Chapter 3

ARCHEOZOOLOGICAL ANALYSIS OF THE MIDDLE PALEOLITHIC FAUNA FROM SELECTED LEVELS OF KABAZI II

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INTRODUCTION

This study analyzes the Middle Paleolithic fauna of four archeological levels of Kabazi II. Two of theses levels are from Unit II: Levels II/7E and II/8C, and two from Unit IIA: Levels IIA/1 and IIA/2. In all of these levels, the dominant species is *Equus hydruntinus*.

This small equid was identified originally by Regalia in 1904 (Stasi and Regalia 1904) and its characteristics defined in 1907 (Regalia 1907). It presents numerous features of the stenonids of Europe (Forsten 1990) and differs from asinines and hemiones, in spite of similar proportions. It descends from *Equus altidens* (Eisenmann 1992) and is found from Western to Eastern Europe up to Azerbaijan (Binagady), from the Middle Pleistocene (end of Cromerian) to the Holocene (Eisenmann and Patou 1980). Morphological analysis of the teeth reveals the following characteristics: a slight folding of the enamel characteristic of grazers, there is a double knot (asinine type) on the lower cheek teeth, with a long vestibular groove on the molars, convex inner edges on the protoconid and hypoconid, a v-shaped lingual groove, convex inner edges of the metaconid and metastylid, and a very deep vestibular groove without the caballoid plication. On the upper cheek teeth, there are very prominent styles, which are wide and simple; flat or slightly concave interstylar faces; a short protocone, which is globular and very developed on the mesial side; simple infoldings; and a poorly developed caballoid plication. The morphometric analysis shows a very marked microdontia. The measurement of the width of the protocone, and, when possible (many of the teeth are fragmented), the calculation of the protoconic index, emphasizes that if the mesio-distal diameter of the upper premolars is within the range of *Equus hydruntinus minor*, the protoconical index is higher, as the length of the protocones are larger (Table 3-1 and fig. 3-1). The small equid of Kabazi II is, perhaps, closer to the more evolved *Equus hydruntinus davidi* or *Equus hydruntinus hydruntinus* (Prat 1968).

The bones of the post-cranial skeleton are fragmented and measurements are impossible to take in most cases. However, based on a complete metacarpal III found in Level II/7E, the height to the withers of one of the adult equids is estimated to be 1.39 m (maximum total length (21.8 cm) x weighted Kieswalter coefficient, 1888 (6.41)/100). The weight of an adult, according to P. Auguste (1995), is probably around 188 Kg.

LEVEL II/7E FAUNA

The faunal material recovered from Level II/7E of Kabazi II comprises 3,749 pieces, of which 80.8% are unidentifiable. The identifiable remains (19.2% of all pieces) principally consist of a small horse: *Equus hydruntinus* (94.7% of identified remains; Table 3-2). Other species which are present are Saiga antelope (4.45%), Bos/Bison (0.14%), and cave lion (0.28%). The total weight of bone splinters is 10.685 Kg, of which 1.465 Kg, or 13.7%, are

Translated from the French by K. Monigal.

TABLE 3-1

Kabazi II. Measurements of Upper Cheek Teeth of *Equus hydruntinus*: Minimum-Mean (number of teeth)-Maximum

	MDDof	*VLDof*	*MDDPtP*	*VLDPtP*	*Protocone L*	*PIof*	*PIPtP*
P^2	28	21	24	21	5.3-6.5(6)-7	22.5	30
P^{3-4}	22.8-24.1(9)-26	14.6-21.1(8)-23.8	21.5-23.1(8)-26	14-21.2(8)-24	8-9.5(13)-11	30.7-39.4(6)-48.2	33.3-41.6(5)-50
M^{1-2}	—	—	—	—	8-8.9 (5)-10	—	—
M^3	21-22(4)-23	17-19.2(4)-20.5	20-22.1(4)-23	18-19.2(4)-20.5	9-9.8(6)-11	40-48.3(4)-61.7	40-45.1(4)-52.5

MDDof–Mesio-distal diameter at occlusal face
VLDof–Vestibular-lingual diameter at occlusal face
MDDPtP–Mesio-distal diameter taken at point P
VLDPtP–Vestibular-lingual diameter taken at Point P
L–Length of protocone
PIof–Protocone index, occlusal face
PIPtP–Protocone index, Point P

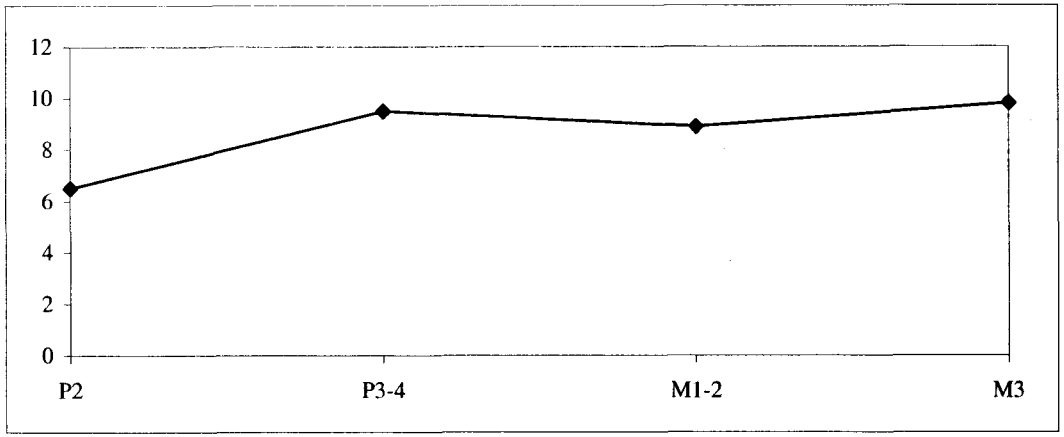

Fig. 3-1—Kabazi II, length of protocone of upper cheek teeth of *Equus hydruntinus* (in mm).

TABLE 3-2
Kabazi II, Level II/7E, Number of Species Present

	NR	*MNE*	*MNIc*
Equus hydruntinus	681	473	18
Saiga tatarica	32	32	3?
Bos/Bison	1	1	1
Equids or Bos/Bison	1	1	–
Artiodactyla Ind.	2	2	–
Panthera (Leo) spelaea	2	2	1
Total	719	511	23?

NR - Number of remains
MNE - Minimum number of elements
MNIc - Minimum number of individuals by combination

fragments smaller than 2 cm in length (the analysis of bone splinters was conducted during excavations by V. McKinley).

The faunal remains, in general, are relatively poorly preserved; the cheek teeth (molars and premolars) of *Equus hydruntinus* are mostly ruptured. The surfaces of the bones are altered and the upper layer is often missing; some are corroded, others present light traces of partial dissolution. Weathering action, along with that of climate, significantly affected the preservation of the bones. The assemblage remained in the open air for a relatively long time, undergoing climatic alteration (desquamation, exfoliation, splintering of fragmented bone, rupture of cheek teeth, alteration or even destruction of very fragile bones, such as those of juveniles, for example). Carnivores have left only one indication of their presence: a proximal extremity of a proximal phalanx of *Equus hydruntinus* (in square O5) bears a perforation from the bite of a small canid or mustelid. The role of carnivores in the origin and history of the assemblage, therefore, is only anecdotal.

Analysis of *Equus hydruntinus* Remains

Cranial Skeleton

Petrous bones are the best represented of the cranial elements (50% of cranial bones, Table 3-3). Other elements, which are very fragile, are very badly preserved, including hemi-maxillas (30% of cranial bones, Table 3-3). On the other hand, hemi-mandibles are relatively frequent (15.9% of total cranial remains, Table 3-3), but only one fragment of a horizontal ramus has 2 teeth in place. The horizontal ramus is best represented among these remains (65.8% of hemi-mandibles, Table 3-3). Teeth, by far, are the best conserved elements (205, including teeth present on maxillas and mandibles, or 80.7% of total cranial skeleton remains, Table 3-3). The permanent lower cheek teeth are the most abundant (42.4%, Table 3-3). The premolars are the least fragmented of the teeth, being the most robust. Incisors/canines, as well as deciduous teeth, are rare, as they are more fragile (9.8% and 1.9% respectively of total cranial bones, Table 3-3).

Given this set of remains, and taking into account age and sex, 15 individuals are estimated to be represented (Table 3-3).

TABLE 3-3
Kabazi II, Level II/7E, Cranial Skeleton Elements of *Equus hydruntinus* (number of teeth in jaw)

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Cranial Bones	7	3	3	3	3
Hemi-Maxilla	3 (12)	2	1	2	2
Isolated Permanent Upper Cheek Teeth	66	66	5.5	4	10
Isolated Permanent Incisors/Canines	7	7	0.87*	2	3
Isolated Upper Deciduous Teeth	3	3	0.18*	1	1
Hemi-Mandible	38 (2)	8	4	4	4
Isolated Permanent Lower Cheek Teeth	85	85	7.08	10	14
Isolated Permanent Lower Incisors/Canines	4	4	0.5*	3	3
Isolated Lower Deciduous Teeth	2	2	0.12*	1	1
Unidentifiable Isolated Cheek Teeth	10	10	–	–	–
Unidentifiable Isolated Incisors/Canines	14	7	–	–	–
Total	239 (254)	197 (212)	4.6 (4.7)	10	15

NR - Number of remains
MNE - Minimum number of elements
MAU - Minimum animal units
MNIf - Minimum number of individuals by frequency
MNIc - Minimum number of individuals by combination
* estimate uncertain

Post-Cranial Skeleton

The faunal remains from Kabazi II, Level II/7E are fragmented and the bone surfaces tend to be poorly preserved (often missing the upper surface).

Axial Skeleton (vertebrae, ribs, sterna, sacra, innominates)

With the exception of innominate bones, the elements of the axial skeleton are badly preserved: 28.5% of total post-cranial elements or 15.5% of MNE (Minimum Number of Elements) (Table 3-4). Sterna and sacra are absent, as well as the cartilaginous innominate bones. Among the vertebrae, thoracic vertebrae are the most frequent (11 of 29 in MNE). The ribs, which are very fragmented, are principally represented by shaft fragments. Of the innominate bones, the majority are represented by the acetabulum (condyloid cavity).

Upper Foreskeleton

The humerus, followed by the radius, is the most frequent element (Table 3-4). Scapulae are rare (mostly fragments of the glenoid cavity, 4 of 6), as are the degenerate metapodia and the carpals (Table 3-4). Among the carpals (usually complete, 14 of 16), the scaphoid is most abundant; the cuneiform and trapezoid carpals are absent.

Upper Hindskeleton

The tarsals (most often complete), dominated by the talus, tibia, and metatarsal III, are the most well preserved elements (Table 3-4). Femurs and splint bones are rare (Table 3-4). The patella and intermediate cuneiform are absent.

Autopodium Bones (phalanges and sesamoids)

The preservation of the proximal phalanges is relatively good, while that of the other phalanges, and especially the sesamoids, is poor (Table 3-4). The phalanges are usually complete (84.3%).

Based on the post-cephalic skeleton, it is estimated that the minimum number of individuals (by combination) present in Kabazi II, Level II/7E, is fifteen (Table 3-3).

TABLE 3-4
Kabazi II, Level II/7E, Skeletal Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Skull Fragments	7	3	3	3	3
Hemi-Maxilla	3	2	1	2	2
Hemi-Mandible	38	8	4	4	4
Isolated Upper Teeth	76	76	3.8	4	10
Isolated Lower Teeth	91	91	4.55	10	14
Isolated Teeth, Unidentifiable	24	17	–	–	–
Cranial Skeleton Sub-Total	*239*	*197*	*4.6*	*10*	*15*
Vertebra	104	29*	0.93	1	2
Rib	6	4*	0.11	1	1
Innominate	22	10	5	5	6
Axial Skeleton Sub-Total	*126*	*43**	*0.6*	*5*	*6*
Scapula	6	4	2	2	2
Humerus	23	12	6	6	8
Radius	16	8	4	4	6
Ulna	7	5	2.5	4	4
Carpals	16	16	1.14	5	5
Metacarpal III	6	6	3	4	4
Metacarpal II and IV	9	9	2.25	3	3
Upper Foreskeleton Sub-Total	*83*	*60*	*2.14*	*6*	*9*
Femur	4	3	1.5	2	2
Tibia	23	16	8	8	9
Tarsals	53	51	4.25	12	13
Metatarsal III	30	16	8	9	9
Metatarsal II and IV	6	6	1.5	2	2
Upper Hindskeleton Sub-Total	*116*	*92*	*3.83*	*12*	*14*
Phalanges, Proximal	32	31	7.75	8	9
Phalanges, Medial	20	17	4.25	5	5
Phalanges, Distal	18	16	4	4	5
Sesamoid	2	2	0.16	1	2
Autopodium Sub-Total	*72*	*66*	*2.75*	*8*	*9*
Metapodials, Unidentifiable	35	15	–	–	–
Long bones, Unidentifiable	10	–	–	–	–
Post-Cranium Sub-Total	442	276*	1.87	12	14
Total	681	473*	2.48	12	18

* estimate uncertain

Preservation of Major Skeletal Units and Long Bones

As shown in Figure 3-2, the unit corresponding to the cephalic skeleton is the best represented, followed by the upper hindskeleton. The tibia and metatarsal III are the best preserved long bones, followed by the humerus (fig. 3-3). Analysis of the preservation of the different parts of long bones (in MNE) shows the absence of proximal extremities of the humerus and tibia, and of the distal extremities of the ulna and femur (fig. 3-4).

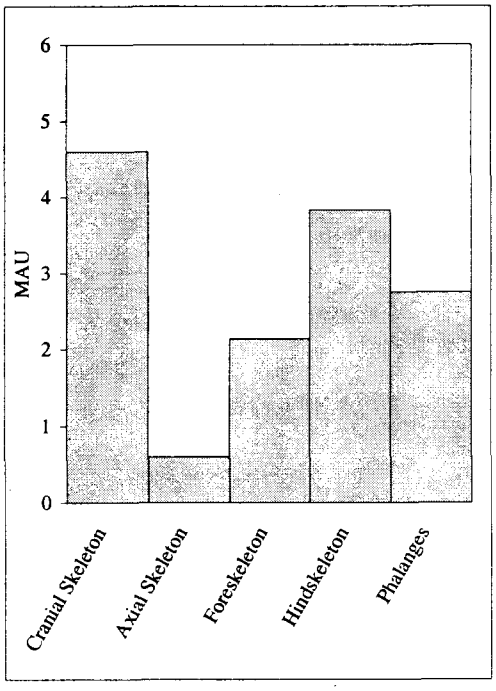

Fig. 3-2—Kabazi II, Level II/7E, preservation of major anatomical units (in MAU) of *Equus hydruntinus*.

