1978

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## Repository Citation

Dennis, Karen Elizabeth, "An Analysis of Faunal and Human Osteological Remains from the Eiden Site (33 Ln 14) of Sheffield, Ohio" (1978). *Honors Papers*. 721.
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# An Analysis of Faunal and Human Osteological Remains from the Eiden Site (33 Ln 14) of Sheffield, Ohio

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May, 1978

I have come to appreciate the well-worn phrase that goes: "The list of those I have to thank is endless . . . ," for indeed it is. Most of those people must go unnoted here. I would, however, especially like to thank Dr. David Brose, who made it possible for me to work at Eiden, and at the Cleveland Museum of Natural History; Don Bier, Jr., whose generosity with his time and whose unfailing helpfulness and patience have made all the difference in drawing this research project together; and Dr. John Lallo, for graciously allowing me access to the Eiden burial materials, the Cleveland State University physical anthropology labs, and his notes on the Bungart collections. The help and the time these three people have given me is deeply appreciated.

I would also like to thank Dr. Warren Walker, who has answered some very odd questions about osteology, and Susan Haas, who typed this presentation.

Finally, I want to thank my adviser, Dr. Linda L. Taranik, for the instruction and guidance she has provided not only for this project, but for all of my sojourn in the Anthropology Department. To her, in admiration, this paper is respectfully dedicated.

K. Dennis
May, 1978

## Introduction

The research project upon which this paper is based actually has been centered upon two separate though related foci: the first, laboratory analysis conducted by the author of the faunal remains collected during the summer 1977 season of evacuations at the Eiden site (33 Ln 14), a Late Woodlands occupation in Sheffield, Ohio; the second, work with fourteen of the burials located during that season at that site. These two areas of investigation have an underlying relationship, centering upon my interest in determining the implications of the results of both for attempting a reconstruction of the probable subsistence patterns of the Eiden people. The faithfulness of such a reconstruction has been affected in no slight degree by my inexperience in osteological work -- whether on animal or human specimens; nevertheless, the process of deriving conclusions from this research has been both instructional and challenging.

The nature of the research project itself dictates the form of this paper, which will consist of three major sections. The first two, respectively, will be discussions of the analysis methods employed and the data collected through analysis, relating those data to the findings previously presented by other workers. Areas of correspondence and deviance will be remarked upon, where pertinent.

The third section will present arguments for interpreting the possible relationships the faunal and human materials have with each other, in terms of their usefulness for drawing inferences about the subsistence strategies employed during the occupation(s) of Eiden. Suggestions and predictions for further work at the Eiden site will also be presented, and it is to be hoped that these, in conjunction with those presented by Ms. Letitia Shapiro (based upon her analysis of the stratigraphic situation at Eiden, and of the flint and ceramic artifacts from last summer's excavations), will be of aid in future excavations and interpretations.

Since descriptions of the history of amateur and professional investigations at Eiden have been so ably presented elsewhere (McKenzie, et al., 1973; McKenzie and Blank, 1976), I will not outline it here; suffice it to say that, unless otherwise noted, the comparative materials which will be discussed in relation to my own findings are based upon the analysis, by other workers, of materials removed from Eiden between 1959 and 1964 by A. Bungart (of Avon, Ohio) and of Bungart's field notes. (Copies of these notes have been made available to me through the kindness of Donald R. Bier, Jr.)

It is perhaps appropriate here to raise a point which will be discussed later in this paper as well. Considerable limitations are imposed upon a discussion of my analysis in terms of previous works, for several factors which must significantly affect the comparability of these two sets of data are clearly in evidence. Sampling biases are certainly present in the earlier material (Cf. Shane, 1973:34), and possibly in the 1977 materials as well; stratigraphic control is largely absent; in addition, there are the problems which inevitably arise from secondary (or tertiary) analysis of any kind: one can have no control over what sort of information has been collected or presented by another worker, and this can limit the usefulness and comparability of that information to one's own research. It must be noted that this by no means implies that the earlier materials or analysis here available are either inadequate or inaccurate, but simply that they are perhaps not as applicable to my own work as I would have liked, a function only of the different goals of the analyses attempted.

This analysis can only skim the surface in terms of the available data, for limitations of time and inexperience have prevented all but the most general study. It is my hope that others with more time and training will be able to analyze the Eiden materials at greater depth now that the basic inventory and cataloguing work has been completed. Even given the limitations imposed upon such study (which will be discussed in Part One of this paper), a great deal of work can be done beyond that here attempted. And of course, analysis of materials recovered in the upcoming excavations might be enhanced by examination of the material already available.

Processing and analysis of all faunal and other artifacts, excluding human remains and flotation or radiocarbon samples, was conducted by Letitia Shapiro and I in the anthropology lab of Oberlin College's Sociology/Anthropology Department. Materials have been extensively inventoried by lot number, unit of excavation, level, and date of excavation, and are currently being stored here at Oberlin. At some future date they will be placed in permanent storage by the Lorain County Metropolitan Park District in Elyria. The 1977 burials will also be in storage there, along with the Bungart collection. The artifactual materials have been catalogued and bagged by lot number, with subdivisions into major groups of flint, ceramics, faunal remains, and "other" materials (including historical materials). Sample inventory sheets are included in Appendix I, as are sample inventory sheets employed for analysis of the 1977 burials. The latter were designed by myself, after models provided by Dr. John Lallo.

* * *

# Part One: Faunal Remains from 1977 Excavations at the Eiden Site

Faunal remains were identified for analysis through a two-step procedure. For the first, all bones and other faunal elements in each particular lot (roughly equivalent to one day's excavation of one unit level) were identified and divided into five major groups: "Large Mammal," "Small Mammal," "Fish," "Bird," and "Shell" (the latter category subsumes *all* mollusca, including gastropods). Cases of elements which could not be clearly allocated to one of these categories were few, and in most cases a later comparison with similar material -- or exposure to a now-more-practiced eye -- allowed identification of such materials. It should be noted here that the dichotomy "Large" vs. "Small Mammal" is an entirely subjective one, and for all intents and purposes the latter group subsumes the identified mammalian species with the exception of white-tailed deer (*Odocoileus virgianicus*) and wapiti (*Cervas canadensis*).

Elements were catalogued on lot inventory sheets (see Appendix I) by these major groups, with total numbers of elements present recorded for each. The materials in each major group were then sorted for further identification, with fragmentary and/or unidentifiable materials recorded as such (i.e., "13 fragments, unidentifiable longbone shaft(s)"), and other elements grouped by common identity as to the part of the body they represented. This process helped provide a rough estimate of the number of individuals present in each major group, as well as providing a means of checking for sampling bias based on the differential preservation of specific elements. Such differential preservation, wholly divorced from considerations of collecting bias (to be discussed shortly), is clearly present in the 1977 Eiden collection of faunal remains; a number of factors are involved.

The first and most obvious consideration is that of the intrinsic fragility of certain elements in comparison with others, both within and between major groups. The relative robusticity of large mammalian bones as opposed to small ones, of articular ends of longbones as opposed to longbone shafts -- which compose the overwhelming majority of indeterminate fragmentary elements in each category, and of all mammalian bone in relation to bird bone and shell, acts to select for probable disproportionate representation of the former types of elements. Weathering and shatter effects take a far heavier toll on the lighter, smaller, and less dense bones of any individual animal in the archeological record, as well as favoring substantially the preservation of mammalian elements over those of other vertebrates, especially birds.

Another factor involved in differential preservation of fauna is of course cultural manipulation of various kinds, which will be discussed somewhat further on, in the body of the text.

Collection bias during the 1977 season was controlled for the most part by extensive screening of removed earth through 1/4-inch mesh screens. This procedure could not, of course, totally eliminate a bias toward the selection of larger elements; nevertheless, it has helped circumvent the problem of obvious sample bias to some degree. Such a sampling bias has clearly affected analysis of the Bungart faunal collection, for as Shane has pointed out (1973:34), the materials in that collection were clearly representative only of complete or nearly complete bones, and show size and species bias "to the extent that the bones of small mammals . . . , small fishes, and amphibians . . . were absent" (34). For the 1977 materials it is perhaps safe to assume that deliberate collection bias is mostly or entirely absent; it should however be noted that (1) elements capable of slipping through 1/4-inch mesh will represent a higher percentage of smaller (and/or more splintered, fragile) bone, and thus will affect counts for all groups except perhaps large mammals, and (2) the collection of materials from screens was done by volunteer workers almost entirely, who (like the author, at the onset of this research) lacked the training to distinguish very small bone from dreck, and therefore may have inadvertently selected for larger or more immediately identifiable elements such as teeth or otoliths. Given even these limitations, however, the 1977 materials are fairly extensive and probably reasonably representative of the animals actually present in the archeological record of this site.

The results of this first step in faunal identification are noted below in Table I, which provides absolute counts of skeletal and other elements combined for each class. The percentage of the total represented by each group is also noted.

Table I: Total Faunal Elements, by Major Class: 1977

| | | |
|---|---|---|
| Large Mammal | 1,152 | (8.68%) |
| Small Mammal | 7,784 | (58.67%) |
| Fish | 3,562 | (26.85%) |
| Bird | 194 | (1.47%) |
| Shell (including gastropods) | 572 | (4.33%) |
| Total = | 13,267 | |

A comparison of these figures with those reported for the Bungart collection is in order. The table below was constructed with data from Shane (1973:34) on total element counts for mammals (without size distinction), fish, and bird, and from Murphy (1973:45) for shell. Percentages of the total have been calculated to provide a basis for comparison, in light of the much smaller (by a factor of 3.62) sample represented by the earlier data.

Table II: Total Faunal Elements, by Major Class: Bungart Collection

| | | |
|---|---|---|
| Mammal | 2,920 | (79.76%) |
| Fish | 444 | (12.13%) |
| Bird | 114 | (3.11%) |
| Shell | 183 | (5.00%) |
| | Total = 3,661 | |

Before a comparison is made, a point of some probable significance must be raised. The 1977 materials were classified by the author: that is to say, by a person with no previous experience in zoological ? osteology. This inexperience, in conjunction with the high degree of bone shatter in the total faunal sample, may have contributed heavily to any noticeable disparity between the figures for the two collections; differentiating between small mammal bone and fish bone, for example, proved to be somewhat difficult, especially early in the course of laboratory analysis. Despite this consideration, however, I feel a comparative analysis is possible.

It is interesting to note that in the later sample, the relative importance of mammalian materials is much somewhat less than in the earlier sample: 67.35% of the total (combined large and small mammal) vs. 79.76% (see Table II). Conversely, fish represent a far larger proportion of the 1977 sample (26.85%) than of the Bungart sample (12.13%); birds, on the other hand, account for only 1.47% of the later collection -- about half their proportion for the Bungart materials (3.11%). The proportion of shell represented in both samples is essentially the same, which tends to support Murphy's argument that the relatively small number of mollusks and gastropods in the Bungart collection does *not* represent sampling bias in collection (1973:45), but an actual absence of shellfish (in any great quantity) from the diet of the Eiden peoples. This point will be discussed further on in this paper.

The mammal and fish percentages, on the other hand, may very well indicate that selection for the former (more likely to be large and/or complete bones) occurred during the collection of the earlier sample. Examination of data presented by Shane in Table 7-2 (1973:35) reveals that 302 of the 391 *identifiable* (as to species) elements classed as fish represent freshwater drum (*Aplodinotus grunniens*). Although Shane makes no mention of the nature of those particular elements, it seems likely that they are, in large part, otoliths, the compact earbones which are known locally as "lucky stones." In the 1977 sample, 1,154 of the elements classed as fish remains are drum otoliths, representing 32.40% of the fish total (3,562); the 302 elements identified in the Bungart collection represent 68.02% of the total. This figure itself suggests some sort of sample bias, and it can reasonably be argued that the disproportionate representations of freshwater drum in the two samples most likely stem from collecting bias on

Bungart's part, otoliths being preferred (or noted) because of their relative size and degree of completeness as compared to other fish elements. If the 32.40% drum figure of the 1977 sample were applied to the Bungart sample, we would predict a total of 932 fish elements if 302 were drum, rather than a total of 444.

The 14.72 point difference in percentage of fish elements between these two samples is nearly equal in size -- and is opposite in direction -- to the point difference between the mammalian percentages in the samples (12.41), which adds weight to the argument for sampling bias in the Bungart collection: if the Bungart fish data were adjusted to the levels suggested by the 1977 materials, the disparity between the percentages noted for mammal remains would all but disappear; the proportion represented in the earlier sample would be 71.06%, only 3.7 points greater than that for 1977. It seems fairly evident that disparities between the data reported for the Bungart faunal remains and those for the later sample can be accounted for by postulating consistent preferential selection for larger and more complete faunal remains, including (by virtue of their greater sturdiness and resistance to erosion and shatter) mammal bone and drum otoliths, thus substantiating Shane's observations on the probable bias in collection (1973:34).

Unfortunately, this correction is of little help in accounting for the disparity on recorded numbers of bird remains, where even after adjustment of percentages for the Bungart materials, the proportion of bird elements in the sample is twice that of the 1977 collection (2.74%, corrected Bungart data, vs. 1.47%, 1977 data; see Table I). Although it might be possible to maintain that collection bias is in evidence in the later sample, due to such factors as those mentioned above, it is far more likely that identification/classification errors on the part of the author are the major source of the deviation here. Given the large number of fragmentary materials classed as "small mammal" in particular, it is likely that a significant part of the disparity here could be accounted for by recognizing that shatter fragments of bird bone may have been classed as mammalian remains. This question can only be resolved when and if the materials are examined by someone more familiar with avian osteology than is the author.

The first step of the classification and identification procedure has thus provided some interesting information both about the 1977 faunal remains collection itself, and about its relationship to the earlier Bungart collection. The second step of the procedure involved further elaboration of the identification process, aimed at identifying the species present in the sample, and the minimum number of individuals per species. The latter body of data is of particular importance in analyzing and interpreting the faunal record at Eiden, or at any archeological site. A discussion of the methods of determination of minimum numbers will follow shortly, and the use of such in interpretation and elaboration of faunal data will also be discussed.

Identifications of faunal materials as to species proceeded with the use of drawings of mammalian and other bones, both cranial and postcranial, in Cornwall's Bones for the Archeologist (1964), and of mammalian crania in Peterson's The Mammals of Eastern Canada (1966). Drum and other fish materials were identified through information provided by Dr. David Brose (personal communication) and mollusca (including both naiad and gastropod remains) through reference to LaRoque's Pleistocene Mollusca of Ohio (1967 -

1970). Type skeletons of most represented species were not available for study, which imposed some limitations upon accurate species designation, especially for the more indeterminate remains; in general, however, the drawings provided by Cornwall, Peterson and LaRoque were sufficiently detailed to permit interpretation of most materials.

Recognition of fish species was accomplished on the basis of otoliths, dorsal spines, and jaw fragments, the latter being especially useful in identifying the presence of pike (Esox) in the sample. Although fish scales are present in the sample in fairly large numbers, they are somewhat difficult to identify as to species; all those identified are cycloid scales, characteristic of freshwater species (Casteel 1947b:557), but no clearly discernable features diagnostic of particular species are reported in the literature which could make such identifications possible.

Identification of mammalian species involved, for the most part, distinguishing diagnostic features of dental and mandibular remains, although for moderate-sized and larger species (such as deer), and some smaller ones (notably shrew, Sorex cinerius, and cottontail rabbit, Sylvilagus floridanus), postcranial remains such as scapulae and longbone articular ends were useful indicators. Bird bone, all remains of which were greatly fragmented, was identified by its relative lightness, its characteristically "polished" look, and the fragile hollow longbones. It proved impossible to identify the great majority of bird remains by species, both because of the unavailability of comparative osteological texts of an appropriate nature, and because of the nature of the elements in the sample. All were extremely small, the products of extensive shatter, and all showed moderate to heavy weathering effects. The only exceptions to these comments involve the presence in the sample of worked bird bone beads (see Appendix II: N524/E498 and N525/E532), some of which exhibit ring cuts similar to those which Shane reports for turkey (*Melaegris gallopavo*) ulnae (1973:38); this would seem to indicate that the beads represent turkey, which is therefore the only bird species identified here.

Since the most diagnostic and therefore the most reliable means of species identification involve dentition and mandibular elements, almost all species listed below in Table III are represented in the 1977 sample by such elements. The minimum number figures are therefore fairly conservative ones, as in most cases postcranial remains which might have been included in those estimates were simply not clearly enough identifiable as to species to the author's inexperienced eye. This fact accounts for the inclusion in Appendix II of minimum number counts for "Large Mammal" and "Small Mammal" categories, where individuals could be differentiated from one another by size factors or duplication of particular skeletal element, but could not be given species classification.

Mandible size and morphology, and specialization of dentition, allowed for many specific identifications, especially below the family level; in some cases, however, the fragmentary and/or indeterminate nature of some such elements prevented identification by species, though probable genus could be assigned. This situation most notably obtained for specimens identifiable as *Mustelidae*; no less than ten such individuals could be recognized in the sample, four of which could be assigned to the genus *Martes* (either marten, *M. americana*, or fisher, *M. pennanti*), and six to the genus *Mustela*. At least one of the latter group seems to indicate *Mustela vision* (mink), and two others suggest Mustela frenata (long-tailed weasel); identification, however, is too uncertain to warrant actual inclusion of these in the minimum numbers count of Table III.

Table III, therefore, presents the minimum numbers as well as the common names and taxonomic classifications of those species identified in the 1977 faunal collection from Eiden. Discussions of the importance of minimum numbers counts will immediately follow, and will be followed by discussions of the implications and interpretive possibilities of the Eiden faunal remains.

Table III: Species Identified at Eiden (1977 Sample)

| | Common Name | Species Classification | Min. # |
|---|---|---|---|
| Mammals: | Wapiti (Elk) | Cervas canadensis | 9 |
| | White-tailed Deer | Odocoileus virgianicus | 13 |
| | Raccoon | Procyn lotor | 10 |
| | Beaver | Castor fiber | 4 |
| | Skunk | Mephitis mephitis | 3 |
| | Badger | Taxidea taxus | 2 |
| | Fisher | Martes pennanti | 3 |
| | Marten | Martes americana ? | 1 |
| | River Otter | Lutra canadensis | 1 |
| | Common Opossum | Didelphis marsupialis | 1 |
| | Least Weasel | Mustela rixosa | 1 |
| | Red Fox | Vulpes vulpes | 2 |

| | Common Name | Species Classification | Min. # |
|---|---|---|---|
| | Grey Fox | *Urocyon cinereoargenteus* | 1 |
| | Cottontail Rabbit | *Sylvilagus floridanus* | 3 |
| | Common Mole | *Scalopus aquaticus* | 1 |
| | Common Shrew | *Sorex cinerius* | 3 |
| | Eastern Grey Squirrel | *Sciurus carolinensus* | 2 |
| | Red Squirrel | *Tamiasciurus hudsonicus* | 2 |
| | Eastern Chipmunk | *Tamias striatus* | 4 |
| | Meadow Vole | *Microtus pennsylvanicus* | 4 |
| | Deer Mouse (?) | *Peromyscus maniculatus* | 1 |
| | Meadow Jumping Mouse | *Zapus hudsonicus* | 1 |
| | Family: Mustelidae | Prob: *Martes* | 4* |
| | Family: Mustelidae | Prob: *Mustela* | 6* |
| Bird: | Turkey | *Melaegris gallopavo* ? | 3 |
| Fish: | Freshwater Drum | *Aplodinotus grunniens* | 712 |
| | Channel Catfish | *Ictalurus punctatus* | 5 |
| | Pike | *Esox* sp.? | 37 |
| Naiads: | (Common Mussel) | *Amblema costata* | 62 |
| | (Common Clam) | *Lasmigona costata* | |
| Gastropods: | Aquatic: | *Pleurocera acutum* | 4 |
| | (Aquatic: Pleurocera acutum) | | |
| | | *Fossaria parva sterkii* | 1 |
| | | *Amnicola pilsbryi* (?) | 30 |
| | | *Campeloma decisum* | 1 |
| | | *Stagnicola reflexa* | 1 |
| | | *Stagnicola kirtlandia* | 20 |

| | Common Name | Species Classification | Min. # |
|---|---|---|---|
| Gastropods: | Terrestrial | Anguispira alternata | 9 |
| | | Anguispira kochi | 5 |
| | | Ventridens ligera | 1 |
| | | Stenotrema fraternum | 1 |
| | | Stenotrema leaii | 1 |
| | | Mesodon pennsylvanicus | 2 |
| | | Discus macclintocki | 3 |
| | | Vallonia excentrica | 1 |
| | | Allogona profunda | 1 |
| | | Triodopsis tridentata | 1 |
| | | Guppya sterkii (?) | 2 |

The first point which must be made in discussing minimum number counts has been raised elsewhere by Uerpmann (1972:311): the "minimum number of individuals" is by no means the same thing as the "number of individuals;" minimum numbers represent only the conservative figure which tallies the "number of individuals necessary to account for all . . . the skeletal elements . . . of a particular species found in the site" (Shotwell, quoted in Grayson, 1973:433). Thus the minimum number represents neither the number of potentially utilizable animals represented at a site, nor the number of those actually utilized. In fact, the question must arise as to whether or not the presence of a species in a faunal assemblage is an indication of human exploitation, or whether it is indicative of either contemporaneous or post-occupational intrusión.

David Hurst Thomas (1971) has addressed this problem, which he calls "the nagging question of precisely which bones from a site can be attributed directly to the actions of man [sic]" (366). Intrusion of species can result from predation by other species, from burrowing activities (especially of rodents), and from natural mortality of species indigenous to the immediate area (366). The problem, as Thomas frames it, is to distinguish "cultural" bone, "those fragments of non-human tooth and osseous material deposited as a result of human activity" (336), from "natural" bone, deposited by other means. To accomplish this distinction, two communities of fauna are identified, the proximal and distal communities. The former represents "those animals living on the depositional site" (366), the latter, those intrusive via human or other means. Drawing from the work of Shotwell (quoted, pg. 367), Thomas argues that the proximal faunal community will be represented by more complete skeletal remains than other fauna, based upon the "educated speculation" that "dietary practices . . . tend to destroy and disperse the bones of [a] prey-species" (367). He cautions, however, that determinations of this sort must be reconsidered at every application to particular sites (367), for the decision as to whether or not intrusive, exploited faunal remains represent human rather than other predator activities remains a qualitative, interpretive one (370). Thomas presents a formula for determining an index of the relative completeness of specimens, the "corrected number of specimens per individual (CSI)" (367), which is as follows:

$$\text{CSI} = \frac{(100)\text{x}(\text{no. of specimens})}{(\text{est. no. of elements})\text{x}(\text{min. no.})}$$

where "minimum number" is defined as above, "number of specimens" is the number of "recognizable bones and teeth in the sample," and all species are "corrected" to a standard of 100 elements per individual (367). Unfortunately, it is somewhat unclear in the text as to whether "number of elements" is meant to imply "number of elements of the species in question" or "total faunal elements present" (which <u>seems</u> to be what is meant by "number of specimens"), although the former interpretation seems more likely.

Thomas' formula is noted as a potentially useful test for further analysis of the Eiden faunal collections; however, application to the analysis here presented was not attempted, mostly because of time considerations. It was also not clear that the species identifications, especially of post-cranial materials, were accurate enough to warrant use of this model. The method Thomas presents, however, is a fairly simple one, and might profitably be applied to the Eiden faunal assemblages given a higher degree of control or expertise in classification. As Thomas demonstrates (369-370), it is a method which allows for a standardization of inter-site comparative studies, eliminating to some degree the factors of observer/analyst bias, and quantifying results rather neatly (see comparative faunal analysis diagrams, Thomas 1971:369).

These limitations which prevent the use of a quantitative method of analysis, at least for the purposes of the present study, nevertheless do not entirely eliminate the possibility of distinguishing "cultural" from "natural" bone in the Eiden assemblage of 1977. A number of criteria were used to determine those species and individuals most likely representative of distal (i.e., intrusive) faunal communities from those indicative of the proximal community, and these criteria were then applied to interpretation of minimum number counts; they constitute a set of generalizations, drawn from examination of these data and from the working models of other authors.

The first assumption made was that all terrestrial gastropods represented in the 1977 faunal assemblage were members of the proximal Eiden community.

All told, this group encompasses some 27 individuals (Table III, pg. 12) of 11 species. The exclusion of this group from the distal/utilized category was based both upon Murphy's observations for the Bungart collection, in which he notes no apparent utilization of those gastropods present in the sample (1973:45; this paper, pg. 5) and upon the relative completeness of the elements -- indicative, by Thomas' model, of non-utilization (1971:367). Perhaps more important than the latter point, however, is the observation that the extremely small sizes of all the represented species would tend to limit their usefulness as a significant contribution to the Eiden diet, unless they could be shown to be extensively collected. Although it can be argued that the intrinsic fragility of gastropod elements would militate against both preservation and collection, it is not worthwhile to argue from negative evidence and assert that they have been subjected to such biases; even the most intensive collection of land snails is not likely to have added significantly to subsistence, and exclusion of these from the "utilized" category should not cause any substantial problem. It should be noted, however, that terrestrial and aquatic gastropods alike are particularly sensitive to environmental factors, and are therefore useful in a reconstruction of the ecological matrix of a site. We will examine the specifics of the Eiden gastropod assemblage at a later point in this discussion.

In a like manner, the small sizes and limited number of individuals representing species of aquatic gastropods argue against their playing any significant role in the Eiden subsistence pattern, although fortuitous utilization cannot be ruled out. The presence of aquatic species in the faunal assemblage cannot adequately be argued to be the result of natural deposition, which would most likely require a process of flooding; on the other hand, the limited number of individuals represented argues against any deliberate exploitation of these species. The two exceptions both represent extremely tiny species: Amnicola pilsbryi, represented by 30 individuals, is only tentatively identified, and the individuals in question may in fact represent young forms of the species Campeloma decisum; they were found inside an individual of the latter species. The other tiny species represented by a relatively large number of specimens (20 -- Table III, pg. 11), Stagnicola kirtlandia, are of some interest in that they were found -- apparently the remains of a bracelet--- around the right wrist of burial #1977-9. Since this bracelet is the only example of any "burial goods" associated with the 1977 burials, it is perhaps a bit rash to dismiss the notion of utilization of aquatic gastropods out of hand. Nevertheless, the contribution of these individuals to the subsistence measures to be discussed could be at best minimally significant, and they have thus been excluded from the distal/utilized category.

Naiads, represented by common molluscs such as freshwater mussel and clam, have been included in the "utilized" category, as both their size and the number of individuals represented in the 1977 collection (62 -- Table III, pg. 11) argue for a significant contribution to the subsistence pattern. Unfortunately, it was not possible to obtain data indicative either of the average live weight of these molluscs or of the probable usable meat per individual, which, as it will be shown below, are the basic items of information required to generate estimates of the available meat yield of any species represented in a faunal assemblage. As a consequence, it has not been possible here to quantify that contribution to the diet which such molluscs may represent. Therefore, although molluscs will be included in discussions below of the Eiden subsistence pattern, they have not been included in the tables below (IV and V) which present calculations of the relative contributions of species present to the overall dietary pattern. As yet another source of probable error in those calculations, this particular exclusion can only be viewed as a necessary evil, though a potentially correctable one should appropriate information become available to future analysis.

All fish individuals and species were assumed to be part of the distal/utilized category. Birds, including the somewhat tentatively identified turkey (Melaegris gallopavo) individuals (3 -- Table III, pg. 11), were excluded from the utilized category because of the highly indeterminate nature of the elements in the sample, and the fact that the one "identified" species was only identified by extrapolation from Shane's analysis of the Bungart collection (Shane, 1973:38 -- see pg. 9 above). Again, this exclusion seemed necessary, although as with the exclusion of molluscs, it undoubtedly represents a source of error in the tables below. (Reasons for assuming this, based upon arguments and evidence from other works, will be presented below.)

All species found in or near areas of identifiable hearths, and/or in association with charred bone fragments (see Appendix II), were included in the distal/utilized category. Both on the basis of Thomas' "destruction criterion" (1971:367), and upon observations of Uerpmann's (1972) that "bone debris in living areas will consist of small, inconspicuous fragments" (308), mammalian skeletal elements exhibiting notable shattering were assumed to represent cultural vs. natural bone; however, only those minimum numbers of identifiable individuals which are listed in Table III were used in calculations of subsistence contributions, yielding (as noted above) relatively conservative figures.

Several species of small mammals were assumed to be indicative of the natural proximal faunal community, including most notably the smaller rodents such as mice (deer mouse, Peromyscus maniculatus; meadow jumping mouse, Zapus hudsonicus), voles (Microtus pennsylvanicus), and chipmunks (Tamias striatus). On the basis of small individual size and/or limited numbers of represented individuals, a few other species were also grouped into this proximal category; they include shrew (Sorex cinerius), mole (Scapolus aquaticus), and least weasel (Mustela rixosa). None of these species would have represented even .01% of the total available meat for the assemblage had they been included, a final and decisive criterion for their exclusion. It should be noted here that inclusion of a species in the "distal/utilized" category in no way implies that the species is (was) not part of the local faunal assemblage of the Eiden region, but rather that characteristics of the elements representing that species at the site (such as bone shatter or association with a hearth, as above) tend to indicate exploitation by the human population.

Obviously there are some problems with these criteria, especially with the latter. The extent to which the very small mammalian species were identifiable in the 1977 assemblage was directly related to the relative degree of "completeness" of those elements (a function of analyst inexperience), so that arguments for exclusion of those species from the distal/utilized category which might be based upon specimen completeness would be tautological. Likewise, in the absence of application of a formula such as Thomas' (1971:367 -- see above), the inclusion of somewhat larger species (such as badger, skunk, and squirrel), despite low individual counts in some cases (Table III), will be justifiable only through the somewhat circular argument that these species are represented by less complete specimens than the smallest species. In fact, inclusion of those moderate-sized mammals into the tables below was ultimately based upon this author's assessment of each species in question as to its "prey value" -- that is, whether or not the hunting or trapping of that species was likely to be profitable, in terms of the average live weight of individuals and so on; that assessment was, in most cases, supported by the inclusion of the species in White's list of game animals "large enough to be important food animals" (1953:397; Table 14).

One last point, whose implications for environmental reconstruction will be discussed at greater length below, should be raised here. Included in the species list (Table III) are two species not now native to regions south of the Great Lakes (a possible third, Mustela vision -- mink, is among the ten specimens of Mustelidae which could not be identified clearly enough; see Table III, pg. 11). These are fisher (Martes pennanti) and marten (Martes americana). The ranges of both are now restricted to Canada and certain parts of the Continental Divide in the United States (see maps, Peterson 1966:254, 258). Peterson (254,258) indicates that the ranges of both species once included the southern Erie shore region, however, so that their presence in the faunal assemblage at Eiden is not actually anomalous. The small individual size of marten, and its representation by only one individual in this sample, led to its exclusion from the tables below; had it been included, it would have represented only .01% of the total available meat tally.

Having outlined the process by which species were identified as to probable contribution to the Eiden subsistence pattern, it is now necessary to discuss the means by which the minimum numbers used in the calculations below were derived. This has been discussed in Part II, above (pg. 9), but needs elaboration. And more to the point, the importance of minimum number counts, hinted at throughout this discussion, should be made clear.

> The most crucial decision which a faunal analyst must make once . . . beyond the identification and interpretation of individual bones and . . . beginning the statistical analysis of . . . data concerns the choice of the proper unit to use in that manipulation. . . . It is certainly tempting to use the raw data of faunal analysis -- the number of identified specimens per taxon -- as the unit of statistical manipulation in faunal studies, and a number of analyses . . . have proceeded on this basis. Unfortunately, however, the use of the number of identified specimens can be criticized on a number of grounds. First, and most seriously, one never knows if the units being so manipulated . . . are independent of one another . . . Secondly, there is little doubt that the use of numbers of specimens alone, even were that use not confounded by the problem of interdependence of elements, simply does not provide as much information, and allow as many inferences, about a body of faunal data as does the use of minimum numbers of individuals (Grayson 1973:432).

The interdependence of specimens (elements) of which Grayson speaks refers to the fact, of course, that the skeletal structures of animals normally involve scores to hundreds of discrete elements, so that, for example, one individual human can be represented by 206 separate osseous elements (see Bass, 1971:4-5). Assuming preservation of all these elements (and, presumably, uncommon ignorance on the part of the analyst), use of the "number of specimens" count would grossly overestimate the number of individuals represented; the consequences for meaningful interpretation of the archeological assemblage would be significant.

White first proposed the use of minimum number counts in faunal analysis of archeological sites (1953), although (as Grayson notes) this methodology was already widely employed as early as 1929 by paleontologists pursuing other areas of research (1973:453). His method involved "siding" skeletal components for each identified species and using the greater number (of right or left elements) as the unit of calculation (1953:397). To use an example from the Eiden 1977 analysis: if, in a particular hearth area, 13 freshwater drum (A. grunniens) otoliths are found, of which 9 are right-sided and 4 left (I), then the minimum number of individuals would be 9. (This is a method which avoids the kind of error that would result in artificially lowering counts even more should the total number (13) be divided in half (7 individuals) -- White 1953:397). There is, of course, room in this methodology for qualitative analysis; if, in our hypothetical sample, the 4 left otoliths are all larger than the rights by some significant degree (say, a factor of 2), then it would be justifiable to register this sample as representing a full 13 individuals. In a like manner, the presence in the sample of five dorsal spines from drum, unless size differentiation was markedly present, would indicate only one individual in a minimum number count; if found with the otoliths above, it would not add to the count of 9 individuals, but be subsumed by that count -- the minimum number of individuals necessary to account for all 18 skeletal elements (cf. Shotwell in Thomas 1971:367).

Minimum number counts are used in faunal analysis in archeology not only to indicate the number of animals represented at a site, which provides a rough measure of the exploitation of particular species by the population in question; they are also used, as Grayson notes, as units for the calculation of another important measure of subsistence: the total meat available through the utilization of those animals. The means by which such a measure is derived involve multiplying the minimum number of each species present by the average live weight of individuals for that species, and dividing that figure by the percent of usable meat (of the total weight) of an animal. This is the method presented by White (1953), who derives percentages for usable meat (per taxon) from analogy with those percentages obtained from modern domesticated species (397).

