



The Global History of Paleopathology: Pioneers and Prospects

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Paleopathology in Lebanon, Syria, and Jordan

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Abstract and Keywords

This chapter presents a diachronic view of paleopathology in Lebanon, Syria, and Jordan within the context of archaeological research conducted in these regions. Archaeological exploration in Lebanon began in the eighteenth century while the region was part of the Ottoman Empire's Greater Syria. Until the 1960s, archaeologists in Lebanon rarely noted the presence of skeletal material in the tombs and graves they excavated, and instead focused their attention on grave goods, including sarcophagi. The history of paleopathology in Syria parallels that in Lebanon as a result of their political unity before the demarcation of Lebanon as a separate country by the French in 1926. Early explorers in Syria contributed to the interest in craniology by appropriating skulls with little interest in documenting their disposition or location, or even collecting all bodily skeletal elements. Archaeological exploration in Jordan has lagged behind Syria and Lebanon, due to a self-perceived unimportance in antiquity. However, a marked push to create a strong infrastructure after 1948, involving construction and public works projects, began to reveal the archaeological richness of Jordan's countryside.

Keywords: Lebanese paleopathology, Syrian paleopathology, Jordanian paleopathology, history, archaeological research

The history of paleopathology in Jordan and the northern Levant diverges notably from other areas of the ancient Near East such as Israel and Egypt. Archaeological research in Iraq, Egypt, Israel, and parts of Turkey and Cyprus, followed different trajectories due to their links to the eastern Mediterranean's "Great Empires," i.e., Greece, Egypt, Mesopotamia, and the "Holy Land" (i.e.,

modern Israel and the Palestinian Territories). These political and religious entities served as focal points of the historical narrative of Western civilization and thus provided the research foci for most Western scholars. As a result, Jordan, Syria, and Lebanon, despite their geographic positions at the crossroads of history, held marginal positions in the eyes of many researchers. The archaeology that finally spilled over into this “peripheral” region in the late 19th and early 20th centuries reflected the text-based, humanistic focus of what eventually would become Mesopotamian, Biblical, and Classical archaeologies and Egyptology, rather than having an anthropological perspective (Andr n 1998:41–42, 105; Funari 1999:40). The earliest stages of archaeological inquiry during this period focused on antiquarianism, including the collection of skulls from archaeological sites. After this initial foray into collecting *objets d'art*, researchers fully embraced the paradigm of culture-history and attempted to categorize and seriate artifacts and relate them to specific periods and cultures. This included the introduction of careful stratigraphic excavation, which eventually set the stage for a more “scientific” approach to archaeology (Trigger 1990:196–205).

So where does bioarchaeology, specifically paleopathology, fit into this research history? Influenced by physicians and anatomists such as Johann Friedrich Blumenbach, Samuel Morton, and John Warren, explorers and researchers in Jordan and the northern Levant adopted the 18th and 19th century cranial fixation described by Cook 2006; Blake 1872, 1879; Burton and Blake 1872; Busk 1879; Chantre 1895; Davis 1867; Owen 1879; and Seligman 1917. Physicians and other individuals interested in the skulls first began noting similarities in skull morphology between different sites, which eventually grew into formalized cranial typologies. Researchers attempted to use these typologies to understand ancient migrations, heredity, and relatedness between ancient and living Near Eastern populations. As discussed below, few researchers investigated health, disease, or demography in these ancient skeletal samples.

The increasingly scientific nature of archaeology and changes in physical anthropological research during the later 20th century did not have a strong impact on human skeletal studies in the Near East. In terms of paleopathology, particularly in North America, this meant a shift from purely descriptive studies to a population-level approach to disease in ancient skeletons (Cook and Powell 2006:301). The rise of processual archaeology in the 1970s further facilitated the development of a contextualized, problem-oriented physical anthropology, where human skeletal data would be analyzed and interpreted to answer archaeological and historical research questions, rather than simply described in the appendix of research reports. This new perspective, coined “bioarchaeology” by Jane E. Buikstra in the 1970s (Buikstra 1977), stimulated human skeletal studies in many areas of the globe, most notably in the Americas. However,

these developments in physical anthropology took decades to impact archaeological explorations in Jordan, Syria, and Lebanon.

Paleopathology of this region, as a result, is in its infancy, although the past decade has seen a surge in population-based skeletal biological research, including paleopathology. This chapter presents a diachronic view of paleopathology in Lebanon, Syria, and Jordan¹ within the context of archaeological research conducted in these regions.

(p.452) Paleopathology in Lebanon

Archaeological exploration in Lebanon began in the 18th century while the region was part of the Ottoman Empire's Greater Syria. Until the 1960s, archaeologists working in Lebanon rarely noted the presence of skeletal material in the tombs and graves that they excavated and instead focused their attention on grave goods, including sarcophagi (e.g., Baramki 1958; de Contenau 1920a, b, c, d; Dunand 1927; Saidah 1969). The lack of skeletal studies in general, and paleopathology in particular, is surprising considering that there was a strong presence of physical anthropology in early 20th-century Lebanon. Two professors at the Medical College of the American University in Beirut, William M. Shanklin, a histologist and anatomist, and Johannes Ariëns Kappers, a neuroanatomist, were interested in creating racial typologies of Near Eastern populations through blood typing and anthropometric observations (e.g., Kappers 1930a, b, 1931a, b, 1932, 1933, 1934; Cummins and Shanklin 1937; Shanklin 1934, 1935a, b; 1936a, b; 1938, 1946, 1953, 1956; Shanklin and Cummins 1937; Shanklin and Izzeddine 1937; Seltzer 1940). However, both Shanklin (e.g., Shanklin 1956; Shanklin and Ghantus 1966) and Kappers (1934) also studied archaeological skeletal remains from Lebanon to provide a diachronic perspective to their typological studies. No notes on skeletal disease were included in these reports.

A few observations of disease from early 20th century Lebanon do exist, such as the study of Chalcolithic (Eneolithic) and Bronze Age skeletal remains from Byblos, which mentions dental caries (Virolleaud 1922) and stature calculations (Vallois 1937). However, the authors did not consider these data as indicators of population health. The first comprehensive study of paleopathology of an ancient Lebanese skeletal sample was not published until 1977 by Manfred Kunter. Kunter studied a 5th to 4th century BC skeletal sample excavated in the 1960s from Kamid el-Loz, and compiled detailed observations of pathological lesions in the bones in order to provide a temporal perspective on population health in the Near East. Kunter pointed out that the site sits at an important crossroads between Egypt, Palestine, Syria, Anatolia, Mesopotamia, and Phoenicia (Kunter 1977:115). He identified high frequencies of dental and vertebral disease, and attributed the latter to heavy labor or other arduous activities. Kunter often provided a clinical basis for his interpretations, and he even used evidence from ancient sources to suggest possible activities or diets that could have caused

these prevalent conditions. He did not, however, provide any comparative data to support his assertion that these frequencies were “high.” Kunter also presented these observations apart from their historical and archaeological contexts. In fact, at one point, Kunter noted that the cultural-historical interpretation of the skeletal data should be left to the historian, and presumably not be made by the anthropologist² (Kunter 1977:108).

Kunter's work appears to be an isolated example in Lebanon's history of paleopathology through the end of the 20th century. After the 1960s, excavation and study of human skeletal remains was still not a major research focus for archaeologists in Lebanon. In fact, the lack of research on skeletal remains from some historically significant cemeteries, such as ancient Tyre, is striking. In 1998 the author observed that skeletal remains from hundreds of graves in Tyre's Roman cemetery had been returned to the excavated funerary monuments. Many bones remain exposed to the elements, and have never been studied.

Political unrest and conflict in Lebanon since the late 1940s likely attenuated the development of archaeology, and specifically paleopathology. Rebuilding Beirut since the end of the Civil War in 1990 has generated large-scale contract and salvage archaeological projects, but no skeletal reports from these excavations are known to exist, even though graves have been excavated (Seif 2008). To this day, there are no university programs focusing on biological anthropology in Lebanon, and thus most researchers come from other countries. Recently, researchers at the University of Bradford and the British Museum have begun analysis of skeletal material recovered from Sidon (Saida), south of Beirut. A preliminary report of the burials (Ogden and Schutkowski 2004) does not include paleopathology, although Schutkowski (2008, pers. comm.) notes that such studies are planned for the future, and at the time of this volume's publication an additional article on the diet at ancient Sidon has been published by Schutkowski and Ogden (2011).

Paleopathology in Syria

The history of paleopathology in Syria parallels that in Lebanon due to their political unity before the demarcation of Lebanon as a separate country by the French in 1926. Early explorers in Syria contributed to the interest in craniology by appropriating skulls with little interest in documenting their disposition or location, or even collecting all bodily skeletal elements. Captain Richard F. Burton (**p.453**) reported to the Anthropological Institute of Britain and Ireland his method of human skeletal collection at Palmyra in 1870, while serving as British Consul in Damascus:

I secured forty-five coolies, who had nothing but diminutive picks and hoes, grain-bags and cloaks, which they converted into baskets for removing sand and rubbish. Operations began (April 15, 1870) at the

group of tomb-towers marked “cemetery” in the Handbook, and bearing W.S.W. from the great temple of the Sun ... Here the loculi ... were easily cleared out; they had been ransacked before, and they supplied only a few bones and shreds of mummy cloth. A calvaria [*sic*] (No. 1), however, and the larger thigh-bone, with attachments of dried muscles, were found in the upper story by one of the Fellahs. From another and a neighbouring tomb-tower, they brought calvaria [*sic*] No. 2, which evidently belongs to an elderly and masculine person, of decidedly unpleasant propensities. He is, in fact, a fit companion for No. 1.

(Burton and Blake 1872:304–305).

C. Carter Blake, an anatomist and member of the pro-polygenic Anthropological Society of London (cofounded by Burton), studied the eight crania and a seemingly random sample of postcrania that Burton and his team collected from Palmyra, and provided detailed morphological descriptions and stature estimations (Blake 1872). Blake suggested the individuals at Palmyra were taller than their contemporaries in other regions, but he attributed this to inheritance rather than health-related or other environmental causes. Blake did note the presence of marked dental wear in one individual (Blake 1872:318), but he made no observations of “true” pathologies. During his diplomatic service in Damascus, Burton also took time to collect skeletal remains from Sahib el Zaman, Ma'alulah, Homs, and Dayr Mar Musa el Habashi, all examined by Blake in the same manner as the material from Palmyra (Burton and Blake 1872). Further study of additional crania from Palmyra by Busk (1879), Owen (1879), and Blake (1879) also focused on cranial typology rather than paleopathology.

Interest in human crania decreased after the turn of the 20th century, and until the 1960s most publications of tomb excavations focused on grave good typologies. Researchers occasionally provide information on presence and/or preservation of the human skeletal remains within the graves (Amy and Seyrig 1936; Dunand et al. 1954–1955; Mesnil du Buisson 1927a; Nasrallah 1950), body position (Carrière and Barrois 1927; Mesnil du Buisson 1927b; Parrot 1937), or age and sex of the skeletons (Abel and Barrois 1928; Carrière and Barrois 1927; Schaeffer 1931, 1934, 1938). A few exceptions include publications by Le Comte Robert du Mesnil du Buisson, an archaeologist who is better known for early geophysical survey and its application to archaeology (Hesse 2000). Le Comte obviously also saw value in the study of human skeletal material, for not only do his preliminary publications on the skeletons from Mishrife/Qatna contain substantially more detailed information than other reports (e.g., Mesnil du Buisson 1927b, 1932), but one also included results of preliminary skeletal analysis by an M. Lester of the Laboratory of Anthropology at the “Museum”³ (Mesnil du Buisson 1930). Lester had noted the lack of pathological conditions in the sample and that the skeletal and dental derived ages did not match; he did

not, however, suggest that poor health or nutrition may have created this mismatch.