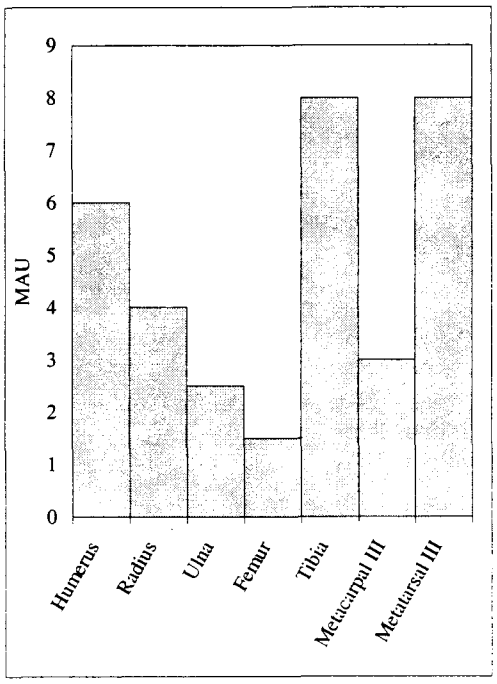

Fig. 3-3—Kabazi II, Level II/7E, preservation of long bones (in MAU) of *Equus hydruntinus*.

Analysis of Long Bone Fragmentation

Only one metacarpal III is complete, all other long bones are fragmented. The morphology of the fracture plane and observed marks (point of impact, internal and external splintering) indicate fracture by percussion on green bone. In most cases, the percussion is on the proximal or distal diaphysis, more rarely on the medial diaphysis, leading to the weakening of these parts (figs. 3-4 and 3-5) and the total or partial preservation of one or two sides, very rarely three.

Analysis of Butchery Marks

No butchery marks were observed on the faunal material in Level II/7E.

Mortality Profile and Composition of the Slaughtered Population

Based on the analysis of dental wear and the epiphyseal fusion of bones, the presence of at least eighteen small equids is estimated: four juveniles younger than 3 years and fourteen adults. One of the juveniles is younger than 12-15 months (and was killed in the spring), two are less than 2 years, and one is about 3 years old. Among the adults, two are about 5 years, two are 4-5 years, three are 5-10 years, four are 10-15 years, and three are older than 15 years. The mortality profile (fig. 3-6) corresponds to a mortality curve of "catastrophic" type, similar to the family group model of M. Levine (1983). One canine and a few bones of large dimensions indicate the presence of at least one adult male.

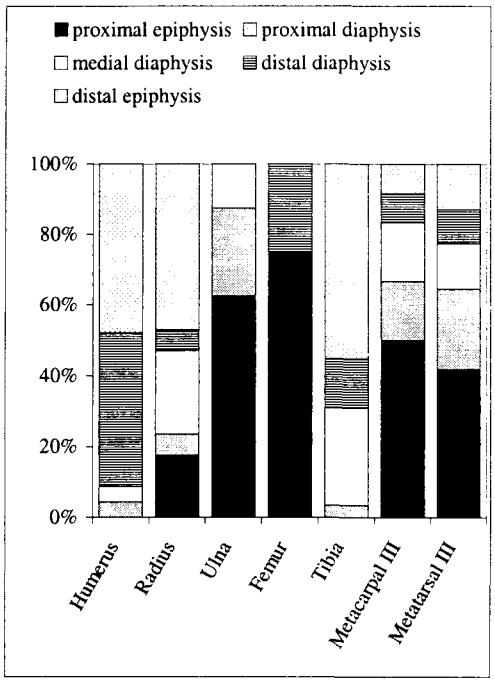

Fig. 3-4—Kabazi II, Level II/7E, preservation of different parts of long bones of *Equus hydruntinus*.

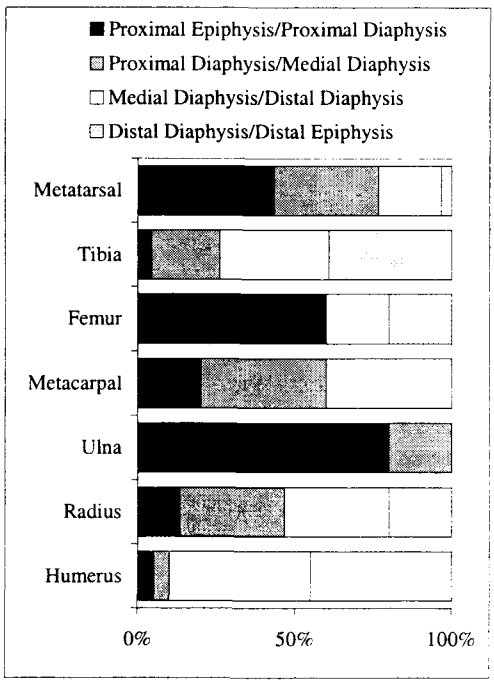

Fig. 3-5—Kabazi II, Level II/7E, point of fracture of long bones of *Equus hydruntinus*.

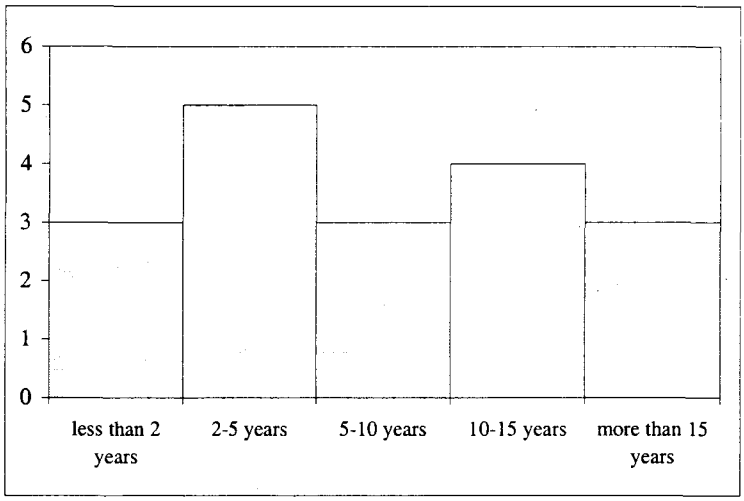

Fig. 3-6—Kabazi II, Level II/7E, mortality profile of *Equus hydruntinus*.

Spatial Analysis of Identifiable Bones

The spatial analysis of the remains of *Equus hydruntinus* (fig. 3-7) indicates a high density in the following squares, in descending order: O4 (120), O5 (88), П5 (68), O6 (43), H5 (42), H4 (34), H6 (32), and M5 (29). Bones of the cranial skeleton are most abundant in O4, O5, П5; those of the axial skeleton in O4; those of the upper foreskeleton in O5, O4, and O6; those of the upper hindskeleton in O4, O5, and M5, and those of the autopodium in O4, O5, П5, and H6. The remains of the juvenile younger than 12-15 months were discovered in M4 and M5, those of the 3 year old juvenile in O5, O6, П5, and H6, and those of the two juveniles younger than 2 years in squares O6, O4, and П5. The unidentifiable bone splinters greater than 2 cm in length are abundant in squares П5 (581), O5 (439), O4 (432), H6 (249), O6 (234), and H5 (181). Splinters shorter than 2 cm are, by weight, most frequent in П5, O5, O4, M4, and O6. With the exception of square M4, they follow the same distribution as the longer bone splinters. Taking into account the ensemble of faunal remains, the squares with the greatest density (fig. 3-8), in descending order, are: П4 (649), O4 (552), O5 (527), H6 (281), O6 (277), H5 (223), M4 (171), M5 (161), and O7 (134).

The analysis of anatomical elements suggests that the dismemberment and disarticulation of these animals took place principally in squares O5 and O6 (especially the forelimb), O4 and П5 (especially the axial skeleton, hind limb, and autopodium), and in square H5. In squares O5, O6, and O4, there are numerous bones rich in meat and marrow; defleshing and marrow extraction were probably carried out here. The "waste" of these activities is found especially in squares M5, H6, and H4. Three squares—M4, Л4, and O7—may be considered toss zones ("garbage dump").

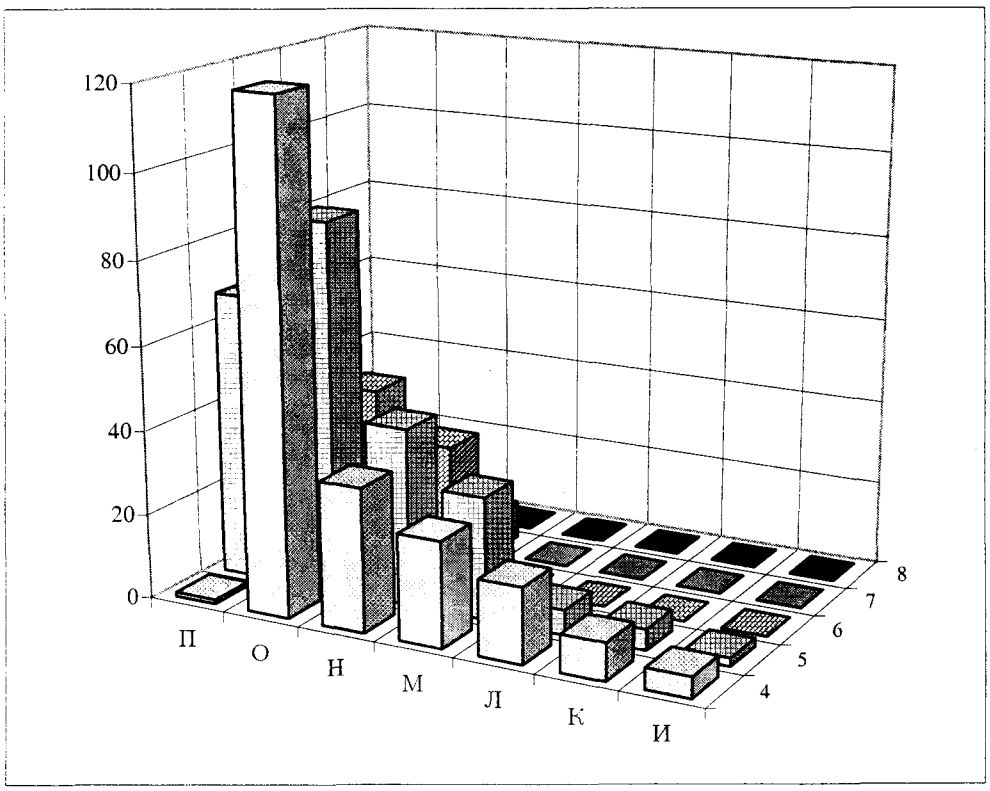

Fig. 3-7—Kabazi II, Level II/7E, spatial distribution of identifiable remains of *Equus hydruntinus*.

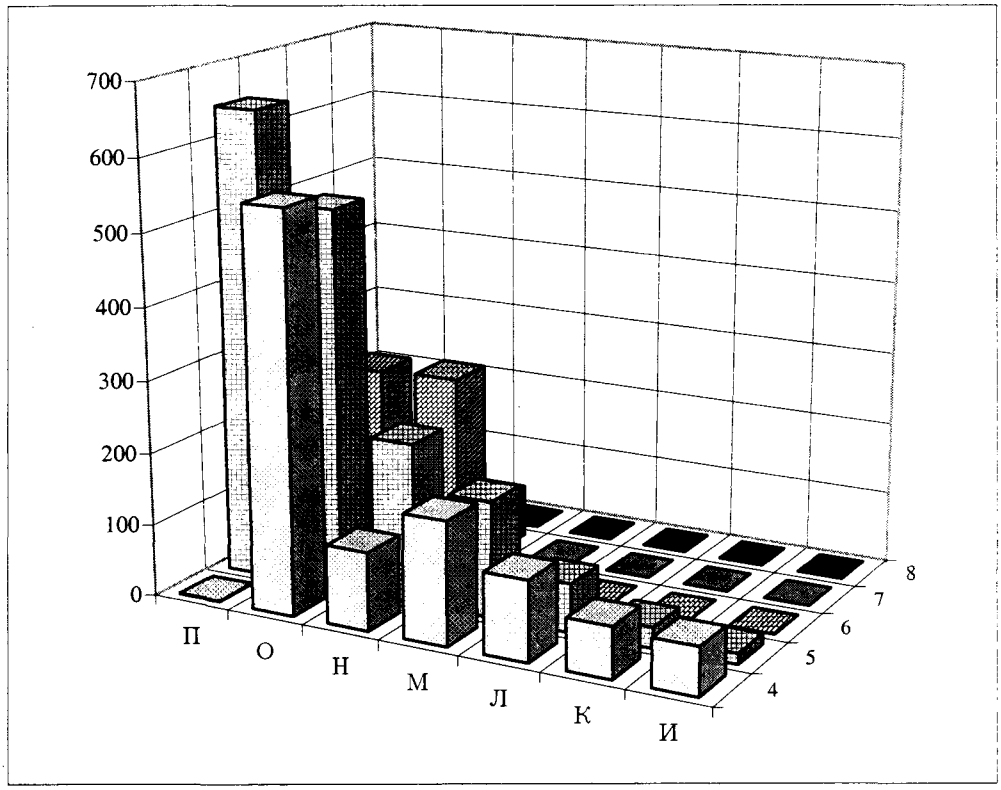

Fig. 3-8—Kabazi II, Level II/7E, spatial distribution of entire faunal assemblage.

Analysis of Remains of Other Species

Only two bones suggest the presence of cave lion near the site: a right metacarpal IV without the distal extremity (in square O5) and a right metacarpal V with exostoses (in square I15), probably due to the advanced age of the animal to which it belongs. These two bones appear to belong to the same animal.

A proximal part of a metapodial III of a Bos/bison was found in square O5.

Thirty-two bones of Saiga antelope were identified, representing at least 3 adult individuals. A number of skeletal elements are absent: the femur, patella, malleolus, the tarsals, carpals (with the exception of the naviculo-cuboid carpal), sesamoids, and the second and third phalanges. The significant deficit of bones (even teeth are extremely rare) is possibly due to climatico-edaphic and/or biological agents. The material probably remained a long time in the open air and the most fragile bones could have been destroyed or consumed by carnivores. The relatively good representation of long bones, especially the upper part of the forelimb (scapula, humerus, radius-ulna) and the age of individuals (only adults) could indicate that they were hunted by the prehistoric inhabitants. The animals were dismembered on site (possibly in squares H5 and O5). The dispersal of the remains of Saiga antelope is wide, and corresponds to that of *Equus hydruntinus*.

LEVEL II/8C FAUNA

The faunal material recovered from Level II/8C consists of 891 pieces, of which 74.3% are unidentifiable. The identifiable remains (25.2% of the total number of remains) belong mostly to *Equus hydruntinus* (97.3%; Table 3-5). The only other species present in this level is Saiga antelope (2.6%; Table 3-5). The six pieces of this small Bovid are a mandible

TABLE 3-5
Kabazi II, Level II/8C, Number of Species Present

	NR	*MNE*	*MNIc*
Equus hydruntinus	219	163	7
Saiga tatarica	6	5	1 v. old male
Total	225	168	8

fragment (in square П5), a very worn distal lobe of a right molar (in К4), a trochlea of the distal end of a right humerus (in О4), a distal end of a metapodial (О4), a tibia diaphysis fragment (М5), and a shaft fragment of a right calcaneum (К4). All of these belong to a very old adult. The total weight of the bone splinters is 2.175 Kg, of which 0.205 Kg, or 9.42%, are splinters shorter than 2 cm.

