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Modern Era burials from Tell Abu Hureyra, Syria

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Abstract: *Rescue excavations in 1972 and 1973 on the summit of Tell Abu Hureyra, Northern Syria, undertaken in advance of flooding by the Tabqa dam downstream on the Euphrates River, recovered over a hundred burials from the Modern Era. The 142 burials recovered comprise males, females and subadults from five of the seven trenches opened on top of the Neolithic mound. The health, and identity of the people who selected the mound to bury their dead is explored and, in particular, whether the burials were of Islamic, nomadic or non-Islamic communities. The question of what would be the best indicators to distinguish such burials and would they be the same for all burials is also addressed.*

Key words: Christian; Islamic; nomad; Ottoman Period

Introduction

Tell Abu Hureyra, a conspicuous mound on the right bank of the Euphrates River (35°51'58"N, 38°24'00"E) was excavated by Andrew Moore during an 8-week season in 1972 and a 16-week season in 1973 (Moore et al. 2000). Orientated NE-SW, the eastern side of the mound consisted of a platform four or five metres lower in elevation than the western ridge. Four trenches, identified as A, B, C and E, were opened along the crest of the mound, while three trenches, identified as D, F and G, were opened on the west and east slopes, avoiding the cemetery of the modern village of Abu Hureyra that covered much of the centre of the platform. Trench G was excavated to the north of this cemetery.

The prehistoric site of Tell Abu Hureyra had been abandoned at the end of the Neolithic Period. The mound was used again in modern times, for buildings and for burials, into the 1970s (Moore et al. 2000:207, 259). The soft ashy soil that had accumulated on the ancient Neolithic tell was used for burials along the crest of the mound. The density of burials was high, suggesting intensive use of the prehistoric mound over several centuries. The most recent villagers, who also buried their dead on the top of the mound, had no memory of any previous inhabitants, although they appear to have avoided the older cemetery (Moore et al. 2000:298). Moore concluded that burials were confined to those parts of the site that were most visible up and down

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the valley and that the people buried on the mound in recent centuries had lived in villages along the valley, or that they may have been nomads (Moore et al. 2000:299). Calibrated radiocarbon dates on human bone from trenches A and B indicate that parts of the cemetery date to between the 15th and 19th centuries CE, encompassing the end of the Mameluke period to middle years of the Ottoman Empire (**Table 1**). A thermoluminescence date for a pottery sherd from a pit in Trench D confirms that the pit was dug in Islamic times (Moore et al. 2000:221); only isolated human bones were found in this pit. Islamic pottery and scraps of iron were also recovered. Some Byzantine pottery sherds were found in trenches E and G.

Table 1. Dating of Modern Era human remains from Tell Abu Hureyra (from Moore et al. 2000).

Trench	Level	Sample	Date	Calibrated date (95.4%)
A	13	TrA72.85 bone	^{14}C 390±60 BP (OxA-2044)	1431–1639 cal. AD
B Phase 11	87	TrB70 bone	^{14}C 170±60 BP (OxA-2045)	1655 cal. AD or later
C	3-18			
D Phase 6	Islamic pit	pottery	TL 600–1000 AD	
E Phase 9	1-2, 126, 136			
F				
G Phase 2	63			

Graves were usually oval in plan and large enough to accommodate an extended human burial. Very few artefacts were associated with the graves. In addition to the graves there were burial pits that contained isolated human as well as animal bone (Legge & Rowley-Conwy 2000), scraps of iron, glass, and other modern artefacts (Moore et al. 2000). Taphonomically, the bones are generally in good condition, although usually fragmented. It has been possible, using excavation numbers, to locate many of the graves on the level diagrams for Trenches B and E published by Moore et al. (2000:Figure 8). The collection is now housed in the Department of Earth Sciences, Palaeontology, Natural History Museum, London (NMHUK).

Overview of human skeletal remains

The abbreviations utilised herein are as follows: A = adult; Adol. = adolescent/sub-adult; indet. = indeterminate; Infant = 0-2 years; J = juvenile, 2-12yrs; MA = mature adult; N = neonate; OA = old adult; YA = young adult; in terms of sex estimation, F = female; F? = probable female; M = male; M? = probable male.

The Modern Era human remains recovered from Trenches B, D, E, and G were already presented in the book by Moore et al. (2000). Most of that study was carried out many years ago. In order to maintain continuity, the methodology used for analysis of the human skeletal remains is the same as that used for earlier studies, es-

sentially that detailed in Brothwell (1981), although it is now more than a little dated (cf. Molleson in Moore et al. 2000; Molleson 2016).

Trench B

Trench B sections show an orderly row of east-west orientated graves at depths of 60–130cm. The Trench B burials appear in two levels: an upper level, Phase 11, and a lower, Phase 10, with some cut into the uppermost Neolithic strata (**Table 2**). About 18 Modern Era graves were recovered, two of them covered with stone slabs (Moore et al. 2000:297). The remains of a further 16 individuals were identified from bone bags.

Table 2. Trench B Modern Era burials found at two main levels: an upper level, Phase 11; and a lower level, Phase 10, and a Pit level 50 that cut down into levels 30 and 34 of Phase 10.

Phase	Level	Find	Burial	Age (years)	Sex
11	1		72.4	2	
10?	1		SR1184	1.5	
11	2	B11	SR1186	2.5	
11	2	B21	SR1482	A?	
11	3	21	73.56	2	
11	12	B34a	SR1210	A	
11	12	B34b	SR1210	c 0.25	
11	12	B34c	SR1210	1-1.5	
11	14	B39	SR1215	YA	
11	14	32	72.162A	N	
11	14	32	72.162B	MA	F
11	50	43	72.264B	N/I	
11	5	7	72.588	0.75	
Pit D	23	B58	SR1205	I	
11	24	B56	SR1172	J	
Pit	25	B62	SR1176	J	
11	27	33	72.161	c. 0.3	
10	10	B30	SR1221	c. 5	
10	18	24	73.70.	YA	F
10	18	B75	24	A	M?
10	18	B76	B76b	MA	F
10	18	B76	B76a	YA	
Pit C	30	B50	SR1310	I	
11	30	B53	SR1335	I	
11	30	B54a	SR1304	Adol.	
11	30	B54b	SR1304	1.75	
11	30	B55	SR1333	c. 6	
11	34	B77	B77	A	F?
11	34	B78	B78+B81?	YA	F
11	34	B81	B81+B78	A	F
11	34	B82	B82	A	M
Pit	37		72.163	1.25	M?
10?	37		72.164	0.5	F?
10	67	76	72.519	1.2	

Trench E

A total of 12 modern graves from Trench E were recorded in the field and a further 10 fragmentary finds from bone bags. The burials located on the level diagram are divided into an upper level, Phase 9, confined to the Modern ashy layer, and a lower level, Phase 8, that cut into the Neolithic levels (**Table 3**). An east-west section shows a grave inserted between building walls of the former Neolithic settlement; another interment was orientated northwest-southeast, with the head facing west, the orientation possibly being constrained by the walls of the Neolithic building (Moore et al. 2000:226, 230).

Table 3. Trench E Modern Era burials found in an upper level, Phase 9, and a lower level, Phase 8.