The first detailed, albeit only descriptive, publication on paleopathology in Syrian skeletons concerned the 19th through 13th-century BC and 4th-century AD material excavated from Ras Shamra/Ugarit and Minet el-Beida by Claude F.A. Schaeffer from the 1930s through the 1950s. A preliminary publication from the 1930s (Schaeffer 1939) described a vertebra with an embedded bronze arrowhead, studied in detail by Dr. Marc Jarry. The final excavation report included a section on observations of paleopathology (Dastugue 1962) in addition to chapters on “racial” typologies based upon craniometrical data (Charles 1962; Vallois and Ferembach 1962). Jean Dastugue focused on trauma and other obvious skeletal anomalies, such as spina bifida. Despite the detailed presentation of these individual skeletons, Dastugue, who, along with Jarry was a medical doctor, did not mention the presence or absence of less obvious health problems, such as dental enamel hypoplasias or dental caries. On the other hand, as the lead archaeologist, Claude Schaeffer did relate the results of the skeletal study to the larger project goals (Schaeffer 1962), which was unusual for this time.

The discovery of plastered and other modeled crania at Neolithic sites in Syria during the 1960s and 1970s resulted in increased involvement of physical anthropologists on archaeological projects. Unique deposition practices and postmortem alteration drew attention to Neolithic burials, but this did not translate early on into investigating the biological impact of, for example, the intensification of agriculture. Physical anthropologists (p.454) working in Syria during this period focused on classifying Neolithic populations at Tell Ramad and Tell Mureybet based on craniofacial and dental measurements, though dental health was often assessed (Ferembach 1969, 1970; Özbek 1976, 1979). These researchers apparently were strongly influenced by Brothwell's (Chapter 3) 1963 publication, *Digging up Bones*, and many used this manual (and subsequent editions), along with Martin and Saller's *Lehrbuch der Anthropologie Vol. II* (1959) and Olivier's *Pratique Anthropologique* (1960), as guides for skeletal analysis. Unlike *Digging up Bones*, the latter volumes emphasized normal variation in humans and did not outline the means or criteria for assessing abnormal variation (pathological change). Age-at-death and sex diagnoses were also frequently included.

After a period of political instability caused by repeated conflicts with Israel and internal unrest during the late 1960s and early 1970s, archaeologists began working in Syria again during the mid-1970s and 1980s. Preliminary and final reports of their mortuary discoveries rarely included information derived from the skeletal remains (e.g., Akkermans 1986–1987; Courbin 1973, 1975; Falb et al. 2005; Goffinet 1982; Lauffray 1991; Masuda and Sha'ath 1983; Orthmann 1982; Parrot 1975; Saliby 1976, 1979–1980; Stucky 1975; Van Loon 1973). Some

researchers, however, did present some preliminary information about age and sex alongside discussions of the composition of mortuary features (e.g., Buccellati and Kelly-Buccellati 1977–1978, 1982; Jean-Marie 1999; Riis 1979; Vandenabeele 1972; Verhoeven 1999; Zaqqûq 2001; Van Loon and Meijer 2001). Methods were not mentioned, nor were the results of skeletal study integrated into the larger project results.

Paleopathology became more visible during the 1980s and 1990s through the publication of final excavation reports that included chapters on human skeletal remains. Many of these final reports only briefly mentioned a few pathological conditions such as dental disease and trauma, rather than providing a complete record of disease (e.g., Alexandersen 1978; Carlier 2000; Christensen et al. 1986; Darcque 1996; Entzian 2006; Geerlink 1989; Littleton and Frohlich 2002; Nakahashi 1994; Nakahashi et al. 2001). In addition, the data frequently were not presented in a format that facilitates comparative study, nor were they interpreted within broader archaeological or historical contexts. In many cases, criteria used for description and diagnosis of pathological conditions were not noted.

The continued recovery of Neolithic period skeletal remains during the 1980s and 1990s did facilitate comprehensive analyses and comparative studies. Investigations of skeletal and dental diseases from Tell Dja'de (Anfruns 1993), Chagar Bazar (Anfruns and Oms 2006; Sołtysiak 2009a), Cheikh Hassan (Clère et al. 1985), Aswad and Ghoraifeh (Clère 1995), and Tell Halula (Anfruns et al. 1996) sought to uncover the health and quality of life of Neolithic individuals, and the data were occasionally compared to earlier, semi-sedentary but preagricultural Natufians. Researchers began to expand studies beyond dental pathology to include other “nonspecific indicators of stress,” but also continued to create typologies based on craniofacial characteristics.

Most studies of paleopathology in Syria during the late 20th century showed little concern for applications of scientific methods. The most extreme case of extensive and insightful interpretations without discussion of methods is Theya Molleson's publication of the Epipaleolithic and Neolithic burials from Abu Hureyra (Molleson 1989, 1994, 2000). Molleson outlined a number of conclusions about the Abu Hureyra population based on their pathological profile, but she did not discuss her data collection methods or the basis for her conclusions. For instance, she attributed the high frequencies of vertebral compression fractures, osteoarthritis in the knee and toes, and other injuries, to habitual operation of a saddle quern, and the changes in dental pathology through time to alterations in the preparation and consumption of food, without citing any other studies supporting these associations (as noted by Peterson 2002).

Rarely have specialized publications in Syrian paleopathology appeared in broader disciplinary, as opposed to region-specific, publications. Yoshimura and colleagues (2006) presented data in the *Journal of Archaeological Science* on dental fluorosis and its relationship to other pathological conditions in Palmyrene skeletons originally published by Nakahashi and colleagues (Nakahashi 1994; Nakahashi et al. 2001). Theya Molleson's research on Abu Hureyra also caught scholars' attention for her intriguing conclusions about gender division of labor during the early Neolithic at Abu Hureyra (Molleson 1989, 1994). In addition, Tomczyk et al. (2007) have assessed diachronic changes of dental enamel hypoplasias in the Syrian Middle Euphrates Valley within a volume on biocultural diversity. However, the generally closed nature of paleopathology in Syria has hindered intellectual exchange of ideas and development of new research techniques. Furthermore, the results of paleopathology in Syria have been rarely **(p.455)** disseminated to the larger biological anthropology and archaeology communities.

At the close of the first decade of the 21st century, we apparently are witnessing a sharp increase in human skeletal studies in Syria, particularly in paleopathology. Detailed and contextualized studies of paleopathology in Bronze Age through Roman-Parthian period skeletal samples from Qatna have focused on the health effects of social stratification and agricultural intensification (e.g., Canci and Bartoli 2007; Witzel and Kreutz 2007; Witzel et al. 2000). Sołtysiak and colleagues have made a concerted effort to systematically study and compare human remains from a number of sites in central Syria using Buikstra and Ubelaker's data collection standards (Buikstra and Ubelaker 1994), for example Tell Ashara-Terqa (Sołtysiak 2002, 2007a; Tomczyk and Sołtysiak 2007a), Tell Barri (Sołtysiak 2008a, 2010a), Tell Majnuna (Sołtysiak 2007b, 2008b, 2010b; Sołtysiak and Chylińska-Drapella 2009), Tell Arbid (Sołtysiak 2006, 2010c), Tell Hamoukar (Sołtysiak 2009b), Tell Fares el-Sharqi (Sołtysiak 2010d), Tell Masiakh (Sołtysiak 2008; Sołtysiak and Tomczyk 2008a; Tomczyk and Sołtysiak 2007b), Jebel Mashtale and Tell Marwaniye (Sołtysiak and Tomczyk 2008b), and assessment of recently excavated remains from Tell Brak (Sołtysiak 2009c; Tomczyk and Sołtysiak 2008b). Ongoing investigations at Tell Dja'de (Estebarez and Anfruns 2006), Tell Halula (Estebarez et al. 2007), Tall Seh Hamad (Witzel et al. 2000), Umm el-Marra (Schwartz 2007; Schwartz et al. 2000, 2003, 2006), and Ein al-Karkh (Tsuneki et al. 1997, 1998, 1999, 2000) all include teams of physical anthropologists investigating paleopathology. This increased focus on the potential of data from human skeletal remains for illuminating the archaeological record can increase the visibility of paleopathology in Syria. These researchers should pay increased attention to attaining standard methods for data collection and contextualizing interpretations to facilitate paleopathology's development in the region.

Paleopathology in Jordan

Archaeological exploration in Jordan has lagged significantly behind Syria and Lebanon, due to a self-perceived unimportance in antiquity (Perry 2002:4–6). Until the end of the British Mandate period in 1948, large portions of the country remained inhospitable and logistically challenging for researchers and scholars (see comments by C.L. Woolley and T.E. Lawrence in the *Wilderness of Zin* [Woolley and Lawrence 1914–1915:15] and Nelson Glueck in *The Other Side of the Jordan* [Glueck 1970:41]). A marked push to create a strong infrastructure after 1948, involving construction and public works projects, began to reveal the archaeological richness of Jordan's countryside. Numerous tombs were encountered by construction crews during this period, followed by studies undertaken by employees of the Department of Antiquities of Jordan. The material culture recovered from these tombs helped researchers to establish valuable ceramic typologies used to identify periods of Jordan's ancient history. However, published reports on these excavations rarely included any information on skeletal material (e.g., Abbadi 1973; Bisheh 1972; Dajani 1964, 1966a, b, c, 1967–1968, 1970; Dana 1970; Harding 1951a, b; Ma'ayeh 1960). The location of this material is not known, for none of it has been retained by the Department of Antiquities in their main storage facility. William Shanklin and Anthony Dark of the University of Beirut published a report on human skeletal remains during this period by the *Annual of the Department of Antiquities of Jordan* (Shanklin and Dark 1953). In this publication, Shanklin continued his earlier research on Near Eastern cranial typologies but, similar to his study of Lebanese skeletal remains, he did not discuss paleopathology.

An increasing anthropological influence in Jordanian archaeology began to appear in the 1970s and 1980s, with researchers focusing on mortuary practices, including information on body disposition (e.g., Bisheh 1973; Hadidi 1979; Kurdi 1972; Thompson 1972; Zayadine 1974, 1979) and demographic information (e.g., Clark 1979; Kafafi et al. 1990; Rollefson 1983; Rollefson and Simmons 1984, 1985; Rollefson et al. 1989; Simmons et al. 1989; Suleiman and Betts 1981). No information on sex and age estimation methods was discussed in these articles, excepting cases where artifacts were used to establish the sex of a burial (Khadija 1974; Mare 1985).

The beginning of the 1980s marked a significant increase in Jordanian human skeletal analysis, mostly to investigate the effects of subsistence practices and increased sedentism on population health. An early physical anthropologist seeking to answer these questions was Scott Rolston, a graduate student in archaeology and anthropology at George Washington University and the University of Chicago. During the 1980s, Rolston analyzed skeletal material from the Harra region (Clark 1981), the Baq'a Valley (McGovern 1986), Qasr Kharaneh (Rolston 1982), Khirbet Qurei' (Leonard 1987), and Tiwal esh-Sharqi (Helms 1983). Although most of (p.456) Rolston's publications simply provided a descriptive account of pathological conditions, his work at Qasr Kharaneh

explored the health consequences of the transformation from nomadic to agricultural lifestyles during the Epipaleolithic (Rolston 1982). Rolston primarily relied upon Steinbock (1976) and Angel (1971) for his research methods, although a diagnosis of rheumatoid arthritis was submitted to the headquarters of the Paleopathology Association in Detroit for “collective judgment [*sic*]” (Rolston 1982:226).

