

# Towards an Absolute Chronology of Early Mesopotamia: a Radiocarbon Perspective



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## Abstract

The region of Southern Mesopotamia, modern-day southern Iraq, saw a number of important socio-cultural transformations during the 4<sup>th</sup>-3<sup>rd</sup> millennia BC, which led to the emergence of the world's first urban, literate civilisation. These crucial developments reverberated across the neighbouring regions and greatly contributed to the later Classical and Judaeo-Christian traditions. Despite the importance of this period, our understanding of its chronology is limited. The main aim of this thesis is to build a reliable absolute chronology for the Uruk, Early Dynastic, and Akkadian periods in Mesopotamia using radiocarbon (<sup>14</sup>C) dating. Radiocarbon dates published in the archaeological literature underwent a thorough evaluation in order to ensure that only reliable measurements were included in the analysis. New dates were produced for the periods and contexts most lacking in radiocarbon data. Archaeological and textual sources were used to create Bayesian models in order to produce even more precise time estimates. The resulting periodisation of Mesopotamia was compared to the contemporary cultural sequences of ancient Iran and the Syrian Jezirah. While corroborating the standard Middle Chronology model, the results highlighted a number of intricacies relevant to our understanding of the early history of the Mesopotamian civilisation. Most importantly, this thesis argues that the developmental process was one of long periods of cultural continuity punctuated by sudden changes and shorter phases of innovation and creativity.

*“Every judicious person will be sensible that the problem now mentioned is by no means merely a curious speculation in the doctrine of chances, but necessary to be solved in order to a sure foundation for all our reasonings concerning past facts, and what is likely to be hereafter.” - Price 1763: 53*

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# Chapter 1

## Background and Introduction to the Problem

### 1.1 Introduction

The importance of Early Bronze Age Southern Mesopotamia in the grand narrative of human cultural development cannot be overstated. From around 6000 BC, the unique geography of the region - the floodplain of the Tigris and Euphrates rivers (see maps in **Figure 1**, **Figure 2**, **Figure 3**) - allowed the ancients to create large sedentary communities which based their subsistence on intensive irrigation agriculture. At the same time, the region's poverty in other raw materials such as stone, wood and metal, instigated intercultural contact with neighbours, such as the societies of northern Mesopotamia and Syria, as well as more remote places, such as the Badakhshani mountains of Afghanistan, famous as the source of the much-prized lapis lazuli stone. Proximity to the Persian Gulf allowed the ancient Mesopotamians to engage in long-distance trade with the peoples of the Arabian Peninsula, the Iranian Plateau, as far as the Indian Coast and the Indus Valley. Within this cultural network, a wide range of diverse, complex societies emerged. Starting with the Uruk period (ca. 4000 BC), Southwest Asia entered a new age - one of intensive urbanism, population expansion and highly-developed administration which laid the groundwork for the later writing tradition. These gradual developments ultimately led to the appearance of all the hallmarks of a mature complex state ca. 2900 BC

(Early Dynastic period): large communities with advanced internal organisation and inter-regional networks of dependence; organised religion and monumental communal structures; centrally controlled production and wealth distribution; written language, complete with administrative, commemorative and literary texts. Unlike other societies which developed writing independently (e.g. Ancient Egypt), Mesopotamian literary, cultural, religious and scientific achievements had profound influence on the later Biblical and Classical traditions and thus became a crucial element of the foundations of the modern Western civilisation.

It is therefore safe to say that the late 4<sup>th</sup> - early 3<sup>rd</sup> millennium BC was a turning point not only for the region, but human history in general. This should be reason enough to multiply scholarly efforts to understand the social processes which led to these developments. The first and most basic step in the historical or archaeological investigation of any region or period is establishing its chronology - both relative (understanding the sequence of events) and absolute (determining the time the events took place). In this work, I focus on the absolute chronology of the Late Uruk - Akkadian period in Southern Mesopotamia. The importance of establishing absolute chronologies goes beyond knowing the exact date of individual events. Without answering the questions *when* and *how long*, all attempts to address the *how* and *why* will be burdened by much uncertainty and speculation. As put succinctly by Campbell 2007 (p. 103), absolute chronology should be seen “*not just as a way of organizing the past but also as part of the process of understanding it*”. For over a century, Biblical scholars, ancient historians, philologists, archaeologists and natural scientists tried to pull their strengths together to create an absolute chronology for the period (see **Figure 4**).

For reasons outlined below, the different disciplines failed to arrive at a single reliable chronology for the all-important formative period. Every discussion about the early stages of social development in Mesopotamia has to either rely on extremely

broad age estimations, or resort to speculations and brave assumptions about their date and duration, leaving many burning questions unresolved. Research on the origins of Mesopotamian socio-political organisation, literature and scientific thought cannot progress unless the pitfalls of the absolute chronology of the 4<sup>th</sup> - 3<sup>rd</sup> mill. BC period are openly addressed. The credibility of Ancient Near Eastern studies as an academic discipline depends on whether the assumptions our knowledge is built on can still hold against the continually expanding body of evidence. The fact that Early Mesopotamia received much attention from researchers from various disciplines is a mixed blessing. On the one hand, their cumulative work produced volumes of valuable data and analyses. On the other, there is very little agreement about how to combine these data, accounting for the strengths and limitations of each body of material. The main focus of this research is to answer the question: how does one proceed to construct a reliable absolute chronology from seemingly disparate and incommensurable sources? This thesis will try to present a new methodology for analysing the regional chronology of Southern Mesopotamia during the Uruk - Early Dynastic period using three main bodies of information: archaeological material, written sources and radiocarbon dates. These sources of data will be compiled using Bayesian statistics to produce a reliable, comprehensive absolute chronology of the most important cultural and historical developments of the period. The impact of the results of such study are twofold. Firstly, the absolute, scientific dating serves to re-evaluate the models constructed using only the standard archaeological methods. Secondly, the Bayesian modelling of the radiocarbon dates helps to express the complexities of the past social and cultural phenomena. Finally, the resulting absolute chronology provides the point of departure for inferences regarding questions usually difficult to answer in the study of human past. In the case of this work, the questions being tackled are: "What was the timing and pace of the cultural developments which led to the appearance of historical city-states in Mesopotamia?" and "How did the changes occur at different sites and in different regions?".

As noted before, understanding the development of the Mesopotamian civilisation is impossible without considering the regions beyond the alluvial plains of Tigris and Euphrates for two main reasons. The dynamic cultural, economic and political relationships with the polities of ancient Iran, Syria, Arabia, and the Levant can be seen as one of the main forces behind the rise and fall of complex societies in Mesopotamia proper. At the same time, Mesopotamian cultural and technological achievements were readily adopted and modified by their neighbours, as evident, amongst others, in the spread of the cuneiform culture. Nevertheless, researchers working on Mesopotamian material often turn to the surrounding regions out of necessity. The particularly convoluted history of archaeological research in the region, and the poverty of available sources make the scholars resort to using material from outside Mesopotamia proper, extrapolating the emergent patterns onto the entire Near East. For these reason, this study will try to align the radiocarbon chronologies of Southern Mesopotamia with those of the Syrian Jezirah (specifically the Khabur River Valley) and Central-western Iran, two regions with the most promise to shed light onto the timing of the transition from prehistory to history.

## **1.2 Constructing Chronologies - Theoretical Considerations**

In archaeology and history, chronology is often regarded as an auxiliary discipline, providing a basic skeleton for the true “body” of the research. The process of constructing chronologies can seem banal and mechanical, limited to identifying the correct sequence of events, assigning absolute dates to them, and providing them with appropriate errors to account for doubts and uncertainties. In reality, one of the main difficulties in chronological research is realising that every endeavour to create a chronology has to draw from a number of sources, all very different in nature. In other words, apart from identifying a particular artefact or document as having chronological value, one has to be explicit about what *type* of chronological informa-

tion it provides. In general, types of chronological information can be divided into three broad categories:

1. Information regarding individual events.
2. Information regarding periods.
3. Information regarding uncertainties.

The first, arguably most common but by no means straightforward, type of information envisions the past as composed of individual events which have occurred at *a single, well-defined locality*. These can either take place in a sequence, or be roughly contemporary. This type of information is most relevant to ancient historical research, as most textual information relates to discrete occurrences in the lives of significant individuals such as births, deaths, marriages, battles, building projects, diplomatic treaties etc. In archaeology, events include depositions of either individual artefacts and bodily remains, or entire layers of deposits if there is sufficient information to suspect a very rapid rate of accumulation. Of course, the exact meaning of “rapid” very much depends on the period studied; however, in the context of late prehistory and early history it can most generally be taken to stand for a generation (ca. 25-30 years) or less. Information regarding the relative chronology of events allows us to determine their order and arrange them into sequences, which is of course necessary when discussing any form of causal relationship. Unfortunately, long, contiguous sequences allowing for the reconstruction of the entire chronological development are not always available. More often than not, the sequence has to be reconstructed from disjointed pieces of evidence. The smallest building blocks of any sequences are referred to as termini post and ante quem (tpq and taq). If an event X is the *terminus post quem* for Y, Y had to happen after X. The opposite is true for *terminus ante quem*. The two terms can therefore be understood as the exclusive minimum lower and maximum upper boundaries for the date an event. It is important to keep in mind that tpq and taq do not inform us about how much time elapsed between the

boundary and the event in question. Moreover, an individual tpq/taq is not enough to construct a sequence. For example, if event X is a taq for two events, Y and Z, this piece of information on its own does not tell us anything about the relationship between Y and Z. Absolute chronology, when referring to events, means the numerical referents which specify the number of years separating the event in question from a conventionally chosen point of reference, most often year 1 of the Christian era (BC/AD or BCE/CE), or before AD 1950 (BP). In radiocarbon studies, these are also known calendar ages. All uncalibrated dates in this study are reported in the BP format as per convention (Millard 2014). Calibrated and modelled date estimates are always given in the BC format, which is more prevalent in the studies of history and late prehistory.

When it comes to periods, history and archaeology define them slightly differently. In most cases, historical periods are defined as the time between two events seen as particularly portentous. Archaeological periods, on the other hand, are usually understood as the time when the material culture of a given site or region was dominated by a particular type of objects, manufacture or decoration technique. While the transition from one archaeological period to another can be quite abrupt, e.g. through military conquest or large-scale natural disasters followed by a displacement of people, archaeology most often deals with gradual transitions from one period to another. Given this ambiguity, the concept of a period's duration becomes quite elusive, as illustrated in the debate about the meaning of the Latin term *floruit* (see Aitchison, Ottaway, and Al-Ruzaiza 1991 and Buck et al. 1994). In its original historical application, this term was used to designate the period when a historical figure was certain to have lived when the actual dates of his/her dates of birth and death are not known. The *floruit* of an archaeological phase, on the other hand, usually denotes the period when the type material culture of that period was most prevalent, i.e. after it established itself as the dominant type and before the first elements of the following phase become visible in the archaeological context (Bronk Ramsey and

Lee 2012). Therefore, while in the first case the need for *floruit* arises from uncertainty associated with imperfect sources, in the second case it is a heuristic device used to deal with the vague concept of “period” which is not clear defined. In order to avoid subtle yet significant conceptual problems, every period considered in this study will be defined as the time between two boundaries (start and end), denoting the transition from one period to the next. As noted by Koliński 2007 (p. 342), “*Any periodization (...) is, in fact, an attempt to define transitions*”. The boundaries are considered single events with their own age uncertainty. For each of the archaeological periods, the start boundary is understood as the age of the youngest archaeological context containing the material culture or textual sources characteristic for the period. Thus, with two consecutive periods X and Y, the end boundary of period X is the same as the beginning boundary of period Y. Wherever these transitions are gradual, the intermediate transitory periods are reflected in greater uncertainties of the boundaries, or the inclusion of a transitional phase. It is also important to notice that just as events are defined with reference to their particular locality, archaeological and historical periods also have to be defined geographically. That is, a period can only exist in a region where sites display similar archaeological inventories or were demonstrably part of a single socio-political complex. Even then, one has to account for the possibility of individual sites having disparate life histories with periods lasting longer at some than at others.

Eventually, every chronology needs to be provided with uncertainties which adequately reflect the shortcomings of the material and methods used in the research process. The first, most common type of uncertainty associated with absolute chronologies can be referred to as continuous uncertainty. This is when a date of an event or a duration of a period is provided with a margin of error. In history and archaeology, this is usually achieved by providing two dates, minimum and maximum estimates, e.g. an event dated to 3200-3000 BC assumes that any date between 3200 BC and 3000 BC can potentially turn out to be correct. The same can be expressed using the

median and an error, i.e. 3100 BC  $\pm$  100. Although seemingly trivial, using this type of uncertainty makes some important implicit assumptions. Most importantly, the uncertainty is uniformly distributed. Therefore, in our previous example, 3150 BC is just as likely as 3100 BC or 3001 BC. Secondly, representing the uncertainty as 3200-3000 BC or 3100 BC  $\pm$  100 excludes dates before 3200 BC and after 3000 BC. An alternative approach is to conceptualise the date as a probability density function distributed normally (i.e. Gaussian distribution). A normally distributed date  $\mu = 3100$  BC  $\sigma = 50$ , or  $N(3100,50)$ , informs us that there is about 68% ( $1\sigma$ ) probability that the event occurred in the range 3150-3050 BC, and is almost certain (95% probability,  $2\sigma$ ) to have happened between 3200 BC and 3100 BC. The other type of uncertainty can be called discrete. A good example of this type of uncertainty is provided by the dendrochronological studies. A sequence of 10 tree rings may correspond to several time periods (e.g. 2510-2501 BC, 646-637 BC and 308-299 BC), but it cannot fall in between them (e.g. 2505-2496 BC, 647-639 BC, 573-568 BC). Another example would be an inscription dating to the first year of king Tukulti-Ninurta of Assyria. The inscription could come from the year 1366 BC if it refers to Tukulti-Ninurta I or 891 BC if it was commissioned by Tukulti-Ninurta II. Other years are not possible.

### 1.3 Problems of Mesopotamian Archaeology

Near Eastern archaeology has a long and eventful history. Originally driven by the colonial ambitions of European powers as well as a burgeoning interest in Biblical archaeology, the most important and productive archaeological excavations took place in the late 19<sup>th</sup> - early 20<sup>th</sup> cc. Many large and important sites were excavated by British (e.g. Loftus 1852 in Susa), German (e.g. Koldewey 1914 in Babylon) and French (e.g. Genouillac 1924 in Tello) expeditions. Since the 1920's, more systematic excavations were being carried out throughout Southern Mesopotamia, and the excavated material was being organised into coherent periodisation schemes (most notably Delougaz 1952). Large engineering works in the 1970's and 1980's forced

the focus of the archaeological works to move from exploration and systemisation to salvage and recovery. As a result, while the number of excavated sites grew, their stratigraphies were often less than adequate. The ongoing political upheaval following the Gulf War in 1990-91 and the American-led Invasion of Iraq in 2003, archaeological work in southern Mesopotamia slowed down significantly, with most researchers moving to neighbouring regions such as Syria or Turkey (Matthews 2003a: 18). Ever since, the geography of the archaeological work in the Near East was dictated by international politics and internal conflicts. With most of the fighting concentrated in Southern Iraq during the 1990's and 2000's, relatively little work has been done in the region in the most recent decades. As a result, scholars working on the early historical periods in Southern Mesopotamia depend heavily on the findings of excavations conducted during the infancy of the discipline, with much of the excavated material left in museums and collections in highly unstable countries. This reliance on old excavation reports constitutes the first major problem of Mesopotamian archaeology. When discussing the excavation works on the important site of Kiš, Lloyd 1969 (p. 48) wrote that it was “*badly excavated, the excavations were badly recorded and the records were correspondingly badly published*”. Unfortunately, this sentence could be applied to the majority of important Southern Mesopotamian sites. Inadequate excavation methods, incomplete records, elite context bias and excessive focus on the recovery of textual sources plague so many archaeological publications that several generations of researchers dedicated large parts of their careers to salvaging contextual information from the imperfect publications for significant sites with long stratigraphies (e.g. Moorey 1964, Moorey 1966, Moorey 1970; Gibson 1972; and Zaina 2016 on Kiš; Benati 2013, Benati 2014, Benati 2015a, Benati 2015b on Ur; an ongoing project by the German Archaeological Institute on the Uruk material; also sites such as Tello and Susa).

Regrettably, conflicts in the Near East damaged the cultural heritage of the region in other ways. When inspecting the daunting aerial photographs of the looted

Mesopotamian sites (see **Figure 5**), one can say that the meticulousness of the looters exceeded that of the early archaeologists. Though the practice of ancient treasure looting is as old as the antiquities themselves, the number of acts of robbery and violence against cultural heritage grew exponentially in the last two decades. News of looting and destruction of artefacts in Near Eastern museums and cultural institutions following the Coalition invasions (Rothfield 2009), the Arab Spring (Williams 2013) and the rise of Islamic extremist groups reach the public news outlets almost daily. It was also a common practice among excavators of major Mesopotamian sites in the early days of Near Eastern archaeology to buy illicitly excavated artefacts and cuneiform texts from the locals with nothing but their word to account for the provenance of the objects (Matthews 1992: 2; Gibson 2009). A brief look at the Cuneiform Digital Library Initiative (CDLI) database reveals just how many early texts presumed to have come from important sites, e.g. Tell Jokha (ancient Umma), cannot actually be securely linked to a specific site, let alone an individual archaeological context. The importance of secure archaeological context is self-evident to every archaeologist, but even more so to researchers working on chronologies. The reliability of any periodisation constructed on the basis of archaeological material depends to a high degree on the quality of their context. Therefore, the importance of the quality control of archaeological material used in studies on Mesopotamian chronology cannot be overestimated.

The problems outlined above are some of the principal limitations of archaeological approaches to the study of Mesopotamian chronology. There are, however, other significant issues deriving from the very nature of archaeological inquiry. Most importantly, for all their usefulness in tracing and studying the changing patterns in material culture, and thus by extension ancient society and culture, stratigraphies and typologies can only provide us with relative chronologies. These relative chronologies, however indispensable in identifying and studying socio-cultural processes, also have their limitations. First and foremost, every archaeological periodisation starts with

the definition of discrete spatio-temporal units of cultural evolution - archaeological *cultures* in the geographical dimension and *periods* on the chronological axis. Although identifying cultures and periods is the routine practice of archaeology, one encounters multiple problems when carrying out regional analyses on material such as that of Mesopotamia - a large number of cultural complexes, intricately linked yet extremely varied, scattered over extremely large distances, living in drastically different environments (Nissen 2001: 179). It is indisputable that at least since 6000 BC, Late Neolithic cultural complexes with similar artefact assemblages were distributed over large areas of the Near East. However, recent critical re-analyses have actually stressed the importance of local variability across such Mesopotamian sites, which has in turn brought the existence of entire cultures (e.g. Finkbeiner 1986 on Jemdet Nasr; Carter and Philip 2010 on 'Ubaid) and periods (Porada et al. 1992: 108; Evans 2007; Luciani 2015 on Early Dynastic II) into question. Even if a direct link between cultural assemblages of two archaeological sites can be established, traditional archaeology is in no position to determine whether the two were synchronous. In other words, the relative chronologies constructed solely on the basis of archaeological material remain speculative until they can be strengthened with external evidence.

The other significant problem with relative archaeological chronologies is the issue of resolution. Because there are no “cultural clocks” which would allow scholars to evaluate the length of a given period, archaeologists usually resort to using very broad time estimations. The problem with this approach is twofold. First, while a periodisation situated on a timeline split into units of hundreds or thousands of years is often enough to satisfy prehistorians, researchers working on historical periods are usually interested in very precise date estimations. Secondly, the archaeological approach implicitly models the development of human culture as a slow, logical progression and gradual change (Stevenson 2015: 147). History, on the other hand, prefers to see chronologies as a sequence of discrete events. Since the period studied in this thesis marks the transition between prehistory and history in southern Mesopotamia, these

conceptual differences pose a significant methodological problem. In situations where written sources are insufficient to create a historical narrative, the obvious temptation is to “hybridise” the chronological units, i.e. define in terms of archaeology and history. In the case of Early Bronze Age Mesopotamia, however, it very quickly became evident that some of the most significant historical events known from written sources do not find their reflection in the archaeological record and vice versa, the texts are silent about the patterns visible in the material culture (Moon 1982: 67; McMahon 2006: 2; Koliński 2007: 342). It is apparent that the difficulties in using archaeology to construct chronologies for Early Bronze Age Mesopotamia derive from the nature of the material as well as the discipline’s methodology. Aiming for a more holistic, interdisciplinary approach is a logical next step in trying to combat these problems. As it will be outlined in the sections below, however, drawing from various sources of information, while necessary, is not a *panacea*.

## 1.4 Textual Sources and Mesopotamian History

The origins of Western fascination with the ancient cultures of Mesopotamia can be traced back to the links between the cuneiform tradition and the Bible. Though Babylon and Assyria feature prominently in the Old Testament, it was through the works such as G. Smith’s decipherment of the Babylonian Flood Story in 1872 and F. Delitzsch’s (Delitzsch 1903) influential lecture *Babel und Bibel*, arguing for the Mesopotamian origins of a number of Biblical stories, that historians, philologists and Biblical scholars truly realised the importance of the cuneiform tradition. Since the original impetus for the study of the Mesopotamian civilisations came primarily from disciplines working on textual sources, philological and historical approaches dominated the study of the region. The belief that cuneiform studies need to be independent from other approaches to the study of the past was so prominent in the early days of the discipline that B. Landsberger, one of the forefathers of modern Assyriology, explicitly argued for *die Eigenbegrifflichkeit*, “conceptual autonomy” of

the Babylonian World (Landsberger 1976). Even today, textual sources are given primacy over archaeological material by many scholars (Zettler 2003: 7-8). Nonetheless, even the strongest proponents of textual study would agree that for the very earliest periods, our textual sources are insufficient to serve as the sole source of information about Mesopotamian history. Moreover, most of the texts of historical value we do possess are often fragmentary and poorly understood, which makes classical historical and philological analyses of the material impossible (Diakonoff 1976). For that reason, scholars have had to resort to using mythological or mythicised pseudo-historical accounts composed or edited centuries or even millennia later (Frayne 2009; Sallaberger and Schrakamp 2015: 3).

The earliest texts of historical value appear in the later part Early Dynastic IIIa period (first half of the 3<sup>rd</sup> millennium BC), some ca. 500 years after the earliest appearance of writing. At that time, Southern Mesopotamia seems to have been splintered into a number of city-states and small territorial polities. The rulers of these political units variously called themselves lords<sup>1</sup>, governors<sup>2</sup> or kings<sup>3</sup>. Some of these kings and governors left short inscriptions in clay, stone and metal, commemorating their construction works and military victories. Unfortunately, some ancient rulers were more productive than others, leaving us with only few individual names of kings, and sometimes their spouses, scattered across different places and time periods. Rulers of individual sites can rarely be linked into broader regional sequences with only a few exceptions. Apart from the patchiness of the written records for this period, the political fragmentation of the region during the earliest periods of history adds another level of complexity to the puzzle. Even when one is able to construct a sequence of rulers at an individual site, such as that of the First Dynasty of Lagaš, where the inscriptions of Ur-Nanše and his successors were found in a stratified sequence in Ĝirsu, very few synchronisms between rulers of different polities can be established.

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<sup>1</sup>Sum. en

<sup>2</sup>Sum. ensi<sub>2</sub>

<sup>3</sup>Sum. lugal

The historical tradition of the later periods draws a picture of logical sequence of dynasties, passing the dominance of the region from one to another. However, many of the dynasties and rulers conventionally taken to be consecutive might in fact have been contemporary (e.g. McMahon 2006: 4 on Early Dynastic - Akkadian transition). While administrative archives have always played a central role in the development of cuneiform writing, it is only from the ED IIIb phase onwards that one sees individual documents dated to a year of a named king. Unfortunately, such practices were limited to only a handful of Mesopotamian sites: Lagaš and Ĝirsu, and Umma and Zabalam in the South (Marchetti and Marchesi 2011; Marchesi 2015: 67-95; Sallaberger and Schrakamp 2015; Pomponio 2015); Mari and Ebla in the North (Archi 2015; Marchesi 2015: 96ff.). Even when individual kings and their year numbers can be identified, they provide an incomplete picture of local history which often cannot be linked into a broader regional narrative.

Another group of texts which is systematically used for the reconstruction of history and chronology of the 3<sup>rd</sup> mill. BC Mesopotamia is the chronicles, especially the so-called Sumerian King List (SKL) - a chronicle of consecutive rulers supposedly ruling the region since from before the mythic Flood until the 2<sup>nd</sup> mill. BC; the text is known from a number of different, often contradictory versions (Steinkeller 2015b). The classical version of the text was probably composed during the Isin-Larsa period, ca. 1900 BC (Michalowski 1983), based on a earlier Ur III edition (Steinkeller 2003). There are numerous problems with using this text for any historical reconstruction. While the sequence of the kings and the lengths of their rule seem reasonable for the 2<sup>nd</sup> mill. BC, the list slowly descends into more and more incredible accounts<sup>4</sup>. What is more, numerous powerful and important kings whose names are known from Early Dynastic inscriptions do not appear in the SKL (Marchesi 2010; Dalley *in press*: 5). It is usually assumed that the last credible account of reign mentioned by the SKL is

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<sup>4</sup>E.g. ETCSL 2.1.1: 112) bil<sub>4</sub>-ga-mes 113) ab-ba-ni lil<sub>2</sub>-la<sub>2</sub> 114) en kul-la-ab-ak-ke<sub>4</sub> 115) mu 126 i<sub>3</sub>-a<sub>5</sub> (Bilgames, whose father was a vampire, the lord of Kullab, ruled for 126 years)

that of Sargon of Agade, whose conquests sometime in the 24<sup>th</sup> c. BC put an end to the Early Dynastic civilisation of the Sumerian city-states. The choice of this cut-off date for the text’s historicity is, however, arbitrary, due to being on the “*verge of credibility*” (Nissen 1987: 609). It is no secret that the SKL is used for chronological reconstructions “*faute de mieux*” (Frayne 2009: 39). Even if one accepts the SKL as a basis for the construction of sequences of ruling dynasties, one has to accept the fact that reliable accounts of successive reigns were only created for periods when the region was politically centralised. In other words, collapses of ancient empires and the subsequent “dark ages”, i.e. long periods without yearly records, render the sequences of rulers floating<sup>5</sup>. Researchers have looked to astronomical observations recorded in texts to fix these floating chronologies. Decades of intensive research allowed for the creation of a consensus, Middle Chronology (Huber 1999; Reade 2001; Roaf 2012). The combined forces of historians and astronomers cannot, however, overcome the problem of the “dark ages” during the 3<sup>rd</sup> mill. BC, the duration of which is usually arbitrarily determined by individual scholars (Zettler 2003: 19; Steinkeller 2015b). Other chronicles going back to the Early Dynastic times such as the Tummal Chronicle and the Chronicle of the Single Dynasty (Glassner and Foster 2004) do very little to alleviate these problems, occasionally giving unreasonable reign lengths for historical rulers we know had existed<sup>6</sup>. Another ancient text, the so-called Lagaš King List seems to be a genre unto itself, apparently mocking the other texts which try to recreate the ancient chronology, further eroding the credibility of the chronicles as a source of historical knowledge (Sollberger 1967). An ancient historian is therefore left torn between two corpora of ancient texts: an incomplete collection of royal inscriptions and administrative documents on the one side; and a mythical,

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<sup>5</sup>The “dark ages” breaking the linear narrative of Mesopotamian history were recognised as a problem already in the antiquity. Perhaps most famously, the scribe compiling the Sumerian King List gave up on describing the chaos following the collapse of the Akkadian Empire, asking the rhetorical question: “Who was king? Who was not king?” (ETCSL 2.1.1: 284)

<sup>6</sup>Utu-heġal of Uruk, known from his inscription as the conqueror of the Gutian barbarians (RIME 2.13.06.04), was supposed to rule for 420 years and 7 days according to the Chronicle of the Single Dynasty (Glassner and Foster 2004: 105)

unreliable, confused and often contrary evidence from later literary compositions.

Palaeographical studies attempt to recover chronological information from the form of the cuneiform signs inscribed on tablets and other objects (Frayne 2008: 14). Although general patterns can be observed in the styles of ancient ductus, any attempt to order the different corpora of texts faces multiple problems. It has been pointed out that the shape of the cuneiform signs may depend not only on the age of the document, but also on the regional tradition (Biggs 1973: 46) as well as the genre of text (Bretschneider 2015) and the material on which the signs were impressed/carved (Biggs 1966: 76). Another prominent feature of the early Mesopotamian archaeological assemblages, cylinder seals and their impressions on clay documents and other objects are often used as a proxy for dating archaeological contexts with associated texts; however, academic confidence in the chronological potential of this body of material seems to have diminished over the years (Nissen 1986: 328). Apart from the problem of synchronic regional differences in decoration of cylinder seals, as well as the possibility of a seal being handed down over generations before it was deposited/discarded in an archaeological context, several authors pointed to our lack of full understanding of the selective use of cylinder seals with different glyptics, especially in the early periods (Matthews 1993; Steinkeller 2002). It therefore becomes evident that in the realm of chronology textual resources, despite their fundamental importance for our understanding of the early Mesopotamian civilisation, have to be complemented by other sources of information. Nevertheless, Zettler 2003 (p. 35) points out that a holistic, interdisciplinary approach has the potential to produce skewed results if material from different disciplines are not carefully assessed. The significant divide between philologists and historians on the one side and Near Eastern archaeologists on the other quite often results in the selective use of data, commonly without an understanding of weaknesses of different bodies of materials. There is no single widely accepted methodology of compiling different sources of information,

causing many scholarly discussions to be left unresolved, having the interested parties choose side according to their preference and subjective judgement. In the next section, I demonstrate how, in the case of ancient chronologies, radiocarbon dating and Bayesian statistics may address this problem.

## 1.5 Radiocarbon Dating

Few discoveries in the history of archaeology had an impact comparable with that of Libby's (Libby, Anderson, and Arnold 1949) work on the use of radioactive carbon isotopes for the age determination of organic materials. By measuring the ratio of the unstable  $^{14}\text{C}$  to the stable  $^{12}\text{C}$  in the body of a dead organism, one can determine how long ago the organism stopped exchanging carbon with the atmosphere, i.e. arrive at the time of its demise. The technique can be used on most organisms that died within the last 50,000 years. The importance of radiocarbon dating extends beyond producing dates for individual samples - the possibility of arriving at absolute dates allowed archaeologists to assess the credibility of their relative sequences of archaeological complexes, to fix these floating chronologies and, perhaps most importantly, to be able to relate the histories of different regions and write a larger narrative of human civilisation. Since the First Radiocarbon Revolution, following the immense impact the absolute dating technique had on our understanding of the past,  $^{14}\text{C}$  dating became an integral part of most archaeological studies (Taylor 2005: 23). The technique itself evolved greatly as scientists began to fully understand its strengths and limitations. Discovering variations in the atmospheric ratio of carbon isotopes throughout history, sometimes called the Second Radiocarbon Revolution, revealed the need for the calibration of radiocarbon measurements (Vries 1958). The Third Radiocarbon Revolution occurred in the late 1970's with the introduction of the Accelerator Mass Spectrometry (AMS) to radiocarbon studies, which allowed the sample sizes to be reduced by a factor of 1000 (Muller 1977; Muller, Stephenson, and Mast 1978; Linick et al. 1989; Bruins 2001: 1153). As the development of the technique

proceeded, increasingly rigorous protocols regarding sample selection, pretreatment and measurement were put into place. A detailed description of these procedures relevant to this study will be given in **Section 2.2**.

Despite the great potential of scientific dating techniques, very few studies of ancient Mesopotamian history and culture have made systematic use of radiocarbon information, for several reasons. Firstly, the bias towards the study of written sources prevails in the Ancient Near Eastern studies and few historians or philologists are compelled to complement their research with scientific methods of absolute dating. Despite the numerous studies on other early literate societies, especially in Early Egypt and the Bronze Age Levant (Dee et al. 2012), the majority of ancient historians as well as archaeologists refuse to engage with radiocarbon studies, doubting their reliability or usefulness<sup>7</sup> (Plicht and Bruins 2001: 1155). The work of H.J. Bruins and colleagues (Bruins and Mook 1989; Bruins, Plicht, and Mook 1991; Plicht and Bruins 2001; Bruins 2001), advocating the use of absolute dating techniques remained very much a *vox clamantis*. It is, of course, unfair to blame the lack of radiocarbon studies on Mesopotamian material solely on the reluctance of a certain academic milieu. As it was pointed out by Plicht and Bruins 2001 (p. 1160), a radiocarbon date is only as good as its context. As we have seen in the previous sections, the little datable Mesopotamian material we do have is more often than not deprived of any contextual information. Moreover, a <sup>14</sup>C measurement obtained from a sample should not only come from a securely defined archaeological context, but the nature of the original material should also be taken into consideration to account for the possibility of naturally inbuilt age, i.e. the sampled tissue being older than the age of death of the organism (esp. old wood), or an object being used over long periods of time before deposition etc. (Waterbolk 1971). It is widely accepted that short-lived materials, esp. botanical samples, are the best sources of accurate radiocarbon dates (Stry-

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<sup>7</sup>“It [<sup>14</sup>C dating] is irrelevant for characterizing political and even many aspects of social history (Cryer 2000: 655)”

donck 2012: 127-128). Unfortunately, most of the radiocarbon dates for the Southern Mesopotamian sites have been so far derived from charcoal, a material which notoriously produces dates older than expected (Bronk Ramsey 2009b). But the problems do not end there. Due in part to the fluctuations in the production of  $^{14}\text{C}$  in the outer layers of Earth's atmosphere throughout the ages, some sections of the radiocarbon calibration curve display so-called “reversals” and “plateaux”, i.e. periods for which radiocarbon determinations cannot produce precise calibrated dates. Unfortunately, some of the most significant plateaux include 3340-2920 BC and 2890-2590 BC (Bruins, Plicht, and Mook 1991: 183).

## 1.6 Bayesian Statistics

For the reasons outlined above, archaeologists, especially those working on regions such as Mesopotamia, are discouraged from using individual radiocarbon dates as representative of archaeological phases or events (Waterbolk 1994: 351). But as we have seen, in some cases, even the strictest data quality control and accumulation of large bodies of dates may be insufficient to construct reliable chronologies. It is now well recognised that radiocarbon dates represent a limited and often flawed sample of the past, and in order for them to be of any use to the researcher, they have to undergo statistical analysis and interpretation. As the complexity of the dating process became evident, most researchers abandoned the concept of a calibrated radiocarbon date as a mean value with uncertainty (e.g.  $3500 \pm 40$  BC) in favour of probability density functions - in other words, calibrated radiocarbon dates give the probability that the age of death of the organism happened during a particular period (Walanus 1983: 15). Conventionally, what interests the researcher is the period falling within the range of 68.2% probability or 95.4% probability (sometimes referred to as 1 and 2 standard deviations or  $1\sigma$  and  $2\sigma$ ). Presentation of dates as probability density functions made the researchers turn from Classical to Bayesian statistics - an increasingly popular branch of statistical science operating on probabilities rather than discrete sets of

data (Bronk Ramsey 2009a: 337). Thomas Bayes (1701?-1762), an elusive historical figure, was a British Presbyterian pastor, a theologian and a mathematician. His work on probability (or the “doctrine of chances” as it was known at the time), was allegedly inspired by his gambling (Bellhouse 2004: 20). Bayes was interested in a method which would allow for re-assessing the probability of an event occurring with every new observation of said event actually taking place or failing. The method developed by him was, for the longest time, considered cumbersome and impractical, as it required numerous repetitions (Bellhouse 2004: 25). With the rapid development in the computing power of machines and the possibility to run millions of simulations and calculations in a relatively short time, the interest in Bayes’s work was reignited. His most famous mathematical theorem, published posthumously by Richard Price (1723-1791), can be expressed as:

$$p(\text{parameters}|\text{data}) \propto p(\text{data}|\text{parameters})p(\text{parameters})$$

In the case of radiocarbon dating, the radiocarbon data [ $p(\text{data}|\text{parameters})$ : the likelihood of obtaining the data for each calendar year] are combined with prior beliefs about the probability density distribution [ $p(\text{parameters})$ : additional information limiting the possible years] in order to arrive at the posterior probability density based on the radiocarbon data [ $p(\text{parameters}|\text{data})$ : the probability each calendar year given the data] (Bayliss et al. 2007: 5). With this approach, it is possible to reduce the probability ranges of radiocarbon results. The prior contains all the chronological assumptions of a given model. It is the mathematical expression of the information obtained from sources such as archaeology or history: the cut-off dates for particular events (e.g. *termini post* and *ante quem*), time lapses between individual dates (e.g. from tree rings), the expected sequences of consecutive dates etc. Prior information can also be derived from the grouping of samples within a defined corpus: by pooling results together, for example, the problem of outliers (dates coming from samples which have been contaminated or displaced from their original context) can be alleviated by downweighting their influence on the entire model (Bronk Ramsey 2009b).

The introduction of Bayesian analysis to archaeology and radiocarbon dating is sometimes considered to have been the Fourth Radiocarbon Revolution (Buck, Litton, and Smith 1992; Bayliss 2009). Thanks to the Bayesian analysis, scientists can routinely produce 95% date ranges shorter than a century, provided sufficient archaeological information is available. In the present work, I utilise one of the first and the most popular pieces of software that allow Bayesian modelling of radiocarbon dates, OxCal v.4.2 (Bronk Ramsey 1995; Bronk Ramsey 2009b; Bronk Ramsey and Lee 2012). The program was used to introduce the prior parameters derived from archaeological, palaeographic and historical analyses into the calibration of radiocarbon dates from Southern Mesopotamia and the other regions.

Bayesian treatment of archaeological data is not free from drawbacks and pitfalls. As in every statistical method, it can obscure the actual picture and bend the data towards a favoured theory. The first problem with Bayesian statistics is quite evident: since it relies heavily on the prior beliefs determined by the researchers, it can suffer greatly if the prior is incorrect. Another problem stems directly from the fact that Bayesian statistics requires radiocarbon dates to be treated as probability density functions. Even before the introduction of Bayesian statistics to the radiocarbon dating became a routine, some authors (e.g. Walanus 1983: 1) claimed that probabilistic representation is less informative than an archaeologist would normally wish, since every date is possible and some are more probable than others. Despite its scientific and mathematical basis, Bayesian modelling of radiocarbon dates remains a heuristic and a probabilistic device, where the results have to be interpreted with respect to other archaeological data (Waterbolk 1994: 351; Plicht and Bruins 2001: 1155). Therefore, one has to pursue a methodology which critically assesses the reliability of radiocarbon measurements, incorporates them into larger bodies of dates in order to weigh down the effect of the outliers, and cross-references the results with the available archaeological information. Thankfully, since the initial implementation of Bayesian modelling in radiocarbon studies, researchers have developed strategies

that account for the strengths and weaknesses of the technique (see esp. Buck et al. 1994: 231-232; Buck and Meson 2015; Bayliss 2015).

The idea of compiling larger bodies of radiocarbon dates for the Near East is not new. Probably the most notable early examples include the work of Mellaart 1979 on the absolute chronology of Egypt and the Near East and the larger collaborative projects of synchronising numerous cultures of the Mediterranean and beyond (Aurenche, Evin, and Hours 1987; Porada et al. 1992). While impressive in their scope and ambitious in their goals, these works could do little more than list individual radiocarbon dates and draw conclusions from those at a time when radiocarbon studies were only starting to enter North African and Near Eastern archaeology. The article by Hassan and Robinson 1987, though focused on Egyptian and Levantine material, represents an early attempt at a statistical treatment of Mesopotamian dates conceptualised as probability density distributions. Unfortunately, the article does not engage critically with the contextual information of the radiocarbon dates and their reliability. The Associated Regional Chronologies for the Ancient Near East (ARCANE) initiative, based at the University of Tübingen is the latest large-scale project working on the absolute chronologies of the region in question during the Early Bronze Age. As of 2017, the ARCANE project released three region-specific volumes (Lebeau and Bianchi 2011; Peltenburg 2013; Finkbeiner et al. 2015) and one comparative volume on the ceramics of the Near East (Lebeau 2014), and one on the early textual sources (Sallaberger and Schrakamp 2015). Since the main goal of ARCANE is to compare the diachronic cultural processes occurring in several regions, resorting to absolute dating techniques and Bayesian modelling was inescapable. These publications laid important groundwork for important chronological research: they highlighted the need to go beyond textual and archaeological studies, revealing both the potential and restrictions of  $^{14}\text{C}$  dating. At the same time, it is my feeling that ARCANE volumes fall short when it comes to the radiocarbon aspect of their work. Firstly, the study of material culture is the project's main focus, with similarities in

archaeological material being used to construct periodisations, with the  $^{14}\text{C}$  determinations added at the end. Secondly, while the publications do utilise rudimentary Bayesian modelling, I demonstrate in this work how this approach can be taken further to include more advanced modelling techniques. Thirdly, following a review of the archaeological publications, I came to decide that some of the  $^{14}\text{C}$  dates were misassigned by the ARCANE authors. For these reasons, while this thesis draws heavily from the ARCANE archaeological periodisation work and methodology, it tries to take the work further with more attention paid to the intricacies of the radiocarbon dating procedure. With the rapid development of radiocarbon dating as well as statistical methods for the analysis of radiocarbon measurements, the time is now ripe for a comprehensive study of the absolute chronology of Mesopotamia, complete with strict control of the data quality, and a full exploration of the possibilities the modern dating techniques provide.

## Chapter 2

# Southern Mesopotamia in the 4<sup>th</sup>-3<sup>rd</sup> millennia BC - Overview

### 2.1 Late Prehistory and Protohistory: Ubaid to Jemdet Nasr Periods (ca. 6000-3000 BC)

Southern Mesopotamia is the region delineated by the ancient catchment areas of the rivers Euphrates in the West and Tigris in the East, the marshes of the northern Persian Gulf in the South and the narrowing between the two river beds near modern-day Baghdad in the North. The region is a flat floodplain, with its life cycle very much dependent on the annual floodings of the two rivers. This characteristic of Mesopotamia's environment was originally seen as the main factor behind the development of complex societies in the region. The "hydraulic civilisation" hypothesis (Wittfogel 1957; Foster 1981: 227) stated that in order to maximise cereal harvest, the society had to invest in constructing and maintaining large irrigation works which would stimulate the development of an administrative elite and lay the groundwork under the emergence of early states. Later theories of the ecology's impact on the ancient society stressed the fact that irrigation can be performed on a smaller scale and does not require an administrative superstructure (Scarre 2005: 433). What is more, Postgate 1994 (p. 188-189; also Pollock 1999: 32) pointed out that unlike the Nile, the Euphrates and Tigris flooding cycle is incongruent with the agricultural cy-

cle which meant that draining water was perhaps more important than irrigating the land. The salinity of the flood water posed another serious problem to the ancient farmers. In recent decades, the focus of Ancient Near Eastern studies moved away from simplistic models focused on agriculture and tried to explain the emergence of early complex societies in terms of interactions between societies occupying varied natural environments. For example, Kennett and Kennett 2006 highlight the importance of coastal areas and marshes forming in the deltas of Euphrates and Tigris. Indeed, fishing and fowling feature prominently in the earliest written accounts<sup>8</sup>. Southern Mesopotamia's relative poverty in natural resources such as stone, wood and metal ores has often been quoted as the main reason for the region's involvement in long-distance trade with surrounding regions: Levant (wood), Anatolia (copper, tin and silver), Oman (copper), Iranian and Afghani mountains (lapis lazuli and chlorite) as well as the Indus Valley (carnelian). While Pollock 1999 (p. 42-44) argues that Mesopotamia's natural poverty and reliance on trade may have been overestimated in the literature, it is an undeniable fact that long distance trade networks existed already by the beginning of the 5<sup>th</sup> mill. BC.

Southern Mesopotamia first becomes part of a larger, more or less homogenous (cf. Carter and Philip 2010) archaeological culture during 'Ubaid period. The earliest phases of this period at sites such as Tell Oueili (Huot 1989) and Tepe Gawra (Rothman 2002; Streit 2012: 159-160) date to around 6000 BC. The archaeological complex is believed to have originated in Northern Mesopotamia and influenced a vast region spanning from the Eastern Anatolia all the way to the Iranian Plateau - the exact mechanism of this spread (migration, acculturation, conquest) is still unknown (Oates 2004: 90, 98). Although displaying some regional variety, the culture is defined by its fine, decorated pottery (Porada et al. 1992: 87). During the later periods, the 'Ubaid

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<sup>8</sup>Since the proto-cuneiform texts of the Uruk period, birds (ORACC Q000017) and fish (ORACC Q000013) appear in lexical lists. During the subsequent Early Dynastic periods, mentions of fish, especially in the context of temple offerings, can be found in multiple administrative texts (e.g. BIN 8 356 = P221487).

complex is complemented by the iconic clay figurine, coming in two main varieties: ophidian (Daems 2010; see **Figure 6**) and Mother Goddess-type (Porada et al. 1992: 89). The domestic architecture of the Near East becomes dominated by houses with a central hall (*Mittelsaalhaus*; Nissen 2001: 170), while communal buildings such as those of Eridu and the eponymous site of Tell al-‘Ubaid evolve from small chapels to large temples on elevated platforms (Safar, Mustafa, and Lloyd 1981). The appearance of stamp seals in the later part of the ‘Ubaid period heralds the appearance of one of the most important cultural inventions of early Mesopotamian civilisation: the proliferation of administrative techniques (Porada et al. 1992: 90-92). These features would echo throughout the later stages of Mesopotamian history.

The transition between ‘Ubaid and Uruk periods in the Southern Mesopotamia is difficult to pinpoint due to continuity in the material culture assemblage (Nissen 2001: 153). The Uruk period takes its name from the site of Warka whose rapid growth during the late 5<sup>th</sup> and early 4<sup>th</sup> mill. BC turned it into a sprawling metropolis with the area of ca. 200 ha (Nissen 2013). The growth of the city and the development of monumental cultic centres such those of Eana and Kullaba in Uruk (see **Figure 7**) was accompanied by the appearance of a new set of ceramics - the fine and highly elaborate pottery of the ‘Ubaid and Halaf periods was gradually replaced by crude, handmade pottery, with the famous bevelled-rim bowls (**Figure 8**) becoming the type-fossil for this period (Porada et al. 1992: 97). Though the exact function and purpose of these vessels has been the subject of endless debate (Delougaz 1952; Buccellati 1990; Pollock 2003; Potts 2009; Helwing 2014), the consensus view among most archaeologists is that the bevelled-rim bowls were used to distribute rations (Nissen 1970). The “*evolution of simplicity*” (Wengrow 2001) in the pottery style, as well as the parallel elaboration of counting and administrative techniques (clay tokens, bullae and numerical tablets; Schmandt-Besserat 1979, Englund 1998: 214-215), culminating in the appearance of proto-cuneiform tablets of lexical and administrative nature (Englund, Nissen, and Damerow 1993; Englund and Boehmer 1994, **Figure 9**), are

traditionally seen as evidence for an increased centralisation of production and re-distribution of wealth (Nissen 1988: 66; Postgate 1994: 24-25; Rothman and Badler 2008: 3-4; cf. Pollock 2001). The Uruk cultural assemblage of crude, mass-produced pottery and administrative tools, as well as architecture (tripartite houses and monumental temples built of flat, square Riemchen brick) spreads across a wide area, from Anatolia in the west (Stein et al. 1996) to Kerman in Iran (Desset, Vidale, and Alidadi Soleimani 2013; Vidale and Desset 2013). Near Eastern archaeologists like to differentiate between Uruk sites *sensu stricto* and the so-called “Uruk colonies”, i.e. sites where an enclave with Uruk-related material was inserted into a settlement displaying local characteristics (Oates and Oates 1997: 287; Oates 2014: 1491). The Uruk phenomenon was certainly a turning point for the entire region. The evolution of administrative tools, the appearance of proto-script, the enormous sizes of temple complexes and iconography such as that of the famous Warka Vase (**Figure 10**) leave no doubt as to the fact that one can speak of a complex state, understood as a community spread over a large area united by an elite “high culture” (Yoffee and Baines 1998). In the case of Uruk Mesopotamia, the elite was closely linked with the cultic activities of the temples, which were the administrative centres of the community. The enigmatic “priest-king”, also known as the “man in the netted skirt” appearing on the Warka Vase and in the glyptic of the cylinder seals (Glassner 1993; Steinkeller 1999: 105) is oddly absent from the earliest proto-texts; however lexical lists such as the Standard Profession List<sup>9</sup> are proof enough to postulate the existence of a stratified, hierarchical society dominated by a priestly bureaucracy and nobles engaged in warfare. The geographic span of the Uruk culture demonstrates that these significant changes in the makeup of the ancient society took place on an enormous scale.

Just as its sudden explosion over a large area, the abrupt end of the cultural complex continues to perplex Near Eastern archaeologists. The abandonment of Uruk “colonies” on sites outside of Southern Mesopotamia and the replacement of the

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<sup>9</sup>ORACC Q000002

previous ceramic assemblage by new pottery types led researchers to speak of a civilizational collapse. The suggested explanations for this change range from an alteration in trade and exchange networks (Algaze 2004) to a climatic deterioration (Weiss and Bradley 2001). In Southern Mesopotamia, the succeeding period is referred to as Jemdet Nasr or Uruk III. The two names derive from two contexts which produced numerous, palaeographically similar proto-cuneiform tablets: Jemdet Nasr, an archaeological site on the northern border of Southern Mesopotamia, and the Level III of Eana sounding at Uruk (Matthews 1992: 5). Associated with these tablets was an assemblage of decorated pottery, recovered from other Southern sites such as Nippur, Abu Salabikh, Kiš, Khafajeh and Fara (Finkbeiner 1986; Matthews 2002: 20). Despite the collapse of the Uruk system, central administration continued to function as attested by numerous proto-cuneiform tablets, accompanied by a complex system of sealings which is as of yet not fully understood (Matthews 1993). The appearance of the so-called city seals, i.e. cylinder seals with symbolic representations of several Southern Mesopotamian sites (Ur, Larsa, Nippur, Uruk, Keš, Zabala; other uncertain names), suggests that during the Jemdet Nasr period, Southern Mesopotamia formed some kind of a religious, economic and/or cultural union (Steinkeller 2002; Matthews 2002: 36). Nevertheless, it seems that direct contacts between the southern alluvium and the surrounding regions ceased (Matthews 1993: 19). Uruk material disappears from Syria, Northern Mesopotamia, and Iran and is replaced by regional cultures with varying sets of artefacts and architectural forms. Though culturally distinct, archaeological cultures such as Ninevite 5 in Northern Mesopotamia or Proto-Elamite in Iran draw heavily from the material and literary traditions of their Uruk predecessors. Jemdet Nasr is therefore characterised by a diversification and regionalisation of economic and cultural practices, a tendency that would continue throughout the subsequent periods.

## 2.2 The Earliest Historical Periods: Early Dynastic I-IIIa (ca. 3000-2500 BC)

While the transition from Uruk to Jemdet Nasr periods can be seen as a sudden breakdown of an expansive socio-cultural system, no such dramatic change can be observed in the transition from the Jemdet Nasr to the Early Dynastic (henceforth ED) times. In fact, it has been noted (Finkbeiner 1986: 49; Nissen 2001: 167) that rather than the appearance of a new cultural complex, one observes a diversification of the already ubiquitous material. Still, some innovations in material cultures can be identified. As far as pottery is concerned, the so-called solid-footed goblets (**Figure 11**), probably used as drinking ware (Romano Romano 2012), are usually considered the main leitmotif of the oldest phases of the Early Dynastic period (Wilson 1986: 60; Martin 1988: 23; Pollock 2003: 24). Although the Early Dynastic sacral architecture displays a high level of regional and local variability (Ławecka 2014), its defining characteristics are the plano-convex bricks, usually laid out in a “herringbone” pattern (**Figure 12**). The Jemdet Nasr practice of including small shrines in the compact domestic architecture gradually gives way to the return of larger central complexes (Crawford 2002: 48). Though the majority of the archaeological works of the Early Dynastic period in Southern Mesopotamia focused on elite and monumental contexts, the limited data for domestic contexts we do possess draw a picture of a society divided into extended households, sometimes dubbed *oikoi* (Pollock 1999: 117; Zaina 2016; Benati 2014). The term “Early Dynastic” is perhaps a misnomer when applied to the earliest historical periods in Southern Mesopotamia. The name derives from the concept of the region splintered into individual city-states, each ruled by a local dynasty of rulers. This was certainly true for the later phases of the period - such is the picture drawn by the royal commemorative and votive inscriptions of the ED IIIb times. Written sources for the earlier phases (ED I and II) are, however, too few and too fragmentary to postulate a similar socio-political situation. In fact, very little is known about the social organisation of the earliest historical periods. Early Dynastic

should therefore be seen as a period defined by a particular ceramic assemblage rather than an historical era.