With the exception of those in square Н5, the surfaces of the bones are in good condition. Nineteen *Equus hydruntinus* cheek teeth (17 in square Н5) are ruptured (25% of the cheek teeth). Five long bones (2 in square О5, 2 in Ж5, 1 in П5) are significantly altered and a medial phalanx (in Ж5) has light marks from partial dissolution. The climate, therefore, is primarily responsible for the alteration of faunal material (desiccation?). The second phalanx was exposed to the air for a relatively long time. There is no evidence for carnivores in the faunal material; they play no role in the origin and history of the Level II/8C assemblage.

Analysis of *Equus hydruntinus* Remains

Cranial Skeleton

Petrous bone and the occipital condyles are the best represented of the cranial elements (61.5% of the cranial bones). Other elements, which are very fragile, are not at all well preserved, including the hemi-maxillas and hemi-mandibles (1.9% each of cranial bones). Teeth are by far the best preserved cranial element (86, or 83.5% of all cranial bones). The permanent cheek teeth, especially the upper premolars, are the most abundant. Incisors/canines and deciduous teeth are rare, representing 9.7% and 3.9% respectively of all cranial bones (Table 3-6).

Taking age into account, the cranial elements probably represent at least seven individuals (Table 3-6).

TABLE 3-6
Kabazi II, Level II/8C, Cranial Skeleton Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Cranial Bones	13	2	1	2	2
Hemi-Maxilla	2	1	0.5	1	1
Permanent Upper Cheek Teeth	44	44	3.6	4	4
Permanent Incisors/Canines	4	4	0.5	1	2
Hemi-Mandible	2	1	0.5	1	1
Permanent Lower Cheek Teeth	26	26	2.16	3	7
Permanent Lower Incisors/Canines	3	3	0.3	1	1
Deciduous Lower Teeth	4	4	0.66	2	2
Unidentifiable Cheek Teeth	2	2	–	–	–
Unidentifiable Incisors/Canines	3	3	–	–	–
Total	103	90	2.09	4	7

Post-Cranial Skeleton

Axial Skeleton (vertebrae, ribs, sterna, sacra, innominates)

Axial skeleton elements are poorly preserved (16.3% of the post-cranial skeleton and 8.3% in MNE, Table 3-7). The sterna, cartilaginous innominates, and sacra are absent. The vertebrae, with the exception of two atlas fragments, are unidentifiable due to their fragmentary state. Ribs, which are also fragmentary and represented only by shaft fragments, are very rare (4.3% of the post-cranial skeleton and 2.7% in MNE, Table 3-7).

TABLE 3-7
Kabazi II, Level II/8C, Skeletal Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Skull fragments	13	2	1	2	2
Hemi-Maxilla	2	1	0.5	1	1
Hemi-Mandible	2	1	0.5	1	1
Upper Teeth	48	48	2.4	4	5
Lower Teeth	33	33	1.65	3	7
Unidentifiable Teeth	5	5	–	–	–
Cranial Skeleton Sub-Total	*103*	*90*	*2.09*	*4*	*7*
Vertebra	11	3*	0.09	1	1
Rib	5	2	0.05	1	1
Innominate	3	1	0.5	1	1
Axial Skeleton Sub-Total	*19*	*6**	*0.08*	*1*	*1*
Scapula	7	3	1.5	2	2
Humerus	–	–	–	–	–
Radius	7	4	2	3	3
Ulna	4	3	1.5	2	2
Carpals	7	7	0.5	2	2
Metacarpal III	7	2	1	1	1
Metacarpal II and IV	4	4	1	2	2
Upper Foreskeleton Sub-Total	*36*	*23*	*0.82*	*3*	*3*
Femur	–	–	–	–	–
Tibia	13	6	3	3	3
Tarsus	12	10	0.8	3	3
Metatarsus III	2	2	1	1	1
Metatarsus II and IV	4	4	1	2	2
Upper Hindskeleton Sub-Total	*31*	*22*	*0.91*	*3*	*3*
Phalanges, Proximal	9	9	2.25	3	3
Phalanges, Medial	6	6	1.5	2	2
Phalanges, Distal	6	6	1.5	2	2
Sesamoid	1	1	0.08	1	1
Autopodium Sub-Total	*22*	*22*	*0.91*	*3*	*3*
Metapodials, Unidentifiable	5	–	–	–	–
Carpals or Tarsals	1	–	–	–	–
Long Bones, Unidentifiable	1	–	–	–	–
Vertebral or Cranial Fragments	1	–	–	–	–
Post-Cranium Sub-Total	116	73*	0.49	3	4
Total	219	163	0.85	4	7

Upper Foreskeleton

The radius and the scapula (mostly represented by the glenoid cavity) are the most common elements of the upper foreskeleton (Table 3-7). There are no humeri (Table 3-7). Among the carpals, which are often complete (4 of 7), the pyramidal and pisiform are absent.

Upper Hindskeleton

Tibias are the best represented of the upper hindskeleton elements; femurs and patellae are absent (Table 3-7). The tarsals are relatively well preserved and often whole (7 of 12); the talus and navicular bones dominate; the calcaneum and the small cuneiform are absent (Table 3-7).

Autopodium (phalanges and sesamoids)

Phalanges, especially the proximal phalanges, are well preserved (Table 3-7) and they are usually complete (90.5%).

Based on the post-cephalic skeleton, it is estimated that at least four individuals (by combination) are present in Level II/8C.

Preservation of Major Skeletal Units and Long Bones

As shown in Figure 3-9, the MAU indices are weak, with the exception of the cephalic skeleton. Tibias, followed by radii, are the best preserved of the long bones (fig. 3-10). The study of the preservation of the different portions of long bones (in MNE) shows that the extremities are not well preserved, with the exception of the extremities of metacarpals and the distal ends of tibias (fig. 3-11).

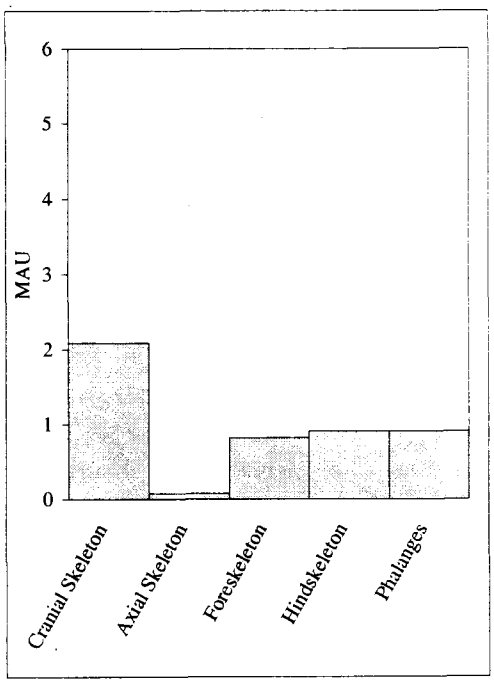

Fig. 3-9—Kabazi II, Level II/8C, preservation of major anatomical units (in MAU) of *Equus hydruntinus*.

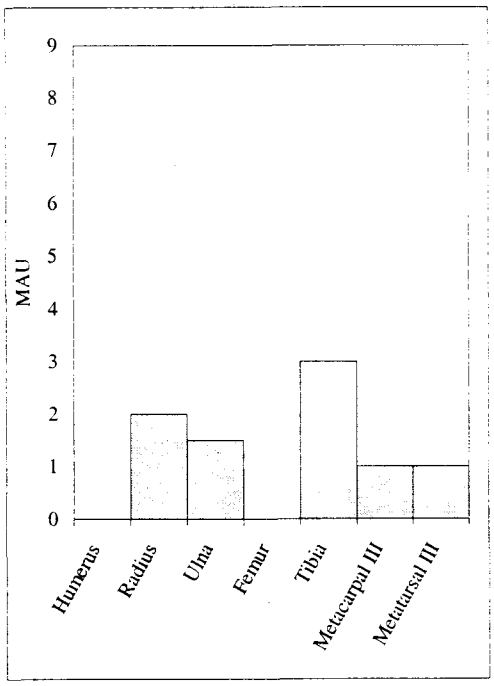

Fig. 3-10—Kabazi II, Level II/8C, preservation of long bones (in MAU) of *Equus hydruntinus*.

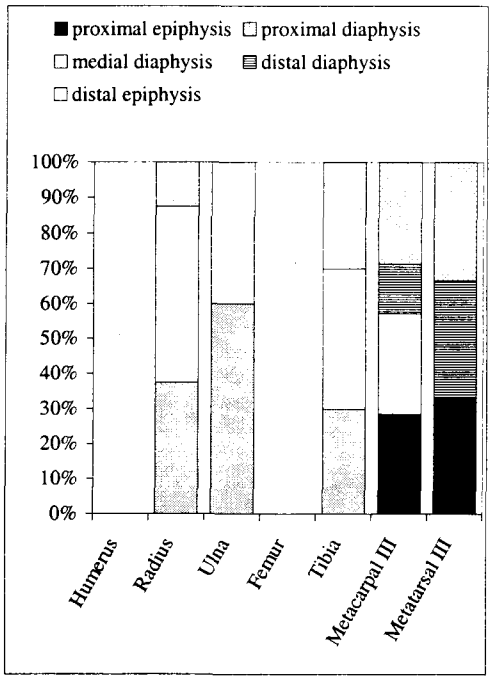

Fig. 3-11—Kabazi II, Level II/8C, preservation of different parts of long bones of *Equus hydruntinus*.

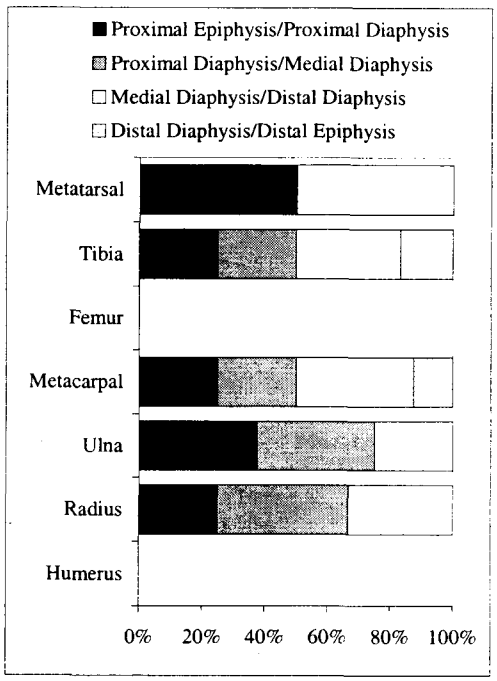

Fig. 3-12—Kabazi II, Level II/8C, point of fracture of long bones of *Equus hydruntinus*.

Analysis of Long Bone Fragmentation

None of the long bones are complete. The morphology of the fracture planes indicates anthropic fracture followed by post-depositional breakage. In most cases, percussion occurred on the distal diaphyses of bones, resulting in the weakening of these parts (figs. 3-11 and 3-12). Only one or two faces of the long bones are preserved. According to the index of fragmentation, NR/MNE, the metacarpal III and the tibia are the most fragmented of the long bones.

Analysis of Butchery Marks

No marks that could be attributed to butchery were observed on the faunal material. Only the presence of five burned splinters indicates a clear anthropic alteration.

Mortality Profile and Composition of the Slaughtered Population

Based on the analysis of dental wear and the epiphyseal fusion of bones, it is estimated that at least seven small equids—two juveniles less than 3 years old and five adults—are present in Level II/8C. One of these juveniles was between 4-9 months and died in autumn/winter. Among the adults, one is between 3-5 years, two between 5-10 years, one between 10-15 years, and one is older than 15 years. The mortality curve (fig. 3-13) corresponds to the slaughtering of a small group of females and young, close to the family group model of M. Levine (1983). None of the assemblage indicates the presence of a male *Equus hydruntinus*.

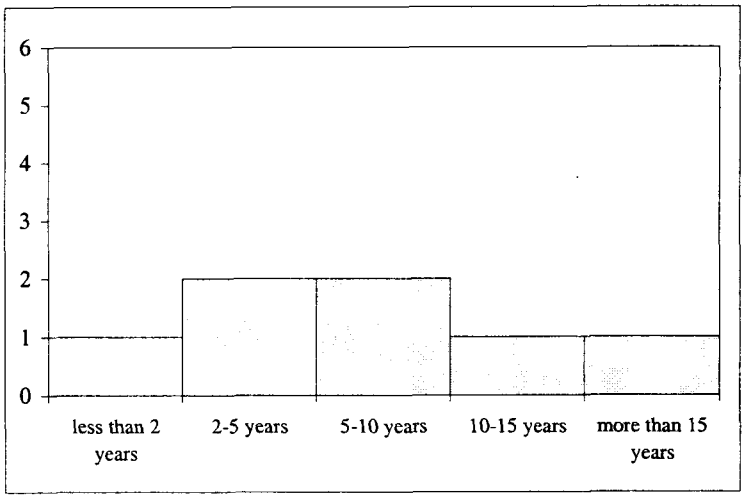

Fig. 3-13—Kabazi II, Level II/8C, mortality profile of *Equus hydruntinus*.

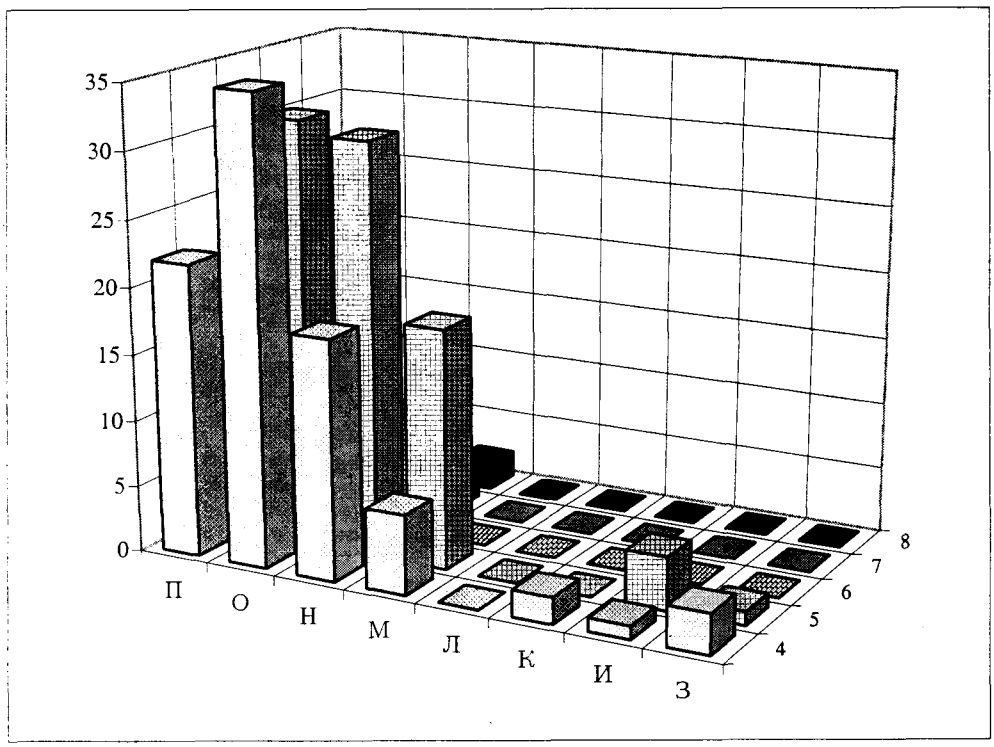

Fig. 3-14—Kabazi II, Level II/8C, spatial distribution of identifiable remains of *Equus hydruntinus*.