Concurrent with Rolston's work, German paleopathologists began analyzing skeletal remains from Bronze and Iron Age Tell el-Mazar (Disi et al. 1983, 1984) and Neolithic Ba'ja, Basta, and Sabra (Carli-Thiele and Schultz 2001; Nissen et al. 1987, 1991, 2004; Rohrer-Ertl and Frey 1987; Rohrer-Ertl et al. 1988; Schultz and Scherer 1991; Schultz et al. 2004, 2005, 2007). Disi and colleagues' observations of paleopathology in the Tell el-Mazar sample had the generic goal of “reconstructing the social aspects of ancient societies,” including mortality, life expectancy, and disease (Disi et al. 1983:515, 1984:191). Their study was the first to provide a population-level approach to skeletal analysis in Jordan and specific criteria for their investigations of pathological bones (e.g., using Bach and Bach 1971; Hengen 1971; Schumacher and Schmidt 1976; Steinbock 1976; Stloukal et al. 1970). This move from descriptive studies continued in the work on the Neolithic sites of Ba'ja, Basta, and Sabra by Schultz, Rohrer-Ertl, and their colleagues. Here, disease frequencies were used to illuminate living conditions and hygiene after the intensification of agriculture and increased sedentarization of Near Eastern populations. The skeletal remains also displayed markers of postmortem modification, which serve to clarify Neolithic mortuary rituals and interpersonal violence (Rohrer-Ertl and Frey 1987; Schultz et al. 2007). In some cases, however, their criteria for diagnosing conditions such as meningoencephalitis and rheumatoid arthritis (Nissen et al. 1991) were not outlined, nor did explicit, detailed differential diagnoses occur. Furthermore, the interpretations of some pathological conditions occasionally verged on the outlandish (e.g., Rohrer-Ertl and Frey 1987).

The late 1970s and 1980s heralded Donald J. Ortner and Bruno Frohlich's study of Early Bronze Age individuals from Bâb edh-Dhrâ (Frohlich and Ortner 1982, 2000; Ortner 1979, 1981, 1982; Ortner and Frohlich 2007, 2008, in press; Ortner and Ribas 1997; Ortner et al. 2007; Rashidi et al. 2001). Ortner has a strong interest in the impact of socioeconomic change on human health and disease (Chapter 11), and the cemeteries at Bâb edh-Dhrâ had the potential to provide an interesting case study of the health effects of sedentism and urbanization. To date, this is the most comprehensive exploration of ancient skeletal biology in Jordan, probably because the project directors recognized the significance of skeletal data sets from the beginning of the project. This excavation was one of the few that integrated bioanthropological data with overall interpretations (e.g., Schaub and Rast 1981). Ortner applied his rigorous methodology (see Ortner 2003; Ortner and Putschar 1985) to the description and diagnosis of pathological indicators, through which he was able to identify one of the earliest skeletons

with tuberculosis in the world at Bâb edh-Dhrâ', in addition to brucellosis (Ortner 1979; Rashidi et al. 2001). Beyond the presence of these zoonoses, Ortner and colleagues noted little change in disease levels of the Bâb edh-Dhrâ' inhabitants with increased sedentism (Ortner et al. 2008:303).

The work of Ortner and colleagues did not, however, stimulate further comprehensive and detailed paleopathological work in Jordan. This is surprising, especially since Ortner published his results in archaeological (e.g., Ortner 1981, 1982), and physical anthropological (e.g., Ortner 1979) journals. Similar to Syria, there is a notable lack of comparative studies of health and disease across Jordan and in relation to data sets from contexts outside the country. Mahmoud El-Najjar and colleagues sought to overturn Ortner's claim for the oldest case of TB in Jordan by describing three possible examples from Neolithic 'Ain Ghazal (El-Najjar et al. 1997). The diagnosis of these individuals has been questioned, however, based on the location of the lesions and the unlikelihood of animal-human transmission before the domestication of cattle (HersHKovitz and Gopher 1999; Roberts and Buikstra 2003).

Through the 1990s, researchers in Jordan began to recognize the importance of standardized, rigorous burial excavation methods and that the presence of a physical anthropologist in the field was essential. This shift is partially due to Yarmouk University establishing during 1990 the first MA program in physical anthropology in the Near East, with the exception of Israel (Department of Anthropology, Yarmouk University 2008; Rose and al-Shorman 2004). The department's first professor, Mahmoud El-Najjar, established his credentials in paleopathology through his work on porotic hyperostosis and other nonspecific indicators of "stress" (El-Najjar 1976, 1979; El-Najjar and Robertson 1976; El-Najjar et al. 1976, 1982). **(p.457)** Dr. El-Najjar unfortunately passed away in January 2009 (Chapter 23), but his legacy of Jordanian physical anthropology will live on in his many students and colleagues at Yarmouk.

During this period, preliminary articles focusing largely on skeletal data began to appear in regional journals, such as the *Annual of the Department of Antiquities of Jordan* and the *Palestine Exploration Quarterly* (e.g., Brashler 1995; Cheyney 1995; Hendrix 1995, 1998; Henke and Wahl 1990; Leach and Rega 1996; Nabulsi 1996; Nabulsi et al. 1998; Politis 1998; Rose et al. 1997). Final excavation publications during this period also included skeletal analyses (e.g., Bourke 1992; Browne 1992; Frohlich 1987; Grauer and Armelagos 1998; Henderson 1990; Krogman 1989; Nabulsi 1998). Many of these studies (with the exception of Grauer and Armelagos 1998, and Leach and Rega 1996) only provided descriptions without historical or archaeological contexts and/or details concerning methodology.

Similar to Syria, the first decade of the 21st century is witnessing a substantial increase in preliminary publications of skeletal data (Abu Shmais and al-Nabulsi 2004; Cheyney et al. 2009; Edwards et al. 2002; El-Najjar et al. 2001; Jensen et al. 2005; Lenoble et al. 2001; Levy et al. 1999, 2005; Loh and Ji 2000; Maher 2007; Montgomery and Perry 2010; Nabulsi 2010; Nabulsi et al. 2007, 2008, 2009; Perry and al-Shiyab 2005; Perry and Joukowsky 2006; Perry et al. 2007; Politis et al. 2005; Rollefson et al. 2003) and the inclusion of skeletal data in final reports (Chase 2002; Judd 2003a, b; Judd and Defonzo 2003; Perry 2002, 2007; Roberts 2007; Schultz et al. 2004; Williams et al. 2004). In some instances, such as the analysis of the material from Fidan (Levy et al. 2005) and Qasr ar-Rabba (Perry and al-Shiyab 2005), the data are presented to facilitate their inclusion in future comparative studies. When paleopathology is represented, however, it is generally descriptive and rarely interpretive or contextualized (for exceptions see Perry 2002, 2007; Williams et al. 2004). Stephen Bourke and Karen Hendrix have attempted to provide a broader, more integrated picture of skeletal studies (including paleopathology) in Jordan within the context of documenting twenty years of Australian physical anthropological research in Jordan (Bourke and Hendrix 2001). Their work at Epipaleolithic Azraq and Wadi Hammeh, Bronze Age, Byzantine, and Islamic Pella, and Byzantine Jerash includes discovery of Jordan's earliest evidence for trepanation (the two Bronze Age skulls from Tomb 4 at Pella) and a mass grave recovered within Jerash's hippodrome ("stadium for racing") purportedly related to the 6th-century AD plague epidemic. Although they present preliminary data, they develop a comparative and contextualized perspective.

The decontextualized, descriptive nature of paleopathological studies in Jordan is expected to change with increased numbers of publications and archaeological research designs that explicitly include the excavation and study of human skeletal remains. Jerome Rose and Mahmoud El-Najjar recently completed an extensive bioarchaeological study of the sites of Ya'moun, Yajuz, and Yasileh in northern Jordan (Williams et al. 2004). The study of ancient health and disease is also an ongoing research priority at the sites of Fidan (Levy et al. 2005), Petra (Augé and Sachet 2006; Bikai and Perry 2001; Bikai et al., forthcoming), Aila (Perry 2002), Khirbet edh-Dharih (Delhopital 2009; Lenoble et al. 2001), and Khirbet Faynan (Perry in press). The continued presentation of these data to both archaeological and biological anthropological audiences will doubtless increase the visibility of bioarchaeology, including paleopathology, in Jordan.

Conclusions

The history of paleopathology in Jordan, Syria, and Lebanon has been shaped largely by the culture-historical nature of archaeological inquiry prevalent in these countries. An early focus on artifact typologies and architectural features meant excavators of tombs and graves had little interest in the bodies that the mortuary features held. The rise of processual archaeology and bioarchaeology

in the 1970s eventually impacted skeletal biological research in the region, after which researchers gradually began including information on skeletal remains in both their preliminary and final reports. Paleopathology reports from Syria and Jordan during the 1980s and early 1990s primarily were descriptive, with little discussion of research methods or archaeological or historical implications. The first decade of the 21st century has seen a strong surge of large-scale paleopathology in these countries by scholars seeking to understand the effects of subsistence strategies, urbanism, trade, and economy on ancient health and wellbeing. Research in Lebanon, however, has suffered the consequences of the fifteen-year civil war, which officially ended in 1990. Although graves and tombs presumably have been uncovered during extensive postwar rebuilding, no reports on paleopathology of any human remains could be found in the course of this study. Research at ancient Sidon by the University of Bradford and the British **(p.458)** Museum should reignite the study of ancient health and disease in this important region.

Despite these issues, paleopathology in Jordan, Lebanon, and Syria has made substantial contributions to the discipline and understanding of the impact of demographic and subsistence transitions on health and disease. This region includes some of the earliest examples of agricultural production and large sedentary communities in the world. Paleopathological data from a number of sites, including Sabra and Basta in Jordan, and Tell Ramad, Tell Mureybet, Tell Halula, and Abu Hureyra in Syria, have illuminated changes in disease, diet, and activity with the transition to agriculture during the Neolithic. In addition, information from early settlements such as Bâb edh-Dhrâ and Tell el-Mazar in Jordan, and Qatna and Ras Shamra in Syria have demonstrated that increased sedentism minimally impacted health and disease levels in these communities. Finally, Near Eastern skeletons have provided some of the earliest data globally on zoonotic infections such as tuberculosis and brucellosis due to the antiquity of animal domestication in the Near East.

The most notable aspect of paleopathological publications from Lebanon, Syria, and Jordan is the general lack of interpretation or problem-oriented research. Absent methodological descriptions and poorly or incompletely presented data also prevent comparative analyses. Bruno Frohlich and Don Ortner (Ortner and Frohlich 2008:306–307) close their recent volume on Bâb edh-Dhrâ by outlining frustrations they faced in conducting bioarchaeological research in Jordan that, in my experience, are true across the region. Interpreting the health of ancient communities using paleopathology is hindered by significant excavation sampling bias caused by tomb selection and the actual number of graves excavated. Furthermore, no standards exist for the collection of skeletal data, and this creates substantive difficulties in comparative analyses that are necessary for providing a larger regional or diachronic picture of health and disease. Finally, data often are interpreted and presented without archaeological or historical contextual information, essential for developing bioarchaeological

research questions. These problems are frequently exacerbated by poor preservation or commingling of remains, which limits many analyses (see Judd 2009). Researchers have already begun to address these problems using standard data collection procedures outlined in *Standards for Data Collection of Human Skeletal Remains* (Buikstra and Ubelaker 1994). Jerome Rose and Mahmoud El-Najjar have made a significant impact on the use of this protocol through their bioarchaeological field schools in northern Jordan between 1995 and 2007, which included both American and Jordanian students. In addition, an increased presence of physical anthropologists in the field, usually overseeing the excavation of human skeletal remains or even directing their own excavations, should result in truly contextualized interpretations.