The proto-cuneiform signs had been in use for about half a millennium by the time the first Early Dynastic tablets appear in the archaeological record. During the ED period, they are, for the first time, used to write words and simple sentences in Sumerian, an isolate language, whose phylogenetic associations are still debated (Edzard 2003: 2-3). The most archaic ED tablets pose numerous problems for our understanding of the earliest writing. Apart from being few and fragmentary, the order of signs is not regular<sup>10</sup>, homophones abound and many grammatical markers such as pre- and suffixes are often omitted (Biggs 1971: 194). Nevertheless, the ED texts allow us to identify some distinctly Sumerian features (see **Section 2.2**). Though examples of writing being used to represent grammatical features of the languages are very rare at this point in time, the odd suffix marker<sup>11</sup> allow us to identify Sumerian as the language behind the Early Dynastic texts. There has been much debate about the origins of the Sumerian people and their language. The “Sumerian problem”, i.e. the questions about where the Sumerians originate from and whether they were the first ethno-linguistic group in Southern Mesopotamia, has been approached from archaeological (Frankfort 1932, Postgate 1986, Potts 1997, Cooper 2012), linguistic (Rubio 1999, Englund 1998, Whittaker 2001, Rubio 2005, Glassner 2005, Whittaker 2008, Englund 2009) and even physical anthropological perspectives (Langdon 1920, Speiser 1933, Sołtysiak 2004, Ogihara, Makishima, and Ishidia 2009). It is still unknown whether the transition from the prehistoric Jemdet Nasr to the Early Dynastic period was related to the influx of a new, Sumerian-speaking population into a region previously inhabited by a different ethnic group

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<sup>10</sup>That is not equivalent to saying that the arrangement was random. While it is safe to say that syntax of a spoken phrase was not the determining the arrangement of signs in a case. The rationale behind the arrangement of signs can be purely aesthetic, although sometimes the internal structure of a case may have a semantic value (e.g the UD.GAL.NUN texts, see **Section 4.3**).

<sup>11</sup>E.g. Nisaba 25 66 (CDLI P449053) 1) inim-ma (for either /inima(k)/, *of a/the word/utterance*, or /inim'a/, *in a/the word/utterance*)

(referred to as (Proto-)Euphratics), or whether the transition from proto- to literate was simply a technological development, with the script gradually evolving from an ideographic to an ideo-phonetic system. Palaeographically, the script of the ED I/II tablets remains largely linear<sup>12</sup>, with some curved lines still unbroken<sup>13</sup>. Nevertheless, an increasing number of tablets with signs composed of triangular and club-shaped<sup>14</sup> impressions foreshadow the appearance of a fully cuneiform script which would come to dominate the early written history of the region.

Despite its regional variability, some features of the ED I can be used to define it as a chronological unit. The situation is much more problematic when one moves forward in time. The concept of the Early Dynastic period and its subdivision into 3 subphases (ED I, II and III; ED III usually further divided into ED IIIa and ED IIIb) was developed in reference to the results of archaeological surveys and excavations carried out in the Diyala region in Northern Mesopotamia (Delougaz 1952). This scheme was generally accepted by archaeologists probably due to the pleasing scholarly aesthetics of tripartite classifications, inspired by the Montelian archaeological tradition. The Diyala chronology was thus often used as a reference for the Southern sequences (e.g. Weiss 1975: 1; Martin 1988: 11). Nonetheless, it soon became evident that this simplistic tripartite division is not universally applicable throughout Mesopotamia. The period supposedly following the first appearance of Sumerian cuneiform texts, the mysterious Early Dynastic II, is especially difficult to identify, not only at Southern sites (Porada et al. 1992: 108), but also in the North (Zettler 1989: 7). Evans 2007 (p. 629) argued that the temple complex of the Northern site of Tell Asmar, ancient Ešnunna, is the only place the tripartite scheme of the Early Dynastic can be recognised - unlike most Mesopotamian cultic structures which display a high degree of conservatism over time, the Ešnunna temple evolved throughout the Early Dynastic, going through three construction phases. The pottery associated with those phases

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<sup>12</sup>E.g. CDLI P200021; Nisaba 25 16 = CDLI P449003; UET 2 133 = CDLI P005713

<sup>13</sup>E.g. Nisaba 25 2 = CDLI P448989; Nisaba 25 8 = CDLI P448995

<sup>14</sup>E.g. Nisaba 25 1 = CDLI P448988; Nisaba 25 20 = CDLI P449007

was then used as a proxy for the definition of ED subphases. Despite the increasing evidence against the usefulness of ED II as a chronological unit, philologists and historians remained undeterred in trying to write a history of the region. There are no tablets or inscriptions which can be classified as “Early Dynastic II” on palaeographic or linguistic grounds. Still, Nissen 1988 (p. 135) claims that the differences between the Jemdet Nasr and ED I texts on the one hand and the later Fara sources of the ED IIIa period on the other is significant enough to see insufficient archaeological finds, rather than rapid decrease in writing, as the reason for the hiatus. Nissen’s argument is not lacking in value: our archaeological record for the period remains selective and poorly understood, and it is highly plausible we have not excavated a statistically significant volume of the ancient record. Notwithstanding, as with any archaeological discussion, any argument made on the basis of negative evidence should be approached with caution. The lack of larger corpora of administrative texts and historical texts which could be securely identified as ED II in date encouraged researchers to populate the period with legendary personages known from later mythological compositions (Charvát 1982; Frayne 2009), such as Lugalbanda, Gilgameš, Enmerkar and Aga of Kiš. For the sake of this inquiry, ED I and ED II are treated as a single period, ED I/II, due to insufficient material and textual evidence to separate them. ED II should be understood as a transitional period between ED I and ED IIIa, or the final stage of ED I (Porada et al. 1992: 108; Pestle *in prep.*: 11). The problem of ED II is still unresolved (Canullo 2010; Marchetti and Marchesi 2011; Luciani 2015: 251).

If ED II can be seen as the first “dark age” in the history of Mesopotamian civilisation, the exact opposite is true for the following Early Dynastic III. Based on the stratigraphy of the WF Sounding at Nippur, ED IIIa can be defined by the prevalence of vessels such as conical bowls and tall “fruit stands” (**Figure 13**), often with notched or impressed rim (McMahon 2006: 67). As with the previous period, the architecture of the Early Dynastic temples display a considerable variety in layout (Crawford 2002: 48). Still, most temple complexes can be recognised by the presence of large walled

central courtyard. The actual temple buildings within are relatively small, recognisable by the presence of decorative niches, small rooms and cellae for the display of divine effigies, often equipped with altars and offering tables. Though the exact plans of many temple complexes are unknown due to incomplete archaeological documentation (e.g. in Ĝirsu) or destruction during construction works in later antiquity (e.g. in Ur), the sounding at Inana Temple in Nippur revealed a sprawling complex of multiple courtyards and buildings (Ławecka 2014: 210). The apparent “monumentalization” of certain sites can also be seen in the YW and YWN Soundings at Tell Ingharra, ancient Kiš, with the appearance of two large ziqqurats (monumental construction consisting of overlaid mud brick platforms), Monuments Z.1 and Z.2 (Zaina 2016). Another notable development in the Early Dynastic architecture is the appearance of the so-called “palaces”. Large monumental complexes, bearing many similarities to the temples but without any obvious evidence of cultic activities have been interpreted as royal residences (Margueron 1982). Most prominent early palaces include Palace A (Moorey 1970: 98) and the Plano-Convex Building (Matsumoto and Oguchi 2002, Matsumoto and Oguchi 2004) in Kiš, Level II Palace of Eridu (Safar, Mustafa, and Lloyd 1981; Leick 2001: 18), the Stampflehmgebäude in Uruk (Dittmann 2007: 57) and possibly House XVh in Fara (Martin 1988: 89). Monumentalisation and the appearance of palaces during the ED III has been seen as indicative of important changes taking place in the socio-political situation of ancient Sumer, usually understood as the rise of secular, military-oriented nobility gradually replacing the former temple administration as the main political power in a Mesopotamian city-state.

The most notable change from the previous periods, however, was the evolution of writing during the ED III times. Represented primarily by the text corpora of Fara (Deimel 192224; Pomponio and Visicato 1994) and Abu Salabikh (Biggs 1966, Biggs 1974; Postgate and Krebernik 2009), the characteristic tablets of the ED IIIa are often labelled as “Fara period” texts or “Fara-style” tablets, which should not be confused with “Fara-style seal designs”, which may have appeared earlier (Martin

1975: 180; Porada et al. 1992: 109). The Fara and Abu Salabikh texts display a number of important features which differentiate them from the ED I/II corpus of Ur. In terms of palaeography, the signs acquire a fully cuneiform look. Just like in the previous periods, the text is divided into cases, arranged into columns. The arrangement of signs within an individual case is not fixed (Biggs 1971: 194). While lexical and administrative documents prevail, ED IIIa prides itself on producing a new genre of written sources, which can be described as literary<sup>15</sup>. The most notable compositions come from Abu Salabikh and include the hymns in the honour of temples (Keš Temple Hymn) and deities (za<sub>3</sub>-mi<sub>2</sub> hymns) and wisdom literature (Instructions of Šuruppak). Though few and fragmentary, these texts use the cuneiform writing not only to spell out personal and common names but also, for the first time, to realise the phonetic and grammatical aspects of the Sumerian language<sup>16</sup>. Alongside these new texts, copies of lexical lists dating back to the Uruk period continued to be produced<sup>17</sup>. Comparative studies of the personal names from Fara administrative sources and the earlier Ur materials (Pomponio 1984; Visicato 1995) showed marked differences. Moreover, Semitic names become more prevalent in the Fara and Abu Salabikh texts, also among the names of scribes (Biggs 1974: 27). To summarise, the Fara-style texts are radically different from the Ur corpus in a number of ways. Three main theories can be put forward to account for these radical changes:

1. After a period of sporadic writing of the ED I texts, a major explosion of scribal and literary arts occurred during the ED IIIa.

<sup>15</sup>Some researchers argued that the literary tradition may go back to the proto-literate periods. A peculiar lexical text, most likely Uruk III in date, known as the Sumerian Word List C or “Tribute List” displayed some significant differences from other lists and was interpreted variously as the oldest example of literature (Englund 1998: 99; Civil 2013), a repository of secret knowledge (Westenholz 1998) or a quick reference sheet for the ancient scribes (Veldhuis 2006). See Wagensohn 2016 for the latest overview of the lexical tradition.

<sup>16</sup>IAS 256 (Instructions of Šuruppak): i 7) dumu- $\tilde{g}$ u<sub>10</sub> na ga-de<sub>5</sub> 8)  $\tilde{g}$ eš $\tilde{g}$ eštu<sup>tug2</sup> he<sub>2</sub>-a<sub>5</sub> (My son, let me give instructions / may you pay attention!) Note the logographic spelling of  $\tilde{g}$ eštu (ear, wisdom; here: attention) with the sign PI, accompanied by phonetic complements  $\tilde{G}$ EŠ (tree) and TUG<sub>2</sub> (cloth, garment), unambiguously proving that cuneiform signs were used to represent phonetic values independent of their logographic origins during the ED IIIa period.

<sup>17</sup>E.g. SF 75 = CDLI P010670. An ED IIIa copy of Standard Profession List from Fara

2. Writing was abandoned at the end of the ED I and re-appeared in a changed form.
3. There was a transitional phase between the Archaic and the Fara periods (“ED II”), for which archaeology failed to produce evidence due to the bias in preservation and excavation (Nissen 1988).

As has been mentioned before, it is extremely difficult to reconstruct the political structure of the Early Dynastic society. The model of a conglomerate of extended households focused around a central cultic complex and temple estates was perhaps still the dominant pattern, however the Fara texts point to the existence of power structures reaching beyond the confines of individual city-states. Intensive contacts among the southern cities dated back at least to the Jemdet Nasr period as attested by the city-seals; however a whole new level of regional cooperation comes to light when one studies the administrative archives of this period, perhaps most famously the so-called “*g̃uruš* lists”. The eponymous *g̃uruš*, usually translated as “young, able-bodied men” are mentioned in several texts occurring in groups, usually identified by profession<sup>18</sup>, sometimes by name<sup>19</sup>. Groups of *g̃uruš* of different professions, including *dubsar*, “scribes”, *saḡḡa*, “temple administrators” and a possible mention of an *ensi*<sub>2</sub>, “governor, ruler” of Uruk<sup>20</sup> are recorded to have received payment in barley and animal products. The two *g̃uruš* texts which have attracted much attention<sup>21</sup> document groups of young men from a number of significant southern cities (Ur, Adab, Lagaš, Šuruppak, Umma, Nippur and Badurun?). In both cases, the *g̃uruš* were stationed at a place called *ki-en-gi* - the name was used in later times as the Sumerian word for

<sup>18</sup>E.g.: OIP 99 490 = CDLI P010419: obv ii 2) 40 *g̃uruš* 3) 5 *ugula* 4) *simug*<sub>x</sub> (SIMUG<sub>x</sub>KASKAL) 5) 26 *g̃uruš*; rev i 1) 1 *ugula* 2) *bur-gul* 3) 13 *g̃uruš* 4) 4 *ugula* 5) *tug*<sub>2</sub>-*du*<sub>8</sub> (*40 young men / 5 overseers / smiths / 26 young men / 1 overseer / stone-cutters / 13 workers / 4 overseers / weavers? ...*)

<sup>19</sup>WF 98 = CDLI P011055: obv i 1) 2 *g̃uruš* 2) *an-nu-me* 3) 3 *bil*<sub>x</sub>(ĜEŠ.PAP.NE)-*kalam-du*<sub>10</sub> 4) 2 *ur*-*sud*<sub>3</sub> 5) 8 *nam-mah* (*2 [measures of flour] for the worker / Annume / 3 for Bilkalamdu / 2 for Ur-Sud / 8 for Nammah ...*)

<sup>20</sup>OIP 99 528 i' 1'-2'

<sup>21</sup>WF 92 = CDLI P011049; WF 94 = P011051

the geographical region of Sumer. Mentions of  $\tilde{g}uru\check{s} me_3$ , “young men of battle”<sup>22</sup> led Jacobsen (Jacobsen 1943) to postulate the existence of a Kiengi/Sumerian League - a military alliance against a common, unnamed enemy, with member states providing  $\tilde{g}uru\check{s}$  drafted militiamen (see Selz 2014 for an alternative interpretation). Though alternative names such as “Sumerian regio” (Steible 2015) or “Šuruppak Hexapolis (Pomponio and Visicato 1994) have been suggested for the organisation, the general premise of Jacobsen’s theory has been accepted by most researchers (for criticism, see e.g. Steinkeller 2002). Elam, the northern kingdom of Kiš, and Ur, the only major city not mentioned in Fara texts, have been quoted as likely candidates for the League’s main antagonist. It is, however, important to stress that this interpretation is far from certain. One text<sup>23</sup> seems to record the distribution of drinks for  $\tilde{g}uru\check{s}$  gathered for a cultic festival, while another<sup>24</sup> mentions some of the  $\tilde{g}uru\check{s}$  “escaping” like one would expect slave workers or war captives. Moreover, two texts from Abu Salabikh<sup>25</sup> seem to make the distinction between the  $\check{s}a_3 e_2-gal$ , “ $\tilde{g}uru\check{s}$  of the palace”, and  $\check{s}a_3 (e_2-)iri$ , “ $\tilde{g}uru\check{s}$  of the (house of the) city”, perhaps corroborating the hypothesis of new forms of power, focused around the palace and military-driven kingship, take over Southern Mesopotamia at this time. While the ED IIIa can definitely be seen as a period of significant changes in Mesopotamian society, the nature of these dynamics continue to elude us.

That said, it is important to note that the emergence of a centralised power focused around ruling dynasties must have been complete by the end of the ED IIIa period, as it is at this time that one sees the development of a new type of written source: royal inscriptions on object dedicated to deities. These short and laconic texts provide us with limited historical information, usually only supplying the name of the ruler

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<sup>22</sup>WF 95 = CDLI P011052; WF 101 = CDLI P011059

<sup>23</sup>FTP 74 = CDLI P222150

<sup>24</sup>WF 99 = CDLI P011056: rev i)  $gu_2-an-\check{s}e_3 20 la_2 1 \tilde{g}uru\check{s} ii) lu_2 zah_3$  (*A total of 20  $\tilde{g}uru\check{s}$ , 1 missing/escapees/scattered?*)

<sup>25</sup>TŠŠ 554 = CDLI P010852; TŠŠ 613 = P010863

(alternatively, that of his spouse<sup>26</sup>), his title and the name of deity. Nonetheless, these isolated glimpses into the history of ancient Mesopotamia may offer interesting insights into the political situation of the Southern alluvium. Arguably the most famous ED IIIa king, Mesilim of Kiš is mentioned in several such inscriptions together with rulers of other city states, appearing to have been their overlord<sup>27</sup> (see Steinkeller 2015a on the reading of the name). This would suggest that either some of the largest cities of the Sumerian world were under the political control of Kiš for some time during the ED IIIa, or that the ruler of Kiš played a prominent role in the Sumerian “League”. Mesilim is also mentioned in later ED IIIb texts as a mediator in the famous territorial conflict between Umma and Lagaš (Cooper 1983).

## 2.3 The Rise of Empires: Early Dynastic IIIb and Old Akkadian Periods (ca. 2500-2200 BC)

As was mentioned previously, the Early Dynastic III period is divided into two subphases, ED IIIa and ED IIIb. These are extremely hard to differentiate in terms of archaeological material. The analysis of ceramic assemblage at Nippur Western Mound showed that the transition between ED IIIa and IIIb levels was marked only by the appearance of a handful of variations of already common types (McMahon 2006: 70). Typically ED architectural features such as buttressed and niched walls, or plano-convex bricks laid in a herringbone-pattern continue to be prominent. By the time Mesopotamia enters Early Dynastic IIIb period, the archaeological record shows unambiguous evidence of monumental palatial architectural, exemplified by the Stampflehmgebäude in Uruk (Eichmann 1989: 61; Crawford 2004: 97). No ob-

<sup>26</sup>E.g. RIME 1.11.03.01 = CDLI P222751: 1) <sup>d</sup>inana 2) a-kalam 3) dam 4) abzu-ki-du<sub>10</sub> 5) ensi<sub>2</sub> 6) nibru<sup>ki</sup> 7) a mu-ru (*For the goddess Inana / Akalam / the wife of / Abzukidu / the governor of / Nippur / has dedicated [this]*)

<sup>27</sup>Mesilim’s macehead inscription (**Figure 14**): RIME 1.08.01.01 = CDLI P222741: 1) me-silim 2) lugal 3) kiš<sup>ki</sup> 4) e<sub>2</sub> du<sub>3</sub> <sup>d</sup>nin-ġir<sub>2</sub>-su 5) <sup>d</sup>nin-ġir<sub>2</sub>-su 6) mu-gub 7) lugal-ša<sub>3</sub>-daġal 8) ensi<sub>2</sub> 9) lagaš (*Mesilim / king of / Kiš / for the building of the house of Ninġirsu / for Ninġirsu / put [this statue] up / Lugalšadaġal / was the governor / of Lagaš*)

vious break with the previous traditions is visible either in the glyptic of the seals or wall inlays. Similarly, the format of cuneiform tablets and the sign forms of the ED IIIa texts are almost indistinguishable from those of the ED IIIb except for a single important development - the order of signs within individual cases becomes fixed, respecting the rules of Sumerian syntax and lexicon. What truly defines ED IIIb as a separate period is the proliferation of texts which can be dated to the reigns of individual kings. The previously timid attempts at creating royal inscriptions become notably more prevalent - long and elaborate texts such as the Stele of Vultures<sup>28</sup> and Reforms of Iriinimgina<sup>29</sup> represent a new tradition of official propaganda. Unlike the earlier ED IIIa, this new tradition sporadically recorded important events in the political history of Mesopotamia: battles<sup>30</sup>, conquests<sup>31</sup>, royal marriages<sup>32</sup> and alliances<sup>33</sup>. Previous compilations of the royal inscriptions (especially Frayne 2008 and Marchetti and Marchesi 2011) produced accounts biased towards dynasties of the two main political centres for which extensive royal records are available, Ur and Lagaš, with only occasional mentions of rulers of other polities such as Umma, Adab, Nippur or Kiš. Cases of unambiguous evidence for contemporaneity of rulers are very scarce, which prevents us from producing a comprehensive history. Administrative archives constitute the other crucial source of historical information for this period. Sallaberger and Schrakamp 2015 produced a detailed overview of adminis-

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<sup>28</sup>RIME 1.09.03.01 = CDLI P431075

<sup>29</sup>RIME 1.09.09.01 = CDLI P431154

<sup>30</sup>A fragment of the Stele of Vultures: RIME 1.09.03.01 = CDLI P431075 a xi 6') umma<sup>ki</sup> 7') GIN<sub>2</sub>.ŠE<sub>3</sub> [be<sub>2</sub>-se<sub>3</sub>] 8') du<sub>x</sub>(IŠ.DU<sub>6</sub>.KID)-bi<sub>2</sub> 20 9') bi<sub>2</sub>-dub 10') e<sub>2</sub>-an-na-tum<sub>2</sub> 11') er<sub>2</sub> du<sub>10</sub>-ga pa<sub>3</sub>-a (... of Umma / he defeated / their corpses into 20 funeral mounds / he piled up / Eanatum / cried with tears of joy)

<sup>31</sup>An inscribed stone vessel from Nippur: RIME 1.14.17.01 ex. 1 + ex. 5 = CDLI P222871 + P222874: 3') u<sub>4</sub> diğir-re-ne 4') e-na-ne<sub>2</sub>-eš<sub>2</sub>-[a] 5') kiš 6') mu-hul 7') en-bi<sub>2</sub>-eš<sub>18</sub>-[dar] 8') lugal kiš<sup>ki</sup> 9') mu-dab<sub>5</sub> (*When the gods / commanded him [Enšakušana] / Kiš / he destroyed / Enbi-Eštar / the king of Kiš / he captured*)

<sup>32</sup>A document from Ebla recording a betrothal gift between the families of Ebla and Kiš: Archi 1987: 138 no. 10: obv ix 1) in u<sub>4</sub> niğ<sub>2</sub>-mu-sa<sub>2</sub> bur-kak keš<sub>2</sub>-du-ut en kiš<sup>ki</sup> (*In the year of the betrothal gift from [the family of princess] Kešdut to the lord of Kiš*)

<sup>33</sup>Cone with the inscription of king Enmetena of Lagaš: RIME 1.09.05.03 = CDLI P222550: ii 4) u<sub>4</sub>-ba 5) ensi<sub>2</sub> en-me-te-na 6) lagaš<sup>ki</sup> 7) lugal-ki-DU<sub>3</sub>.ŠE<sub>3</sub>-du<sub>7</sub>-du<sub>7</sub> 8) ensi<sub>2</sub> 9) unu<sup>ki</sup>-bi 10) nam-ses he<sub>2</sub>-a<sub>5</sub> (*On that day Enmetena / the governor of Lagaš / with LugalkiDUŠEdudu / the governor / of Uruk / made brotherhood*)

trative sources relevant to chronological reconstructions, admitting however that the irregular time-keeping practices allowed them to do little more than determine the minimum duration estimates for a handful of rulers of only three Sumerian polities: the Lagaš State (composed of the cities of Lagaš, Ĝirsu and Nina), Umma and Adab. Their reconstruction is also occasionally hampered by excessive reliance on the SKL for the reign lengths (e.g. Sallaberger and Schrakamp 2015: 37). Though the details of the Early Dynastic history remain vague, by the end of the ED IIIb the majority if not all of Southern Mesopotamia came under the control of a single ruler, with the individual city-states being incorporated into a larger territorial polity. It is unclear as to which ruler was the first to accomplish this feat, but it is often assumed, based on the boastful titulary of their inscriptions, that it was either Enšakušana of Uruk<sup>34</sup> and Ur or Lugalzagesi of Umma<sup>35</sup> (Frayne 2008: 429; Sallaberger and Schrakamp 2015: 87; Marchesi 2015: 146 suggests that the conquest may have started with Urni of Uruk).

The end of the Early Dynastic period is marked by the rise of a new political power in the North, namely the empire of Sargon of Akkad. The birth and origins of king Sargon of Agade are shrouded in mystery as is his birth name (Akk. Šarrum-kēn lit. “The king is legitimate” being probably his coronation name, although see Frayne 1993: 7). His own inscriptions record him becoming the overlord of the Sumerian land having defeated Lugalzagesi, then bearing the title king of Uruk<sup>36</sup>. Through conquest,

<sup>34</sup>RIME 1.14.17.1 = CDLI P431228: 3) en-ša<sub>3</sub>-kuš<sub>2</sub>-an-na 4) en ki-en-gi 5) lugal kalam-ma (*Enšakušana / the lord of Sumer / king of the Land*)

<sup>35</sup>RIME 1.14.20.1 = CDLI P431232: 36) u<sub>4</sub> <sup>d</sup>en-lil<sub>2</sub> 37) lugal kur-kur-ra-ke<sub>4</sub> 38) lugal-za<sub>3</sub>-ge-si 39) nam-lugal 40) kalam-ma 41) e-na-šum<sub>2</sub>-ma-a 42) igi kalam-ma-ke<sub>4</sub> 43) si e-na-sa<sub>2</sub>-a 44) kur-kur ĝiri<sub>3</sub>-na 45) e-ni-se<sub>3</sub>-ga-a 46) utu-e<sub>3</sub>-ta 47) utu-šu<sub>2</sub>-še<sub>3</sub> 48) gu<sub>2</sub> e-na-gar-ra-a () 67) para<sub>10</sub>-para<sub>10</sub> ki-en-gi 68) ensi<sub>2</sub> kur-kur-ra 69) ki unu<sup>ki</sup>-ge 70) me nam-nun-še<sub>3</sub> 71) mu-na-tar-e-ne (*On the day when Enlil / the lord of all the lands / to Lugalzagesi / the kingship / of the land / gave to him / when the eyes of the land / he directed onto him / when he had set all the lands before him / from the East / to the South / when they submitted to him / ... / all the diases of Sumer / and the lords of all the lands / for the land of Uruk / the divine power of princeliness / they destined for him*)

<sup>36</sup>RIME 2.1.1.1 = CDLI P461926: 23) lugal-za<sub>3</sub>-ge-si 24) lugal 25) unu<sup>ki</sup> 26) in me<sub>x</sub>(REC169) 27) šu-du<sub>8</sub>-a 28) in si-gar-rim<sub>3</sub> 29) a-na ka<sub>2</sub> 30) <sup>d</sup>en-lil<sub>2</sub> 31) u-ru-us<sub>2</sub> (*Lugalzagesi / the king / of Uruk / in a battle / having captured / in wooden clamps / to the gate / of Enlil / he led him*)

Sargon established a domain stretching from Mari in Syria to Susa in the East. Sargon’s descendants, especially his son Rīmuš and grandson Narām-Sîn, continued to expand eastwards. Nonetheless, Sargon’s impact on Mesopotamian history and culture was perhaps more significant than his military exploits. Most importantly, it was under the rule of the Sargonid dynasty that the Semitic Akkadian, the predecessor of later Babylonian and Assyrian languages, is adopted as the primary language of the administrative texts (Gelb 1961). Though Sumerian continued to be used in literary compositions, religious texts and royal inscriptions, Akkadian words and sentences start to appear in the royal inscriptions during the reign of Sargon<sup>37</sup>. Being the first to lay the groundwork for the later traditions of imperial state building, Sargon secured a place for himself in the literary and cultural memory of the future civilisations in Mesopotamian and beyond. The later romanticised biographies describe him as a child of fate, borne by a priestess in hiding, set in a basket on the river to be rescued and raised by a lowly water-carrier (Westenholz 1997: 33-49). Through the intercession of goddess Inana/Ištar, the orphan gardener then became the cup-bearer of king Ur-Zababa of Kiš only to usurp the rulership for himself and ultimately end his life as the conqueror of the known world (Westenholz 1997: 51-55; ETCSL 2.1.4). Though fascinating, there are no contemporary sources to prove the historicity of such stories. Although the impact of Sargon and his dynasty on Ancient Mesopotamia is impossible to overstate, it remains difficult to identify the ED-Akkadian transition in the archaeological context. The presence of Akkadian cuneiform texts seems to be the only reliable indicator. As far as pottery is concerned, apart from a few new introductions (e.g. the buff-coloured conical bowls), the ceramic material remains unchanged (Almamori 2014: 156). Therefore, archaeologists speak mostly of “Late ED IIIb/Early Akkadian” levels at sites such as the Nippur Area WF (McMahon 2006) or Kiš Cemetery A (Pestle *in press*: 8). The monumental architecture does not differ significantly from the previous periods (Matsumoto and Oguchi 2002: 6

<sup>37</sup>RIME 2.1.1.6 = CDLI P461931: 26) nibru<sup>ki</sup> 27) *a-na* 28) <sup>d</sup>en-lil<sub>2</sub> 29) *u-li-il* 30) *sar-ru*-GIN 31) lugal 32) kalam-ma<sup>ki</sup> 33) *š*u <sup>d</sup>en-lil<sub>2</sub> 34) *ma-hi-ra* 35) *la i-di<sub>3</sub>-nu-sum<sub>6</sub>* (Nippur / for / Enlil / he did purify / Sargon / king / of the land / to whom Enlil / an equal / did not give to him)

on Plano-Convex Building in Kiš). The glyptics of cylinder seals can offer only a limited source of chronological information; however (Zajdowski 2014 argued that a gradual change from banquet scenes (**Figure 15**) to presentation scenes (**Figure 16**) occurs during the early Akkadian period. Several authors tried to look for Sargon's military campaigns in destruction levels visible at several important sites known to have been incorporated into the Akkadian empire, most notably Ebla (Gelb 1981: 58; Sallaberger and Schrakamp 2015: 100) and Kiš (Zaina 2016). Even though the fall of Lugalzagesi, the last Early Dynastic Sumerian king of Mesopotamia, offers a clear cut-off point for the chronological analysis, the ambiguity of the ED/Akkadian transition needs to be taken into account.

# Chapter 3

## Methodology

### 3.1 Methodology Outline

#### 3.1.1 Site Selection

Each radiocarbon date used in this analysis was described in terms of its archaeological context, defined in terms of association with diagnostic material and stratigraphic relationships. The first step was to define the geographical and temporal scope of this study. This analysis distinguished four levels of archaeological inquiry: context → sounding → site → region. This gradual progression from the most clearly defined archaeological contexts and sequences to the less precise regional comparisons is in line with the ARCANE project philosophy<sup>38</sup>. This study attempts to limit subjective bias stemming from typological determinations to bare minimum; therefore wherever the contexts were placed within their archaeologically defined periods (“Uruk”, “Early Dynastic”, “Middle Banesh”), these categories were as broad and conservative as possible, defined using a single distinctive archaeological or textual feature, such as the examples described in **Chapter 2**. For the same reason, archaeological soundings at the same site were considered independently. While the position within a stratigraphy is a fairly good basis for the establishment of chronological sequences (barring holdovers and context disturbance), linking two stratigraphic soundings often requires typological inference. Large and important sites with complex stratigraphic situations

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<sup>38</sup>“Archaeological sequences need to be site-specific first and only subsequently be extended to the immediate region before being compared to other sequences.”(Luciani 2015: 251)

were described in detail in **Chapter 4**, **Chapter 5**, and **Chapter 6**. Sites which yielded smaller numbers of radiocarbon dates or had their radiocarbon chronologies well established in previous studies received only brief descriptions in **Section 4.7**, **Section 5.5**, and **Section 6.7**. The sites were selected according to the following criteria:

- A) **Location** The region of Southern Mesopotamia is the main focus of this study, and so the analysis focused on sites from this region. The Syrian Jezirah (specifically the Khabur River Valley), and Iran divided into several subregions (Susiana Plain, Zagros, Fars, Isfahan, Kerman) were chosen for the purpose of comparison.
- B) **Relevance** The sites used in this analysis were chosen according to the presence of contexts and sequences containing archaeological and textual material which could be related to the large-scale regional cultural complexes of the 4<sup>th</sup> and 3<sup>rd</sup> mill. BC. The Late Uruk and Akkadian periods (inclusively), as defined by the Southern Mesopotamian material, are taken as the start and end boundaries of the analysis. Older and younger contexts were considered whenever they could provide relevant *termini post* and *ante quem*. Methodological considerations and interregional cultural features relevant to the chronological analysis which were not limited to a single site were described in **Section 4.1**, **Section 4.3**, **Section 5.1** and **Section 6.1**
- C) **<sup>14</sup>C Availability** Since the research philosophy of this study is to limit the use of prior archaeological knowledge only to the most uncontroversial assumptions, and to allow the <sup>14</sup>C dates to “speak for themselves”, only sites which produced radiocarbon dates and samples from relevant contexts were studied in more detail.

Access to samples, preservation, and the high cost of  $^{14}\text{C}$  dates were the main limiting factors of the radiocarbon aspect of this study. In the end, procuring new datable material focused on four archaeological sites:

**Abu Salabikh** The Southern Mesopotamian site of Abu Salabikh lent itself to closer radiocarbon analysis due to large amounts of short-lived botanical material which have been recovered from the site by Dr M.P. Charles at the time of the excavation. 12 batches were sampled for dating out of the total 61 batches available. Though often brittle and delicate, cereals recovered from dozens of well-defined archaeological contexts provided the possibility of constructing an archaeological sequence spanning Middle Uruk to ED IIIb.

**Tell Brak** Similarly to Abu Salabikh, the excavations at the Syrian site of Tell Brak yielded large amounts of short-lived plant materials originally used for palaeobotanical analyses (Charles and Bogaard 2001). Out of the total 16 batches coming from chronologically-relevant contexts, 9 samples were chosen for the study. Though the site has been dated in the past, many of the old measurements were affected by laboratory contamination, leaving some important events in the site's history poorly dated.

**Ur** Originally, this work aimed to establish an internal chronology of the Royal Cemetery due to its importance for the 3<sup>rd</sup> mill. BC Mesopotamia. This, however, turned out to be impossible due to the small number of available samples. Human bones were extremely poorly preserved, and only 4 datable animal osteological and botanical samples was identified as viable. Out of those, only 2 turned out to be sufficiently well preserved. Though there exists a handful of short-lived plant samples from the grave offerings, these were inaccessible to this study. The total number of potential samples suitable for dating is impossible to pinpoint given that most of the original finds from Sir L. Woolley's excavations have not been fully catalogued. A preliminary inspection puts the number in the range between 10 and 20.

**Fara** 5 out of 10 bone tools catalogued in the Penn Museum records, coming from the archaic graves at Fara were identified as having the potential to provide a *terminus post quem* for the ED IIIa contexts. Unfortunately, only one tool contained sufficient collagen to allow  $^{14}\text{C}$  dating.

**Kiš** The Y sounding at Kiš was originally meant to provide an ED I-III sequence of samples from bone tools, aided by human bone samples derived from the graves. Poor collagen results of these samples in previous studies (Zaina 2015, Pestle, *pres. comm.*) forced this line of inquiry to be abandoned.

### 3.1.2 Date and Sample Selection

Once a site had been selected, all available radiocarbon dates from said site available in the literature were collected and analysed individually in order to determine their reliability. In the same manner, available datable material was selected according to its preservation and the relevance of its archaeological context. For more details on the sampling and pretreatment process, see **Section 3.2**. The dates and their contexts were described in **Chapter 4**, **Chapter 5**, and **Chapter 6**. All of the dates collected during this research project have been assembled in **Appendices**. The purpose of this very detailed description of individual samples (similar methodology adopted in e.g. Ess 2015) is to ensure that the reasons for including or excluding a date in the model are fully transparent. The concern for affecting the model by selective sampling is particularly pertinent where dates are few. The criteria used to discriminate among dates were as follows:

- A) **Technical Considerations** Although there are multiple techniques for pre-treating samples and measuring carbon isotope ratios employed by laboratories around the world, there is a bare minimum of technical capability a laboratory has to meet in order for the date to be considered reliable. This includes standard pretreatment (usually including acid and alkali pretreatment processes)

and correcting for isotope fractionation whenever accelerator mass spectrometry is involved (Stuiver and Polach 1977; Long 1990; Bronk Ramsey, Higham, and Leach 2004; Millard 2014). Whenever there were doubts regarding the purity of the material, the measurement method, or the final precision of the date, it was flagged as an outlier and removed from the analysis.

B) **Context** Most importantly, the samples were evaluated on their archaeological context. Preferably, the sample had to be clearly associated with an archaeological assemblage or an architectural feature which could be linked to a broader cultural context. The main consideration at this stage was to avoid samples assigned *post factum*, i.e. assumed to have represented a particular archaeological period due to their absolute age, thus resulting in circular reasoning. Dates from contexts containing no datable material could still be informative due to their place in the stratigraphic sequence.

C) **Consistency** There are numerous factors which can affect the final date of a radiocarbon sample. Undetected contamination, context misassociation, human error, machine malfunction, AMS measurement errors - the list can be extended indefinitely. The messy nature of archaeological sites and the archaeological process, combined with the high precision required for  $^{14}\text{C}$  measurements means that any sample can produce an erroneous date for no obviously explicable reason. Bronk Ramsey 2009b estimates this chance to be around 1 in 20. For this reason, every large-scale radiocarbon analysis faces the same dilemma: exclude any and all samples which produced unexpected results, often leaving insufficient material for any meaningful analysis, or conversely, adopt a more statistical approach, gradually excluding the dates which do not conform with the remainder of the sequence. This study followed the latter methodology. The main danger of this approach is a risk of skewing the model towards one's expectations.

### 3.1.3 Bayesian Modelling

The chronological sequences based on stratigraphies and typologies described in **Section 3.1.1** were used to construct Bayesian models. Hence, the dates selected in **Section 3.1.2** were inserted into said models. The purpose of this exercise was twofold. Firstly, it serves to reduce the uncertainties of individual radiocarbon dates using the available archaeological and textual resources. Secondly, a single model composed of multiple dates, rather than inspecting individual radiocarbon dates, allows for the calculation of parameters which are useful for archaeological and historical discussions, such as timespans of individual phases, their durations, the points of transition from one era to another etc. More importantly, it calculates dates for events (e.g. transitions between phases) for which we do not have any directly dated samples. The modelling process followed the context  $\rightarrow$  sounding  $\rightarrow$  site  $\rightarrow$  region progression:

- A) **Context** Dates coming from the same or related contexts believed to have been more or less contemporary were placed in the same phase. No relative ordering was assumed for samples sharing the same phase.
- B) **Sounding** These phases were then arranged consecutively into sequences as recorded in the stratigraphies of individual soundings.
- C) **Site** Whenever multiple soundings were available for a single site, these were compared. If the agreement between the absolute dates of these soundings was good enough to corroborate the archaeological dating, they were combined to create a master sequence for the site.
- D) **Region** Regions, or collections of sites grouped due to similarities in their material culture, were the highest order of comparative unit. The master sequences of individual sites were compared within each region. Again, if the sequences were sufficiently consistent, they were combined into a regional periodisation scheme which provided approximate time estimates for the area as a whole.

Such a progression allowed for the identification and discussion of problems with the archaeological datings of individual contexts and cross-regional comparisons wherever they arose. Once these sequences of different orders were constructed, further investigations became possible. Durations of periods were compared to gain an insight into the cultural dynamics of ancient Mesopotamia. Whenever the results were uncertain, the problems addressed using simulations and multiple exploratory models reflecting alternative interpretations. For details on the methods used in Bayesian modelling of the dates, see **Section 3.3**.

## 3.2 Radiocarbon Dating

### 3.2.1 Sample material

The main concern when selecting material for  $^{14}\text{C}$  dating is the “inbuilt age”, i.e. the phenomenon of a particular fraction of the sample having an older radiocarbon date than the organism itself. The problem stems from the fact that certain tissues (e.g. hair, nails, horns, shells, wood rings, bone) cease or decelerate the process of carbon exchange while the organism continues to thrive. Technically, every sample is affected by the inbuilt age problem, but it only becomes visible when dealing with organisms that live over hundreds of years, or if they can be used over a long period of time before being deposited in an archaeological context (Waterbolk 1971: 16; Waterbolk 1983: 58-59).

Whenever possible, short-lived plant samples were selected for dating. This mostly included cereal seeds and charred fruit. These materials are unaffected by inbuilt age, and are likely to be deposited in their contexts at the time of processing, consumption, or, in the case of grave offerings, interment. Therefore, barring context disturbance and contamination, short-lived plant material is the best source of  $^{14}\text{C}$  dates. Most of the samples dated during this project were barley<sup>39</sup> (*Hordeum* sp.) and wheat<sup>40</sup>

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<sup>39</sup>Sum. še, Akk. še'um

<sup>40</sup>Sum. ziz<sub>2</sub>, Akk. kiššātum

(*Triticum* sp.) seeds, cereals staple of the 4<sup>th</sup> and 3<sup>rd</sup> mill BC Mesopotamia. Additional samples included pulse seeds<sup>41</sup> (*Lens* sp.), charred pomegranate<sup>42</sup> (*Punica* sp.), and date pits<sup>43</sup> (*Phoenix* sp.). While being the optimal material for dating, the dating of short-lived plant fossils is not free from problems. First of all, their small size facilitates them moving within the stratigraphy and lead to context misassociation. What is more, they are rarely deposited *in situ* deliberately, so the association with the context is never straightforward. Since the samples are collected through flotation, much of the original microstratigraphic information is lost. Finally, individual seeds are often too small to allow for dating, necessitating the dating of bulk samples which introduces further uncertainty (Bayliss 2015: 688). Therefore, whenever possible and relevant, multiple readings should be performed on different subsamples of material from the same context in order to ensure that the readings are representative.

Unfortunately, botanical samples are available only for a handful of sites, since flotation and palaeobotanical analysis have been included in the standard archaeological procedure long after the excavations at many important sites. Therefore, some bone objects and animal teeth have been sampled. The standard practice with such samples is to extract the organic fraction (collagen) as the least affected by post-depositional changes in the <sup>14</sup>C fraction (Klinken 1999). It is well known, however, that collagen preservation in bone and tooth samples from Mesopotamia is very poor, with an average rate of 1 out of 9-11 samples having collagen yields sufficient for AMS dating (Zaina 2015; Pestle, *pers. comm.*). Thus, alternative approaches to bone and tooth dating have been adopted (see below).

The radiocarbon dating of wood, charcoal and ash samples is also problematic, given that more often than not it is not possible to securely identify the species of the sample. Though short-lived plants, especially reed<sup>44</sup>, had many everyday uses

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<sup>41</sup>Sum. gu<sub>2</sub>, Akk. *kakkûm*

<sup>42</sup>Sum. nu-ur<sub>2</sub>-ma, Akk. *nurmû*

<sup>43</sup>Sum. zu<sub>2</sub>-lum, Akk. *suluppum*

<sup>44</sup>Sum. gi; Akk. *qanûm*

in ancient Mesopotamia, one can expect long-lived wood species such as poplars<sup>45</sup> (*Populus* sp.), boxwood<sup>46</sup> (*Buxus* sp.), tamarisk<sup>47</sup> (*Tamarix* sp.) or date palm<sup>48</sup> being used in elite and ceremonial contexts. Lebanese cedar<sup>49</sup> (*Cedrus libani*) was a particularly highly-valued material, used in the construction of temples and palaces as attested in the literature. This increases the chance of the materials being recycled over centuries, exacerbating the inbuilt age problem. One therefore has to assume that the wood and charcoal samples are affected by old wood effect possibly greater than 100 years.

### 3.2.2 Pre-treatment Methods

A number of different chemical pretreatment methods were applied to the samples prior to AMS dating in order to remove contamination and extract the desired fraction (Waterbolk 1971: 19; Waterbolk 1983: 61). The choice of the pretreatment method depended on the type of the material as well as its preservation and suspected contamination. All of the bone, tooth, and wood samples came from museum collections, where they have most likely been treated with preservatives. Sadly, there are no records of the types of preservatives used. Every sample was carefully inspected and, wherever possible, signs of preservatives and glues were removed manually using a scalpel and an air-abrader. In order to purify the sample further of absorbed preservatives, a solvent wash protocol was applied. The protocol consisted of washes in distol-grade methanol and acetone, 30min at 40°C each, followed by a chloroform wash overnight at room temperature (RT) (Dee et al. 2011). This process was repeated wherever the contaminants were still visible on the surface of the sample. The sample was then thoroughly dried to extract the volatile solvents - a step which was crucial due to the fact that most of the solvents themselves contained carbon. Al-

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<sup>45</sup>Sum. *ildag*; Akk. *adārum*, *ildakkum*

<sup>46</sup>Sum. *taškarin*; Akk. *taskarinnum*

<sup>47</sup>Sum. *šinig*; Akk. *bīnum*

<sup>48</sup>Sum. *gešnimbar*; Akk. *gišimmarum*

<sup>49</sup>Sum. *eren*; Akk. *erēnum*

though charred seed samples were unlikely to have undergone a preservation process, they were treated the same way to ensure comparable results.

Most protocols included the standard (see Brock, Bronk Ramsey, and Higham 2007 and Brock et al. 2010 for details) acid-alkali-acid treatment (also known as acid-base-acid or ABA): 20min in 1M HCl at 80°C; 10min in 0.2M NaOH at 80°C; 30min in 1M HCl at 80°C. Between each step, the sample was rinsed three times with ultrapure water. The sample was then freeze-dried and combusted using Elemental Analyser Mass Spectrometer (EA-MS). CO<sub>2</sub> was collected and graphitised for 6h at 520°C using an Fe catalyst. Finally, the graphite was pressed into targets which were then loaded into the ORAU AMS (Bronk Ramsey, Higham, and Leach 2004).

**Short-lived plant material (Lab. code: ZR\*)** This protocol involved only the standard ABA pretreatment and combustion detailed above.

**Wood samples (Lab. code: UW\*)** The protocol involved the standard ABA treatment. Due to the fragile nature of the samples, each of the steps was followed by centrifuging (5min at 2150 rpm) to maximise the yield. The samples were then treated with a 5% NaO<sub>2</sub>Cl solution, pH 3 at 80 °C for 20min. The main purpose of the oxidant phase is to remove all the remaining organic compounds except the cellulose which had to be part of the original wood sample.

**Fragile wood samples (Lab. code: RR\*)** Initial attempts to date the wood samples using the standard (UW\*) protocol failed due to poor preservation. The samples were brittle and delicate, and did not survive the alkali phase. Therefore, an alternative, less harsh method of humic acid extraction was applied. Following the solvent wash, 1M HCl was applied for 1h at RT, followed by centrifuging (5min at 2150 rpm). A fresh solution of 1M HCl was then applied and the sample was ultrasonicated for 15min at RT and rinsed four times with ultrapure water. It then underwent seven rounds of ultrasonication (5min). Hence, 1M HCl was used to ultrasonicate the

sample for an additional 5min. The pretreatment was concluded by two final rinses in ultrapure water. Despite being thorough and time-consuming, this technique is likely to be less effective than the standard alkali treatment, and there is a possibility of the resultant dates to be affected by an offset due to the potential presence of exogenous humic acids. Conversely, previous studies on the dating of humic acids from Bronze and Iron Age Eastern Mediterranean sites (Wild et al. 2013) showed that most of the humic acids extracted from botanical samples probably originated from the samples themselves, and thus the offset, if it exists, should not be significant. Therefore, the choice of the RR\* pretreatment should not negatively affect the readings.

**Bone and tooth collagen (Lab. code: AG\*)** Mortar-crushed bone samples were subject to standard solvent and ABA washes. For tooth samples, dentine was extracted by precision drilling at low speeds to prevent collagen burning. Following the ABA phase, the dissolved collagen was gelatinised for 20h in pH 3 water at 70°C. Standard bone/tooth pretreatment protocol at the ORAU involves an ultrafiltration step following the gelatinisation (Higham, Jacobsen, and Bronk Ramsey 2006; Brock, Bronk Ramsey, and Higham 2007; Brock et al. 2010). Nonetheless, this step was omitted for the bone and dentine samples in this project for two reasons. Firstly, ultrafiltration reduces the collagen yield of a sample, which would prove highly problematic for the already poorly preserved Mesopotamian samples. Secondly, it has been experimentally demonstrated (Talamo and Richards 2011; Fülöp et al. 2013) that ultrafiltration has little to no effect on Holocene samples (younger than ca. 10kya). The sample was then freeze-dried and passed on to the EA-MS for combustion.

**Tooth enamel apatite (Lab. code: NRC\*)** Poor preservation of collagen in bone and tooth samples necessitated an alternative approach. Earlier attempts to date the mineral fraction of bone and tooth (Cherkinsky 2009; Zazzo and Saliège 2011; Zazzo 2014) showed that there is visible difference between dates performed on bioapatite and collagen from the same organism. The likely explanation for this

difference is the fact that mineral fractions are known to exchange carbon with the environment post-deposition, unlike collagen which simply degrades and decomposes. Unfortunately, the difference is by no means systematic and can result in the apatite dates being either younger or older by anywhere between 0 and 300 years for Holocene samples, depending on the type of the environment, water percolation and pre-treatment method used. For these reasons, bioapatite dates are seen as less reliable than their collagen counterparts. ORAU protocols do not include a standard methodology for bioapatite samples. For the purpose of this study, the chemical pretreatment method developed by Hopkins, Snoeck, and Higham 2016 was adopted. The study compared several pretreatment methods and identified one which produced dates which, while still consistently younger, were the closest to those performed on the collagen fraction. Therefore, these apatite dates can be considered either as correct or as *termini ante quem*. The method involved the sample being treated with 0.05M HCl for 2h at 4°C. The sample was then rinsed in ultrapure water three times. Each step was followed by centrifuging (5min at 2150 rpm).

### 3.3 Bayesian Modelling

#### 3.3.1 Phases, Sequences and Boundaries

Calibration and Bayesian modelling was performed using the OxCal v 4.2 software. The software uses the Chronological Query Language (CQL) to express prior beliefs about chronological relationships among radiocarbon dates. One of the most basic and most commonly used types of modelling is the construction of sequences (Bronk Ramsey 2009a, Bronk Ramsey and Lee 2013). Radiocarbon dates are input using the *R\_ Date()* function, and multiple measurements on the same sample were combined with the *R\_ Combine()* command. Radiocarbon dates performed on samples sharing the same context, layer, or believed to be contemporary for other reasons were assigned to the same *Phase()*, which does not presuppose any internal order. These phases were then used to construct sequences (the *Sequence()* function), which intro-

duce a prior assumption of successive order of the phases, but not of the dates within those phases. A *Boundary()* function was introduced between two consecutive phases to estimate the date of the transition. In other words, the end of one phase is seen as equivalent to the start of the next one (also known as contiguous ordering). Bronk Ramsey and Lee 2012 suggested that archaeological periods should be modelled using “trapezoidal boundaries”, which assume a gradual transition from one culture to the next. Given that in this work, the start of a phase is defined as the first appearance of a particular diagnostic type of material or textual culture, the standard *Boundary()* function, which assumes an abrupt transition, is more suitable. Also, the use of “trapezoidal boundaries” would introduce a large number of complex and multilayered queries into a system with relatively few readings, risking overparametrisation. Some soundings were interrupted by a hiatus in occupation, or by a phase for which we possess no radiocarbon dates. In such cases, an empty *Phase()* was inserted to simulate an expected break in the sequence.

### 3.3.2 Averaging Results

When discussing larger sets of data, there arises a need to average the results so that they become more manageable without losing too much information regarding the associated uncertainties. This problem is by no means trivial (Waterbolk 1971: 20-28; Waterbolk 1983: 63-69), and there are three principal approaches one may adopt:

*Boundary()* The beginning and end *Boundary()* functions described above can serve as a good representation of the sequence as a whole (Dee and Bronk Ramsey 2014). The greatest strength of this approach is that it highlights the nature of transition from one phase to the next (abrupt, gradual), and helps to identify any potential hiatuses. On the other hand, it may be confusing to the interpreter as the one thing of interest, namely the date and span of archaeological period itself, is the negative space between its start and end boundaries.

*Sum()* As the name suggests, this function sums all the probability density functions within a bounded phase. As such, *Sum()* is therefore more representative of the phase as represented by its radiocarbon dates. Its utility decreases dramatically, however, as less dates are available for a phase, as is often the case in this case study. Whenever an archaeological phase is presumed but has no radiocarbon dates assigned to it, or if it is represented by 1-3 dates only, *Sum()* loses its purpose entirely.

*Date()* Inserting an empty *Date()* function into a phase highlights the entire probability range between the start and end boundaries of this phase. As such, it represents the most inclusive and representative visualisation of a chronological phase. Nonetheless, it loses a lot of valuable information regarding the probability distribution of the individual radiocarbon dates. Moreover, it may be difficult to distinguish between the length of duration of a phase on the one hand, and the uncertainty of the readings on the other.

As explained above, these approaches all have their strengths and limitations. They can, however, complement one another. Therefore, the results will report all of these wherever possible and relevant.