Phase	Level	Find	Burial	Age
9	1	B2	B2	YA
9	1	B1	B1	MA
9	10	21	73.95	0.8
9	3=5	12	73.3443	8.5
9	3=5	B3	SR1022	I
9	3=5	9	73.512	0.5
9	3=5	B6	SR1028	N
9	11	15	72.178	OA
9	11	41	73.300.	A
9	11	B9	B9	1
9	101	B159	SR993	N
8	6		73.92	0.3
8	81	B146	SR947	A
8	7	11	73.3442	1
9	7	15	73.3441	2.5
8	12	113	73.3438A	YA
8	12	113	73.3438B	I
8	12	B29	B29	MA
8	12	B40	B40	YA
8	8	17	73.3440A	1
8	8	17	73.3440B	1.3

Several burials were visible on the surface of the mound in Trench E and Moore reasoned that at least some of the burials were Byzantine, the heads of most of the skeletons being oriented to the west and Byzantine pottery having been found in proximity. A later building had been constructed that subsequently collapsed, sealing much of the area with debris (Moore et al. 2000:240, 298). Comparisons with similar Byzantine burials at Bouqras, however, noted that there the burials were in wooden coffins (Contenson 1985:340). The only settlement in the vicinity of Abu Hureyra with traces of Byzantine occupation is Banat Abu Hureyra, 4km to the east, which was inhabited in Byzantine and early Islamic times (Moore et al. 2000:299; Van Loon 1967:5-6).

An infant, TrE73.95, aged about one year, had a cranial pathology. The right parietal is swollen with a small jagged hole at apex. On the endocranial surface there is diffuse superficial bone necrosis with flaking and there is a smaller similar region in the remaining part of the left parietal. There is a sharp impression of the parietal branch of probably mid-vertebral artery indicating that the underlying tissues were swollen and had pressed against the bone. The basi-occipital shows some osteitis.

Trench A

Trench A yielded the largest estimated number (n=51) of Modern Era burials of the eight trenches that were opened along the crest of Tell Abu Hureyra. Many of the graves were identified in 1972 when a 3×8m area of Trench A was cleared and a trial trench, TrA1, excavated across the northern and western parts of the area. In 1973 excavation was extended over the whole trench, with additional numbering of levels for TrA2. More graves were located in this area and, once the intervening baulk had been taken down, the whole area of the trench was excavated through to the Neolithic levels. The Modern graves were above the Neolithic surface, and at least one, Grave TrA73.B144, of an infant, was intruded into it (Floor 126, part of Floors 77, 87, 137, 87, 96), which extended intermittently across the trench. It could be the first of the Modern burials in Trench A; another burial, TrA72.255 level 33, was close to a Neolithic burial.

Graves were fitted in between earlier Modern Era buildings, the walls of which could have influenced the orientations of the graves. Graves in Trench A were orientated NW-SE, supine, head west facing south (**Table 4**). Many graves held several burials that were sometimes difficult to separate, with some having been excavated in successive years. A suffix, A, B, etc. was then added to the skeleton number (e.g. TrA72-73.338A-F).

Very few objects were found in the grave fills or associated with a grave. These include part of a stone disc in a double burial, TrA72.59 and TrA72.60, pottery sherds, retouched blades, bone tools and a large piece of iron near TrA72.102; iron bracelets were also recovered from under the wrists of both forearms of an adolescent, TrA73.B64. Tools of bone, spatulas, points and flint blades, close to the remains of the head, horns and scapula of a goat are recorded in the field notebook (1972 book 1, 9). They hint at one activity that took place on the mound, the skinning and preparation of a goat with removal of the main meat-bearing parts.

The most complete skeletons were in articulation, head west turned to face south. Other interments were somewhat disarticulated, which could have resulted from disturbance through reuse of the grave area, delayed burial of a bundle, or burial without either a shroud or coffin. These were usually incomplete but placed NW-SE, with the head, if present, turned to face south.

Table 4. Trench A Modern Era burials found 1972 in Trench A1 and extended 1973 in A2.

Level	Find	Burial	Age	Sex	Orientation
			Trench A1		
13	14	72.85A	MA	M	head NW feet SE
13	14	72.85B	YA	F	
13	57, 41	72.176A	MA	M	
13	57	72.176B	<3		
14	B92	B92	0.6-0.75		
14, 15	69	72.338A	MA	M	
15	69	72.338B	Age	M	
14, 15	53	72.338C	c. 2-3		
14	53	72.338D	OA	F	
14	53	72.338E	J		
14	53	72.338F	YA	?	
16		72.276	9		W-E
17	12	72.57B	1.25		head NW feet SE
18		72.59	MA	M	on side, head W facing S
18	11	72.6	YA	M	disturbed supine head W, feet E
21		72.58A	2.0-4.0		disarticulated
21	13	72.58B	1		disarticulated
23	15	72.102	YA	F	W-E supine, arms on pelvis
27		72.521	c. 1-3		
29		72.203	c. 4		
33		72.255	0.75		
36	43	72.275A	MA	F?	N-S, feet point S
36	43	72.275B	YA	M	
			Trench A2		
7		73.306	c. 2-3		W-E
7	B88	B88	1		
9		73.334A	0.5		
11	26	73.299	YA	M	NW-SE? disarticulated
11	intrusive	with 72.299	Adol.	M	
11	B13	SR1948	MA	F	
11, 18	B16	SR1944	YA		
11	B18A	B18A	MA	F	
11	B18B	B18B	N?		
11	B8A	SR00721	A	F	
11	B8B	SR00721	5.0-6.0		
11	36	36A	MA	M	NW-SE disturbed, supine facing SE
11	with 36	36B	14-15		
11	39	39	A	M	
11	44	44	YA	F	W-E, facing S, supine, arms folded
11	B20	B20	A	F	
12	with 37	37B	A		
12	37	37A	OA	F	W-E, extended on right side
23	B21	B21	A	F	
29	B118A	B118A	YA	F	
29	B118B	B118B	Foetal		
29	B119	B119	YA	F	
36	B25	SR1912	A	M	
49	B64	SR1964	13-14		
49	B64	B64B	c. 4		
49	B64	B64C	A	?	

Table 4. (continued)

Level	Find	Burial	Age	Sex
		Trench A2		
49	B64	B64D	A	?
126	B144	B144	0.25	

Usually, skeletons were in anatomical position, although some had been disturbed. In a large grave, with the male TrA73.36+39, cut into level 11, the right forearm and hand had been displaced to the south while still in articulation and there is evidence of excavation between the two parts, torso and displaced forearm (**Figure 1a**). General disturbance without displacement is revealed by the torso and mandible of an adult male, TrA73.299, not in articulation but with the long bones generally aligned NW-SE. There is also a femoral shaft of an adolescent and fragments of juveniles TrA73.299B and C, along with associated animal bones (**Figure 1b**).

The remains of about 50 individuals from Trench A are attributed to the Modern Era. Thirteen burials, five adult females, two adult males, and six immature individuals, including an adolescent, are reasonably complete. Confident assessment of age-at-death and sex was not possible in all cases. Females and males are about equally represented, and more than a third of the individuals assessed are immature, which suggests that the cemetery was used by domestic communities. There are indications from the ratios of age groups that there would have been even more juveniles in the population, in particular infants are under-represented, and the newborn deceased must have been buried elsewhere. Most skeletons were incomplete; some contexts had parts of several individuals suggesting they might be secondary burials or in a reused grave; others consisted of a few or single bones.