Spatial Analysis of Identifiable Bones

The spatial analysis of the faunal material of *Equus hydruntinus* shows a significant density in the following squares, in descending order: O4 (35), O5 (32), and H5 (31) (fig. 3-14). Cranial bones are most abundant in H5, O4, П4, and M5. Those of the axial skeleton are dispersed. The bones of the upper foreskeleton are most abundant in squares П4, H4, П5, and O5, those of the upper hindskeleton and autopodium in squares O4 and O5. Bones rich in meat are also most abundant in these two squares, as well as in squares П4 and П5. The remains of the juveniles were found in H8, M5, П5, and, especially, in O4 (5 of 8 bones).

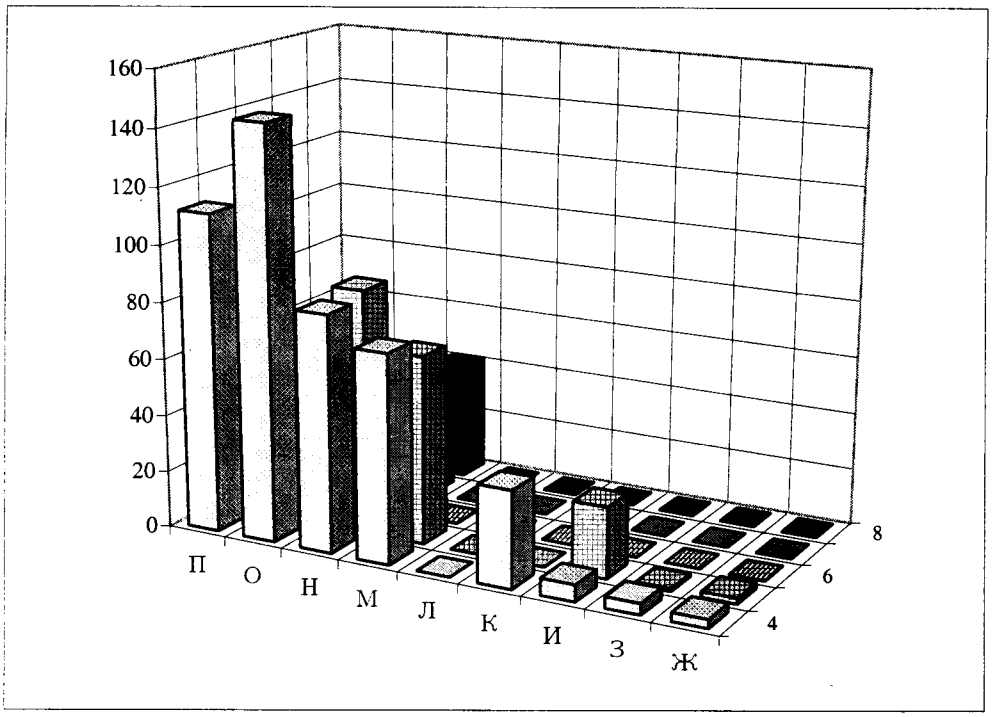

Fig. 3-15—Kabazi II, Level II/8C, spatial distribution of entire faunal assemblage.

Unidentifiable bone splinters longer than 2 cm are abundant in O4 (112), П4 (90), M4 (66), H5 (55), and П5 (50). Splinters shorter than 2 cm in length are, by weight, most frequent in squares H4, П5, and M4. They follow a spatial distribution similar to the longer splinters. For the entire faunal assemblage, the squares with the highest density of bones are, in descending order: O4 (145), П4 (112), H5 (86), H4 (83), M4 (73), П5 (67), and M5 (66) (fig. 3-15).

Spatial analysis of anatomical elements suggests that the complete treatment of the animals took place principally around squares O4 and O5. The five burned bones were found outside this zone, towards the back of the excavated area in Ж4 (3), З4, and Ж5. It should be noted that there is a large rock slab at the intersection of squares O7 and O6.

LEVEL IIA/1 FAUNA

The faunal material in Level IIA/1 comprises 757 pieces, of which 72.7% are unidentifiable. The identifiable bones (27.3% of the total) are mainly (99.5% of identifiable remains) *Equus hydruntinus* (Table 3-8). Only one other species was identified, saiga antelope (a fragment of the horizontal ramus in square O5). The total weight of the bone splinters is 1.385 Kg, of which 0.185 Kg, or 13.35%, are splinters shorter than 2 cm in length.

The surfaces of the bones are in good condition, but there is significant fragmentation. The cheek teeth of *Equus hydruntinus* are mostly fragmentary and the bones in small pieces. Two bones are corroded and three others show traces of partial dissolution. It is mainly climatic factors (along with weathering) which have altered a significant portion of the material, and the assemblage appears to have remained in the open air for a relatively long time. A metacarpal IV of *Equus hydruntinus* was gnawed on by a small rodent (in square O4). There is no indication that carnivores played any role in the origin and history of the faunal assemblage.

TABLE 3-8
Kabazi II, Level IIA/1, Number of Species Present

	NR	*MNE*	*MNIc*
Equus hydruntinus	206	146	8
Saiga tatarica	1	1	1 Adult
Total	207	147	9

Analysis of *Equus hydruntinus* Remains

Cranial Skeleton

Petrous bones are the best represented element of the cranial skeleton (21.4% of cranial bones in MNE, Table 3-9). The other cranial bones, which are very fragile, are very poorly preserved; there are no hemi-maxillas, and the hemi-mandibles are very rare (4% of all cranial bones, Table 3-9). For these remains, only fragments of the horizontal ramus and ascending ramus are present. The teeth are by far the best preserved (81 or 81.8% of the total cranial skeleton, Table 3-9). Permanent cheek teeth, especially the upper premolars and the lower molars, are most frequent (Table 3-9). Incisors/canines are rare (14.8% of all teeth) and there are no deciduous teeth (Table 3-9).

The assemblage of cranial elements indicates the presence of at least eight individuals (by combination) (Table 3-9).

TABLE 3-9
Kabazi II, Level IIA/1, Cranial Skeleton Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Cranial Bones	14	1	1	1	1
Hemi-Maxilla	–	–	–	–	–
Permanent Upper Cheek Teeth	35	35	2.9	4	6
Permanent Incisors/Canines	3	3	0.3	2	2
Hemi-Mandible	4	1	0.5	1	1
Permanent Lower Cheek Teeth	26	26	2.1	4	6
Permanent Lower Incisors/Canines	7	7	0.8	3	3
Unidentifiable Cheek Teeth	8	8	–	–	–
Unidentifiable Incisors/Canines	2	2	–	–	–
Total	99	83	1.9	4	8

Post-Cranial Skeleton

Axial Skeleton (vertebrae, ribs, sterna, sacra, innominates)

Elements of the axial skeleton, especially the ribs (there is only one), are rare (24.3% of total post-cranial bones and 11.1% in MNE, Table 3-10). Sterna, cartilaginous innominates, and sacra are absent. The vertebrae, which are very fragmentary, are unidentifiable.

Upper Foreskeleton

The radius is the most frequent long bone present of the upper foreskeleton (Table 3-10). The carpals are represented by the scaphoid, unciform, and semi-lunar bones (4 complete of

TABLE 3-10
Kabazi II, Level IIA/1, Skeletal Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Skull Fragments	14	1	1	1	1
Hemi-Maxilla	–	–	–	–	–
Hemi-Mandible	4	1	0.5	1	1
Upper Teeth	38	38	1.9	4	6
Isolated Lower Teeth	33	33	1.65	4	6
Isolated Unidentifiable Teeth	10	10	–	–	–
Cranial Skeleton Sub-Total	*99*	*83*	*1.9*	*4*	*8*
Vertebra	21	4*	0.12	1	1
Rib	1	1	0.02	1	1
Innominate	4	2	1	1	1
Axial Skeleton Sub-Total	*26*	*7**	*0.09*	*1*	*1*
Scapula	3	2	1	1	1
Humerus	1	1	0.5	1	1
Radius	6	4	2	2	2
Ulna	3	2	1	2	2
Carpals	5	5	0.35	2	2
Metacarpal III	1	1	0.5	1	1
Metacarpal II and IV	13	13	3.25	4	4
Upper Foreskeleton Sub-Total	*32*	*28*	*1*	*4*	*4*
Femur	1	1	0.5	1	1
Tibia	3	1	0.5	1	1
Tarsals	10	10	0.83	3	4
Metatarsal III	2	2	1	1	1
Metatarsal II and IV	4	3	0.75	2	2
Upper Hindskeleton Sub-Total	*20*	*17*	*0.7*	*3*	*4*
Phalanges, Proximal	1	1	0.25	1	1
Phalanges, Medial	6	6	1.5	2	2
Phalanges, Distal	2	2	0.5	1	1
Sesamoid	2	2	0.16	2	2
Autopodium Sub-Total	*11*	*11*	*0.45*	*2*	*3*
Metapodials, Unidentifiable	3	–	–	–	–
Unidentifiable Vestigial Metapodials	8	–	–	–	–
Long Bones, Unidentifiable	7	–	–	–	–
Post-Cranium Sub-Total	107	63*	0.42	4	5
Total	206	146*	0.76	4	8

* estimate uncertain

5); the pyramidal, pisiform, capitate, and the trapezoid are absent. There is only one principal metacarpal, while vestigial metacarpals are abundant.

Upper Hindskeleton

Bones of the upper hindskeleton are rare. Only tarsals (9 complete of 10) are relatively abundant (Table 3-10). Among these, the navicular dominates; the talus and small cuneiform are absent. There are no patellae.

Autopodium (phalanges and sesamoids)

Phalanges are relatively poorly represented; the intermediate phalanges are the most numerous (Table 3-10).

The analysis of the post-cephalic skeleton indicates that at least five individuals (by combination) are present in Level IIA/1.

Preservation of Major Skeletal Units and Long Bones

On the whole, preservation is poor and the MAU are low. As seen in Figure 3-16, the unit corresponding to the cranial skeleton is the best represented, followed by that of the upper foreskeleton. The radius is the most frequent type of long bone (fig. 3-17). The study of the different parts of the long bones (in MNE) also indicates the poor preservation of long bone extremities. These are absent for the humerus and femur; there are no proximal extremities of tibia, as well as no distal extremities of radii, ulnas, metacarpal III, or metatarsal III (fig. 3-18).

Analysis of Long Bone Fragmentation

All of the long bones are fragmented. The morphology of the fracture planes indicates anthropic breakage followed by secondary post-depositional breakage. In most cases, fracture is on the proximal or distal diaphyses of the bones (figs. 3-18 and 3-19). One or two faces of the long bones (that is, ¼ to ½ of the circumference) are preserved. According to the index of fragmentation, NR/MNE, the tibia and the metatarsal III are the most broken.

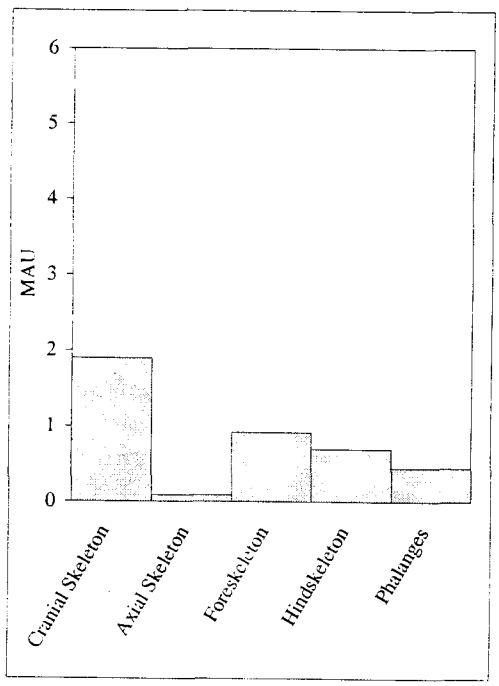

Fig. 3-16—Kabazi II, Level IIA/1, preservation of major anatomical units (in MAU) of *Equus hydruntinus*.

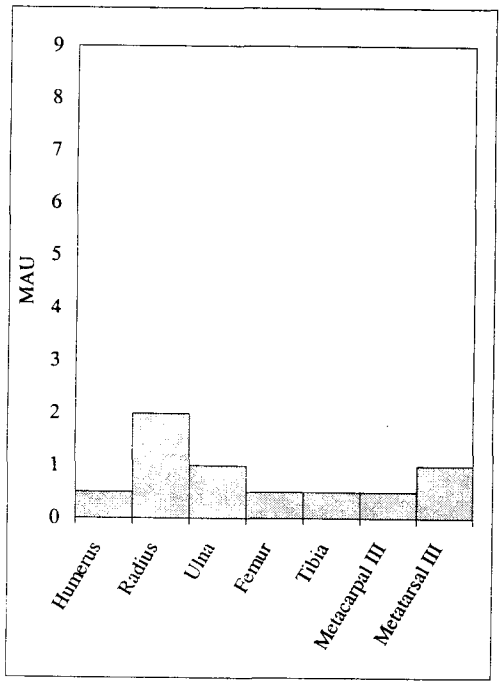

Fig. 3-17—Kabazi II, Level IIA/1, preservation of long bones (in MAU) of *Equus hydruntinus*.

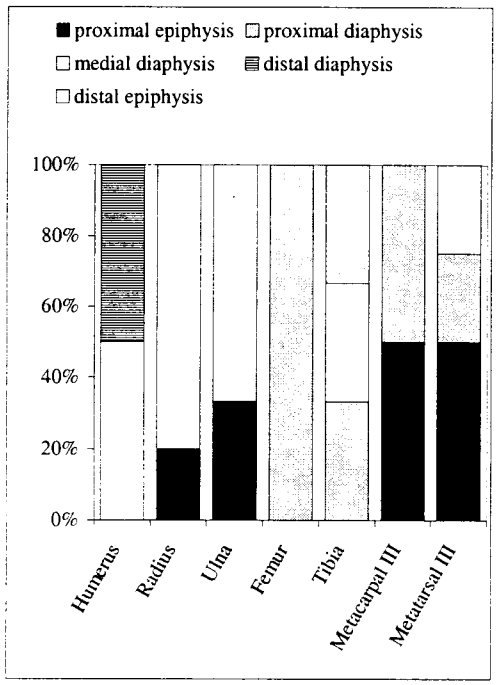

Fig. 3-18—Kabazi II, Level IIA/1, preservation of different parts of long bones of *Equus hydruntinus*.