### **3.3.3 Determining Duration**

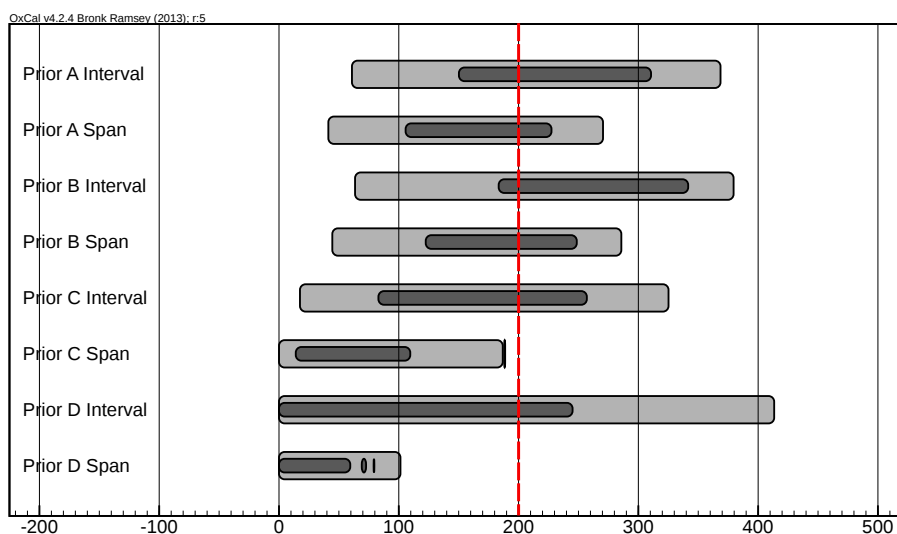
This research is also interested in the duration of individual periods. OxCal offers two alternative approaches to estimating how long a chronological phase lasted:

*Span()*: estimates the duration based on the range covered by the individual radiocarbon dates placed within the phase.

*Interval()*: estimates the duration by calculating the difference between the start and end boundaries of the phase.

In order to test which one of these functions is more applicable to this study, a series of simulations was run, modelling a short sequence of three consecutive phases, each spanning 200 years. Four different scenarios were modelled:

- A Each phase containing 6 dates, evenly spaced over the 200 years.
- B Each phase containing 6 dates, dates of the middle phase cluster towards the beginning of the phase.
- C The middle phase contained only 3 dates, spaced evenly over the 200 years.
- D The middle phase contained only 3 dates, clustering towards the beginning of the phase.



Graph 1: Results of the simulation process of 3 consecutive phases and determining the duration of each phase using the *Interval()* and *Span()* function. The correct duration (200 years) is marked with a red dotted line.

The *Span()* and *Interval()* parameters for the middle phase are shown in **Graph 1**. As visible, the *Span()* function tends to underestimate the duration of the phase, and the opposite is true for *Interval()*. Unsurprisingly, a comparison between A,B on one

side and C,D on the other shows that the *Span()* parameter is more easily affected by reducing the amount of radiocarbon dates used in the analysis. Unfortunately, for reasons described in **Chapter 1**, one cannot hope that the available database used in this study forms an exhaustive and representative sample of the ancient chronology. Therefore, *Interval()* appears to be the more conservative and cautious way of estimating the duration of successive archaeological phases.

### 3.3.4 Dealing with Outliers

In addition to radiocarbon dates produced using the protocols described above, the database for this project was assembled using dates available in the literature. Each radiocarbon date is discussed in terms of its archaeological context (see **Chapter 4**, **Chapter 5**, and **Chapter 6**). The archaeological context being underdefined or disturbed was grounds for removing the date from the analysis. Unfortunately, the quality of the context could not always be reconstructed, and it is entirely possible that samples from well-sealed contexts can produce aberrant dates due to re-use of artifacts, contamination or unobserved context disturbance. Therefore, the models constructed for the purpose of this analysis use the OxCal *Outlier\_Model()* function (Bronk Ramsey 2009b). This function estimates the coherence of every individual radiocarbon date with the remainder of the datapoints. Dates which do not fit well within the model, and are thus more likely to be outliers, are gradually downweighed. The number of dates with high outlier probabilities can therefore be considered a robust way of assessing the agreement between the dates and the model.

### 3.3.5 Modelling the Royal Cemetery of Ur

The radiocarbon dates from the Royal Cemetery of Ur are a special case. The original intention of the research project was to construct a sequence based on the stratigraphic relationships among the individual burials and thus establish an internal chronology of the site. Unfortunately, it was not possible to secure a substantial number of well-stratified short-lived samples from relevant burials (See **Section 4.5**). Instead, the

project assumes that the burials of the occupants of all of the dated graves occurred at roughly the same time. The radiocarbon dates performed on the bones of these individuals were presumed to have represented an accurate, if a rather imprecise estimate of the Cemetery's age. Two new samples of old wood (P40,008 and P40,011) associated with the burials were treated as *terminus post quem*. One sample of enamel apatite (P40,009) was dated using the NRC protocol described above. Due to the small number of available dates and the fact that the old wood samples were modelled as *termini* rather than actual dates, no *Outlier Model()* was used.

# Chapter 4

## Southern Mesopotamia

### 4.1 Excursus - Mesopotamian Archives

While many cuneiform tablets are isolated finds, large collections of excavated texts, referred to as archives, constitute the most scholarly important part of the corpus. At this point it is important to discuss in greater detail the concept of an ancient “archive”. The problem was already highlighted by Veenhof 1986 (p. 7), who argued that the traditional definition of an archive as “*the total of records accumulated during the time a particular task was performed by an institution or person (...) and still present with those who made them out or used them*” does not adequately reflect the nature of ancient Mesopotamian text corpora. First of all, the ancient archives contain texts other than administrative records (Veenhof 1986: 4). Palatial archives also included copies of epigraphic material as well as royal praise poetry. Temple archives stored their administrative records together with liturgical texts and prayers. Private scribal schools possessed copies of literary texts and exercise tablets. Another problem is that of purpose. If the primary goal of keeping and maintaining archives was future reference, then it is important to keep in mind that most of the 3<sup>rd</sup> mill. BC archives were found in discard contexts, and so were clearly not safeguarded for posterity. Furthermore, one has to consider the temporal dimension of the archives. An archive in the classical sense is meant to record an activity over a long period of time. There is, however, evidence that in many cases the Mesopotamian archives recorded only brief periods of activity prior to being discarded. What follows is that

despite the large volumes of cuneiform texts from 3<sup>rd</sup> mill. BC contexts, one cannot say we possess a full record of the development of writing during this formative period. Eventually, as pointed out by Veenhof 1986 (p. 9), it is often difficult to differentiate between private and institutional archives. The ED IIIa Fara archive, described below, is a good case study demonstrating many of these problems.

## 4.2 Fara/Šuruppak

The tell at modern day Fara was first excavated in 1902-3 by a German expedition under the direction of R. Koldewey and F. Delitzsch. It was later re-visited by an American excavation team led by E. Schmidt. These early excavations produced a large body of Early Dynastic cuneiform tablets and sealings which allowed us to identify Tell Fara as the ancient city of Šuruppak<sup>50</sup>, a place of great cultural and religious importance. H. P. Martin, who conducted a brief survey of the site in 1973, dedicated much of her career to re-assessing the site's archaeology, reconstructing the site's stratigraphies from the scattered and sometimes incomplete records. The site was probably first occupied during the Jemdet Nasr period, as attested by the large numbers of characteristic painted pots and sherd in Level 7 of the DE 38/39 sounding (Martin 1983: 26; Martin 1988: 20). The domestic contexts of the Jemdet Nasr were destroyed by fire and sealed by a layer of clean deposit which were interpreted as evidence for the site's abandonment. Although, in keeping with the tradition of the Near Eastern archaeology, the layer was nicknamed "the flood level", Martin 1988 (p. 22) noted that the stratum was not perfectly sterile, suggesting some small-scale residual occupation, and that the level may have well been created from aeolian deposits. In the two deep soundings, DE 38/39 and FG 42/43, the next five levels of occupation were attributed to the initial phases of the Early Dynastic period, i.e. ED I/II. Though the architecture of Levels 1-5 was less clearly defined than that of the Jemdet Nasr strata, the structures remained residential in nature. A considerable

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<sup>50</sup>Also spelled Šuruppag.

number of graves was sunk into the floors of these houses, intramural burials being a common practice in Early Dynastic Mesopotamia (Martin 1988: 26ff.). In terms of ceramic material, the Levels 1-5 can be broadly assigned to the ED I/II period, as evidenced by the presence of solid-footed goblets, small conical bowls, grey burnished ware and reserve slip pottery (Martin 1988: 150ff). The glyptic evidence corroborates this dating: Graves 11 and 14 contain seal impressions with geometric designs (Martin 1988: 23), traditionally associated with Jemdet Nasr, now more commonly linked with early ED contexts (e.g. Postgate 1977: 297; Porada et al. 1992: 104 in Nippur; Benati 2015b: 9 in Ur). Most of the Fara seals from these levels have correspondences with “ED II” styles in Diyala and Nippur (Martin 1975: 174; Martin 1988: 25). ED IIIa domestic layers overlying the Levels 1-5 was found just below the surface (Martin 1983: 27). These structures were then sealed by a large-scale destruction event, evidenced by burning (Visicato 2000: 19). Though there is textual evidence for the occupation of Šuruppak during the Ur III, no buildings younger than ED IIIa survived the weathering (Martin 1983: 29).

A great volume of cuneiform tablets has been recovered from the site, most of which were associated with this last ED level. The majority of the cuneiform texts were recovered from drainage pipes sunk into the ED I/II levels from the ED IIIa house floors. The Fara corpus is composed of several interrelated archives, with at least 25 different findspots identified (Martin 1975: 178). By far the largest one (ca. 320 tablets) was recovered from House XVh, nicknamed “Tablet House”. The administrative texts dealt mainly with agricultural production and house economy. The second largest corpus came from House XVII cd, where the administrative texts seem to have dealt with interregional contacts, mentioning other important urban centres of Sumer - regardless of how one interprets the nature of the “Kiengi League”, Šuruppak was certainly a key player (Pomponio and Visicato 1994: 11-15; Cripps 2013). House XIII fi yielded the third largest corpus, which was the only group of texts found in an actual house as opposed to drainage pipes. Fragments of exercise tablets led Visicato

2000 (p. 128) to suggest that the house was a scribal school, though this suggestion remains speculative<sup>51</sup>. Given the domestic character of the Fara architecture and the large number of different findspots, Martin 1975 (p. 178) interpreted the ED III Fara tablets as private archives, indicative of an *oikos* economy. Conversely, Pomponio 1983 (pp. 129-130; also Visicato 1995) managed to demonstrate that the separate findspots are actually linked prosopographically with the mentions of the same officials. Moreover, the fact that the “literary”, i.e. non-administrative texts, are not limited to a single context but are scattered across different findspots seems to suggest that the texts came from a single, “*capillary*” institution (Visicato 2000: 22). The Fara texts draw a picture of a large bureaucratic hierarchy of officials, administrators, and overseers of different levels: Visicato 2000 (p. 22) estimates around 100 different scribes being involved in the running of the institution. The issue of state-controlled economy versus private enterprise at this time is still contentious, depending on how one interprets the nature of the Fara archives. The seal glyptic most commonly associated with the Fara texts is the so-called “Anzu-Sud” style, named after an important official appearing in texts and sealing inscriptions (Charvát 1986).

The problem of the “missing temple” of the patron goddess Sud at Šuruppak has already been noted by Martin 1975 (p. 183) - that no central monumental structure at the site has been identified as cultic is surprising given the paramount role of temples in the 3<sup>rd</sup> mill. BC. The problem is exacerbated by the lack of mentions of temples or shrines in the administrative texts. Indeed, the mentions of a “*palace*”<sup>52</sup> and one mention of an “*estate of the city*”<sup>53</sup> made Visicato 1995 (p. 147; Visicato 2000: 21)

<sup>51</sup>Scribal schools, in Sumerian *edubbaa* (lit. “*the house that distributes tablets*”) and later *eduba* (lit. “*The house of the tablet*”) remain a “Holy Grail” of Mesopotamian Archaeology. The earliest recovered examples of such buildings date to the Old Babylonian period. Despite being mentioned in texts believed to be Ur III in date, there is no archaeological evidence for scribal schools in the 3<sup>rd</sup> mill. BC, it is therefore unclear how or where the scribes (Sum. *dubsar*, Akk. *tupšarru*) received their formation. See Visicato 2000 for a detailed discussion.

<sup>52</sup>CT 50, 6 = CDLI P010043; FTP 100 = P010016; TŠ 554: CDLI P010852; TŠ 780: CDLI P010904; TS 794 = CDLI P010907; WF 27 = CDLI P010984; WF 35 = CDLI P010992; WF 53 = CDLI P011010; WF 64 = CDLI P011021; WF 66 = CDLI P011023; WF 71 = P011028; WF 95 = CDLI P011052

<sup>53</sup>TŠ 613 = CDLI P010863: 2) ša<sub>3</sub> e<sub>2</sub>-iri gub

see the Fara administration as purely secular, managed by an *ensi*<sub>2</sub>, a governor or perhaps a mayor. A significant problem of the Fara “archive” or “archives” is the question of their internal chronology. Despite being one of the cornerstones of Early Dynastic textual research, it is unclear how long of a period these texts represent. Picchioni 1981 claims that the palaeography of the Fara texts is not homogenous and suggests no less than 3 different stages of writing development, indicating a rather long period of operation. On the other hand, Pomponio and Visicato 1994 (p. 8) argue, on prosopographical grounds, that administrative texts represent at most two generations of administrators. In an article on the relationship between the registers of personal names in literary and administrative texts, Pomponio 1984 tried to demonstrate that there is a correspondence between names in Fara lexical lists and those known from the Archaic Ur administrative texts, suggesting that the lists may have been composed outside of Šuruppak and/or be of considerably older age than the bulk of the administrative tablets. He then postulates a similar relationship between Abu Salabikh and Ebla texts. Since Pomponio’s material, as he readily admits (Pomponio 1984: 555) is insufficient, and his results are not statistically significant, the link is tenuous at best. Nonetheless, the difference between the administrative and literary tablets from Fara is a legitimate point and undermines the usefulness of “Fara period” as a stylistic or chronological determination. A comprehensive list of lexical and literary tablets from Fara was provided by Biggs 1974 (p. 36-42). Lexical lists constitute by far the largest part of this corpus. These include lists of deities<sup>54</sup>, animals<sup>55</sup>, objects and commodities<sup>56</sup>, geographical names<sup>57</sup>, professions<sup>58</sup>, and others. Some of the lexical texts are copies of earlier Uruk<sup>59</sup> and Archaic<sup>60</sup> compositions,

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<sup>54</sup>SF 1-6 = CDLI P010566-P010572

<sup>55</sup>SF 8-14: CDLI P010574-P010580; SF 81 = CDLI P010677

<sup>56</sup>SF 15-17 = CDLI P010586-P010589; SF 20-22 = CDLI P010595-P010598

<sup>57</sup>SF 23-24 = CDLI P010600-P010602

<sup>58</sup>SF 28-29 = CDLI P010607-P010608; SF 47-48 = CDLI P010632-P010633; SF 70 = CDLI P010663

<sup>59</sup>Esp. the Standard Profession List: SF 33, SF 75; SF 64 = CDLI P010655 duplicating OECT 7 195

<sup>60</sup>E.g. SF 9 = CDLI P010576 duplicating the Archaic Text from Ur UET 2 234

demonstrating the continuation of scribal tradition in Mesopotamia. The great innovation of the Fara period is the appearance of a larger number of literary genres, some of which continue to into the later ages. We find first examples of religious texts such as incantations<sup>61</sup>. Some texts have been identified as proverbs, having parallels with those of Abu Salabikh and the standard Old Babylonian compilations (Alster 1976; Alster 1991). A number of literary tablets are difficult to place in a single genre<sup>62</sup>.

## Fara - New <sup>14</sup> Samples

**OxA-33,185 (4178 ± 35):** bone tool (unknown species); Penn 33-13-432 (Lab. ref.: P39,852); D E 39; Grave, Level 2; Exc. no. 436; This small broken bone pin was the only one of five sampled ED I/II tools from Fara to produce sufficient collagen yield (**Figure 17**). There seems to be a slight conflict of information regarding the context of this sample. On the one hand, the records mention this object to come from Level 2. On the other, its recorded depth is 3.4 to 3.5m below surface, which would place it in Level 4 (Martin 1988: 24). This makes me believe that the object likely came from the fill of one of the graves sunk into Levels 1 and 2. Regardless, given that Level 4 of the D E 39 was the first to be fully ED I/II in nature (lack of painted Jemdet Nasr types, dominated by solid footed goblets), Level 2 graves can be considered to represent the later parts of the ED I/II period. The level from which the grave was sunk likely represented the main occupation of the ED I/II residential buildings. Given the Fara-type tablet found just below Level 1, the date provides a good *terminus post quem* for the ED IIIa period on the site (Martin 1988). The pin was polished (possibly waxed) and glued, therefore the sample's surface was air-abraded prior to solvent wash.

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<sup>61</sup>including some early examples of the enuru incantations: TSS 170 = CDLI P010769 iv 5) en<sub>2</sub> e<sub>2</sub>-nu-ru; SF 71 = CDLI P010665: i 1) e<sub>2</sub>-nu-ru

<sup>62</sup>e.g SF 40 (Lambert 1953) - a religious text referencing Enki and hierogamy (holy marriage between deities); TSS 46; TSS 126, mentioning Inana; TSS 194; TSS 271; NTSS 148; NTSS 168; NTSS 294

### 4.3 Excursus - The UD.GAL.NUN texts

One curious feature of the ED IIIa textual tradition which merits special attention is the so-called UD.GAL.NUN texts. This rather poorly defined category of Early Dynastic non-administrative texts poses numerous problems, and was once described as the creation of “*scribal deviousness at its worst*” (Finkel 2009: 14). The prevailing interpretation of the UD.GAL.NUN tablets, found in Fara, Abu Salabikh and possibly Nippur<sup>63</sup>, is that it represents a cryptographic system of sign substitution (Krecher 1978). The name derives from the three signs used in this particular type of texts to spell the name of god Enlil (DIĜIR.EN.LIL<sub>2</sub> → UD.GAL.NUN). It is important to point out that qualifying a cuneiform text as UD.GAL.NUN or “normal” is never straightforward, as the UD.GAL.NUN is never used consistently within a single text (Krecher 1992: 297). The UD.GAL.NUN is also not a one-to-one system, and one “normal” sign can have several UD.GAL.NUN spellings. Apart from using a cryptic system used to write an already poorly-understood Old Sumerian language, the UD.GAL.NUN texts are short, contain few grammatical markers and are rich in repetitions. This makes them extremely difficult to read and interpret. While Lambert 1981 (p. 92) wanted to see myths as the preferred UD.GAL.NUN genre, Krecher 1992 (p. 294) claims it was mainly used for “*religious texts*” and word lists. Johnson 2014b, on the other hand interprets the UD.GAL.NUN tablets as the predecessors of the “*scholastic*” genre of religious-literary commentaries. In short, this writing system remains one of the greatest enigmas of the early cuneiform history. None of the suggested theories trying to explain the distinct character of these texts (regional dialect, a corpus of secret knowledge, a possible spelling of the Emesal-Sumerian literary dialect) is generally accepted (Finkel 2009). Apart from the sign substitution system, the UD.GAL.NUN texts can be differentiated from the “normal” Sumerian texts by their characteristic arrangement of signs within each case, which is divided into two columns. This feature, however, is not limited to the UD.GAL.NUN texts,

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<sup>63</sup>An unpublished text mentioned in Lambert 1981: 305

further blurring the lines between different ED IIIa text genres (Johnson 2014b: 16-18). The UD.GAL.NUN writing seems to have been a rather short-lived development and did not survive beyond the Fara period, and so it can be potentially used as one of the defining features of the ED IIIa non-administrative corpus. The other important feature of the UD.GAL.NUN texts pertinent to chronological studies are the slight graphical variations of certain signs, described by Krecher 1992 (p. 297). This is significant, since if one can demonstrate that the shape of cuneiform signs depended not only on the geographical origin of the texts and its age, but also on its literary genre, any chronological scheme based on palaeographical typologies has to be taken with great care.

## 4.4 Abu Salabikh

The site of Tell Abu Salabikh is composed of three tells, situated on two banks of an ancient river canal. The site was originally excavated in the 1960's by an American team under the supervision of D. Hansen. The excavations were then renewed in 1975 by a British team led by J.N. Postgate. The ancient name of the site is still unknown, the two most likely possibilities being Ereš and Keš<sup>64</sup>(Biggs 1966: 74 fn. 12; Biggs 1974: 24). The two smaller mounds on the western side were occupied since at least the proto-historic times. In the lowest level (Level III) of the soundings 2G36/46 and 3G81 on the West Mound, the presence of bevelled-rim bowls points to an Uruk-period occupation. The Uruk buildings were levelled and the area was covered by a layer of clear sand prior to the construction of the Level II buildings (Postgate 1982: 109). Though no polychrome-painted pottery of the typically Jemdet Nasr type was found on the site, the intermediary strata between the Uruk and ED levels were littered with red-painted sherds (Postgate 1982: 119-121). ED material

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<sup>64</sup>The city of Keš (ŠU.AN.HIxGAD<sup>ki</sup>), famous for its temple praised in several literary compositions, has not yet been located with certainty, and should not be confused with the city Kiš(KIŠ<sup>ki</sup>), modern Tell Ingharra. See Cohen 1976 for a possible identification of Abu Salabikh as Čišgi, the city of the goddess Lisi(n), and Postgate 1976 for the possible identification of Tell Wilayah with ancient Keš.

is poorly attested in these contexts; however the construction Levels I and II in this part of the site were most likely domestic or industrial in nature, as evident in the great number fire installations (Postgate 1982: 125).

The eastern tell, also known as Main Mound, was beyond any doubt encircled by a city wall (Matthews and Postgate 1987: 109; Postgate 1990: 96). The three main areas of interest on the Main Mound were, in order of north to south, Areas A, H, and E. The ED occupation of the Main Mound was divided into three main levels, with the youngest one subdivided into IC, IB and IA (Postgate 1977: 282). The pottery from stratified sequences shows an assortment of types such as conical bowls and spouted jars undergoing a gradual evolution of shapes and sizes characteristic for the post-JN periods (Postgate and Moorey 1976: 140-141; Postgate 1977:282-295). The main feature of Area A was a large building complex, the role of which is still uncertain. The large wall encircling it and the military nature of the copper objects included in the graves sunk into the building made the excavators suggest that this communal building was in fact an early palace (Abdi 2003: 95-100). A single tablet from this context<sup>65</sup>, a list of personal names, probably documenting distribution of some kind of goods, does not provide any hints regarding the past activities of the Area A complex. To the immediate south of Area A, in Area H, at least two large Early Dynastic houses were discovered. These houses were assigned to the youngest phase of ED occupation of this area of the site, namely ED IIIa (Matthews and Postgate 1987). The most prominent house, 6H82 showed two main phases of construction activities, IC and IB, with graves sunk into the floors from level IA (Matthews and Postgate 1987: 92; Postgate 1990: 99). Most of these graves have been robbed of both jewellery and human bones (Matthews and Postgate 1987: 98). The fills of the graves and pits in this building included administrative and literary texts<sup>66</sup>. The presence

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<sup>65</sup>IAS 516, published in *Iraq* 40/2, p. 104-105

<sup>66</sup>IAS 550-554 from a fill of two intersecting graves; IAS 555 & 546 (lexical) from Grave 223; IAS 547-548 (lexical) from Room 62; IAS 556 from Grave 234; IAS 549 (incantation) from a drain in Room 68

of these text fragments in the 6H82 house was interpreted as evidence for the central administration being diffused among several households and institutions, similarly to Fara; the different function of various “capillaries” may also be visible in the apparent lack of sealings in 6H82, as opposed to the Area A Complex (Matthews and Postgate 1987: 101). Domestic structures were also found in Area 4I/5I, located in the trough between Areas E and A. The presence of early solid-footed goblets suggest an ED I/II dating (Postgate 1982: 123). The early date of these contexts is also evident in the architecture of the 5I buildings, where the walls are thinner and their layout less regular (Crawford 1983: 32).

The Area E of the Main Mound is arguably the most significant part of the site. It is dominated by the large Central Complex: a series of adjoining rooms, including the Burned Buildings and the Southern Unit, not to be confused with the “South Building” in Area A (Postgate 1977). The complex was separated by a main street from domestic contexts referred to as “Eastern Houses” to the northeast (Postgate 1977: 279). Just as elsewhere on the site, the role of the Southern Unit and the Central Complex is difficult to discern. The large size of the building and the presence of plastered floor in the courtyard (= Room 44) may point to a temple; however the lack of altars, shrines or cellae makes it impossible to confirm this theory (Biggs 1974: 11). The largest room of the complex (Room 39) was originally taken for a cella, but it lacked the usual furnishings (niche for statues, altar)(Biggs 1974: 6). That the Southern Unit was in some ways related to the cultic and/or administrative centre of the site seems very probable, given the presence of the so-called “Ash Tip” to immediate southeast of the Central Complex. The “Ash Tip” is the nickname given to a refuse fill containing large quantities of burnt botanical material, as well as multiple sealings - it is therefore thought to have accumulated during the operation of a nearby administrative unit, most probably related to a temple estate (Postgate 1977: 279). The formation of the “Ash Tip” was divided into three phases, though most of the material was recovered from the two later levels, II and III. One sealing from

Phase II was identified as “ED II” in style; however the remainder of the available information does not corroborate such an early dating. ED IIIb, Akkadian and Ur III graves sunk into the uppermost layer provide a *terminus ante quem* for the “Ash Tip” (Green 1993: 30), while the style of most of the seal impressions would place the deposition event early in the ED IIIb (Green 1993: 30). Furthermore, the “Tip” was cut into the neighbouring ED III buildings, with the Phase I overlying Level II structures (Green 1993: 156). Concluding, despite some potential older inclusions<sup>67</sup>, the “Ash Tip” should probably be dated to the ED IIIb period, postdating the main occupation of the Southern Unit.

The main period of occupation/use of the Southern Unit, Phase IC, was followed by infilling, with graves and pits cut from level IA. It is in those pits sunk into the Southern Unit that the vast majority of the ca. 500 Abu Salabikh tablets were found. Postgate and Krebernik 2009 (p. 3) believe, however, that this was not the primary context of these texts which should rather be seen as contemporary with the IC phase. The only well stratified tablets were the ones found on the floor of the “Room 44” courtyard, contemporary with the IC buildings (Biggs 1974: 6). The majority of the Abu Salabikh texts are considered roughly contemporary with or slightly later than the Fara tablets, based on the similar, yet not identical, palaeography and a common set of texts (Biggs 1966, Biggs 1974: 24). Unlike the Fara archives, the Abu Salabikh texts are composed mostly of “literary” sources, although it is important to reiterate that in the case of ED IIIa this term applies to any text which cannot be positively identified as administrative<sup>68</sup>. At Abu Salabikh, as elsewhere in early Mesopotamia, lexical lists constitute an important part of the written corpus<sup>69</sup>. Biggs (Biggs 1974: 31) divided the non-administrative texts into two main categories: 1) texts written in

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<sup>67</sup>IAS 54-541 = CDLI P010001-P010002, two fragmentary text, most probably administrative lists of personal names. Palaeographically identical to the other ED IIIa texts from Abu Salabikh.

<sup>68</sup>Abu Salabikh administrative texts: OIP 99 490-515; Biggs and Postgate 1978: IAS 516-519; IAS 528-532

<sup>69</sup>OIP 99 1-111; Biggs and Postgate 1978: IAS 521, IAS 527

“normal Sumerian” orthography<sup>70</sup>; 2) UD.GAL.NUN texts (See **Section 4.3**). The “normal” Sumerian texts can be divided into three smaller sub-categories. The first can be broadly described as “wisdom texts”, which include short proverbs<sup>71</sup> and a longer composition known as the The Instructions of Šuruppak (Biggs 1971). The Instructions are a collection of proverbs, presented as teachings of the titular Šuruppak to his son Ziusuġa<sup>72</sup>, the hero of the Sumerian Flood Story, identified with the later Akkadian Ūta-napištim. A fragment of an early version of this text is also known from Adab<sup>73</sup>. The Instructions become an important part of Sumerian literary tradition, as attested by the Standard Sumerian version dating to the Old Babylonian period. The other significant collection of literary texts from the site are referred to as the za<sub>3</sub>-mi<sub>2</sub> hymns. The composition begins with an invocation to Enlil, and contains 68 short (2-12 lines) praises to different deities, each ending with the eponymous “DN za<sub>3</sub>-mi<sub>2</sub>”, usually translated as “May the god/goddess DN be praised!”. The hymns are yet another genre which continues to be expanded for centuries in the future. It is important, however, to note that the expression za<sub>3</sub>-mi<sub>2</sub> itself is not limited to hymnic composition and is found in numerous very different texts in the Standard Sumerian literary corpus, that the word should not be understood as clearly defined genre. The Abu Salabikh texts are believed to be slightly later than the bulk of the Fara texts for three main reasons: 1) The Abu Salabikh texts mention multiple individuals with Semitic names, and contain some Semitic words (Biggs 1974: 27; Biggs 1981: 122-123); 2) The Abu Salabikh corpus contains more literary texts which become a part of the later Standard Sumerian literature; 3) The Abu Salabikh ductus, though very similar, displays some “mature” features (Picchioni 1981: 116; Visicato 2000: 14). It

<sup>70</sup>This should not be confused with “Standard Sumerian”, which is used to denote the literary style of the Sumerian texts composed during the late Ur III - Old Babylonian periods.

<sup>71</sup>e.g. OIP 99 255: ii 12) lu<sub>2</sub> min ša<sub>3</sub> tab 13) aša<sub>5</sub> uru<sub>4</sub> (*Two men will have two minds / about ploughing [the same?] field.*)

<sup>72</sup>ETCSL 5.6.1 7) šuruppak dumu ubara-tu-tu-ke<sub>4</sub> 8) zi-u<sub>4</sub>-su<sub>3</sub>-ra<sub>2</sub> dumu-ni-ra na na-mu-un-de<sub>5</sub>-de<sub>5</sub> 9) dumu-ġu<sub>10</sub> na ga-de<sub>5</sub> na de<sub>5</sub>-ġu<sub>10</sub> he<sub>2</sub>-dab<sub>5</sub> (*Šuruppak, the son of Ubara-Tutu / Ziusuġa, his son / was he not instructing him / “my son, let me give you advice, and may you follow my advice!”*)

<sup>73</sup>OIP 14, 55-56; note that in this version, the “Instructor”’s name is spelled UR<sub>2</sub>.AŠ as opposed to Šuruppak (SU.KUR.RU.KI), see Civil and Biggs 1966

is important to add regarding point 1) that it relies on the now outdated belief that Semitic population represents the “new-comer” population, displacing the original Sumerian speakers during the mid-3<sup>rd</sup> mill. BC (Jacobsen 1939). One should consider regional differences, given the fact that Abu Salabikh most likely had connections with the northern territories<sup>74</sup>(Biggs 1981: 133). In summary, the significance of the Abu Salabikh texts lies in the great variety of literary genres present at the site. The few examples of texts which continue to be copied in later periods seem to show that a classical Sumerian literary tradition was already more or less crystallised by the ED IIIa (Biggs 1966: 77).

### Abu Salabikh - Published <sup>14</sup>C Dates

**AA-10170 (4760 ± 50 BP):** charcoal; a selection of dates from Abu Salabikh was derived from contexts associated with Middle Uruk pottery: large quantities of bevelled-rim bowls, straight spout and nose-lugged jars, open bowls with round and flat rims. The dates are described in greater detail in Wright and Rupley 2001 (p. 86). Though the information regarding the context of these dates is quite scant, they can be used as a lower boundary for the Late Uruk period.

**AA-10169 (5005 ± 60 BP):** charcoal; See AA-10170.

**AA-5289 (4785 ± 65 BP):** charcoal; See AA-10170.

**AA-5288 (4790 ± 60 BP):** charcoal; See AA-10170.

**AA-10168 (4900 ± 50 BP):** charcoal; See AA-10170.

**BM-1365A (3938 ± 54 BP):** wood; Room 39, Southern Unit, Area E; Floor IC; 6G64:655. The Floor IC of the large Room 39 was identified as contemporary

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<sup>74</sup>One line from the Abu Salabikh edition of the Keš Temple Hymn mentions the king of Kiš, which led Biggs (Biggs 1971: 206) to believe Abu Salabikh might have been a part of the Kishite kingdom. OIP 99 308 iii 4') e<sub>2</sub> lugal 5') kiš<sup>ki</sup> 6') bur an-ma-gub (“*The house where the king / of Kiš / places the offering bowl*”)

with the findspot of the courtyard (Room 44) tablets<sup>75</sup>. Another tablet was found in the fill above the floor (Postgate and Krebernik 2009: 3)<sup>76</sup>. Therefore, this date has the closest archaeological connection to the early Fara texts from the site.

**BM-1365B (3963 ± 57 BP):** wood; Room 39, Southern Unit, Area E; Floor IC; 6G64:655. See BM-1365A.

**BM-1365C (3826 ± 47 BP):** wood; Room 39, Southern Unit, Area E; Floor IC; 6G64:655. See BM-1365A. Noticeably younger than the remainder of the composite BM-1365 dates, this reading had to be removed from the model.

**BM-1365D (3916 ± 50 BP):** wood; Room 39, Southern Unit, Area E; Floor IC; 6G64:655. See BM-1365A.

**HAR-1877 (3830 ± 70 BP):** This unpublished date, mentioned in Burleigh and Matthews 1982 (p. 167) was taken on a separate sample from the same context as BM-1365. The date is, similarly to BM-1366 and BM-1365C, the date is excessively young and had to be removed from the model.

**BM-1390 (4267 ± 85 BP):** charred twigs; Area A; South Building; sounding underneath Floor II in Room 4; 5I 21:360(1157); This samples context and place in the stratigraphy of the site (Postgate 1977: 278) would suggest that it should predate BM-1366 and BM-2328R, as indeed it does. Given that the sample was collected from a layer of charred twigs, presumably the remains of a thatch roof, the reading should be unaffected by inbuilt age associated with charred material from long-lived samples.

**BM-1366 (3869 ± 56 BP):** carbonised wood; Area A; South Building; Rooms 1 and 2; Floor II; Sample 5I10:184; This roof beam was found on the floor, with the associated material described in Postgate and Moorey 1976: 137-139 and

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<sup>75</sup>IAS 1; 3; 4; 18; 19; 391

<sup>76</sup>IAS 507

Postgate 1977: 271-276. Given its stratigraphic position and archaeological context, the roof beam was likely to have come from a construction phase immediately prior to the ED IIIa contexts of IC, and thus late ED I/II or early ED IIIa in date. The date is visibly younger than BM-1365 and has its agreement index fall below 60% even when modelled as part of the same phase. The date had to be removed from the model as an outlier. It is possible that the excessively young date was a result of sample contamination reported for some other Abu Salabikh samples (Tite et al. 1987, Bowman, Ambers, and Leese 1990).

**BM-2328R (4010 ± 130 BP):** charcoal; Area A, Room 28 (corridor); According to the publication (Postgate 1984: 98-100), the sample was associated with “ED II” pottery assemblage, characterised especially by hollow fruit stands. The authors, however, do account for the possibility of the building being used in the ED III period as well given the rich cache of copper finds. The sample belonged to the batch affected by laboratory contamination, and the date was recalculated and its measurement error increased. The date is most likely to represent the lower boundary of the ED III period at Abu Salabikh and thus should be contemporary with BM-1366.

**P-2050 (4850 ± 50 BP):** Charcoal; Area E, fill above Floor 3; Level IB; 4 additional samples from the ED IIIa contexts in Area E were published by Fishman, Forbes, and Lawn 1977. The publication claims that they were associated with the earliest stratified cuneiform texts (listed as IB, now thought to come from IC, see BM-1365). It is evident that out of these 4 samples, only P-2051 provides a credible time estimate, with the remainder dating to Middle and Late Uruk (more than 500 years older than BM-1365). Moreover, this group of measurements is internally inconsistent, with two samples from the same context (P-2050 and -2053) being vastly different. It is unclear whether this difference is due to context misassociation or inbuilt age. Regardless, P-2051 was the only sample used in this analysis.

**P-2051 (4100 ± 60 BP):** charcoal; Area E, burning level; Level I; See P-2050.

**P-2052 (4330 ± 60 BP):** charcoal; Area E, fill; Level I; See P-2050. See P-2050.

**P-2053 (4390 ± 60 BP):** charcoal; Area E, fill above Floor 3; Level IB; See P-2050.

### **Abu Salabikh - New <sup>14</sup>C Samples**

**OxA-33,321 (3931 ± 33 BP):** barley seeds (*Hordeum* sp.); AbS 2683 (Lab. ref.: 39,913); 6G76; “Ash Tip” Phase II; This sample of 4 seeds was collected from the lower (II) of the two ED III deposition levels of the “Ash Tip”. It was divided into two subsamples of 2 seeds each in order to test the homogeneity of the deposit. Though there is little associated material which would allow us to date this layer, its stratigraphic position suggests a ED IIIb date.

**OxA-33,153 (3949 ± 35 BP):** barley seeds (*Hordeum* sp.); AbS 2683 (Lab. ref.: 39,913); 6G76; “Ash Tip” Phase II; see OxA-33,321.

**OxA-33,151 (3899 ± 32 BP):** barley seeds (*Hordeum* sp.); AbS 6416 (Lab. ref.: 39,912); 6G67; “Ash Tip” Phase III; A sample of 3 seeds, divided into two subsamples of 1 and 2 seeds. These seeds were collected in the uppermost level of the “Ash Tip”. Given its stratigraphic position, the sample should postdate AbS 2683. item[]**OxA-33,152 (3947 ± 33 BP):** barley seeds (*Hordeum* sp.); AbS 6416 (Lab. ref.: 39,912); 6G67; “Ash Tip” Phase III; See OxA-33,151.

**OxA-34,581 (4727 ± 30 BP):** barley seeds (*Hordeum* sp.); AbS 5381 (Lab. ref.: 41,208); 5IS:224; Fire Installation 81/7; A bulk sample of 6 seeds was recovered from the fire installation in area 5IS. The installations were associated with a typical ED I/II ceramic type, the solid-footed goblet (Crawford 1983: 32-33).

**OxA-34,587 (4797 ± 29 BP):** barley seeds (*Hordeum* sp.); AbS 5381 (Lab. ref.: 41,208); 5IS:224; Fire Installation 81/7; See OxA-34,581.

**OxA-34,582 (4433 ± 30 BP):** barley seeds (*Hordeum* sp.); AbS 5443 (Lab. ref.: 41,209); 2G36:174; Fire Installation 81/30; The fire installation was located in the 2G36/46 sounding of the West Mound (Postgate 1982: 106-108). The sounding revealed three main phases of activity. Level I and the much better preserved Level II can be dated to the ED I/II period with high probability, based on pottery. Both contained mainly residential units with enclosures. These were constructed on top of the Level III Uruk-period buildings following their levelling and infilling with layers of sand and potsherds. The sample should therefore be a good representative of the youngest stages of ED I/II at the site.

**OxA-34,588 (4488 ± 32 BP):** barley seeds (*Hordeum* sp.); AbS 5443 (Lab. ref.: 41,209); 2G36:174; Fire Installation 81/30; See OxA-34,582.

**OxA-34,236 (4325 ± 40 BP):** barley seeds (*Hordeum* sp.); AbS 5412 (Lab. ref.: 41,292); 2G36:102; floor layer; This sample was recovered from a floor layer in Level II, overlaying the sherd layer. It is likely to be contemporary with AbS 5443.

**OxA-34,407 (4197 ± 34 BP):** barley seeds (*Hordeum* sp.); AbS 5535 (Lab. ref.: 41,210); 2G46D; Potentially a domestic fire installation; According to the available archaeological information, this sample was recovered from the potsherd-filled layer separating Level III (Uruk) from Level II (ED I). Though the exact nature of the context is not clear, the date should provide a well-constrained estimate for the Uruk-ED transition at the site.

**OxA-34,499 (4283 ± 31 BP):** barley seeds (*Hordeum* sp.); AbS 5535 (Lab. ref.: 41,210); 2G46D; See OxA-34,407.

**OxA-34,408 (4777 ± 36):** barley seeds (*Hordeum* sp.); AbS 5607 (Lab. ref.: 41,211); 3G81: 146; Fire Installation 81/29; Uruk levels were found immediately below structural ruins built of plano-convex bricks (Postgate 1982: 103-105). The sounding produced relatively few ceramic finds, which would allow for a more precise dating, with the exception of a late-Uruk bowl (Postgate 1982: 122). Regardless, the context's stratigraphic location makes it safe to treat the sample as a representative of the Uruk period.

**OxA-34,500 (4842 ± 32 BP):** barley seeds (*Hordeum* sp.); AbS 5607 (Lab. ref.: 41,211); 3G81: 146; Fire Installation 81/29; See OxA-34,408.

**OxA-34,234 (4524 ± 38 BP):** barley seeds (*Hordeum* sp.); AbS 5602 (Lab. ref.: 41,290); 3G81; floor; The sample came from a layer sealed by an ED I wall, containing fragments of bevelled-rim and conical bowls. Although the context contained no painted pottery usually associated with the Jemdet Nasr period, it has been suggested (Postgate 1982: 109, 123) that the context might in fact be contemporary with the Eana III levels at Uruk given its assemblage of crude pottery and place in stratigraphy. For the purpose of this analysis, the date sample will be treated as representative of the Jemdet Nasr period.

**OxA-34,583 (4113 ± 32 BP):** barley seeds (*Hordeum* sp.); AbS 8512 (Lab. ref.: 41,212) 6H72:62; Room 58, Level IC occupation floor; The large residential quarter of 5G and 6H was described in Postgate 1984 and Matthews and Postgate 1987. Two separate construction events were identified in Levels IC and IB. Multiple graves were sunk from the overlying level IA. Since IB walls were found on the surface, only the lower level, IC, had its structural remains preserved well enough to allow identification. The sample came from the floor of Room 58, adjacent to the house's main courtyard (=Room 65). As described in the section above, ED IIIa is the most likely date for the construction and use of the building.

**OxA-34,589 (4098 ± 29 BP):** barley seeds (*Hordeum* sp.); AbS 8512 (Lab. ref.: 41,212) 6H72:62; Room 58, Level IC occupation floor; See OxA-34,583.

**OxA-34,180 (4015 ± 36 BP):** barley seeds (*Hordeum* sp.); AbS 8614 (Lab. ref.: 41,213); 6H82:1027; Room 65 fire installation; The sample was collected from the main inner courtyard of the building. It was in association with multiple fish bones, suggesting a specialised fish drying/cooking activity. Like the remainder of the 6H samples, this one is treated as ED III in date.

**OxA-34,235 (4080 ± 40 BP):** barley seeds (*Hordeum* sp.); AbS 8667 (Lab. ref.: 41,291); 6H82:1039; Fire Installation 86/11; A sample was taken from one of the two hearths found in the NW corner of Room 67, adjacent to the western wall of the courtyard.

**OxA-34,181 (4024 ± 34 BP):** barley seeds (*Hordeum* sp.); AbS 8670 (Lab. ref.: 41,214); 6H82:1024; Room 67, Level IC occupation floor; A sample collected from the stratified ashy floor deposit in Room 67. It is likely to be contemporary with AbS 8667.

**OxA-34,975 (4255 ± 35 BP):** barley seeds (*Hordeum* sp.); AbS 5942 (Lab. ref.: 42,472); 3G60:75; F.I. 81/25; The context was described as an oval pit, most likely used to fire pottery given the large amounts of clinker (Postgate 1982: 105). The pottery found within the pit was not informative in terms of the context's relative age. F.I. 81/25 was assigned an Uruk date due to the presence of crude Uruk sherds found on the mound's surface.

**OxA-34,976 (4121 ± 31):** barley seeds (*Hordeum* sp.); AbS 5535 (Lab. ref.: 42,473); 2G46:62; See OxA-34,399.

**OxA-34,977 (4236 ± 30):** barley seeds (*Hordeum* sp.); AbS 5431 (Lab. ref.: 42,474); 2G36:212; blue-gray floor with ED I/II ceramics sealed by an ED wall; The context of this sample, similar to that of AbS 5412, can undoubtedly be

placed in the ED I/II phase due to the associated ceramics and place in the stratigraphy.

**OxA-34,978 (4158 ± 31):** barley seeds (*Hordeum* sp.); AbS 7228 (Lab. ref.: 42,475); 5I78:81; ash line; The stratigraphic feature from which this sample was extracted was identified by the Excavator as contemporary with Wall B, an architectural feature dated to the ED I/II period.

	EARLY SOUNDINGS	SOUTHERN UNIT, AREA E (6G)	ASH TIP (6G)	AREA I (5IS)	SOUTH BUILDING, AREA A (5I)	WEST MOUND (2G36/46, 3G81, 3G60)	ED HOUSES (6H72, 6H82)
ED IIIb			ED IIIb, Phase III OxA-33,321 OxA-33,153 ED IIIb, Phase II OxA-33,151 OxA-33,152				
ED IIIa		ED IIIa BM-1365 P-2051			ED IIIa BM-1366 BM-2328R		ED IIIa OxA-34,583 OxA-34,589 OxA-34,180 OxA-34,235 OxA-34,181
ED III				ED III OxA-34,581 OxA-34,587	ED III BM-1390	ED III OxA-34,582 OxA-34,588 OxA-34,236 OxA-34,407 OxA-34,499 OxA-34,976 OxA-34,977	
Jemdet Nasr?						Uruk/ED III transition OxA-34,234	
Late Uruk						Uruk OxA-34,408 OxA-34,500 OxA-34,975	
Middle Uruk	Late M. Uruk AA.5289 AA.5288 AA.10168 Early M. Uruk AA.10170 AA.10169						

Graph 2: A schematic representation of the Abu Salabikh archaeological sequence.

## 4.5 Tell Muqayyar/Ur

Few Mesopotamian sites can boast of a long lasting importance comparable to that of Ur, also known in the literature as “Ur of the Chaldees”. The site attracted Western travellers and scholars since the 17<sup>th</sup> c. AD. While the earliest systematic archaeological works (1918-1919) under the direction of Egyptologist H.R. Hall on behalf of the British Museum focused on the later periods of the site (1<sup>st</sup> mill. BC and Ur III), most of our information about the earlier periods came from the famous excavations of the Penn Museum Expedition by Sir L. Woolley (1922-1934). Occupied since at

least the ‘Ubaid period in the 6<sup>th</sup> mill. BC, the main mound of Tell Muqayyar and a string of smaller tells remained a centre of human activity throughout the protoliterate periods of Uruk and Jemdet Nasr (Crawford 2015: 3). During the Early Dynastic period, the city became the seat of a powerful and rich dynasty whose tombs, the Royal Cemetery, remains to this day one of the most spectacular finds of the Near Eastern Archaeology. Following the collapse of the Akkadian Empire, the rulers of the Ur III Dynasty (21<sup>st</sup>-20<sup>th</sup>) established a large territorial state controlling most of Mesopotamia and Elam. The site became dominated by the large ziqqurat known as Etemenniguru (lit. “*House whose foundations are clad in terror*”), constructed by king Ur-Namma, the Dynasty’s progenitor. Even though the site never regained its political status after the rule of Ibbi-Su’en, the last king of Ur III Dynasty, Ur maintained its position as an revered cultic centre until the Persian conquest in the 6<sup>th</sup> c. BC. Ur most probably owed its undying significance to its close proximity to the ancient coastline of the Persian Gulf which granted it access to trade routes connecting Mesopotamia, the Arabian Peninsula, Southern Iran and India (Crawford 2015: 2). The site also enjoyed the patronage of the main lunar deity, Sumerian Nanna, Akkadian Su’en/Sîn, who found many devout worshippers among the Mesopotamian rulers. The echoes of Ur’s cultural significance can be found in the Bible, where the Book of Genesis quotes Ur as the home city of Abraham.

Any Early Dynastic temple and palatial buildings of the later Early Dynastic would have been destroyed by the large-scale constructions of Ur-Namma. Woolley excavated 4 levels of pre-Ur III occupation under the main ziqqurat. Only few important objects which would allow for accurate dating of these contexts were recovered from these levels. A bronze spear with the inscription of king Meskalamdu suggests that “Archaic Level I” of the ziqqurat (not to be confused with the “Archaic Texts” discussed below) was contemporaneous with the Royal Cemetery (Benati 2013: 205-206). The most significant finds, however, came from a number of soundings to the immediate south-east of the wall around the sacred precinct (often referred to as *temenos*)

constructed by the Neo-Babylonian king Nebuchadnezzar II. The Pre-Dynastic levels, discovered in Pits F and G, most likely housed an Uruk- and Jemdet Nasr-period industrial area, as evidenced by a number of kiln installations (Benati 2014, Benati 2015b, Crawford 2015: 7-9). During the earliest phases of the Early Dynastic period, these complexes were turned into a residential zone (Benati 2015a: 3). A small cemetery found in this area, awkwardly nicknamed “Jemdet Nasr Cemetery” was most likely used during the ED I (Kolbus 1983; Sürenhagen 2002: 238; Benati 2015a). This early cemetery was then covered by eight layers of refuse, discarded from the neighbouring temple platform. Due to the large number of clay sealings, these sealings are often referred to as the Seal Impression Strata (SIS). Given the nature of this context and its disturbance by later pits, combined with the often imperfect documentation of the archaeological excavations make some aspects of SIS stratigraphy difficult to unravel (Otto 2010: 22). The occurrence of solid-footed goblets in the lowest level of SIS (SIS 8) allows us to date the beginning of the deposition to the ED I period (Charvát 2010: 15; Marchetti and Marchesi 2011: 52 fn. 144). SIS 7-6 are usually dated to ED II, although given the lack of clearly-defined ceramic markers for that period and the questionable chronological value of seal glyptic, these levels may be considered ED I/II in date (Zettler 1989).

Some 410 tablets, referred to as the “Archaic Text of Ur” were found in SIS 8-4 (Burrows 1935; Lecompte and Verderame 2013; Lecompte 2015). Most of the inscribed fragments came from SIS 5-4, and only three tablets<sup>77</sup> were recovered from the underlying strata (Sallaberger 2010: 31). While it is true the Archaic Texts were found across a number of SIS levels, it was noticed that the texts appear to form a homogeneous corpus, both palaeographically and prosopographically (Charvát 2010: 16; Sallaberger and Schrakamp 2015: 58). The same can be said about the designs of sealings found in the context (Otto 2010: 26). The accumulation of SIS 8-4 most likely occurred during a rather short timespan, perhaps one or two generations, and

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<sup>77</sup>UET 2 305 = CDLI P005892; UET 2 306 = CDLI P005893; UET 2 307 = CDLI P005894

therefore one cannot speak of an internal chronology of the Archaic texts based on their context. The Archaic texts constitute the single largest corpus of ED I/II texts found in a stratified context. Thus, their format, ductus, and contents are usually seen as defining features of ED I/II texts in general. Stylistically, the tablets are considered to constitute a “missing link” between the Jemdet Nasr and the ED IIIa Fara Tablets. The form of the signs is often pre-cuneiform and highly figurative, closer to the proto-literate tablets than the standard Early Dynastic Sumerian texts. Unlike the Uruk and Jemdet Nasr texts, however, many of the words and entries can be understood as Sumerian linguistic constructions. That is especially true for the personal names mentioned in the texts<sup>78</sup>. The inventory of Sumerian, and possibly Semitic (Lecompte 2015: 143), personal names was noted to have been very different from that of the Fara Texts (Charvát 1998). This was usually interpreted as evidence for a large gap in time between the two corpora, although one cannot disregard the possibility of regional or even city-specific traditions<sup>79</sup> influencing the onomasticon of administrative texts. It has to be said that while they were certainly written in Sumerian, these texts contain almost no signs of more elaborate verbal forms which would allow for a better study of the language of the period. Moreover, the archaeological context of the Archaic texts was a mixed one, as demonstrated by the several fragmentary duplicates of Fara-period lexical lists found therein (Burrows 1935: 2).