Infants were buried in the cemetery with evidence of ages as young as six to nine months. The youngest infant, TrA73.B144, had a dental age of about three months. It was within the lower 10% size range of the Maresh (1955) data, which suggests that babies at birth were within the average human range. At six months (dental age) both TrA72.255 and TrA73.334 were within the Maresh range, and also TrA.B92, aged seven to nine months. An individual TrA72.57B, with a dental age of about 15 months was the first infant to fall outside the lower 10% range. This individual has endocranial osteitis of the frontal and parietal bones, and alveolar pitting around the erupting second deciduous molars. There are erosions or dental caries on the upper incisors. The crowns of the teeth are discoloured. There is one very small infant, from the size of the lower limb bones. It is probably of foetal age, being interred in association with the burial of TrA72.B118/9A, a very small female.

Reasonably complete skeletons of six juveniles were excavated in 1972. Isolated bones of immature individuals recovered as scatter or intrusive in earlier burials pro-

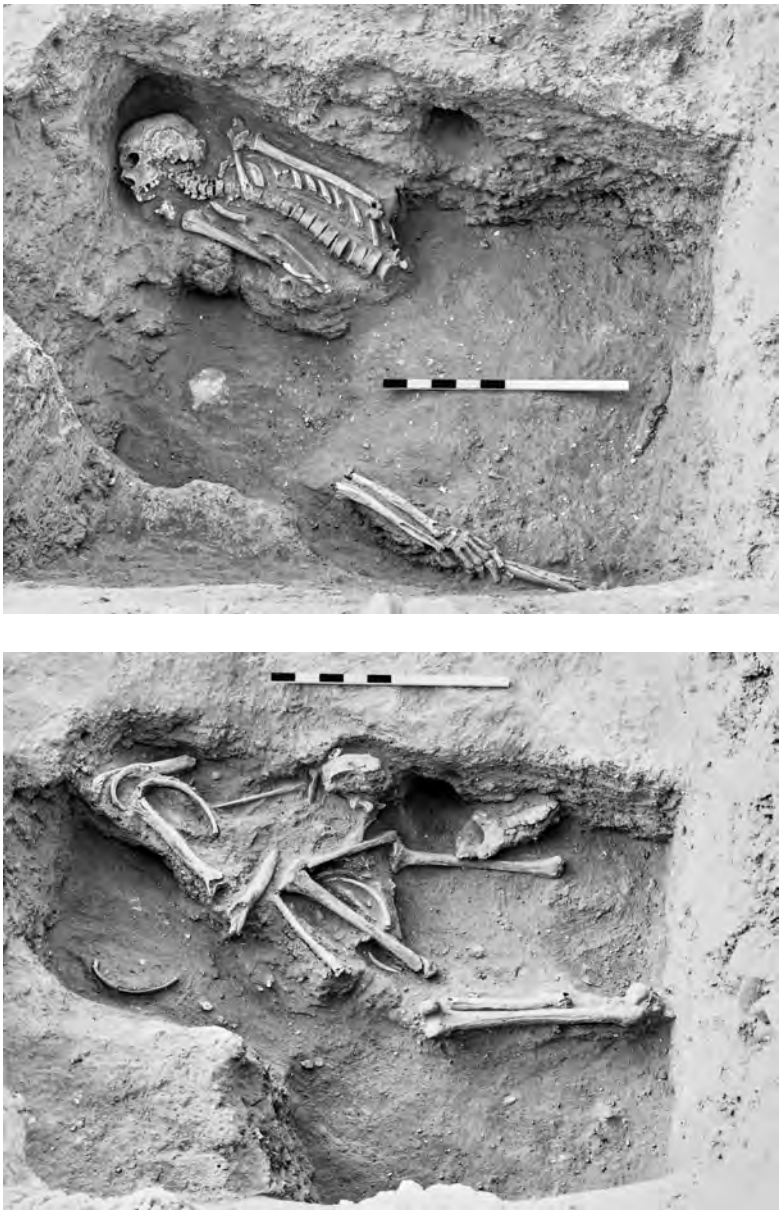

Figure 1. (top) Disturbed burial, articulated, supine, oriented NW-SE. The right forearm and hand had been displaced to south edge of the grave while still articulated. TrA73.36+39 (photo courtesy A. Moore); (bottom) Secondary burials with animal bones. Probably four individuals are represented. The general orientation is still NW-SE. TrA73.299 and B26, level 11 (photo courtesy A. Moore).

Table 5. Long-bone maximum length (mm) for Modern Era adults from Trench A. Estimated values are marked by an asterisk.

Individual	Radius	Ulna	Femur	Tibia	Fibula
Females					
TrA72.102	-	237*	-	340	339
TrA.B118/9A	-	-	-	281	283
TrA.B37	-	-	382	-	-
TrA72.338	232	-	-	-	-
TrA72.72.275A	-	-	-	348	-
Males					
TrA72.59	-	-	-	-	412*
TrA72.60	-	-	-	345	344
TrA73.299	-	-	-	-	365
TrA72.85A	232	254	-	-	346
TrA72.176A	-	-	-	-	348
TrA72.275B	-	263	-	-	-

vide evidence of further burials. Several of the juveniles had dental ages between two and four years: they were toddlers vulnerable to greater exposure to post-weaning infections. One child, TrA72.338C, with a dental age around three years, has unworn teeth and may not have been fully weaned, or was being weaned onto cooked cereal or other soft foods. Only isolated bones were recovered, but femur length seems in agreement with the dental age (Maresh 1955). The well-preserved skeleton of a four year old, TrA72.203, with complete deciduous dentition has occlusal facets on the deciduous molars but little wear, which suggests that eruption had been recent. The skeleton of TrA72.58A is fragmented and is somewhat smaller than TrA72.203, but larger than TrA72.338C aged about 3 years. The third to fifth toddler years evidently were a vulnerable period, perhaps associated with weaning. TrA73.B64 is the fairly complete skeleton of an adolescent aged about fourteen years: the second molars have erupted but not the third. The epiphyses of the long bones have not yet fused, nor even the acetabulum, although the patellae have ossified. Small vastus notches had developed on the patellae.

It is difficult to reconstruct the growth of the children from such very sparse data. In general, size seems to be compatible with dental age, but the individuals are very small. At around twelve months, children are at or only just below the lower 10^{th} percentile of Maresh's data. A child, TrA72.203, with a dental age of about four years is below the 10^{th} percentile of Maresh for all limb bones, although tall compared to other juveniles in the sample. This difference increases with age. We do not have the data to demonstrate when linear growth ceased.

In contrast to the Neolithic assemblage of Trench A, where females outnumber males 5:1, the sexes are equally represented in the modern era assemblage, five females versus six males (see Molleson 2000). There are sparse data for long bone length (**Table**

5). Bone dimensions for males and females are very variable, which could reflect uncertainty in determining sex of individuals, using secondary sex characters that are poorly preserved. In particular, one of the two skeletons numbered TrA72.275 is probably male. The cranium is robust, also the clavicle, which as a generality is one of the most dimorphic bones in the skeleton (Molleson et al. 1993). Apart from the uncertainties, female dimensions are on average smaller than those of males but not greatly and measurements certainly would not predict sex reliably. Tibiae and fibulae are relatively longer in males than in females.