With careful study of ancient human skeletal remains, including health indicators, bioarchaeologists can successfully address the many unanswered archaeological and historical research questions. The long history of archaeology in Syria, Jordan, and Lebanon, in addition to their important locations at the crossroads between many ancient civilizations, means that many hypotheses generated by earlier research exist to be addressed using bioarchaeological data. The impact of human migration, the effects of competing political interests of regional states and kingdoms and large-scale empires on indigenous populations, the influence of changing subsistence practices and settlement patterns, and the impact of diverse climatological and environmental factors on human health and disease can all be explored through paleopathology. Moreover, the long history of human occupation in the region can facilitate a *long durée* perspective on health and quality of life in the Near East and the world. Paleopathology has a long and healthy future in the region, provided that biological anthropologists present their results in accessible interdisciplinary formats, and those developing archaeological research designs recognize the data source that human skeletal remains can provide.

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References

Bibliography references:

Abbadi S. 1973. A Byzantine tomb from Na'ur. *Annual of the Department of Antiquities of Jordan* 18:69–71.

Abel M, Barrois A. 1928. Fouilles de École Archéologique Française Jérusalem: effectuées a Neirab du 12 Septembre au 6 Novembre 1927. *Syria* 9:187–206.

Abu Shmais AI, al-Nabulsi A. 2004. Rescue excavation of an Early Bronze (EB-IV) tomb at Abu Ridin/Na'ur town. *Annual of the Department of Antiquities of Jordan* 48:147–154.

Akkermans PMMG. 1986–1987. Excavations at Tell Damishliyya, a Neolithic settlement in the Balikh Valley northern Syria. *Les Annales Archéologiques Arabes Syriennes* 36/37:40–66.

Alexandersen V. 1978. Sukas V: A study of teeth & jaws from a Middle Bronze Age collective grave on Tall Sukas. Copenhagen: Munksgaard.

Amy R, Seyrig H. 1936. Recherches dans la nécropole de Palmyre. *Syria* 17:229–266.

Andrén A. 1998. *Between Artifacts and Texts: Historical Archaeology in Global Perspective*. New York: Plenum Press.

Anfruns J. 1993. Etude anthropologique et odontologique préliminaire de deux cranes néolithiques de Dja'de, el Mughara (Syrie). *Cahiers de l'Euphrate* 7:151–159.

Anfruns J, Majò T, Olms JI. 1996. Los restos humanos del Neolítico precerámico. In Molist Montaña M, editor. *Tell Halula (Siria): Un Yacimiento Neolítico del Valle Medio del Éufrates, Campañas de 1991 y 1992*. Madrid: Instituto del Patrimonio Histórico Español. p 161–173.

Anfruns J, Oms JI. 2006. Les ossements humains. In Tunca Ö, Baghdo Ae-M, editors. *Chagar Bazar (Syrie) I: Les sondages préhistoriques (1999–2001)*. Lovain: Peeters. p 113–115.

Angel JL. 1971. *The People of Lerna: Analysis of a Prehistoric Aegean Population*. Princeton, NJ: American School of Classical Studies at Athens.

Augé C, Sachet I. 2006. *Ath-Thugrah Necropolis, Petra Archaeological Park*. Report in possession of the author. Amman: Department of Antiquities.

Bach H, Bach A. 1971. Anthropologische untersucheng. In Bach H, Dusek S, editor. *Slawen in Thuringen: Geschichte, Kulture, und Anthropologie im 10. Bis*

12. Jahrhundert nach den Ausgrabungen bei Espenfeld Wiemar: Herman Bohlaus Nachfolger. p 133-265.

Baramki D. 1958. A Late Bronze Age tomb at Sarafend ancient Sarepta. *Berytus* XII:129-142.

Bikai PM, Perry MA. 2001. Petra North Ridge Project Tombs 1 and 2: preliminary report. *Bulletin of the American Schools of Oriental Research* 104:59-78.

Bikai PM, Perry MA, Kanellopoulos C. Forthcoming. The Petra North Ridge Project 1996-2002. Amman: American Center of Oriental Research.

Bisheh G. 1972. A cave burial tomb from Jabal Jofeh el-Sharqi in Amman. *Annual of the Department of Antiquities of Jordan* 17:81-83.

Bisheh G. 1973. Rock-cut tombs at Rajib. *Annual of the Department of Antiquities of Jordan* 18:63-67.

Blake CC. 1872. Notes on human remains from Palmyra. *The Journal of the Anthropological Institute of Great Britain and Ireland* 1:312-320.

Blake CC. 1879. Notes on skulls brought by Captain R. F. Burton from the East. *The Journal of the Anthropological Institute of Great Britain and Ireland* 8:319-321.

Bourke S. 1992. First preliminary report on the excavation and study of human remains. In McNicoll AW, Edwards PW, Hambury-Jenison J, Hennessy JB, Potts TF, Smith RH, Walmsley A, Watson P, editors. *Pella in Jordan 2: The Second Interim Report of the Joint University of Sydney and College of Wooster Excavations at Pella: 1982-1985*. Sydney: MEDITARCH. p 215-226.

Bourke S, Hendrix KB. 2001. Twenty years of Australian physical anthropology in Jordan: retrospects and prospects. In Walmsley A, editor. *Australians Uncovering Ancient Jordan: Fifty Years of Middle Eastern Archaeology*. Sydney: The University of Sydney and the Department of Antiquities of Jordan. p 77-88.

Brashler J. 1995. The 1993 and 1994 seasons at Umm al-Jimal: the 1994 Umm al-Jimal cemetery excavations: Areas AA and Z. *Annual of the Department of Antiquities of Jordan* 39:457-468.

Brothwell DR. 1963. *Digging up Bones*. 1st edition. London: British Museum.

Browne CD. 1992. Palaeopathological survey of the human remains from Pella. In McNicoll AW, (p.460) Edwards PW, Hambury-Jenison J, Hennessy JB, TF Potts TF, Smith RH, Walmsley A, Watson P, editors. *Pella in Jordan 2: The Second Interim Report of the Joint University of Sydney and College of Wooster Excavations at Pella: 1982-1985*. Sydney: MEDITARCH. p 227-229.

Buccellati G, Kelly-Buccellati M. 1977–1978. The Terqa Archaeological Project: preliminary report. *Les Annales Archéologiques Arabes Syriennes* 27/28:72–96.

Buccellati G, Kelly-Buccellati M. 1982. The Terqa Archaeological Project: preliminary report on the third season (1977). *Les Annales Archéologiques Arabes Syriennes* 32:133–142.

Buikstra JE. 1977. Biocultural dimensions of archeological study: a regional perspective. In Blakely RL, editor. *Biocultural Adaptation in Prehistoric America*. Athens: University of Georgia Press. p. 67–84.

Burton RF, Blake CC. 1872. On anthropological collections from the Holy Land. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 1:300–312.

Buikstra JE, Ubelaker DH. 1994. *Standards for Data Collection from Human Skeletal Remains*. Fayetteville, AR: Arkansas Archaeological Survey.

Busk FRS. 1879. Notes of some skulls from Palmyra, presented to the Institute by the late Mr. Cotesworth. *The Journal of the Anthropological Institute of Great Britain and Ireland* 8:366–368.

Canci A, Bartoli F. 2007. Food in ancient Qatna: the results of paleopathological examination and trace element analysis on human bones. In Bonacossi DM, editor. *Urban and Natural Landscapes of an Ancient Syrian Capital: Settlement and Environment at Tell Mishrifeh/Qatna and in Central-Western Syria*. Udine: Forum. p 169–172.

Carlier C. 2000. Tell Beyder: deux squelettes exhumés en 1994 rapport anthropologique préliminaire. In Van Lerberghe K, Voet G, editor. *Tell Bedar: Environmental and Technical Studies*. Subartu VI. Brepols: Turnhout. p 39–53.

Carli-Thiele P, Schultz M. 2001. Wechselwirkungen zwischen Mangel- und Infektionskrankheiten des Kindesalters bei Neolithischen Populationen. In Lippert A, Schultz M, Shennan S, Teschler-Nicola M, editors. *Mensch und Umwelt während des Neolithikums und der Frühbronzezeit in Mitteleuropa*. Rahden/Westfalen: Verlag Marie Leidorf. p 273–285.

Carrière B, Barrois A. 1927. Fouilles de l'École Archéologique Française de Jérusalem: effectuées a Neirab du 24 Septembre au 5 Novembre 1926. *Syria* 8:126–142.

Chantre E. 1895. *Missions Scientifiques en Transcaucasie: Asie Mineure et Syrie 1890–1894*. Archives du Muséum d'Histoire Naturelle de Lyon VI. Lyon: Librairie de la Faculté de Médecine et de la Faculté de Droit.

Charles R-P. 1962. Contribution a l'étude anthropologique du site de Ras Shamra. In Shaeffer CFA, editor. *Ugaritica IV: Découvertes des XVIIIe et XIXe campagnes, 1954-1955, Fondements préhistoriques d'Ugarit et nouveaux sondages, études anthropologiques, poteries grecques et monnaies islamiques de Ras Shamra et environs*. Paris: Paul Geuthner. p 521-563.

Chase JW. 2002. Report on the human bones from Tall al-'Umayri 1992-1996. In Herr LG, Clark DR, Geraty LT, Younker RW, LaBianca OS, editors. *Madaba Plains Project: The 1994 Season at Tall al'Umayri and Subsequent Studies*. Berrien Springs, MI: Andrews University. p 206-221.

Cheyney M. 1995. The 1993 and 1994 seasons at Umm al-Jimal: Umm al-Jimal 1993: a cist burial. *Annual of the Department of Antiquities of Jordan* 39:447-455.

Cheyney M, Brashler J, Boersma B, Contant N, DeWall K, Lane M, Smalligan J, Vandern Berg B. 2009. Umm al-Jimal Cemeteries Z, AA, BB and CC: 1996 and 1998 Field Reports. *Annual of the Department of Antiquities of Jordan* 53:361-359.

Christensen AP, Thomsen R, Ploug G. 1986. Hama: Fouilles et recherches 1931-1938 III 3: The Graeco-Roman objects of clay, the coins and the necropolis. Copenhagen: Nationalmuseets Skrifter.

Clark VA. 1979. Investigations in a prehistoric necropolis near Bâb edh-Dhrâ. *Annual of the Department of Antiquities of Jordan* 23:57-77.

Clark VA. 1981. Archaeological investigations at two burial cairns in the Harra region of Jordan. *Annual of the Department of Antiquities of Jordan* 25:235-265.

Clère J. 1995. Étude anthropologique des restes osseux d'Aswad. In de Contenson H, editor. *Aswad et Ghoraifé: Sites Néolithiques en Damascène (Syrie) aux IX^{ème} et VIII^{ème} Millénaires avant l'ère Chrétienne*. Beirut: Institut Français du Proche Orient. p 193-217.

Clère J, Adeleine P, Ferembach D. 1985. Etude anthropologique des mandibules de Cheikh Hassan. *Cahiers de l'Euphrate* 4:265-273.

Cook DC. 2006. The old physical anthropology and the New World: a look at the accomplishments of an antiquated paradigm. In Buikstra JE, Beck LA, editors. *Bioarchaeology: The Contextualized (p.461) Analysis of Human Remains*. New York: Academic Press. p 27-72.