About 1,850 graves were excavated in an area of ca. 4,000 m<sup>2</sup>, most of them believed to have been sunk from SIS 3 (Zettler 1998b: 21). 16 of these graves were identified as “royal” by L. Woolley due to their size and lavish furnishing. Both private and

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<sup>78</sup>E.g. Nisaba 25 55 (CDLI P449042) obv. i 3) utu-ur-saĝ (lit. “*The Sun God is a Hero*”), ii 3) en-abzu-si (lit. “*The Lord (who) Fills the Abyss*”); Nisaba 25 57 (CDLI P449044) : obv. iv 7) ur-nanna<sub>x</sub>(ŠEŠ.NA) (lit. “*One/Dog of the Moon God*”); Nisaba 26 52 (CDLI P449049) : obv. iii 3’) ama-ušum:gal (lit. “*Mother is a Dragon*”)

<sup>79</sup>This is especially visible in the use of theophoric names referencing the patron deity of the site. Compare the common occurrences of Archaic Ur names mentioning Nanna (e.g. Ur-Nanna, Nanna-ursaĝ, Nanna-mud, Ur-Nanna, AK-Nanna) to Fara Texts mentioning the deity Sud (e.g. Ur-Sud, AK-Sud, Maš-Sid, Sud-ursaĝ, Anzu-Sud, Inim-Suda-zi)

royal graves displayed a high degree of heterogeneity in terms of their shape, size and architecture. 660 of the smaller private graves which can be associated with the Royal Tombs are mainly simple inhumations with bodies wrapped in reed matting or placed in wooden coffins (Zettler 1998b: 22). The single- or multi-chambered royal tombs were built of limestone, mud and bricks. Retainer burials were found in subsidiary graves (e.g. PG1618/1631/1648), in the ruler's chamber (e.g. PG800) or in large death pits outside the tombs (PG 789 and PG800)(Zettler 1998b: 23). Despite the richness and importance of the Royal Cemetery, our understanding of the site is still imperfect as many of the bodies were lost after the excavation (Molleson and Hodgson 1993), and the publication of field notes was very selective. The Cemetery's stratigraphy (Nissen 1966), the identity of its occupants (Reade 2001; Sürenhagen 2002; Marchesi 2004) and the nature of the graves offerings (Ellison et al. 1978; Pollock 1985; Zettler 1998b; Zettler 1998b; see Vidale 2011 for further references) have been studied and discussed numerous times in the literature. Perhaps most famous of all was the rich tomb PG800, whose main occupant was a woman identified as ereš, “*queen*”, Pū-abim<sup>80</sup> thanks to an inscribed lapis lazuli seal found in the grave. The attendants of the queen included, among others, musicians and performers, as evidenced by fragments of lyres and harps in the death pit associated with PG800 (Zettler 1998a: 35-37). Another large tomb named PG789, abutting PG800 from the southwest, was built directly under PG800's death pit. Although this grave was extensively looted in antiquity, the built chamber, grave offerings (including a silver boat model and a gaming board), as well as armoured soldier attendants indicated that the grave was a resting place of an unnamed king (Zettler 1998a: 35). A simple yet richly furnished grave PG755, dug into the shaft of the multi-chambered royal tomb PG779 tentatively assigned to king Ur-Pabilsaĝ (Reade 2001: 18), contained the body of a young man whose identity is quite problematic. The unremarkable size of his grave contrasted with the lavish electrum and copper offerings, some of

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<sup>80</sup>formerly read Šub-ad

which bore the name Meskalamdu<sup>81</sup>. A king of this name is known from three other inscriptions: a seal from PG1054, where the main occupant was female<sup>82</sup>; an inscribed bead from the so-called “Treasure of Ur” found in Mari, where Meskalamdu bears the prestigious title King of Kiš and is identified as king Mesanepada’s father<sup>83</sup>; two spear points (copper and bronze) found in the Archaic I Level of the ziqqurat area<sup>84</sup>. Given the unassuming size of the PG755 and the young age-at-death of its occupant, several scholars, including Woolley himself, doubted whether it belonged to king Meskalamdu (Woolley 1929: 74-77; Reade 2001: 18; Marchesi 2004: 183-184). Regardless of whether the grave contained a body of Meskalamdu or one of his prematurely deceased family members, it is likely that PG755 was contemporary with the royal tombs of PG789 and PG800. Skeletal studies on the bodies of retainers from the death pits and subsidiary graves (Molleson and Hodgson 1993; Molleson and Hodgson 2003b; Molleson and Hodgson 2003a; Baadsgaard et al. 2011) revealed a number of interesting insights. The bodies from the death pits showed evidence of heating, suggesting that the retainers were not only sacrificed, but also mummified through roasting. Skeletal trauma and adaptation pointed to a number of specialised functions, e.g. head-basket carrying (retainers from PG1648) and chariot-driving (an exceptionally well-built male from PG1573).

The layers covering the Royal Cemetery (SIS 1-2) contained sealings of king Mesanepada and his spouse Ninbanda<sup>85</sup>, providing a *terminus ante quem* for the tombs. According to the Sumerian King List, Mesanepada was the first king of the First Dynasty of Ur<sup>86</sup>. However, the SKL can offer very little help in constructing a chronology of this time. Even though the reign lengths of the First Dynasty of Ur are

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<sup>81</sup>Also read Meskalamdug, Mes-kalamšar in older publications. See Marchesi (2004) for the alternative reading Mesuḡdu

<sup>82</sup>RIME 1.13.03.01 = CDLI P247679

<sup>83</sup>RIME 1.13.05.01 = CDLI P431203

<sup>84</sup>RIME 1.13.03.02 = CDLI P431202; The inscription mentions only the names Meskalamdu and Zuen (Nanna)

<sup>85</sup>RIME 1.13.05.03 = CDLI P247685; the name is also read Nintur.

<sup>86</sup>ETCSL 2.1.1: 135

within believable ranges, both the preceding and the succeeding dynasties are given impossibly long reigns. Also, the text mentions Meskiaḡnun(a)<sup>87</sup> as Mesanepada's successor without mentioning Aanepada, Mesanepada's son well attested in 3<sup>rd</sup> mill. BC inscriptions. Given the lack of any extensive written material associated with the Royal Tombs, linking the First Dynasty of Ur (Meskalamdu, Mesanepada, Aanepada) with the much better understood First Dynasty of Lagaš (the Dynasty of Ur-Nanše) proved to be quite the challenge to Sumerologists. The generally-held belief that Mesanepada was contemporary with Eanatum was first suggested by Nissen 1966 (pp. 136ff.), who presented several palaeographic and linguistic lines of evidence which can be summarised as follows:

- A) The writing of grammatical suffixes in personal names (such as Mesanepadaa) is attested in Lagaš only from the times of Eanatum.
- B) The form of the LUGAL signs, specifically the hatching of the lower horizontal wedge, changes in Lagaš between the reigns of Ur-Nanše and Eanatum. Meskalamdu's seals seem closer to the latter features.

Nissen therefore stated that the construction of the Royal Cemetery can be most likely placed between the reigns of Ur-Nanše and Eanatum (thus, during the reign of Akurgal). Nissen's argument was reiterated and confirmed by Boehmer 1969, who focused on the study of ED III glyptic and the form of the LUGAL sign. There are several problems with this methodology - first and foremost, it seems overly optimistic to expect the seal glyptic and sign forms to display significant and systematic changes between the reigns of successive rulers<sup>88</sup>. Secondly, as noted by Nissen 1966 (p. 136) himself, it is unclear whether such a difference would allow for a meaningful comparison between different city-states. Thirdly, the first claim regarding the spelling of Mesanepada's name can be rejected, given that we do have examples of

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<sup>87</sup>In the SKL, the name appears as Meskiaḡ-Nanna. See Marchetti and Marchesi 2011 for an alternative reading Mesnunkiaḡ.

<sup>88</sup>Moreover, consider the difference of what is defined as the "Meskalamdu"-style LUGAL sign in Nissen 1966 and Boehmer 1969

Fara-period personal names containing grammatical markers<sup>89</sup>. Finally, due to insufficient material, palaeography has to rely on comparing sign forms on different types of object. The few examples of sign forms which can be attributed to the Ur I Dynasty come primarily from cylinder seals and seal impressions. The Lagasite material, on the other hand, includes large numbers of inscribed metal and stone documents and no seals or sealings. The oft-omitted implication of palaeographic difference between seal glyptic and tablet writing is that, by the very function of the object, seals are likely to be more enduring, used and recarved over long periods of time, while cuneiform texts are more likely to represent a “snapshot” of handwriting in a particular time at a particular place. As a result, one cannot help but wonder if making any kind of high-resolution comparisons can be meaningful. For the purpose of this inquiry, the reign of Ur-Nanše is taken to mark the beginning of the ED IIIb period. Without any unambiguous historical synchronisms, it seems prudent to treat Ur-Nanše—Akurgal—Eanatum as a single chronological unit, understood as “early ED IIIb”. The combined rules of Meskalamdu—Mesanepada—Aakalamdu can then be treated as roughly contemporary<sup>90</sup>.

## Ur - Published <sup>14</sup>C Dates

**BM-64 (3920 ± 150 BP):** bone; PG755; The bone sample belonged to the skeleton of a young man usually identified as king Meskalamdu of Ur. This sample, together with BM-70 and -76, was published in 1961 and represents the very earliest attempt to apply <sup>14</sup>C dates to archaeological contexts in the region. Though the large measurement error reflects this early stage of the dating technique, the dates cluster together, confirming the theory that the construction of the royal cemetery was either a singular event or occurred over a relatively short time.

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<sup>89</sup>E.g. IAS 298 rev. i 12) mes-ki-gal-**la**; IAS 122 rev. i 5') ur-dumu-zi-**da**; TSS 107 obv. ii 3) ud-unken-**a**; Also note the rather unusual spelling in TSS rev. i 3) saġa ur-saġ-<sup>d</sup>en-lil<sub>2</sub>-**la**, using LA rather LA<sub>2</sub>.

<sup>90</sup>See Marchetti and Marchesi 2011 for an alternative, slightly later dating of Ur I Dynasty, where Mesanepada is taken to be contemporary with Enanatum I

**BM-70 (4030 ± 150 BP)**: burnt bone; PG1515; The identity of the individual is unknown. See BM-64.

**BM-76 (3990 ± 150 BP)**: bone; PG800; This bone sample came from the female skeleton usually identified as Pū-abim. See BM-64.

**P-724 (3959 ± 59 BP)**: wood; This reading has been performed on a bulk sample of wood collected from various axes found within the graves. Little can be said about the context of this sample, however the fact that measurement has been performed on material likely affected by the old wood effect gives sufficient grounds to treat it as a *terminus post quem* for the bone samples.

## Ur - New <sup>14</sup>C Samples

**OxA-33,848 (4166 ± 32 BP)**: wood (*Cedrus libani*); BM 1935,0116.87 (Lab. ref.: 40,008); coffin wood from PG1648; PG1648 was described by Woolley as the smallest royal tomb, a single limestone chamber no larger than 2x1.5m (Woolley 1934: 133-134). It was dominated by the wooden coffin in question, which contained a poorly preserved skeleton of a young man. Beads of gold, silver and lapis lazuli placed around the individual's head suggested an elaborate headdress. The chamber contained three subsidiary burials: a male and two females, one young and one older. Molleson and Hodgson 2003a analysed the burials to find that the bodies were exposed to high temperatures, and the male body showed stress suggesting head-basket carrying. The elaborate headdress and the collection of stone and copper bowls can therefore be juxtaposed with the apparent "retainer" identity of the grave occupants. Not much can be said about the stratigraphic position of the grave, except that it is overlaid by another small royal tomb, PG1618. The coffin fragment was identified by Dr C. Cartwright as cedar wood, at least 35 years old at the time of its felling. The sample is therefore likely affected by the old wood problem.

**OxA-34,011 (4211 ± 32 BP):** wood (*Cedrus libani*); BM 1935,0116.87 (Lab. ref.: 40,008); coffin wood from PG1648; See OxA-33,848.

**OxA-X-2685-8 (3992 ± 36):** ox tooth; BM 1935,0116.17 (Lab. ref.: 40,009); PG789; A detached molar (**Figure 18**) has been found near an ox jaw bone in the richly furnished PG789. The tooth most likely belonged to the ox which pulled the ceremonial chariot. The animal itself was decorated with jewellery, as evidenced by a golden nose-ring (ca. 9cm in diameter). There is therefore little doubt that the ox tooth can be associated with the royal burial. Unfortunately, none of the teeth recovered from the Royal Cemetery yielded enough collagen to allow dating. As a result, the <sup>14</sup>C measurements were performed on the mineral fraction, thus reducing the reliability of the date (see **Section 3.2.2**).

	<b>Royal Cemetery</b>	
<b>Bone</b>		BM-76
		BM-70
		BM-64
		OxA-X-2685-8
<b>Old Wood</b>		OxA-33,848
		OxA-34,011
		P-724

Graph 3: A schematic representation of the Bayesian model for the Royal Cemetery of Ur.

## 4.6 Nuffar/Nippur

Nippur is a large site spread over two mounds, reaching ca. 25 m from the ground level at its highest point (Leick 2001: 141). First visited by European explorers in the 1850's, systematic explorations of the city began in the 1888. The first seasons were carried out by archaeological teams from the University of Pennsylvania Museum of Archaeology and Anthropology and the Baghdad School of the American School of

Oriental Research. Since 1945, the site was investigated by scholars of the Oriental Institute of the Chicago University. The city of Nippur was perhaps one of the most ancient cities in Mesopotamia to be continuously settled since the prehistoric 'Ubaid times (ca. 5000 BC) well into the 1<sup>st</sup> mill. AD. Undoubtedly, the city owed its importance to the presence of the cultic centre of the god Enlil, one of the most significant figures in the Mesopotamian pantheon. Though Nippur was at no point of its history a political capital, Enlil's role as the patron god of kingship and military-oriented leadership made Nippur popular among ancient rulers, whose construction projects and votive gifts abound in the cultic contexts at the site. Enlil's ziqqurat temple, Ekur (lit. "*The Mountain House*"), occupied the most prominent place on the main mound of the site and underwent numerous reconstructions (McCown and Haines 1967). The significance of the Enlil cult to the city's identity is stressed by the fact that in the logographic writing of the city's name is indeed the same as that of its deity (EN.LIL<sub>2</sub><sup>KI</sup>). The discovery of the so-called Tablet Hill south of the Ekur ziqqurat, was perhaps one of the most significant findings in the history Near Eastern Archaeology. The context was named after an archive of more than 60,000 tablets which contained some of the earliest editions of important Mesopotamian literary works (Crawford 1959: 75).

The Ekur excavations never revealed pre-Sargonic layers. Two soundings on the north-west extreme of the Main Mound revealed another cultic structure, dubbed the North Temple, dedicated to an unknown deity (McCown and Haines 1967: 150). These soundings reached the Protoliterate (Jemdet Nasr) levels, though typical Jemdet Nasr pottery types were scarce (McCown, Haines, and Biggs 1978: 3). The original function of the Protoliterate structures in this area is unknown, as Mesopotamian temples are known to have identical architectural plans to normal residential buildings. The first architectural features clearly identifiable as cultic, such as cellae and altars, appear in Level VIII, associated with ED I ceramic material (McCown, Haines, and Biggs 1978: 6). Levels VII and VI have been assigned to the

ED II period, even though the associated ceramics can in no way be distinguished from either ED I or ED III and represents a transition. The North Temple was rebuilt in Levels VI and V, most likely during the early ED IIIa period. An interesting feature of this new temple was a decorated box altar, hollow on the inside, found in Level IV. A similar feature was found in Shrine I in Tell Asmar (McCown, Haines, and Biggs 1978: 17) and in Tell Brak (see **Section 5.2**). Excavations on the Western Mound, Sounding WF, yielded 19 levels of occupation spanning from ED IIIa to Parthian periods (McMahon 2006: 5). A single tablet reminiscent of the ED IIIa “Fara style” was recovered from Level XVII of the WF, though this may represent a holdover from earlier periods, as most ED IIIa style pottery in this sounding was found in Levels XIX and XVIII (McMahon 2006: 14). The sounding revealed a persistence of some characteristics of the Early Dynastic period, e.g. plano-convex bricks which can still be found in the Ur III contexts (McMahon 2006: 9). Analysis of the pottery in this sounding showed that while the transition between ED IIIa and ED IIIb is noticeable, it is difficult to distinguish between ED IIIb and Akkadian contexts, except for the introduction of some new small find types (e.g. baked clay figurines) (McMahon 2006: 17; 68-70). This underlines the complicated relationship between historical and archaeological records in Mesopotamia.

Two soundings southwest of the Ekur ziqqurat revealed yet another temple, dedicated to the goddess Inana. The temple was identified as Eduranki (lit. “*The House that is the Binding of Heaven and Earth*”) thanks to the discovery of royal inscriptions of king Šulgi of the Ur III Dynasty<sup>91</sup>. Excavations of the Inana Temple, especially Sounding B (IT in Wilson 1986), provided archaeologists with an unbroken sequence of construction levels through from the Protohistoric levels until the second millennium. Together with the Diyala sequences of Tell Asmar, Inana Temple became the

<sup>91</sup>RIME 3/2.01.02.20 = CDLI P247518: 1) <sup>d</sup>inana 2) nin-an-i 3) šul-gi 4) nita kal-ga 5) lugal uri<sub>5</sub><sup>ki</sup>-ma 6) lugal ki-en-gi ki-uri-ke<sub>4</sub> 7) e<sub>2</sub>-dur-an-ki-ka-ni 8) mu-na-du<sub>3</sub> (“*For Inana / Šulgi / the strong man / king of Ur / king of Sumer and Akkad / her House that Binds Heaven and Earth / built for her*”)

main reference sequence of Early Dynastic pottery (Hansen 1965: 201). The temple had humble beginnings as a complex of two, most likely domestic, buildings in the Late Uruk strata (Levels XVI-XV), distinguishable from the earlier Middle Uruk in terms of associated pottery (esp. plum-red slip ware and bevelled-rim bowls)(Wilson 1986: 58-59). The original function of these buildings is hard to discern; although there are no clear indication of a temple prior to mid-ED I, the floors of the Jemdet Nasr buildings were covered with gypsum which suggests the buildings had a special status (Hansen and Dales 1962). The appearance of poly- and monochrome painted pottery in Level XV marks the beginning of the Jemdet Nasr period, with the Uruk-style bevelled rim bowls decreasing in number in Level XIV. The first examples of solid-footed goblets, a diagnostic pottery type for the ED I, appear in Level XII. Though some Jemdet Nasr and Uruk types appear sporadically in later levels, Level XI indicates a new phase with new ED I types (e.g. rim-lugged vessels) becoming more prominent (Wilson 1986: 63); the development is accompanied by the appearance of plano-convex bricks, another hallmark of the Early Dynastic period (Hansen and Dales 1962: 82). It is therefore safe to say that both transitions (Uruk-Jemdet Nasr and Jemdet Nasr-ED I) were gradual. The first clear indicator of the cultic character of the building appears in Level IX in the form of a cella (Hansen and Dales 1962: 82). Levels VII and VIII probably represented the periods of the temples activities, after the Level IX temple was destroyed, filled and rebuilt (Porada et al. 1992: 111). Some of the finds confirming the temple's importance include three hoards of votive statuettes, 50 stone bowls and shell inlays, not unlike those on the Standard of Ur from the Royal Cemetery (Hansen and Dales 1962: 79). The ED III levels (VIII-VI) are rather poor in pottery and therefore their dating is less secure (Hansen 1965: 209). One notable exception is the carved chlorite bowl of the "Intercultural Style" found in Level VIIb - a characteristic and fascinating type of artifact mass produced at the site of Tepe Yahya (ancient Marhaši) in Iran, distributed across ancient Iran and Mesopotamia (Aruz 2003). This vessel would link the context to the Royal Cemetery, although it may also represent a holdover from earlier periods. Level

V, probably representing later parts of the ED III was very much disturbed by the king Šulgi's building projects (Level IV); what follows is that either Inana Temple was not used during the Akkadian period, or that all signs of Sargonic presence were destroyed during the Ur III period.

Given the scarcity of available ceramic materials, the relative dating of the Levels VIII-VII relies on the palaeographic study of cuneiform sources. Most of the Early Dynastic texts from Nippur recovered during the Philadelphia excavations in the 1880's and early 1900's are essentially unstratified, and many have been purchased from the locals (Westenholz 1975). A helpful body of data was retrieved from soundings in the open spaces in the immediate vicinity of the Inana Temple, during the 7<sup>th</sup> and 8<sup>th</sup> excavation seasons (Porada et al. 1992: 111). These included administrative texts as well as royal inscriptions. Three poorly preserved administrative texts<sup>92</sup> came from Level IX in an open area. Another inscribed tablet fragment<sup>93</sup> was found in Level VIII. According to Buccellati and Biggs 1969, these documents are palaeographically comparable to the Archaic Texts of Ur, and thus represent the earliest examples of Sumerian writing (ED I/II). A number of administrative tablets can be assigned to Level VII, mostly placed on top drain fills<sup>94</sup>. According to Biggs (in Porada et al. 1992: 111), these tablets represent a "*mature Fara*" period, and should thus be dated to the ED IIIa period. Only hand drawings are available for most of these tablets, making it difficult to assess their palaeography. They are also relatively short<sup>95</sup>. Four texts were found in Level VI and were designated as "ED III-Sargonic"<sup>96</sup>. For example, the elegant tablet in white clay from Level VI (AS 17, 09) uses fully cuneiform numerals, which appear already in the times of Lugalzagesi<sup>97</sup>. The occurrence of a

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<sup>92</sup>AS 17 1; AS 17 2; AS 17 3

<sup>93</sup>AS 17 4

<sup>94</sup>CTMMA 1 1-5

<sup>95</sup>AS 17, 17 = CDLI P226073 seems to be an exercise and contained mostly single DIŠ signs.

<sup>96</sup>AS 17 06 = CDLI P212537; AS 17 07 = CDLI P212538; AS 17 08 = CDLI P212539; AS 17 09 = CDLI P212540

<sup>97</sup>E.g. Ellis 1979 no. 40, 42

Semitic name<sup>98</sup> may also point to a late ED date. On the other hand, the more fragmentary tablet AS 17, 07 from the same level displays some archaic features<sup>99</sup>.

## **Nippur - Published <sup>14</sup>C Dates**

**P-530 (4672 ± 74 BP):** Inana Temple, Level XVII; wood charcoal of unknown species from a fire pit; The sample comes from a stratum dated to the “Protoliterate B” period based on the associated ceramic material. The sample should probably belong to the Late Uruk phase (Stuckenrath 1963).

**P-798 (4145 ± 59 BP):** Inana Temple, Level IX; charcoal; The transition between the Jemdet Nasr and ED levels at Nippur was a gradual one and started with Level XII. Level IX corresponds to the earliest examples of ED tablets similar to the Archaic tablets of Ur. For the purpose of this analysis, the dates from Inana Temple IX and VIII are grouped together in the “ED I/II” phase, subdivided into two consecutive subphases on the basis of stratigraphy.

**P-803 (4221 ± 53 BP):** Inana Temple, Level IX; charcoal; kiln. See P-798.

**P-801 (4590 ± 65 BP):** Inana Temple, Level IX; charcoal; floor; See P-798. This date is considerably older than the other samples from the same level. Stuckenrath and Ralph 1965 provides no explanation for why this may be the case. It is possible that this wood sample was affected by inbuilt age. P-801 has been excluded from the analysis as an outlier.

**P-800 (4157 ± 62 BP):** Inana Temple, Level IX; charcoal; floor; See P-798.

**P-820 (4090 ± 62 BP):** Inana Temple, Level IX; charcoal; floor; See P-798.

**P-819 (4272 ± 65 BP):** Inana Temple, Level IX; charcoal; fireplace; See P-798.

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<sup>98</sup>AS 17, 09 rev. 2) i-šar-be-li<sub>2</sub>

<sup>99</sup>Numerals in obv. 6'; the form of the sign MU in rev. 2

**P-807 (4090 ± 64 BP):** Inana Temple, Level VIII; charcoal; floor; See P-798.

**P-799 (8472 ± 102 BP):** Inana Temple, Level IX; charcoal and dirt; kiln. This date is considerably older than the rest. This is probably due to it being a bulk sample of dirt deposit with inclusions of older material.

**P-806 (4345 ± 66 BP):** Inana Temple, Level VIII; charcoal; floor. This date is older than the other sample from Level VIII (P-807) by ca. 300 years, possibly due to inbuilt age. The date was highlighted as an outlier.

**P-809 (3945 ± 62 BP):** Inana Temple, Level IX; charcoal; floor. This date is considerably younger than the other Level IX dates, probably due to the insufficient weight of the original sample (Stuckenrath and Ralph 1965: 189). The date was removed from the analysis as an outlier.

**P-804 (4095 ± 52 BP)** Inana Temple, Level VII; charcoal; floor; Though the dates P-804 and P-805 were classified as “ED II” in the original publication, the presence of the Fara-style texts in Level VII makes it much more probably for the contexts to date to the earlier parts of ED III.

**P-805 (4006 ± 62 BP):** Inana Temple, Level VII; charcoal; See P-804.

**P-810 (4074 ± 64 BP):** Inana Temple, Level V; charcoal; The sample, originally assigned to ED II/III, is much more likely to date to the later parts of the ED III period due to its place in the stratigraphy. The presence of Fara-style tablets and chlorite bowls in the underlying Level VII would most likely make this reading younger than the texts from Fara and Abu Salabikh, as well as the Royal Cemetery of Ur.

Inana Sounding		
ED IIIa/b	Level V	P-810
ED IIIa	Level VII	P-804 P-805
ED I/II	Level VIII	P-807 P-806
	Level IX	P-809 P-799 P-819 P-820 P-800 P-801 P-803 P-798
Jemdet Nasr		
Late Uruk	Level XVII	P-530

Graph 4: A schematic representation of the Nippur archaeological sequence.

## 4.7 Other Southern Mesopotamian Sites

### Uruk - Published $^{14}\text{C}$

Uruk is arguable one of the most significant late 4<sup>th</sup> mill. BC site not only in Southern Mesopotamia, but also in the entire Near East (**Section 2.1**). The site is not given a detailed description in this work for two main reasons. Firstly, over a century of archaeological inquiry of Uruk would be impossible to summarise in a single chapter. Secondly, the recent publication of a number of new  $^{14}\text{C}$  dates from the site (Ess 2015) provides a good discussion of the samples and how they relate to the general stratigraphy. The descriptions of these samples are given below, with some some discussion where relevant.

**Gebäude C, Eana:** 15 radiocarbon dates on charcoal material from the Building C, also known as Temple C, have been published so far. 3 appeared in Wright and Rupley 2001, and 12 in Ess 2015. These, however, will not be used in the Bayesian model as one precise dendrochronological date (**3290-3245 calBC** within  $2\sigma$ , provided by Hußner in Ess 2015) provides a far better lower boundary estimate for the building's construction.

**UGAMS-12440 (4650 ± 25 BP):** wood (*Cedrus libani*); Anu Ziqqurat; Anu Bauschicht 7 or later; Sample W 8925; Interpreted as remains of door to the White Temple (Anu Bauschicht 7).

**UGAMS-12441 (3860 ± 25 BP):** wood (*Cedrus libani*); Anu Ziqqurat; Anu Bauschicht 7; Sample W 16112; This sample, most likely also a door frame fragment, was conserved at the museum. The pretreatment methods were not successful at extracting the preservatives, producing a date significantly younger than the rest of the Anu Ziqqurat samples. The date was excluded as an outlier.

**UGAMS-12442 (4660 ± 30 BP):** wood, probably pine; Anu Ziqqurat; Anu Bauschicht 10 or 11; Sample W 16605; No exact layer was recorded for the sample. In any case, this date certainly came from the fill below the White Temple and can be used as a *terminus post quem* for its construction.

**UGAMS-12443 (4640 ± 30 BP):** juniper (*Juniperus* sp.); Anu Ziqqurat; Anu Bauschicht 10 or 11; Sample W 16605; Another wood sample found in a posthole, it is not possible to convincingly assign it to any of the layers of the Anu Ziqqurat. However, it seems probable that, together with UGAMS-12442, this date offers a *terminus post quem* for Bauschicht 8 which was laid underneath the White Temple (Ess 2015: 28).

**UGAMS-12435: (4980 ± 25 BP):** bone apatite; sheep/goat; Eana Ziqqurat; Sample Riemchengebäude West 1; A number of dates was performed on samples from the fill of the Riemchengebäude in the Western part of the Eana ceremonial complex. The exact nature of the fill has not been well recorded, although it is quite possible that it contained material excavated from earlier levels. The bone dates were performed on the mineral fraction of the bone, which has long been recognised as problematic. The exact pretreatment protocol for the apatite dates was not given, Ess 2015 (p. 17) merely referencing Cherkinsky 2009. It is important to note that the apatite dates pre-treated with this protocol often

produced dates older than those performed on collagen, as opposed to alternative methods which systematically gave younger dates (see **Section 3.2.2**). The unexpectedly old age of UGAMS-12435 and UGAMS-12137 (excluded as outliers) may be therefore a result of either insufficient sample pretreatment or intrusive material.

**UGAMS-12436 (4630 ± 25 BP):** bone apatite; sheep/goat; Eana Ziqqurat; Sample Riemchengebäude Southwest 2; See UGAMS-12435.

**UGAMS-12437 (4930 ± 25 BP):** bone apatite; sheep/goat; Eana Ziqqurat; Sample Riemchengebäude North 3; See UGAMS-12435.

**UGAMS-12438 (4540 ± 25 BP):** bone apatite; sheep/goat; Eana Ziqqurat; Sample Riemchengebäude Mittelraum 4; See UGAMS-12435.

**UGAMS-12439 (4700 ± 25 BP):** bone apatite; sheep/goat; Eana Ziqqurat; Sample Riemchengebäude 1049 5.

**UGAMS-20148 (4570 ± 20 BP):** carbonised straw/reed; Eana Ziqqurat; Sample Riemchengebäude 12; This sample came from the main room of the building (Mittelraum). The reeds were either contents of the broken pot found in the vicinity or were the remains of reed matting on the building's floor.

**UGAMS-20149 (5350 ± 30 BP):** carbonised straw/reed; Eana Ziqqurat; Sample Riemchengebäude 13; See UGAMS-20148. It is unclear as to why the sample is much older than UGAMS-20148 with which it shared context, though contamination (bitumen?) is suspected.

**UGAMS-20152 (4460 ± 20 BP):** straw/reed; Eana Ziqqurat; Sample Md 15-4 16; The bundles in the small trenches of Md 15-4 were found with characteristic Jemdet Nasr painted pottery. Given this and the fact that the presence of bricks which resemble the plano-convex material used in the Early Dynastic periods

suggest that the samples from this context postdate the Uruk IV samples from the neighbouring Riemchengebäude and are likely to represent the Jemdet Nasr.

**UGAMS-20153 (4460 ± 20 BP):** poplar (*Populus* sp.); Eana Ziqqurat; Sample Md 15-4 17; See UGAMS-20152.

**Opferstätte:** 2 bone bioapatite and 2 wood samples were recovered from pits sunk into the “Offering Courtyard” which overlaid Temple C and predated the Eana III level. Their stratigraphic position would make them important for the dating of the transition between Uruk IV and Jemdet Nasr periods at the site. However, as noted by Ess 2015 (pp. 30-31), at least some of the material in the fill of Temple C which formed the Opferstätte likely dated to use periods of the Temple. Therefore, the context is very likely a mixture of Uruk IV and later samples. Because of these complications, the dates could not be assigned to either Uruk IV or Jemdet Nasr periods and were therefore excluded from the model.

**UGAMS-20154 (4530 ± 20 BP):** ash; Archaische Siedlung; Ovens I and II; Sample Archaische Siedlung 18; The bulk sample of ash collected from two different ovens in the Archaische Siedlung area, a residential quarter northeast of the ceremonial complex, spanning over Jemdet Nasr and Early Dynastic periods. The ovens both came from Level IX of the Siedlung which also contained considerable amounts of characteristic painted pottery. This date can therefore be ascribed to the Jemdet Nasr period.

**UGAMS-20155 (4790 ± 25 BP):** ash; Archaische Siedlung; Ovens I and II; Sample Archaische Siedlung 19; Same material as UGAMS-20154.

**UGAMS-20156 (4990 ± 25 BP):** ash; Archaische Siedlung; Ovens I and II; Sample Archaische Siedlung 20; Same material as UGAMS-20154. This date is considerably older than UGAMS-20154 and UGAMS-20155, which give the expected age. Given the unclear nature of the mixed material, it is difficult

to say what could cause the contamination. The sample was excluded as an outlier.

**UGAMS-20157 (7380 ± 30 BP):** ash; Archaische Siedlung; Ovens I and II; Sample Archaische Siedlung 20; Same material as UGAMS-20154. This date is considerably older than UGAMS-20154 and UGAMS-20155 which give the expected age. Given the unclear nature of the mixed material, it is difficult to say what could cause the contamination. The sample has been excluded as an outlier.

	Gebäude C, Eana		Riemchengebäude, Eana		Md 15-4, Eana		Archaise Siedlung		White Temple, Anu	
<b>Jemdet Nasr</b>					JN/ED I/II	UGAMS-20152	Jemdet Nasr	UGAMS-20154		
						UGAMS-20153		UGAMS-20155		
								UGAMS-20156		
								UGAMS-20157		
<b>Late Uruk</b>	Dendro date	3290-3245 BC	Late Uruk fill	UGAMS-12435					Bauschicht 7	UGAMS-12440
				UGAMS-12436						UGAMS-12441
				UGAMS-12437					Bauschicht 10-11	UGAMS-12442
				UGAMS-12438						UGAMS-12443
				UGAMS-12439						
				UGAMS-20148						
				UGAMS-20149						

Graph 5: A schematic representation of the Uruk archaeological sequence.

## Ğirsu - Published <sup>14</sup>C Dates

**UGAMS-8186 (4150 ± 30 BP):** brushwood charcoal; Tell K; “2.15m beneath the mound surface”; “sealed ash lense, consistent with a household hearth” A number of dates from Southern Mesopotamia were published by Hritz et al. 2012; however only one of them came from a sealed context. The sample was reported as brushwood. Although the species is not known, one can discount potential inbuilt age. The description of the context leaves a lot of doubts, but the sample must predate the “Maison des fruits”, also known as the Ur-Nanše Building (Forest 1999). The construction of the building is attributed to the first king of the First Dynasty of Lagaš, though there are some doubts about how long the building was used (Forest 1999: 10; Huh 2008: 150; Marchetti and Marchesi 2011: 39). If Hritz et al. 2012 are right in attributing the sample to a

layer of domestic occupation, the layer has to precede not only the Ur-Nanše (ED IIIb) Buildings, but also the underlying “*Sous sol d’Our-Nina*” (Forest’s level 4), and the “*Construction inférieure*” (Forest’s levels 6-5) which was sealed with a layer of brick and gypsum slabs (Marchetti and Marchesi 2011: 40). Although there is no unambiguous association with diagnostic pottery, the *termini ante quem* described above make it possible the sample should be classified as ED I/II in date.

### **Kiš - Published <sup>14</sup>C Dates**

**OxA-28,283 (3905 ± 27 BP):** bone collagen; YWN sounding; Phase 2; The sounding YWN revealed two main layers of construction, both of them dated to the late ED III - early Akkadian period. The context was interpreted as the inside of an extensive and rich household (Zaina 2016: 436). Given that ED III and Akkadian ceramic repertoires are virtually indistinguishable, it is impossible to say whether this context predates the Akkadian conquest on the basis of pottery finds. Majority of the sealings from Phase 2 at YWN belong to the ED III tradition (lion and antelope scenes, banquet scenes), however at least two scenes can be identified as Akkadian (a theomachy scene, an inscribed procession scene)(Zaina 2015: 228). Zaina 2015 (p. 229) claims that the textual material<sup>100</sup> of the context suggests a chronological range between ED IIIa and Akkadian periods; however the linguistic features of these documents seem to place them on the younger end of this spectrum. Taking all of this into consideration, Zaina 2015 suggests a dating of the YWN Phase 2 contemporaneous with Cemetery A and the destruction of the Plano-convex Building at the site, i.e. terminal ED IIIb.

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<sup>100</sup>Akkadian administrative tablets (Gelb 1970: 3642, nos. 4551), fragments of an Akkadian kudurru (Gelb, Steinkeller, and Whiting 1991: 64-66, no. 16) (Westenholz2014: 1847).

# Chapter 5

## Syrian Jezirah

### 5.1 Excursus - Ninevite 5 Culture

Out of all the different ceramic traditions of the late 4<sup>th</sup> - 3<sup>rd</sup> millennium BC, few are as significant to the North Mesopotamian chronology as the so-called Ninevite 5 pottery. The characteristic painted sherds were first recorded during R.C. Thompson's excavations at Nineveh during the 1929-1930 season (Thompson and Hutchinson 1931), but the assemblage was only defined and given its current name during the following 1931-1932 season, where a sounding in the Prehistoric Pit recovered a long sequence of pre-Assyrian levels (Thompson and Mallowan 1933). These have been named Ninevite 1 to 5 (with Ninevite 1 being the lowest one, and Ninevite 5 on the top, contrary to modern archaeological conventions). Ninevite 4 level contained pottery types similar to the Late Uruk pottery and the south, while a number of Akkadian-style sealings found in the upper parts of the Ninevite 5 level provided a *terminus ante quem* for the material culture. Ninevite 5-style pottery was found on several sites in the Northern Iraqi region of Mosul (Nineveh, Tell Billa, Tellul eth-Thalathat, Tell Karrana, Tell Mohammed Arab) and in the Syrian Khabur River Valley (Tell Brak, Tell Leilan, Tell Raqa'i). Small amounts of Ninevite 5 sherds were recovered from sites further away, such as Tell Asmar in the Diyala region in Iraq and in Mari (Roaf and Killick 1987: 201-205). The general consensus is that the development of the Ninevite 5 was divided into three main chronological phases, based on their decoration: painted (**Figure 19**), incised, and excised (Roaf and Killick

1987: 222; Rova 2003b; Killick and Roaf 2003; although see **Section 5.4**). Early Ninevite 5 sherds have been reported in association with bevelled-rim bowls, and several sites yielded “Transitional” Uruk-Ninevite 5, which would imply that Ninevite 5 was likely a local development of the Uruk culture (Roaf and Killick 1987: 203; Rova 2003b: 5). Though it is difficult to connect the Jezirah sequence with the Southern Mesopotamian chronology, it is safe to say that the entire span of the Ninevite 5 culture roughly corresponds to the Jemdet Nasr - ED IIIa periods. The culture is difficult to define outside of its ceramic material. Ninevite 5 sites are not distinctive in terms of their architecture (Forest 2003). The Ninevite 5 cemeteries show no signs of social stratification in terms of grave goods or burial architecture (Bolt and Green 2003). Lack of monumental architecture or any evident growth in urbanism during the Ninevite 5 period can be juxtaposed with the presence of some kind of central administration as evident from large amounts of sealings found in some Ninevite 5 contexts (Matthews 1999: 301; Schwartz 2003: 586). The preliterate Ninevite 5 remains one of the most significant and mysterious local cultural phenomena of ancient Syria and Northern Iraq. It is perhaps best seen as a prelude to the emergence of the large regional city-states of the Early Dynastic period (Brak, Leilan, Mozan, Mari). As a result of the work of the ARCANE project (Rova 2011: 52-57), the Ninevite 5 culture has been integrated into the now widely accepted Early Jezirah (EJ) chronology, where it corresponds to EJ I (earliest painted Ninevite 5 in the Eastern Khabur region) and EJ II (starts with the appearance of the excised decoration, until the rise of the Early Dynastic city-states).

## **5.2 Tell Brak/Nagar**

Tell Brak can arguably be called the most significant site of its region. It easily challenges Uruk in terms of size and antiquity, being a clear proof that the development of early civilisations in the North occurred independently, though not in isolation. The high profile of Tell Brak is also reflected in the long and eventful history of excava-

tion. The site was first systematically surveyed and excavated by M.E.L. Mallowan in the 1930's (Mallowan 1947) who discovered the Akkadian-period "Narām-Sîn palace" (currently believed to have been a fortified storeroom, Oates, Oates, and McDonald 2001: 19) and the iconic "Eye Temple". The excavations restarted in 1976 under the direction of J. Oates, and have continued ever since with several site directors. The site, dominated by a single large mound, was occupied since at least the 'Ubaid period ca. 4500 BC, and achieved its greatest size around 3500 BC, making it a contemporary of Middle Uruk Eana. It is at this time (Tell Brak Phase F) that the so-called "Eye Temple" was constructed on the Southcentral edge of the main mound. This cultic building owes its name to the thousands of small stone idols with characteristically large stylised eyes, believed to have depicted the worshippers presented before the chief deity of the site, Belēt-Nagar<sup>101</sup>. Surface survey clearly demonstrated that Phase F was indeed the heyday of Tell Brak when the site was the largest known urban centre at that time (Ur, Karsgaard, and Oates 2011: 7). A major change in the settlement pattern occurred with the arrival of Southern influences, diagnostic of Late Uruk culture. The Uruk sherds were clustered in several areas surrounding the Main Mound, giving credence to the proposition of an "Uruk colony" present at this time (Ur, Karsgaard, and Oates 2011: 9). During the later phases (K-L), Tell Brak joins Tell Leilan and Tell Mozan as one of the largest and most powerful city-states of the region. Its independent existence was brought to an abrupt end by the Akkadian conquest. The demise of the Akkadian was as sudden and drastic as its arrival, causing the site to shrink in size, though it was not abandoned (Oates, Oates, and McDonald 2001: 389). Following the Akkadian collapse, the site regained importance during the 2<sup>nd</sup> mill. BC under Hurrian rule. Later occupation continued with breaks until the first centuries of the 1<sup>st</sup> mill. BC.

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<sup>101</sup>It is important to note, however, that the name of the goddess does not appear until the Ur III period (Eidem and Matthews 1993: 203). Most famously, the goddess is mentioned in the oldest known Hurrian text, the inscription of Tiš-atal of Urkeš (Parrot and Nougaurol 1948; Wilhelm 1998). The lack of extant early 3<sup>rd</sup> texts from Nagar makes it very difficult to demonstrate that the goddess, or some related deity, was worshipped at the site. Connecting the prehistoric Eye Temple with Belēt-Nagar is pure speculation.

Starting with the southern edge of the Main Mound, the sounding CH was an excavated area immediately adjacent to Mallowan's Eye Temple and the Narām-Sîn Palace. The latter structure offers an important chronological marker for the sounding in question, as inscribed bricks with the name of the last great Akkadian king give a reliable synchronism with CH Level 4a based on stratigraphy (Oates, Oates, and McDonald 2001: 19-21). This is especially important given the paucity of datable ceramics or glyptic material in the soundings. Individual sherds of the Ninevite 5 type discovered on top of the unexcavated Level 8 provide us with a *terminus post quem* for the younger levels. Ninevite 5, discussed in greater detail **Section 5.1**, is usually taken as roughly contemporary with the earlier phases of the Early Dynastic (ED I - ED III). What follows are two construction Levels (7 and 6, Phase L) of small terraced houses, with traces of hearths, ovens and stairs. Each of these levels ended with a destruction by fire; however while the Level 7 houses seemed to have been cleared out prior to destruction, Level 6 yielded material (pottery, grindings stones) *in situ*, suggesting a violent and unexpected event (Oates, Oates, and McDonald 2001: 28-30). This destruction is traditionally dated to the Akkadian conquest, although it is important to remember that there is no direct association with diagnostic material culture. The floor plan of the pre-Akkadian houses was reconstructed, albeit in a more schematic and organised manner in the subsequent Levels 5 and 4b (Oates, Oates, and McDonald 2001: 30-32). Should the association between the construction layers of Level 4 complex in CH and neighbouring the Narām-Sîn Palace be correct, the two layers of constructions would suggest a lengthy pre-Narām-Sîn Akkadian occupation at the site. <sup>14</sup>C samples recovered from the destruction levels of Phase L can therefore be viewed as a good *terminus post quem* for the Akkadian conquest of Brak.

ER was another area originally excavated by Mallowan and re-excavated by Oates's team. Located to the Northeast of CH, the area shows signs of prehistoric occupation, as the deep-sounding Levels 12-13 yielded crude Uruk sherds. The Uruk levels were sealed by a series of ashy fills, one of which (Level 8) contained Ninevite 5 pottery,

suggesting contemporaneity with early Late Uruk or initial ED in the South (Oates, Oates, and McDonald 2001: 36). The excavations revealed a large domestic structure in Level 5. Pottery and charred grain seeds found *in situ* made the excavators interpret the contexts as storage areas of a private household. ER Level 5 was seen as roughly contemporary with CH Level 6, for several reasons:

- A) The Level 5 structure was violently burnt and destroyed, with plentiful *in situ* material sealed within, similarly to CH Level 6;
- B) The “red Stone Ware” is considered as typical for Phase L (Oates, Oates, and McDonald 2001: 35);
- C) There is little room for Phase L occupation below Level 5.

This interpretation poses some difficulties. Firstly, the monumental complexes of FS and SS clearly show that large-scale destruction events were by no means limited to the ED-Akkadian transition. Secondly, it has been noted that Stone Ware occurs in both ED and Akkadian layers at Brak (Oates, Oates, and McDonald 2001: 153). In other words, equating the destruction layer of Level 5 with Akkadian conquest, as it is the case in CH Level 6, seems highly plausible, though is by no means certain.

Two soundings, FS and SS, although placed on the opposite extremes of the mound (NE and SW respectively), should be discussed together given the peculiar similarities noted by Oates, Oates, and McDonald 2001 (p. 386). In FS, the impressive monumental complex (Level 5) consisted of numerous rooms and courtyards, and was interpreted as a subsidiary complex of the temple of Šakkan, found immediately to the North. The complex was cleared out and infilled. Oates, Oates, and McDonald 2001 (p. 41) believe that the abandonment and destruction of the complex was ritual in nature, given the lack of evidence for violent burning, the fact that the complex was almost devoid of *in situ* material, and the interesting inclusions in the fill of the complex. These included human and animal burials, as well as caches of precious

silver, gold, electrum and semi-precious stone objects (Oates, Oates, and McDonald 2001: 45-46). The only textual material from Level 5 which offers some insights into the date of the complex consists of three Akkadian bullae<sup>102</sup>. The monumental building was overlaid by a smaller complex of buildings, economic but not purely domestic in nature (Oates, Oates, and McDonald 2001: 53). It is safe to say that the complex housed a branch of the Akkadian administration at the site, as visible in the documents found in the level<sup>103</sup>. The Level 4 structures did not survive long, as they were superseded by another set of structures in Level 3. Although significantly less imposing than the Level 5 complex, Level 3 buildings are undoubtedly monumental in character, as evidenced by the semi-column wall decoration and arched doorways (Oates, Oates, and McDonald 2001: 56-61). There is no direct evidence which would allow us to securely date the Level 3 building; however, it was taken to represent a late phase of Akkadian occupation of the site. The reasoning was based on two main observations: 1) The ephemeral character of Level 4 structures made the excavators interpret them as a temporary “*prelude*” to Level 3 (Oates, Oates, and McDonald 2001: 62); 2) The architecture of the superseding Level 2 was drastically different, with large household structures replacing the previous monumental complexes. Considering the evidence from other soundings at the site, this was understood as an abandonment of the Akkadian settlement and the beginning of the Post-Akkadian occupation. Therefore, Levels 5-3 were assigned to Phase M, while the Level 2 houses and the much eroded and poorly preserved Level 1 would constitute Phase N.

The protruding area on the Southwestern edge of the Main Mound was designated as SS. This part of the site housed another imposing monumental complex, the construction of which was dated to Level 5 of the sounding. The complex was dominated by two large courtyards, surrounded by smaller cellae. The layout of the building and the “bent axis” access to the subsidiary cellae point to a cultic nature of the building.

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<sup>102</sup>Eidem, Finkel, and Bonechi 2001 nos. 77-79 = CDLI P227372-P227374

<sup>103</sup>Eidem, Finkel, and Bonechi 2001 nos. 67-76 = CDLI P213500-P213509

Some interesting architectural features, esp. the “fluted wall” decorations have no parallels either in the Jezirah or Southern Iraq (Oates, Oates, and McDonald 2001: 388). A subsidiary complex to the west of the large courtyards was interpreted as auxiliary economic and possibly administrative institution, based on the presence of small sealed clay bullae<sup>104</sup> (Oates, Oates, and McDonald 2001: 84). Similarly to the FS structures, the SS complex was briefly abandoned, then cleared and infilled. Ritual deposits on the floors included food offerings, metal objects and semi-precious stone beads (Oates, Oates, and McDonald 2001: 90). Though it is unclear whether the SS complex was constructed before or after the Akkadian conquest of the site, it seems safe to say that the temple was used during the early Akkadian period, given the ample sealing material in the fill of the South Courtyard (= Room 8)<sup>105</sup>. Following the abandonment and destruction of the monumental building, two layers (Levels 4-3) of domestic occupation followed (Oates, Oates, and McDonald 2001: 92-93). Cuneiform tablets<sup>106</sup> found in Level 3 demonstrate that these levels were still Akkadian in date. Though two further layers were discovered overlying Level 3 houses (Level 1-2), only the latter was preserved well enough to provide satisfactory contextual information. The area seemed to have continued to be dominated by domestic architecture. The most prominent feature of Level 2 was a large kiln sunk into the Level 3 layers (Oates, Oates, and McDonald 2001: 93-96). One can clearly see how the life history of the area SS mirrors that of FS. Both were originally occupied by massive structures, most plausibly temples. There is no reason to doubt that the powerful Early Dynastic kingdom of Nagar would have the resources to complete such projects. Unfortunately, one cannot say with all certainty whether these buildings were part of the monumental construction project of the Akkadian conquerors. Regardless, the last phases of use for these complexes certainly fell into the Akkadian period. The brief abandonment which followed was suggested to be equivalent with the “air-blast event” postulated

<sup>104</sup>Eidem, Finkel, and Bonechi 2001 no. 61-64 = CDLI P227367-P227370

<sup>105</sup>Eidem, Finkel, and Bonechi 2001 p. 144, Fig. 181 “Scribe’s Seal”: 1) dub-sar 2) X-X(*ti?*) 3) an-na

<sup>106</sup>Eidem, Finkel, and Bonechi 2001: nos. 54-57 = CDLI P227360-P227363

by Courty 2001. The highly ritualised destruction and infilling clearly demonstrate the special status of these loci, and the offering deposits show that this status persisted even after the walls were pulled down. While small-scale monumentalisation efforts were made in FS, SS was then turned into a domestic quarter. Both areas saw a drastic change in the transition to the Post-Akkadian Phase N, characterised by even smaller domestic structures.

A protruding “tongue” of the mound to the immediate north of SS was named HP. The excavations of this part of the tell revealed yet another brick structure of monumental proportions (ca. 29 x 8.5m). The building was deprived of any furnishings which would allow for a better interpretation of its nature. A small room adjacent to the south wall of the structure contained an interesting architectural feature: a plastered pentagonal pedestal placed in the corner, adjacent to two benches (Matthews 2003b: 210-212). An ashy build-up accumulated by the western walls of the complex contained around four hundred sealings. The sealings were quite varied, both in terms of their form (jar, peg and cord, basket, bullae) and glyptic. The sealings include depictions of animal rows, contest scenes (heroes and mythical creatures in conflict), banquet scenes, war scenes (some with chariots), mythical scenes (a deity in a boat) and one geometric design (potentially a holdover from earlier periods). Despite this variety, the art styles of these sealings were considered quite homogenous and quite similar to those found in the SS monumental structure and Levels 5 and 4 in the FS sounding (Matthews 2003b: 213-228). Given the similarities in the glyptic material and the fact that the HP structure was infilled following its abandonment, it is safe to suggest that it was roughly contemporary with the ST monumental complex. Given the large quantity of discarded sealings, the HP building was most likely an auxiliary branch of the cultic institution, charged with administrative duties.

Immediately to the south of sounding FS, several trenches were sunk in the area designated as ST. The deepest levels of the sounding (Levels 15-13) yielded large

quantities of Ninevite 5 pottery, providing a *terminus post quem* for the remainder of the strata. This is particularly important given that the overlying levels (Levels 12-6) were heavily destroyed by terracing operations on the verge of the wadi (Oates, Oates, and McDonald 2001: 40). These levels were thus classified as Phase L, “Early Dynastic” (= Pre-Akkadian). The date of the Level 5 structure nicknamed “red libn building” is somewhat ambiguous, as is the stratigraphic situation of the overlying Level 4. The excavators have cautiously suggested that Level 4 may represent the Akkadian conquest, basing this claim mainly on the similarity of building material used in Level 5 and other Early Dynastic buildings at the site (Oates, Oates, and McDonald 2001: 40). These final three levels house a large Akkadian structure of unknown purpose. Interestingly enough, unlike the planned and ritualistic destructions in FS and SS, these Akkadian structures seemed to have suffered a sudden and unplanned abandonment, given the material found *in situ*, namely large urns and a clay figurine of a wagon (Oates, Oates, and McDonald 2001: 37).

A smaller building was identified in the HF1 sounding, sunk into the slope of the mound to the east of FS. A fragment of a wall and a plastered floor, interpreted as a courtyard, suggested a small shrine in what was called Level 5. Only a few painted sherds, probably dating immediately before the Ninevite 5 appearance, were recovered from the building (Matthews 2003b: 121). This building was replaced by another structure of at least three rooms. The large quantity of near-complete pots found in the Level 4 structure also points to an important, albeit unknown, function. The pots included incised and excised sherds, pointing to a mature Ninevite 5. Finally, the building was completely restructured in Level 3. Although this level was heavily affected by erosion, a section of bitumen-plastered floor was clearly visible. The pottery of Level 5 indicates a late phase of the Ninevite 5 culture, characterised by excised decoration (Matthews 2003b: 122). To summarise, the area of HF1 probably housed a subsidiary branch of the official temple or palatial authorities at the site. The sounding was, however, poor in seals and sealings which one could expect in

an administrative context. Therefore, the structure could have also been an elite residence.