White himself discusses some potential sources of error in the use of such analogy, based on the observation that the presumably less intensive butchering techniques of aboriginal hunter/gatherers render it "doubtful that the percentage of usable meat obtained . . . will run as high" (397) as modern estimates. Nevertheless, he points out, such groups have often been shown to exhibit highly efficient butchering and utilization techniques, and the error, if present, should remain fairly constant over a large sample (397). On the basis of this argument, the use of White's percentages was deemed to be a reasonably accurate measure of available meat per individual. For species not listed by White, percentages were calculated according to the guidelines he presents: 50% usable for large species, 70% for smaller mammalian taxa (397). Average live weights of individuals for each species not listed by White were derived from the average live weights given by Peterson (1966); again, following White's guidelines (397), male and female weights were averaged for these tables, as for none of these species did the difference exceed 30% (White 1953:397). White's data, and those of Shane for fish taxa (1973:35 -- unfortunately, Shane provides figures for "usable meat per individual," but not average live weights, so those cells of Table IV below must remain empty), have been converted from English Standard to metric weights. The total meat available (in grams) for each represented species, and the percentages of each of the total for 1) mammalian taxa and 2) fish are also noted.

Table IV: Available Meat, by Species: Eiden, 1977 Faunal Assemblage
W = from White, 1953 (converted to metric equivalent)
P = from Peterson, 1966 (see text):397-398
S = from Shane, 1972:35 (converted to metric equivalent)

| Species | Av. Live Weight (gm) | Usable Meat | Min. # | Total Meat (gm) and % of Total |
|---|---|---|---|---|
| White-Tailed Deer | 290,718.74 (W) | 145,359.37 | 13 | 1,889,671.81 (53.85%) |
| Wapiti | 317,515.60 (W) | 158,757.80 | 9 | 1,428,820.20 (40.72%) |
| Raccoon | 10,351.18 (W) | 7,937.89 | 10 | 79,378.90 (2.26%) |
| Beaver | 24,972.60 (W) | 17,463.36 | 4 | 69,853.44 (1.99%) |
| Skunk | 3,243.20 (W) | 2,267.97 | 3 | 6,803.91 (.19%) |
| Badger | 8,107.99 (W) | 5,669.92 | 2 | 11,339.84 (.34%) |
| Fisher | 3,120.72 (P) | 1,560.36 | 3 | 4,681.08 (.14%) |
| River Otter | 8,107.99 (W) | 5,669.92 | 1 | 5,669.92 (.16%) |
| Opossum | 5,513.44 (W) | 3,855.55 | 1 | 3,855.55 (.11%) |
| Red Fox | 3,628.74 (W) | 1,814.37 | 2 | 3,628.75 (.10%) |
| Grey Fox | 4,082.34 (W) | 2,041.17 | 1 | 2,041.17 (.06%) |
| Cottontail Rabbit | 1,587.58 (W) | 793.79 | 3 | 2,381.37 (.07%) |
| Grey Squirrel | 510.00 (P) | 255.00 | 2 | 510.00 (.03%) |
| Red Squirrel | 195.00 (P) | 97.5 | 2 | 195.00 |

Total Mammal = 35,909.261 kgm.

TABLE IV, continued

| Species | Av. Live Weight (gm) | Usable Meat | Min. # | Total Meat (gm) and % Total |
|---|---|---|---|---|
| Freshwater Drum | NA | 1,360.78 (S) | 712 | 968,875.36 (95.32%) |
| Channel Catfish | NA | 1,451.50 (S) | 5 | 7,257.50 ( .71) |
| Pike | NA | 1,088.62 (S) | 37 | 40,278.94 (3.96) |

Total Fish = 1,016.412 kgm.

It should perhaps be noted at this point that several workers (cf. Kubasiewicz, 1956, in Uerpmann, 1972:310) suggest that a more useful and accurate system of quantifying the available meat represented by a faunal assemblage can be designed: rather than employing simple minimum number counts as suggested by White, they argue that distinct correlations exist between total bone weight and total flesh weight of animals, so that "weighing all the bones of one species should provide quantitative results more directly related to meat weight than could be obtained by counting the bones" (Uerpmann 1972:310). In fact, as Uerpmann points out,

> the proportions of species judged by the bone and the meat weights are virtually identical. In fact, since the meat weights are hypothetical and only represent a part of the meat consumed on the site . . . it is possible to ignore their calculation and to use bone weight proportions directly for determining the contribution of different species to the diet of the site occupants (1972:310).

Uerpmann discusses the problem of variability in infraspecies bone density and weight as a potential source of error in this technique, but argues that for "pre- or proto-historic" species (and, by extrapolation, wild species), such variation from "type" will be less marked than in modern domesticated species (311). He also notes that attempts to determine animal weights from "skeletal build" (312) have become more common, and show potential for an even more exact measure than simple weighing techniques. Richard Casteel's work on correlations of total live weight to simple linear measurements of skeletal elements, specifically for fish taxa (1974a), are an example of such a method. This approach promises a great deal in terms of improving measurement accuracy in faunal analysis, for it is conducive to simple standardized formulations potentially applicable to any and all faunal species, and in addition, allows for a more sensitive adjustment of results which could take into account observable individual size factors. Because the White method provides only a standard average weight for each taxon, large individuals and small individuals are lumped together, and valuable information is lost in the process. Preferential hunting behavior, for example, which might be exhibited in the archeological record by clusters of similarly-sized individuals; seasonal variation in food intake, potentially identifiable by consistent variations in average sizes/ weights of animals collected at specific temporal points; and long term changes -- such as overall declines in average body size, and therefore, available meat, which could be interpreted as signs of environmental exhaustion and overexploitation -- are all masked by usage of the White method, and are potentially discernible through such methods as those which Uerpmann discusses (311-312).

Unfortunately, it proved to be impossible to obtain appropriate sources which might present bone weight/body weight ratios for the conversion of raw data of the former kind either into the latter kind or into numbers of individuals. Comparison of raw bone weights would also require far more accurate classification of the skeletal elements in the 1977 Eiden sample than was possible in this project, for the fact that the overwehlming number of elements were classifiable only as "large" vs. "small" mammal must have a significant effect upon projections of the importance of each species to the subsistence pattern. Comparisons of bone weight totals <u>not</u> controlled for differential species size could show considerable error, and it was felt that without a clearer understanding of the methodology employed in this sort of analysis it could not be attempted here.

Grayson (1973) has outlined some criticisms of the use of minimum numbers analysis, mostly focusing upon variation in operationalizing the concept; he points out that this sort of variation can significantly affect the resultant numbers used for statistical manipulation, but that this has generated "no set way of determining the clusters of faunal material within an archeological site are in turn used to calculate minimum numbers" (433). He outlines three major approaches commonly used to derive minimum numbers counts, placing them on a continuum -- albeit a continuum of three discrete points -- of archeological distinction in data-grouping (433). In order to distinguish such clusters as he describes, and thus arrive at a usable minimum numbers count,

> one can, for instance, use all possible archeological distinctions . . . by first dividing the faunal material on the basis of stratigraphic breaks, and then secondly subdividing that material on the basis of the excavation unit in which it was found. These small clusters . . . , each representing one vertical unit cross cut by a horizontal one, are then used in calculating minimum numbers. . . . This method of defining analytical units . . . , the maximum distinction method, yields a maximum account of minimum numbers of individuals (1973:433).

The maximum distinction method, although providing the highest degree of "control," has a significant drawback; in utilizing as a basis of minimum numbers calculation the "totally arbitrary mechanism" of excavation units, it assumes "that the remains of individual animals will not be distributed across several of these units" (1973:438) -- a rather unrealistic assumption, to be sure. If site excavation techniques such as genuine random sampling are employed, the assumption may be reasonably justifiable; this will depend, of course, on the degree of horizontal separation of excavation units: the closer together such units are, the more likely it is that horizontal dispersion of skeletal elements will affect this assumption negatively.

The second approach takes this factor into account:

> If vertical excavation units are not felt to be a proper means of organizing faunal material into analytic groups, the calculation of minimum numbers might proceed by examining clusters of faunal material recovered in single strata or groups of roughly coeval strata without regard to the excavation unit in which they were found . . . this procedure will yield minimum numbers which are less than those determine by the first approach outlined above (1973:433).

It is clear that this approach will tend to follow normal stratigraphic control procedures for defining archeological clusters of all varieties of artifacts, and will be of the greatest usefulness in determining long-term variations in faunal exploitation, especially as such patterns may relate to different periods of human occupation of a site. Grayson feels this to be the best of the three methods for determining minimum numbers (438).

The third possible approach Grayson terms the "minimum distinction method" (434); this approach entails considering all the faunal material from a site as one analysis cluster, "ignoring both stratigraphic breaks and vertical excavation units" (433). This method will result in the lowest minimum number counts of all;

> permissible, perhaps, for those sites in which stratigraphy is totally lacking, calculation of minimum numbers in this fashion . . . would seem to violate some basic tenets of archeological methodology where stratigraphy is present (1973:434).

As Grayson notes, a considerable amount of information is lost through the application of such a method (438), rendering the usefulness of the minimum number counts derived by these means somewhat limited. Interpretation of data so generated could be at best tentative, and seriously misleading. As in so many endeavors, it seems clear that following the middle way is the best course for analysis of this kind.

Although the excavation strategy employed at Eiden during the 1977 season did, in fact, result in fairly widely separated excavation units for the most part, it was in those areas of the site in which contiguous units were excavated that the greatest densities of faunal materials were found (2). The maximum distinction method was therefore felt to be inappropriate for this analysis, as horizontal dispersion of faunal elements was clearly in evidence. In assessing these materials, however, the question of the applicability of stratigraphic distinctions had to be carefully considered. There are clear indications in the available recorded data that the integrity of depositional units, whether natural or cultural, may have been significantly compromised by poor overall control of vertical excavation. It is difficult to adequately compare across excavation units, for the data were often inadequately recorded; in some units, depth measurements for defining levels were not noted in the field records, and no standardized method of defining, for example, the vertical limits of "level 2" was applied.

These problems of control are certainly most clearly a result of the difficulties involved in the use of an almost entirely volunteer crew, which was only moderately stable over time. Likewise, the extent of site testing prior to the 1977 season was severely limited, and no pre-existing system of strata-definition could be set up to guide unit excavation. Since Letitia Shapiro will present (under separate cover) proposals for more adequate stratigraphic control in the upcoming season, based on her analysis of the discernible stratigraphy of the site, I will not pursue this point much further. In the context of this paper, the vertical control problem has immediate application only to the degree that it affects employment of the second analysis method presented by Grayson (above).

Because Grayson includes "groups of roughly coeval strata" with single strata as appropriate horizontal units for this approach (1973:433), it was felt that the method could be applied to this analysis of the Eiden 1977 faunal collection. Despite the problems of interunit comparability noted above, it is possible to differentiate three general levels, roughly consistent throughout the site. In Appendix II, these are listed as "plow zone" (approximately 0 - 30 cm), "Level 1" (30 - 80 cm), and "Level 2" (below 80 cm) (see Brose and Bier, 1978:12-13). Although considerable problems arise at the boundaries of these levels, in terms of assigning "borderline" materials, it was not found to be an impossibly unwieldy method of analysis. The minimum counts noted in Appendix II are the result of this process; they are condensed, and noted by species, in Table IV above.

Examination of the information presented in Table IV -- from minimum numbers of individuals utilizable to total available meat tallies -- reveals a fairly detailed picture of the proposal subsistence emphases represented in the archeological record at Eiden. Discussion will proceed from general comments through specific observations on this information, and then will return to some of the points noted above which are of particular interest in a reconstruction attempt.

It is clear that significant and deliberate attention to the procurement of fish occurred during occupation, for the minimum number count indicates the presence of no less than 754 individuals, the overwhelming majority being freshwater drum. The degree to which the preponderance of drum in the sample reflects actual selective preference for that species is somewhat surprising: this particular fish is considered to be relatively worthless in modern times, having a disagreeably strong and oily taste (Brose, personal communication). Setting aside entirely the questions of collection bias and analysis error, it is clear that the preponderance of drum represents some fairly high degree of utilization; the greatest concentrations of drum elements at the site are associated with areas of charred bone and animal remains of other kinds, indicating <u>some</u> deliberate means of exploiting this species. Of course, the question of taste is demonstrably culturally relative, so we cannot assume that the Eiden people found drumfish to be unpleasant, or argue from such an assumption that this represents a period in which resource scarcity made the consumption of less preferred foods necessary. Clearly, there is no selection <u>against</u> drum by those fishing: they were not being thrown back as useless parts of a catch.

The high oil content of drum may itself have some bearing on this question, for it is possible that the species was exploited (1) specifically because of a lack of oils in the diet otherwise obtained, and most specifically as a source of vitamins A and D (Chaney and Ross, 1971:206, 221), or (2) as a source of cooking and/or lamp oil, as were candlefish in the Pacific Northwest. Unfortunately for this analysis, neither possibility can be ruled out as unlikely or unsupported, for any arguments which could be made on the basis of human osteological evidence -- specifically, any observation of the presence or absence of deficiency diseases related to vitamins A or D -- would be complicated by the fact that other fish species were also exploited. On the basis of the evidence in and of itself, this analysis will assume utilization of freshwater drum as part of the diet of the human population at Eiden.

Fish account for over one thousand kilograms of available meat in the 1977 faunal assemblage. This indicates that exploitation of the freshwater resources of their local area was one focus for the Eiden people, although comparison with the total available mammalian meat count clearly indicates that such a focus was not as important as land hunting. Since the fish species identified do not have seasonal "runs," there is no easy way to determine seasonality from the presence of their elements in this assemblage. Casteel has presented arguments for the determination of seasonality from fish scales (1974b:571-572), but hedges this with cautions involving both climate variables and age variables which can effect significant changes in a "standard" pattern of seasonal growth rings (1974b:575-576). Both because of the nature of preservation of fish scales at Eiden, and the difficulty (already discussed above) of identifying them as to species, it was felt that attempts to determine season of collection from these elements would not be fruitful. Likewise, seasonality potentially identifiable through growth progressions in other skeletal elements was a kind of information rendered inaccessible by the unavailability of clear comparative information.

As was noted above (pg. 5), there seems to be reason to believe that shellfish did not play a significant role in the Eiden subsistence pattern, although they were clearly exploited to some degree. This supports the argument that orientation towards the exploitation of water resources was only of secondary concern to the Eiden population, and will be of some interest in discussions below, including some arguments about seasonality from other data than growth patterns in particular taxa.

Mammals clearly provided a far larger amount of available meat than fish, accounting for nearly 36,000 kilograms (Table IV). Large mammals, specifically wapiti and white-tailed deer, account for the overwhelming proportion of that available meat, hardly surprising in light of the size differential between these two species and those others present in the sample. Raccoon (Procyn lotor), the third most important prey species, accounts for significantly less available meat (only 2.26%), and the drop-off for all other species -- beaver (Castor fiber), with 1.99%, representing only a mild exception -- is marked. Clearly, a focus upon exploitation of wapiti and deer is the defining characteristic of the subsistence pattern evidenced here. Although a fairly broad range of moderately-sized mammals is present, they account for so little of the available meat total that it is perhaps necessary to argue that utilization of these species is most profitably viewed from another angle: as primarily sources of pelts (Shane 1973:41). Exploitation of fur-bearing animals is not exclusive of utilization of those animals as food, of course, but assuming the primary focus to be upon the former emphasis seems to be a useful means of interpreting the 1977 assemblage: a broad range of small fur-bearing mammals, with low representation in terms of individuals for any particular taxon, would tend to indicate incidental trapping rather than selective hunting. This interpretation is additionally supported by the distribution of numbers of individuals represented: after raccoon, beaver, skunk (Mephitis mephitis), fisher (Martes pennanti), and cottontail rabbit (Sylvilagus floridanus) are the most abundant, and these are all species whose furs have been or continue to be widely utilized in historical times (see Peterson, 1966). Trapping of fisher, skunk and rabbit (as well as other terrestrial mammals represented) would require only simple traps in wooded areas; otter (Lutra canadensis) and beaver remains indicate that traps for these species may have been set at or near observed dens, possibly in the French Creek or the Black River (the former, because somewhat quieter a run of water, is the more likely location).

In order to more clearly demonstrate the subsistence emphases indicated by the 1977 Eiden faunal assemblage, Table V below has been abstracted from Table IV. A number of alterations have been made, to underscore some points of this discussion which have been and will be mentioned. First, in order to obtain the most conservative figure possible for the contribution made by large herbivores to the Eiden subsistence pattern, all wapiti and white-tailed deer have been grouped as "white-tailed deer," and available meat has been calculated from that perspective. This procedure also helps to eliminate any upward skewing of those totals potentially resulting from misidentification of deer remains as wapiti; since the basis for making a distinction between the two species was, as often as not, a matter of observable size differentials between collection elements (again, a problem arising from the author's inexperience in zoological osteology), some of those individuals identified as wapiti may be misclassified. It was felt that the best response to this possibility was, in Table V, to consider all Cervidae as deer (O. virgianicus).

Raccoon and beaver are each noted separately, since they represent approximately 2.0% apiece of the overall total; opossum (Didelphis marsupialis), fisher, otter, skunk, and badger (Taxidea taxus) were grouped together because they represent species of a fairly large size, and are all pelt-bearing mammals. Red fox (Vulpes vulpes) and grey fox (Urocyon cineroargenteus) were grouped together separate from the latter group because exploitation of these two species seemed even more clearly oriented towards procurement of furs; finally, all remaining mammals were lumped together. All three identified fish taxa are noted, to facilitate comparisons.

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Table IV: Total Available Meat, by Major Group.
(N.B.: For this table, wapiti and white-tailed deer have been weighted as though all were deer: see text above.)

| | | | |
|---|---|---|---|
| Cervidae | 3,197,906.14 gm. | (72.60%) | |
| Raccoon | 79,378.90 gm. | (1.80%) | |
| Beaver | 69,853.44 gm. | (1.59%) | |
| Opossum, fisher, otter, skunk and badger | 32,350.30 gm. | (.73%) | (.94%) |
| Red fox and grey fox | 5,669.52 gm. | (.13%) | |
| Other mammal | 3,516.50 gm. | (.08%) | |
| Freshwater drum | 968,875.36 gm. | (21.99%) | (23.06%) |
| Pike | 40,279.12 gm. | (.91%) | |
| Channel catfish | 7,257.50 gm. | (.16%) | |
| Total: | 4,405,086.78 gm. | | |
| | (4,405.087 kgm.) | | |

The first observation to be made is that the use of a conservative estimate for the available meat obtainable through exploitation of the Cervidae represented in the 1977 collection nevertheless indicates a strong emphasis on this group in the Eiden subsistence pattern: it accounts for nearly three quarters of the potentially utilizable meat. It is clear that, for all intents and purposes, the primary focus of Eiden subsistence strategies was upon intensive hunting of deer (and elk), combined with active fishing and a slight degree of trapping of small to moderately-sized fur-bearing mammals, especially raccoon and beaver. The two latter taxa account for 3.39% of the total available meat; altogether, smaller mammals constitute a total of 4.33% of the overall subsistence. In contrast, fish account for nearly a quarter of the total, with the major part of that quarter represented by only one species (A. grunniens, freshwater drum).

This puts the subsistence pattern into a much clearer focus than was possible through simple examination of minimum number counts. What the faunal assemblage suggests for the Eiden occupation is a pattern of strong emphasis upon large herbivores and easily obtainable freshwater fish. Incidental trapping of other mammalian species is indicated, but is clearly not of great importance, and may in fact represent fortuitous utilization of the meat of animals primarily exploited for their pelts. Indeed, even this latter economic purpose is of markedly little importance, suggesting that it represented little deliberate effort on the part of the Eiden people. The diet here indicated is a simple one, heavily weighted towards food resources which may well represent those easily prepared for storage purposes through techniques of smoking and rack-drying. We will discuss the implications of this pattern for reconstruction of the occupation pattern at Eiden shortly. At this juncture, however, a point should be raised about non-animal resources which seems especially pertinent.

Although at this point in time a thorough analysis of flotation samples taken during the 1977 season at Eiden has not been completed (that analysis is being conducted at the Cleveland Museum of Natural History), the excavations themselves made one thing quite clear: despite the late date (ca. 1490 A.D. -- McKenzie _et_ _alia_, 1973:84) suggested for the Eiden occupation, there is no evidence at all for agriculture -- no cultigen remains are found in the entire 1977 artifactual collection. McKenzie _et_ _al_. suggest that this places Eiden into the "Western Lake Erie Tradition" (1972:83-85), which exhibits just this sort of subsistence pattern of intensive hunting and fishing to the near or total exclusion of agriculture (83). It is not the purpose of this paper to develop that particular argument, but rather to provide a detailed examination of the faunal evidence available which may prove helpful in reaching conclusions as to that argument's merits. Clearly, the evidence seems to indicate support of such a conclusion, but at this point a definitive statement may not be warranted. The possibility that more extensive and more carefully controlled excavation of the Eiden site, such as is planned for the 1978 season, might yield floral remains indicative of at least some horticultural activities cannot be entirely ruled out. In the presence of this cautionary note, however, it nevertheless seems justifiable to dismiss (for the time being) the sort of "negative evidence argument" required, and to propose that one may reasonably predict, based upon the 1977 assemblage data and a knowledge of the general excavation strategies employed, the following: future excavation at Eiden is unlikely to indicate the presence of agriculture at all during the period of aboriginal occupation.(3)

This prediction is based not only upon the faunal assemblage here discussed, but upon interpretation of those data derived from analysis of that assemblage in terms of their seasonal implications for the occupation of the site. Although it has been pointed out above that the skeletal remains themselves could not be employed (by this author) for determination of site seasonality, other information indirectly indicative of this can be derived. First, we will discuss the general implications of the faunal evidence for reconstruction of the Eiden environment, and then proceed to examine some ways in which the pattern of subsistence exploitation of those fauna indicates seasonal occupation of that site.

The faunal assemblage indicated for Eiden is clearly that of a mixed-forest climax community, or of a biotic community exhibiting very similar characteristics (Williams 1936:43-44). Shane suggests that the Eiden region is "characterized by a diversity of floral communities and vegetation zones" (1972:33), and notes that at the period of earliest European settlement, the area was mostly mixed elm-ash swamp forest with extensive surrounding stands of mixed oak, mixed mesophytic and beech forest (33). That this essential pattern can be assumed for the period of the Eiden occupations will be demonstrated by discussion of the faunal collection. The general structure of that faunal community supports such a notion; some particular elements add emphasis.

First of all, as has been noted above, the presence of marten (*M. americana*) and fisher (*M. pennanti*) in the Eiden collection is of some interest, for their ranges no longer extend this far south, and both are characteristic of somewhat cooler climatic zones than currently affect the Eiden region. Both species are actively arboreal (Peterson 1966:253, 258), and the fisher in particular is described by Peterson as rarely prone to venturing out into large open areas (257). Both species actively prey upon smaller mammals, amphibians, insects, and have been known to scavenge carrion of larger animals (1966:253, 257). Of particular interest here are the species especially common in their diets: "mice, shrews, chipmunks, [and] rabbits" (253), and for fishers, "the carrion of deer, . . . raccoons, otter, and beaver" (257). The Eiden fauna clearly indicate an appropriate environment for these two species, suggesting (1) a somewhat cooler climate than now common and (2) strong presence of mixed forest communities, capable of supporting a wide variety of mammalian and other species. The total faunal assemblage tends to support this.

The presence of badger (Taxidea taxus) and skunk, among other species, requires a modification of the above conclusions, however. Both are species tending to prefer open grasslands/prairie habitats (Peterson 1966:265, 267), although the latter is fairly flexible in preference and is widely noted in "semi-open areas of mixed forests" (267). The presence of skunk and badger in the 1977 collection indicates that the site probably was relatively near such an open grassy area, and/or was in part itself an open point in a generally strongly forested area. However, Peterson notes that badgers may have entered certain regions "as a result of the clearing of land for agriculture" (265), and this, in conjunction with the deep-burrowing characteristic of this species, may be grounds for arguing that the badger remains are a late and intrusive addition to the Eiden faunal assemblage.

The presence of raccoon, least weasel (which prefers marshy areas and brush meadows (Peterson 1966:242)), river otter, and beaver are predictable from the Eiden environment, regardless of forest cover, for Eiden stands at the confluence of the Black River and French Creek, appropriate habitats for these species being inevitably present as a result. Similarly, the mixed forest community assumed above, in conjunction with areas of moist-to-swampy meadow, is the preferred habitat of meadow jumping mice (Zapus hudsonicus) (1966:182), meadow voles (Microtus pennsylvanicus) (1966:162), and of course a habitat in which the ubiquitous deer mice (Peromyscus maniculatus) (1966:143), shrews

(*Sorex cinerius*) (1966:36), and Eastern grey squirrels (*Sciurus cardinensus*) (1966:108) are at home. Although well-drained areas are preferred by chipmunks (*T. striatus*) (1966:123), moles (*S. aquaticus*) (1966:54), and other species, there are clearly areas up away from the water runs at Eiden which allow sufficient drainage for these taxa to be present -- as indeed they are.

Grey fox (*U. cineroargenteus*), sometimes called a "tree fox" because of its climbing abilities ("unique among the canids" -- Peterson 1966:217), prefers wooded areas, especially in or near "rocky-river gorges . . . associated with lakes or streams" (1966:217). Red fox (*V. vulpes*) appears in a wide range of habitats, although it tends to prefer wooded areas (1966:210); the same is true of cottontail rabbit (*S. floridanus*), which shows preference for woodlots and dense shrubbery (1966:97). Opossum (*D. marsupialis*) "is most common along wooded streams and around lakes and swamps" (1966:29). Finally, of course, the presence of deer (*O. virgianicus*) and wapiti (*C. canadensis*) indicates wooded areas with areas of open space rather than very dense closed forest, for both these species tend to prefer such habitats (1966:321, 324).

The mammalian taxa in the 1977 Eiden assemblage give a good general outline of the probable biotic community characteristic of that site region for the time of aboriginal occupation. Further evidence is available through analysis of gastropod remains in the assemblage, as has been suggested at a number of points above. Since these small species are very sensitive to environmental factors, they are an important part of our reconstructive efforts here. It has already been argued that those gastropods in the Eiden assemblage need not be interpreted as part of the subsistence pattern; their importance lies in our ability to determine additional environmental information from their presence in the proximal faunal community of the site.

The first point that should be made is that all of the species identified in the 1977 collection are still found in the southern Lake Erie region, which suggests that significant climatic change has probably not occurred since the deposition of those gastropods at Eiden. The presence of marten and fisher in the sample, therefore, may not necessarily provide a good argument for a much cooler climate during the aboriginal occupation of the site; their presently restricted ranges may be more closely related to deforestation and intensive human settlement in the more southern parts of their former territories.

The aquatic gastropods are slightly less revealing than the terrestrial forms, but nevertheless are of interest to this discussion. Three species are normally found in shallow, fairly quiet and "more or less swampy brooks and streams" (LaRoque, 1968:478): these are *Pleurocera acutum* (1968:416), *Amnicola pilsbryi* (1968:391), and *Fossaria parva sterkii* (1968:478). *Campeloma decisum*, on the other hand, is "generally more abundant in rapid current" (1968:374); this latter species would tend to suggest origin in either the Black River or the French Creek, but the former three would seem to suggest the presence of a less active run, or a standing body of shallow swampy water in the Eiden vicinity. Similarly, the two remaining aquatic forms suggest the presence of such a body of water: *Stagnicola reflexa* and *Stagnicola kirtlandia* are both found in "small pools or ponds, especially those that dry out in summer, in woods or fields" (1968:450, 448). These gastropods indicate that the somewhat marshy meadow areas indicated as the preferred habitats of several of the mammalian taxa (noted above) may have been a significant characteristic of the Eiden area, substantiating the projection for this time period of an open mixed forest with interspersed wet meadows.

A number of the terrestrial gastropod forms also suggest this sort of environment. *Discus macclintocki* is indicative of "rather wet situations"

(LaRoque 1970:677) in a general context of a humid forest community; *Mesodon pennsylvanicus* is normally found in "wet pasture" areas of wooded stands, with nearby streams (1970:581). In fact, the underlying common characteristic of the habitats for all noted terrestrial gastropod taxa in the Eiden assemblage is mild to moderate dampness. *Vallonia excentrica* is common to "damp protected places" (1970:759); *Stenotrema leaii*, to damp areas near bodies of water (1970:568); *Allogona profunda* is found in mostly damp wooded areas (1970:605). *Discus patulus* (683), *Guppya sterkii* (612), and *Stenotrema fraternum* (570) are all characteristic of "damp woodlands, especially those of deciduous trees" (cf. 1970:683). The latter taxon, along with *Triodopsis tridentata* (1970:588) and *Anguispira alternata* (672) are favored foods of shrews, noted above as part of the observed proximal mammalian community for Eiden. *T. tridentata* and *A. alternata* are both found near the edges of open areas of deciduous forests (570, 671), common habitats for shrews (see above). A common companion species of the latter form is *Ventridens ligera* (1970:651), which tends to inhabit fallen logs in areas of open, damp woodlands (649). Finally, *Anguispira kochi* tends to prefer damp "bushy and forested slopes and creek bottoms," and the rotting ground cover of climax community forests (1970:674).

The gastropods in our assemblage overwhelmingly indicate that the Eiden environment during aboriginal occupation was damp, even swampy, with areas of standing mixed deciduous forest alternating with more open sections. The picture that emerges of the Eiden habitat before European settlement -- during the aboriginal occupation of the region -- is therefore one of an extensive mixed forest community, with areas of open grassy meadow prone to marshiness during much of the year, and inhabited by a wide variety of animals exploiting the floral and faunal resources of that environment. The human inhabitants of the site region concentrated their attentions upon a rather limited part of the faunal range -- notably on Cervidae and freshwater fish. This emphasis itself has some implications indicative of the seasons represented by human occupations, as we shall see.

Bruce D. Smith, in his discussion of the exploitation patterns of Middle Missisippi groups (1974), points out that the general orientations indicated by those patterns of emphasis are valuable data "on which to base hypotheses concerning seasonality of exploitation" (281), and although the region he examines is different from that of the Eiden site, his discussion has applicability to our own. In particular, he suggests that a high degree of concentration upon the utilization of white-tailed deer, in conjunction with significant quantities of raccoon and turkey, strongly indicates site occupations during the late fall and winter seasons (284-285), and high concentrations of fish indicate alternation of the former pattern with a spring/summer exploitation of the same areas (285). Except for the apparent "absence" of turkey from the Eiden faunal assemblage, what is clearly in evidence for this site is the kind of faunal exploitation pattern Smith outlines for Middle Mississippian populations.

Smith points out that many of the smaller mammalian species found in the same habitats as deer, raccoon and turkey "are distributed more evenly over the landscape during the fall and winter . . . and are less susceptible to exploitation" (289) than the former three taxa. All three of these congregate into smaller areas of their annual range during the cold seasons (289), with a resultant significant rise in population density at these times. As he notes, this kind of behavior allows for a high yield of utilization for a relatively low degree of effort during the fall/winter period (289). The Eiden faunal assemblage, particularly of mammalian species, strongly suggests, therefore, occupation of the site during the winter months. Although Smith's argument that high concentrations of fish indicate spring and summer exploitation is based upon the behavior of those species common to the Mississippi (281), the greater availability and ease of collection of all freshwater fish during their spawning seasons and during summer low-water phases would hold for the Eiden region as well (see Smith 1974:281-282).

The 1977 faunal collection from Eiden, with its high concentration of Cervidae, a fairly large presence of raccoon, and limited numbers of those species which den and/or disperse during winter, clearly indicates winter occupation of the site. If Smith's model can be applied to our analysis, the same model permits interpretation of the high levels of fish remains as indicative of occupation during the warmer seasons as well. It seems therefore that the Eiden site was occupied year-round, by a population which alternated subsistence emphasis seasonally according to the relative abundance of particular selectively exploited food resources. Data now available do not permit informed speculation about the extent of utilization of wild plant materials, although future investigations may provide more information, particularly if utilization of acorns -- the primary winter diet of deer, raccoon and turkey (Smith 1974:281) -- was practiced by the human inhabitants (see Smith 1974:281-282). No agricultural activity is in evidence, and I suggest that future archeological investigation at Eiden will not produce any such evidence.

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These observations conclude this discussion of the analysis of the faunal assemblage collected from the Eiden site during excavations in 1977. Part II of this paper will discuss, somewhat less extensively, the human osteological remains recovered during that season of investigation, with an eye to INDICATIONS IN THOSE REMAINS OF NUTRITION-RELATED DISORDERS.

# Part Two: Eiden Burials

During the 1977 summer season of excavations at Eiden, no less than fifteen burials were discovered, thirteen of which were ultimately excavated and submitted for laboratory analysis. That analysis was undertaken by Dr. John W. Lallo of Cleveland State University, and the results of Dr. Lallo's work are noted in the 1978 Eiden site report (Brose and Bier, 1978). During January of 1978 I was able to examine those skeletal remains, in the physical anthropology labs at CSU, due to Don Bier's intercession and Dr. Lallo's kind permission. The experience proved to be a valuable exposure to the pleasures and frustrations of archeological osteology, and much of the information to be discussed in this section is the result of that work. This discussion will outline the methods employed in that analysis, present information and data derived thereby and compare those data with those presented by Blank (1972) for the Bungart burial collection, and address some of the implications of the skeletal materials for interpretation of the Eiden site as a whole. Attention to the interpretation of observable pathologies in those materials will provide a somewhat tenuous bridge between this research focus and that of part I (faunal analysis of the 1977 Eiden collection).

