

A Data Analysis of Near Eastern Middle Palaeolithic Hominid Fossil Occurrences Using Evidence of Disposal of the Dead


by
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B.A., University of Victoria, 1995

A Thesis Submitted in Partial Fulfillment of the
Requirements of the Degree of


Master of Arts

in the Department of Anthropology

We accept this thesis as conforming
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ABSTRACT


Fossil occurrences ascribed to archaic *Homo sapiens*, *Homo (sapiens) neandertalensis*, or early *Homo sapiens sapiens* or associated with the Middle Palaeolithic or Mousterian Techno-complex from twenty caves and rockshelters in the Near East are examined. These sites include: Amud, Bisitun, Dederiyeh 2, Geulah, possibly el-Wad, Hayonim, Karain, Kebara, Ksâr' Akil, Masloukh, Qafzeh, Ras el-Kelb, Shanidar, Shovakh, Shukbah, Skhul, Tabun, Tamtama, Zuttiyeh, and Kanal, Tikali, or Merdevenli (near Magracik in Turkey).

The patterns of behavior expressed at these sites through disposal of the dead evidence suggest regional continuity with the gradual emergence of social complexity during the Middle Palaeolithic and reflect symbolic prescience on the part of the social groups. Curation or post-mortem processing of skeletal remains intensified over time and continued into the Upper Palaeolithic. The Near Eastern Middle Palaeolithic was a period of social development which laid the foundations for Upper Palaeolithic behaviors.

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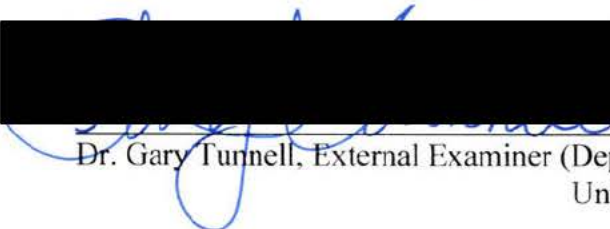
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ACKNOWLEDGMENTS

Several individuals contributed to the preliminary research and preparation of this thesis. Dr. Nicolas Rolland, my supervisor, is a dedicated and astute palaeoanthropologist. His critical perspective was essential to the formulation and completion of this project. I am grateful for Shirley Rolland's forbearance and support over the past 4-1/2 years of investigation and writing, particularly since Dr. Rolland retired in 1998.

I want to thank Marcel Otte for the privilege of spending two field seasons in Seladina Cave and for the amenities provided to the foreign excavators. Dominique and Aysel Bonjean taught me the techniques and precision required in cave excavation. On a personal level, I value their friendship, hospitality, and generosity. I appreciated Dominique's patience in answering every question and his trust. The students from the University of Liege and the other foreign excavators broadened the scope of the field experience. In particular, I want to acknowledge Isabelle Loodts and Olivier Renotte from Belgium, Dorota Wojcizak from Poland, and Dan White and Chip Colwell from the United States.

Jean-Jacques Hublin donated several hours of his time at the *Musée de L'Homme* in Paris to enlighten me on the morphological differences between Neandertals and anatomically modern humans. He also provided an introduction to Pierre-Yves Demars from the University of Bordeaux who took me on a guided tour of some of the sites around *Les Eyzies de Tayac*. Monsieur Cleyet-Merle and Jacquelin Angot-Weston from the *Musée National de Préhistoire* offered advice and assistance on additional site visitations. Michelle Monnier, a graduate student in archaeology from the University of Bordeaux, led me on an excursion to the site of La Ferrassie. Philip Chase and Harold Dibble permitted me to visit their excavation at Fontchevade. Brooks Ellwood, from the Fontchevade team, took me to the site of La Chaise. Discussions with Dibble's knowledgeable team of excavators, particularly Shannon McPherron and April Nowell, added a new dimension to the understanding of Palaeolithic investigation and research goals.

Erella Hovers' counsel on and perception of the sites in the Near East, particularly Amud Cave were an invaluable addition to this analysis. Ofer Bar-Yosef responded to many queries and offered considerable support and information on the latest research perspectives derived from Near Eastern Middle Palaeolithic studies. Baruch Arensburg's caution was warranted and his suggestions were productive.

I want to thank E. A. Hammell, from the University of California at Berkeley, who met with me and discussed his article about the demographic constraints on early human populations when he visited Victoria as the University's Lansdowne Scholar. Tim White, also from Berkeley, answered several questions related to issues of taphonomy, cremation, and cannibalism. Jerome Cybulski, from the Museum of Civilization in Ottawa, and Richard Lazenby, from the University of Northern British Columbia, answered similar forensic and taphonomic questions and offered insights of their own based on their experiences in Canadian archaeology.

I wish to extend my gratitude to Mrs. Lieselotte Linge for her translation of German articles.

The seminar debates and post-seminar discussions with my fellow graduate students aided in the development of this thesis and the observational approach. These individuals include: Colin Moyer, Elliot Reynolds, Karl Schmidt, Steve McKenzie, Bruce Hoskins, Judith Mitchell, Ruben Wackley, Tamara Hutton, Linda Clack, Marie-Christine Cormier, and Terence Clark.

I am indebted to Susan Crockford and Becky Wiggins from the University of Victoria who are also representatives of Pacific Identifications. Susan's expertise on interbreeding between species provided an understanding of the mechanisms and constraints which are operative in this regard. I was fortunate to study osteology under the tutelage of Dr. Orville Elliot before his retirement in 1998. We spent several hours discussing morphology and morphological species determinations. In conjunction with personal support and encouragement, Dr. N. Ross Crumrine provided ethnographic information. I also valued the academic stimulation engendered by the 'devil's advocate' position of Dr. Quentin Mackie.

I am grateful to my thesis committee for their patience and assistance with the research. Besides my supervisor, my committee consists of Dr. E. A. Roth, Dr. Louise Page, and Dr. Gary Tunnell.

Finally, I want to thank my family for their tolerance during the research and production of this thesis. In particular, I am cognizant of the sacrifices made by my husband, Len Roy.

Chapter 1: INTRODUCTION

Every year, new hominid fossil occurrences are discovered and placed into the human evolutionary scheme based primarily on critical features of their individual morphology. In addition, the palaeoanthropological literature is constantly enriched by new approaches to the analysis of human evolution and the relevance of the variety of hominid species to the evolution of *Homo sapiens sapiens*. These innovative and novel approaches incorporate genetic research and its relevance to evolution; cognitive and psychological analyses of lithic technologies and variability; inferential studies of linguistic abilities and the corresponding potentials for social organization; high resolution analyses of intra-site and inter-site spatial patterning and correlated interpretations of social complexity; lithic reduction and core reconstruction models; analysis of settlement systems; and an increasing number of behavioral investigations including mortuary practices.

Significant technological advances have been witnessed in the domains of site discovery, excavation, and recovery of materials and information. As indicated above, methods of analysis have been rapidly expanding and incorporating new approaches. But, progress at the level of explanation, particularly archaeological explanation, has often been restrained and has not kept pace with the new discoveries or the results of the new approaches. The inclination of researchers is to turn inward, to rely on pre-existing literature and paradigms to provide explanations for the new discoveries, for the results of the new methods of analysis, and for the relevance of these conclusions

to human evolution. While this approach is to some degree warranted, it tends to stasis. Instead of employing the new information to test paradigms, paradigms are often used to explain the new data. This tendency diminishes the validity of the archaeological analysis and jeopardizes the scientific value of the archaeological perspective.

This problem is particularly relevant in the study of Neandertals. The crucial allocation of a specimen to either a Neandertal or an anatomically modern human classification establishes the expected level of behavior regardless of the archaeological context of the discovery. Frequently, the only archaeologically significant data are the associated tool industries which are commonly used to enhance behavioral expectations (Bar-Yosef, Ofer 1998:personal communication). Paul Mellars (1996:1) summarizes investigators' perceptions of the Neandertals' evolutionary status and their behavioral capacities as fitting into one of two extremes: "those who saw Neanderthals as standing directly astride the main course of human evolution, only slightly different in either their physical or mental capabilities from modern populations; and those who saw them, by contrast, as much more primitive figures, with behavioural and physical capabilities radically different from those of later populations and almost certainly representing an extinct side branch of human evolution".

Characterizations of Neandertal behavior derived from these polar perspectives were equally extreme. On the one hand, those who eliminated Neandertals from the evolutionary trajectory of modern humans tended to exclude complex cultural responses from the Neandertal behavioral repertoire. Neandertals lacked the hunting acumen necessary for killing most large animal species. They were incapable of foresight

in their economic and social spheres. Neandertal social organization more closely resembled the “sexually segregated foraging groups” of primates (Mellars 1996:2). Neandertals were also deficient in their abilities to symbolize and to communicate via a complex, syntactical language (Mellars 1996:2, 388). On the other hand, researchers who favored the Neandertal contribution to the modern human gene pool argued that Neandertals possessed the capacity for complex behaviors; but developed these abilities gradually through a cumulative process which led to more complex behavioral responses and ultimately to the emergence of modern human behaviors as they evolved into modern human forms

Neandertals were highly resourceful, highly intelligent creatures. They were not big, dumb brutes by any stretch of the imagination. They were us - only different. (Smith, Fred: personal communication cited in Gore, Rick 1996:6).

Anthony Marks (1992:229-230) approached this problem in the Near East from a slightly different angle. He contested the almost exclusive use of non-archaeological data in the construction of supporting evidence for evolutionary paradigms, particularly the Out of Africa II and Rapid Replacement Model of human evolution. Three of these essentially ‘non-archaeological’ issues were identified by Marks: (1) mt-DNA studies; (2) the discovery of Proto-Cro-Magnons (or early anatomically modern humans) at the site of Qafzeh in Israel; and (3) the new dates for Qafzeh. The mt-DNA studies designated an African genesis for modern humans around 200,000 years ago. The discovery of early modern humans in the site of Qafzeh, dated

around 92,000 years ago, established their prior presence in the Levant. Neandertals occupied the region around 60,000 to 70,000 years ago.¹ Amalgamated, this information tended to exclude Neandertals as contributors to the modern human gene pool.

While each factor is open to question, their combined effect has been very significant as scholars have adjusted their ideas to fit each new claim. For the most part, however, the archaeological record has been examined only briefly compared to the non-archaeological data. (Marks 1992:230).

Marks (1992:230) argued that the archaeological record from Africa, particularly Northeast Africa, should be examined to determine whether corroborating evidence for population movements out of Africa could be identified.. Searching the archaeological record in the Levant for indications of regional continuity or for manifestations of discontinuities compatible with migrational incursion from outside was also essential. Indeed, Marks (1992:245-246) concluded that although the 'Out of Africa' scenario could not be eliminated as an hypothesis, "discontinuities apparent in the Levant are most easily explained as the spread of peoples, not from Africa, but from the north and east".

This predilection for circuitously describing and defining behavior based on non-archaeological information, particularly evolutionary theories and paradigms, may potentially exaggerate or distort real differences and/or similarities in comportment as

¹ One possible exception was the cave of Tabun in Israel which yielded Neandertal and modern human remains. The Tabun dates range from around 87,000 years ago to around 186,000 years ago [levels B through D] according to the ESR - linear uptake dating method (Grun, Rainer; Christopher B. Stringer; Henry P. Schwarcz 1991:242).

well as obscure behavioral evidence. In turn, archaeological support is a mandatory prerequisite for the advocacy and perpetuation of any theory or paradigm.

THESIS

PERSPECTIVE

The admonitions and cautions mentioned above, in conjunction with the increasing number of hominid fossil finds, are sufficient stimuli to recommend a re-examination of these fossil occurrences within their original context of discovery. In fact, when paradigms, morphology, and their behavioral corollaries are ignored, the patterns of mortuary and social behavior expressed through the disposal of the dead in the Near East appear complex. The registration of age related life stages through body position and orientation is intricately symbolic. These disposal attributes are consistent throughout the region and over time. The variability in disposal conditions indicate complexity in social organization. Ascribed status for infants and toddlers appears during the Middle Palaeolithic. Achieved status, dominance/subordinance, increasing numbers of social roles, and more diverse social *personae* are manifested in this period. Sexual distinctions are not prevalent in the early Middle Palaeolithic; but, evidence for an emerging sexual dichotomy increases over time. Curation or post-mortem processing of skeletal remains is featured in all the sites. Curation intensifies over time and continues into the Upper Palaeolithic. In fact, the Middle Palaeolithic in the Near East represented a time of social development which laid the foundations for Upper Palaeolithic behaviors.

AIMS

The initial intent of this thesis was to conduct an analysis of data on disposal of the dead for all the Neandertal fossils from the entire spectrum of their Western Eurasian geographic distribution. The primary purposes of this investigation were:

- 1) to assess inter-site and intra-site spatial patterns in the depositions of Neandertal fossils;
- 2) to identify the physical parameters of the individual disposals;
- 3) to assess the consistencies and differences in the disposals;
- 4) to ascertain the likelihood of the deliberate or fortuitous nature of the emplacements;
- 5) to infer behavioral responses from the archaeological contexts of these disposals.

Preliminary research established an estimated minimum population of between 297 to 331 Neandertals from at least 129 Western Eurasian sites. The Near East was the first region studied and was chosen because this region has yielded hominid remains bearing both Neandertal and modern human morphological characteristics. Both forms have been discovered in association with Middle Palaeolithic [Mousterian] tool industries. During the process of investigation, the original reckoning of the population for this region [43 so-called Neandertal fossil occurrences] was found to be greatly underestimated and many of the Middle Palaeolithic fossils from the Near East were not taxonomically classified. The final tally of the hominid fossil population in this region was determined to number between 136 to 141 individuals. In addition, information presented by Baruch Arensburg and Anna Belfer-Cohen (1998) contested the presence of

Neandertals in the Levant. As a result, the region of study was limited to the Near East. Ralph Solecki's (1971:14) working definition of the Near East was used and encompassed the following modern geopolitical regions: "Turkey, Lebanon, Syria, Jordan, Iraq, and Iran". The subject population was modified to incorporate the previously assumed Neandertals and the so-called anatomically modern humans which were subsumed under the phrase 'Middle Palaeolithic hominid fossil occurrences'. As Marks (1992:229-230) indicated, the modern human presence in this region may have predated the Neandertal presence, if Neandertals occupied the region at all.

Three principal goals were accomplished through the process of investigation: (1) an updated analytical catalogue of the Middle Palaeolithic hominid fossils from the Near East was created; (2) structural patterns illuminated by the reconstitution of the archaeological contexts of the hominid fossil depositions were examined; and (3) this research was situated within the context of ongoing research in palaeoanthropology. The archaeological reconstructions of the fossil find-sites were facilitated through a review of the academic literature and via personal communications with researchers in the field of palaeoanthropology. No doubt, some fossil hominids were omitted. Baruch Arensburg (1998:personal communication) mentioned that new discoveries were encountered each field season. The time lapse between the discovery of fossils and the reports of these discoveries prevents incorporation of all finds.

The literature review for this study was extensive and encompassed technical information from several other fields and sub-fields besides palaeoanthropology. These included cultural anthropology, physical anthropology, osteology, forensic

anthropology, burial archaeology, taphonomic studies, and statistics. As a result, the literature review was not addressed separately, but was interspersed throughout the paper.

The analytical approach employed by this investigation corresponds with Claude Lévi-Strauss' (1958:307) level of observation which differs from his level of experimentation.

Ces deux niveaux seront toujours distingués. L'observation des faits, et l'élaboration des méthodes permettant de les utiliser pour construire des modèles, ne se confondent jamais avec l'expérimentation au moyen des modèles eux-mêmes.....Au niveau de l'observation, la règle principale - ou pourrait même dire la seule - est que tous les faits doivent être exactement observés et décrits, sans permettre aux préjugés théoriques d'altérer leur nature et leur importance. Cette règle implique une autre, par voie de conséquence: les faits doivent être étudiés en eux-mêmes (quels processus concrets les ont amenés à l'existence?) et aussi en relation avec l'ensemble (c'est-à-dire que tout changement observés en un point sera rapporté aux circonstances globales de son apparition). (Lévi-Strauss, Claude 1958:307).

In other words, the structural patterns noted in the study were used to generate models for behavioral practices. Experimentation to test these 'models' must be deferred to further research and must devolve from the recovery contexts of new discoveries. All of the patterns are reported as they appear with adjunct explanations which require testing to verify or reject. Models are advanced to provoke further research and re-analysis. Since experiments to test the models have not been conducted, the models must not be considered theories or even hypotheses. In other words, these models are not intended to stand as absolute facts.

As Arthur Saxe (1971:39) stipulates, data never speak for themselves.

Data communication is a function of the questions asked. Many pertinent questions are never asked. In order to devise potential models and corollary explanations as well as reduce the complications of time compression and palimpsests of occupation, several questions were contemplated:

- 1) What were the spatial and structural patterns exhibited through the disposal of the dead in each site?
- 2) Are these patterns consistent throughout the layers or was change over time evident?
- 3) How did the intra-site patterns relate to inter-site patterns?
- 4) What were the behavioral implications of the patterns?
- 5) How did the hominid remains enter the deposits?
- 6) Do the patterns reflect some form of symbolic response?
- 7) What criteria supported deliberate inhumation?
- 8) Why were some individuals apparently buried while others were not buried?
- 9) What was the significance of inhumation of immature individuals?
- 10) Could any of the fragmentary remains distributed in the site belong to the same individual and how could the association of remains be determined?
- 11) What other methods of disposal, besides inhumation, were insinuated by the patterns?
- 12) Was differential treatment based on age and/or sex implied by the structural patterns, the position of the bodies, or burial inclusions?

- 13) What constituted an inclusion and what tests could be applied to ascertain whether an inclusion was deliberate or fortuitous?
- 14) What evidence existed for mortuary treatment such as cannibalism or curation?

Many of the questions cannot be adequately answered based on the present state of the data. However, these queries and many others of a similar nature can serve as investigative guidelines.

The sequence of analysis for this investigation is prioritized in accordance with the assumption that sites separated in time and in space may represent differences which may correspond with different social group identities. Most investigations of Middle Palaeolithic mortuary practices [see Chapter 5] approached the data from the general to the specific: comparisons of all Neandertal inhumations and from all of the geographic regions bearing Neandertal specimens were analyzed first. Some regional considerations were addressed after the broad comparisons. Specific site information was employed as a last line of analysis, particularly for explanatory purposes. This research reverses the order and begins with the specific and moves to the general. The sites are analyzed by layer, then by intra-site patterns, and finally by inter-site and regional patterns.

PRACTICAL LIMITATIONS

Perhaps the most difficult challenge of the thesis was the reconstruction of the archaeological context from a literature review. Library studies cannot replace field

work. Sites tend to have a specific character or nature which is difficult to transmit through academic articles. Lack of 'on site' experience in the Near East is a definite limitation to this research. However, field experience was obtained in other areas. This researcher worked on the excavation of several sites on the Northwest Coast of Canada. Two of these were burial sites which required the removal and preliminary analysis of skeletal remains. Two field seasons at Scladina Cave in Belgium via the auspices of Marcel Otte and under the direction and supervision of Dominique Bonjean provided practical experience in Middle Palaeolithic cave excavation. A tour of the Musée de L'Homme in Paris viewing the replications of the posited Neanderthal burials in conjunction with a meeting with Jean-Jacques Hublin regarding Neanderthal morphology enhanced the practical experience. A guided tour of the region around Les Eyzies was facilitated by Hublin through an introduction to Pierre-Yves Demars. Demars' tour included Roc du Marsal, L'Abri Armand Chadourne, L'Abri des Merveilles and other rock shelters of the Vallon de Castelmerle [Blanchard I and II, Castanet I and II]. An independent tour of the site of La Ferrassie was accomplished through the assistance of an archaeology student from the University of Bordeaux, Michelle Monnier. Monsieur Cleyet-Merle and Jacquelin Angot-Westin augmented the tour of the Musée National de Préhistoire in les Eyzies de Tayac. One day was spent at the site of Fontéchevade in the Charente with Harrold Dibble, Philip Chase, Brooks Ellwood Shannon McPherron, April Nowell, and the balance of their team of excavators. Ellwood directed a tour of La Chaise [Bouchard-Delaney and Suard]. Independently, the areas around La Quina and La Roche à Pierrot [Saint Césaire] were visited. An anthropological safari in Kenya in 1992

under the guidance of Gary Tunnell added a different dimension to the the realm of personal experience. This trek included a visit to the Museum in Nairobi, a visit to Koobi Fora, and encounters with the Samburu of northern Kenya and the Masai of Masai Mara.

The fragmentary nature of the fossil occurrences, both in terms of the number of skeletal elements and in terms of the damaged condition of many of the bones, has precluded the acquisition of some relevant information. Sex and age determinations are difficult with hominid remains particularly as no series of skeletal samples of known sex and age exists for these archaic populations. Comparisons can only be derived from more recent collections of modern human skeletal remains whose sex and age are established facts, such as the Hamann-Todd Collection [Cleveland Museum of Natural History, Cleveland, Ohio] and the Terry Collection [Smithsonian Institute, Washington, D. C.] (Krogman, Wilton Marion and Mehmet Yasar Iscan 1986:7).

Another encumbrance to the research has been the incomplete nature of the data. Important information has been excluded from the published literature. For example, the exact provenience of fossil occurrences, particularly those represented by single elements, has been excluded from the academic reports. The “x” and “y” coordinates from the excavation grids were never presented, although the quadrants were often listed. Attempts to acquire this information were unsuccessful.. Also, taphonomic alterations of singular elements have rarely been discussed. While these bits and pieces of data may seem trivial and irrelevant, particularly in the case of single element remains, they may provide significant information. Any patterning to the placement of these elements, such as specific and consistent orientations, or any evidence of carnivore

damage and cutmarks are useful details in the determination of whether the remains entered the deposits through the auspices of hominids, carnivores, or some other taphonomic or geological process. Furthermore, the lack of exact provenience renders the assessment of whether the hominid remains overlapped each other impossible to determine. Overlap may indicate intrusion of one emplacement upon another or may imply non-hominid methods of disposal or even suggest that two isolated elements may belong to a single individual if the depths below datum are fairly close. Lack of overlap may signify deliberate placement of the remains and through inference some method of marking the location of the deceased.

The paradigmatic nature and the polarity of the Neandertal/modern human debate complicated the assessment of data for the reconstruction of the archaeological circumstances of deposition of the hominid fossil occurrences. A case in point corresponded to discussions of and acceptance of burial inclusions. The acceptance of the deliberate nature of the inclusion of artefacts with skeletal remains was often correlated to the taxonomic designation of the hominid. In particular, inclusions were considered an acceptable contribution if the hominid was classified as modern human. Qafzeh 11's deer antler inclusion was accepted, but Amud 7's fragmentary deer maxilla inclusion was questioned (Tillier, Anne-Marie 1995:70). The conundrums created by these interpretations and the circularity of the arguments forced a careful re-examination of the debate and aspects of this debate were included in the thesis, especially in Chapters 2, 3, and 4. Comprehension of the literature necessitates comprehension of the debate.

In order to minimize the aforementioned difficulties, the patterns were described as indicated by the existing literature and 'possible' explanations were offered. Resolution of some of these issues will hopefully arise through ongoing research or through a re-examination of the excavation notes from the relevant sites.

FORMAT OF PRESENTATION

The thesis is divided into three parts. Part I [Chapters 2 through 5] addresses the problems. These are the major issues surrounding the Neandertal/modern human debate and the development of the theoretical paradigms. Part II [Chapters 6 and 7] presents the research design. Part III furnishes the data analysis and the results of the study.

PART I: The Problems

The next chapter, Chapter 2, provides an historical overview of the study of Neandertals and evolution. The major foci of the chapter are the paradigms which have dominated the field of palaeoanthropology. The paradigms have constrained the interpretation of many aspects of behavior. Many articles advocating specific paradigms contained data pertinent to the tables.

Chapter 3 examines the question: who or what were the Neandertals? The major thrust of the chapter is a morphological description and discussion of the physical traits or features which are associated with Neandertal forms

Chapter 4 focuses more specifically on Neandertal behavior and the present Neandertal/modern human debate. This debate is circular in nature with corresponding point and counter-point arguments which are frequently misinterpreted by

opposing researchers. This controversy is also redundant; the same time-worn arguments tend to keep re-surfacing. Both sides of the argument are founded on precisely the same archaeological information; however, interpretations of the data are drawn from markedly contradictory assumptions. In order to minimize misunderstandings, the arguments are presented to reflect as closely as possible the perspectives of the individual researchers cited.

Chapter 5 examines burial in the Middle Palaeolithic. Aspects of taphonomy and its relevance to the interpretation of deliberate interment are explained as well as the criteria used by palaeoanthropologists to identify deliberate inhumations. These criteria are re-addressed and new ones added. Results of previously published Middle Palaeolithic mortuary studies are recounted. Curation is introduced as a potential mortuary behavior along with some basic criteria applicable to the identification of this custom. Cannibalism, which is a speculated behavioral practice of some Middle Palaeolithic hominids is presented as well as a definition of the term and classifications of the various forms of this behavior.

PART II: Research Design

Chapter 6 discusses in detail the first part of the research design. This discourse involves the catalogue of fossil remains as well as the choice of topic, “methods of disposal of the dead”; what this phrase implies; and the specific criteria under consideration in the analyses. The tables which comprise the catalogue of fossil occurrences are explained.

Chapter 7 describes the second portion of the research design. The methods of analysis and approaches derived from burial archaeology and mortuary studies are mentioned. The incomplete nature of the data precluded the full application of these methods to the analyses. Their inclusion in the discussion is relevant as the underlying theoretical perspectives were considered and applied where possible.

PART III: Data Analysis

Section A [Chapter 8] presents the site sample including the hominid remains, skeletal patterns, and demographic information as well as the excavation histories of the twenty sites which yielded hominid remains. Fifteen of the sites were not specifically analyzed. As a result, these fifteen sites were described in more detail in this chapter. The general skeletal element distribution was recounted for each site and consolidated in the summary.

Section B [Chapters 9 through 14] provides the formal analysis of the sites. Chapters 9 through 13 comprise the site specific analyses. The sites are discussed in the following order: Amud, Kebara, Qafzeh, Shanidar, and Skhul. The disposal patterns for each of these sites are discussed along with the implications and possible explanations of these patterns. Chapter 14 incorporates a regional analysis of the five sites studied in detail. Some of the patterns from other sites are interjected into this deliberation.

Section C [Chapter 15] summarizes the findings of the research. This section re-addresses the questions asked in this chapter. The results of the analyses are also compared to the previous Middle Palaeolithic mortuary studies discussed in Chapter

5. Models which correlate with the most securely established patterns of disposal of the dead during the Middle Palaeolithic in the Near East are presented.

PART I: The Problems

Chapter 2: HISTORICAL OVERVIEW

Historically, the emphasis on paradigms and theories permeated the study of human evolution. Erik Trinkaus and Pat Shipman (1994) collated an entertaining and fairly detailed overview of the history of paleoanthropology complete with a “cast of characters” [researchers], hominid fossil occurrences, and the theories and paradigms which shaped and directed the development of this field. The text highlighted the sometimes convoluted, even bizarre, approaches of the early antiquarians to evolution and humanity. Furthermore, the book forcefully demonstrated the roles played by dominant personalities, politics, and religion in the generation of scientific constructs over time. Political and religious orientations were often mutually intertwined and culpable in rejecting evolution, particularly human evolution. When the Neandertal type fossil was discovered in Feldhofer Cave near Dusseldorf, Germany, in 1856, most academics and intellectuals were neither prepared to accept nor able to comprehend evolution from an ape-like ancestor.² The cosmology of the period dictated that the genesis of man was the act of God described by the creation story in “Genesis” of the *Bible*.

USSHER: Creation

Bishop William Ussher [1581 - 1656] used biblical genealogies to calculate one of the most widely accepted versions for the exact time of the Creation: the

² The Feldhofer Neandertal was discovered before Charles Darwin published *The Origin of Species* in 1859 (Trinkaus and Shipman 1994:78).

night prior to October 23, 4004 B. C. (Grayson, Donald K 1983:27-28). Therefore, the earth and mankind were only 6000 years old. The antiquity of the earth and man remained coupled until the last part of the eighteenth century. At this point, "the first few days of Genesis had become allegory and earth history had been greatly lengthened" (Grayson 1983:40). The earth had to be modern before the appearance of man. As the last of God's creations, man was still considered recent, no more than 6000 years old. Tools and human bones arose from modern strata and did not appear in diluvial deposits. Diluvium provided the evidence for the great Deluge of Noah's time (Grayson 1983:40, 47-48, 52-53, 62-63).

CUVIER: Catastrophism

One of the most popular early theories was developed by a French anatomist, Georges Cuvier [1769 - 1832]. Cuvier was a strong proponent of the theory of catastrophism which argued that extinction was the direct result of catastrophes of immense proportions. For Cuvier, there was only extinction and not "evolution" or "gradual transformation of species into other species" (Trinkaus and Shipman 1994:18; Grayson 1983:47, 51). A species continued only if the catastrophe was incomplete and left a few survivors to carry on the form. Cuvier's rejection of evolution was founded upon the absence of transitional forms in the fossil record (Grayson 1983:46-51). His theory was compatible with religious perspectives which made it palatable in scientific, political, and religious domains and perpetuated its survival until the late 1830's.

LAMARCK: Inheritance of Acquired Traits

Jean-Baptiste-Pierre-Antoine de Monet, Chevalier de Lamarck [1759-1832] was an anathema to Cuvier. Lamarck, one of the first researchers to espouse any form of evolution, formulated the theory of species transformation through the inheritance of acquired traits. He was a transformationist rather than an evolutionist in the sense that he believed all life forms were ultimately related by more or less remote ancestry. "Lamarck viewed life as organized into continuous categories and viewed species as fully mutable" (Grayson 1983:51). He recognized the fit between somatic and behavioral traits and their habitat context. The hallmark example of Lamarck's theory depicted the transformation of a short-necked type of giraffe into a long-necked type through the process of progressively reaching higher into the trees to obtain food. Traits acquired by one specimen were transmitted to its offspring. Lamarck's transformationist theory received little support, particularly as he lacked the academic and political clout to promote its adoption by the scientific community of France. Of course, Cuvier was the recognized intellectual authority of this brotherhood. Lamarck also made a vague reference to "an apelike ancestry for humans" (Trinkaus and Shipman 1994:20).

VIRCHOW: Polygenist

The pre-eminent anatomist in Germany at the time of the Neandertal type-specimen's discovery was Rudolf Virchow [1821 - 1902]. Virchow adamantly opposed evolutionary concepts. He considered them effluence from the non-scientific and faddish study of *Naturphilosophie* which "combined a sort of romantic mysticism - a nostalgia for

a medieval study of chivalry and feudalism - with a philosophical style of natural history built upon the notion of the oneness of God and Nature” (Trinkaus and Shipman 1994:56). As a ‘polygenist’, Virchow believed extant forms arose from others like themselves and, therefore, each ‘race’ derived from a different provenance: “Celts came from Celts; Germans came from Germans; and so on” (Trinkaus and Shipman 1994:37).

UNIFORMITARIANISM AND EVOLUTION

Charles Lyell [1797 - 1875], a British geologist, dislodged the last vestiges of support for catastrophism and paved the way for the evolutionary theories of Charles Darwin and Alfred Russell Wallace. Lyell acknowledged and demonstrated the cogency of James Hutton’s observations of the late 1700’s which specified that “modern geological processes of wind, rain, river erosion, periodic local flooding, glacial movements, volcanic eruptions, and the like were the only processes which had ever worked to shape the earth” (Trinkaus and Shipman 1994:28). These processes worked uniformly and in concert over an enormous span of time remodeling the contours of the Earth’s landscape (Grayson 1983:38-39). Calamitous events were superfluous and not solely responsible for the alteration of geological profiles. Lyell’s results, known as the principle of uniformitarianism, were published in his book, *Principles of Geology*, between 1830 and 1833.

Charles Darwin (1809 - 1882) envisioned the same types of principles appertaining to evolution with “ordinary events happening over long periods of time, thus causing slow, incremental, almost imperceptible changes to living species” (Trinkaus and

Shipman 1994:31). Darwin's speculations about the processes of change appeared in his diary, written during his sojourn on the H. M. S. Beagle from 1831 to 1836, and in an unpublished paper written in 1842. Information derived from Thomas Malthus' [1766 - 1834] essay on population provided Darwin with clues to the mechanism involved in species variation and change (Weiss, Mark L. and Alan E. Mann 1990:22). Natural selection, autonomously named by both Darwin and Wallace, provided the mode of species modification. Alfred Russel Wallace [1823 - 1913] extended the concept to include "survival of the fittest" (Postlethwait, John H. and Janet L. Hopson 1989:16).

Accreditation for the almost simultaneous advancement of the theory of species modification and descent through the process of natural selection by two independent researchers, Darwin and Wallace, was surreptitiously managed by Lyell and Joseph Hooker, a British botanist. Darwin was accorded priority in the development of the theory while Wallace was minimally recognized for his contributions to this theory. Papers furnished by both men were presented at the same meeting of the Linnaean Society in London on July 1, 1858 (Trinkaus and Shipman 1994:73). Darwin's paper, "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural means of Selection", was presented first. Wallace's paper, "On the Tendency of Varieties to Depart Indefinitely from the Original Type" followed Darwin's (Trinkaus and Shipman 1994:72-73). Darwin and Wallace bore no animosity towards each other and developed a friendship which lasted until Darwin's death. Through the auspices of Darwin, Wallace received a government pension and Wallace acted as one of the pallbearers at Darwin's funeral (Postlethwait and Hopson 1989:16).

NEANDERTAL FOSSILS: Early Discoveries

The reception of the Feldhofer fossil hominid disappointed the two individuals responsible for its preservation and description: Johann Karl Fuhlrott [1804-1877], a local schoolteacher who rescued the fossil remains and Hermann Schaaffhausen [1816 - 1893], an anatomist from Bonn (Trinkaus and Shipman 1994:49-53; Grayson 1983:212). Schaaffhausen recognized the antiquity of the specimen; noted the comparative robusticity of the bones; discussed the unusual, capacious cranial configuration complete with low forehead, brow ridges, and chignon; remarked on the rugosity of the muscle attachments and the larger articular surfaces of the joints; and described the pathology of the ulna which bore signs of an improperly healed fracture. Eminent German scholars disregarded Schaaffhausen's evidence and created interpretations of their own. In this case, Virchow's anti-evolutionary stance and his status in the German scientific hierarchy prejudiced the reaction to the Neandertal fossil. The antiquity of the specimen was questioned and the interpretation of pathological traits was appropriated to mean physically deformed.

Given a rickety child with a bad habit of frowning (say from internal flatulent disturbances to which such children are especially liable), and the result will be a Neandertal man! [In Mayer's view] the Neandertal man was nothing but a rickety, bow-legged, frowning Cossack, who having carefully divested himself of his arms, accoutrements, and clothes (no traces of which were found), crept into a cave to die..... (Huxley, Thomas Henry 1864:436, summarizing, translating, and quoting Mayer, A. F. (1864); cited in Trinkaus and Shipman 1994:38).

The Feldhofer Neandertal was the first specimen identified, not the first one discovered. In 1830, in the Grottes des Awirs near Engis, Belgium, Phillippe Charles Schmerling discovered the skeleton of a Neandertal child of 5 to 6 years (Toussaint, Michel 1996:50). The child was originally described as a human with primitive cranial features and was recovered from “the deepest deposits of the site” in direct association with extinct fauna (Grayson 1983:110). Schmerling recognized the significance of this find and published his conclusions between 1833 and 1834. The context of the discovery contested the recency of man and indicated a human antiquity of more than 6000 years. Few credited Schmerling’s discovery including Charles Lyell (Trinkaus and Shipman 1994:xviii, 38-39). A century passed before this specimen was recognized as a Neandertal.

Forbes Quarry, in Gibraltar, also yielded a Neandertal cranium in 1848. The Gibraltar cranium collected dust in a small museum until 1864, when it was resurrected and named *Homo calpicus* by George Busk and Hugh Falconer (Trinkaus and Shipman 1994:xiv, xv, 45, 89-90).

Discoveries of Neandertal fossils continued to accumulate. Neandertal specimens were recovered from Sipka, Moravia, in 1880 and the famous Spy fossils of Betche-aux-Roche, Spy d’Arneau, Belgium were retrieved in 1886 (Rosendahl, Wilfried 1996:41; Toussaint 1996:53-54; Trinkaus and Shipman 1994:126-128). The Spy remains securely established the antiquity of the Neandertal forms. Maxim Lohest and Marcel de Puydt unearthed the remains of the two Spy Neandertals in contexts and positions reminiscent of intentional burials, although these researchers never “explicitly stated” this

case (Trinkaus and Shipman 1994:128). Lohest, de Puydt, and Julien Fraipont misconstrued the tibial retroversion of the Spy specimens and imbued Neandertals with a stoop-shouldered posture and bent-kneed, shuffling gait. This misconception remained for seventy years, despite considerable evidence to the contrary (Trinkaus and Shipman 1994:131).

KRAPINA: Cannibalism

The first of the Krapina [Croatia] specimens were unearthed in 1899 by Karl Gorjanovic-Kramberger and Stjepan Osterman. Gorjanovic-Kramberger was conscious of the importance of these discoveries and utilized every possible means to maintain stratigraphic control during the excavation³ (Trinkhaus and Shipman 1994:163). One major error in the excavation procedure was the use of dynamite to remove the overburden. The detonation may have contributed to some of the fragmentation of the remains. Over one thousand hominid fossil fragments were recovered from this site representing between twenty-four and thirty-six individuals. The demographic distribution of the specimens exemplified a “biological population of fossil humans” and represented the first fossil population to be discovered (Trinkaus and Shipman 1994:167, 172).

Some of the Krapina specimens exhibited morphological traits attributed to modern humans. Gorjanovic-Kramberger employed this information and insisted the

³ C. Loring Brace (1964:7) argued that “Krapina was not dug stratigraphically and the exact faunal associations of the human skeletal material” were “still unknown”.

site of Krapina provided evidence for the *in situ* evolution of Neandertals, or *Homo primigenius*, into modern human forms which he called *Homo aurignacensis* (Trinkaus and Shipman 1994:172).

Gorjanovic-Kramberger suspected the Krapina Neandertals practiced some form of cannibalism. He “saw that the Krapina fossils, though they represented many different skeletons, were consistently broken up, disarticulated, and scattered through the deposits.....every one of the large bones that would have contained edible marrow was splintered” (Trinkaus and Shipman 1994:169). These clues, in conjunction with indications of burning on some of the bony remains and the high incidence of non-adult specimens offered additional support for Gorjanovic-Kramberger’s suspicions.

BOULE: Not our ancestors!

Marcellin Boule [1861-1942], the French anatomist who analyzed the remains of the “Old Man” from the burial of La Chapelle-aux-Saintes [discovered on August 3, 1908], fostered the delusion of the Neandertal shuffling gait and added to the idea of ape-like ambulation by endowing Neandertals with a divergent hallux or great toe. Boule became the authoritative voice of French paleoanthropology and nurtured the image of Neandertals as apish, brutish, stooped-shouldered, shuffling creatures who represented an extinct and very distant side branch of human evolution. They were not the ancestors of modern humans. He disregarded any evidence contrary to his interpretations and any information which postulated modern human affinities for Neandertals. For example, the studies of Léonce-Pierre Manouvrier [1850-1927]

demonstrated the relationship between tibial retroversion and physical activities (Trinkaus and Shipman 1994:180-192]. Manouvrier's research clearly refuted Boule's and the Spy researchers' interpretations which associated retroversion with a bent-kneed gait and in-toed feet.

Boule continued to promulgate his theories about Neandertals via his 'Pre-sapiens' Hypothesis. This hypothesis claimed that modern humans arose from a pre-sapiens branch which was distinct from the branch giving rise to Neandertals or even pre-Neandertal forms. Oddly, as a perceived pre-sapiens fossil, the forged Piltdown specimen⁴ was central to this theory (Trinkaus and Shipman 1994:235). Boule's successor, Henri Vallois, conveniently replaced Piltdown with the Fontéchevade fossils as pre-sapiens representatives when the Piltdown hoax was finally and officially revealed in 1953 by Joseph Weiner, Wilfred Le Gros Clark, and Kenneth Page Oakley (Trinkaus and Shipman 1994:294-295, 308).

TAXONOMY: Too many names

Boule contended that hominid evolution conformed to a bushing or branching pattern rather than the unilineal pattern favored by Gabriel de Mortillet, a French contemporary of Boule's. Boule's theory supported William King's 1863 classification of Neandertals as *Homo neanderthalensis* (Trinkaus and Shipman 1994:87) now spelled *Homo neandertalensis* (Heim, Jean-Luis 1987:310). The other common

⁴ Piltdown, named *Eoanthropus dawsoni*, was discovered between 1908 and 1911 in Sussex, England by Charles Dawson (Trinkaus and Shipman 1994:199-207).

taxonomic name for Neandertals, *Homo sapiens neandertalensis*, was proposed by Otto Kleinschmidt in 1938. Over the years, Neandertals received a variety of taxonomic classifications including thirty-four different species names and six genus names (Heim1987:310).

THE NEAR EAST: 'Races'

Excavations in the Near East began in the 1930's with Dorothy Garrod's investigations of the Mount Carmel region of Palestine, now Israel. Mugharet el-Wad, Mugharet et-Tabun, and Mugharet es-Skhul yielded hominid remains. Garrod conferred the analysis of these hominids and the excavation of Skhul to Theodore McCown and Sir Arthur Keith⁵. McCown, an American anthropologist, noted the contrasts between the morphological characteristics of the remains of the Tabun female and some of the Skhul remains. At the time, the hominid bearing deposits of Skhul and Tabun were considered contemporaneous. McCown's potentially controversial interpretation of the presence of more than one 'race' of humans in the Mount Carmel region was defused by Keith who pronounced all the specimens Neandertals (Trinkaus and Shipman 1994:247-249). Keith specified that the Near Eastern Neandertals were morphologically more modern than the European Neandertals.

In 1946, the contrasts between the Western European Neandertals and the Near Eastern and some of the Eastern European Neandertals [eg. Krapina] were described

⁵ Keith's name was also linked with the famous Piltdown forgery. Like Boule, Keith considered Piltdown a pre-sapiens specimen (Trinkaus and Shipman 1994:205, 210, 235).

as regional variations by Earnest Hooton. Hooton believed ‘racial’ diversity contributed to these differences and coined the term “classical Neandertal” to correspond to the more hyperrobust forms of Neandertals such as La Chapelle-aux-Saintes (Trinkaus and Shipman 1994:271). F. Clark Howell (1957:332-334) also highlighted the differences between Neandertal populations. He subdivided these archaic hominid populations into ‘early’ and ‘classic’ Neandertals. [See Chapter 3].

ARCHAIC TOOLS AND BORDES’ TOOL TYPOLOGY

The gradual acceptance of primitive tool forms was linked to the acceptance of human antiquity and evolution. Ancient tools associated with extinct fauna were known from at least 1797 when John Frere [1740 - 1807], “a gentleman farmer”, found knapped stone tools in a gravel pit near Hoxne, England (Trinkaus and Shipman 1994:33; Grayson 1983:55). The stone artifacts and Frere’s drawings of these tool forms [hand axes and bifaces] received attention; but, no recognition of their likely antiquity.

In 1847, Jacques Boucher de Crèvecœur de Perthes published a text, *Antiquités et Antidiluviennes*, replete with drawings of artifacts he identified as stone tools. Although some of these sketches represented tools which have now become well known as archaic tool forms, such as Acheulian hand axes, many of the representations were eoliths.⁶ The Académie des Sciences in Paris attempted to prevent the book’s

⁶ Eoliths are potential tool forms. They may show minimal evidence of modification by humans or other hominids. Usually they are “indistinguishable from natural objects” (Trinkhaus and Shipman 1994:43). Another term, sometimes incorrectly used synonymously with eoliths is geofacts which are naturally modified stone objects which resemble hominid modified stone tools.

publication and distribution. They finally permitted its circulation in 1849. The basis of the Academy's reluctance to publish or distribute Boucher de Perthes' book was probably two-fold. First, Boucher de Perthes was notorious for his "lack of scientific judgement" and his reputation as "a crank on the subject of prehistoric man" (Trinkaus and Shipman 1994:43; also Grayson 1983:117-132). Secondly, the antiquity and genesis of man was still the Biblical version. The publication pre-dated the discovery of the Feldhofer Neandertal as well as Darwin's and Wallace's theories of evolution.

Understanding the tool forms and what they might represent in terms of the populations manufacturing and using them was problematic. Some tool industries appeared more primitive than others. The first attempts to understand the bewildering array of tools, tool complexity, and variability resulted in the division of the Palaeolithic. The term Palaeolithic, meaning 'Old Stone Age', was proffered by John Lubbock in 1854 to specify the period in human antiquity when tools were manufactured out of "chipped stone" (Trinkaus and Shipman 1994:346). The Palaeolithic was subdivided into three consecutive periods, each marked by increasing sophistication in the production of stone tools. The Lower Paleolithic was the oldest period which witnessed the inception of stone tool manufacture and use. The tools were relatively crude by comparison to later periods. The Lower Palaeolithic knapping procedure involved the removal of flakes from a core stone by striking it with a second stone or hammerstone. The Middle Palaeolithic, the second period, introduced greater finesse in the process of stone tool manufacture. Core preparation was more refined and 'soft', non-stone, hammers were sometimes used. These soft hammers were wood, bone, or antler. During the early phases of lithic

research, the tools of the Middle Palaeolithic were believed to be hand held, not hafted. In the Upper Palaeolithic, or final Stone Age, tools were created using precision techniques not developed in the previous periods. “Blades were struck or ‘punched’ off cores using pressure rather than an abrupt blow” (Trinkaus and Shipman 1994:347). During the Upper Palaeolithic bone and antler were frequently used to create tools that had previously been fabricated from lithic materials.

Early researchers tended to identify stone tool assemblages by noting variations. Local variations of the stone tools were classified into assemblages which often received names related to their recovery sites. The Mousterian was named for the site of Le Moustier in France (Trinkaus and Shipman 1994:347).

Attempts to seriate the assemblages to show the progressive evolution of tool forms were frequently unsuccessful. The use of a palaeontological approach based on *fossil directors* was unproductive, confusing, and frequently ambiguous. Finally, in the 1950’s, a French researcher named François Bordes undertook the systematic study of the various tool forms in order to develop a classification system which would be useful in “standardizing” the study of the stone tool industries (Trinkaus and Shipman 1994:347). Bordes formulated a list of sixty-three tool forms. Using the frequency of each tool type in each stratigraphic layer, Bordes established the parameters of the tool assemblage for that layer. He employed these assemblage parameters to identify “typological subdivisions” or facies which he suggested represented different ethnic groups (Trinkaus and Shipman 1994:349; Bordes, François 1961:134). In the south of France, these facies, subdivisions, or industrial variants were the Mousterian of Acheulian

Tradition [Type A and Type B], the Typical Mousterian, the Denticulate Mousterian, and the Charentian Mousterian [the Quina and the Ferrassie facies].

MIDDLE PALAEOLITHIC VARIABILITY

As a typological system, Bordes typology has been very successful for the identification of the various types of tool forms. His explanation of various industrial facies representing different ethnic groups has been less informative. Today, several theories have arisen to contradict or complement Bordes' original interpretation. In particular, researchers have endeavored to explain the extensive variability of the Middle Palaeolithic industries. This variability has symbolized:

.....the most striking feature of the Middle Palaeolithic technology - especially when viewed over long time spans and wide geographical areas..... This is seen in many parameters: in the primary flaking techniques; in the dramatic variations in the relative frequencies of different tool forms; in some conspicuous variations in the forms of retouched tools (eg. side scrapers, hand axes and other bifacial forms) and in the highly localized distribution of certain, idiosyncratic type-fossil forms (cordiform hand axes, backed knives, limaces, bifacial leaf-points, etc.). (Mellars 1996:342).

Lewis Binford recommended functional variability rather than different ethnic groups. The variety of tool forms were directly related to their use in the performance of specific activities: a type of form equals function relationship (Mellars 1996:316).

Harold Dibble and Nicolas Rolland (1990:480) accounted for the variability in tool forms for the Middle Palaeolithic as “caused by toolmaking and tool rejuvenation processes and/or by differential occupation intensity induced by environmental circumstances”. This model suggested that the final form of the tool was not the originally intended form, but the result of successive reshaping and resharpening (Mellars 1996:332; Rolland, Nicolas and Harold L. Dibble 1990:480; Rolland, Nicolas 1981:15). Furthermore, in times of climatic extremes brought on by glacial maximums, occupation intensity was greater due to reduced mobility, and more intensive use of lithic resources was required. Ameliorated climatic conditions where occupation intensity was reduced permitted “more profligate use of lithic materials” (Rolland and Dibble 1990:490). Proximity to lithic sources also factored into the relationship between climate, occupation intensity and mobility, and extensive reduction techniques.

In conjunction with Binford’s functional explanation and with Rolland’s and Dibble’s “tool reduction models”, Paul Mellars (1996:342-355) invoked an interacting combination of “social distance”, “demographic fluctuations”, “technological adaptations”, and “technological convergence” to account for the variability in Middle Palaeolithic industries. Social distance afforded the variable timing of the development of different technological approaches in diverse regions. Demographic fluctuations accommodated the changing population densities in various regions over time and the effect of environmental oscillations on this density. Changes in population size influenced the frequency of representation of a particular population’s industrial variant. Changing environments also stimulated technological adaptation. Convergence reflected

the limited technological choices available for lithic reduction in this time frame. Mellars' interpretation broadened Bordes' original ethnographic explanation for variability.

Mellars (1996:354; 1969:162) also explicated the chronological trends in the distribution of the various Mousterian facies, particularly in the Perigord region of France. Mellars (1996:183-190; 1969:162) determined that the Ferrassie, Quina, and Mousterian of Acheulian Tradition [MTA] attested to a "stratigraphic and chronological distribution" which may be confined within a reasonably short time span. The Ferrassie facies appeared first; the Quina was intermediate in the sequence; and the MTA appeared later. For these three facies, no interstratification was apparent. Type A - MTA appeared before Type B - MTA which demonstrated a chronological development for these variants of the MTA. Strata with Upper Palaeolithic industries often overlay the MTA. Typical Mousterian assemblages generally emerged in the various phases of isotopic stage 5 or early in the "last glacial sequence" and reappeared, in some cases, in the later phase of the Würm II glacial period (Mellars 1996:191). The Denticulate Mousterian had two fairly confined time frame appearances. The first horizon arose in the later Würm I "stratified within the longer sequences of Typical Mousterian Assemblages" (Mellars 1996:192). The second and better known Denticulate Mousterian was superimposed over Quina Mousterian assemblages in some sites such as Combe Grenal.

Other research into the tools of the Middle Palaeolithic focused on the technological approaches to lithic production. Eric Boëda and Jean-Michel Geneste recognized the mental templates inherent in the production of some tool forms,

particularly evidenced in the use of the Levallois technique of tool manufacture (Mellars 1996:57). Geneste employed the concept of *chaîne opératoire* or chain of operations used to produce tool forms. He reconstructed cores to determine the methodology and steps utilized in the creation of tool blanks or tools. These analyses have enabled many researchers to perceive three dimensional conceptualization and planning depth in the lithic production techniques of archaic hominids, particularly Neandertals.

EVOLUTIONARY SCHEMES:

‘MULTIREGIONAL EVOLUTION’

By 1958, three principal evolutionary schemes had been proposed (Trinkaus and Shipman 1994:304-311). Unilineal evolution, originally favored by de Mortillet and Gustav Schwalbe [late nineteenth and early twentieth century researchers from continental Europe] and later championed in the 1920’s through 1940’s by Ales Hrdlicka and Franz Weidenrich (Piveteau, Jean in Silvana Condemi 1992:vii), proposed a Neandertal phase from which modern humans arose. Neandertals were the direct ancestors of modern humans. Weidenrich’s version of this theory, called “polycentric evolution” (Wolpoff, Milford 1989:78) or “multiregionalism” (Trinkaus and Shipman 1994:274), provided the foundation for the ‘Multiregional Evolution’ Hypothesis described in present literature. This theory, fostered by Milford Wolpoff and Alan Thorne, predicted differential timing for the transition from Neandertals or Neandertal-like archaic humans into modern human forms in disparate regions (Trinkaus and Shipman 1994:370-371; Wolpoff 1989:62-108). Gene flow was maintained by contact

with other populations who were also evolving into modern forms. Clines of variation within a polytypic species were sustained by a balance between “gene flow, local selection and genetic drift” (Stringer, C. B. and P. Andrews 1988:1263; Wolpoff 1989:88). Gene flow changed allele frequencies more often than gene flow dispatched new mutations across the clines. Populations at the peripheries of the clines or gradients were more homogenous than those at the center.

The genetic potential for transition was already inherent in the erectus grade populations as they migrated out of Africa. Climatic, behavioral, and environmental stresses triggered change and were responsible for the differential timing of evolutionary transition. Gradualistic evolution marked the progression from the archaic hominids to anatomically modern humans.

‘PRE-NEANDERTAL’ HYPOTHESIS

The second theory established prior to 1958 was the ‘Pre-Neandertal’ Hypothesis. Grafton Elliot Smith developed this evolutionary scheme in 1924. The major difference between Smith’s theory and the ‘Pre-sapiens’ theory, mentioned earlier, was reflected in the timing of the divergence of the modern human forms: the archaic human lineage diverged “at several different branching points from the the ancestral lineage” before the Neandertal forms in Europe diverged (Trinkaus and Shipman 1994:235). The truly modern forms developed from the archaic human lineage. This theory also rejected Neandertals as contributors to the modern human gene pool.

Sergio Sergi expanded and clarified the ‘Pre-Neandertal’ theory from 1934 to 1953: Sergi suggested European Pre-Neandertals were a “more generalized form of hominid” (Trinkaus and Shipman 1994:306). The bifurcation of this Pre-Neandertal lineage created a human branch from which archaic humans evolved into modern forms and a “dead-end” branch represented by the Neandertals. Sergi emphasized the similarities between the Saccopastore fossils from Rome and the fossils from Fontéchevade [France], Steinheim and Ehringsdorf [Germany], and Swanscombe [Great Britain].

To Sergi’s eyes, these few fossils attested to the presence in Europe of a less specialized type of human living before the Neandertals developed their extreme morphology. He created a large cluster of fossils with Swanscombe and Steinheim at the base, leading to Krapina, Ehringsdorf, and Saccopastore on the one hand and then to Neandertals - and their approximate contemporary, Fontéchevade, on the other - leading to modern humans. Sergi believed that the pre-Neandertal cluster looked more like modern humans than the Neandertals did. (Trinkaus and Shipman 1994:306).

‘PRE-SAPIENS’ THEORIES

The third theory ensconced by 1958 was Marcellin Boule’s ‘Pre-sapiens’ Hypothesis which excluded Neandertals from the evolutionary trajectory of modern humans. This theory was previously discussed. Vallois perpetuated this hypothesis after Boule’s death. The ‘Presapiens’ theory was revised in 1987 by Jean-Luis Heim. Heim extracted the most feasible aspects of both the ‘Pre-sapiens’ and the ‘Pre-Neandertal’ Hypotheses and generated a new ‘Pre-sapiens’ Hypothesis of evolution which included

Neandertals. Although Heim's adaptation of this hypothesis received little notice among academics, the intrinsic value of this theory was noteworthy. Heim focused on the differences and the similarities between modern humans and Neandertals. He correlated these differences/similarities with specimens which predated both forms, specifically the erectus-grade populations. Through this comparison Heim constructed his evolutionary scheme. *Homo erectus erectus* migrated out of Africa and spread into other regions of the world. This sub-species of hominid was never present in Europe. By the time the erectus grade populations reached Europe, they had evolved into *Homo erectus pre-sapiens*, a progressive erectus. The Mauer mandible was a fossil representative of this progressive erectus. Traits characteristic of *Homo erectus pre-sapiens* were evident in Africa [Omo-Kibish, Broken Hill, Florisbad, and Eyassi], Asia [Dali, Sambungmachan] and possibly Australia [Willandra Lakes] (Heim 1987:319). *Homo erectus pre-sapiens* began to diverge along two lines: the pre-Neandertal types designated by fossils such as the Petralona cranium and the pre-sapiens types epitomized by the Fontéchevade fossils. The divergence continued. The pre-Neandertal forms gave rise to *Homo pre-sapiens neandertalensis*, at least in Western Eurasia, who were recognized by their retention of archaic features and the pneumatization of their faces. Forms with similar archaic features are found in other parts of the world and are often described as late representatives of *Homo erectus*. *Homo pre-sapiens sapiens*, noted by the reduction of their faces and supra-orbital tori, and post-cranial gracilization, derived from the pre-sapiens forms. These forms were seen in Eurasia, and Africa: China [Mapa], the Near East [Skhul and Qafzeh], and North Africa [Jebel Irhoud] (Heim 1987:319). *Homo pre-*

sapiens neandertalensis became extinct while *Homo pre-sapiens sapiens* evolved into *Homo sapiens fossilis* who, in turn, evolved into *Homo sapiens sapiens* (Heim 1987:305-323).

‘OUT OF AFRICA II AND RAPID REPLACEMENT’

The two major paradigms prevalent today were developed from previous theories of evolution and amplified in the 1980’s. The ‘Multiregional Evolution’ Hypothesis was discussed earlier in this section. The other major theory, the ‘Out of Africa II and Rapid Replacement’ Model of human evolution, has obtained considerable support particularly from the field of genetic research.

Variouly named the ‘Mitochondrial Eve’ Hypothesis or ‘Eve’ Hypothesis, the ‘Garden of Eden’ Hypothesis, the ‘Noah’s Ark’ Hypothesis, and the ‘Out of Africa II and Rapid Replacement’ Model of human evolution, the theory was actually a punctuated equilibrium model founded on principles of genetics, biology, and to some extent ecology. Wolpoff (1989:62) acknowledged that W. W. Howells, in 1976, authored the original ‘Noah’s Ark’ version of the theory; but, Wolpoff noted that Howells presented this version as only one of the many possible models of evolution. Essentially the ‘Rapid Replacement’ version of this theory argued that the ancestors of *Homo sapiens sapiens* arose in Africa and only in Africa around 200,000 years ago⁷. These populations

⁷ Alan Templeton, a geneticist, contested the timing of the mt-DNA clock devised by the original researchers. His research indicated the divergence period was sometime between 191,000 years ago and 772,000 years ago. This timing could incorporate the original Out of Africa movement of erectus populations (Trinkaus and Shipman 1994:396).

migrated out of Africa and spread throughout Eurasia, including Southeast Asia, ‘rapidly replacing’ all other *Homo* species.

New approaches to the study of human genetics contributed to the evidence supporting the ‘Replacement’ Model, particularly the study of mitochondrial DNA⁸. Mt-DNA furnished the ideal genetic material for evolutionary study because of the relatively stable mutation rate of mt-DNA, the inheritance of mt-DNA only through the female line⁹, and the principle that mutations in mt-DNA were considered neutral changes which independently remained neutral. Mutation is the only means by which mt-DNA is altered. The slow rate of change and the general lack of tremendous variability among modern human mt-DNA supports the contention of neutral mutation. Neutral mutations accumulated over time to become suddenly expressed in a punctuation event or speciation (Wolpoff 1989:62).

The replacement axiom stipulated that no interbreeding occurred which altered the migrational view to “invasion without admixture” (Wolpoff 1989:63). The biological restriction of two species occupying the same niche at the same time and the apparent distinctiveness of anatomically modern and archaic morphologies sustained the proscription against cross-fertilization (Wolpoff 1989:85). In other words, the two forms

⁸ The original mt-DNA studies and their relevance to human evolution were published by R. L. Cann, W. A. Brown, and A. C. Wilson in 1982 and 1984. In 1987, Cann, Wilson, and Mark Stoneking published the article which became the backbone of ‘Out of Africa II and Rapid Replacement’ theory (Trinkaus and Shipman 1994:386).

⁹ Ulf Gyllensten (1991, interviewed by Phillip Ross 1991:32) discovered that inheritance through the female line may not be absolute. Mt-DNA can leak into the cellular fluid. In the case of males, the leakage may adhere to the sperm cells’ surfaces prior to ejaculation and the ‘contaminants’ carried by the sperm may be introduced into the ova at fertilization. Although a rare occurrence, one event of this nature is capable of causing dramatic alterations in mt-DNA inheritance by significantly modifying the mutation rate. Before he died, Alan Wilson, one of the original mt-DNA researchers, claimed that Gyllenstens findings meant ‘Eve’ [the female ancestor to us all] would have lived around 75,000 years ago.

were either biologically or behaviorally non-fecund based on physiological or phenotypic differences which limited mating choice.