Cook DC, Powell ML. 2008. The evolution of American paleopathology. In Buikstra JE, Beck LA, editors. *Bioarchaeology: The Contextualized Analysis of Human Remains*. New York: Academic Press. p 281-322.

Courbin P. 1973. Ras el Bassit: rapport sur la campagne de 1972. *Les Annales Archéologiques Arabes Syriennes* 23:25-38.

Courbin P. 1975. Rapport sur la 4eme campagne de fouilles (1974) a Ras el Bassit. *Les Annales Archéologiques Arabes Syriennes* 25:59-71.

Cummins H, Shanklin W. 1937. Dermatoglyphics in peoples of the Near East. 1. Lebanese: Mitwali. *American Journal of Physical Anthropology* 22:263-265.

Dajani RW. 1964. Iron Age tombs from Irbed. *Annual of the Department of Antiquities of Jordan* 8/9:99-101.

Dajani RW. 1967-1968. An (EB-MB) Burial from Amman. *Annual of the Department of Antiquities of Jordan* 12-13:68-69.

Dajani RW. 1966a. An Iron Age tomb from Amman. *Annual of the Department of Antiquities of Jordan* 11:41-47.

Dajani RW. 1966b. Jabal Nuzha tomb at Amman. *Annual of the Department of Antiquities of Jordan* 11:48-52.

Dajani RW. 1966c. Four Iron Age tombs from Irbed. *Annual of the Department of Antiquities of Jordan* 11:88-101.

Dajani RW. 1970. A Late Bronze-Iron Age tomb excavated at Sahab, 1968. *Annual of the Department of Antiquities of Jordan* 15:29-34.

Dana SF. 1970. Luweibdeh Roman tomb. *Annual of the Department of Antiquities of Jordan* 15:37-38.

Darcque P. 1996. Trois inhumations simultanées du Bronze Recent I a Bassit (Syrie). *Syria* 73:129-152.

Dastugue J. 1962. Les pièces pathologiques de Ras Shamra et Minet el-Beida. In Schaeffer CFA, editor. *Ugaritica IV: Découvertes des XVIIIe et XIXe campagnes, 1954-1955, Fondements préhistoriques d'Ugarit et nouveaux sondages, études anthropologiques, poteries grecques et monnaies islamiques de Ras Shamra et environs*. Paris: Paul Guethner. p 623-627.

Davis JB. 1867. *Thesaurus Craniorum*. London: Printed for the Subscribers.

de Contenau G. 1920a. Mission archéologique a Sidon (1914). *Syria* 1:16-55.

de Contenau G. 1920b. Mission archéologique a Sidon (1914) (Deuxième article). *Syria* 1:108-154.

de Contenau G. 1920c. Mission archéologique a Sidon (1914) (Troisième article). *Syria* 1:198-229.

de Contenau G. 1920d. Mission archéologique a Sidon (1914) (Quatrième article). *Syria* 1:287–317.

Delhopital N, al-Muheisen Z, Le Mort F, Murail P, Tillier A-M, Villeneuve F. 2009. Monumental tomb and simple pit-graves at Khirbat Edh-Dharih (Nabataean period, Jordan): an archaeo-anthropological study. In al-Khraysheh F, editor. *International Conference on the History and Archaeology of Jordan X*. Amman, Jordan: Department of Antiquities of Jordan. p 805–822.

Department of Anthropology, Yarmouk University. <http://portal.yu.edu.jo/Default.aspx?tabid=289> (Accessed October 15, 2008).

Disi AM, Henke W, Wahl J. 1983. Tell el-Mazar: study of the human skeletal remains. *Annual of the Department of Antiquities of Jordan* 27:515–548.

Disi AM, Henke W, Wahl J. 1984. Human skeletal remains: physical anthropological analysis. In Yassine K, editor. *Tell el Mazar I: Cemetery A*. Amman: University of Jordan. p 135–195.

Dunand M. 1927. La cinquième campagne des fouilles de Byblos (Mars-Juin 1926). *Syria* 8:93–104.

Dunand M, Saliby N, Khirichian A. 1954–1955. Les fouilles d'Amrith en 1954: rapport préliminaire. *Les Annales Archéologiques de Syrie* 4/5:189–204.

Edwards PC, Falconer SE, Fall PL, Berelov I, Czarzasty J, Day C, Meadows J, Meegan C, Sayej G, Swoveland TK, Westaway M. 2002. Archaeology and environment of the Dead Sea Plain: preliminary results of the second season of investigation by the joint LaTrobe University/Arizona State University project. *Annual of the Department of Antiquities of Jordan* 46:51–92.

El-Najjar M. 1976. Maize, malaria, and the anemias of the pre-Columbian New World. *Yearbook of Physical Anthropology* 20:329–337.

El-Najjar M. 1979. Human treponematoses and tuberculosis: evidence from the New World. *American Journal of Physical Anthropology* 51:599–618.

El-Najjar M, Andrews J, Moore JG, Bragg DG. 1982. Iron deficiency anemia in two prehistoric American Indian skeletons: a dietary hypothesis. *The Plains Anthropologist* 27:206–209.

El-Najjar M, Robertson AL. 1976. Spongy bones in prehistoric American. *Science*. 193:141–143.

El-Najjar M, Ryan DJ, Turner BG, Lozoff B. 1976. The etiology of porotic hyperostosis among the prehistoric and historic Anasazi Indians of Southwestern United States. *American Journal of Physical Anthropology* 44:477–487. **(p.462)**

El-Najjar M, Al-Shiyab A, Al-Sarie I. 1997. Cases of tuberculosis at 'Ain Ghazal, Jordan. *Paleorient* 22:123-128.

El-Najjar M, Rose JC, Attalah N, Turshan N, Khawasneh N, Burke D. 2001. First season of excavation at Ya'mun (1999). *Annual of the Department of Antiquities of Jordan* 45:413-417.

Entzian W. 2006. Feto-pediatric skeletons of Tell al-'Abr: osteologic findings and comments on four individuals. In Hammade H, Yamazaki Y, editors. *Tell al-'Abr (Syria): Ubaid and Uruk periods*. Louvain: Peters. p 435-441.

Estebananz F, Anfruns J. 2006. Estudio de los restos antropológicos del yacimiento neolítico de Dja'de, Syrie. In Molist M, editor. *Informe de la Campaña de Excavaciones y Estudios Arqueológicos en el Yacimiento Neolítico de Tell Halula (Valle del Eufrates, Siria)*. 28 agosto-3 octubre de 2006. Barcelona: Seminari d'Arqueologia Prehistòrica del Proxim Orient. p 43-47.

Estebananz F, Martínez LM, Anfruns J, Pérez-Pérez A. 2007. Tell Halula (Syria), seasons 1992-2005. *Bioarchaeology of the Near East* 1:65-67.

Falb C, Krasnik K, Meye J-W, Vila E. 2005. Gräber des 3. Jahrtausends v. Chr. im Syrischen Euphrattal: 4: Der Friedhof von Abu Hamed. Saarwellingen: Saarländische Druckerei & Verlag.

Ferembach D. 1969. Etude anthropologique des ossements humains néolithiques de Tell-Ramad (Syrie). *Les Annales Archéologiques de Syrie* 19:49-70.

Ferembach D. 1970. Etude anthropologique des ossements humains Néolithiques de Tell-Ramad, Syrie (Campagnes 1963-1966). *L'Anthropologie* 74:247-254.

Frohlich B. 1987. Appendix D: the human skeletal series. In Ibrahim MM, Gordon RL, editors. *A Cemetery at Queen Alia International Airport*. Weisbaden: Harrossowitz. p 50-56.

Frohlich B, Ortner DJ. 1982. Excavations of the Early Bronze Age cemetery at Bâb edh-Dhrâ, Jordan, 1981: a preliminary report. *Annual of the Department of Antiquities of Jordan* 26:249-267.

Frohlich B, Ortner DJ. 2000. Social and demographic implications of subadult inhumations in the ancient Near East. In Stager LE, Greene JA, Coogan MD, editors. *The Archaeology of Jordan and Beyond: Essays in Honor of James A. Sauer*. Winona Lake, IN: Eisenbrauns. p 122-131.

Funari PPA. 1999. Historical archaeology from a world perspective. In Funari PPA, Hall M, Jones S, editors. *Historical Archaeology: Back from the Edge*. London: Routledge. p 37-66.

Geerlink J. 1989. The human skeletal remains of Tell Sabi Abyad. In Akkermans PMMG, editor. *Excavations at Tell Sabi Abyad: prehistoric investigations in the Balikh Valley, northern Syria*. Oxford: British Archaeological Reports International Series 468. p 295–299.

Glueck N. 1970. *The Other Side of the Jordan*. Winona Lake, IN: Eisenbrauns.

Goffinet M. 1982. Les tombes. In Beyer D, editor. *Meskéné-Emar': dix ans de travaux 1972–1982*. Paris: Editions Recherche sur les Civilisations. p 137–139.

Grauer AL, Armelagos G. 1998. Skeletal biology of Hesban: a biocultural interpretation. In Waterhouse SD, editor. *The Necropolis of Hesban: A Typology of Tombs*. Berrien Springs, MI: Andrews University Press. p 109–131.

Hadidi A. 1979. A Roman family tomb at es-Salt. *Annual of the Department of Antiquities of Jordan* 23:129–137.

Harding GL. 1951a. A Roman tomb in Amman. *Annual of the Department of Antiquities of Jordan* 1:30–33.

Harding GL. 1951b. Two Iron-Age tombs in Amman. *Annual of the Department of Antiquities of Jordan* 1:37–40.

Helms SW. 1983. The EBIV (EB-MB) cemetery at Tiwal esh-Sharqi in the Jordan Valley. *Annual of the Department of Antiquities of Jordan* 28:55–85.

Henderson JD. 1990. Appendix A: The human bones from Tiwal esh-Sharqi. In Tubb JN, editor. *The Excavations at the Early Bronze Age Cemetery at Tiwal esh-Sharqi*. London: British Museum. p 101–108.

Hendrix KB. 1995. Preliminary investigation of the human skeletal remains from the Hippodrome at Jarash. *Annual of the Department of Antiquities of Jordan* 39:560–562.

Hendrix KB. 1998. Further investigation of the human skeletal remains from the Hippodrome at Jarash. *Annual of the Department of Antiquities of Jordan* 42:639–640.

Hengen OP. 1971. Cribra orbitalia: pathogenesis and probable etiology. *Homo* 22:57–76.

Henke W, Wahl J. 1990. The skeletal remains from two graves of the northeastern apsis of the church at Umm Qeis (Gadara, Jordan). *Annual of the Department of Antiquities of Jordan* 34:343–349.

HersHKovitz I, Gopher A. 1999. Is tuberculosis associated with early domestication of cattle? Evidence from the Levant. In Pálfi G, Dutour O, Deák J,

Hutás I, editors. Tuberculosis: past and present. Budapest/Szeged: Golden Book (p.463) Publishers and Tuberculosis Foundation. p 445-449.

Hesse A. 2000. Count Robert du Mesnil du Buisson (1895-1986), a French precursor in geophysical survey for archaeology. *Archaeological Prospection* 7:43-49.

Jean-Marie M. 1999. Tombes et Nécropoles de Mari. Mission Archéologique de Mari Tome V. Beirut: IFAPO.

Jensen CH, Hermansen BD, Petersen MB, Kinzel M, Hald MM, Bangsgaard P, Lynnerup N, Thuesen I. 2005. Preliminary report on the excavations at Shakarat al-Musay'id, 1999-2004. *Annual of the Department of Antiquities of Jordan* 49:115-134.