That the 1977 excavations should have uncovered any burials at all was a matter of no little astonishment, and this astonishment was only heightened by the proveniences of the burials in question. It had been assumed that (1) Bungart's explorations of Eiden had resulted in the removal of all burials from the site and (2) the southeastern area of the site was totally disturbed by those explrations, with little (if any) of the cultural materials of that area remaining <u>in situ</u>. These assumptions were based upon reconstructions, from his field notes, of the extent of Bungart's investigations (McKenzie <u>et</u>

al.,1972:4-7). Those reconstructions cannot be faulted, for the original field notes -- especially the earlier set (ca. 1955-1958; McKenzie, et al., 1972:1) -- employ a somewhat unrefined reporting technique (1972:4); the source of error may perhaps be attributable to a misunderstanding of the points of reference employed by Bungart in his reports. In any case, not only did the excavations of 1977 clearly indicate that Bungart's investigations did not extend as far to the west (along the southern edge of the site, parallel to the bluff above French Creek) as had been assumed, but that he did not excavate certain areas as intensively as his notes seemed to indicate.

It became possible, during the 1977 excavations, to identify areas of soil admixture indicative of disturbance; comparison of these pits across the site (especially along the southern margin) led to the conclusion that a characteristic pattern of topsoil/gravel interfingering in such areas was indicative of excavation by Bungart. Such areas are in evidence in the southern stratigraphic profile of unit N505/E507 (3 by 4 meters), and in the walls of Backhoe Trench #1 and Trench #3. They suggest that some exploration to the west did take place, but also seem to indicate that it was of a limited nature, neither intensive nor extensive. It is interesting to note, for instance, that the "Bungart pit" noted in N505/E507 (3 x 4 m.) just narrowly missed including burials 1977-9, -13, and -14, and that areas of disturbance were noted in the western walls of Backhoe Trench #3 in close proximity to burial 1977-12 (see Eiden 1977 field notes: stratigraphic records). In both instances, had Bungart actually dug where his notes report, he could not have missed these burials; the fact that they remained in situ is a clear indication that he did miss them. In fact, the 1977 season of excavations has led to the almost inescapable conclusion that significant areas of the Eiden site remain undisturbed, and the projected 1978 season will derive its impetus and direction from that conclusion.

Despite the interpretive problems here noted, the Bungart notes and burial collection continue to be a rich source of information on the Eiden population. Although the considerations noted above require dismissing (unfortunately) any specific proveniences for the Bungart burials which are derived from his field notes, general analysis of the collection, and of such items as burial types, orientations, and associations, can still be of use here. We will discuss the characteristics of that collection, and make some comparisons between these and those of the burials located in the course of the 1977 dig.

Bungart's notes indicate the presence (and removal) of 234 burials in the area investigated (McKenzie, et al., 1972:50); the present collection, however, consists of only 122 individuals in a good state of preservation (Blank 1972:55), and many of the latter are coated with varnish (1972:55) -- a fact which will complicate comparison of this assemblage with that of 1977 (see below). Of these remaining specimens, 101 could be assigned to categories of skeletal age (1972:61), and 80 could be identified as to sex (1972:62). The methods employed for both these types of analysis are outlined in Blank's discussion (1972:56-62). Table VI bellow presents the data derived by Blank for gross demography of the Bungart collection, and the female/male percentages identified.

Table VI: Gross Demography of Eiden Population: Bungart Collection (From Blank, 1972:61 -- Tables 10-1 and 10-2)

| Age Class | # | % | Cum. % |
|---|---|---|---|
| Fetal | 2 | 1.980% | 1.980% |
| Infant (0 - 2 yrs) | 8 | 7.920 | 9.900 |
| Early Childhood (2 - 6 yrs) | 6 | 5.941 | 15.841 |
| Late Childhood (6 - 12 yrs) | 5 | 4.951 | 20.792 |
| Young Adult (12 - 20 yrs) | 10 | 9.901 | 30.693 |
| Adult: | | | |
| 20 - 25 years | 1 | 0.990 | 31.683 |
| 25 - 30 | 29 | 28.731 | 60.396 |
| 30 - 35 | 18 | 17.822 | 78.218 |
| 35 - 40 | 7 | 6.931 | 85.149 |
| 40 - 45 | 5 | 4.950 | 90.099 |
| Over 45 years | 10 | 9.901 | 100.00 |
| Total = | 101 | | |

43 Females (53.75%)
37 Males (46.25%)

Total = 80

Although the population curve represented by this age distribution is not a smooth one, and the 20 - 25 year old mortality is surprisingly low, in most respects it represents a population much as one would expect: a fairly high child mortality rate, a mortality peak during the child-bearing years (although Blank's analysis seems to indicate that the female/male mortality ratio from age 25 - 35 is nearly even: 1972:62); the sex ratio is also normal. It is unfortunate that so much of the information available from Eiden should have been lost with the 202 burials that have "dropped out" of the sample; the population curve might very well be significantly biased towards a "normal" appearance by their absence. Of course, it is equally likely that inclusion of these materials into analysis might have smoothed out the curve. It will be shown below that inclusion of the 1977 burials has no notable effect upon this population curve.

Analysis of Bungart's field notes led to a number of conclusions about typical burial patterns for the Eiden population. A typical burial was a primary extended interment, with the body oriented east-to-west, head to the east; a very few interments were secondary burials, primarily bundles (1972:50). Only three of the latter type were noted, all of which were in multiple burials (50).

> Multiple interments in one burial pit seem rare. . . . We note perhaps seven cases of double burial and one of triple burial. Three of the double burials included an adult and a young child (1972:50).

> The burial pattern of the culture occupying the Eiden site is characterized by primary, extended interments oriented in an easterly direction in shallow pits. Occasionally, grave goods were placed with the dead, but they are neither frequent nor elaborate (1972:52).

Of the original burial population noted in Bungart's field notes, only some 64 (of 234) had some sort of artifactual association (1972:51), 34 of these being individuals decorated with shell beads, pendants, and/or bone beads around the neck, wrists, or ankles (51). This latter point -- a relative lack of grave goods for site burials -- is of interest in as much as the only apparent grave goods associated with any of the 1977 burials is a bracelet of Stagnicola kirtlandia (see above, Part I) around the right wrist of burial 1977-9 (see below); the two samples are consistent with one another in this respect. A detailed examination of the burial pattern in evidence for the 1977 burials will underscore some of the points made here, as we will see.

Although McKenzie et al. (in their summary of the information available through Bungart's notes) note that burial depths "range from surface to 4.0 feet" = 0 to 1.219 meters, mean = .625 m.), they provide no information about depth clusters (perhaps indicating that they do not exist) which might be helpful for discussing burial episodes. Since their conclusions from analysis of the total range of artifacts and osteological remains is that "the Eiden site is basically single-component" (1972:81), it may be reasonable to assume that they found no indications in the Bungart field notes of any distributions of interments suggestive of temporal separation. Luckily, however, they have provided in the site report the depths of all Series II burials (Bungart notes, 1959 - 1964: McKenzie, et al., 1972:Appendix I) and a schematic map of those burials which indicates burial types and orientations (1972:110-111). Rather than undertake a full reconstruction of the burial patterns of the Bungart collection, I have chosen to employ part of the information available, to identify "surface" burials in that collection. The reasoning behind this decision will become clear as discussion of the 1977 burials progresses.

Since the map provided is a schematic one, and the authors caution that it may not be completely accurate (1972:109) -- a caution only underscored by the problem, noted above, of the interpretation of the notes from which burial proveniences were drawn (i.e., Bungart's field notes) -- it is impossible to argue strongly that spatial clusters which seem to exist are more than just artifacts of either excavation bias or reconstruction error (the former is a rather tempting hypothesis, given the bias that seems evident in the faunal assemblage; see Part I). This is unfortunate, for such information could be quite helpful in interpretation of the 1977 burials and their spatial distribution. It may be possible, with the controlled results of future Eiden excavations and the stratigraphic information available from the 1977 season, to more accurately "locate" the Series II burials, making the derivation of such data possible (and ultimately more useful). Retrieval of these data can only enhance interpretation of the Eiden site, both as a coherent whole itself and in terms of its relationships to other cites (cf. Blank's comparisons with the Libben burial population, 1972:56): it would be a shame if that information were not made available.

Having outlined some of the characteristics of the Bungart burial collection, this discussion will now turn to the human remains discovered at Eiden during the 1977 season of excavations. The more general characteristics of that assemblage will be noted first, and compared with those of the earlier sample. The course and methods employed by this author in laboratory analysis will then be outlined, and data derived from that analysis, along with that presnted by Lallo (1978:61-79), will be examined. Final remarks will be directed towards the interpretation of skeletal pathologies observed, in so far as they are indicative of nutritional status and/or stress for the Eiden population.

The first burial encountered during the 1977 excavations at Eiden was noted on July 8, in a pit at the northern margin of N505/E508, .60 meters below the surface. This discovery set the pattern for burial excavation during that season, as the general procedure for recovery of identified burials resulted in expansion of the "parent unit" in which the interment was located. By excavation of successive units in this way, the N505/E507 (3 x 4 meters) superunit (see Appendix III) was created, and it was in this unit that eleven of the fifteen burials identified during the 1977 excavations were discovered. The proveniences of those burials are noted on the "map" of this superunit which is included in Appendix III; as can be seen from that drawing, the two burials left <u>in situ</u> (1977-7 and "1977-15") are included in this group. The reasons why both were left unexcavated include their proveniences: removal of 1977-7 would have involved expansion of the superunit northward by another meter, and to a .60 meter depth, a matter of considerable time and effort that, it was generally felt, could best be directed to more pressing problems of site testing (and, as it later became clear, an undertaking likely to generate yet another burial discovery). 1977-15 was discovered on nearly the last day of the season, when the corner walls of N507/E507 were being trowelled down for the purpose of clarifying mapping of their stratigraphy. Since extension of the season was impossible at that point in time -- and since 1977-15 was found at a point some .45 meters below the surface, with only the top of the frontal bone exposed in the unit corner -- this burial was also left in place. Seven fragments from 1977-7 were available for analysis (as a result of a trowel "test" of the burial pit), mostly mandibular and malar fragments; these have been noted on inventory sheets (see Appendix IV). The only conclusion these fragments allow about the nature of the burial #1977-7 is that an adult is indicated; age and sex could not, of course, be determined. 1977-7 will therefore (unless otherwise indicated below) be excluded from all tables of this discussion (4). No part of 1977-15 was disturbed, so that burial too has been excluded, for the most part, from this discussion.

Burials were numbered consecutively in order of their discovery, rather than by their associations with one another. As a consequence, burials #1977-10 through 1977-12 received number designations before 1977-13 and -14, although these latter two occur in the same grave as 1977-9; they were not identified until excavation was undertaken to remove the latter burial, the skull of which was revealed in the stratigraphic profile of the west wall of N505/E508. The reader who finds this confusing will perhaps also be disheartened by the following observations: field notes and burial forms for burials #1977-8, -10, and -11 are missing from the 1977 field records, either because they were lost or because they were never actually filled out during excavation. Since the proveniences for all three are noted on the (provisional) map for the site (a copy of which is available for examination in the Oberlin College Anthropology Lab, King 320), I must assume that those notes have been misplaced somewhere along the line, and trust that they will eventually be relocated. As a consequence of their loss, however, these three burials can provide no information as to interment depth, type, or orientation.

There is another loss, which is of a somewhat more serious nature. In the field notes and notes on the burial drawing form for 1977-12, the presence of an infant burial is also noted: "Infant cranial fragments and long bone mixed in -- under 3 mo." (see burial notes, burial drawing, 1977-12 (at asterisk): Appendix III). These bones are <u>not</u> in the 1977 Eiden human assemblage, and can only have been lost during the collection process (which seems unlikely) or during the transportation and/or preparation of the skeletal remains. Given the fragmentary nature of these small specimens, it is possible that they may have been overlooked, and the possibility that they were incorporated into another infant burial (1977-4, 1977-6, or 1977-13) cannot be ruled out entirely (although 1977-4 perhaps can be, as no cranial fragments are noted for that burial either by John Lallo (1978:68) or by myself (see inventory sheets in Appendix IV)). In either case, either the notes are in error or an individual from the 1977 burial assemblage has been lost -- and with it, some potentially fascinating information. Further observations on the possible implications of these losses will be included in the discussions below.

Despite the limitations posed by the problems noted above, there are a number of points which can be made through the use of the information which is available. Depths are recorded for twelve of the burials identified; interment types can be identified for most, and orientation of burial for at least ten. All the burials except the two unexcavated could be aged, and all of the latter, with the exception of the three infant burials (1977-4, -6, and -13), could be sexed. The results of these analyses will now be presented and discussed below.

Depths recorded for the 1977 series of burials were taken from the ground surface to the top of the skull. For the multiple burial which includes 1977-9, 1977-13 and 1977-14, two depths have been recorded; apparently the placement of the burials into the grave was somewhat deeper for burial 1977-9 than for 1977-14. Both figures have been employed in the calculations below. Since no depth recordings can be found for burials 1977-8, -10, and -11, these have been excluded from Table VII. The burials and depths are noted in order of increasing distance from the surface, and the mode and mean depths have been noted. (The two values given for the multiple burial, as noted, have been averaged for the purpose of calculating mean depth.)

Table VII: Depths of Burials Located During 1977 Excavations at Eiden

| Depth | Burial # |
|---|---|
| .25 meters | 1977-5, 1977-6 |
| .45 m. | 1977-15 |
| .47 - .52 m. | 1977-9, 1977-13, 1977-14 |
| .60 m. | 1977-1, 1977-2; 1977-3, 1977-4; 1977-7 |
| .67 m. | 1977-12 |
| Mode = .60 meters | Mean = .5178 meters |

The first thing notable in comparison of these figures with those (noted above) for the Bungart Series II burials is the clearly evident vertical "compression" of the surface-to-burial range in the 1977 assemblage: all the latter occur within 70 centimeters of ground surface, with the mode at .60 meters, and eight of the twelve clustering between .47 m. and .60 m. For the Bungart collection, as has been noted above, the range vertically is almost twice this (1.211 meters), with a mean depth value of .625 meters. Given that the 1977 burials represent only a small subsample of the Eiden population total, this difference is perhaps irrelevant; nevertheless, there are some factors involved in the 1977 excavations that may account for the discrepancies noted here.

One factor is that the excavations in 1977, with the exception of the backhoe trenches, reached depths of only about -.80 meter throughout most of the area excavated. Since some 30 individuals in the Bungart Series II collection are distributed at depths exceeding -.90 meters (see McKenzie, et al., 1972:Appendix I) -- the deepest, #79 and #197, are at -1.22 m. -- the 1977 burials lie only in the upper ranges of the total depths distributions. It is therefore of some interest that the mean values of the two samples are only about 11 centimeters apart (.625 m. to .5178 m.), as this implies either that the extremes of the Bungart distributions tend to cancel out one another, or that the central tendency of that distribution is so strong as to weaken the effect of the extremes.

The Bungart sample shows significant clustering at four depth levels: -.46 meters (30 individuals), -.61 meters (19), -.76 meters (31), and -.91 meters (22). There is a somewhat smaller cluster of "surface" burials, comprised of 12 individuals, at depths from -.30 to -.35 meters below ground surface. The 1977 burials cluster around these modal points as well: two "surface" burials at -.25 meters; four burials in the .45 - .52 meter range; five clustered at -.60 meters below ground surface. In other words, with the exception of 1977-12 (which is itself only .07 meters "too low"), all the burials from the 1977 excavations can be shown to cluster at the same points, vertically, as the upper burials of Series II.

A factor that should be taken into consideration here (although it seems to have little overall effect upon the situation as a whole) is that of surface disturbance, particularly during the "post-Bungart" period, at this site. Mr. John Thompson, whose property is coterminous with the Eiden lands (now owned by the Lorain County Metropolitan Park District), and who permitted excavation on his own land (by Mr. Bungart), informed us that he himself helped grade back the areas that were excavated, with the use of power equipment. He has stated that the grading may have extended to the west of the N505/E507 superunit (Thompson 1977: personal communication). It would be difficult to argue much overall significance for this factor, although the slight "decreases" in surface-to-burial depths from the Series II distribution to the 1977 materials may reflect removal of some small amount of overburden from the "plow zone." It seems more pertinent that the observable differences fall within the distribution ranges of the population as a whole.

More important, perhaps, for the interpretation of the burial distributions (of the 1977 burials in particular) is the possibility that the modal clusters we have noted above represent burial episodes separated both spatially and temporally. Although the spacing of these clusters is consistent, at intervals of approximately 15 centimeters -- perhaps indicative of simplified recordings of burial depths on Bungart's part? -- the 1977 materials seem to suggest that the separation of "surface" burials from those clustering around a depth of approximately -.47 meters (and lower) may actually reflect different temporal sequences (see Brose and Bier, 1978:10). Since such an assumption may prove important in an argument against the "single-component" hypothesis presented by McKenzie et al. (1972:81), as has been suggested by Brose and Bier (10), it is of some interest to this discussion to note distinguishing characteristics of those two clusters which may be points of differentiation.

In the Bungart burial Series II, twelve burials occur between -.30 meters and -.35 meters in depth. Five of these are noted on the schematic map provided by McKenzie et al. (1972:Appendix II) as "disturbed" burials, consisting of skulls only; two are noted as consisting of "human bone fragments" (1972:110). Of the remaining five, two are burials of children, for whom the burial types (i.e., extended, flexed, etc.) are not recorded; the last three are all extended adult burials, but unfortunately are not included among those for whom either age or sex could be determined (Blank 1972:65; also McKenzie et al. 1972:Appendix I). This suggests that the state of preservation of these burials was not particularly good, although it is possible that post-excavation deterioration had more to do with this than did poor preservation in situ. Briefly, the most significant common factor of all twelve burials seems to be the relatively limited usefulness of the material for analysis. Damage due to plow disturbance and leaching in the upper zone of soil may explain the seven fragmentary/"disturbed" burials; since no information is presented on the relative state of preservation of the other materials, no sweeping generalizations can be made on that score. It is of some interest that two of the extended adult burials, #132 and #147, are noted as being of unusual orientations (see map, McKenzie et al. 1972:after 110) with respect to the typical east-west orientation for the site (see above): B-132 is oriented from southeast (skull) to northwest, and B-147 is oriented north-south (skull to the north). The map also seems to indicate orientations for the child burials (indicative perhaps of extension?): B-61 is on the same sort of southeast-to-northwest (skull to south) angle as B-132; and B-74, like B-147, is oriented true north-south, with the skull to the north. The remaining adult burial, however, is noted as being oriented in the typical pattern of east-west orientation with the skull to the east.

The two burials of the 1977 collection which are "surface" interments (at a depth of .25 meters) are 1977-5 and 1977-6, which occur together in one grave (see Appendix III, map of N505/E507 superunit, and burial drawing). The orientations of these two burials are on an east-west axis, but the skulls of both are to the west. 1977-6 is an infant burial, lying on its right side and facing south; 1977-5 is an adult female (see discussion below). It was difficult to determine, during the uncovering of these burials, whether 1977-5 represented a secondary, bundle burial or a flexed burial (presumably primary). Arguments that the extremely fragmentary nature of the burial was due to plow and/or leaching damage (most likely the former) and that the general orientation of skeletal elements suggested flexion, were considered; the fact that the burial association was of a young adult female (see below) with an infant suggested that "simultaneous" death of a mother and infant pair might be indicated. On the other hand, the skull of the adult burial (1977-5) seems to have been disarticulated from the cervical vertebrae, and the overall fragmentary nature of the burial can be interpreted as antemortem disarticulation (bundling) rather than postmortem damage. The deaths of these two individuals, whether they were related to one another or not, may have been temporally separate enough to allow for secondary burial treatment of the adult's skeleton by the time of the child's death. In either case, 1977-5 and 1977-6 are "surface" burials with orientations anomalous with respect to the typical pattern noted for Eiden. When they are compared with the other "surface" burials, we can note the following correspondences.

Of the twelve Series II "surface" burials, seven are fragmentary and/or "disturbed" burials, consisting of (at most) skull remains; 1977-5 is a fragmentary and/or disturbed burial, represented by cranial, vertebral, long-bone and rib fragments (see Appendix IV, inventory sheets). Of the five Series II burials for which orientations can be suggested, four are anomalous with respect to the typical Eiden pattern of east-west, skull-to-the-east burials; both 1977-5 and 1977-6 are also anomalous with respect to that pattern. Two of the Series II burials, and 1977-6, are children (this is not, perhaps, very surprising). The three adults in the Series II "surface" sample are all noted as extended burials, however, where 1977-5 is either a primary, flexed burial or a secondary, bundle burial. Aside from this last point, the correspondences between these two small subgroups of the total Eiden population seem marked.

These points, in combination with the vertical separation of these "surface" burials from the next underlying burial clusters (a separation which is more pronounced for the 1977 sample -- 20+ centimeters -- than for the Series II Bungart burials, where the distance ranges from 16 to 11 centimeters), may well indicate that the "surface" burials represent a later time period, with a totally different burial pattern. What that pattern seems to be becomes most clear if the burials which are noted as "framgentary" and/or "disturbed" (including 1977-5) are interpreted as secondary, probably bundled interments; if the surface burials are plotted schematically, they look like this:

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Figure II-1: Schematic Representation of Eiden "Surface" Burials (Depths: -.25 to -.35 Meters)

P = primary interment　　C = child
S = secondary interment　　A = adult
U = unusual (atypical) orientation

| | | | |
|---|---|---|---|
| (P,U,C) | (P,U,A) | (S,U,A) | (S,A) |
| (P,U,C) | (P,U,A) | (S,A) | (S,A) |
| (P,U,C) | (P,A) | (S,A) | (S,A) |
| | | (S,A) | (S,A) |

What this seems to suggest is a burial pattern of primary interments, usually extended (see discussion above) of both adults and children, with subsequent exhumation and bundling of at least the adults, and re-interment. This interpretation, of course, assumes a temporal sequence for which there is no archeological evidence; the strictest interpretation could only say that these burials are predominantly secondary and of atypical orientations.

The 1977 burials which cluster at the next lower modal point (-.46 meters), and at the third (approximately -.61 meters -- see above), comprise three quarters of that subsample. If 1977-12 is included into the latter range (it deviates by only .07 meters, which is the same range width as that of the highest and lowest figures for the second cluster: 1977-15 at -.45 meters, to 1977-9 at -.52 meters; see above), then half of the burials noted during the 1977 excavations occur at this level. Given the limited extent vertically of the 1977 investigations, it is impossible to draw any conclusions about the likely distribution of as-yet-undiscovered, deeper burials, but the correspondences of this small subsample to the depth patterns of the overall population (1977 plus Bungart Series II burials) suggests that burials are likely to be located at points approximately 15 and 30 centimeters (respectively) below those discovered in 1977. Given what is known about the stratigraphic sequence of the N505/E507 superunit, in particular (the reader is referred to Ms. Shapiro's discussion of the stratigraphic profile of the Eiden site), this means that burials can be predicted within the yellowish lacustrine gravels which underlie the site. It has been suggested (Shapiro, personal communication) that areas of intrusion into that substratum may represent Archaic occupations of the Eiden site; there seems, at least, to be a temporal separation between such intrusive features and those of distinct overlying strata (Brose and Bier 1978:10, 15, and Appendix II).

It seems, therefore, that the depth distributions represent at least two and possibly three distinct occupational episodes at the Eiden site. There are obvious limitations upon any conclusive statements that can be made here: it must be emphasized that the analysis here presented of the Bungart Series II burial distributions is, at best, tertiary; in addition, the 1977 burial sample is quite small, and apparently limited to the upper ranges of the total depth distributions. Extensive excavations, such as those planned for the 1978 season, should help clarify and test these interpretations.

The non-surface burials of the 1977 sample were also examined for burial type, position, and orientation. As has been noted above, burials 1977-8, 1977-10, and 1977-11 cannot be identified in these terms because of loss of the appropriate records; it is possible that the extremely fragmentary natures of all three burials, and especially of #8 and #11, are indicative of secondary, bundle interments (see inventory sheets, Appendix IV). All three are adult burials (see below). Burial #1977-7, since it was not excavated, also cannot be described in these terms. Although 1977-15 was not excavated, and burial type and position cannot therefore be determined, the burial was identified by the appearance of the cranium in the northwest corner of unit N505/E507 (see map, Appendix III, of N505/E507 superunit); its position allows us to assume a burial orientation basically on an east-west axis, with the skull facing south.

Two of the burials of this group are identifiably secondary, bundle burials. From the burial drawing (see Appendix III), it appears that 1977-12 is oriented basically on a north-south axis; the only cranial material present in that burial, however, is a fragment of the right malar (see inventory sheets, Appendix IV), and it is clearly impossible to determine the placement of the skull (assuming, of course, that a skull <u>was</u> interred with this burial, and was lost to the ever-efficient backhoe which located it). 1977-14, the other identified bundle, was oriented east-west, with the skull slightly to the east of center (see burial drawing, Appendix III) and facing north. It should be noted that both of these bundle burials -- like the probable bundle, 1977-5 -- occur as parts of multiple burials: 1977-12, as we have noted above, with a (lost) infant burial described in the notes of its drawing (R. P. Mensforth: see Appendix III); and 1977-14 with 1977-9 (a flexed adult) and 1977-13 (a semi-flexed infant). This latter multiple burial will be discussed somewhat more extensively below.

The remaining burials of the 1977 sample are 1977-1 through 1977-4, 1977-9 and 1977-13. These occur in three graves: the latter two (as has been noted) with 1977-14; 1977-1 and 1977-2 in one grave, and 1977-3 and -4 in a third grave, intrusive into that of 1977-1 and -2 (see Appendix III, map of superunit and burial drawings).

Burial orientation cannot be determined for 1977-4, due both to the extremely fragmentary nature of the burial and to the apparent absence of cranial materials. 1977-4 has been identified as an infant of between zero and three months of age (see discussion of aging methods, below), and because of its association with a young adult female (see below) -- 1977-3 -- may represent a death occurring at birth, or immediately postparturition (McKenzie _et al_. Note a similar case in the Bungart collection -- 1972:50). Despite the fragmentary nature of the burial, the individual burial form completed in the field (on file, Oberlin College Anthropology Lab) indicates a supine, semiflexed position (see also Lallo 1978:63).

Burials 1977-1 through -3, 1977-9, and 1977-13 are all oriented on an east-west axis, with their skulls to the east. 1977-3 has a slight southeast angle, but it is not pronounced. 1977-1 and 1977-2 together represent a single burial event; the former is in a supine, extended position, and the latter is flexed, lying on the right side. Both individuals face south (see burial drawing, appendix III). The grave pit which includes burials 1977-3 and -4 is intrusive into that of 1977-1 and -2, and the lower legbones of both of the latter individuals were broken off and displaced by that intrusion. Fragments of those bones were found in the second grave pit, to the north of the skull of 1977-3 (see burial drawing). There is no question that the interments of 1977-1 and 1977-2 represent a single burial event (rather than two separate interments in close proximity), for the right arm of the former individual was draped over the latter's knees, and the two crania lie in contact with one another.

1977-3 is an extended, supine burial, facing north; as noted above, it lies on a slight southeast angle with respect to burials 1977-1 and -2. The infant burial 1977-4 was found in the region of the lower right arm and hip of 1977-3 (see above). The feet of the latter are rather oddly positioned, being flexed into curves with the toes pointing towards one another (see burial drawing, Appendix III). No pathological indications have been noted for the bones of the feet of this burial (inventory sheets, Appendix IV), which suggests that this flexion is not representative of any antemortem deformity; it is perhaps likely that the feet were bent so as to fit the body into its burial pit, but the obvious objection to such an interpretation is that flexing the entire body, rather than only the feet, would more efficiently alleviate the problem of a too-small grave. There is no available evidence for the Bungart Series II burials which would suggest other instances of such foot-flexing.

The remaining two burials for which interment type and orientation can be determined are 1977-9 and 1977-13. As has been noted above, these two individuals occur in a common grave with the bundle burial 1977-14; like the latter, they lie on an east-west axis. The skulls of both are to the east, and both are semiflexed burials -- the knees are bent, and the heels brought up towards the pelvis, but the strong "fetal-position" flexion of, say, 1977-2 is not present. 1977-3 is an infant burial, of about 0-- 6 months in age (see aging methods, below), and was found held in the arms of 1977-9 against the latter's chest. The hands of 1977-9 were curved around the cranium of the infant, and around its right wrist were found 20 specimens of the aquatic gastropod <u>Stagnicola kirtlandia</u>, apparently composing a bracelet (see comments above on the scarcity of burial goods for the 1977 sample). Burial 1977-9 faces south, lying on the left side; 1977-13 lies on its right side, with the skull facing northeast (see burial drawing, Appendix III).

A number of generalizations can be made about the 1977 burials in terms of burial patterns. Perhaps the most interesting and most immediately obvious point is on the proliferation of multiple burials in the sample. Of the thirteen burials <u>excavated</u>, only three (1977-8, -10, and -11) are <u>not</u> noted as being parts of multiple burials -- and given that all three of these were located by the backhoe during trenching, and are all extremely fragmentary (see inventory sheets, Appendix IV), it is possible that only parts of each burial have actually been removed from the site. Further investigation in the pertinent areas, during the upcoming season, would clarify the situation here.

In any case, the 1977 burials deviate strongly from observations made by McKenzie et alia of the Bungart Series II burials (as quoted above on page 48; 1972:50) on the subject of multiple burials; far from being rare, they are the norm for this sample. It is noted that three out of seven of the double burials in the Bungart collection include an adult and a child (1972:50); this is an association found in all of the 1977 multiple burials. I was able to identify five of these multiple burials through the use of the data presented by McKenzie et alia (1972:Appendix I -- B-7, -27, -55, -217, and -279). B-7 is noted at .40 meters below ground surface, B-217 and -279 are at -.76 meters, and B-27 and -55 at -.91 meters; wide horizontal separations, however, argue against any systematic relationships between them. Further investigations may clarify the situation somewhat, but for the time being it seems that the 1977 burial sample as a whole is somewhat anomalous with respect to the general burial pattern of the Eiden site.

Having outlined here those aspects of the Eiden burial population(s) most directly accessible through simple visual inspection, the discussion will now turn to the methods employed in laboratory analysis of the 1977 burials, and then concentrate more upon interpretation and synthesis of those data derived through lab work than upon the data themselves: since Dr. Lallo's findings are available in the 1977 site report for Eiden (Brose and Bier, 1978:61-79), and Appendix IV of this paper contains all the written information of my own analysis, inclusion of that information in the body of this paper seems unnecessary, and indeed, rather pointless. Where pertinent, the reader will be directed to either (or both) of these sources.

Analysis of each burial began with a simple inventory of those skeletal elements present, so that the relative completeness of each could be ascertained. All skeletal elements were sorted, identified, and sided with the use of Bass's <u>Human Osteology</u> (1971), and with reference to articulated modern skeletons and articulated functional "systems" (such as an articulated hand, foot, pelvis, etc.) available in the Cleveland State University anthropology labs. They were inventoried on analysis sheets which I designed from models provided by Dr. John Lallo; sample sheets are included in Appendix I. Burials were laid out for inventory and analysis in an extended supine position, both as a visual aid to analysis and to facilitate the identification of absent and/or supernumerary elements; since on at least two occasions bones were found to be mislabeled -- "1977-5," for example, was found on <u>two</u> first cervical vertebrae (atlas) -- this method was a particularly useful means of avoiding errors. Fragmented elements which proved impossible to identify through reference to the materials above were either identified by Dr. Lallo or with the help of Michael Vincent DeSanti, to whom I am gratefully indebted: Vince graciously gave of his time and experience on more than one occasion, although he was busy himself with other work.

Some reconstructive work was done on the burials, especially on longbones and cranial material, but this was not an important part of the laboratory analysis, and, on Dr. Lallo's advice, was limited to that amount of reconstruction I found most useful for adequate identifications. This was most often the case where cranial elements were concerned, as several skulls were so fragmented that it was difficult to otherwise identify the presence or absence of the different cranial bones. No suture areas or epiphyseal ends were glued together, but some longbone shafts and pelvic bones were reconstructed. For analysis purpose, teeth were placed in their sockets, but none were glued into place. Glyptal, diluted with acetone, was the glue employed in this process.

Skeletal elements were noted on the inventory sheets for each burial with the use of a notation key identifying (1) relative completeness of the bone, and (2) absence or presence of pathologies and/or anomalies (see notation key, beginning of Appendix IV); this system was suggested by Dr. Lallo, who employed it in his own analyses of the Eiden burial materials (1972:62). The state of general preservation of each burial, apart from the completeness of the skeleton, was noted; this ranged rather widely from burial to burial, and was sometimes found to differ between two individuals in the same grave. (cf. 1977-1 and 1977-2: see inventory sheets). This latter observation can be explained by differential degrees of intrinsic bone fragility, especially as it relates to age; infants and aged individuals tended to exhibit generally poorer states of preservation than did younger adults. In general, the Eiden soils seem not to have a strong negative effect upon bone preservation; although all were mottled and stained to a greater or lesser degree, most were not brittle or badly eroded. Of course, differential preservation of skeletal elements occurs in human bone as well as faunal (see discussion, pg. 2: P rt I), and an examination of the 1977 burials clearly indicates this. The more fragmentary remains of any particular burial tended to be excluded from the inventory sheets, and for some of the burials this may have meant recording as "absent" elements which were actually present, but too difficult to identify. Consequently, the apparent completeness values for some of these burials, as derived from examination of the inventory sheets in Appendix IV, should probably be viewed as fairly conservative indications of their state of completeness and/or preservation.

At this level of analysis, general indications of pathologies of the skeletal elements were noted, as were any notable anomalous characters which might be identifiable as congenital characteristics (such as mandibular tori, Wormian bones, etc.), but specific identifications as to the nature of the pathological conditions represented were not attempted until a later stage (see below). When the elements had been identified, inventoried, and laid out for further examination, techniques for determining sex and skeletal age were employed. A wide range of materials were utilized for these determinations, both to cross-check results of any particular analysis method and to provide myself the widest possible exposure to the possibilities and the problems of such techniques. At times, when bewildering masses of conflicting data were generated, the process became immensely frustrating; at the same time, the challenging nature of the work made success all the more delightful. This approach helped clarify some of the difficulties involved in doing osteological analysis in physical anthropology, of which I had a wide reading knowledge but no practical experience prior to undertaking this project.

