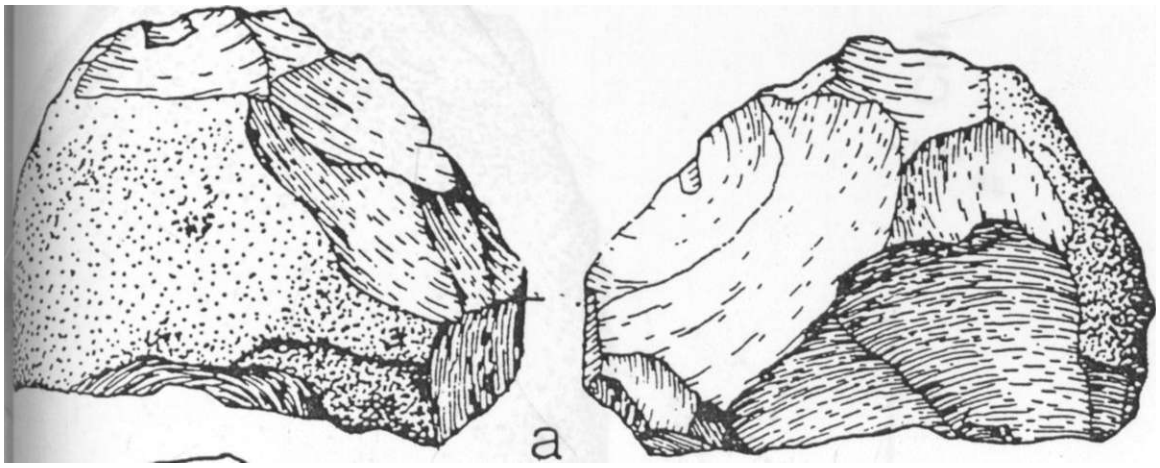


FIGURE 17: Levallois core, Ombo Fhonolite,
McBrearty, 1981, p.222)

FIGURE 13: a) Subradial cores, Ombo Phonolite, Muguruk

b) Radial " ' " " "

(after. McBrearty, 1931, p.217)