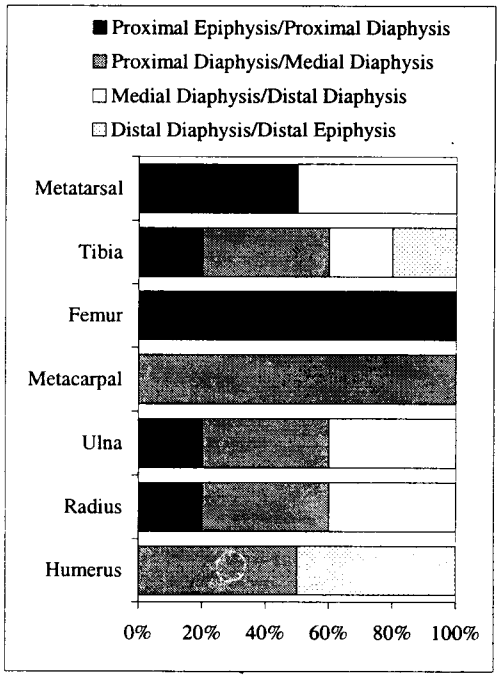

Fig. 3-19—Kabazi II, Level IIA/1, point of fracture of long bones of *Equus hydruntinus*.

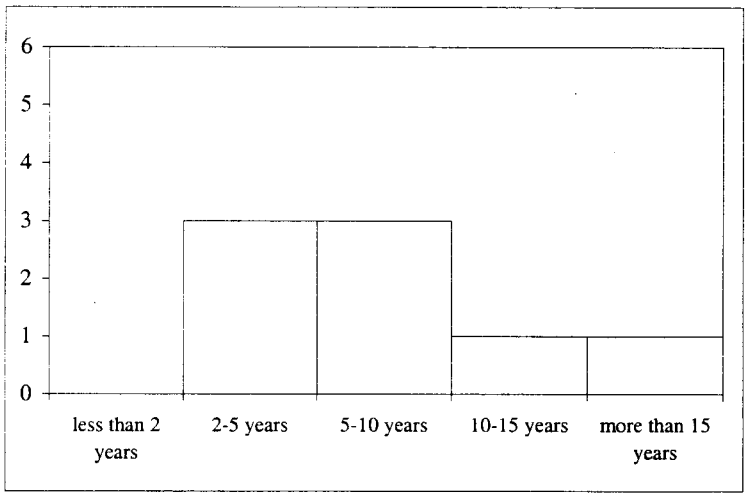

Fig. 3-20—Kabazi II, Level IIA/1, mortality profile of *Equus hydruntinus*.

Analysis of Butchery Marks

No cut marks resulting from butchery were observed in the assemblage from Level IIA/1. The only clear indication of anthropic intervention is the presence of nine burnt bone splinters, including a diaphyseal fragment of an *Equus hydruntinus* femur.

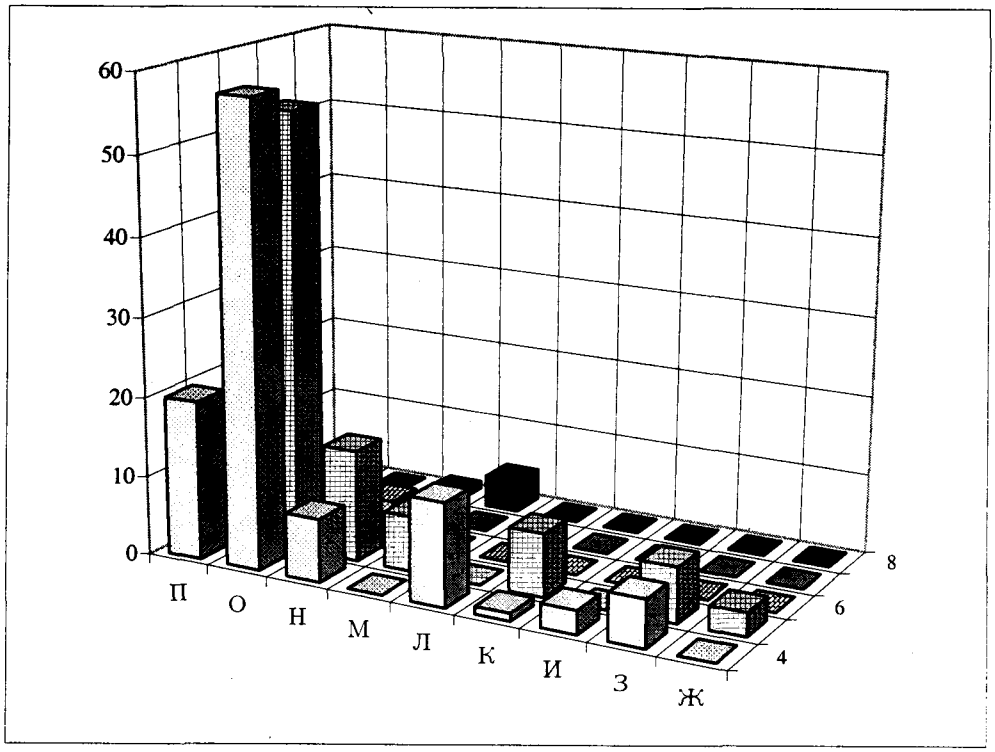

Fig. 3-21—Kabazi II, Level IIA/1, spatial distribution of identifiable remains of *Equus hydruntinus*.

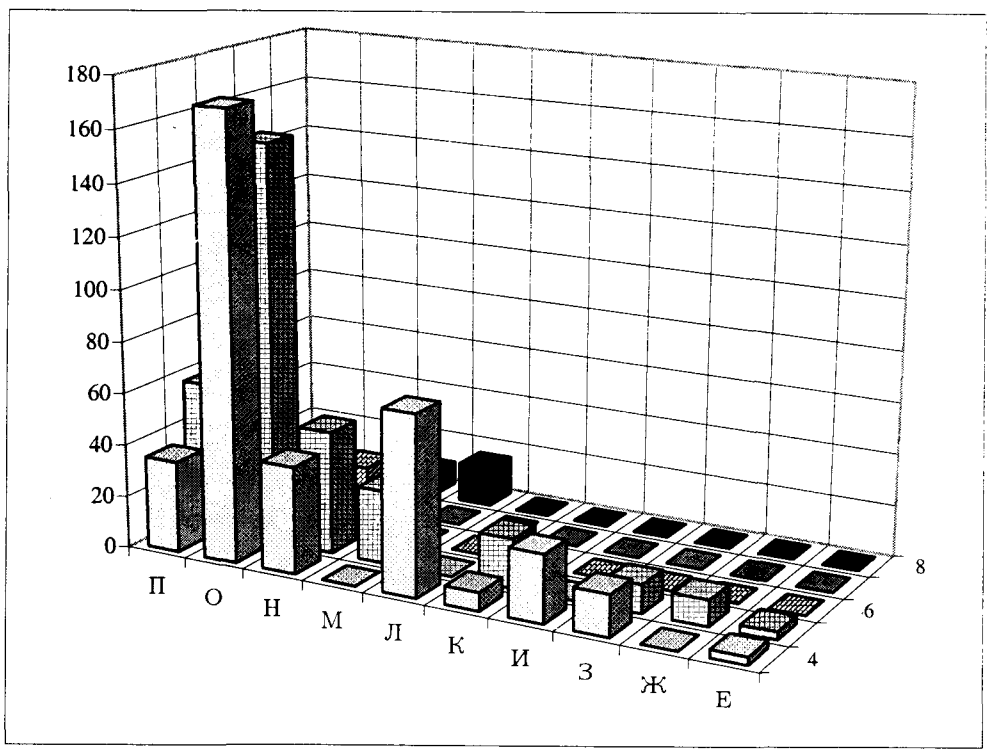

Fig. 3-22—Kabazi II, Level IIA/1, spatial distribution of entire faunal assemblage.

Mortality Profile and Composition of the Slaughtered Population

According to the analysis of dental wear and the epiphyseal fusion of bones, at least eight individuals are estimated to be present: a juvenile younger than 3 years and seven adults. The juvenile was around two and a half years old. Among the adults, two were 3-5 years old, three were 5-10 years, one 10-15 years, and one older than 15 years. The mortality profile (fig. 3-20) corresponds to a catastrophic type curve, similar to the stalking model or bachelor group model of M. Levine (1983). A few bones that are large indicate the presence of at least one adult male.

Spatial Analysis of Identifiable Bones

Spatial analysis of the *Equus hydruntinus* remains (fig. 3-21) shows the highest density in squares O4 (58, or 28.1%) and O5 (56, or 27.1%). Cranial skeleton elements are most abundant in these two squares, and those of the axial skeleton are found in two zones: И4, Л4, К5 and O4, O5, H5, П4, П5. Long bone fragments are dispersed. Bones of the end of the hoof (from the carpal/tarsal to the phalanges) are grouped in squares O4, O5, П4, and П5. The juvenile remains were found in squares O4 and M5. The burnt bone splinters are outside the denser zones, toward the back (3 in E4, 3 in E5, and 2 in Ж5), although there is one burnt fragment of a femur diaphysis in square O4. Unidentifiable bone splinters longer than 2 cm are most abundant in squares O4 (113), O5 (97), and Л4 (56). Those splinters shorter than 2 cm are by weight most abundant in these squares. They therefore follow the spatial distribution of the longer splinters and that of the identifiable bones. For the entire assemblage, the densest squares are, in descending order: O4 (171), O5 (154), Л4 (69), and П5 (58) (fig. 3-22).

According to the spatial analysis of anatomical elements, dismemberment was principally carried out in two areas, one around square И4 and the other around square O4. Disarticulation took place principally in O4 and O5. The extremities of the hooves were apparently left in this disarticulation zone, while the long bones, which are richer in meat and marrow, were taken elsewhere on the site, or, for the most part, outside of the site. It should be noted that there is a large rock slab at the intersection of squares O7 and O6.

LEVEL IIA/2 FAUNA

Faunal remains in Level IIA/2 comprise 3355 pieces, of which 57.8% are unidentifiable. The identifiable bones (42.2% of the total remains) belong for the most part to *Equus hydruntinus* (98.8% of identifiable remains; Table 3-11). The other species are saiga antelope (0.21%), Bos (Bison? 0.35%), *Cervus elaphus* (0.14%), and horse (0.07%) (Table 3-11). The total weight of bone splinters is 11.41 Kg, of which 2.6 Kg (or 22.77%) are splinters shorter than 2 cm.

The bones are by and large poorly preserved, especially in certain squares (for example, squares H7, O6, and M5). *Equus hydruntinus* cheek teeth are fragmented for the most part, and the bone surfaces are altered and often missing the upper layer. Some bones are corroded, others display light marks of partial dissolution and of manganese dioxide. With the exception of one tooth (in square O8), there are no plant rootlet vermiculations on the bones. This suggests that during the deposition of Level IIA/2, there was relatively little vegetation at the site and the environment was arid steppe. It is therefore weathering, along with the climate, which has significantly altered the faunal remains in this level. The assemblage remained in the open air for a relatively long time and underwent alteration from climate and weather. There is evidence of carnivores on seven *Equus hydruntinus* bones.

TABLE 3-11
Kabazi II, Level IIA/2, Number of Species Present

	NR	*MNE*	*MNIc*
Equus hydruntinus	1399	670	16
Saiga tatarica	3	3	1 male adult
Bos/Bison	5	3	1 adult
Cervus elaphus	2	2	1 adult
Equus (caballus) sp.	1	1	1 adult
Unidentifiable Species	6	1	1 adult
Total	1416	680	21

TABLE 3-12
Kabazi II, Level IIA/2, Cranial Skeleton Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Cranial Bones	59	4	4	3	3
Hemi-Maxilla	9	6	3	3	3
Permanent Upper Cheek Teeth	98	98	8.16	9	13
Permanent Incisors/Canines	16	16	2	3	3
Isolated Upper Deciduous Teeth	0	0	0	0	0
Hemi-Mandible	30	12	6	7	7
Permanent Lower Cheek Teeth	63	63	5.33	8	10
Permanent Lower Incisors/Canines	23	23	2.87	4	4
Isolated Lower Deciduous Teeth	1	1	–	1	1
Unidentifiable Isolated Cheek Teeth	14	10	–	–	–
Unidentifiable Isolated Incisors/Canines	7	7	–	–	–
Hemi-Mandible/Maxilla	1	–	–	–	–
Total	321*	240*	5.58	9	14

* Estimate uncertain

These are tooth bites or gnawing of small canids or mustelids (2 in square O8, 1 in M5, 1 in H7, and 1 in H5). Carnivores, therefore, played only a small role (0.2% of the total remains) in the origin and history of this assemblage.

Analysis of *Equus hydruntinus* Remains

Cranial Skeleton

Two more or less complete skulls of *Equus hydruntinus* were found in Level IIA/2. The first, in square P4, had the entire maxilla with six left and three right cheek teeth and the six incisors/canines. The other, in square П4, had the whole maxilla with four left and five right cheek teeth and four incisors. These skulls were probably from females. Petrous bones and occipital condyles are the best represented of cranial elements (75% of cranial bones in MNE; Table 3-12). The other, more fragile, cranial bones are very poorly represented, even hemi-maxillas (2.5% of all cranial bones). Hemi-mandibles are slightly better represented (5% of

TABLE 3-13
Kabazi II, Level IIA/2, Skeletal Elements of *Equus hydruntinus*

	NR	*MNE*	*MAU*	*MNIf*	*MNIc*
Skull fragments	59	4	4	3	3
Hemi-Maxilla	9	6	3	3	3
Hemi-Mandible	30	12	6	7	7
Hemi-Maxilla/Mandible	1	–	–	–	–
Upper Teeth	114	114	8.4	9	13
Isolated Lower Teeth	87	87	6.2	8	10
Cranial Skeleton Sub-Total	21	17	–	–	–
Cranial Sub-Total	*321*	*240*	*5.58*	*9*	*14*
Vertebra	383	117*	3.77	8	8
Rib	116	15*	0.41	1	1
Innominate	64	28	14	14	14
Axial Skeleton Sub-Total	*563*	*160**	*2.25*	*14*	*14*
Scapula	17	12	6	6	6
Humerus	29	10	5	5	6
Radius	30	11	5.5	6	6
Ulna	10	8	4	6	6
Carpal	22	22	1.57	5	6
Metacarpal III	25	6	3	5	5
Metacarpal II and IV	21	19	4.75	5	5
Upper Foreskeleton Sub-Total	*154*	*88*	*3.14*	*6*	*8*
Femur	13	6	3	3	3
Tibia	21	6	3	3	4
Patella	1	1	0.5	1	1
Tarsals	45	44	3.66	7	7
Metatarsal III	34	10	5	5	5
Metatarsal II and IV	10	10	2.5	5	5
Upper Hindskeleton Sub-Total	*124*	*77*	*3.2*	*7*	*9*
Phalanges, Proximal	50	50	12.5	13	13
Phalanges, Medial	33	33	8.25	9	9
Phalanges, Distal	20	20	5	5	5
Phalanges, Proximal or Medial	1	1	–	–	–
Sesamoid	1	1	0.08	1	1
Autopodium Sub-Total	*105*	*105*	*4.37*	*13*	*13*
Metapodials, Unidentifiable	16	–	–	–	–
Carpals or Tarsals	29	–	–	–	–
Long Bones, Unidentifiable	87	–	–	–	–
Post-Cranium Sub-Total	1078	430*	2.92	14	16
Total	1399	670*	3.52	14	16

* estimate uncertain

all cranial bones). Among these remains, three had teeth in place, fragments of horizontal ramuses and ascending ramuses are the most numerous. The teeth are by far the best preserved (218, including those in place on maxilla and mandibles, or 90.8% of the total cranial bones). Permanent cheek teeth, especially the upper molars are most abundant. Incisors/canines are rare and milk teeth almost absent, 19.1% and 0.4% respectively of all cranial bones (Table 3-12).