Further support for this theory was derived from the investigations of Christopher Stringer. Stringer (1989, 1992) applied statistical tests [nearest neighbour relationships, numerical cladistic analysis, and Penrose Shape Distance] to the morphometric measurements of crania and cranio-facial indices to determine degrees of relatedness and their relevance to evolution. Results of the analyses of face shape and face-vault relations concluded that replacement without interbreeding may not be complete. Some minimal evidence for gene flow was indicated. However, this evidence was not sufficient to be “equated with a significant ancestor-descendant relationship between the Neandertals and early modern humans, since all the important novel morphological features of the early modern humans were apparently derived from non-Neandertal sources” (Stringer 1989:241).

BRÄUER: HYBRIDIZATION

Another ‘Out of Africa II’ scenario was constructed by Günter Bräuer in 1976. In this scheme, modern humans evolved in Africa and migrated throughout Eurasia where they encountered Neandertal populations. This evolutionary model predicted a “complex hybridization and replacement process during the dispersal of modern humans of African origins” (Bräuer, Gunther 1992:402). A fossil representative of this hybridized group was Hahnöfersand, discovered in 1973 near Hamburg, Germany (Bräuer 1981:467). Stringer (1989:241) indicated some support for this approach in his statistical analyses of cranio-facial measurements.

OTTE: CONVERGENCE

Marcel Otte (1994) offered another approach to the study of human evolution. Otte (1994:270) argued the origin of modern humans began as *Homo erectus* migrated out of Africa around a million years ago. Evolution from that point on occurred on a local basis stimulated by cultural adaptation, technological innovation, and the intra-species development of analogous 'racial' or ethnic variations. The process of humanization was a convergence within the *sapiens* species.

The genus *Homo* spread throughout Eurasia across a vast geographical expanse and into extremely diverse environmental zones. Cultural behavior was part of the selective and adaptive processes involved in human development. Therefore, the human genetic constitution derived from *Homo erectus*. In other words, all of the archaic forms of humans which developed after the exodus out of Africa by *Homo erectus* were analogous, but not identical, forms. "Culture partially substituted the process of natural selection" (Otte 1994:271). For Otte (1994:271-272), this was not a process of Lamarckian evolution, but was "a secondary phenomenon" of intraspecies evolution and was "marked by reversible and limited anatomical variation". Otte's theory represented a modified form of the 'Multiregional' Hypothesis.

'SPLITTERS'

"The history of the hominid family has been one of repeated evolutionary trial and error: of new hominid species spawned, competing, and becoming extinct" (Tattersal, Ian 1999:25). Evolution is characterized as a large bush with several branches or twigs. *Homo sapiens sapiens* represents only a "twig" on the bush (Tattersal 1999:25).

An “up to date geneology of modern humans and their evolutionary predecessors” listed 3 different genera and 15 to 16 separate species associated with hominid evolution (Lemonick, Michael D. and Andrea Dorfman 1999:34-35). The concept that several different species and/or genera of hominids existed at the same time is the most important feature of the ‘splitters’ evolutionary perspective. The most significant characteristic which separated modern humans from Neandertals was the “development of symbolic thought” (Lemonick and Dorfman 1999:38).

Different researchers express slight differences in their interpretation of the fossil record and the evolutionary trajectory which eventually led to modern humans. Bernard Wood’s Human Family Tree shows modern humans arising from the *Homo ergaster* populations of Africa, in particular the Lake Turkana region of Kenya where they were discovered. *Homo ergaster* specimens, which pre-date *Homo erectus* in Asia, are perceived to be ancestral to *Homo erectus*. *Homo erectus* is viewed as a strictly Asian hominid. This Asian species may have given rise to other hominid populations; but, not necessarily any modern human forms (Hublin, Jean-Jacques 1999:29, 31, 35). Another geneology suggests that the status of *H. ergaster*’s taxonomic designation is debated and *H. erectus* was the first hominid to use fire and migrate out of Africa (Lemonick and Dorfman 1999:35). This version also recognizes the recent discovery of *Homo antecessor* in Spain [around 800,000 years old] which is believed to be the last common ancestor of modern humans and Neandertals.

SUMMARY

The overview highlights only a few of the theories and the theoreticians who have attempted to study human evolution. This abbreviated resume clearly underlines the lack of resolution to many evolutionary questions. The Neandertal's position in the evolutionary tree of modern humans is still debated. Even the taxonomic classification of this form is still at issue. Are these archaic forms *Homo sapiens neandertalensis* or *Homo neandertalensis*?

Paradigms are also problematic and can be viewed as both positive and negative influences on the field of research.

On the negative side, paradigms become entrenched; laws unto themselves. The implacability of paradigms has the effect of modifying, moderating and manipulating research and the acceptance of alternative explanations. The historical overview certainly indicates how stifling entrenched theories can become. Unfortunately, assessments of Neandertal capabilities are still influenced by some of these early perceptions.

On the positive side, paradigms generate considerable research either to refute or to support a paradigm's basic tenets. Furthermore, as theories, paradigms contribute to the gradual accumulation of knowledge as certain aspects of many theories are relevant.

Theories must constantly be subjected to rigorous testing. In the case of paleoanthropology, the data recovered from archaeological research should provide critical evidence for testing theories rather than the reverse. In addition, evaluations of

behavioral capacities founded on any one of these evolutionary theories are inappropriate at present. The extremely polarized nature of the corresponding theoretical perspectives simply confounds the issues, eradicates important data, and limits objective discussions.

New data on the Near Eastern hominids accentuates the need for caution and continual testing of theories. Baruch Arensburg and Anna Belfer-Cohen (1998) present evidence contesting the presence of Neandertals in the Levant. While postulating close affinities with African early anatomically modern humans due to continuous gene flow between the two regions; their study suggests the Near Eastern Middle Palaeolithic hominids represent a morphologically variable population of early modern human forms.

We believe that regional evolution of Upper Pleistocene *Homo sapiens* manifesting generalized as well as derived traits, characterizes the Near Eastern Middle Paleolithic hominids..... It is our opinion that the emergence of Neandertal features in the course of human evolution may well reflect a genetically inherent human variability. This variability is clearly expressed in the wide range of morphological diversity observed among early AMHS¹⁰ specimens from the Near East. (Arensburg and Belfer-Cohen 1998:319-320).

The verification and acceptance of these findings could invalidate some of the long established research results for this area. This information must also be correlated to or reconciled with the 1997 mt-DNA study which suggested that Neandertals [in particular, the Feldhofer Neandertal] were not contributors to the modern human gene pool (Lindahl, Thomas 1997:1-3; Ward, Ryk and Chris Stringer 1997:225-226).

¹⁰ AMHS means anatomically modern *Homo sapiens*.

Chapter 3: NEANDERTALS

The critical question at this juncture is who or what were the Neandertals? As the evolutionary status of these enigmatic hominids is far from elucidated, the answer to this question becomes more complicated.

EARLY DEFINITIONS AND DESCRIPTIONS

Original descriptions of Neandertals and their skeletal morphology relegated Neandertals to the category of pathological [deformed] modern humans rather than archaic hominids. Early antiquarians described the Feldhofer Neandertal as a “Cossack”; a “Celt”; an “old Dutchman”; a “hydrocephalic”; a “modern, freakish, and sick individual”; an “idiot who had suffered from rickets and other bone diseases and had a violent disposition” (Pfeiffer, John E. 1985:145); and “one of those wild men, half-crazed, half-idiotic, who are always more or less to be found living on the outskirts of barbarous tribes, and who now and then appear in civilized communities to be consigned perhaps to the penitentiary or gallows, when their murderous propensities manifest themselves” (anonymous English scholar cited in Pfeiffer 1985:145).

The image of Neandertals as bent-kneed, stoop-shouldered, brutish creatures with a shuffling gait and divergent hallux was gradually ensconced in the literature by Marcellin Boule beginning in 1908 with preliminary reports on the La Chapelle-aux-Saints specimen. (Trinkaus and Shipman 1994:192)..

Neandertal man is commonly pictured as but incompletely erect; as an almost hunchbacked creature with head thrust forward, knees habitually bent, and flat, inverted feet, moving along with a shuffling, uncertain gait. According to this view, he was a thoroughly unattractive fellow who was but imperfectly adapted to upright, bipedal posture and locomotion characteristic of the modern type of man. The notion of Neanderthal man - and we herein use the term "Neanderthal" in its more restricted and proper sense, i.e., as referring to so-called classic Neanderthal man of the Würm or fourth glacial period - undoubtedly goes back to the discovery of the holotype specimen near Düsseldorf, Germany.....in 1856. It received impetus from the subsequent discovery of the Spy skeleton [1886] and was finally crystallized by Marcellin Boule's [1911-13] detailed analysis and reconstruction of the man of La Chapelle-aux-Saints found in 1908. (Straus, William L. Jr. and A. J. E. Cave 1957:348).

Boule's analysis of La Chapelle-aux-Saints and his resultant interpretation of Neandertals in general influenced many of the researchers of the period and incited further exaggerations of Neandertal characteristics. Several of these exaggerations were interpretive assessments and were not founded on factual evidence.

His short, thick-set, and coarsely built body was carried in a half-stooping slouch upon short, powerful, and half-flexed legs of peculiarly ungraceful form. His thick neck sloped forward from the broad shoulders to support the massive flattened head, which protruded forward, so as to form an unbroken curve of the neck and back, in place of the alternation of curves which is one of the graces of the truly erect *Homo sapiens*. The heavy overhanging eyebrow-ridges and retreating forehead, the great coarse face with its large eye-sockets, broad nose, and receding chin, combined to complete the picture of unattractiveness, which it is more probable than not was still further emphasized by a shaggy covering of hair over most of the body. The arms were relatively short, and the exceptionally large hands lacked the delicacy and nicely balanced co-operation of thumbs and fingers which is regarded as one of the most distinctive of

human characteristics. (Smith, G. Elliot 1924; cited in Straus and Cave 1957:349 - 350).

Evidence for Neandertals being excessively hirsute has yet to be produced. In fact, the oldest trace of the surface of fossil hominid skin was discovered at a site near Königsau, Germany and was dated around 55,800 years BP. An imprint of “human papillary lines” was found in “a resin binder attaching a retouched artifact to a wooden handle” (Vlcek, Emanuel 1996:48).

The original misinterpretation of tibial retroversion by Lohest, de Puydt, Fraipont, and later Boule was only the first in a series of such misconceptions. The La Chapelle specimen was described as an old man; however, estimations of age at death based on cranial sutures varied among researchers. Boule determined La Chapelle’s age to be 50 to 55 years; Keith recommended under 40 years; Vallois suggested not more than 40 years; and Straus and Cave estimated 40 to 50 years (Straus and Cave 1957:352). After reconstructing the La Chapelle cranium, Jean-Luis Heim (1989:113) ascertained an age at death of between 50 to 60 years. The use of the remains of potentially elderly individuals, like the use of the remains of juvenile individuals, to establish a generalized morphological description for an entire species or subspecies, such as the classic Neandertals, was inappropriate and yielded inaccurate results. Age related changes cannot be used to exemplify morphological traits of an entire group.

Straus’ and Cave’s (1957:351) re-examination of the La Chapelle specimen in July, 1955, revealed several inconsistencies in Boule’s analysis. The skeletal remains exhibited definitive pathologies, many of which were either age related or

activity induced: “severe osteoarthritis deformans” of the spine, osteoarthritis of the temporo-mandibular joint, osteoarthritis of the hips, periodontal disease, and tibial squatting facets (Straus and Cave 1957:352, 356-357, 359-360). Boule’s reconstruction of the vertebral column indicated an absence of lordosis or curvature of the spine. The lack of curvature resulted in a forward thrust of the head on a straight spine. Boule expressed the sentiment that the length of the spinous processes impeded normal curvature. He failed to account for the presence of intervertebral disks which contribute to lordosis. Although Boule had recognized the osteoarthritic changes on the vertebrae, he appeared to ignore the implications of these changes to the structure and form of the vertebral column (Straus and Cave 1957:354 - 356). The re-examination revealed that Neandertals were fully upright, bipedal hominids with a spinal curvature and head carriage similar to modern humans (Straus and Cave 1957:356). Other misconceptions elucidated by Straus and Cave (1957:356 - 359) included: Neandertal ambulation was similar to modern humans; the tibial retroversion was related to activities such as those “involving frequent bending of the knee”; the tibial torsion was within the range of variability witnessed in modern humans; the tibial torsion was consistent with an outturn of the toes like modern humans rather than an inturn as noted with apes; “vestiges of simian structure” in the pelvis were not recognized, and the feet and the hands were essentially the same as modern humans. However, these researchers emphasized that the total morphological pattern of Neandertals did differ from modern humans (Straus and Cave 1957:358). Straus and Cave, C. Arambourg, and Étienne Patte reached similar

conclusions regarding the La Chapelle specimen almost simultaneously (Straus and Cave 1957:350, 361).

Wilfred Le Gros Clark (1978:16 - 17, originally published in 1955) discussed the concept of total morphological pattern which became central to the identification of Neandertal remains. “It seems desirable to stress this concept of pattern rather strongly because the assessment of the phylogenetic and taxonomic status of fossil hominoid remains must be based not on the comparison of individual characters one by one in isolation, but on a consideration of the *total pattern* they present in combination” (Clark 1978:16). This combination of the total complex of traits within specific anatomical regions, such as the masticatory region of Neandertals, comprised the functional pattern. Individual traits could be discerned in forms which either evolutionarily preceded or succeeded Neandertals; but, the total complex of individual traits was rarely present unless the form was also a Neandertal, possibly an ancestor of Neandertals, or potentially a descendent of Neandertals.

Another early definition of Neandertals was strictly cultural and correlated the Neandertals with “the period of the Mousterian Culture” (Hrdlicka, Ales 1930:328; cited in Brace, C. Loring 1964:17). This definition did not account for any of the morphological differences now recognized between Neandertals and anatomically modern humans. Hrdlicka believed Neandertals represented a phase in the process of lineal evolution towards modern humans. Brace (1964:18) expanded Hrdlicka’s definition to minimally accommodate morphology: “Neanderthal man” was “the man of the Mousterian culture prior to the reduction in form and dimension of the Middle

Pleistocene face". While Neandertals were associated with the Mousterian Techno-Complex, they were also found in conjunction with Early Upper Palaeolithic industries in various regions, such as the Chatelperronian in France. Secondly, early anatomically modern humans were discovered in Levantine Mousterian deposits and in chronologically earlier time frames than many of the Levantine Neandertals. Facial reduction was already underway.

Later definitions focused more precisely on morphological differences between Neandertals and *Homo sapiens sapiens*. A general affiliation with Mousterian industries was maintained; but cultural definitions of Neandertals were less secure than morphological ones.

CURRENT PERSPECTIVES:

Although some consensus on Neandertal morphology is apparent in the literature, debate persists regarding the functional relevance of this supposedly 'specialized'¹¹ Neandertal morphological configuration.

The geographical distribution of Neandertals is another contentious issue, although "there seems to be reasonable agreement that most of the distinctive features of Neanderthal anatomy can be traced across a broad arc of Europe and western Asia,

¹¹ W. E. Le Gros Clark (1978:44-50) used 'specialized' to indicate derived traits or autapomorphs: "making a general distinction between primitive and specialized characters depends on the fact that the latter may be taken to indicate divergent trends of evolution giving rise to more or less aberrant groups, and such aberrant groups, of course, are unlikely to bear an ancestral relationship to later-evolved groups in which similar specializations are absent" (Clark 1978:45-46). He also implied that specialized traits were not "minor deviations" but functionally relevant, or specialized, morphological alterations.

extending from the Atlantic coasts of France and the Iberian peninsula to the western parts of the Middle East and Central Asia - for example at Tabun, Amud and Kebara in Israel, Shanidar in Iraq, and as far eastward as Teshik Tash in Uzbekistan” (Mellars 1996:3). Some specimens from Africa, the Far East, and South East Asia have periodically received a Neandertal, Neandertal-like, or Neandertaloid designation: Broken Hill and Jebel Irhoud [Africa], Mapa [China], and Ngandong [Indonesia] (Santa Luca, A. P. 1978:619). Some Central European specimens have been designated Intermediate Neandertals such as Sala nad Váhom [Slovakia]; Kulna, Sipka, and Ochoz [Moravia] (Vlcek 1996:48-54).

The ‘classic Neandertal’ chronology is generally considered to cover the time range from 110,000 to 35,000 BP (Mellars 1996:3). Two possible exceptions at each end of the spectrum may alter this perception: Biache St. Vaast [northern France] dated at 200,000 to 250,000 BP (Mellars 1996:3) and Zafarraya [southern Spain] dated around 30,000 BP (Shreeve, James 1995:71). Some Neandertal traits are recognized in earlier specimens, but these are provisionally identified as “‘pre’ or ‘proto’ Neanderthal forms, anatomically transitional between the late *Homo erectus*/*Homo heidelbergensis* populations of Europe and the succeeding Neanderthal forms” (Mellars 1996:3-4).

Jean-Jacques Hublin (1996:38, 43; personal communication¹²) indicated Neandertals with their distinct morphology evolved through a process of mosaic evolution over a period of at least 300,000 years from an ancestral, archaic *Homo sapiens* population [similar to Swanscombe, Krapina or Petralona] within Europe. The

¹² Hublin spent three hours with this writer in his office at the Musée de l’Homme in Paris. The subject of the discussion was the 1996 article in *Archaeology* and Neandertal morphology.

progressive evolution of the Neandertal skeletal traits in pre-Neandertal populations appeared as a series of modifications starting with the development of mid-facial projection and receding cheeks. The next transition included the gradual alteration of the occipital bone to form a 'chignon'. The exaggerated appearance of the chignon was the result of the development of the supra-iniac fossa on the occipital bone. The final stage in the process of trait acquisition incorporated the expansion of the cranial vault and temporal bone to attain the rounded Neandertal cranial configuration.

While Hublin (1996:38) proposed a strictly European evolutionary transition for European Neandertals from an isolated archaic *Homo sapiens* population as mentioned above; he also indicated they had "close relatives in the Near and Middle East, from Israel to Uzbekistan" including Tabun C1, Teshik Tash, Kebara 2 and Amud I. F. Clark Howell (1957:333) advocated a similar approach: "neandertalization.....was a continuing and strictly European phenomenon". Howell's conclusion derived from the comparison of forms he identified as "early Neandertals"¹³ and those he recognized as "classic Neandertals"¹⁴. Howell's early Neandertals exhibited traits which were amplified in classic Neandertals [Neandertal derived traits]; however the total

¹³ Howell's early Neandertals included cranial remains from "the two Saccopastore skulls", "the series of broken and mutilated specimens from Krapina", "another fairly complete cranium (No. 3) from Kaempfer's Quarry, Ehringsdorf" (Howell 1957:332). Post-cranial fossil remains representing early Neandertals were: "an incomplete femur of Tabun Eb, juvenial post-cranial fragments from Ehringsdorf", and Teshik-Tash (Howell 1957:332).

¹⁴ Howell's (1957:334) classic Neandertals were recovered from the following sites: "Neandertal" [Germany]; "Bay Bonnet, Engis, La Naulette, Spy" [Belgium]; "St. Brelade" [Channel Islands - Jersey]; "Maularnaud", "La Chaise, La Quina, Petit-Puymoyen", "La Chapelle-aux-Saints", "Genay", "Combe Grenal, La Ferrassie, Le Moustier, Pech de l'Azé", "Montsempron", "Hyena and Wolf Caves, Arcy-sur-Cure" [France]; "Bañolas, Cove Negra", "Gibraltar" at "Forbes Quarry" and "Devil's Tower", "Piñar" [Spain]; "Monte Circeo" - "Fossellone and Guattari", and "Santa Croce di Bisceglie" [Italy].

morphological pattern of early Neandertals was closer to the modern human configuration.

MORPHOLOGY

The major morphological differences between Neandertals and modern humans were visible on the skull: the cranial vault, face, mandible, and teeth. Post-cranial differences were most frequently reflected in the general robusticity of the bones and larger articular surfaces of the joints. Anne Hambücker (1995:37-47) contradicted the interpretation of greater robusticity for Neandertals. Her study revealed the “robusticity of their humerus” was “moderate; that of the radius relatively weak, while the ulna” was “very slender by comparison with modern humans” (Hambücker 1995:37).

CLASSIC NEANDERTAL MORPHOLOGY

In general, the ‘classic’ Neandertals were cold adapted and their general morphological structure echoed this adaptation. They were short in stature, barrel-chested with relatively long trunks, and sturdily built bodies (Hublin 1996:38). Neandertal vertebrae displayed long transverse and spinous processes and low vertebral bodies. Their slender clavicles were long and curved with robust articular ends. Their scapulae exhibited a “prominent dorsal crest on the axillary border and a well-developed dorsal marginal sulcus” (Howell 1957:335). In size, the pelves of Neandertals and modern humans were similar; structurally, differences existed particularly in the longer length of the superior pubic ramus of Neandertals (Rak, Y. and B. Arensburg 1987:227). Neandertal femurs were longer than their tibias (Pfeiffer 1985:144). Therefore, their

crural indices were lower. Ulnar, radial, and femoral curvature was marked (Heim 1987:315). The cortical thickness of the long bones was much greater than in modern humans and Neandertal muscle attachments were extremely pronounced (Hublin 1996:38; Heim 1987:315). Neandertal bones were 10% to 20% heavier than those of modern humans (Pfeiffer 1985:144).

The correspondence of Neandertal and modern human cranial capacities belied the differences in their cranial configurations. When viewed from the back of the head, Neandertal crania exhibited a rounded shape rather than the pentagonal shape associated with modern humans. Neandertal faces were pneumatized. This pneumatization resulted from the development of large sinus cavities in the maxillary bone which reduced and lateralized the cheeks. The large maxillary sinuses also contributed to peri-nasal dilation which minimized or eliminated the canine fossa. Neandertals possessed large sinus cavities in their frontal bones and strong, continuous supra-orbital tori with a pronounced glabellar projection (Heim 1987:314-317). Neandertals were less prognathic than their archaic predecessors (Heim 1987:315) although they retained a mid-facial prognathism (Rak, Y. 1986:158). Their faces were more vertical which enhanced their long, sloping foreheads and overall cranial length. The cranial elongation was also accentuated by the chignon or bun on the occipital bone. The chignon was structurally developed via the delineation of the supra-iniac fossa by the torus occipitalis (Heim 1987.314 - 317). Hublin (1988:69; 1996:personal communication) noted the torus seemed to be divided into two branches framing the supra-iniac fossa. In the medial region, the torus indented yielding bilateral, maximal

developments which gave the torus the appearance of being comprised of two projections from the inferior view. The topography of the middle meningeal vessels of Neandertal crania differed from modern humans. The large diameter of the Neandertal sphenoparietal sinus also contrasted with modern humans (Heim 1987:314). Neandertal foramen magnum exhibited an “elongated”, oval shape (Rak, Y.; W. H. Kimbel; and E. Hovers 1994:316).

In the juxtamastoid region, Neandertal cranium displayed an “anterior mastoid tubercle” (Hublin 1988:70; Santa Luca 1978:627). This protruberance arose on the mastoid process just behind the auditory meatus and progressed upward towards the parietal incisure. The occipitomastoid crest in Neandertals was frequently larger than or equal to the mastoid process in size. The crest ran parallel to the mastoid tubercle just behind the mastoid process and extended toward the base of the process (Hublin 1988:70; Santa Luca 1978:628). Santa Luca (1978:628) described “marked depressions on either side of the occipitomastoid crest” which isolated the crest “from the surrounding bone”. In Neandertals, the zygomatic bone and external auditory meatus were positioned at the same level; the styloid process was not in the immediate proximity of the edge of the auditory meatus; the petro-tympanic crest and mastoid process lacked contact; and the digastric groove was closed in the anterior aspect (Vandermeersch, Bernard 1985:307). Neandertals possessed “smaller anterior and posterior canals” in the “bony labyrinth” of the ear which was also “characterized by a markedly inferiorly positioned semi-circular canal relative to the plane of the lateral canal” (Hublin, Jean-Jacques; Fred Spoor; Marc Braun, Frans Zonneveld; and Silvana Condemi 1996:224-225).

Neandertal mandibles were massive and usually lacked a conspicuous mental eminence or chin which gave the jaw a receding appearance. Their mandibles displayed a pronounced medial pterygoid tubercle “at the superior border” of the insertion of the medial pterygoid muscle on the internal face of the ascending mandibular ramus (Rak, Kimbel, and Hovers 1994:320). A retromolar space existed between the third molar and the ascending ramus of many Neandertal mandibles (Shreeve 1995:78; Rak 1986:159). Taurodontism¹⁵ and Carabelli’s cusps or pits¹⁶ were common features in Neandertal molars. In general, Neandertal incisors were larger buccolingually than in modern humans and their first molars were smaller (Smith, P. 1989:113). Neandertal anterior dentition was, in general, fairly large (Rak 1986:162).

NEAR EASTERN NEANDERTAL MORPHOLOGY

Individual Near Eastern Neandertals differed from the classic forms in several ways. These differences received a variety of interpretations. Santa Luca (1978) offered one possible explanation for the Levantine Neandertals. In an attempt to substantiate the designation of Neandertal-like or Neandertaloid specimens mentioned earlier and to assess their phylogenetic relevance, Santa Luca (1978:627-628) determined the most diagnostic characteristics of Neandertal crania were: (1) the mastoid crest or tuberosity, (2) the occipitomastoid crest, (3) the occipital torus with no external

¹⁵ Taurodontism denotes the enlargement of the pulp cavities with an associated reduction in the roots or fusion of roots. (White, Tim 1991:107; Krogman, Wilton Marion and Mehmet Yasar Iscan 1986:369).

¹⁶ “Cusplets, grooves, or other topographic features on” an upper molar’s “mesiolingual surface” are collectively identified as “Carabelli’s effects” (White 1991:106); or Carabelli’s complex or trait (Smith, Patricia 1989:113)

protruberance, and (4) the supra-orbital fossa. His conclusions formed the basis of his definition of Neandertals.

The Neandertals are a morphological cluster restricted to Europe and the Levant. The diagnostic characters which define them are not found in fossil hominids from any other part of the world. In these terms, the Neandertals form a cohesive evolutionary group within which are found several varieties. Howell (1957) also considered Neandertal varieties, but he thought the Levant Neandertals were transitional to an Upper Paleolithic morphology. But the lack of significant similarities makes his interpretation unlikely. Perhaps the Levant Neandertals should be viewed as less "neandertalized" with respect to their western European cousins. That is, the Levant Neandertals retain the ancestral Neandertal morphology more than do the western European Neandertals. Thus, the Levant Neandertal morphology really looks backward to its ancestry rather than forward to an Upper Paleolithic morphology. (Santa Luca, A. P. 1978:633).

In a review of the literature on the fossil occurrences from the Mousterian period in the Near East, several specimens diverged from the expected total morphological pattern of classic Neandertals. In fact, Hambücker (1995:44) discovered the Near Eastern Neandertals were generally less robust than European Neandertals

The Tabun female [Tabun C1], identified as a Neandertal, exhibited a more rounded occiput, smaller articular surfaces on the long bones, and smaller dentition than classic Neandertals (Grün, Rainer; Christopher Stringer; and Henry P. Schwarz 1991:237). Arensburg and Belfer-Cohen (1998:313) reiterated these differences and added a large mastoid process to the list of variances. Their studies also revealed the mandibular morphology of the Tabun female did not accord with a Neandertal affiliation

or with an anatomically modern *Homo sapiens* designation whereas the Tabun C2 male mandible did correlate with a modern mandibular morphology. Arensburg and Belfer-Cohen (1998:313) recommended an archaic *Homo sapiens* categorization for Tabun C1.

Amud 1 was another fossil hominid identified as a Neandertal. This male specimen's stature of 177.8 cm. was tall by comparison to classic Neandertals and placed him in an intermediate position between Skhul VI [176.2 cm.] and Skhul V [185.7 cm.]. Both of the Skhul specimens were male and identified as anatomically modern humans or Proto-Cro-Magnons (Arensburg and Belfer-Cohen 1998:315). Amud 1's limb bones were more gracile and longer than those of European Neandertals. Amud's cranial height was greater than any of the other specimens from the Middle Palaeolithic and approached the height of crania from the Upper Palaeolithic. He possessed a mastoid process similar in size and shape to modern humans and a temporal bone which also resembled the modern human form (Arensburg and Belfer-Cohen 1998:314).

The Neandertal male from the burial at Kebara (Kebara 2) evinced some unique traits as well. His stature was approximately 174 cm., again larger than the classic Neandertals. "Several measurements" exceeded "those in modern humans as well as those in other Middle Palaeolithic hominids" (Bar-Yosef, Ofer; B. Arensburg; A. Belfer-Cohen; P. Goldberg; H. Laville; L. Meignen; Y. Rak; J. D. Speth; E. Tchernov; A. -M. Tillier; and S. Weiner 1992:529). Arensburg and Belfer-Cohen (1998:315-318) stipulated the features of Kebara 2's mandible were inadequate for species identification and the pelvic structure displayed characteristics common to both anatomically modern humans and Neandertals. Many of the specific traits of Kebara 2's pelvis most closely

associated with the Skhul specimens. Therefore, a Neandertal classification for Kebara 2 was unfounded.

The incipient chin of Shanidar 1 [Iraq] was in sharp contrast to the general classic Neandertal morphology; however his mandible lacked a gonial angle (Stewart, T. D. 1972:135).

The Skhul, Qafzeh, and Zuttiyeh fossils originally received a Neandertal or Neandertaloid classification based on perceived Neandertal features. Today, Qafzeh and Skhul are all considered anatomically modern humans. Zuttiyeh is identified as an archaic *Homo sapiens*. The mixed morphology of the alleged Neandertals in the Near East, which expressed both anatomically modern traits and Neandertal traits, led Arensburg and Belfer-Cohen (1998:311) to declare “there is actually little evidence for the existence of a ‘Southwest Asiatic Neandertal population’ in Israel during the Middle Paleolithic period”. Furthermore, these researchers argued the Neandertal traits expressed in the Near Eastern fossil hominids were the result of “synapomorphic characteristics that evolved parallel to those of the ‘classic’ Neandertals” (Arensburg and Belfer-Cohen 1998:320).

Clearly, a Neandertal classification for the fossil hominids in the Near East is debatable. On the one hand, the Neandertal aspects of the morphology of these hominids is emphasized. On the other hand, the mixture of anatomically modern human and Neandertal morphological traits is magnified.

CENTRAL AND EASTERN EUROPEAN NEANDERTALS

The same variability witnessed in the Near Eastern Neandertal forms was recognized in Central and Eastern European Neandertals. Vlcek (1996:48) favorably correlated some of the intermediate Neandertals with anatomically modern populations in the Levant. Sala nad Váhom [a female] corresponded with Zuttiyeh [a male] and with some of the Skhul fossils. The differences between the male Zuttiyeh and the female Sala in the glabellar region accorded with the expected level of sexual dimorphism.

“Morphologically and typologically” the Kulna remains [probably two individuals] conformed “with the forms of intermediate Neanderthals, as encountered in Moravia, Slovakia, and the Near East” (Vlcek 1996:52). The fragment of the Ochoz mandible demonstrated a dental arch analagous to those found on some Krapina and Skhul specimens as well as on Circeo III. The site of Circeo yielded classic Neandertal forms.

Vlcek (1996:59) also recognized similarities between intermediate Neandertals and the later Upper Palaeolithic modern human remains such as Mladec II, V, VI, and VII; the Koneprusy remains, and the St. Prokop Cave humans. The primitive architecture of the cranial vault, particularly in the occipital and frontal regions, were analagous to the intermediate Neandertals. The configuration of the child’s mandible (Mladec VII) was similar to those of Neandertal children such as Chateauneuf, La Chaise, Pech de l’Azé, and Sipka. The Mladec I series corresponded to the Cro-Magnon remains from France.

Therefore, these oldest modern Central European humans show certain relationships to the forms of the intermediate Neanderthals of Central Europe. Continued development of the aforementioned features can be traced, in a reduced form, to as late as some individuals of the earlier Gravettian populations in Moravia. (Vlcek, Emanuel 1996:39).

MORPHO-FUNCTIONAL EXPLANATIONS

Functional explanations for Neandertals' unique morphology, particularly cranial morphology, varied. One explanation mentioned early was cold adaptation (Hublin 1996:44). The inflation or pneumatization of the face in conjunction with a large nasal aperture were viewed as adaptations to the harsh, glacial environments of the Würm glacial periods. The large nasal canal presumably facilitated warming the cold, dry air before inhalation into the lungs (Mellars 1996:3). Rak (1986:151-164) ascribed the "facial topography" of Neandertals to anterior dentition loading. This topography provided buttressing in the various regions to accommodate the directional stresses applied during mastication with large anterior dentition. Cranial elongation afforded "biomechanical compensation" for mid-facial prognathism in addition to the intensive use and loading of the dentition (Hublin 1988:70-71). Heim (1987:315-316) argued the total cranial configuration permitted the re-establishment of cephalic equilibrium on the vertebral column by shifting the center of gravity backward.

Post-cranial differences registered the strenuous life styles of the Neandertals and reflected "an adaptation to conserve body heat" during deteriorating or extremely cold climatic conditions (Mellars 1996:3). However, the Neandertals lived

during inter-glacials and throughout the Northern Mediterranean where climatic conditions were less extreme.

SUMMARY

Definitions and descriptions of Neandertals are abundant in the present literature, particularly for classic Neandertals. Consensus on which specimens merit a Neandertal designation is absent. At the very least, Neandertals represented a highly variable species or sub-species of the genus *Homo* which spread across a vast geographical area during the Middle Palaeolithic. At most, the term Neandertal described a series of morphological features which were present to a greater or lesser extent in a variety of different *Homo* species or sub-species during the Middle Palaeolithic. Whether the term Neandertal most accurately depicts the classic Neandertals which are the predominate forms of the Middle Palaeolithic hominid fossil series of Western Europe or whether this term also accommodates the Near Eastern, Central European, Central Asian, and Eastern European forms exhibiting a mixture of Neandertal and anatomically modern features cannot be adequately determined for the moment.

The differential application of the concept of total morphological pattern in the determination of taxonomic classifications of specimens adds to the confusion. A case in point is the Neandertal classification of Kebara 9 [a right 4th metatarsal] and Kebara 10 [a right distal phalange of the hallux] (Courtaud, P. 1989:45, 47, and 49). Although these osseous elements may merit a Neandertal designation, their classification

is suspect as the elements recovered are not sufficient to fulfill the criteria of 'total morphological pattern'.

The Near East is a crossroads between Africa and Eurasia. Populations periodically converged in or moved through this area. The differences as well as similarities between the early anatomically modern humans and the so-called Neandertals in this region may mark significant gene flow or even hybridization.

Clearly differences do exist between the various specimens. However, too many questions are either unanswered or the answers are contradicted by other researchers. Morpho-species determinations are inconsistent and caution is warranted.

Chapter 4: BEHAVIOR

As indicated in the first chapter, interpretations of Neandertal behavior have been extremely polarized. Behavioral complexity, particularly the symbolic element of this complexity, has been one of the most contentious issues in the study of Neandertals. Many analyses of Neandertal behavior, particularly the behavior of classic Neandertals, have derived from comparative studies which have focused on the contrasts between Neandertal and modern human departments and/or the Middle to Upper Palaeolithic transition. (See for example: White, Randall 1989; Mellars 1996, 1989, 1973; and Chase and Dibble 1987). Modern human conduct established the standard against which Neandertal conduct was tested and frequently found lacking. The unfortunate outcome of these studies was the interpretation of Neandertal behavior in terms of what they did not do rather than what they did. They were defined by their deficiencies.

Over the past decade, there has been an increasingly popular trend among North American and some British prehistorians to dehumanize Neandertals and depict them as qualitatively different from Upper Paleolithic peoples. Neandertals have been portrayed as incompetent users of language and symbolic thought (Lieberman, 1975; Chase and Dibble, 1987), as incompetent hunters (Binford, 1981, 1985), as incapable of anticipating patterned animal movements (Soffer, 1989a; Trinkaus 1989:55-58), as incapable of anticipating future needs for tools and therefore only employing expedient technologies (Binford, 1973; Chase and Dibble, 1987), as incapable of using future tenses or clauses and therefore lacking alliances and even extended families (Whallon 1989), as incapable of forming ethnic identities (Binford 1972:159-161, 1973), as possibly lacking aggregation sites or even home

bases (Conkey, 1980; Binford cited in Mellars, 1989a:360), as incapable of abstract or realistic artistic expression (Chase and Dibble, 1987; Gargett, 1989; Benditt, 1989), as lacking values or symboling ability related to the intentional interment of the dead and by inference lacking any developed religious thought (Gargett, 1989), as lacking the motor and mental conceptual wherewithal to manufacture stone blades and bone tools (Dennell, 1985:81-102; Gargett, 1989) and as generally lacking culture as we recognize it (Binford, 1982, 1985, 1986, cited in Mellars, 1989a). (Hayden, Brian 1993:113)¹⁷

Philip G. Chase and Harold L. Dibble (1987:264) argued that “all modern cultures share an underlying similarity of nature, in that cultural behavior is largely symbolic, and that cultures are identified and transmitted through the learning of these symbols”. Therefore, the adaptive strategies of Neandertals and modern humans should be structurally similar unless major differences in these strategies existed during the Middle Palaeolithic.

The emergence and rapid development of behavioral elaboration has long been tied to the origin of anatomically modern humans. However, anatomically modern human forms appeared in the Near East [Qafzeh, and Skhul] and Africa [Klasies River Mouth and Border Cave] (Deacon, H. J. 1992:105) at least 50,000 to 100,000 years before the rapid expansion and amplification of complex behavioral responses. The correlation between behavioral complexity and the emergence of anatomically modern humans can no longer be fully sustained. Robert Gargett (1996:7) agreed that the

¹⁷ The researchers listed in the citation were Hayden's. They were retained in the quote for the purpose of emphasis. Some of these articles were used as resource material for this study [See Bibliography]. For a complete bibliography of Hayden's article, see Hayden 1993 in the *Journal of Human Evolution* 24:113-146.

emergence of complexity and the emergence of modern morphology were not simultaneous; but, complexity arose within the “modern morphotype”.

Gargett (1996:2) classified the skeletal samples of the Middle Palaeolithic under the term “pre-modern hominid”. These hominids included the anatomically modern human populations who created and used Middle Palaeolithic tool forms, such as those from Qafzeh and Skhul in the Levant. Gargett (1996:2) stipulated that “over most of their range, and through considerable time (i.e. about 200 kyr), pre-modern hominids produced a quite uniform archaeological signature that was in many ways unlike that of modern humans”. To be accorded a modern human nomenclature a hominid must have been both skeletally and behaviorally modern. The behaviorally modern ascription incorporated the ability to communicate via a complex, syntactical language and the capacity for and demonstration of culture.

Avraham Ronen (1992:218) listed four archaeologically recoverable traits which correlated with modern behavior: (1) “objects of art and personal adornment”; (2) “blade technology”; (3) “exploitation of a larger variety of raw materials than before, including bone and antler”; and (4) “lithic assemblages based on grattoirs, burins, knives, and microliths” which “replace the 1.5 million year long handaxe-racloir tradition”.

Paul Graves (1991:513) correlated the Neandertal/modern human dichotomy to “a metaphor for the issues of race and racism” and to concepts of “identity and equality”. While Neandertals and modern humans certainly differed in many respects, these differences were not necessarily commensurate with inequality.

TOOLS

Typological and technological analyses of stone tools furnished the framework for studies of Middle Palaeolithic behavior. “Here, as in the rest of the Palaeolithic, stone-tool assemblages provide the most durable and complete record of human development with a degree of continuity and fine-scale resolution which is much better than that of the faunal assemblages and far more complete than that of the skeletal remains of the populations involved” (Mellars 1996:56). Technologically, Neandertals employed a variety of reduction strategies in the manufacture of primary flakes or flake blanks. These techniques included a variety of specialized methods, such as those used to produce Quina flakes for sidescrapers and complex Levallois reduction strategies. Blade technologies were also known: blades were produced using both Levallois and non-Levallois methods. The variety of methods for lithic reduction attested to an “inherent technological complexity of some of the individual flaking strategies” (Mellars 1996:88).

By contrast, Upper Palaeolithic industries in Western Eurasia evinced an advancement in blade technologies; an increase in the number of new and standardized tool forms; and an escalation in the production of bone, antler, and ivory tools and artefacts (Mellars 1996:393-400, 1989:365-367; White, R. 1989a:176). White (1989a:176) recognized a strong “stylistic component” in Upper Palaeolithic industries and correlated the stylistic differences to manifestations of ethnicity, increasing social networks, and the appearance of exchange systems.

The variability of Mousterian industries [discussed in Chapter 2] was one of the most distinctive features of the Middle Palaeolithic. However, in terms of tool

types or new forms of tools, the Middle Palaeolithic allegedly witnessed very little innovation. The lack of novelty has been regarded by some as stagnation; a position contested by Nicolas Rolland (1999:318-320, 330-332; 1990:358) on the basis of evidence for “an accelerating tempo” of change near the period of the Middle to Upper Palaeolithic transition. Rolland (1990:358) cited two lines of evidence which supported his contention: (1) an increase in the use of wood and bone for the purpose of manufacturing tools and (2) the use of “laminar flaking” to create tools similar to Upper Palaeolithic forms.

Chase and Dibble (1987:267) agreed that “Middle Palaeolithic behavior as reflected in the lithic industries was based on a learned set of behaviors and therefore” was “cultural in that sense”. The lithic assemblages also indicated some measure of planning and foresight, particularly in terms of lithic procurement and material transport. However, ‘isochrestic’ styles, especially “functionally equivalent alternatives in morphology and technology”, were less readily identified, but perhaps still present, in the Middle Palaeolithic industries with the possible exception of some industries in the Near East, Central Europe, and Eastern Europe (Chase and Dibble 1987:270). ‘Isochrestic’ styles corresponded to culturally prescribed traditions in tool attributes, cultural choices of technological approaches in tool manufacture, or to functions of specific tool forms within a cultural context: a style which complied with cultural preferences. From lithic analyses, Chase and Dibble (1987:271) concluded that evidence for Neandertal symbolic thought could not be “demonstrated”; but, this did not mean that some form of symbolic presence in the manufacture of stone tools or in their function was nonexistent.

Clive Gamble (1998:440) suggested that the tool itself, its style or method of manufacture was less important symbolically than the actions of the individual wielding or creating the implement and the breadth of the social network within which the individual functioned.

Technology is not just about making stone axes to chop down trees. The gestures which are used to make the axe and then use it embody social representations or ideas, which are part of wider symbolic systems.....As an embodied gesture the cup, spear, costume, paint brush have symbolic power as thought in action. When the artifact was being made, handled, and transported it took on the properties of the person as a social actor. This is one reason why we need to reject in the Palaeolithic the dualism between an artefact's function and its style. The latter is generally recognized as that part of artefact form which communicates about social identity and values. Something which is added after the business of function has been sorted out. Looking at the same artefact from the perspective of material action, the gesture, makes us consider the social aspects of techniques as ways of doing which have their own repeated forms, movements and rhythms. Technology plays an active role, rather than the passive voice of style alone, in the stasis and change of social life as individuals interact and perform society through the construction of social networks. (Gamble 1998:440)

Gamble (1998:440, 443) rejected technology as symbolic for most of the Lower and Middle Palaeolithic as societies in this time frame lacked "extended networks"¹⁸.

Habituation could also be implied from technology. Gamble (1998:440) suggested the key to perceiving technology as symbolic was the ability to form "intimate relations with

¹⁸ Gamble's (1998:435) "extended networks" are those which incorporated "acquaintances". These were individuals who were not personally well known: a broader category of social relations than the "effective network" of family and close friends.

objects” which only became possible when broader social relations without co-presence could be fostered: “the release from proximity”. Lower and Middle Palaeolithic societies functioned at the ‘effective’ level of social relations.

Gargett (1996:4) restricted technology to one of many interactive processes of culture: “language, self-consciousness, symbolic manipulation of material objects, as well as the knowledge required to reproduce a given technology, are all part of culture, all part of being human”. The production and use of a tool, in itself, does not necessarily have an extended meaning or value. Chimpanzees use implements to acquire food; the implements are facilitators to the satisfaction of a need. Beyond the gratification of that need, neither the implement nor the food have any specific meaning (Gargett 1996:4-5). Pre-modern hominid tool production may have had no extended meaning beyond the satiation of a basic, inherent physiological requirement.

Brian Hayden (1993:115-120) remonstrated researchers for failing to recognize Neandertals’ potential for the creation of more complex tool forms. Evidence for hafting demonstrated Neandertals’ ability to plan ahead in the process of creating and curating stone tools. He argued that blades, bone tools, and more standardized tool forms were unnecessary time investments for the accomplishment of economic tasks in Neandertal societies. When the need arose for more complex tool forms, Neandertals were capable of producing blades as well as bone and antler implements. The recovery of bone points, awls, and other modified bone implements from late Neandertal sites in France and other parts of Europe supported Hayden’s assertions. “To summarize the Neandertal technological domain, there is excellent evidence for curation, foresight,

planning, skilled craftsmanship and more than adequate abilities for the manufacture of blades, bone tools and most tool types characteristic of the Upper Palaeolithic” (Hayden 1993:120).

LEVANTINE MOUSTERIAN INDUSTRIES

The anatomically modern humans and the supposed Neandertals in the Levant behaved in similar fashions. They created similar industries, hafted some of their tools, and used their tools in similar manners (Bar-Yosef 1992b:197). Evidence for wood-work appeared in both of their archaeological residues.

The Mousterian industries of the Levant were originally separated into two phases: the Lower Levallois-Mousterian and the Upper Levallois-Mousterian (Marks 1988:111). They are now subdivided into three phases on the basis of the stratigraphic sequence of Tabun Cave in the Mount Carmel region of Israel. All three variants expressed a high Levallois component.

The earliest Mousterian assemblage was recovered from Tabun layer D and was named the Tabun D Levantine Mousterian, Phase 1 Levantine Mousterian, or Early Levantine Mousterian (Bar-Yosef 1992a:193; Jelinek, Arthur J. 1992:236; Marks 1992: 232; Clark, G. A. and J. M. Lindly 1989a:645 - 647; 1989b:968). The technological strategy employed in this phase and confirmed by the cores was a unipolar, convergent Levallois method with minimally prepared striking platforms. The typological structure of this industrial facies included “elongated retouched points, numerous blades, racloirs, and burins”; bifaces were not common but did arise (Bar-

Yosef 1992:193). Although the Levallois method of core reduction was the dominant technological strategy, other methods of core reduction were used “ranging from discoidal through simple, single platform, hard-hammer blade” (Marks 1992:232). In the youngest Tabun D assemblages the number of diverse technological approaches decreased and the knappers in the final stages utilized either a unipolar or bipolar reduction strategy to produce blanks from elongated cores. The Tabun D assemblages, with the exception of the type site of Tabun and the Bezez B complex, contained large numbers of Upper Palaeolithic tools. In fact, over time, the number of typologically identified Middle Palaeolithic tool forms “decreased markedly to the point of disappearance” (Marks 1992:232).

The second variant, the Tabun C Levantine Mousterian, was also called Phase 2 Levantine Mousterian or Late Levantine Mousterian (Bar-Yosef 1992:193; Jelinek 1992:236; Marks 1992:232; Clark and Lindly 1989:645-647). A radial or lineal Levallois method of core reduction producing large, oval flakes marked the technological approach. Some triangular points were found with this facies (Bar-Yosef 1992:193, 197). Side scrapers and Mousterian points were prevalent while Upper Palaeolithic tool forms and Levallois points were rare (Marks 1992:232). Non-Levallois reduction strategies were also employed.

The final phase, Phase 3 or the Tabun B Levantine Mousterian was also known as the Late Levantine Mousterian (Bar-Yosef 1992:193; Jelinek 1992:236, Marks 1992:232; Clark and Lindly 1989:645-647). A unipolar, convergent Levallois core reduction strategy was utilized to create the predominant tool forms of “broad based

points, often short thin flakes, and some blades [all made by the same recurrent method]" (Bar-Yosef 1992a:197). The Levallois points were frequently convex (Jelinek 1992:257). Assemblages were dominated by side scrapers; denticulates appeared in moderate numbers; and Upper Palaeolithic tool forms were rare. Some radially prepared cores were discovered in upper Mousterian levels in certain sites such as Kebara (Bar-Yosef 1992a:197).

The chronology of the Levantine Mousterian is difficult to accurately ascertain. Absolute dating and biochronological schemes do not always correlate. Rainer Grün, Christopher Stringer, and Henry P. Schwarcz (1991:242-243) disclosed the dates obtained for the type site of Tabun cave using ESR early and linear uptake dating of the collection of faunal teeth recovered during Dorothy Garrod's original excavation of the cave. The averaged dates generated for the Mousterian deposits were: Tabun D $122,000 \pm 20,000$ [EU] and $166,000 \pm 20,000$ [LU]; Tabun C $102,000 \pm 17,000$ [EU] and $119,000 \pm 11,000$ [LU]; and Tabun B $86,000 \pm 11,000$ [EU] and $103,000 \pm 16,000$ [LU]. Eitan Tchernov's (1992:177) biochronology for the Levant, based on microfauna, yielded the following dates for Tabun Cave: Tabun D c.128,000 - 65,000 BP; Tabun C c.65,000 to 55,000 BP; and Tabun B c.55,000 - 40,000 BP. The Tabun C Mousterian site of Qafzeh has yielded a much earlier date than the C-type Mousterian at Tabun. These dates, $80,000 \pm 24/-18$ kya [uranium/thorium] and $94,000 \pm 10/-8$ kya [uranium/protactinium] were established by direct dating of the Qafzeh 6 hominid fossil remains using non-destructive gamma-ray spectrometry (Yokoyama, Yuji, Christophe Falguères, and Marie-Antoinette

de Lumley 1997:773). Tchernov (1992) recommended a biochronological date range between approximately 105,000 and 80,000 BP for Qafzeh.

No hominid remains in the Galilee-Mount Carmel region have been recovered in Tabun D contexts while the Tabun C has been found in association with Proto-Cro-Magnons or anatomically modern human forms [Qafzeh and Skhul] and the Tabun B with alleged Neandertal specimens [Amud, Tabun, and Kebara] (Bar-Yosef 1992b:196). Yoshihiro Nishiaki and Lorraine Copeland (1992:122) expanded the flint industry/hominid type association to incorporate some of the Lebanese material. They suggested Neandertals produced the Yabrudian and Tabun B Mousterian while the Tabun C Mousterian correlated to a “*Homo sapiens* with archaic features or to a population with mixed morphology” (Nishiaki and Copeland 1992:122).

One of the debates in the Levant centers on the continuity or discontinuity of the Mousterian industries in accordance with the chronological seriation identified by the Tabun sequence. Marks (1992:235) indicated the chronological progression was also viewed as a developmental one beginning with the antecedents of the Mousterian in the region, the Late Acheulian and the Mugharan Tradition. One tendency in the temporal ordering of the industries was to combine the Tabun B and Tabun C industries into a joint phase (Phase 2/3) which was described as the Late Levantine Mousterian because the Tabun B assemblage in Tabun Cave was inadequately described (Clark and Lindly 1989a:645). Jelinek (1992:256) has suggested that “with the exception of Ras el-Kelb.....and Naame.....no major Levantine Mousterian collections outside the type site has been assigned specifically to a Tabun C industry”; but, Qafzeh and Skhul have been

designated Tabun C Levantine Mousterian sites. The dates for sites in the Levant, the Negev, and southern Jordan revealed the considerable time depth for the Tabun D technology in both cool, wet climates and cold, dry zones (Marks 1992:235, 1988:115). Marks (1992:239) argued that the evidence in the Levant favored contemporaneity or at least a temporal overlap for the Tabun D and the Tabun C industries. He speculated the Tabun D at the type site of Tabun Cave was perhaps younger than the Tabun C at the site of Qafzeh. The geographic distributions of the two industries did differ. The Tabun C industry never extended farther south than the Mt. Carmel region and was generally confined to coastal zones while the Tabun D industry was usually found in the south and the interior (Marks 1992:237). This assessment also eliminated the combination of the Tabun B and Tabun C Mousterian industries as a Phase 2/3 complex or Late Levantine Mousterian. The reappraisal was contingent on the acceptance of the new dates for Qafzeh (92,000 years BP or older), and the dates for the Tabun B industries between 80,000 to 100,000 years BP and 48,000 to 46,000 years BP. The dates have also refocused attention on the discrepancies in the temporal succession of all the assemblages and raised questions about the correlation of the Tabun sequence to all regions of the Levant.

As stated above, the antecedent industries in the Levant were the Late or Upper Acheulian and the Mugharan Tradition. One other industry, the Hummalian, was discovered in the region in the same stratigraphic position as Tabun D. This industrial variant was analogous to the D-type Mousterian in the “proliferations of blades and points”; but, differed in the use of a non-Levallois technology (Bar-Yosef 1992:193).

Marks (1992:230) implied this industry, as well as assemblages from Amud and Douara Caves, were intermediate between the antecedent industries and the Levantine Mousterian.

The Mugharan Tradition accommodated three facies: (1) a Yabrudian facies exhibiting a non-Levallois technology with “numerous side scrapers” on thick flakes, Quina or demi-Quina retouch, and few blades or Upper Palaeolithic tool forms (Bar-Yosef 1992a:193, 1992b:196; Muhesen Sultan 1992:34); (2) an Acheulian facies with bifaces and Yabrudian scrapers; and (3) an Amudian facies, also recognized as a Pre-Upper Paleolithic industry, with “end scrapers, burins, backed knives and rare bifaces” as well as “evidence for limited practice of Levallois technology” (Bar-Yosef 1992b:196; Ronen, Avraham 1992:218). The Upper Acheulian was a “developed Levallois” technology with points, a biface element whose numbers varied relative to flake tools, denticulates, and a number of side scrapers and Upper Palaeolithic tools (Marks 1992:230-231)

Marks (1992:229, 236-239) maintained that discontinuities did exist in the Levantine Mousterian which corresponded with intrusive complexes. These discontinuities were witnessed during the appearance of the Mugharan Tradition (around 150,000 years BP); between the antecedent complexes [the Mugharan and the Late Acheulian] and the appearances of the Tabun D and Tabun C complexes (in the range of 95,000 to 80,000 BP), and between the previous two complexes and the emergence of the Tabun B Levantine Mousterian (approximately 60,000 years BP). Marks considered the Late Acheulian an autochthonous development within the Levantine region while the

Mugharan Tradition reflected an intrusive complex which entered the region from the north or northeast. Marks believed the Late Acheulian was the most likely progenitor of the Levantine Mousterian, although the Mugharan could not be completely eliminated. The Tabun D and Tabun C Mousterian industries were unlikely candidates for intrusion and most reasonably represented contemporaneous industries with “technological and typological differences related to specific adaptive requirements” (Marks 1992:237). The Tabun B Mousterian was probably intrusive and corresponded to a southward expansion of Neandertals. To summarize, the intrusions in the Levant appeared to originate from the north or northeast. “An examination of the archaeological record of Egypt and Sudan indicates that at no point in this long period”, 150,000 to 50,000 BP, “is there any evidence for Northeast African/Levantine connections on more than a technocomplex level” (Marks 1992:229). Bar-Yosef (1992a:197) acknowledged that although some broad affinities existed between Levantine Mousterian industries and Middle Stone Age industries from Cyrenaica, Egypt, and South Africa; differences were also apparent..

Pre-Upper Paleolithic industries in the Levant, such as the Pre-Aurignacian of Yabrud and the Amudian, demonstrated strong correlations with the Upper Palaeolithic industries except they expressed a more primitive character. For example, the Pre-Aurignacian of Yabrud contained numerous grattoirs; retouched and non-retouched blade elements with “trapezoidal cross sections, regular edges and unfaceted butts” (Ronen 1992:218). The knappers of this industry recycled hand axes from earlier layers as cores for the creation of new tool forms. Of the Pre-Upper

Paleolithic industries, only the Pre-Aurignacian from Yabrud contained Aurignacian elements. The backed blade was the characteristic tool of the Amudian industry.

The lithic sequences in the Near East are extremely complicated. “The Levantine Mousterian differs markedly from the Mousterian facies in the Zagros and Taurus mountains, to the north, although the Karain industry has a strong component of radial Levallois preparation” (Bar-Yosef 1992:197). The Turkish Levallois-Mousterian sites, such as Karain, yielded Levallois debitage in conjunction with a discoidal technique. “In Antalya, the discoidal cores pass through a stage of Levallois debitage, while in southeastern Anatolia, on the other hand, they develop independently” (Yalçinkaya, Isin 1995:410). The Zagros Mousterian assemblage described by Solecki for Shanidar Cave was similar to the Typical Mousterian of Western Europe. Levallois techniques were known to the Shanidar Neandertals as evidenced by the “four or five diminutive Levallois” [“tortoise”] “cores made on small pebbles” discovered during the excavation (Solecki, Ralph 1971:264). Solecki (1971) also indicated the Zagros Mousterian created by the Shanidar Neandertals changed very little throughout the Mousterian occupations of the cave.

Transitional Middle to Upper Palaeolithic industries are known from sites in Lebanon and the Negev highlands. The transition is not recorded in the Anatolian/Iranian region or the Caucasus region. The autochthonous development of the Ahmarian from the Transitional industries is reasonably well documented in the sites of Ksâr’ Akil in Lebanon and Boker Tachtit in the Negev. Typological changes seemed to occur before technological ones. The racloir and point components were gradually

replaced by end scrapers, chamfered blades, burins and Emireh points. Technological approaches shifted from unipolar and bipolar Levallois cores to prismatic cores or unipolar blade technology. The Ahmarian was a blade/bladelet technology containing some El-Wad points which arose around 38,000 to 35,000 BP and lasted through 22,000 to 20,000 BP when it was replaced by Epi-Palaeolithic cultures. The Ahmarian was interrupted around 35,000 to 28,000 BP by the Levantine Aurignacian which contained a blade/bladelet component, nosed and carinated scrapers, and a minimal bone and antler technology. The Aurignacian seemed to be restricted to the coastal regions of northern and southern Levant. The later phase of the Aurignacian, the Levantine Aurignacian B as well as the Aurignacian in the Zagros, exhibited an increase in flake production and the characteristic tool forms of the early Aurignacian, and a more abundant bone and antler industry (Bar-Yosef 1992a:197-198; 1992b:197-198; Bar-Yosef and Belfer-Cohen 1988:25-28). “Unlike the Upper Paleolithic cultures of Europe, the Levantine assemblages are rather poor in bone and antler objects” (Bar-Yosef and Belfer-Cohen 1988:28).

SUBSISTENCE AND SETTLEMENT PATTERNS

Patterns of resource utilization or subsistence and settlement patterns were concomitant survival strategies for Palaeolithic societies. The seasonal and regional availability of resources impacted on social organization, group size, mobility, and settlement systems. The major questions driving research on these topics for the Middle Palaeolithic are: (1) the comparative roles of hunting versus scavenging; (2) specialized

versus generalized exploitation of fauna; (3) the nature of the strategies employed by Middle Palaeolithic hominids and the behavioral correlates of these strategies; and (4) processing and storage of game or scavenged carcasses (Mellars 1996:194). In general, these questions are addressed on a per site basis with a long range view toward the establishment of local, regional, and broader geographic trends.

HUNTING, SCAVENGING, COLLECTING

Lewis Binford (1985:320) reasoned that “by Würm II times in south-central France hominids were regularly hunting moderate-body-sized animals” as well as “scavenging large-sized animals, such as aurochs and horses”. The Würm II corresponded to Isotopic Stage 3 and dated between 55,000 and 35,000 BP (Clark and Lindly 1989a:628). Binford believed a gradual shift in resource acquisition occurred during Würm I [Isotopic Stage 4 or between 80,000 and 55,000 years BP]. Prior to this time frame, hominids were scavenging on a more regular basis either to acquire meat or to obtain marginal portions, such as marrow, from carnivore ravaged carcasses (Binford 1985:320-321).