Criteria for aging of human skeletal remains have been presented by numerous authors; the major sources employed in this analysis were Bass (1971), D. R. Brothwell (Digging Up Bones, 1972), and a set of notes on various techniques which was compiled by Dr. Lallo for his students' use (again, my thanks to Dr. Lallo for making these materials available to me). The latter source was particularly useful for identifying developmental stages of growth in vertebrae (from Anderson, 1962: Lallo notes) and pubic symphyses (Todd-Lyon 1954; McKern and Stewart, 1957: Lallo notes). Techniques for the latter will be discussed below at somewhat greater length.

Brothwell presents the basic data for determing skeletal age from degrees of epiphyseal fusion of various skeletal elements, identifying the age ranges during which such fusion normally occurs (1972:60, Figure 25). Bass (1971) presents information and drawings on the developmental stages of almost all bones of the skeleton; this source proved to be a particularly valuable one for this very reason, for it presents easily accessible visual criteria for interpreting morphological changes related to growth. In addition, the drawings in Bass proved to be a helpful guide in identification of skeletal elements, such as unfused epiphyseal ends and so on, which other sources do not describe. To the inexperienced eye, the unfused components of various ekeletal elements are often alien, and difficult to relate to recognizable adult forms; Bass's presentation proved to be a significant help in overcoming that difficulty.

Determination of skeletal age through analysis of developmental stages of dentition is discussed in both Bass and Brothwell, and the latter presents a diagrammatic representation of those stages (1972:59, Figure 24). Patterns of eruption of both deciduous and permanent dentition are among the most important means of age determination which are commonly employed in osteological analysis; given the relatively high preferential preservation rates for mandibular and dental elements in the archeological record in general, these types of analysis are often the most accessible as well. Of course, patterns of development of dentition are most useful for sub-adult individuals; for full development of the permanent dentition tends to be completed by early adulthood (but see Brothwell (1972:58) on populational variations in stages of development). Once the permanent dentition are established, however, occlusal wear patterns can be examined in terms of aging; Brothwell outlines such a method, as used on a sample of pre-medieval British burials (1972:69). This method has some notable limitations: not only will individual variation in attrition rates occur within a particular population, but standards against which to measure progressive occlusal wear will vary significantly from population to population; differences in dietary emphasis and food preparation, for example, will clearly create such variations (Bass 1971:238-239). Factors of this nature, as Bass points out, severely limit the accuracy of age determinations from occlusal attrition patterns, and the method should not be used without reference to other aging criteria (Bass 1971:239). Brothwell's data for dental development were used in the laboratory analysis of the 1977 Eiden burials, and the dentition of all adult burials, where present, were examined for attrition. Because of the limited size of the available sample, it was not felt to be possible to establish any standards against which to compare individual patterns; as a consequence, whatever information could be derived by these means was seen only as supplemental to that acquired through other techniques.

Through the kindness of Ms. Clare McJimsey Yarborough, a student manual of techniques for skeletal identification compiled by J. Lawrence Angel of the Smithsonian Institution was made available to me, after the laboratory analysis of the 1977 Eiden burials was completed. This source includes somewhat more detailed information for various types of age and sex determinations than in Brothwell, especially in terms of sexual variations in rates of skeletal development (cf. variations, in age ranges for epiphyseal fusion, between females and males; Angel 1977:5). Although it was not possible to directly apply the methods presented to the burials themselves, a number were applied to the data recorded on burial inventory forms (Appendix IV) to test the conclusions drawn. The obviously limited usefulness of such an approach militates against serious reinterpretations of any such conclusions; on the other hand, this exercise served to underscore the problems involved in osteological analysis, and as such was a (necessary) reminder that such analysis requires a broad range of approaches in order to achieve valid results.

As has been noted above, age determinations can be made on the basis of examinations of the pubic symphyses; indeed, this technique is perhaps the most reliable for determining ages of adult skeletons (Lallo notes:4). Through a processs much like that of epiphyseal fusion, the symphyseal faces of the pubic bones undergo a series of successive changes which begin at approximately age 18 and follow "a regular metamorphosis" (Bass.1971:155) throughout adult life. The phases of that metamorphosis were first identified by Todd (1920, 1921: in Bass 1971:155-156), and are such that age estimations of considerable accuracy can be made by identification of the phase of development exhibited by the pubic symphyses of a particular individual. Age ranges indicated by these phases are quite small: the first four phases (up to age 26) pinpoint skeletal age within two-year periods, and phases V through IX (to age 50), within ranges of only five years (1971:155-156). After age 50, the technique is slightly less specific in usefulness, for age determination from that age onward is dependent upon progressive "disfigurement" (1971:156) rather than upon specific morphological changes. This latter limitation, however, is obviously of minor significance, given the overwhelming usefulness of the technique -- and for that matter, can be predicted to have little application to most aboriginal burial populations, in which individuals 50 or more years old are likely to be sparsely represented.

The Todd technique has one other limitation, however, which is of far greater significance: "It consistently overestimates the age of individuals older than 20 years" (Lallo notes:4). Brooks (1955; Lallo:4) has proposed a correction factor, however, which can be used to eliminate some of the error of this technique. A second technique for age determinations from public symphyses has been developed by McKern and Stewart (1957; Lallo:4, Bass 1971:156), which presents a somewhat more complicated method for interpreting symphyseal developmental changes:

> . . . the symphyseal face is divided into three components [I: dorsal plateau; II: ventral rampart; III: symphyseal rim], each of which is characterized by five successive ageing characteristics. Each of the three components is scored separately on a scale from 0 to 5 and the total score is correlated with an established age range. . . . The McKern-Stewart can be used with the aid of . . . illustrated components (Figure 53.2 [page 67]) or with a set of plastic casts which show the same features somewhat more effectively (Lallo notes:4).

Descriptions of the characteristics of these component stages of development, and data for interpreting the values generated through this "scoring" technique, can be found in McKern and Stewart (1957) and are outlined by Lallo (notes:8). Although Bass feels that the McKern-Stewart system is "quite complicated and difficult for the unskilled to use" (1971:156), I found that the use of a set of casts such as mentioned abovemade application of this technique fairly simple; that set was made available to me in the Cleveland State University anthropology lab, along with the skeletal materials mentioned above.

There are, of course, some problems with this analysis technique as well, as with any other:

> The McKern-Stewart technique is limited in that the changes they describe are based upon observations of American males and thus are likely to yield unreliable results when applied to female skeletons or other populations. A second limitation of this technique is that the effective age range is only from 17 to 41 years (Lallo notes:4).

With respect to aboriginal populations, as mentioned above for the Todd method, the second limitation of the McKern-Stewart method may be of little importance; the first, however, is clearly of significance. Sexual and interpopulational variations in skeletal elements are often quite marked -- and the former type of variation is especially significant when considering any aspect of pelvic structure; sexual dimorphism of the human pelvis is pronounced, and application of developmental data derived for one sex to the pubic symphyses of the other may not be justified.

One final factor affects the usefulness of techniques for age determination from the pubic symphyses, at least for pre-historic (and probably early historic) burial populations: the paired pubic bones, being the most fragile bones of the pelvis, are quite often broken or crushed by soil overburden; of course, breakage tends to occur at the weakest structural point, which happens to be the area of symphyseal fusion, more often than not. As a case in point, it is relevant here to point out that only <u>one</u> of the 1977 burials, 1977-3, had pubic elements sufficiently complete to attempt an age determination from the symphyseal faces (see Appendix IV, inventories). To add insult to injury, this individual has been identified as a female; thus, the only burial which could be used to learn application of the two techniques above was also an inappropriate subject for the second (McKern-Stewart). Unfortunately, both available presentations of the Todd series standards (Lallo notes: 5 -- Figure 53.1; Bass 1971: 156) were difficult to interpret visually, and without clear comparative representations for references, the descriptions offered for each phase were decidedly unclear. Once again, lack of experience with osteological analysis was a telling weakness here.

Fortunately, 1977-3 is the most complete of the 1977 burials, and several different methods of age determination could be applied to test for the accuracy of the pubic symphyses. In order to outline the general path which analysis of the Eiden burials followed, the findings for 1977-3 via application of those different methods will be presented and discussed; since all the burial analyses followed the same general format, this will be the only such discussion presented here at any length.

Examination of the dentition of 1977-3 as to developmental stage revealed that eruption of all permanent teeth had occurred, suggesting an age of approximately 21 years or more (see Brothwell, 1972:59). Fusion of the secondary centers of vertebral neural arches indicated post-pubescence; retention on the vertebral bones of raised "rims," and of lines of fusion, suggested an age below 25 years (Lallo notes:2). The overall post-cranial pattern of epiphyseal fusion tended to be one of fairly complete closure, but with well-marked epiphyseal lines in most cases. Fusion of various parts of the skeleton with ranges of epiphyseal union whose upper values are greater than 20 years of age (cf. iliac epiphyses; distal tibia, etc.) was noticeably less advanced than that for areas uniting at lower ages (cf. distal humerus, proximal radius and ulna); averaging the values for all epiphyseal areas resulted in an estimate of 19+ years of age (see Brothwell 1972:60, and inventory sheets, Burial 1977-3). Finally, the symphyseal faces of the paired pubic bones were examined according to the McKern-Stewart system (with the cautions noted above kept in mind), with reference to both printed representations of symphyseal components (Lallo notes:6), and plastic casts (see above). The total score arrived at placed 1977-3 in the 18-21 age range, with the mean age of that group at 19.79 years (±0.85) (Lallo notes:8). The values derived from these four indices (dental, vertebral, epiphyseal, and symphyseal) were averaged, and a value of 19.8 years of age was derived. Thus, the physiological/skeletal age estimate noted on the inventory sheets in Appendix IV is recorded as "19-20 years."

This format of age determination was applied to all of the 1977 burials, although none of the other burials were as complete as 1977-3; of course, the less complete a burial, and the fewer the number of methods utilizable, the more tentative are the age ranges derived. The values obtained through my own analysis are presented on the inventory sheets in Appendix IV; comparison of these with those presented by Dr. Lallo in the 1978 Eiden site report (Brose and Bier 1978:Appendix IV) show that significant deviation between our two sets of values occurs for only one burial, 1977-2. The source of the deviation was easily identified. Apparently, in the process of laying this burial out for inventory and analysis, I failed to identify the remains of the pubic bones -- the main index indicated for aging 1977-2 (Lallo 1978:64). In the (apparent) absence of this criterion, the only method I could apply that would yield a more specific age estimate than "20+ years" (the upper limit of epiphyseal closure; Brothwell 1972:60) involved identification of the degree and distribution of vertebral osteophytosis. This is a method proposed by T. Dale Stewart (1958; in Bass 1971;19-20), which identifies the amount of involvement and the intensity of the osteophytosis for the lumbar, thoracic and cervical vertebrae, respectively, and which is presented as a series of reference graphs against which to measure any particular burial.

There were a number of problems which arose when I attempted to employ Stewart's technique. I found the graphs difficult to interpret, for one, and was unsure of how to attack the problem of constructing similar graphs for the Eiden population; in fact, constructing graphs of that kind for such a small sample was quickly recognized to be, at best, inappropriate. A subjective rating scale of the intensity of osteoarthritic involvement in a population is necessary before you can talk about the same phenomenon for any particular individual, and there was clearly no way for me to derive the former. Nevertheless, in the absence of other criteria, I ventured to use Stewart's graphs, with impressively erroneous results.

Sex determinations for the Eiden 1977 burials were derived through the same sort of multifocal approach as were age determinations, although with a decided preference for identifications from the pelvis, universally acknowledged as the most diagnostic skeletal evidence of sex (cf. Bass 1971:156). Since sexing criteria are generally more familiarly known than are those for aging, they will not be outlined here in any detail. It is perhaps of interest, however, to make note of one particular criterion that I had previously been unaware of; that is, that "measurement of the maximum diameter of the head of the humerus and of the femur is especially useful in sex determination" (Bass 1971:21). The usefulness of this method is mostly comparative; that is, size and robusticity of these elements are compared with those of other individuals of the same population, preferably with individuals already sexed by more stringent means. Such a comparative approach was employed to identify burials 1977-11 and 1977-12 as to sex; these were compared with 1977-3 and 1977-14, both of which had previously been sexed by reference to pubic criteria (see inventory notes, Appendix IV).

Again, comparison of my analysis results with those of Dr. Lallo (1978) show agreement for all but one of the adult burials (but see Notes, #4, at end of text) -- 1977-12. Since both determinations are noted as they are on the basis of comparative measurements of the heads of the femora, it is unclear where the error lies. On the assumption that the deviation is an artifact of my inexperience, I have included this burial into the various tables below as a male, although the inventory sheets for 1977-12 here included identify the burial as a female (Appendix IV). Since the unreliability of juvenile sex determinations is well-known, it should be no surprise that the infant burials 1977-4, 1977-6 and 1977-13 have not been so identified; 1977-1, identified as an 8 year old child, has been <u>tentatively</u> sexed (despite the comments noted above) as a male, on the basis of certain pelvic characteristics (see Lallo 1978:62-63). It should be emphasized that this "identification" is only a suggestion, and should not be given more significance than that would warrant.

Having outlined the methods used to determine age and sex for individuals in the 1977 Eiden burial sample, this discussion will now turn to a presentation of the general results of analysis, and finally, discuss the presence of observable pathologies in those burials. Unless otherwise indicated, page numbers in parentheses will be references to Dr. Lallo's report (1978:Appendix IV, pgs. 61-79), and references to the burial inventory forms included in this report will be noted by burial number, in this form: (IV, 1977-1).

Table VIII below presents the age and sex identifications derived through this analysis for the thirteen excavated burials of the 1977 Eiden archeological investigations. The basic forms of the age classes were modelled after those employed by Blank (1972:61) for discussions of age distributions in the Bungart Series II burial collection, so that comparisons would be facilitated. The number of individuals identified for each age class, and their probable sex, is noted for each category, and the burials they represent are shown.

Table VIII: Age and Sex Identifications, 1977 Excavated Burials (After Blank, 1972:61)

| Age | #, Sex | Burial # |
|---|---|---|
| Neonate/infant | 3 (sex unknown) | 1977-4, 1977-6, 1977-13 |
| Early childhood (2 - 6) | -- | -- |
| Late childhood (7 - 12) | 1 male | 1977-1 |
| Young adult (13 - 20) | 1 female | 1977-3 |
| Adult: | | |
| 21 - 24 yrs | 1 female | 1977-5 |
| 25 - 29 yrs | 3 males | 1977-8, 1977-11, 1977-12 |
| 30 - 34 yrs | -- | -- |
| 35 - 39 yrs | -- | -- |
| 40 - 44 yrs | 1 male | 1977-10 |
| 45 - 49 yrs | 1 female, 1 male | 1977-2, 1977-9 |
| GE 50 yrs | 1 female | 1977-14 |
| | Total = 13 | |

It should be noted that the "fetal" category of Blank's tables (see above, pg. 47) has been combined with "infant" here, since no apparent *in utero* fetal remains were noted in the 1977 sample, but at least one -- 1977-4 -- may represent a death during parturition (see above, and IV, 1977-4), and in any case is no more than three months (post-natal) old (68).

Certain points which can be made in a discussion of these two sets of data are immediately obvious. The infant mortality represented in both samples is fairly high, with a combined total of thirteen individuals in this category; however, the mortality rate for early childhood (2 to 6 years old) seems low, and this group is not even represented in the 1977 sample. Child mortality for both early and late childhood seems to be less than half the infant mortality rate; combined totals from the two sample populations for these categories are six individuals for each (see pg. 47).

It is interesting that the mortality level for the category of 20 to 24 years of age should be so low, containing only two individuals. Comparison of this value with those for the two adjoining categories only underscores this point: the "young adult" category has a combined total of eleven individuals, and the "Adult: 25 - 30 years old" category has 32 (see Table VI, Table VIII). The figures would seem to suggest that this five-year period in the typical Eiden life cycle was, for some reason or another, a "safe" period. On the other hand, it should probably be noted that this age category falls at the upper limit of dental eruption sequences and the lower limit (for the most part) of the pubic symphyseal metamorphosis sequence (see discussion above of these sequences), and as such may be the age group most prone to errors of age classification. Whatever reason there may be for this drop in the population curve, it is a notable one.

The two age categories of "25 - 29 years" and "30 - 34 years" represent the highest peaks of the population mortality curve for Eiden. This is perhaps not surprising for a hunting/fishing population such as that postulated in Part I, for this age range would in general include both the most active food procurers (especially male hunters) and those women entering into the latter half of their child-bearing years; it is in that half that health disorders and the dangers of pregnancy are most pronounced. After this period, mortality levels drop significantly for the two categories from 35 years to 45 years of age (combined totals of 7 and 6, respectively, for the two halves of that age range); this probably represents the reduced dangers to individuals past the child-bearing age, and possibly past the point of active participation in at least the more dangerous subsistence tasks. Finally, a predictable rise in mortality for those 45 years and older is clearly present. It is unfortunate that the earlier analysis stopped at this age category, for it would have been of interest to note whether or not individuals age 50 and over occur in any numbers. A larger number of deaths for the "45 - 49 years old" category, such as is in evidence in Table VIII, would tend to argue for a life expectancy limit at approximately this level; older individuals would be rare. At this point, given the available information for the Series II burials, it is impossible to argue for such an interpretation, for we cannot rule out the possibility of clustering at a greater age.

Table IX below presents the combined age and sex distribution for the analyzable Eiden burials, as represented in the Bungart Series II collection and the 1977 burial sample. Because of the difficulties involved in attempting to determine sex for sub-adults (see discussion above), those burials included in Table IX represent only the adult burials of the two samples, a total of 89 individuals. Eleven individuals which could be identified as adults and assigned as to sex, but whose ages could not accurately be determined, are included in this table in the category "unknown age."

Table IX: Age/Sex Distribution, Eiden Adults: 1977 Data and Bungart Collection Data Combined
(Bungart data from Blank 1972:62)

| Age | Male | Female |
|---|---|---|
| 20 - 24 yrs | 0 | 2 |
| 25 - 29 | 16 | 16 |
| 30 - 34 | 8 | 10 |
| 35 - 39 | 4 | 3 |
| 40 - 44 | 3 | 3 |
| GE 45 | 6 | 7 |
| Unknown age | 6 | 5 |
| | Total = 43<br>(48.31%) | Total = 46<br>(51.69%) |

The overall sex ratio has come a little closer to equality than was evident for the Bungart burial series alone: the percentage of males has risen from 46.25% (see Table VI:47) to 48.31%; women outnumber men by only 3 individuals in the combined sample. The sex ratios within each category are also quite balanced, with approximately equal representations of the sexes in each. It is interesting to note that both of the individuals in the "20 - 24 years old" category -- that group with the surprisingly low mortality figure -- are identified as females. One is 1977-3, for whom the probable cause of death (as has been argued above) can be identified as "complications occurring during childbirth;" it would be interesting to know if the same cause is a possibility for the other individual. Unfortunately, I was unable to locate, in the lists provided by McKenzie, et al. (1972: Appendix I), the burial this figure represents; thus, it was not possible to determine whether or not the individual in question was buried with an infant, as was 1977-3. The question as to why this age group is so significantly underrepresented in the Eiden burial population remains unanswered.

At this point in discussion it is perhaps important to note that a notion such as "underrepresentation," when employed in a discussion of population, is based upon expectations for normal distribution curves that are only actualized in extremely large populations -- such as those which are studied by population demographers. In fact, given the size of the Eiden population, as represented by the combined 1977 and Bungart Series II collections, it is somewhat inappropriate to discuss observable age and sex distributions as though they could be compared to a normal distributional curve for population composition -- such curves are based on populations often a hundred times the size of the Eiden sample. In point of fact, the seeminly extraordinary drop in mortality for this age category of 20 to 24 years old may mean nothing more than a low number of individuals of those ages in the population in general. For instance, we can account for a population with few 20 - 24-year-olds in it by postulating a slightly higher infant mortality during the time of that cohort's infancy due to (for example) a reasonably brief period of nutritional stress: such a phenomenon would be masked (in our tables) prior to adulthood by the wider age classes (cf. "young adult," an eight-year span), but might "appear" twenty years later in much the same form as that for the Eiden population.

This is not intended as an argument for a pre-existing period of subsistence stress for the Eiden population, but rather as a hypothetical example of the sort of phenomena which account for unsmooth fluctuations in the distributional curves of small-scale populations such as that at Eiden. It is necessary to keep in mind, when dabbling in demographic reconstructions from a burial population, the very real limitations upon the usefulness of such notions as "normal distributions," "atypical curves," and so on. To attempt application of these notions to analysis of populations which are "too small" is perhaps tempting, but certainly inappropriate; it is surely preferable to lose this particular tool for interpretation than to derive from it essentially idealized hypotheses which may only serve to obscure the true picture.

Stature regressions were derived, by Blank (1972:65), for the Bungart Series II burials; in the 1977 sample, however, only three individuals (1977-2, 1977-3, and 1977-14) had longbone remains associated with them which were sufficiently complete to allow stature reconstruction. Table X presents the data derived from that reconstruction, which was accomplished through the application to the burials in question of regression formulae presented by Trotter and Gleser (1958: in Angel 1977). Since this information does not significantly enhance the discussion here presented, Table X has been appended to the end of Part II, rather than included in the text. Stature reconstruction was the only anthropometric technique employed in this analysis, for a number of reasons. For one, time limitations on the availability of the 1977 burials for analysis purposes were complicated by the loss of quite a few days worth of lab time, due to severe weather conditions during the month of January which closed down the roads, and Cleveland State itself. Another reason for the limited use of anthropometric techniques was my own feeling that the derivation of such data would be more appropriate to a level of analysis well beyond that possible for me to pursue; my limited background in statistical analysis, combined with a still-profound inexperience in osteological analysis, would have left me unable to adequately manipulate those data. Given these reservations, and fortified by the opinion expressed by John Blank in the Eiden site report that "many recent investigators have gone 'overboard' in osteometric investigations . . . osteometric measurement should be utilized to serve a specific purpose and should not be carried out for its own sake" (1972:66), I came to the conclusion that analysis time could more profitably be spent in some other way. Finally, the general state of the burials discovered during the 1977 season would have necessitated a great deal of expenditure of time and effort in reconstruction, in order to facilitate anthropometric analysis; this was another factor in the decision to concentrate upon qualitative rather than quantitative analysis.

Once inventoried, "aged" and "sexed," the burials were examined for the presence of skeletal anomalies and pathologies. Identifications of these types of phenomena were made through references to Brothwell (1972: especially Chapter V) and through identifications made by Dr. Lallo (personal communication); all observations were recorded on the inventory sheets for each burial (IV, 1977-1 through -14). Comparison of the results of my own analysis with those presented in the 1978 Eiden site report (Lallo 1978: 61-79), once laboratory work was completed, has aided interpretation.

Skeletal anomalies, probably congenital in nature, were noted in various burials. A fairly common occurrence was of spina bifidia of the cervical vertebrae, which was noted in five individuals: 1977-1 (IV, -1); 1977-2 (IV, -2); 1977-3 (67; IV, -3); 1977-5 (IV, -5); and 1977-14 (IV, -14). 1977-3 also exhibited spina bifidia of the sacrum (67). The appearance of this anomalous trait in both 1977-1 and 1977-2 suggests that the burial association of these two individuals represents a biological relationship, as well as contemporaneous deaths. It is interesting that 1977-3, intrusive into the common grave of 1977-1 and -2, also exhibits this trait; if a biological relationship may be assumed to exist, the intrusion of this third burial (with its companion infant burial, 1977-4) may represent a deliberate introduction of the individual into a common family grave. If similar clusters of congenital traits could be identified in the burial population as a whole, there would be grounds for suggesting a burial pattern which included preferential interment by family group.

Of course, the vertical displacement between these burials and the two others (1977-5 and 1977-14) in whom spina bifidia is observed argues for significant temporal separation as well, and the trait may therefore represent only a commonly-occurring congenital anomaly which remains present in the Eiden population over time. Direct descent cannot be dismissed, either, and in fact, a hypothetical preferential pattern for interment in family burial areas would help explain, in part, the spatial distributions of burials at Eiden in general. Temporal continuity of such trait clusters, for example, if interpreted with the use of this model, would suggest longterm (generational) occupation of the site.

Wormian bones of the cranium were noted at the occipital suture of 1977-5 (68), and at the lambdoid sutures of 1977-3 (IV, -3) and 1977-14 (IV, -14). Shovel-shaped incisors were noted in 1977-1 (62-63; IV, -1), 1977-3 (IV, -3), and 1977-5 (maxillary incisors only -- IV, -1). As an easily recognized congenital trait, shovel-shaped incisors have been shown to vary in frequencies of incidence that may range from about 15% for European populations to levels approaching (or exceeding) 80% in "Mongoloid" populations (Brothwell 1972:118). The frequency of incidence of this trait in the Eiden population could not be calculated here, for pertinent identifications are not available for the Series II burials (Blank 1972). I would suggest that examination of those burials for the presence of this trait, and for that of spina bifidia in particular, would be a worthwhile project in further analysis of the Eiden materials, for they are likely to occur in numbers sufficient for discussion of the population as a whole, rather than of individuals alone.

A number of other anomalies, such as multiple foramina (IV, 1977-3, 66; IV, 1977-5), an unfused sternum body (IV, 1977-3), a perforated fossa, distal right humerus, 1977-12 (IV, -12), etc., were identified in these burials, but none were noted in the same skeletal elements of more than one individual. No congenital deformities were noted which would have involved disablement of any particular individual. Some dental anomalies were noted, such as supernumerary teeth (cf. 1977-3, left mandibular premolar: IV, -3) and retention of deciduous dentition despite eruption of the permanent teeth; for 1977-3 (IV, -3), the retention of the left maxillary deciduous canine resulted in crowding of anterior teeth, and so on. No extreme morphological anomalies of the dentition were noted for any burials.

Observable dental pathologies were common. Occlusal, buccal and/or lingual caries of varying severity were noted for burials 1977-1 (62; IV, -1), 1977-3 (66; IV, -3), and 1977-5 (especially: interproximal caries of left maxillary premolars, IV, -5; 68-69). Loss of the left mandibular first molar of 1977-3, probably through abscess or infection, resulted in slight mandibular resorption and lateral movement of the adjoining teeth (66; IV, -3); for 1977-1, advanced infection resulting in a large abscess cavity and serious damage to both right mandibular molars (deciduous dentition) was quite pronounced. The infection seems to have begun in the deciduous second molar and to have spread into the jaw (62; IV, -1). Enamel hypoplasia lines were noted, especially on incisors, for burials 1977-3 and 1977-5 (IV, -3, -5). Considerable mandibular resorption and loss of dentition was noted for burials 1977-2 (62; IV, -2), 1977-9 (72), and 1977-14 (78; IV, -14): in the latter, for instance, the only teeth not lost before death were the mandibular central and lateral incisors, and the left maxillary premolars and right maxillary first and second molars (78). Dental attrition was especially pronounced for older adults in the sample, although observed in almost all burials, and was generally more severe on anterior teeth (cf. 1977-9 -- 1978:72).

Preliminary results of studies of dental attrition and pathological development in four burial populations -- Fort Ancient, glacial Kame, Adena and Hopewell cultural groups -- were presented at the Chillicothe Hopewell Conference (March 9-12, 1978) by Dr. Joseph Addington, and those findings are of some interest to interpretation of the Eiden dental pathologies. The population of glacial Kame hunter/gatherers was noted as exhibiting patterns of severe abscessing and dental attrition, especially of anterior dentition (Addington 1978:personal communication); this corresponds rather closely with what can be seen in the 1977 Eiden burial sample, as noted above. In addition, enamel hypoplasia was noted for all four of the cultural groups studied. Addington pointed out that there were indications that this condition (indicative of arrested enamel development due to dietary deficiencies of Vitamin D (Chaney and Ross 1971:220)) when accompanied by widespread periostitis of the longbones, was strongly suggestive of a subsistence emphasis on utilization of fish (personal communication).

It would seem, in light of this information, that the dental attrition patterns and pathological manifestations observed in the 1977 Eiden burial sample lend support to the reconstructions presented in Part I of the probable subsistence pattern for that site. Blank has noted that attrition patterns in the Bungart Series II burials "was . . . most marked in the incisors" (1972:72); he also notes that premortem tooth loss for Eiden adults was especially severe (1972:74), and, as with the population of the Libben site, was generally the loss of posterior rather than anterior teeth (1972:72). He notes, however, that the incidences of alveolar abscessing and of dental caries were low in frequency (1972:80), and this does not seem to be the case with the 1977 burials. The deviation here may be a result of variance between subjective judgements of "severity" of pathology rather than representing any real differences between the two Eiden collections; only a direct comparison of the two can clarify this point. In either case, the attrition patterns are similar, and -- if Addington's suggestions can be applied here -- indicative of a subsistence strategy such as that suggested in this paper for the Eiden site.

Actually, this assertion of agreement between the faunal assemblage and the human burial population has jumped the gun, for it has not yet been shown that the enamel hypoplasia observed <u>is</u> in association with marked degrees of post-cranial periostitis. Periostitis is a condition involving inflammation of the cortical tissues of bone (Brothwell 1972:134), appearing in the form of striations and roughening resulting from bone remodelling (Lallo 1978: personal communication). The severity of infection involved can be determined not only by the degree of alteration involved, but by progressive spread throughout the skeleton; periostitis is most often exhibited first in the longbones of the legs, and progresses by appearances in the upper limbs, followed by spreading of the infection to other skeletal elements (Lallo, personal communication).

In order to most accurately determine the degree of periostitic inflammation actually present in the Eiden burials, and to avoid a source of possible subjective bias, all references to the presence of periostitis in the discussion below were drawn from Dr. Lallo's analysis report (1978:61-79) rather than from my own. Numbers in parentheses are pages of that report.

Periostitis was noted in burials 1977-2 through -6, -9 through -12, and -13. Mild to moderate forms of this inflammation were noted on the following: the left humerus of 1977-2 (65); both tibiae of 1977-3 (67); the left humerus of 1977-4; the left femur of 1977-5 (69); both humeri, ulnae, tibiae and femora of 1977-6 (70-71); for 1977-9, both ulnae, femora, and the left humerus (73); 1977-10, both tibiae (74); 1977-11, both longbones of the lower limbs (78-79). Heavy periostitic involvement was noted for: tibiae and fibulae, 1977-9 (73); right femur and fibula, left tibia of 1977-5 (69); both femora, 1977-3 (67). As noted above, 1977-3 and 1977-5 were the two burials in which clear evidence was found of enamel hypoplasia; for most of the remaining burials, especially adults, dental pathologies of other kinds and/or significant loss of dentition may obscure evidence of this enamel disorder.

Of course, conclusive statements based upon a correspendence of this nature for only two individuals would be (to state the case mildly) completely inappropriate for the Bungart Series II burials; Blank notes only seventeen cases of pathological conditions, none of which represents periostitic inflammation (1972:66). There is even some question as to how accessible such a condition might be to visual analysis of those burial materials: many of the specimens were coated with varnish, removal of which proved to be more time-consuming than was thought worthwhile (1972:55), and this coating could conceivably obscure the mild roughening and striations diagnostic of periostitis. In any case, the information presented above can only suggest that correspondences of the Eiden skeletal pathologies to those predicted by Addington do occur; only further analysis, either with other burial recoveries in the upcoming season or through a patient re-examination of the Bungart collection, will provide a large enough body of data to test this possibility.

A number of other disorders related to dietary deficiencies were noted in the 1977 Eiden burial collection. Osteomalacia, a "disease of adults . . . similar to rickets" (Brothwell 1972:160) can be caused by Vitamin D deficiency (1972:160); it is noted for at least two burials, #1977-2 and -11 (Lallo 1978: 65, 75). Porotic hyperostosis (osteoporosis), noted in the eye orbits of the infant burial 1977-13 (IV, -13; 61), has been suggested as a result of avitaminosis (Brothwell 1972:160). Other types of osteoporotic infections, involving especially ectocranial pitting of cranial bones, were noted in burials 1977-1 through -3, -5, -9, and -14. Cranial "bossing," a diagnostic feature of rickets, was noted in burial 1977-1 (62), 1977-3 (66), and 1977-5 (68). Rickets, of course, is caused by significant vitamin D deficiency, which interferes with deposition of calcium in bone (Chaney and Ross 1971:219).

The common underlying factor of all the observable pathologies of the 1977 Eiden burials, therefore, seems to relate to Vitamin D deficiencies in the diet of that population. Not only are most of the skeletal disorders noted here so caused, but the high rates of dental loss, attrition, and decay -- as well as extreme mandibular resorption in older individuals (see above) -- can probably also be interpreted in this light. The inability of the bones and teeth to retain sufficient levels of calcium, which is a result of avitaminosis D, can be predicted to have just these sorts of effects. Since most of the pathologies noted are not severe enough to indicate prolonged and serious deprivation, however, it is probably reasonable to assume that these effects are the results of fairly infrequent periods of moderate levels of nutritional stress. It is interesting that the two individuals in which the combined effects of this deficiency are most pronounced are 1977-3 and 1977-5; both are young females (approximately 19 and 22 years old, respectively: IV, -3, -5) associated with infant burials. It has been suggested above that these individuals may have died as a result of the trauma of parturition; if this is in fact the case, these burials most probably represent victims of the intensification of nutritional stress common during pregnancy. It should be noted in this context that 1977-6, the infant associated with 1977-5, shows significant periostitic infection of all longbones (Lallo 1978:70-71) and this may reflect *in utero* deprivation of Vitamin D. Likewise, although the evidence is slightly less clear (due to significant erosion damage), the infant 1977-4 (associated with 1977-3) shows periostitic infection as well (68).

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This discussion has outlined the general characteristics of the population represented by the 1977 Eiden burials, and presented some arguments for the probable sources of pathologies present in those materials. In Part III, these observations will be synthesized with those of Part I, briefly, and with an eye to the causal links between subsistence strategies and skeletal pathologies.