Six smaller trenches were sunk into the northwestern slope of the mound, in the area designated HS. HS1 yielded the earliest evidence of occupation in this area, with a long sequence of prehistoric occupation. The lowest excavated level, Level 7, revealed a circular kiln and fragmentary building walls. Level 6 was investigated in more detail, yielding the structural remains of a domestic structure of at least three rooms. The ceramic material of these levels are dominated by undecorated types such as plain carinated and hammer-head rim bowls as well as jars. These types are typical of the Late Chalcolithic period in Northern Mesopotamia and have been found in association with Middle Uruk ceramics (Felli 2003: 54-55). A stamp sealing found in Level 6 corroborates this dating (Felli 2003: 60). One can therefore imagine that these contexts dated to the heyday of the Eye Temple. Further to the northwest, the soundings HS4:1 and HS4:2 were initially excavated separately, and only later had their stratigraphies been connected. Although Matthews 2003b (p. 115) states that the HS4:1 sequence represents the full span of the Ninevite 5 culture, it is important to note that the first sherds that appear in Level 8 are of the incised type. The lack of painted sherds in the sequence may suggest that the culture arrived at Brak already in its mature form. In Level 11 at the bottom of the sounding, a large building with plastered floor contained little pottery, making it difficult to determine either its date or function. The structure could have been ritually emptied prior to its abandonment and infilling. A series of floors in the overlying Level 10 contained some tools, indicating industrial activity. Some poorly preserved architectural remains were recorded in the ashy deposits accumulated in the Levels 9-6. The prevalence of cooking ware remains, in combination with the ashy nature of the deposits, suggests an open area used primarily for food-processing (Matthews 2003b: 107). One can observe the evolution of Ninevite 5 pottery since its inception in Level 8 (incised) to the appearance of excised sherds in Levels 6-4. The

most significant feature of the sounding, a single-room temple, was found in Level 5. The temple's furnishings included white plastered walls, benches, and a curious plastered-mudbrick altar in the shape of a hollow box. More than 500 sealings were found in the immediate vicinity of the altar (Matthews 2003b: 111). The temple was then abandoned, infilled, and replaced by yet another small cultic structure in Level 4. Although this building was partially destroyed by the Level 3 constructions, it seems to have followed the layout of the previous temple. Level 4 contained large quantities of late Ninevite 5 sherds and one Metallic Ware sherd (Matthews 2003b: 113).

Further to the northwest of the area HS, the soundings HS3, HS4:2, HS5 revealed levels most likely dating to the second half of the 3<sup>rd</sup> mill. BC. The sequence of these soundings have been correlated with that of HS4:1. The earliest excavated level, Level 7, was most likely a courtyard of a pisé domestic complex roughly contemporary with HS4:1 Level 3. The architectural plan of Levels 7-5 suggests the presence of a small, possibly domestic complex. The large ovens in Level 6 and large amounts of mass-produced pottery, especially bowls, in Level 5 may point to a dedicated industrial area (Matthews 2003b: 198). The layout of the area changes in Level 4, when the buildings are reconstructed using brick. The two-room structure built in Level 3 was characterised by a baked-brick drain. The grinding stones found in Level 3, previously absent from the structure, showed a greater variety of economic activities in the building. Perhaps the most notable feature of this structure was a hoard of precious objects interred in the house. The place of the treasure was marked with a white stone, over which a brick bench was constructed. The hoard included a number of silver objects, predominantly wire rings, a number of semi-precious stone beads, a lapis lazuli amulet in the shape of an Anzu, and most curiously, a golden plaque with two lions. The treasure is not without parallels in Brak and elsewhere in Mesopotamia (Matthews 2003b: 203-208). The most high profile comparandum is the so-called "Trésor d'Ur" found in the Mari palace, famously mentioning the

king Mesanepada of Ur (Parrot and Dossin 1968). While the treasure from Mari is sometimes interpreted as a diplomatic gift given its find locus and the mention of a foreign ruler, the Brak hoard was most likely a personal wealth stockpile. The Anzu amulet constitutes the most striking parallel between the Treasure of Ur and the Brak hoard. The sounding's stratigraphic position and the similarities between the Brak hoard and other Early Dynastic treasures from Northern Mesopotamia suggest that the Levels 7-3 can all be dated to the later Early Dynastic period. Unfortunately, the Akkadian conquest is not immediately observable in the sounding.

### **Tell Brak - Published <sup>14</sup>C Dates**

**BM-2554 (3990 ± 50 BP):** charcoal; FS; Level 5; Two charcoal samples came from the Level 5 monumental building (described in greater detail above). As already mentioned, although there are some doubts regarding the building's construction date, it is certain that it was used and abandoned during the Akkadian period. It is therefore safe to assume that the sample belongs to this period, even if affected by inbuilt age.

**BM-2556 (3960 ± 50 BP):** charcoal; FS; Level 5; See BM-2554.

**BM-1970R (3820 ± 100 BP):** charcoal; FS; Level 2; Yet another pair of readings from the FS sounding were performed on samples from the domestic contexts of Level 2. These are, with all probability, the houses of the Post-Akkadian period. The date, however, is marred by an exceedingly large measurement error and, more importantly, belonged to the group of samples analysed by the BM laboratory to suffer from intralaboratory contamination. Therefore, BM-1970R, together with the other recalculated BM dates from Brak, was removed from the analysis (Tite et al. 1987; Bowman, Ambers, and Leese 1990).

**BM-2555 (3730 ± 50 BP):** charcoal; FS; Level 2; See BM-1970R.

**BM-2687 (3700 ± 80 BP):** charcoal; SS; Level 4; This pair of samples comes from the level overlying the large monumental complex of the SS area. Although the context seems to be domestic in nature, the associated finds place it still in the late Akkadian period. This may be surprising given the two dates consistently give a rather young date, suggesting a longer Akkadian presence.

**BM-2688 (3780 ± 50 BP):** charcoal; SS; Level 4; See BM-2687. The sample was explicitly described as lying “below BM-2687” in the publication, however for the purpose of this analysis, the two samples are grouped in a single phase representing the Akkadian occupation of Level 4.

**BM-2900 (4660 ± 35 BP):** charred seeds; TW; Phase 16 building; The three samples came from the large building in the TW sounding, likely contemporary with the Middle Uruk Eye Temple (Postgate 1994: 175). These samples provide a useful *terminus post quem* for the 3<sup>rd</sup> mill. BC occupation at the site.

**BM-2901 (4570 ± 35 BP):** charred seeds; TW; Phase 16 building; See BM-2900.

**BM-2914 (5670 ± 60 BP):** charred seeds; TW; Phase 16 building; See BM-2900.

**BM-1761R (4210 ± 210 BP):** ash; ST 1104; A domestic structure was identified at the very bottom of the the ST trench. Incised Ninevite 5 sherds found within this building point to a pre-ED date. The date seems to be in accordance with other <sup>14</sup>C dated Ninevite 5 contexts (Oates and Oates 1994: 171). Nevertheless, for the sake of consistency, the date was removed from the model together with the remainder of the BM-17XXR samples, affected by intralaboratory contamination.

**ER Level 5** 5 radiocarbon dates on seeds from jars *in situ* have been recovered from the destruction level, previously reported as ER Level 4 (Oates 1982: 194),

marking the transition from Early Dynastic to Akkadian. Given the similarities in stratigraphies, the event was believed to have been contemporary with the CH Level 6 conflagration. The dates, however, give a much later estimate. This led Oates, Oates, and McDonald 2001 to withdraw their original claim; however Ristvet 2011 simply rejected the dates as outliers. The fact that all of the dates were produced at the British Museum Laboratory during the period of systematic sample contamination, there is a legitimate reason to doubt whether they are correct (despite the attempted correction of the result and a duplicate of one of the samples). Furthermore, ER 29.4/23, a sample from the same layer dated as a part of this project (see below), failed to reproduce the original results. Therefore, these samples will be excluded from the analysis.

**OxA-7,544 (4070 ± 45 BP):** charred seeds; HS4:1; Level 9; This sample was collected in the HS4 sounding. The layer was a fill of an open area, associated with pre-Ninevite 5 ceramic material. In the Tell Brak periodisation scheme, the layers were dated to Phase J, i.e. the earliest stages of the ceramic complex. Despite the fill context being far from ideal, the long stratigraphy of the sounding allows for a construction of a satisfactory Bayesian model.

**OxA-7,545 (4105 ± 45 BP):** charred seeds; HS4:1; Level 8; Another seed sample from a layer deposit, characterised by considerable amounts of ash. In this layer, the first evidence of Ninevite 5 pottery occurs. The sample can therefore be considered as representative of the fully-developed Ninevite 5 culture, likely to correspond to Jemdet Nasr - ED I/II in the south.

**OxA-7,546 (3990 ± 45 BP):** charred seeds; HS4:1; Level 6; Seed sample from an ashy layer underlying the construction of the small Level 5 temple. The pottery finds suggest that the level can be dated to Phase K, i.e. the later Phase of Ninevite 5 presence at the site. The date is, however significantly

younger than expected and does not conform to the samples from overlying layers. The sample had to be rejected as an outlier.

**OxA-7,348 (4730 ± 100 BP):** charred seeds; HS4:2; Level 5; The sample was recovered from the fill close to the temple floor. Its stratigraphic position would therefore suggest that the sample should represent the date of the temple's closing. The date is, however, significantly older. The large measurement error may suggest contamination of the sample or a smaller sample size (2.1mg according to the laboratory records, as opposed to the suggested 3-4mg). According to the laboratory records, the sample underwent RR treatment (See **Section 3.2.2**), which means it underwent neither solvent washes nor alkali pretreatment. One cannot, therefore, rule out the possibility of sample contamination. The date was excluded from the model as an outlier. Although the dates OxA-7,348, -7,547, -7,548, -7,549, and -7,479 are given the provenance of HS4:2 in Ristvet 2011, the Level 5 must surely refer to the HS4:1 sequence scheme, as HS4:2 Level 7 corresponds to HS4:1 Level 3 (Adams 1988).

**OxA-7,547 (4155 ± 45 BP):** charred seeds; HS4:2; Level 5; This sample was found in the fill of the box altar placed inside of the box altar in the Level 5 temple.

**OxA-7,548 (4150 ± 45 BP):** charred seeds; HS4:2; Level 5; Fill near to the temple floor. See OxA-7,348.

**OxA-7,549 (4110 ± 45 BP):** charred seeds; HS4:2; Level 4; Burnt fill over the rebuilt temple. The date should represent the *terminus ante quem* for the second temple. It probably dates to the destruction of the temple prior to Level 3 construction.

**OxA-7,479 (4040 ± 40 BP):** charred seeds; HS4:2; Level 4; Ashy fill on the rebuilt temple. The context is similar to OxA-7,549, although placed slightly below it. Given the fact that both of the samples come from infilling of the

temple, it is easier to assume that they are contemporary. Both are likely to represent the very late phases of Ninevite 5 culture.

**OxA-7,490 (4155 ± 45 BP):** charred seeds; HF1; Level 4; Room 3; The sample was collected from the plastered floor of the Level 4 building. The sample was associated with mature Ninevite 5 pottery.

**OxA-7,491 (4395 ± 45 BP):** charred seeds; HF1; Level 3; fill to the west of Room 1; The date is older than the OxA-7,492, which should be roughly contemporary by about 300 years. One can therefore consider it a holdover. The date was excluded as an outlier.

**OxA-7,492 (4090 ± 45 BP):** charred seeds; HF1; Level 3; fill in Room 1; Given the late Ninevite 5 types in Level 3, the date can be considered an upper boundary for the existence of the ceramic culture in the area.

**OxA-7,623 (3815 ± 40 BP):** charred seeds; HP; ashy tip; The sample comes from the ashy build-up atop the large brick structure. The excavators linked the context with the monumental buildings of FS and SS based on the similar archaeological situation, and comparable sealings. Should this connection be accurate, the building dated to the early Akkadian period or shortly before it. Assuming this date is representative of the date of infilling of the room, it would then date to the post-Akkadian conquest.

**BM-2915 (4650 ± 50 BP):** charred wood; CH; Level 9; The sample has been recovered from a level underlying the Early Dynastic stratum. Based on their stratigraphic position, this context has been labelled as Middle Uruk (Postgate 1994: 173, 175). Given the material of the sample, it may be affected by the old wood effect.

**BM-1758R (3720 ± 100 BP):** charcoal; CH; Level 8; Two samples of charcoal have been collected from a tannur. The context overlies a Late Uruk hearth

and was immediately followed by the ED levels of the sounding (CH 7-6). The samples should thus represent the pre-ED, Ninevite 5 period. This sample belonged to the BM- batch affected by contamination and had to be recalculated, hence the increased reading error. Unfortunately, the excessively young age of both BM-1758R and -1759R, as well as the large error render them unusable.

**BM-1759R (3770 ± 110 BP):** charcoal; CH; Level 8; See BM-1758R.

**BM-2511 (3960 ± 90 BP):** humic acids; CH; Level 6; A number of samples were collected from the destruction level in the CH Level 6. This selection of measurements is usually taken as the date for the Akkadian conquest. Nonetheless, if one assumes that the charcoal samples came from the architectural remains of the building, while the seed samples were leftover from its previous activity, it seems more plausible that the dates immediately predate the destruction. BM-2511 and -2531 have been performed on humic acids and humins respectively, which makes it possible that they represent a mixture of organic material dating from before the destruction.

**BM-1971R (3860 ± 100 BP):** seeds; CH; Level 6; See BM-1970R.

**BM-2531 (3840 ± 50 BP):** humins; CH; Level 6; See BM-2511.

**BM-1972R (3710 ± 100 BP):** seeds; CH; Level 6; See BM-1970R.

**BM-1973R (3870 ± 100 BP):** charcoal; CH; Level 6; See BM-1970R.

**OxA-7,538 (5015 ± 55 BP):** ash; HS1; Level 7; An ashy fill collected from a kiln in the Level 7 house level. While bulk ash samples are not ideal given that they may represent a mix of burning activities over potentially long periods of time, this old date seems to be consistent with the remainder of the Middle Uruk dates and can be used as a *terminus post quem* for the 3<sup>rd</sup> mill. BC sequences.

**OxA-7,539 (4750 ± 45 BP):** charred seeds; HS1; Level 6; The sample is reported to have been taken from locus A4162; however there are no further details regarding this context. The date shares its stratum with OxA-7,540-7,543.

**OxA-7,540 (4900 ± 50 BP):** charred seeds; HS1; Level 6; A sample collected from an ashy fill covering the floor of the probably abandoned Room 2 in Level 6. The date should thus provide a *terminus ante quem* for the occupation of the building. The sample is directly associated with the Middle Uruk stamp seal impressions found in the same fill.

**OxA-7,541 (3875 ± 45 BP):** charred seeds; HS1; Level 6; These seeds have been recovered from a “crude hearth” in Room 2 (Felli 2003: 56). The date appears excessively young when compared to other samples from HS1. There seems to be no obvious archaeological reason for this excessively young date, as no evidence of context disturbance were reported. This date was excluded from the analysis as an outlier.

**OxA-7,542 (5140 ± 50 BP):** charred seeds; HS1; Level 6; The sample was recovered from the grave A4112. The context was a burial of an infant in a sealed pot. The date is slightly older than expected, and is also older than OxA-7,538 which is older stratigraphically. The date had to therefore be rejected as an outlier.

**OxA-7,543 (4895 ± 45 BP):** charred seeds; HS1; Level 6; The sample came from a large deposit of pottery sherds in Room 2. Compare the context for OxA-7,540.

## Tell Brak - New <sup>14</sup>C Samples

**OxA-33,154 (3838 ± 31 BP):** charred seeds (*Hordeum sp.*); SS 142/65 (Lab. ref.: 39,914); SS Level 2; oven; The sample was collected from a fire installa-

tion in one of the levels overlying the late Akkadian domestic context. This stratigraphic information allows us to place the sample in the period of the post-Akkadian occupation of the site.

**OxA-33,155 (3849 ± 33 BP):** charred seeds (*Hordeum sp.*); FS 1067 (Lab. ref.: 39,915); FS Level 3; Room 3 floor; The sample was collected from the floor of one of the late monumental storerooms in FS. As explained in **Section 5.2**, although there is no direct association with datable archaeological material, the sample's stratigraphic situation makes it plausible for it to be Akkadian in date.

**OxA-33,322 (3827 ± 33 BP):** charred seeds (*Hordeum sp.*); ST 105/27 (Lab. ref.: 39,916); ST Level 4; pot in hearth; The sample comes from the large, paved fire installation in the ST sounding. Given the scarcity of datable material in Levels 5 and 4, the archaeological dating of the sequence is problematic. As described above, the excavators believed that the installation was originally Akkadian in date, while acknowledging the considerable uncertainty of this assumption (Oates, Oates, and McDonald 2001: 40). The old radiocarbon age of the sample may suggest that the hearth, and thus Level 4, belong to the pre-Akkadian period. The alternative, suggested by the excavators, was to see the signs of fire as equivalent to the terminal ED destructions attested at other parts of the site. Therefore, for the purpose of this study, the sample was placed in the ED phase, *post factum*.

**OxA-33,890 (3923 ± 31 BP):** charred seeds (*Hordeum sp.*); ER 29.4/23 (Lab. ref.: P39,917); ER Level 5; pot in hearth; The sample comes from the same context as the BM ER Level 5 samples (see above). The date produced seems to correspond well with the CH Level 6 dates, corroborating the excavators' theory that the two destruction events were roughly contemporary, and most likely represent the Akkadian conquest.

**OxA-33,156 (3873 ± 33 BP):** charred seeds (*Hordeum* sp. and *Triticum* sp.); FS 351 (Lab. ref.: P39,918); FS Level 3; Room 4 floor; This sample comes from one of the Akkadian storerooms. See OxA-33,155.

**OxA-34,182 (3906 ± 33 BP):** charred seeds (*Hordeum* sp.); CH 85/45 (Lab. ref.: P41,215); CH Level 6; Room 610 floor; Four barley samples have been collected from the CH Level 6, associated with the destruction level in the sounding. This batch is therefore significant, as it should contribute to the dating of the Akkadian conquest. The samples should, in principle, be of the same date as BM-1971R-1973R, -2511, and -2531.

**OxA-34,183 (3838 ± 33 BP):** charred seeds (*Hordeum* sp.); CH 85/46 (Lab. ref.: P41,216); CH Level 6; Room 610 oven; See OxA-34,182.

**OxA-34,237 (3937 ± 38 BP):** charred seeds (*Hordeum* sp.); CH 84/29 (Lab. ref.: P41,293); CH Level 6; Room 610 floor; See OxA-34,182.

**OxA-34,238 (3819 ± 39 BP):** charred seeds (*Hordeum* sp.); CH 85/18 (Lab. ref.: P41,294); CH Level 6; Room 610 pot; See OxA-34,182.

### 5.3 Tell Beydar/Nabada

The modern site of Tell Beydar, ancient Nabada, was founded on Wadi Awaij, one of the lesser tributaries of the Khabur and it is one of the westernmost sites of the Khabur triangle. The site was first investigated in 1991, and has been subject to extensive archaeological investigation under the direction of M. Lebeau ever since, with the most recent season coming to an end in 2010 (Quenet 2011: 24). The earliest signs of the site's occupation date back to the Late Chalcolithic Period (ca. 4300-3700 BC roughly corresponding to Middle Uruk) found in the southern outskirts of the main site (Beydar III). The occupation focused on the main mound (Beydar I, ca. 25ha), almost perfectly circular in shape. Beydar shares its characteristic

	TW472	CHA	ER4	HS4	HF1	HP	HST	IS	FB	ST	
Phase N (Post-Medieval)									Level 2 OAA.33.15f	BM.207R BM.204E	
Phase M (Akabadian)								Level 4 OAA.33.15f	Level 3 OAA.33.155 Level 5 BM.2554 BM.250F		
Phase L (EJ IIIB)		Disturbance BM.2511 BM.1071R BM.1072R BM.1073R OAA.34.182 OAA.34.183 OAA.34.237 OAA.34.238	Disturbance P38917							Level 4 OAA.33.322	
Phase K (Nimrodic S; EJ IIBa)		Temple BM.7159R BM.7159R		Level 4 OAA.7548 Level 3 OAA.7547 Level 5 OAA.7548 Level 6 OAA.7548 Level 8 OAA.7548	Level 7 OAA.7549 Level 4 OAA.7550					Network S house BM.7181R	
Phase J (Pre-Early Nimrodic S; EJ IIf)				Level 9 OAA.7544							
Phase I (Post-Link)											
Phase G (Late Urnk)											
Phase F (Middle Urnk)	Phase 16 building BM.200 BM.2001 BM.2014	Level 9 BM.2015						Level 5 OAA.7239 Level 6 OAA.7240 OAA.7241 OAA.7242 OAA.7243			
								Level 7 OAA.7238			

Graph 6: A schematic representation of the Tell Brak archaeological sequence.

layout based on concentric circles (central acropolis - first line of fortifications - upper

town - outer wall) with other sites found in the area between the Khabur and Balikh river - these sites, known collectively as *Kranzhügels*, include Tell Chuera, Mari and al-Rimah (Lyonnet 1998). Beydar I most likely received its shape during the EJ II-IIIa periods (roughly contemporary with the earlier parts of the ED III phases in Southern Mesopotamia), and it enjoyed its heyday during the succeeding EJ IIIb period (Lebeau 2006: 1). This is also when the very first cuneiform tablets appear in the Beydar contexts. More than 200 tablets, dating mainly to the late Early Dynastic period have been recovered from the site (Lebeau 2006: 15). Together with the Mari and Ebla tablets, the Tell Beydar text corpus constitutes one of the main historical sources for our study of pre-Akkadian Northern Mesopotamia. According to the texts, the ancient city of Nabada could have been under the control of the kings of Nagar (Lebeau and Bianchi 2011: 328; Lebeau 2012: 309). Nabada was later integrated into the Akkadian empire as evidenced by major reorganisation works on the acropolis. The site was then abandoned and re-occupied during the 2<sup>nd</sup> mill. BC by the Hurrians, who expanded the city with an additional ring of occupation (Beydar II, ca. 50ha)(Lebeau 2006: 3). The main mound was also briefly occupied during the Neo-Assyrian and Hellenistic periods. In the discussion of the site's periodisation, I use the site-specific system developed by the chief excavator (Lebeau 2000) which, to a large extent, is interchangeable with the standard ARCANE Jezirah periodisation and the standard Southern Mesopotamian chronological scheme (e.g. Beydar IIIb ~ EJ IIIb ~ ED IIIb).

Most of the excavations focused on the acropolis (Field F) and the upper town. The acropolis is around 60m in size and is placed ca. 7m above the rest of the upper town. The hill is dominated by two main structures. The first one, nicknamed the "Bloc officiel", was with all probability a palatial complex (Lebeau and Milano 2003: 21). The excavations revealed a layer buildings of uncertain function dating to the earlier parts of the EJ III period (EJ IIIa, corresponding to the end of the Ninevite 5 tradition; Lebeau 2000: 172) which were destroyed and levelled to prepare ground for

the main monumental complex (Lebeau and Milano 2003: 21). The most substantial buildings on the acropolis all date to the EJ IIIb, corresponding to the final stages of the pre-Akkadian kingdom of Nagar-Nabada. The so-called “Bloc Officiel” was a large palatial structure which underwent no fewer than three construction phases, all dating to the EJ IIIb (Lebeau and Milano 2003: 23). The original building complex was composed of thirteen different rooms and contained very little datable material. During the succeeding phase, the number of rooms almost doubled through the addition of three new wings. During the third and final phase, the western part of the Bloc was entirely reconstructed and new chambers were added inside the central courtyard (Lebeau and Milano 2003: 25). Some twenty ED cuneiform tablets were recovered from the palace (Lebeau 2006: 7). The building was levelled at the end of the EJ IIIb period, although it is unclear whether the palace was violently destroyed or merely abandoned, as there are no obvious signs of conflagration. To the south, the palace was flanked by the imposing ED Temple A, which continued to be used during the Akkadian period (Lebeau and Milano 2003: 26). Further to the south, the acropolis was bounded by a ring of three smaller temples (Suleiman 2003). The southernmost of the temples, Temple E (Field M), was placed outside of the immediate acropolis complex. This large tripartite cultic structure revealed two layers of occupation, both rich in ceramics. Like other Early Dynastic temples, the temple was used during both the Early Dynastic (EJ IIIb) and the Akkadian (EJ IVa) periods (Suleiman and Ali 2011: 77-79). The northwestern section of the upper town (Field B) confirmed the general layout of the upper city being based on concentric circles: palatial/cultic - official - domestic. The U Building (named after its U-shape, not to be confused with Field U in the eastern part of the site) belonged to the second ring of administrative buildings, though the lack of available material makes it hard to determine the exact function of the structure (Stede 2007: 7). Beyond this administrative building, a number of smaller domestic buildings was recovered. One of the houses built alongside the main street yielded most of the EJ IIIb tablets from the site (ca. 140), and was thus nicknamed “maison aux tablettes” (Lebeau 2006:

15; Stede 2007: 12). The Field B structures were linked to the main phases of the acropolis on the basis of belonging to the same EJ IIIb architectural horizon, known simply as “niveau principal” (Stede 2007: 7).

Several important soundings were made outside of the main acropolis. Excavations in the far north of the site (Field I) uncovered a city gate, and a later Hellenistic palace (Field A) in the immediate vicinity. Built closely to the gate was a long official building, referred to as the Northern Building. Based on the ceramic material and the 16 tablets found inside, the building was most likely constructed and used during the EJ II-IIIa period, as the texts seem to be some of the most archaic in the region. The monumental features of the building (buttressed entrance, plastered floors, benches) can be juxtaposed to the apparently economic (specifically baking-related) focus of the building’s activity, as evidenced by the large number of bread ovens (Milano and Rova 2008: 587). Four main phases of the building’s utilisation were identified (with Phase 1 being the youngest, and Phase 4 the oldest, contrary to archaeological convention). The final two or three phases probably extended into the final Early Dynastic period (EJ IIIb)(Milano and Rova 2008: 589). The Field I excavations are particularly significant to our analysis, as they provide a stratified sequence of radiocarbon dates providing a good estimate for the beginning of the all-important EJ IIIb period.

Two main discoveries were made to the east of the main mound. Firstly, another large monumental building was unearthed in Field P. Some of the architectural features of the structure (a raised podium presumable for the throne; a large central courtyard area; sanitation installations) suggest that the structure was indeed an elite residence (Pruß and Hilby 2010: 23). After an initial phase when the building indeed functioned as a royal residence (Level 5c), the structure was repurposed into a metal working facility (Levels 5b-a) (Pruß 2007). The shows signs of destruction

in the succeeding Level 4, and is overlaid by a much smaller building, probably domestic in nature. This sequence shares a lot of similarities with the fate of other public buildings of the ED-Akkadian transition in the Khabur region. The other significant find in the eastern part of the site was the long and narrow public building, composed of four identical rooms. The presence of a grill-patterned floor made the excavators interpret the building as a granary (Sténuit 2003: 248). The building was, unfortunately, cleared before infilling, leaving little datable material inside. The dating of the Field E building was achieved using the pottery finds in an adjacent building, most likely built during the final phase of the granary's use (Broekmans 2003: 287). This structure, interpreted as a private house, contained pottery comparable with other EJ IIIb contexts of the site, including sherds of the Ninevite 5 type (potentially holdovers) and a few fragments of the Metallic Ware, believed to correspond to terminal ED, possibly early Akkadian, contexts of the Khabur Region (Pruß 2000; Broekmans 2003: 289). The granary was therefore assumed to have been contemporary with the rest of the long-lived EJ IIIb structures on the site.

## **Tell Beydar - Published <sup>14</sup>C Dates**

It has already been noted by the excavators of Tell Beydar (Lebeau and Milano 2003) that the site's stratigraphy cannot be easily aligned with those of Tell Brak and Tell Leilan. The site has a long and rich EJ III history with very few examples of Ninevite 5 pottery. The earliest radiocarbon-dated levels contained fragments of the characteristic Bichrome Jezirah stands, believed to correspond to final periods of the EJ II and early EJ IIIa (Rova 2003a: 5). Therefore, for the purpose of this research, all of the Pre-Akkadian Beydar samples are considered as contemporary with Brak Phase L and Leilan IIa.

**OxA-10,184 (4255 ± 40 BP):** seeds; Field I; Phase 1; open space 35005; 6 radiocarbon samples have been recovered from the buildings in the northern part of the main tell. The "Eastern" and "Western sectors" were the only

contexts to yield pre-EJ III material (Milano and Rova 2001; Milano, Rova, and Sténuit 2003). The seeds in this sample have been found in association with administrative objects (counting tokens, sealings). Unfortunately, pre-EJ IIIa levels of the sounding are poor in datable pottery, therefore their date (EJ I-II) was assigned mainly on the basis of stratigraphy (Lebeau and Milano 2003: 19). Compare OxA-10,170 below.

**OxA-10,170 (4070 ± 45 BP):** seeds; Field I; Beydar 2-3; underneath a room floor 9540; This sample came from an ash layer with Bichrome Jezirah Ware, a pottery type believed to have corresponded with the final phases of the Ninevite 5 culture and the Metallic Ware, thus dating to the EJ II - early EJ IIIa period (Lebeau 2000: 172; Rova 2003a: 5; Matthews 2003a: 132).

**OxA-10,285 (3800 ± 40 BP):** charcoal; Field I; Beydar 2-3; fireplace in open space 35175; This sample of unidentified charcoal came from the same level as OxA-10,170, and yet it was flagged as an outlier by the original publication due to being too young by ca. 200 years. There seems to be no obvious explanation for this outlier. Fire installations do tend to produce divergent dating results, probably due to being a mix of material accumulated over long periods of time. However, one would expect the outliers to be older, either due to inbuilt age or being residuals.

**OxA-10,150 (3935 ± 65 BP):** seeds; Field I, Western Sector; Beydar 3; This sample was reported to have come from the floor of room 9125, where it was associated with a number of clay sealings. According to (Lebeau and Milano 2003: 19), OxA-10,232, -10,150 and -10,157 all came from “well-synchronised stratigraphic sequences”, probably contemporary, with the exception of OxA-10232 which could be slightly earlier. The contexts were dated to EJ IIIa, i.e. predating the main monumental architecture of the Beydar Early Dynastic.

**OxA-10,157 (3935 ± 65 BP):** seeds; Field I, Western Sector; Beydar 3; See OxA-10,150.

**OxA-10,232 (3934 ± 30 BP):** seeds; Field I, Western Sector; Beydar 3; jar from room 9125. See OxA-10,150.

**OxA-10,151 (3970 ± 55 BP):** charcoal; Field B, Western Sector; ashy filling in room 20514; A series of samples was gathered from the area to the northwest of the main acropolis. These were all associated with buildings with the architectural level known as “niveau principal”, EJ IIIb in date. They were found in association with inscribed bullae, one may therefore assume that the contexts reflect the administrative activities of the Official Block. Two of them (OxA-10,286 and -10,293) were exceedingly old when compared to the remainder of the samples (more than 900 years). It is not entirely surprising that the filling material was mixed and contained residuals. The samples were therefore excluded as outliers.

**OxA-10,158 (3885 ± 45 BP):** charcoal; Field B, Western Sector; ashy filling in room 20514; See OxA-10,151.

**OxA-10,286 (5930 ± 90 BP):** charcoal; Field B, Western Sector; ashy filling in room 20514; Outlier. See OxA-10,151.

**OxA-10,293 (4855 ± 40 BP):** charcoal; Field B, Western Sector; ashy filling in room 20514; Outlier. See OxA-10,151.

**OxA-10,155 (3965 ± 45 BP):** charcoal; Field B, Official Sector; room 28050; This sample was recovered from the floor of a room recovered from one of the subsidiary buildings of the “Bloc Officiel”, nicknamed the “Stables”. The sample should be EJ IIIb in date, on the basis of architectural and stratigraphic connections with the EJ IIIb monumental buildings.

**OxA-10,171 (4025 ± 50 BP):** seeds; Field F, canalisation; This seed sample came from a drain in a paved road associated with the Bloc Officiel (Lebeau and Milano 2003). The sample should therefore predate the Akkadian contexts in the field.

**OxA-10,168 (3970 ± 45 BP):** seeds; Field F, Akkadian Pit fill; This sample comes from a fill inside of a pit sunk into the levelled buildings of the “Bloc Officiel”. Given its stratigraphic position and the associated finds, the sample should date to EJ IVa, i.e. the Akkadian occupation of the site. The radiocarbon date, however, seems older by ca. 100 years. Given that fill contexts usually present numerous problems, this mismatch is not surprising. The date has been excluded as an outlier.

**OxA-10,169 (3855 ± 40 BP):** seeds; Field F, tannur 32342A; A seed sample from a fire installation built inside a private Akkadian house. This date therefore provides a convenient upper boundary for the EJ IIIb Beydar kingdom.

**OxA-10,156 (3910 ± 45 BP):** seeds; Field E, foundations (locus 5756); A single sample from the Field E “Granary” provides support for the EJ IIIb dating of the building.

**LTL-1074A (4163 ± 50 BP):** seeds; Field I, stone ramp; Beydar 2; The seeds constituting this sample have been recovered from a stone ramp leading up to the northeastern gate of the city. Sherds of some diagnostic pottery cultures, including late (incised-excised) Ninevite 5 and Metallic pottery made the excavators assign the construction of the ramp to EJ II (Milano and Rova 2008: 588). It is important to note, however, that the use of Metallic ware extended into the EJ III, and the Ninevite 5 sherd may well have been holdovers used for ramp filling.

**LTL-1116A (4016 ± 45 BP):** charcoal; Field I, Northern Building Phase 4a-3; Beydar 3; A number of charcoal and seed samples were recovered from

the monumental Northern Building. They represent two consecutive phases of the building's use, assigned by the excavators to the EJ IIIa and IIIb periods respectively. This sequence can therefore be viewed as an estimate for the beginning of the all-important EJ IIIb period.

**LTL-1113A (3945 ± 45 BP):** charcoal; Field I, Northern Building Phase 4a-3; Beydar 3; See LTL-1116A.

**LTL-1112A (3940 ± 50 BP):** charcoal; Field I, Northern Building; Phase 4a-3; Beydar 3 See LTL-1116A. This sample is of particular importance, as it was collected from a wall recess in the Phase 4 building, sharing the context with 16 tablets, representing the earliest phase (EJ IIIa) of writing at the site (Milano and Rova 2008: 587).

**LTL-1068A (3884 ± 45 BP):** seeds; Field I, Northern Building Phase 4a-3; Beydar 3; See LTL-1116A.

**LTL-1073A (3878 ± 45 BP):** seeds; Field I, Northern Building Phase 4a-3; Beydar 3; See LTL-1116A.

**LTL-1067A (3894 ± 50 BP):** charcoal; Field I, Northern Building Phase 1; Beydar 3; This sample, as well as LTL-1115A and -1072A, come from the upper part of the Phase 1 Northern Building, dating to the earliest part of the EJ IIIb.

**LTL-1115A (3852 ± 45 BP):** charcoal; Field I, Northern Building Phase 1; Beydar 3; See LTL-1067A.

**LTL-1072A (3900 ± 35 BP):** charcoal; Field I, Northern Building Phase 1; Beydar 3; See LTL-1067A.

**LTL-1081A (3851 ± 45 BP):** charcoal; Field I, Northern Building Phase 3; Beydar 3; Unfortunately, some of the Tell Beydar dates were originally reported by the Excavators in the proceedings of the 3<sup>rd</sup> International Congress

on the Archaeology of the Near East (ICAANE), which was never published and the manuscript was not available to me. The contextual information for these samples has been recovered and reconstructed from secondary publications. LTL-1081A and -1075A were both sampled from the Northern Building in Field I. According to the excavators' notes, they belong to Phase 3 of building, which would place them between the EJ IIIa (LTL-1116A, -1113A, -1112A, -1068A, -1073A) and the early EJ IIIb samples (LTL-1067A, -1115A, -1072A).

**LTL-1075A (3925 ± 50 BP):** seeds; Field I, Northern Building Phase 3; Beydar 3; See LTL-1081A.

**LTL-1070A (4131 ± 45 BP):** seed; Field I; Northern Building Phase 4; Beydar 2-3; See LTL-1081A. Two short-lived plant samples were recovered from the earlier phases (EJ IIIa) of the North Building. Both LTL-1070A and -1069A should therefore be contemporary with (or slightly older than) LTL-1116A, -1113A, -1112A, -1068A and -1073A.

**LTL-1069A (4091 ± 45 BP):** seed; Field I; Northern Building, Phase 4; Beydar 3; See LTL-1081A.

**LTL-2954A (3820 ± 60 BP):** charcoal; Field M; Temple E, Level 4a; See LTL-1081A. Two samples were recovered from the Akkadian workshops which superseded the EJ IIIb Temple E.

**LTL-2955A (3800 ± 80 BP):** charcoal; Field M; Temple E, Level 4a; See LTL-1081A and LTL-2954A.

**LTL-2956A (3895 ± 35 BP):** seeds; Field P, Level 3b; metal workshop 16631-E-1; See LTL-1081A. The three samples of seeds were found in the metalworking workshops, dating most likely to the later phases of the EJ IIIb period (Pruß and Hilby 2010: 23).

**LTL-2957A (3755 ± 40 BP):** seeds; Field P, Level 3b; metal workshop 16672-E-3; See LTL-1081A and LTL-2956A.

**LTL-2958A (3755 ± 45 BP):** seeds; Field P, Level 3b; metal workshop 16557-E-6; See LTL-1081A and LTL-2956A.

**LTL-1114A (3801 ± 55 BP):** charcoal; Field B; “tomb of a baby”; See LTL-1081A. According to Stede 2007, 4 infant tombs were found in Field, two sunk into the floor of the Building “U”, and two dug into the fills of the residential houses. Regardless, the stratigraphic position of these tombs would indicate an Akkadian dating for the context. It is however important to note that the scarcity of associated data makes us rely solely on the the stratigraphy of the area and analogies with Field F (Stede 2007: 7).

**LTL-1065A (3902 ± 40 BP):** wood; Field F; “tomb, two room”; See LTL-1081A. This sample most likely comes from a tomb sunk into the ruins of the EJ IIIb monumental buildings and is thus Akkadian in date.

## 5.4 Tell Leilan/Šehna

The site of Tell Leilan, found in the fertile rain-fed area of the Khabur River Valley, has been known to Assyriologists since the 19<sup>th</sup> c., however it is best known for the long-running excavations by the Yale University team, supervised by H. Weiss. Spanning over three decades, the work of the American team and its collaborators included a detailed survey of the site and its environs, as well as several deep soundings. Like most sites in the region, Tell Leilan was composed of a sprawling lower city (ca. 90ha at its greatest extent), focused around a raised Acropolis. In juxtaposition to the *Kranzhügel* sites in Syria, the Acropolis (ca. 15ha) wa an oblong mound leaning on the eastern edge of the site. The deep soundings at the site clearly demonstrate the site’s uncanny longevity, demonstrating an unbroken sequence of occupation since the prehistoric times until late in the 3<sup>rd</sup> mill. BC. During the 3<sup>rd</sup> mill. BC, Tell Leilan

	Field I, E. & W. Sectors	Field I, N.B. and the City Gate	Field B	Field E	Field F	Field P	Field M
<b>Akkadian</b>			Infant burial LTL-1114A		Akkadian cante OxA-10.168 LTL-1065A		
<b>Beydar IIIb (EJ IIIb)</b>		Northern Building LTL-1087A LTL-1115A LTL-1072A	Niveau principa OxA-10.151 OxA-10.158 OxA-10.286 OxA-10.293 OxA-10.155	Granary OxA-10.156	Bloc officiel OxA-10.171	Metal workshop LTL-2956A LTL-2957A LTL-2958A	Temple E LTL-2954A LTL-2955A
<b>Beydar IIIa-b (EJ IIIa-4)</b>	Level 3 Phase 4 OxA-10.150 OxA-10.232 OxA-10.157	Northern Building LTL-1081A LTL-1075A Northern Building LTL-1116A LTL-1113A LTL-1112A LTL-1068A LTL-1073A LTL-1070A LTL-1069A					
<b>Beydar II/IIIa (EJ II/IIIa)</b>	Levels 1-3 OxA-10.170 OxA-10.285 OxA-10.184	Stone ramp LTL-1074A					

Graph 7: A schematic representation of the Tell Beydar archaeological sequence.

was the capital of the kingdom of Šehna, one of the main political players in the Early Dynastic Syrian politics, on par with Nagar, Mari, Ebla and Urkeš. Similarly to the other city-states, Šehna was conquered by the Akkadians who established a strong administrative presence on the Acropolis. Akkadian occupation came to an abrupt end, and after a brief post-Akkadian settlement, Leilan was abandoned completely for over a century. It re-ascertained its important political role during the early 2<sup>nd</sup> mill. BC when the Old Assyrian king Šamši-Adad (Samsi-Addu) I renamed the city to Šubat-Enlil (lit. “*The Dwelling place of Enlil*”) and established the capital of his powerful if short-lived empire within its walls. The site also boasts the most extensive database of high-quality <sup>14</sup>C performed well stratified, short-lived samples (Ristvet 2011; Weiss 2012). Thanks to its longevity, its ancient prominence and the availability of radiocarbon dates, Tell Leilan is particularly valuable for chronological research.

Out of the 9 main soundings sunk into the site of Tell Leilan, the investigation of the northwestern extreme of the Acropolis, called Operation 1, is by far the most significant for establishing the site’s chronology. The sounding yielded no fewer than 61 discrete layers, spanning prehistoric times to the 2<sup>nd</sup> mill. BC re-occupation, allowing the excavators to establish the ceramic sequence for the site. The very earliest strata (61-40) of the sounding were assigned to Leilan Periods VI-IV, identified as contemporaries of the southern Uruk period. In level 39, the typical Uruk bevelled-rim bowls disappear, giving way to new painted pottery types, heralding the beginning of the Ninevite 5 culture (Mayo and Weiss 2003: 29). Operation 1 offered a rare chance to produce a sequence spanning the entire existence of the Ninevite 5 pottery at the site, subdivided into 4 phases (Strata 39-15, IIIa, IIIb, IIIc and IIId). An important finding of this investigation was the unequivocal evidence for painted and incised sherds co-occurring throughout the sequence, with the incised and later excised decorations gradually becoming dominant (Schwartz 1988: 68-69). This is especially significant for the dating of shorter sequences at other sites, since it clearly demonstrates that the presence of a particular type of Ninevite 5 decoration is not

enough for an unambiguous dating. The site remained rather small until the final Ninevite 5 subphase (Strata 17-15, Leilan IIIId) when the lower town expanded. This rather abrupt transformation of the rural Ninevite 5 sites into large urbanised centres of Northern Mesopotamia is sometimes referred to as the “second urban revolution” (Calderone and Weiss 2003: 201). The final Leilan III phases were overlain by major fortification works in Level 14, marking the beginning of the IIa period, when Leilan joined the ranks of the other powerful Jezirah kingdoms. During the IIa period, the Acropolis was dominated by a large brick cultic platform furnished with an altar and accompanied by a number of storerooms. The platform suffered a violent destruction by fire, identified with the Akkadian conquest (Weiss et al. 2002: 59-60). North of the platform was a large building complex interpreted as an Early Dynastic palace (Weiss et al. 2012: 168).

An administrative complex was constructed on top of the destroyed cultic platform during the earliest phase of Akkadian occupation (IIb3). Due to a number of school tablets recovered from one of the rooms, it was suggested that the structure housed an early scribal school (Lillis-Forest, Milano, and Mori 2007: 43). Adjacent to the tablet room was a bath installation. The Akkadian imperialisation of the site intensified and the buildings were themselves levelled during the succeeding period IIb2. The scale of the Unfinished Building, an imposing monumental structure of basalt blocks, suggests that Leilan was a crucial strategic site for the Akkadians (Lillis-Forest, Milano, and Mori 2007: 46-47). On the northern side of an Akkadian paved road, the Akkadian Administrative Building (AAB), a complex of 17 connected rooms, was erected on top of the IIa palace. The AAB lasted throughout the later Akkadian phases (IIb2-1)(Weiss 2012: 169-170). The end of the Akkadian occupation at the site was as abrupt as its beginning (Weiss 2015). The construction of the Unfinished Building was stopped during the Leilan IIb1 period. A small, 4-room building of unknown purpose was constructed on top of the Akkadian administrative structures, re-using some of the extant walls of the IIa palace (Weiss et al. 2012: 163). Following this

brief post-Akkadian occupation (IIc), the site was effectively abandoned until the 2<sup>nd</sup> mill. BC. The 2<sup>nd</sup> mill. BC re-occupation is marked by the appearance of the so-called Khabur Ware (Frane 1996; Oguchi 2001; Oguchi 2006). The general consensus is that the appearance of the Khabur Ware, previously identified with the historical Old Assyrian period, predated the rise of Šamši-Adad I (Akkermans and Weiss 2003: 309; Palmisano 2012).

A sounding in the southern part of the Lower Town (Operation 5) exposed a series of 12 occupation levels. All of them contained non-elite households, probably inhabited by the Leilan working-class citizens (Weiss et al. 2002: 61). Levels 12-8 contained late excised Ninevite 5, and the ceramics were comparable to strata 15-18 in Operation 1 (Weiss 1990: 205). The following two levels (7-6) were “stratigraphically continuous” (Weiss 1990: 203) and represented the pre-Akkadian Early Dynastic (IIa) domestic occupation. The Akkadian occupation was represented by two levels of medium-sized houses on both sides of a paved street, separated by smaller alleyways infilled with pottery sherds. The 3<sup>rd</sup> mill. BC levels in Operation 5 yielded 35 intramural burials, mostly infants and neonates, showing that burying the dead underneath house floors was a common practice in the Khabur River Valley as well as in the South (Weiss 1990: 201). The structural remains of Level 4 and 3 were poorly preserved, and they were overlain by mediaeval contexts (Level 2).

On the north edge of the site, the excavators discovered a section of the outer walls with what was interpreted as the main gate to the lower city (Operation CG). The excavation of this section of the fortifications revealed 9 archaeological phases, spanning from the pre-Dynastic times until the 2<sup>nd</sup> mill. BC re-occupation of Leilan. The earliest fortifications in Phases 1-2 consisted of two earthen ramparts, into which a mudbrick wall (Wall A) was later sunk. The wall was built of alternating red and black bricks. Phase 1 was dated to the Leilan IIIId period based on the presence of late excised Ninevite 5 sherds (Ristvet 2007: 193). While these sherds continue into

the succeeding Phase 2, the character of the city gate area changes substantially. The space is divided into a number of compartments with thin mudbrick “curtain walls” which contained no traces of domestic production or storage. This led the excavators to posit that the change represented a development of late Ninevite 5 political apparatus at the site (Ristvet, Guilderson, and Weiss 2004: 10). The parcelisation of the area with thin walls continued into the succeeding Phase 3; however Ninevite 5 sherds were not found in these contexts, clearly showing a gradual and endogenous development of the local IIa administration. The city gate continued to be utilised during the Leilan IIb period, as visible in the building of the Akkadian Wall B, which used much smaller bricks than the earlier Wall A. The Akkadians expanded the bureaucracy of the site by developing an administrative district between the two rings of the city walls (Ristvet 2007: 190).

### **Tell Leilan - Published <sup>14</sup>C**

As it was mentioned above, the intensive radiocarbon investigation of Tell Leilan over the years led to the creation of an impressive radiocarbon database (152 dates, more in press; See **Table 4**). The individual contexts of these dates will not be discussed in this work for three reasons. Firstly, detailing this enormous database is beyond the scope of this research, which focuses on southern Mesopotamian sites. Secondly, the sheer number of dates from associated contexts is likely to drown out the effect of any outliers resulting from contamination or context misassociations. Thirdly, comprehensive overviews of these dates and their interrelationships have been treated in detail over a number of publications (Schwartz 1988; Weiss et al. 1993; Ristvet 2011; Weiss et al. 2012). The model presented here diverges from the previous analyses mainly by dividing the site sequence into the three main areas described above.

**Op.1, Periods VI-IV (2 dates):** Strata 58 & 44; Two dates from the deepest layers from Op.1 are used as a *terminus post quem* for the Ninevite 5 culture at the site, providing an estimate for the Uruk-Ninevite 5 transition.

**Op.1, Period IIIa (2 dates):** Strata 38 & 35; These two dates represent the earliest phase of the Ninevite 5 pottery, dominated by painted decorated sherds. The small area exposed at these low levels revealed a number of walls and thin mudbrick screens, however it was not possible to determine the nature and function of these (probably domestic) buildings. One sample was recovered from a hearth, the other from a floor layer covered with sherds and carbonised seeds.

**Op.1, Period IIIb (2 dates):** Stratum 34; A layer overlying Stratum 35 contained no new structures, however was covered by a rich layer of carbonised seeds which were sampled <sup>14</sup>C dating (Schwartz 1988: 15). The dates should therefore be a good estimate for the beginning of the middle phase of the Pre-Dynastic period at Leilan (“mature” Ninevite 5).

**Op.1, Period IIIc (8 dates):** Strata 20 & 19; A new structure constructed in Stratum 20 contained yet another layer of ash and charred seeds which were used for dating. The overlying stratum, composed of a thick layer of occupational debris, contained no new structures, however a grave sunk into the floor was furnished with objects of shell, semi-precious stones, copper, and a steatite seal (Schwartz 1988: 22). These may suggest that the Ninevite 5 society had begun to undergo the process of socio-economic stratification.

**Op.1, Period IIId (2 dates):** Stratum 15; Two dates come from the stratum associated with the very last occurrence of the Ninevite 5 pottery at the site, providing a good estimate for the demise of this archaeological complex (Calderone and Weiss 2003: 198).

**Op.1, Period IIa (12 dates):** Strata 13 & 14; This selection of dates came from the Early Dynastic (pre-Akkadian) layers of Tell Leilan. The dates came from tannurs and store rooms destroyed by the catastrophic fire identified with the Akkadian conquest of the site (Weiss et al. 1993: 998; Weiss et al. 2002:

59). It is worth noting that the IIIa dates CAMS-81861 to -81869 provided in the original publication (Weiss et al. 2002, also Ristvet 2011) have different ages given in the revised publication (Weiss et al. 2012). For the purpose of this research, the Leilan models will only include the revised dates.

**Op.1, Period IIb3 (2 dates):** L02 44W16 lot 415; A pair of dates was collected from the rooms identified as a scribal school. This building was taken to represent the very earliest phase of Akkadian presence at Tell Leilan (Weiss et al. 2012: 171).

**Op.1, Period IIb2 (26 dates):** Akkadian occupation; A large number of samples was recovered from the Akkadian administrative buildings and the associated granaries. This larger body of dates thus represents the heyday of Akkadian presence at the site (Lillis-Forest, Milano, and Mori 2007: 46-47).

**Op.1, Period IIb1 (21 dates):** Final Akkadian occupation; Samples from L06 44S15 13 as well as L06 44S16 lots 113, 206 and 210 were dated to the levels of the final occupation and activity at the site, associated with some smaller repair works to the courtyard and the streets on the Acropolis, as the larger buildings continue to serve their purposes of storage and administration (Lillis-Forest, Milano, and Mori 2007: 50).

**Op.1, Period IIc (20 dates):** Post-Akkadian; These dates have been collected from the ashy floor of the four-room building erected on top of the Akkadian administrative complexes (Lillis-Forest, Milano, and Mori 2007: 52; Weiss et al. 2012: 174). This series of dates is therefore a *terminus ante quem* for the Akkadian abandonment of the site. Similarly to the Operation 1 IIa dates quoted above, CAMS-81869 to -81873 (original publication Weiss et al. 2002) have been re-assessed in the later paper (Weiss 2012) and only the latter will be used here.

**Op.1, Post-IIc (16 dates)** Residual; A number of dates have been collected from contexts overlying those of the small IIc building. These lack any clear associations with structural remains or archaeological artifacts and likely represent the destruction layers of the remaining Akkadian and Post-Akkadian walls, as well as small-scale (potentially temporary) occupation of the site following its deurbanisation. Despite this lack of clearly-defined context, these dates offer a useful *terminus ante quem* for the abandonment of Tell Leilan following the brief and humble Post-Akkadian occupation.

**Op.1, Period I (2 dates):** Early Khabur Ware; These dates were associated with the earliest occurrences of the characteristic 2<sup>nd</sup> mill. BC ceramic type known as Khabur Ware. Stratigraphically, they predate the Old Assyrian texts and sealings of Šamši-Adad I. Though they are well outside the temporal scope of this research, they provide a useful estimate for the resettlement of the site during the early 2<sup>nd</sup> mill. BC.

**Op.5, Period IIa (8 dates):** Phases 7 & 6; The two phases of the Lower Town South sounding were “*closely sequential*” (Weiss 1990: 203) buildings in the square 76F20. Thus, they will therefore be considered a single chronological unit, corresponding to the Early Dynastic period predating the Akkadian conquest. The samples in this unit have been collected from the house floor.

**Op.5, Period IIb, early (10 dates):** Phase 5; The domestic contexts in this phase have been dated to the very earliest part of the IIb period given the first occurrence of Akkadian mass-produced pottery (Weiss 1990: 203). The samples came from the surface of a baked platform in square 77E01.