Taking into account age and sex, the cranial elements indicate the presence of at least fourteen individuals (Table 3-12).

Post-Cranial Skeleton

Axial Skeleton (vertebrae, ribs, sterna, sacra, innominates)

The bones of the axial skeleton, especially the innominates, are relatively well preserved (52.2% of total post-cranial bones and 37.2% in MNE, Table 3-13). Notably, the innominates have a very high MAU (Table 3-13) and usually only the acetabulum was preserved. The sterna, cartilaginous innominates, and sacra are absent. Among the vertebrae, the thoracic vertebrae are most numerous (51 of 117, in MNE, Table 3-13). The ribs, fragmented and principally represented by the shaft fragments, are much rarer (10.7% of post-cranial identified and 3.4% in MNE, Table 3-13).

Upper Foreskeleton

Scapulae (especially the glenoid cavity), radii, and humeri are the most frequents elements of the upper foreskeleton (Table 3-13). Among the carpals, which are rather rare but often complete (18 of 22), the scaphoid and the capitatum are most abundant; there are no pyramidal carpals.

Upper Hindskeleton

The metatarsal III is the most abundant element of the upper hindskeleton, and the patella the least abundant element (Table 3-13). Among the tarsals, which are relatively well preserved and most often complete (39 of 45), the talus and the calcaneum dominate. Tibias, femurs, and vestigial metatarsals are rare (Table 3-13).

Autopodium (phalanges and sesamoids)

The preservation of proximal phalanges is very good (88% are complete), that of the other phalanges and especially the sesamoids is worse (Table 3-13). Phalanges, except distal phalanges, are complete for the most part (77.8%).

It should be noted that in Level IIA/2 there is a significant number of bone fragments—especially long bone diaphyses—that are unidentifiable, both anatomically and to species.

The study of the post-cephalic skeleton indicates that the minimal number of individuals present in Level IIA/2 is sixteen (by combination).

Preservation of Major Skeletal Units and Long Bones

As seen in Figure 3-23, the unit corresponding to the cephalic skeleton is the best represented among major skeletal units, followed by the autopodium. The radius, followed by the humerus and metatarsal III, is the best preserved long bone (fig. 3-24). Analysis of the differential preservation of parts of long bones (in MNE) shows the very good preservation of distal extremities, with the exception of those of the femur and ulna, and the rarity of proximal extremities of the humerus and tibia (fig. 3-25).

Analysis of Long Bone Fragmentation

Only an ulna, four metacarpals III, and three metatarsals III are complete, all other long bones are broken. The morphology of the fracture planes and the observed marks (point of impact, internal and external splintering) indicate breakage by percussion on green bone. In most cases, percussion took place on the proximal or distal diaphyses, and very rarely on the medial diaphysis, thereby leading to the weakening of these parts of the long bones (figs. 3-25 and 3-26). Two bones, a humerus and a tibia, are present in the form of small pieces of diaphyseal cylinders; aside from these, one or two faces are preserved, and very rarely three. According to the index of fragmentation, NR/MNE, the metacarpal III, the tibia, and the metatarsal III are the bones most often fragmentary.

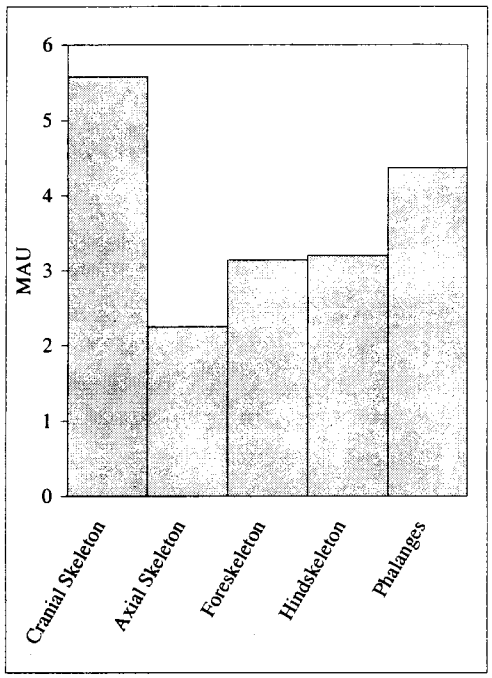

Fig. 3-23—Kabazi II, Level IIA/2, preservation of major anatomical units (in MAU) of *Equus hydruntinus*.

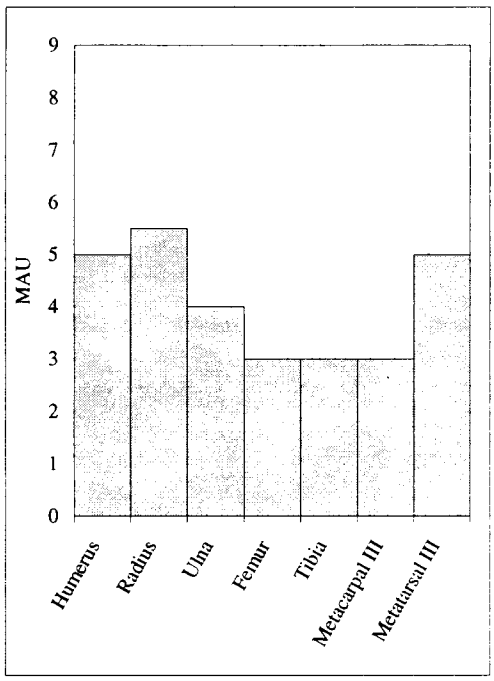

Fig. 3-24—Kabazi II, Level IIA/2, preservation of long bones (in MAU) of *Equus hydruntinus*.

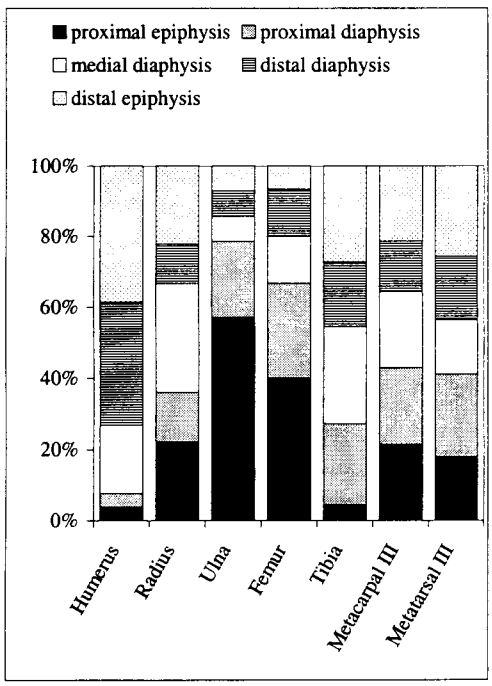

Fig. 3-25—Kabazi II, Level IIA/2, preservation of different parts of long bones of *Equus hydruntinus*.

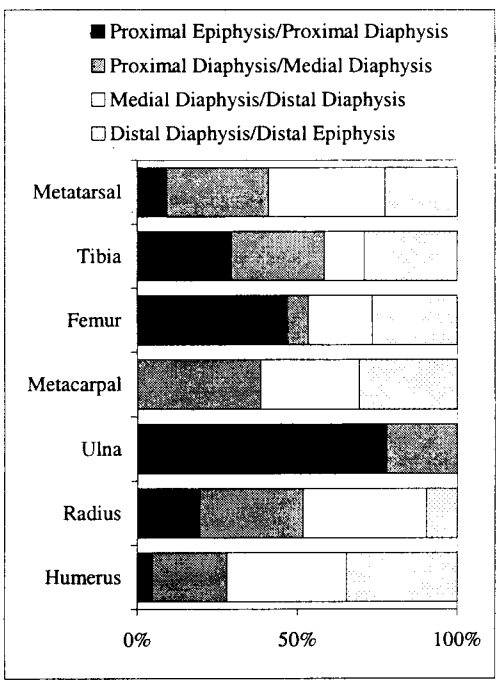

Fig. 3-26—Kabazi II, Level IIA/2, point of fracture of long bones of *Equus hydruntinus*.

Analysis of Butchery Marks

Cut marks are difficult to observe due to the alteration of the superficial layer of the bones; only three bones of *Equus hydruntinus* have such marks. In square M5, a left calcaneum with a short, deep cut mark, indicates a tibia-tarsal disarticulation. In squares H7 and O5, two proximal extremities of a metacarpal II (a left and a right) have, on one, two short and deep cut marks, and on the other, a cut mark from the disarticulation of the radius-ulna/ metacarpals.

Mortality Profile and Composition of the Slaughtered Population

According to the analysis of dental wear and epiphyseal fusion of bones, the presence of at least sixteen individuals is estimated: three juveniles less than 3 years old and thirteen adults. One of the juveniles is younger than 13-15 months, another is around 13-15 months old, and the third is between 2-½ and 3 years. Among the adults, two are between 3 and 5 years old, three 5-10 years, four 10-15 years, and four are older than 15 years. The mortality profile (fig. 3-27) corresponds to a "catastrophic" type mortality curve, similar to the family group model of M. Levine (1983). A canine and a few large bones suggest the presence of at least one adult male older than 15 years in age, and the two nearly complete skulls represent two females, one of which was 10-15 years old, the other 15-20 years.

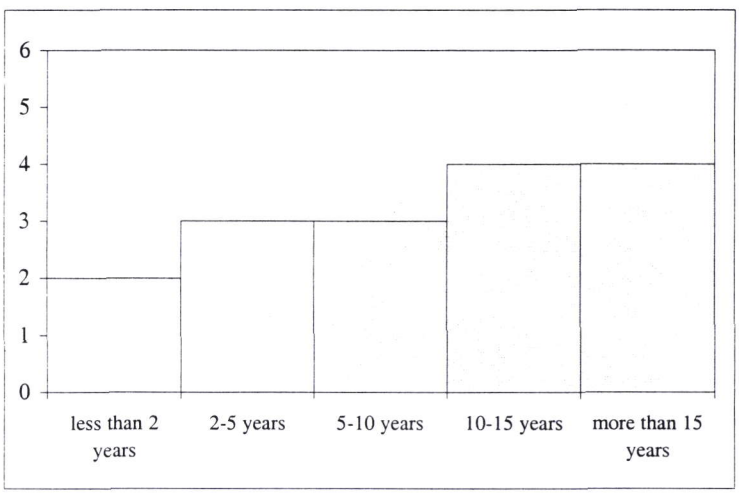

Fig. 3-27—Kabazi II, Level IIA/2, mortality profile of *Equus hydruntinus*.

Spatial Analysis of Identifiable Bones

The analysis of the spatial distribution of the *Equus hydruntinus* assemblage (fig. 3-28) shows the highest densities in the following squares, in descending order: H5 (139), M5 (138), H6 (105), O4 (72), H4(70), O8 (66), O5 (56), and H7 (54). The bones of the cranial skeleton are most abundant in squares K4, H4, O4, and M5 (plus the presence of the two complete skulls in squares P4 and П4); bones of the axial skeleton are most abundant in M4, those of the upper foreskeleton in П4, П5, H5, and O4; those of the upper hindskeleton in O4, H5, and H6; and those of the autopodium in O7, O8, H7, П5, and O5. The remains of the three juveniles aged less than 3 years were discovered in squares M5, M4, H6, O4, and O7. Unidentifiable bone splinters longer than 2 cm are abundant in squares H4 (471), H5

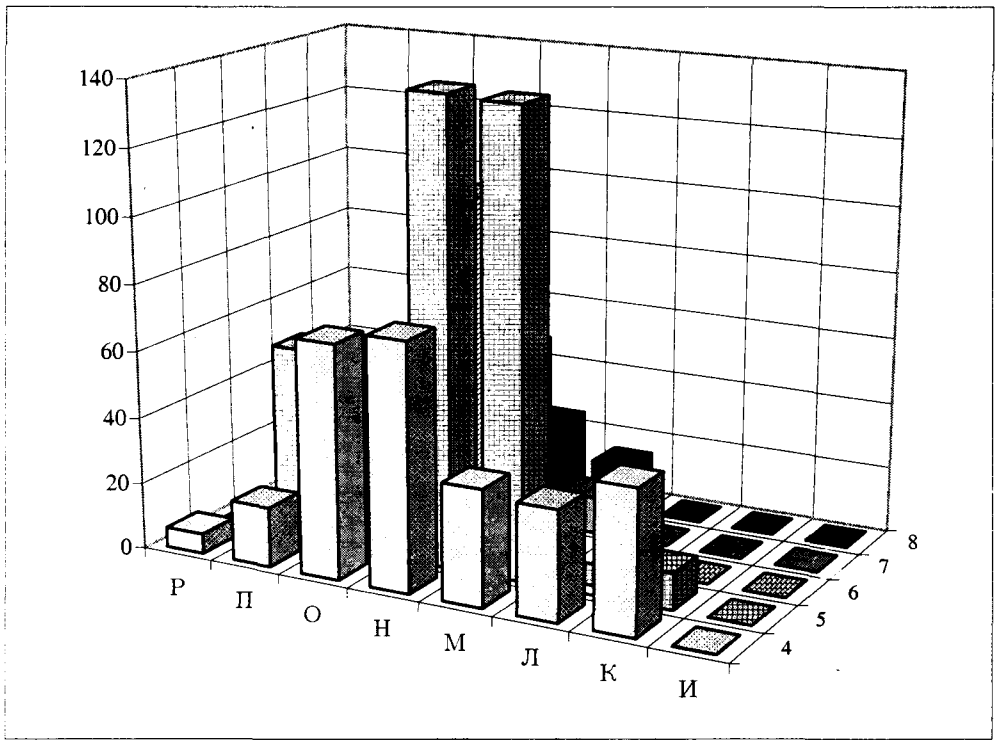

Fig. 3-28—Kabazi II, Level IIA/2, spatial distribution of identifiable remains of *Equus hydruntinus*.