There were few injuries, and none that could be attributed to interpersonal violence. A systemic condition was noted on the two individuals 72.275A and B (**Figures 2–4**).

Trench C

Trench C was opened near the summit of the mound, on the western side, near the northern end. The burials were extended, orientated west–east, lying on the right side, head to the west facing south. The burials were from two depths, the deeper sometimes stratigraphically very close to Neolithic burials. Associated goods were infrequent: a grinding stone with TrC72.45 and beads with a child (TrC72.78). The bones are very fragmented, although the plans depict interments of complete skeletons. In all, about twenty Modern Era burials were recovered (**Table 6**). The skeletons are very incomplete: the bones are fragmented with cracking due to sub-aerial erosion which raises the possibility that they might be of an earlier date. Finger, toe and vertebra fragments were recovered from other levels through sieving. These isolated bones could not be associated with any of the recognized burials.

Slightly more than half of the individuals recovered in Trench C were immature; six or seven of the adults were tentatively identified as female and only one or two as male, but the material is so fragmented that sex determination is very insecure. Most adults reached middle age. That more females than males were identified could reflect mortality rates or the burial of males elsewhere, since they are equally distributed between upper and lower levels.

Six months seems to have been a vulnerable age for babies, with four infants of this age. Perhaps it is associated with the start of early weaning. One six-month-old, TrC72.84, had delayed dental eruption, 'frayed' metaphyses of the radius and porous rib ends suggesting rickets, and another infant, TrC72.78, the size of a two-month-old, had swollen rib ends; this individual was buried with two beads. The lesions may be signs of general malnutrition and/or rickets.

Bones of three or four juveniles were recovered from Level 3. The cranium, spine and upper limbs of a four year old, TrC73.310, were found near the leg bones of TrC73.85. There is very little wear on the teeth for the age, implying a diet of primar-

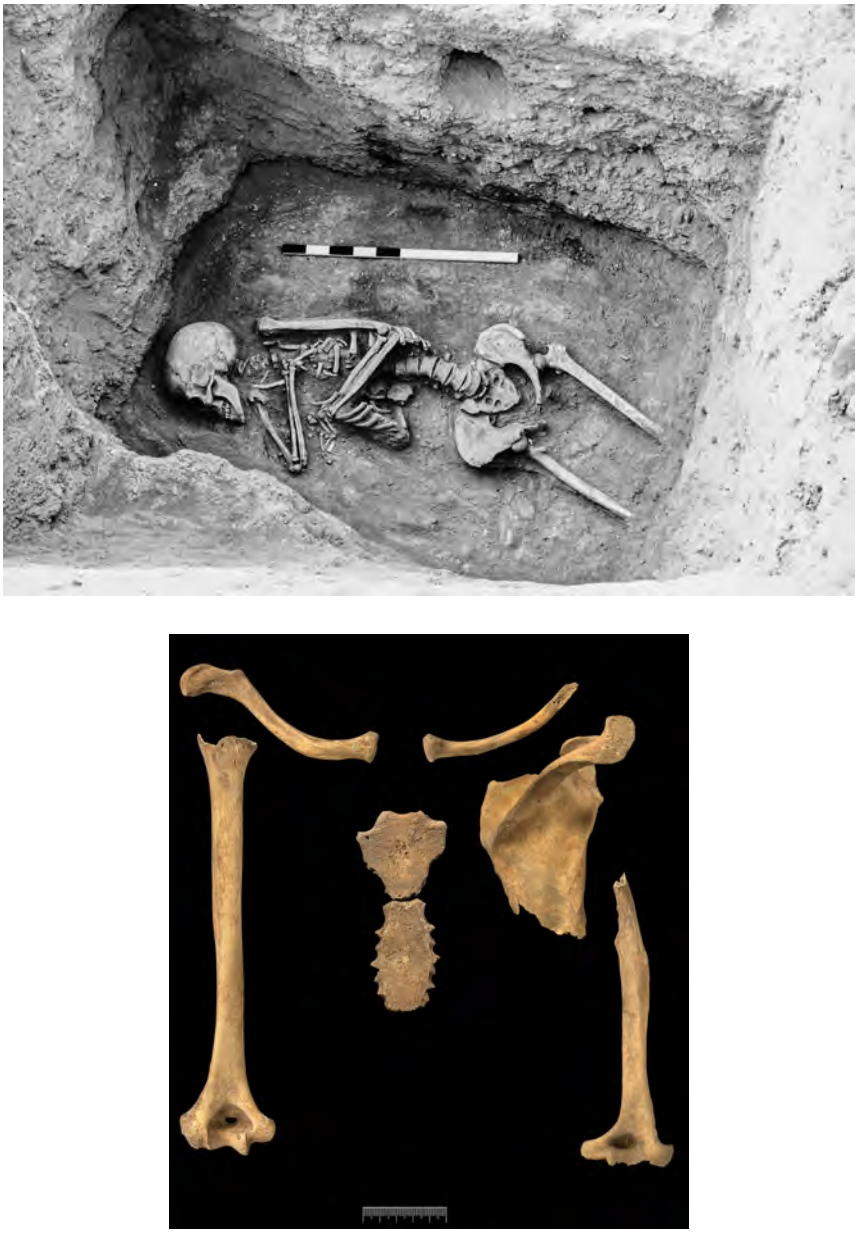

Figure 2. Female TrA72.B44, (top) Curvature of the spine disturbs the general W-E orientation. Unfortunately, the legs, which could reveal the original injury, remained in the baulk (photo courtesy A. Moore); (bottom) Expanded sternum, withered right clavicle and humerus of the woman with probable crutch palsy (photo: Studio NHMUK).

Figure 3. TrA72.275, the only inhumations orientated N-S, (left) Tarsal and metatarsal bones of a left foot showing a large defect in the head of the second metatarsal. TrA72.275A; (centre) Bones of left and right feet assembled. TrA72.275B; (right) Lateral views of cystic heads of both first metatarsals of TrA72.275B (photos: Studio NHMUK).

Figure 4. Lateral and anterior views and radiographic evidence for an old injury to the distal shaft of the right ulna, TrC73.76B, (left) Lateral view showing the deformed styloid process (photo: Studio NHMUK), (centre) Radiographic evidence for an old injury (radiograph: T. Molleson), (right) Anterior view with evidence for an old injury to the styloid process (photos: Studio NHMUK).

Table 6. Trench C Modern Era burials excavated in 1972 and 1973.