Judd MA. 2003a. Excursus: JJ Burial 4 - the skeletal remains. In Daviau PMM, editor. *Excavations at Tall Jawa, Jordan: Volume I: The Iron Age Town*. Leiden: Brill. p 390-391.

Judd MA. 2003b. Excursus: JJ Burial 1 - the skeletal remains. In Daviau PMM, editor. *Excavations at Tall Jawa, Jordan: Volume I: The Iron Age Town*. Leiden: Brill. p 415-449.

Judd MA. 2009. Bioarchaeology east of the Jordan. In Bientrowski P, editor. *Studies on Iron Age Moab and Neighbouring Areas in Honour of Michèle Daviau*. Leuven: Peeters Publishers. p 245-273.

Judd MA, Defonzo R. 2003. Excursus: the Persian burial. In Daviau PMM, editor. *Excavations at Tall Jawa, Jordan: Volume I: The Iron Age town*. Leiden: Brill. p 108-115.

Kafafi Z, Rollefson GO, Simmons AH. 1990. The 1989 season at 'Ain Ghazal: preliminary report. *Annual of the Department of Antiquities of Jordan* 34:11-25.

Kappers CUA. 1930a. Contributions to the anthropology of the Near East. I. The Armenian skull and brain. *Proceedings of the Royal Academy of Amsterdam* 33:792-801.

Kappers CUA. 1930b. Contributions to the anthropology of the Near East. II. The spread of brachycephalic races. *Proceedings of the Royal Academy of Amsterdam* 33:802-808.

Kappers CUA. 1931a. Contributions to the anthropology of the Near East. III. Phoenician and Palmyrene skulls. *Proceedings of the Royal Academy of Amsterdam* 34:106-115.

Kappers CUA. 1931b. Contributions to the anthropology of the Near East. IV. The semitic races. *Proceedings of the Royal Academy of Amsterdam* 34:116–130.

Kappers CUA. 1932. *The Anthropology of the Near East*. Beirut: American Press.

Kappers CUA. 1933. The anthropological features of Armenian and Assyrian (Aissorie) women. *Proceedings of the Royal Academy of Amsterdam* 36:299–307.

Kappers CUA. 1934. *An Introduction to the Anthropology of the Near East in Ancient and Recent Times*. Amsterdam: N.V. Noord-Hollandsche Uitgeversmaatschappij.

Khadija MMA. 1974. Beit Zar'a tombs. *Annual of the Department of Antiquities of Jordan* 19:157–163.

Krogman WM. 1989. Representative Early Bronze crania from Bâb edh-Dhrâ. In Schaub T, Rast WE, editors. *Bâb edh-Dhrâ: Excavations in the Cemetery Directed by Paul W. Lapp (1965–1967)*. Winona Lake, IN: Eisenbrauns. p 507–520.

Kunter M. 1977. Kamid el-Loz: 4. Anthropologische Untersuchung der menschlichen Skelettreste aus dem eisenzeitlichen Friedhof. Bonn: Verlag.

Kurdi H. 1972. A new Nabataean tomb at Sadagah. *Annual of the Department of Antiquities of Jordan* 17:85–87.

Lauffray J. 1991. Halabiyia-Zenobia: Place forte du limes oriental et al Haute-Mésopotamie au VI^e siècle. Tome II. Paris: IFPA (Geuthner).

Leach S, Rega E. 1996. Interim report on the human skeletal material recovered from the 1995 Tell es-Sa'idiyeh excavations, Areas BB and DD. *Palestine Exploration Quarterly* 128:131–138.

Lenoble P, al-Muheisen Z, Villeneuve F. 2001. Fouilles de Khirbet edh-Dharih (Jordanie) I. Le cimetière au sud du Wadi Sharheh. *Syria* 78:89–151.

Leonard J, Albert 1987. The Jarash-Tell el-Husn Highway Survey. *Annual of the Department of Antiquities of Jordan* 31:343–390.

Levy TE, Adams RB, Shafiq R. 1999. The Jabal Hamrat Fidan Project: excavations at the Wadi Fidan 40 cemetery, Jordan (1997). *Levant* 31:293–308.

Levy TE, Najjar M, Muniz A, Malena S, Monroe E, Beherec M, Smith NG, Higham T, Munger S, Maes K. 2005. Iron Age burial in the lowlands of Edom: the 2004 excavations at Wadi Fidan 40, Jordan. *Annual of the Department of Antiquities of Jordan* 49:443–487.

Littleton J, Frohlich B. 2002. Excavations of the cemetery. In Clarke GW, Connor PJ, Crewe L, Frohlich B, Jackson H, Littleton J, Nixon CEV, O'Hea M, Steele D, editors. *Jebel Khalid on the Euphrates: Report on the excavations 1986–1996*. Sydney: Meditarch. p 49–69.

Loh CM, Ji C-HC. 2000. A preliminary report on the human remains from a rock-cut chamber tomb near Iraq al-Amir. *Annual of the Department of Antiquities of Jordan* 44:201–209. **(p.464)**

Ma'ayeh FS. 1960. Recent archaeological discoveries in Jordan. *Annual of the Department of Antiquities of Jordan* 4/5:114–116.

Maher LA. 2007. 2005 excavations at the Geometric Kebaran site of 'Uyun al-Hammam, al-Kura District, Jordan. *Annual of the Department of Antiquities of Jordan* 51:263–272.

Mare WH. 1985. The 1984 season at Abila of the Decapolis. *Annual of the Department of Antiquities of Jordan* 29:221–237.

Martin R, Saller K. 1959. *Lehrbuch der Anthropologie Band II*. Stuttgart: Fischer Verlag.

Masuda S, Sha'ath S 1983 Qminas, the Neolithic site near Tell Deinit, Idlib (preliminary report). *Les Annales Archéologiques Arabes Syriennes* 33:199–231.

McGovern PE. 1986. *The Late Bronze and Early Iron Ages of Central Transjordan: The Baq'ah Valley Project, 1977–1981*. Philadelphia: University of Pennsylvania.

Mesnil du Buisson LCR. 1927a. L'ancienne Qatna: ou les ruines d'el-Mishrifé au N.-E. de Homs (Émèse): Deuxième campagne de fouilles, 1927. *Syria* 8:277–301.

Mesnil du Buisson LCR. 1927b. Les ruines d'el-Mishrifé au N.-E. de Homs (Émèse): Deuxième campagne de fouilles, 1927 (2^e article). *Syria* 8:13–33.

Mesnil du Buisson LCR. 1930. Compte rendu de la quatrième campagne de fouilles a Mishrifé-Qatana. *Syria* 11:146–163.

Mesnil du Buisson LCR. 1932. Une campagne de fouilles a Khan Sheikhoun. *Syria* 12:171–188.

Molleson T. 1989. Seed preparation in the Mesolithic: the osteological evidence. *Antiquity* 63:356–362.

Molleson T. 1994. The eloquent bones of Abu Hureyra. *Scientific American* 271:70–75.

Molleson T. 2000. The people of Abu Hureyra. In Moore AMG, Hillman GC, Legge AJ, editors. *Village on the Euphrates: From Foraging to Farming at Abu Hureyra*. Oxford: Oxford University Press. p 301–324.

Montgomery RT, Perry MA. 2010. Homicide at Qasr al-Hallabat. *Annual of the Department of Antiquities of Jordan* 54:477–482.

Nabulsi A. 1996. The Byzantine cemetery at Khirbat as-Samra: preliminary human osteological analysis. *Annual of the Department of Antiquities of Jordan* 40:315–321.

Nabulsi A. 1998. The Byzantine cemetery in Samra. In Humbert J-B, Desreumaux A, editors. *Fouilles de Khirbet es-Samra en Jordanie*. Turnhout: Brepols. p. 271–279.

Nabulsi A. 2010. Khirbat as-Samra cemetery: Site E, season 2009. *Annual of the Department of Antiquities of Jordan* 54:217–219.

Nabulsi A, Abbadi A, Shami A, Aksar H. 2009. Khirbat as-Samra ancient cemetery: preliminary discussion of Site C. *Annual of the Department of Antiquities of Jordan* 53:167–172.

Nabulsi A, Abu Shmais AI, Masaeed J, Eger C. 2007. The ancient cemetery in Khirbet as-Samra after the sixth season of excavations (2006). *Annual of the Department of Antiquities of Jordan* 51:273–281.

Nabulsi A, Eger C, Timm S, Khawasneh N. 2008. The 2007 season of excavations at Khirbat as-Samra ancient cemetery. *Annual of the Department of Antiquities of Jordan* 52:203–207.

Nabulsi A, Humbert J-B, Abbadi AA. 1998. The 1996 excavation season at Khirbat as-Samra': the Byzantine cemetery site B. *Annual of the Department of Antiquities of Jordan* 42:615–620.

Nakahashi T. 1994. Human skeletal remains unearthed from Tombs C and A. In Higuchi T, editor. *Tombs A and C southeast Necropolis, Palmyra, Syria surveyed in 1990–1992*. Vol. 1. Nara: Research Center for Silk Roadology. p 107–115.

Nakahashi T, Funahashi K, Koga H, Yoshimura K. 2001. Human skeletal remains. In Higuchi T, Saito K, editors. *Tomb F: Tomb of BWLH and BWRP, southeast necropolis, Palmyra, Syria*. Nara: Research Center for Silk Roadology. p 145–163.

Nasrallah J. 1950. Tumulus de l'Age du Bronze dans le Hauran. *Syria* 27:314–331.

Nissen HJ, Muheisen M, Gebel HG. 1987 Report on the first two seasons of excavation at Basta (1986–1987). *Annual of the Department of Antiquities of Jordan* 31:79–119.

Nissen HJ, Muheisen M, Gebel HG. 1991. Report on the excavations at Basta. *Annual of the Department of Antiquities of Jordan* 35:13–40.

Nissen HJ, Muheisen M, Gebel HG. 2004. Editors' introduction. In Nissen M, Muheisen M, Gebel HG, editors. *Basta I: The Human Ecology*. Berlin: ex Oriente. p 22–34.

Ogden A, Schutkowski H. 2004. Human remains from Middle Bronze Age burials at Sidon, Lebanon; the 2001 season. *Levant* 36:159–166.

Olivier G. 1960. *Pratique Anthropologique*. Paris: Vigot Frères.

Orthmann W. 1982. Ausgrabungen in Halawa 1978. *Les Annales Archéologiques Arabes Syriennes* 32:143–176.

Ortner DJ. 1979. Disease and mortality in the Early Bronze Age people of Bâb edh-Dhrâ, Jordan. **(p.465)** *American Journal of Physical Anthropology* 51:589–598.

Ortner DJ. 1981. A preliminary report on the human remains from the Bâb edh-Dhrâ cemetery, 1977. *Annual of the American Schools of Oriental Research* 46:119–132.

Ortner DJ. 1982. The skeletal biology of an Early Bronze IB charnel house at Bâb edh-Dhrâ, Jordan. In Hadidi A, editor. *Studies in the History and Archaeology of Jordan I*. Amman: Department of Antiquities. p 93–95.

Ortner DJ. 2003. *Identification of Pathological Conditions in Human Skeletal Remains*. San Diego: Academic Press.

Ortner DJ, Frohlich B. 2007. The EB IA tombs and burials of Bâb edh-Dhrâ, Jordan: a bioarchaeological perspective on the people. *International Journal of Osteoarchaeology*, 17:358–368.

Ortner DJ, Frohlich B (eds) 2008. *EBI Tombs and Burials of Bâb edh-Dhrâ, Jordan*. Lanham, MD: AltaMira.