Table X: Stature Regressions, Burials #1977-2, 1977-3, 1977-4 (Basic regression formulae from Trotter and Gleser 1958 -- in Angel 1977)

fem = femur; tib = tibia; hum = humerus

White females: (A) 2.47 fem + 54.10

(B) 2.90 tib + 61.53

(C) 3.36 hum + 57.97

(D) 4.27 ulna + 57.76

(E) 1.39 (fem + tib) + 53.29

(F) 1.35 hum + 1.95 tib + 52.77

(G) 0.68 hum + 1.17 fem + 1.15 tib + 50.12

Black females: (A) 2.28 fem + 59.76

(B) 2.45 tib + 72.65

(C) 3.08 hum + 64.67

(D) 3.31 ulna + 75.38

(E) 1.53 fem + 0.96 tib + 58.54

(F) 1.08 hum + 1.79 tib + 62.80

(G) No formula, fem + tib + hum

| Burial # | Bone | Length (cm.) |
|---|---|---|
| 1977-2 | Left humerus | 31.5 cm. |
| | Right humerus | 31.8 |
| | Left ulna | 25.6 |
| | Right ulna | 25.4 |
| 1977-3 | Left femur | 42.3 cm. |
| | Right femur | 42.2 |
| | Left tibia | 36.1 |
| | Right tibia | 35.8 |
| 1977-14 | Left femur | 42.7 cm. |
| | Left tibia | 34.9 |
| | Left humerus | 28.5 |

| Burial # | Formula | White | | Black |
|---|---|---|---|---|
| 1977-2 | C | Left: | 163.81 cm. | 172.40 cm. |
| | | Right: | 164.82 | 173.32 |
| | D | Left: | 167.07 | 160.12 |
| | | Right: | 166.22 | 159.45 |
| | Av. ht. = | | 165.48 cm. | 166.32 cm. |
| 1977-3 | A | Left: | 158.58 | 156.20 |
| | | Right: | 158.33 | 155.98 |
| | B | Left: | 166.22 | 161.10 |
| | | Right: | 165.35 | 160.36 |
| | E | Left: | 162.18 | 157.92 |
| | | Right: | 161.62 | 157.47 |
| | Av. ht. = | | 162.05 cm. | 158.17 cm. |
| 1977-14 | A | Left: | 159.57 | 157.12 |
| | B | Left: | 162.74 | 158.16 |
| | C | Left: | 153.73 | 152.45 |
| | E | Left: | 161.06 | 157.38 |
| | F | Left: | 159.30 | 156.05 |
| | G | Left: | 159.59 | -- |
| | Av. ht. = | | 159.33 cm. | 156.23 cm. |

# Part Three: Conclusions and Predictions

Part I of this paper has presented a discussion of the 1977 faunal assemblage from Eiden, and some suggestions as to reconstruction of the probable subsistence patterns of the Eiden population, based upon analysis of that assemblage. It has been suggested that the people of Eiden were year-round inhabitants, and that this sedentism was permitted by a seasonal round of exploitation of faunal resources, with little or no dependence upon utilization of cultigens. It has been noted that Eiden has yielded, thus far, no evidence of maize cultivation, despite the fairly late date proposed for the (terminal) Late Woodland occupation; the "apparent" lack of evidence for horticulture has been suggested to be an actual lack, and it has been predicted that no indications of significant utilization of cultigens will be found during future archeological investigations at Eiden.

A seasonally intensive pattern of concentration has been outlined: emphases were noted on hunting of white-tailed deer and wapiti, and non-selective fishing, with the former predominating in the fall and winter seasons and the latter of greatest importance in spring and summer months. Although no strict and mutually exclusive pattern of alternation need be implied for these two concentrations, the overlap of either subsistence strategy into the season of the other (such as would be represented by summer season hunting of Cervidae) would be curtailed by the environmental constraints on each: the freezing of river, creek and lake making fish difficult to procure in winter, though abundant in summer and spring; the wider dispersal of Cervidae, raccoons, and turkey in warmer seasons making procurement of these resources far less productive than during the winter months.

It has been suggested in Part I (and Note (3)) that more detailed attention to certain indirect forms of evidence, such as plant residues on ceramic and flint artifacts, etc., might be a means of bolstering any floral evidence obtained through flotation techniques, inasmuch as such evidence would clarify whether or not the presence of any "utilizable" plant actually indicates its exploitation in subsistence. It has also been the conclusion of this writer that there must be strict vertical spatial control of excavations to be conducted at Eiden in the future, for (as has been briefly noted in Part II) there are clear indications in both the faunal and human assemblages that the Eiden site is multi-component. The problems of analysis which arose from poor separation of faunal remains can only be corrected by a more rigorous control of stratigraphic units; the work done in analysis of the 1977 excavation assemblages (both artifactual and osteological), in conjunction with stratigraphic analyses presented by Ms. Letitia Shapiro elsewhere, should provide clear guidelines for obtaining such control -- as well as providing justification for making the effort. If Eiden is in fact a multi-component non-horticultural sedentary occupation site, with a population of hunter/fisher/gatherers so late in the Late Woodland period, then its importance for interpretation of Late Woodland cultural history in the southern Lake Erie drainage basin cannot be overlooked.

It has been noted that disturbances of the site are significant, but there are numerous indications throughout the field records of the 1977 excavations that a substantial part of this site may remain undisturbed. As has been argued in Part II above, it is apparent that the western limits at least of the burial area have not yet been defined, and it is here suggested that strict stratigraphic control of test units, even in the areas assumed to be disturbed, will provide significant supportive evidence for the "multi-component hypothesis" discussed here and elsewhere (see Brose and Bier 1978). It has been noted in this report that some such stratigraphic separation is indicated by even the most disturbed materials (i.e., the Bungart faunal and burial assemblages) already removed from the site.

Part II of this paper presents some arguments which suggest that the burial population recovered from Eiden in 1977 exhibits skeletal and dental pathologies related to nutritional stress; more specifically, that moderate and/or periodic deficiencies of Vitamin D in the Eiden diet are indicated. Some general discussion has already been presented on the reconstructive implications of these observations, but it remains to tie together the two areas of analyses presented here.

The best sources for Vitamin D in any diet are dairy products, fruits, and certain vegetables; grains, meat, poultry and fish "are among the poorest sources" (Chaney and Ross 1971:135) of calcium and Vitamin D, although the liver oils of some fish can be potent sources of the latter (1971:221). A diet which concentrates heavily upon grains or animal protein will tend to produce nutritional stresses (resulting in Vitamin D deficiency pathologies) when other environmental/subsistence factors prevent inclusion of vegetable materials into the diet. At Eiden, it seems reasonable to argue that the most stressful time of the year -- in terms of avitaminosis D -- would have been the winter season, when the availability of appropriate plant sources of this vitamin would have been minimal, and the availability of fish (specifically, of fish liver oils) would have been significantly curtailed as well. Indeed, this situation would probably have obtained for the Eiden population even if storage techniques such as smoking and/or drying of fish made those species available protein sources in the winter months: Vitamin D -- and all other vitamins -- is quickly lost in heat processing, and breaks down rapidly with exposure.

Throughout this analysis, it has been suggested that the materials already available for analysis of the Eiden site are a potentially rich source of interpretive information. The problems most obvious for these sorts of endeavors are related to the relatively inexact stratigraphic and horizontal spatial controls of these samples. It has been suggested that strict controls employed in further excavation may allow more detailed and more accurate analysis of pre-existing assemblages from this site. It is the hope of this author that such predictions will prove true, and that the Eiden site will help illuminate the general picture of Late Woodland occupations in the southern Lake Erie drainage basin.

Notes:

(1) The siding of drum otoliths in the 1977 assemblage was a fairly simple operation, for the otoliths are "engraved" with a characteristic shape consisting of a somewhat square "head" and a "tail" which has a right-angle bend at the bottom. The direction in which this tail bent was used to determine sidedness, although those otoliths classed as "right" are not here assumed to be from the right ears of drum and vice versa; that is, although the otoliths were clearly "sided," it was not possible to determine which side was which. (My thanks to Dr. Warren Walker, for his advice in this process.)

(2) The areas in question include: the 4 by 3 meter "superunit," N505-8/E507-11; N525/E510, a 2 by 2 meter unit; and N538-44/E510, a hand-excavated trench.

(3) A number of indirect means of determining subsistence exploitation of floral species have been proposed, and may prove to be useful means, ultimately, of accessing data otherwise unavailable from archeological sites. Joseph Addington (personal communication) has pointed out that ceramic fragments may have cooking residues on them, and that this may allow educated speculation on the types of food prepared, etc.; he recommends that all ceramic artifacts be left unwashed until such evidence is taken into consideration. Frederick L. Briuer (1976) has determined that microscopic identification of organic residues can be made on utilized edges of flint tools, with three major foci of examination: (1) identification of characteristic wear patterns which can be linked to causal factors including specific kinds of tool use (cf. Keeley, 1974; Nance, 1970); (2) "identification of morphologically distinct plant parts" (478), plant residues of specific types indicative of function; and (3) use of chemical reagents for botanical analysis.(1976:478). These approaches,

he feels, will allow identification of the use of tools for plant food processing as well as butchering and so on (482-483). Again, as does Addington, he urges that artifacts be examined for such residues before any washing takes place (483), for although microwear patterns may not be affected by scrubbing, the residues of materials on which the tools were used will be lost.

(4) It should be noted that information noted in the 1978 site report (Lallo 1978:71) for burial 1977-7 seems to be in error: the burial has been sexed, apparently on the basis of comparative analyses of three foot bones; however, field notes for this burial indicate that no foot bones were removed from the grave pit. It seems possible that this is a transcription error, since the same information is entered for #1977-8 (1978:71-72), and both field notes and my own inventory sheets (see Appendix IV for the latter) verify the existence of these foot bones (talus, three metatarsals, and one phalanx of the left foot) for this latter burial.

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# Appendix I: Artifact Inventory Forms

## Burial Inventory Forms

Lorain Co. Archaeological Project.

Site Name: ____________________ Site Number: _______________

| LOT NO. | DESCRIPTION OF CONTENTS | HORIZONTAL LOCATION | VERTICAL LOCATION | CONTEXT | COLLECTED BY | DATE |
|---|---|---|---|---|---|---|
| | | | | | | |
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# EIDEN 1977

unit ________

| date | depths: level, feature description | associated forms | bag(s) and contents | excavators |
|---|---|---|---|---|
| | | | | |
| | | | | |
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| | | | | |
| | | | | |
| | | | | |

BURIAL NUMBER ____________

SITE NAME ____________

SITE NUMBER ____________

ANTIQUITY ____________

CULTURE ____________

EXCAVATION DATE ____________

---

AGE: ____________

SEX: ____________

---

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | FRAGMENTARY | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| E) Upper limbs | | | | | | |
| 1) Humerus | | | | | | |
| 2) Ulna | | | | | | |
| 3) Radius | | | | | | |
| Hand | | | | | | |
| 1) Carpals (8) | | | | | | |
| 2) Metacarpals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |
| F) Innominate | | | | | | |
| 1) Ischium | | | | | | |
| 2) Ilium | | | | | | |
| 3) Pubis | | | | | | |
| 4) Acetabulum | | | | | | |
| G) Lower limbs | | | | | | |
| 1) Femur | | | | | | |
| 2) Fibula | | | | | | |
| 3) Tibia | | | | | | |
| 4) Patella | | | | | | |
| Foot | | | | | | |
| 1) Tarsals (7) | | | | | | |
| 2) Metatarsals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |

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ADDITIONAL COMMENTS, OBSERVATIONS :

BURIAL NUMBER ____________ SITE NAME ____________

SITE NUMBER ____________

ANTIQUITY ____________

CULTURE ____________ EXCAVATION DATE ____________

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A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural-- ____ Dental ____ Pubis ____ Epiphyses ____ Average ____

PHYSIOLOGICAL AGE ESTIMATE: ____

2) SEX: Female ____ Male ____ /____________/

---

B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
- ____(a) fractures /____________/
- ____(b) crushing injuries /____________/
- ____(c) bone wound, sharp instrument /____________/
- ____(d) dislocations /____________/
- ____(e) Osteosclerosis /____________/
- ____(f) surgery /____________/

____(2) ARHTRITIS
- ____(a) degenerative joint disease /____________/
- ____(b) Vertebral osteophytosis /____________/
- ____(c) Traumatic arthritis /____________/
- ____(d) Rheumatoid arthritis /____________/
- ____(e) Infectious arthritis /____________/
- ____(f) Anklyosing spondylitis /____________/

____(3) OSTEITIS
- ____(a) Periostitis /____________/
- ____(b) Acute osteomyelitis /____________/
- ____(c) Chronic osteomyelitis /____________/
- ____(d) Chronic non-supportive osteomyelitis /____________/
- ____(e) Granulomatous lesions /____________/

____(4) TUMORS
- ____(a) Benign /____________/
- ____(b) Malignant /____________/
- ____(c) Metastases of the skeleton /____________/

____(5) ANOMALIES
- ____(a) Endocrine disturbances /____________/
- ____(b) Blood disorders /____________/
- ____(c) Nutritional deficiencies /____________/
- ____(d) Congenital defects /____________/
- ____(e) Miscellaneous defects /____________/
- ____(f) Squatting faces /____________/
- ____(g) Allen's facets /____________/
- ____(h) Foramina of vertebrae
  - ____(1) missing /____________/
  - ____(2) incomplete /____________/
  - ____(3) multiple /____________/

---

# Appendix II: Faunal Remains by Unit and Level: Species Present and Minimum Numbers of Individuals

## Appendix II: Faunal Remains by Unit and Site

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| N488/E470 | -- | -- | -- | | -- |
| N500/E490 | 0 - 30 cm. | 2 | Freshwater Drum | (2) | |
| | | | Deer | (1) | |
| | 20 - 30 cm. | 3 | Freshwater Drum | (6) | |
| | | | Bivalve | (1) | |
| | 30 - 50 cm. | 4 | Lg. Mammal | (1) | |
| | | | Freshwater Drum | (2) | |
| | | | Bird | (1) | |
| | - 51 cm. | 6 | Sm. Mammal | (1) | Charcoal |
| N505/E507 | Level 1 | 10-13 | Lg. Mammal | (2) | |
| | | | Freshwater Drum | (6) | |
| | | | Small Mammal | (1) | |
| | | | Fox | (1) | |
| | Level 2 | 14 | Lg. Mammal | (1) | |
| | | | Drum | (7) | |
| | | | Mussel | (3) | |
| N505/E508 | Plow Zone | 19 | Lg. Mammal | (1) | |
| | | | Sm. Mammal | (1) | |
| | | | Drum | (17) | |
| | Level 1 | 20,21 | Sm. Mammal | (4) | Charred Bone |
| | | | *Mustelidae* (?) | (1) | |
| | | | Lg. Mammal | (3) | |
| | | | Drum | (49) | |
| | | | Bird | (1) | |
| | | | Gastropods | (2) | |
| | | | Mussel | (1) | |
| | - 38 cm. | 22,25 | Drum | (2) | Feature 1 |
| | Level 2 | 23 | Drum | (2) | |
| | | | Sm. Mammal | (2) | |
| | "Plow Zone of West Wall" | 27 | Sm. Mammal | (4) | |
| | | | Meadow Vole | (1) | |
| | | | Drum | (5) | |
| N505/E510 | ? | 28,29 | Sm. Mammal | (1) | Charred Bone |
| | | | White-Tailed Deer | (1) | |
| | | | Badger | (1) | |
| | | | Raccoon | (1) | |
| | | | Drum | (21) | |
| | | | Pike | (2) | |
| | | | Bird | (1) | |
| | | | Mussel | (5) | |
| | | | Gastropod | (1) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| | - 28.5 cm. | 31 | Mussel | (1) | |
| | | 32 | Wapiti | (1) | |
| | Level 2 ( - 42 - 52 cm.) | 33 | Wapiti | (1) | |
| | | | Drum | (2) | |
| | | | Pike | (1) | |
| | | | Mussel | (1) | |
| | | | Gastropods | (4) | |
| N506/E463.5 | 0 - 30 cm. | 35 | Lg. Mammal | (1) | |
| N507/E507 | -- | 36 | Sm. Mammal | (1) | |
| | | | Lg. Mammal | (1) | |
| | | | Drum | (2) | |
| | Plow Zone | 37 | Sm. Mammal | (1) | |
| | | | Drum | (2) | |
| N507/E508 | Fill, Burial 1 | 38 | Fox | (1) | |
| | -- | 39 | Drum | (3) | |
| | | | Bivalve | (1) | |
| | Plow Zone | 40 | Drum | (8) | |
| | | | Mussel | (5) | |
| | | | Wapiti | (1) | |
| | | | Mole | (1) | |
| | | | *Mustelidae* | (1) | |
| N507/E508-510 | -- | 41 | Drum | (1) | |
| | | | Mussel | (1) | |
| N507/E510 | 0 - 43 cm. | 43 | Drum | (5) | Worked Bone: Punch/Drill |
| | | | Mussel | (1) | |
| | | | Sm. Mammal | (3) | |
| | | | Lg. Mammal | (1) | |
| N508/E532 | 0 - 27 cm. | 44 | Lg. Mammal | (1) | |
| | | | Bird | (1) | |
| | | | Mussel | (1) | |
| | - 27 - 37 cm. | 45 | Pike | (2) | Charred Bone |
| | | | Drum | (18) | |
| | | | Catfish | (2) | |
| | | | Gastropods | (7) | |
| | | | Mussel | (2) | |
| | | | Rabbit | (1) | |
| | | | *Martes* (?) | (1) | |
| | | | Deer | (1) | |
| | | | Sm. Mammal | (3) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| N508/E536 | -- | 46 | Sm. Mammal | (2) | |
| | | | Drum | (4) | |
| | | | Bird | (1) | |
| | | | Squirrel | (1) | |
| | | | Fisher | (1) | |
| | "Yellow Gravel" | 47 | Sm. Mammal | (1) | |
| N515/E470 | Level 1 | 48 | Drum | (1) | |
| | Level 2 | 77 | Wapiti | (1) | |
| | Level 3 ( - 40 - 70 cm.) | 49 | Drum | (1) | |
| | | | Gastropods | (2) | |
| N515/E488 | Level 1 | 50 | Sm. Mammal | (1) | |
| | | | Drum | (3) | |
| | | | Mussel | (2) | |
| | - 31 cm. | 51 | Beaver | (1) | |
| | | | Rodent | (1) | |
| | | | Drum | (6) | |
| | | | Mussel | (1) | |
| | | | Lg. Mammal | (1) | |
| | 31 - 36 cm. | 52 | Sm. Mammal | (3) | |
| | | | Lg. Mammal | (1) | |
| | | | Drum | (11) | |
| | | | Mussel | (1) | |
| | - 36 cm. | 53,55 - 57,59, 60 | Pike | (2) | Feature 8; Charred Bone |
| | | | Drum | (49) | |
| | | | Mussel/Clam | (2) | |
| | | | Gastropods | (1) | |
| | | | Bird | (5) | |
| | | | Chipmunk | (2) | |
| | | | Squirrel | (1) | |
| | | | Raccoon | (1) | |
| | | | Wapiti/Deer | (1) | |
| | | | Beaver | (1) | |
| | | | Sm. Mammal | (2) | |
| | - 55 cm. | 54 | Drum | (1) | |
| | | | Gastropods | (2) | |
| | Feature 9 | 58 | Drum | (1) | |
| N524/E483 | Level 1 | 61 | Drum | (8) | Charred Bone |
| | | | Wapiti | (1) | |
| | | | Raccoon | (1) | |
| | | | Sm. Mammal | (4) | |
| | Level 1? | 62 | Skunk | (1) | |
| | | | Drum | (3) | |
| | | | Sm. Mammal | (2) | |
| | | | Lg. Mammal | (1) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| 524/E498 (cont.) | - 30 - 75 cm. | 74,75 | Catfish | (1) | |
| | | | Bird | (3) | |
| | | | Mussel | (8) | |
| | | | Gastropods | (3) | |
| | | | Shrew | (1) | |
| | | | Red Squirrel | (1) | |
| | | | Deer | (1) | |
| | | | Marten | (1) | |
| 525/E455 | Plow Zone/ Level 1 | 76 | Meadow Vole | (1) | |
| | | | Badger | (1) | |
| 525/E510 | Plow Zone | 78,79 | Drum | (28) | Charred Bone |
| | | | Pike | (1) | |
| | | | Mussel | (2) | |
| | | | Gastropod | (1) | |
| | | | Bird | (2) | |
| | | | Raccoon | (1) | |
| | | | Rodent | (1) | |
| | | | Deer | (1) | |
| | | | Sm. Mammal | (4) | |
| | Level 1 | 80 | Drum | (31) | Charred Bone |
| | | | Pike | (1) | |
| | | | Bird | (1) | Worked Bone? |
| | | | Sm. Mammal | (2) | |
| | | | Lg. Mammal | (2) | |
| | Arb. Level 2 | 81,82 | Drum | (50) | Charred Bone |
| | | | Pike | (1) | |
| | | | Mussel | (3) | |
| | | | Bird | (2) | |
| | | | Squirrel | (1) | |
| | | | Chipmunk | (1) | |
| | | | Mustelidae | (1) | |
| | | | Deer | (1) | |
| N524/E483 (cont.) | Level 1 (to - 32 cm.) | 63 | Deer | (1) | Worked Bone: Punch/Drill |
| | | | Sm. Mammal | (1) | |
| | | | Lg. Mammal | (3) | |
| | | ? | Pike | (1) | |
| | | | Drum | (10) | |
| | | | Gastropod | (1) | |
| | - 32 - 42 cm. | 64-67 | Drum | (19) | Charred Bone |
| | | | Pike | (3) | |
| | | | Mussel | (2) | |
| | | | Bird | (1) | |
| | | | Skunk | (1) | |
| | | | Sm. Mammal | (4) | |
| | | | Lg. Mammal | (2) | |
| | | | Mustelidae | (1) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| N524/E483 (cont.) | - 42 - 52 cm. | 68-69 | Bird | (2) | |
| | | | Drum | (9) | |
| | | | Lg. Mammal | (1) | |
| | | | Sm. Mammal | (1) | |
| | | | Wapiti | (1) | |
| | | | Meadow Vole | (1) | |
| | - 52 - ? cm. | 70,71 | Drum | (1) | |
| | | | Gastropod | (1) | |
| | | | Wapiti | (1) | |
| N524/E498 | 0 - 30 cm. | 72,73 | Pike | (1) | Charred Bone |
| | | | Drum | (35) | |
| | | | Bird | (2) | Bird Bone Beads |
| | | | Mussel | (2) | |
| | | | Gastropods | (2) | |
| | | | Wapiti | (1) | |
| | | | Opossum | (1) | |
| | | | Lg. Mammal | (2) | |
| | | | Sm. Mammal | (4) | |
| | - 30 - 75 cm. | 74,75 | Drum | (40) | Charred Bone |
| | | | Pike | (3) | |
| N525/E510 (cont.) | Feature 3 | 83,84<br>86 | Drum | (38) | |
| | | | Pike | (1) | |
| | | | Mussel | (2) | |
| | | | Wapiti | (1) | |
| | | | Chipmunk | (1) | |
| | | | Mustelidae | (1) | |
| | | | Sm. Mammal | (3) | |
| | | | Lg. Mammal | (1) | |
| N525/E532 | 0 - 30 cm. | 94,98 | Rodent | (2) | Charred Bone |
| | | | Meadow Jumping Mouse | (1) | |
| | | | Mustelidae | (3) | Bone Beads |
| | | | Drum | (23) | |
| | | | Mussel | (1) | |
| | | | Wapiti | (1) | |
| | | | Drum | (6) | Charred Bone |
| | -- | 95 | Gastropod | (1) | |
| | | | Bird | (1) | |
| | | | Shrew | (1) | |
| | | | Mustelidae | (1) | |
| | | | Deer (Wapiti?) | (1) | |
| | - 40 cm. | 96 | Drum | (18) | |
| | | | Pike | (1) | |
| | | | Mussel/Clam | (2) | |
| | | | Gastropods | (2) | |
| | | | Otter | (1) | |
| | | | Raccoon | (1) | |
| | | | Grey Fox | (1) | |
| | | | Deer | (1) | |

| Unit | Level | Lot # | Species (#) | Comments |
|---|---|---|---|---|
| 525/E532 (cont.) | -- 45 cm. | 97 | Pike (1) | Charred Bone |
| | | | Drum (12) | |
| | | | Mussel (2) | |
| | | | Raccoon (2) | |
| | | | Martes (1) | |
| | | | Wapiti (1) | |
| | - 50 - 60 cm. | 99,100, 101,102 | Drum (21) | Charred Bone |
| | | | Pike (2) | |
| | | | Mussel (1) | |
| | | | Gastropod (1) | |
| | | | Wapiti (1) | |
| | | | Shrew (1) | |
| | | | Rabbit (1) | |
| | | | Raccoon (1) | |
| | | | Beaver (1) | |
| | -- | 103 | Drum (5) | Feature? |
| | | | Pike (3) | Charred Bone |
| | | | Gastropods (2) | |
| | | | Bird (2) | |
| | | | Fox (1) | |
| | | | Martes (1) | |
| | | | Lg. Mammal (1) | |
| N538/E510 | Plow Zone | 105 | Drum (1) | |
| | | | Sm. Mammal (1) | |
| | - 10 - 30 cm. | 106 | Sm. Mammal (3) | Charred Bone |
| | | | Wapiti (1) | |
| | | | Pike (2) | |
| | | | Drum (16) | |
| | | | Mussel (1) | |
| | - 30 - 35 cm. | 108 | Sm. Mammal (1) | |
| | | | Lg. Mammal (1) | |
| | | | Drum (1) | |
| | Level 2 | 109, 110 | Pike (2) | |
| | | | Drum (2) | |
| | | | Gastropod (1) | |
| | | | Mussel (2) | |
| | | | Bird (1) | |
| | | | Martes (1) | |
| | | | Lg. Mammal (1) | |
| | Level 3 | 112 | Drum (2) | |
| | | | Sm. Mammal (1) | |
| | Feature 6 | 113, 114 | Drum (1) | |
| | | | Mussel (1) | |
| | | | Gastropods (2) | |
| | | | Sm. Mammal (1) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| N540/E510 | Level 1 | 119, | Sm. Mammal | (4) | |
| | | 124 | Skunk | (1) | |
| | | | Raccoon | (1) | |
| | | | Drum | (12) | |
| | | | Pike | (1) | |
| | | | Mussel | (1) | |
| | | | Gastropods | (18) | |
| | | | Lg. Mammal | (1) | |
| | Feature 4 | 120- | Wapiti | (1) | |
| | | 123 | Rabbit | (1) | |
| | | | Drum | (2) | |
| | -- | 125 | Mustelidae (Martes?) | (1) | Charred Bone |
| | | | Drum | (25) | |
| | | | Pike | (2) | |
| | | | Mussel | (1) | |
| | | | Gastropod | (1) | |
| N542/E510 | 0 - 30 cm. | 126, | Drum | (4) | Charred Bone |
| | | 135 | Catfish | (1) | |
| | | | Pike | (1) | |
| | | | Raccoon | (1) | |
| | | | Wapiti (?) | (1) | |
| | - 30 cm. | 127, | Drum | (29) | Charred Bone |
| | | 130, | Pike | (1) | |
| | | 131 | Mussel | (2) | |
| | | | Gastropods | (2) | |
| | | | Lg. Mammal | (2) | |
| | | | Sm. Mammal | (3) | |
| | Feature 4 | 129, | Sm. Mammal | (3) | |
| | | 132 | Drum | (2) | |
| | | | Pike | (1) | |
| | - 42 - 47 cm. | 133 | Wapiti (Deer?) | (1) | |
| | | | Drum | (10) | |
| | | | Pike | (1) | |
| | | | Catfish | (1) | |
| | | | Mussel | (1) | |
| | | | Gastropods | (16) | |
| | | | Sm. Mammal | (4) | |
| N545/E525 | Plow Zone/ | 139, | Wapiti | (1) | |
| | Level 1 | 140 | Drum | (1) | |
| | Level 2 | 141, | Drum | (3) | |
| | | 142 | Pike | (1) | |
| | | | Gastropods | (2) | |
| | | | Sm. Mammal | (1) | |

| Unit | Level | Lot # | Species (#) | | Comments |
|---|---|---|---|---|---|
| N545/E525 (cont.) | "Backfill" | 143 | Wapiti | (1) | |
| | | | Rodent | (1) | |
| | | | Drum | (4) | |
| | | | Gastropod | (1) | |
| | - 50 cm. | 145 | Rodent | (1) | |
| | | | Deer (Wapiti?) | (1) | |
| | | | Drum | (1) | |
| | | | Pike | (1) | |
| | | | Mussel | (1) | |
| N560/E510 | Level 1 | 146-148 | Drum | (1) | |
| | | | Lg. Mammal | (1) | |

# Appendix III: Eiden Burials, 1977

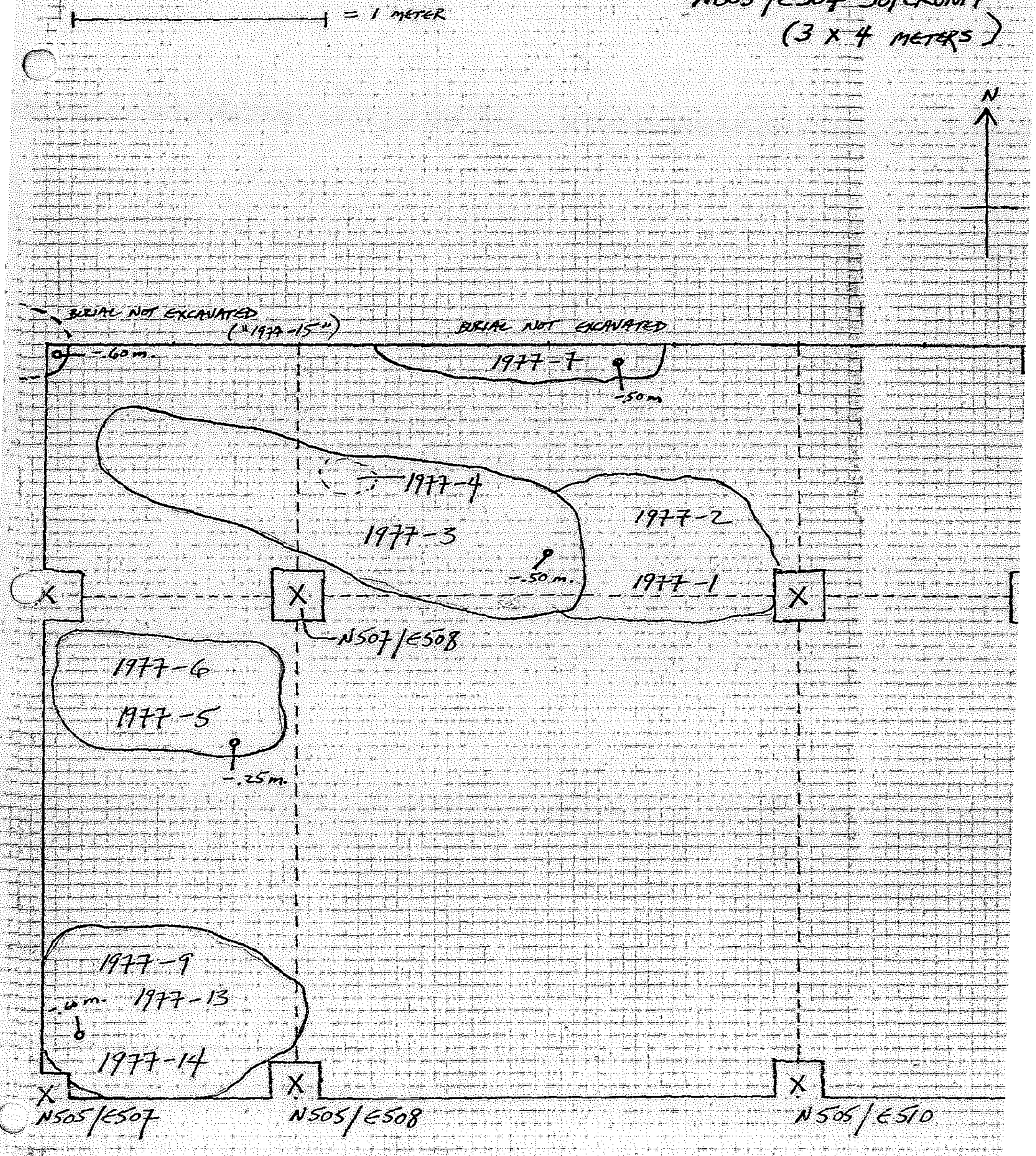
Burial drawings by: R. P. Mensforth
K. E. Dennis

# Appendix III: Proveniences, 1977 Burials

(See Drawings, and map of N505/E507 superunit)