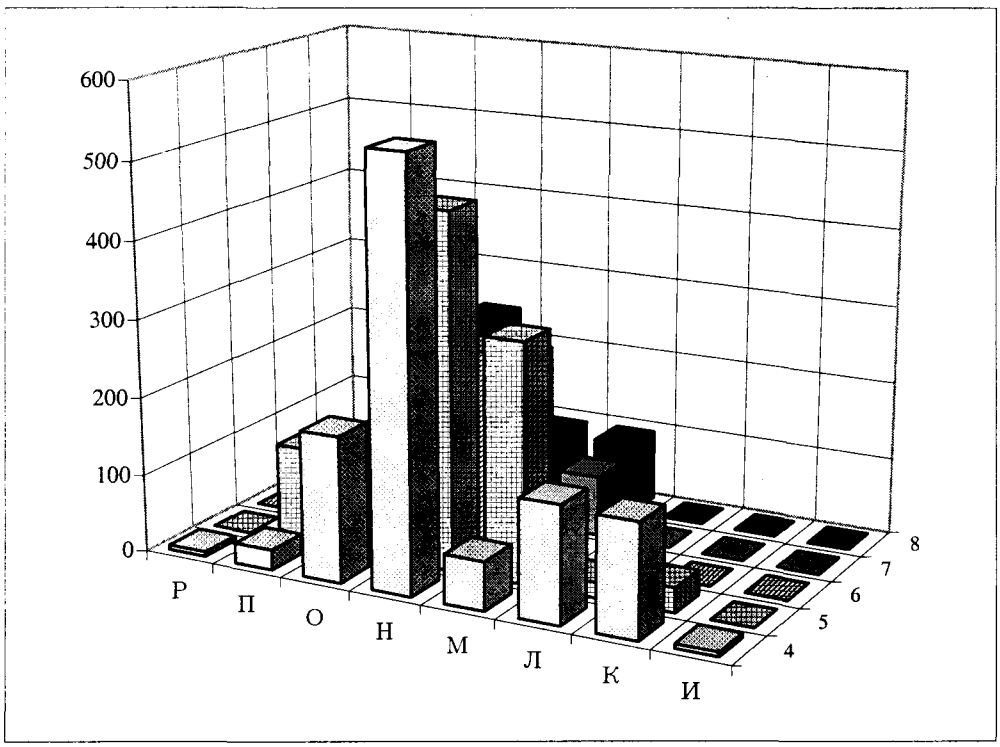

Fig. 3-29—Kabazi II, Level IIA/2, spatial distribution of entire faunal assemblage.

(314), H7 (219), O8 (171), and H6 (149). Bone splinters shorter than 2 cm are, by weight, most frequent in H4, M5, H5, O8, H7, and H6. With the exception of M5, they follow the spatial distribution of the longer splinters. For the entire faunal assemblage, squares with the largest densities are, by decreasing order: H4 (545), H5 (455), H6 (254), O8 (237), and H7 (219) (fig. 3-29).

According to the analysis of the distribution of anatomical elements, there are at least nine crania of adults (reconstruction, cranial bones, atlas, and axis) in squares P4, П4, O4, H4, К4, Л4, H5, and two skulls in square M5. The distribution of innominates and scapulas is similar to the distribution of the skulls (with the exception of squares П5 and H7), especially in O4 and H5, as is the distribution of vertebrae and ribs. These observations suggest that that the slaughtering and dismembering took place in the same area, and principally in row 4. Disarticulation of limbs likewise took place in this zone. On the other hand, rows 6 (except square H6), 7, and 8 would correspond to toss zones (numerous unidentifiable bone splinters and abundance of carpal bones, tarsals, and phalanges). It should be noted that there is a large rock slab at the intersection of the squares O7 and O6.

Analysis of Remains of Other Species

Two remains of deer indicate their presence near the site: a proximal diaphysis fragment of a small right tibia in square O5 and a proximal part of a metacarpal III in square H5.

Five remains of Bos were discovered: a fragment of a thoracic vertebra and a right radius missing its distal portion in square П5, and three diaphysis fragments of the same left humerus, two of these in square O5 and one in П4.

Three Saiga antelope bones were identified, belonging to at least one adult male. These include, in square O4, a distal extremity of a right humerus and a complete proximal phalanx, and in square M8, a fragment of a tibia-fibula condyle.

In square H5, a distal part of a left tibia was found and is attributed to a horse.

In square П4, six shaft fragments of one rib belong to a small, unidentifiable animal.

Comparative Analysis of Levels II/7E, II/8C, IIA/1, and IIA/2

Level II/7E is the most rich in total number of remains, in number of individuals, and in unidentifiable bone splinters (especially those longer than 2 cm). On the other hand, Level IIA/2 has the largest number of total identifiable bones and the most bone splinters less than 2 cm in length (fig. 3-30).

Equus hydruntinus and Saiga antelope are omnipresent, with the latter slightly more abundant in Level II/7E (fig. 3-31). In Levels II/8C and IIA/1, only these two species were identified. The faunal range of Level IIA/2 appears a little more diverse (fig. 3-31). During the formation of the four levels, the climate remained nearly the same, except with a slight increase in aridity in Levels II/8C and IIA/1 (this is further supported by the taphonomic analysis). This increase could correspond either to an occupation of the site during a different time of year (winter, in this case, in a strongly continental regime where the climate is cold and dry) or to a regional climatic alteration. Based on the composition of the slaughtered populations, the first hypothesis seems more likely. The ecological niches of the species that are present at the site during this time suggest a cold climate, but not rigorously so (no permafrost) and dry (without substantial snowfalls). The countryside was very open and should correspond to a grass steppe. The small equids, Saiga antelope, and bison grazed on the top of Kabazi cuesta and the deer on the hills below.

The condition of the bone surfaces suggests that the two non-biological taphonomic agents that played a role in the history of the faunal assemblages are weathering and climate

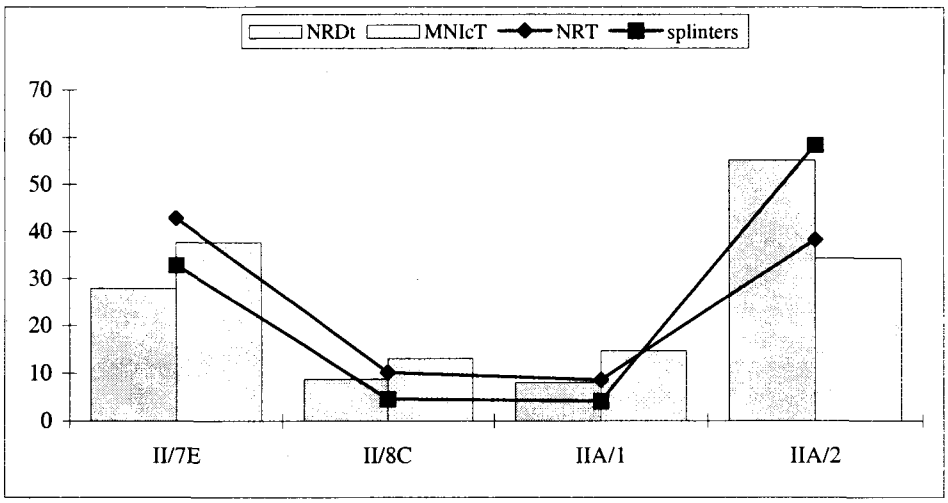

Fig. 3-30—Kabazi II, relative quantification of faunal material, by level.

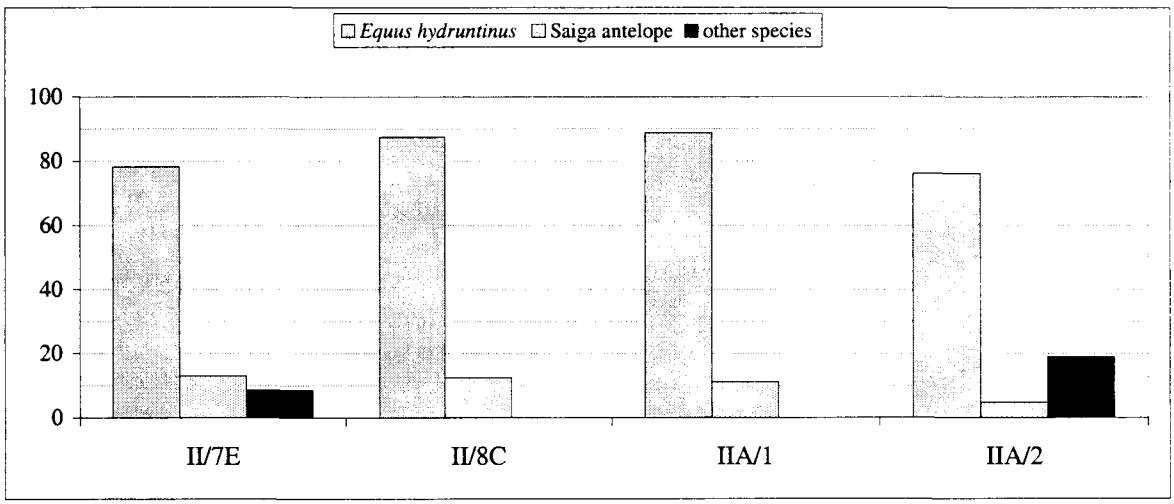

Fig. 3-31—Kabazi II, relative percentages of species present.

(desiccation). While usually associated with each other, in Levels II/7E and IIA/2 it is the former that is more important, whereas in Levels II/8C and IIA/1, climate is more important. We have used numerous criteria to evaluate the degree of preservation of the bones (Table 3-14); the preservation appears better in Levels II/7E and IIA/2, slightly worse in Level II/8C, and especially worse in Level IIA/1. The degree of fragmentation of the material could also be evaluated with the aid of several indices, such as the ratio of the number of identifiable to unidentifiable specimens (%NRDt/NRI) and the ratio of the minimum number of elements to the total number of remains (%NMEt/NRt). In addition, one can compare the proportion of bone splinters shorter than 2 cm to those longer than 2 cm. From Table 3-15, it is evident that the bones have a higher degree of fragmentation in Levels II/7E and IIA/2. In these two levels, the observation of fracture planes and marks indicates breakage by percussion on green bone. A post-depositional secondary fragmentation further altered the material already fractured by humans in Levels II/8C and IIA/1. In all these levels, there are very few complete long bones (1 in Level II/7E and 8 in Level IIA/2) or intact diaphysis cylinders (3 in Level IIA/2). The faunal remains in all the levels carry very few extrinsic marks. In Level II/

TABLE 3-14
Kabazi II, Taphonomic Criteria for Degree of Preservation

	II/7E	*II/8C*	*IIA/1*	*IIA/2*
NR/MNIc	37.8	31.3	25.75	87.43
% unidentifiable cheek teeth/ % identifiable	6.2	2.7	11.6	8
% intact deciduous teeth	10.4	11.1	–	2.77
% dental remains	28.04	39.26	39.32	15.86
% ribs and vertebrae	15.27	7.3	10.67	35.66
% long bone extremities	53	17.24	14.28	24.38

TABLE 3-15
Kabazi II, Taphonomic Indices of Fragmentation

	II/7E	*II/8C*	*IIA/1*	*IIA/2*
% identifiable remains/ % unidentifiable remains	23.72	33.78	37.63	73.02
% NMEt/NRt	69.45	74.43	71.01	48.02
% weight of bone splinters < 2cm	13.7	9.4	13.3	22.7

7E, only one bone has evidence for gnawing by a small canid or mustelid (0.01% NR); in Level II/8C, there are five burned bones (2.2%); in Level IIA/1, one bone was gnawed by a small rodent (0.48%) and nine bone splinters were burned (4.3%); and in Level IIA/2, seven bones were chewed by carnivores (canids or hyaenas) and three bones have marks from disarticulation (0.21%). The relatively bad preservation of the bone surfaces, which are often missing the upper layer, makes the identification of butchery marks very difficult. Carnivores only played an anecdotal role in the origin and history of these faunal assemblages. The site is situated on the upper part of the slope, so the natural deaths of herds recurring exactly in the same place and not topographically caused cannot be envisioned. Only the prehistoric human inhabitants are responsible for these accumulations.

The analysis of the preservation of the major anatomical units of *Equus hydruntinus* (figs. 3-2, 3-9, 3-16, and 3-23) indicates that the cephalic unit is always the best represented and the axial skeleton the least well represented. The MAU indices are weak, particularly in Level II/8C and especially in Level IIA/1; they are slightly higher in Level II/7E and even more so in Level IIA/2. These low ratios might correspond to strategies referred to as reverse (Binford 1978; Lyman 1994). They are characteristic of butchery sites. The modified general utility indices (MGUI) as a function of the percentage of minimum animal units (MAU) (fig. 3-32) indicate that the four levels can be grouped into pairs: Levels II/8C and IIA/1 (group A) and Levels II/7E and IIA/2 (group B). The curves of group A (fig. 3-32) emphasize the rarity of all anatomical elements, especially the most nutritious. This might suggest a strategy of reverse mass (reverse bulk strategy). Those of group B, on the other hand, show a relative abundance of elements with an average nutritive value (fig. 3-32). This might correspond to a reverse gourmet strategy, especially in Level IIA/2. Figures 3-33 and 3-34 confirm these results; there is a strong deficit in most of the bones rich in meat (notably femurs and humeri). Some of these bones were therefore taken out of the site at the same time as the meat. There was apparently less of a selective choice in group A, where the quantity appears to have been more important than the quality. On the other hand, the indices of bones rich in marrow as a function of the MAU (figs. 3-35 and 3-36) indicate a greater abundance of marrow in group A

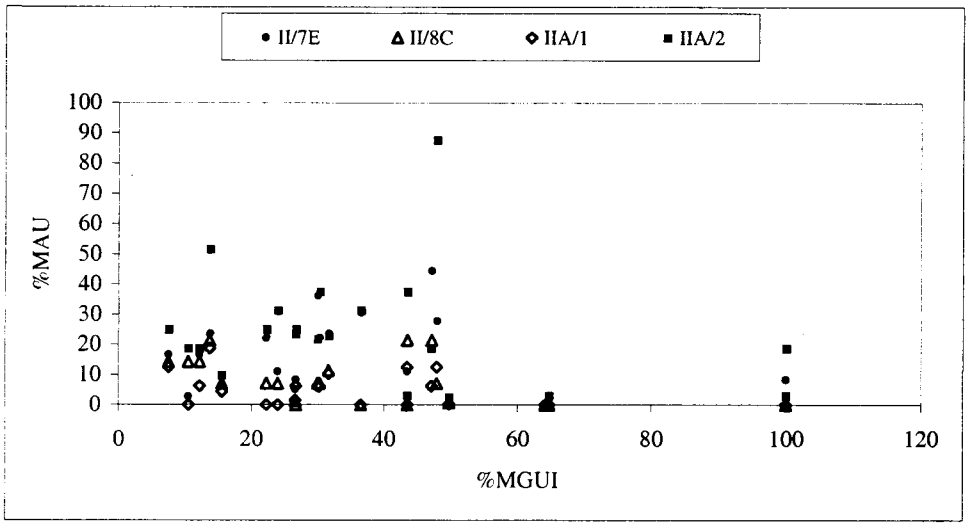

Fig. 3-32—Kabazi II, relationship between the MGUI and MAU of *Equus hydruntinus*.