**Op.5, Period IIb, late (4 dates):** Phase 4; Although the architectural remains of this level were poorly preserved, the fact that no signs of post-Akkadian occupation have been recorded at Leilan barring the small building on Acrop-

olis NW, the Excavators assigned this level to the later parts of the Akkadian occupation of the site.

**Op.CG, Period IIIId, early (2 dates):** Phase 1; Two samples were collected at the lowest level of the sounding sunk in the northern extremity of the site, revealing Leilan's impressive outer fortifications. Since the level contained excised Ninevite 5 sherds, it can serve as an estimate for the final presence of this culture at the site.

**Op.CG, Period IIIId, late (2 dates):** Phase 2; In terms of the associated material, Phase 2 of the Op. CG is still IIIId in date, however the significant changes in the architecture and organisation of the area warrant a distinction between the dates from Phase 1 and those from Phase 2.

**Op.CG, Period IIa (12 dates):** Phase 3; The dates in this unit can be treated as *terminus ante quem* for the transition from the Ninevite 5 to the Early Dynastic period at Leilan, independently of the dates from Op. 1 strata 13-12 (Ristvet 2007: 193-195).

## 5.5 Other Syrian Sites

### Tell Mozan/Urkeš - Published <sup>14</sup>C Dates

Tell Mozan, identified as the ancient city of Urkeš (Buccellati and Kelly-Buccellati 1995b) was found on the northernmost extremes of the Khabur Triangle. The site has the form of a *Kranzhügel* (a circular tell with two concentric rings of fortifications), and is particularly significant as the earliest city to be ruled by Hurrians - an ancient ethnic group which became a significant regional power during the 2<sup>nd</sup> mill. BC. The initial attempts at radiocarbon dating the site were unsuccessful (Buccellati and Kelly-Buccellati 1988: 86). Additional samples were reported to have been collected from the Akkadian layers of the "storehouse" in Area AK (Buccellati and Kelly-Buccellati 1995b), but these appear to have never been published. Two radiocarbon

	Op. 1 Acropolis NW		Op. 5, Lower Town South		Operation CG	
2nd mill. BC (I)	Early Khabur Ware 4 dates					
Abandonment (post-IIc)	Residual Occupation 16 dates					
Post-Akkadian (IIc)	Stratum 9	20 dates				
Akkadian (IIb)	Strata 12-10	49 dates	Phases 4-5	14 dates		
Pre-Akkadian (IIa)	Strata 14-13	12 dates	Phases 7-6	8 dates	Phase 3	12 dates
Late Ninevite 5 (III d)	Strata 17-15	2 dates			Phase 2	3 dates
					Phase 1	3 dates
Upper Ninevite 5 (III c)	Strata 25-16	8 dates				
Lower Ninevite 5 (III b)	Strata 34-24	2 dates				
Early Ninevite 5 (III a)	Strata 39-35	2 dates				
Uruk (VI-IV)	Strata 40-61	2 dates				

Graph 8: A schematic representation of the Tell Leilan archaeological sequence.

dates are available for the 3<sup>rd</sup> mill. contexts, both reported in Buccellati and Kelly-Buccellati 1995a. Additional information regarding the context of these dates has been recovered from a number of additional excavation reports.

**UCI-145 (4340 ± 170 BP):** charcoal; Sounding S2; Level A12; A deep sounding has been sunk at the western foothill of the main mound. This radiocarbon sample yielded three small cups which were assigned to the Ninevite 5 period (Buccellati and Kelly-Buccellati 1995a: 389). The decoration of these cups was of the incised type (Buccellati 1990: 23), suggesting a “mature” Ninevite 5 date, i.e. just predating the Early Dynastic kingdom.

**(UCI-144 (3930 ± 60 BP):** charcoal; Area BA (Temple); Level A1 floor; One

charcoal sample was recovered from the floor of the large ceremonial complex which was likely the highest-built structure of the ancient city. The numbering of the four main phases of the building changed between publications, and so the lowest level from which the sample was taken is variably called “B1” (Buccellati and Kelly-Buccellati 1995a) and “A1” (Ristvet 2011). Either way, the sample most likely came from the lower (a) of the two sublayers of the building phase. The presence of a ceramic assemblage composed primarily of jars with grooved rim, conical cups and early Metallic Ware jars made the Excavators assign this level to the late ED (i.e. pre-Akkadian) period (Kelly-Buccellati 1990: 125; Weiss 1991: 712-713; Buccellati and Kelly-Buccellati 1995a: 392). This dating is further corroborated by the fact that the Level A1/B1 temple was violently destroyed, levelled and infilled. Although the later levels were poorly preserved and thus difficult to date, it is possible that the destruction represented and Akkadian, or Akkadian-related intrusion (analogically to the destructions visible at other Syrian sites).

### **Tell Raqa’i - Published <sup>14</sup>C Dates**

Tell Raqa’i was a small rural site found south of Tell Brak, in the vicinity of the sites of Kerma, ‘Atij, Judeideh and Ziyadeh and Umm Qseir. It was excavated during the 1986-87 by a joint team of the Amsterdam and John Hopkins Universities. Two radiocarbon dates were recovered from the site.

**Ute-822 (4020 ± 90 BP):** seeds; Area 18; Level 3; This sample came from Level 3, which yielded the main structural remains for the site. At this time, the site was dominated by a central oval feature, surrounded by smaller, rectangular, most likely domestic structures. The ceramic assemblage of this level included some 60 incised and excised Ninevite 5 fragments, as well as 3 Metallic ware fragments (Curvers and Schwartz 1990: 15). This would suggest a pre-ED III date for the layer. The date is further supported by the overlying Level 2, where the ceramics are reminiscent of the late ED layers in Brak and Leilan.

**Ute-823 (4020 ± 70 BP):** seeds; Area 18; Level 4; The date was originally misassigned to Level 6 (Curvers and Schwartz 1990: 18 fn. 37; Ristvet 2011: 320 fn. 28). The levels from the deep step trench which preceded Level 3 were extremely poor in datable pottery. Nonetheless, the recovery of a single small jar with a pointed base bearing incised Ninevite 5 decorations (Curvers and Schwartz 1990: 21 fig. 24/15) suggests that this level represents the “mature” Ninevite 5 period.

## Tell Khuera - Published <sup>14</sup>C Dates

Tell Khuera is one of the larger (ca. 80ha) *Kranzhügel* sites of Early Bronze Age Syria - it has been the subject of intense excavations and study since 1958 (Meyer 2010). Nine radiocarbon samples were published and discussed in detail by Weninger, Neef, and Meyer 2010. I find the estimates for the destruction of Phase Ic buildings presented in said publication highly problematic. The authors used a very prior-heavy model of wiggle-matching using very constraining assumptions regarding the sequencing of the dates and the time lapses between them. These assumptions seem highly arbitrary and cannot be substantiated with the scant archaeological material recovered from the contexts. Additionally, Ristvet 2011 (p. 315) is right to point out the problems with wiggle-matching samples deriving from mixed material. Therefore, the radiocarbon dates from Area B will be treated as a single phase.

**KN-5730 (4120 ± 40 BP):** charcoal (*Populus* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; Room 202 or 203; The figure showing the original findspot of the samples (Weninger, Neef, and Meyer 2010: 196) contains a misprint, showing KN-5730 twice: one in Room 202 and one in Room 203. One of these samples is likely to be KN-5737, although it is impossible to determine which is which. Regardless, the 6 samples collected from Area B share the destruction context of the monumental building, seen as the end of the Khuera Ic period. Despite the paucity of characteristic ceramics in the building itself,

the excavators (Orthmann 1995: 14-15; Meyer 2010: 27) identified this building as “early ED”, contemporary with early EJ III (Quenet 2011: 22), based on similarities in plain ceramics found in different soundings at the site.

**KN-5731 (3985 ± 35 BP):** seeds (*Hordeum* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; Room 202 pithos; See KN-5730.

**KN-5732 (4105 ± 40 BP):** seeds (*Hordeum* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; Room 202 pithos; See KN-5730.

**KN-5735 (3970 ± 40 BP):** seeds and charcoal (*Hordeum* sp. and *Populus* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; Room 203 pithos; See KN-5730.

**KN-5737 (3965 ± 35 BP):** seeds and charcoal (*Hordeum* sp. and *Populus* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; Room 202 or 203; See KN-5730.

**KN-5738 (3905 ± 35 BP):** seeds (*Hordeum* sp.); Area B; Steinbau 4; Bauschicht 4 destruction level; debris; This was the only sample collected from outside of the main building, recovered from underneath the ruined wall to the immediate southeast of the main building. See KN-5730.

**KN-5733 (3870 ± 30 BP):** charcoal (*Populus* sp.); Area F; Bauschicht 2; Royal Palace; Orthmann and Pruß 1995 reported 4 construction levels from the monumental Palace in Area F. KN-5733 and -5734 were both recovered from Bauschicht 2, which the excavators dated to “young (i.e. late) Early Dynastic”. This dating is corroborated by the few finds of Metallic ware found in Bauschichten 3 and 2 (Orthmann and Pruß 1995: 140). The plain ceramics found in the lowest level (Bauschicht 4) were similar to those found in Area B buildings (Phase Ic).

**KN-5734 (3825 ± 30 BP):** charcoal (*Papilionaceae* sp.); Area F; Bauschicht 2; Royal Palace; See KN-5733.

**KN-5736 (3975 ± 40 BP):** charcoal (*Cedrus* sp. and *Populus* sp.); Area F; Bauschicht 1c; Royal Palace; This radiocarbon sample came from the layer immediately overlying Bauschicht 2. The pottery of this level was comparable to that of Leilan IIb, thus dating this level to Khuera Phase Ie, i.e. Akkadian (Orthmann and Pruß 1995: 137-139).

### **Tell Ziyadeh - Published <sup>14</sup>C Dates**

Tell Ziyadeh was a small, rural site, established some time during the 'Ubaid period, and continued its existence until the Early Bronze Age (mid-3<sup>rd</sup> mill. BC). The Early Jezirah ( Early Dynastic) architecture of the site included two buildings main buildings: a storage room with the characteristic “grill” wall layout, and an adjacent complex of smaller rooms, found in the northern part of the tell (Hole 1999: 268-270). Having ceased their original function, the buildings were abandoned and infilled.

**AA-30483 (4210 ± 50 BP):** charred seeds; Phase N3; storage building fill; Four radiocarbon dates are available for the small site of Ziyadeh. The lack of any stratigraphic information regarding the fill does not allow us to create any local sequence. The only available context is the fill itself. According to the excavator (Hole 1999: 270; Hole 2001: 76), the plain pottery of this phase was comparable to that of Tell Raqa'i 3 and 4-7, which would suggest an EJ 1-2 date. This is corroborated by the few early (painted) Ninevite 5 pottery fragments (Hole and Arzt 1998: 65).

**AA-30484 (4445 ± 50 BP):** charred seeds; Phase N3; storage building fill; See AA-30483.

**AA-30485 (4385 ± 50 BP):** charred seeds; Phase N3; storage building fill; See AA-30483.

**AA-30486 (4415 ± 50 BP):** charred seeds; Phase N3; storage building fill;  
See AA-30483.

## Tell Kuran - Published <sup>14</sup>C Dates

Tell Kuran is a small prehistoric site in the Khabur, no larger than 0.25ha in size. The main occupation of the site fell to the 'Ubaid and Late Chalcolithic (probably contemporary with Jemdet Nasr) periods (Hole 1991).

**Beta-75959 (4710 ± 60 BP):** material unknown; Context K-125F; Two samples of unreported material were dated from the same context. Very little is known about the archaeology of these contexts, apart from the the “typically Uruk sherds” found in association (Hole 2001: 76). Though the contextual information is scant for these samples, they may provide a useful *terminus post quem* for the Early Bronze Age in Syria.

**AA-30487 (4625 ± 70 BP):** material unknown; Context K-125F; See Beta-75959.

## Kerma - Published <sup>14</sup>C Dates

The site of Kerma consists of two small tells. Soundings in three areas revealed Early Bronze Age structures underneath an ashy layer. Some of the buildings showed signs of destruction (Saghieh 1991).

**OxA-2082 (4230 ± 70 BP):** charred seeds; Area B; Granary A; This sample was collected from the mudbrick-paved floor of a buttressed building interpreted as a fortified storehouse (perhaps analogical to the “Narām-Sîn” Palace in Brak). According to the excavator (Saghieh 1991: 171-173), the pottery found in this contexts was a mix of several periods, pointing to severe context disturbance. The Kerma contexts were dated to the EJ 1-2 *post factum*, using only the <sup>14</sup>C dates.

**OxA-2083 (4100 ± 70 BP):** wood charcoal; Area F; domestic layers; This sample comes from the layer of domestic architecture overlying a thick wall, interpreted as city fortifications. Note that this date was mislabelled as identical with OxA-2082 in Ristvet 2011. Regardless, this sample is similar to OxA-2082 in that no independent archaeological dating of its context can be deduced from the publication records. The Kerma samples were thus excluded from the final model.

### **Kazane Höyük - Published <sup>14</sup>C Dates**

Kazane Höyük in Southeastern Turkey was a site of considerable size and antiquity. Together with Tell Khuera, the site is one of the most likely candidates for the ancient city of Abarsal, well attested in the Ebla archives<sup>107</sup>. The site, focused around a central mound, was inhabited since at least the Halaf period. During the mid-3<sup>rd</sup> mill. BC, the sprawling lower town achieved its impressive maximum size of ca. 100ha (Wattenmaker and Mosir 1993; Wattenmaker 1996). Three radiocarbon dates have been procured from the site, all coming from the lower town.

**AA-68981 (3939 ± 41 BP):** charred seeds; Area 1; Operation 2.1; Building Unit 5 floor; This sample of seeds was recovered from a building interpreted as a grain storage due to large amounts of barley recovered from within. Following its use, Building 5 was infilled with bricks, which show signs of destruction by fire. The architectural layout of the buildings in Area 1 link this building to Building Units 4 (Operation 2.2) and 8 (Operation 4). This, together with the homogenous ceramic material found within, led Creekmore 2008 (p. 188) to believe the three samples were contemporary and dated to the EJZ 3 period. See below.

**AA-68982 (3958 ± 44 BP):** burnt material (probably wood); Area 1; Operation 4; Building Unit 8, southern room floor; Given its monumental size and

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<sup>107</sup>See especially ARET 13 5, a diplomatic document regarding the borders between the areas of influence of the Eblaite and Abarsalian kingdoms.

the large amounts of decorated pottery, the southern Building Unit 8 was interpreted as a temple storage, supporting a small chapel found in the adjacent northern room (Creekmore 2008: 166). Among the ample pottery fragments in the room, fragments of a Metallic Ware cup point to an EJ 3-4 date. While the Metallic Ware is known to have continued into the Akkadian period, the presence of associated fenestrated stands would place this context, and by extension the two remaining dates, in the earlier (i.e. pre-Akkadian) period.

**AA-68983 (3911 ± 44 BP):** burnt material (probably wood); Area 1; Operation 2.2; Building Unit 4 storage jar; The large number of hefty storage jars found within this building suggest that it was used as a storehouse. The plain pottery found inside the building connects it to the other Area 1 buildings (Creekmore 2008: 652-663). Although a number of possible sealings have been recovered from the building (Creekmore 2008: 534), they are often too fragmentary to provide any additional chronological information.

	Ziyadeh	Mozan	Raqa'i	Kazane
Early Dynastic		Area BA Temple UCI-144		Operations 2.1, AA-68981
				AA-68982
				AA-68983
Ninevite 5	"Grill storeroo AA-30483 AA-30484 AA-30485 AA-30486	Sounding S2 L UCI-145	Area Level 18 L Ute-822	
			Area Level 18 L Ute-823	

Graph 9: A schematic representation of the periodisation model for the Syrian Jezirah archaeological sites.

# Chapter 6

## Iran

### 6.1 Excursus - Proto-Elamite Texts

The Proto-Elamite textual tradition remains the single most fascinating and enigmatic cultural phenomenon of ancient Iran. The tablets were first identified as a separate literary tradition by J-V. Scheil during J. de Morgan's excavations at Susa (Desset 2012: 3). The Susa corpus remains the largest collection of Proto-Elamite tablets, with smaller archives known from seven other Iranian sites: Tal-i Ghazir, Tal-i Malyan, Tepe Sialk, Tepe Ozbaki, Tepe Yahya, Shar-i Sokhta and Tepe Sofalin (Dahl, Petrie, and Potts 2013: 353). Perhaps the most striking feature of the Proto-Elamite texts is their geographical spread, spanning almost the entire Iranian Plateau, while showing hardly any regional variation. The name "Proto-Elamite" is slightly misleading, as there is no evidence that either the script or the language it recorded (if any) was related to the later Elamite (Hatamtite) texts<sup>108</sup>. Although some contents of the texts can be discerned through parallels with the proto-cuneiform tradition of Southern Mesopotamia, it is unclear how much language information is recorded in these tablets, and so the ethnolinguistic identity of the Proto-Elamite scribes remains a mystery (Englund 2004: 104, 141).

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<sup>108</sup>One may draw parallel with the so-called "Proto-Hittite" texts of the 2<sup>nd</sup> mill. BC Anatolia, which were written in Hattic, the language of the indigenous populations prior to the arrival of the Indo-European Hittites (Nesites).

The origin of this writing system, obviously inspired by the proto-cuneiform tradition of Late Uruk yet very distinct, is unclear (**Figure 20**). While some (Sumner 2003; Abdi 2003) argued for a truly indigenous development in the Fars province of Southcentral Iran, the general consensus is to place the beginning of the tradition in the Susiana (Englund 2004; Dahl, Petrie, and Potts 2013; Petrie 2014). The stratigraphic investigation in Susa revealed that the numerical tablets were most likely the immediate predecessor of the Proto-Elamite texts. Despite our limited understanding of the Proto-Elamite culture, it is fairly uncontroversial to say that, similarly to the proto-cuneiform, the writing system was developed for the purposes of accounting and administration. The Proto-Elamite texts inherited a few proto-cuneiform signs in slightly altered forms, as well as the sexagesimal and bisexagesimal numerical systems. Interestingly, the Proto-Elamites introduced their own unique decimal system, reserved for counting what we think were low-status goods (Englund 2004: 109, 122; Desset 2012: 33). Over time, the system grew in complexity - interestingly, out of the 1,500-2,000 known signs, more than half are *hapax legomena* (occur only once, Desset 2012: 20). Studies in the frequencies and distributions of signs show that apart from numerical signs and ideographs signifying goods being counted as well as individuals and/or institutions engaged in the accounting process, the Proto-Elamite scribes seemed to have developed a unique system of signs of uncertain meaning. Due to their volume and the fact that they have no obvious graphic referent, it has been suggested (Dahl 2002; Dahl 2005) that they were in fact a phonographic method used to spell personal names. The disappearance of the Proto-Elamite writing was as mysterious as its development. Leaving apparently no successors, the literary culture seems to have spread across Iran quickly, grown exponentially in complexity, and vanished without a trace (Abdi 2003: 146-147).

The Proto-Elamite texts were associated with a distinctive material culture, including an easily-recognisable glyptic, famous for depicting animals engaging in economic activities, with a virtual taboo on depicting humans proper. Some of the ceramic

types associated with the Proto-Elamite culture include painted ware reminiscent of the decorated Jemdet Nasr types of Mesopotamia, as well rough trays, conical cups, goblets and bevelled-rim bowls (Petrie 2014: 142); however they tend to occur with local ceramic and glyptic types at different sites (Abdi 2003: 150). Although the geographic scale and the complexity of the Proto-Elamite culture invites speculation about the nature of this cultural phenomenon, the fact that despite their homogeneity, the tablets were made from local clays and their contents dealt mainly with local agricultural production seems to suggest that the proliferation of the writing system did not represent the rise of a centralised polity (Dahl, Petrie, and Potts 2013: 375). The Proto-Elamite writing has traditionally been seen as a local Iranian elaboration of proto-historic Southern Mesopotamian administrative practices following the collapse of the Late Uruk world system, and thus equated with Jemdet Nasr. Nonetheless, due to the lack of a reliable absolute chronology for Southern Mesopotamia for a reference, it has been impossible to determine whether the culture could have been contemporary with the Uruk and Early Dynastic periods (Petrie 2014: 151; Dahl, Petrie, and Potts 2013: 364). Still, despite these questions which are likely to remain unanswered, the Proto-Elamite tablets, related ceramics and glyptics are a useful tool for connecting Iranian archaeological contexts across large distances.

## 6.2 Susa/Šušin

The tell of Susa near the modern-day village of Shush is arguably the single most important site of late prehistoric Iran, as well as a crucial case study in Near Eastern archaeology in general. The site has an extremely long history of occupation and, throughout its existence, Susa was notable for maintaining its local identity while being an active player in the socio-political and cultural processes shaping Mesopotamia. Its privileged position as a link between the civilisations of Mesopotamia, the Eastern Zagros and the Iranian Plateau ensured Susa's immense significance in antiquity. Together with the city-state of Anšan-Awan, Susa was one of the two centres of the

Elamite civilisation which dominated Iran until the arrival of the Medes and Persians in the 1<sup>st</sup> mill. BC (Amiet 1979). The site has been surveyed and excavated multiple times since the mid-19<sup>th</sup> c. Perhaps the best known are the infamous excavations of J. de Morgan and R. de Mecquenem in the late 1800's and early 1900's. One of the best known finds of these excavation seasons was the monumental stele with the Code of king Hammurapi of Babylon, brought there by the Elamite king Šutruk-Nahhunte as war booty. De Morgan's "*less than adequate excavation and recording*" (Potts 2015: 51) techniques and large scale constructions on top of the tell deprived us of crucial stratigraphic information. Works by other French excavators were renewed in the 1940's and continued until the 1970's. The tell is divided into four main areas: the Acropolis in the southwestern corner, the Ville Royale to its east, "Apadana" (a columned hall of the Parthian period) in the northern part of the main tell, and a smaller tell nicknamed "Ville des artisans" (Potts 2015: 49). A number of soundings was sunk into these areas, producing layers spanning from the Chalcolithic periods until the Islamic era.

Despite more than seven decades of work dedicated to the material of Susa, the stratigraphic and typological chronologies of the site have been the subject of much controversy. Long pottery sequences which included seals, sealings and inscribed artefacts make Susa crucial for developing chronological sequences, and while numerous periodisation schemes have been produced and re-adjusted (Le Breton 1957; Le Brun 1971; Steve and Gasche 1971; Carter 1980; Steve et al. 1980; Dittmann 1986), correlating the sequences of individual soundings proved challenging. The scheme presented below follows the most recent periodisation (Voigt and Dyson 1992; Potts 2015: 49-60) of the site, established mainly on the basis of soundings in two areas: Acropole I and II (Le Brun 1971; Steve and Gasche 1971 Le Brun and Vallat 1978; Canal 1978) and Ville Royale I (Carter 1980). The earliest period, Susa I (Acropole I levels 27-23; Acropole II levels 11-7) was dominated by a large mudbrick structure associated with numerous burials (*massif funéraire*), later superseded by the construction of an

even bigger brick monument known as *haute terrasse*, which was decorated with clay cone mosaics and inlays (Potts 2015: 50). This period is characterised by a distinct type of painted pottery, thought to be more or less contemporaneous with the ‘Ubaid culture in Mesopotamia. The presence of these imposing structures, as well as simple administrative techniques (e.g. stamp seals, Steve and Gasche 1971: 168) leaves no doubts about the presence of an advanced indigenous civilisation, parallel to those found at for example Tell ‘Ubaid or Eridu in the West. Susa I era came to an abrupt end as attested by the presence of firey destruction, a rapid turnover in pottery types and changes in the architecture visible on the Acropolis (Canal 1978: 169) - Susa II (Acropole I levels 22-17; Acropole II levels 6-1). The new pottery assemblage is dominated by coarse Uruk-style wares, including the diagnostic bevelled-rim bowls. Susa II is therefore seen as the time when the site is well and truly incorporated into the Uruk World System. The abrupt nature of the transition leaves room for speculation regarding the nature of this event, with the military conquest and influx of Mesopotamian migrants being a serious possibility. At this time the site grew to ca. 25ha (Potts 2015: 56). Similarly to Syrian sites which found themselves within the influence zone of the Uruk culture, one important aspect of the Uruk culture which seems to be missing from Susa is the more advanced proto-cuneiform administrative text corpus (Potts 2015: 60). The tablets found in the Acropole I levels 18 and 17 (final Susa II levels) contained only numerical signs and, unlike the Uruk tablets, were almost always sealed, with the seal impression usually going on top of the numerical signs (Dahl, Petrie, and Potts 2013: 355). Therefore, while there are no doubts that Susa was very much part of the Uruk civilisation, it has developed some idiosyncratic features which distinguished it from the southern Euphrates alluvium.

The Uruk period in Susa seems to have ended just as abruptly as it had begun. The occupation Acropole I levels of layers 17 (17B1 and 17B2) was overlaid by a stratum of sherds (17A), likely representing the levelling of the structures, which in turn was covered by a terrace upon which the level 16 structures were erected (Le Brun and

Vallat 1978: 16). Although the break in material culture and architecture is clear, there is some debate regarding the nature of the transition. It is unclear whether the level 17 occupation was followed by hiatus (Dittmann 1986: 171). Based on the presence of tablets, the palaeography of which seems to suggest a transitional stage between the numerical texts of levels 18-17 and the Proto-Elamite documents from levels 16-14, it has been suggested that an intermediate period of Susa occupation labelled “level 17x” existed between the levels 17 and 16 (Dahl, Petrie, and Potts 2013: 357; Petrie 2014: 141). Such a level is not, however, accounted for in the Acropole I sounding. In any case, the Susa III period (Subdivided into IIIA, IIIB, and IIIC), corresponding to Acropole I levels 16-13 and Ville Royale I levels 18-13, is usually referred to as the Proto-Elamite period due to the appearance of the characteristic inscribed and unscribed material which link Susa to other major sites scattered across the Zagros mountains and the Iranian Plateau (Voigt and Dyson 1992: 133, see **Section 6.1**). Some of the new ceramic types include crude trays and tall goblets with a pedestal-like base (*goblets à base en moignon*, not to be confused with “solid-footed goblets” of ED Mesopotamia (**Graph 21**); Dittmann 1986: 174). Although bevelled-rim bowls and other Uruk types seem to continue in small numbers, the discovery of some mono- and polychrome in Acropole I (Le Brun and Vallat 1978: 183) and Ville Royale I (Carter 1980:20) led to the assumption that the beginning of the Proto-Elamite period corresponds to the onset of the Jemdet Nasr period in Southern Mesopotamia, while the final phases correlate with the ED I/II times (Helwing and Neumann 2014: 46). Evidence of surface erosion and change in architectural plan in Acropole I (Le Brun and Vallat 1978: 190) and Ville Royale I (Carter 1980: 21) suggest yet another dramatic transition, potentially followed by a hiatus. Susa IVA (Acropole I levels 10-13 and Ville Royale I levels 12-9) pottery assemblage is usually defined using a characteristic style of monochrome painted ceramics, confusingly known as the “Second Style” (not to be confused with the Uruk Susa II ceramics). Some early examples of this style appear in the final stages of Susa III (Carter 1980: 21; Voigt and Dyson 1992: 134). Amiet 1979 tentatively

suggested that this change marks the conquest of Susa by one of the Sumerian kings, potentially king Enmebaragesi of Kiš<sup>109</sup>. The later part of the Susa IVB period is marked by yet another change in the architectural makeup of the site (Le Brun and Vallat 1978: 179; Carter 1980: 22). The waning of the "Second Style" painted pottery, the appearance of new ceramics with parallels in Southern Mesopotamia (e.g. jars with "mother-goddess" handles), as well as the recovery of the first Akkadian tablets from the Acropole I levels 1-9 make a strong case for seeing the Susa IVA-B transition as evidence of the Akkadian conquest (Voigt and Dyson 1992: 134).

### Susa - Published <sup>14</sup>C Dates

**P-912 (5418 ± 40 BP):** charcoal and ash; Apadana Locus 6; According to the original article (Stuckenrath, Coe, and Ralph 1966), samples P-912 and -913 were collected by R. Ghirshman during his 1963 campaign. Ghirshman's reports (Ghirshman 1963; Ghirshman 1965), however, do not mention the sample collection so we do not possess any detailed context information. Voigt and Dyson 1992 classify this sample as "Uruk" in date, however "Loc. 6" may only refer to a locus in Ghirshman's Chantier 25 (Steve and Gasche 1990: 24). The ceramics of this locus correspond to Acropole I 27-25, i.e. early Susa I. The date seems to indeed be much older than Uruk. Given the uncertainty of its context, the sample is excluded from the analysis.

**P-913 (3703 ± 124 BP):** ash; Locus 50, A/III; The sample has been described as "undersized" (Stuckenrath, Coe, and Ralph 1966), hence the large measurement error. this sample has also been classified as "Uruk" by Voigt and

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<sup>109</sup>King Enmebaragesi of Kiš is mentioned in several literary compositions, and belonged to the First Dynasty of Kiš mentioned in the SKL. According to the SKL: ETCSL 2.1.1: 83) en-men-bara<sub>2</sub>-ge-si 84) lu<sub>2</sub> ma-da elam<sup>ki</sup>-ma 85) ġeš<sup>š</sup>tukul-bi ib<sub>2</sub>-ta-an-gur<sub>2</sub> 86) lugal-am<sub>3</sub> mu 900 i<sub>3</sub>-a<sub>5</sub> (*Enme(n)baragesi / the people of the country (horde?) of Elam /with his weapon he made them bow down / he ruled for 900 years*).

Enmebaragesi is usually identified with Me-bara<sub>2</sub>-si known from an Early Dynastic inscription (RIME 1.07.22.01 = CDLI P431026). If this identification is correct, Enmebaragesi would not only be the earliest historically-attested king of the SKL, but also the only convincing line of evidence proving the historicity of Gilgamesh who, according to a legend, fought against Enmebaragesi's son, Aga of Kiš.

Dyson 1992. “A/III” most likely refers to Ghirshman’s dig in Chantier A. Level III of this sounding dates to the 1<sup>st</sup> mill. AD (Ghirshman 1952: 6). Similarly to P-912, this sample is excluded from the model.

**IRPA-25 (5093 ± 105 BP):** charcoal; “*from fire in archaeological layer 35 cm depth on floor of room. A firestone and wall of unbaked bricks stood nearby. Most likely 2700 B.C.*”; IRPA-25 and -26 were collected by H. Gasche in 1965. The available contextual information is scarce, and the large mismatch between these two supposedly contemporary dates make them unsuitable for the analysis.

**IRPA-26 (3140 ± 150 BP):** charcoal; “*from oven found in a archaeological layer at 75cm depth on same site as IRPA-25. most likely 2750 B.C.*”; See IRPA-25.

**Gif-180 (3175 ± 250 BP):** ash and bone fragments; Acropole; Suse C, No. 1; No contextual information is available for this sample, and the very large measurement error do not allow for this sample to be included in the analysis.

**TUNC-58 (5665 ± 121 BP):** charcoal; Acropole II; Locus 5.3.9; This sample was supposedly associated with Susa I pottery, although the exact level in the Acropole II sequence was not given. The date has a very large measurement error and is exceedingly old, putting it beyond the scope of this analysis.

**TUNC-59 (4650 ± 90 BP):** charcoal; “South Acropole” (Acropole I?); “*1780 H5*”; TUNC-59 is the only available date supposedly coming from the Acropole I sounding (Dahl, Petrie, and Potts 2013: 360). Unfortunately, despite being classified as “Uruk”, there is no information regarding its original level. The sample is therefore impossible to include in the chronological model.

**GrN-6054 (5275 ± 75 BP):** ash and charcoal?; “Chantier de la haute terrasse”; Level 20 m 70; Locus 314; The samples published by Steve and Gasche 1971 may represent the only coherent body of radiocarbon dates from Susa

which lend themselves to Bayesian modelling. Unfortunately, there are still numerous questions regarding the archaeology of these contexts (see GrN-6051, -6053, SPr-43 and -46 below). GrN-6054 and -6052 both came from levels immediately below the Uruk construction and containing the painted pottery of pre-Uruk Susa. They may therefore provide a useful *terminus post quem* for the beginning of Susa II. Locus 314 was a partially excavated fill of a room which contained multiple sherds of the characteristic Susa I pottery. According to the excavators' report, both GrN-6054 and -6052 were found on the floor of the "Suse A" buildings erected upon virgin soil, and should therefore date to the earlier phase of the Susa I occupation of the site.

**GrN-6052 (5370 ± 40 BP):** ash and charcoal?; "Chantier de la haute terrasse"; Level 21 m 22; Locus 301a; See GrN-6054. Locus 301a was one of several rooms comprising a structure which contained sherds of Susa I painted pottery (Steve and Gasche 1971: 38). Given its level, the sample should be younger than GrN-6054 but still predate Uruk occupation of Susa.

**GrN-6051 (5040 ± 40 BP):** charcoal; "Chantier de la haute terrasse"; Level 22 m 23; Locus 267; See GrN-6054. Dates GrN-6051 and -6053 are rather problematic to assign to a phase. In the original publication, Steve and Gasche 1971 dated the large mudbrick structure "massif orange" to the Late Uruk-early Jemdet Nasr period based on the use of riemchen bricks (Steve and Gasche 1971: 145). The two samples were collected from above the "massif" and were thus ascribed to the Jemdet Nasr. Dittmann 1986 (p. 175), however, argued that Locus 266 and 267 (a dump of pottery sherds and other small clay objects) from which GrN-6051 was taken contained no unambiguously Jemdet Nasr-style material, ceramic or otherwise. Rather, the generic Uruk assemblage found in the locus could be dated to just about any of the subphases of the Uruk period. Indeed, the dates seem significantly older than the ones for Eana IV in Warka. Therefore, it is safer to assume that the two dates represent a *terminus*

*post quem* for the appearance of the Uruk culture in Susa. Given the lack of a stratigraphic link between these levels and any later Susa III context, it is impossible to connect these dates with the later Proto-Elamite tradition (Dittmann 1986: 178).

**SPr-43 (4740 ± 220 BP):** Ash and charcoal?; “Chantier de la haute terrasse”; Level 22 m 23; Locus 267; See GrN-6054. This measurement was performed on the same sample as GrN-6051. The difference in the two dates is compensated for by the large measurement error.

**GrN-6053 (5015 ± 90 BP):** Ash and charcoal?; “Chantier de la haute terrasse”; Level 22 m 02; Locus 304; See GrN-6054. Locus 304 was located in the northwestern corner of the Square A6, and the sample was recovered from above the “Suse A” (Susa I) walls (Steve and Gasche 1971: 34, 152). Given its place in the level sequence, the sample should be contemporary with GrN-6051/SPr-43.

	<b>Susa "chantier de haute terrasse"</b>		<b>Farukhabad</b>	
<b>Susa II</b>	Level 22	SPr-43	Exc. A Layer 21	M-2152
		GrN-6051		
		GrN-6053		
<b>Susa I</b>	Level 21	GrN-6052		
	Level 20	GrN-6054		

Graph 10: A schematic representation of the archaeological sequence at Susa and Farukhabad.

### 6.3 Tal-i Malyan/Anšan

The 130ha tell of Malyan in the Fars province has occupied a central place in the cultural and political life of Central Iran. The site was first examined in the 1960's by the Persian archaeologist F. Tavallali; however most of our information comes from the excavations of W. Sumner of the Ohio State University during the 1970's. An inscribed brick of the Middle Elamite king Hutelutuš-Inšušinak, a contemporary of

Nebuchadnezzar I, helped to identify the site as ancient Anšan, also known as Anzan in the Elamite sources (Sumner 1974: 176). Together with Susa, Anšan was one of the focal points of the indigenous Iranian civilisations. Tal-i Malyan was occupied since at least the Neolithic (6<sup>th</sup> mill. BC), and achieved importance during several periods of its history, the last one being the Sasanid era (1<sup>st</sup> mill. AD), Sumner 2003: 2). 4<sup>th</sup>-3<sup>rd</sup> mill. BC levels have been studied in three main operations at the site. The long stratigraphies containing local ceramics, sealings and Proto-Elamite tablets helped to link the chronologies of Susa and the Zagros with the Lapui-Banesh-Kaftari pottery sequence of the Fars region.

Operation ABC was conducted on the top of the main mound of Tal-i Malyan and consisted of 9 adjacent soundings. A total of five building levels were identified across 20 strata. The lowest four strata (16-20) contained a series of almost sterile layers above virgin soils, with some evidence of flint industry and hearths. Stratum 16 contains the sequence's first examples of the diagnostic Banesh ceramics. The earliest Banesh-period building, Building Level (B.L.) 5, was erected upon this stratum, and was composed of adjoining rectangular rooms laid out in a very regular pattern (Sumner 2003: 20-21). The building was interpreted by the excavators as a large elite house (Nicholas 1990: 131). The building was demolished and upon it two further building levels of the succeeding phase (B.L. 4A and 4B) were constructed. The rectangular rooms and corridors of B.L. 4A and 4B follow a different orientation than B.L. 5, however the associated ceramics of the two levels seem similar. The presence of some Uruk types (bevelled-rim bowls) and Banesh chaff-tempered ceramics (e.g. goblets, trays) suggest an (Early) Middle Banesh date for the building, potentially representing a public space dedicated to crafts production and/or commerce (Sumner 2003: 53). B.L. 3 was the largest and best-preserved of the ABC construction layers. Constructed on top of the levelled and infilled remains of B.L. 4, B.L. 3 was a large residence particularly notable for the ample evidence of wall painting within the structure (Sumner 2003: 27). Although fragments of painted wall plasters have

been found in other Banesh contexts at the site, ABC B.L. 3 stands out in terms of the number of recovered fragments. It is unclear whether the B.L. 3 structure was a palace or a temple, but it is safe to assume that it performed an important public function. In terms of ceramics, there is a visible decline in the number of bevelled-rim bowls and grit-tempered ceramics associated with the later Banesh culture become more prevalent, suggesting a Late Middle Banesh date for B.L. 3 (Sumner 2003: 53). Moreover, most of the Proto-Elamite tablets in ABC were found in the B.L.s 4 and 3, underlying the importance of the building complexes (Sumner 2003: 115). B.L. 2, most likely a storehouse, was the final Banesh-era structure in ABC, most likely still belonging to the Middle Banesh phase based on the ceramics. Its abandonment was followed by a hiatus, evident in the erosion of the B.L. 2 walls. Overlaid by the pebbly Stratum 7. The refuse deposits of B.L. 1 contained the characteristic Kaftari painted ceramic types (Sumner 2003: 16). Though the length of the Banesh-Kaftari hiatus at ABC is unknown, the Kaftari material provides a *terminus ante quem* for the main Proto-Elamite/Banesh occupation.

The smaller mound of the TUV operation to the East of the main mound was described as the “suburbs” of the Banesh-period Malyan (Nicholas 1990: 131). Three main building levels were recognised across thirteen strata. At the bottom of the sequence lay the B.L. 3 structure remains, composed of several adjoining rooms. An intermediary Stratum 9 was found only above some rooms, suggesting that the succeeding B.L. 2 was constructed soon or immediately after B.L. 3 ceased its function (Nicholas 1990: 28). B.L. 2 was the largest of the TUV architectural complexes. Its layout was notably different to that of B.L. 3 and included a number of rooms and corridors, as well as a free-standing circular structure. B.L. 2, unlike the previous building level, was infilled with bricks and levelled (Nicholas 1990: 34). Proto-Elamite tablets were found both in B.L.s 3 and 2 (Sumner 2003: 115). The uppermost B.L. 1 was preserved only in some parts of the excavation. The orientation of the walls is the same as that of B.L. 2, but the layout differs. In terms of ceramic finds,

characteristic types such as bevelled-rim bowls, pedestal-footed goblets, trays and grit-tempered painted ware occur throughout the TUV sequence, with their relative frequency changing gradually. Therefore, all three TUV B.L.s were assigned to the Middle Banesh phase (Voigt and Dyson 1992: 141), although the excavators allow for the possibility of B.L. 1 being occupied during the Late Banesh period (Dittmann 1987: 48; Sumner 2003: 117; Helwing and Neumann 2014: 51).

A sounding in area By8 examined the city wall, which encircled a total area of about 200ha. A total of thirteen strata was recognised in the sounding (Sumner 1985: 155). The large city wall and a number of associated rooms was constructed on top of the prepared sandy Stratum 11B. The typological dating of the ceramic assemblage associated with the construction and use of these buildings posed some problem, as it seemed to incorporate both Banesh and Kaftari types. The Excavators assigned the construction of the city wall to Late or Terminal Banesh, a dating that is further corroborated by the presence of a *terminus ante quem* in the form of typical Kaftari ceramics (including the famous “fat left-facing birds”) found in the overlying Stratum 8 and wells sunk therefrom (Sumner 1985: 156).

### **Tal-i Malyan - Published <sup>14</sup>C Dates**

**P-3060 (5040 ± 270 BP):** Charcoal; Operation ABC; Stratum 15B; B.L. 5; This sample was associated with the earliest Banesh-period construction works in the Operation. Note that according to Voigt and Dyson 1992, the sample came from Stratum 19C, i.e. preceding the construction of the building. Either way, since the pre-B.L. 5 strata contained early Banesh sherds, the date can safely be considered a *terminus post quem* for the Middle Banesh sequence, although its large measurement error gives it little value.

**TUNC-31 (4671 ± 88 BP):** Charcoal; Operation ABC; Stratum 13B; B.L. 4; Lot 63; Sample 227; Two measurements have been performed on the same

sample from the B.L. 4. Note that the difference in the ages is quite substantial (ca. 300 years).

**P-2187 (4370 ± 60 BP):** Charcoal; Operation ABC; Stratum 13B; B.L. 4; Lot 63; Sample 227; See TUNC-31.

**P-2336 (4630 ± 260 BP):** Charcoal; Operation ABC; Stratum 13B; B.L. 4; Pit 84; This sample was recovered from the same level as TUNC-31 and P-2187. Unfortunately, the large error of this measurement does not allow us to say which one of the two measurements is more accurate (ca. 4600 uncalBP *versus* ca. 4300uncalBP).

**P-2334 (4460 ± 70 BP):** Charcoal; Operation ABC; Stratum 13A; B.L. 4; Area 80; Lot 143; According to the excavation reports (Sumner 2003: 19), Stratum 13A floors overlaid the layers associated with the construction and the earliest use of B.L. 4A. The sample should therefore be younger than TUNC-31, P-2187 and -2336.

**P-2335 (4390 ± 90 BP):** Charcoal; Operation ABC; Stratum 8E; B.L.s 3-2; Area 3; Lot 90; The original publication (Fishman and Lawn 1978) does not give the stratum number from which the sample was taken, mentioning only that it came from an intermediary layer between the B.L.s 3 and 2. According to Voigt and Dyson 1992, the sample came from “Stratum 8E”, which is not mentioned in the excavation reports. It is therefore most likely that the sample derives from the intermediary Stratum 9.

**P-2186 (3670 ± 60 BP):** Charcoal; Operation ABC; Stratum 7; B.L. 1; P-2186 was collected from the pebbly surface (Stratum 7) overlying B.L. 2. This was the earliest level containing Kaftari sherds.

**P-2062 (3560 ± 60 BP):** Charcoal; Operation ABC; Stratum 4; B.L. 1; Area 20; Lot 56; Samples 77 and 78; This sample came from a well sunk from Stratum

4, containing Kaftari pottery sherds.

**TUNC-28 (3510 ± 63 BP):** Charcoal; Operation ABC; Stratum 3; B.L. 1; Lot 3; Stratum 3; Sample 82; TUNC-28, -29 and -30 were all taken from the same level. Note that Voigt and Dyson 1992 give “Stratum 4” as the original context, as opposed to Stratum 3 in the original publication Bovington, Mahdavi, and Masoumi 1973. Because of this uncertainty, Strata 4 and 3 will be treated as a single chronological unit.

**TUNC-29 (3526 ± 61 BP):** Charcoal; Operation ABC; Stratum 3; B.L. 1; Lot 3; Stratum 3; Sample 82; This measurement has been derived from the same sample as TUNC-28. See TUNC-28.

**TUNC-30 (3531 ± 63 BP):** Charcoal; Operation ABC; Stratum 3; B.L. 1; Lot 3; Stratum 3; Sample 56; See TUNC-28.

**P-2063 (3430 ± 60 BP):** Charcoal; Operation ABC; Stratum 3; B.L. 1; Area 16; Lot 34; Sample 52; The context of this sample has been described as a refuse deposit associated with B.L. 1.

**P-3067 (4150 ± 210 BP):** Charcoal; Operation GGX98; Stratum 11; B.L. 3A; The only detail available for the samples P-3067, -3068, and -3347 is that they have been found in association with Early Kaftari ware.

**P-3068 (3980 ± 80 BP):** Charcoal; Operation GGX98; Stratum 7; Pit 52; See P-3067.

**P-3347 (3510 ± 50 BP):** Charcoal; Operation GGX98; Stratum 7; See P-3067.

**P-3347 (4170 ± 260 BP):** Charcoal; Operation GHI; Stratum 24; Burial 149; A single date has been recovered from the small test trench of GHI. Note that while Sumner 2003 places this sample in Stratum 24, Voigt and Dyson 1992

report it as Stratum 23. The sample is difficult to place in the Banesh-Kaftari sequence, as it has been found above levels containing typical chaff- and grit-tempered Banesh pottery (Stratum 25) and the first appearance of the painted Kaftari ware (Stratum 22). The sample has thus been described as Transitional Banesh-Kaftari.

**P-2982 (4260 ± 70 BP):** Charcoal; Operation By8; Stratum 11B; This sample comes from the earliest phase of the city walls' construction.

**P-2981 (4780 ± 60 BP):** Charcoal; Operation By8; Stratum 10D; Room 10; P-2981 and -2984 have been collected from within a room associated with the city wall. Considering the typological age of these contexts (Late Banesh), the two samples appear surprisingly early.

**P-2984 (4770 ± 290 BP):** Charcoal; Operation By8; Stratum 10B; Room 10; See P-2981.

**P-3266 (4410 ± 60 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; A total of 9 samples coming from different contexts in the B.L. 3A structure in TUV have been dated. Detailed contextual information regarding the loci of these samples is available only for some of them. With the possible exception of P-2333, they give a good estimate for the Middle Banesh occupation of the site and are consistent with those from ABC.

**P-3063 (4430 ± 70 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; Room 250; See P-3266.

**P-2985 (4450 ± 60 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; Trashpile 241; See P-3266.

**P-3269 (4480 ± 50 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; See P-3266.

**P-3061 (4490 ± 70 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; Area 338; See P-3266.

**P-3050 (4500 ± 60 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; See P-3266.

**P-3268 (4520 ± 70 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; See P-3266.

**P-2986 (4590 ± 70 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; Room 258; See P-3266.

**P-2333 (4150 ± 250 BP):** Charcoal; Operation TUV; Stratum 10; B.L. 3A; Lot 61; See P-3266.

## 6.4 Tepe Yahya/Marhaši

The small, almost perfectly circular, tell of Tepe Yahya in the southeastern Iranian province of Kerman was discovered in 1967 by C.C. Lamberg-Karlovsky of Harvard University. The excavations continued until 1975 and revealed seven phases of occupation, spanning from the Neolithic until the Sasanian Era. The ancient name of the site is unknown; however, it has been previously argued that Tepe Yahya was the cultural and political centre of the land of Marhaši, well attested in the Mesopotamian texts as an important trading partner and a notable political power since the 3<sup>rd</sup> mill. BC (Steinkeller 1982; Potts 2004). Tepe Yahya is a rather isolated site and seems to have been the only large settlement in the region during the late 4<sup>th</sup> - early 3<sup>rd</sup> mill. BC (Mutin and Lamberg-Karlovsky 2013: 11). The tell was cut by two step trenches, on the south (trenches A-E) and north (trenches XA-XE). The main body of archaeological information about the stratigraphy, architecture and typology came from the south step trench. The contexts from trenches XA-XE were correlated with the main sequence based on pottery typology (Voigt and Dyson 1992: 147).

	ABC	TUV	City Gate (B9)	G0X	GHI	Tal-i Kureh	Tol-e Spid	Tol-e Nurabad
Kufari	B.L. 1 P-2186 P-2162 TUNC-28 TUNC-29 TUNC-30 P-2169			Strata 11-7	P-3077 P-3098 P-3347		Phase 17-15 OZ1-141 Wk-13963 OZ1-142 Wk-13964	
	Late/Terminal Banesh		Strata 11-10		Burai 149			Phase 16a OZ1-135
Middle Banesh	B.L. 3-2 P-2335 JASINGLETEXT		P-2382 P-2381 P-2384				Phase 18	Phase 16a Wk-13969
	B.L. 3a TUNC-31 P-2187 P-2389 P-3081 P-3050 P-3288 P-2986 P-2333							
Early Banesh	Pie-B.L. 5 P-3160						Phase 19 Wk-13861	Phase A10 Wk-13968
Lapui/Banesh Transitional						Stratum 2 Brea-382279		
						Stratum 3 Brea-382281		
Lapui Phase						P-2026 Brea-382282 Brea-382280		Phase A11-A12a OZ1-132
						Stratum 7 P-2024	Phase 20 Wk-13979 Phase 21 OZ1-140 Phase 22 Wk-13980 Phase 23 OZ1-138	Phase A12b OZ1-134

Graph 11: A schematic representation of the archaeological sequence for Tal-i Malyan, Tal-i Kureh, Tol-i Spid and Tol-i Norabad.

The earliest phase of interest is Yahya V, subdivided into three subphases (VC-A). Several construction levels, all seemingly domestic in nature, contained painted pot-

tery similar to other smaller sites in the region. The pottery displayed significant continuities with the previous assemblage of local decorated types (Lamberg-Karlovsky 1970: 83). The structural remains of the uppermost building phase (VA), a series of rooms laid out in a square grid, showed signs of weathering, which led the excavators to believe that the site was abandoned at the end of Phase V (Potts 2001: 2). This hypothesis is further substantiated by the fact the Yahya sequence lacks a phase which could be seen as contemporary with the Late Uruk period. Late Uruk material is attested at other sites in southeastern Iran in the assemblage of the so-called Aliabad Period, which is absent from Yahya (Mutin and Lamberg-Karlovsky 2013: 28; Helwing and Neumann 2014: 47). The hiatus is followed by the construction of the large Period IVC building. The ceramic, glyptic and textual evidence from the IVC contexts leave little doubt as to the date of the complex, placing it securely in the Proto-Elamite period, corresponding to the Middle Banesh in Tal-i Malyan (Voigt and Dyson 1992: 147; Mutin and Lamberg-Karlovsky 2013: 187). The repertoire of administrative tools in and around the IVC building, including Proto-Elamite tablets and seals, suggest that the building was an important administrative centre. The internal chronology of the Yahya IVC period has been the subject of some disagreement. Potts 2001 (pp. 5, 55, 192) suggested a twofold division between the main occupation of the building (IVC2) and later building and infilling activity (IVC1) followed by a hiatus (Prickett 1986: 453). Mutin and Lamberg-Karlovsky 2013 strongly disagreed, arguing for a IVC2-IVC1 continuity, extending perhaps even into the IVB6 level. Indeed, typical Proto-Elamite/Jemdet Nasr types such as bevelled-rim bowls and conical cups continued to be used, though in smaller numbers, after the end of Yahya IVC (Voigt and Dyson 1992: 150).

Regardless, the building was abandoned and an intermediary phase containing no structural remains (IVB6) followed. The succeeding IVB phase has been divided into three main subphases: an intermediary post-IVC layer (IVB6), main construction level (IVB5) and 4 later occupation layers (IVB4-1). The main feature of the IVB

phase was nicknamed the “Persian Gulf Room” after the associated ceramics and stamp seal designs which showed remarkable parallels with types found on sites along the south shore of the Persian Gulf, such as the Island of Bahrain, ancient Dilmun (Potts 2001: 104-107), suggesting an important role Tepe Yahya played in the ancient long-distance maritime trade. Most importantly, however, the large numbers of finished and unfinished chlorite stone bowls carved in the so-called Intercultural Style allowed Yahya to be identified as the chief producer of this characteristic type of artifacts found at multiple sites in Syria, Southern Mesopotamia, Arabian Peninsula, and as far north as Uzbekistan (Kohl 1975; Kohl 2001; Aruz 2003). Although chlorite vessels and jewelry have been found throughout the Yahya sequence, the rapid growth in chlorite bowl production at the site was interpreted by Kohl 2001 (p. 210) as motivated by some kind of a “*nonlocal or externally generated demand for the objects produced by the Tepe Yahya people*”. In Mesopotamian contexts, these carved bowls appear in contexts dated to the mid- to late ED III (ED IIIa/b), suggesting a mid-3<sup>rd</sup> mill. BC date for IVB at Yahya.

## **Tepe Yahya - Published <sup>14</sup>C Dates**

A total of 39 radiocarbon dates has been reported for various Yahya contexts. Despite this seemingly large number, the dates remain highly problematic. Firstly, a great majority of these dates have extremely large measurement errors. Secondly, multiple of them seem to have been either intrusive or holdovers given the large differences in date among samples supposedly coming from the same phase. Thirdly, detailed context information is available for only some of the samples. Finally, as outlined above, there still remains a considerable disagreement regarding the phasing of the IVC-IVB transition. Therefore, a large number of dates listed here had to be excluded from the analysis. The dates from north and south step trenches are discussed separately.