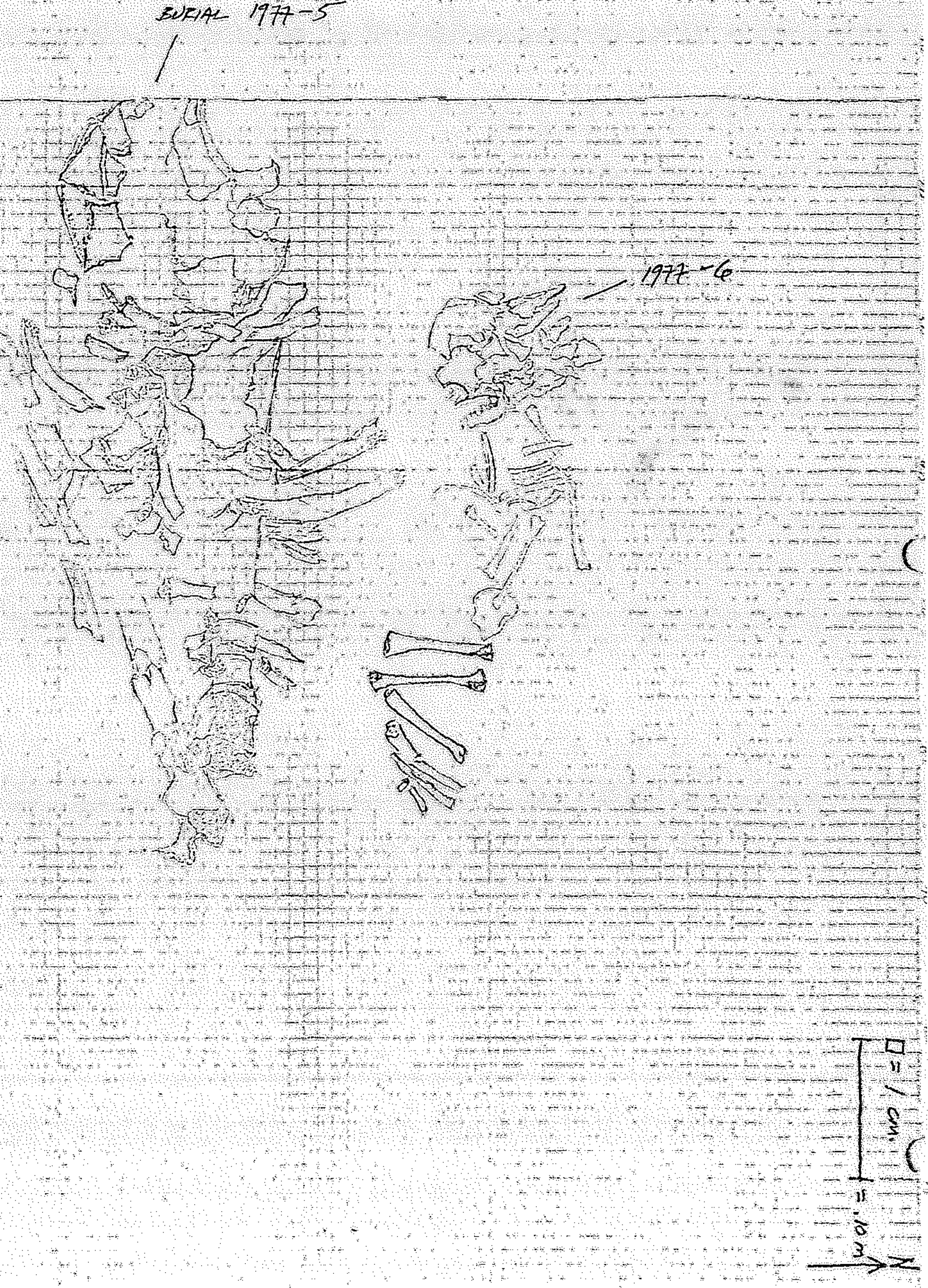
| | |
|---|---|
| 1977-1<br>1977-2 | North wall, northeastern section of N505/E508 to southeastern quadrant of N507/E508 |
| 1977-3 | - From SW N507/E507 to SW N507/E508, intrusive into grave of 1977-1 and 1977-2 |
| 1977-4 | - West, N507/E508; with 1977-3 |
| 1977-5<br>1977-6 | North, N505/E507 (2 x 1 m.) |
| 1977-7 | - North wall, N507/E508 (not excavated) |
| 1977-8 | - Backhoe trench #1? |
| 1977-9<br>1977-13<br>1977-14 | South, N505/E507 (2 x 1 m.) |
| 1977-10<br>1977-11 | Backhoe trench #3, between stakes 3-7 and 3-8. |
| 1977-12 | - .40 m. south of N513.27/E525.75, trench #1. |
| "1977-15" | - Skull in NW corner of N507/E507 (not excavated) |

N505/E507 SUPERUNIT
(3 x 4 METERS)



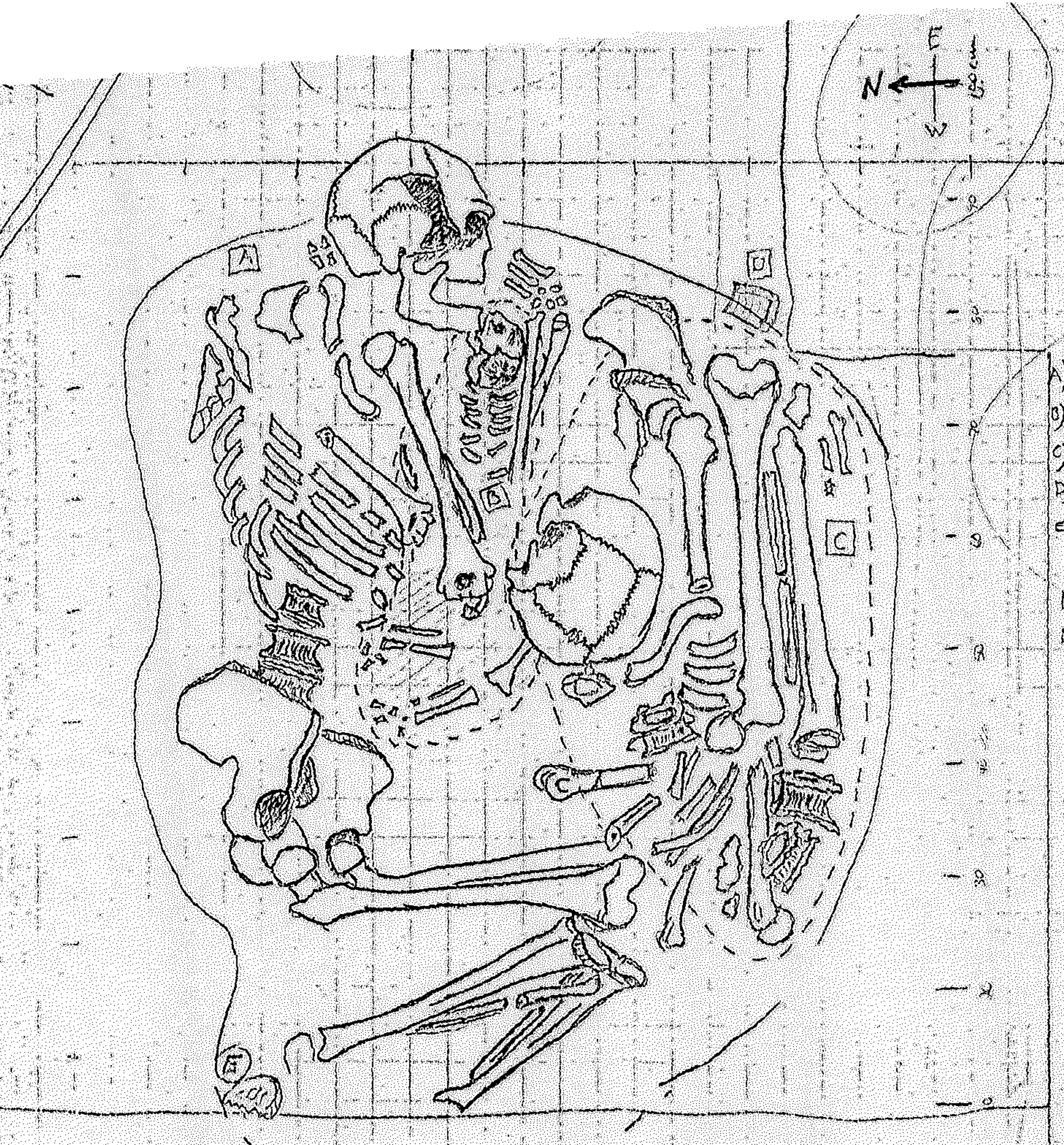
Indicate: Scale, North, Location Stake, Depths from Surface of Origin of Pit

BURIALS: 1977-
1977-



DRAWN BY: K.E. DAWIS

BURIALS:



scale = [▨] 10cm

N505/E.508

- include this provenience loca

A) FLEX = BURIAL 9
B) CHILD = BURIAL 13
C). BUNDLE - BURIAL 14
D). POTSHERD
E). SCRAPER

BREGMA PT ~~on~~ FLEX = 58cm N/ 2cm E.
BREGMA PT. ON BUNDLE = 35cm N/ 40cm W.

Tom - to highlight the shaded area in which the child burial is located, can you first place down an underlay of light sand and ink over that

- put a north arrow in where it looks the best
  N ⟵
- place a scale using numbered tick-marks vertically along the drawing
- draw only burial pit, not th chalk outline

# PLAN VIEW

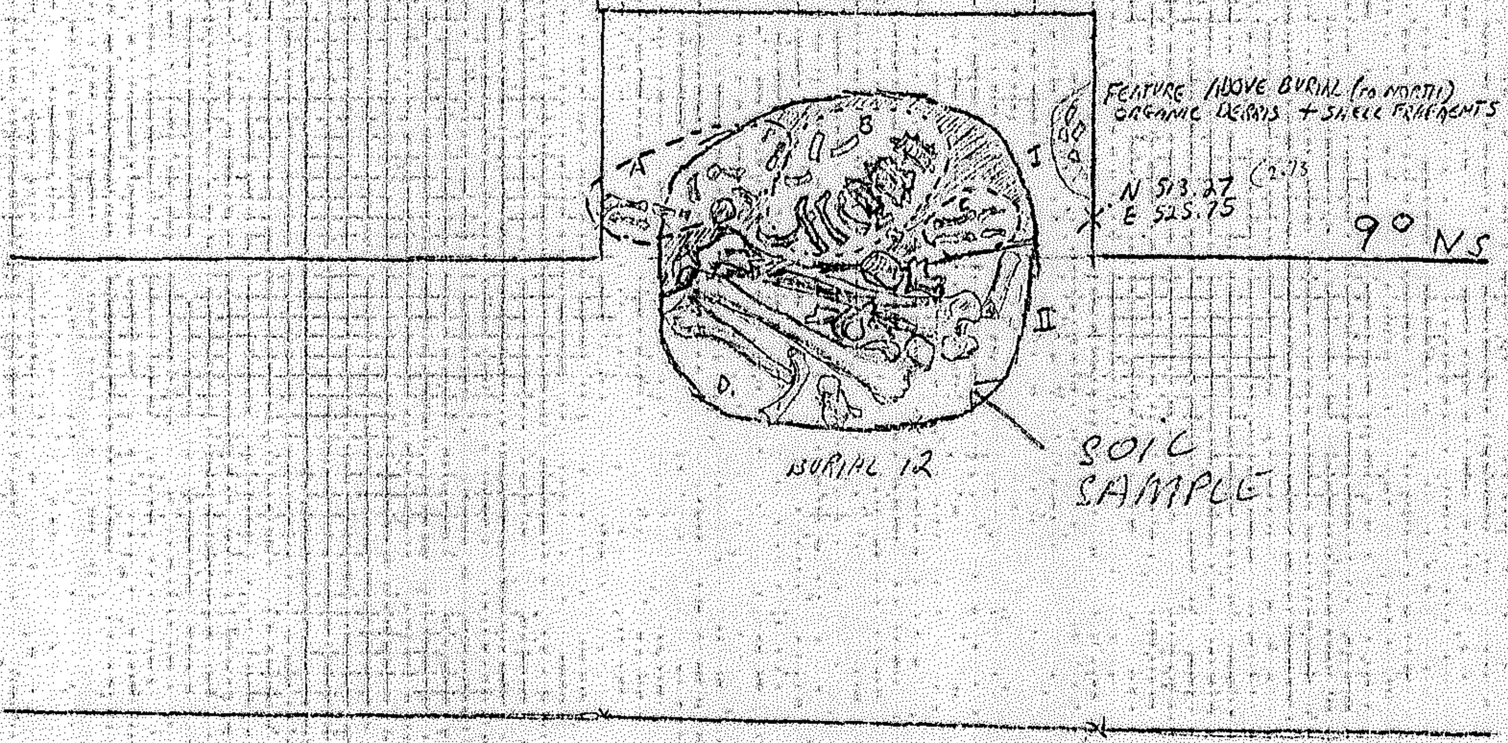
Indicate: North, Scale, Datum Stake, Depths, Individual Burial No., Associated Artifacts and FSN's, Location of Analysis Samples

1977-12

* good portion of the burial was efficiently exhumed by the back hoe - picking up VERTEBRAE, SACRUM, SCAPULA, + TIBIAL FRAGMENT

▨ = .10 METERS.

→ N



I. BLUE-SHADED AREA OF PIT

- GENERALLY DISTURBED, POOR PRESERVATION, NAILS (2) MIXED IN UPPER LAYER

A). MIXED HAND + FEET BONES

B). MIXED FRAGMENTARY VERTEBRA & RIBS

C). ASSORTED FEET BONES

II (TRENCH PORTION OF BURIAL PIT).

D) MODERATE TO FAIR PRESERVATION OF BONE - LONG BONES MIXED WITH CLAVICLE + VERTEBRAL BODIES

CULTURAL DEBRIS

- 2 or 3 POT SHERDS (3 DIFF. DECORATIVE PATTERNS)
- GOOD FLINT CHIPPAGE

✱ INFANT CRANIAL FRAGMENTS + LONG BONE MIXED IN
- UNDER AGE OF 3 MONTHS

* BURIAL APPEARS TO BE YOUNG ADULT ♀
EPIPHYSIS WELL FUSED FRAGMENTS INDICATE
GOOD TRABECULAR BONE, NO INVOLUTION, SMALL SIZE

DRAWN BY: L.P. MENSFORTH

## Appendix IV: Completed Inventory Sheets

Burials #1977-1 -14

[redacted]

Notation Key:

1: Bone complete, no pathology noted
2: Bone 50% complete, no pathology noted
3: Bone fragmentary, no pathology noted
4: Bone complete, pathology or anomaly present
5: Bone 50% complete, pathology or anomaly present
6: Bone fragmentary, pathology or anomaly present

(System derived from Lallo, 1978:62)

BURIAL NUMBER 1977-1
EXTENDED

SITE NAME GIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE 15 JULY 1977

BURIAL ASSOCIATION: W/ #1977-2 (#1977-3 INTRUSIVE; TIBIA & FIBULA SEVERED BY IT)

AGE: 8 YRS

PRESERVATION: FAIR (>GOO

SEX: ?

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | 6 (BASI-OCCIPITAL FRAGMENTED NZ: PITTING NZ. FORAMEN MAGN | | | | | |
| 2) parietal | 2 | 2-3 | | | | |
| 3) frontal | <1 | | | | | |
| 4) temporal | 4? | <1 | | | PATHOLOGY BEHIND MASTOID? | |
| 5) spheroid | | | ✓ | ✓ | | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) EHH Face

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | 1 | 1 | | | | |
| 4) maxilla | 4 | | | ✓ | PATH. ABOVE MED. INCISOR? | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| C) Mandible | 1 | 5 | | | | ROOT ABSCESS — SEE NOTES |

POST-CRANIAL:

A) Vertebral column

19 CENTRUMS
21 ARCHES
1
3 CERVICAL VERT. W/ BIFID SPINES

10 Cervical: <1 / 4 / (4) 1 / (4) 1 / (4) 1 / (5) 2 / ABSENT
2) Thoracic: 2-3
3) Lumbar
4) Sacrum: 2 / 1 / 2 / 3 / 3 / -
5) Coccygeal: ABSENT

B) Ribs

72 FRAGS. (2-3)

1) True Ribs
Left
Right

2) False Ribs
Left
Right

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | 1 | | |
| 2) Body | 2 PCS PRESENT – | NO PATHOLOGY | |
| 30 Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT LEFT | PRESENT R | ABSENT L | ABSENT R | L | R |
|---|---|---|---|---|---|---|
| 1) Clavicle | 2 | 2 | | | (2 PCS.) | (2 PCS) |
| 2) Scapula | 3 | 3 | | | | |

BURIAL NUMBER 1977-1

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE 13 July 197

---

AGE: 8 yrs
SEX: ?

---

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS ~~[illegible]~~ L | COMMENTS R |
|---|---|---|---|---|---|---|
| E) Upper limbs | | | | | | |
| 1) Humerus | 1 | 1 | | | EPIPHYSES PRESEN | |
| 2) Ulna | 2 | 3 | | | | |
| 3) Radius | 1 | 2 | | | | |
| Hand | | | | | | |
| 1) Carpals (8) | | | ✓ | ✓ | | |
| 2) Metacarpals (5) | | | ✓ | ✓ | | |
| 3) Phalanges (14) | | | ✓ | ✓ | | |
| F) Innominate | | | | | | |
| 1) Ischium | 2-1 | (<)2 | | | | |
| 2) Ilium | (<)1 | <1 | | | | |
| 3) Pubis | 1 | 1 | | | | |
| 4) Acetabulum | 1 | 2 | | | | |
| G) Lower limbs | | | | | | |
| 1) Femur | >3 | >3 | | | PROX. EPIPHYSES & ENDS PRESEN | |
| 2) Fibula | | <2 | ✓ | | | |
| 3) Tibia | 3 | <2 | | | | |
| 4) Patella | | | ✓ | ✓ | | |
| Foot | | | | | | |
| 1) Tarsals (7) | | | ✓ (~~[illegible]~~) | ✓ | | |
| 2) Metatarsals (5) | | | ✓ | | | |
| 3) Phalanges (14) | | | ✓ | | | |

---

ADDITIONAL COMMENTS, OBSERVATIONS :

TEETH PRESENT: MANDIBLE: L – LM1, LL1, C, $dM_1$, $dM_2$, $M_1$ ($M_2$ PRESENT)(IN JAW)
** R – LM1, LL1, dC, $dM_1$, $dM_2$, $M_1$ ($M_2$ PRESENT)(IN JAW)*

MAXILLA: L: UM1, UL1 ERUPTING, (d)C, $dM_1$, $dM_2$, $M_1$, ($M_2$ 'IN' JAW UNERUPTED)
(dL1 PRESENT)
* R: UM1, UL1, C (ERUPTING?), $dM_1$, $dM_2$, $M_1$ ($M_2$ IN JAW UNERUPTED
(dC PRESENT?) ($PM_1$, $PM_2$ IN JAW)

[*ALL LOOSE]

[** $RPM_1$, $RPM_2$ IN MANDIBLE] ~~[illegible]~~

[BOTH UMIs, ~~[illegible]~~ & RULI SHOVEL-SHAPED]

CARIES: UL$dM_1$, UL$M_1$ (PRONOUNCED) (U$dM_2$?)
~~LR~~ $dM_1$ (PRONOUNCED)
LL $dM_1$, LL $dM_2$
LR $dM_1$; LR $dM_2$ ALMOST DESTROYED. SIGNIFICANT MANDIBULAR RESORPTION AT ROOT. ABSCESS CAVITY. DAMAGE TO ROOTS OF BOTH dMs.

BURIAL NUMBER 1977-1

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ____

CULTURE ____

EXCAVATION DATE 13 JULY 1977

---

A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural -X Dental 10 Pubis 5-10 (LOW) Epiphyses 5-10 VERTEBRAE ≈7+ Average 8 YR

PHYSIOLOGICAL AGE ESTIMATE: 8 YRS

2) SEX: Female ____ Male ____ / SCIATIC NOTCH? POSS BIFURCATE MASTOID PROCESS

CANINE ERUPTIONS W/RESPECT TO PREMOLARS INDETERMINATE

---

B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
- ____(a) fractures / ____ /
- ____(b) crushing injuries / ____ /
- ____(c) bone wound, sharp instrument / ____ /
- ____(d) dislocations / ____ /
- ____(e) Osteosclerosis / ____ /
- ____(f) surgery / ____ /

____(2) ARHTRITIS
- ____(a) degenerative joint disease / ____ /
- ____(b) Vertebral osteophytosis / ____ /
- ____(c) Traumatic arthritis / ____ /
- ____(d) Rheumatoid arthritis / ____ /
- ____(e) Infectious arthritis / ____ /
- ____(f) Anklyosing spondylitis / ____ /

____(3) OSTEITIS
- ____(a) Periostitis / ____ /
- ____(b) Acute osteomyelitis / ____ /
- ____(c) Chronic osteomyelitis / ____ /
- ____(d) Chronic non-suppertive osteomyelitis / ____ /
- ____(e) Granulomatous lesions / ____ /

____(4) TUMORS
- ____(a) Benign / ____ /
- ____(b) Malignant / ____ /
- ____(c) Metastases of the skeleton / ____ /

✓ (5) ANOMALIES
- ____(a) Endocrine disturbances / ____ /
- ____(b) Blood disorders / ____ /
- ____(c) Nutritional deficiencies / ____ /
- ✓ (d) Congenital defects / BIFID SPINES, CERVICAL VERTEBRAE /
- ____(e) Miscellaneous defects / ____ /
- ____(f) Squatting facets / ____ /
- ____(g) Allen's facets / ____ /
- ____(h) Foramina of vertebrae
  - ____(1) missing / ____ /
  - ____(2) incomplete / ____ /
  - ____(3) multiple / ____ /

BURIAL NUMBER 1977 - 2
& SEMI - FLEXED

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE N13 JULY 1977

BURIAL ASSOCIATION: W/ 1977 - 1 (1977 - 3 INTRUSIVE)

AGE: 51 - 60 YRS?

PRESERVATION: POOR

SEX: FEMALE

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| 1) occipital | 6 | (ABSENT | MOST OF LEFT SIDE; | | BASI-OCCIPITAL | FRAGMENTED* |
| 2) parietal | 5-4 | 6-5 | PITTING, THICKENED: | | DESTRUCTION ALONG | INTERNAL SAGIT SUTU |
| 3) frontal | 4 | | | | SEVERE PITTING, | THICKENED AT |
| 4) temporal | 6 | <5 | | | OSTEOPHYTOSIS OF MASTOID | CORONAL SUTUR PITTING, ROUGHENIN |
| 5) sphenoid | | 6 | ✓ | | | PITTING |
| 6) ethmoid | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ |

* PITTING OF EYE ORBITS

** SEVERE PITTING & DESTRU
AT EXT. OCCIP. PROTUBERANCE - EROSI

B) Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | 5 | 6 | | | FUSED. NOTICEABLE | PITTING |
| 3) malar | 4 | 4 | | | PITTING, ROUGH | SEVERE PITTING |
| 4) maxilla | 6 | | | ✓ | STRIATIONS, SPURS: | PERIOSTITIS? |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | 6 | 4 | | | SEE NOTES | BELOW |

LOSS OF ALL TEETH EXCEPT MANDIBULAR LEFT LATERAL INCISOR & RIGHT LATERAL INCISOR (?)

POST-CRANIAL:

A) Vertebral column ↙ LIPPING, PITTING, DESTRUCTION — OSTEOPHYTOSIS

20 CENTRUM FRAGS; 12 FRAGS, ARCHES

1) Cervical: PRONOUNCED ARTHRISTIS, ALL 4 REMAINING; 2 W/ BIFID SPINOUS PROCESSES
2) Thoracic: VERTEBRAL OSTEOPHYTOSIS ON AT LEAST THREE LUMBAR VERTEBRAE; MILD LIPPING
3) Lumbar: ON SEVERAL THORACIC; PITTING OF SURFACES PRONOUNCED
4) Sacrum: FRAG. OF 1ST PRESENT; LIPPING, ARTHRITIC DESTRUCTION OF UPPER MARGIN
5) Coccygeal: ABSENT

B) Ribs

47 RIB FRAGS:

1) True Ribs
Left: THINNING AND DEFORMATION OF CAUDAL EDGES OF SEVERAL RIBS
Right: OSTEPHYTOSIS? (OSTEOARTHRITIS)

2) False Ribs
Left:
Right:

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | 4 | PITTING, STRIATIONS | ON BOTH — BUT |
| 2) Body | 6 | EROSIVE DAMAGE | PRONOUNCED |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | 5 | <4 | | | PERIOSTITIS | |
| 2) Scapula | 6 | 6 | | | ROUGHENING, ARTICULAR | SURFACE |
| | L | R | L | R | L | R |

BURIAL NUMBER 1977-2

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~13 JULY 19

---

AGE: 51 - 60 yrs ?

SEX: FEMALE

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## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| **E) Upper limbs** | | | | | | |
| 1) Humerus | 4 | 4 | | | SEE BELOW | |
| 2) Ulna | 4 | <4 | | | SEE BELOW | |
| 3) Radius | <4 | >5 | | | | |
| **Hand** | | | | | | |
| 1) Carpals (8) 7 PRESENT, EACH SIDE | 4-5 | 4-5 | | | PITTING | — |
| 2) Metacarpals (5) ALL BUT L 5TH | 4-5 | 4-5 | | | LIPPING | & PITTIN |
| 3) Phalanges (14) 4R, 3L PROXIMALS 2 MEDIALS | 4 | 4 | | | 〃 | 〃 |
| **F) Innominate** | | | | | | |
| 1) Ischium | | | ✓ | ✓ | | |
| 2) Ilium | 6 | 6 | | | SEE BELOW | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | 6 | | | ✓ | OSTEOPHYTOSIS O<br>MARGINS – | |
| **G) Lower limbs** | | | | | | |
| 1) Femur DISTAL ARTICULAR ENDS FRAGMENTARY, BOTH FEMURS — PITTING, LIPPING ALL HEADS | 4-5 | 4-5 | PERIOSTITIS, SHAFTS, MODERATE | | | |
| 2) Fibula | 6 | 6 | | | | |
| 3) Tibia | 6 | 6 | PERIOSTITIS PRONOUNCED; OSTEOPHYTE, SHA OF L TIBIA | | | |
| 4) Patella | 4 | 4 | STRIATIONS, BONY SPURS, BOTH SIDES | | | |
| **Foot** | | | | | | |
| 1) Tarsals (7) MOST OF LEFT, FRAG. OF RIGHT, ASTRAGALI | 6 | 6 | | | PITTING | |
| 2) Metatarsals (5) 2 RIGHT | | 6 | ✓ | | PITTING, SHAFT | |
| 3) Phalanges (14) ALL PROXIMALS EXCEPT 1ST (HALLUX); ALL RIGHT DISTALS, 1 LEFT | 4 | 4 | OSTEOARTHRITIC | | | |

---

ADDITIONAL COMMENTS, OBSERVATIONS :

MANDIBLE : R: CONSIDERABLE RESORPTION, W/PITTING. BONY SPURS AT SYMPHSEAL FUSION, AT BASE OF RAMUS
BONY WING AT MANDIBULAR FORAMEN (CONGENITAL ANOMALIES). ROUGHENING & PITTING OF
CHIN AREA: OSTEOPOROSIS. BONE REMODELING, NECK OF CONDYLE
L: FRAG., MOST OF RAMUS. BONY SPURS AT EITHER SIDE OF MANDIBULAR FORAMEN, AND AL
INTERIOR MARGIN AT BASE (AS ABOVE.) OSTEOARTHRITIC DAMAGE, CONDYLE

HUMERI : R: OSTEOPHYTIC DEVELOPMENT, MARGINS OF POSTERIOR TROCHLEA & CAPITULUM; PERIOSTITIS, W/
REMODELLING, DISTAL SHAFT; SEVERE PITTING, PROXIMAL SHAFT; PITTING, HEAD
L: PITTING, HEAD; PERIOSTITIS, SHAFT; PITTING OF DISTAL NECK PRONOUNCED; MILD LIPPING,
DISTAL END

ULNA: R: PRONOUNCED LIPPING, DEGENERATION OF OLECRANON; SEVERE PITTING, PROXIMAL NECK; PERIOSTITIS
SHAFT; ROUGHENING, ARTICULAR DISTAL HEAD
L: PRONOUNCED LIPPING, NOTCH; DEGENERATION OF OLECRANON. BONE REMODELLING, PROX. NECK;
BONY SPUR IN SEMI-LUNAR NOTCH; PITTING, SHAFT; ROUGHNESS, DISTAL ART. HEAD

RADIUS: R: OSTEOPHYTOSIS, RADIAL TUBEROSITY, HEAD; PERIOSTITIC REMODELLING, ESP. PROXIMAL SHAFT,
L: LIPPING, DISTAL ARTICULAR SURFACE — ROUGHENED

ILIUM : R: PITTING } EXTREME EROSION DAMAGE

BURIAL NUMBER 1977-2

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ___

CULTURE ___

EXCAVATION DATE ~ 13 JULY 1977

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A) GROSS AGE AND SEX DETERMINATIONS VERTEBRAL OSTEOPHYTOSIS : 51-60 YRS?

1) AGE: [illegible] ___ Dental 25+ Pubis ___ Epiphyses 30+ Average ___

PHYSIOLOGICAL AGE ESTIMATE: 51-60 YRS?

2) SEX: Female ✓ Male ___ / SCIATIC NOTCH 50% PRESENT, BUT WIDE ; BROW RIDGES / SMALL ; RIGHT MASTOID PROCESS NOTICEABLE BIFURCATE ; HEAD OF FEMUR SLIGHTLY SMALLER THAN 1977-14 (

---

B) GROSS PATHOLOGICAL OBSERVATIONS

___ (1) TRAUMA
- ___ (a) fractures / /
- ___ (b) crushing injuries / /
- ___ (c) bone wound, sharp instrument / /
- ___ (d) dislocations / /
- ___ (e) Osteosclerosis / /
- ___ (f) surgery / /

✓ (2) ARTHRITIS
- ✓ (a) degenerative joint disease / CONDYLES, MANDIBLE ; BOTH HUMERI, RADII, PHAL
- ✓ (b) Vertebral osteophytosis / ESP. LUMBAR, CERVICALS, SEE (f) /
- ___ (c) Traumatic arthritis / /
- ___ (d) Rheumatoid arthritis / /
- ___ (e) Infectious arthritis / /
- ___ (f) Ankylosing spondylitis / VERTEBRAE? ESP. SACRUM /

___ (3) OSTEITIS
- (a) Periostitis / BOTH HUMERI, ULNAE, FEMORA, TIBIAE /
- ___ (b) Acute osteomyelitis / /
- ___ (c) Chronic osteomyelitis / /
- ___ (d) Chronic non-supportive osteomyelitis / /
- ___ (e) Granulomatous lesions / /

___ (4) TUMORS
- ___ (a) Benign / /
- ___ (b) Malignant / /
- ___ (c) Metastases of the skeleton / /

✓ (5) ANOMALIES
- ___ (a) Endocrine disturbances / /
- ✓ (b) Blood disorders / OSTEOPOROSIS, MANDIBLE ; THICKENING, PARIETALS, FRONTAL /
- ___ (c) Nutritional deficiencies / ? ← /
- ✓ (d) Congenital defects / BONY SPURS, MANDIBLE? /
- ___ (e) Miscellaneous defects / /
- ___ (f) Squatting facets / /
- ___ (g) Allen's facets / /
- ___ (h) Foramina of vertebrae
  - ___ (1) missing / /
  - ___ (2) incomplete / /
  - ___ (3) multiple / /

BURIAL NUMBER 1977-3
& EXTENDED

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~13 JULY 1977

BURIAL ASSOCIATION: INTRUSIVE INTO #1977-1 (& 1977-2)

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AGE: 19-20 YRS

SEX: FEMALE

PRESERVATION: EXCELLENT

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## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

PROB. OSTEOPOROSIS, MOST CRANIAL BONES

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| 1) occipital | > 5 | BASI-OCCIPITAL FRAGMENTED | | | | |
| 2) parietal ✓ THICKENING | 4 | 4 | | | 6 PCS | 5 PCS PT |
| 3) frontal | 4 | | | | | |
| 4) temporal | 4 | 4 | | | | |
| 5) sphenoid | (4? | 4?) | | | | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) ~~XXX~~ Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | 1 | 1 | | | | |
| 3) malar | 5 | | | ✓ | SPUR; BODY OF ~~MALAR~~ | |
| 4) maxilla | < 4 | < 4 | | | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | 4 | 4 | | | RESORPTION | ABSCESS |

POST-CRANIAL:

A) Vertebral column

BIFURCATE SPINES, 4 & 5 CERVICALS; MILD EVID. OSTEOARTHRITIS

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 Cervical | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | |
| 2) Thoracic | 4 | 3 | 3 | > 3 | > 3 | < 2 | < 2 | < 2 | 2 | 2 | 2 | |
| 3) lumbar | < 4 | < 4 | < 5 | < 5 | < 5 | | | | | | | |
| 4) Sacrum | 2 | 2 | 2 | 3 | 3 | - | | | | | | |
| 5) Coccygeal | ABSENT | | | | | | | | | | | |

B) Ribs

24 FRAGS. (2-3)

1) True Ribs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Left | | | | | | | |
| Right | | | | | | | |

2) False Ribs

| | | | | | |
|---|---|---|---|---|---|
| Left | | | | | - |
| Right | | | | | |

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | 5 | | ANOMALOUS; BODY IN 2 P |
| 30 Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | 4 | 4 | | | BONY SPUR | INFECTION EXAMINA |
| 2) Scapula | 2 | 2 | | | | |
| | LEFT | R | L | R | L | R |

BURIAL NUMBER 1977-3

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~13 JULY 19

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AGE: 19-20 yrs

SEX: FEMALE

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INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| E) Upper limbs | | | | | | |
| 1) Humerus | 1 | 1 | | | | |
| 2) Ulna | 1 | 1 | | | | |
| 3) Radius | 1 | 1 | | | | |
| Hand | | | | | | |
| 1) Carpals (8) | >2 | >2 | | | 7 CARPALS | 6 CARPA |
| 2) Metacarpals (5) | >2 | 1 | | | NOT M5 | |
| 3) Phalanges (14) | >2 | >2 | | | NOT DISTAL PHALANX, V | ~~NO~~ DIST PHALA ALL BR |
| F) Innominate | | | | | | |
| 1) Ischium | 5 | ~~3~~5 | | | ← | NOTE PIT |
| 2) Ilium | 4 | 4 | | | ← | PITTING |
| 3) Pubis | >5 | >5 | | | ← | PITTIN |
| 4) Acetabulum | 1 | 1 | | | | |
| G) Lower limbs | | | | | | |
| 1) Femur | 4 | 4 | | | | |
| 2) Fibula — BONY SPUR, L FIBULA | >5 | >2 | | | | |
| 3) Tibia | 1 | 1 | | | | |
| 4) Patella — OSTEOPHYTIC, R PATELLA | 1 | 4 | | | | |
| Foot | | | | | | |
| 1) Tarsals (7) ALL TARSALS PRESENT | 1 | 1 | | | | |
| 2) Metatarsals (5) | >2 | 1 | | | M2 FRAG. | |
| 3) Phalanges (14) | 2 | <2 | | | 4 PRESENT | 6 PRESE |

LIGHT → NO PERIOSTITIS HUMERI (Humerus, Ulna, Radius)

LIGHT—MOD PERIOSTITIS, ESP. FEMURS (Femur, Fibula, Tibia)

---

ADDITIONAL COMMENTS, OBSERVATIONS : POSS. WORMIAN BONE, L ORBIT

WORMIAN BON
LAMBDOID
SUTURE
L PARIETAL

ENAMEL HYPOPLASIA LOWER INCISORS (ALL), UMIs ?, LRC, U MOLARS, L & R
UMIs & ULIs SHOVEL-SHAPED

MANDIBLE : L: $M_1$ LOST TO ABSCESS? SUPERNUMERY PREMOLAR ($Pm_1$)
R: RESORPTION, NECK OF $M_3$
DENTAL CARIES, ESP $M_2$ — BUCCAL CARIES ABOVE NECK \ ALSO $M_1$

MAXILLA — 
L: CROWDING OF ANTERIOR TEETH DUE TO RETENTION OF dC — SEVERE
R: OCCLUSAL CARIES, ALL, ESP $M_1$, $M_2$

FEMURS — NOTE AREAS OF PITTING / BONE REMODELLING, NECK OF PROXIMAL ARTICULAR END, BOTH FEMURS

LEFT FIBULA — SPUR AT NECK OF PROXIMAL ARTICULAR END (OSTEOPHYTIC)

BURIAL NUMBER 19775 SITE NAME EDEN
SITE NUMBER 33 Lw 14

ANTIQUITY ______

CULTURE ______ EXCAVATION DATE ~20 JULY 1

AGE: ~~[illegible]~~ 24 YRS

SEX: ~~[illegible]~~ (?) FEMALE?