Level	Find	Burial	Age	Sex
3	1	73.76A	MA	F?
3	1	73.76B	N	
3	2	73.77A	OA	F?
3	2	73.77B	MA	F?
3	2	73.77C	N	
3	3	73.78	0.2-0.3	
3	4	73.79	0.25-0.5	
3	10	73.85	c. 4	
3	11	73.86	N	
3	13	73.87	A	F?
3	19	73.141A	c. 6-9	
3	19	73.141.B	c. 0.5	
3	12	73.217	c. 6-7	
3	14	73.308B	0.5	
3	14	73.308A	MA	
3	12	73.309	YA	M?
3	15	73.31	c. 4	
4	B16	SR00585	J	
4	B16	SR00585	A	
4	B24	SR00632	A	
9	B9	SR1534		
10	B23	SR00601		
10	B6	SR1532		
10	B13	SR1541		
11	12	72.45	MA	F
12	B8	SR1558		
14	20	72.343	YA	
16	21	72.84	0.5	
17	B17	SR1535	J	
17	B17	SR1535	J	
17	B29	B29	YA	
18	31	72.105	MA	F
18	B19	SR1530	A	
18	B19	SR1530	J	
Baulk	B21	SR1533	J	

Table 7. Epigenetic variants observed on Trench C Modern Era human crania.

ID	Trait
73.77	Asterion ossicle
73.77	Zygo-facial ossicle double
73.217	Lambdoid ossicle
72.105	Torus palatinus
72.105	Divided hypoglossal foramen

ily cooked weaning food. The cranium, vertebrae and upper limb bones of TrC73.217 and the lower spine, coccyx and lower limb bone fragments of TrC73.141A, indicate that both were aged about six or seven years; the larger, TrC73.217 already has pronounced uncinate processes on the cervical vertebrae.

Few long bone measurements could be recorded, and those that were indicate very low dimorphism between males and females, while other dimensions revealed females could be more robust than males. In general, the adults were physically well developed with pronounced areas for the attachment of the muscles, of the upper limbs in particular.

Few epigenetic traits were recorded (**Table 7**). Most are of uncertain etiology. Some spinal anomalies are associated with nutritional deficiencies which, if experienced in utero, may persist among descendants through several generations (VerMilyea et al. 2009; Molleson 2010).

Apart from general degenerative conditions, there is little evidence for pathology. Only one individual, a female (TrC72.105), displayed oral pathology. She had two dental caries (per 24 teeth), a cervical one of the left M2 and an occlusal one on the right M3, two abscesses (per 31 sockets) and four teeth lost ante-mortem (per 31 sockets). Calculus and periodontal disease were slight. She also had suffered a severe back injury, had developed enthesopathies in the thoracic vertebrae and had detached L4 and L5 vertebrae arches. A probable female, TrC73.76B, had strongly developed muscle insertion areas on the forearms, especially of the right ulna, and healed periostitis attributed to probable greenstick fracture with deformity of the distal condyle (**Figure 4**). She also suffered osteoarthritis of cervical vertebrae C2 and C3. Acquired traits, such as *cribra orbitalia* or porotic hyperostosis, were not recorded.

People of the Modern Era

Burials of the Modern Era amount to over 140 individuals and provide a valuable insight into the local population in historic times, designated Period 3 (Moore et al. 2000:258). An overview of the Modern Era burials from Trenches B and E is given in Moore et al. (2000:296-299, 302). Some scattered isolated human bones were recovered from Islamic pits in Trenches D, F and a single incomplete burial in Trench G.

The Modern Era burials probably span less than 400 years, yet at least 140 individuals are represented, more than half the number recovered from 4000 years of Neolithic deposits (**Table 8**). This implies a considerable increase in population density in the area, and, by extension, in the exploitation of the local resources. Analysis of the bones examined how this is reflected in the demography, physique and health of the human remains recovered.

Given the high infant mortality (c. 22%), neonate mortality would have been at least as high, and it follows that most of the newborn dead were buried elsewhere (Molleson 1991). Only Trenches B and E have an excess of immature to adult individuals, though fewer than expected. The graves with multiple burials, notably

Table 8. Age at-death distribution of Modern Era burials (excluding scattered bones).

Trench	Level	N	Infant	J	Adol.	F	M	A	Total	%
A	A1	0	4	7	0	4	7	1	23	
	A2	2	3	3	3	7	6	4	28	
Total		2	7	10	3	11	13	5	51	35.9
B	Ph.11	1	2	2	0	2	0	0	7	
	Ph.10/11	2	1	1	1	4	1	1	11	
	Ph.10	1	7	4	0	0	1	3	16	
Total		4	10	7	1	6	2	4	34	23.9
C	Upper	3	4	4	0	4	1	2	18	
	Lower	0	1	0	0	2	0	2	5	
	SR nos	0	0	5	0	0	0	8	13	
Total		3	5	9	0	6	1	12	36	25.4
D	Phase 6	0	0	0	0	0	0	1	1	
E	Phase 9	2	4	1	0	0	2	2	11	
	Phase 8	0	5	1	0	1	0	3	10	
Total		2	9	2	0	1	2	5	21	14.8
All trenches		11	31	28	4	24	18	26	142	
%		7.7	21.7	19.7	2.8	16.9	12.7	18.3	99.8	100.0

Table 9. Dental variants, FDI tooth notation.

ID	Cusps	Hypodontia	Megadontia	Roots
TrA.B20	21 trace shovel			
TrA.B37	35 accessory	44		24 single
TrA.B44			48	
TrA72.60	16, 26 Carabelli cusp			
TrA.B64A				5, 25 2-rooted
TrA72.276	12, 22 shovelled			36 fused
TrA72.338B	24, 44 tricusped			
TrA72.338C	36 Carabelli pit			
TrA73.338D		18, 28		
TrB73.70		12, 22, 28, 38		
TrB72.162		18, 28		14, 24 single
TrC72.343	12, 22 tubercle			
TrE.B2	13 tubercle			
TrE72.178		38		
TrE73.300		18, 28, 38, 48		

TrA72/3.338A-F, do not present clusters of dental non-metric traits (**Table 9**).

Task-related tooth abrasion resulting in grooves, chipping, fractures and displacement were observed frequently, especially in Trench A individuals (**Table 10**). Even the very young, TrA57B aged 18 months and a four-year-old, TrA72.203, had severe wear, chipping or very thin enamel of the anterior teeth, which could be associated with weaning practices. In others, asymmetric wear would indicate a handed task that applied force to the teeth of one side (often evident in pipe smokers).

Oral health observations were very limited owing to poor preservation (**Table 11**). Very few incidents of dental pathology are recorded. Apart from the already discussed female TrC72.105, a male from Trench E, TrE72.178, had lost ten teeth ante-mortem,

Table 10. Task related dental wear, FDI tooth notation.

ID	Chipping	Abrasion	Hypercementosis
TrA.B16		lingual	
TrA.B37			24
TrA.B36	11	incisor palatal	
TrA.B44	6, 25		
TrA72.60			yellow staining 6,7
TrA.B85A		left anterior	
TrA.B119	Up. PMs, M1s, C		
TrA72.57B	61, 52	incisors	
TrA72.203		thin enamel	
TrA72.338A	11, 34	anterior	distal root 27
TrA72.338B	21		
TrB73.162	21, 23		
TrB73.70		lingual 26, buccal 36	
TrE73.3438		occlusal 21, 11	

Table 11. Oral health, FDI tooth notation.