**GX-1737 (3290 ± 120 BP):** Material unknown; D.4(69); Phase VIB; Although this sample was reported to date to Phase VI, its young age strongly

suggests contamination and it is thus excluded from the model.

**GX-1728 (5610 ± 140 BP):** Material unknown; D.TT1.7(69); VIB; No detailed information regarding this sample is available.

**Beta-6477 (6870 ± 550 BP):** Material unknown; C.TT3.1.2(69); VIA; Given the extremely large measurement error, this reading has no chronological value and has been thus excluded from the model.

**TF-1139 (4195 ± 110 BP):** Charcoal; C.TT6.3(69); VI?; No detailed information regarding this sample is available.

**GX-1736 (3290 ± 120 BP):** Material unknown; C.7.12(69); VC; No detailed information regarding this sample is available. The date is obviously too young (by ca. 2000 years) to come from Period V, which suggests contamination or misassociation. The sample was excluded from the model.

**Beta-6476 (5210 ± 130 BP):** Material unknown; C.TT1.1.5(69); VB; No detailed information regarding this sample is available.

**WSU-872 (5580 ± 280 BP):** Material unknown; C.TT7.1(68); VA; No detailed information regarding this sample is available.

**Beta-6469 (4650 ± 230 BP):** Material unknown; A.11.4(75); IVC; According to the available notes, the sample was collected from Area B, an open space to the north of the IVC2 building, interpreted as a basin or a draining pool. The associated ceramics bore similarities to the Proto-Elamite types of the IVC2 at Tal-i Malyan (Potts 2001: 7-8).

**GX-1730 (4590 ± 180 BP):** Material unknown; C.TT6.6(68); IVC; Though no context is explicitly given for this sample, the available publication notes allow us to trace it to a drain associated with the IVC2 building (Potts 2001: 281).

**GX-5161 (3720 ± 175 BP):** Material unknown; A.11.4(75); IVC; This sample came from a pit in Area B. See Beta-6469. The date is considerably younger than the remainder of the IVC2 dates (by ca. 1000 years), and was therefore removed from the model.

**GX-5159 (4310 ± 195 BP):** Material unknown; B.20a(70); IVC; The sample was collected inside Room 5, a large room of the IVC2 complex with relatively few pottery sherds inside. Despite the paucity of ceramic material, two fragments of chlorite bowls, a chlorite pendant and a cache of uninscribed tablets found within betray an important function and place it in the Proto-Elamite period (Potts 2001: 13).

**GX-5160 (4150 ± 275 BP):** Material unknown; BW-CW.7.7(71); IVC; The sample was recovered from a wall in Areas F-G to the west of the main building. Although the pottery found within these areas was mixed, containing some painted sherds reminiscent the pre-Uruk Period V ceramics, the sample's find-spot allows us to connect it to the IVC building phase (Potts 2001: 13).

**TUNC-37 (4725 ± 115 BP):** Material unknown; B.1(71); IVB6; According to the available notes, the samples TUNC-37 and Beta-6472 came from a series of layers sealing the IVC Proto-Elamite building. Considering the large difference between these two readings and the fact that neither of them fit the VIC-VIB sequence, these two samples were removed from the model.

**Beta-6472 (3560 ± 140 BP):** Material unknown; B.3(71); IVB6; See TUNC-37.

**New-series-2 (3665 ± 140 BP):** Seeds; BBW.T6.4(70); IVB5; A series of 9 dates have been performed on material from contexts associated with the IVB5 structures, usually seen as contemporary with the later ED III in Southern Mesopotamia. Although still very imprecise, this series may be the only truly reliable source of absolute dating for the Yahya sequence. The radiocarbon

measurements, performed by the Arizona Laboratory, were published without their laboratory numbers and are only referred to as “New series” in Mutin and Lamberg-Karlovsky 2013 - this naming convention is retained in this work.

**New-series-3 (3690 ± 55 BP):** Charcoal; B.8.1(70); IVB5; See New-series-2. According to the context number, the sample is likely to have been collected from the area to the southeast of the Persian Gulf Room (Mutin and Lamberg-Karlovsky 2013: 316). Excavations in this area revealed some construction fragments, although the architectural plan is uncertain. Among other finds, a chlorite pounder and a fragment of a chlorite bowl link this context to other stone bowl production-related contexts in IVB5 (Potts 2001: 112).

**New-series-4 (3835 ± 55 BP):** Charcoal; BBW.T5.8(69); IVB5; See New-series-2. The sample was recovered from the fill of Room 10 of the IVB5 context, a structure adjacent to the Persian Gulf Room. Although the ceramic fragments in the fill were similar to those found in the Persian Gulf Room and included an unfinished chlorite bowl, the presence of Yahya V painted pottery may be indicative of the disturbed nature of the context (Potts 2001: 110).

**New-series-6 (3790 ± 55 BP):** Charcoal; BBW.T4.5.1(70); IVB5; See New-series-2. No detailed information regarding this sample is available.

**New-series-7 (3690 ± 65 BP):** Charcoal; A.9.3(75); IVB5; See New-series-2. The only available piece of information regarding the origin of this sample is that it has been recovered from one of the IVB5 ovens (Mutin and Lamberg-Karlovsky 2013: 316).

**New-series-8 (3715 ± 90 BP):** Charcoal; BW.T5.6(69); IVB5; See New-series-2. No detailed information regarding this sample is available.

**New-series-9 (3675 ± 110 BP):** Charcoal; BW.T5.5(69); IVB5; No detailed information regarding this sample is available.

**New-series-1 (3800 ± 135 BP):** Seeds; BW.T5.5(69); IVB5; This sample has been collected from the floor of the Persian Gulf Room.

**New-series-5 (3800 ± 135 BP):** Seeds; BW.T5.5(69); IVB2; No detailed information regarding this sample is available.

**GX-1726 (2595 ± 120 BP):** Grain; BW.TT5.8(69); IVB5; In addition to the “New series” discussed above, 5 additional dates are available for the IVB5 level. As opposed to the “New series” dates, which are largely consistent with one another, GX-1726, -1727, Beta-6475, TF-1143 produced very divergent date estimates. They are also deprived of any detailed contextual information. Therefore, these 4 dates will be excluded from the analysis.

**Beta-6475 (2950 ± 60 BP):** Grain; BW.TT4.7.1(70); IVB5; See GX-1726.

**Beta-1727 (4430 ± 360 BP):** Material unknown; BW.TT5.7(69); IVB5; See GX-1726.

**TF-1143 (4150 ± 130 BP):** Material unknown; B.8.1-1(70); IVB5; See GX-1726.

**GX-1735 (11140 ± 360 BP):** Material unknown; BW.TT5.1.1(69); IVB1; The excessively old age of this sample may be due to contamination with bitumen. The date is not included in the model.

**Beta-6470 (3610 ± 70 BP):** Material unknown; B.TT5.1.5(69); IVB1; No detailed information regarding this sample is available.

**GX-1734 (5320 ± 170 BP):** Material unknown; BW.TT5.6(69); IVB4-1; GX-1734 and WSU-876 are considerably older (ca. 2000 years) than the two other dates assigned to IVB4-1 (New-series-5 and Beta-6470) and do not fit the overall sequence. These two dates were therefore excluded from the analysis.

**WSU-876 (5390 ± 310 BP):** Material unknown; BW.11(68); IVB?; See GX-1734.

**Beta-6473 (3300 ± 70 BP):** Material unknown; B.TT4.2B(69); IVA?; No detailed information regarding this sample is available.

**Beta-6474 (3300 ± 70 BP):** Material unknown; B.TT4A.7.1(69); IVA?; No detailed information regarding this sample is available.

**Beta-6471 (2530 ± 70 BP):** Material unknown; B.TT4A.7.1(69); IVA?; This date is much younger (ca. 1000 years) than the two other Period IVA dates. This measurement was therefore removed from the model.

**TF-1136 (4130 ± 85 BP):** Charcoal; XC; VA-B; The only information available regarding this sample is that it was taken from underneath the floor of Stratum 5 in the XC sounding (Agrawal and Kusumgar 1973). Contextual problems aside, the 5 dates from the north step trench (XC and XCE) do not lend themselves to be put into a coherent sequence. Not only are the supposed phases internally inconsistent (TF-1136 and Beta-6483 *versus* Beta-6560), they are also significantly different from the samples from the south step trench sequence. Given the lack of a stratigraphic link between the two sequences and the poor quality of the XC and XCE measurements, these five dates were not included in the chronological model.

**Beta-6483 (4060 ± 83 BP):** Charcoal; XCE.T2.14.30(71); VA; See TF-1136.

**Beta-6560 (5060 ± 110 BP):** Charcoal; XCE.14B.39(71); VA; See TF-1136.

**TUNC-39 (3859 ± 73 BP):** Charcoal; XBTT2.6b E. of 36(71); IVB?; See TF-1136.

	Southern Trench		Northern Trench	
<b>Yahya IVA</b>		Beta-6473		
		Beta-6471		
		Beta-6474		
<b>Yahya IVB</b>		TUNC-37		
		Beta-6472		
		New-series-2		
		New-series-3		
		New-series-4		
		New-series-6		
		New-series-7		
		New-series-8		
		New-series-9		
		GX-1726		
		Beta-6475		
		GX-1727		
		TF-1143		
		Beta-6475		
		New-series-1		
		New-series-5		
		GX-1735		
	Beta-6470			
	GX-1734			
	WSU-876			
<b>Yahya IVC</b>	IVC2	GX-5161		
		GX-5159		
		GX-5160		
	IVC1	Beta-6469		
		GX-1730		
<b>Yahya V</b>		GX-1736	TUNC-38	
		Beta-6476	TF-1136	
		WSU-872	Beta-6483	
			Beta-6560	
<b>Yahya VI</b>		GX-1737		
		GX-1728		
		Beta-6477		
		TF-1139		

Graph 12: A schematic representation of the Tepe Yahya archaeological sequence.

## 6.5 Godin Tepe

Despite the lack of ancient written sources mentioning a site which could be identified with Godin Tepe, archaeologists widely agree that the site is one of great importance to our understanding of the Chalcolithic-Bronze Age cultures of Iran and

Mesopotamia. Located in the Kangavar Valley of Zagros Mountains in the Kermanshah Province of northwestern Iran, the site occupies a strategic position on the “High Road”, an ancient trade route connecting Central Asia, Northern and Central Iran, and Northern Mesopotamia, where the land route connects to the fluvial transport system of Tigris and Euphrates (Cuyler Young 1969: 1; Gopnik and Rothman 2008: 62-63). Godin Tepe was therefore not only the gatekeeper of the long-distance trade of the prehistoric Near Eastern societies, it was also a meeting place for the cultures of the alluvial Mesopotamia, the highland Iran, the mountainous Transcaucasia and the Central Asian steppes. Secondly, the site owes its chronological importance to the almost unbroken occupation record since the Neolithic until the Iron Age, providing a very good reference record of ceramic traditions (Godin XI-I). Finally, Godin Tepe received a lot attention from archaeologists due to the prominence of Uruk material discussed below, predominantly from the Oval Complex on the top of the mound. Just as the sites of Habuba Kabira and Jebel Aruda are often discussed as evidence for the intrusion of Uruk-period Mesopotamians into Syria, Godin Tepe Period VI has become a model case study of Uruk eastward expansion (Rothman 2013). The site was first identified in 1961 by T. Cuyler Young of the Royal Ontario Museum, who later excavated the site between 1965 and 1973.

Several trenches were dug into the oblong mound and its immediate environs; however, the vast majority of information regarding the 4<sup>th</sup>-3<sup>rd</sup> mill. BC came from the Deep Sounding (DS) on the northern peak of the main mound, as well as three nearby soundings sunk into the northern slope (XYZ, A, B). The other relevant sounding, dubbed Brick Kiln Cut (BKC) was excavated to the west of the Godin mound (Gopnik and Rothman 2008: 34). The earliest period of interest to this study is Godin VII. Our understanding of the architecture of this period, dating to the Late Chalcolithic, is limited (Cuyler Young 1969: 3). Characteristic ceramic types include a local painted pottery type showing some parallels with the decorated wares from

Susa I *massif funéraire* (Gopnik and Rothman 2008: 78). The period is also notable for the increase in the number of stamp seals used at site, hinting at a local development of social and administrative complexity (Voigt and Dyson 1992: 161; Gopnik and Rothman 2008: 71). The succeeding Period VI was originally divided into two subphases (VIB, VIA; Cuyler Young 1969: 5); however later re-analysis of the stratigraphy introduced a finer division into VI:3, VI:2, and VI:1 (Gopnik and Rothman 2008: 82). The earliest phase, VI:3, displayed a great continuity with VII in terms of pottery (Cuyler Young 1969: 5). Godin VI:2 was the first phase to contain Southern Mesopotamian ceramics associated with the Late Uruk culture, including bevelled-rim bowls and types with string-cut bases (Gopnik and Rothman 2008: 90).

The most significant feature of the site, however, was the so called Godin Oval constructed on the top of the mound and uncovered mainly in the DS. The building's construction and later changes to its layout define the Godin Periods VI:1b (earlier) and VI:1a (later). The compound had previously been assigned to its own phase ("Godin V"), this determination was nonetheless abandoned due to the continuity in ceramics across VI/V (Voigt and Dyson 1992: 162). A recent detailed overview of the building and its inventory has been provided by Rothman 2013. As the name suggests, the building complex consists of an oval enclosure with internal walls dividing it into several rectangular rooms focused around a central courtyard. The building and its immediate environs yielded multiple typically Late Uruk ceramics, as well as numerical tablets, many of which were sealed. The traditional interpretation of the building complex was that it served as a citadel-*cum*-administrative centre for an intrusive Southern Mesopotamian population. A possible military nature of the building was suggested on the basis of mace heads, a spear head, and hundreds of clay sling pellets found inside the building. Nonetheless, it has been noted that while the ubiquitous storage jars and the famous bevelled-rim bowls link the site to Warka, the feasting ceramic types (trays, goblets) as well as the cooking ware used in the building was of local origin (Rothman 2013: 83). It is therefore unclear whether

the building housed a foreign merchant colony, a military garrison guarding its new conquests, a local elite imitating their southwestern neighbours, or a mixture of the above. It is, nonetheless, important to note that while we lack comparative material from non-elite contexts at Godin, the limited sounding of the BKC contemporaneous with Godin IV:1 seems to contain mainly local types (Gopnik and Rothman 2008: 107), suggesting very different pottery use patterns inside and outside the Oval.

It is unclear whether the site was abandoned for a longer period of time after the Oval Complex fell into disuse (Voigt and Dyson 1992: 162). A layer of erosion observed in the BKC suggests that this hiatus could have been significant (Gopnik and Rothman 2008: 165). When the settlement re-emerged during the Godin IV period, the site came under the influence of a new cultural complex. Various referred to as the Early Transcaucasian Cultures (ETC) or the Kura-Araxes people, the archaeological complex emerged in southern Caucasus some time during the 4<sup>th</sup> mill. BC and spread along the mountainous areas towards Anatolia and Iran. Some distinctive features of the Kura-Araxes culture include a type of burnished black-and-grey pottery, circular domestic architecture, and the importance of central hearths (Wilkinson 2014). The early Kura-Araxes presence at Godin is divided into phases IV:2, IV:1b and IV:1a. The structures of the earliest phase were poorly preserved. During the Godin IV:1b period, the architecture of the main mound was dominated by a large two-room structure to the west (Building 3), flanking a smaller central building complex with a small outdoor platform, surrounded on two sides by a curving row of adjacent rectangular rooms. While Building 3 survived into the later IV:1a, the remainder of the structures was replaced by three new building complexes surrounding a much larger central platform (Gopnik and Rothman 2008: 161). Another distinctive feature of the Transcaucasian culture, the so-called “andirons”, i.e. transportable metal hearths, were recovered from the Godin IV contexts in their simplest, cylinder-shaped forms. The more elaborate three-legged andirons were only found in Godin III contexts (Gopnik and Rothman 2008: 149).

Godin III is somewhat problematic as a chronological designation: while the ceramics display a high degree of continuity, the consecutive construction levels show no fewer than six subphases, spanning over a millennium (mid-3<sup>rd</sup> until mid-2<sup>nd</sup> mill. BC). During the earliest subphase III:6, the main mound of Godin was covered by densely-packed domestic architecture composed of numerous rectangular rooms. While the ceramics and other finds showed continuities with the older Kura-Araxes contexts at the site, new painted pottery types connect Godin to the Diyala River Valley of Northern Mesopotamia and other Iranian sites in the Zagros Mountains (Henrickson 1987: 42). Importantly, very similar painted pottery types, most likely imported from Iran, were found in stratified contexts at the important Southern Mesopotamian site of Tell al-Hiba, the ancient city of Lagaš. The textual and glyptic evidence from said contexts date the pottery, and thus Godin III:6, to the reigns of Eanatum, Enanatum I and Enmetena, the well-attested Lagašite kings of the ED IIIb (Henrickson 1987: 45; Renette 2015). The III:6 occupation came to an abrupt end, most likely due to an earthquake as suggested by the presence of human skeletons crushed by wall rubble. Godin III:5 architecture was poorly attested in the DS, suggesting that the occupation extended beyond the investigated area (Gopnik and Rothman 2008: 211). Godin III:4 occupation, most likely the final 3<sup>rd</sup> mill. BC phase at the site, manifested in the presence of a completely new layout of large houses on the mound's peak, notable for the presence of stone-paved floors. This settlement also suffered from a violent destruction, as again attested by the rubble-buried bodies (Gopnik and Rothman 2008: 214).

### **Godin Tepe - Published <sup>14</sup>C Dates**

**GaK-1074 (4730 ± 120 BP):** Material unknown; Operation B; Stratum 39a; Godin VII; The laboratory numbers GaK-1070 to -1075 represent samples dated during the original excavations in the late 1960's. In the Excavator's own words, the dates were "*cursed with contamination*" (Cuyler Young 1969: 47). Most of these dates do not conform to the stratigraphic sequence and thus cannot

be considered reliable. Moreover, the relatively large measurement errors make them of limited use to the analysis. In the case of GaK-1074, the sample came from the bottom of the sequence and is nonetheless younger than Gak-1073 from a later layer in the same sounding. Therefore, both Gak-1074 and -1073 were rejected as outliers.

**GaK-1073 (5710 ± 100 BP):** Material unknown; Operation B; Stratum 35; Godin VII; See Gak-1074.

**GaK-1075 (6700 ± 110 BP):** Material unknown; Operation B; Stratum 20; Godin VII; See Gak-1074. This date is significantly older than the predicted range and seems to predate the two samples which lie beneath it.

**GaK-1072 (4340 ± 100 BP):** Material unknown; Operation A; Stratum 32; early Godin VI/IV; See Gak-1074. This sample came from a hearth and was identified by the Excavator as a *terminus post quem* for the beginning of the Godin IV period. It may be the single reliable date among the GaK- dates.

**GaK-1071 (3803 ± 120 BP):** Material unknown; Operation A; Stratum 27; Godin IV/III; See Gak-1074. According to the original publication, the sample should represent the very beginning of the Godin III period and give a *terminus ante quem* for the Godin IV period (Cuyler Young 1969: 48-49). It remains unclear as to how this would be the case given that GaK-1071 came from above GaK-1074. See SI-4908.

**GaK-1070 (4170 ± 100 BP):** Material unknown; Area 5004; Godin III:5; See Gak-1074. The sample was identified as an outlier by the Excavator (Cuyler Young 1969: 48), on the basis of it being older than the Godin IV sample GaK-1071. However, as noted above, GaK-1071 was significantly younger than the remainder of Godin IV dates. Therefore, it seems more probable to regard Gak-1070 as the reliable one of the two.

**Beta-231151 (4600 ± 60 BP):** Wood; Oval Complex; Room 22; Godin VI; The measurement was performed on a charred beam from the easternmost room of the Uruk-period Oval Structure. The date should therefore give a *terminus post quem* for the construction of the famous complex.

**SI-2677 (4290 ± 80 BP):** Material unknown; Oval Complex; Room 17; Godin VI; This sample belongs to the group of measurements likely dating to the use of the building.

**SI-2678 (4465 ± 75 BP):** Material unknown; Oval Complex; Room 17; Godin VI; See SI-2677.

**SI-2671 (4520 ± 80 BP):** Material unknown; Oval Complex; Room 17; Godin VI; See SI-2677.

**SI-2673 (4580 ± 75 BP):** Material unknown; Oval Complex; Room 18; Godin VI; See SI-2677.

**SI-2672 (4570 ± 80 BP):** Material unknown; Oval Complex; Room 18; Godin VI; See SI-2677.

**SI-2682 (4350 ± 90 BP):** Material unknown; B01 Locus 52; Godin VI/IV; The sample came from a mixed context dating to the very end of the Oval Complex.

**SI-2674 (4180 ± 80 BP):** Material unknown; A01 Locus 44; Godin IV; The dates SI-2674 and -2676 were originally assigned to the period VI/V (Oval Complex, Voigt and Dyson 1992), however a re-assessment of the stratigraphy revealed that they were in fact recovered from pits sunk from Godin IV contexts into the Uruk levels (Gopnik and Rothman 2008: 166).

**SI-2676 (4180 ± 80 BP):** Material unknown; A01 Locus 45; Godin IV; See SI-2674.

**Beta-231150 (4220 ± 60 BP):** Material unknown; Platform 16; Godin IVb; The sample was collected from the floor of the central platform of the Kura-Araxes settlement.

**Beta-231149 (4160 ± 50 BP):** Material unknown; Room 30; hearth; Godin IVa; Beta-231149 and -231148 were both take from the main room of Building 10 - a large structure in the northern part of the younger Kura-Araxes central communal complex. The hearth from which Beta-231149 was collected was placed by the western wall of the building.

**Beta-231148 (4110 ± 50 BP):** Material unknown; Room 30; floor; Godin IVa; See Beta-231149.

**SI-4908 (3880 ± 50 BP):** Material unknown; Operation A; Stratum 27; late Godin IV; No detailed information regarding this sample is available except for its position in the sequence, which would make it a *terminus post quem* for the end of Godin IV. SI-4908 and GaK-1071 pose a significant obstacle to the interpretation of the Godin IV-III stratigraphy, as both are significantly younger than expected and do not agree with the Godin III samples (Beta-231147 and GaK-1070).

**QU-1044 (3580 ± 100 BP):** Material unknown; Area 5019; Godin III:5; 5 <sup>14</sup>C dates have been assigned to Godin III. Unfortunately, very little is known regarding their contexts. Although the periods after Godin III:6 are beyond the scope of this study, the 5 dates may provide a useful *terminus ante quem* for the Godin sequence. Unfortunately, the 3 QU- samples are considerably younger (ca. 500 yrs) than the other 2 Godin III:5 samples (Beta-231147 and GaK-4170). Moreover, the QU- dates would place the Godin III:5 period in the early 2<sup>nd</sup> mill. BC, which is impossible to agree with either the stratigraphy of the site or the associated material. Therefore, the 3 samples were excluded from the analysis.

**QU-1041 (3660 ± 80 BP):** Material unknown; Area 5004; Godin III:5; See QU-1044.

**QU-1043 (3580 ± 100 BP):** Material unknown; Context unknown; Godin III:5; See QU-1044.

**Beta-231147 (4030 ± 40 BP):** Material unknown; Context unknown; Godin III:5; See QU-1044.

Deep Sounding, A, B				
<b>Godin III</b>	III:5	QU-1044		
		QU-1041		
		QU-1043		
		Beta-231147		
	III:6			
<b>Godin IV</b>	Late IV	SI-4908	Unspecified	SI-2674
		GaK-1071		
	IV:1a	Beta-231149		
		Beta-231148		
	IV:1b	Beta-231150		
	Early IV	GaK-1072		
<b>Godin VI/V</b>	Mixed VI/IV	SI-2682		
	Oval Complex	SI-2677		
		SI-2673		
		SI-2678		
		SI-2671		
		SI-2672		
		SI-2681		
Beta-231151				

Graph 13: A schematic representation of the Godin Tepe archaeological sequence.

## 6.6 Arisman Tepe

Arisman Tepe is a site located on the edge of the Central Iranian Plateau desert, spread across several small mounds. Excavated by a joint German-Iranian team

between 2000 and 2004, the site presented a good opportunity to study the 4<sup>th</sup>-3<sup>rd</sup> mill. BC transition. The earliest signs of occupation were recovered from Area B in the central part of the east mound (Arisman I). The sounding in the area revealed 12 layers, which formed 5 main periods (Boroffka, Chegini, and Parzinger 2011: 39). The deepest layers (12-9, Arisman BV) were poorly preserved and their stratigraphic order was not clearly discernable. The function of these layers is likewise problematic; however, given the large amount of charcoal found suggested that the site housed a small industrial compound, probably focused on pottery production (Boroffka, Chegini, and Parzinger 2011: 28; Helwing 2011b: 374). Layers 10 and 9 marked the appearance of the first buildings, most likely domestic in nature. Layer 8 (Arisman BIV) represented the main occupation of these structures, of which three small rectangular buildings with fire installations were recovered (Boroffka, Chegini, and Parzinger 2011: 30). The pottery of this period was dominated by a characteristic black-on-buff painted ware, notable for the prevalence of hatched and checkerboard designs. This assemblage was linked to period III:7-6 at the neighbouring site of Sialk, representing the final pre-Proto-Elamite layers, and most likely contemporary with Middle Uruk in Mesopotamia (Parzinger 2011: 140). Tepe Sialk ceramic chronology is commonly used as a chronological model for the entire region, despite the suggestions to rechristen the pottery style to “Plateau Culture” (Majidzadeh 1981; Mashkour, Fontugne, and Hatte 1999). The buildings were abandoned and destroyed, with their debris forming layer 7. Period BIII was defined by the sinking of pottery kiln pits into said rubble. A small-scale rebuilding was undertaken in the succeeding layer 6, with only a few fragments of stone and pisé walls recovered (Boroffka, Chegini, and Parzinger 2011: 36). These buildings also seemed to have been abandoned with yet another phase of pottery kilns (Period BI) constructed on top.

The other residential area excavated at the site was designated Area C. Located in northern part of the Arisman I mound, the 6 excavated squares produced clear evidence for the existence of 5 large mudbrick structures, composed of rectangular

bricks, separated by 1-2m wide streets. The construction layer of these tightly-packed buildings was designated as level 7, with level 6 (and its several subphases) representing the lengthy occupation of the buildings (Chegini, Fahimi, and Helwing 2011: 64). The finds in these layers suggest that the buildings were large households with dedicated copper-processing areas. In terms of ceramics, the contexts of these houses were seen as contemporary with Sialk IV (Proto-Elamite times). The parallels to the Proto-Elamite/Jemdet Nasr cultural horizon include tall bevelled-rim bowls, crude trays, as well as several types of decorated jars (Helwing 2011a: 216). At the end of the level 6 occupation, the walls collapsed and weathered as they were being covered by a layer of aeolian sand (level 5). Some sections of the area show evidence of flooding (Chegini, Fahimi, and Helwing 2011: 60). The copper-working areas at the site were re-used during the later periods (level 4).

In addition to the two residential quarters, 3 large copper-slag heaps (Areas A, D, and E) were investigated in order to gain an understanding of the beginnings of metal industry in the region. The pottery from the slag heaps was rather uninformative and was assigned to the same period as the Area C residential quarter (Sialk IV, Proto-Elamite) based on the similarity in the fabric (Helwing 2011b: 196). Area A was a circular slag heap in the northernmost part of the mound. The excavations revealed a mudbricks platform upon which metal furnaces were discovered (Steiniger 2011: 69). Area D was a metal production space ca. 100m northeast of the Area B residential quarter. Strata of dense copper slag alternated with layers rich in charcoal and ash (Steiniger 2011: 87). The evidence for early metal working in Area E was discovered west of the Area C occupation. Apart from the thick layers of slag and ash, the excavations yielded remains of walls (Steiniger 2011: 95). Given the presence of a small quantity of painted pottery, found in association with one of the walls, it was suggested that the structural remains may represent an earlier, Sialk III (Uruk) use of the areas (Steiniger 2011: 98).

## Arisman Tepe - Published <sup>14</sup>C Dates

**Bln-5393 (4700 ± 29 BP):** Charcoal; Square B45; layer 12-7; feature 17; According to Helwing 2011a (p. 374), the sample was collected from the layers preceding the construction of the Sialk III-period settlement in Area B. The date is, however, noticeably younger than the remainder of the Area B sample. In fact, the order of the 4 dates from Area B seems reversed, probably due to the contextual disturbances reported for the older layers. This prohibits the construction of any internal sequence for Area B. All 4 of the samples were therefore assigned to a common Sialk III (pre-Proto-Elamite) phase.

**Bln-5392 (5461 ± 33 BP):** Charcoal; Square B45; layer 7; feature 16; See Bln-5393.

**Bln-5491 (5177 ± 36 BP):** Charcoal; Square B46; layer 10; feature 20; See Bln-5392.

**Bln-5531 (4908 ± 38 BP):** Charcoal; Square B46; layer 6; feature 20; See Bln-5392.

**Bln-5772 (4437 ± 33 BP):** Charcoal; Square C56; Phase 6; House I, Room A; feature 104; This context was a pit sunk into the lowest floors of the Sialk IV (Proto-Elamite) settlement, thus representing the earliest phase of occupation.

**Bln-5770 (4525 ± 35 BP):** Charcoal; Square C56; Phase 6; House I, Room B; feature 93; Similarly to Bln-5772, this sample should date to the beginning of the Proto-Elamite settlement phase.

**Bln-5771 (4317 ± 42 BP):** Charcoal; Square C56; Phase 5A; House I, Room A; floor; The date of this sample should represent the erosion level post-dating the abandonment of the Area C settlement, thus providing a *terminus ante quem* for the domestic architecture in that area. According to Helwing 2011a (p. 60), the post-Phase 6 layers still belong to the Sialk IV period.

**Bln-5766 (4633 ± 39 BP):** Charcoal; Square D44; feature 10; Square D44; planum 8-9; The contextual information regarding the Area D slag heap samples is somewhat problematic. On the one hand, Bln-5766, -5767, -5768 are reported to have been collected from the lower layers of the heap (Helwing 2011a: 374). On the other, the sample Bln-5769, noticeably younger, is reported to come from the same planum as Bln-5768. For this reason, all of the Area D samples will be treated as a single phase.

**Bln-5767 (4635 ± 35 BP):** Charcoal; Square D44; planum 5-6; feature 6; See Bln-5766.

**Bln-5768 (4633 ± 39 BP):** Charcoal; Square D44; planum 8-9; feature 6; See Bln-5766.

**Bln-5769 (4517 ± 41 BP):** Charcoal; Square D44; planum 8; feature 6; See Bln-5766. This sample was re-dated twice, producing a total of 3 measurements which can be combined.

**Bln-5769L (4474 ± 37 BP):** Charcoal; Square D44; planum 8; feature 6; See Bln-5769.

**Bln-5769LI (4495 ± 48 BP):** Charcoal; Square D44; planum 8; feature 6; See Bln-5769.

**Bln-5763 (4537 ± 39 BP):** Charcoal; Square D45; feature 7; No detailed information regarding this sample is available.

**Bln-5493 (4564 ± 33 BP):** Charcoal; Square D45; feature 18; This sample came from a layer rich in ash and charcoal.

**Bln-5765L (4522 ± 37 BP):** Charcoal; Square D45; feature 18; The sample came from the same layer as Bln-5493.

**Bln-5764L (4518 ± 37 BP):** Charcoal; Square D45; feature 12; Two samples were taken from the same slag-rich stratum, with Bln-5492 dated twice.

**Bln-5492 (4514 ± 36 BP):** Charcoal; Square D45; feature 12; See Bln-5764L.

**Bln-5492L (4510 ± 37 BP):** Charcoal; Square D45; feature 12; See Bln-5764L.

**Bln-5396 (4388 ± 35 BP):** Charcoal; Square A45; feature 9; According to Steiniger 2011 (p. 81), Two samples from Area A were taken from slag-rich layers, while one of them came from a pit. It is unclear which one of the 3 samples came from the mentioned pit, with Bln-5396 being the best candidate.

**Bln-5395 (4367 ± 34 BP):** Charcoal; Square A45; feature 6; See Bln-5396.

**Bln-5394 (4290 ± 36 BP):** Charcoal; Square A45; feature 5; See Bln-5396.

**Bln-5773 (4148 ± 31 BP):** Charcoal; Square A45; feature 4; There is no information regarding the context of the two samples from the Area A slag heap.

**Bln-5774 (4114 ± 38 BP):** Charcoal; Square A45; feature 4; See Bln-5773.

	Arisman A	Arisman B	Arisman C	Arisman D	Arisman E	Ghabristan Tepe
<b>Sialk IV</b>	Metalworks Bln-5396 Bln-5395 Bln-5394		Phase 6-5 Bln-5772 Bln-5770 Bln-5771	Metalworks Bln-5768 Bln-5767 Bln-5766 Bln-5769 Bln-5769L Bln-5769L Bln-5493 Bln-5763 Bln-5765L Bln-5764L Bln-5492 Bln-5492L	Metalworks Bln-5773 Bln-5774	
<b>Sialk III</b>		Layers 10-6 Bln-5392 Bln-5491 Bln-5531 Bln-5393				Sialk III:5-7 Gif-10227 Gif-10409 Gif-10408 Gif-10225 Gif-10411 Gif-10412 Gif-10410

Graph 14: A schematic representation of the archaeological sequences at Arisman and Tepe Ghabristan.

## 6.7 Other Iranian Sites

### 6.7.1 Sharafabad - Published $^{14}\text{C}$ Dates

Sharafabad was a small rural site 15km southeast of Susa, occupied with interruptions since the late 6<sup>th</sup> until the mid-2<sup>nd</sup> mill. BC. Several soundings at the site revealed Uruk-related occupation (Schacht 1971). The Uruk Pit, located in the southeast of the tell, produced a stratified sequence of seasonal occupation of two consecutive years. The pit layers contained occupational refuse, as well as Middle Uruk ceramics and mudbrick fragments (Pollock 2008: 46). Despite this well-defined, high-resolution dating of the sequence, the 3 radiocarbon dates recovered from the pit had to be excluded from the analysis for several reasons.

**TUNC-32 (4832  $\pm$  55 BP):** Charcoal; Uruk Pit; No detailed information regarding this sample is available. While the age estimate would indeed place this sample in the Middle Uruk period, note the significant age difference between TUNC-32 and TUNC-33 (ca. 500 years). The latter would fall in the Late Uruk period. Since there is no way to determine which one of these two samples is a more reliable age estimate, both will be excluded from the analysis.

**TUNC-33 (4331  $\pm$  50 BP):** Charcoal; Uruk Pit; Lot 13; See TUNC-32.

**P-2210 (5140  $\pm$  60 BP):** Charcoal; Uruk Pit; Lots 12, 14, and 43-44; Samples from various lots within the Uruk Pit were combined into a bulk sample due to small size. This, combined with the surprisingly old date, make this reading unsuitable for any meaningful statistical analysis.

### 6.7.2 Tepe Ghabristan - Published $^{14}\text{C}$ Dates

The site of Tepe Ghabristan is located in the Qazvin Plain northwest of Tehran. Together with the two neighbouring tells of Zaghe and Sagzabad, the sites produced a long sequence of occupation since the Neolithic until the Iron Age. Even though a number of radiocarbon dates for Zaghe and Sagzabad have been published (Voigt

and Dyson 1992), it has been noted that the early  $^{14}\text{C}$  dates for the 4<sup>th</sup>-3<sup>rd</sup> mill. BC contexts produced by the Tehran University Nuclear Centre (TUNC-1-20) have not been corrected for the  $\delta^{13}\text{C}$  fractionation, a standard procedure in AMS dating today, and thus cannot be used for comparison (Mashkour, Fontugne, and Hatte 1999; Pollard et al. 2012: 118). Out of the three sites, only Ghabristan produced a sufficiently large body of reliable dates for the period in question to allow a meaningful analysis.

**Gif-10227 (4530  $\pm$  45 BP):** Bone; Trench A; Level XXII; This sample, as well as the other Gif- dates, represent the later, Early Bronze Age occupation of the site. Although the dates come from different trenches Mashkour, Fontugne, and Hatte 1999 (p. 67) assigns all of them to the “Middle and Late Plateau” period, which, in the Majidzadeh 1981 periodisation scheme, corresponds to Sialk III5-7, i.e. Middle-Late Uruk (pre-Proto-Elamite). The only available information regarding these samples is the recorded depth within the individual soundings. The ages, however, do not correspond with the relative depths, making it impossible to construct an internal sequence of the Sialk III occupation of Ghabrestan.

**Gif-10409 (4130  $\pm$  50 BP):** Bone; Trench E/J15; Depth 100; This sample is significantly younger than the remainder of the Gif- samples (ca. 600 years) and was thus removed from the analysis.

**Gif-10408 (4720  $\pm$  70 BP):** Bone; Trench E/J15; Depth 180-285; See Gif-10227.

**Gif-10225 (4730  $\pm$  70 BP):** Bone; Trench E/J15; Depth 200-210; See Gif-10227.

**Gif-10411 (4700  $\pm$  80 BP):** Bone; Trench EA/G14; Depth 30-40; See Gif-10227.

**Gif-10412 (4890 ± 50 BP):** Bone; Trench E/H14; Depth 140-150; See Gif-10227.

**Gif-10410 (4690 ± 105 BP):** Bone; Trench E/H14; Depth 85-90; See Gif-10227.

### 6.7.3 Tal-i Kureh - Published <sup>14</sup>C Dates

Tal-i Kureh is a small site in the Fars province, located 13km away from Tal-i Malyan (Alden 1979; Sumner 2003; Alden and Petrie 2015). The site is notable for having a large concentration of fire installations, and was immensely useful for the establishment of the Lapui-Banesh transition sequence. Unfortunately, three of the radiocarbon dates reported by Meulengracht, McGovern, and Lawn 1981 have extremely large measurement errors and are thus unlikely to be very informative about the absolute chronology of the sequence.

**P-2624 (5000 ± 290 BP):** Charcoal; 7F1; Stratum 7; Lot 10; The ceramic material from Stratum 7 falls well within the Late Lapui phase (Alden 1979: 155; Sumner 2003: 195; Alden and Petrie 2015: 186), even though the original publication (Meulengracht, McGovern, and Lawn 1981) reports it as “Initial Banesh”.

**P-2626 (4550 ± 280 BP):** Charcoal; 7F1; Stratum 5; Lot 8; The finds of Stratum 5 at Tal-i Kureh were originally used to define the “Initial Banesh” phase (Alden 1979: 61), however more recent analyses of the material are more comfortable in placing the level in the Lapui/Banesh Transitional Phase (Sumner 2003: 195; Alden and Petrie 2015: 186).

**P-2627 (4360 ± 230 BP):** Charcoal; 7F1; Stratum 5; Lot 9; See P-2626.

**Beta-382382 (4680 ± 30 BP):** Bone; 7F1; Stratum 5; Lot 10; See P-2626.

**Beta-382380 (4230 ± 30 BP):** Bone; 7F1; Stratum 5; Lot 7; See P-2626. Given the low collagen preservation rate, this measurement has been performed on a bulk sample of collagen yields of a number of bone fragments. This may account for the seemingly young date of the sample, when compared to other dates from Stratum 5.

**Beta-382381 (4540 ± 30 BP):** Bone; 7F1; Stratum 3; Lot 9; This sample came from a lot composed of several mixed strata of a midden built on top of a floor containing Banesh ceramics (Alden and Petrie 2015: 186). Despite this mixed nature of the context, the midden's stratigraphic position makes it possible to place this date after the Lapui-Banesh transition.

**Beta-382379 (4600 ± 30 BP):** Bone; 7F1; Stratum 2; Lot 6; The context of this sample has been described as a black ashy floor, associated with Early Banesh pottery.

#### 6.7.4 Farukhabad - Published <sup>14</sup>C Dates

Farukhabad is located on the Deh Luran plain in the Central Zagros Mountains region. The site's respectable size and evidence of long-distance trade suggest that it was a settlement of some significance during the late 4<sup>th</sup> mill. BC (Wright 1981: 276). More importantly, deep soundings on the site allowed for the establishment of a long archaeological sequence spanning pre-Uruk (Farukh Phase), Uruk, Jemdet Nasr, Early Dynastic and post-Akkadian (Awan Dynasty) periods, helping to connect the Deh Luran chronology to that of the Susiana plain (Voigt and Dyson 1992: 128). Unfortunately, only a handful of very imprecise radiocarbon dates is available. The two samples described below come from two different trenches (Excavations A and B).

**M-2152 (4460 ± 190 BP):** Charcoal; Excavation A; Layer 21; Feature 24; A sample of charcoal was collected from a household hearth from a layer assigned

to the Middle Uruk (Wright 1981: 80), however it has been noted by the excavator (Wright 1981: 436) that the two Uruk sherds directly associated with the hearth could be either Middle or Late Uruk. Moreover, one type of sherd pointed to a later, Late Uruk date. Therefore, the possibility of the hearth being sunk from the overlying Layer 20 cannot be excluded

**M-2151 (3990 ± 180 BP):** Charcoal; Excavation B; Layer 23; Feature 15; Two samples were taken from a bin found in a refuse-filled granary, in a layer containing polychrome painted Jemdet Nasr-style pottery (Wright 1981: 87). Both of the measurements were surprisingly young, suggesting that either the context was disturbed by erosion, or that the Jemdet Nasr period lasted well into the mid-3<sup>rd</sup> mill. BC. The lack of radiocarbon dates from later contexts make it impossible to verify this supposition. Therefore, both M-2151 and -2419 will be excluded from this analysis.

**M-2419 (3800 ± 160 BP):** Charcoal; Excavation B; Layer 23; Feature 15; See M-2151.

### 6.7.5 Konar Sandal Complex - Published <sup>14</sup>C Dates

Three mounds located in the Jiroft region not far from Tepe Yahya, form a complex of interrelated sites occupied during the 4<sup>th</sup>-3<sup>rd</sup> mill. BC. Although known from surveys conducted in the 1930's, the sites of Konar Sandal North, Konar Sandal South and Mahtoutabad (to the east) were excavated in the early 2000's as a response to the arts market having been flooded by a great number of artifacts, including carved chlorite bowls of the Intercultural Style (Madjidzadeh and Pittman 2008; Vidale and Desset 2013). Despite having been thoroughly looted, the mounds produced well-stratified sequences of occupation, including a cemetery, a monumental complex, industrial and domestic areas. The discovery of objects such as the carved chlorite plaque representing a serpent man, reminiscent of the Intercultural Style (Madjidzadeh and Pittman 2008: 79), confirmed Konar Sandal to have been an important

part of ancient Marhaš, of which Tepe Yahya was most likely the capital. Radiocarbon dates for 2 of the 3 sites, Mahtoutabad and Konar Sandal South, provided age estimates for the late prehistoric and early historical periods respectively.

**LTL-4244A (5284 ± 45 BP):** Charcoal; Mahtoutabad I; All samples from Mahtoutabad were assigned to the earliest phase of occupation, Mahtoutabad I. The phase is believed to represent the local cultures predating the Uruk intrusion into Iran, for two reasons. Firstly, Mahtoutabad I contexts contain some sherds of the Lapui plain red ware, corresponding to the pre-Uruk phases in the Malyan sequence. Secondly, (Middle) Uruk-types, including the bevelled-rim bowls appear only in Mahtoutabad III layers (Vidale and Desset 2013: 245-248). Unfortunately, very little contextual information is available for LTL-4244A, it was therefore grouped with LTL-4240A to represent the earliest phases of Mahtoutabad I.

**LTL-4240A (5038 ± 40 BP):** Charcoal; Mahtoutabad I; This sample came from a “*green layer of the first floor*” (Vidale and Desset 2013), belonging to the earliest phase of Mahtoutabad I.

**LTL-4239A (4805 ± 45 BP):** Charcoal; Mahtoutabad I; LTL-4239A and -4241A came from a layer immediately above LTL-4240A. As noted by Vidale and Desset 2013 (p. 247), the difference of about 200 years between these dates suggests a hiatus in occupation, without any marked changes in the ceramic assemblage. Mahtoutabad I was therefore likely to have lasted multiple centuries.

**LTL-4241A (4745 ± 45 BP):** Charcoal; Mahtoutabad I; See LTL-4239A.

**Beta-207292 (4130 ± 40 BP):** Charcoal; Konar Sandal South; Trench XI Phase 3; This sample came from the lower town non-elite contexts, where it underlied a rectangular structure. Given its position in the stratigraphy, the excavators assigned the sample to a phase preceding the Konar Sandal South Citadel (Madjidzadeh and Pittman 2008: 79).

**Beta-207287 (3830 ± 40 BP):** Charcoal; Konar Sandal South; Step Trench 9; This sample dated to the very earliest phase of occupation at the Citadel Mound, from which the serpent-man chlorite plaque was recovered. The context should therefore be roughly contemporaneous with ED III in Southern Mesopotamia based on the Intercultural Style connection.

**Beta-207286 (3880 ± 40 BP):** Charcoal; Konar Sandal South; Step Trench 8; Both Beta-207286 and -207285 came from levels associated with the second phase of the monumental complex (Shrine Phase). A single tablet fragment, containing a short inscription in the still undeciphered Linear Elamite script, securely dated to the Awan Dynasty period (ca. 21<sup>st</sup> c. BC) has been recovered from this level (Madjidzadeh and Pittman 2008: 81).

**Beta-207293 (3880 ± 40 BP):** Charcoal; Konar Sandal South; Trench III, Phase 3; Beta-207293 and -207294 were taken from the same layer. The context was a floor of the earliest phase of the building complex, associated with several sealings. Given its stratigraphic position and the associated sealings, the dates should belong to the same building phase as Beta-207287 (Vidale and Desset 2013: 79).

### 6.7.6 Tol-i Spid - Published <sup>14</sup>C Dates

Tol-e Spid is a small (2ha) yet quite tall (16m) mound located in the Mamasani Region of the Fars region in south-central Iran. Together with Tol-e Nurabad, Tol-e Spid produced an important record of the Lapui-Banesh-Kaftari sequence outside of the Kur River Basin (the Malyan-Kureh area). The sounding on the tell revealed a stratigraphic sequence of several superimposed construction levels (Petrie et al. 2009: 91). Although the sounding itself was quite small and only small portions of the buildings were discovered, the diagnostic pottery recovered from these building levels allowed for the construction of a periodisation scheme for Tol-e Spid. There are several problems with the radiocarbon dates from this site. Petrie et al. 2009 (p.

	KSS Citadel		Mahtoutabad	
Awan Dynasty	Step trench 7	Beta-207285		
	Step trench 8	Beta-207286		
ED III	Step trench 9	Beta-207287		
	Trench III 3	Beta-207293		
		Beta-207294		
ED I/II	Trench XI 3			
Pre-Uruk			Upper layers	LTL-4239A
				LTL-4241A
			Lower layers	LTL-4244A
				LTL-4240A

Graph 15: A schematic representation of the Konar Sandal Complex archaeological sequence.

124) reported that both charred seeds and wood charcoal have been used for dating, they do not, however, specify the source material for each of the individual dates. It is therefore impossible to account for the potential inbuilt age in some of these readings.

**OZI-139 (5070 ± 60 BP):** Charred material; Phase 23; Locus 3164; This sample comes from the very first construction level unambiguously associated with the grit-tempered burnished Lapui ware. The phase consists by two walls forming the corner of a building and the associated occupation layers (Petrie et al. 2009: 93).

**Wk-13980 (4981 ± 51 BP):** Charred material; Phase 22; Locus 3153; The second construction of the Lapui phase was characterised by a ceramic material similar to that of Phase 23. A single wall was recovered from this phase. The locus from which the sample was sourced was described as an ashy fill containing multiple pottery sherds (Petrie et al. 2009: 94).

**OZI-140 (4910 ± 40 BP):** Charred material; Phase 21; Locus 3150; A clay deposit rich in ash belonging to third Lapui construction phase yielded a single radiocarbon date (Petrie et al. 2009: 94).

**Wk-13979 (4821 ± 47 BP):** Charred material; Phase 20; Locus 3142; The locus, described as a series of thin fill layers, came from the final Lapui construction phase. It is important to note that Phase 20 was the first to yield the characteristic red-slipped Lapui ware, thus proving that this type of ceramic represented a relatively late development (Petrie et al. 2009: 94).

**Wk-13981 (4857 ± 48 BP):** Charred material; Phase 19; Locus 3132; The locus of this sample was a clay layer with multiple charcoal inclusions. The dating of this phase is somewhat problematic. On the one hand, the ceramic assemblage is a typical example of Late Lapui types, including the characteristic red-slipped ware. On the other, a single fragment of a bevelled-rim bowl found in this phase may suggest the beginning of the Banesh period (Petrie et al. 2009: 95). Due to this uncertainty, Phase 18 was assigned to the Lapui/Banesh Transitional period, possibly extending into Early Banesh.

**Wk-13982 (4515 ± 46 BP):** Charred material; Phase 18; Locus 3117; The river-stone building in Phase 18 represented the first, and seemingly last, unequivocal Banesh period occupation at the site. Although the Lapui red-slipped ware continue in small amount, the ample evidence for chaff-tempered crude types places the phase in the Early/Middle Banesh (Petrie et al. 2009: 124). The Banesh occupation was seemingly brought to an abrupt end by an earthquake, after which the site was abandoned (Potts 2009: 177).

**OZI-141 (3360 ± 50 BP):** Charred material; Phase 17; Locus 3112; As noted by Petrie et al. 2009 (p. 179), the radiocarbon dates from Phases 17-15 are difficult to interpret. While the contexts contain painted Kaftari ware (late 3<sup>rd</sup>-early 2<sup>nd</sup> mill. BC) which corresponds well with the age estimates, there seems to be little agreement between the samples' ages and their stratigraphic positions - making it is impossible to construct an internal sequence of the Kaftari occupation following the abandonment. There seems to be no archaeological

explanation for this state of affairs. Therefore, all of the Kaftari dates were modelled as a single phase.

**Wk-13983 (3643 ± 43 BP):** Charred material; Phase 17; Locus 3108; See OZI-141.

**OZI-142 (3390 ± 40 BP):** Charred material; Phase 16; Locus 3096; See OZI-141.

**Wk-13984 (3425 ± 48 BP):** Charred material; Phase 15; Locus 3092; See OZI-141.

### 6.7.7 Tol-i Nurabad - Published <sup>14</sup>C Dates

Tol-i Nurabad, located some 15km south of Tol-i Spid, is a slightly larger tell (ca. 9ha) rising 23m above the plain level. Two soundings (Trench A and B) have been sunk into the mound. All of the radiocarbon samples from the site were collected from Trench A. Although almost no structures have been recovered, the ceramic finds at the site allow for the construction of a cohesive sequence (Weeks et al. 2009: 31).

**WK-13997 (26999 ± 493 BP):** Charcoal; Phase A13; Locus 89; The sample yielded an unrealistically old age estimate due to contamination with bitumen (Weeks et al. 2009: 69) and was thus excluded as an outlier.

**OZI-134 (4750 ± 50 BP):** Charcoal; Phase A12b; Locus 78; Phase A12b was identified as Late Lapui due to the presence of red-slipped ware. A single mudbrick wall was the only architectural feature in this phase. The sample itself was closely associated with the wall locus (Weeks et al. 2009: 36).

**OZI-132 (4620 ± 50 BP):** Charcoal; Phase A11-12a; Locus 68; The locus of this sample was reported to have been stratigraphically mixed between the two layers, although the exact nature of the locus is not discussed (Weeks et al. 2009: 69). The ceramic assemblages of both layers A12a and A11 were

identified as Late Lapui based on the presence of the burnished red ware. Layer A11, however, contains a few fragments of bevelled-rim bowls, placing it in the same Transitional phase as Phase 19 at Tol-i Spid (Weeks et al. 2009: 36).

**Wk-13998 (4682 ± 51 BP):** Charcoal; Phase A10; Locus 64; This phase has been described as a floor-like sandy clay layer with evidence of burning. The ceramics of this phase are difficult to date as the new chaff-tempered Banesh-style ceramics occur with red-slipped Lapui types, as well as residual Chalcolithic Bakun wares (Weeks et al. 2009: 36). It is therefore unclear whether the date should be placed in the Lapui/Banesh Transitional or Early Banesh phases.

**Wk-13999 (4476 ± 46 BP):** Charcoal; Phase A8; Locus 45; A series of floors with more evidence for burning constituted Phase 8. The ceramics of this period have been classified as typical Middle Banesh, based on the occurrence of chaff-tempered plain wares, including the typical Banesh pedestal-footed goblets, which first appeared in Phase A9 (Weeks et al. 2009: 36).

**OZI-135 (4160 ± 50 BP):** Charcoal; Phase A6; Locus 37; The ceramic assemblage of this phase was dominated by undecorated chaff-tempered ceramics, predominantly bevelled-rim bowls, suggesting a Late Banesh date (Weeks et al. 2009: 37, 54).