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

|  |  | PRESENT |  | ABSENT |  | COMMENTS ~~[illegible]~~ |  |
|---|---|---|---|---|---|---|---|
|  |  | L | R | L | R | L | R |
| E) Upper limbs |  |  |  |  |  |  |  |
| 1) Humerus | 3 | ? | ? |  |  | 23 FRAGMENTS |  |
| 2) Ulna |  | ? | ? |  |  | OF LONG BONES - |  |
| 3) Radius |  | ? | ? |  |  | TOTALLY UNIDENT |  |
| Hand |  |  |  |  |  |  |  |
| 1) Carpals (8) | 3 |  |  | ✓ | ✓ | SOME FRAGMENTS |  |
| 2) Metacarpals (5) |  |  |  | ✓ | ✓ | POSS. METACARPAL |  |
| 3) Phalanges (14) |  |  |  | ✓ | ✓ | OR CARPALS? |  |
| F) Innominate |  |  |  |  |  |  |  |
| 1) Ischium |  |  | (3) | ✓ | ✓ |  | FUSION – BONE C |
| 2) Ilium |  |  | 3 | ✓ |  |  |  |
| 3) Pubis |  |  | 3 | ✓ |  |  |  |
| 4) Acetabulum |  |  | 1 | ✓ |  |  |  |
| G) Lower limbs |  |  |  |  |  |  |  |
| 1) Femur – R. PERIOSTITIS – STRIATIONS, ROUGHENING |  | 2-3 | 2-3 |  |  |  |  |
| 2) Fibula |  | 2 |  |  | ✓ | WORM-BORING. |  |
| 3) Tibia L TIBIA: PERIOSTITIS, MOD → HEAVY |  | 3 |  |  | ✓ | PROX. ART. HEAD ONLY |  |
| 4) Patella |  |  |  | ✓ | ✓ |  |  |
| Foot |  |  |  |  |  |  |  |
| 1) Tarsals (7) |  |  |  | ✓ | ✓ | SEE NOTES TO |  |
| 2) Metatarsals (5) |  |  |  | ✓ | ✓ | HAND | ABOVE |
| 3) Phalanges (14) |  |  |  | ✓ | ✓ |  |  |

ADDITIONAL COMMENTS, OBSERVATIONS :

NOTE SUTURE OF OCCIPITAL & L PARIETAL – 2 SMALL ARCHS, WORMIAN BONE

LEFT FEMUR – BOWING – PROB. RESULT OF DEFICIENCY DISEASE?
NOTE ROUGHENING – ~~[illegible]~~? MOD → SEVERE INFECTION

DENTITION: ~~[illegible]~~

MANDIBLE –
R: ALL PRESENT. PRONOUNCED WEAR, BOTH INCISORS, BUCCAL CARIES, ALL 3 MOLARS (& OCCLUSAL)
ENAMEL HYPOPLASIA LINES, $M_1$, $M_2$, C, LLI, LMI
L: BOTH INCISORS IN JAW. C, $PM_2$, ALL 3 MOLARS PRESENT BUT LOOSE,
ENAMEL HYPOPLASIA LINES, LMI, LLI, $M_1$, $M_2$, C. LINGUAL CARIES, $M_1$, $M_2$
PRONOUNCED WEAR, BOTH INCISORS. OCCLUSAL CARIES, ALL MOLARS.

MAXILLA –
L: ALL TEETH PRESENT. BOTH INCISORS SHOVEL-SHAPED. INTERPROXIMAL CARIES, $PM_2$ – SEVERE. OCCLUSAL CARIES, ALL MOLARS. WEAR PRONOUNCED, $M_1$, $M_2$.
ENAMEL HYPOPLASIA LINES, UMI, ULI, C, $PM_1$, $M_1$, $M_2$
R: UMI, C, $M_1$, $M_2$ PRESENT. OCCLUSAL/LINGUAL CARIES, $M_1$, $M_2$. ENAMEL HYPOPLASIA: ALL

BURIAL NUMBER 1977-5

SITE NAME EDEN

SITE NUMBER 33 LW 14

ANTIQUITY ______

CULTURE ______

EXCAVATION DATE ~ 13 July 1977

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A) GROSS AGE AND SEX DETERMINATIONS I, 18.0 II, 19.0 III o 19.0 VERTEBRAL; < 25 / > PUBERTY

1) AGE: Sutural-- Dental ~/21 Pubis 19.0 Epiphyses 19 + Average 19.+ (19.

PHYSIOLOGICAL AGE ESTIMATE: 19-20 YRS

2) SEX: Female ✓ Male ___ / NOTE SCIATIC NOTCH /

---

B) GROSS PATHOLOGICAL OBSERVATIONS

___(1) TRAUMA
- ___(a) fractures /______/
- ___(b) crushing injuries /______/
- ___(c) bone wound, sharp instrument /______/
- ___(d) dislocations /______/
- ___(e) Osteosclerosis /______/
- ___(f) surgery /______/

✓(2) ARHTRITIS
- ✓(a) degenerative joint disease (OSTEOARTHRITIS) / CERVICAL VERTEBRAE: MILD /
- ✓(b) osteophytosis / BONY SPUR, L FIBULA; OSTEOPHYTE, R PATELL
- ___(c) Traumatic arthritis /______/
- ___(d) Rheumatoid arthritis /______/
- ___(e) Infecticus arthritis /______/
- ___(f) Anklyosing spondylitis /______/

✓(3) OSTEITIS
- ✓(a) Periostitis / FEMURS, LIGHT → MODERATE; HUMERI, LIGHT → NONE /
- ___(b) Acute osteomyelitis /______/
- ___(c) Chronic osteomyelitis /______/
- ___(d) Chronic non-supportive osteomyelitis /______/
- ___(e) Granulomatous lesions /______/

___(4) TUMORS
- ___(a) Benign /______/
- ___(b) Malignant /______/
- ___(c) Metastases of the skeleton /______/

✓(5) ANOMALIES
- ___(a) Endocrine disturbances /______/
- ✓(b) Blood disorders → / THICKENING OF PARIETALS, PITTING, VERTICAL STRIATIONS
- ✓(c) Nutritional deficiencies / OF PARIETAL BONE; INFECTION AROUND FORAM OF RIGHT CLAVICLE
- ✓(d) Congenital defects / BIFID SPINES, 4th & 5th CERVICAL VERTEBRAE; STER
- ___(e) Miscellaneous defects / IN 2 PTS (UNFUSED?) ♀; BONY SPUR, L CLAVICLE
- ___(f) Squatting faces /______/
- ___(g) Allen's facets /______/
- ___(h) Foramina of vertebrae
  - ___(1) missing /______/
  - ___(2) incomplete /______/
  - ___(3) multiple /______/

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BURIAL NUMBER 1977-4
*? SUPINE, SEMI-FLEXED

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY ______

CULTURE ______

EXCAVATION DATE ~13 JULY 1977

BURIAL ASSOCIATION : W/1977-3

---

AGE: INFANT; ~~[illegible]~~ 0-6 mo. ~~[illegible]~~

SEX: ______

EXTREMELY FRAGMENTARY;
PRESERVATION POOR

---

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | | | ✓ | ✓ | | |
| 2) parietal | | | ✓ | ✓ | | |
| 3) frontal | | | ✓ | ✓ | | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) ~~[illegible]~~ Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | | | ✓ | ✓ | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | | | ✓ | ✓ | | |

POST-CRANIAL:

A) Vertebral column

1 VERTEBRAL CENTRUM
1 NEURAL ARCH FRAG

10 Cervical
2) Thoracic
3) Lumbar 3
4) Sacrum ABSENT
5) Coccygeal ABSENT

B) Ribs

9 RIB FRAGS INCL. 1ST LEFT

1) True Ribs
Left
Right

2) False Ribs
Left -?
Right

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 30 Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |
| | LEFT | R | L | R | L | R |

BURIAL NUMBER 1977-4

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~13 JULY 19

AGE: INFANT; ~~[illegible]~~ 3-6 mo.) ~~[illegible]~~

SEX: ?

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| * E) Upper limbs | | | | | | |
| 1) Humerus | 2 | | | ✓ | | |
| 2) Ulna | 2 | 2 | | | | |
| 3) Radius | | | | | | |
| Hand | | | | | | |
| 1) Carpals (8) | | | ✓ | ✓ | | |
| 2) Metacarpals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |
| F) Innominate | | | | | | |
| 1) Ischium | / | | | ✓ | | |
| 2) Ilium | | | ✓ | ✓ | | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |
| * G) Lower limbs | | | | | | |
| 1) Femur | | | ✓ | ✓ | | |
| 2) Fibula | | | | | | |
| 3) Tibia | | | | | | |
| 4) Patella | | | ✓ | ✓ | | |
| Foot | | | | | | |
| 1) Tarsals (7) | | | ✓ | ✓ | | |
| 2) Metatarsals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |

Hand, 1)–3): TWO (2) METAPODIALS: (1 POSS. PHALANGE) UNIDENTIFIABLE BOTH – (1)

Fibula, Tibia: SOME FRAGS

Foot, 1)–3): SEE HAND

ADDITIONAL COMMENTS, OBSERVATIONS :

BURIAL NUMBER 1977-4

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ____

CULTURE ____

EXCAVATION DATE ~13 JULY 1977

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A) GROSS AGE AND SEX DETERMINATIONS REMAINS EXTREMELY FRAGMENTARY. INFANT, POSSIBLY A NEWB (ASSOC. W/ BURIAL #3)

1) AGE: Sutural X Dental X Pubis ____ Epiphyses ____ Average ____

PHYSIOLOGICAL AGE ESTIMATE: INFANT ; NEONATE ( 0 - 6 ~~YR~~ mo. )

2) SEX: Female ____ Male ____ / impossible to determine /

---

B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
____(a) fractures /____/
____(b) crushing injuries /____/
____(c) bone wound, sharp instrument /____/
____(d) dislocations /____/
____(e) Osteosclerosis /____/
____(f) surgery /____/

____(2) ARHTRITIS
____(a) degenerative joint disease /____/
____(b) Vertebral osteophytosis /____/
____(c) Traumatic arthritis /____/
____(d) Rheumatoid arthritis /____/
____(e) Infectious arthritis /____/
____(f) Anklyosing spondylitis /____/

____(3) OSTEITIS
____(a) Periostitis /____/
____(b) Acute osteomyelitis /____/
____(c) Chronic osteomyelitis /____/
____(d) Chronic non-supportive osteomyelitis /____/
____(e) Granulomatous lesions /____/

____(4) TUMORS
____(a) Benign /____/
____(b) Malignant /____/
____(c) Metastases of the skeleton /____/

____(5) ANOMALIES
____(a) Endocrine disturbances /____/
____(b) Blood disorders /____/
____(c) Nutritional deficiencies /____/
____(d) Congenital defects /____/
____(e) Miscellaneous defects /____/
____(f) Squatting facets /____/
____(g) Allen's facets /____/
____(h) Foramina of vertebrae
____(1) missing /____/
____(2) incomplete /____/
____(3) multiple /____/

BURIAL NUMBER 1977-5
≈ FLEXED

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 20 JULY 1977

BURIAL ASSOCIATION: W/ 1977-6

AGE: 24 YRS
SEX: FEMALE?

PRESERVATION - POOR
BURIAL FRAGMENTED

# INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

EXTR. FRAG.

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | 3 | | | | BASI-OCCIPITAL | |
| 2) parietal | 1 | 3 (2) | | | 4 PCS | ≈ 7 PC |
| 3) frontal | 3-2 (RIGHT SIDE FRAG) | | | | 6 PCS — MOSTLY R | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |

B) Face

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | 1 | 1 | | | | |
| 3) malar | | | ✓ | ✓ | | |
| 4) maxilla | 4 | 4 | | | CARIES, etc | ABSCESSES! SEE M |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

C) Mandible — WINGED SPUR ON RAMUS, SPINOUS PROCESSES, CENTER

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| Mandible | 3 | 1 | | | (CARIES) | CARIES |

POST-CRANIAL:

A) Vertebral column

BIFID SPINE; DOUBLE RIGHT FORAMINA 6TH CERVICAL

NOTE: EXTRA ATLAS IN BOX MARKED "77-5"

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) Cervical | 1 | 2 | 1-2 | 1-2 | 1 (-2) | 1 | 2 | | | | |
| 2) Thoracic* | 5 | <1 | <1 | <1 | <1 | >2 | >2 | 2 | 2 | 3 | ABS. |
| 3) lumbar | <1 | >2 | 2 | 2 | 3 | | | | | | |
| 4) Sacrum | ABSENT | | | | | | | | | | |
| 5) Coccygeal | ABSENT | | | | | | | | | | |

* FIRST THORACIC VERTEBRA: CAVITY IN CENTRUM NEAR RIGHT ARCH BASE

B) Ribs

VERY FRAG.

1) True Ribs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Left | *1 | <2 | <2 | <2 | 3 | 3 | 3 |
| Right | *1 | <2 | <2 | 2-3 | 2-3 | 3<2 | <2-3 |

2) Ribs

| | | | | | | |
|---|---|---|---|---|---|---|
| Left | 3 | 3 | 3 | 3 | 3 | -2 |
| Right | ≤2-3 | ≤2-3 | 3 | 3 | 3 | |

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |

BURIAL NUMBER 1977 - 5

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 20 JULY 1977

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## A) GROSS AGE AND SEX DETERMINATIONS

VERTEBRAL - UNDER 25 ? - CENTRUM NOT FUSED

1) AGE: Sutural - X Dental ~~[illegible]~~ 22! Pubis No sympt. Epiphyses 23 + Average 23

PHYSIOLOGICAL AGE ESTIMATE: 24 ~~[illegible]~~

2) SEX: Female ? Male / NOTE SCIATIC NOTCH → IMPRECISE: FRAG, MANDIBLE - ROBUST ACETABULA /

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## B) GROSS PATHOLOGICAL OBSERVATIONS

(1) TRAUMA
- (a) fractures
- (b) crushing injuries
- (c) bone wound, sharp instrument
- (d) dislocations
- (e) Osteosclerosis
- (f) surgery

(2) ARHTRITIS
- (a) degenerative joint disease
- (b) Vertebral osteophytosis
- (c) Traumatic arthritis
- (d) Rheumatoid arthritis
- (e) Infectious arthritis
- (f) Anklyosing spondylitis

✓ (3) OSTEITIS
- ✓ (a) Periostitis / FEMUR, TIBIA: MODERATE → HEAVY ACETABULA - NOTE ROUGHENING (L INNOMINATE)
- (b) Acute osteomyelitis
- (c) Chronic osteomyelitis
- (d) Chronic non-supportive osteomyelitis
- (e) Granulomatous lesions

(4) TUMORS
- (a) Benign
- (b) Malignant
- (c) Metastases of the skeleton

✓ (5) ANOMALIES
- (a) Endocrine disturbances
- (b) Blood disorders
- (c) Nutritional deficiencies
- ✓ (d) Congenital defects / WINGED SPUR ON RAMUS, SPINOUS PROCESSES ON MANDIBLE
- (e) Miscellaneous defects / BIFID SPINE, 5 TH CERVICAL VERTEBRA
- (f) Squatting facets
- (g) Allen's facets
- ✓ (h) Foramina of vertebras
  - (1) missing
  - (2) incomplete
  - ✓ (3) multiple / 6TH CERVICAL VERTEBRA

BURIAL NUMBER 1977-6
* EXTENDED / SEMI-FLEXED

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 20 JULY 1977

BURIAL ASSOCIATION: w/1977-5

AGE: INFANT: ~~[illegible]~~ / FETAL (9 MONTHS)

SEX: ?

BONE EXTREMELY FRAGILE; BONE LOSS/SCATTER — PRESERVATION: FAIR

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | 6 | 6 | | | SEE NOTES | — |
| 2) parietal | (6? | 6?) | | | | |
| 3) frontal | 6 | 5 | | | | |
| 4) temporal | (6? | 6?) | | | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | | | | |

B) ~~THE~~ Face

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | 1-2 | 1-2 | | | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

C) Mandible

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| C) Mandible | <1 | <1 | | | | |

ALL TEETH ABSENT

POST-CRANIAL:

A) Vertebral column
1) Cervical
2) Thoracic
3) Lumbar
4) Sacrum — ABSENT
5) Coccygeal — ABSENT

— 1 FRAG, VERTE. BODY, NO PATH.
— 27 NEURAL ARCHES
— BOTH HALVES, ARCH OF ATLAS

B) Ribs
1) True Ribs
Left
Right
2) False Ribs
Left
Right

28 RIB FRAGS; NO NOTEABLE PATHOLOGY

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | 1 | | |
| 2) Body | | ✓ | |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | L | R |
|---|---|---|---|---|---|---|
| 1) Clavicle | <1 | 1 | | | | |
| 2) Scapula | 2 | 1 | | | | |

BURIAL NUMBER 1977- 6

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 20 July 19

AGE: INFANT : FETAL } 9 months
SEX: ?

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| E) Upper limbs | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Humerus | <4 | <4 | | | | |
| 2) Ulna | 5 | <4 | | | | |
| 3) Radius | <4 | <4 | | | | |

9 METAPODIALS (POSS. PHALANGES — AT LEAST 1)

| Hand | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Carpals (8) | | | ✓ | ✓ | | |
| 2) Metacarpals (5) (SEE FOOT) | | | | | | |
| 3) Phalanges (14) | | | | | | |

| F) Innominate | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Ischium | | | ✓ | ✓ | | |
| 2) Ilium | | 4 | ✓ | | | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |

| G) Lower limbs | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Femur | <4 | <4 | | | | |
| 2) Fibula | <4 | 5 | | | | |
| 3) Tibia | <4 | 5 | | | | |
| 4) Patella | | | ✓ | ✓ | | |

SEE HAND

| Foot | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Tarsals (7) * (1 POSS. LEFT HALLUX) | | | ✓ | ✓ | | |
| 2) Metatarsals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |

ADDITIONAL COMMENTS, OBSERVATIONS :

CALVARIUM
- BOTH PETROUS PORTIONS, MASTOID PROCESSES
- BOTH OCCIPITAL CONDYLES
- 13 FRAGS. CRANIAL BONE

* HEAVY INFECTION, ALL BONES — PROBABLY CAUGHT IN UTERO

BURIAL NUMBER 1977-6

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ______

CULTURE ______

EXCAVATION DATE ~ 20 JULY 1977

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A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural X Dental X Pubis ___ Epiphyses ___ Average ___

PHYSIOLOGICAL AGE ESTIMATE: ___ INFANT: FETAL — NOTE MANDIBLE

2) SEX: Female ___ Male ___

---

B) GROSS PATHOLOGICAL OBSERVATIONS

___(1) TRAUMA
- ___(a) fractures ______
- ___(b) crushing injuries ______
- ___(c) bone wound, sharp instrument ______
- ___(d) dislocations ______
- ___(e) Osteosclerosis ______
- ___(f) surgery ______

___(2) ARHTRITIS
- ___(a) degenerative joint disease ______
- ___(b) Vertebral osteophytosis ? ______
- ___(c) Traumatic arthritis ______
- ___(d) Rheumatoid arthritis ______
- ___(e) Infectious arthritis ______
- ___(f) Anklyosing spondylitis ______

✓(3) OSTEITIS
- ✓(a) Periostitis ALL LONGBONES, PELVIS, CRANIAL BONES
- ___(b) Acute osteomyelitis ______
- ___(c) Chronic osteomyelitis ______
- ___(d) Chronic non-supportive osteomyelitis ______
- ___(e) Granulomatous lesions ______

___(4) TUMORS
- ___(a) Benign ______
- ___(b) Malignant ______
- ___(c) Metastases of the skeleton ______

___(5) ANOMALIES
- ___(a) Endocrine disturbances ______
- ___(b) Blood disorders ______
- ___(c) Nutritional deficiencies ______
- ___(d) Congenital defects ______
- ___(e) Miscellaneous defects ______
- ___(f) Squatting facets ______
- ___(g) Allen's facets ______
- ___(h) Foramina of vertebrae
  - ___(1) missing ______
  - ___(2) incomplete ______
  - ___(3) multiple ______

BURIAL NUMBER 1977-7
* (GRAVE IDENTIFIED)

ANTIQUITY

CULTURE

SITE NAME EIDEN
SITE NUMBER 33 LN 14

EXCAVATION DATE BURIAL NOT EXCAVATED

AGE:
SEX:
} IMPOSSIBLE TO DETERMINE (7 FRAGS)
ADULT, LARGE.

PRESERVATION: IMPOSSI
TO DETERMIN

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calverium

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | | | ✓ | ✓ | | |
| 2) parietal | | | ✓ | ✓ | | |
| 3) frontal | | | ✓ | ✓ | | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | | | | |

B) ~~EEM~~ Face

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | 4 | | | ✓ | ROUGHENING, SURFACE OF CO MARGIN | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| C) Mandible (7 FRAGS: TWO LG.) | 3 | | | ✓ | | |

(ARTICULAR HEAD & FRAG OF BODY OF RAMUS) NOTE SIZE, ROBUST
OF MUSCULAR ATTACHMENTS, BUT COMPARATIVE THINNESS OF BO

POST-CRANIAL:

A) Vertebral column

ABSENT {
1) Cervical
2) Thoracic
3) lumbar
4) Sacrum
5) Coccygeal

B) Ribs

ABSENT {
1) True Ribs
Left
Right
2) False Ribs
Left
Right

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | L | R |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |

BURIAL NUMBER 1977-7
(GRAVE IDENTIFIED

ANTIQUITY

CULTURE

SITE NAME EIDEN
SITE NUMBER 33 LN 14

EXCAVATION DATE BURIAL NOT EXCAVATED

---

AGE: } IMPOSSIBLE TO DETERMINE.
SEX: } ADULT, LARGE

---

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| E) Upper limbs | | | | | | |
| 1) Humerus | | | ✓ | ✓ | | |
| 2) Ulna | | | ✓ | ✓ | | |
| 3) Radius | | | ✓ | ✓ | | |
| Hand | | | | | | |
| 1) Carpals (8) | | | ✓ | ✓ | | |
| 2) Metacarpals (5) | | | ✓ | ✓ | | |
| 3) Phalanges (14) | | | ✓ | ✓ | | |
| F) Innominate | | | | | | |
| 1) Ischium | | | ✓ | ✓ | | |
| 2) Ilium | | | ✓ | ✓ | | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |
| G) Lower limbs | | | | | | |
| 1) Femur | | | ✓ | ✓ | | |
| 2) Fibula | | | ✓ | ✓ | | |
| 3) Tibia | | | ✓ | ✓ | | |
| 4) Patella | | | ✓ | ✓ | | |
| Foot | | | | | | |
| 1) Tarsals (7) | | | ✓ | ✓ | | |
| 2) Metatarsals (5) | | | ✓ | ✓ | | |
| 3) Phalanges (14) | | | ✓ | ✓ | | |

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ADDITIONAL COMMENTS, OBSERVATIONS :

MALAR BONE — POSS. INFECTION : PERIOSTITIS?

BURIAL NUMBER 1977-8
*

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ?

AGE:
SEX: MALE?

~~IMPOSSIBLE TO DETERMINE~~. ADULT, VERY ROBUST ⟨10 FRAGS. OF BURIAL ALL OF LEFT FOOT⟩ (>25 YRS?)

PRESERVATION OF BONE: GOOD

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R R | L | R | L | R |
| 1) occipital | | | ✓ | ✓ | | |
| 2) parietal | | | ✓ | ✓ | | |
| 3) frontal | | | ✓ | ✓ | | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ |

B) Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | | | ✓ | ✓ | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | | | ✓ | ✓ | | |

POST-CRANIAL:

A) Vertebral column

ABSENT {
10 Cervical
2) Thoracic
3) lumbar
4) Sacrum
5) Coccygeal

B) Ribs

ABSENT {
1) True Ribs
Left
Right
2) False Ribs
Left
Right

C) Sternum

| | PRESENT | ABSENT | FRAGMENTARY |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | FRAGMENTARY | |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |
| | LEFT | R | L | R | L | R |

BURIAL NUMBER 1977-8

SITE NAME GIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ?

---

AGE:
SEX: MALE? } ~~[illegible]~~ ADULT, VERY ROBUST (>25 YRS?)

---

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | FRAGMENTAR | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| E) Upper limbs | | | | | | |
| 1) Humerus | | | ✓ | | | |
| 2) Ulna | | | ✓ | | | |
| 3) Radius | | | ✓ | | | |
| Hand | | | | | | |
| 1) Carpals (8) | | | | | | |
| 2) Metacarpals (5) | | | | | | |
| 3) Phalanges (14) | | | | | | |
| F) Innominate | | | | | | |
| 1) Ischium | | | ✓ | ✓ | | |
| 2) Ilium | | | ✓ | ✓ | | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |
| G) Lower limbs | | | | | | |
| 1) Femur | | | ✓ | ✓ | | |
| 2) Fibula | | | ✓ | ✓ | | |
| 3) Tibia | | | ✓ | ✓ | | |
| 4) Patella | | | ✓ | ✓ | | |
| Foot | | | | | | |
| 1) Tarsals (7) ~~[illegible]~~ LEFT TALUS | 3 | | | ✓ | | |
| 2) Metatarsals (5) — 3: INCL. HALLUX | | | | | | |
| 3) Phalanges (14) — 1 | | | | | | |

NOTE ROBUSTICITY

---

ADDITIONAL COMMENTS, OBSERVATIONS :

BURIAL NUMBER 1974-8

SITE NAME GIDEN

SITE NUMBER 33 LN 14.

ANTIQUITY ____

CULTURE ____

EXCAVATION DATE ?

---

A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural-- ____ Dental ____ Pubis ____ Epiphyses >25 yrs ? Average ____

PHYSIOLOGICAL AGE ESTIMATE: ____

2) SEX: Female ____ Male ? / (~~[illegible]~~) MALE?

COMPARISON OF TALI OF BURIALS 3, 8, 11, 12

---

B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
- ____(a) fractures /____/
- ____(b) crushing injuries /____/
- ____(c) bone wound, sharp instrument /____/
- ____(d) dislocations /____/
- ____(e) Osteosclerosis /____/
- ____(f) surgery /____/

____(2) ARHTRITIS
- ____(a) degenerative joint disease /____/
- ____(b) Vertebral osteophytosis X____/
- ____(c) Traumatic arthritis /____/
- ____(d) Rheumatoid arthritis /____/
- ____(e) Infectious arthritis /____/
- ____(f) Anklyosing spondylitis /____/

____(3) OSTEITIS
- ____(a) Periostitis /____/
- ____(b) Acute osteomyelitis /____-/
- ____(c) Chronic osteomyelitis /____/
- ____(d) Chronic non-supportive osteomyelitis /____/
- ____(e) Granulomatous lesions /____/

____(4) TUMORS
- ____(a) Benign /____/
- ____(b) Malignant /____/
- ____(c) Metastases of the skeleton /____/

____(5) ANOMALIES
- ____(a) Endocrine disturbances /____/
- ____(b) Blood disorders /____/
- ____(c) Nutritional deficiencies /____/
- ____(d) Congenital defects /____/
- ____(e) Miscellaneous defects /____/
- ____(f) Squatting facets /____/
- ____(g) Allen's facets /____/
- ____(h) Foramina of vertebrae
  - ____(1) missing /____/
  - ____(2) incomplete /____/
  - ____(3) multiple /____/

BURIAL NUMBER 1977-10
*

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ?

---

AGE: 40 + ?

SEX: FEMALE

BURIAL FRAGMENTARY; PRESERVA
POOR

---

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R R | L | R | L | R |
| 1) occipital | | 6 | | | 2 FRAGS, BASI-OCCIPITAL | |
| 2) parietal | 6? | | | ✓ | FRAG., PERA. L PARIETAL, | |
| 3) frontal | | | ✓ | ✓ | PITTING, ROUGHENING OF | |
| 4) temporal | | | ✓ | ✓ | INTERNAL SURFACE: NUT | |
| 5) sphenoid | | | ✓ | ✓ | IONAL / BLOOD DISORDER | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) ~~XXX~~ Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | | | ✓ | ✓ | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | | | ✓ | ✓ | | |

POST-CRANIAL:

A) Vertebral column

| | | | | | | |
|---|---|---|---|---|---|---|
| 10 Cervical | ABSENT | | | | | |
| 2) Thoracic | ABSENT | | | | | |
| 3) lumbar | 1, RANKED 5(-4): MILD → MODERATE PITTING, OSTEOPHYTOSIS (8 ADDITIONAL FRAGS | | | | | |
| 4) Sacrum * | 5 | 6 | 6 | 6 | ABSENT | - |
| 5) Coccygeal | ABSENT | | | | | |

(* MILD PITTING, ALL SURFACES)

B) Ribs

1) True Ribs
Left
Right
ABSENT

2) False Ribs
Left
Right
ABSENT.

C) Sternum

| | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 30 Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |
| | LEFT | R | L | R | L | R |

BURIAL NUMBER 1977-10

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ?

AGE: 40 + ?

SEX: FEMALE

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

|  | PRESENT |  | ABSENT |  | COMMENTS |  |
|---|---|---|---|---|---|---|
|  | L | R | L | R | L | R |
| E) Upper limbs |  |  |  |  |  |  |
| 1) Humerus |  |  | ✓ | ✓ |  |  |
| 2) Ulna | 6 | 5 |  |  | PERIOSTITIS — MILD |  |
| 3) Radius |  | 6 | ✓ |  |  | ** |

(** PROXIMAL FRAG: MILD OSTEOPHYTOSIS —— S
EXTR. SWOLLEN, W/ MEDULLARY DESTRUCTION. SEE R

|  | PRESENT |  | ABSENT |  | COMMENTS |  |
|---|---|---|---|---|---|---|
| Hand |  |  |  |  |  |  |
| 1) Carpals (8) — R LUNATE PRESENT |  | 6 | ✓ |  | PITTING, MILD LIPP |  |
| 2) Metacarpals (5) 1ST - 4TH RIGHTS PRESENT |  | 2-3 | ✓ |  |  |  |
| 3) Phalanges (14) 1ST - 4TH RIGHT PROXIMALS PRESENT (2ND, RANKED < 4) |  | 4 | ✓ |  |  | MILD PER<br>MILD LIPP |

11 FRAGS. PRESENT, UNIDENTIFIABLE

|  | PRESENT |  | ABSENT |  | COMMENTS |  |
|---|---|---|---|---|---|---|
| F) Innominate |  |  |  |  |  |  |
| 1) Ischium | 5 |  | ✓ |  | ~~MILD PITTING~~ |  |
| 2) Ilium | 6 | 6 |  |  | — PITTING (MILD |  |
| 3) Pubis |  |  | ✓ | ✓ |  |  |
| 4) Acetabulum | 3 |  |  | ✓ | (ISCHIAL 1/3 PRE |  |

NOTE: EXTRA LEFT FEMUR (MARKED 1977-10) FOUND IN BOX

|  | PRESENT |  | ABSENT |  | COMMENTS |  |
|---|---|---|---|---|---|---|
| G) Lower limbs |  |  |  |  |  |  |
| 1) Femur | 5 | 6 | EXTREMELY MILD PERIOSTITIC STRIATIONS |  |  |  |
| 2) Fibula | 5 |  |  | ✓ | MILD PITTING; SHA<br>(DISTAL) SMALL SHAFT S |  |
| 3) Tibia | 5 | 5-6 |  |  | SEE NOTES BELOW |  |
| 4) Patella |  |  | ✓ | ✓ |  |  |
| Foot |  |  |  |  |  |  |
| 1) Tarsals (7) |  |  | ✓ | ✓ |  |  |
| 2) Metatarsals (5) |  |  | ✓ | ✓ |  |  |
| 3) Phalanges (14) |  |  | ✓ | ✓ |  |  |

ADDITIONAL COMMENTS, OBSERVATIONS :

LEFT TIBIA: MILD PERIOSTITIS, W/ REMODELLING ON PROXIMAL NECK
RIGHT TIBIA: PERIOSTITIS, SHAFT, PROXIMAL END; ANTERIOR SURFACE OF PROXIMAL END, ABOVE CREST, SHOWS PRONOUNCED
PITTING & DEGENERATION; AND SHAFT & NECK SWOLLEN (COMPARED TO LEFT, QUITE NOTICEABLE) ; POSSI
SYPHILITIC. (!)