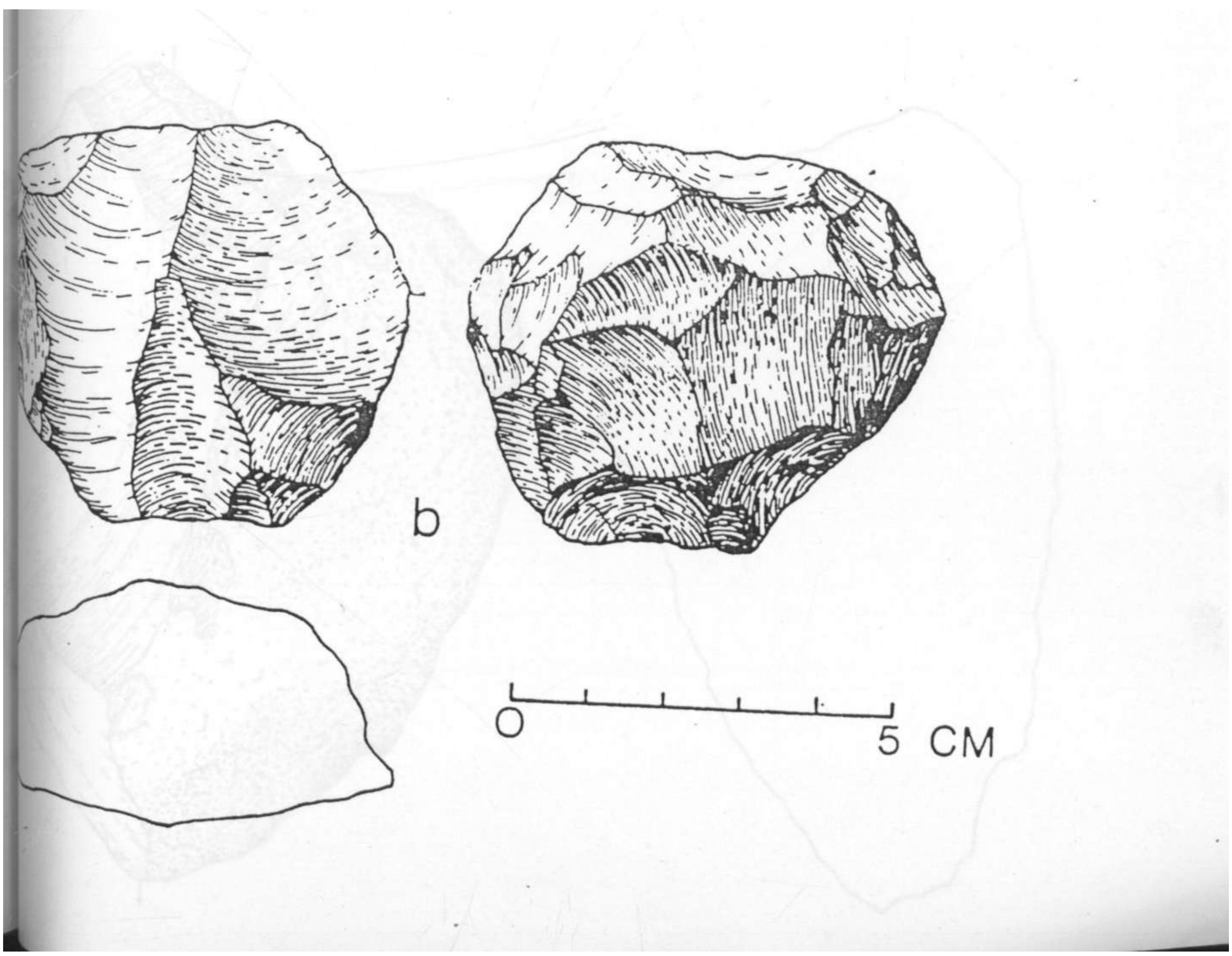
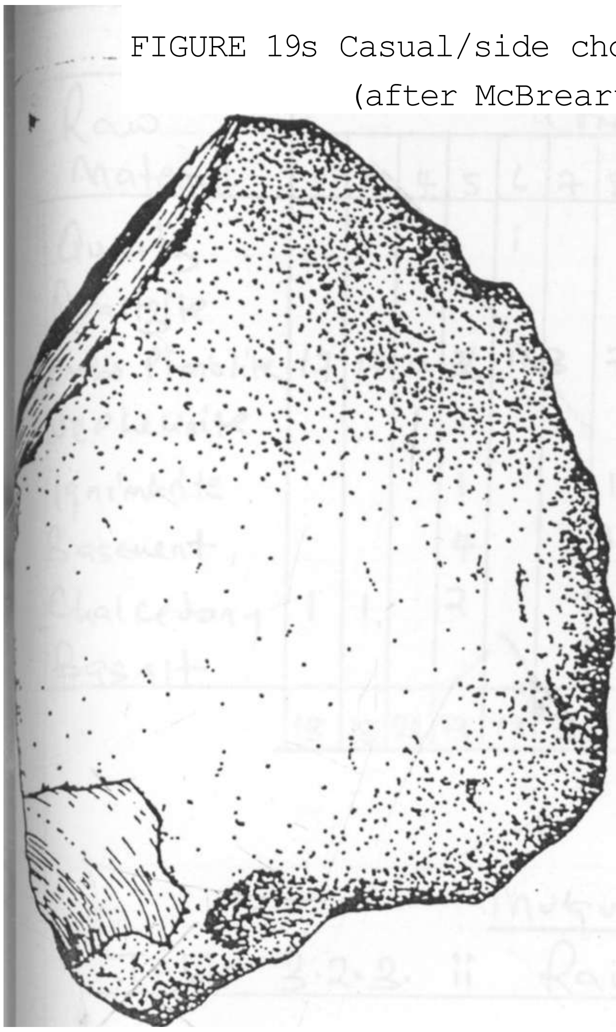


FIGURE 19s Casual/side chopper cores., _pmbo fhonolite, iauguruk (after McBrearty, 1981).