ID	Age	Calculus	Periodontal disease	Caries (total)	Abscess (total)	Antemortem loss (total)
TrA.B16		mild 36	severe			
TrA.B37	OA	45	18, 23	0	1(32)	9(32)
TrA.B44	YA	slight		2(25)	1(32)	5(32)
TrA72.60		slight				
TrA72.85A	MA	general	33	0(7)	0	0
TrA.B118/9	YA	cervical		2(16)		
TrA72.203	J	slight	32, 42, PMs			
TrA72.205B	YA	slight	25	2(16)		4(23)
TrA72.276	J	slight				0
TrA72.338A		slight	13, 43	10(15)	16?	6(29)
TrA72.338B	A	slight	41			
TrA73.338D	OA			1(7)		13(28)
TrB72.162	MA	slight				
TrB73.70	YA	moderate	slight	18, 36		17
TrC72.105		slight		37, 48	22, 26	14, 16, 27
TrE72.178	OA			34	14	
TrE.B2	YA	moderate	47			

suffered an abscess and had an inter-proximal carious lesion in one of the five remaining teeth. The generally good oral health seems surprising and could be interpreted as an indication that sugar was not widely available to the nearby communities, although conical sugar moulds have been found in historic period sites in Jordan and at Susa (Insoll 1999:164); or that the preparation of cereal products did not render the carbohydrates particularly cariogenic. Notably, Porman and Savage-Smith (2007:138) note that 'virtually all strata of society regularly practised a form of dental hygiene in which they cleaned their teeth using a brush'. The brush was usually made from the arāk tree, the properties of which have been shown to be effective in preventing plaque and gingivitis. Some ante-mortem tooth loss could have resulted from delib-

erate extractions, particularly where many teeth are missing given the individual's age, such as the adult TrA.B37, and TrA72.205B with 4 of 23 teeth lost.

Many post-cranial bones bear signs of strenuous activity, even as young as four years, both through modification of morphology during the growing period and acquired degenerative changes in later life, some through habitual labour, others from accidental incidents. Apparently, children had carried loads on the head heavy enough and for long enough to induce the development of pronounced unciform processes on the cervical vertebrae (cf. Molleson 2007). Heavy loading and accompanying strain continued into adulthood with many adults showing pronounced muscle attachments on upper limb and lower limb bones and degenerative changes of the joints. The female TrB72.162B, had a cleft sacral vertebra (S1), a failure of the neural arch to unite, which was also noted in another female, TrB72.B78, from the deeper level. Exceptionally, she was buried together with two perinatal infants, perhaps twins, who died during the birthing process, together with the mother (TrB72.162A, B and C).

The overall increase in population must have led to increasing intensity of agricultural use of land and labour investment that is disproportionately greater than the returns received. Inevitably, productivity declines unless new technology is introduced (Bocquet-Appel 2008). This did not happen. The Ottomans in the 16th century had reached the limits of their geographical expansion and thereafter began to fall behind. As trade routes bypassed the region, it was increasingly impoverished and the Ottoman agrarian system collapsed (Tainter 1987, Lewis 1980). In the Abu Hureyra region, once it became a backwater, a kind of stasis should have resulted as pressure on the land declined, yet the very high infant mortality, is a strong indicator of continued environmental impoverishment and populations under considerable stress. Enamel hypoplasia, marking stress events including fevers that occurred during childhood when the dental crowns were developing, are noted in most trenches.

Whose burials?

The Modern Era burials from Tell Abu Hureyra are often fragmented and any interpretations can only be seen as suggestions. The graves excavated from Trenches A, B, C, and E were located in an upper level of the tell confined to the Modern Era deposits and a deeper lower level that reached the uppermost Neolithic levels. The density of burials was high, suggesting intensive use of the prehistoric mound over many years, and it is possible that the general west-east orientation of the graves was dictated by the constraints of the orientation of the mound over-riding any cultural or ideological preference (Moore et al. 2000:Figure 2.14). It is possible the trenches excavated may have sampled parts of a single cemetery that was used, possibly intermittently, over several centuries by different communities according to their differing rites (**Figure**

5). Alternatively, the trenches may have sampled different cultures that buried their dead on the tell. In particular the layout of graves exposed in Trench B differs from those of the other trenches.

Simpson (1995) has reviewed Late Islamic burials. Cemeteries are often on agriculturally poor, dry raised ground, particularly on deserted tells. In some cases there is shared use of one mound by different villages, and graves can be clustered according to family. In general, the grave is dug deeper for women (1.5m) than for men (1.3m), infants (0.2–0.8m), and secondary burials deepest. Normally, for a primary burial the body is wrapped in a shroud, not placed in a coffin and laid head facing Mecca. Miscarried foetuses and young infants were buried in pots from the 18th century (Simpson 1995:241-244), but such have not been found at Abu Hureyra. Some

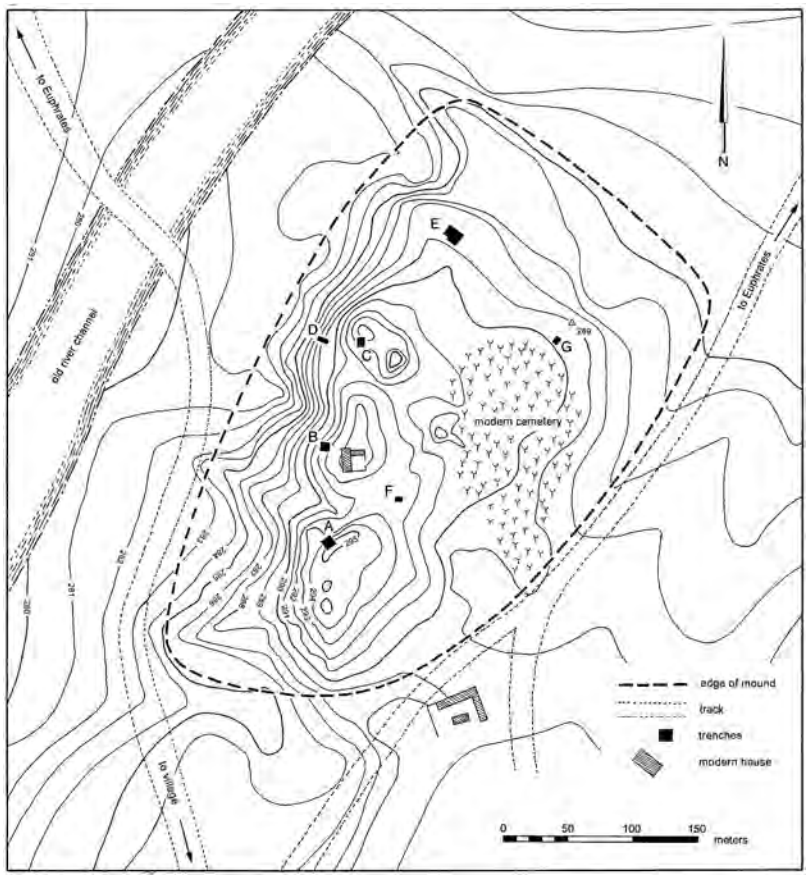

Figure 5. Distribution of excavation trenches along Tell Abu Hureyra, which is orientated N-E to S-W, from Moore et al. 2000, Figure 2.14, with permission.

nomads prefer burial in a village cemetery or close to a perennial water supply, others simply bury near the tent. Burials may number a few dozen or several hundred (Simpson 1995:243).