RIGHT RADIUS: CANCELLOUS / MEDULLAR DESTROYED, SHAFT SWOLLEN : OSTEOMYELITIS ?

BURIAL NUMBER 1977-10

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ____________

CULTURE ____________

EXCAVATION DATE ?

---

A) GROSS AGE AND SEX DETERMINATIONS

FLATTENED SACRUM - ♀?

VERTEBRAL OSTEOPHYTOSIS: ≥ 40?

VERTEBRAE +25

1) AGE: Sutural X Dental X Pubis ___ Epiphyses +25 Average ___

PHYSIOLOGICAL AGE ESTIMATE: 40 + ? — SYPHILIS: TERTIARY STAGE: ≈ 40's?

2) SEX: Female ✓ Male ___ /FRAG OF RIGHT OBTURATOR FORAMEN SEEMS TO SUGGEST/ TRIANGULARITY — ♀; SEE SACRUM (ABOVE); VERTEBRAE — W THEN HIGH, W/ PRONOUNCED MARGI

---

B) GROSS PATHOLOGICAL OBSERVATIONS

___(1) TRAUMA
- ___(a) fractures
- ___(b) crushing injuries
- ___(c) bone wound, sharp instrument
- ___(d) dislocations
- ___(e) Osteosclerosis
- ___(f) surgery

✓ (2) ARTHRITIS
- ✓ (a) degenerative joint disease /RIGHT HAND?/
- ✓ (b) Vertebral osteophytosis /LUMBAR VERTEBRAE/
- ___(c) Traumatic arthritis
- ___(d) Rheumatoid arthritis
- ___(e) Infectious arthritis
- ___(f) Anklyosing spondylitis

✓ (3) OSTEITIS
- ✓ (a) Periostitis / LOWER LIMBS; INNOMINATES; ULNAS?
- * (b) Acute osteomyelitis /POSSIBLY CALVARIUM, RIGHT TIBIA, RIGHT RADIUS —/
- ___(c) Chronic osteomyelitis
- ___(d) Chronic non-supportive osteomyelitis
- ___(e) Granulomatous lesions

___(4) TUMORS
- ___(a) Benign
- ___(b) Malignant
- ___(c) Metastases of the skeleton

* (5) ANOMALIES
- ___(a) Endocrine disturbances
- * (b) Blood disorders — SEE ABOVE, 3(b)
- ___(c) Nutritional deficiencies
- ___(d) Congenital defects
- ___(e) Miscellaneous defects
- ___(f) Squatting facets
- ___(g) Allen's facets
- ___(h) Foramina of vertebrae
  - ___(1) missing
  - ___(2) incomplete
  - ___(3) multiple

BURIAL NUMBER 1977 - 11

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ?

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AGE: 23 +

SEX: [illegible] MALE?

BURIAL EXTREMELY FRAGMENTARY;
PRESERVATION OF BONE FROM EROS
WEATHERING: GOOD → EXCELLENT

---

# INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

2 FRAGS. CRANIAL BONE — SEE NOTES BELOW

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| 1) occipital | | | ✓ | ✓ | | |
| 2) parietal | | | ✓ | ✓ | | |
| 3) frontal | | | ✓ | ✓ | | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) ~~The~~ Face

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | | | ✓ | ✓ | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| C) Mandible | | | ✓ | ✓ | | |

POST-CRANIAL:

A) Vertebral column

| | | | |
|---|---|---|---|
| 1) Cervical | ABSENT | | |
| 2) Thoracic | | | |
| 3) Lumbar | | | |
| 4) Sacrum | | | |
| 5) Coccygeal | ABSENT | 5 (PITTING) | ABSENT |

B) Ribs

9 RIB FRAGS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1) True Ribs Left | | | | | | | |
| Right | | | | | | | |
| 2) False Ribs Left | | | | | | | |
| Right | | | | | | | |

C) Sternum

| | PRESENT | ABSENT | FRAGMENTARY |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| 3) Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | FRAGMENTARY | |
|---|---|---|---|---|---|---|
| 1) Clavicle | | | ✓ | ✓ | | |
| 2) Scapula | | | ✓ | ✓ | | |
| | LEFT | R | L | R | L | R |

BURIAL NUM: 1977 - 11

SITE NAME: EIDEN
SITE NUMBER: 33 LN 14.

ANALYZED BY:

CULTURE:

[illegible]: ?

---

AGE: 23 +

SEX: ~~[illegible]~~ MALE [illegible]

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INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

|  | PRESENT L | PRESENT R | ABSENT L | ABSENT R | ~~COMMENTS~~ COMMENTS L | R |
|---|---|---|---|---|---|---|
| E) Upper limbs (5 FRAGS, SHAFTS (3 POSS FIBULA)) |  |  |  |  |  |  |
| 1) Humerus |  |  | ✓ | ✓ |  |  |
| 2) Ulna |  | 3 (2) | ✓ |  |  | SEE No |
| 3) Radius |  |  | ✓ | ✓ |  |  |
| Hand |  |  |  |  |  |  |
| 1) Carpals (8) |  |  | ✓ | ✓ |  |  |
| 2) Metacarpals (5) — RIGHT THUMB ONE MEDIAL MC | 1 | 4 |  |  |  | ROUGHE OF SHA |
| POSSIBLY FOOT? — 3) Phalanges (14) (2 MEDIAL, 1 TERMINAL) | 3 |  |  |  |  |  |
| F) Innominate |  |  |  |  |  |  |
| 1) Ischium |  | 3 | ✓ |  | NOTE — 8 |  |
| 2) Ilium |  |  | ✓ | ✓ | UNIDENTIFIABLE |  |
| 3) Pubis |  |  | ✓ | ✓ | FRAGMENTS, |  |
| 4) Acetabulum |  |  | ✓ | ✓ | ALL PROB. PEL |  |
| G) Lower limbs (SEE UPPER LIMBS) |  |  |  |  |  |  |
| 1) Femur — R: MOD → LIGHT PERIOSTITIS |  | 5 | ✓ |  |  |  |
| 2) Fibula |  | >6 | ✓ |  |  |  |
| 3) Tibia |  |  | ✓ |  |  |  |
| 4) Patella — R PATELLA: OSTEOPHYTIC, SPURS: RESPONSE TO INFECTION (SEVERE) | 2 | (4?) |  |  |  | EXTREM ROUGHEN & STRIA |
| Foot |  |  |  |  |  |  |
| 1) Tarsals (7) 5 PRESENT, PROB LEFT. SEE NOTES | 4 |  |  | ✓ |  |  |
| 2) Metatarsals (5) 6 PRESENT — LEFT HALLUX, 5 MEDIAL MTS | 6 |  |  |  | ~~[illegible]~~ — OSTEOPORO |  |
| (SEE HAND) → 3) Phalanges (14) |  |  |  |  |  |  |

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ADDITIONAL COMMENTS, OBSERVATIONS :

TARSALS — LEFT NAVICULAR, PITTING — 4 (-5)
LEFT CALCANEUS, SEVERE PITTING (OSTEOPOROSIS), BONY SPURS (CONGENITA), ROUGHNESS — <4
LEFT TALUS, LIGHT PITTING — 4
~~[illegible]~~ POSS. FRAG. OF CUBOID
LEFT MEDIAL CUNEIFORM, — 1

RIGHT FEMUR — "REACTION AREA," NECK OF ~~PROXIMAL ARTICULAR END~~, PITTING, BALL OF HEAD. NOTE ROUGHNESS OF ATTACHMENTS, LESSER TROCHANTER OSTEOPOROTIC PITTING ALONG SHAFT. PERIOSTITIS / INFECTION

PROXIMAL ARTICULAR HEAD, RIGHT FIBULA — NOTE ROUGHENING, PITTING OF ARTICULAR SURFACE, ROUGH MUSCULAR ATTACHMENTS

RIGHT ULNA — FRAG, NECK OF PROXIMAL END BELOW HEAD. LIGHT PITTING?; FRAG, SHAFT (DISTAL)

BURIAL NUMBER 1977 — 11

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ____

CULTURE ____

EXCAVATION DATE ?

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A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural — X Dental NA Pubis NA Epiphyses ≥23 (PROXIMAL FIBULA) Average ____
PHYSIOLOGICAL AGE ESTIMATE: 23 +

2) SEX: Female ____ Male ✓ / ROBUSTICITY OVERALL — NOTE COMPARISON WITH / 1977-3 — & OF FEMORAL MUSCULAR ATTACHMENTS. COMPARISON, WIDTH OF HEAD OF FEMUR W/BURIALS 3,1C

B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
____(a) fractures /____/
____(b) crushing injuries /____/
____(c) bone wound, sharp instrument /____/
____(d) dislocations /____/
____(e) Osteosclerosis /____/
____(f) surgery /____/

✓ (2) ARHTRITIS
____(a) degenerative joint disease /____/
✓ (b) ~~[illegible]~~ osteophytosis / OSTEOPHYTE, R PATELLA — SEVERE STRIATIONS: RESPONSE TO PERIOSTITIS? /
____(c) Traumatic arthritis /____/
____(d) Rheumatoid arthritis /____/
____(e) Infectious arthritis /____/
____(f) Anklyosing spondylitis /____/

✓ (3) OSTEITIS
✓ (a) Periostitis / FEMUR (R) — SEE R PATELLA /
____(b) Acute osteomyelitis /____/
____(c) Chronic osteomyelitis /____/
____(d) Chronic non-supportive osteomyelitis /____/
____(e) Granulomatous lesions /____/

____(4) TUMORS
____(a) Benign /____/
____(b) Malignant /____/
____(c) Metastases of the skeleton /____/

✓ (5) ANOMALIES
____(a) Endocrine disturbances /____/
____(b) Blood disorders /____/
____(c) Nutritional deficiencies /____/
✓ (d) Congenital defects / BONY SPURS, L CALCANEUS /
____(e) Miscellaneous defects /____/
____(f) Squatting facets /____/
____(g) Allen's facets /____/
____(h) Foramina of vertebrae
____(1) missing ____
____(2) incomplete /____
____(3) multiple /____

1

BURIAL NUMBER 1977-12
& POSSIBLE BUNDLE

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 29 JULY 1977

AGE: 23-6
SEX: FEMALE ~~[illegible]~~

BURIAL FRAGMENTARY; PRESERVATION OF BONE FROM EROSION/WEATHERING: GOOD

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

SEE NOTES BELOW

| | PRESENT L | PRESENT R R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | | | ✓ | ✓ | | |
| 2) parietal | | | ✓ | ✓ | | |
| 3) frontal | | | ✓ | ✓ | | |
| 4) temporal | | | ✓ | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | ✓ | ✓ | | |

B) EKM Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | | 5 | ✓ | [illegible] | | PITTING |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | | | ✓ | ✓ | | |

POST-CRANIAL:

A) Vertebral column

10 FRAGS THORACIC & LUMBAR

| | | | | | |
|---|---|---|---|---|---|
| 10 Cervical | 3 PRESENT: | 3 | 2 | 2 | — |
| 2) Thoracic | | | | | |
| 3) Lumbar | | | | | |
| 4) Sacrum | ABSENT — | | | | |
| 5) Coccygeal | ABSENT — | | | | |

B) Ribs

25 MISC RIB FRAGS

1) True Ribs

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Left | | | | | | | |
| Right | | | | | | | |

2) False Ribs

| | | | | | |
|---|---|---|---|---|---|
| Left | | | | | |
| Right | | | | | |

C) Sternum

| | PRESENT | ABSENT | [illegible] |
|---|---|---|---|
| 1) Manubrium | | ✓ | |
| 2) Body | | ✓ | |
| ~~3~~0 Xiphoid process | | ✓ | |

D) Shoulder Girdle

| | PRESENT | | ABSENT | | [illegible] | |
|---|---|---|---|---|---|---|
| 1) Clavicle | 2 | 3 | | | | |
| 2) Scapula | | | ✓ | ✓ | | |

BURIAL NUMBER 1977-12

SITE NAME GIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~28 JULY 197

AGE: 23-26
SEX: FEMALE

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| **E) Upper limbs** | | | | | | |
| 1) Humerus – CONGENITAL ANOMALY – PERFORATED FOSSA, DISTAL ENDS | | 1 | ✓ ⊕ | | | |
| 2) Ulna | | 3 | | | | * |
| 3) Radius | 3 | | | | ** | |
| **Hand** | | | | | | |
| 1) Carpals (8) 2 – NOT SIDED | | | ✓ | ✓ | | |
| 2) Metacarpals (5) POSS.: L II METACARPAL, 8 FRAGS | (3? | 3? | | | | |
| 3) Phalanges (14) 6 MEDIAL PHALANGES, 2-3; 1 TERMINAL, 1 | | | | | | |
| **F) Innominate** | | | | | | |
| 1) Ischium | | | ✓ | ✓ | | |
| 2) Ilium | | | ✓ | ✓ | | |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |
| **G) Lower limbs** | | | | | | |
| 1) Femur | 5 | 6 | | | | |
| 2) Fibula | (3 | 3) | | | ? SEE NOTES | |
| 3) Tibia | 2 | | | ✓ | POSS. 5 | |
| 4) Patella | 1 | 1 | | | | |
| **Foot** | | | | | | |
| 1) Tarsals (7) – CALCANEUS, TALUS, 3RD CUNEIFORM } LEFT → | 1 | | | ✓ | | |
| 2) Metatarsals (5) ♠ EACH SIDE, MEDIAL: 2L, 1R | 4 | ♠ 2 | | | PITTING | |
| 3) Phalanges (14) – 3 PRESENT: MEDIAL & DISTAL PHALANGES, LEFT HALLUX; MEDIAL PHALANX, RIGHT HALLUX | 1 | | | | | |

INFECTIONS (PERIOSTITIS) ON MATERIAL PRESENT – LIGHT → MOD.

ADDITIONAL COMMENTS, OBSERVATIONS :

CRANIUM: 3 FRAGS CRANIAL BONE, INDETERMINATE; PITTING, ROUGHENING

RIGHT HUMERUS: PITTING, OSTEOPOROSIS AROUND EPIPHYSEAL LINE OF PROXIMAL HEAD

* POSSIBLY DISTAL ARTICULAR END.

** POSSIBLY DISTAL HALF, SHAFT.

? – 2 FRAGS, THIN LONGBONES.

⊕ – POSS. FRAG. OF L. HUMERUS SHAFT.

LEFT TIBIA – POSS. OSTEOPOROTIC PITTING, DISTAL ARTICULAR SURFACE

RIGHT FEMUR – DEFINITE PITTING, HEAD OF GREATER TROCHANTER; 'REACTION AREA' NECK OF ARTICULAR END; PITTING, HEAD

LEFT FEMUR – PERIOSTITIS (STRIATIONS); REACTION AREA BELOW HEAD; MILD PITTING, ROUGHNESS ON HEAD

BURIAL NUMBER 1977 - 12

SITE NAME EIDEN

SITE NUMBER 33 Ln 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 28 JULY 1977

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## A) GROSS AGE AND SEX DETERMINATIONS

VERTEBRAE — ≤25 / >23? 16-22 / 16-25 / 15-27 RIDGES OF CENTRA NOT FUSED

1) AGE: Sutural X Dental NA Pubis NA Epiphyses 20-25 Average

PHYSIOLOGICAL AGE ESTIMATE: ≈23-25

2) SEX: Female ✓ Male

VERTEBRAL MARGINS PRONOUNCED, WIDTH > HEIGHT: ♀

COMPARISON, WIDTH OF HEAD OF FEMUR, w/BURIALS 3, 11

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## B) GROSS PATHOLOGICAL OBSERVATIONS

(1) TRAUMA
- (a) fractures
- (b) crushing injuries
- (c) bone wound, sharp instrument
- (d) dislocations
- (e) Osteosclerosis
- (f) surgery

(2) ARTHRITIS
- (a) degenerative joint disease
- (b) Vertebral osteophytosis
- (c) Traumatic arthritis
- (d) Rheumatoid arthritis
- (e) Infectious arthritis
- (f) Ankylosing spondylitis

✓ (3) OSTEITIS
- ✓ (a) Periostitis LEFT FEMUR, R FEMUR
- (b) Acute osteomyelitis
- (c) Chronic osteomyelitis
- (d) Chronic non-supportive osteomyelitis
- (e) Granulomatous lesions

(4) TUMORS
- (a) Benign
- (b) Malignant
- (c) Metastases of the skeleton

(5) ANOMALIES
- (a) Endocrine disturbances
- (b) Blood disorders OSTEOPOROSIS, HUMERI
- (c) Nutritional deficiencies
- (d) Congenital defects
- (e) Miscellaneous defects
- (f) Squatting facets
- (g) Allen's facets
- (h) Foramina of vertebrae
  - (1) missing
  - (2) incomplete
  - (3) multiple

BURIAL NUMBER 1977-13
* SEMI-FLEXED (IN ARMS OF 1977-9)

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~29 JULY 1977

BURIAL ASSOCIATION: W/1977-9 & 1977-14

AGE: INFANT: 6 MONTHS (0-6 mo.)
SEX: ?

BONE FRAGILE, BUT PRESERVATION GOOD → EXCELLENT. SOME FRAGMEN
ESP. OF CRANIUM.

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

64+ FRAGS – CRANIAL BONE (occipital, parietal, frontal)
LINES; – INFECTION ALL CRANIAL BONES
– PITTING, EYE ORBITS (frontal)

| | PRESENT | | ABSENT | | COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R R | L | R | L | R |
| 1) occipital | | | | | SEE NOTES, | OBSERVATION |
| 2) parietal | 3 | 3 | | | | |
| 3) frontal | 4-5 | 4-5 | | | FRAGS, BOTH | ORBITS |
| 4) temporal | 2 | | | ✓ | | |
| 5) sphenoid | | | ✓ | ✓ | | |
| 6) ethmoid | | | | | | |

B) Face

| | | | | | | |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | | | ✓ | ✓ | | |
| 3) malar | <1 | <1 | | | | |
| 4) maxilla | | | ✓ | ✓ | | |
| 5) lacrimal | | | ✓ | ✓ | | |
| 6) inferoir nasal | | | ✓ | ✓ | | |
| 7) vomer | | | ✓ | ✓ | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C) Mandible | | 3 | ✓ | | | |

CROWN FRAGMENT, MOLAR?

POST-CRANIAL:

A) Vertebral column

7 VERTEBRAL BODIES, 40 UNFUSED SEGMENTS NEURAL ARCHES

10 Cervical
2) Thoracic
3) Lumbar
4) Sacrum 2(-1) ABSENT
5) Coccygeal ABSENT

B) Ribs

37 RIBS OR FRAGS. PRESENT 4:1 THE REST: 3

1) True Ribs
Left 1 SEE COMMENTS
Right 1
2) False Ribs
Left
Right

| C) Sternum | PRESENT | ABSENT | |
|---|---|---|---|
| 1) Manubrium | 1 | | |
| 2) Body | | ✓ | |
| 30 Xiphoid process | | ✓ | |

| D) Shoulder Girdle | PRESENT | | ABSENT | | | |
|---|---|---|---|---|---|---|
| 1) Clavicle | <1 | 2 | | | | |
| 2) Scapula | 1 | 2 | | | | |
| | LEFT | R | L | R | L | R |

BURIAL NUMBER 1977-13

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~29 JULY 197

AGE: INFANT : 6 MONTHS

SEX: ?

INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

| | PRESENT | | ABSENT | | ~~[illegible]~~ COMMENTS | |
|---|---|---|---|---|---|---|
| | L | R | L | R | L | R |
| E) Upper limbs | | | | | | |
| 1) Humerus | 4 | 5 | | | | DISTAL E |
| 2) Ulna | 4 | 5 | | | | PROX. EN |
| 3) Radius | 4 | 6 | | | 2 PCS. | PROX. E |
| Hand | | | | | | |
| 1) Carpals (8) | | | ✓ | ✓ | | |
| POSS. TARSAL — 2) Metacarpals (5) — 8 PRESENT | | | | | | |
| 3) Phalanges (14) — THREE PRESENT | / | | | | | |
| F) Innominate | | | | | | |
| 1) Ischium | | / | ✓ | | | |
| 2) Ilium | <2 | 4 | | | | PERIOST |
| 3) Pubis | | | ✓ | ✓ | | |
| 4) Acetabulum | | | ✓ | ✓ | | |
| G) Lower limbs | | | | | | |
| 1) Femur | 4 | 4 | | | | |
| 2) Fibula | 5-6 | 5-6 | | | | |
| 3) Tibia | 4 | 1-4 | | | | 2 PC |
| 4) Patella | | | ✓ | ✓ | | |
| Foot | | | | | | |
| 1) Tarsals (7) | | | ✓ | ✓ | | |
| SEE HAND — 2) Metatarsals (5) HALLUX – LEFT? 4 MTS – SIDE? | / | | | | 5 PRESENT — S | |
| 3) Phalanges (14) | | | | | | |

ADDITIONAL COMMENTS, OBSERVATIONS :

OCCIPITAL : BOTH PETROUS PROCESSES, MOST OF FRAGS OF BASI-OCCIPITAL

ONE TOOTH CROWN PRESENT
CARBONS IN SMALL ENVELOPE

BURIAL NUMBER 1977 -13

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ______

CULTURE ______

EXCAVATION DATE ~29 JULY 1977

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A) GROSS AGE AND SEX DETERMINATIONS

1) AGE: Sutural x Dental x Pubis ___ Epiphyses ___ Average ___

PHYSIOLOGICAL AGE ESTIMATE: INFANT: 6 MONTHS ~~[illegible]~~

2) SEX: Female ___ Male ___

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B) GROSS PATHOLOGICAL OBSERVATIONS

___(1) TRAUMA
- ___(a) fractures
- ___(b) crushing injuries
- ___(c) bone wound, sharp instrument
- ___(d) dislocations
- ___(e) Osteosclerosis
- ___(f) surgery

___(2) ARTHRITIS
- ___(a) degenerative joint disease
- ___(b) Vertebral osteophytosis
- ___(c) Traumatic arthritis
- ___(d) Rheumatoid arthritis
- ___(e) Infectious arthritis
- ___(f) Anklyosing spondylitis

✓(3) OSTEITIS
- ✓(a) Periostitis CRANIAL BONES, ALL LONGBONES (ESP. L UPPER LIMB), PE
- ___(b) Acute osteomyelitis
- ___(c) Chronic osteomyelitis
- ___(d) Chronic non-supportive osteomyelitis
- ___(e) Granulomatous lesions

___(4) TUMORS
- ___(a) Benign
- ___(b) Malignant
- ___(c) Metastases of the skeleton

✓(5) ANOMALIES
- ___(a) Endocrine disturbances
- ___(b) Blood disorders
- ✓(c) Nutritional deficiencies
- ___(d) Congenital defects PITTING OF EYE ORBITS
- ___(e) Miscellaneous defects
- ___(f) Squatting facets
- ___(g) Allen's facets
- ___(h) Foramina of vertebrae
  - ___(1) missing
  - ___(2) incomplete
  - ___(3) multiple

BURIAL NUMBER 1977-14
* FLEXED (BUNDLED?)

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~ 29 JULY 197

BURIAL ASSOCIATION: W/BURIALS #1977-9 & 1977-13

AGE: 50 +

PRESERVATION: FAIR (→ P

SEX: FEMALE

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT

CRANIAL:

A) Calvarium

NOTE: 3 WORMIAN BONES AT LAMBDOIDAL SUTURE — (R) RIGHT SIDE

occipital — THICKENED, ROUGH, PITTED

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) occipital | 2 4 | | BASI-OCCIPITAL FRAGMENTED · | | | MILD PITTING |
| 2) parietal | 4 | 5 | ROUGHENING, THICKENING, MILD PITTING | | | |
| 3) frontal | 4 | | | | | |
| 4) temporal | 4 | 3 | | | MILD PITTING, LIPPING, STYLOID P | |
| 5) sphenoid | | 5 | ✓ | | | MILD PITTIN |
| 6) ethmoid | | | ✓ | ✓ | | |

B) Face

MOST OF BOTH EYE ORBITS — EST LEFT — PRESENT

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) palatine | | | ✓ | ✓ | | |
| 2) nasal | 2 | 2 | | | UPPER HALVES OF BOTH | |
| 3) malar | 1 | 1 | | | ZYGO. ARCH GONE, R. | |
| 4) maxilla | 6 | 6 | | | CONSIDERABLE RESORPTION, PIT | |
| 5) lacrimal | | | ✓ | ✓ | LOSS OF MOST TEETH SE | |
| 6) inferoir nasal | | | ✓ | ✓ | WEAR & DESTRUCTION OF | |
| 7) vomer | | | ✓ | ✓ | REMAINING. | |

C) Mandible 4 | 5 | LOSS OF ALL LOWER TEETH, CONSIDERABLE RESORPTION, BOTH SIDES; PITTING; CONGENI ANOMALY: SPURS "BELOW INCISORS" AT SYMPHYSE FL

POST-CRANIAL:

A) Vertebral column 3 CERVICAL VERTEBRAE: BIFID SPINES

* NOTABLE OSTEOARTHRITIS (SEVERE)

| | |
|---|---|
| 1) Cervical | FIRST 6 PRESENT: ALL SEVERE OSTEOARTHRITIC LIPPING, MARGINS OF CENTRU |
| 2) Thoracic | 16 CENTRUM & CENTRUM-ARCH FRAGS; 10 ARCH FRAGS. AND → HEAVY LIPPING |
| 3) Lumbar | SEVERE OSTEOARTHRITIC LIPPING, MARGINS OF CENTRUM — 2 PRESENT (4 |
| 4) Sacrum | BODY OF SACRUM, EXTREMELY FRAGMENTARY (6) — STRIATIONS — OSTEOARTHRITIS! |
| 5) Coccygeal | ABSENT |

B) Ribs

47 FRAGS. — ALL 3s OSTEOARTHRITIC LIPPING, ART. END OF L FIRST RIB

1) True Ribs
Left
Right

2) False Ribs
Left
Right

C) Sternum

| | PRESENT | ABSENT | COMMENTS |
|---|---|---|---|
| 1) Manubrium | 5 | | SEVERE ROUGHNESS — |
| 2) Body | | ✓ | INFLAMMATION, OSTEO- |
| 3) Xiphoid process | | ✓ | ARTHRITIC LIPPING, etc. |

D) Shoulder Girdle

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Clavicle | 24 | <4 | | | ** | * |
| 2) Scapula | 6 | (5-)6 | | | | MILD LIPPING, [illegible] ROUGHENING |

* BONE REMODELLING, PITTING SEVERE

** SEVERE ROUGHENING

BURIAL NUMBER 1977-14

SITE NAME EIDEN
SITE NUMBER 33 LN 14

ANTIQUITY

CULTURE

EXCAVATION DATE ~29 JULY 19

AGE: 50+

SEX: FEMALE

## INVENTORY OF OSTEOLOGICAL MATERIAL PRESENT, continued

E) Upper limbs R: BONE PITTING & REMODELLING
L: OSTEOARTHRITIC PITTING SPUR ON DISTAL ART. SURFACE (MEDIAL)

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Humerus | 4 | 4 | | | | 3 pcs. |
| 2) Ulna | 4 | <4 | | | | 3 pcs. |
| 3) Radius | <4 | 4 | | | DISTAL END GONE | |
| Hand | | | | | | |
| 1) Carpals (8) 1 PRESENT | | 1 | ✓ | | | |
| 2) Metacarpals (5) | | | ✓ | ✓ | | |
| 3) Phalanges (14) 1 PRESENT | | 4 | ✓ | | | |

LIPPING, DORSAL MARGINS ~ OSTEOARTHRI

F) Innominate
— LIPPING ALONG CAUDAL, MEDIAL MARGINS, BOTH; PERIOSTITIS — STRIATIONS, REMODELING OF BLADE NR. MARGINS

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Ischium | ✓ | 6 | | | | |
| 2) Ilium | 5 | 6 | [illegible] | | LIPPING* | PITTING, POLISHIN |
| 3) Pubis | 6 | | | ✓ | PITTING, STRIATION | |
| 4) Acetabulum | 4 | 4 | | | MOD. PROX. | LIPPING, PITTING, OSTEO |

G) Lower limbs

| | PRESENT L | PRESENT R | ABSENT L | ABSENT R | COMMENTS L | COMMENTS R |
|---|---|---|---|---|---|---|
| 1) Femur | 4 | 4 | | | | |
| 2) Fibula | 4-5 | 5-6 | | | DISTAL END GONE | PROX. EN |
| 3) Tibia | 4 | >5 | | | | PROX END |
| 4) Patella | 4 | 4 | | | OSTEOPHYTIC SEVERE<br>STRIATIONS (DEGENERATIVE) | OSTEO LIPPI<br>PIT STRIA |
| Foot | | | | | | |
| 1) Tarsals (7) ALL PRESENT EXCEPT R MEDIAL CUNEIFORM SEE NOTES | 4 | 4 | | | | |
| 2) Metatarsals (5) ALL PRESENT | 1 (4) | 1 (4) | | | POSS. MILD LIP | |
| 3) Phalanges (14) 8 PRESENT! | 1 (4) | 1 (4) | | | ART. MARGINS | |

SEE NOTES

(L) ALL PROXIMAL PHALANGES AND (R) 5TH PROXIMAL PHALANX
(L) 1ST DISTAL PHALANX
(L) 2ND MEDIAL PHALANX

## ADDITIONAL COMMENTS, OBSERVATIONS :

L HUMERUS: PITTING, STRIATIONS, ROUGHENING OF SHAFT — PERIOSTITIS
R HUMERUS: EXT. ROUGHNESS, REMODELLING, LIPPING DISTAL CONDYLE; ROUGHENING, STRIATIONS, PITTING, SHAFTS: PERIOSTIT OSTEOARTHR

L ULNA: SEVERE LIPPING, MARGINS OF PROXIMAL END; BONE REMODELLING (INFLAMMATION), DISTAL SHAFT
R ULNA: " " " " " "; PITTING OF SHAFT ∴ OSTEOARTHRITIS

L RADIUS: PITTING, MILD PERIOSTITIS (ESP. PROX. END)
R RADIUS: SEVERE ARTHRITIC LIPPING, PROXIMAL END; LIPPING, DISTAL ART.; PERIOSTITIS, DISTAL SHAFT

L FEMUR: MODERATE LIPPING, PROXIMAL HEAD; MILD LIPPING, DISTAL ART. MARGINS: PITTING; STRIATIONS, SHAFT (ESP. DISTAL END,
R FEMUR: NOTICEABLE LIPPING, PROX. HEAD; LIPPING & SPURS, GREATER TROCHANTER; PRONOUNCED OSTEOPHYTOSIS, DISTAL ARTICULAR END, ESPECIALLY ON LATERAL CONDYLE MARGIN
R TIBIA: MILD LIPPING, DISTAL ART. END; BONY SPUR, PROX. END OF SHAFT (CONGENITAL ANOMALY?)
L TIBIA: MOD. LIPPING, MARGINS DISTAL END; MILD, PROX. END; PERIOSTITIC STRIATIONS, DISTAL NECK; MILD PI ARTICU
R FIBULA: ROUGHENING & REMODELLING, DISTAL NECK
L FIBULA: SEVERE LIPPING, PROX. END; MILD ROUGHENING OF SHAFT.

BURIAL NUMBER 1977 - 14

SITE NAME EIDEN

SITE NUMBER 33 LN 14

ANTIQUITY ____

CULTURE ____

EXCAVATION DATE ~ 29 JULY 1977

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A) GROSS AGE AND SEX DETERMINATIONS VERTEBRAL OSTEOPHYTOSIS EXTREME: 50+

1) AGE: Sutural ✓ Dental ✓ Pubis ✓ Epiphyses ✓ Average ____

PHYSIOLOGICAL AGE ESTIMATE: 50+

2) SEX: Female ✓ Male ____ /SCIATIC NOTCH, HEAD OF FEMUR SMALLER THAN IN 1977-3/

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B) GROSS PATHOLOGICAL OBSERVATIONS

____(1) TRAUMA
- ____(a) fractures /____/
- ____(b) crushing injuries /____/
- ____(c) bone wound, sharp instrument /____/
- ____(d) dislocations /____/
- ____(e) Osteosclerosis /____/
- ____(f) surgery /____/

✓ (2) ARTHRITIS
- ✓ (a) degenerative joint disease } /RIBS, STERNUM, LIMBS, INNOMINATES
- ✓ (b) osteophytosis } /SEVERE ON VERTEBRAE, PATELLAS, FEMURS
- ____(c) Traumatic arthritis /____/
- ____(d) Rheumatoid arthritis /____/
- ____(e) Infectious arthritis /____/
- ____(f) Anklyosing spondylitis /____/

✓ (3) OSTEITIS
- ✓ (a) Periostitis /INNOMINATES, ALL LONGBONES, CLAVICLES, SCAPULAE/
- ____(b) Acute osteomyelitis /____/
- ____(c) Chronic osteomyelitis /____/
- ____(d) Chronic non-supportive osteomyelitis /____/
- ____(e) Granulomatous lesions /____/

____(4) TUMORS
- ____(a) Benign /____/
- ____(b) Malignant /____/
- ____(c) Metastases of the skeleton /____/

✓ (5) ANOMALIES
- ____(a) Endocrine disturbances /____/
- ✓ (b) Blood disorders /POSS. LEFT CLAVICLE/
- ____(c) Nutritional deficiencies /____/
- ✓ (d) Congenital defects /BIFID SPINES, 3 CERV. VERT.; SPURS, MANDIBLE, BOTH CALCANEUSES/
- ____(e) Miscellaneous defects /POSS. R. TIBIA./
- ____(f) Squatting facets /____/
- ____(g) Allen's facets /____/
- ____(h) Foramina of vertebrae
  - ____(1) missing /____/
  - ____(2) incomplete /____/
  - ____(3) multiple /____/