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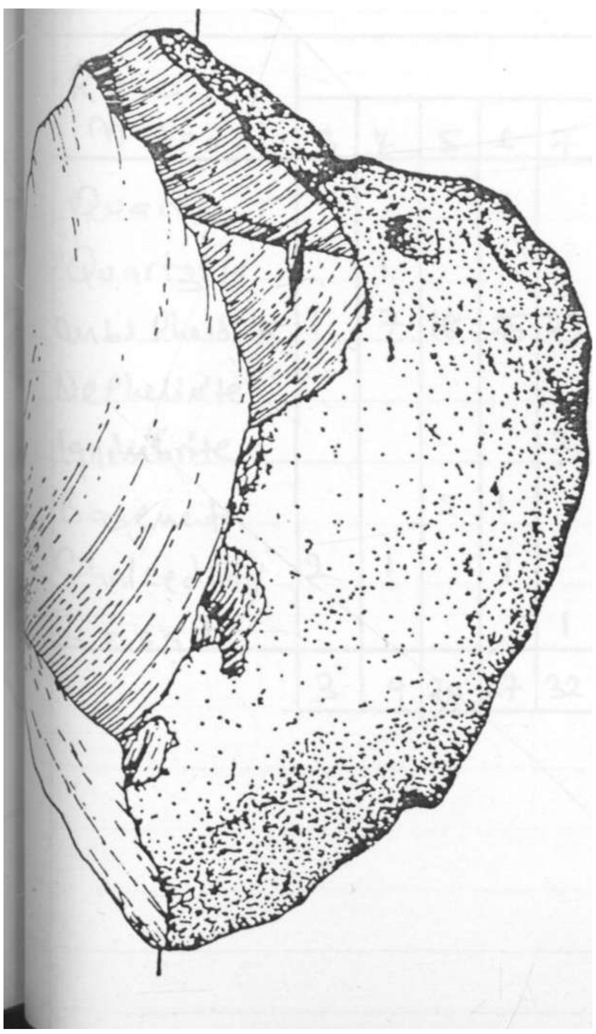

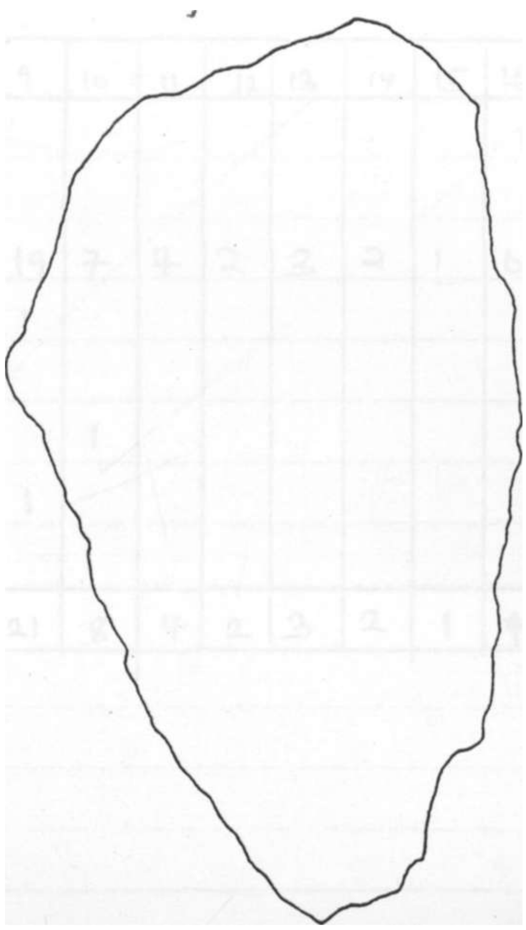

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