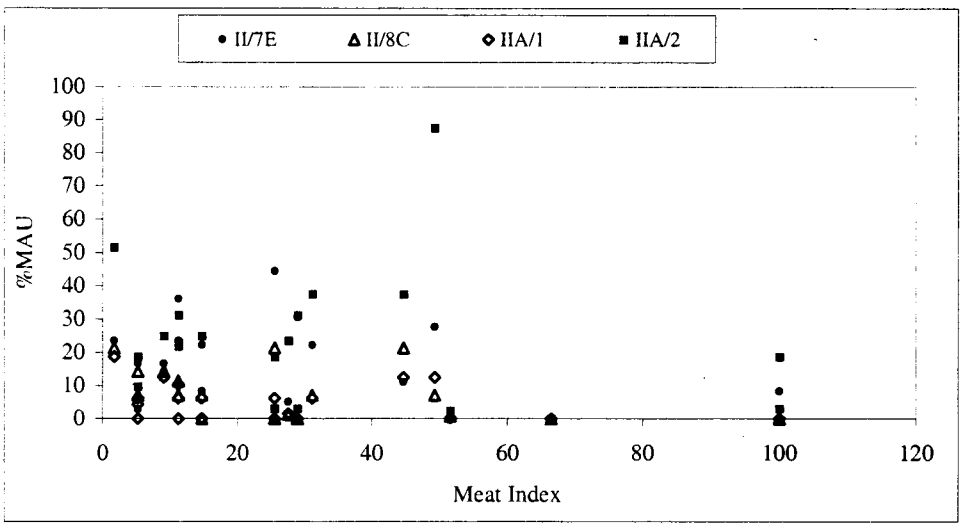

Fig. 3-33—Kabazi II, relationship between the Meat Index and MAU of *Equus hydruntinus*.

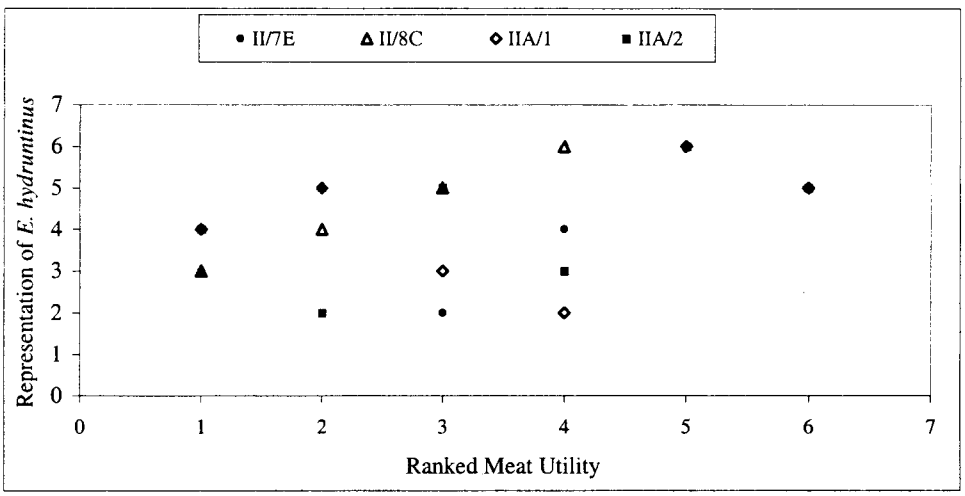

Fig. 3-34—Kabazi II, relationship between the Ranked Meat Utility and representation of remains of *Equus hydruntinus*.

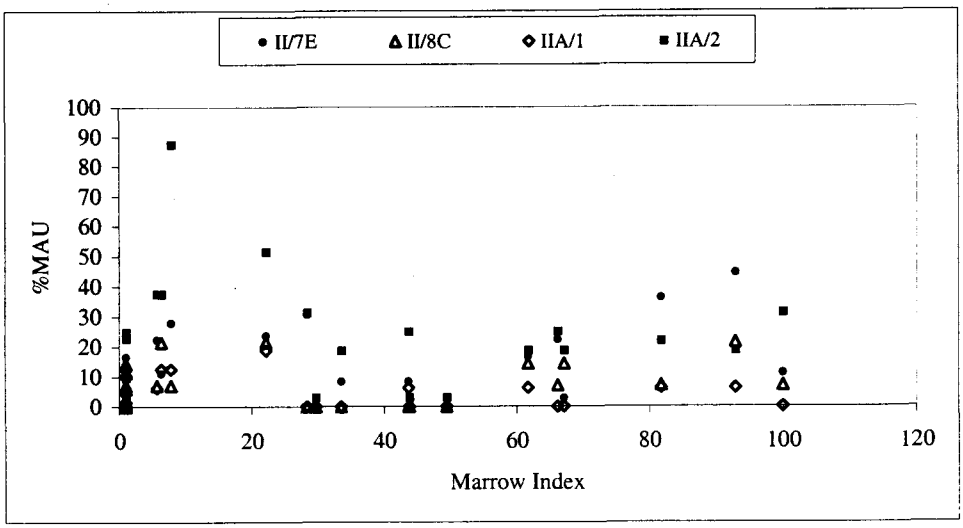

Fig. 3-35—Kabazi II, relationship between the Marrow Index and MAU of remains of *Equus hydruntinus*.

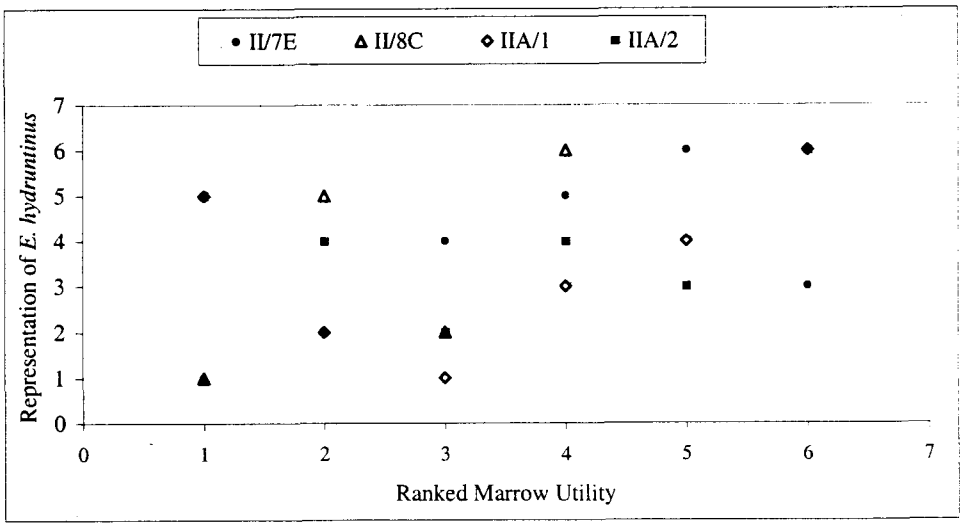

Fig. 3-36—Kabazi II, relationship between the Ranked Marrow Utility and the representation of remains of *Equus hydruntinus*.

than in group B. These bones were broken on-site to extract marrow; whether the marrow was then immediately consumed or taken out of the site is unknown.

In addition, by the number of slaughtered individuals, the four levels also fall into the same distinct two groups. The analysis of mortality curves of the small equids (figs. 3-6, 3-13, 3-20, 3-27, and 3-37) indicates the killing of small family groups (family group model) in Levels II/7E and IIA/2, the killing of a group of females with young in Level II/8C, and probably of a group of males (bachelor group model) in Level IIA/1. For Level IIA/1, one could also propose the hypothesis that there was selective hunting for "heavy" animals aged between 2 and 10 years. The presence of a few milk teeth and the structure of the populations indicate that the animals were killed in the springtime for the equids in Levels II/7E and IIA/2, the beginning of winter for those of Level II/8C, and for Level IIA/1, in the winter or summer, although given the data presented above, it was most likely the beginning of the winter. During this season, it is more difficult to procure game (the horses live in small

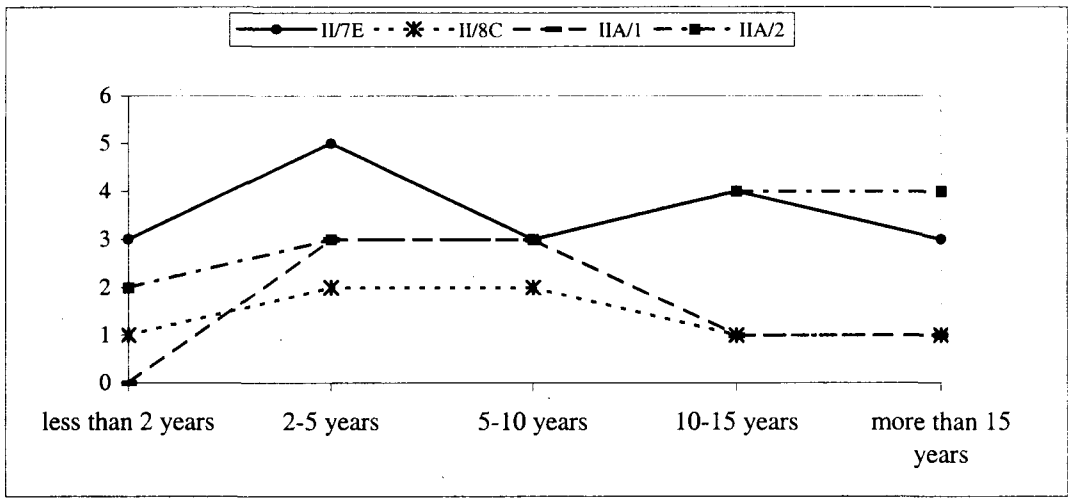

Fig. 3-37—Kabazi II, mortality profiles of *Equus hydruntinus*.

isolated groups, which, especially for the bachelor male group, can move across great distances) and the animals are therefore exploited to the maximum extent, which appears to be the case for Levels II/8C and IIA/1. According to all of these data, we can propose the hypothesis that within each level there was a single kill and butchery episode.

A few observations can be made on the basis of the spatial distribution of the faunal material. The highest density is found in Level IIA/2 (about 83 in comparison to the total number of excavated squares) and in Level II/7E (163 in comparison to the number of squares in which at least one bone was found), followed by Levels II/8C and IIA/1. The post-mortem dispersal of bones is relatively significant; with the exception of the bones of extremities of the hooves, no articulations were observed. This further confirms the assumption of anthropic intervention on the faunal assemblage. In all four levels, a concentration of faunal material is observed towards the front of the excavated area and on the right side (as one faces the cliff). The heaviest density of bones is present in Levels IIA/1, followed by II/7E, II/8C, and IIA/2. For all four levels, the bones are found primarily in nine squares: rows 4 and 5 of П to H, in O, and H6, Л4 (figs. 3-8, 3-15, 3-22, and 3-29). The highest concentration of unidentifiable bone splinters is found in Level IIA/2, followed by II/7E and IIA/1, then in II/8C. The areas of concentration of bone splinters in Levels II/7E and IIA/1 are very similar and differ slightly from the other two (in II/8C more towards the back and in Level IIA/2 more towards the left, row 8). For the bones of *Equus hydruntinus*, their concentration is highest in IIA/1, followed by II/7E and II/8C, then IIA/2. They are found principally in squares O4 and O5 in Levels II/7E, II/8C, and IIA/1, and more towards the back in H5 and M5 in Level IIA/2 (figs. 3-7, 3-14, 3-21, and 3-28). In examining the spatial distribution of different major anatomical units of *Equus hydruntinus*, one notes a higher concentration of: the cranial elements in Level IIA/1 (this level and Level II/7E also have a similar distribution); axial skeleton elements in II/7E and IIA/2; upper foreskeleton elements in level II/7E, row O (Levels II/8C and IIA/2 also have a similar distribution of this unit); upper hindskeleton elements in II/8C (and the distribution is similar to that of Level II/7E); and finally, the autopodium elements in Level II/8C (and this distribution is similar to that of Levels II/7E and IIA/1). In sum, the dismemberment of these equids, with the exception of Level IIA/1, took place in the same zone (O4-5). The disarticulation, defleshing, and breakage of bones for marrow extraction were also carried out in this zone (around O4-5, especially in row 4 in Level IIA/2). On the other hand, the toss zones and garbage dumps differ by level. The presence of burnt bone in

Level II/8C and IIA/1 indicates the existence of a hearth; based on the distribution of these elements, it might have been situated towards the back of the excavated area, outside the main area of butchering activity. The distribution of the remains of species other than *Equus hydruntinus* varies. The remains of Bos/Bison and Saiga antelope have an identical spatial distribution to that of *Equus hydruntinus*, while that of deer and horse differs in comparison to the zones of highest density.

CONCLUSIONS

For Levels II/7E, II/8C, IIA/1, and IIA/2, the inhabitants of Kabazi II occupied the site during a somewhat cold and dry period. The environment was very open grass steppe. The human inhabitants are responsible for the accumulation of faunal material in all four of the studied levels. The site corresponds to a slaughter and butchery site, which is further confirmed by the relative paucity of lithic material (Chabai 1996) and the absence of habitation structures. The inhabitants practiced the specialized hunting of *Equus hydruntinus*. On Kabazi Mountain, probably in a single episode for each level, they killed a small family group (in springtime) in Levels II/7E and IIA/2. In Level II/8C, they killed a smaller group composed of females and young. In Level IIA/1, a small group of bachelors, or male adults aged between 2 and 10 years, was killed during the winter. In Levels II/8C and IIA/1, the treatment of the carcasses was complete; pieces of meat still containing bone (e.g. humeri and femurs) were taken out of the site (reverse mass strategy). On the other hand, in Levels II/7E and IIA/2, the treatment was more selective, with quality having more importance than quantity (reverse gourmet strategy). Perhaps in these levels, the strategy was to recover meat specifically to take out of the camp (to their habitation site?). One could also advance the hypothesis that, contrary to the two other levels, the conditions during Levels II/7E and IIA/1 were more favorable (a period of abundance). This may be related to the season of the slaughter; during the winter, game is more rare, more dispersed across the territory, and the animals more thin. This would correspond more to a period of shortage. Except in Level IIA/1, the treatment of animals took place in the same zone, towards the front and right of the excavated area. The rarity (or even absence in some levels) of carnivore remains and their traces, implies that either they were rare in the immediate vicinity of the site, or that the defleshing by the humans was very significant (which would confirm the above assumptions about the function of the site). The site of Kabazi II provides an extremely interesting perspective on the subsistence behavior of Neandertals during the Last Interglacial.