Chase (1988:229, 231) disputed the role of scavenging in Middle Palaeolithic subsistence patterns in Western Europe. Instead, the faunal evidence pointed to hunting of large animals as well as moderately sized animals while smaller ones were virtually ignored. Chase cited direct evidence from Lehringen [Germany] where a wooden spear was recovered beneath the skeleton of an elephant. The Lehringen site was occupied “early in the Middle Palaeolithic” (Chase 1988:230).

Rolland (1990:354) also endorsed hunting as a definite method of resource acquisition although he did not eliminate scavenging as an occasional alternative. Sites such as La Cotte de St. Brélade [Jersey] and La Quina [France] provided strong evidence in favor of game drives over cliffs (Rolland 1990:354; Chase 1988:229; Scott 1980:150).

Specialized exploitation of one or two specific game species was identified in several sites in Western Eurasia. Kebara, in the Levant, was one example where fallow deer and gazelle dominated the faunal assemblage (Rolland 1990:354). The faunal assemblage at the site of Mauran was essentially bovid and reindeer represented 95% of the faunal assemblage at Vergisson in Burgundy (Rolland 2000:personal communication). Mellars (1996:221) agreed that systematic hunting was practiced in southwestern France during the Middle Palaeolithic. He cautiously allowed that some specialization of prey species was apparent in certain southwestern French sites; but questioned the “relative scale on which” specialized “hunting strategies were practised” (Mellars 1996:226). Specialization in prey species has been recognized in some of the Middle Palaeolithic sites in Central Europe, such as Kulna and Sipka. In fact, cave bear remains “represented mainly by skulls and paws” suggested “that, in this case, hunters were interested in skins rather than meat” (Svoboda, Jiri; Vojen Lozek; and Emanuel Vlcek 1996:95). Specialized hunting strategies may be indicated for the sites of Lehringen in Germany [110,000 - 130,000 BP] and a much earlier site, Schöningen, in Germany [400,000 BP] where wooden spears were discovered (Rolland 1999:319; Mellars 1996:227; Chase 1988:230).

The dietary role of plants was difficult to ascertain for the Middle Palaeolithic (Rolland 1990:355); however, “carbonized seeds of wild peas” were discovered in Kebara (Bar-Yosef, O.; B. Vandermeersch; B. Arensburg, A. Belfer-Cohen; P. Goldberg; H. Laville; L. Meignen; Y. Rak; J. D. Speth; E. Tchernov; A.-M. Tillier; and S. Weiner 1992:530). Wild pulses were recovered from Abri Agut in northeastern Spain (Rolland 2000:personal communication). Pollen from at least eight different species of flowering plants with medicinal properties were recovered with the Shanidar IV, VI, VIII, and IX burial complex (Defleur, Alban 1993:161-163; Solecki 1975:880 and 1971:246;)

SETTLEMENT SYSTEMS

The archaeological residues of Middle Palaeolithic hominids have been recovered from caves, rock shelters, and open-air sites. Regional characteristics of environment, abundance of game, and lithic availability influenced settlement patterns and home ranges. For southwestern France, the majority of Middle Palaeolithic cave and rock shelter sites were situated in protected locations, usually facing south, with panoramic views of potential resource catchment areas. Most of these sites were established within close proximity to raw material sources and water (Mellars 1996:249, 251). Intensively occupied sites were frequently positioned in “minor tributary valleys” rather than in “major river valleys” and within a few kilometers of their confluences (Mellars 1996:248, 259). The degree of occupation intensity and the advantageous positioning of these sites has been cited in defense of their use as home bases or “central places” (Mellars 1996:252).

Analyses of the relationships between open air sites and cave/rock shelter sites are complicated by several factors including greater exposure to site destruction processes and the lack of secure dates for the open air localities. Middle Palaeolithic open air deposits in southwestern France significantly out-numbered Middle Palaeolithic cave and rock shelter sites in the same region (Mellars 1996:253-254). By contrast, open air sites were generally less intensively occupied than caves and rock shelters.

Open air sites represented a variety of economic activities: some were specific activity sites while others divulged mixed strategies. “Extraction and exploitation” sites corresponded to lithic quarry sites where lithic materials were extracted for later use in tool production while “extraction and production” sites were quarry and workshop sites (Mellars 1996:265-266). “Mixed strategy sites” documented the same activities as the previous two, but also included tool rejuvenation as indicated by the number of retouched forms recovered in the deposits (Mellars 1996:266). “Episodic occupation” sites corresponded to “stopover” sites (Mellars 1996:266).

Svoboda, Lozek, and Vlcek (1996:88) described the Central European zone as less intensively occupied during the Middle Palaeolithic than southwestern France. Neandertal settlement strategies varied between caves and open air sites located near warm springs. Open air sites were occupied early in the Middle Palaeolithic while cave sites became intensively occupied in the later periods. During interglacial phases, caves were avoided and were only reoccupied during phases of climatic deterioration (Svoboda, Lozek, and Vlcek 1996:90).

The formation of settlement networks was influenced by important landmarks: springs, caves, and geographic corridors. Mountainous sites, like those in the Alpine region, are missing in our territory. Relationships to relief and to relatively constant altitudes suggest that the hunters consciously preferred locations where two environments (forest and open landscape) met. It seems, therefore, that the trends toward an optimal pattern in the following Upper Paleolithic had a solid Middle Paleolithic background. (Svoboda, Lozek, and Vlcek 1996:90).

Some sites in southern Germany were abandoned and high altitude sites in this region were unoccupied during interstadials (Rolland 2000:personal communication).

Marks (1988:114, 1983:90-91) discussed the radiating system of Early Levantine Mousterian populations. Site types varied between base camps, quarry sites, and ephemeral camps although none of these sites could have existed in isolation without one or perhaps two of the others. The radiating system implied the establishment of base camps in a circumscribed area with associated specialized activity sites distributed across the catchment zone. A predictable supply of water and adequate subsistence resources were critical for a society practicing a radiating pattern of settlement. By nature, the radiating system was more sedentary than the circulating system acknowledged for the transitional phase. Circulating systems generally lacked specialty sites and indicated greater mobility on the part of the populations (Marks 1983:91).

Donald Henry (1995) identified a pattern of transhumance in southern Jordan which related to Late Levantine Mousterian adaptations. This system signified gradually increasing mobility. Winter or wet season occupation of sites at lower elevations [the base camps] and dry season occupation and exploitation of higher

elevations were characteristic for this pattern of transhumance. High elevation sites were smaller and less intensely occupied which indicated Mousterian groups split into smaller units during this phase of the transhumant rounds.

SITE ORGANIZATION

Mellars (1996:237, 269) warned that sites represented palimpsests of “repeated visits to the same location, probably extending over periods of several decades if not several centuries”; but, not necessarily without recurrent patterns (Rolland 2000:personal communication). This temporal overlay of activities obscures high resolution determinations of events in a restricted time frame such as group size during an occupation episode. Like settlement patterns, spacial configurations are determined on a per site basis. The positioning of various features within the habitation landscape and the relationships between these features provide some of the most important clues to the lifeways of the homind societies. Solecki (1971:244) specified “some of the best occupational traces were to be found at the wall of occupied caves”. The Kurdish occupants of Shanidar cave during Solecki’s excavations also allocated their living space around the wall of the cave.

HEARTHES

The use of fire has been recognized in archaeological residues in caves and open air sites from at least the period of the Elster glaciation. The earliest, unambiguous evidence goes back to around 400,000 years ago (Rolland 2000:personal communication).

Hearths provided protection against carnivores, light, warmth, and heat for cooking.

Hearth locations delineated centers of economic and social activity (Mellars 1996:295).

Several types of hearths have been reported from a variety of sites: open hearths, constructed hearths, paved hearths, and excavated hearths (Mellars 1996:296-301). Open hearths were the most common form described for Middle Palaeolithic occupation surfaces and were recognized as “localized areas of burning” (Mellars 1996:296). Constructed hearths were demarcated by a deliberate arrangement of stones. Middle Palaeolithic hearths of this nature were generally discredited. Mellars (1996:296) described the paved hearths discovered by Bordes at Pech de l’Azé II as “deliberate arrangements of flattened limestone blocks placed at the base of hearth deposits and usually showing clear evidence of burning on their upper surfaces”. As the name implied, excavated hearths were dug into the surface of underlying deposits either through the process of ash removal or through the auspices of deliberate hominid activity in hearth creation (Mellars 1996:299-301).

Bar-Yosef (1992a:206) recognized the similarity of Middle and Upper Paleolithic hearths in the Levant. Hearths in both periods were either rounded or oval without stone formations. Hearth dimensions exhibited both intra-site and inter-site variability. Hearths found in Tor Faraj [Southern Jordan] followed “the arc of the cave shelter” and were located “1 to 2 meters from the back wall” (Henry 1996:49). Heat reflected off the back walls of the cave to create a warmth zone for occupants between the walls and the hearths. Phytoliths recovered from the hearths in this rock shelter suggested

that a remarkable quantity of wood was used to maintain the fires. Mellars (1996:202) noted faunal bones were sometimes used as fuel.

STRUCTURES

Paving of occupation floors, stone walls, huts or shelters, pits, and screens were among the potential structures identified in Middle Palaeolithic sites (Rolland 1999:323; Mellars 1996:301-314). Determinations of the veracity of these deliberately constructed formations were based on some limited direct evidence and on the implications drawn from spatial relationships between features such as hearths, debitage, discarded tools, and middens. Rolland (1990:359) even noted some evidence for bedding discovered in the site of Mas-des-Caves.

While the structures and features mentioned above were probably present during the Middle Palaeolithic, archaeological traces of these features in the Upper Palaeolithic were more distinctive, more consistently patterned, and more frequent. In other words, the qualitative and quantitative evidence for structural features and patterning in the Upper Palaeolithic was more profound.

P. B. Pettitt (1997:219) analyzed the spatial patterns in Neandertal sites and determined Neandertals divided their sites into living spaces and dumping zones. Non-human carnivores divided their habitation spaces in virtually the same fashion.

SOCIAL ORGANIZATION

“Social life based on interaction occurred throughout the Palaeolithic” (Gamble 1998:442). Interaction functioned within the confines of intimate and effective

networks. Intimate networks corresponded to relationships between close kin while effective networks expanded to incorporate individuals outside the kin group with whom an individual interacted on a regular basis; those to whom an individual was obligated or vice versa. These were close friends or non-familial members of a small band (Gamble 1998:434). Relationships of this nature depended upon co-presence of individuals. For most of the Lower and Middle Palaeolithic, social relations operated within a local framework; the social landscape had not been extended. Gamble (1998:443) insisted that this did not mean that their lives lacked enrichment and some degree of complexity because these hominids “were multifaceted due to the array of resources these large-brained, capable, and skilful people could employ when interacting”.

Pettitt (1997:211- 212, 214-215, 219) felt that individuals or very small numbers of Neandertals occupied sites at any one time based of the “size of the available area inside the cave and the distribution of cultural materials within it”. He found Neandertal behavior to be habitual and repetitive. The dichotomous organization of space mentioned in the last section, implied habituation in terms of Neandertal behavior. This habituation was reflected in the use of specific regions of the cave for living purposes and circumvention of dumping zones. Social organization, by extrapolation from Pettitt’s analysis, must have been extremely simple and unsophisticated.

Whallon (1989:451-452) believed pre-Upper Palaeolithic populations had probably acquired some minimal level of linguistic ability, but lacked past and future tenses. The inability to express and perhaps conceive of temporal displacement would have excluded expansive kinship systems from developing within their social

organization. Kinship would have been restricted and would have allowed only sufficient minimal “rights and obligations among individuals” to permit mate acquisition and to accommodate some limited sharing of resources and territories. Group size may have been larger but less hierarchically organized due to “less organizational pressure to differentiate internally” (Whallon 1989:452).

An alternative interpretation was developed through a study of the evidence for lithic transport and curation in Europe during the Middle Palaeolithic by Wil Roebroeks, Jan Kolen, and Eelco Rensink (1988:17-34). The distances of raw material transport increased over time from the Plio-Pleistocene, early Palaeolithic through the Upper Palaeolithic. The most significant change in distances occurred during the Late Middle Palaeolithic which, by comparison, exhibited little difference from the Early Upper Palaeolithic. In addition to raw material transport, the hominids transported and maintained toolkits as well as utilized local raw materials. Exotic raw material artifacts were transported; products manufactured from local raw materials were usually discarded locally. These activities signified technological organization. The transportation of raw materials and the transportation and curation of tools implied planning depth and anticipation on the part of these hominids. Transport distances correlated to the “activity radii” of the hominid groups and the increase in distances associated with colonization or the expansion of territorial ranges and incursions into regions of uncertain resources. (Roebroeks, Kolen, and Rensink 1988:30). Knowledge of future needs was implied by the planning and anticipatory behavior of the hominids. “Fundamental forms of behavior such as anticipation over larger time intervals and information exchange must be

considered prerequisites for the colonization and exploitation of such regions”

(Roeboeks, Kolen, and Resnink 1988:30).

Graves (1991:521) posited that Neandertals were more dependent on “intragroup rather than intergroup” relations and their social organization was more cohesive with all members participating in all activities. This pattern of behavior contrasted with the behavior of groups who splintered into various activity aggregations. The interaction between Neandertals and modern humans, implied by their temporal overlap in southwestern France and the Levant, afforded the opportunity for acculturation on the parts of both populations. The interaction might have extended to integration via the acquisition of mates. Graves (1991:520) believed that Neandertal females were more involved in subsistence activities, including hunting, and were, therefore, the social equivalents of males. Biological constraints for Neandertal females, such as neoteny and hypothesized longer gestation periods, in conjunction with differences in social status may have excluded Neandertal females as potential partners for modern human males. Modern human females may have been advantageous partners for Neandertal males in reproductive terms as well as social terms as modern human societies were male dominated. The absence of Neandertal mt-DNA in modern humans could be explained if hybridization was asymmetric and occurred only between modern human females and Neandertal males (Graves 1991:518-524).

Mellars (1996:356-357) identified the patterns expected in modern social organization: long term male/female pair bonding, formation of families and temporally durable “residential groupings”, sharing of food with mates and offspring, incest taboos

and exogamy, and the establishment of home bases. The archaeological residues indicative of social organization for both modern humans and Neandertals were roughly similar although not identical. Mellars (1996:364) argues “the sudden appearance and proliferation of personal ornaments in early Upper Palaeolithic sites is likely to reflect either an increase of emphasis on individual personal roles and social relationships in Upper Palaeolithic societies, or a much clearer definition and symbolic expression of their roles, based on more complex and highly structured language patterns”. The previous statement explains White’s (1989a:176) prediction of a “total restructuring of social relations across the Middle/Upper Paleolithic boundary”.

OTHER COMPONENTS OF BEHAVIORAL EXPRESSION

BURIALS

Several Neandertals skeletons have been recovered in contexts and positions reminiscent of burials. Their acceptance as deliberate inhumations and the spirituality implicit in this type of mortuary behavior is strongly challenged. The symbolic nature of Neandertal burials is also adamantly contested. This topic is discussed in detail in the next chapter.

ART AND PERSONAL ORNAMENTATION

The florescence of mobiliary art forms and objects of personal ornamentation allied with the Aurignacian Industry signalled a change in cognitive capacities particularly the ability to think symbolically or, as White (1989b:99) suggested,

to think “visually”. Art forms in conjunction with new types of tools and new technologies were also indicative of greater complexity in social organization, in particular the development of more hierarchical systems with social differentiation. Personal ornamentation may have designated individual or corporate identity. Rolland (2000:personal communication) suggested the apparent florescence of artistic forms represented an intensification of ‘material expression’. The rarity of art objects recovered from Middle Palaeolithic sites indicated to Chase and Dibble (1987:284) that symbolic expression leaving archaeological traces was not a “regular, integral part of Middle Palaeolithic adaptation”. Rolland (2000:personal communication) contends that many of these generalizations rely too heavily on ‘material expression’ which is only a portion of the potentially symbolic behavior of these hominids.

Other researchers besides Rolland, in particular Alexander Marshack (1997, 1996, 1988) and Brian Hayden (1993), have staunchly defended Neandertals’ capacity for symbolic behavior. Red ochre and manganese dioxide fragments [with or without use traces], La Quina’s reindeer phalange and fox canine [each perforated], incised bones and a perforated bone from Pech de L’Azé II [recovered from Rissian deposits]; grooved cave bear teeth from Sclayn (Bar-Yosef 1988:14); perforated bones [a swan vertebra and a wolf metapodial] from Bockesteinschmiede; a carved oval plaque and an incised fossil nummulite as well as a polished mammoth ivory with ochre stain from Tata (Bordes 1968:110); an hypothesized bone ‘flute’ on a bear femur [Divje Babe I, western Slovenia] (D’Errico, Francesco; Paola Villa; Ana C. Pinto Llona; and Rosa Ruiz Idarraga 1998:78); beads made of fossilized shell, a crinoid, carved bone and animal

teeth from Chatelperronian levels at Arcy-sur-Cure [Grotte de Renne in France], an engraved bone fragment from Mousterian levels at Bacho Kiro [Bulgaria] (Marshack, Alexander 1988:67), a plate of engraved flint cortex [Quineitra in the Golan Heights] (Marshack, Alexander 1996), the Berekhat Ram figurine (Marshack 1997), and a limestone block with carved cupmarks from La Ferrassie [La Ferrassie 6 burial of a child] (Binant, Pascale 1991:10)” were among the few potential ornaments, art objects, or symbolic elements recovered from pre-Upper Palaeolithic contexts. (See also Mellars 1996:369-375).

Many of the artefacts from the previous list have been systematically rejected as deliberately manufactured and therefore excluded as symbolic evidence. For example, the bone ‘flute’ was re-analyzed and the holes were found to be the result of carnivore damage (D’Errico *et al* 1998:78). By contrast, the Berekhat Ram figurine was recently re-evaluated by April Nowell and Francesco D’Errico. Nowell presented a report on the findings at the 1998 CAA Conference (Nowell 1998:presentation). (See also Marshack 1997). This figurine, apparently a crude carving of a female, was described as deliberately modified. The Berekhat Ram figurine was dated between 280,000 and 250,000 BP and was discovered in Upper Acheulian Deposits in the Golan Heights.

Red ochre and manganese dioxide are materials frequently used as pigments for body painting, coloring objects, or art work. The upper layer of the site of Maras revealed a “1 in. diameter ocher floor with reindeer bones and an ocher stained hammerstone” (Rolland 1999:328). The presence of the materials in Middle Palaeolithic deposits and their use as coloring agents are not disputed “The critical issue here is

whether the simple use of colouring materials can be regarded as an explicitly symbolic act (Mellars 1996:370). Red ochre is also used in tanning hides and making medicine (Bar-Yosef 1988:14).

Paul Bahn (1996:206) posited two reasons for the lack of “solid evidence of art before the Upper Paleolithic”. The first reason was the pre-determination of the absence of art before the Upper Palaeolithic by researchers in the field of palaeoanthropology. The pre-determination of absence emphasizes the circularity of this argument. Taphonomic processes and the damage caused by these processes supplied the second reason for the absence of evidence. “The further back in time we look, the more truncated, distorted, and imperceptible will the traces of art appear” (Bahn 1996:206).¹⁹

Chase and Dibble (1987:283) questioned the linkage of a Middle Palaeolithic “esthetic sense” to a representative symbolism. In fact, symbolic behavior appeared to be either minimally developed or perhaps only arose as isolated, unrelated episodes (Chase and Dibble 1987:285). Potentials are not demonstrations, and the potential for symbolism cannot be used to argue for the demonstration of symbolic behavior (Chase and Dibble 1987:282).

¹⁹ Prime examples of this type of distortion were the petroglyph discoveries in the Côa Valley of Portugal. These petroglyphs were discovered in open air locations and were dated on stylistic grounds to between 20,000 and 10,000 years BP. The stylistic attributes corresponded to similar art forms from Upper Palaeolithic caves. Erosion had occurred and the petroglyphs were also coated with silica glazes. Carbon dates, based on the assumption that the silicate glazes created a closed, non-contaminated system, recommended a younger age of less than 7000 years BP. However Ronald I. Dorn (1997) conducted research which suggested the system was open and was subject to contamination. Although no secure dates were established, the possibility of contamination, via erosion or even re-engraving, made the older dates more reasonable. If Upper Palaeolithic people were decorating the environment outside of cave contexts, and as erosion damaged exposed surfaces and impeded accurate dating; the greater time depth for Middle Palaeolithic art would have exacerbated this distortion. Also, re-engraving, if it did occur, might have obscured earlier art. Although hypothetical, this possibility cannot be ignored.

SUMMARY

The suspected behavior of Neandertals has only been partially elucidated in this chapter. Researchers agreed that Neandertals created tools; occupied caves and rock shelters; utilized open air sites for various activities; hunted game; built hearths; bore children; and left the remains of their dead [intentionally or unintentionally] in the caves and rockshelters they occupied. The complexity of their life ways, the intricacies of their social organization, their ability to symbolize; their linguistic communication skills, and their spirituality are rigorously debated.

The articles cited in this chapter represent only a miniscule sampling of the thousands of articles which have been written on the subject of Neandertal behavior. They were chosen to delineate the extreme polarity of Neandertal behavioral interpretations. The most striking feature of these opposing explanations is both arguments are posited on the same archaeological evidence. Many explanations derive from basic interpretive assumptions which are not necessarily proven. For example, the value of Gamble's elegant discussion of tool production and use as thought in action is diminished by the assumption that Lower and Middle Palaeolithic hominids lacked extended social networks and, therefore, their tool production and use was the result of habituation. Although Gamble's interpretation may eventually be proven correct, for the present this assessment exhibits a leap in logic which is unwarranted. The Chatelperronian industrial variant is a Transitional or early Upper Palaeolithic industry which is accompanied by artifacts of personal ornamentation and Neandertal skeletal remains {the Saint-Césaire specimen from La Roche à Pierrot and the Grotte de Renne

remains from Arcy-sur-Cure]. If this industrial variant was the result of acculturation through Neandertal contact with modern humans, as Grave's (1991:521-522) advocated, then Neandertals probably developed extended social networks and generally behaved like modern humans. With modern humans, diffusion and acculturation are widespread mechanisms of social change and adaptation.

As Mellars suggests, most behavioral investigations focus on the technological and typological analyses of lithic assemblages. As technology is only one aspect of culture, the intense concentration on this single aspect is likely to bias behavioral exegeses. Neandertal behavioral modification is witnessed with the emergence of transitional industries such as the Chatelperronian in the Perigord region of France. Whether the development of the Chatelperronian is the result of acculturation or independent innovation is not clear; however, the fact that Neandertals were capable of responding to conceivably new stresses is registered in the production of this new industrial variant.

Perhaps the most significant problem encountered in the analyses of Neandertal behavior was time compression; the 100,000 to 200,000 years predicted for the existence of Neandertal morphology has been compressed into a singular phase. (See Rolland 1999). Evolution is not a static process; it is continuous. Time compression and the palimpsest nature of archaeological deposits has tended to obliterate changes which were surely occurring within Neandertal populations from a paleoanthropological perspective. Furthermore, comparisons, particularly in Western Europe, between Neandertal behavior throughout their temporal span of existence and anatomically

modern human behavior from later time frames tends to distort and exaggerate the differences between the two populations.

Finally, other archaeologically recoverable aspects of behavior should be correlated with the evidence from lithic research. These include the occupation signatures of the hominids derived from spatial analysis such as the relationship of the disposal units for the dead to other features within sites. Patterns of behavior inherent in the placement and treatment of the deceased can and frequently do have symbolic correlates. The type of information derived through these studies augments the interpretations derived from lithic analysis and produces a broader understanding of behavioral capacities and responses.

Chapter 5: BURIAL

“While the case for the existence of intentional burial practices in Neanderthal contexts remains strong, evidence for possible rituals or symbolic offerings associated with burials [at least in European contexts] is very weak” (Mellars 1996:375). However, acceptance of deliberate inhumation is not universal. Robert Gargett (1999, 1989) rejected Neanderthal burials, in particular, and Middle Palaeolithic burials, in general, based on principles of geomorphology, sedimentology, and taphonomy. Natural processes were responsible for the fortuitous deposition of hominid corpses and for their preservation. More specifically, Gargett concentrated less on biological mechanisms and more on mechanical or geological processes which contributed to the taphonomic history of the fossils, particularly those related to cave or rock shelter formation and degradation. Gargett credited the impression of inhumation to the influences of solifluction, cryoturbation, karstic collapse, solution holes, slumping and infilling, and rapid sedimentation rates within caves and rock shelters. Middle Palaeolithic hominid remains are only discovered in caves or rock shelters because preservation of osseous material is better in these areas due to “sedimentation rate, mode of deposition, pH, and microclimate” and the bones are not “lying out in the open” (Gargett 1999:35). Many of his arguments are pertinent and might account for some of the posited inhumations or for some post-depositional disturbances; but, some of his disputations are weakened by an inadequate recognition of other aspects of taphonomy; by the elimination of archaeologically significant, non-random patterns in the disposals; and by a failure to

incorporate the physical situation of the site. The discussion of the La Ferrassie burials was particularly problematic. La Ferrassie is not located on a high cliff overlooking a deep valley such as Roc-de-Marsal. Instead, the large rock shelter of La Ferrassie is located near the mouth of two small valleys on a relatively gentle incline at the base of a hill. A small cave yielding Aurignacian and Perigordian tools is located above the rock shelter and another Mousterian shelter is situated above this cave (Defleur 1993:70; personal experience). La Ferrassie is more exposed than many others in the region. Unprotected corpses would have been vulnerable to scavengers and predators.

TAPHONOMY AND DIAGENESIS

This section examines the skeletal remains of fossil hominids in terms of some of the processes which operate to alter or modify them during their metamorphosis from newly deceased, fully fleshed organisms to complete or fragmentary skeletal remains recovered in archaeological sites. An understanding of these processes is critical to differentiating biological and mechanical disturbances and to the identification of contexts which may correlate with deliberate inhumations or even culturally prescribed treatment of the dead [curation]. An examination of the processes of mortification and the potential for preservation of more recent remains establishes a useful background for understanding and interpreting the recovery contexts of hominid fossil occurrences. Fossilization, taphonomy, and diagenesis relate directly to preservation and incorporate crucial mechanisms for modification of skeletal remains. None of these factors is solely responsible for decomposition, skeletonization, and most significantly preservation. The

degree of preservation is the result of many components acting in concert or individually over time. All these mechanisms may be classified as conditioning agents of taphonomy.

FOSSILIZATION

Fossils are the remains of prehistoric animals and plants. Usually they are some hard part of the organism, resistant to decay, that has been preserved, enclosed in sediment - past life that has been buried with the rocks and entombed inside them. Fossils can equally be the record of activity of animals - fossil footprints, or the tubes and trails of soft-bodied worms that otherwise leave no trace. (Fortey, Richard 1991:9).

Palaeolithic hominid remains are called fossils. Pascal Tassy (1993:31) describes a fossil as ‘petrified time’: “.....an object out of the past, imprisoned in geological strata, a direct eye-witness to history”. As such, fossils are verification of evolution. Roland Goldring(1991:2-3) adds seven other categories of information besides evolutionary data retrievable from fossils: (1) systematic and morphological information for the “identification and classification” of the specimen, (2) physiological, (3) energetics²⁰, (4) ecological, (5) taphonomic²¹, (6) stratigraphic, and (7) diagenetic²².

The word fossil derives from a Latin term ‘*fodere*’ meaning ‘to dig’.

Originally, the application of the term was intended to represent “anything extracted from

²⁰ Energetics are “energy transformations within communities” (Goldring 1991:2).

²¹ Goldring (1991:3) did not use the term taphonomic, but his terms “hydraulic, stratinomic, and younging” or “geopetal” are combined under the study of taphonomy.

²² Diagenesis, according to Goldring (1991:3) as well as Bruce M Rothschild and Larry D. Martin (1993:43-50) is the process of “physical, chemical, and biological” changes which act upon or alter the fossil after deposition.

the Earth that was likely to arouse interest and curiosity” (Lecourt, Dominique 1993:7). This usage was altered in the late 1700’s to label once living organisms whose remains were preserved in rock. Cuvier, the apostle of catastrophism, was influential in clarifying the organic origins of fossils. His text, *Recherches sur les ossements fossiles des quadrupèdes*, marked the inception of comparative anatomy as a scientific endeavor. Although Cuvier was not an evolutionist, comparative anatomy eventually became an important discipline in the study of evolution.

Fossilization is not necessarily synonymous with mineralization, although this is frequently the result. Technically speaking, osseous material can still be present. The degree of fossilization [more appropriately mineralization] of Amud I was described by Hajime Sakura (1970:122) as “relatively low”. Once an organism dies and is covered by sediments, the fossilization process begins.

Burial is a critical prerequisite to any fossil preservation and obrution deposits reflect exceptionally rapid burial events in which the bodies of organisms were abruptly and permanently entombed in the sediment. Keys to the recognition of obrution layers in the field include complete articulated multielement skeletons.....”. (Brett, Carlton E; Gordon C. Baird; and Stephen E. Speyer 1997:10)

Shells, teeth, bones, and wood are generally the types of organic remains amenable to fossilization. Soft tissues will only fossilize in very rare circumstances. As the organic materials deteriorate, the consistency of the bone or shell residues become more porous. Lacustrine environments or the presence of ground water exacerbates this situation as water permits leaching of elemental constituents of bone such as calcium. The porosity

of materials facilitates the mineralization process to which some fossils are subjected (Fortey, Richard 1991:14). The pores or small openings become the substrate for the deposition of non-organic minerals such as silica, lime, or iron (Rhodes, Frank H. T., Harold S. Zim, and Paul R. Schaffer 1962:12). The density of the fossil is often greater than the same element in a living organism (Fortey 1991:14).

The nature of the sediments encasing the fossils influences the condition of the remains. For example, ancient fossilized creatures deposited in shale tended to be compressed while those deposited in limestone tended to maintain most of their natural form. Warpage can occur due to the weight of the deposits overlying the remains (Fortey, Richard 1991:14). Fossilized hominid crania often exhibit evidence of warpage and flattening. Other taphonomic processes can also damage or distort fossilized remains.

TAPHONOMY

“Taphonomy literally means “the laws of burial” and less formally concerns all aspects of the passage of organisms from the biosphere to the lithosphere” (Olsen, Everett C. 1980:5; internal citation from Effremov, I. A. 1940). Roland Goldring (1991) uses two similar terms with slightly different nuances of meaning: stratinomy and taphonomy. Stratinomy refers to the “processes between death of an organism and its final burial” while taphonomy describes “all the changes that occur to an organism [or its work] between death and discovery as a fossil. Technically speaking, diagenesis is a non-mechanical, taphonomic process (Goldring 1991:206). Concepts of taphonomy extend to archaeological applications and incorporate any changes which occur within a site or to artifacts.

PRESERVATION

Several factors affect the likelihood of preservation of skeletal remains as well as the rate of decomposition of a fresh corpse. The physical context of deposition is one of the principle determinants of preservation. The environment and environmental history play important roles in the conservation of remains so the physical attributes of the scene of corpse recovery delineate important variables affecting the condition of the remains. Exposure to the air, temperature (or history of temperature fluctuations), amount of moisture, types of sediment and soil chemistry all contribute to the degree of deterioration of the corpse and the amount of damage to osseous material.

DECOMPOSITION AND THE ENVIRONMENT

Insects and micro-organisms such as bacteria assist in the decomposition of corpses. Insect invasion follows a series of approximately eight waves involving different types of insects (Krogman and Iscan 1986:23-28). The onset of the first wave begins immediately after death. The final wave removes the last vestiges of soft tissue still adhering to the skeletal material.

Deposition in open air locations immediately exposes the corpse to several mechanisms which promote or deter decomposition. For example, exposure to air, wind, water, and moist environments [hot or cold temperatures] “accelerate” mortification of soft tissues while snow and arid conditions [hot or cold temperatures] “decelerate” decomposition (Krogman and Iscan 1986:30-31). Examples of this type of preservation are the frozen mammoth recently discovered in Siberia and the frozen Scythian tombs in the Altai (Rolland 2000:personal communication).

Accessibility of the corpse to animals, such as dogs, wild pigs, and rodents can also speed up the decomposition process. Solecki (1971:242) encountered rodent burrows which led to the Shanidar skeletal remains. He suggested the rodents were attracted by the decomposing bodies.

In open air contexts, soil chemistry immediately affects the regions of the body in direct contact with the soil. Acidic soils rapidly destroy tissues and bone. Body decimation is slower in alkaline soils (Krogman, Wilton Marion and Mehmet Yasar Iscan 1986:30-31, Hill, Andrew P.1980:143). Plants will also cause damage to bone through general growth processes.

Exposed bodies decompose at a faster rate than those interred in the ground or deposited in water. The average time for mortification and dessication is between three and five years in temperate climates (Krogman and Iscan 1986.30).

In general, skin, ligaments, tendons, and bone deteriorate more slowly than the other soft tissues. Sequentially, decomposition occurs in the following order: “(1) brain; (2) liver; (3) lungs; (4) G. I. tract; (5) spleen; (6) urogenital system; (7) skin, muscle, tendon; and (8) bone (Krogman and Iscan 1986:31). The timing of this sequence is altered by internal conditions of the body of the deceased. Disease and puncture wounds of the abdomen rank high among these conditions.

“The degree of preservation of bone in the natural environment is a function of time and the environment” (Hare, P. E.1980:208). Faunal activity, as indicated above, also contributes to the state of preservation of bone. Weathering of surface bones alters the integrity of the structure. Cracks begin to appear one to two years

after exposure and become more pronounced over time. Significant damage is evident by 5 to 10 years of skeletonization in moist, hot environments. The organic constituents of bone decay more rapidly in hot conditions and bone chemistry is altered as elements are ionized in the presence of water and leached from the bone. This process can quickly reduce bone to hydroxyapatite crystals. The reverse is true of bone exposed in hot, dry climates. In this case, “decay may never occur” (Krogman and Iscan 1986:30). In fact, in terrestrial environments bones rarely endure beyond 10,000 years due to the instability of hydroxyapatite (Lucas, Jacques and Lilian E. Prévôt 1991:397). By this time, the bone has generally broken down into soils.

Anna Kay Behrensmeyer (1991:312-313) devised a table which related “environmentally controlled circumstances which contributed to preservation” of skeletal remains. All environments subjected remains to similar destructive and/or conservative processes. Physical agents included the amount of water, the rate of sedimentation, and temperature changes. Chemical influences were related to anoxia; soil chemistry, such as alkalinity or acidity; and the presence of calcium carbonate and minerals. Gargett (1989), as mentioned above, discussed other mechanical processes like earthquakes, cave degradation, and roof collapse. Biological contributors were bioturbators and other animals, bacteria, and hominids.

The circumstance which relates most directly to this discussion of burials in the Middle Palaeolithic is cave disposal although hominid remains were recovered from rock shelters. Deposition in caves removed hominid remains from the influences of some environmental factors, in particular extreme fluctuations in “temperature and

moisture” and exposure to “surface processes”; but, made them vulnerable to “chemical precipitation of CaCO₃” [calcium carbonate] and damage caused by “bone collectors”, animal “denning” and “bioturbators” (Behrensmeyer 1991:313). Destruction of osseous material is fairly rapid in acidic soils which are low in calcium and phosphorus.

Limestone caves have a fairly alkaline soil base, although infiltration of highly acidic ground waters can damage the structural integrity of both the cave and the bones by leaching calcium.

Corpses disposed in rock shelters would be more vulnerable to external influences. At the rock shelter of Skhul, most of the hominid disposals were on the terrace outside the drip line of the shelter overhang. The limestone structure of the rock shelters would contribute to the alkalinity of the soil base. However, unprotected corpses would be more exposed to weathering processes, carnivores, carrion avifauna, and other forms of biological and mechanical disturbances. Fortuitous inhumation of the articulated hominids by natural processes at Skhul seems suspect.

ANIMAL

Forensic and archaeological studies indicate most human remains deposited in open air contexts or exposed on the surface almost invariably exhibit evidence of animal damage (Morse, Dan 1983b:148). Andrew Hill’s (1980:31) studies of post-mortem damage to carcasses suggest that “concurrent with damage to bone are other changes involving loss of soft parts, disarticulation, and the dispersal of skeletal elements.” In particular, the bones will be scattered, trampled, gnawed, or broken in a

prescribed fashion directly related to the type of fauna responsible for the alteration or dislocation.

Animals are also known bone-collectors. “Porcupines”, hominids, “hyenas and other scavenger predators”, and “leopards” rank among the principal perpetrators of this activity (Brain, C. K. 1980:107). Some specific patterns of scattering are noted in the literature. Pigs are known to remove small bones from exposed carcasses as well as ‘root’ as deeply as two feet below the surface. Pigs are capable of uncovering a shallow grave. Some birds, especially black vultures, can completely deflesh a corpse in one to three days. Carrion avifauna tend to congregate around a carcass. Their joint activities cause “larger bones and sometimes entire carcasses to be moved” (Morse 1983b:150). Birds are also able to carry small fragments of a corpse [bones and/or flesh] short distances. Racoons scatter bones; but, they do not appear to damage the bone by gnawing or chewing. Land crabs will sequester small bones from human corpses in little caches. Black bears are known to kill and eat humans in certain situations; however, they avoid contact with human corpses which are not their own prey. Even deer, sheep, cattle, camels, giraffes, wildebeest, and antelopes are known to chew on bone. One explanation for this practice is acquisition of minerals which are lacking in their environment, such as phosphorus. “A deer will place an end of a long bone in the back of his mouth where the rear teeth will grind off the convexity leaving a peculiarly looking two-pronged fork” (Morse 1983b:152).

In general, animals can disarticulate and scatter exposed remains over considerable distances. One case study mentioned in Morse (1983a:127) discussed the

spread of the skeletal remains of one individual over nine acres in less than three months due to the activity of a pack of dogs.

DELIBERATE INHUMATION - DIAGNOSTIC CRITERIA

Several palaeoanthropologists considered the circumstance of some of the Neandertal depositions strongly indicative of intentional inhumation which merited further research. They engaged in the study of suspected Neandertal burials in order to isolate specific criteria to aid in identifying deliberate interment. They were also interested in the nature of Neandertal mortuary practices. The details of these mortuary studies are discussed later in this chapter.

Sally Binford (1968:140-141) used the presence of a grave pit and/or “an arrangement of the body or body parts which seemed to preclude natural agency” to establish the deliberate nature of interment. This description encompassed many exceptionally fragmentary remains. Francis Harrold (1980:197) required more positive proof of inhumation such as a “strongly flexed body position” and a definitive burial pit or unambiguous inclusion of artifactual material associated with the skeleton or recovered from the confines of the pit. Alban Defleur (1993:57-58) designated four crucial elements favoring deliberate inhumation: (1) direct articulation or anatomical association of skeletal remains; (2) a body recovered in a flexed or contracted position lying on its back or one of its sides; (3) the presence of a burial pit; and (4) some form of inclusion associated with the skeleton. Anatomical association recognized conditions in which the remains were generally still in association, but not completely articulated. For Anna

Belfer-Cohen and Erella Hovers (1992:464), the most important criteria for the identification of deliberate inhumation was the articulation of the skeletal elements recovered even when these were not complete remains. Y. A. Smirnov (1989:212; cited in Belfer-Cohen and Hovers 1992:464) indicated good preservation of osseous remains were crucial to the identification of an intention burial, particularly as most areas of corpse placement, “pits and hearths or mounds and stoneworks” improved preservation of bone.

The section on taphonomy and diagenesis identified the types of factors which influence the preservation of hominid remains. More importantly, the likelihood of survival of remains, particularly articulated and associated remains, is overwhelmingly low if some method of corpse protection was not employed at the time of death. “Because disarticulation is relatively rapid in both subaerial and aquatic environments, preservation of articulated fossil bones indicates rapid burial or other circumstances such as anoxia that prevent scavengers and bioturbators from disturbing the skeleton” (Behrensmeyer 1991:301). This information strongly supports the assumption of deliberate inhumation for articulated and associated remains.

The taphonomic history of fragmentary remains, including the possibility of behavioral activity, needs to be understood as their survival and recovery from any site is at least as significant as that of more complete remains. Deliberate cutmarks, disarticulation, calcination, and bone breakage are important taphonomic clues to behavioral activities. (See Defleur, Alban; Tim White; Patricia Valensi; Ludovic Slimak; and Évelyne Crégut-Bonnoure 1999:128-131).

Many of the criteria discussed at the beginning of this section are relevant and worthy of consideration as indicators of intentional inhumation. Binford's (1968) description is useful in the determination of deliberate disposal and perhaps curation of remains. In the case of curation, additional criteria need to be included. These additional criteria might involve disposal within a particular or restricted zone within the site, consistent orientations of specified elements, or apparent non-random choices of skeletal elements. The taphonomic history of the disarticulated remains [mentioned above] is also relevant. The total number of skeletal elements recovered or the number of skeletal categories represented is pertinent to both inhumation and curation..

Burial pits, when distinguished, provide fairly reliable information as to the deliberate nature of a disposal although solifluction and cryoturbation can create the false impression of a pit outline (personal experience). Pits from Middle Palaeolithic deposits can be difficult to discern. Solecki (1971:223, 241, 242) recognized that burrowing animals disrupted and mixed the deposits in Shanidar Cave. "Rodent burrows around the skeletal remains led to the location of Shanidar V" (Solecki 1971:242).

Inclusions associated with skeletal remains are not yet fully and consistently accepted as intentional offerings to the dead. The mundane nature or everyday character of some of the material contained in suspected Neandertal burials has led many researchers to reject most posited inclusions. Until consensus is reached regarding what constitutes deliberate inclusions, this feature alone cannot be used to define deliberate inhumations.

Flexed or contracted body position seems to apply in the identification of a deliberate inhumation; however, other body positions are possible. While individuals from prehistoric burials are often discovered in flexed positions, burial positions varied considerably and possibly reflected culturally prescribed methods of burial or differential status and treatment. Brown (1981:35 - 37) described “extended, bundled, and scattered bone burials” for the Klunk-Gibson of the Hopewellian Phase in Illinois [110 B.C. - A.D.400]. Saxe (1971:46) found variation among the female burials of Wadi Halfa; one was on her back in an extended rather than flexed position. (For more examples, see Chapman, Kinnes, and Randsborg 1981).

Articulation of skeletal remains appears the most significant criterion indicating deliberate inhumation. Association of skeletal elements indicates similar taphonomic factors as articulation. Bloating during the process of decomposition of a corpse, biological and mechanical disturbances, and plant growth can lead to semi-disarticulation or disarticulation of skeletal remains (Behrensmeyer 1991:301). However, these remains may still retain some degree of anatomical association.

The number of skeletal elements or number of skeletal categories represented in the disposal is also important in the determination of deliberate inhumation, particularly in cases of potential secondary interments.

The condition of the osseous material is more dependent on the context of deposition, the position within the site, and the degree and types of taphonomic processes as well as the weight and composition of overlying sediments.

Gargett's (1989) discussion of geomorphological processes and mechanical disturbances cannot be dismissed either. All lines of evidence must be brought to bear on the information to assess the potential intentional nature of the disposal.

MIDDLE PALAEOLITHIC MORTUARY PRACTICES

Besides contributing to the establishment of criteria identifying deliberate inhumation, mortuary studies have advanced considerable information on the treatment of the dead in the Middle Palaeolithic.

In 1965, Bernard Vandermeersch published a lengthy and informative article on the Middle Palaeolithic hominid remains from Southwestern France. This publication preceded the publication of the *Catalogue of Fossil Hominids I, II, and III* (Oakley, Kenneth Page, Bernard Grant Campbell, and Theya Ivitsky Molleson 1967, 1971, 1975). Vandermeersch (1976) readdressed some of the French sites and confirmed that deliberate burial was practiced by Neandertals in France; however, the deliberate nature of inclusions and the association of features could not be demonstrated because of errors in recovery methods and gaps in the data published in site discussions.

Binford's (1968) study recommended marked differences between Western European and Near Eastern Mousterian burials particularly in some of the demographic distributions, the skeletal elements represented by fragmentary remains, location in the sites, body position, and inclusions (Binford 1968:143). Two of the most striking differences were: (1) females were under-represented in the burial population and

(2) the various forms of burial treatment accorded children in the Near East as compared with Western Europe indicated “more kinds of social distinctions were made” in the Near East (Binford 1968:144).

Francis Harrold (1980) also conducted a comparative study of Middle and Upper Palaeolithic burials. Harrold (1980:198) recognized “statistically verified differences between groups of Palaeolithic burials” which he ascribed to “sociocultural variability” in mortuary practices. Mousterian burials implied some degree of sexual differentiation. Harrold noted a bias favoring male remains; but this bias was more marked in Western Europe than in the Near East. Neither of these were statistically significant due to sample size. Inclusions and associated features/artifacts were recovered only in relation to male burials which suggested a “more complex social *persona*” for males (Harrold 1980:207). No age distinctions were noted for the samples studied. Most of the burial positions were identified as ‘foetal’ or strongly flexed. Harrold (1980:201) contradicted Binford’s (1968) suggestion of more social distinctions in the Near East and disputed her finding of inter-regional differences.

E. Bonifay (1988:34) argued against the supposition that Neandertal burials represented a hygienic measure to protect the living from contamination by the decomposing corpse. He believed Neandertal burials were highly significant in both their symbolic and behavioral implications. These burials identified a concern for the living and deceased members of the society, the notion of an afterlife signified by food offerings, a sense of the sacred such as recommended by the evidence from Regourdou, the ability to think abstractly and to communicate linguistically, and the emergence of

more complex cultural perspectives and social structures with some levels of differentiation.

Pascale Binant (1991) approached mortuary studies from a totally objective perspective. A catalogue of burials was created which listed the site, the excavation history, archaeological data, and burial attributes. No personal observations or conclusions were offered.

A regionally specific study was conducted by Anna Belfer-Cohen and Erella Hovers (1992). Middle Palaeolithic burials in the Levant were compared to Natufian burials in the same region. Chronologically, the Middle Palaeolithic and Natufian periods were separated by about 30,000 years. The intervening Upper Palaeolithic and Epi-Palaeolithic have so far yielded mainly skeletal fragments and very few burials. Among these remains were 5 burials and several burned skeletons from Kebaran levels at Kebara Cave (Belfer-Cohen and Hovers 1992:464). The researchers main argument rested with the acceptance of burials for the Natufian without adherence to the criteria required to establish the intentional nature of Middle Palaeolithic burials. Some specific elements in Natufian graves corresponded with features noted for some of the suspected Middle Palaeolithic burials: stones were part of the burials in the Natufian and not the fill matrix; drilling of small cup marks in the stones above and beside graves at Nahal Oren and Hayonim Cave [La Ferrassie 6 burial had cupmarks etched into the stone overlying the grave]; Natufian grave goods were rare and when present were generally common ornaments; direct relationships between grave goods and the corpse in the Natufian were often difficult to establish (Belfer-Cohen and Hovers 1992:465-466).

In summary, the “most that can be said about the common Natufian burial is that it consists of a flexed skeleton lying in a shallow pit, without grave goods or decorations” (Belfer-Cohen and Erella Hovers 1992:468). This description fits depictions of most of the Mousterian burials regardless of their association with modern human forms [Qafzeh and Skhul] or with suspected Neandertal forms.

In a comparison of behaviors expressed by disposal of the dead, E. Hovers, Y. Rak, R. Lavi, and W. H. Kimbel (1995) determined that “strong similarities” as well as “subtle differences” existed between anatomically modern humans and the supposed Neandertals in the Near East which might support the taxonomical classification of *Homo neandertalensis* for Neandertals. The spatial distribution of remains in Neandertal sites differed from the distribution of modern humans. Neandertals were generally clustered in a specified zone inside caves, while modern human burials were congregated at the entrance of the cave [Qafzeh] or distributed across the surface of the rock shelter [Skhul]. More critically, the major difference between the mortuary practices of the two groups was registered in the more frequent practice of “intentional [symbolic] burial” for the modern human populations (Hovers *et al* 1995:58).

V. A. Alekshin (1995:753) recommended that the mortuary practices established during the Middle Palaeolithic were fairly “stable” and signified no “radical change over time”. Transformations were gradual and the burial rites practiced in the Mousterian period resembled those of later periods. Individuals were still buried in pits at the sites and in ritual postures with or without inclusions and associated features. Neandertal burial ritual was different from subsequent periods particularly in the form of

“post-mortem manipulation of corpses” (Aleksin 1995:754). These rituals also registered social differentiation in terms of sex and age where men appeared dominant..

Anne-Marie Tillier (1995) examined the disposal contexts of immature individuals recovered from Middle Palaeolithic sites in the Near East. In particular, she compared the Neandertal and early anatomically modern human mortuary behaviors in relation to children. Tillier (1995:74) emphasized the interpretations of greater complexity in mortuary treatment of modern human children were premature.

By contrast, Herbert Ullrich (1995a, 1995b, 1995c, 1994, 1986) has examined the remains of the majority of the hominid fossil occurrences for the entire Palaeolithic, including the fragmentary remains. He has investigated the patterns and frequencies of the skeletal elements representing individuals. In addition, biological relationships between hominids have been studied. For example, Ullrich (1995a) determined the Spy fossils were probably not related while the entire Krapina population were possibly closely related (Ullrich 1995a:770-771). Ullrich (1995c:363, 368) has tried to demonstrate that populations were selecting specific skeletal elements from their dead for the purpose of mortuary rituals. He has indicated that fragmentary remains belonged to certain ‘favored’ individuals . The selected remains of these individuals were either discarded or buried once the ritual activities were completed. This corresponds with a form of post-mortem processing or curation of the dead (Brown 1981:31, 34, 36).

The most thorough study of Middle Palaeolithic mortuary practices was compiled by Alban Defleur (1993). Defleur was intrigued by the metaphysical nature of the Mousterian populations implicated by their burial practices, particularly the

symbolism inherent in burial and the associated spirituality underlying burial of the dead. He attempted to correlate the patterns of disposal to social organization and to cultural responses. Although his text focused explicitly on burials, he recognized the importance of the fragmentary remains and the patterns of their disposal (Defleur 1993:213-218). Most of his findings have been described in the previous discussions. He mentioned some unique patterns such as the postulated removal of skeletal remains from previously deposited corpses [Kebara 2, Qafzeh 10 and 15], the burial of the dead within the habitat of the living, disposal in pits or under mounds, the relationship of hearths to burials, the correspondence of faunal remains with food offerings to the dead, the association of site features to the disposal units, the relationship of stones to the burial complex, and the covering of burials by other materials besides soil and/or rocks as methods of protection of the body (Defleur 1993:255-267).

POST-MORTEM PROCESSING, CURATION, AND CANNIBALISM

As indicated above, the fragmentary nature of the majority of fossil occurrences has led certain researchers (Ullrich 1995b, 1995c, 1994, 1986; Defleur 1993; Alekshin 1995; Le Mort 1989, 1988) to hypothesize that some form of post-mortem manipulation or treatment of the dead was regularly practiced in the Middle Palaeolithic. This incorporates any form of treatment of the dead such as defleshing the corpse, exhuming and transporting bones, reburial in secondary contexts, displaying skeletal remains, or removing selected bones for specific rituals activities. Cannibalism fits within the category of specialized treatment of the dead and is a form of curation.

Cremation may also be indicated by calcined, fragmentary, and distorted osseous material.

Curation in the Middle Palaeolithic must also be demonstrated using specific criteria. The taphonomic history of the bones; non-random patterning of skeletal elements represented; and consistent location patterning within the site, particularly when the deposition zone is in the same region as identified burials, are considerations pertinent to this determination. André Leroi-Gourhan (1964:47-48) noted the high incidence of isolated cranial and mandibular remains and the low incidence of maxillary remains in Palaeolithic deposits. Mandibles are durable elements which may survive without protection while crania and maxillae are fragile elements which are unlikely to survive without protection. A high incidence of crania recovered in deposits or the recovery of maxillae may indicate the deliberate activity of hominids. Consistency of orientation in the disposal units may also be informative. Other possible explanations must be considered such as biological disturbances of the disposal zone by carnivores, other fauna, or hominids; mechanical disturbances such as earthquakes; diagenesis; or any other evidence which might preclude the attribution of curation.

Evidence supporting curation mentioned in the mortuary studies included the missing cranium and lower limb from the Kebara 2 burial, missing feet from the Qafzeh 10 burial, missing lower body from the Qafzeh 15 disposal, and perhaps the missing cranium from Shanidar III. Defleur (1993:216) recommended the cranium was originally present in the interment of Kebara 2 because an upper molar was found in the deposits. This is probably a correct assumption in this case, but cannot be held to be

representative of all cases. Many individual remains were delineated by teeth alone. To assume that the corresponding body portion was placed in the deposits may be incorrect especially if curation or processing was practiced in this time frame.

Cannibalism or ritual cannibalism was first suggested for the site of Krapina, mentioned in Chapter 2. Since that discovery, other sites have yielded hominid remains with 'cut marks' on their bones. The presence of cut marks was correlated to defleshing of the skeleton and frequently, by inference, to cannibalism. The Engis 2 calvaria, (Russell, Mary and François Le Mort 1986); 3 mandibular fragments and part of a humerus from Combe Grenal (Le Mort, François 1989), and the Circeo I cranium from Grotta Guattari, Italy (White, Tim D. and Nicolas Toth 1991) represent some of these specimens.

Tim White (1992:4) embarked on a detailed study of cannibalism at Mancos 5MTUMR-2346 in the American Southwest in order to recognize specific "osteological manifestations" of cannibalism, particularly patterns of peri-mortem and post-mortem damage which might be correlated with this activity. (See also Defleur *et al* 1999:128-131 and Patou-Mathis, Marylène 1997:63-90). Cannibalism, according to White (1992:9), is defined as the "conspecific consumption of human tissue". White (1992:13) used three categories of cannibalism: (1) survival cannibalism which was "starvation induced"; (2) funerary cannibalism which corresponded to the connection between the living and the dead and which signified some degree of "affection" or obligation; and (3) gastronomic cannibalism which was practiced under "nonfunerary" and "non-starvation" conditions. The patterns indicative of cannibalism must be drawn

from a comparative analysis of human and faunal remains from the same site. The patterns of damage and manipulation of both must exhibit similar signatures particularly the patterns of “cutmarks, percussion damage, fracture, and burning” as well as close correspondence in the “representation of human remains” (White 1992:339).

Another form of cannibalism, ‘warfare cannibalism’ has been suggested for the American Southwest (Lekson, Stephen H. 1997:69; Walker, Amélie A.1997:26). This aspect of anthropophagy introduces another topic relevant to Middle Palaeolithic research: the prospect of endo-cannibalism [cannibalism within a group] or exo-cannibalism [cannibalism outside the group]. This may be a difficult issue to resolve for Middle Palaeolithic sites which exhibit evidence of anthropophagy.

A recent excavation of the site of Moula-Guercy has produced strong evidence for cannibalism during the Middle Palaeolithic in France. “The inference of Neandertal cannibalism at Moula-Guercy is based on comparative analysis of hominid and ungulate bone spatial distributions, modifications by stone tools, and skeletal part representations” (Defleur *et al* 1999:128).

White and Toth (1991:123) clearly demonstrated the ‘cut marks’ on the Circeo specimen were not the result of cannibalistic activities. Instead, these marks were the result of carnivore gnawing. Furthermore, the enlargement of the foramen magnum “has no necessary implication for cannibalism” (White 1992:20). A similar pattern of foramen magnum enlargement was noted in a cranial series collected for the D’Entrecasteaux Islands in the late 1800’s and was related to the traditional practice of displaying cranium on poles (White 1992:19-20).

Russell and Le Mort (1986:322) determined the marks on the Engis 2 specimen were inconsistent with defleshing and concluded the “frontal squama of Engis 2 was repeatedly scored with a stone tool at or near the time of the child’s death”. White (1991:282) disputed the assessment of Engis 2 and indicated the cut marks were the result of recent damage caused by a diagraph needle used in the cleaning and preparation of the calvaria for preservation.

The cannibalism hypothesis for the site of Krapina has been disputed by Erik Trinkaus (1985) and Mary Russell (1987a; 1987b). Trinkaus stated no evidence for cannibalism existed on the Krapina remains. Damage to these remains were most likely post-depositional ones. Russell considered the damage to the Krapina remains consistent with defleshing to clean the bones before secondary interment in the site (Russell 1995b:394). The fracture patterns of the broken bones corresponded to nonhuman taphonomic processes (Russell 1995a:377). Recent research has challenged these assessments and has re-introduced an interpretation of cannibalism for this site (Patou-Mathis 1997:63-90). Human and faunal bones were discovered in association and the patterns of osseous damage on both were similar. Some of the hominid bones from this site were calcined which indicated burning. The presence of burned or calcined bone is part of the list of potential indicators for anthropophagy.

White (1998:personal communication) also stated that most of the marks on the Middle East skeletal remains were due to preparator damage, in particular the Qafzeh remains. The fragmentary remains had not been personally examined by him. White is presently collaborating with Alban Defleur in an analysis of the possible

cannibalized Neandertals in France (White 1998:personal communication). The Moula-Guercy excavation is part of this study.

SUMMARY

The evidence strongly favors the hypothesis that deliberate inhumation was practiced by Middle Palaeolithic populations. The criteria for burial, listed above, established fairly secure guidelines for the determination of the 'likelihood' of deliberate inhumation. The primary criterion favoring inhumation is articulation or anatomical association of skeletal remains. Other lines of evidence such as number of skeletal elements or element categories, pit outlines or cairns over the remains, non-random positions of the body, specialized zones for interment, and inclusions augment this criterion and promote the interpretation of deliberate interment to the level of 'most reasonable' explanation. As with most archaeological reconstructions of past societies and interpretations of behavior, 'likelihood' and 'most reasonable' do not translate into absolute fact. Shanidar is a good cautionary example as the remains of at least one and possibly two individuals may have been accidentally interred by a roof collapse. All the evidence must be examined including the mechanical and geological processes discussed by Gargett (1999, 1989).

The same cautions also apply to curation. All the lines of evidence must be applied to the analysis. To reiterate, details relevant to interpretation of curation are the taphonomic history of the bones, non-random selection of skeletal elements, and deposition in a prescribed zone of the site. Lack of overlap of elements and consistency

of orientation within the disposal unit reinforces the criteria, augments the number of attributes in a 'key' (see Chapter 7), and expedites the analysis.

The balance of this study describes the research design and examines the fossil hominids of the Near East. The patterns identified in the sites and interpretations drawn from these patterns are then assessed and compared with the findings of the previous studies of Middle Palaeolithic mortuary practices.

PART II: Research Design

Chapter 6: RESEARCH DESIGN 1 - ANALYTICAL CATALOGUE OF FOSSIL HOMINIDS

In order to study the structural patterns and the behavioral implications of the patterns suggested by disposal of the dead methods, an analytical catalogue of the hominid fossil occurrences for the Near East was created. The catalogue is one of the major contributions of this thesis and its compilation is the result of an extensive review of the available literature on the sites in the Near East. The challenge of coordinating the vast array of information into comprehensive tables which exhibit minimal redundancy was accomplished via the consideration of the following series of questions.

- 1) What were the general characteristics of each site?
- 2) Which individuals were recovered in each site and what were the ages and sexes represented?
- 3) Were the individual hominids represented by one or more skeletal elements?
- 4) What were the biological or pathological indicators retained on the osseous elements of each individual?
- 5) Where in the site were the hominid remains recovered?
- 6) How were the corpses disposed and what were the disposal attributes for each hominid, such as body position or orientation?
- 7) Was there any evidence for special treatment such as defleshing?
- 8) Were artifactual elements [potential inclusions] discovered in association with the skeletal remains?

- 9) Were features, such as hearths, discovered in close proximity to the hominid remains?
- 10) What were the dates assigned to each site? Were these dates derived by absolute dating methods or through comparative methods?

As a result, the analytical catalogue consists of a number of tables which relate significant variables relevant to the questions considered above and pertinent to the analyses of disposal methods. The tables, described below, included: (1) General Site Data [page 569]; (2) Individuals [page 630]; (3) Skeletal Elements [page 654]; (4) Biological Data [page 727]; (5) Location in Site [page 758]; (6) Disposal, Body Position, Treatment [page 775]; (7) Inclusions [page 791]; (8) Associated Artifacts/Features [page 800]; (9) Dating Methods - Absolute Dates [page 802]; and (10) Dating Methods - Comparative Dates [page 819]. Table 1 relates data about the site; Tables 2, 3, and 4 impart individual details regarding the hominid remains; Tables 5 through 8 provide archaeological information; and Tables 9 and 10 designate the variety of dates established for each site by layer, individual, or some other significantly associated feature.