Burial practices can be indicative of Islamic, Christian, or nomadic communities, though none is absolute (Simpson 1995:241). Location, orientation, internal zoning, grave goods and variation in age, sex and social status are all relevant and were, as far as possible, considered here. Differences in burial layout observed in each trench could show that each community worked out its own conventions, and indeed each instantiation of the conventions may have been instituted individually. In general, Islamic burials face Mecca and Christian burials face east, at least in Europe, the direction from whence the coming of the next messiah will occur.

Evidence for different observances within a cemetery is possible and was looked for since it might also reflect acceptance in that community. Variation in layout between different trenches, if detected, would indicate differences in ritual, though it would be hard to identify in the piecemeal exposures in isolated trenches of different eras. Insoll (1999:173-174) describes the rationalisation for inclusion of Muslim plots in an otherwise Christian or secular Cambridge (UK) cemetery: "below ground one is still a good Muslim." However, "Jewish and Christian burials should not be placed near those of the faithful". The Muslim section in the Cambridge cemetery is defined and the burials have a slightly different orientation, as is to be expected from Cambridge which is almost on the Meridian, Jerusalem SW and Mecca SSW (see Insoll 1999:Figure 5.4).

The social context and interpretation of the cemetery burials on the mound was attempted by considering the layout of the graves, their orientation, whether primary or secondary, depth, position of the body, sex distribution or segregation, associated goods, and demographic distribution in the hope of gaining some inkling of religious affiliation, specifically Christian or Islamic, and whether they derived from nomadic or settled communities. Further, the demography of sex, kinship, physique and health could reveal something of the cultural, social conditions and labour patterns of the people who had been buried on the mound over a period of several hundred years.

In Trench B phase 11 Modern Era graves B87, B99, B103, cut through Neolithic phase 10 into phase 9 deposits (Moore et al. 2000:191-195). The graves are shown as a row of five transverse cuts in the six-metre north-south section from which it follows that the burials were aligned W-E; they are closely spaced, leaving little room to walk between them. They seem much more ordered than those in Trench A.

The burials in Trench C were extended, oriented W-E, head west facing south, lying on the right side. Several reached depths that abutted the walls of the former Neolithic buildings. Here, the W-E orientation of some of the burials could support a non-Islamic ritual without categorically excluding the possibility they could be Is-

lamic, since the head was turned to face S. The apparent preponderance of women and children in Trench C suggests that men and women might have been buried in separate areas of the cemetery. This could be considered indicative of Islamic burial practice overriding the W-E orientation of the graves, and is plausible if the turning of the face to the south to face Mecca is significant and accepted as diagnostic. However, no area had a preponderance of males.

For Trench E, burials are usually orientated W-E, including an extended supine burial, TrE73.3438A, of a young adult female with an infant humerus visible beside her own left humerus (Moore et al. 2000) and a two- to three- year old juvenile, TrE73.3441, extended lying on its right side facing south, left upper limb by the side (right not visible), lower limbs extended, slightly flexed. TrE73.3440 an extended burial of an infant was oriented W-E facing south (**Figure 6**). Both Byzantine and Islamic pottery sherds and scraps of ironware were recovered in the vicinity. A transverse W-E section depicts a phase 9 grave inserted between walls of a Neolithic building (Moore et al. 2000:226, Figure 8.44). An extended burial, TrE73.300, inserted between walls of a Neolithic house, is orientated NW-SE (Moore & Molleson 2000:297).

No Modern Era graves are recorded for Trench D, although an Islamic pit did include a few human bones, possibly disturbed when the pit was dug. No Modern Era burials were recovered from Trench F and only one from Trench G, TrG73.3066, the cranium and mandible (with cervical vertebrae) of a ten-year-old, was "placed in a shallow pit dug in occupation debris just outside a building". It could be intrusive into the uppermost Neolithic level of Trench G (Moore et al. 2000:288, 298, see p. 242, where it is attributed to Neolithic 2B).

The burials are extra-mural, on dry raised ground, a deserted tell, and close to the Euphrates river, a perennial water supply. Any zoning of the cemetery with segregation of men, women and children, is not generally apparent; perhaps in the samples from trenches A and C where more females were recovered, burials do appear to be in two levels. Throughout, juveniles are the most numerous, most are buried in the upper levels. There were too few goods associated with graves to establish whether or not they were accidental or deliberate inclusions, just the iron bracelets, possible tokens, and two beads which could be an amulet.

Delayed or re-burial of nomadic pastoralists would be less likely to present as complete extended inhumations. Both primary and secondary burials were usually too fragmented for any distinction to be made between them or for their respective depths of interment, if any. The isolated and fragmented bones recovered from bone bags are less easy to assess; they could be from disturbed earlier graves or represent delayed interments of the dead of nomadic groups, who used the conspicuous mound along a trade route. Human bone recovered from Islamic pits could be bone that was

displaced during later activities. Differences between camel, cattle and horse keepers might equally be evident (Insoll 1999:161, 217).

Overall, burial evidence for ideological context is ambiguous. Most of the burials are orientated W-E, with the head, when present, turned to face south. In Europe, tra-

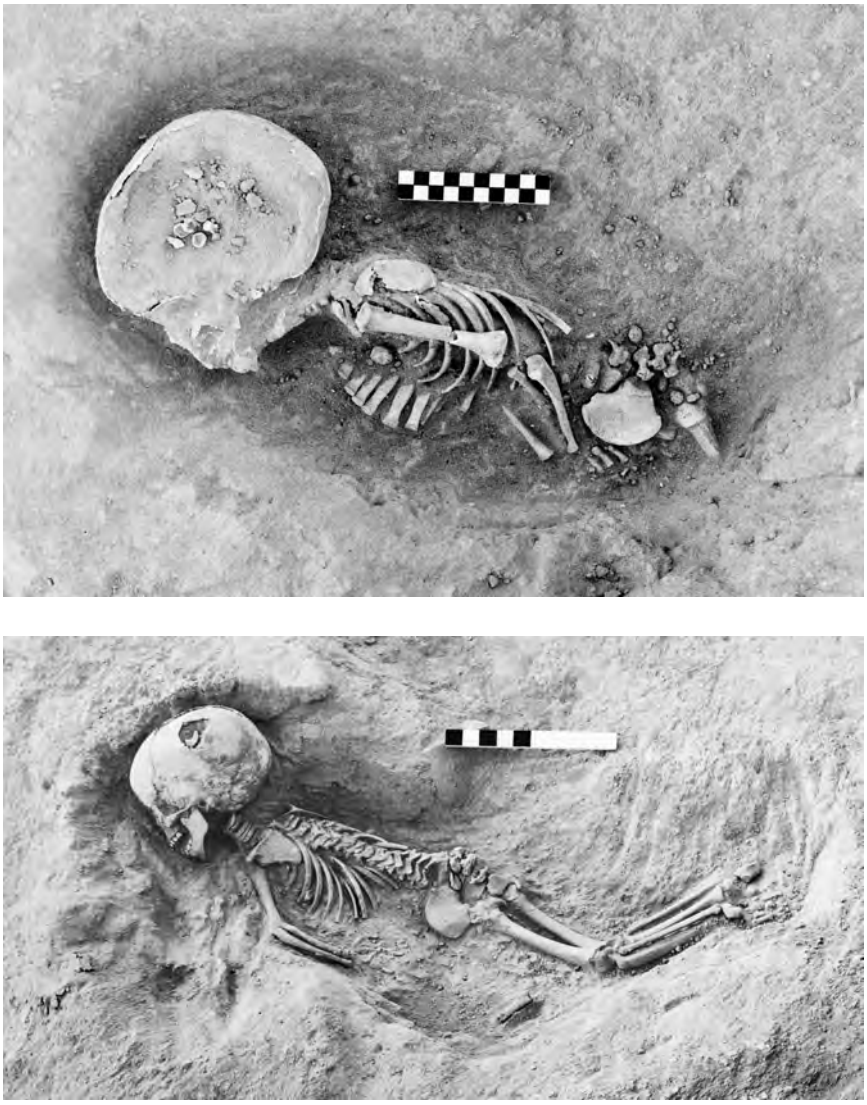

Figure 6. (top) Semi prone extended burial of a juvenile about 3 years old. Tr.E73.3441 (excavation photograph courtesy Andrew Moore); (bottom) Extended west-east burial of an infant lying on its right side. TrE73.3440 (excavation photograph courtesy Andrew Moore).