Ortner DJ, Frohlich B (In Press) The EBIA people of Bâb edh-Dhrâ, Jordan. In Cheeson M, editor. *Life in Early Bronze Age Communities: Papers in Honor of Walter Rast and R. Thomas Schaub*. Winona Lake, IN: Eisenbrauns.

Ortner DJ, Garofalo EM, Zuckerman MK. 2007. Burials of Bâb edh-Dhrâ, Jordan: bioarchaeological evidence of metabolic disease. In Faerman M, Horwitz LK, Kahana T, Zilberman U, editors. *Faces from the Past: Papers in Honor of Patricia*

Smith. Oxford: British Archaeological Reports International Series 1603. p 181–194.

Ortner DJ, Garofalo EM, Frohlich B. 2008. The paleopathology of the EBIA and EB people. In: Ortner DJ, Frohlich B, editors. The Early Bronze Age I Tombs and Burials of Bâb edh-Dhrâ, Jordan. Lanham, MD: AltaMira Press. p 263–280.

Ortner DJ, Putschar WGJ. 1985. Identification of Pathological Conditions in Human Skeletal Remains. Washington: Smithsonian Institution Press.

Ortner DJ, Ribas C. 1997. Bone changes in a human skull from the Early Bronze site of Bâb edh-Dhrâ, Jordan, probably resulting from scalping. *Journal of Paleopathology* 9:137–142.

Owen P. 1879. Observations on the collection of skulls sent by Capt. Burton, F.R.G.S., &c., to the British Museum, September 1878. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 8:323–324.

Özbek M. 1976. Etude anthropologique d'ossements humains néolithiques du VIII^e millénaire J.C. provenant de Mureybet, Syrie. *Les Annales Archéologiques de Syrie* 26:161–180.

Özbek M. 1979. Etude odontologique des habitants préhistoriques du village de Mureybet (Syrie). *Cahiers de l'Euphrate* 2:120–128.

Parrot A. 1937. Les fouilles de Mari: troisième campagne (hiver 1935–1936). *Syria* 18:54–84.

Parrot A. 1975. Fouilles de Mari: XX^eme campagne. Automne 1974. *Les Annales Archéologiques Arabes Syriennes* 25:9–15.

Perry MA. 2002. Health, Labor, and Political Economy: A bioarchaeological analysis of three communities in Provincia Arabia. PhD Dissertation, University of New Mexico, Albuquerque, NM.

Perry MA. 2007. Is bioarchaeology a handmaiden to history? Developing a historical bioarchaeology. *Journal of Anthropological Archaeology* 26:485–515.

Perry MA. In press. Condemned to *metallum*: who were the residents of the Byzantine mining camp at *Phaeno*? In Perry MA, editor. *Bioarchaeology and Behavior: The People of the Near East*. Gainesville: University Press of Florida.

Perry MA, al-Shiyab AH, Falahat H. 2007. The 2006 Wadi Abu Khasharif and Wadi al-Mudayfa'at cemetery excavations. *Annual of the Department of Antiquities of Jordan* 51:303–312.

Perry MA, al-Shiyab AM. 2005. A Late Roman tomb near Qasr ar-Rabba. *Annual of the Department of Antiquities of Jordan* 49:81–87.

- Perry MA, Joukowsky MS. 2006. An infant jar burial from the Petra Great Temple. *Annual of the Department of Antiquities of Jordan* 50:169-177.
- Peterson J. 2002. *Sexual Revolutions: Gender and Labor at the Dawn of Agriculture*. New York: AltaMira Press.
- Politis KD. 1998. Rescue excavations in the Nabataean cemetery at Khirabat Qazone 1996-1997. *Annual of the Department of Antiquities of Jordan* 42:611-614.
- Politis KD, Kelly AM, Usman L. 2005. Survey and excavations at Khirbat Kazun 2004. *Annual of the Department of Antiquities of Jordan* 49:327-337.
- Rashidi JS, Ortner DJ, Frohlich B, Jonsdottir B. 2001. Brucellosis in Early Bronze Age Jordan and Bahrain: an analysis of possible cases of brucella spondylitis. *American Journal of Physical Anthropology Supplement* 32:122-123.
- Riis PJ. 1979. Sukas VI: The Graeco-Phoenician cemetery and sanctuary at the southern harbour. Copenhagen: Munksgaard.
- Roberts C. 2007. The human bones. In Finlayson B, Mithen S, editors. *The Early Prehistory of Wadi Faynan, Southern Jordan: Archaeological survey (p.466) of Wadis Faynan, Ghuwayr, and al-Bustan and excavation of the Pre-Pottery Neolithic A site of WF16*. Oxford: CBRL/Oxbow Books. p 401-407.
- Roberts C, Buikstra JE. 2003. *Bioarchaeology of Tuberculosis*. Gainesville: University Press of Florida.
- Rohrer-Ertl O, Frey K-W. 1987. Two cases of homicide from the pre-ceramic Neolithic area of Arabia Petraea. *Gegenbaurs morphologisches Jahrbuch* 133:507-537.
- Rohrer-Ertl O, Frey K-W, Newsely H. 1988. Preliminary note on early Neolithic human remains from Basta and Sabra. In Garrard AN, Gebel HG, editors. *The Prehistory of Jordan: The State of Research in 1986*. Oxford: BAR International Series 396. p 135-136.
- Rollefson GO. 1983. The 1982 excavations at 'Ain Ghazal: preliminary report. *Annual of the Department of Antiquities of Jordan* 27:1-15.
- Rollefson GO, Davey JA, Maricich JR. 2003. A note on the burials from AWS-102, al-Azraq. *Annual of the Department of Antiquities of Jordan* 47:19-23.
- Rollefson GO, Kafafi Z, Simmons AH. 1989. The 1988 season at 'Ain Ghazal: a preliminary report. *Annual of the Department of Antiquities of Jordan* 33:9-26.
- Rollefson GO, Simmons AH. 1984. The 1983 season at 'Ain Ghazal: preliminary report. *Annual of the Department of Antiquities of Jordan* 28:13-30.

Rollefson GO, Simmons AH. 1985. Excavations at 'Ain Ghazal 1984: preliminary report. *Annual of the Department of Antiquities of Jordan* 29:11–30.

Rolston SL. 1982. Two prehistoric burials from Qasr Kharaneh. *Annual of the Department of Antiquities of Jordan* 26:221–229.

Rose JC, al-Shorman A. 2004. Physical anthropology in Jordan. *Physical Anthropology: Official Newsletter of the American Association of Physical Anthropologists* 5:2.

Rose JC, El-Najjar M, Tourshan N, Sari S. 1997. Sa'ad: notes on the 1996 excavation. *Annual of the Department of Antiquities of Jordan* 41:475–476.

Saidah R. 1969. Archaeology in the Lebanon 1968–1969. *Berytus* XVIII:119–142.

Saliby N. 1976. Nécropole de 'Azar. *Les Annales Archéologiques Arabes Syriennes* 26:127–165 (Arabic section).

Saliby N. 1979–1980. Une tombe d'Ugarit découverte fortuitement en 1970. *Les Annales Archéologiques de Syrie* 29/30:105–139.

Schaeffer CF-A. 1931. Les fouilles de Minet-el-Beida et de Ras Shamra: deuxième campagne (printemps 1930): rapport sommaire. *Syria* 11:1–14.

Schaeffer CF-A. 1934. Les fouilles de Ras Shamra: cinquième campagne (printemps 1933): rapport sommaire. *Syria* 15:105–135.

Schaeffer CF-A. 1938. Les fouilles de Ras Shamra-Ugarit: neuvième campagne (printemps 1937): rapport sommaire. *Syria* 19:193–255.

Schaeffer CF-A. 1939. Les fouilles de Ras Shamra-Ugarit: dixième et onzième campagnes (automne et hiver 1938–1939): rapport sommaire. *Syria* 20:277–295.

Schaeffer CF-A. 1962. Résumé: des onze chapitres du volume. In Schaeffer CF-A, editor. *Ugaritica IV: Découvertes des XVIIIe et XIXe campagnes, 1954–1955, Fondements préhistoriques d'Ugarit et nouveaux sondages, études anthropologiques, poteries grecques et monnaies islamiques de Ras Shamra et environs*. Paris: Paul Geuthner. p XIII–XXXVI.

Schaub RT, Rast WE. 1981. Patterns of burial at Bâb edh-Dhrâ. In Rast WE, Schaub RT, editors. *The Southeastern Dead Sea Plain Expedition*. *Annual of the American Schools of Oriental Research* No. 46. Cambridge, MA: American Schools of Oriental Research. p 45–68.

Schultz M, Scherer A. 1991. Report on the excavation of Basta: human skeletal remains. *Annual of the Department of Antiquities of Jordan* 31:96–97.

Schultz M, Schmidt-Schultz T, Gresky J, Kreutz K, Berner M. 2004. Die Menschen von Basta und Ba'ja im akeramischen Neolithikum. In Salje B, Riedl N, Schauerte G, editors. *Gesichter des Orients* Mainz: Verlag Philipp von Zabern. p 57-60.

Schultz M, Berner M, Schmidt-Schultz TH. 2005. Preliminary results on the morbidity and mortality in the Late PPNB population of Basta, Jordan. In Beinert H-D, HG Gebel HG, editors. *Central Settlements in Neolithic Jordan*. Berlin: Ex Oriente. p 259-270.

Schultz M, Schmidt-Schultz T, Gresky J, Kreutz K, Berner M. 2007. Morbidity and mortality in the Late PPNB populations from Basta and Ba'ja (Jordan). In Faerman M, Horwitz LK, Kahana T, Zilberman U, editors. *Faces from the Past: Diachronic patterns in the biology of human populations from the Eastern Mediterranean: Papers in honour of Patricia Smith*. Oxford: British Archaeological Reports International Series 1603. p 82-99.

Schumacher GH, Schmidt H. 1976. *Anatomie und biochemie der Zahne*. Berlin: Verlag Folk und Gesundheit.

Schutkowski H, Ogden A. 2011. Sidon of the Plain, Sidon of the Sea - reflections on Middle **(p.467)** Bronze Age diet in the Eastern Mediterranean. *Archaeology and History in the Lebanon* 34-35:213-225.

Schwartz G. 2007. Hidden tombs of ancient Syria. *Natural History* 116:42-47.

Schwartz G, Curvers H, Dunham S, Stuart B, Weber J. 2006. A third-millennium BC elite mortuary complex at Umm el-Marra, Syria: 2002 and 2004 excavations. *American Journal of Archaeology* 110:603-641.

Schwartz GM, Curvers H, Dunham S, Stuart B. 2003. A third-millennium BC elite tomb and other new evidence from Tell Umm el-Marra, Syria. *American Journal of Archaeology* 107:325-361.

Schwartz G, Curvers H, Gertizsen F, MacCormack J, Miller N, Weber J. 2000. Excavation and survey in the Jabbul Plain: The Umm el-Marra Project 1996-1997. *American Journal of Archaeology* 104:419-462.

Seif A. 2008. New archaeological discoveries in Beirut. *Archaeological Museum Newsletter of the American University of Beirut* XXII:10-13.

Seligman CG. 1917. The physical characters of Arabs. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 47:214-237.

Seltzer CC. 1940. *Contributions to the Racial Anthropology of the Near East*. Cambridge, MA: Peabody Museum of American Archaeology and Ethnology.