The most critical attributes of disposal of the dead which proffer the maximum level of information are age of the individual; sex of the deceased; the disposal locations within the sites as well as the positions of the bodies; and the number of skeletal elements or element categories represented. Age and sex are obvious markers for monitoring the relevance of the disposal patterns in accordance with social dimensions. Location within sites can also imply some degree of relationship between the living and the dead as well as inform about the allocation of space within a site. The positions and

to some extent treatment of remains establishes the precise configuration of the disposal. The number of skeletal elements or element categories generates some information about the completeness of the skeletal remains and the potential for deliberate placement or curation.

The structural patterning was analyzed using various aspects of the analytical methods mentioned in the next chapter. Patterns were used to generate models for future testing.

DISPOSAL OF THE DEAD

One of the principle aims of archaeology is to interpret the remains of past societies and to attempt to reconstruct plausible explanations for their social structures and patterns of existence. This task involves the recognition of the processual development of past social systems. The ultimate purpose of these interpretations is to understand the broad range of human diversity in the cultural, ecological, and biological spheres of adaptation. Social organization is basic to most living social systems and the level of internal structuring establishes certain elemental priorities by which a society survives. Analyses of lithic industries, site formation processes, settlement patterns, subsistence practices, and spatial relations within and between sites are presently fundamental aspects of pre-historic research. Lewis Binford (1971:6) states that “one of the most frequently encountered classes of cultural features observed by archaeologists” are human burials.

Methods of disposal of the dead was chosen as the focus of this study rather than mortuary practices or burial analyses. Mortuary practice is a broad term encompassing a wide range of behaviors related to death and dying. These behaviors involve the entire social group. Concepts of and responses to death, preparations for disposal and disposal of the corpse, ritual treatment of the dead, mourning, and fear or respect for the dead are only a few aspects of mortuary practice. Most of these are invisible or minimally represented in the archaeological record. The archaeologically observable elements of mortuary practices are generally the method of corpse disposal, treatment of the body, position of the body, and the grave inclusions. These comprise a minute portion of the entire mortuary procedure. The ceremony and ritual aspects, grave visitations, and offerings may be distinguishable in the archaeological residues around the grave which can enlarge the scope of the observable detail; but the proportion of the entire social practice which this represents remains small. "Only when one is working with a situation in which there is a continuity between the prehistoric assemblage and a known ethnohistoric group is there some potential for positing the rest of the mortuary sequence" (Bartel, Brad 1982:53).

'Methods of disposal of the dead' implies that the mode of corpse disposal is the result of a conscious decision on the part of the surviving population. Conceptually, this term incorporates both primary and secondary forms of disposal. Cremation, disposal in water, disposal in trees or on scaffolds, abandonment, inhumation, placement in ossuaries, and post-mortem processing or curation of corpses (Brown, James 1981:31) are among the many possible means of disposal and methods of

treatment. Some of these modes can occur in combination. An example from Tibet will have a very strange archaeological signature in the future: artifacts, but no skeletal remains. In Tibet, “corpses are dismembered and fed to vultures or other carnivores; the bones are then collected, ground into powder, mixed with barley and flour, and again fed to vultures (Tucci, G. 1967 and Tomasevic, N. 1981; cited in White 1992:12).

CRITERIA

AGE

In order to facilitate a behavioural analysis, the skeletal populations studied were subdivided by age categories. These categories were devised to follow developmental trajectories. Changes in social role within a group often correlate to developmental stages. The categories used in this study were:

Infant = 0 - 12 months
 Toddler = 1 - 4 years
 Toddler/Child = 4 - 5 years
 Child = 5 - 10 years
 Child/Adolescent = 10 - 12 years
 Adolescent = 12 - 15 years
 Adolescent/Young Adult = 15 - 20 years
 Young Adult = 18 - 25 years (when ages are given)
 Adult = > 20 years

Some researchers identified certain adult remains as elderly individuals; but, there was no consistency in this classification. The category ‘elderly adult’ was incorporated in accordance with the individual researcher’s designation.

Many of the non-adult remains were presented by paleoanthropologists as ‘*enfants*’, immature, juvenile or ‘non-adult’. This classification corresponds reasonably well with the medical definition of a child: “the human young from infancy to puberty” (Agnew, L. R. C.; Domingo M. Aviado; Jerome I. Brody; William Burrows; Roy F. Butler; C. Murphy Combs; Carl M. Gambill; Otto Glasser; Maynard K. Hine; Walter B. Shelley; and Lloyd W. Daly 1965:290). Anthropologically, the aforementioned designations and the definition were too broad for detailed analysis of social role or fine-grained interpretations of culturally prescribed social transitions from one life stage to another. Ethnographic research has illustrated that many societies did not determine age by solar years. Instead, the passage of time was marked by the transition from one life phase to the next. “Timing for an individual’s passage from one stage to the next was most commonly based on bodily signs [eg. ability to walk, appearance of pubic hair, enlargement of breasts, or the onset of muscular flabbiness and physical decrepitude]” (Oliver, Douglas L. 1989:60).

Most individual ages at death presented in the literature were age ranges. The challenge was to attempt to fit the ranges within categories that were meaningful, to some extent substantiated by medical definitions; consistent with concepts of anthropological life stage transitions; and amenable to the development of a continuum of age ranges.

The infant category is medically defined as “a young child; generally considered to designate the human young from birth or from the termination of the newborn period [the first four weeks of life] to the time of assumption of erect posture

[12 to 14 months]” (Agnew *et al* 1965:737). The age range for the infant category was therefore established at 0 - 12 months. The acceptance of infants as full members of societies differed significantly between societies. “Full citizenship rights did not obtain to infants in the Pacific Islands” (Olivier 1989:59).

The medical dictionary introduced the category of pre-school child which included the ages of 2 to 6 years (Agnew *et al* 1965:290). The introduction of kindergarten has actually reduced this age to between 2 to 4 years. However, women in some ‘primitive’ societies tend to nurse their young for more than 2 years, [for example, Eskimo] (Service, Elman 1978:81). This time range can extend up to 4 years [for example, !Kung] (Service 1978:102]. For these reasons, the category ‘toddler’ was created to incorporate the age range of 1 to 4 years. This stage accommodates the progressive development of motor skills such as walking as well as the gradual acquisition of more complex linguistic abilities.

Some age ranges overlapped. The toddler/child category of 4 to 5 years incorporated this overlap. Conceivably, this is a transitional phase and might be correlated with the loss of deciduous teeth and the eruption of the first adult dentition. The lower first molar (M1) is generally the earliest to erupt. The timing is sometime between 5.42 to 7.0 years for males and between 5.13 and 6.75 years for females; however, dental eruption for American Indians is “somewhat earlier” (Krogman and Iscan 1986:360-361).

The medically ascribed age range for a school child is from 6 to 10 years. Based on the age categories previously established and the differential timing of puberty,

between 10 and 12 years, the child category range incorporated children between the ages of 5 and 10 years. The child/adolescent category complied with the differential onset of puberty, 10 to 12 years.

The adolescent phase was restricted to between 12 and 15 years for a number of reasons. Courtaud's (1989:45, 49) determination of the age of Kebara 9 and 10, which he suggested might be the same individual, was between 15 and 22 years [most likely approaching 20 years]. This assessment overlapped the original estimation of the adolescent phase of 12 to 18 years. Generally, an adolescent phase is osteologically considered to extend from puberty to the time when most of the long bone epiphyses have fused, around 17 to 18 years in females and 18 to 20 years in males (Krogman and Iscan 1986:64). Timing of fusion may have differed considerably in the Palaeolithic. The ethnographic literature also indicated that adult status often accompanied puberty (Oliver 1989:60-61).

The inception of the adolescent/young adult phase of between 15 and 20 years was primarily for the same reasons previously mentioned. Young adults were generally considered to range between 18 years, based on epiphyseal fusion, and 25 years if ages were given. Otherwise anyone over 20 years of age was deemed to be an adult.

These categories are modified in the explanations and conclusions based on the patterns encountered in the sites and the behavioral and/or social implications of these patterns.

SEX

The anthropological literature is full of information on sex related statuses and roles within various human societies. Differential treatment along the lines of sex are also well documented in the literature on burial archaeology. (See, for example, Robert Chapman, Ian Kinnes and Klavs Randsborg, (eds.) 1981). Sex, like age, is perhaps one of the most significant indicators of social dimensions and status equality or inequality in the organizational structures of past societies.

LOCATION IN SITE; POSITION OF BODY

These criteria are essential to the illumination of spatial patterns within the site and within the disposal context. Evidence for differential treatment and ascribed status, is frequently affiliated, either directly or indirectly, with the location of the disposal and the situation of the body within the disposal unit. For example, most of the hominid remains, both articulated and disarticulated, were discovered in specific regions of Amud, Kebara, Qafzeh, Skhul, and Shanidar. Many of these locations were affiliated with northern portions of the sites. This allocation may be significant. At Amud, the disposal zone separated into two locales: near the wall and away from the wall. The region away from the wall contained one potential inhumation and disarticulated remains in the form of cranial elements. In addition to one posited infant burial, long bones were found only in the near wall region. Again, this separation may be important. The site of Amud also offers an example of possible ascribed status. One infant [Amud 7] may have been accorded a primary disposal with inclusions. The other infants from the site were

recovered as disarticulated fragmentary remains. The difference between these disposal formats may indicate that some form of status ascription was operational in this time frame. An example of the relevance of body position comes from the site of Skhul. Two males [Skhul IV and IX] and one female [Skhul VII] were placed on their right sides. These individuals were aged between 35 years and 50 years. This evidence suggests no sexual differentiation in disposal positions. A slightly younger male [Skhul V], aged between 30 and 40 years, was discovered on his back. The back position may signify a different social role or status for this individual which may be based on an age distinction.

SKELETAL ELEMENTS

The fragmentary nature of the hominid remains propels this criteria to the forefront of information recovery particularly in terms of remains that might be identified as inhumations. The more complete the skeletal or element categories recovered in the deposits, the greater the likelihood the disposal was deliberate in nature. This statement should not be construed as an absolute rule. For example, some form of processing or curation of remains may have been practiced by Middle Palaeolithic groups as potentiated by the hypothesized removal of the cranium of Kebara 2 (Bar-Yosef, Ofer; B. Vandermeersch; B. Arensburg; A. Belfer-Cohen; P. Goldberg; H. Laville; L. Meignen; Y. Rak; J. D. Speth; E. Tchernov; A.-M. Tillier; and S. Weiner 1992:529). In addition, as many as four of the Shanidar remains [Shanidar 1, 2, 3, and 5], may have been killed in a cave roof collapse. Their positions in the deposit may indicate accidental interment despite evidence for ensuing mortuary ritual after death.

TABLES

The tables were formatted through the use of Microsoft Access Relational Database Management System for Windows, Version 2.0 (1994). This program is designed to manage descriptive data and permits the data to be rearranged in specified fashions. For example, examining details on infant remains was accomplished by filtering out the data on those individuals who did not fit within this age category. Only the Individuals, Biological, and the Skeletal Elements Tables contain a complete list of the hominids. In cases where the actual number of individuals was not obtained, the remains recovered were listed under the site name [for example see Karain]. The balance of the tables eliminated individual remains for which no data was available on the specified variables.

The General Site Data table is lengthy and is not described below. Some of the information from this table is presented in Chapters 8 through 14. The table served to describe and position the sites within the regional setting as well as to inform about important site characteristics such as tool industries, sediments, number of individuals recovered, and proximity to water.

The tables, as the catalogue of fossil remains, were designed to incorporate as much explicit information as possible regarding the individuals recovered, their location within the sites, their position within their disposal context, and their relationship to various features within the sites.

Citing individual researchers within the data tables was too awkward to accomplish and maintain a legible and informative table. Instead, a Site Referenced

Bibliography is provided at the end of the Tables [page 828]. Certain specific citations are listed, particularly in the dating tables. Individuals recovered in a site for which no other references were encountered were cited by researcher in the table and contradictory information was also referenced.

INDIVIDUALS

This table lists the specific demographic information on the individuals discovered within the site. The site was listed in the first column; the second column identified the Absolute Date ascribed to the specific layer in which the individual was recovered. A full list of the dates by dating sample is presented in the Dating Methods - Absolute Dates Table. The Isotopic Stage column denoted the Oxygen Isotope Stage associated with the absolute date. The Bio-chronological date indicated the date associated with the micro-faunal remains recovered from the specific layers in which the remains were recovered and identified in the Comparative Dates Table. This system was devised by Eitan Tchernov (1992). The Bio-Isotopic Stage was the Oxygen Isotope Stage which correlated with the Bio-chronology.

The balance of the Individuals Table listed the specific individual fossil occurrence, that individual's age category, age [when given], and sex. The assignments of age and/or sex were frequently missing from the academic literature.

SKELETAL ELEMENTS

In accordance with the ascription, this table lists the skeletal elements recovered for each individual. The skeletal categories [a total of 20] were assigned as

follows: cranium, mandible, teeth, hyoid, vertebrae, ribs, clavicle, sternum, sacrum, innominate, scapula, humerus, ulna, radius, hand bones, femur, tibia, fibula, patella, and foot bones. The element categories followed the previous list, but included left and right clavicle, scapula, humerus, ulna, hand bones, femur, tibia, fibula, patella, and foot bones. The maximum number of element categories was 31. The establishment of categories is a more effective means of enumerating the skeletal remains recovered because the adult human skeleton incorporates a total of 206 bones (White, Tim 1991:24; Krogman and Iscan 1986:50) while an infant at birth retains approximately 450 centers of bone growth and 11-week fetuses carry 806 centers of bone growth. A table of individual bones would have been unmanageable. Furthermore, the precise bones recovered were only itemized in specialized articles for certain sites.

The implementation of element and skeletal categories was also more precise than the use of areal allocations such as cranial and post-cranial remains or appendicular and axial skeleton. The skull is composed of the cranium, the mandible, and maxillary and mandibular dentition. While the cranium is comprised of 11 paired bones and 5 single bones (White 1991:24), it can also be sub-divided into broader categories which are also listed in the academic literature on the hominid remains: calvaria, calotte, splanchnocranium, and neurocranium²³. Teeth were included as a separate category and not as part of the cranial or mandibular remains because teeth were not always identified according to maxillary or mandibular dentition. Also, many individuals were represented by dental remains alone. Keeping teeth a separate category

²³ The calvaria is "the cranium without the face" or splanchnocranium while the calotte lacks the splanchnocranium and the cranial base and the neurocranium is "the brain case" (White 1991:45).

seemed advisable since their association with deceased remains could be questioned.

Individuals lose their teeth for various reasons during life.

A tabulation of the total number of element categories and the total number of skeletal categories were provided for each individual.

BIOLOGICAL DATA

The biological table displays personal information about the specific individuals. One category, notated 'Designation', was devised to indicate the taxonomic classification of the individual hominid.²⁴ The supposed Neandertal remains were identified as *Homo (sapiens) neandertalensis* due to the uncertain status of their taxonomic classification: either *Homo sapiens neandertalensis* or *Homo neandertalensis*. Other individuals were listed as 'Mousterian' and, in some cases, an indication of whether their affinities were allied more with Neandertal or archaic modern human morphologies. While 'Mousterian' is not a taxonomic classification, it is a term frequently used by Levantine researchers to identify unclassified specimens recovered in Mousterian deposits. These designations may eventually be invalidated if the morphological analyses of Arensburg and Belfer-Cohen (1998) are accepted by other paleoanthropologists. Other features listed in the table were stature, skeletal elements and element categories, and evidence for disease, trauma, or stress. The miscellaneous data included any specific information related to the skeleton which did not fit under one of the other categories.

²⁴ The data spreadsheet program did not permit the use of different fonts. Italicizing the taxonomic classification required italicizing the entire table.

LOCATION IN SITE

This table is the first of the archaeological tables and functions to situate the fossils occurrences within the domain of the site. The variables incorporated in the table and listed by individual included: location in site, level or unit, layer, depth below datum, and grid square. Maps are included in the Appendix to demonstrate the position of the remains within the site.

DISPOSAL, BODY POSITION, TREATMENT

This second archaeological table positions the fossil remains as precisely as possible within the disposal context. Important evidence for positioning under consideration for disposal were the pattern of the remains [articulated or disarticulated], the type of disposal [deliberate inhumation or secondary disposal], and indications for a burial pit. The body position was noted under orientation of the body, position of the body [right side, left side, on back, on knees], the direction of the head, the side on which the head was resting, the direction the head was facing, other miscellaneous information related to head position, and the placement of both arms [contracted, contracted to face, crossed over chest, extended along the body] and legs [semi-flexed, right angle flex; extended]. Diagrams of the burial positions of some posited inhumations are supplied in the Appendix: Burial Diagrams. Treatment was listed under specific evidence for 'treatment', indications of corpse protection, burial inclusions, and any associated features or artifacts which may bear some direct or indirect relationship to the disposal.

INCLUSIONS

The third archaeological table registered the inclusions recovered in association with skeletal remains. Whether material recovered in direct association with the fossil hominids were deliberate offerings to the dead or fortuitous inclusions was strongly contested in the literature. In keeping with Lévi-Strauss' (1958:307) rule of observation, materials recovered in association with skeletal remains were admitted to the tables under the term 'inclusions'. The nature of their entry into the matrix surrounding hominid disposals must be tested using appropriate scientific methods and not determined according to research assumptions. Little information was provided by researchers which demonstrated adequate proof for acceptance or rejection of inclusions.

In certain cases, the assessment of whether an element was an inclusion or an associated feature became a judgement call. Some of the items noted in the Associated Artifacts/Feature table might just as realistically be incorporated under the term 'inclusions', for example the limestone blocks placed over the feet or pelves of some of the inhumations.

The Inclusions table catalogued the artifact or element and its position in relation to the skeletal remains, when this information was available. Inclusions generally fell under the categories of antler, bone, fish remains, manganese dioxide, ocher, shell, animal teeth, and a category identified as 'other'. 'Other' corresponded to any material which did not fall into any of the specifically listed categories: for example, the 'subrectangular limestone slab' recovered above the head of the Dederiyeh infant.

ASSOCIATED ARTIFACTS/FEATURES

The last of the archaeological tables, Associated Artifacts/Features denoted particular features or artifacts which might be associated in some manner with the disposal. Hearths figured prominently in this table. The position of the feature or artifact in relation to the disposal was mentioned along with an hypothesized purpose for the feature. These ‘purposes’ were generally mentioned by the researchers.

DATING METHODS

Accurate dating of sites or individuals represents one of the major difficulties in palaeoanthropology. Several techniques have been developed for dating. Most of these methods rely on the decay rates of radioactive substances (Kenneth L. Feder and Michael Alan Park 1997:156). One example is radiocarbon dating which utilizes the decay rate of Carbon-14²⁵. The method has limitations for palaeoanthropology as dating is not considered accurate beyond about 50,000 years.

Electron spin resonance is another method which dates the ‘cumulative damage produced on a paleoanthropological specimen [usually a tooth] by radioactive decay in the specimen itself as well as in the soil in which it was deposited” (Feder and Park 1997:158). The tooth specimens were usually obtained from faunal remains recovered in the sites. Deposited samples were subjected to radiation from radioactive elements such as uranium, thorium and potassium as well as “cosmic rays” (Schwarcz, H. P.; R. Grün, B. Vandermeersch, O. Bar-Yosef, H. Valladas, E. Tchernov 1988:734).

²⁵ The half-life for Carbon-14 is 5730 years (Feder and Park 1997:157) which means that half of the C-14 isotope will decay in this period of time.

With teeth, internal as well as external radiation occurred. Both the enamel and dentin took up uranium over time. Early uptake measurements assumed that all the uranium uptake occurred shortly after deposition. The early uptake measurement is deemed to provide a minimum age. Linear uptake measurements presumed that uranium uptake in the tooth was fairly constant over time. The linear uptake dating method generally falls within the range of other dating techniques.

Thermoluminescence also measures radiation doses which are “estimated from its uranium, thorium, and potassium concentrations” (Valladas, H.; J. L. Joron; G. Valladas; B Arensburg; O. Bar-Yosef; A. Belfer-Cohen; P. Goldberg; H. Laville; L. Meignen; Y Rak; E. Tchernov; A. M. Tillier; and B. Vandermeersch 1987:160). With burned flints, these internal concentrations mark the paleodose accumulation since the flint was last burned. The external dose of radiation is determined by burying dosimeters near the positions where the original burned flints were found. Dosimeters remain in the ground for one year when they are recovered and the amount of radiation measured which is called the annual dose. The age of a site equaled the paleodose divided by the annual dose and marked the time since the flint was last burned (Valladas, H. and J. L. Joron 1989:97).

The final two absolute dating methods (Uranium-Thorium and Uranium-Protactinium) used in the Near East fit under two methodologies: alpha spectrometry and a newer method called non-destructive gamma-ray spectrometry.

The method is based on the uranium-thorium (U-Th) and uranium-protactinium (U-Pa) principle.....When bones are buried, at the beginning of the fossilization process, they

incorporate uranium from natural waters in the soil, but not the daughters such as thorium (Th-230) and protactinium (Pa-231) which are insoluble. These nuclides grow from their parents decay (U-234 and U-235) in the bone as time passes. The measurement of the Th-230 / U-234 and Pa-231 / U-235 ratios allows dating to the sample. These ratios are usually determined by alpha spectrometry after chemical separation of uranium and thorium. A new method..... consists of determining these ratios by non-destructive gamma-ray using a pure germanium detector. This method has the main advantage of not destroying the sample..... (Yokoyama, Yuji; Christopher Falguères; and Marie-Antoinette de Lumley 1997:774).

Non-destructive gamma spectrometry appears to provide the most accurate method of dating fossil hominids as the fossil's age can be measured directly and destruction of or damage to the remains can be minimized. This method is also less affected by accumulations of water in the deposits since thorium and protactinium are insoluble.

Jelinek (1992:253, 267-271) advocated dating by means of the correlation of several lines of evidence such as Oxygen Isotope Stage; stratigraphy; absolute dating of artifacts, hominids, and features within the site; dating of travertines; and environmental evidence drawn from palynology and faunal studies. He was concerned that other forms of evidence were not compatible with "thermoluminescence, electron-spin resonance, and uranium decay series" (Jelinek 1992:223). Tchernov's (1992) Bio-chronology based on extinction of archaic species and the appearance of new species of microfauna in the region seems another valid line of evidence. Micro-fauna are r-selected²⁶ rather than k-selected²⁷ which means environmental changes that induce stress

²⁶ R-selected creatures are those with short life spans and "high reproductive potentials" with short gestation periods and, therefore, short birth spacing (Postlethwait and Hopson 1989:G15).

on the populations are likely to be more immediately evident with these small creatures. Correlating these changes, the extinction and migrations of new species, to evidence for environmental change can establish a relatively secure comparative marker for dating.

DATING METHODS - ABSOLUTE DATES

The table for absolute dates included all dates which have been generated using absolute dating techniques. The dates were listed by site and level or layer. The dating methods were Accelerator Mass Spectrometer (AMS), Carbon-14, Electron Spin Resonance early (EU) and linear (LU) uptake methods, Thermoluminescence, Uranium-Protactinium, Uranium-Thorium. The Isotopic Stage which corresponded to the absolute date was listed and some correlated dates which involved several lines of evidence were noted.

DATING METHODS - COMPARATIVE DATES

The last table lists various other dating methods used to identify the time frame of habitation. These were not absolute methods and comprised some of the other types of evidence referred to by Jelinek (1992). The table provided estimates, geological age, glacial period, and the corresponding chronological span of the period, Isotopic stages associated with some of the comparative dates, date ranges from referenced researchers, and Tchernov's Biochronology.

²⁷ K-selected species are those which have longer life spans, longer gestational periods and as a result have fewer offspring (Postlethwait and Hopson 1989:G9)

FINAL DATES

The dates selected for inclusion in the Individual Table were the result of a correlation between Tchernov's (1992) Bio-chronology and the series of absolute dates listed in the Dating Methods - Absolute Dates. The absolute dates represented the ones which most closely corresponded to the Bio-chronology and were selected as a matter of personal choice. Other dates, especially the average or mean date, could just as readily be applied. However, those dates acquired through the Uranium-Thorium and Uranium Protactinium techniques are generally considered to be more accurate than ESR dates or thermoluminescence dates. In cases where the specific hominid bones were dated, this measurement became the date for that individual and for any other individuals recovered in the same layer.

Chapter 7: RESEARCH DESIGN 2 - ANALYTICAL METHODS

MORTUARY STUDIES

Although the major purpose of this study was to observe the patterns expressed through methods of disposal of the dead, the theoretical principles behind methods of burial analysis were pertinent to the development of models. These theoretical principles were also fundamental to the consideration of implications and explanations derived from the patterns. This section describes some of the methods used in burial analysis for defining social dimensions in prehistoric archaeology. Alban Defleur (1993) implemented some of these analytical methods in the study of Mousterian burials and Francis Harrold (1980) employed some aspects of these approaches in his study of Eurasian Palaeolithic burials. Nevertheless, most of these forms of analysis have been restricted to the investigations of more recent pre-historic inhumations.

ROLE THEORY

Arthur Saxe (1970, cited in Tainter, Joseph 1978:106) drew from “anthropological role theory” as defined by Ward Goodenough (Goodenough 1965, referenced in Tainter 1978:106) to develop this approach for archaeological burial analysis. Goodenough introduced “a set of terms defining elements of social interaction that have archaeological implications” (1965; cited in Tainter 1978:106). Three terms of particular importance were: ‘social identity’ which was essentially the same as social status; ‘identity relationship’ which referred to individuals with more than one social

identity within a society and which indicated that more than one social identity was relevant at any point in time; and 'social *persona*' which was the "composite" of the social identities of an individual for any particular social interaction situation. An individual's social *persona* was reflective of the principles of organization present in the society. Saxe (1970:1; cited in Chapman, R. R. and Klavs Randsborg 1981:7) "argued that mortuary practices could be analyzed within the context of the social system and emphasized that this approach required a concern with processual rather than formal regularities". Saxe believed that formal comparisons of mortuary practices were more effective in the identification of the symbolism behind the disposal methods, but were not capable of exposing the socially conceived organizational principles underlying them. Since social identity was founded on the organization principles of a society, increasing numbers of social identities expressed by an individual accompanied an equally increasing number of identity relations. Saxe also supported the use of ethnographic analogy to confirm theories of mortuary practices.

Saxe (1971:39-57) published a paper on his analysis of the social dimensions of the mortuary practices of Wadi Halfa, Sudan, which is a useful example to follow in burial analysis in any time frame. The Wadi Halfa population studied by Saxe were Mesolithic and date estimated at around 8000 to 11,000 years ago based on lithic materials. The bones had already been mineralized to some extent and could not be accurately dated using Carbon-14 methods. Saxe (1971:39) collected data on "age, sex, pathology, treatment of the body, and mode of interment". Saxe began his analysis by posing two questions: (1) did the male/female ratio show selectivity for burial of either

sex within the sample cemetery; (2) did the ratios suggest a higher percentage of male to female births. Lack of selectivity and random placement in the cemetery based on sex implied that both sexes were afforded equal treatment in burial which also suggested that the social organization was egalitarian. General burial position patterning indicated a preference for placement on the left side with an orientation of “between 65 degrees east of north to 215 degrees [clockwise] of north with a tight flex [less than 45 degrees] between the femur, tibia, and the humerus generally at an angle of less than 45 degrees to the orientation of the vertebral column and with the hands somewhere in the area of the face and chest” (Saxe 1971:46). This position was fairly consistent although females generally exhibited greater variability in body position. This variation suggested that post-marital residence may have been patrilocal or “biased toward patrilocality” (Saxe 1971:48) and women were placed in graves in accordance with their natal social patterns. If patrilocality was substantiated as the reason for variable female positioning, then a form of lineage or corporate system was also suggested. However, the differentiation could have depended upon a minimal form of sexual ascription where ascription was maintained within the confines of an egalitarian structural organization.

In accordance with the directional placement of the burials in a circular fashion, burial time seemed to be around midmorning and most burials appeared to have occurred from the summer solstice through a three to six month period. This information was still in the suppositional stage at the time of Saxe’s (1971:50) publication.

A supplementary, yet crucial, component of role theory was recognized and re-iterated by Avi Gopher (1995:93) while discussing comments on infant burials

from an article authored by James A. Brown (1981): “complex societies emphasize infant burials.....since their ascribed status does operate, and has meaning, even if they died as infants”.

FORMAL ANALYSIS

Both Saxe (1971) and James Brown (1971) utilized formal analysis to interpret mortuary practices. This method applied combinations of attributes to the assessment of mortuary practices (Tainter 1978:110).

Only until recently, with the increasing anthropological interest in formal semantic analysis on the one hand and the systemic approach on the other, has there even been a clear effort to develop interpretive techniques within such a general method. Formal analysis, which has been almost entirely restricted to explicitly semantic situations, as in a componential analysis of kinship, has a more general relevance in anthropology.....formal analysis can properly be directed upon perceptual, non-linguistic data through an inversion of formal semantic analysis. In the latter, most customarily used case, linguistic units are the objects of ordering through the medium of perceptual components. In the inverted case, which is of direct concern for the archaeologist, an order can be generated from perceptual data through an artificial language. Such a reversal in the object order of the designata entails no basic change in the theoretical problems of formal analysis but rather a shift in the area of greatest weakness.....It is a means whereby a paradigm or model is generated..... (Brown, James A. 1971:92).

Key diagrams are drawn using mortuary data. Diagrams represent perfect trees or perfect paradigms. The perfect tree is noted for its redundancy. [See example

diagram below]. A decision made at one stage in the diagram automatically establishes the next level. Redundancy is registered by the fact that any stage to the right of the formal or casual disposal attributes reiterates the categories of formal or casual treatment of the dead. For example, disposal in river reiterates disposal in water which in turn re-states casual burial.

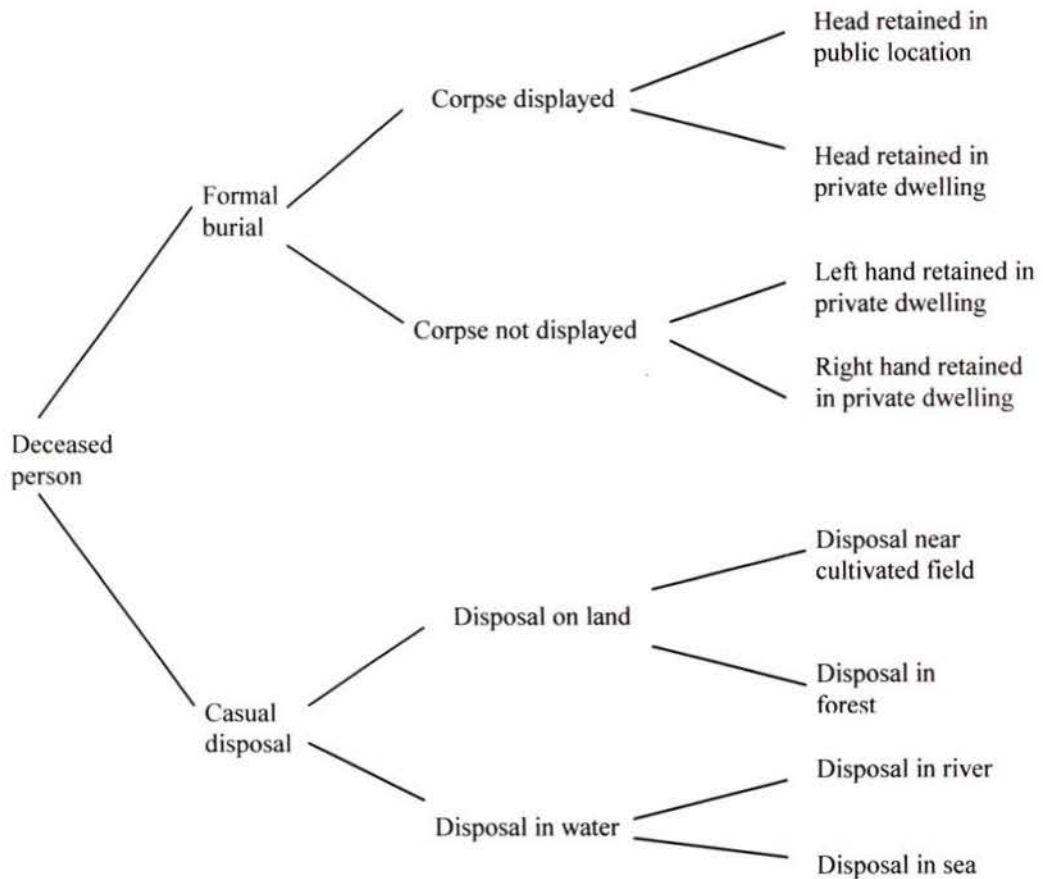


Figure 7.1. “Key diagram of a perfect tree” (Taken from Tainter 1978:111).

The following diagram represents the perfect paradigm where all attributes are independent of the preceding ones. Redundancy is not integral in perfect paradigms.

At any point to the right of the two types of burial, articulated and disarticulated, the descriptive attribute can identify either form. For example, ‘no grave inclusions’ could be found in either cremation or non-cremation, and either of these two categories fit under articulation or disarticulation.

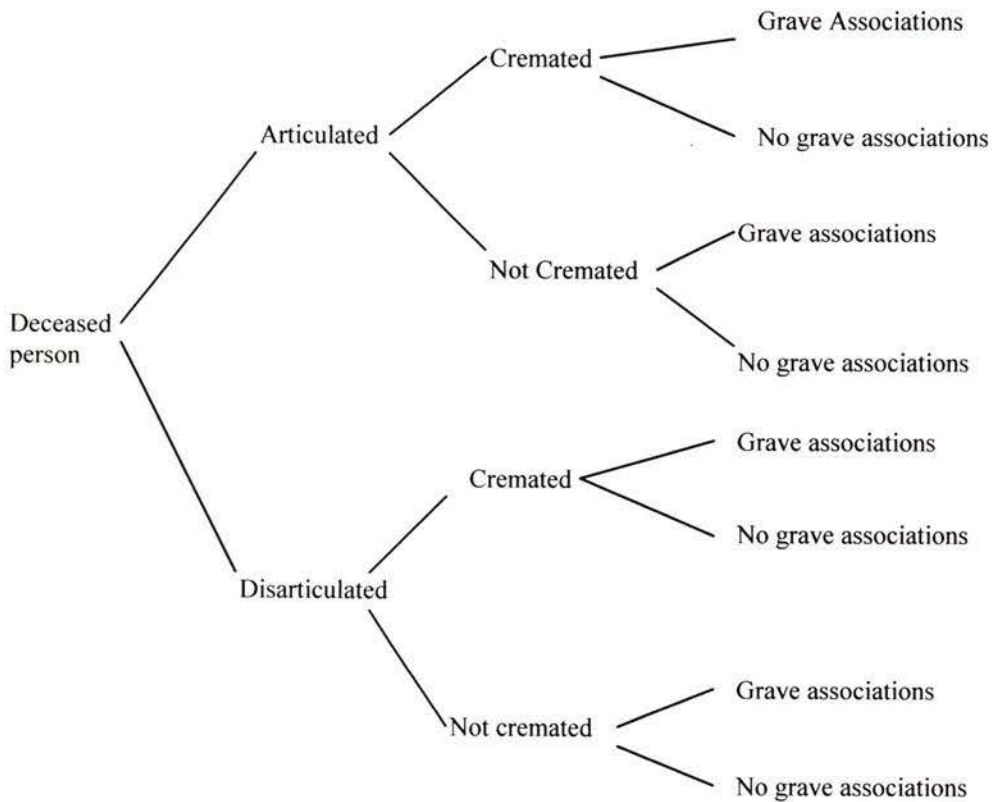


Figure 7. 2: “Key diagram of perfect paradigm” (Taken from Tainter 1978:112)

Saxe developed the following hypotheses which are relevant to role theory, formal analysis, and many of the other forms of analysis introduced later in this chapter. These hypotheses also relate to the two forms of key diagrams.

1. The components of a Given Disposal Domain Cooperate in a Partitioning of the Universe, the Resultant Combinations Representing Different Social Personae. (Saxe 1970:65; cited in Tainter 1978:117).
2. Within a Given Domain Personae of Lesser Social Significance Tend to Manifest Fewer Positive Components in Their Significata Relative to Others, and Conversely. (Saxe 1970:69; cited in Tainter 1978:118).
3. To the Degree that Corporate Group Rights to Use and/or Control Crucial but Restricted Resources are Attained and/or Legitimized by Means of Lineal Descent from the Dead (i.e. Lineal Ties to Ancestors), Such Groups Will Maintain Formal Disposal Areas for the Exclusive Disposal of Their Dead, and Conversely. (Saxe 1970:119; cited in Tainter 1978:123).
4. The More Paradigmatic the Attributes Evidenced in the Key Structure of the Domain, the Less Complex and More Egalitarian the Social Organization. Conversely, the More Tree-Like the Attributes the more Complex and Less Egalitarian the Social Organization. (Saxe 1970:75; cited in Tainter 1978:75).
5. The Simpler a Sociocultural System the Greater Will Be the Tendency for There To Be a Linear Relationship Between Number of Components in Significata, Number of Contrast Sets Necessary To Define Them, and the Social Significance of the Significata; and Conversely. (Saxe 1970:112; cited in Tainter 1978:112).

As mortuary practices are a form of social communication, the use of a linguistic methodology is not really at odds with the original intent of formal analysis in linguistic semantics. The meaning of structure of mortuary practices and the meaning of semantic structures are essentially analogous. "As in any communication system, the messages generated through mortuary ritual are subject to noise, which may induce errors or distortion, or inject extraneous material into the message" (Shannon, C. E. 1949:75;

paraphrased in Tainter 1978:113). Redundancy [see page 152] is built into the coding system used in transmitting the communication[s] to contravene the static. Using this information, identifying the social uniqueness of the individual from the perfect paradigm key will be difficult. Many burial forms will represent the same kind of symbolic patterning which can make interpretation arduous and abstruse. The tree paradigm, with high redundancy, should yield a high degree of validity in the archaeological interpretation. Formal analysis is most suited to the analysis of mortuary systems where redundancy is elemental. Formal analysis is:

.....essentially a means of formally relating items in an explicit cultural domain by their membership within successively more inclusive sets, each stage of which is determined by alternatives of specific dimensions relevant to the domain. It is an attempt to consider the structural relations among members of a domain by transcending explicit cultural content and by transferring cultural observations to aspects of dimensions of higher order. In fact, formal analysis is characterized by the overt recognition of what Hammel (1965:2) terms "a superordinate level of determinants in an analytical domain". (Brown 1971:110).

Information theory supplies the methods of measurement for formal analysis. The perfect paradigm is completely random meaning that this is a situation of maximum entropy. Entropy is defined as disorganization or randomness in this case. The perfect tree is completely redundant and correlates to maximum organization and minimal randomness. To determine whether the key represents a paradigm or a tree, the degree of entropy must be measured. Redundancy was noted for some of the disposal

$K = 0$ in a perfect paradigm
 $K = 1$ in a perfect tree
 (Mathematical formulas taken from Tainter (1978:112-113))

populations in the Near East. However, the numbers of attributes were small and lack of information diminished the ability to adequately resolve the degree of entropy.²⁸

GENERAL SYSTEMS THEORY AND THE SYSTEMIC APPROACH

General systems theory or GST is applied to archaeological analysis as: “a theory”, “a body of concepts”, “a set of modeling techniques”, “a source of testable propositions and hypotheses”. and “a model for explanation”. (Plog, Fred T. 1975:207). Plog affirms the application of “GST” (Wenke, Robert J. 1981:99) as a constituent of processual archaeology. In GST, cultural systems are perceived as behavioral systems which are continuously interacting with each other and with their environment. Their means of interaction and their modes of adaptation provide the sources of change within their systems. The changes in the systems are instigated by a multiplicity of causal agents. GST is not a simple cause and effect approach; instead, GST deals with the multifactoral and simultaneous catalysts which modify systems (Plog 1975:208).

²⁸ The first step in the mathematical process is to determine S

$$S = C_a \times C_b \times \dots \times C_n$$

S = means significata; represents the maximum number of possible combinations of burial modes and could be represented as Smax.

C = combinations

n = total number of combinations, (a, b, ..., n); n is infinity.

Cn = the nth combination

Amount of information in Smax is measured as:

$$E = \log_2 S_{max}$$

E = maximum entropy possible in key

Actual entropy measured by number of significata [Sactual] actually observed:

$$e = \log_2 S_{actual}$$

e = actual entropy

Relative entropy [RE] and its converse, redundancy [R]

$$RE = e/E \quad [\text{Relative Entropy}]$$

$$R = 1 - RE \quad [\text{Redundancy}]$$

R = 0 in a perfect paradigm

R = 1 in a perfect tree

(Mathematical formulas taken from Tainter 1978:112-113)

GST is the result of several propositions and hypotheses devised by systems theorists stressing systems and systemic relations. L. von Bertalanffy (1968:32-33; cited in Wenke 1981:99-100) offers the following “basic credo” for general systems theory:

[We] can ask for principles applying to systems in general, irrespective of whether they are of physical, biological or sociological nature. If we pose this question and conveniently define the concept of systems, we find that models, principles, and laws exist which apply to generalized systems irrespective of their particular kind, elements and the “forces” involved. A consequence of the existence of general systems properties is the appearance of structural similarities or isomorphisms in different fields. There are correspondences in the principles that govern the behavior of entities that are, intrinsically, widely different. (von Bertalanffy 1968:32-33; cited in Wenke 1981:99-100).

The emphasis and priority of GST is finding commonalities in organizational principles of various systems which transcend the system’s types. How societies deal with complexity and diversity within the context of their organization is fundamental to this approach.

Systems theory, as a theoretical approach in archaeology, was used by David Clarke (1968; cited in Plog 1975:210-213). Clarke determined that material culture required understanding in terms of a system. Clarke used a comparative approach for studying the system of material culture and the system of behavior. He introduced several new concepts into this approach and most of these are still used today. The concepts of Clarke’s systemic theory were: artifact, assemblage, attribute, culture, culture group, and technocomplex. Concepts are defined polythetically rather than

monothetically. Clarke looked for regularities in spatial, temporal, and systemic relationships. The system of material culture acted as the moderator, regulator, and controller of cultural information. Clark focused on answering questions relating to patterned sharing; yet, he also attempted to refrain from eliminating variability which is why he employed polythetic types and continuous variation.

Concepts of systems are extremely varied. In fact, the lack of consensus on what actually comprises a system, as everything appears to be a portion of some system, has become one of the major criticisms of this approach (Wenke 1981:101). The forms of greatest utility to archaeology are: “system, open system, closed system, environment, mapping, equilibrium, homeostasis, morphogenesis, feedback, and deviation” (Plog 1975:209). In terms of systems modeling, three are most frequently addressed: (1) equilibrium models, (2) systems trajectories through time, and (3) and flow charts or digraphs²⁹ (Plog 1975:209).

INFORMATION THEORY

Information theory appears to be a combination of systems theory and formal analysis. Wenke (1981:103) noted the highly mathematical qualities of information theory which are generally relevant to problems of engineering. “There are general principles one can use to describe and analyze the collection, processing, storage, retrieval, and communication of information, as is well illustrated by modern computers, satellite-based communications grids, and the arcana of modern systems analysis”

²⁹ Plog used the term “**digraph**”. The term used in texts discussing flow charts is “**digraph**” (Hage, Per and Frank Harary 1983:65).

(Wenke 1981:103).

As a method for analyzing communication, information theory is definitely applicable to formal analysis in archaeology with its use of the fundamentals of formal analysis of linguistics, particularly semantics. Entropy is a concept of information theory and entropy is used in formal analysis. Entropy identifies with randomness and in circumstances of complete randomness, the likelihood of any particular individual affiliating with any particular component is $1/N$ where N is the number of components. This corresponds to what Tainter designated statistical equilibrium. Equilibrium models are part of systems analysis.

Wenke's definition also indicates the use of information theory in modern systems analysis. If the theory applies to modern systems, then the same principles might be useful in archaeological analysis of past systems. For example, change in past societies may have been related to techno-environmental structures; yet the essential properties of the change may not necessarily have been rooted in nature or '*per capita* energy expenditure'. The properties of change may have rested with the "organization and efficiency of energy capture and use" (Wenke 1981:103).

Classification of mortuary data allows archaeologists to isolate and analyze clusters of similar burial forms. This methodology was consistent with formal analysis and Saxe (1970) made use of this compatibility in devising the mutually dependent hypotheses listed under formal analysis. Idiosyncratic variations of individual burials tend to predominate when using formal analysis and key diagrams. Rather than "keying out individual burials" (Tainter 1978:118), burials which exhibit similar formats

and which are indicative of similar social personae should be marked out.

Mortuary data can be assessed through various forms of multivariate analyses. For example, the use of information statistic³⁰ can indicate divergence and amount of organization. Tainter noted that one of the problems with multivariate analyses is different procedures may give different results, even when the same data is used. The clusters derived from the analyses may incorporate too many individuals from various grades in the ranking system.

A more fine grained analysis is found through monothetic-divisive procedures. The burial population is progressively subdivided so that each level within a stratified or ranked system is “maximally” homogenous. A stop system halts the process at the point of maximum homogeneity. Grave associations may provide the framework for the analysis. For example, grave associations are classified under the categories of (1) egalitarian, and (2) ranked. The egalitarian grave associations are generally obtained from the technological sphere. Status markers are based on personal accomplishment and show no affinity to rank markers and the differential distribution is based on individuals and not groups. Status is not necessarily inherited. Differentiation is attributed more to quantity of inclusions in more egalitarian societies although quality items may still be found. Conversely, in ranked burials more status symbols are evident; status symbols

³⁰ The formula for measuring the information statistic (Shannon 1949:50 - 51; cited in Tainter 1978:133) is:

$$H = [\text{the sum of all } p_i \log_2 1/p_i]$$

H = entropy (or information)
p_i = probability of the ith component

The information statistic formula described above is an expansion of the formulas used to determine entropy [maximum, actual, and relative] in the discussion on formal analysis.

appear to be group related; the variation between burials is more marked; and status symbols are inherited. Quantity and quality of goods contribute to the grave inclusions in ranked burials.

Some archaeologists place all the onus for status representation on grave inclusions. This is flawed. Grave inclusions are only one aspect of status. Other variables are the type of mortuary structure or facility, location of the burial within a cemetery, orientation of the burial, position of the corpse, disposal condition of the body, and so on. "The nature of a symbol is such that the relationship between the form of the symbol and its referent is arbitrary, or at most expedient" (Tainter 1978:121). Obviously, mortuary practices are symbolic.

Energy expenditure has been employed by Lewis Binford. Binford worked from the premise that stability, subsistence strategies, and kinship were interrelated. He found little difference between hunters and gatherers, pastoralists, and shifting agriculturalists (Binford 1971:18). Binford began his analysis by establishing the parameters or variables for identifying the types of social phenomena symbolized through burial practices. The variables were the "social *persona* of the deceased" and "the composition and size of the social aggregate recognizing status responsibilities to the deceased" (Binford 1971:21). Binford had already recognized that a significant amount of differentiation was based on sex and age (Binford 1971:20). These variables were used to further create nominal categories of variables which were sensitive to deriving status information. Each of these categories was subdivided to provide more refined detail. The first category was the treatment of the body registered by how the body was

prepared for burial; by the types of treatment it received such as mutilation, mummification, or cremation; and by the method of disposal of the body in a grave, on a scaffold, exposed on the ground, *et cetera*. The second variable noted the preparation of the receptacle for the corpse indicating the type such as single, multiple, architectural, and so on; how the grave was orientated as in cardinal directions, facing the sun, or feet to the river; and where in relation to the community the burial was located. The third variable included the grave furniture and explicated the form of the grave goods; the quantity of the goods; and the form and quantity combined. Binford tested these findings on 40 non-state societies drawn from the HRAF files.

As a result of his detailed research and his ethnographic testing of this model, Binford determined that the higher the status of the deceased individual the greater the societal disruption at the individual's death. This status was visible in the amount of time, energy, and detail expended on the mortuary rituals involving the deceased (Tainter 1978:125). Tainter determined that the energy expenditure was expressed in burial features, handling of the corpse, and grave inclusions. Tainter tested the hypothesis of energy expenditure on 103 ethnographic cases. The hypothesis held for all 103 cases.

EVOLUTIONARY TYPOLOGIES

Evolutionary scales for comparative analysis of societies have been consistently factored into anthropological and archaeological studies. Mortuary studies applied evolutionary typologies as analogues for archaeological explanation of the social practices of extinct societies. Ethnology, in particular, and ethnography have contributed

the most to this form of investigation. Elman R. Service (1978) has been one such contributor and his scheme has been well known to students of anthropology: bands, tribes, chiefdoms, and states. Societies were classified as one of the four types on the basis of "dichotomous attributes" (Tainter 1978:115). When working with keys established on the basis of typologies, archaeologists identified only a limited number of dichotomous attributes and the selection was based on the belief that identification of a few of the major aspects of a particular typological level would illuminate all of the others. In essence, typological classification was based on assumptions. Placing an extinct society under one of these categories was not altogether unfounded. However, caution must be exercised in allowing the categorization to establish criteria which have not been supported by archaeological recovery. For example, as a tribe developed towards the level of a chiefdom, the differences between them decreased. To call the society a chiefdom implied all of the 'trappings' that were part of the concept which numbered around twenty (Tainter 1978:116). The fact remained that the society being studied lacked several of these categories. Typologies were either too loose or too tightly structured to be useful and the analysis was rendered inaccurate. The best approach was to note each and every attribute that could be determined directly from the archaeology of the site. As Tainter (1978:117) suggested, "To concentrate our research effort worrying over what to call a past society is a waste of that effort.....and we should concentrate on the development of truly quantitative scales for measuring social characteristics".

STRONG INFERENCE

Another method examined and applied in a limited fashion to the data was ‘strong inference’. Strong inference is an “accumulative method of inductive inference” (Platt, John R. 1964:347) and involves a three-step process: (1) alternative hypotheses are generated for patterns evinced in disposal methods; (2) methods to test the hypotheses are designed; and (3) tests are conducted on the hypotheses. Hypotheses not supported by the tests are eliminated from the analysis. New hypotheses can then be developed as the process is repeated. Strong inference is especially applicable in experimental science. This technique allows the researcher to revise and refine hypothetical models. Rather than attempting to prove a single hypothesis, the researcher creates several hypotheses; all of which have the potential of being falsified. Disproving hypotheses is simpler and quicker than trying to prove one single hypothesis. Furthermore, research bias is dramatically reduced as investment in a single hypothesis is unnecessary and the analysis becomes de-personalized (Platt 1964:350). The enquiry is strictly “problem oriented” (Platt 1964:351) and the formation of falsifiable alternative hypotheses is the most complicated task facing the researcher.

As this study is an observational assessment of structural patterns registered in disposal of the dead evidence, and because of the incomplete nature of the data, the application of strong inference is limited to the advancement of models. The testing of these various models must be conducted in future research with more complete lines of evidence.

ANALYTICAL APPLICATIONS

Most of the methods discussed in this chapter are useful for a wide range of studies, not simply burial analysis. These methods apply to scientific research, archaeological analyses, anthropological studies, and sociological approaches. The theoretical principles behind these approaches are fairly similar. Their fundamental utility is the discovery of patterns represented in the data and the assessment of the patterns identified in the data analysis.

In conducting these analyses, the fact that the sites do not represent a random sample must be acknowledged. The sites which have yielded hominid fossil remains are caves or rock shelters. None of the specimens were recovered from open air sites. The sites comply more with a stratified sample.

In considering the patterns recognized in the deposits, certain priorities were established. Most significant was the explication of individual site patterns. In order to reduce the influence of the palimpsest character of deposits and to reduce some of the effects of time compression, the patterns were first identified for the various layers and then the intra-site patterns were examined. Comparisons between sites were most useful for developing models and for explanations of the patterns.

As suggested, the present state of the documents prevents full application of the techniques described above. The methods which proved most useful in the assessment of the patterns of disposal of the dead in the Near East were role theory, formal analysis, GST [particularly equilibrium or deviation amplification models], and strong inference. In general, the theoretical principles behind the various forms of

analysis were applied to the patterns. The potential primary interments in the Near East numbered twenty-seven. Considerable gaps in the information on the burials and the small numbers of primary interments for which all the information was available limited the use of the data for inferential statistical methods of analysis, particularly the multivariate forms. Absence of information reduces the reliability of statistical analyses. Furthermore, statistical methods enhanced time compression. Instead, descriptive statistical approaches were employed. [See Elifson, Kirk W.; Richard P. Runyon, and Audrey Haber 1990:11-12]. Contingency tables and matrices were devised during the process of analysis using Microsoft Excel 5.0 (1993). The tables were used to generate distribution charts via the auto-chart function of Microsoft Excel 5.0 (1993). In this way, all the information possible could be incorporated and used in the interpretation of the patterns expressed in the disposal of the dead.

The attributes illuminated through the study of disposal of the dead methods are nominal variables. When the data is more robust, the statistical methods most amenable to nominal variables and burial analysis are: presence and absence charts and distance matrix analyses (Hage and Harary 1983:93-113); monothetic-divisive analyses using contingency tables, chi-square, and information statistic (Tainter 1978:119); correspondence analysis³¹ (Shennan 1997:308); and principal co-ordinate analysis³² (Shennan 1997:347-352).

³¹ Correspondence analysis is essentially the principal component analysis for nominal variables (Shennan 1997:308).

³² Principal co-ordinate analysis examines the issue of which attribute[s] contributes most to the variation (Shennan 1997:345-52)

Populations of hominids, which may represent different 'ethnic groups' or social groupings, should not be expected to behave in identical fashions. Behavior is moderated through the strictures of cultural perspectives, even if the 'culture' exhibited a very primitive or archaic character. Culturally prescribed variations in treatment and disposal of the dead could be compared to isochrestic styles in lithic technologies. As a result, the patterns exposed in one site should not be expected to directly mirror those from another site. Marked similarities did exist particularly in the registration of age, but, all the patterns within the sites were not identical. In some circumstances, the fundamental cosmology underlying the behaviors expressed in the patterns may have been remarkably different. The time span for these sites ranged between 175,000 to 150,000 BP and 50,000 to 45,000 BP. The approach used in each analysis and in the generation of models must obtain directly to the question or questions being asked.

PART III: Data Analysis

SECTION A: The Documents

Chapter 8: THE SITE SAMPLE - HOMINID REMAINS, SKELETAL PATTERNS, AND DEMOGRAPHIC INFORMATION

The contents of this chapter serve to describe the sites, a total of seventeen, which have yielded Middle Palaeolithic hominid fossil occurrences; to enumerate these fossil occurrences and their skeletal category distribution³³; to relate the demographic data on the fossils; and to discuss the excavation histories of the sites. Maps of the region are presented in Appendix 1: Regional Maps [pages 500 - 501].

Five sites were most amenable to analysis: Amud, Kebara, Qafzeh, Shanidar, and Skhul. The first three sites were chosen because of the number of individuals recovered, the more modern excavation strategies employed, and the quantity and quality of information published in the academic literature. Shanidar and Skhul were also included because of the number of skeletons recovered. Significant gaps in the data limited the analyses of these sites. As the five sites are described in detail in the next five chapters, only the excavation histories, basic skeletal category distributions, and demographic details are presented below.

The balance of the sites are listed and described to complete the catalogue. These sites were not included in the site specific analysis for two reasons.

³³ In order to accurately enumerate the skeletal elements in the charts, each side for osseous elements is considered an element category. Maxillary and mandibular dentition are also treated as one category each. A single tooth in a category is treated as 1 since the category is represented. In cases where no side is given, where mandibular and maxillary dentition are not identified, and where the element side or dentition is followed by a question mark in the tables from the catalogue, the category is notated as 1. If the cranium and mandible were present and teeth indicated as 'present', the teeth category was counted as 2. Ribs and the innominate were enumerated as a single category.

First, many of the sites contained only one or two individuals represented by single skeletal elements. Second, the exact provenience of many of the remains were not adequately established, particularly for Dederiyeh 2 and Tabun.

Two additional sites, Zuttiyeh and Masloukh, were included in the tables. Both sites contained hominids associated with pre-Mousterian tool industries. Zuttiyeh is now identified as an archaic *Homo sapiens* while the Masloukh deposits delivered a tooth ascribed to *Homo sapiens neandertalensis* (Oakley, Campbell, and Molleson 1975:164). These two sites bring the total number examined to nineteen. Tabun Cave, Layer E, also held the remains of two individuals associated with a pre-Mousterian tool industry, the Mugharan Tradition [Acheulian, Yabrudian, and Amudian facies] (Jelinek 1992:270) or Acheulo-Yabrudian (Bar-Yosef 1992b:196). They were also listed in the catalogue.

Tamtama, the twentieth site, was retained in the tables to provide some continuity with the *Catalogue of Fossil Hominids* (Oakley, Campbell, and Molleson 1975:119-120). The femur from Tamtama was non-hominid (Trinkaus 1983:34).

AMUD

Amud Cave was originally discovered in the 1960's. The first excavations were carried out by the Tokyo University Scientific Expedition to Western Asia in 1961 and 1964 under the direction of H. Suzuki (Oakley, Campbell, and Molleson 1975:126). Excavations were renewed from 1991 to 1994 by a multidisciplinary team including E. Hovers, Y. Rak, R. Lavi, and W. H. Kimbel (1995:48).

The remains from Amud are generally designated Neandertals (Rak, Y., W. H. Kimbel, and E. Hovers 1994:313); but, the “eclectic anatomy of Amud I” is frequently re-examined and questioned. Arensburg and Belfer-Cohen (1998:313-315) recently disputed the Neandertal status of Amud I.

The Middle Palaeolithic layers of Amud Cave have provided skeletal elements allocated to nineteen individuals. One specimen, Amud 6, was an intrusive burial from an historic period [carbon dated to 1250 ± 65 BP or AD 680 - 880] (Rak, Kimbel, and Hovers 1994:314). Two other hominid remains, Amud 14 and Amud 15, were recovered from disturbed deposits (Hovers *et al* 1995:50). Their exact provenience in relation to the layers cannot be properly ascertained. A fourth individual, identified as Amud Isolated Tooth, was found near the head of Amud I (Sakura, Hajime 1970:118). Again, the exact provenience of this tooth cannot be established. One other hominid fossil, Amud II, was “re-deposited in antiquity” and “its original location might have been closer to the cave wall” (Hovers *et al* 1995:53). However, Amud II is accepted as a Middle Palaeolithic deposition. Several potentially hominid bone fragments were discovered in the Middle Palaeolithic deposits; but, they were too fragmentary to be of value in Sakura’s analysis (Sakura 1970:117). Provenience was established for fifteen individuals.

The skeletal category distribution of both articulated/associated and disarticulated hominid fossil remains for the site of Amud is depicted in the following chart. The individuals represented in this chart included the remains from disturbed

deposits but not the intrusive burial. The disarticulated remains were allocated to 15 individuals and the total number of articulated remains marked 3 individuals.

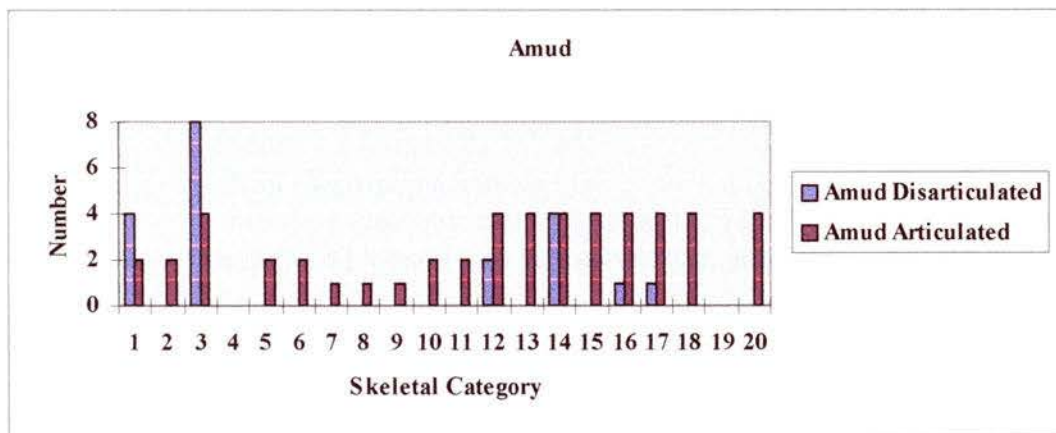


FIGURE 8.1: Amud Skeletal Category Distribution

Legend:	1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
	2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
	3 - Teeth	9 - Sacrum	15 - Hand Bones	
	4 - Hyoid	10 - Innominate	16 - Femur	
	5 - Vertebrae	11 - Scapula	17 - Tibia	
	6 - Ribs	12 - Humerus	18 - Fibula	

Total Number of Disarticulated = 15

Total Number of Articulated = 3

TOTAL NUMBER OF INDIVIDUALS = 18

For the remains securely associated with Middle Palaeolithic deposits, 5 were considered adults and 10 were described as “infants” and/or given precise ages. Amud 14, from the disturbed deposits was an adult and Amud 15, also from disturbed sediments and recovered from the same quadrant as Amud 16, was an “infant” (Hovers *et al* 1995:50). The criteria for defining “infant” was uncertain; but, E. Hovers (1998:personal communication) believed that they were probably under the age of 12 years. For this reason, these remains were listed in the tables as ‘infant?/toddler?/child?’ and were noted as immature remains in the site discussion. Amud Isolated Tooth was

deemed to be a juvenile of 15 years (Sakura 1970b:212, 214). Using the categories established for this thesis, and the securely provenienced remains, the age distribution was:

infant - 2 [Amud 5, 7]
 toddler - 3 [Amud III, IV, 16]
 child - 2 [Amud 8, Amud 11]
 immature unknown age - 3 [Amud 10, 12, 18]
 adults - 5 [Amud I - 25 years, Amud II, 9, 13, 17]

The partition by age category is exhibited in the chart below which includes all the remains except the intrusive burial, Amud 6.