ditional Christian methods of burial ensured that, at the resurrection, the body would face east in anticipation of the next coming of the messiah. If this were specifically facing Jerusalem (31°47'N 35°13'E) viewed from Abu Hureyra (35°52'N 38°24'E) it is only slightly south-west of Mecca, and is almost due south of Tell Abu Hureyra, the two rites would be indistinguishable. The body was laid W-E, supine, face up; or could be laid on its side, head to the north turned facing east. Muslim burials face Mecca (21°25'21"N 39°49'24"E); the grave should be aligned perpendicular to the Qibla (the direction to the Kaaba in Mecca) with the face turned to the right along the Qibla. The face turned to face south would be towards Mecca, as is evident in most documented cases summarised by Simpson (1995:245).

Evidence for the use of coffins is not recorded and shrouds were probably used to transport the body to the place of burial. Interments depicted on the photographs and planned as intact skeletons would be more likely if buried soon after death; whereas disarticulated and secondary burials could support a delayed burial context or simply disturbance of earlier inhumations. In other respects, the burials are also consistent with Islamic preferences; neonates are largely excluded from the cemetery. A skeleton, wrapped in a shroud, found prone or semi-prone could have rolled over.

Several skeletons appear to represent delayed burials or reburials, which raises two questions: why was it so important to bury in a particular place, that after death the body was transported to a cemetery, in this case to tell at Abu Hureyra? Any grave would be for someone who had been a member of a wider community, settled or mobile, wherever it was; the cemetery would be an extension of that community. Older graves are respected, however distant in time, as would be the different generations of the living. Ingold (2011:xvi, 133-134) suggests that genealogical thinking in agricultural and pastoral societies is carried on within the context of a rational approach to the generation of knowledge and substance embedded in life historical narratives and emplacements of their interventions, often from beyond the grave, in the lives of successors. Burial can be understood as a movement along a way of life.

In a cemetery the dead remain part of the community, a community that may have many facets. Burials within the environs of a house remain in the family, out of view, for an infanticide; outside the community for the suicide or murdered; or war dead who were rarely returned to the community. Exceptionally, a cenotaph or, in observant societies, a memorial might be created. Croucher (2012:302) concludes that "death was not the end of a person's role in society, but rather, death was a transformation, with relationships continuing between the living and the dead," and "mortuary performances can be seen as deeply mnemonic, identity-shaping events". Lifetime disabilities are ignored in the grave. The rite, extended, supine, excluding grave goods, is a sufficient identifier for Muslims or Christians. Individuality is sublimated to conformity with an over-riding rite that unites and identifies the commu-

nity. Knowledge of a specific individual may not matter as long as identity remains in the collective memory, in stories told, elaborated, and mythologised.

The significance of the Modern Era burials on the tell at Abu Hureyra is that an extended dispersed community was united. As people moved away, they took the living community with them while their ancestors remained and were respected by later residents although they had not known them.

Conclusion

The Modern Era burials on Tell Abu Hureyra were recovered from graves, pits or simple interments, exposed in the four trenches of the six opened across the tell that would be the most visible from a distance. Dated to the Ottoman Empire, they could span four hundred years and represent at least parts of several communities. Other parts of these communities could be elsewhere. Numbered graves were more likely to comprise remains of several individuals than were bone bags; while all age groups were represented in both groups.

Different treatments are indicated possibly in the close-packed orderly arrangement of graves revealed in Trench B. This orderly arrangement, however, may not represent a different ideology since in these, as in the other trenches, the face was turned to face south. This orientation of the head has been the main criterion used to identify the Modern Era burials as Islamic since Mecca lies to the south of Abu Hureyra (Dickson 1949:214). It is supported by other factors including burial near water and the location on a conspicuous mound like Tell Abu Hureyra.

Trench B was dominated by infants in both Phases 11 and 10. The numbered graves actually included the skeletal remains of newborns as well as infants; one adult, a female was buried with a newborn child. It can't be assumed that bone bag material represented displaced fragments of numbered skeletons. In Trench B, where several Islamic pits were excavated, fragments and isolated bones of adults, in contrast to the infants of the numbered skeletons, comprised a significant proportion of the bone bag material in both phases as it did in other trenches.

The upper levels of Trench C also held the graves of neonates and infants as well as adult females, and juveniles. Estimation of sex was uncertain. The age at death of infants that clustered around two years could reflect age of weaning and consequent toddler infections. Males must have been buried elsewhere or in upper levels that have been deflated by erosion. In all, the demography could be reflecting a socially driven mortality pattern of the society; in which case, they would likely be from a locally based community. Trench E burials, as in the other trenches, has a preponderance of immature individuals that could reflect the demography of the group. All newborn infants, including one skeleton, however, were recovered from the bone bag material.

Trench A with 28 identified and possibly 50 individuals between the numbered graves and bone bag material, equally distributed as to preservation and age, is perhaps the most socially representative of the Modern Era people. There are more males than females notably in the numbered graves. Children were as likely as an adult to be buried in a numbered grave; thus, they had received the same burial rite. Many bore signs of heavy load bearing, some of healed injury that could have required care and compromised their ability to work. A few secondary burials, with disarticulated or selected parts may have been recovered for reburial and could identify nomad burials. There were no mass graves, nor any evidence for warfare.

At Abu Hureyra orientation of the head has been the main criterion used to identify the Modern Era graves as Islamic. This is supported by other features. In W-E aligned graves the body is usually a primary interment, extended, supine or on its right side, head turned facing south, towards Mecca. The bones are in articulation, implying that they were originally placed in a shroud or buried soon after death. These are inferred to be Islamic, though Christian burial cannot be excluded.

The demographic pattern from each trench indicates an essentially local catchment. Sołtysiak (2010:83-85) has reviewed morphological studies demonstrating a strong influence of local environment on skeletal, notably cranial, development. While the Modern Era mandibles have a modern gracility, with reduced gonial area, they also appear to be an amalgam of the two mandibular morphotypes identified in the Neolithic assemblage (Molleson & Rosas 2012). They have a high ascending ramus of the dominant ABU type and a robust mandibular body of the much rarer ABO type. It is hoped to examine whether this implies further immigration of the ABO type in an ongoing study.

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