- Shanklin W. 1934. The anthropology of Transjordan Arabs. *Psychiat. en. Neurolog. Bladen.* no. 3 en 4.
- Shanklin W. 1935a. Blood grouping of the Rwala Bedouin. *Journal of Immunology* 29:427-433.
- Shanklin W. 1935b. The anthropology of the Rwala Bedouins. *Journal of the Royal Anthropological institute* 65:375-390.
- Shanklin W. 1936a. Anthropology of the Akeydat and the Maualy bedouin. *American Journal of Physical Anthropology* 21:217-252.
- Shanklin W. 1936b. Blood grouping of the Maualy and Akeydat Bedouin. *American Journal of Physical Anthropology* 21:39-48.
- Shanklin W. 1938. Anthropometry of Syrian males. *The Journal of the Anthropological Institute of Great Britain and Ireland* 68:379-414.
- Shanklin W. 1946. Anthropometry of Transjordan Bedouin with a discussion of their racial affinities. *American Journal of Physical Anthropology* 4:323-375.
- Shanklin W. 1953. Anthropological measurements on the Arab Bedouin with comments on their customs. *Man* 53:134.
- Shanklin W. 1956. Appendix A. In Mackay D, Kennedy ES (1956) Report of the excavation of a cave near the mouth of the Dog River north of Beirut. *Bulletin du Musee de Beyrouth* XIII:53-69.
- Shanklin W, Cummins H. 1937. Dermatoglyphics in Rwala Bedouins. *Human Biology* 9:357-365.
- Shanklin W, Dark AJ. 1953. Anthropological studies on two skulls from Jordan. *Annual of the Department of Antiquities of Jordan* 2:57-61.
- Shanklin W, Ghantus MK. 1966. A preliminary report on the anthropology of the Phoenicians. *Bulletin du Musee de Beyrouth* XIX:91-94.
- Shanklin W, Izzeddine N. 1937. Anthropology of the Near East female. *American Journal of Physical Anthropology* 22:381-415.
- Simmons AH, Kafafi Z, Rollefson GO, Moyer K. 1989. Test excavations at Wadi Shu'eib, a major Neolithic settlement in central Jordan. *Annual of the Department of Antiquities of Jordan* 33:27-42.
- Sołtysiak A. 2002. Human remains from Tell Ashara - Terqa. Seasons 1999-2001. *Athenaeum* 90:591-594.

- Sołtysiak A. 2006. Tell Arbid (Syria), season 1996–2002. *Studies in Historical Anthropology* 3:135–136.
- Sołtysiak A. 2007a. Preliminary report on human remains from Tell Ashara Terqa. Seasons 2003–2004. *Athenaeum* 95:435–439.
- Sołtysiak A. 2007b. Preliminary report on human remains from Tell Majnuna (Spring 2007). *Iraq* 69:161–163.
- Sołtysiak A. 2008a. Tell Barri (Syria), seasons 1980–2006. *Bioarchaeology of the Near East* 2:67–71.
- Sołtysiak A. 2008b. Tell Majnuna (Syria), season 2006. *Bioarchaeology of the Near East* 2:77–94.
- Sołtysiak A. 2009a. Human bones from Chagar Bazar: scientific analyses. In McMahon A, editor. *Once There Was a Place. Settlement archaeology at Chagar Bazar, 1999–2002*. London: British Institute for the Study of Iraq. p 129–159.
- Sołtysiak A. 2009b. Tell Hamoukar (Syria), season 2006. *Bioarchaeology of the Near East* 3:51–53.
- Sołtysiak A. 2009c. Tell Brak (Syria), seasons 1984–2009. *Bioarchaeology of the Near East* 3:36–41.
- Sołtysiak A. 2010a. Tell Barri (Syria), seasons 2008–2010. *Bioarchaeology of the Near East* 4:48–50.
- Sołtysiak A. 2010b. *Death and Decay at the Dawn of the City. Interpretation of human bone deposits at Tell Majnuna. Areas MTW, EM and EMS*. Warsaw: Institute of Archaeology, University of Warsaw.
- Sołtysiak A. 2010c. Tell Arbid (Syria), seasons 1996–2010. *Bioarchaeology of the Near East* 4:45–48. **(p.468)**
- Sołtysiak A. 2010d. Tell Fares al-Sharqi (Syria), seasons 2006–2009. *Bioarchaeology of the Near East* 4:50–52.
- Sołtysiak A, Chilińska-Drapella A. 2009. Tell Majnuna (Syria), seasons 2007–2008. *Bioarchaeology of the Near East* 3:53–58.
- Sołtysiak A, Tomczyk J. 2008a. Tell Masaikh (Syria), seasons 1998–2007. *Bioarchaeology of the Near East* 2:94–97.
- Sołtysiak A, Tomczyk J. 2008b. Jebel Mashtale and Tell Marwaniye (Syria), seasons 2005–2006. *Bioarchaeology of the Near East* 2:97–99.

Steinbock RT. 1976. *Paleopathological Diagnosis and Interpretation*. Springfield, IL: Charles C. Thomas.

Stloukal M, Vyhnanek L, Rosing FW. 1970. Spondylose-häufigkeit bei mittelalterlichen Populationen. *Homo* 21:46-53.

Stucky RA. 1975. Tell el Hajj 1972. *Les Annales Archéologiques Arabes Syriennes* 25:165-181.

Suleiman E, Betts A. 1981. Rescue excavations at Tell Sahl es-Sarabet 1978/79. *Annual of the Department of Antiquities of Jordan* 25:227-234.

Thompson HO. 1972. The 1972 excavation of Khirbet al-Hajjar. *Annual of the Department of Antiquities of Jordan* 17:47-72.

Tomczyk J, Sołtysiak A. 2007a. Preliminary report on human remains from Tell Ashara/Terqa. Season 2005. *Athenaeum* 95:439-442.

Tomczyk J, Sołtysiak A. 2007b. Preliminary report on the human remains from Tell Masaikh. Season 2005. *Athenaeum* 95:442-445.

Tomczyk J, Sołtysiak a. 2007c. Preliminary report on human remains from Jebel Mashtale and Tell Marwanieh, season 2005. *Athenaeum* 95:446-448.

Tomczyk J, Sołtysiak A, Tomczyk-Gruca M. 2007. Temporal changes in frequency of enamel hypoplasias in the Middle Euphrates Valley (Syria). In Bodzár EB, Zsákai A, editors. *Human Diversity and Biocultural Researches. Selected papers of the 15th Congress of the European Anthropological Association*. Budapest: Humanbiologia Budapestiensis. p 87-97.

Trigger BG. 1990. *A History of Archaeological Thought*. Cambridge: Cambridge University Press.

Tsuneki AH, J, Miyake Y, Akahane S, Nakamura T, Arimura M, Sekine S. 1997. First preliminary report of the excavations at Tell el-Kerkh (1997), northwestern Syria. *Bulletin of the Ancient Orient Museum* 18:1-40.

Tsuneki A, Hydar J, Miyake Y, Akahane S, Arimura M, Nishiyama S, Sha'baan H, Anezaki T, Yano S. 1998. Second preliminary report of the excavations at Tell el-Kerkh (1998), northwestern Syria. *Bulletin of the Ancient Orient Museum* 19:1-40.

Tsuneki A, Hydar J, Miyake Y, Hudson M, Arimura M, Maeda O, Odaka T, Yano S. 1999. Third preliminary report of the excavations at Tell el-Kerkh (1999), northwestern Syria. *Bulletin of the Ancient Orient Museum* 20:1-36.

Tsuneki A, Hydar J, Miyake Y, Maeda O, Odaka T, Tanno K, Hasegawa A. 2000. Fourth preliminary report of the excavations at Tell el-Kerkh (2000), northwestern Syria. *Bulletin of the Ancient Orient Museum* 21:1-36.

Vallois H. 1937. Note sur les ossements humains de la nécropole eneolithique de Byblos. *Bulletin du Musee de Beyrouth* 1:23-33.

Vallois HV, Ferembach D. 1962. Les restes humaines de Ras Shamra et de Minet el-Beida: étude anthropologique. In Schaeffer CFA, editor. *Ugaritica IV: Découvertes des XVIIIe et XIXe campagnes, 1954-1955, Fondements préhistoriques d'Ugarit et nouveaux sondages, études anthropologiques, poteries grecques et monnaies islamiques de Ras Shamra et environs*. Paris: Paul Geuthner. p 565-622.

Van Loon M. 1973. First results of the 1972 excavations at Tell Selenkahiye. *Les Annales Archéologiques Arabes Syriennes* 23:145-158.

Van Loon M, Meijer DJW. 2001. Graves and their contents. In Van Loon M, editor. *Selekaniye: Final Report on the University of Chicago and University of Amsterdam Excavations in the Tabaqa Reservoir, Northern Syria, 1967-1975*. Istanbul: Nederlands Historisch-Archaeologisch Instituut. p 4A.127-4B.221.

Vandenabeele F. 1972. Sondages dans la nécropole nord d'Apamée, 1969-1970. In Balty J, Balty JC, editors. *Apamée de Syrie: Bilan des recherches archéologiques 1969-1971*. Brussels: Centre Belge de Recherches Archéologiques a Apamée de Syrie p 85-95.

Verhoeven M. 1999. An archaeological ethnography of a Neolithic community. Istanbul: Nederlands Historisch-Archaeologisch Instituut.

Virolleaud C. 1922. Découverte a Byblos d'un hypogée de la douzième dynastie Égyptienne. *Syria* 3:273-290.

Williams KD, El-Najjar MY, Rose JC, al-Koufahi H, King MJ, al-Awad FNQ. 2004. Skeletal biology. In Rose JC, Burke DL, editors. *Sa'ad: A Late Roman/Byzantine Site in North Jordan*. Irbid, Jordan: Yarmouk University. p 149-180.

Witzel C, Ehlken B, Schutkowski H. 2000. Anthropological investigations of skeletal remains from Tall Seh Hamad. In Kühne H, editor. *Reports on the excavation at Tall Seh Hamad/Dur-Katlimmu. Environment and (p.469) subsistence in the Habur area (Syria) in the late Holocene*. Berlin: Reimer. p 173-214.

Witzel C, Kreutz K. 2007. First results of the anthropological and palaeopathological examination of the human skeletal remains recovered from the Royal Tomb of Tell Mishrifeh/Qatna. In Bonacossi DM, editor. *Urban and*

Natural Landscapes of an Ancient Syrian Capital: Settlement and Environment at Tell Mishrifeh/Qatna and in Central-Western Syria. Udine: Forum. p 173–187.

Woolley CL, Lawrence TE. 1914–1915. The Wilderness of Zin. London: Palestine Exploration Fund.

Yoshimura K, Nakahashi T, Saito K. 2006. Why did the ancient inhabitants of Palmyra suffer fluorosis? *Journal of Archaeological Science* 33:1411–1418.

Zaqzûq A. 2001. The Roman and later graves and their contents. In Van Loon M, editor. *Selekaniye: Final Report on the University of Chicago and University of Amsterdam Excavations in the Tabaqa Reservoir, Northern Syria, 1967–1975*. Istanbul: Nederlands Historisch-Archaeologisch Instituut. p 13.515–13.547.

Zayadine F. 1974. Excavations at Petra (1973–1974). *Annual of the Department of Antiquities of Jordan* 19:135–150.

Zayadine F. 1979. Excavations at Petra (1976–1978). *Annual of the Department of Antiquities of Jordan* 23:185–197.

Notes:

(1.) This review covers research within the present-day borders of these three countries. Therefore, Lebanon's history includes the period when it was part of Greater Syria under the Ottoman Empire, Syria's history does not include research conducted in the disputed Golan Heights region, and Jordan's history does not include research conducted on sites in the areas held until the 1967 War with Israel, such as the West Bank.

(2.) “Eine kulturegeschichtliche Interpretation dieser Befunde muß natürlich dem Historiker vorbehalten sein.”

(3.) An extensive search did not identify with which museum Lester was associated.