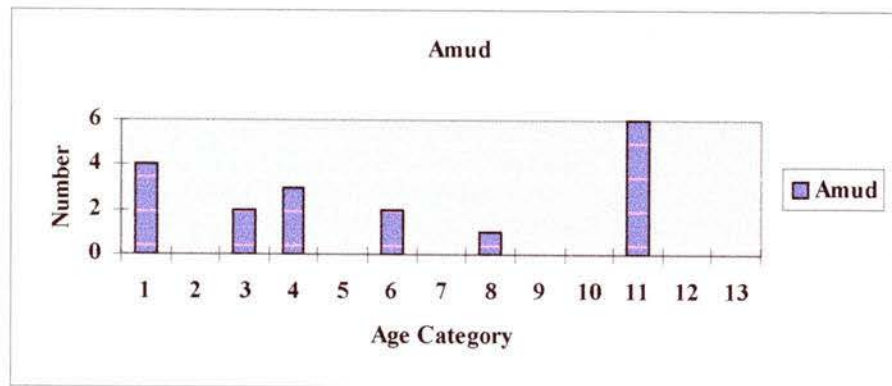


FIGURE 8.2: Amud Age Distribution

Legend: 1 - Immature Unknown Age
 2 - Foetus/Newborn/Infant
 3 - Infant
 4 - Toddler
 5 - Toddler/child
 6 - Child
 7 - Child/Adolescent
 8 - Adolescent
 9 - Adolescent/Young Adult
 10 - Young Adult
 11 - Adult
 12 - Elderly Adult
 13 - Unknown Age

TOTAL NUMBER OF INDIVIDUALS = 18

The ratio of immature remains to adult remains was 2:1. This ratio was not surprising as at least five of the individuals were 4 years of age or less at death. “After the first year or two of an individual’s life, it becomes less likely that death will occur, although children aged 1 - 4 years are very susceptible to infectious diseases and to famine” (Jackes, Mary 1994:156). Children over the age of 10 have a higher probability of survival. Only two of the Amud remains were definitely allocated to the child status. The probability of mortality increases with maturity and advancing age. Females, as well as infants, died in childbirth. The demise of young males was often the result of “accidents” or “violence” (Jackes 1994:156).

Only two individuals retained sexually diagnostic regions of the skeleton. Amud I and II were identified as males (Sakura 1979:118). The disposals of Amud I, 7, and 9 were described as deliberate inhumations (Hovers *et al* 1995:52).

BISITUN

Bisitun Cave is located in western Iran, 48 kilometers east of Kermanshah (Oakley, Campbell, and Molleson 1975:114; Solecki 1971:29). The cave was excavated by Carleton Coon in 1949. He found artifacts described as Evolved Levallois-Mousterian. The date of the cave was associated with Isotopic Stage 4 around 70,000 BP (Clark and Lindly 1989a:628-629).

Coon (1951:79) recovered a fragment of a radius and an upper right I2 from among “masses of bone scrap” and classified the morphology of these elements as Neandertaloid. The *Catalogue of Fossil Hominids* (Oakley, Campbell, and Molleson

1975:114) incorporated the two elements under the name Bisitun 1 and identified the specimen as an adult. Trinkaus (1983:33-34) accepted the radius as hominid, but rejected the tooth. Accordingly, Bisitun cave contained one adult individual represented by a radius.

DEDERIYEH 2

Dederiyeh 2 was discovered in 1988 during an extensive survey of the Afrin Valley of Syria. Test excavations started in 1989, continued in 1990, and were still in progress in 1993 when the ‘infant burial’ was discovered. The excavations were carried out as a multidisciplinary project operated by a joint Syrian-Japanese team.

Dederiyeh 2, also called Houdeiriyeh II, received its name from a Kurdish word meaning “two entrances” (Akazawa, Takeru; Yukio Dodo; Sultan Muhesen; Adel Abdul-Salam; Yoshito Abe; Osamu Kondo; and Yuji Mizoguchi 1993:362; Akazawa, T.; S. Muhesen; Y. Dodo; O. Kondo; Y. Mizoguchi; Y. Abe; Y. Nishiaki; S. Ohta; T. Oguchi; and J. Haydal 1995:78). The name is appropriate because a chimney of at least 10 meters in width opens at the back of the cave. The cave is located on the left bank of Wadi Dederiyeh. Dederiyeh 1 is an Upper Palaeolithic cave across the wadi from Dederiyeh 2. Dederiyeh 2 is “450 meters above sea level” and rests on the “western slope of Jabal Semaan” (Akazawa *et al* 1993:362). The cave is 15 meters wide by 50 meters deep with a maximum height of around 10 meters. The main entrance is 8 meters high. The cave faces north to northwest. Most of the excavations were concentrated in the back of the cave near the convergence of the north and east walls.

The lithic industry from Dederiyeh 2 fits with a Tabun B Levantine Mousterian (Akazawa *et al* 1995:77). No date has been assigned to the site. Considering the span of the Tabun B Levantine Mousterian, Dederiyeh 2 may be contemporaneous with Amud or Kebara, around 50,000 to 60,000 BP.

The excavations at Dederiyeh 2 have introduced 7 hominids to the growing list of fossil occurrences. Only two of these individuals were recovered *in situ* from Middle Palaeolithic layers. The balance of the remains were found in disturbed deposits. The disturbances were ascribed to later occupations. These 7 individuals were classified as Neandertals on morphological or stratigraphic grounds. The skeletal element categories represented are charted below. The disarticulated remains represented 6 individuals and the articulated/associated remains designated one burial, a toddler called the Dederiyeh Infant.

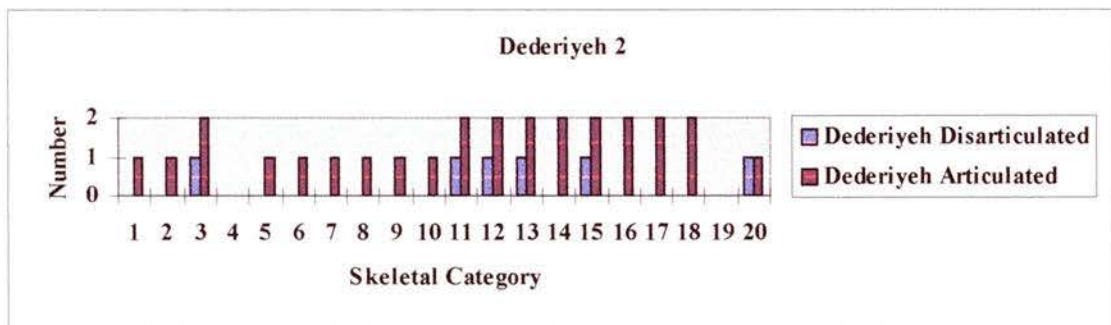


FIGURE 8. 3: Dederiyeh Skeletal Category Distribution

Legend:	1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
	2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
	3 - Teeth	9 - Sacrum	15 - Hand Bones	
	4 - Hyoid	10 - Innominate	16 - Femur	
	5 - Vertebrae	11 - Scapula	17 - Tibia	
	6 - Ribs	12 - Humerus	18 - Fibula	

Total Number of Disarticulated = 6

Total Number of Articulated = 1

TOTAL NUMBER OF INDIVIDUAL = 7

The disarticulated remains were teeth or derived from appendicular skeletal categories. The disarticulated individuals were represented by single elements. A total of 64 other fragments of human skeletal remains were removed from the disturbed sediments in the cave. In lieu of Arensburg's and Belfer-Cohen's (1998) reassessment of lack of evidence for a Neandertal presence in the Levant, these other elements should be re-examined.

The specimen identified as the Dederiyeh Infant, a toddler by thesis classification, was the only individual represented by more than a single element. The toddler burial fits most of the criteria discussed in the last chapter. [See Appendix 3: Burial Patterns, page 531, and Appendix 4: Burial Diagrams, page 553]. Twenty-six element categories and eighteen skeletal categories were present in articulation and anatomical association. The orientation of the corpse was south to north with the head pointed south. The body was resting on its back with the legs flexed in opposite directions and arms extended along the body. "In the most sterile fill of the burial pit there was a subrectangular limestone slab above the head and a small triangular piece of flint where the infant's heart was located" (Akazawa *et al* 1995:79).

The demographic distributions for the skeletal elements was:

Infant - 1

- Dederiyeh 9001; 1 - 5 months; left humerus

Toddler - 1

- Dederiyeh Infant; 1 - 2 years - almost complete
burial

Adult - 5

- Dederiyeh 8901 - left proximal end of ulna

- Dederiyeh 8902 - tooth: lower left I1

- Dederiyeh 8906 - left first proximal phalanx of foot
- Dederiyeh 8909 - right third proximal phalanx of hand
- Dederiyeh 9015 - right scapula, lateral portion

The chart for the demography of Dederiyeh indicated the ratio of adult to immature remains was 5:2. No individuals were sexed.

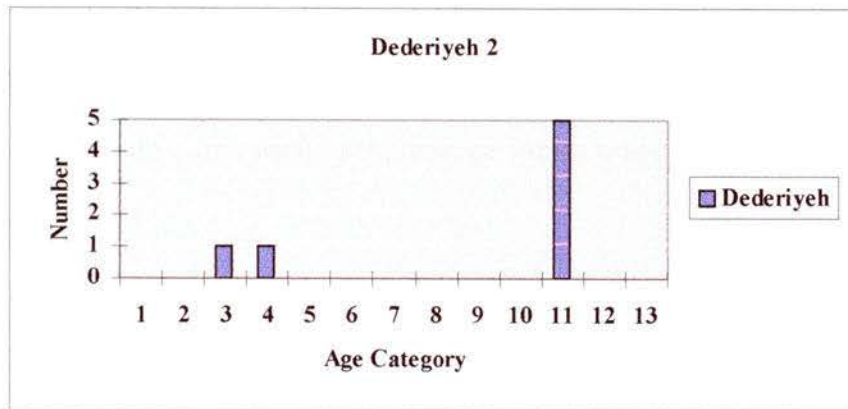


FIGURE 8. 4: Dederiyeh Age Distribution

- Legend:**
- | | |
|---------------------------|----------------------------|
| 1 - Immature Unknown Age | 8 - Adolescent |
| 2 - Foetus/Newborn/Infant | 9 - Adolescent/Young Adult |
| 3 - Infant | 10 - Young Adult |
| 4 - Toddler | 11 - Adult |
| 5 - Toddler/Child | 12 - Elderly Adult |
| 6 - Child | 13 - Unknown Age |
| 7 - Child/Adolescent | |

TOTAL NUMBER OF INDIVIDUALS = 7

The lack of provenience for most of the hominid remains prevents analysis of any pattern of disposal. Any conclusions regarding a localized disposal zone or curation are premature. The excavated area of the cave was limited to a fairly small region.

EL-WAD

Mugharet el-Wad is part of the Mount Carmel series of caves which also includes Mugharet et-Tabun and Mugharet es-Skhul. This cave is situated in the southern region of the range (Oakley, Campbell, and Molleson 1975:147). Excavations were directed by Dorothy Garrod between 1929 and 1934. The cave is comprised of a series of 6 chambers with a talus of around 55 meters. The elevation of the cave is 44.5 meters. The cave faces northwest and sits 12.5 meters above the plain of Wadi el-Mughara and lies near the mouth of the wadi. Mugharet et-Tabun is approximately 70 kilometers from Mugharet el-Wad.

Best known for its Upper Palaeolithic and Natufian deposits, some Middle Palaeolithic artifacts from an Upper Levalloiso-Mousterian Industry were found in level G. A molar was recovered beside a swallow hole in layer G. Because of the proximity of the swallow hole, the tooth was considered to be intrusive and not Middle Palaeolithic. [See Garrod, D. A. E. 1937:5-28]. No age or sex was listed.

GEULAH

Geulah Cave A was excavated in 1962 by E. Wreschner. Geulah is also located in the Mount Carmel Range. The tool industry from the Middle Palaeolithic layers was described as Levalloisian. Layer B1 in the cave was Carbon-14 dated to 42,000 ± 1700 BP (Oakley, Campbell; and Molleson 1975:134; Bar-Yosef 1992a:195). This date corresponded well with Tchernov's (1992:158) bio-chronological date of between 40,000 to 60,000 BP.

One individual, Geulah 1, was found in the cave. A left ulna, a left tibia, and a right tibia comprised the elements discovered. This fossil was not sexed or aged nor was the individual taxonomically classified.

HAYONIM

“During archaeological excavations at Hayonim Cave in Western Galilee, Israel [1965-1971; 1974-1979] Natufian, Kebaran, Aurignacian; and Mousterian layers were exposed” (Arensburg, B.; O. Bar-Yosef; A. Belfer-Cohen; and Y. Rak 1990:107). The Natufian deposits contained at least 27 individuals whose burial pits often intruded into Aurignacian and Mousterian deposits. In addition, burrowing animals have mixed the deposits and have disrupted skeletal remains. Mechanical disturbance was also evident in the cave as a sink hole was discovered in squares F19/20 and G19/20. Provenience for the fossils was difficult to accurately establish

The cave is located approximately 250 meters above the bed of a stream which is a tributary of Nahal Yassof Stream. The upper part of Level E corresponded to a time range of 50,000 - 60,000 years BP according to Tchernov's (1992:177) bio-chronology and the lower portion conformed to a time range between 60,000 years BP and 70,000 years BP. The upper part of layer E held a Tabun C Levantine Mousterian Industry and the lower part delivered a Tabun D Levantine Mousterian (Klein 1996:101)

No morphological assessment has been conducted. The remains are noted as Mousterians [Hayonim Cave Mousterians or HCM] or possible Mousterians [HCpM].

The site analysis for this cave is still in progress. Most of the Middle Palaeolithic hominids were listed by skeletal element because skeletal element associations were not established. The minimum number of individuals represented by these elements was three: one adult [possibly female]; 1 toddler [2 to 3 years old]; and 1 child/adolescent [10 to 12 years old].

The skeletal category distribution for the Mousterian remains is given in the chart below followed by a list of the elements recovered.. A total of 21 elements associated with Mousterian deposits have been found.

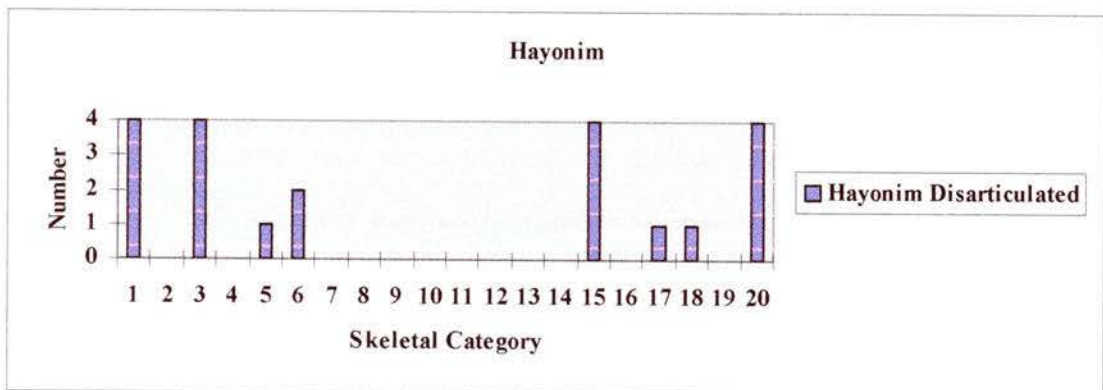


FIGURE 8.5: Hayonim Skeletal Category Distribution

Legend:

1 - Cranium	6 - Ribs	11 - Scapula	16 - Femur
2 - Mandible	7 - Clavicle	12 - Humerus	17 - Tibia
3 - Teeth	8 - Sternum	13 - Ulna	18 - Fibula
4 - Hyoid	9 - Sacrum	14 - Radius	19 - Patella
5 - Vertebrae	10 - Innominate	15 - Hand Bones	20 - Foot Bones

MNI = 3 [1 toddler - age 2-3, 1 child/adolescent - age 10-12, 1 adult - possibly female]

Cranium - 4
 Teeth: lower - 3
 upper - 1
 Vertebrae - 1
 Ribs - 2 fragments
 Hand Bones - 3 or 4 [noted in chart as 4]

Tibia - 1
 Fibula - 1
 Foot Bones - 4 or 5 [noted in chart as 4]

The chart for the Aurignacian remains at Hayonim exhibits a similar, although not identical, distribution with mainly cranial fragments, teeth, hand bones, and foot bones..

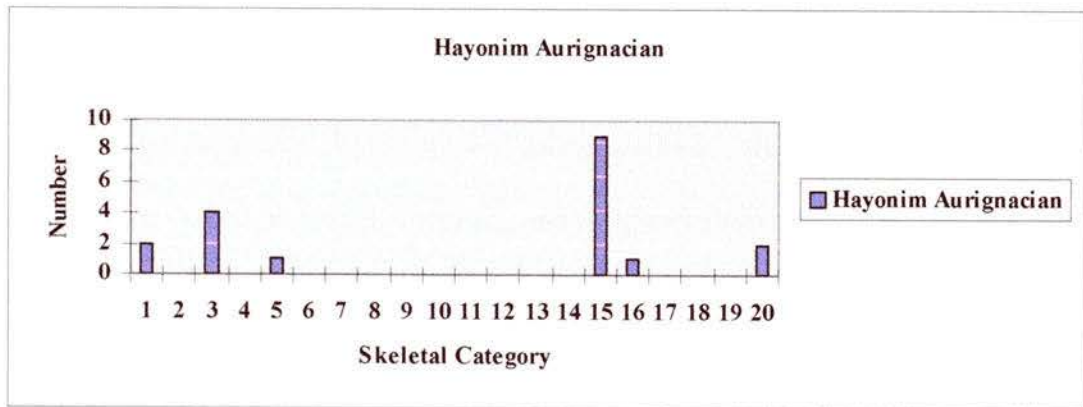


FIGURE 8.6: Hayonim Aurignacian Skeletal Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

MNI = 3 [an infant, a young adult, and an adult]

The fragmentary remains from the Aurignacian levels have not been associated. They are listed by single elements.

Unfortunately, the absence of established provenience and the uncertainty of association of skeletal remains exclude this data from mortuary analysis.

KARAIN

Kiliç Kökten (1955:284) discovered Karain Cave in 1946. He carried out periodic excavations in the site between 1946 and 1973. Excavations are still continuing under the direction of Isin Yalçinkaya. Kökten used dynamite to break through “sinter encrustations” and a “pick and shovel” to excavate the cave. Unfortunately, he did not keep accurate excavation records so the provenience of artifacts and hominid remains were not determined. Karain AH 16 dated between 56,000 and 70,000 years BP by the electron spin resonance [linear uptake] dating method (Otte, M.; I. Yalçinkaya; J. Kozłowski; O. Bar-Yosef; H. Taskiran, and P. Noiret 1995:559). The hominid remains may or may not be contemporaneous with this level.

Karain Cave is known as the black cave and is comprised of 5 chambers. The site is 430 to 450 meters above sea level and is located in the Taurus Mountains, on the flank of Çadır Tepesi (Yalçinkaya, Isin 1988:257). The Middle Palaeolithic industries were identified as Zagros Mousterian and Proto-Charentian.

Some cranial fragments and teeth were recovered from the Mousterian layers. The exact number of individuals represented is unknown (Yalçinkaya 1988:258). At least one of these fragments, a left 2nd upper molar, came from a Neandertal child (Kökten 1955:286). The remains are incorporated in the total number of fragmentary remains as a single individual and marked as a child due to the lack of other information.

Uncertain provenience for an unknown number of individuals from Karain does not permit any form of analysis of the disposal of the dead for this site.

KEBARA

Excavations in Kebara Cave, Me'arat Kebara or Mugharet el-Kebarah, commenced in 1927 with M. Stekelis' test pit. In 1930, Dorothy Garrod also dug a test trench. The following year, F. Turville-Petre began his investigations of the cave. His death in 1942 delayed publication of his discoveries in Kebara. Moshe Stekelis returned in 1951 to continue exploration of the cave and its deposits. His research at the site extended over several years: 1953, 1954, 1955, 1957, 1964, and 1965. The most recent excavations [1982 - 1990] were conducted by a multidisciplinary Franco-Israeli team.

The graph of the skeletal category allocations includes the disarticulated and the articulated/associated hominid fossil occurrences.

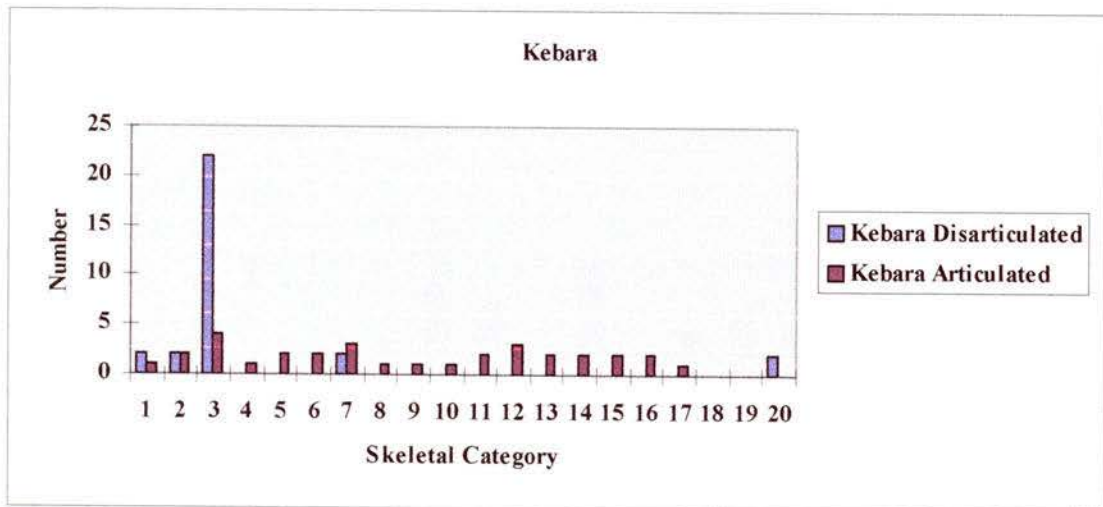


FIGURE 8.7: Kebara Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Total Number of Disarticulated = 27

Total Number of Articulated = 2

TOTAL NUMBER OF INDIVIDUALS = 29

Two burials were discovered in Kebara. One was Kebara 1, or KMH 1, a 7 to 9 month old, possibly male, infant. The other burial, Kebara 2, was an adult male aged 25 to 35 years. A total of 29 individuals were recovered from Kebara Cave.

The two articulated remains were missing several skeletal elements. For the disarticulated fossils, teeth predominate [21] and teeth only representing nineteen [19] individuals. The only osseous element categories recovered were cranium [2], mandible [2], clavicle [2], and foot bones [2]. No long bones were recovered for the disarticulated remains. Several long bones were missing from the articulated disposals.

The demographic structure of Kebara is illuminated in the chart and specifically listed in the following table.

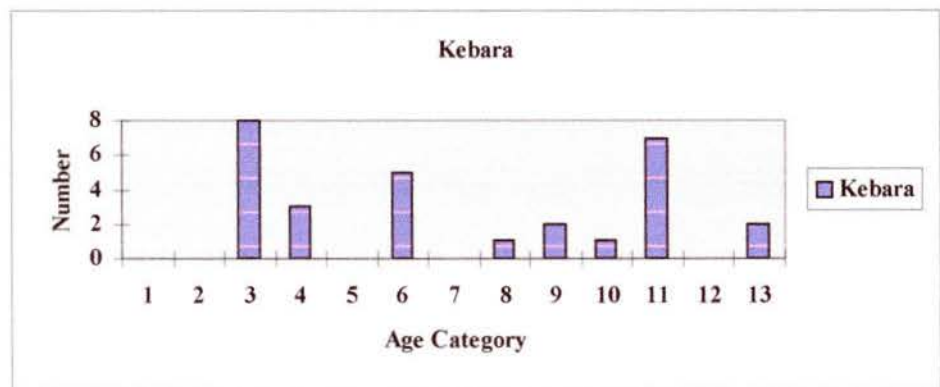


FIGURE 8.8: Kebara Age Distribution

Legend: 1 - Immature Unknown Age 8 - Adolescent
 2 - Foetus/Newborn/Infant 9 - Adolescent/Young Adult
 3 - Infant 10 - Young Adult
 4 - Toddler 11 - Adult
 5 - Toddler/Child 12 - Elderly Adult
 6 - Child 13 - Unknown Age
 7 - Child/Adolescent

TOTAL NUMBER OF INDIVIDUALS = 29

Infants - 8 [KMH 1, 4, 8, 13, 15, 25, 26, 29]
 Toddlers - 3 [KMH 5, 7, 23]
 Children - 5 [KMH 3, 12, 16, 21, 22]
 Adolescent - 1 [KMH 14]
 Adolescent/Young Adult - 2 [KMH 9, 10]
 Young Adult - 1 [KMH 24]
 Adult - 7 [KMH 2, 6, 11, 18, 19, 27, 28]
 Unknown Age - 2 [KMH 17, 20]

With the exception of adolescents and adolescent/young adults, the ratio of immature remains to adult remains was 2:1. One individual [KMH 2] and possibly two [KMH1] were male and two individuals were female [KMH 9 and KMH 10].

Most of the hominid fossil elements from Kebara were designated Mousterian. Kebara 2, an adult male burial, was considered to have strong Neandertal affinities. This classification is now contested (Arensburg and Belfer-Cohen 1998:318). P. Courtaud (1989:55) applied a Neandertal classification to two toe bones, representing KMH 9 and 10. He also felt the skeletal age of the bones supported their association as one individual. These two individuals are still listed separately as indicated in the demographic list above.

KSÂR'AKIL

Ksâr' Akil is more renowned for its Transitional Industry than for its Middle Palaeolithic/Transitional hominid. Yoshihiro Nishiaki and Lorraine Copeland (1992:120) considered most of the lithic assemblages of the cave compatible with a Tabun B Levantine Mousterian. K. Ohnuma and C. A. Bergman (1990:134) determined

the lithic materials from levels XXV - XXI/XX “represent specific stages in the technological transition into the Upper Palaeolithic”.

The rock shelter is about 10 kilometers northeast of Beirut, Lebanon. The shelter rests “at the base of a limestone cliff on the right bank” of Nahr Antelias (Ohnuma and Bergman 1990:91) and is within 25 kilometers of the cave of Ras el-Kelb, also in Lebanon. The shelter was discovered by treasure hunters in 1922. A. E. Day began excavating in 1926, Doherty and Ewing in 1937, and Tixier in 1969. Tixier discontinued his research in the cave in 1975 when civil turmoil erupted in Lebanon. Dates for the site range around $42,750 \pm 1500$ years BP (Bar-Yosef 1992a:195) to $43,750 \pm 1500$ years BP (Ohnuma and Bergman 1990:92) for level XXVI.

A female Neandertaloid maxilla was discovered³⁴ 3 meters from the cliff face and 15 meters below datum in level XXV or XXIV during the 1969 excavation (Ewing, J. Franklin 1963:101; 1969:275; Ohnuma and Bergman 1990:92). The specimen was named Ksâr’Akil 2 and nicknamed ‘Ethelruda’.

The demography for Ksâr’Akil is one female of unknown age.

MAGRACIK (UNNAMED CAVE)

“This cave is located near the village of Magracik in the district of Samandagi in the Vilâyet of the Hatay....in the southern foothills of Musa Dag and in a

³⁴ The Neandertaloid associated with an early stage of a transition towards Upper Palaeolithic Industries was actually outside the time frame of the thesis. The specimen was retained because of the Neandertaloid classification. A complete skeleton of a *Homo sapiens sapiens* child of 8 years, was also discovered at 11.4 meters below datum and in level XVI. The skeleton was too fragmentary to remove. The child was identified as Ksar’Akil 1 or Egbert. This specimen falls well within the Transitional Phase and outside the range of this thesis.

limestone formation of Miocene [Helvetian] age..... at the edge of the ruins of the ancient city of Seleucia” (Senyürek, Muzaffer and Enver Bostanci 1956:81-82). This south facing Turkish cave was not named in the article. Three caves in the region fit the general description of the one described in the article: Merdevenli, Tikali, and Kanal (Yalçinkaya 1995:400). Merdevenli was excavated by Senyürek and Bostanci. Tikali, the “plugged cave”, was mentioned in the discussion of Keoue Cave in Lebanon in which Keoue Cave was designated the “only excavated Mousterian site between Nahr Ibrahim, near Byblos”, in Lebanon, “and Tikali, near Antioch”, Turkey (Nishiaki, Yoshihiro and Lorraine Copeland 1992:119). Attempts to determine the name of the cave were unsuccessful. The lithic assemblages from all three sites were characterized as Levalloiso-Mousterian (Yalçinkaya 1995:400).

The cave is positioned between 40 and 50 meters above sea level. The dimensions were delineated as 23 meters long, 6 meters wide, and 4 meters high. Senyürek and Bostanci (1956:81) indicated three bone fragments and a tooth [a mandibular molar] ascribed to “fossil Man” of “Palaeolithic age” were found in the deposits during Bostanci’s 1956 sondage. Two other permanent maxillary molars and one more mandibular molar associated with “fossil Man” were discovered during the excavation of the lower part of the Middle Palaeolithic layers, 200 to 220 centimeters below ground level (Senyürek and Bostanci 1956:82). These three teeth were the only elements directly associated with identified Middle Palaeolithic layers. Two more permanent teeth were discovered in deposits which also bore pottery shards. They cannot be presumed to associate with the Middle Palaeolithic.

The demographic distribution for this cave cannot be assessed. The three teeth from Middle Palaeolithic layers were treated as one individual, although they could denote as many as three. The age of the remains cannot be accurately addressed.

MASLOUKH

Discovered near Byblos and the coast of northern Lebanon in 1969 by P. Sanlaville and excavated by Ralph Solecki as a salvage project, the site of El-Masloukh consisted of a small cave and three terraces (Skinner, James H. 1970:143-145). The site is dated between 150,000 to 120,000 BP (Nishiaki and Copeland 1992:119). A Neandertal maxillary tooth, M2, was discovered in the cave (Oakley, Campbell, and Molleson 1975:164). Nishiaki and Copeland (1992:121) described the industry as Yabrudian. Layers A and B in the site were conjoined with an Amudian Industry while layer C was connected with a Yabrudian Industry (Ronen, Avraham 1992:219). None of the researchers specified the level from which the tooth derived.

Masloukh delivered one hominid represented by a single permanent molar. No age or sex was mentioned. The tooth is noted in the tables as “adult ?” and an adult designation was used in the charts and for the analysis.

QAFZEH

Djebel Kafzeh, or Qafzeh, was originally excavated in 1939 by the French Consul in Jerusalem, R. Neuville. M. Stekelis assisted Neuville in the investigation of

the cave (Defleur 1993:130). World War II, an Arab-Israeli uprising, and the death of Neuville interfered with a proper publication of the site and the discoveries. In 1965, Bernard Vandermeersch continued the excavation and study of Qafzeh.

The Middle Palaeolithic deposits of the cave contributed the remains of at least 16 and as many as 21 fossil hominids. This fossil population has been variously described as progressive Neandertals similar to the Skhul hominids, Proto-Cro-Magnons, and anatomically modern humans. They are presently accepted as representatives of early *Homo sapiens sapiens*.

The skeletal category allotment from Qafzeh is given below.

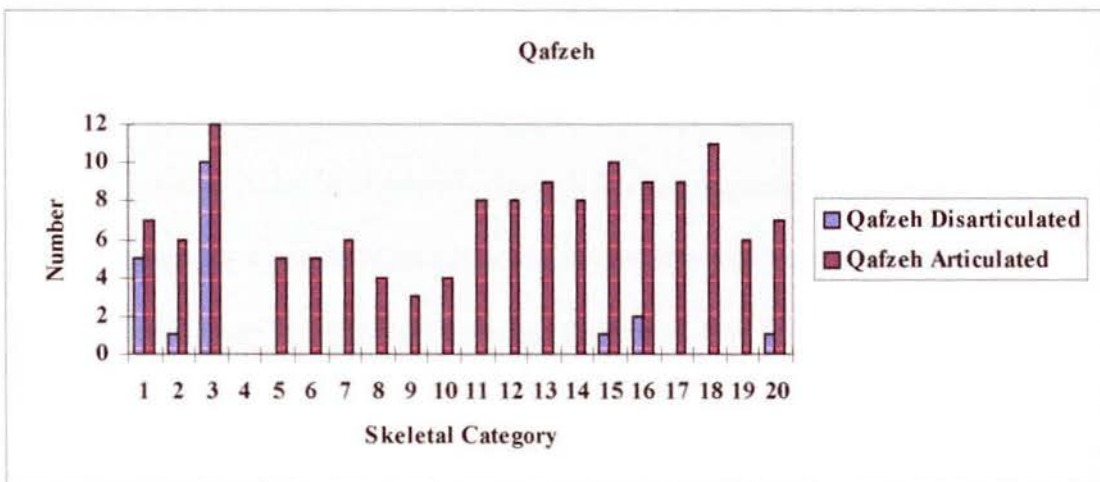


FIGURE 8.9: Qafzeh Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Total Number of Disarticulated = between 10 and 12

Total Number of Articulated = 7

TOTAL NUMBER OF INDIVIDUALS = between 17 and 19

In general, the articulated remains were relatively complete while the disarticulated remains showed a high representation of cranial fragments and teeth. Several discrepancies were indicated for the Qafzeh skeletal remains, especially Qafzeh 8. For the purposes of this study, the information supplied by Vandermeersch (1981) and Tillier (1995) were used to complete the tables and devise the charts.

The exact number of individuals was difficult to determine. The list contains the individuals usually published in the literature Qafzeh 3 through Qafzeh 18. Very little information was available on Qafzeh 4, a child of 6 to 8 years, and a new report identified Qafzeh 4a/21, a toddler of 3 to 4 years, and Qafzeh 4/22, a child of 5 years (Tillier 1995:70). Presumably, the elements of Qafzeh 4 belonged to at least two individuals. Qafzeh 4 is listed in the table and the elements are incorporated in the skeletal category chart, but not in the demography. Instead, Qafzeh 4a/21 and Qafzeh 4/22 are denoted in the demography. Qafzeh 23 was represented by teeth or a tooth and no age was given. Qafzeh 19 and 20 were not listed in any articles and could have derived from Upper Palaeolithic deposits. Qafzeh 10, 11, 12, and 15 were given different ages by Defleur (1993:141,144) and Tillier (1995:70)³⁵. The total number of specimens recognized in the demography was 18.

Infant (foetus?/newborn?/infant?) - 2 [Qafzeh 13 and 14]
 Toddler - 2 [Qafzeh 12 and 4a/21]

³⁵ Defleur (1993:141) gave the age of Qafzeh 10 as 6 years while Tillier (1995:70) placed this child at an age of 5 years. Qafzeh 11 received two age ranges from Defleur (1993:141, 144): 13 to 14 years and 12 to 14 years. Tillier's (1995:70) age estimate was between 10 to 15 years. Qafzeh 12 was aged at 5 to 6 years (Defleur 1993:141) and 1 to 4 years (Tillier 1995:70). An age of between 8 to 10 years for Qafzeh 15 was assigned by Defleur (1993:141) while Tillier (1995:70) aged this individual at 5 years. Tillier's age ranges were retained in the analysis due to her expertise in the study of immature individuals from the Middle Palaeolithic

Child - 3 [Qafzeh 10, 15, and 4/22]
 Child/Adolescent - 1 [Qafzeh 11]
 Immature Unknown Age - 2 [Qafzeh 18, and 23]
 Young Adult - 2 [Qafzeh 5 and 9]
 Adult - 3 [Qafzeh 6, 7, and 8]
 Elderly Adult - 1 [Qafzeh 3]
 Adult Unknown Age - 2 [Qafzeh 16, and 17]

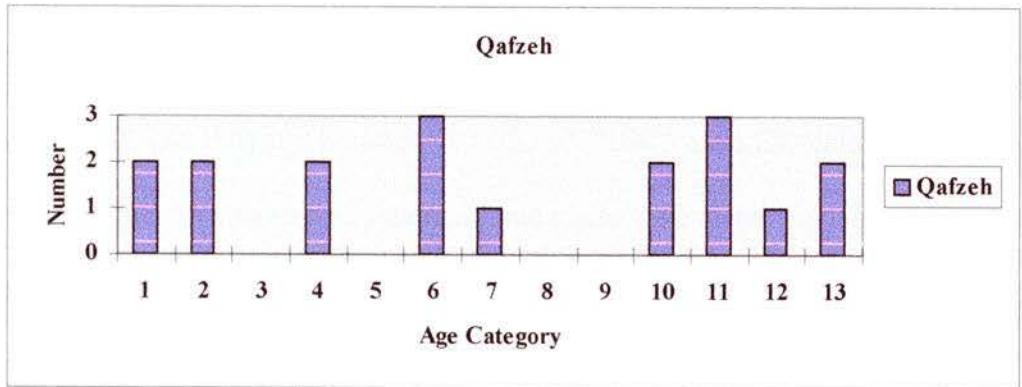


FIGURE 8.10: Qafzeh Age Distribution

- Legend:**
- | | |
|---------------------------|----------------------------|
| 1 - Immature Unknown Age | 8 - Adolescent |
| 2 - Foetus/Newborn/Infant | 9 - Adolescent/Young Adult |
| 3 - Infant | 10 - Young Adult |
| 4 - Toddler | 11 - Adult |
| 5 - Toddler/Child | 12 - Elderly Adult |
| 6 - Child | 13 - Unknown Age |
| 7 - Child/Adolescent | |

TOTAL NUMBER OF INDIVIDUALS = 18

The ratio of immature remains to adults at Qafzeh was 5:4. Sex was established for 5 individuals: 3 were male or probably male [Qafzeh 6, 8, and 11] and 2 were female [Qafzeh 3 and 9]. The demographic structure of Qafzeh incorporated all age ranges from possibly newborn or foetus through elderly adult.

RAS EL-KELB

Ras el-Kelb Cave, in central Lebanon, is positioned on the north face of Ras el-Kelb promontory at the mouth of Nahr el-Kelb” (Oakley, Campbell, and Molleson 1975:164). Henri Martin directed the excavation of the cave in 1959. The lithic assemblage was allotted to a Tabun C Levantine Mousterian (Nishiaki and Copeland 1992:122; Jelinek 1992:256). The cave deposits were dated to more than 52,000 years BP (Bar-Yosef 1992a:195) and between 70,000 and 75,000 years BP (Jelinek 1992:268).

The cave sediments retained three teeth. One tooth was a large pre-molar with Neandertal morphological affinities. The other two exhibited slightly more modern morphologies, although one of these teeth was taurodont (Nishiaki and Copeland 1992:122). The teeth were not taxonomically diagnostic.

The demographic structure for Ras el-Kelb was 1 child of 6 years [upper dm2]; one adolescent/young adult of 16 to 20 years [Neandertaloid pre-molar]; and a young adult of 23 years [upper M2 which was taurodont]. The total number of individuals was 3.

SHANIDAR

Shanidar is a remarkably large cave in northern Iraq. The site was originally investigated in July 1951 by Ralph Solecki. Solecki dug the first test pit in the cave in October 1951. Excavations continued in 1952, 1956-1957, and 1960. Political and civil upheaval in the region prevented further excavations in the cave.

The cave contained the remains of at least nine individuals classified as Neandertals (Trinkaus 1983:426; Stewart, T. D. 1977:121). A tenth individual may still be in the deposits. “Following the removal of Shanidar IV and its associated remains, it was discovered that there were some anomalous bones in the east wall of the excavation” (Solecki 1971:243). Solecki was not certain whether the bones were animal or hominid and opted to leave the remains until the following field season. Unfortunately, studies in the cave were halted at this point and the remains were never recovered.

The skeletal category allocation for Shanidar cave is noted on the chart below.

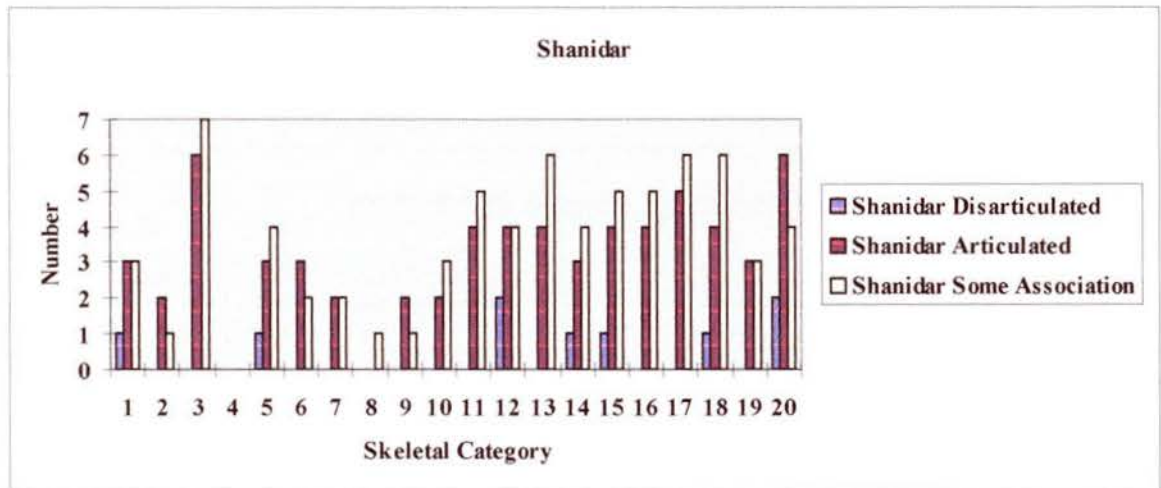


FIGURE 8.11: Shanidar Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Disarticulated [Total Number of Individuals = 2]

Articulated [Total Number of Individuals = 3]

Some Anatomical Association [Total Number of Individuals = 4]

TOTAL NUMBER OF INDIVIDUALS = 9

The skeletons of the Shanidar hominids included 4 individuals in articulated/anatomical association [Shanidar I, III, IV, and VII], 3 individuals with some anatomical association of skeletal elements [Shanidar II, V, and VI], and two disarticulated individuals [Shanidar VIII and IX].

The demographic structure of Shanidar aligned as follows.

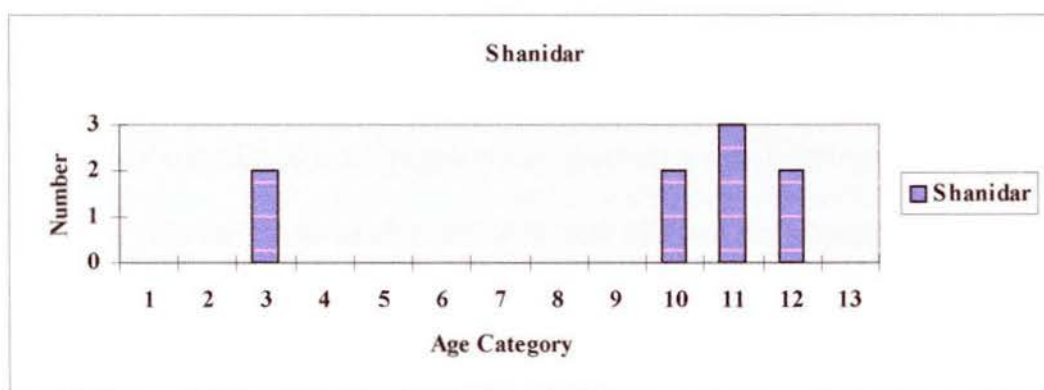


FIGURE 8.12: Shanidar Age Distribution

Legend:

1 - Immature Unknown Age	8 - Adolescent
2 - Foetus/Newborn/Infant	9 - Adolescent/Young Adult
3 - Infant	10 - Young Adult
4 - Toddler	11 - Adult
5 - Toddler/Child	12 - Elderly Adult
6 - Child	13 - Unknown Age
7 - Child/Adolescent	

TOTAL NUMBER OF INDIVIDUALS = 9

Infants: 2 [Shanidar VII and IX]
 Young adults: 2 [Shanidar II and VIII]
 Adults: 3 [Shanidar I, IV, and VI]
 Elderly Adults [or Advanced Age]: 2 [Shanidar III and V]

Two of the adult remains were females and 5 were males. The child to adult ratio was 2:7. The absence of toddlers and children is interesting. However, only a small area in the center of the cave was excavated. The demography for this site should not be considered representative of this population. Shanidar contained at least 4 individuals in a burial context and the other disposals exhibited traces of possible mortuary ritual.

SHOVAKH

Me'arat Shovakh or Mugharet esh-Shubbabiq was discovered in 1969 by F. Clark Howell. The cave is located on the west bank of Wadi Amud approximately half a kilometer from Amud cave (Binford 1966:20). Sally Binford excavated in the cave from October through December of 1962 (Binford 1966:18). The lithic industry was described as a Mousterian of Levallois facies. Tchernov (1992:158, 165) estimated the date for Shovakh to fit somewhere within Oxygen Isotope Stage 3, between 40,000 and 60,000 years BP.

Shovakh delivered a single tooth, a lower right permanent molar from an adolescent/young adult individual of 17 to 18 years.

SHUKBAH

The cave of Shukbah is northwest of Jerusalem. The site is elevated 22 meters above Wadi en-Natuf. The cave has three chambers. The first chamber is around 18 meters in diameter, the second chamber measures 7 meters by 6 meters. The third and

much smaller chamber is approached through “two low tunnels” or through an opening next to the main entry of the first chamber (Garrod and Bate 1942:1-2). Dorothy Garrod excavated the cave in the spring of 1928.

Shukbah released the remains of one Middle Palaeolithic hominid and its associated Upper Levalloiso-Mousterian tool industry from layer D of Chamber I. Clark and Lindly (1989a:628-629) estimated the age for layer D of Shukbah to range between 60,000 and 80,000 years BP. One other hominid was discovered and later determined to be an intrusive disposal into layer D from an overlying layer. Shukbah D1 was identified as a Neandertal (Oakley, Campbell, and Molleson 1975:152).

Shukbah D1 was neither aged nor sexed and was represented by a temporal bone, frontal bone, and a permanent molar (Oakley, Campbell, and Molleson 1975:152).

SKHUL

Mugharet es-Skhul, located 200 meters from Tabun, was excavated and studied by Theodore McCown and Sir Arthur Keith at the same time Garrod investigated Tabun Cave (Defleur 1993:123; Trinkaus and Shipman 1994:247-249). The cave was discovered in 1928; research was started in 1929 and was continued in 1931 and 1933. The industry assigned to the cave and rock shelter was originally described as a Lower Levalloiso-Mousterian (Oakley, Campbell, and Molleson 1975:141). The industry has been re-evaluated and consigned to a Tabun C Levantine Mousterian (Bar-Yosef 1992a:197; 1992b:195). Absolute dates based on the electron spin resonance dating

method for the site of Skhul were: $81,000 \pm 15,000$ years BP [EU] and $101,000 \pm 12,000$ years BP [LU]. Tchernov (1992:177) considered the date of the Skhul microfauna from layer B to fit with a date range between 50,000 and 70,000 to 75,000 years BP.

First classified as Neandertals, the skeletal population from Skhul is now ascribed to anatomically modern humans or Proto Cro-Magnons. The skeletal category allocation is denoted by the next chart.

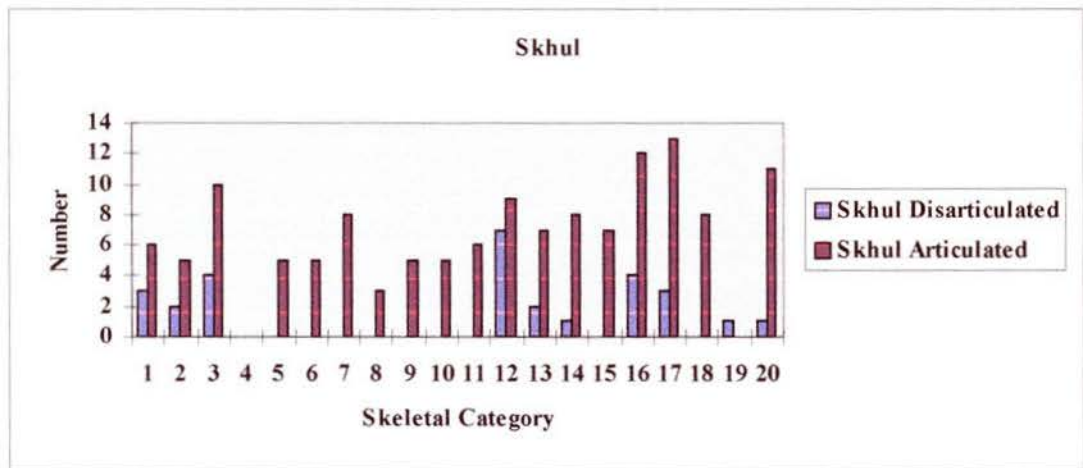


FIGURE 8.13: Skhul Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Total Number of Disarticulated = 18

Total Number of Articulated = 8

TOTAL NUMBER OF INDIVIDUALS = 26

The deposits of Skhul released the remains of at least 26 individuals. Six and possibly eight of these individuals were recovered as articulated remains or possible burials. One other individual, Skhul II, was represented by 7 skeletal elements and 5

skeletal categories. Skhul II, may have been the object of a secondary interment or the remnants of a disturbed burial.

The majority of the fragmentary remains, perhaps denoting as many as 18 individuals, have not been provenienced, sexed, or aged. The skeletal category with the highest representation for the fragmentary remains was the humerus [7] followed by the femur [4] and teeth [4], and the cranium [3] and tibia [3].

The demography of Skhul was not as broad as Qafzeh. However, the demographic structure may alter if the 16 individuals of unknown age receive an age determination.

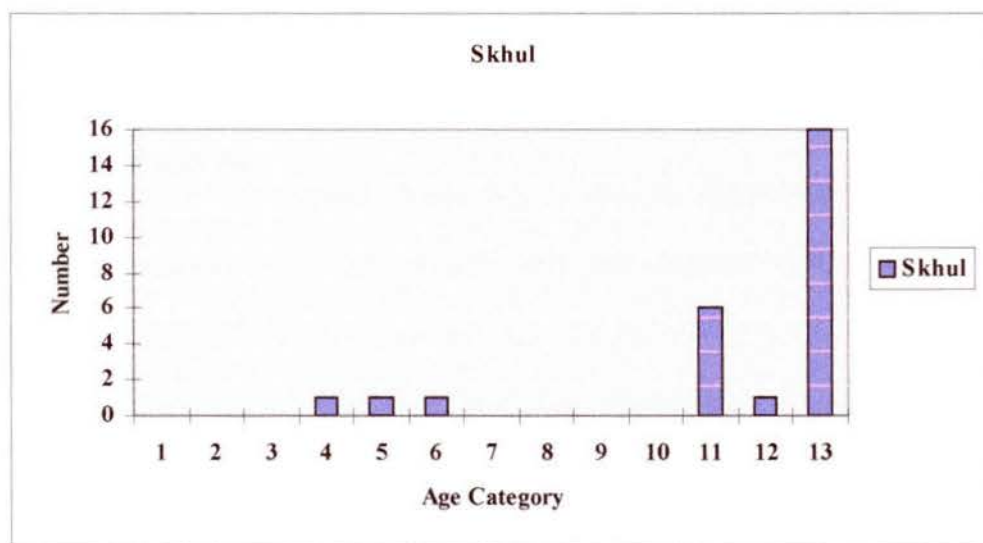


FIGURE 8.14: Skhul Age Distribution

Legend:

1 - Immature Unknown Age	8 - Adolescent
2 - Foetus/Newborn/Infant	9 - Adolescent/Young Adult
3 - Infant	10 - Young Adult
4 - Toddler	11 - Adult
5 - Toddler/Child	12 - Elderly Adult
6 - Child	13 - Unknown Age
7 - Child/Adolescent	

TOTAL NUMBER OF INDIVIDUALS = 26

Toddler: 1 [Skhul I]
 Toddler/Child: 1 [Skhul X]
 Child: 1 [Skhul VIII]
 Adult: 6 [Skhul II, III, IV, V, VI, and VII]
 Elderly Adult: 1 [Skhul IX]
 Unknown: 16 [Skhul 11 - 26]

The immature/adult ratio for those remains of established age was 3:7 which resembled the ratio from Shanidar [2:7]. Two of the more complete skeletons and one fragment were diagnostically female [Skhul II, VII, and 14]. Five more adults received a male classification [Skhul III, IV, V, VI, and IX]. All three children were sexed as males; however, information presented in Tillier (1995:72) suggested Skhul I was female. The female sex for Skhul I was retained for the analysis based on Tillier's discussion and expertise with immature remains. The ratio of identified males to identified females was 7:4.

TABUN

Tabun Cave represented one of the longest depositional sequences in the Levant and probably covered a time span of around 170,000 to 180,000 years. The cave was excavated by the Joint Expedition of the British School of Archaeology, directed by Dorothy Garrod, between 1929 and 1934 (Oakley, Campbell, and Molleson 1975:142). Jelinek excavated some of the remaining deposits between 1967 and 1973. The principle intent of the new research was to re-investigate the complex stratigraphy of the site and to resolve issues of chronology for the Levant. The new stratigraphy was considerably

different for this excavation; however, this study retained Garrod's stratigraphy for the allocation of hominids by layer. Provenience for these remains was problematic and was not clearly established. Excavations at the time of Garrod's research were not conducted in the same precise manner as today. Depths were often measured from ground level and no grid system was used. Stratigraphic control was not always maintained. The discoveries were frequently placed in accordance with distances from features or between hominid discoveries. Excavations in the site have continued under the direction of A. Ronen (Grün *et al* 1991:231).

The stratigraphy of the cave has been affected by the chimney and "swallow holes" in the floor of the cave (Grün *et al* 1991:232).

Tabun's deposits have yielded several lithic industries: Mugharan or Acheulo-Yabrudian, Tabun D Levantine Mousterian, Tabun C Levantine Mousterian, and Tabun B Levantine Mousterian (Bar-Yosef 1992:193-194). In fact the sequence from Tabun has been used to establish a chronological and typological sequence for the entire region of the Levant.

Mugharet et-Tabun, meaning the 'cave of ovens', is located in the Mount Carmel region of Israel. The cave was formed at the western foot of the southern flank of Mount Carmel and overlooked a coastal plain. The site faces northwest. The elevation is 63 meters (Defleur 1993:118) or 45 meters above sea level (Grün *et al* 1991:232). The three chambered cave is 18 meters above and on the left bank of Wadi el-Mughara, or Nahal Me'erat.

The chronological sequence in Tabun has been the source of considerable debate, particularly in the case of the stratigraphic association of the Tabun C1 female and the dates allocated to this individual. The average dates for the site were established by the electron spin resonance method of dating and were drawn from faunal teeth collected during Garrod's excavation. The dates for the site are given by layer below:

Layer Ed: 182 ± 61 kya [EU]; 213 ± 46 kya [LU]
 Layer Ec: 176 ± 10 kya [EU]; 199 ± 7 kya [LU]
 Layer Eb: 151 ± 21 kya [EU]; 168 ± 15 kya [LU]
 Layer Ea: 154 ± 34 kya [EU]; 188 ± 31 kya [LU]
 Layer D: 122 ± 20 kya [EU]; 166 ± 20 kya [LU]
 Layer C: 102 ± 17 kya [EU]; 119 ± 20 kya [LU]
 Layer B: 86 ± 11 kya [EU]; 103 ± 16 kya [LU]
 (Grün *et al* 1991:243)

The dates selected for this study were not necessarily the average dates. They were chosen from Grün *et al*'s (1991:243) list of dates to correspond with Tchernov's (1992:177) bio-chronology.

The remains of several hominids were found in the deposits of Tabun Cave. The disarticulated remains from Tabun B were strictly teeth while Tabun C and E showed similar skeletal category distributions. The lack of secure provenience and the inability to identify a specified area or areas for the disposal of human remains restricted any determination of whether the skeletal category differences were allied to changes in disposal methods, cultural practices, or other undetermined factors between the habitation of Tabun B and Tabun C. Tabun B compares with the high incidence of teeth at Kebara.

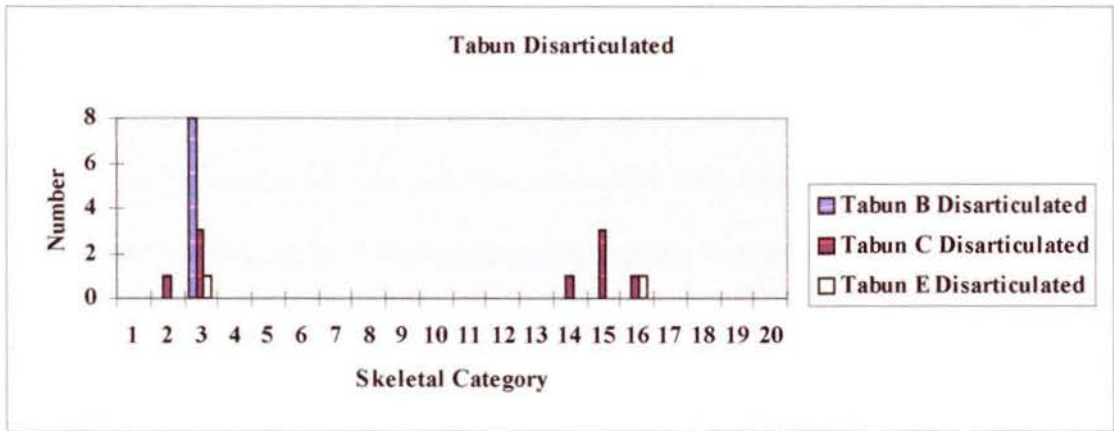


FIGURE 8.15: Tabun Disarticulated Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Total Number in Tabun B = 7
 Total Number in Tabun C = 6 to 8
 Total Number in Tabun E = 2
TOTAL NUMBER OF INDIVIDUALS = 16 - 18

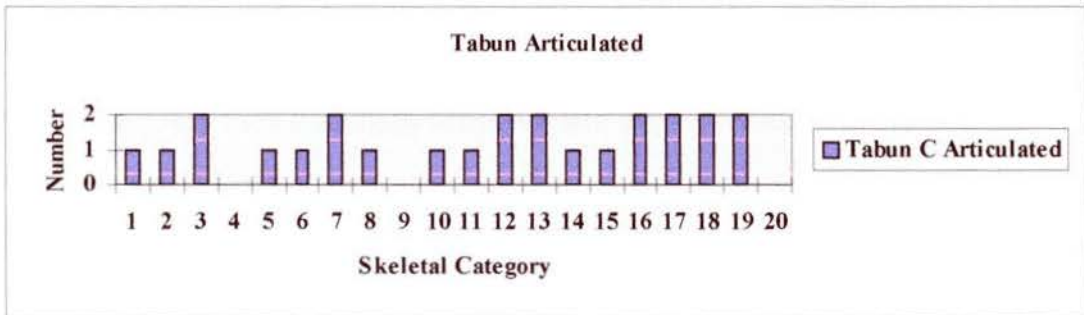


FIGURE 8.16: Tabun C1 Skeletal Category Distribution

Legend: Same as previous chart
TOTAL NUMBER OF INDIVIDUALS = 1

One hominid was found in a burial context, the Tabun C1 female [approximately 30 years of age at death]. [See Appendix 3: Burial Patterns, page 547, and Appendix 4: Burial Diagrams, page 567]. The layer from which this individual derived has been debated. She has been associated with Layer B or C (Bar-Yosef 1992b:196) or with Layer C or D (Jelinek 1992:264). This female disposal fits with several of the criteria established for burial. The skeletal elements numbered 24 and represented 17 skeletal categories. The elements were recovered in anatomical articulation. No pit was recognized; but, her emplacement was north of a large limestone block, a natural feature providing protection for the corpse (Defleur 1993:121). The position of her head on its base with her chin pushed into her chest was used to implicate a pit. Tabun C1 was deposited just outside the cave mouth in a hearth and was positioned between 1.5 to 2.0 meters from the cave wall (Garrod and Bate 1937:64). C1's axis of orientation was east to west with her head pointed east (Defleur 1993:120). She was lying on her back with her left forearm flexed at a right angle away from her body and her right arm extended down her side. Tabun C1's right hand rested on her pelvis. Her legs were minimally separated and slightly flexed. The legs leaned to the left. Burned and broken faunal bones, possibly from the hearth beneath the skeleton, were found in the fill matrix. Tabun C1 has been described as a Neandertal (Grün 1991:238).

The fossil remains from layer B were designated Neandertals (Oakley, Campbell, and Molleson 1975:146). Some of the remains from layer C were possibly modern humans, particularly the Tabun C2 male. The femur of Tabun C3 resembled

Tabun C1's femur (Grun *et al* 1991:238). The hominids from layer E were listed as Neandertal (Oakley, Campbell, and Molleson 1975:143). As stated at the beginning of this chapter, Tabun E1 and E2 were associated with a pre-Mousterian industry.

Those individuals marked as 'adult?' reflect the uncertain age of these hominids. Tillier (1995:64) excluded the fossils from the list of immature remains; so they were assumed to be adults. The demographic structure of Tabun is listed by layer.

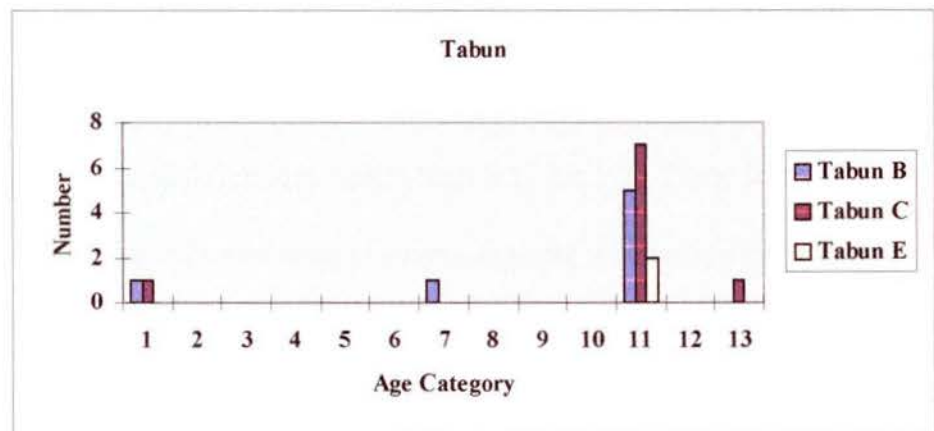


FIGURE 8.17: Tabun Age Distribution

Legend: 1 - Immature Unknown Age
 2 - Foetus/Newborn/Infant
 3 - Infant
 4 - Toddler
 5 - Toddler/Child
 6 - Child
 7 - Child/Adolescent
 8 - Adolescent
 9 - Adolescent/Young Adult
 10 - Young Adult
 11 - Adult
 12 - Elderly Adult
 13 - Unknown Age

Tabun B [Total = 7]

Tabun C [Total = between 7 and 9]

Tabun E [Total = 2]

TOTAL NUMBER OF INDIVIDUALS = between 16 and 18

Layer Eb:

Adult: 1 [Tabun E2]

Layer Ea

Adult: 1 [Tabun E1]

Layer C:

Immature- unknown age: 1 [Tabun C?] (Tillier 1995:64)
 Adult?: 3 - 5 [Tabun C3; C4; and the C5,6 and 7 possible grouping]
 Adult: 2 [Tabun C1 and C2]
 Unknown age: 1[Tabun C??] (Jelinek 1992:264)

Layer B:

Immature - unknown age: 1 [Tabun BC?]
 Child/Adolescent: 1[Tabun B1, Series I]
 Adult?: 5 [Tabun B3, B4 - Series III, B5 - Series IV, BC2 - Series II, and Tabun BC6]

The total demography for Tabun Cave was 3 immature individuals, one of which was a child or adolescent; 12 to 14 adults; and one individual of uncertain age. The ratio of immature to adult remains was at least 3:12 [or 1:4]. Three females [Tabun C1, Tabun C3, and Tabun E2], one male [Tabun C2] along with two possible males [Tabun B1, Series I and Tabun E1] were identified.

TAMTAMA

Tamtama Cave was excavated by Carlton Coon in 1949. The site is located in Iran approximately 21 kilometers “north of Rezaiyeh and west of Lake Urmiya” (Oakley, Campbell, and Molleson 1975:119. The section of femur that Coon discovered in Tamtama {Coon 1949:79) was described as “non-hominid” by Erik Trinkaus (1983:34).

ZUTTIYEH

Mugharet el-Zuttiyeh is about 500 meters from Amud Cave and is dated by uranium/thorium to $164,000 \pm 21,000$ years BP and $148,000 \pm 6,000$ years BP for the pre-Yabrudian Layers. Tchernov (1992:177) recommended an age of between 165,000 and 135,000 years BP. The lithic industry associated with the hominid was Acheulo-Yabrudian (Bar-Yosef 1992b:196) or the Mugharan Tradition (Jelinek 1992:270). The cave was excavated by Turville-Petre in 1925 when the Zuttiyeh hominid was discovered (Oakley, Campbell, and Molleson 1975:150). Bar-Yosef continued investigations in the cave in 1973 and 1974 (Vandermeersch 1981:15).

The Zuttiyeh hominid, possibly a young adult male, was represented by cranial fragments: a frontal, left zygomatic, and right sphenoid (Oakley, Campbell, and Molleson 1975:150; Vandermeersch 1981:15). The cranium was originally given a Neandertal classification; but, is now considered an archaic *Homo sapiens* (Nishiaki and Copeland 1992:122).

SUMMARY

The minimum number of hominids discovered in the Near East to date is between 136 and 141 individuals. This number is relatively small considering the time span covered, at least 100,000 to 140,000 years. Some association of skeletal elements in some of the sites may be warranted. At least 24 and possibly more of these individuals were recovered from deliberate inhumations. Twenty-nine individuals were found in

articulation or anatomical association. The total number of identified females was 15 and the total number of males was 22. Between 26 and 28 individuals were not aged; 7 immature specimens could not be classified according to age, and at least 99 individuals were not sexed. One additional adult of unknown sex and one immature individual of unknown sex and age from Amud might be added to the list; they were found in disturbed deposits. Hayonim may also have more than three individuals represented. With so much missing and uncertain information, studies of the demographic distributions would not be accurate. All age categories were recovered from the Near East and the totals are given below.

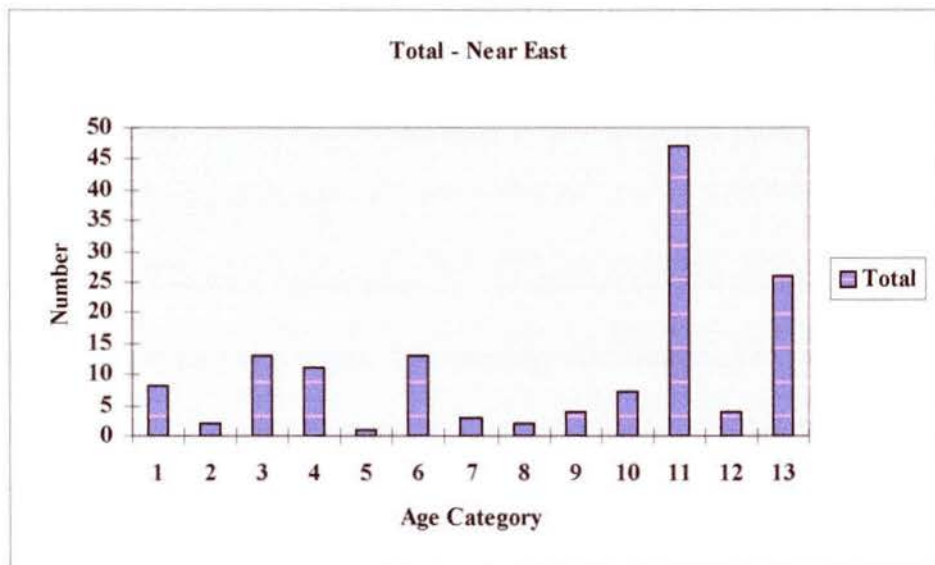


FIGURE 8.18: Near East Age Distribution

Legend:

1 - Immature Unknown Age	8 - Adolescent
2 - Foetus/Newborn/Infant	9 - Adolescent/Young Adult
3 - Infant	10 - Young Adult
4 - Toddler	11 - Adult
5 - Toddler/Child	12 - Elderly Adult
6 - Child	13 - Unknown Age
7 - Child/Adolescent	

TOTAL NUMBER OF INDIVIDUALS = 136 - 141

Immature of unknown age: 7 to 8
Infant: 15 [Includes Foetus/Newborn/Infant = 2]
Toddler: 11
Toddler/Child: 1
Child: 13
Child/Adolescent: 3
Adolescent: 1 to 2
Adolescent/Young Adult: 4
Young Adult: 7
Adult: 44 to 47
Elderly Adult: 4
Unknown Age: 26 to 28

Whether site specific demographics are more informative representations of a population within a site over a much smaller time span is also doubtful. In all probability, the disposals did not delineate the entire population of deceased individuals in the site. However, the present demography is relevant to the interpretation of the disposal patterns within the sites.

The skeletal distributions for the articulated and the disarticulated remains are presented in the next two charts. The category distribution of the articulated hominid remains covered all skeletal categories including the hyoid. The least represented element categories were: the hyoid [1], the sternum[12], the sacrum [14] and patella [14]. The balance of the skeletal categories for the articulated remains indicated a minimum frequency of 19. Most of the articulated remains were missing specific elements from categories which were at least minimally represented such as vertebrae, ribs, and innominate bones.

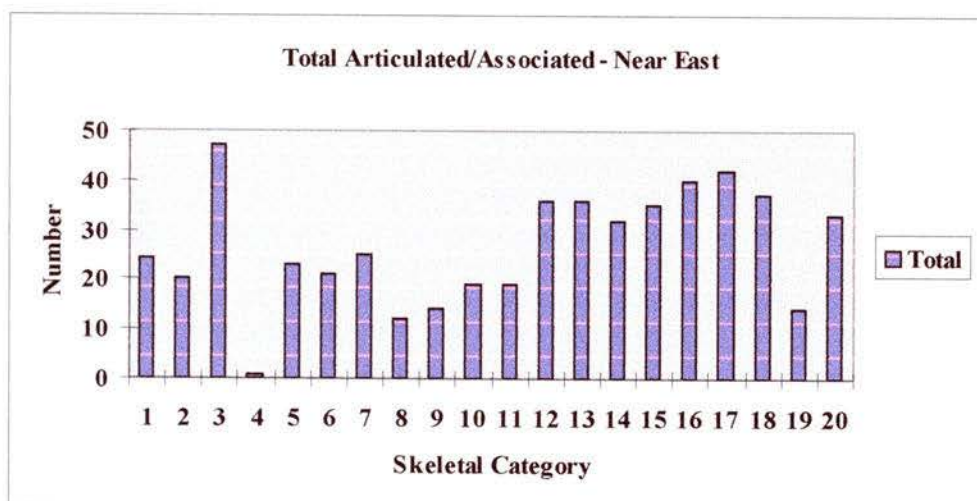


FIGURE 8.19: Near East Articulated/Associated - Skeletal Category Distribution

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

TOTAL NUMBER OF INDIVIDUALS = 29

The category with the highest frequency of representation for the disarticulated remains was teeth [72]. Of the osseous elements, cranial fragments [23] were more frequently retained. In essence, these two categories belonged to the region of the skull which is comprised of the cranium, mandible, maxillary and mandibular dentition. The high incidence of skull elements among the disarticulated remains is discussed in Chapter 15. The humerus [12], foot bones [11], hand bones [10] and femur [9] were fairly closely represented in the deposits. This distribution is carefully considered in relation to the site specific analyses and the regional analysis. In general, each site exhibits its own specific pattern of representation and the distributions in some sites resemble those from others such as Tabun B and Kebara in the preference for teeth.

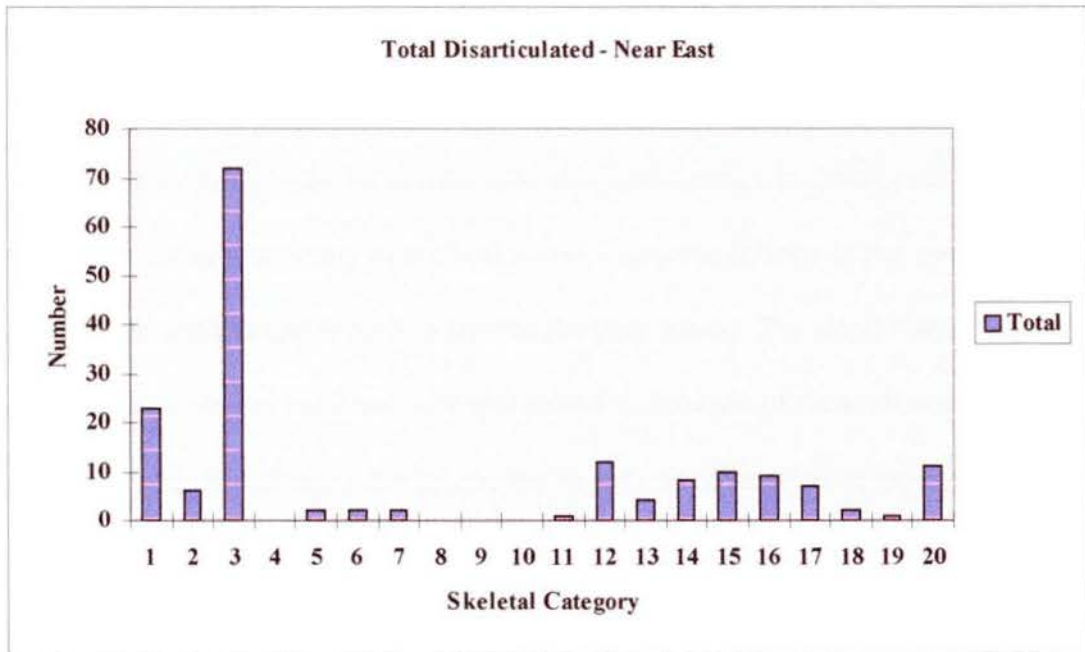


FIGURE 8.20: Near East Disarticulated - Skeletal Category Distribution

Legend:

1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

TOTAL NUMBER OF INDIVIDUALS = 107 to 112

The high frequency of teeth is not unexpected: teeth are the most durable portions of the skeleton. Of the osseous material, the long bones survive better in protected environments due to their size and the thickness of the cortical [compact] bone. The bones of the axial skeleton [sternum, ribs, vertebrae] are less likely to persist even in more recent burial contexts. The cortical bone is thinner and these bones are smaller and oddly shaped. The cranium is actually comprised of 11 paired bones [totalling 22] and 5 single bones (White 1991:24). Some of these are the most delicate bones of the skeleton. The bones of the neurocranium are composed of an inner and outer table of bone with

diploë or spongy bone “sandwiched between” (White 1991:66). The cranium is therefore fragile and unlikely to survive without some degree of protection. The flat bones such as the scapula and ilia of the innominate are also less resistant to destruction due to their shape and the thin covering of cortical bone. The cortical bone of the osseous elements of the hand and the feet is thinner than in the long bones. The small size of the carpals and tarsals as well as the small size and cylindrical shapes of the metacarpals, metatarsals, and phalanges diminishes the likelihood of survival of these bones. Frequently, the distal and proximal ends of the metacarpals, metatarsals, and phalanges are eroded (personal experience). The presence of fragile bones with articulated remains strengthens the likelihood of deliberate protection or inhumation. The high incidence of recovery of skull elements, particularly teeth and cranial fragments; hand bones; and foot bones with disarticulated remains is significant and augments the possibility of deliberate disposal in protected circumstances for these fossil occurrences. The frequency of recovery and the disarticulated character of the individuals marked by these fragmentary remains, particularly skull elements, advocates a different form of disposal or mortuary treatment such as curation.

At present, no simple or absolute method exists for the discrimination between preservation due to natural deposition and preservation due to deliberate hominid activity. Inferences of this sort are generally derived from the correlation of several lines of evidence and are best expressed in terms of increased or decreased likelihood, possibility, and/or probability. Some crucial considerations involve the number of hominid remains recovered from a specific region of a site; the association of

articulated and disarticulated remains within this circumscribed disposal area; taphonomic studies of bone preservation in protected and unprotected contexts; taphonomic indicators on the osseous material such as cut marks or gnaw marks; the presence of bioturbators and carnivores; non-random patterns of skeletal elements discovered within a disposal zone; consistency or continuity of disposal attributes within a site or between sites such as the orientation of bodies or position of burials; geomorphology of a cave or rock shelter; and average sedimentation rates for sites. Average sedimentation rates are particularly useful in the calculation of the average time of corpse exposure in a site before becoming naturally embedded in the sediments [natural inhumation]. The longer a corpse is exposed, even in cave environments, the greater the likelihood of disarticulation, disassociation, and dispersal of body parts or skeletal elements due to non-hominid, biological or mechanical disturbances.

The spatial and structural patterns encountered in the disposal of the dead are discussed in the next six chapters. The implications of these patterns and the explanations which accompany them are derived from anthropological theory and principles of burial analysis, including formal analysis. The meanings of the patterns may never be fully understood or easily explained. The patterns do, however, reflect some level of deliberate behavioral response and symbolic prescience on the part of the hominids whose social structure, organization, and possible spirituality were imprinted in the residues of the sites.

SECTION B: Formal Analysis of Individual Sites

Chapter 9: AMUD

Amud Cave is located in the Jordan Valley, near Lake Tiberias, in northern Israel. Facing southeast, the cave is positioned 35 meters above and on the right bank of Wadi Amud. The cave is difficult to see from the floor of the Wadi and equally difficult to access. The original excavators gained entry to the cave by traversing “the cliff from a natural limestone tower called ‘Amud’ which is about fifty meters upstream from the cave” (Suzuki, Hisashi 1970:5). Ein Amud, a natural and once reliable spring, is situated just below the cave. Zuttiyeh Cave is only 500 meters downstream from Amud.

The cave is 10 meters wide, 5.5 meters high, and 12 meters deep, but narrows with depth below datum. A large terrace [four times the size of the cave] which may have been part of the occupied area extends in front of the cave entrance (Defleur 1993:168). Level B delivered Middle Palaeolithic artifacts and hominid remains. The lithic artifacts recovered from the site were originally assigned to a Transitional Industry. Lithic artifacts from Levels B2 and B4 were re-analyzed and affiliated with the Tabun B Levantine Mousterian (Ohnuma, Katsuhiko 1992:104). Preliminary thermoluminescence dates suggested the site was occupied around 50,000 to 60,000 years BP.

Taphonomic disturbances in the cave were generally ascribed to biological or mechanical sources. Disturbances from overlying layers were cleaned and only the intact Middle Palaeolithic layers studied (Hovers *et al* 1995:53). No evidence of carnivore damage was discovered on the remains of Amud 7. No other information on

the other fossil occurrences was provided. Diagenesis did not appear to be a major contributor to the damage or destruction of skeletal remains (Hovers *et al* 1995:54)

The average sedimentation rate for Amud Cave was around 20 centimeters per thousand years (Chinzei, Kiyotaka 1970:48). Level B4, the lowest of the deposits, was found on the middle and lower terrace of the cave (Ohnuma 1992:83). This level contained one hominid fossil occurrence, a toddler of 3 years [Amud IV]. Hovers *et al* (1995:53) indicated the occupants of this phase “mostly avoided settlement in proximity to the cave’s wall” because traces of occupation were only found in the central regions of the cave.

Level B3 was found mainly on the middle terrace (Ohnuma 1992:85). The level was culturally sterile; no faunal bones, no artifacts, and no hominid remains were discovered in this level.

Level B2 was fairly thick and spread through the middle and upper terrace indicating use and occupation of all the areas excavated (Hovers *et al* 1995:53). This level delivered 10 of the hominid remains. Eight of these fossil occurrences were clustered against the north wall of the cave [Amud 7, 9, 10, 11, 12, 13, 17, and 18]. Amud 7 [a 10 month infant] and Amud 9 [an adult] were described as burials. The hominids placed near the wall represented 3 adults, 1 infant, 1 child, and 3 more immature individuals which were not aged. Two of the remains were discovered away from the wall: Amud II [an adult] and Amud III [a toddler]. All of the hominids in this level were discovered on the middle terrace.

Level B1 revealed 4 hominids with established provenience and 2 individuals from disturbed deposits. These fossils were recovered at the boundary of the upper terrace or the upper end of the middle terrace. Amud I, a 25 year old male, was buried away from the wall. The balance of the fossil discoveries, including the disturbed remains, were clustered along the north wall. Amud 5 was an infant of 6 to 9 months at death, Amud 16 was a toddler of 18 months; and Amud 11 was a child of 8 years. Again, the disturbed remains represented an adult [Amud 14] and an immature individual of unknown age [Amud 15]. The depths below datum for these disturbed depositions were similar to the other disarticulated individuals from Level B1. This level was only about 1.1 meters thick and, in addition to the hominid fossils, contained lithic artifacts and faunal remains.

In summary, a total fifteen individuals were definitely associated with Middle Palaeolithic deposits. These remains are generally considered to be Neandertals (Rak, Kimbel, Hovers 1994:313) although only three individuals retained taxonomically identifiable characteristics (Hovers *et al* 1995:48): Amud I, Amud II, and Amud 7. “Commonly, fragmentary remains that do not bear taxonomic information are grouped under the same taxon as the more informative specimens originating from similar archaeological contexts in the same site” (Hovers *et al*:54). Based on the recent reassessment by Arensburg and Belfer-Cohen (1998) which disputes a Neandertal presence in the Levant, this taxonomic assessment may be unwarranted. Amud Isolated Tooth, recovered near the head of Amud I; Amud 14; and Amud 15 were not securely

associated with Middle Palaeolithic layers; but, may have derived from these layers, particularly level B1. These individuals are briefly considered in the analysis of the site.

PATTERNS AND IMPLICATIONS

LOCATION IN SITE

Several spatial patterns emerged from the analysis of the site maps. [See Appendix 2: Site Maps, pages 502 - 505]. Three locational patterns were most obvious. First, only one region of the cave yielded Middle Palaeolithic fossil hominid remains, in particular the north to northwest side of the site. The researchers eliminated taphonomic factors as the likely cause of the patterns of deposition of hominid remains in the site. If deposition was the result of natural causes, the hominid remains would be expected to appear in other regions of the site. Hominid remains were only recovered from the aforementioned localized area. Hovers *et al* (1995:54) examined and rejected the possibility that diagenesis had caused the disappearance of hominid bone in other regions of the cave or that “bias in the retrieval methods” had created the impression of deposition in only one region. Non-hominid osseous material was discovered in all regions of the excavation with no “bone-devoid areas” (Hovers *et al* 1995:54). The researchers also indicated the hominid disposal zone did not represent a midden or “dumping region” in the cave (Hovers *et al* 1995:56). The specialized disposal area appeared to be allocated to the deposition of hominids and not for the accumulation of refuse and kitchen remains. The majority of the skeletal remains were clustered against

the north wall while the elements which were found away from the wall were recovered at a distance no greater than 4 meters from the “main concentration of hominid remains” (Hovers *et al* 1995:53). This was true for both levels B1 and B2. The single hominid from level B4 was deposited fairly close to the cluster found in B2. In addition, all the posited burials derived from the same locations as the fragmentary remains (Hovers *et al* 1995:56): ‘away from the wall’ for Amud I, ‘near the wall’ for Amud 7 and 9. This allocation of all the hominids through different occupation levels to a specific region of the cave tends to suggest the occupants set aside a particular area of the cave for the deposition of their dead.

Closely tied to the previous spatial patterning is the apparent lack of overlap between depositions except perhaps Amud 15 and Amud 16. Amud 15 was found in disturbed deposits and was immature while Amud 16 was 18 months. These remains may be associated. Amud 15 was a radius encountered between 189 to 194 centimeters below datum while Amud 16 was a femur recovered from 203 to 209 centimeters below datum. No apparent overlap of any of the other remains favorably contributes to the potential of deliberate spatial allocation for the dead. A further implication of lack of overlap is some method of marking the zone of the dead as well as the disposal unit of the deceased.

The final obvious pattern exhibited by the location of the disposals was the transition over time from the middle terrace towards the upper terrace. In other words, the early occupants deposited their dead in the front regions of the cave while the

later occupants disposed of their deceased individuals farther back in the cave; but, in the same general area along the north wall.

Another pattern can be discerned using the site maps. Infants [aged under 12 months] were always placed closest to the wall while adult remains along the wall were usually slightly removed from the wall. Those individuals identified as children according to the thesis age categories [5 to 10 years] occupied a similar position as the adults against the wall. The immature remains of unknown age were also situated closer to the wall than the adults with the possible exception of Amud 10. But, Amud 10 was found at 375 to 385 centimeters below datum and the cave narrows with depth. Amud 10 almost aligns with Amud IV (4) which is the lowest individual. This same pattern appeared in the regions away from the wall. The adults were found farther away from the wall than the toddlers. The map presented by the researchers tended to justify this impression. Amud II, III, and 10 were probably deposited around the same time as their depths below datum were very close [380 cm., 370 cm., and 375-385 cm. below datum respectively]. This pattern tends to imply some deliberate spatial allocation in the disposal zone according to age and possibly sex which is discussed below.

BURIALS

As stated above, three of the disposals were designated deliberate inhumations: Amud I, 7, and 9. [See Appendix 3: Burial Patterns, page 529 and Appendix 4: Burial Diagrams, pages 550 - 551]. The details of these interments comply with the principal criterion of articulation of skeletal elements and they concur with the

specialized zone of deposition. Amud I and 7 fit with additional criteria of large numbers of skeletal elements represented, possible inclusions, and non-random positions of the bodies. The heads of Amud I and 7 pointed northwest with the axes of their bodies directed northwest to southeast (Hovers *et al* 1995:53). No pit outlines were noted in the deposits, but Amud 7 was buried in a niche in the bedrock at the wall of the cave, a natural feature which was compatible with a burial structure.

Amud I, a 25 year old male, was buried on his left side. His legs rested in a right angle flex position with his left leg contracted to his pelvis. The preservation of Amud I's right leg was not good and the bones were slightly displaced. His left arm was in a right angle flex while his right was drawn up to head height (Sakura 1970:118-121; Defleur 1993:170-171). Following the diagram of the burial, several flint artifacts, faunal bones, and stones or small limestone blocks were found on and beside the skeleton. No mention was made of these elements in the literature although E. Hovers (1997:personal communication) had also recognized their presence from the burial plan. The flint artifacts were found on or near the pelvis [5]; on the head [2]; in the triangle created by the body and the left arm [1]; behind and along the line of the spine [2 or 3]; below the mandible [1]; on the rib cage at about the level of the diaphragm [1]. Stones of varying sizes were clustered around the feet and near the left leg; near and on the left hand bones; on the head, particularly over the orbits of the eyes; one near the right ulna, and one large rectangular stone near the left knee. Animal bones were strewn among the stones along the left leg, and one was found within 10 centimeters of and at the same level as Amud I's mouth. For this observational study, these must be taken into account under the

inclusions/associated artifacts/features category. While the presence of these elements may be fortuitous, the position of the stones, in particular, fit with the discoveries in other sites including Qafzeh, Dederiyeh, and some Western European sites (Defleur 1993:259-260). Therefore, the incorporation of these elements in the burial unit may be behaviorally significant.

Amud 7, a 10 month old infant, was buried on its right side in a niche in the bedrock of the cave wall. A red deer maxilla rested against the pelvis of the infant (Rak *et al* 1994:314).

Amud 9, an adult, was denoted by the left tibia, fibula, and foot bones. These elements were recovered in articulation. The researchers considered this deposition a burial which was almost completely destroyed by a rockfall. They suggested the collapse of rock fragmented the remains of the individual and any other bony elements close by. Any of the tiny fragments of bone recovered under the rockfall were “unrecognizable” (Hovers *et al* 1995:53). The photograph provided by Hovers *et al* (1995:53) was very difficult to appraise. However, the position of what appeared to be the lateral maleolus of the fibula with the lateral surface exposed and the location of the first metatarsal of the hallux, suggested the elements were recovered lying on the medial side. This position, if it represented the remains of an entire skeleton, would correspond to interment on the right side. The position may also indicate a burial on the back with the legs flexed to the right. This arrangement must be reassessed as the discovery was not specifically described. No inclusions were indicated for this disposal; however, the rock fall may have altered the burial and may have eliminated any evidence for

accompanying artifacts, bone, and/or stone with the skeletal elements. Amud 9 may have been killed by a rock fall. However, the presence of Amud 9's articulated lower leg within Amud's circumscribed disposal zone renders this possibility less likely as does the presence of a "buffer sediment" between the hominid bones and the rock (Hovers *et al* 1995:53). The individual could also represent a form of mortuary processing of hominid remains or curation: either osseous elements were removed from the burial or the leg bone elements were the only bones deposited.

The disposal of one, and possibly two, individual[s] on the right side in the level, B2, and the interment of Amud I, in B1, on his left side may correspond to different burial practices in the two time frames. An alternative explanation relates the proximity of Amud 7 and 9 to the cave wall and Amud I's distance from the wall to different burial locales and positions for males as compared to females and infants, particularly if Amud 9 was a female and buried on the right side. No females were identified in this site which is not the case for most of the other sites in the region. In the other sites, such as Tabun, and Kebara, identified females were positioned closer to the cave walls than identified males. Kebara is discussed later. Some alternative distinctions may be indicated by these three disposals such as age distinctions like those registered for Shanidar.

The inclusions discovered in association with the skeletal remains are noted in the chart below.

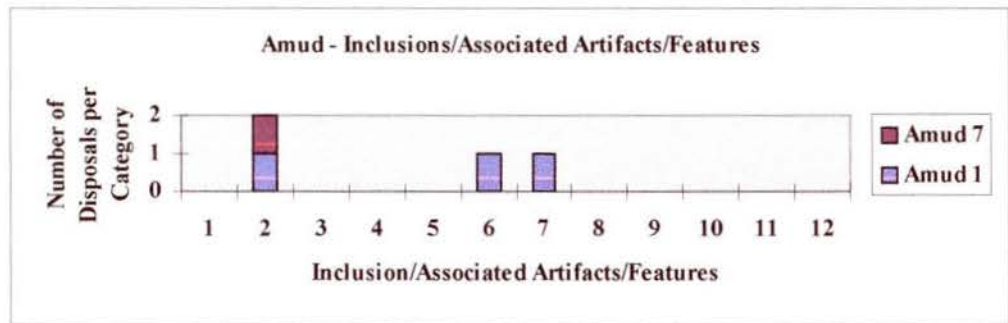


Figure 9.1

Legend: 1 - Antler
 2 - Bone
 3 - Carboniferous Substance?
 4 - Charcoal
 5 - Hearths
 6 - Limestone Blocks
 7 - Lithic
 8 - Ocher
 9 - Plant Pollens
 10 - Shell
 11 - Stones
 12 - Teeth

TOTAL NUMBER OF DISPOSALS = 2

Only one category, bone, was retained with the infant [Amud 7]. The bone was a red deer maxilla which lay across the baby's pelvis. Red deer were not the dominate fauna in the site of Amud. Gazelle and fallow deer were the most highly represented faunal remains [47.2% and 23.8% respectively] while red deer remains were not listed (Defleur 1993:172). "The almost complete red deer maxilla" was "the only complete such specimen retrieved from the site, notwithstanding the abundance of deer remains that occur as dietary residue" (Hovers *et al* 1995:56). The red deer maxilla should be considered an exotic material. The presence of an exotic or unusual element in contact with the skeletal remains diminished the likelihood of fortuitous inclusion in the disposal of the infant.

Amud I's associated lithics were found around and on the skeletal remains. The calcaire or limestone blocks were found near or on the upper and lower extremities and on the head. The faunal bone found near the mouth of Amud I was not

identified by species. The presence of limestone blocks or stones near the appendages and head of the skeleton corresponded with similar distributions of stones or blocks from other Near Eastern sites such as Qafzeh [Qafzeh 8 and 11] and Dederiyeh 2 [the Dederiyeh Infant]. Lithics were recovered from the burial fill, near the bodies, or on the skeletons of several disposals in the Near East [Dederiyeh Infant; Kebara 2; Qafzeh 8; Shanidar 1, 5, and 7; Skhul 1 and 4]. Six of these disposals were adult males [Amud I, Kebara 2, Qafzeh 8, Shanidar 1, Shanidar 5, and Skhul 4]. The other three individuals were toddlers [Dederiyeh Infant and Skhul 1] or infants [Shanidar 7]. Lithics were not recovered in association with all the potential burials from these other sites.

SKELETAL PATTERNS

The skeletal patterns of the disarticulated remains from Amud do not appear to be random, but, do seem to correspond with criteria of age, location in the site, and possibly to the sex of the individuals. The patterns are illustrated by charts in this section. All of the fragmentary remains need to be reassessed to rule out association of isolated elements. If elements spread across the disposal area are associated, then the apparent pattern of skeletal elements is diminished.

The total skeletal category distribution for all remains [articulated and disarticulated] from the site of Amud is represented by layer on the graph on the next page. The skeletal categories demonstrating the highest representation in the site in order of frequency were: teeth [11]; radius [8]; cranium [6] and humerus [6]; femur [5] and

tibia [5]. The other categories, were part of the articulated remains which were identified as burials: Amud I, Amud 7, and Amud 9.

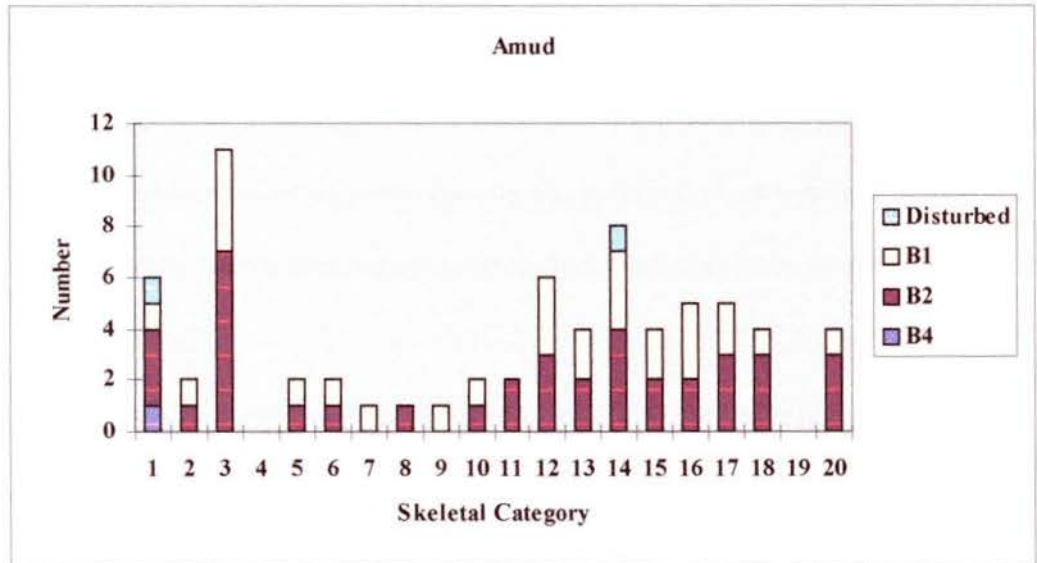


FIGURE 9.2: Amud - Skeletal Category Distribution - By Layer

Legend:

1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

Series 1 = Amud Layer B4
 Series 2 = Amud Layer B2
 Series 3 = Amud Layer B1
 Series 4 = Disturbed

TOTAL NUMBER OF INDIVIDUALS = 18

As stated previously, the presence of teeth in the deposits is difficult to interpret, particularly if only one or two teeth denote an individual. Deciduous teeth are lost during childhood when they are replaced by permanent dentition. Tooth loss can also occur as a result of accidents, periodontal disease, malnutrition, age, or culturally prescribed activities. The Masai regularly remove one of the lower central incisors of

their children as a preventative measure against diseases like tetanus (Tunnell, Gary 1999:personal communication). The position of the teeth in the disposal zone of Amud Cave promotes their incorporation as embodiments of deceased individuals. Defleur (1993:214-215) included teeth within the categories of cranium and mandible as an indication of the original presence of the osseous elements. Although this may be the case, no direct evidence exists to prove the original presence of osseous material in the case of isolated teeth. If curation was practiced, then teeth may have been a preferred element for selection.

The allocation of maxillary and mandibular dentition is denoted in the following chart according to the positions ‘away from the wall’ and ‘near the wall’.

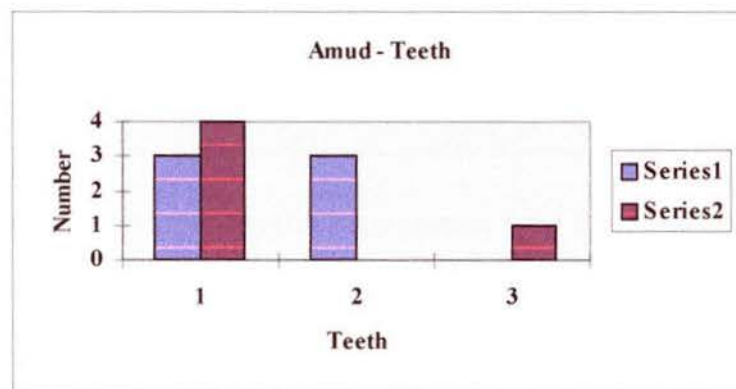


FIGURE 9.3: Amud Teeth - Distribution

Legend: 1 - Maxillary Dentition
 2 - Mandibular Dentition
 3 - Unknown Allocation
 Series 1 - Away From Wall = [Individuals = 4]
 Series 2 - Near Wall [Individuals = 3]
TOTAL NUMBER OF INDIVIDUALS = 7

With the possible exception of the single tooth of unknown allocation which marked Amud 13 and was a worn permanent molar, all the teeth recovered from the ‘near the

wall position' were maxillary dentition including the infant burial [Amud 7]. Of the isolated teeth, only one was sided and derived from the right side [an upper right deciduous molar for Amud 8]. The other teeth were a deciduous canine; two permanent molars [one of which was worn], and a worn, permanent pre-molar. Both mandibular and maxillary teeth were represented in the fragmentary remains positioned 'away from the wall'. The maxillary teeth from the 'away from the wall' position were associated with maxillary cranial fragments: right maxilla for Amud II and left maxilla for Amud III. The mandibular teeth in this position were from the right side of the mandible and were the same teeth, although one was deciduous and the other permanent: Amud III was a right dm2 and the Amud Isolated Tooth was a right M2. Maxillary and mandibular dentition were recovered from Amud I's burial.

The skeletal category distribution for disarticulated remains in the 'away from the wall' location is represented by the graphs below. In the location 'away from the wall, two of the adult remains were male [Amud I and II]. Amud IV's location of 'near the wall' or 'away from the wall' was uncertain due to the fact the cave narrows with depth. Amud IV was removed from Layer B4 at a depth of 460 meters and represented the deepest recovery. Because of the apparent distance away from the wall as extrapolated from the site map, the fragmentary remains of Amud IV were analyzed with the 'away from the wall' category.

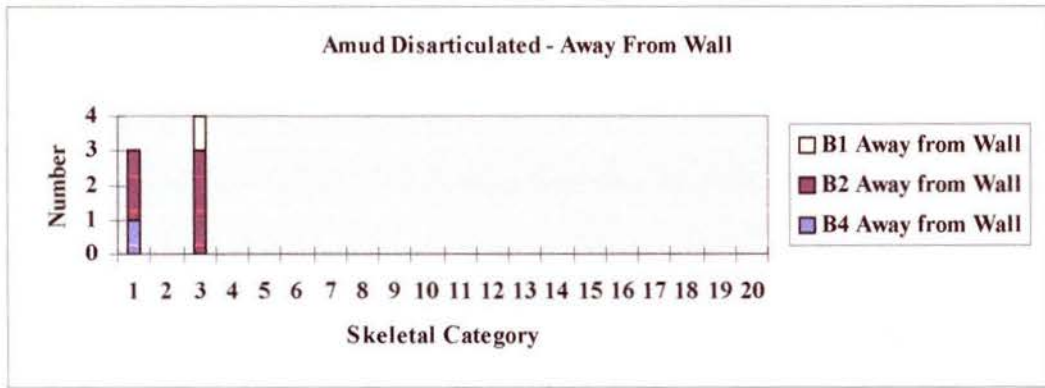


FIGURE 9.4

- Legend:**
- | | | | |
|---------------|-----------------|-----------------|-----------------|
| 1 - Cranium | 7 - Clavicle | 13 - Ulna | 19 - Patella |
| 2 - Mandible | 8 - Sternum | 14 - Radius | 20 - Foot Bones |
| 3 - Teeth | 9 - Sacrum | 15 - Hand Bones | |
| 4 - Hyoid | 10 - Innominate | 16 - Femur | |
| 5 - Vertebrae | 11 - Scapula | 17 - Tibia | |
| 6 - Ribs | 12 - Humerus | 18 - Fibula | |

TOTAL NUMBER OF INDIVIDUALS = 4

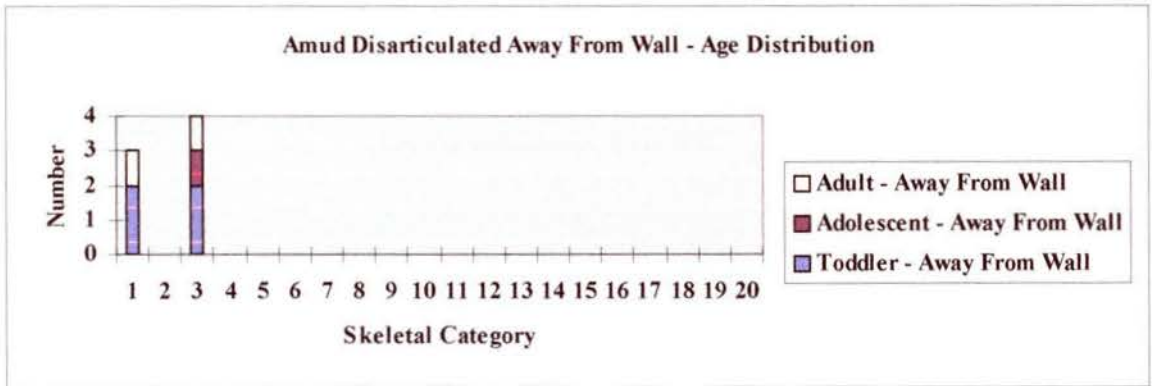


FIGURE 9.5

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 4

All the fragmentary individuals [Amud II, III, IV, and the Isolated Tooth] were represented by teeth and/or cranial bones regardless of the age category. The right side of the skeletal fragments predominate, except for Amud III which has elements from

both sides of the cranium as well as a mandibular tooth [right dm2]. One feasible explanation for this pattern may be the sex of the individuals represented; they may all be male. If curation occurred and if left-sided disposals for male burials can be substantiated, then the predominance of right side elements may agree with the side of the body uppermost in a male primary disposal or inhumation. Amud Isolated Tooth was a right lower M2 which was recovered from a position near the head of Amud I. The level from which it derived was not mentioned nor was a depth below datum given. The lack of provenience makes this specimen difficult to incorporate in the analysis.

The 'near the wall' skeletal category distribution for disarticulated remains differs significantly from the 'away from the wall' distribution as the ensuing graph clearly indicates.

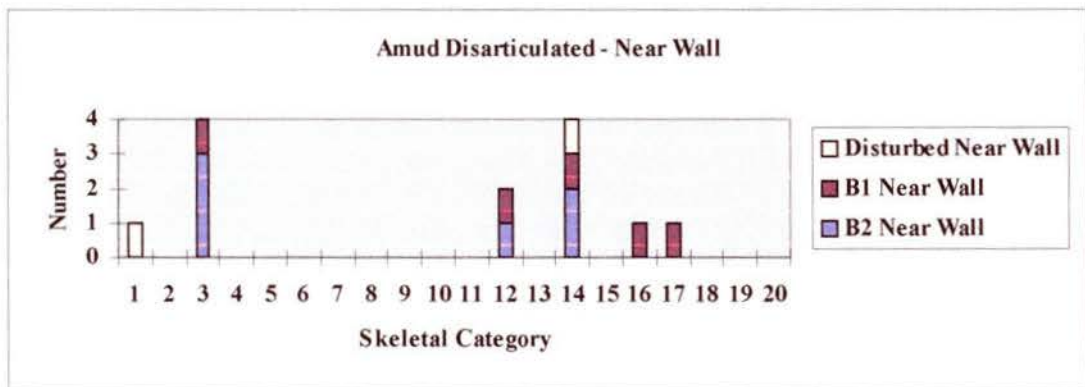


FIGURE 9.6

Legend:

1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

TOTAL NUMBER OF INDIVIDUALS = 11

Teeth [4] and radii [4] were the two principal skeletal categories represented for the remains located ‘near the wall’. All but one of the individuals were represented by either teeth or appendicular skeletal categories. The exception was an adult marked by a left zygomatic fragment [Amud 14] which was recovered in disturbed deposits.

The segregation by age categories of the fragmentary ‘near the wall’ remains generated the allocations displayed in the next two charts. Individuals in the child age category are represented by teeth only. Those individuals in the infant and toddler categories are denoted by appendicular remains with the radius category dominating the skeletal category assemblage. Adults are marked by teeth or a cranial fragment.

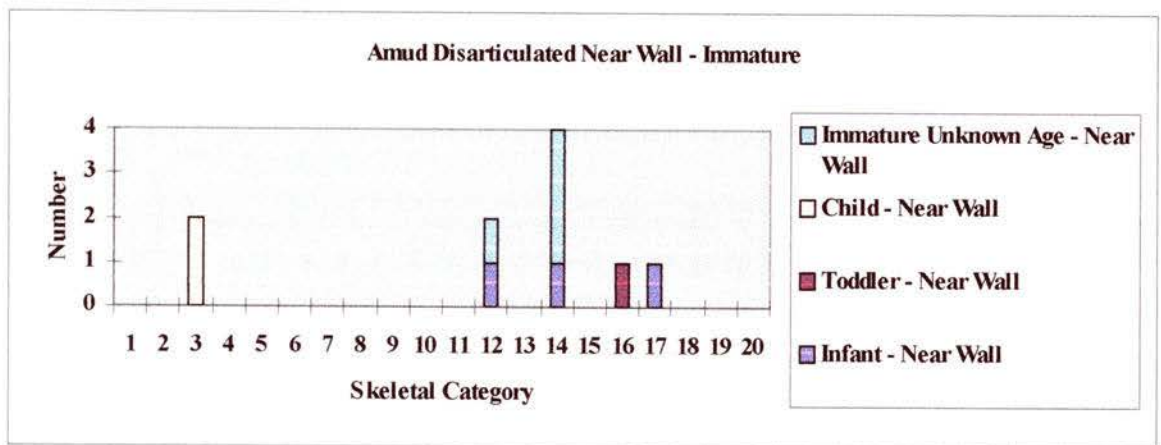


FIGURE 9.7

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

TOTAL NUMBER OF INDIVIDUALS = 8

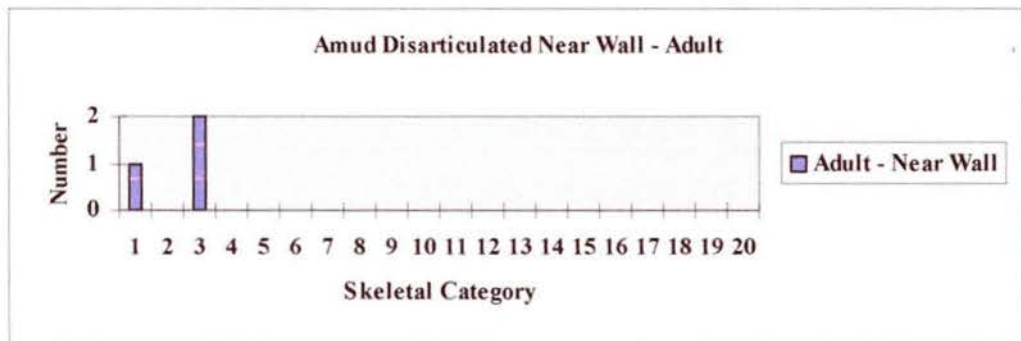


FIGURE 9.8

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

TOTAL NUMBER OF INDIVIDUALS = 3

When the fragmentary remains 'near the wall' were segregated by age category and by layer, the following distributions were obtained.

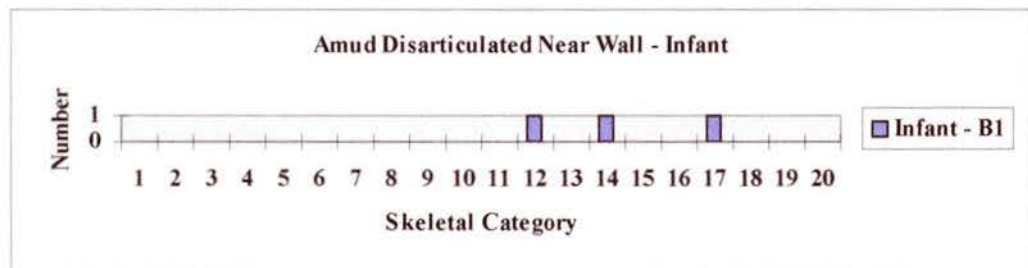


FIGURE 9.9

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 1

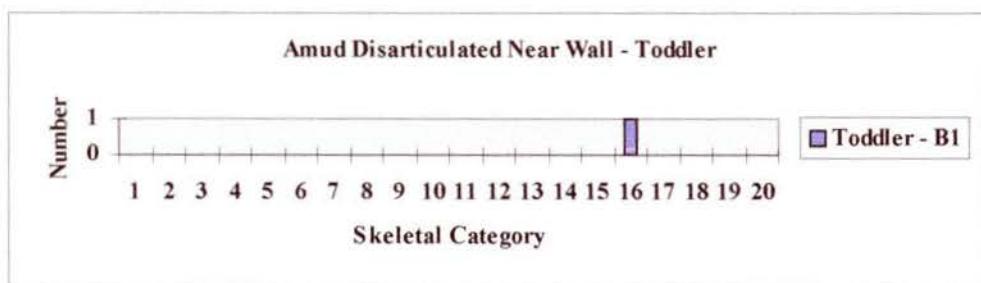


FIGURE 9.10

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

TOTAL NUMBER OF INDIVIDUALS = 1

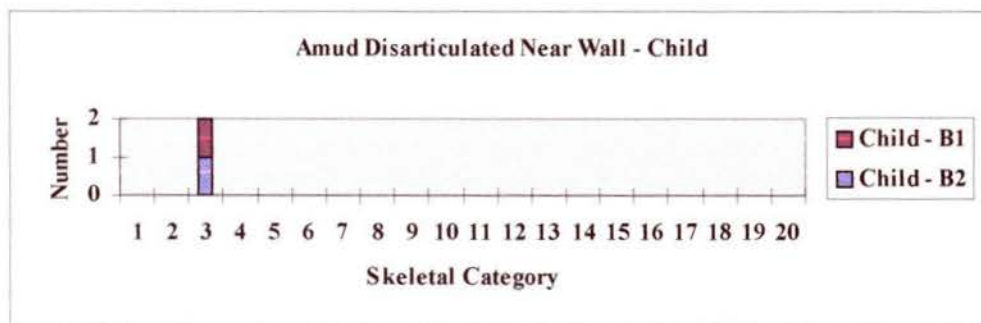


FIGURE 9.11

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 2

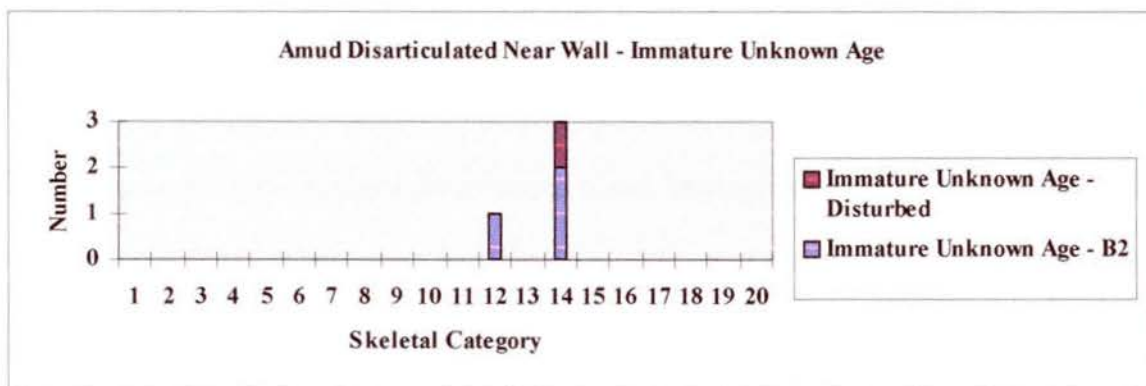


FIGURE 9.12

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 4

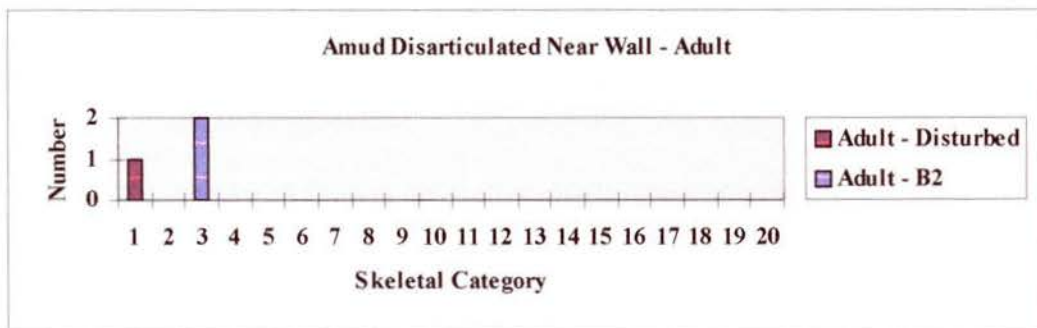


FIGURE 9.13

Legend:	1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
	2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
	3 - Teeth	9 - Sacrum	15 - Hand Bones	
	4 - Hyoid	10 - Innominate	16 - Femur	
	5 - Vertebrae	11 - Scapula	17 - Tibia	
	6 - Ribs	12 - Humerus	18 - Fibula	

TOTAL NUMBER OF INDIVIDUALS = 3

Of the individuals located against the wall, the two infants from both B1 and B2 [Amud 5 and the Amud 7 burial] were delineated by more skeletal elements than the balance of the fossils in this location. In level B2, all of the immature remains of unknown age were denoted by single elements of the arm, either a humerus or a radius. No toddler remains were discovered 'near the wall' in B2. In level B1, a toddler [Amud 16] was recovered and was represented by a femur. The disturbed remains of Amud 15 was marked by a radius. Again, this individual may associate with Amud 16. The similarity between the skeletal distributions of the fragmentary infants and toddlers and the distinct difference between these remains and those of children may indicate the fossils of unknown immature age were associated with individuals aged under 7 years. The children, Amud 8 [8 years of age] and Amud 11 [7 years of age], were represented by single teeth. The adults from B2 were either the possible burial of Amud 9 or worn

teeth. Level B1 retained no adult remains in deposits near the wall. However, the depth below datum of Amud 14 may relate this specimen to B1 and in this case, the hominid was represented by the left zygomatic.

In the deposits against the wall, only the osseous elements of two individuals were identified by side and they were allocated to the left side [Amud 9 burial and Amud 14].

The apparent non-random selection of elements appears in all levels. This selection seems to comply with an age criterion; but, may also reflect sex or a combination of the two. Another possible implication for the aggregation of cranial fragments away from the wall and the accumulation of appendicular elements near the wall is the post-mortem separation of the skull or cranium from the remainder of the skeleton. However, the differences in the depths below datum for these remains do not lend adequate support to this speculation. The cranial fragments were recovered from depths between 370 cm. to 460 cm. below datum while the deepest appendicular elements derived from a depth of around 366 cm. [Amud 18, an immature of unknown age] and 345 cm. [Amud 9, an adult]. The most accurate means of testing this suggestion is DNA analysis to associate skeletal elements if DNA or mt-DNA is present in the fossilized skeletal remains. Amud 18 and Amud 3 would be prime candidates for DNA study as their depths below datum were within 4 cm. of each other and they were separated by approximately 4 meters along the same 'P co-ordinate'.

One additional consideration to graphically represent is the osseous elements missing from the articulated remains.

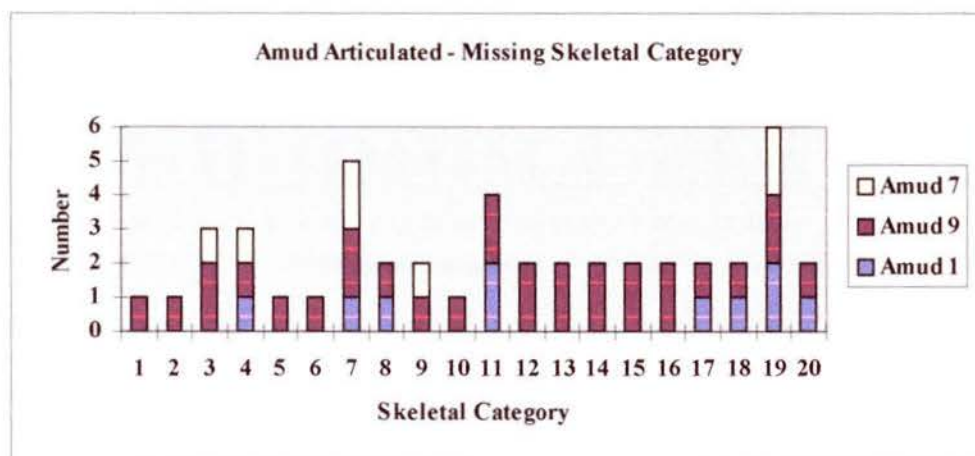


FIGURE 9.14

Legend:

1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

Amud 1 [Adult]
 Amud 9 [Adult]
 Amud 7 [Infant]

TOTAL NUMBER OF INDIVIDUALS = 3

Teeth are included in the chart in the same fashion as the previous charts.

This chart does not account for individual missing teeth and only notates the category of mandibular and maxillary dentition.. Amud 9 is designated by the left tibia, fibula and foot bones and may not represent a deliberate primary interment. However, the skeletal distribution of missing elements for Amud does incorporate Amud 9.

As discussed below, the side missing from the articulated remains is relevant to the consideration of disposal of the dead practices including curation and potential symbolic representation of the social personae or role of the dead in disposals.

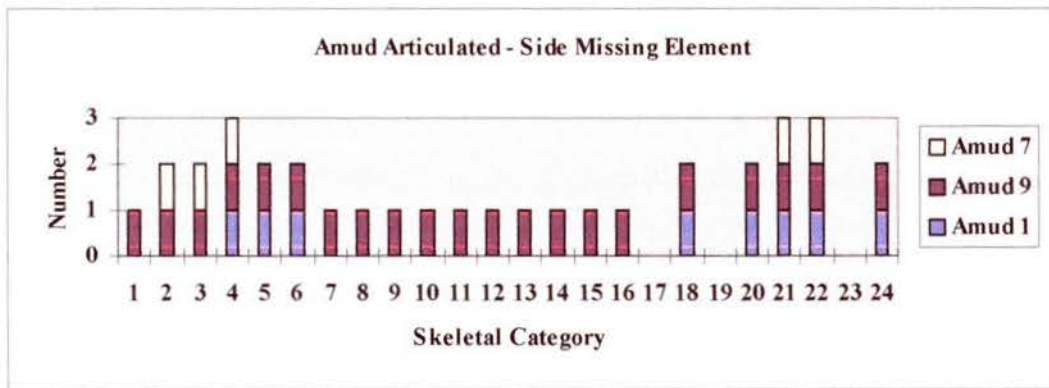


FIGURE 9.15

Legend:

1 - Maxillary Teeth	9 - Left Ulna	17 - Left Tibia
2 - Mandibular Teeth	10 - Right Ulna	18 - Right Tibia
3 - Left Clavicle	11 - Left Radius	19 - Left Fibula
4 - Right Clavicle	12 - Right Radius	20 - Right Fibula
5 - Left Scapula	13 - Left Hand	21 - Left Patella
6 - Right Scapula	14 - Right Hand	22 - Right Patella
7 - Left Humerus	15 - Left Femur	23 - Left Foot
8 - Right Humerus	16 - Right Femur	24 - Right Foot

Series 1 - Amud 1 [Adult]

Series 2 - Amud 9 [Adult]

Series 3 - Amud 7 [Infant]

TOTAL NUMBER OF INDIVIDUALS = 3

The right side predominates for the elements missing from Amud I who was buried away from the wall. This is the same side that is most frequently represented in the fragmentary remains from the 'away from the wall' position. Amud I was buried on the left side and the right side was uppermost in the deposits.

As previously stated, none of the remains in the site have been identified as female. Amud 9 retained no right side of the skeleton and was noted by the presence of the left tibia, fibula, and foot bones. Amud 9 may have been buried on the right side as was Amud 7. The right side might well correspond to a female or immature burial pattern as the male was buried on his left side. If Amud 9 was not a burial of a complete corpse and was representative of the elements removed from another disposal, the left

side representation would still accommodate a right-sided burial as the left side would be uppermost in the deposits and most easily accessible. Again, this may agree with a female representation. Furthermore, the remains near the wall which were sided were allocated to the left side which would be the uppermost side in the hypothesized female burials and infant burials. The fragmentary osseous remains of the infants, toddlers, and immature individuals of unknown age need to be reassessed for side to see if the side agreed with this suggestion.

Since age distinctions also appeared to be marked by the disposals in other sites such as Shanidar, Amud 9 might be an elderly adult [male or female] and the location within the disposal zone may be age rather than sex or age and sex related.

The cranial representation of Amud 14 and the position near the wall does differ from the general pattern in earlier levels where cranial remains were located further away from the wall. This may correspond with a change in burial practices in a later time frame; to an alteration in element choices to represent females in the later periods; to a different aged female; to a young male who had not acquired a full complement of social identities or roles such as Qafzeh 11 [see discussion of Qafzeh]; to an adult male with a different status or *persona* than Amud I or Amud II; or even to an elderly male whose social identity had changed such as Shanidar III.

Besides the side of the body represented, one other important piece of information was missing in the publications: the precise position of the single elements. For example, were the internal [medial] or external [lateral] faces of the bones uppermost in the deposits?

The 'away from the wall' position may equate with a male disposal zone. The wall may designate the disposal area for female adults, infants, and perhaps female toddlers, and female children. Considering the limitations imposed by the structure of the data, this suggestion is speculative.

SUMMARY

The patterns discussed above imply some degree of symbolic representation in the disposal of the dead at Amud. Strong inference facilitates the advancement of several explanations for the patterns manifested in the methods of disposal. The major challenge is to select the most reasonable and most parsimonious exegeses.

The occupants of Amud cave appeared to select the north to northwest region of the cave, near to or slightly away from the north cave wall, to dispose of their dead. This pattern was maintained throughout the period of occupation and use of the site in the Middle Palaeolithic. Two methods of treatment and disposal were suggested by the patterns: burial and curation. In the case of curation; the elements selected appeared to be non-random and the choice of elements seemed to correlate with the positions, 'away from the wall' and 'near the wall', as well as with the age of the individual and possibly the sex. The principle question is whether these two forms of mortuary treatment corresponded to two different methods of disposal or whether burials represented the first stage in a long term phase of mortuary processing or curation of the hominid remains?

In the case of two different methods of disposal, the impression that some hominids were buried in a primary context and others were not raised the possibility of differential treatment of individuals. Amud I and 7, an adult male and an infant, were buried, while Amud II, also an adult male, was apparently not buried as a complete corpse. This, in turn, suggested greater social differentiation with some level of ascribed status for infants and achieved status for adults.

Social differentiation also introduced the issue of which form of disposal represented the highest level of differentiation or highest social status. In Brown's (1981:31) discussion of the Spiro phase of Caddoan burials, the most highly curated and most disarticulated remains corresponded to the highest status: "the lowest ranking burial type was subjected to the least post-mortem handling and the highest burials to the greatest". The most 'handled' remains also had several burial inclusions. No inclusions were noted for the potentially curated remains at Amud.. Furthermore, in terms of absolute numbers, more individuals [15 out of 18] appeared to be curated. If curation represented the most favored form of disposal, then more individuals benefitted from favored treatment than less favored treatment. In this case and for the two reasons just mentioned, curated remains probably did not depict the most highly favored individuals.

Possible inclusions were found in two of the burials, Amud I and 7, while the situation with Amud 9 was uncertain. Using formal analysis, some redundancy was apparent. In general, the deceased was articulated or disarticulated and fragmentary. Articulated remains were conceivably interred with inclusions. Disarticulated remains were found without inclusions. The location of the corpse in the disposal zone may be

associated with the sex and/or the age of the individual. Amud 9 was an exception which created some 'static' in the formation of key diagrams. Whether Amud 9 was a primary burial destroyed by a rock fall or a curated disposal cannot be ascertained. Also, Amud 9 received no sex or age determination so the separation of the disposal zone into two regions cannot be addressed. Therefore, location within the disposal zone amplified the interference or noise encountered. However, the information available supports the explanation of some social differentiation and perhaps some emerging status distinctions. Missing information, particularly individual data, precludes full acceptance of this model and also prevents its elimination. Corroboration for emerging social differentiation was noted for Shanidar, Skhul, and Kebara. Qafzeh displayed some minimal distinctions, especially for male disposals..

The second explanation of burial as the first stage in a long term phase of mortuary processing is also parsimonious with the evidence and derives support from some other sites in the Near East. Evidence for removal of skeletal elements has been suggested for the Kebara 2 adult male interment, and for the Qafzeh 10 and 15 children (Defleur 1993:251). Although co-presence is difficult to ascertain due to the palimpsest nature of deposits, the apparent presence in the cave of both surviving and deceased members of the social group, at the same time, recommends a close relationship between the dead and the living. This evidence does not agree with behavior reflective of 'fear of the dead'. Death in any community is socially disruptive and a close association between the dead and the living may be important to the maintenance of social continuity and integrity. The presence of the dead in the space of the living argues in favor of the

maintenance of the relationship between the two and the continuation of social continuity. Several explanations for co-presence and curation are possible.

Continuity in Middle Palaeolithic societies could be sustained if some of the bones of deceased individuals were removed and transported with the community to new sites. Transportation could also be affiliated with returning part of the body to the natal home of the deceased individual. At Amud, most of the potentially curated remains appeared to be transported to the site for deposition because of small numbers of burials, the number and types of skeletal elements represented, and the lack of articulation for fragmentary hominids represented by more than one skeletal element, such as Amud 5 [a humerus, radius, and tibia]. “The bones of Amud 5 were recovered as separate bones, none was in articulation” (Hovers 1997:personal communication). The side of the bone deposited, when identified, seemed to agree with removal. If the right- and left-sided burials were representative of the burial pattern, the side uppermost in the burial would be the side removed: left for the right-sided burials and right for the left-sided. More information is required to substantiate this suggestion, in particular the side allocation of the fragmentary osseous elements and the precise position of these elements.

Another possible explanation for curation in this time frame could be allied to the display of bones such as the form practiced by the Adaman Islanders. The Adaman Islanders traditionally displayed and used the bones of their dead for many years after death. The deceased was either buried in the ground or positioned on a platform in a tree. When the body was skeletonized, the bones were removed from the disposal, cleaned, and returned to the village.

The skull and jawbone are decorated with red and white bands and attached to a kind of necklace. On ceremonial occasions a husband or wife, or close relative of the deceased, may wear these bones suspended, either in front or behind. Limb bones are usually kept in the roof of the hut. Small bones are kept on a string by the female relatives of the deceased and given away as presents to be worn as preventatives or cures of illnesses. (Service 1978:63).

Display of human remains or interment of the dead could have marked territorial ownership of or usufruct rights to a site. This feature is presently used by First Nation's People of the Northwest Coast to establish priority of occupation in land claims issues (personal experience).

The age distribution for the immature disarticulated remains in conjunction with the skeletal elements retained in Amud may mark some possible life stage transitions. With age, the number of skeletal elements per individual decreased. The immature individuals which were known to be the age of a child were represented by teeth. Many adults were also represented by teeth. The positions of the children in the deposits were also comparable to the adults in the area 'near the wall'. This tended to suggest that by the age of at least 7 or 8 years, children attained a similar, although perhaps not equivalent, social position or identity as adults. The sex of these children would be interesting to ascertain as they occupy a region of the cave which may correlate with a female disposal zone.

One toddler [Amud III] was positioned fairly close to one of the established male remains [Amud II]; both were denoted by cranial elements. Amud II

was redeposited in antiquity and the slight incline of the deposits from NNW-SSE may have been partially responsible for the redeposition (Hovers *et al* 1995:53). This movement would have originally placed Amud II closer to the wall and probably brought the position of Amud II and III into closer alignment. The position of the toddler [Amud III], aged 4 years, and its skeletal representation favors a male sex and a social role approaching adult males. Amud IV, a 3 year old toddler represented by a cranial fragment which again may have indicated a male sex identification, was located closer to the wall. Although Amud IV was deeper in the deposits than the others, Amud IV's position closer to the wall indicated the toddler may not have attained the life stage of Amud III.

The proposal given above signifies the child classification should be extended to incorporate immature remains from approximately 3 or 4 years to at least 8 years. The role change at 3 or 4 years may comply with the age at weaning. Amud 16 may be represented by two elements if Amud 15 is associated. Nevertheless, this eighteen month old's location at or very close to the wall tends to classify it with the infants. This indicates the infant stage should be extended to include the ages from birth through at least 18 months to perhaps 3 or 4 years of age. The balance of the immature remains may well fit within the age range of under 4 years. This does not mean that a phase between infancy, ending at around 12 to 18 months or two years, and the child phase was absent; merely it was not clearly represented at the site of Amud. Naturally, this is also speculative and requires extensive testing.

The posited male and female zones of deposition introduced another topic.

If the hominids of Amud divided the space of the dead in this fashion, did the living members of the society divide their space in the same fashion? Many ethnographic societies separate the living space of their members into female/young children zones and male zones. The Jivaro of South America and the Rwala Bedouins of the Arabian Desert are two examples (Service 1978:207, 285).

These explanations and some of the implications mentioned earlier must be tested. Those which do not fit the unpublished data or new data from this site must be rejected and new explanations formulated to explain the patterns.

Chapter 10: KEBARA

Kebara is another of the series of caves in the Mount Carmel Range. The cave sits at 60 to 65 meters above sea level on the “western escarpment of Mt. Carmel” (Bar-Yosef 1991:17). The cave faces north-northwest; however, a rock collapse on the terrace in the Upper Palaeolithic may have altered the opening of the cave and may have modified the cave’s exposure. Nahal Taninim and its tributaries empty into the Mediterranean and provide drainage for this region of the Carmel Range.

The cave is 26 meters long and 20 meters wide. Unlike Amud, Kebara widens with depth. A chimney opens at the back of the cave. The dates for the cave range between 60.0 ± 3.5 kya. BP and 48.3 ± 3.5 kya. BP. The average rate of sedimentation for Kebara Cave was approximately “33 cm. per 1000 years or 0.33 mm. per year” (Bar-Yosef 1992a:207). The named lithic assemblage discovered in Kebara was a Tabun B Levantine Mousterian (Bar-Yosef 1992b:196).

The taphonomic history of the cave was quite complex and included biological, mechanical, and diagenetic processes. Several factors impacted on the preservation of artifacts and hominid remains as well as contributed to the complicated stratigraphy of the cave deposits: the chimney at the back of the cave; swallow holes or “subsurface slumping”; erosion; diagenetic fronts; human and animal trampling; historic intrusions into underlying deposits; hearths; hyena dens; and borrowing animals (Bar-Yosef *et al* 1992:507-508, 517). At least two of the hominid infants from Kebara were deposited in a “dumping zone which was rich in animal bones, most likely ‘kitchen

garbage” (Bar Yosef 1988b:13; Meignen, L. and O. Bar-Yosef 1988:125). In unit X, faunal bones and lithic artifacts were not present in the hearths; they were clustered towards the back of the cave along the north wall (Bar-Yosef *et al* 1992:510).

Kebara is remarkable for its numerous hearths and evidence of intensive occupation over a fairly long time span. Red ochre was also discovered in the deposits. This natural material has been used prehistorically and ethnographically as a coloring agent, in the production of traditional medicines, and in the treatment of hides (Bar-Yosef 1992a:206; 1988b). Rolland (2000:personal communication) noted the use of ochre as a decorative element in the Upper Palaeolithic.

PATTERNS AND IMPLICATIONS

The patterns represented by disposal of the dead in Kebara are more difficult to discern and interpret than those of Amud. [See Appendix 2: Site Maps, pages 507 - 513]. The taphonomic history of the cave has contributed to marked alterations of the remains. In the first place, bone of any sort is absent in the southern region of the cave due to diagenesis (Bar-Yosef *et al* 1992:511). The clustering of remains along the north wall may be more apparent than real. Secondly, the close proximity of remains with similar depths below datum and similar ages may indicate their association as one hominid rather than several individuals. The most difficult questions to answer were how the hominids entered the deposits and what were the agencies of deposition. The presence of hyenas in the cave, gnaw marks on some bones of unknown classification, and unspecified “acid etched bones” suggests that carnivores cannot be eliminated as

contributors to the pattern of distribution of the fossil occurrences (Bar-Yosef *et al* 1992:517). Traces of carnivore dens were discovered along the north wall. This is the same area which yielded many of the fragmentary hominid remains (Bar-Yosef *et al* 1992:519). Hyenas are known to dig up bones in cemeteries (Rolland 2000:personal communication). The patterns at Kebara may reflect both anthropic burials and carnivore [hyena] activity.

As stated above, some elements need to be assessed for association. Courtaud (1989:45) indicated that Kebara 9 and 10, both identified as females and aged between 15 to 22 years, might be associated even though they were separated by a considerable distance. Their depths below datum were similar although their stratigraphic levels differed: Kebara 9 [Unit IX] at 6.43 to 6.53 meters below datum and Kebara 10 [Unit X] at 6.52 to 6.55 meters below datum. In addition, Kebara 6, 9, 11, and 17 were found in the same general area and at almost identical depths below datum. Age determinations are complex for complete skeletons and extremely difficult for single elements. Kebara 6 was described as “older than” Kebara 2, who was 25 to 35 years at death and Kebara 11 as “younger than Kebara 2” (Bar-Yosef *et al* 1995:527). Kebara 17 was not aged. Kebara 11 and 17 were a right and a left acromial extremity of the clavicle and were fairly close to and almost directly opposite each other in the deposits. Kebara 10’s distance from the others and different stratigraphic position makes her association with Kebara 6, 9, 11, and 17 a little more questionable.

Other remains may also associate for the same types of reasons discussed above. Kebara 21, 22, and 23 were near the same age, located close together, and found

on the surface of the terrace. The individuals from Turville-Petre's sounding should be checked for association [Kebara 18, 19, and 20]. Kebara 25, 26, and 29 were the same age and were found in reworked deposits at similar depths. Kebara 24 which was removed from Level XIN may correspond to Kebara 27 from the reworked deposits. Their depths below datum at the time of discovery were very close: 8.30 to 8.35 m. [KMH 24] and 8.15 to 8.35 m. [KMH 27].

LOCATION IN SITE

Despite the difficulties encountered, some general patterns appeared for Kebara. The disposal area of Kebara cave was principally concentrated along the north or northeast side of the cave. Early occupants of the lower levels of the cave, Units or Levels XII through IX and possibly the reworked deposits, appeared to dispose of the remains of their dead towards the rear of the cave. Fragmentary remains from upper levels [Levels V, VI and possibly the surface discoveries, were located towards the front of the cave. The north central region of the cave in the lower levels [Units XII through X] held the possible burials. The diagenetic front may have created the impression of a specialized location for disposal and may be responsible for the appearance of a change in the choice of disposal zones from the back to the front of the cave. The diagenetic front may have destroyed any hominid bone in the southern portion of the cave.

Identified males [KMH 2 and possibly KMH 1] were deposited in more central locations. The identified, fragmentary females were placed closer to the wall [KMH 9 and 10]. As with Amud, this pattern may reflect male and female disposal zones. An infant and a toddler were discovered away from the wall, in the central area of

the cave in line with KMH 1 and behind KMH 2. KMH1 and KMH2 were posited male burials. The infant and toddler [KMH 5 and 15] may also be males. This supposition must be tested. If this infant and toddler are both males, then the disposal situations in Kebara may indicate differentiation in the social standing of immature male individuals and perhaps some degree of ascribed status for these individuals. The position of the adult in a more central location and in front of the two infants and one toddler may demonstrate the age differences.

BURIALS

To date, only the burial of Kebara 2 has been properly and adequately described. The second possible interment of Kebara 1 was not accurately illustrated. Both burials were found in the same regions as some of the fragmentary remains.

Kebara 2, a male of 25 to 35 years, certainly fits most of the criteria for deliberate interment. [See Appendix 3: Burial Patterns, page 533 and Appendix 4: Burial Diagrams, page 555]. The skeletal elements were articulated and a pit was discerned in the deposits, particularly the northeast limit. The pit came from Unit XI and extended through to XII. The pit was 60 centimeters long and between 20 to 30 centimeters deep which recommended a fairly shallow inhumation. The base of the burial pit “cut obliquely through two hearths” (Bar-Yosef *et al* 1992:527). The body was orientated east-northeast to west-southwest [approximately east to west] (Tillier 1991:92). Kebara 2 lay on his back with his left arm crossed over the lower portion of his rib cage and his right arm crossed over his chest. The cranium, the right leg, and the lower portion of the left leg were missing. Stekelis’ excavation may have cut into the

region of the left leg (Bar-Yosef *et al* 1992:257). Based on the position of the atlas and axis and the location of the mandible, the researchers assumed the head was probably elevated above the rest of body which indicated it leaned against the pit. The head would have faced west according to the position of all the elements. The researchers believed the cranium was deliberately removed sometime after soft tissue decomposition. The hyoid was recovered and the atlas and axis were still in anatomical position. No carnivore marks were discerned on the skeletal remains. Diagenetic processes had altered the left side of the skeleton. Some lithic materials and faunal bones were discovered in the pit. The researchers did not note any pattern to the distribution of the material and considered them part of the fill. No indications of the position of these elements were presented. For this study, the lithic materials and bone must be considered inclusions since they were part of the fill matrix.

Little is known about the exact situation of the Kebara 1 interment. No position for the skeletal remains was given including the degree of articulation of elements. The infant of 7 to 9 months may have been a male. Three stones and a rhinoceros tooth were found in association with the infant. This infant was represented by a total of nine element categories and nine skeletal categories.

The category distributions of inclusions/associated artifacts/features for Kebara is given on the next page. The rhinoceros tooth found near the skeleton of Kebara 1 did not represent the predominant faunal form recovered in Kebara nor was rhinoceros mentioned in the list of fauna for the site. Gazelle were the most frequently recovered faunal remains along with deer [*Dama mesopotamica*]. The rhinoceros tooth

represents an exotic element in the site. The unfortunate lack of exact provenience for this specimen in relation to the skeletal remains does not permit full acceptance of the likely deliberate nature of the inclusion. The three stones near the infant's skeleton also lacked absolute provenience and their association with the disposal might be questioned.

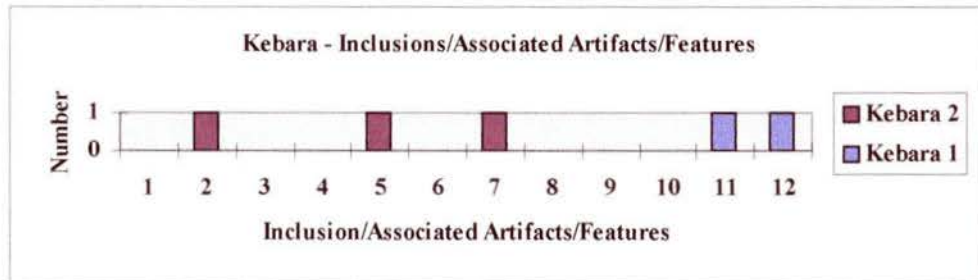


FIGURE 10.1

Legend: 1 - Antler
 2 - Bone
 3 - Carboniferous Substance
 4 - Charcoal
 5 - Hearths
 6 - Limestone Blocks
 7 - Lithics
 8 - Ocher
 9 - Plant Pollens
 10 - Shell
 11 - Stones
 12 - Teeth

TOTAL NUMBER OF DISPOSALS = 2

The materials recovered in the fill matrix around Kebara 2 were similar to the elements recovered from Amud I's disposal. Like Amud I and the other disposals mentioned in the last chapter which incorporated lithic elements, the deliberate or fortuitous nature of these inclusions were difficult to adequately assess. However, the interment of Kebara 2 was on top of a hearth which contained faunal remains and lithics. Therefore, the inclusions may be fortuitous. An alternative question to address is whether the selection of the interment site in a region rich in lithic and faunal material constitutes a deliberate choice relative to the position or *persona* of this individual within the social group. An answer to this question cannot be derived from the published

literature. The hearth association at the base of the interment of the adult male [Kebara 2] is similar to the Shanidar VII infant and the Tabun C1 female.

Both Kebara burials came from earlier deposits: Unit XI to XII for Kebara 2 and Unit X for Kebara 1. Depositions after the time periods represented by these units appeared as fragmentary remains.

SKELETAL PATTERNS

The skeletal patterns of disarticulated remains for Kebara are intriguing as mentioned in Chapter 8. The following charts list the elements by the unit from which both articulated and disarticulated remains were recovered and by the position of 'near wall' or 'central'.

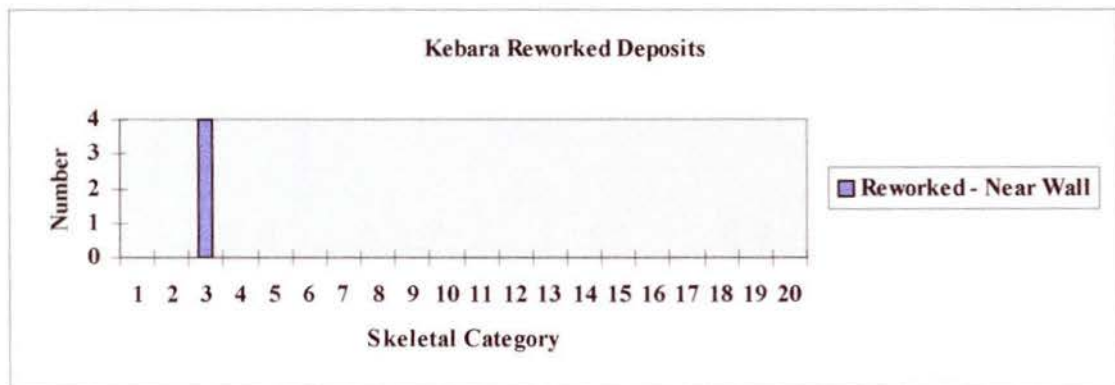


FIGURE 10.2

Legend: 1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

TOTAL NUMBER OF INDIVIDUALS = 4

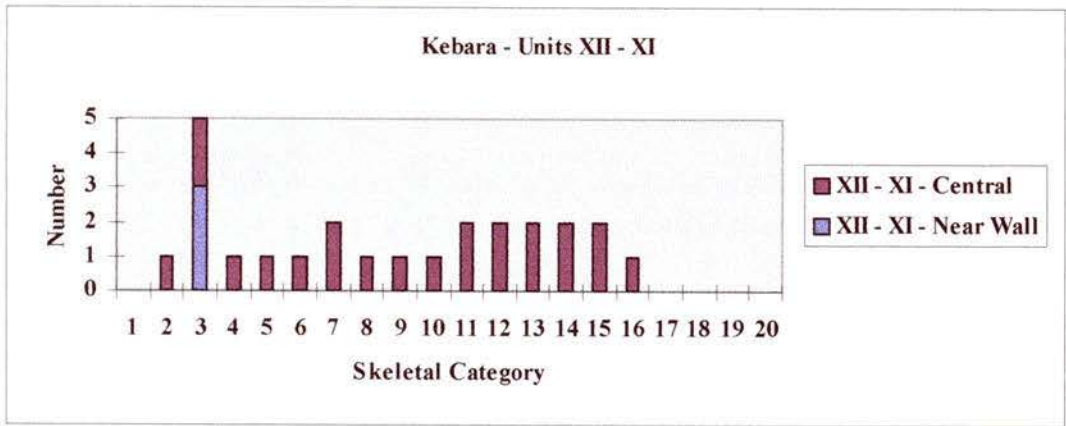


FIGURE 10.3

- Legend:**
- | | | | |
|---------------|-----------------|-----------------|-----------------|
| 1 - Cranium | 7 - Clavicle | 13 - Ulna | 19 - Patella |
| 2 - Mandible | 8 - Sternum | 14 - Radius | 20 - Foot Bones |
| 3 - Teeth | 9 - Sacrum | 15 - Hand Bones | |
| 4 - Hyoid | 10 - Innominate | 16 - Femur | |
| 5 - Vertebrae | 11 - Scapula | 17 - Tibia | |
| 6 - Ribs | 12 - Humerus | 18 - Fibula | |

Near Wall [Total Number of Individuals = 3]
 Central [Number of Individuals including KMH 2 = 1]
TOTAL NUMBER OF INDIVIDUALS = 4

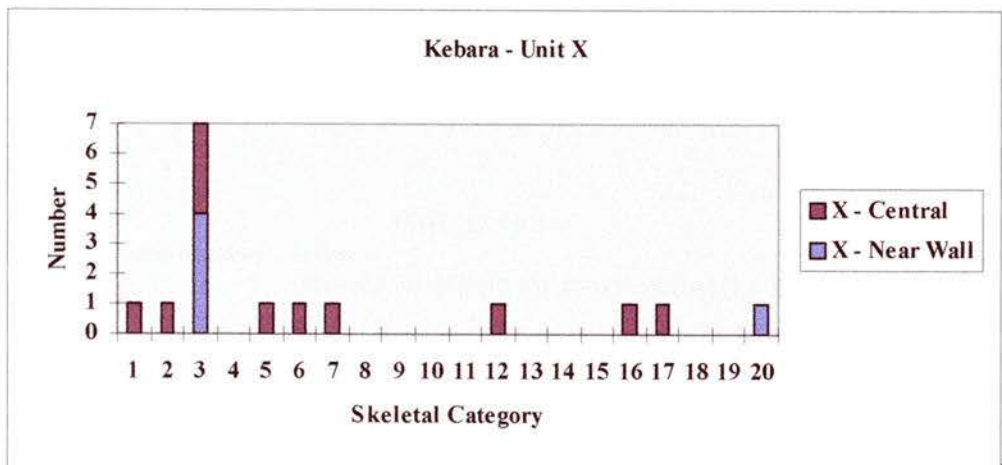


FIGURE 10.4

Legend: Same as previous chart
 Near Wall [Total Number of Individuals = 4]
 Central [Number of Individuals including KMH 1 = 2]
TOTAL NUMBER OF INDIVIDUALS = 6

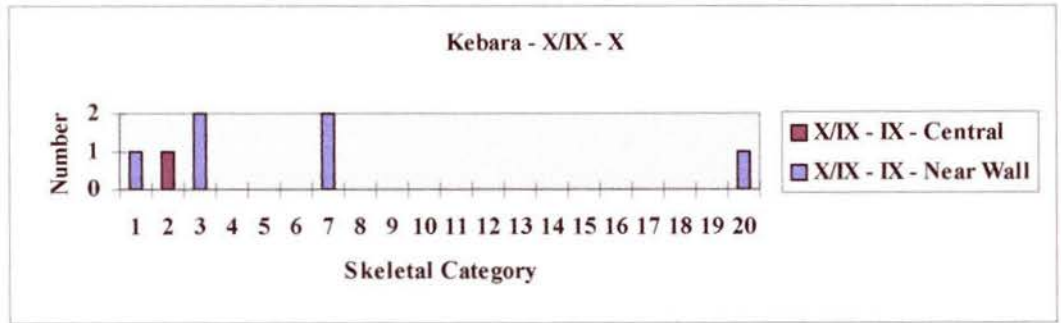


FIGURE 10.5

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Near Wall [Total Number of Individuals = 5]
 Central [Total Number of Individuals = 1]
TOTAL NUMBER OF INDIVIDUALS = 6

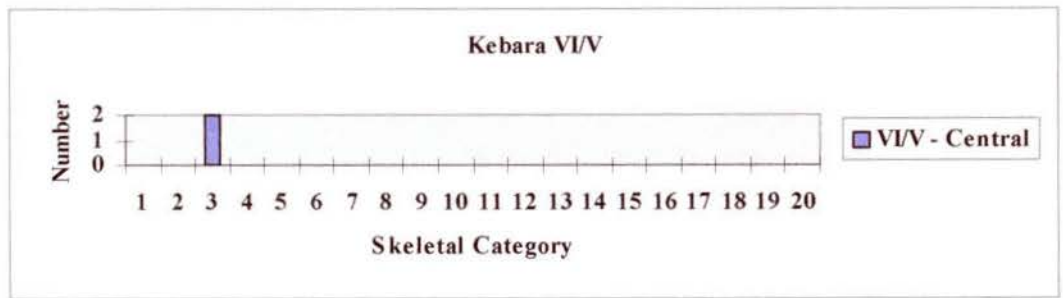


FIGURE 10.6

Legend: Same as previous chart
TOTAL NUMBER OF INDIVIDUALS = 2

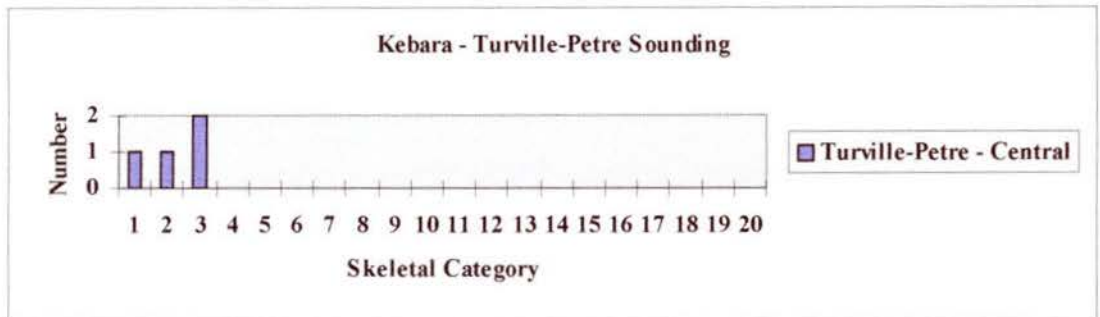
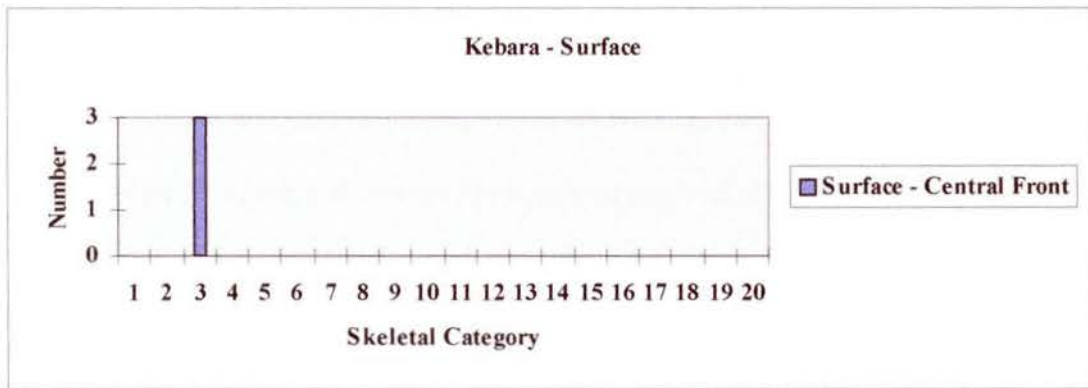


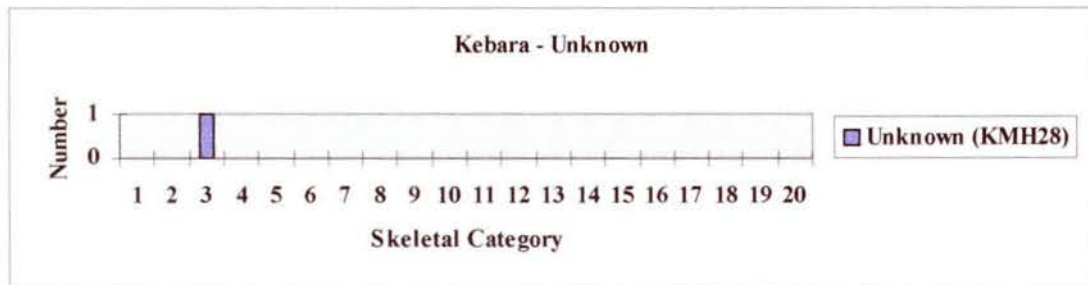
FIGURE 10.7

Legend: Same as previous chart
TOTAL NUMBER OF INDIVIDUALS = 3

**FIGURE 10.8**

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

TOTAL NUMBER OF INDIVIDUALS = 3

**FIGURE 10.9**

Legend: Same as previous charts

Near Wall

TOTAL NUMBER OF INDIVIDUALS = 1

Virtually no long bones were recovered. Most of the incomplete remains were teeth. The only osseous elements were 2 acromial fragments of the clavicle, 2 mandibular fragments, a distal phalanx of the hallux, a right fourth metatarsal, and 2 cranial fragments totalling 8 bone elements and 4 skeletal categories. All of these, except the toe bones, were extremely fragmentary. Most of the fragmentary elements

were clustered along the north [northeast] wall which supported a selected disposal zone. However, evidence for carnivore dens was also recovered in the same region.

When the fragmentary remains were separated by age category, no particular pattern emerged, except the high frequency of teeth in all age categories.

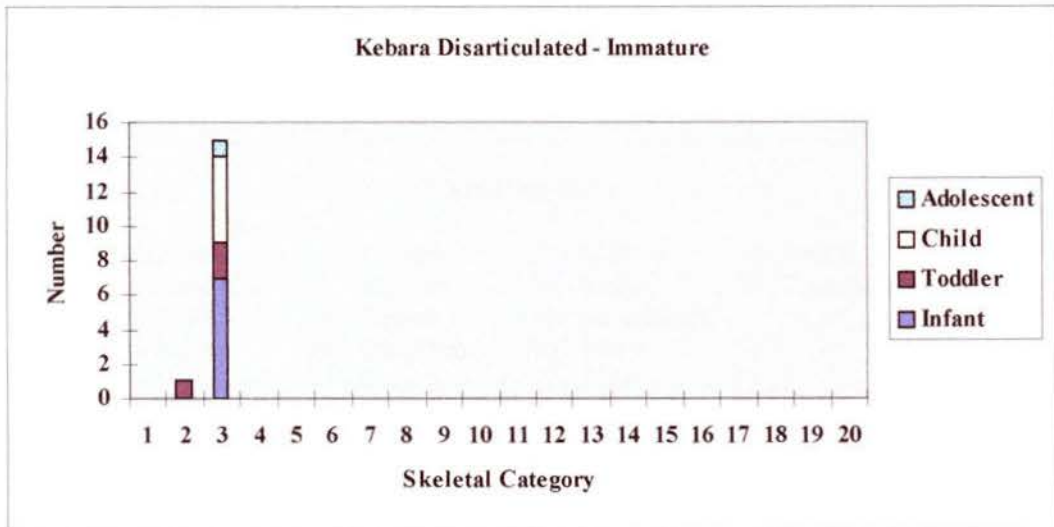


FIGURE 10.10

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Infant [Total Number of Individuals = 7]

Toddler [Total Number of Individuals = 3]

Child [Total Number of Individuals = 5]

Adolescent [Total Number of Individuals = 1]

TOTAL NUMBER OF INDIVIDUALS = 16

The immature disarticulated remains were mainly teeth with the exception of a single osseous element, a mandibular fragment without dentition, marking the toddler KMH 5.

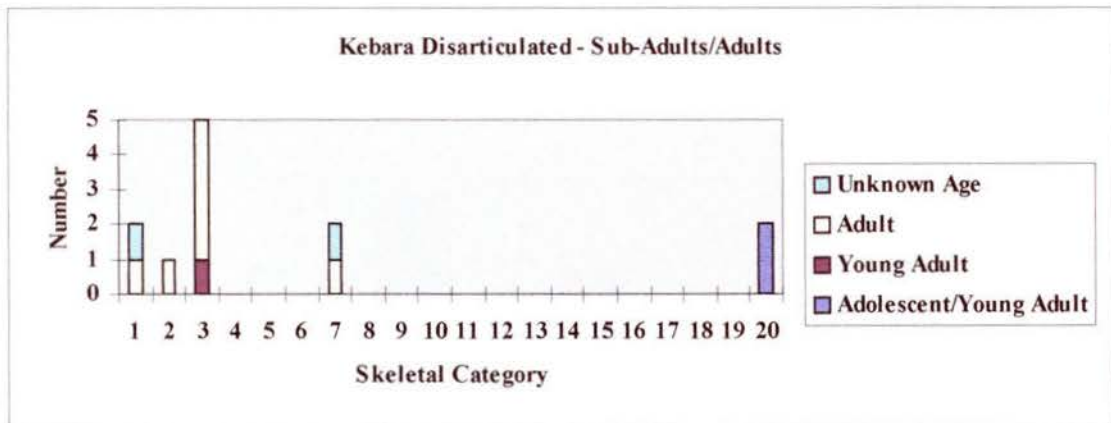


FIGURE 10.11

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Series 1 - Adolescent/Young Adult [Total Number = 2]

Series 2 - Young Adult [Total Number = 1]

Series 3 - Adult [Total Number = 6]

Series 4 - Unknown Age [Total Number = 2]

TOTAL NUMBER OF INDIVIDUALS = 11

The osseous elements for sub-adults and adults corresponded to two adolescent/young adults [KMH 9 and 10, a metatarsal and a distal phalanx of the hallux], 3 adults [KMH 6, a maxillary fragment with teeth; KMH 11, a right acromial extremity of the clavicle; and KMH 18, a mandibular fragment with one tooth], and two individuals of unknown age [KMH 17, a left acromial extremity of the clavicle; and KMH 20, a parietal fragment].

Since dentition, in particular single teeth, was the predominant skeletal category representing hominid fossil occurrences at Kebara, the allocation to mandibular

or maxillary dentition in relation to the position 'near wall' and 'central' was examined.

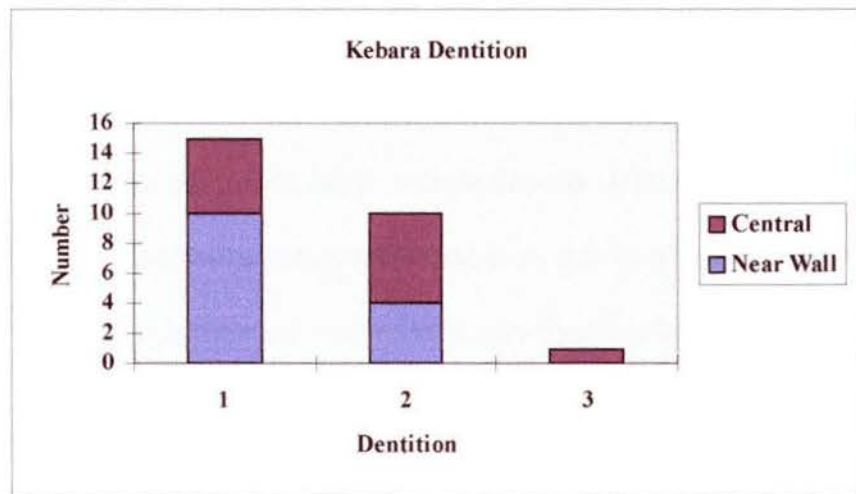


FIGURE 10.12

Legend: 1 - Maxillary Teeth 2 - Mandibular Teeth 3 - Unknown Teeth
 Near Wall [Total Number of Individuals = 13]
 Central [Total Number of Individuals = 10]
TOTAL NUMBER OF INDIVIDUALS [Retaining Teeth] = 23

The 'near wall' position held more maxillary teeth than mandibular teeth while the distribution of mandibular and maxillary teeth in central positions was fairly equal: maxillary dentition [5] and mandibular dentition [6]. The only maxillary fragment discovered in the site, with the exception of the burial of the Kebara 1 infant, was found near the wall. The other cranial fragment was from a central position [KMH 20, a parietal fragment]. Both mandibular fragments were recovered from the central region of the cave. One mandibular fragment [KMH 5] was discovered without dentition and the other with a mandibular molar [M2] was discovered in the region of Turville-Petre's sounding [KMH 18]. Whether the predominance of maxillary dentition in the 'near wall' region is significant is difficult to assess. The distribution of dentition

by unit in the 'near wall region is given in the chart below. The mandibular dentition in the near wall category belonged to KMH 4 which was marked by a series of upper and lower teeth; KMH 7 noted by a right di2; KMH 28 designated by a right I2; and KMH 29 depicted by a left di2. With the exclusion of the series of teeth of KMH 4, all the mandibular dentition were second incisors. The mandibular dentition of KMH 4 included a right di2. Maxillary dentition recovered from the 'near wall' position exhibited a fairly random distribution with no particular dominance in specific teeth and no correlation with age.

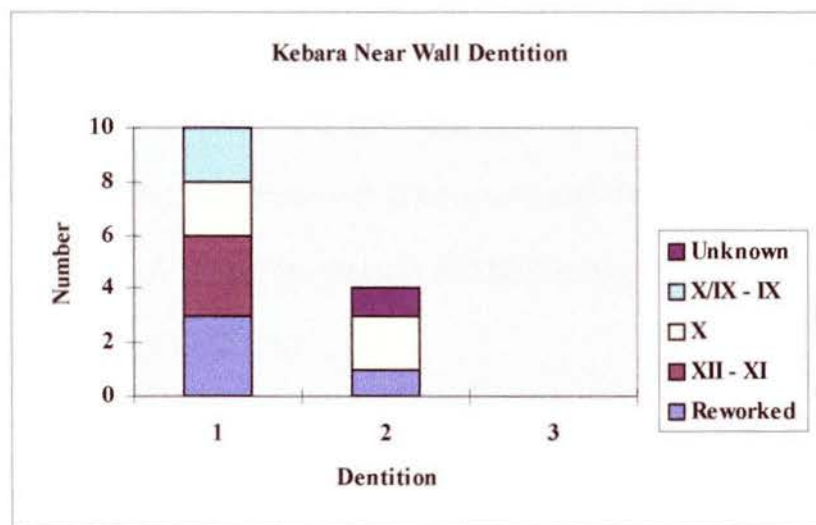


FIGURE 10.13

Legend: 1 - Maxillary Dentition
2 - Mandibular Dentition
3 - Unknown Dentition

TOTAL NUMBER OF INDIVIDUALS =13

The distribution of fragmentary remains along the wall followed a similar pattern in each of the Units IX, X, XI, XII, and the reworked deposits. When adults and immature remains were found in close proximity in the same unit, the adult was closer to

the center and/or front of the cave. This may suggest an age difference marked by the position of the remains.

Carnivore damage could account for some of the destruction of bone, but the Kebara pattern appears almost too extreme for carnivore damage. Although teeth are not likely to be deliberately ingested, this occurs accidentally. Any of the hominid teeth may retain some evidence of ingestion or acid etching due to carnivores (White 1998:personal communication) which may assist in the determination of the cause of fragmentation and dispersal. Swallow holes could also account for the disappearance of some osseous elements and for the stratigraphic disruptions. Diagenesis destroys bone. However, these remains were not recovered in the area of the diagenetic front. Kebara 2 was temporally one of the first disposals and many of the osseous elements of this individual were remarkably well preserved. The innominate was the most complete recovered to date. The left side of the skeleton had been subjected to some diagenetic alteration (Bar-Yosef *et al* 1992:528).

L. Meignen and O. Bar-Yosef (1988b:126) described a sub-circular area of around a meter in diameter and at least 20 centimeters deep, discovered in 1987, which contained high concentrations of bone and lithics encompassed by a halo of soil much darker than surrounding sediments. Wood cinder and charcoal were also present; but, the bones did not seem to be burned. Another article suggested that these features/hearths contained numerous burned bones (Meignen, L.; O. Bar-Yosef; and Paul Goldberg 1989:145). A later publication re-described these features as bone and lithic accumulations not associated with the hearths. The bones bore cut marks and evidence

for carnivore damage was “extremely rare” (Bar-Yosef 1992a:206). Stekelis had also discovered a similar structure in the same area. In no case were the bones identified.

Faunal bone was present, carnivores were present, some human bone was preserved in the burials; but the skeletal elements, with the exception of teeth, for most of the other remains were virtually absent. If the bodies or parts of the skeletons were exposed, such as the faunal bones, more bone elements should be present or at least some long bone splinters or fragments should be recovered. The pattern of carnivore damage should be similar on both human and faunal remains.

Several elements were absent from the posited burials of Kebara 1 and Kebara 2. The chart below graphically represents the categories missing from these potential inhumations. The second chart indicates the sides of the missing element categories.

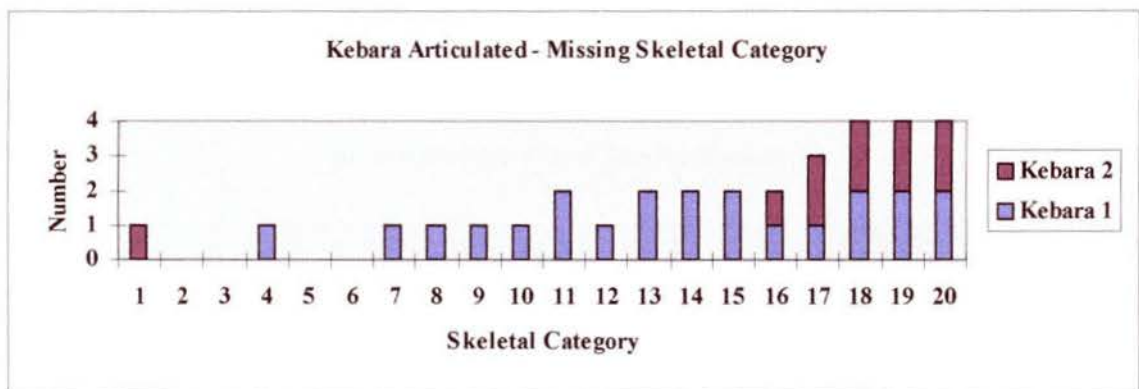


FIGURE 10.14

Legend:

1 - Cranium	7 - Clavicle	13 - Ulna	19 - Patella
2 - Mandible	8 - Sternum	14 - Radius	20 - Foot Bones
3 - Teeth	9 - Sacrum	15 - Hand Bones	
4 - Hyoid	10 - Innominate	16 - Femur	
5 - Vertebrae	11 - Scapula	17 - Tibia	
6 - Ribs	12 - Humerus	18 - Fibula	

Kebara 1 - (Infant)
Kebara 2 - (Adult)
TOTAL NUMBER OF INDIVIDUALS = 2

Kebara 2 retained only one maxillary tooth, an M3. Some minimal correspondence exists between the missing elements from the articulated remains of Kebara 2 and the osseous elements representing disarticulated remains in Kebara, particularly the cranial fragments and the toe bones. The missing long bone elements, in particular the right femur, tibiae, and fibulae, do not complement the other fragmentary remains from the site. Diagenetic processes may bear responsibility for the disappearance of the left leg; however, the pelvis, which is more fragile than the long bones, is one of the most complete discovered to date.

The missing skeletal categories from the infant [KMH 1] do not coincide with the fragmentary remains from the site, particularly the remains of other infants. The elements missing from Kebara 1 are consistent with some fragmentary immature remains from Amud. This is particularly true for the Amud infants, toddlers, and immature of unknown age.

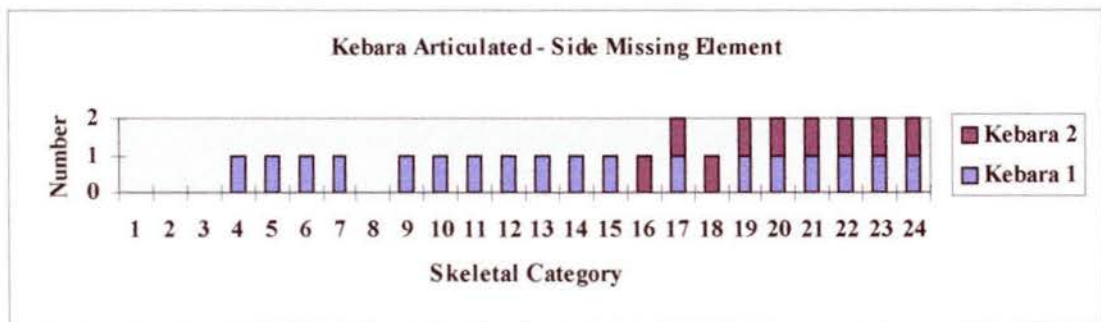


FIGURE 10.15

- Legend:**
- | | | |
|----------------------|-----------------------|-----------------------|
| 1 - Maxillary Teeth | 9 - Left Ulna | 17 - Left Tibia |
| 2 - Mandibular Teeth | 10 - Right Ulna | 18 - Right Tibia |
| 3 - Left Clavicle | 11 - Left Radius | 19 - Left Fibula |
| 4 - Right Clavicle | 12 - Right Radius | 20 - Right Fibula |
| 5 - Left Scapula | 13 - Left Hand Bones | 21 - Left Patella |
| 6 - Right Scapula | 14 - Right Hand Bones | 22 - Right Patella |
| 7 - Left Humerus | 15 - Left Femur | 23 - Left Foot Bones |
| 8 - Right Humerus | 16 - Right Femur | 24 - Right Foot Bones |

TOTAL NUMBER OF INDIVIDUALS = 2

The only long bones retained with the Kebara 1 infant were generally right side elements: right humerus, right femur, and right tibia. The Shanidar infant, Shanidar 7, retained more right side elements than left ones. Shanidar 7 was a right sided burial and so was the infant from Amud, Amud 7. Perhaps Kebara 1 was also a right-sided interment.

Hominid intervention in the removal of the Kebara 2 cranium proposed by the team of researchers at Kebara (Bar-Yosef 1992:529) supports a model of some form of curation, at least for some individuals. Teeth were possibly the elements selected for disposal within the site. The presence of teeth, both upper and lower, may imply the removal of the cranium and/or the entire skull [cranium, mandible, mandibular and maxillary dentition]. The recovery of a series of teeth representing one individual [KMH 4 and 25] and several tooth germs [KMH 4, 13, 25, and 26] offers some support for this supposition. This evidence, in conjunction with the absence of most other skeletal elements, may also indicate some other form of primary disposal such as exposure.

The absence of the left lower limbs of Kebara 1 and lower limbs of Kebara 2 may also indicate some form of curation with the removal of limbs for transport elsewhere, for display, or for some other undisclosed activity. Both depositions were allocated to male or possible male individuals and were recovered in the early Mousterian deposits within the site. The later Mousterian layers may represent a change in traditions for disposal of the dead or may mark different group occupancy in the ethnic sense.

SUMMARY

Obviously, the skeletal representations at Kebara were very unusual; carnivore damage and diagenesis cannot be excluded as a contributors to the pattern. However, carnivore damage to faunal bone was more prevalent in the Upper Palaeolithic layers at Kebara (Bar-Yosef *et al* 1992:519). The distribution of the skeletal elements and burials also tends to support a selected burial zone and curation. The dispersals favor some minimal differentiation based on age and possibly sex; but, only four individuals received a sexual diagnosis.

The burial or disposal zone appears to move from the north or northeast wall of the cave to the front of the cave over time. This cannot be completely substantiated as bone from the southern zone may be absent as a result of the diagenetic front and not as a result of the behavior of the hominids in the cave. Burials only appeared in the earlier levels of Kebara's deposits; the hominid disposals from later periods were fragmentary elements.

Through formal analysis, some redundancy was noted. Disposals were articulated or disarticulated. Articulated depositions were more central and contained inclusions. Disarticulated remains were in all regions with no inclusions. The attributes suggested emerging social complexity with some ascribed status for infants and likely achieved status for adults. No females were articulated which implied some degree of sexual differentiation.

Curation in the cave of Kebara is demonstrated with the removal of the Kebara 2 cranium and possibly the absence of his lower limb bones. In later stages of the

Natufian, “a novel practice seems to have been introduced namely, the separation of the skull from the rest of the skeleton - a custom better documented and more common in the succeeding Neolithic cultures” (Belfer-Cohen and Hovers 1992:466). The remains of teeth may also fit with an explanation of removal of skulls. The principal question to be answered is what happened to the rest of the skeleton?

Diagenesis and carnivore damage have been discussed. The possibility of a different form of primary disposal was mentioned. Certainly, with curation, the primary disposal may have been somewhere else and may not have involved interment. One form of disposal, which is practiced by the Masai, assists in providing an example of a different disposal method. Traditionally, when a Masai individual was dying, the person was taken to the savannah and left. Death was facilitated by carnivores. If the individual was rich, a laiban, or a special individual, members of the manyatta returned and collected whatever remained of the deceased and placed these under rock cairns. When living individuals passed the cairns, they usually added stones to the pile (Tunnell 1999:personal communication). For the Middle Palaeolithic in Kebara, teeth or small bone fragments may have been collected and returned to the cave.

Specialized forms of curation such as cremation or cannibalism cannot be ignored. Both are difficult to assess and require expertise to identify. Contradictory information in the published literature on the amount and type of burned bone in the deposits and their relationship to hearths impeded an analysis of cremation or cannibalism based on a literature review. The material from the bone concentrations should be re-examined to determine if any of them were burned hominid bone. Burned

bone is not always easily recognized particularly if the duration of exposure to heat was short. The degree of heat applied also affects the appearance of burning. “In fact, burning of bone tissue may so closely resemble normal bone weathering processes that microscopic analysis is necessary to distinguish the two” {White 1991:361} and even microscopic analysis may be unreliable (White 1992:156-163). Burned bone also shrinks and loses some of its configuration. Since the integrity of burned bone is already compromised, the taphonomic processes in the cave would function to accelerate further degradation. Furthermore, burned skeletal remains were discovered in the Kebaran levels of Kebara Cave (Belfer-Cohen and Hovers 1992:464).

Cannibalism was also possible as extremely fragmentary hominid remains were recovered from the midden or dumping area of the cave. The association of human and faunal remains was one of the criteria listed in Chapter 5 for cannibalism. The hominid osseous elements should be re-examined to see if any marks or damage patterns can be discerned. This model and the cremation model cannot be tested without first-hand examination of the hominids, the faunal remains, and the site plans.

As a cautionary note, midden disposal does not necessarily equate to throwing the corpse into the garbage nor does the disposal of infants in this zone mean they were unimportant (Bar-Yosef 1988b:13-14). The very presence of infant remains in the hominid disposal zone is significant. As Gopher (1993:913) indicates, infant burials tend to be found in complex societies as their ascribed status is functional even in death.

Midden disposals were an important feature of burials on the northwest coast of Canada until about 1300 A.D. (Cybulski, Jerome S. 1992:iii). Ages of the

middens and ages of the skeletal remains were not always co-eval. “Because of the almost ubiquitous presence of human remains, one might wonder whether shell deposits were specifically sought out as cemeteries in the prehistoric past; whether, in some cases, shell mounds may have specifically been built for the interment of deceased individuals; or, whether, the construction of shell middens was, in some cases, a by-product of a corpse disposal ritual” (Cybulski 1992:168). Some of these comments may be relevant to bone midden disposals in the Middle Palaeolithic, particularly the temporal age of the hominid specimens and the age of the bone middens. The hominid fossils may be older or younger than the midden bone depending upon the activity, hominid or otherwise, which introduced the fossils into the midden deposits.

One more feature of the disposals in Kebara must be noted. The Kebara 2 male suffered from an advanced stage of osteoarthritis at the level of the C1 and C2 vertebrae, S1 sciatica, and possibly a chronic pleural irritation (Duday, Henri and Baruch Arensburg 1991:193). These conditions can be disabling and interfere with an individual’s ability carry out some day to day activities. In the Middle Palaeolithic, these conditions may have presented even greater impediments for Kebara 2. In this regard, Kebara 2 resembled Qafzeh 8 and Shanidar 1 who were also disabled individuals.

To summarize the discussion, some degree of patterning existed at Kebara. Some of this structure indicated differentiation along the lines of age and possibly sex. Change in burial practices over time was suggested as identified burials were only found in the earlier deposits. Ascribed and/or achieved status may be implied by the two burials in the earlier levels when all the other remains were fragmentary.

Some degree of symbolism was implicated. The apparent non-random choice of elements signified by the high incidence of teeth requires further assessment. Except for the burials, especially Kebara 2's burial, all the other patterns encountered must be rigorously tested in order to sort out the hominid participation from the other forms of taphonomic involvement.

Chapter 11: QAFZEH

Qafzeh Cave rests on the left bank of Wadi el-Haj and on the southwest flank of Mount Precipice, or Djebel Kafzeh, at an altitude of 220 meters above sea level and an elevation of 200 meters above the valley carved by the wadi. This western facing cave is about 21 meters long and 17 meters wide with an expansive terrace (Vandermeersch 1981:22; Defleur 1993:136). The approximately 5 meters wide main entrance to the cave leads through a vestibule, although the cave does have two smaller entrances. This vestibule is 5 meters by 4 meters. Most of the hominid remains were discovered in the vestibule which marked an intermediate zone between the cave and the terrace. A chimney opens at the back in the northwest quadrant of the cave.

Qafzeh has been dated using a number of techniques. The weighted mean dates for the site were 96.0 ± 13.0 kya by ESR [EU], 115.0 ± 15.0 kya by ESR [LU] (Schwarcz *et al* 1988:735), and 92.0 ± 5.0 kya by thermoluminescence dating [Valladas *et al* 1988:617]. One of the hominids, Qafzeh 6, was directly dated by non-destructive gamma-ray spectrometry to $80.0 +24/-18$ kya with the uranium/thorium method and to $94.0 +10/-8$ kya using uranium/protactinium (Yokoyama *et al* 1997:778). The range for the uranium/protactinium date was used in the study to date the hominids recovered in Neuville's excavation.

The lithic technology associated with the Middle Palaeolithic deposits was described as a Tabun C Levantine Mousterian (Bar-Yosef 1992a:197) or a Tabun B/C Levantine Mousterian (Jelinek 1992:263-164).

Tim White (1998:personal communication) noted the only damage to the Qafzeh remains, in particular the more complete remains, was caused by the preparators. No carnivore damage was mentioned. Parts of Qafzeh 8 and the lower extremities of Qafzeh 11 were crushed. Obviously, mechanical and biological taphonomic processes contributed to the condition of the skeletal remains. Rodents (Bar-Yosef 1988b:13), the chimney, erosion, and water circulation (Defleur 1993:142) ranked among these taphonomic agents.

The stratigraphies from Neuville's and Vandermeersch's excavations in Qafzeh differed. Neuville's layer L corresponded to Vandermeersch's layers XVII - XIX. Defleur (1993:140) felt all of the hominids except Qafzeh 11 from layer XXII, 13 from layer XVa, and 18 from layer XV belonged to the "*même horizon archéologique*". Vandermeersch's layers XVIII through XIX were devoid of anthropic traces which meant that most of the hominids came from layer XVII. Therefore, the association of the same archaeological horizon for all the hominids except the three mentioned seems reasonable.

The stratigraphy of the cave generally appeared to slope from north to south leveling off near the entrance. The downward slope became more marked from the vestibule onto the terrace. The interior deposits sloped down from the back or north wall of the cave and rose towards the entrance. [See Vandermeersch 1981:24, 25, 28].

Vandermeersch's layer XXII contained the remains of one hominid [Qafzeh 11]; layer XVII produced eight hominids [Qafzeh 8, 9, 10, 12, 14, 15, 16, and 17]; and layers XV and XVa provided two individuals [Qafzeh 13 and 18]. Neuville's layer L delivered five to six hominids [Qafzeh 3, 4-4a/21-4/22, 5, 6, and 7). The exact

positions of Neuville's hominid discoveries were uncertain. Vandermeersch (1981:32) established the general provenience of Qafzeh 3, 6, and 7. The position of Qafzeh 23 was not described. The precise positions of Qafzeh 4 and 5 were not determined. They were discovered against the northeast wall of the terrace sondage (Vandermeersch 1981:30). Neuville's two stratigraphies (Vandermeersch 1981:24-25) tended to imply that Qafzeh 4 and 5 were recovered near the cluster of hominids at the entrance of the vestibule.

PATTERNS AND IMPLICATIONS

The most striking feature of the Qafzeh deposits was the number of individuals who appeared to be deliberately interred. The remains of at least seven individuals were discovered in anatomical articulation. The presence of large numbers of individuals in relatively close proximity within a specific region of the site [discussed below] tends to reduce the likelihood of natural disposal. Neuville's stratigraphy (Vandermeersch 1981:24-25) does not tend to indicate a catastrophic event for layer L nor does Vandermeersch (1981:27-29) suggest such an event from his stratigraphy. The burial attitudes of the hominids were not traumatic, such as the attitudes of Shanidar II and V, so a catastrophe or rockfall does not seem to be the most likely cause of the death and interment of these hominids. [For an alternative perspective, see Gargett (1999:48-55)]. At least one other hominid, Qafzeh 6, was discovered as "*un amas d'os difficile à comprendre*" (Defleur 1993:141). This mass of bones was comprised of between 5 to 10 element categories and 4 to 8 skeletal categories representing at least the head, and the

lower limbs. Contradictory information regarding skeletal elements made the determination of the presence of upper limbs impossible to assess. This disposal may have been a deliberate secondary burial or a necessary re-interment if the disposal of Qafzeh 7 intruded on the original deposition.

LOCATION IN SITE

Qafzeh reflected the same kind of spatial allocation as Amud and Kebara. A specific zone was set aside for the disposal of the dead. [See Appendix 2: Site Maps, pages 515 - 520]. In the case of Qafzeh, this zone was located at the main entry to the cave, specifically at the edge of the terrace and into the vestibule. This aggregation of remains was in the southeast region, the entrance, of the cave or the northeast region of the terrace. All of the hominids, complete burials and fragmentary remains, were found in this confined area.

In general, middle aged and elderly individuals were deposited closer to the interior of the cave and younger individuals were closer to the terrace. Qafzeh 8 appeared somewhat isolated from most of the remains whose locations in the deposits were known. The provenience of Qafzeh 6, an adult male of between 20 and 40 years at death, was estimated within a meter by Vandermeersch (1981:32). Very little enamel remained on his first molars and only a point on his left second molar (Vandermeersch 1981:48). Vandermeersch identified him as an adult and not young adult like Qafzeh 5 who was between 20 to 30 years of age. Qafzeh 6 would fit with the category of adult to middle-aged adult, older than the young adult [Qafzeh 5]. The young adult female, Qafzeh 9, was part of the general cluster of immature remains near the terrace. Qafzeh

11, the adolescent, was placed in a location similar to Qafzeh 9. All of the individuals represented by teeth or teeth and cranial elements were generally south of the primary interments and in the most southerly region of the disposal zone. The lack of provenience for the Qafzeh 4 complex and for Qafzeh 5 is unfortunate. Their positions are relevant to this consideration.

The possible segregation of older members of the Qafzeh disposal population from younger members, particularly for the inhumations, indicates an age distinction. The position of Qafzeh 16 and 17, interpreted as adult remains by extrapolation from Tillier's (1995:70) discussion, do not fit this pattern unless these presumably permanent teeth came from older children, adolescents such as the Amud Isolated Tooth, or young adults. These teeth may also belong to one of the other adult disposals such as Qafzeh 5 or 6. A sex distinction was not apparent in the spatial allocation. The unfortunate lack of absolute provenience for the individuals discovered during Neuville's excavation precludes further interpretation of locational patterns.

BURIALS

The Qafzeh burials are listed individually, by layer or level and by age category allotment in Appendix 3: Burial Patterns, pages 535 - 537. [See also Appendix 4: Burial Diagrams, pages 557 - 558]. This section examines these disposals for their general attributes and their compliance with the criteria for deliberate disposal. The seven burials identified for Qafzeh were Qafzeh 3, 7, 8, 9, 10, 11, and 15. The skeletal elements of all the individuals were generally found in articulation. Qafzeh 7 may be an

exception. The minimum number of skeletal categories represented for Qafzeh 7 was between 6 and 7 and the minimum number of element categories was between 7 and 8.

Some pits or natural burial structures were indicated in the literature. No pit was identified for Qafzeh 3 while Qafzeh 6 and 7 were conceivably buried in the same "*tombe*" (Defleur 1993:141). Qafzeh 8 was recovered from a crevice in a rock and occupied a space of 1 m. by 0.8 m. The crevice was a natural feature similar to the niche containing the Amud 7 infant. The double burial hypothesis for Qafzeh 9 and 10 was based on the confined space which both individuals occupied. The child, Qafzeh 10, was placed perpendicular to and at the feet of the young adult female, Qafzeh 9 (Vandermeersch 1981:32; Defleur 1993:143-144). The length of the child's disposal occupied the same space as the width of the adult's. The complimentary limitations of the two disposals were offered as proof of a pit and their joint interment. The adult was buried 4.7 meters below datum and the child was 4.6 meters below datum. The hypothesis of a double burial was reasonable; but, can neither be completely accepted or adequately rejected based on the information presented. A rectangular pit of 50 to 60 centimeters wide and a depth of 20 to 25 centimeters was described for the burial of Qafzeh 11. The edges of portions of the pit were maintained by rocks (Defleur 1993:148). No pit was noted for Qafzeh 15 yet the position of the head indicated abutment against a pit wall.

The articulated skeletons were discovered in one of three positions: on the back, on the left side; or on the right side. Only the age categories represented in the disposals were included in the chart. All of the immature remains were placed on their

backs while adults were positioned on either their right or left sides. The immature burials were Qafzeh 10, 11, and 15. Tillier (cited in Defleur 1993:143) suggested Qafzeh 10 had secondarily toppled onto its back. Skeletal elements were missing from each of these individuals. Qafzeh 7's position was not known.

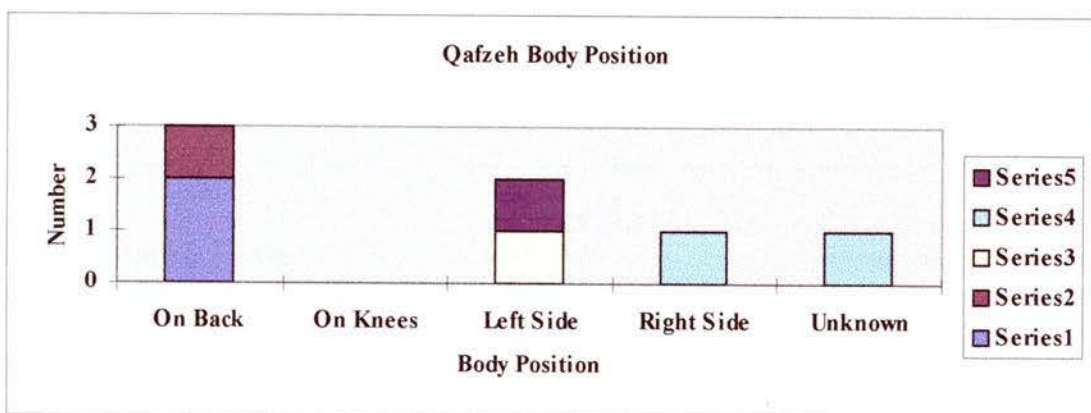


FIGURE 11.1 - Age Distribution

Legend: Series 1 - Child
 Series 2 - Child/Adolescent
 Series 3 - Young Adult
 Series 4 - Adult
 Series 5 - Elderly Adult

TOTAL NUMBER OF INDIVIDUALS = 7

When the positions were analyzed according to sex some sexual allocation was noted. Both identified adult females, Qafzeh 3 and 9, were placed on their left sides. The description of the Qafzeh 3 disposal, 'almost extended on the left side' (Defleur 1993:141), may also suggest a situation similar to Tabun C1 who was discovered on her back with a slight lean to the left. The identified adult male, Qafzeh 8, was deposited on his right side. Qafzeh 8 and 9 were recovered from level XVII. The left side position may mark female burials. The other adult male was Qafzeh 6 whose disposal was possibly a secondary placement or an inhumation disturbed by the interment of Qafzeh 7.

Defleur's hypothesis of a double interment for Qafzeh 6 and 7 can neither be accepted or rejected based on the information and the uncertain provenience for these specimens.

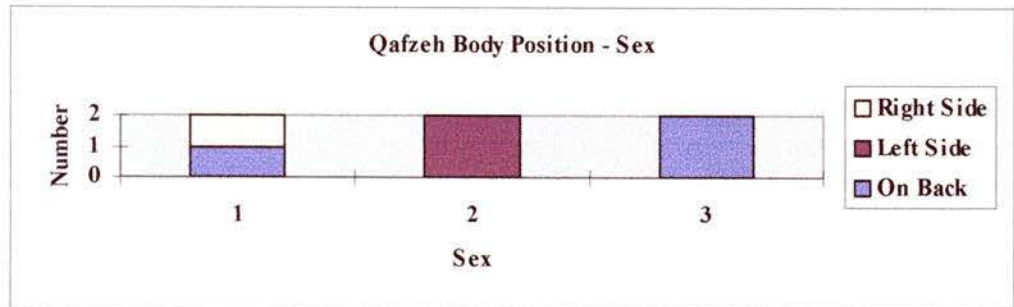


FIGURE 11.2

Legend: 1 - Male 2 - Female 3 - Unknown Sex
TOTAL NUMBER OF INDIVIDUALS = 7

To summarize, the patterns noted on the previous chart indicated known adult females were buried on their left sides and the known adult male was buried on his right side. The immature individual [Qafzeh 11] was identified as male and represented the male burial on the back.

The spatial arrangement of arms was generally inconsistent and varied considerably between individuals. No arm positions were given for Qafzeh 3, 7, and 15. The arm [or arms] of Qafzeh 8 extended down the length of his body. Qafzeh 9's arms crossed over her abdomen with her right hand resting on her left forearm and the left hand placed between her legs. Qafzeh 10 had its left arm bent with the hand tucked under its head while the right arm extended down the length of the body. Both arms of Qafzeh 11 were strongly flexed against the trunk of his body with each hand brought up to the corresponding side of his head.

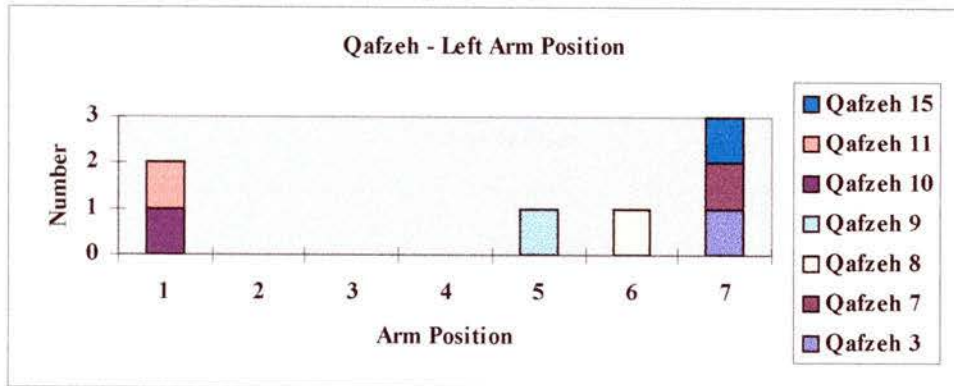


FIGURE 11.3

Legend: 1 - Contracted; hand to head 5 - Crossed over abdomen
 2 - Contracted 6 - Extended down body
 3 - Right angle flex, +/- 7 - Unknown
 4 - Crossed over chest

TOTAL NUMBER OF INDIVIDUALS = 7

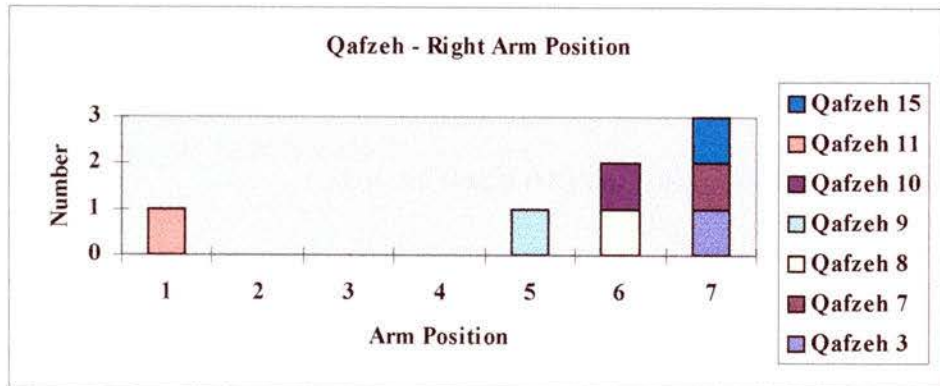


FIGURE 11.4

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 7

The next four charts demonstrate the arm positions according to age category.

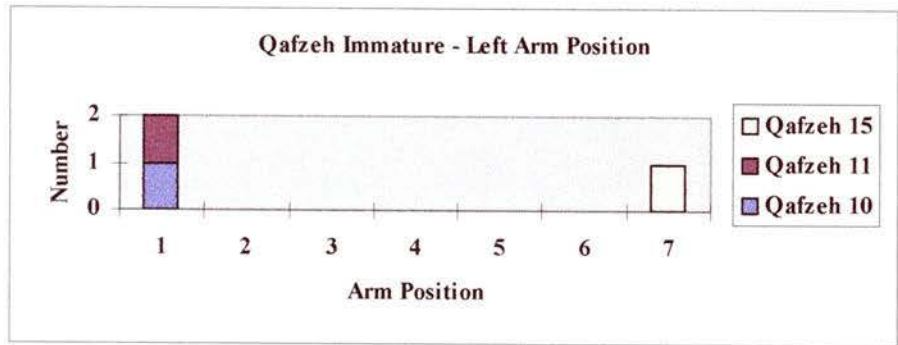


FIGURE 11.5

Legend: 1 - Contracted; hand to head 5 - Crossed over abdomen
 2 - Contracted 6 - Extended down body
 3 - Right angle flex, +/-
 4 - Crossed over chest 7 - Unknown

TOTAL NUMBER OF INDIVIDUALS = 3

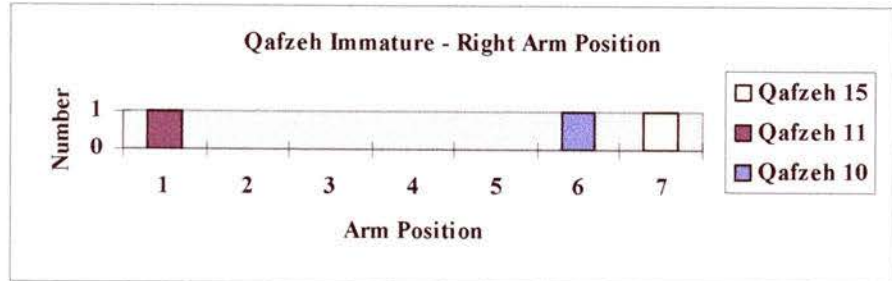


FIGURE 11.6

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 3

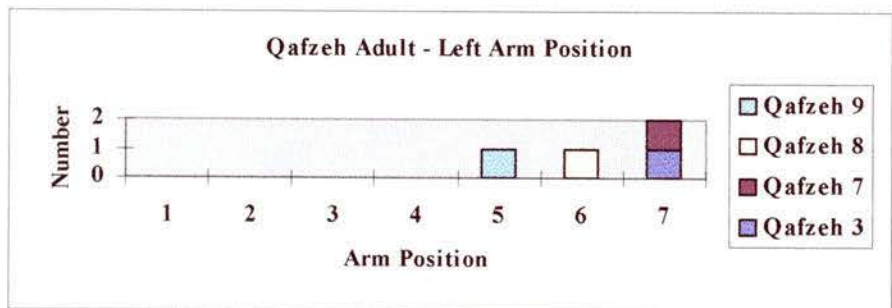


FIGURE 11.7

Legend: Same as above

TOTAL NUMBER OF INDIVIDUALS = 4

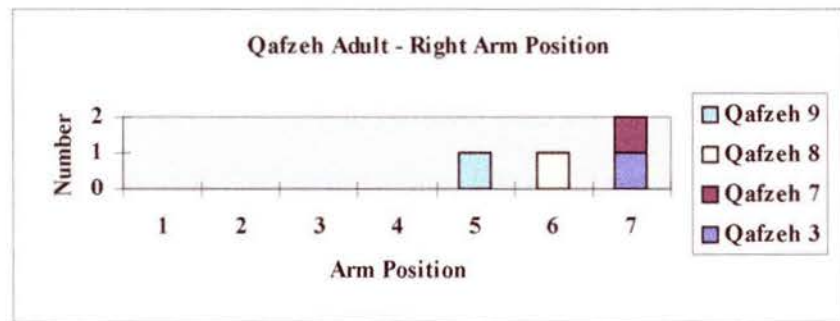


FIGURE 11.8

Legend: 1 - Contracted; hand to head
 2 - Contracted
 3 - Right angle flex, +/-
 4 - Crossed over chest
 5 - Crossed over abdomen
 6 - Extended down body
 7 - Unknown

TOTAL NUMBER OF INDIVIDUALS = 4

In general, the arms of the adults were placed in a more extended position either along the body [Qafzeh 8] or across the lower abdomen [Qafzeh 9]. The immature individuals had at least one arm contracted towards the head.

The arrangement of the legs exhibited regularities according to age and possibly sex when the individual positions were identified.

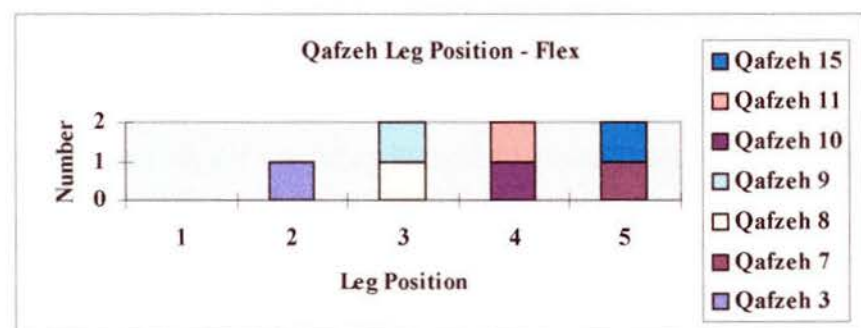


FIGURE 11.9

Legend: 1 - Extended
 2 - Almost extended
 3 - Semi-flexed
 4 - Right Angle Flex, -
 5 - Unknown

TOTAL NUMBER OF INDIVIDUALS = 7

The legs of the young adult female [Qafzeh 9] and the adult male [Qafzeh 8] were semi-flexed. Qafzeh 3, an elderly adult female was described as lying in an almost extended position on the left side (Defleur 1993:141) which may indicate the legs were in a slight or semi-flexed position to the left. The legs of both immature individuals were positioned in an approximate right angle flex. The legs of Qafzeh 10 were described as strongly flexed with the knees to the chest (Defleur 1993:143). The burial photo (Defleur 1993:cover of book) and the burial diagram (Tillier 1995:71) showed the legs' degree of flexion approached a right angle with the legs directed to the left side of the body. The burial diagram of Qafzeh 11 (Defleur 1993:147) indicated a similar right angle flex with the legs leaning to the right side of the body. The lower legs and heels were contracted toward the pelvis, similar to Amud I. Qafzeh 8's legs were semi-flexed to the right and Qafzeh 9's legs were semi-flexed to the left. Qafzeh 8 was a right-sided burial and Qafzeh 9 was a left-sided burial.

When the side of the body to which the legs leaned was examined and then compared to the sex of the individual interred, the distributions followed a pattern. Qafzeh 8 and Qafzeh 11 were both males and their legs angled in the same direction, right. The legs of Qafzeh 10, the immature individual of unknown sex, were leaning to the left. Qafzeh 9 and probably Qafzeh 3 presented leg positions angled to the left as they were left-sided burials. Both individuals were identified as female. The leg position of Qafzeh 10 may indicate a female sex for this child. The absence of the lower body of Qafzeh 15 precluded potential sexual affiliation according to leg position.

When the orientations were examined in accordance with sex, the distributions indicated no direct association with the sex of the individual..

Orientation and body position are compared on the ensuing chart.

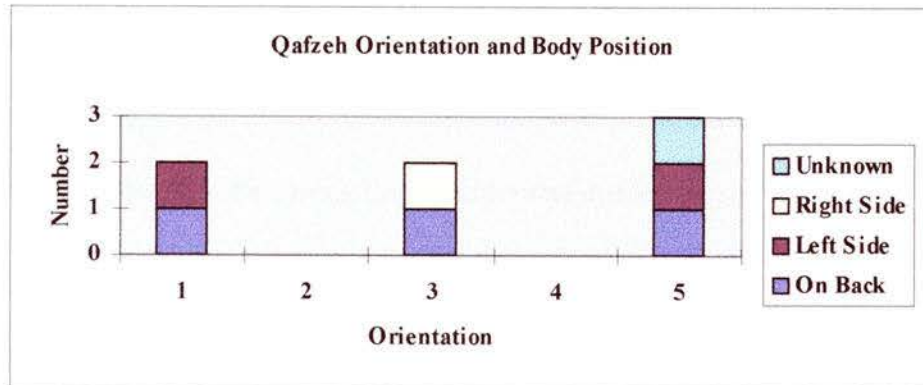


FIGURE 11.14

Legend: 1 - North-South
 2 - South-North
 3 - East-West
 4 - West-East
 5 - Unknown

TOTAL NUMBER OF INDIVIDUALS = 7

The orientations of two of the adults were described in the literature. The female, Qafzeh 9, was placed in a north-south position and Qafzeh 8 was orientated east-west. Despite its actual orientation, Qafzeh 15 was placed with its head in a southerly direction, and Qafzeh 10 was positioned along an east to west axis. Qafzeh 10 followed the same general axis as the adult male. Qafzeh 11, an adolescent male, was placed along an axis almost perpendicular to the Qafzeh 10 child: his head was pointed north and his feet were angled south. His burial orientation was the same as the female, Qafzeh 9. The orientations at Qafzeh did not seem to denote the sex of the individual. Qafzeh 11 was probably an adolescent male based on his age range [10 to 15 years] He

was found in a lower level, XXII. His interment on his back probably marked his immature status.

At least four explanations are possible for the different orientations of the two males, Qafzeh 8 and Qafzeh 11: [1] the different orientations mark a change in the standard orientation for males, north-south in the earlier occupations and east-west in the later occupations; [2] the deviations in orientations indicate different 'ethnic' group practices for burial; [3] the contrasting orientations denote the age differences and social *personae* of the two males; or [4] the orientation of Qafzeh 11 documents a physical handicap due to a cranial fracture and the young male's potential dependency on the social group. Qafzeh 11 had received a blow to the head which had healed to some extent and may or may not have contributed to his death (Defleur 1993:147-149). The orientation of Qafzeh 8 may also reflect some disability. His separation from the main cluster of disposals may also mark his physical handicap. He suffered a crush injury to the ankle and probably walked with a digitigrade [toe walking] gait. The fact that the only known articulated male disposals from Qafzeh represented disabled individuals is intriguing.

The different locations, different orientations, and different positions of the burial populations at Qafzeh, particularly in level XVII, may imply social distinctions marked along the lines of age. Sexual distinctions may be indicated although not as clearly as the age distinctions. To repeat, all the articulated, immature fossil occurrences were placed on their backs. Qafzeh 10 was oriented similarly to the adult male who rested on his right side. The position of the legs of Qafzeh 10 may also indicate a female

sex for this child. Most of the disposals whose orientations were described were placed along cardinal directions. In this regard, Qafzeh 15 seemed to approach a south to north axis. The south to north alignment from other Levantine sites marked immature individuals in the toddler age category such as Skhul I and the Dederiyeh Infant. Despite the discrepancies regarding the age and the orientation of Qafzeh 15, the axis of alignment distinguished this child from Qafzeh 10. The difference may reflect age [life stage] or perhaps sex. If Qafzeh 10 was a female child, perhaps Qafzeh 15 was a young male child or toddler. Qafzeh 15 was also represented by fewer skeletal elements than Qafzeh 10 which may also invoke differences in social positions between Qafzeh 15 and Qafzeh 10 which were likely based on age.

The adolescent male was buried in the female's [Qafzeh 9's] orientation; but, was placed on his back like the other children. The side of his leg arrangement was similar to the male, Qafzeh 8. He may also have reached the age of puberty before his death. Qafzeh 11's burial attitude may identify a change in his social role. His social position within the society at this age may have been comparable, but not identical, to the social position of the young adult female. In this case, age distinctions were probably being registered. Again, the characteristics of Qafzeh 11's disposal may indicate his infirmities. The sex of the two children, Qafzeh 10 and 15 would augment this information and perhaps provide a different interpretation. Their sex, in addition to their ages, may have a bearing on their orientations and body placements.

The season or the time of day of the inhumation may provide an alternative explanation for the different burial orientations of the Qafzeh population.

Saxe (1971:49-50) found some correlation between the orientation of the Mesolithic interments at Wadi Halfa, the seasonal angle of the sun and the time of day the interments probably took place, in particular between sunrise and early afternoon..

Some disposals in Qafzeh contained possible inclusions.

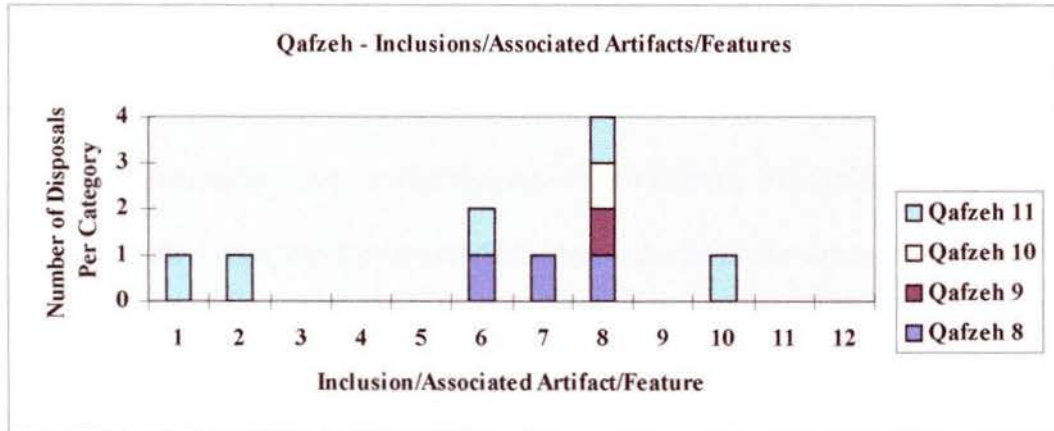


FIGURE 11.15

Legend: 1 - Antler
2 - Bone
3 - Carboniferous substance?
4 - Charcoal
5 - Hearths
6 - Limestone Blocks
7 - Lithics
8 - Ocher
9 - Plant Pollens
10 - Shell
11 - Stones
12 - Teeth

TOTAL NUMBER OF DISPOSALS = 4

Some of the burial offerings in the Qafzeh 11 inhumation have generally been accepted. The inclusions were a [1] red deer antler on his hands, [2] a burnt ostrich egg shell on his chest, [3] ocher fragments in the burial pit, and [4] a diaphysis of a deer tibia near his skeleton and the deer antler (Defleur 1993:147). Ofer Bar-Yosef and Bernard Vandermeersch (1993:98) stated the antler belonged to a fallow deer and remarked that the antler did not exhibit carnivore damage. If the antler was red deer, which was not recognized as a principal faunal category from the site, then the antler was

an unusual element. If the antler was from a fallow deer, then the representation was not exotic; but, the position in the disposal, the lack of carnivore damage, and relatively complete condition of the antler favorably supported deliberate incorporation with the disposal of the skeleton. Ostrich eggshell was more abundant at Qafzeh than other sites in the Levant (Tchernov 1992:176). Qafzeh 11 had a large block of calcaire on his pelvis and feet. Stones seemed to outline portions of the pit as indicated earlier.

The disposal of Qafzeh 8 also contained inclusions. Flint objects, such as an end-scraper, were found in the vicinity of the skeleton. As Qafzeh 8 was interred in the crevice of a rock, the likelihood that lithic material inclusions were fortuitous is reduced. Ocher fragments, some with use traces, were recovered near the body. Limestone blocks covered the feet (Defleur 1993:142-143). The similarities between the two male interments, particularly the positioning of the limestone blocks over their feet, may be significant.

The posited double burial of Qafzeh 9 and 10 contained ocher fragments. Ocher was found in Kebara; but, was apparently not recovered in association with the skeletal remains or the potential burials. To re-iterate, elements recovered as part of the burial complex were considered inclusions for the purposes of this observational study. Furthermore, inclusions were not indicated for the other interments.

SKELETAL PATTERNS

The patterns for the skeletal elements of immature individuals in Qafzeh also followed an interesting sequence or arrangement. These patterns are demonstrated in the following charts. The Qafzeh 4 Complex [4a/21 and 4/22] was excluded from the

analyses due to lack of provenience and the absence of individual skeletal element associations. The skeletal elements listed for Qafzeh 11 and 15 in the skeletal elements tables indicated uncertainty about the exact elements recovered. Defleur's (1993:148-149) discussion suggested that the "cranium, mandibula" and "squelette post-crânien" were represented for Qafzeh 11 and the "cranium, mandibula" and "moitié supérieure du squelette post-crânien" were represented for Qafzeh 15. For the analysis of the patterns within the site of Qafzeh and for the charts, both sides of the appendicular skeleton were counted for these two immature individuals. Vandermeersch's (1981:39-42) inventory of adult skeletal elements was used for the charts. The left arm was probably present for Qafzeh 8; however, the osseous material was crushed and generally deteriorated. The left arm was not included in the tables.

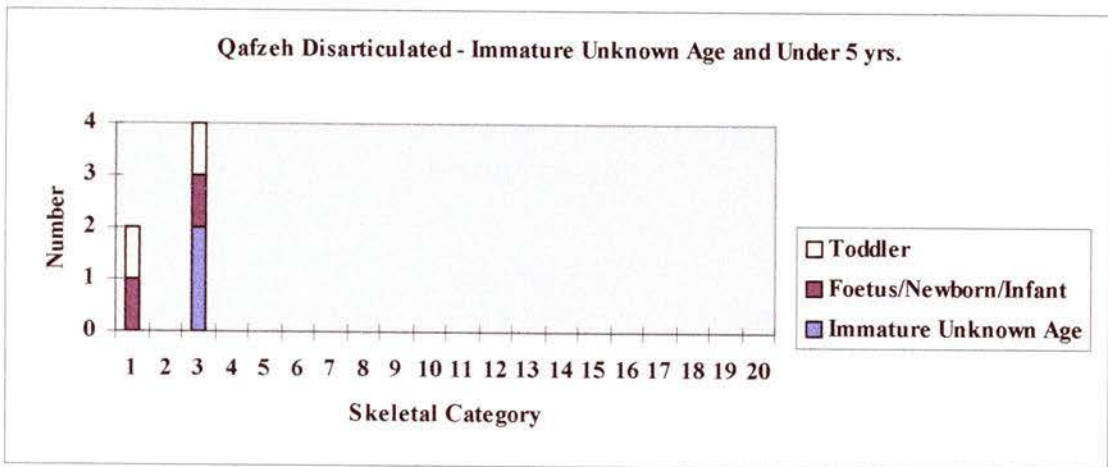


FIGURE 11.16

- Legend:** 1 - Cranium
 2 - Mandible
 3 - Teeth
 4 - Hyoid
 5 - Vertebrae
 6 - Ribs

- 7 - Clavicle
 8 - Sternum
 9 - Sacrum
 10 - Innominate
 11 - Scapula
 12 - Humerus
 13 - Ulna
 14 - Radius
 15 - Hand Bones
 16 - Femur
 17 - Tibia
 18 - Fibula

- 19 - Patella
 20 - Foot Bones

Total Number of Immature Unknown Age = 2

Total Number of Foetus/Newborn/Infant = 2

Total Number of Toddler = 1

TOTAL NUMBER OF INDIVIDUALS = 5

All the immature individuals listed in the previous chart were marked by disarticulated remains. Infants identified by age, Qafzeh 13 and 14, were represented by cranial fragments and/or teeth. The toddler aged between 1 and 4 years, Qafzeh 12, was denoted by a crushed cranium.

The next chart lists the skeletal elements of children and one individual in the child/adolescent category.

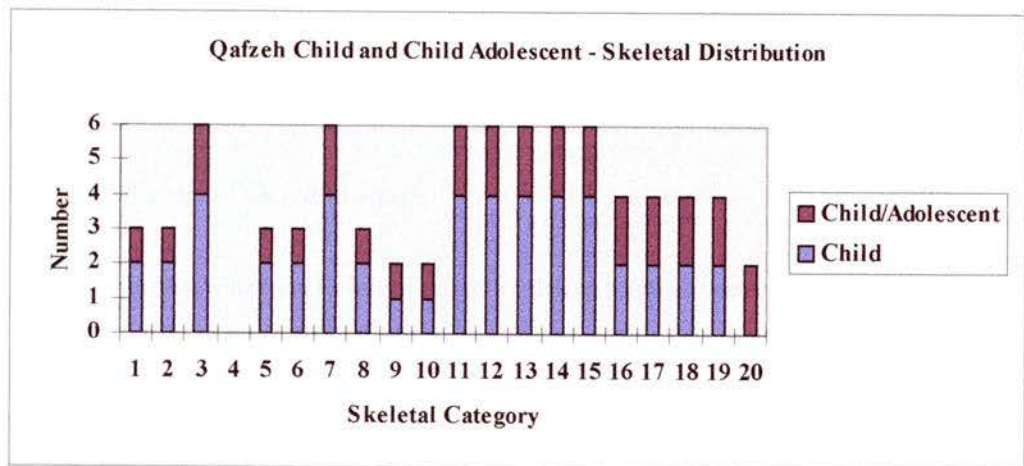


FIGURE 11.17

Legend: 1 - Cranium 7 - Clavicle 13 - Ulna 19 - Patella
 2 - Mandible 8 - Sternum 14 - Radius 20 - Foot Bones
 3 - Teeth 9 - Sacrum 15 - Hand Bones
 4 - Hyoid 10 - Innominate 16 - Femur
 5 - Vertebrae 11 - Scapula 17 - Tibia
 6 - Ribs 12 - Humerus 18 - Fibula

Total Number of Children = 2

Total Number of Child/Adolescent = 1

TOTAL NUMBER OF INDIVIDUALS = 3

All individuals in these age categories were articulated and were represented by more skeletal elements than those individuals in the previous chart. The

differences in the skeletal representations of those of known age may mark their different life stages.

For the remains of the immature at Qafzeh, as the age of the individual increased, so did the number of skeletal elements recovered. Qafzeh 15, a young child or toddler of 5 years according to Tillier³⁶ (1995:70) or 8 to 10 years according to Defleur (1993:141) was denoted by the upper body. The entire lower body was missing. Qafzeh 10, a child of 5 to 6 years was missing the feet. Qafzeh 11, the older child or adolescent, retained most skeletal elements, however the axial skeleton, pelvis and limb bones were crushed (Defleur 1993:147). Therefore, Qafzeh 11 was probably a fairly complete skeleton. The sides of the missing skeletal categories for the articulated remains of children are registered in the next chart.

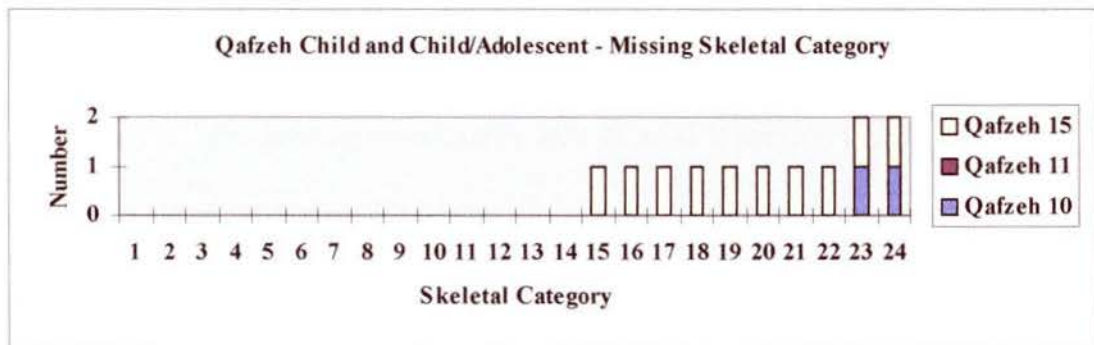


FIGURE 11.18: Qafzeh Child and Child/Adolescent - Missing Skeletal Category [Side]

Legend:	1 - Maxillary Teeth	9 - Left Ulna	17 - Left Tibia
	2 - Mandibular Teeth	10 - Right Ulna	18 - Right Tibia
	3 - Left Clavicle	11 - Left Radius	19 - Left Fibula
	4 - Right Clavicle	12 - Right Radius	20 - Right Fibula
	5 - Left Scapula	13 - Left Hand Bones	21 - Left Patella
	6 - Right Scapula	14 - Right Hand Bones	22 - Right Patella
	7 - Left Humerus	15 - Left Femur	23 - Left Hand Bones
	8 - Right Humerus	16 - Right Femur	24 - Right Hand Bones

TOTAL NUMBER OF INDIVIDUALS = 3

³⁶ Tillier's (1995:70) age estimation was used for the study of Qafzeh 12 and 15. Tillier is the acknowledged expert on immature remains, particularly those from the Middle Palaeolithic.

When appendicular skeletal elements were absent, they were absent from both sides. Natural processes can destroy or move osseous material. However, the involvement of natural agencies in the pattern of absence of all the bones or bone fragments from both sides of the lower extremities for Qafzeh 15 and all the bones or bone fragments from both feet of Qafzeh 10 seems suspect. The legs of Qafzeh 10 were in a right angle flex. The heels may have been drawn up toward the base of the pelvis. The burial diagram indicated the innominate bones were present. Diagenetic processes, for example, would have been likely to damage this region as well. No indication of this type of damage was mentioned in the literature.

Two immature individuals were represented by teeth, Qafzeh 18 and Qafzeh 23. Isolated teeth are difficult to assess. They may be associated with other immature individuals recovered in the site.

The missing osseous elements of some immature skeletons and the presence of teeth and/or teeth and cranial fragments only for other immature individuals indicated the potential for curation, particularly as part of a long term pattern of processing of hominid remains. Two other alternatives could be derived from this pattern.

The first alternative was the osseous material was destroyed over time by taphonomic processes or through differential preservation. The preservation of cranial elements makes this presumption less feasible than the others as cranial elements are less likely to survive than long bone elements, particularly for immature individuals. Immature bone is comprised of woven bone, laminar bone, and fine cancellous bone and

has a less ordered structure than adult bone which is lamellar with a thickness of between “3 - 7 microns” for each lamella (Shipman, Pat; Alan Walker; David Bichell 1985:19). In addition, as stated in the summary of Chapter 8, cranial bone has a different structure than long bones and is less likely to survive in unprotected environments.

The second alternative of the skeletal representations suggested only certain parts of infants and toddlers were deliberately placed in the deposits after another form of primary mortuary treatment or a primary disposal elsewhere. By extension of this second option, perhaps the inhabitants of Qafzeh practiced a different form of primary disposal for individuals under the age of five years where selected elements from the primary disposal were retrieved for secondary deposition in the site of Qafzeh. In many societies, “biological birth” and “social birth” are not co-eval: infants and toddlers are frequently not considered full members of a social group (Oliver 1989:59).

The increasing number of elements with age category may indicate transitions in social roles for immature individuals. The infant category may require extension up to 4 years, a possible time of weaning or the beginning of tooth loss and the acquisition of permanent teeth. With increasing age, children were marked by more elements perhaps indicating a transition towards full membership within the society. The adolescent was probably fairly complete, possibly as a result of completing the transition to a more adult status.

The distribution of skeletal categories for articulated and disarticulated adults is denoted by the following chart. The disarticulated remains were mainly crania and teeth. Some hand bones, foot bones, and two femurs were also recovered. Axial

skeletal elements were missing from several of the articulated adult skeletons. Qafzeh 9 was the most complete adult skeleton with only the hyoid missing. Again, the skeletal representations and distributions for Qafzeh may not be completely accurate. Several contradictions were discovered in the literature. Skeletal patterns are relevant to any discussion of disposal practices and the absence of or contradiction of information diminishes the level of accuracy for any analysis. The plausibility of patterns and their implications is also reduced.

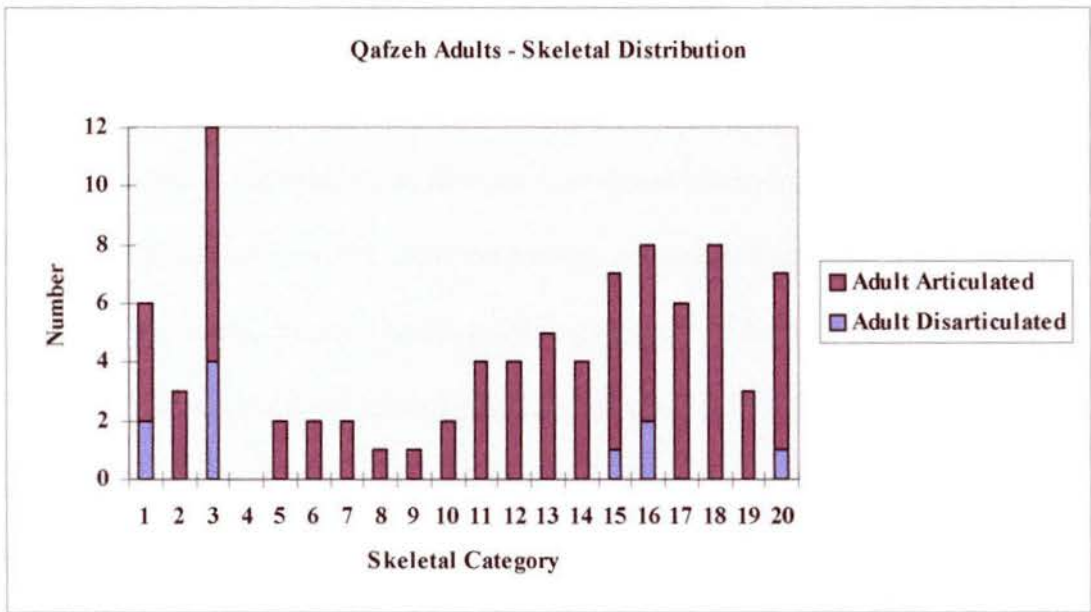


FIGURE 11.19

- Legend:**
- | | | | |
|---------------|-----------------|-----------------|-----------------|
| 1 - Cranium | 7 - Clavicle | 13 - Ulna | 19 - Patella |
| 2 - Mandible | 8 - Sternum | 14 - Radius | 20 - Foot Bones |
| 3 - Teeth | 9 - Sacrum | 15 - Hand Bones | |
| 4 - Hyoid | 10 - Innominate | 16 - Femur | |
| 5 - Vertebrae | 11 - Scapula | 17 - Tibia | |
| 6 - Ribs | 12 - Humerus | 18 - Fibula | |

Total Number of Adult Disarticulated = 4
 Total Number of Adult Articulated = 4
TOTAL NUMBER OF INDIVIDUALS = 8

Two adult teeth were recovered at Qafzeh. Accurate age and sex affiliation cannot be established for these remains. These teeth may belong to other remains from the site, particularly to the potentially curated remains: Qafzeh 5 and 6.

Two adults, Qafzeh 5 and Qafzeh 6, were not complete skeletons. Qafzeh 5 was a young adult of 20 to 30 years which was sexually undiagnostic. This individual was marked by the calotte and palatinum, upper teeth, and hand bones. The other hominid was a male whose age was 20 to 40 years. He was designated by a calotte and face, maxillary teeth, femur [2], and left foot bones. His original disposal may have been disturbed by the disposal of Qafzeh 7. He was supposedly interred in the same disposal pit as this individual. The disarticulated remains of both hominids [Qafzeh 5 and 6] may indicate curation, particularly in the case of element transport into the site for deposition. Both individuals retained the common element of cranial fragments which in some other sites marked males, Amud II and the missing cranium of Kebara 2 and Shanidar III. Qafzeh 6 was assigned a male designation. Perhaps, Qafzeh 5 was also male.

The elements missing from the articulated adult remains of Qafzeh are exhibited in the next two charts. Qafzeh 3 was missing her axial skeleton and portions of both arms, particularly the right humerus and radius and left ulna. She was missing more left sided elements than right sided elements [a ratio of 5:2]. The bones of the axial skeleton such as vertebrae and ribs are fragile bones and deteriorate easily. Qafzeh 3 was also described as elderly. However, rib fragments and vertebrae were recovered in other burials.

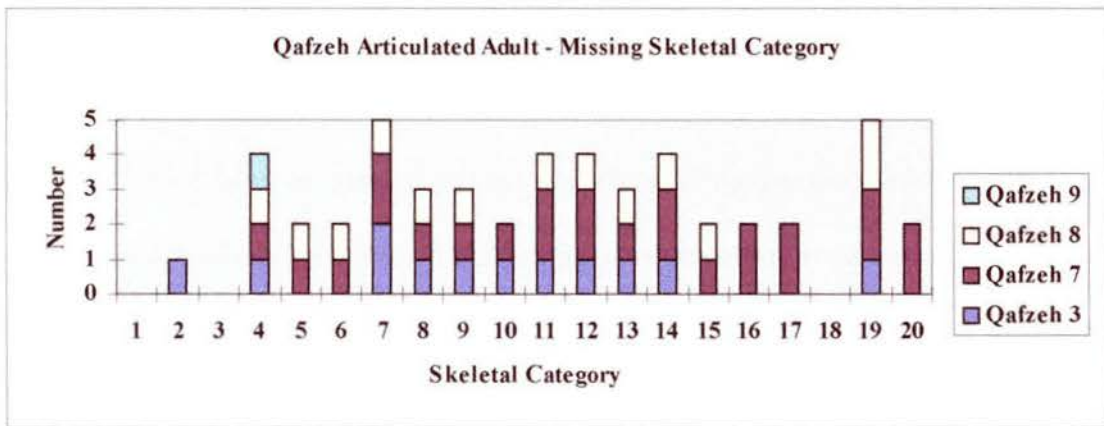


FIGURE 11.20

- Legend:**
- | | | | |
|---------------|-----------------|-----------------|-----------------|
| 1 - Cranium | 7 - Clavicle | 13 - Ulna | 19 - Patella |
| 2 - Mandible | 8 - Sternum | 14 - Radius | 20 - Foot Bones |
| 3 - Teeth | 9 - Sacrum | 15 - Hand Bones | |
| 4 - Hyoid | 10 - Innominate | 16 - Femur | |
| 5 - Vertebrae | 11 - Scapula | 17 - Tibia | |
| 6 - Ribs | 12 - Humerus | 18 - Fibula | |

TOTAL NUMBER OF INDIVIDUALS = 4

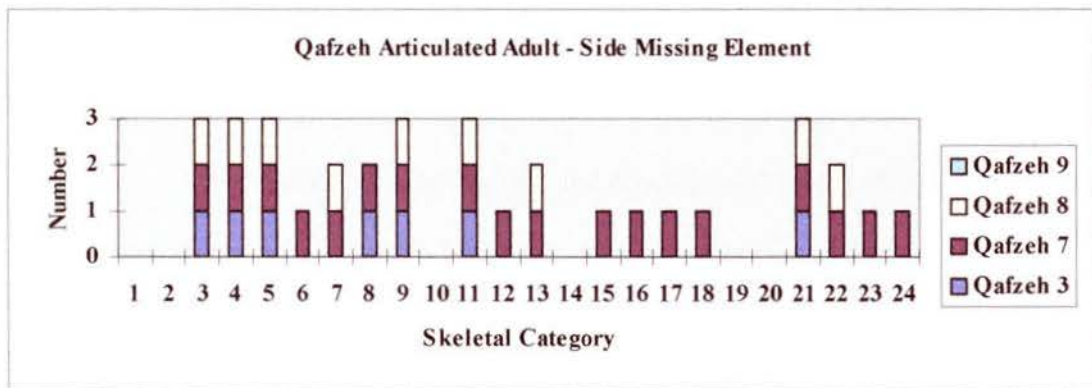


FIGURE 11.21

- Legend:**
- | | | |
|----------------------|-----------------------|-----------------------|
| 1 - Maxillary Teeth | 9 - Left Ulna | 17 - Left Tibia |
| 2 - Mandibular Teeth | 10 - Right Ulna | 18 - Right Tibia |
| 3 - Left Clavicle | 11 - Left Radius | 19 - Left Fibula |
| 4 - Right Clavicle | 12 - Right Radius | 20 - Right Fibula |
| 5 - Left Scapula | 13 - Left Hand Bones | 21 - Left Patella |
| 6 - Right Scapula | 14 - Right Hand Bones | 22 - Right Patella |
| 7 - Left Humerus | 15 - Left Femur | 23 - Left Hand Bones |
| 8 - Right Humerus | 16 - Right Femur | 24 - Right Hand Bones |

TOTAL NUMBER OF INDIVIDUALS = 4

Qafzeh 7 was missing its axial skeleton, and portions of both arms and both legs. The left side dominated by a ratio of 5:4. Qafzeh 8 did not retain his axial skeleton, or possibly his left arm, the ratio of left to right side missing elements was 7:2. As a right-sided burial, Qafzeh 8 had the left side of the body closer to the surface. Qafzeh 7 may also have been a right sided disposal or positioned like Qafzeh 3. Qafzeh 3 had the right side of her body uppermost in the deposits if she was interred like Qafzeh 9. If her position reflected Tabun C1, both sides of her body were accessible. Curation may have occurred with the removal of bones from the uppermost portions of the skeletons in these disposals, particularly for Qafzeh 8. However, left-sided elements predominated the missing element categories for all three individuals. For these individuals, the left side elements may have been destroyed by taphonomic processes or the left side was preferred for curation. The absence of the left arm from Qafzeh 8 may be the result of crushing and destruction by water infiltration (Defleur 1993:142).

The missing elements from the articulated remains at Qafzeh did not correspond with the disarticulated remains. If curation occurred, this lack of correspondence favors curation and transport of skeletal elements into the site or to other sites rather than display of or redeposition of Qafzeh curated bones within the site.

As most of the immature remains were not sexed and since no particular region of the disposal zone appeared to be allocated to only females, no reliable implications related to sex can be derived from the deposition or removal of elements if curation was practiced.

SUMMARY

The Qafzeh locational patterns suggested a preferred zone for the disposal of the dead in either the southeastern limit of the cave or the northeastern edge of the terrace. The excavations concentrated on the vestibule and the eastern portion of the cave and the excavators suggested the interments marked a cemetery or perhaps an “ephemeral camp” rather than an occupation site (Bar-Yosef 1988b:13). Hovers *et al* (1995:58) questioned this interpretation because the distributions of faunal bones and lithic materials were similar in all the levels. No discussion of the potential for occupancy of the terrace was discussed. The stratigraphy of the site of Qafzeh indicated a marked slope on the terrace. With this slope, was terrace occupation tenable? Bar-Yosef (1992:202) described the climatic conditions of Qafzeh at the time of the hominid disposals to be “warm and dry”. On the other hand, Jelinek (1992:258) indicated the conditions during the deposition of Beds XXI - XXIV were relatively dry; during the deposition of Beds XVII - XX conditions were moist, aridity returned in Beds XI - XVI; and moister environments prevailed during the depositions of Beds VII - X. Most of the hominids entered the sediments during the depositions of layers XVII - XIX, which was a moist phase. Caves during wet, erosional phases are dangerous and not particularly amenable to habitation. The presence of the chimney at the back of the cave would have amplified the effects of moisture. Terrace occupation or the habitation of some other site in close proximity to Qafzeh may have been preferred during this time frame. If the terrace was occupied during the time of the inhumations, the burial zone was in the northeast section of the habitation site like Kebara [north to northeast area of the

occupation zone] and similar to Skhul [on the terrace in the northern region of the site] and to Amud [north wall of the northwest region of the occupation zone].

The Qafzeh people did not relegate a specific region of the disposal zone to female interments. Any spatial segregation appeared to correlate with age. The children and young adult [Qafzeh 9] were buried nearer to the terrace while the older adults were buried closer to the interior of the cave. This pattern was different from Amud where some toddlers were placed farther away from the wall than some adults and certainly the other infants, toddlers, and children.

Burial was practiced on a regular basis at Qafzeh although the presence of fragmentary or incomplete remains also favored some form of curation. If curation was a feature of the Qafzeh population's mortuary behavior, the pattern expressed through the elements missing from inhumations was more consistent with a postulated removal and transport of remains. Some of the missing elements were the same as the individual elements recovered from other sites, such as Amud. Other individuals may have been transported into the site, such as Qafzeh 5, 6, 12, 13, 14, 16, 17, 18, and 23. No statement can be made about the Qafzeh 4 complex..

The burial positions and the orientations may comply with an age and possibly a sex differentiation. Qafzeh 15, a young child; another child, Qafzeh 10; and the adolescent, Qafzeh 11 were buried in different orientations. Qafzeh 10 was buried on a similar axis of orientation [approximately east-west] as the adult male, but was still placed on its back and its legs were angled left like the young adult female, Qafzeh 9. The adolescent [Qafzeh 11] was oriented along the north-south axis; but, was also buried

on his back and his legs were angled to the same side as the known adult male, Qafzeh 8. Two female adults were buried on their left sides and at least one was oriented north-south. The adult male was buried on his right side and oriented east-west. The direction of angulation of the legs [left or right] may mark the sex of the individual interred. The axis of orientation may register fine grained age distinctions. In fact, the body position and orientation of the young adult female, Qafzeh 9 [left side; north to south orientation] was similar to that of the young adult male, Amud I [left side; north to south orientation]. Qafzeh 11 was approaching young adulthood. His immaturity was noted by his disposal on his back; his approaching adulthood may be marked by his orientation of north to south. In many ethnographic societies, puberty marks the transition to adulthood. Health status and social dependency may also be indicated by the orientations.

Although infant remains were discovered in the deposits at Qafzeh, these individuals were not represented by identified burials or articulated remains. One possible toddler [Qafzeh 12, 1 to 4 years] was represented in the same fashion as the infants, by cranium and teeth. The older toddler or young child, Qafzeh 15 [approximately 5 years of age], was designated by the upper portion of the body. The disposal conditions for infants at Qafzeh differed to some extent from the sites of Amud, possibly Kebara, and Shanidar. At least one articulated infant disposal was recovered from each site while no articulated infant remains were recovered from Qafzeh. However, disarticulated infant remains were discovered in all four sites. The skeletal representation of Qafzeh infants and toddlers most closely resembled those from Kebara [teeth and mandibles] and the two 'away from the wall' Amud toddlers [Amud III and IV

with teeth and cranial fragments]. The toddlers [Dederiyeh Infant and Skhul I] were more complete than the toddler, Qafzeh 12, and the young child or toddler, Qafzeh 15. Qafzeh featured the burial of children and adolescents. Remains of individuals from these age categories in other sites were usually fragmentary, including Skhul VIII. If curation occurred, perhaps the infant remains of the Qafzeh population were regularly selected for curation and transport. Otherwise, the implications from Qafzeh strongly supported a gradual transition to full membership in the social unit, particularly if only selected elements of immature individuals were placed in the deposits. Therefore, the posited implication of specific regions of the body being selected for disposal to represent different aged immature individuals cannot be eliminated from consideration.

The evidence for role or life stage transitions based on age for the Qafzeh population appeared to separate the individuals into socially distinct phases. The infant stage seemed to fit with an age range from birth to between 2 to 5 years. Qafzeh 15's orientation, regardless of the actual orientation, differentiated this individual from Qafzeh 10. Qafzeh 15 was marked by more skeletal elements than the infants and may actually have been orientated like some other toddlers buried in the Levant [Dederiyeh Infant and Skhul I]; but, Qafzeh 12³⁷ was a toddler aged between 1 and 4 years and was marked only by the cranium and possibly teeth. Qafzeh 12 was younger than Qafzeh 15 and probably belonged in a different life phase than Qafzeh 15. Qafzeh 12's social position was likely closer to those in an infant stage. Qafzeh 12 and Qafzeh 15 could also be toddlers of different sexes. The child phase covered a span from greater than 5

³⁷ Defleur (1993:141) gave the age of Qafzeh 12 as 5 to 6 years, but Tillier (1995:70) classified it as a youngster between the ages of 1 to 4 years.

years up to puberty, probably between 10 to 12 years based on the age of Qafzeh 11 [10 to 15 years]. The adolescent phase marked by Qafzeh 11 was demonstrated by the immature burial position on the back with an orientation identical to the young adult female, Qafzeh 9. The burial position and orientation as well as the mortuary inclusions of Qafzeh 11 implied his social role was no longer that of a child; but, he had probably not acquired the full adult male social *persona* indicated by the right-sided burial and east-west orientation of the older male, Qafzeh 8. Since Qafzeh 11 derived from a different and lower level, his interment could mark a male burial position in an earlier time frame which had changed by the time of the deposition of Qafzeh 8. However, Qafzeh 11's burial position on the back was consistent with other immature remains. Alternatively, Qafzeh 11's disposal attributes may indicate his disabilities and social dependency as a result of the injury [cranial fracture] he sustained.

Young male adults between the ages of 20 to 30 may have been noted by secondary disposals such as Qafzeh 5 if this individual was a male as previously discussed. Qafzeh 5's actual position in the deposits was not known. If Qafzeh 5 was female, then the difference in the disposal conditions between Qafzeh 5 and the other young adult, Qafzeh 9, suggested differences in social status or some level of dominance/subordinance between the two females of the same general age. Older adults were placed closer to the interior of the cave. One of those individuals was a male of 20 to 40 years who was the subject of a secondary form of disposal, Qafzeh 6. Whether the interment was originally a disturbed burial or a deliberate secondary interment could not

be adequately ascertained. The actual disposal circumstances of Qafzeh 7 cannot be addressed in this regard because of the lack of precise information.

The apparent spatial isolation of Qafzeh 8 and the incorporation of more skeletal elements in articulation and anatomical association differentiated this male from the other adult male [Qafzeh 6]. One explanation of the two disposal conditions for the two males may be related to age distinctions or issues of dominance/subordinance. Qafzeh 8's physical disability, the digitigrade gait, may be registered in the location of his primary burial. The skeletal remains of healthy males, without physical handicaps, may have been secondarily curated, transported, and re-interred. Furthermore, the interments of both infirm males [Qafzeh 8 and 11] contained more potential inclusions, while no inclusions were noted for the other male [Qafzeh 6] or for most of the other disposals except perhaps Qafzeh 9 and 10.

Formal analysis implied almost no redundancy. The individuals were either articulated or disarticulated and both forms appeared in the disposal zone of near the terrace and near the interior of the cave. The articulated remains were consistent with primary burials. Some burials were identified with inclusions while others were not. Locational differences appeared to be aligned with age differences. The social structure expressed by the Qafzeh burials complied with a fairly egalitarian organization with some possible early indicators of emerging social distinctions. Age seemed to be the basis of differentiation while sexual distinctions were minimally registered.

The absence of information and the contradictions in the literature diminished the adequacy of the analysis of mortuary patterns at Qafzeh. The

implications and explanations provided for understanding these patterns require further testing with new discoveries from contemporaneous sites or new information on the Qafzeh disposals.