# Chapter 7

## Results

The sections in this chapter list the results for individual sites and regions in the form of calibrated date ranges. The dates are presented both in their unmodelled (i.e. without any extra information) and modelled (i.e. with archaeological prior) forms. Unless stated otherwise, all averaged date estimates for phases, periods and contexts have been calculated using the *Date()* function. See **Section 3.3** for the descriptions of the parameters illustrated here. For the sake of visibility, a colour scheme was adopted for the consecutive archaeological phases: **Middle Uruk**, **Late Uruk**, **Jemdet Nasr**, **ED I-II**, **ED IIIa**, **ED IIIb**, and **Akkadian**.

### 7.1 Nippur, Fara, Ĝirsu, Kiš, Uruk

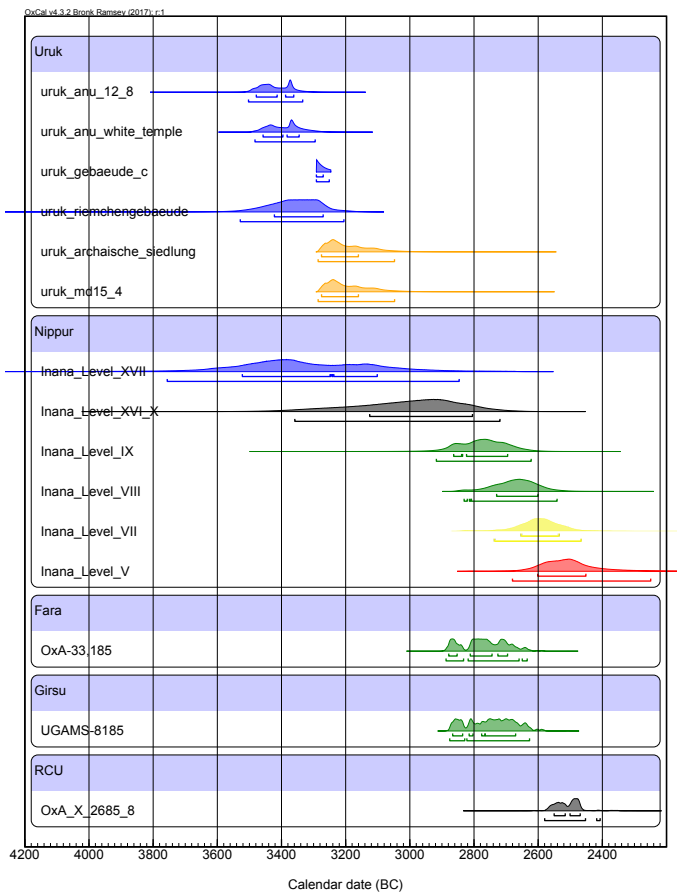
**Nippur** The sequence of dates from the Inana Temple at Nippur is shown in **Graph 16**. The sounding which, for the longest time, has been the main chronological reference for Southern Babylonian archaeology, provides only very broad time estimates for the consecutive phases. It is important to keep in mind that no <sup>14</sup>C dates were recovered from the Levels XVI-X, spanning Terminal Uruk/Jemdet Nasr until the beginning of the ED I. One pertinent observation which can be made is that Levels IX and VIII, the earliest to contain Early Dynastic tablets in the Archaic

Table 1: Calibrated and modelled dates from Nippur, Fara, Ĝirsu, Kiš and Uruk. Averaged estimates derived using the *Date()* function.

Site	Phase/Lab. no.	68.2% range (yr BC)	95.4% range (yr BC)
Uruk	Anu Levels 12-8	3479 - 3362	3503 - 3334
Uruk	Anu White Temple	3458 - 3345	3483 - 3296
Uruk	Eana Gebäude C	3292 - 3270	3292 - 3252
Uruk	Eana Riemchengebäude	3423 - 3271	3529 - 3206
Uruk	Archaische Siedlung	3276 - 3161	3286 - 3048
Uruk	Md 15 4	3276 - 3161	3286 - 3048
Nippur	Inana Level XVII	3523 - 3102	3757 - 2847
Nippur	Inana Level XVI-X	3126 - 2805	3359 - 2720
Nippur	Inana Level IX	2864 - 2696	2918 - 2622
Nippur	Inana Level VIII	2730 - 2601	2831 - 2542
Nippur	Inana Level V	2651 - 2534	2734 - 2465
Nippur	Inana Level V	2602 - 2452	2681 - 2250
Fara	Ox-A33,185	2879 - 2696	2888 - 2635
Ĝirsu	UGAMS-8185	2867 - 2671	2876 - 2627
Kiš	OxA-28,283	2464 - 2348	2470 - 2299

style, cover the range ca. 2900-2600 BC. Level VII, identified as ED IIIa on the basis of Fara-style tablets and a chlorite bowl of the Intercultural style, most certainly predated 2500 BC. Given the wide uncertainty of the single date from Level V, it is difficult to discern whether the level pre- or postdated 2500 BC. Accounting for the presence of Level VI, for which no  $^{14}\text{C}$  dates are available, placing Level V around 2500 BC seems most advisable.

**Fara, Ĝirsu, Kiš** The two samples from Fara and Ĝirsu are indistinguishable, which agrees with their archaeological dating. They are also congruent with the Nippur sequence, corresponding to the ED I/II levels IX-VIII. The Kiš sample seems to be younger than Inana Temple Level V. This agrees with the dating suggested by Zaina 2015 - the context was seen as contemporary with Cemetery A which in turn is dated to the late ED IIIb/Akkadian period. While the lack of any other available stratified samples from these three sites prevent us from constraining their uncertainties, they can be securely placed in their respective chronological phases within the regional chronological model for Southern Mesopotamia.



Graph 16: Comparison of calibrated dates for archaeological contexts in Southern Mesopotamia. The calibrated and modelled bone apatite date from the Royal Cemetery (see **Section 7.3**) has been plotted for comparison.

**Uruk** Dates for the five contexts in the two holy precincts (Eana and Kullaba/Anu) at Uruk allow for making some general observations. Firstly, Gebäude C in Eana, which was dated dendrochronologically and is thus the most reliable estimate, seems to be the youngest of the Uruk IV buildings in either Eana or Kullaba, even with the possible offset due to old wood effect. Only a few samples from the Jemdet Nasr contexts produced reliable readings. The two dated contexts appear to have been contemporary. Moreover, if there indeed was a hiatus between Uruk IV and III, it must have been relatively short, considering the layers containing painted Jemdet Nasr pottery appear to be not much younger than the Late Uruk contexts of Eana and Kullaba, especially Gebäude C. Also, both of these contexts seem to predate 3000

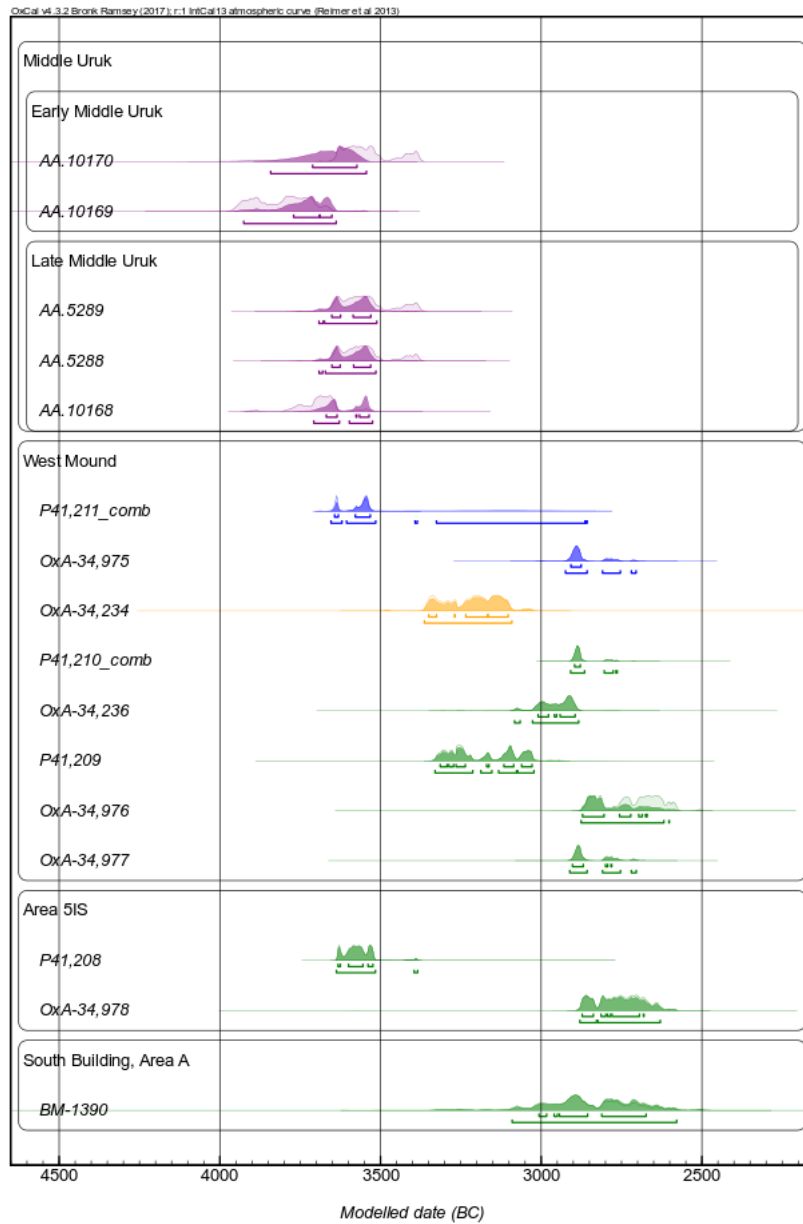
Table 2: Calibrated and unmodelled dates from Abu Salabikh.

Site	Phase/Lab. no.	68.2% range (yr BC)	95.4% range (yr BC)
Abu Salabikh	AA.10170	3636 - 3519	3644 - 3377
Abu Salabikh	AA.10169	3934 - 3707	3950 - 3664
Abu Salabikh	AA.5289	3646 - 3388	3694 - 3375
Abu Salabikh	AA.5288	3645 - 3521	3694 - 3377
Abu Salabikh	AA.10168	3748 - 3640	3792 - 3539
Abu Salabikh	P41,211-comb	3644 - 3537	3651 - 3529
Abu Salabikh	OxA-34,975	2910 - 2875	2921 - 2704
Abu Salabikh	OxA-34,234	3352 - 3114	3361 - 3098
Abu Salabikh	P41,210-comb	2897 - 2879	2908 - 2764
Abu Salabikh	OxA-34,236	3010 - 2895	3082 - 2886
Abu Salabikh	P41,209	3319 - 3030	3331 - 3025
Abu Salabikh	OxA-34,976	2857 - 2623	2867 - 2579
Abu Salabikh	OxA-34,977	2902 - 2779	2909 - 2703
Abu Salabikh	P41,208	3633 - 3525	3636 - 3520
Abu Salabikh	OxA-34,978	2871 - 2678	2878 - 2632
Abu Salabikh	P41,212	2839 - 2582	2858 - 2578
Abu Salabikh	BM-1390	3018 - 2698	3262 - 2581
Abu Salabikh	OxA-34,180	2572 - 2487	2622 - 2467
Abu Salabikh	OxA-34,235	2839 - 2500	2862 - 2489
Abu Salabikh	OxA-34,181	2576 - 2489	2828 - 2470
Abu Salabikh	BM-1366	2460 - 2288	2476 - 2148
Abu Salabikh	BM-2328R	2855 - 2346	2890 - 2155
Abu Salabikh	BM-1365	2464 - 2348	2469 - 2300
Abu Salabikh	P-2051	2859 - 2574	2876 - 2491
Abu Salabikh	HAR-1877	2453 - 2152	2473 - 2045
Abu Salabikh	P39,913	2484 - 2349	2561 - 2344
Abu Salabikh	P39,912	2470 - 2349	2476 - 2310

BC. The results described above will be used as a reference point for the discussions of dates from Abu Salabikh, Ur, and the other regions.

## 7.2 Abu Salabikh

**Uruk - ED I/II** The results presented in **Graph 17** show the dates relating to the Uruk-ED transition at the site.



Graph 17: Calibrated dates for the Uruk and ED I/II dates from Abu Salabikh.

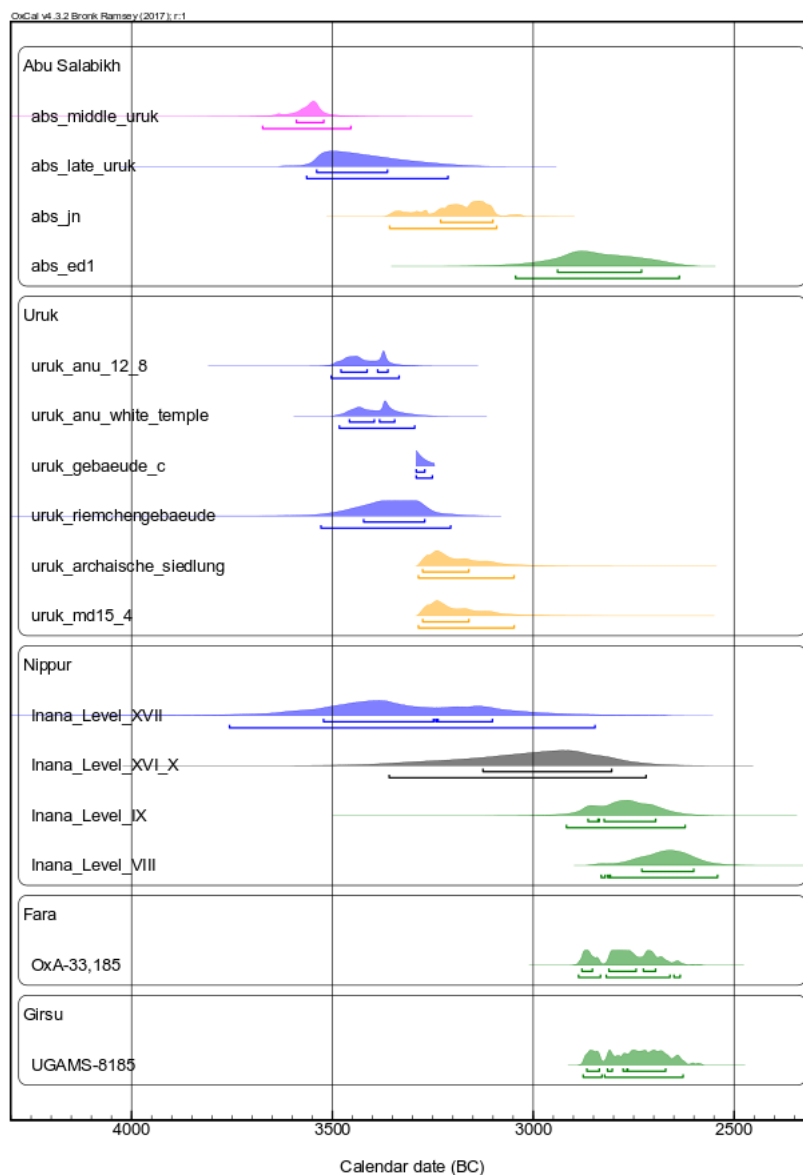
It becomes immediately evident that some of the new  $^{14}\text{C}$  readings from the West Mound and the area 5I do not conform to the relative sequence. Four of the stratigraphically ED I/II samples (OxA-34,581; -34,587; -34,582; -34,588) appear significantly older than expected, placing them in the Middle-Late Uruk time ranges. OxA-34,975, archaeologically defined to come from a Late Uruk context, appears

quite young and seems to fall within the ED I/II range. OxA-34,408 and -34,500, although reported as Late Uruk, seems to be contemporary with the Middle Uruk samples from the early soundings. Though puzzling, these anomalies may have an archaeological explanation. OxA-34,581; -34,587; -34,582; -34,588; -34,408 and -34,500 were all recovered from fire installations. According to the excavator (Postgate, *pers. comm.*) the fire installations were closely associated with their respective architectural levels. The emergent pattern, however, suggests that the fire installations were either misattributed or were backfilled with excavated material following their abandonment. Either way, these samples had to be excluded in order to permit Bayesian modelling of the Abu Salabikh sequence.

The samples OxA-34,408; -34,500; -34,581; and -34,587 require special attention due to their relatively old age. As mentioned above, both seem to suggest a Middle Uruk, rather than Late Uruk date for the contexts. Irrespective of whether the contexts were disturbed or not, these readings would strengthen the case made by Pollock 2015, who argued that Late Uruk occupation at the site was limited to the Uruk Mound for which no <sup>14</sup>C samples are available. Therefore, the occupation of the West and Main Mounds ceased after the end of the Middle Uruk and reappeared during the Jemdet Nasr period, as evidenced by OxA-34,234 (and potentially, though uncertainly, OxA-34,582 and -34,588). OxA-34,234 seems to corroborate the suggestion that the site was indeed occupied during the Jemdet Nasr period, even if it manifested predominantly in the plain wares.

Although it has to be said that the available sample of dates from the early periods at Abu Salabikh is hardly representative, and that more research is needed in order to fully establish the time and nature of the Uruk-ED transition, some general observations can be made. Perhaps the most interesting pattern which seems to emerge is that out of all the samples, regardless of their context or archaeological dating (with

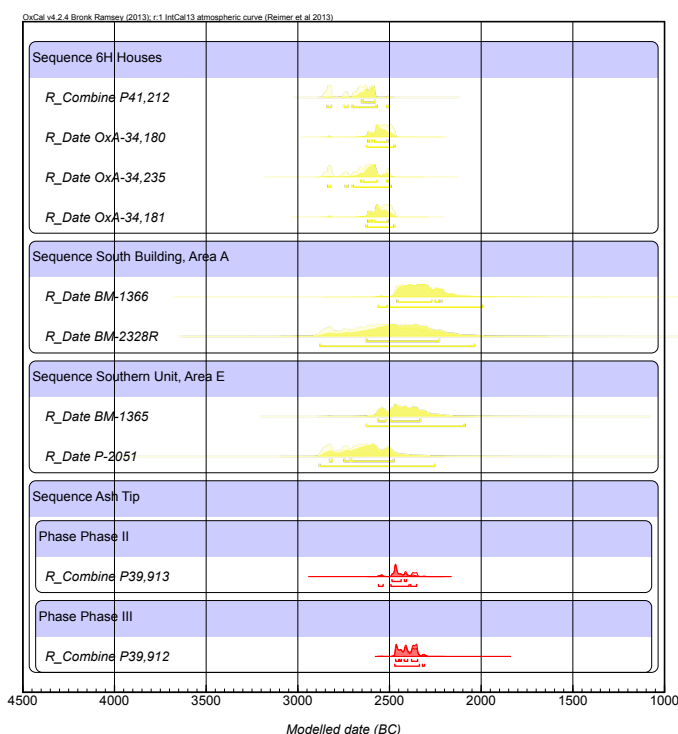
the possible yet unlikely exception of OxA-34,236), none seems to include the 3000 BC date.



Graph 18: A comparison between the calibrated dates for the Uruk and ED I/II contexts at Abu Salabikh with other Mesopotamian sites.

The averaged dates from the consecutive phases are compared to those of other Southern Mesopotamian sites in **Graph 18**. As is apparent, the archaeological chronology corresponds well with the  $^{14}\text{C}$  dates. The single Abu Salabikh date as-

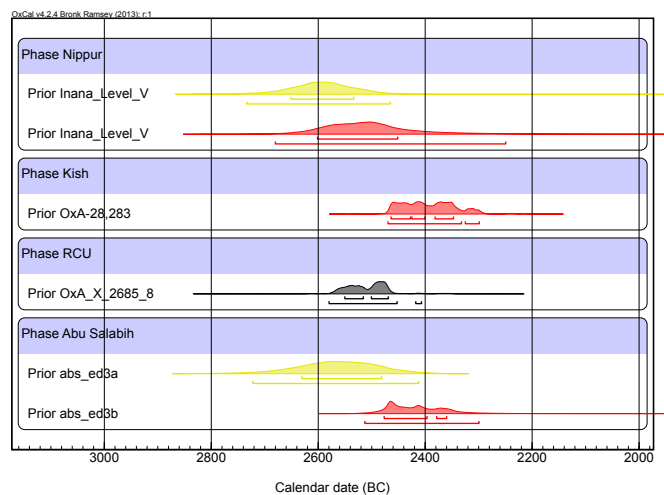
signed to the Jemdet Nasr period appears to be contemporary with the two painted-pottery-bearing contexts from Uruk (Archaische Siedlung and Md 15-4). The ED I/II dates from Abu Salabikh appear to be, in general, slightly earlier than those from the Nippur Inana Levels IX-VIII, as well as those of Fara and Ĝirsu. Although this result may be skewed by the single oldest date (OxA-34,236), this would not be surprising given that the Abu Salabikh sample immediately overlay protohistoric levels, and thus should represent the earliest phases of the Early Dynastic.



Graph 19: Calibrated dates for the ED IIIa and ED IIIb contexts at Abu Salabikh.

**ED IIIa - ED IIIb** The unmodelled dates from the later phases of the Early Dynastic period shown in **Graph 19** are less problematic. The six new samples recovered from the 6H houses form a coherent group, all falling into the 2750-2500 BC time bracket. It is important to note that all of the BM samples from Areas A and E (esp. BM-1365 and -1366) are later, postdating 2500 BC. Given the problems with the BM dates discussed in **Section 4.4**, it seems more prudent to accept the

6H dates as the correct age estimate of the ED IIIa period at Abu Salabikh. This case is further strengthened by the four dates from the Ash Tip, all of which seem to confirm the ED IIIb dating of the contexts (ca. 2500-2300 BC).



Graph 20: A comparison between the calibrated dates for the ED IIIa and ED IIIb contexts at Abu Salabikh with other Mesopotamian sites.

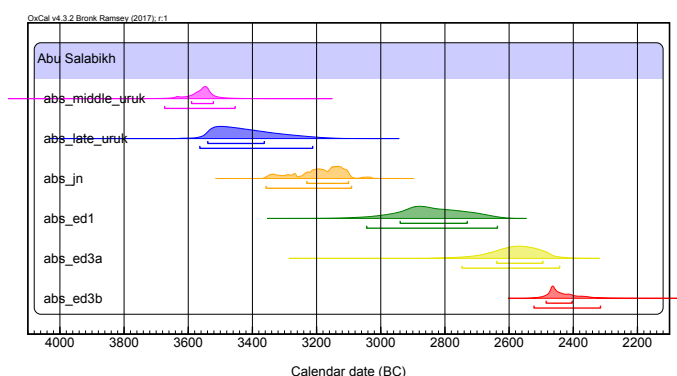
When compared to the ED III dates from other sites (**Graph 20**), one can see good concordance between the relative and absolute chronologies. Abu Salabikh ED IIIa period (including the dates from the 6H Houses as well as Area E) overlaps with Nippur Inana Level VI as well as V. The dates from the Ash Tip seem to postdate Level V at Nippur and be roughly contemporaneous with the sample from the Ywn sounding at Kiš, which would place both in the later parts of the ED IIIb. It is apposite to note that the radiocarbon date for the Royal Cemetery would seem to be closer in date to the Abu Salabikh ED IIIa contexts, rather than the ED IIIb Ash Tip.

**Summarised results** **Graph 21** and **Table 3** show the mean estimates for the successive periods at Abu Salabikh following the re-examination of the results. The

Table 3: Calibrated and modelled date estimates for the Abu Salabikh phases. Averaged estimates derived using the *Date()* function.

Site	Phase/Lab. no.	68.2% range (yr BC)	95.4% range (yr BC)
Abu Salabikh	Middle Uruk	3590 - 3522	3674 - 3454
Abu Salabikh	Late Uruk	3540 - 3363	3564 - 3213
Abu Salabikh	JN	3260 - 3010	3400 - 2933
Abu Salabikh	ED I-II	2940 - 2731	3044 - 2637
Abu Salabikh	ED IIIa	2639 - 2495	2747 - 2443
Abu Salabikh	ED IIIb	2485 - 2404	2523 - 2316

model assumes the existence of a Late Uruk phase for which no dates were available, placed between the Middle Uruk and the Jemdet Nasr (represented by OxA-34,234). Despite its imperfections, the general sequence informs us about several important patterns in the development of the site. First and foremost, there seems to be very little evidence for the beginning of the Early Dynastic period (defined archaeologically) extending into the 4<sup>th</sup> mill. BC. At the same time, the only available Jemdet Nasr/Late Uruk dates fall before the end of the 4<sup>th</sup> mill. BC. This begs the question what exactly happened at the site in the ca. 100-year-long period around 3000 BC. Secondly, the dates from the 6H houses remain the best estimate we have for the appearance of the Fara-style literary tradition at Abu Salabikh. Finally, the ED IIIb date of the Ash Tip samples corresponds well with the Middle Chronological estimates.

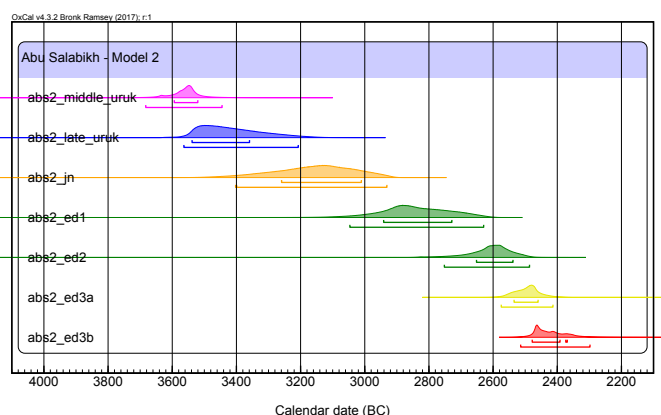


Graph 21: Comparison of calibrated dates for archaeological contexts at Abu Salabikh.

Table 4: Reference tooth collagen and enamel samples from Tidlington, UK. OxA-28,214 and OxA-X-2529-21 had been published by Hopkins, Snoeck, and Higham 2016. OxA-X-2685-7 was produced as a part of this study.

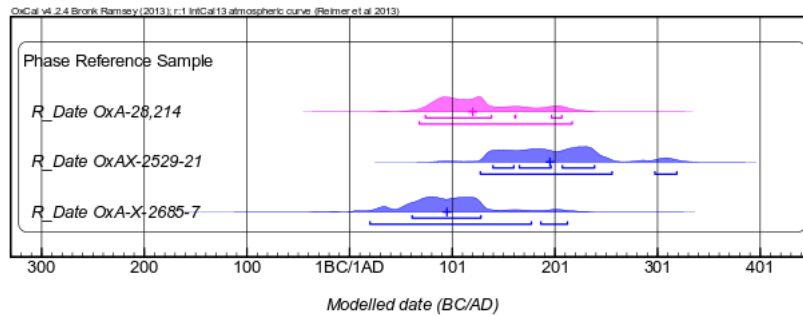
Material	Phase/Lab. no.	68.2% range (yr BC)	95.4% range (yr BC)
Collagen	OxA-28,214	74-208	68-218
Apatite	OxA-X-2529-21	140-239	128-319
Apatite	OxA-X-2685-7	61-128	20-213

At this point it is important to discuss yet another possible interpretation of the data. In an unpublished study by Dr H. Martin, the 6H contexts were argued to be earlier than the Fara-tablet-bearing layers in Area E, mainly on the basis of seal glyptic. While this suggestion is yet to receive a peer-reviewed publication, one may entertain the possibility that while the Area 6H houses represented a late phase of the ED I/II, only Area A and E could be dated to the ED IIIa period. This possibility has been modelled accordingly and the results can be seen in **Graph 22**. In this case, the date of the Area E contexts, and thus the Fara tablets, would be pushed beyond the 2500 BC point.



Graph 22: Comparison of calibrated dates for archaeological contexts at Abu Salabikh according to the alternative reconstruction (6H houses older than the Fara texts).

### 7.3 Ur

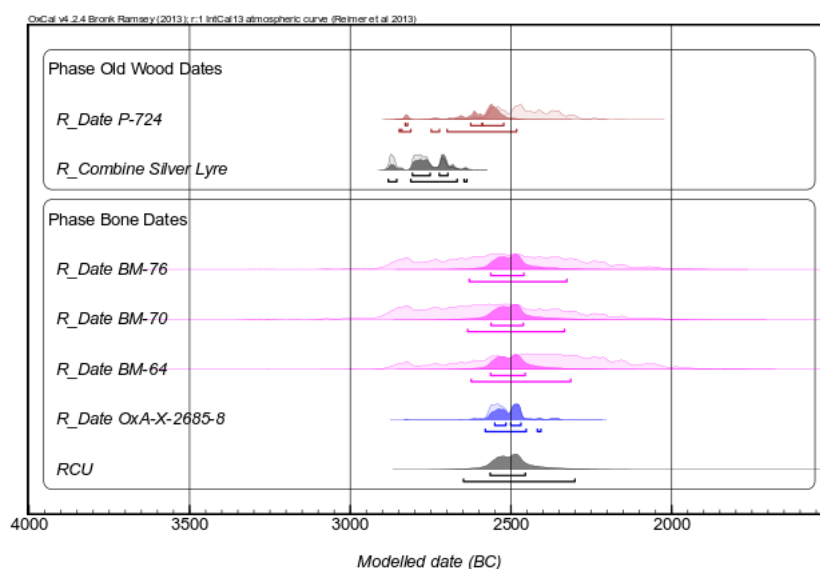


Graph 23: Results of collagen and apatite dating on the reference horse tooth from Tidlington, UK.

As explained in **Section 3.3.5**, the modelling of the  $^{14}\text{C}$  for the Royal Cemetery of Ur depends heavily on the interpretation of the bone apatite dates. The experimental study by Hopkins, Snoeck, and Higham 2016 clearly demonstrated that the date of an apatite sample is very sensitive to the concentration of the acid used, as well as to temperature and time of exposure during the pretreatment. Given all these variables, the lack of a universally-accepted pretreatment protocol, and the absence of an international standard, the tooth apatite sample from Ur was dated alongside a control tooth sample from the Roman site of Tidlington, UK. The result, alongside the collagen date and an apatite date derived using the exact same protocol from Hopkins, Snoeck, and Higham 2016 for the same sample are presented in **Graph 23** and **Table 4**. It is evident that the two apatite dates are slightly different, highlighting the problems with apatite dating. While OxA-X-2685-7 produced during this study looks slightly earlier than the collagen date OxA-28,214, the two dates are statistically identical, successfully combining using the *R.Combine()* function and passing the  $\chi^2$  test. The hypothesis that the apatite dates are likely to be younger than the collagen dates by 0-100 years holds true. Therefore, the apatite date for the Royal Cemetery was modelled as roughly contemporary with the bone dates, while still younger than the three old wood dates.

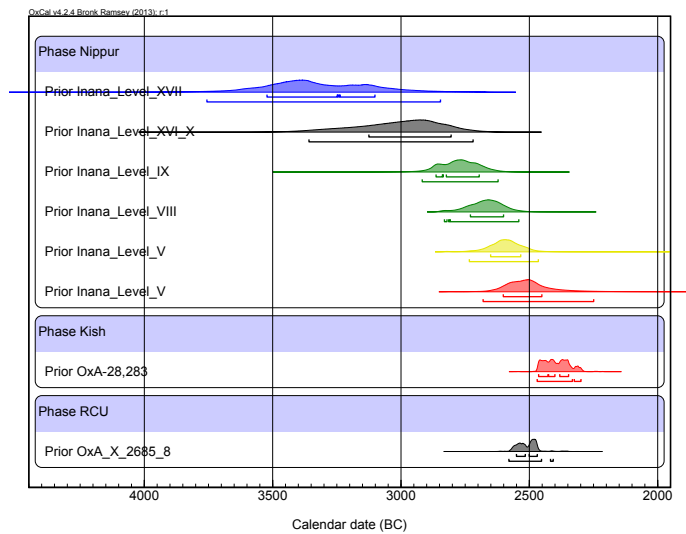
Table 5: Calibrated dates from the Royal Cemetery of Ur. The single date derived from the ox tooth enamel (OxA-X-2685-8) had been reported twice, before and after the introduction of prior time constraints.

Sample/Lab. no.	68.2% range (yr BC)	95.4% range (yr BC)
P-724	2569 - 2348	2624 - 2235
Silver Lyre	2879 - 2707	2887 - 2679
BM-76	2851 - 2293	2900 - 2057
BM-70	2865 - 2349	2923 - 2135
BM-64	2619 - 2147	2872 - 2032
OxA-X-2685-8 (unmodelled)	2567 - 2472	2620 - 2410
OxA-X-2685-8 (modelled)	2551 - 2470	2580 - 2407



Graph 24: Calibrated radiocarbon dates for the Royal Cemetery of Ur.

**Graph 24** and **Table 5** show all the available Royal Cemetery of Ur (RCU) dates. Unfortunately, a reversal in the calibration curve ca. 2550-2500 BC makes it difficult to ascertain whether the tooth enamel sample (OxA-X-2685-8) pre- or postdated 2500 BC. Its date range 2580-2453 BC (94.7% certainty) is taken here as the most reliable time estimate for the construction of the Royal Tombs. If we use the construction of the Royal Cemetery as an arbitrary start of the ED IIIb period, this event can now, with highest probability, be placed in  $2500 \pm 50$  BC.



Graph 25: Comparison of the calibrated radiocarbon dates for the Royal Cemetery of Ur with other Mesopotamian sites.

In **Graph 25**, the date of the tooth apatite from the Royal Cemetery is compared to the Nippur Inana sequence and the single date from Kiš. Even despite the relatively high imprecision of the estimates, the results are quite revealing. Firstly, the Royal Tombs seem to postdate Nippur Inana Level VII. Secondly, they appear roughly contemporary with Nippur Inana Level V. These two observations would confirm the Royal Cemetery’s pivotal role as the transitory event between ED IIIa and ED IIIb.

	Nippur	Abu Salabikh		Other		
ED IIIb	Inana V	Ash Tip II		Kish Ywn Phase 2		
		Ash Tip I				
ED IIIa	Inana VII	6H	Area E			
ED III	Inana VIII	West Mound	5I	Fara D E Level 2	Girsu Tell K	
	Inana IX					
Jemdet Nasr		AbS 5602		Uruk Archaische Siedlung	Uruk Md 15-4	
Late Uruk	Inana XVII			Uruk Anu White Temple	Uruk Eana Riemchengebäude	Uruk Temple C
				Uruk Anu Bsch. 12-8		
Middle Uruk		Early Middle Uruk	West Mound			

Graph 26: A schematic representation of the master sequence Bayesian model for Southern Mesopotamia.

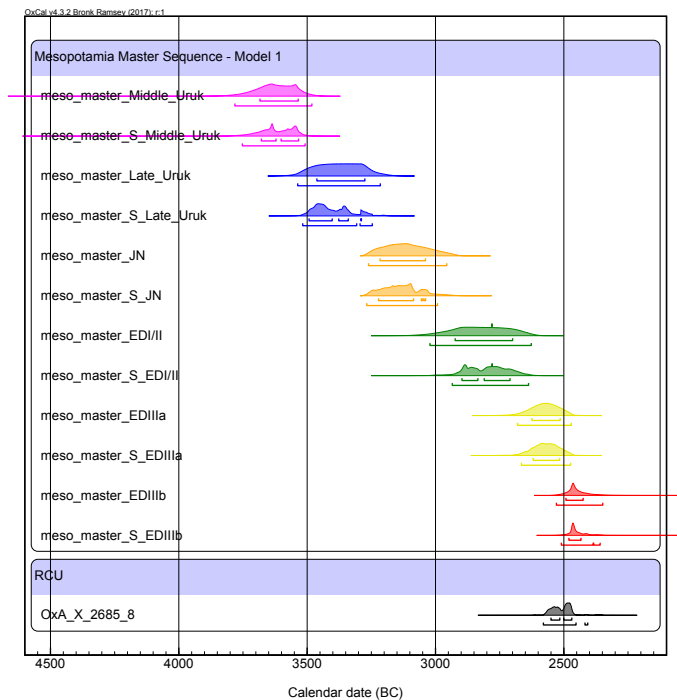
Table 6: Calibrated date estimates (*Date()* function) for the Southern Mesopotamian sequence according to Model 2.

Phase	68.2% range (yr BC)	95.4% range (yr BC)
Middle Uruk	3694 - 3536	3801 - 3478
Late Uruk	3461 - 3276	3536 - 3215
JN	3217 - 3041	3262 - 2958
ED I-II	2923 - 2696	3023 - 2625
ED IIIa	2625 - 2525	2688 - 2475
ED IIIb	2464 - 2345	2520 - 2323

## 7.4 Southern Mesopotamia Master Sequence

**Averaged results** Following the observations detailed above, the samples from all of the Southern Babylonian sites were assembled into a single sequence (see **Graph 26**). Two versions of the same model were tested - Model 1 contained no prior historical information, while Model 2 was constrained by the Middle Chronology date for the Akkadian conquest (modelled as a *Boundary()*, distributed uniformly between 2350 and 2300 BC, Sallaberger and Schrakamp 2015). The results of both models are presented in **Graph 27** and **Graph 28**. Each phase is represented by two estimates (see **Section 3.3**). The differences between the two models, as well as the differences between the *Date()* and *Sum()* estimates, are negligible. This suggests that the date estimates are not heavily affected by either the priors or the choice of the modelling technique. The only noticeable difference is the length of the ED IIIb period between Models 1 and 2. Accepting the validity of the Middle Chronology date for the Akkadian conquest, it becomes apparent that the bulk of the  $^{14}\text{C}$  dates assigned to the ED IIIb must come from the earlier part of the period. Having no reasons to doubt the validity of a conservative estimate for the Middle Chronology date of the Akkadian conquest, the results of Model 2 will be used as a point of reference for the remainder of the analysis.

Due to its ambiguous place in the sequence, the new date for the Royal Cemetery of Ur was not included in the model. It is plotted in **Graph 27** and **Graph 28** for

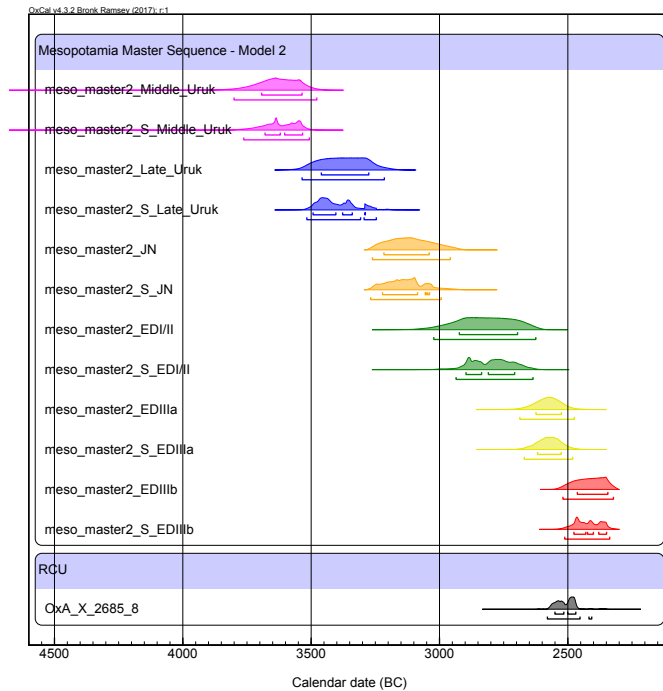


Graph 27: Master sequence for the archaeological phases in Southern Mesopotamia (no historical prior).

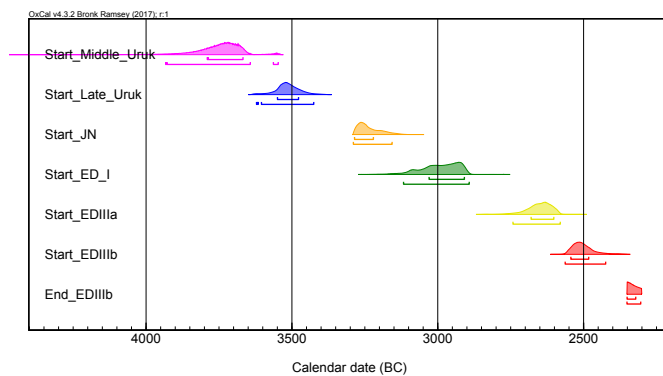
reference, modelled as an independent reading. Should we accept this reading as an accurate estimate for the construction of the Royal Tombs, it becomes apparent yet again that the  $^{14}\text{C}$  results support the transitional character of the Cemetery. As noted in **Section 7.3**, it is impossible to determine whether the construction event occurred before or after 2500 BC, mainly due to the shape of the calibration curve.

**Boundaries** Graph 29 and Table 7 show the *Boundary()* functions of Model 2, marking the beginning and end dates for each of the consecutive phases. This graph is particularly useful in determining the robustness of the chronological model, as it allows for a comment on the uncertainty of the age estimates. Three of these boundaries are particularly notable:

- 1 The beginning of the Middle Uruk period. Without any date which could be used as a *terminus post quem* for the Middle Uruk phase, one cannot pin down the beginning of the Middle Uruk phase.



Graph 28: Master sequence for the archaeological phases in Southern Mesopotamia (Akkadian conquest = 2350-2330 BC).



Graph 29: Boundaries of the master sequence for Southern Mesopotamia.

2 The Jemdet Nasr-ED I/II transition. The large uncertainty on the JN/EDI transitional boundary can be ascribed either to the dearth of dates representing these phases, or to a hiatus between these two phases, which would have allowed this transition to broaden.

3 The ED IIIa-ED IIIb transition. The two boundaries overlap, suggesting that

Table 7: Calibrated date estimates (*Boundary()* function) for the beginning and end dates of archaeological phases in Southern Mesopotamia according to Model 2.

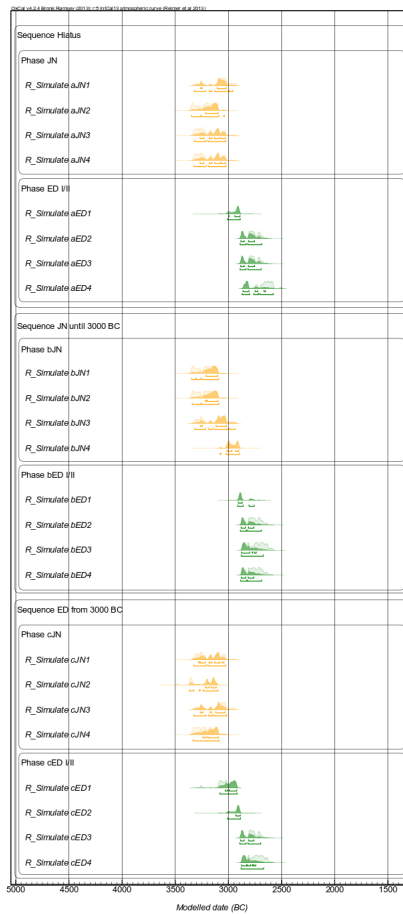
Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Middle Uruk - Start	3791 - 3668	3933 - 3547
Late Uruk - Start	3550 - 3478	3622 - 3426
Jemdet Nasr - Start	3286 - 3221	3290 - 3157
ED I-II - Start	3030 - 2909	3118 - 2893
ED IIIa - Start	2680 - 2603	2743 - 2580
ED IIIb - Start	2544 - 2483	2564 - 2425
ED IIIb - End	2351 - 2322	2352 - 2305

ED IIIa and ED IIIb phases were very close to each other in time.

**End of Jemdet Nasr** The possibility of a hiatus between the end of the Jemdet Nasr and the beginning of the Early Dynastic period (see also **Section 7.2**), needs to be entertained. However, given the relatively few radiocarbon dates available, it is important to ask whether this pattern is in fact an artifact of calibration rather than a reflection of real socio-cultural dynamics. In order to investigate this issue further, a simulation has been run. **Graph 30** shows three hypothetical scenarios (starting from the top):

- 1 The Jemdet Nasr period (3300-3100 BC) was followed by a short hiatus ca. 3000 BC before the onset of the ED I/II (2900-2700 BC).
- 2 The Jemdet Nasr period (3300-3000 BC) was immediately followed by the ED I/II (2900-2700 BC).
- 3 The Jemdet Nasr period (3300-3100 BC) was immediately followed by the ED I/II (3000-2900 BC).

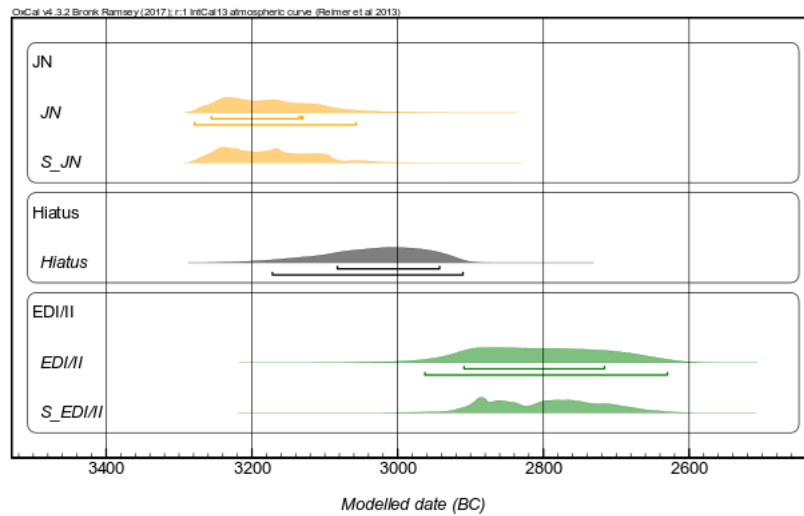
Each of these hypothetical phases was represented by four simulated  $^{14}\text{C}$  dates. Comparing the results of the simulation to the actual radiocarbon results of this



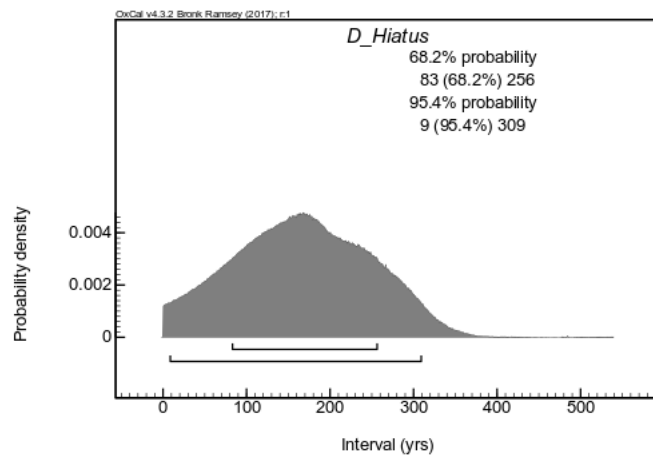
Graph 30: Radiocarbon dates simulating three potential scenarios: 1) A hiatus around 3000 BC; 2) Jemdet Nasr extending into 3000 BC; 3) ED I starting around 3000 BC.

study (**Graph 17**, **Graph 21** and **Graph 28**), it becomes apparent that only Scenarios 1 and 3 fit with the data. If the Jemdet Nasr period extended until 3000 BC, one would expect at least one of the dates fall onto this date, as it does in the simulation. Therefore, while the existence of a JN-ED I/II hiatus cannot be excluded, the alternative interpretation would place the beginning of the Early Dynastic around 3000 BC, which is a century earlier than commonly believed. To further explore this question, an additional model for the Southern Mesopotamian sequence was run. Model 3 was identical to Model 2 detailed above, except it presupposed an additional phase between the end of the Jemdet Nasr and the beginning of the ED I/II. As seen in **Graph 31** and **Graph 32**, there is a high probability of a break in radiocarbon

record around 3150-2900BC.



Graph 31: JN and ED I/II according to Model 3 (an intermediary phase inserted before the start of the Early Dynastic).



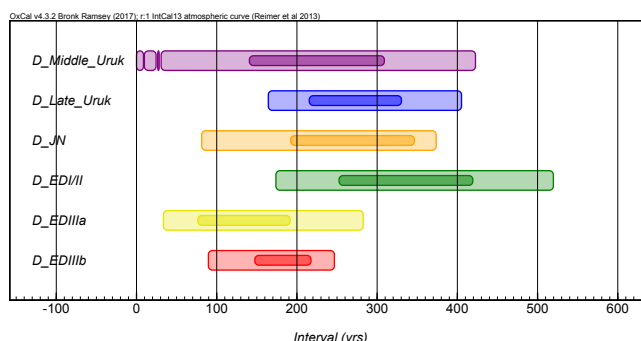
Graph 32: Duration of the suggested JN-ED I/II hiatus derived using the *Interval()* function.

**Duration** The duration of individual phases of Model 2 is reported in **Graph 33** and **Table 8**. Although these estimates are limited by their relatively large uncertainties, the patterns they present are quite clear. The length of the Middle Uruk phase is difficult to discern due to the lack of a fixed start date. The Late Uruk and

Table 8: Calibrated date estimates (*Interval()* function) for the duration of archaeological phases in Southern Mesopotamia according to Model 2.

Period	68.2% range (yr)	95.4% range (yr)
Middle Uruk	141 - 309	0 - 423
Late Uruk	215 - 330	164 - 405
Jemdet Nasr	192 - 346	81 - 374
EDI/II	253 - 419	174 - 520
EDIIIa	77 - 192	34 - 283
EDIIIb	148 - 218	90 - 247

Jemdet Nasr both seem to show a duration of ca. 250-300 years, with the estimate being less certain for the latter. Despite its large uncertainty, the duration estimate for ED I/II suggests this phase was the longest, falling in the range of ca. 250-450 years. The pattern changes in the final phases of the Early Dynastic, with ED IIIa and IIIb being noticeably shorter, falling into the 150-250 years bracket. ED IIIa in particular, seems to fall much closer to the lower end of this range.



Graph 33: Duration estimates for the archaeological phases in Southern Mesopotamia.

## 7.5 Tell Brak

**Ninevite 5 - ED** The dates from Ninevite 5 and Early Dynastic contexts are illustrated in **Graph 34**. With the exception of the dates which have been identified as outliers in **Section 5.2** (mainly the problematic BM dates), the readings seem to be remarkably consistent across different soundings. Unfortunately, due to the

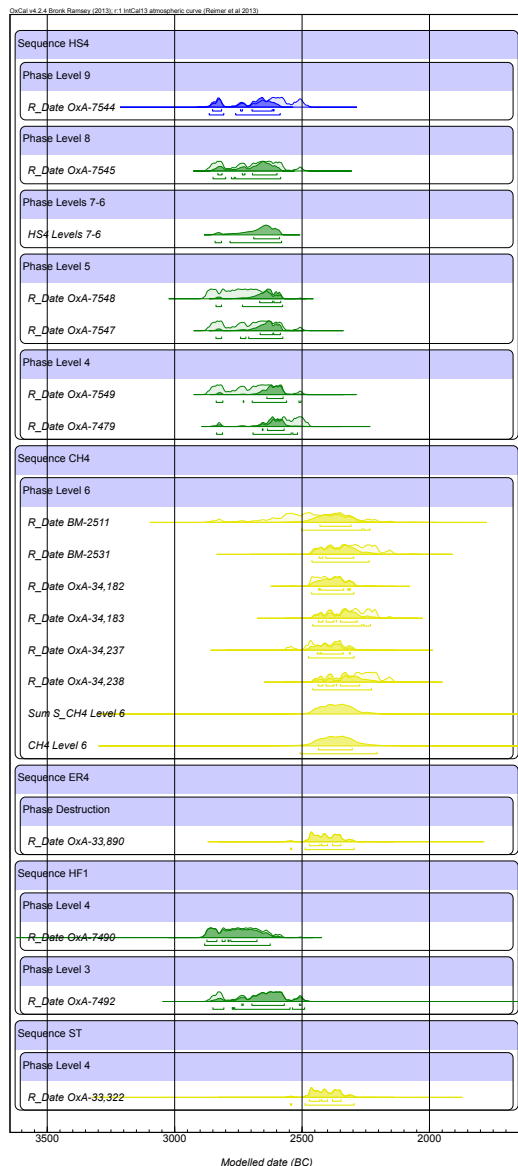
Table 9: Calibrated date estimates (*Date()* function) for the Brak sequence.

Period	Phase	68.2% range (yr BC)	95.4% range (yr BC)
LC 3/4	F	3788 - 3269	4288 - 2926
LC 5 - EJ 1	G-J	3058 - 2735	3290 - 2677
EJ I/II	K	2698 - 2514	2786 - 2441
EJ III	L	2456 - 2336	2529 - 2273
EJ IV	M	2313 - 2232	2372 - 2205
EJ V	N	2263 - 2143	2311 - 1957

insufficient number of available readings, the estimates are quite imprecise. Nonetheless, some general observations relevant to this study can be made. Firstly, it seems undeniable that the transition from the Ninevite 5 to ED period at Brak occurred around 2500 BC. Interestingly, none of the dates seem to include this datepoint. Secondly, the date OxA-33,890 from ER does seem to be contemporary with the CH destruction layers (Level 6). It is therefore plausible that, contrary to the previous interpretations (Ristvet 2011), the ER destruction could also be attributed to the end of the ED period.

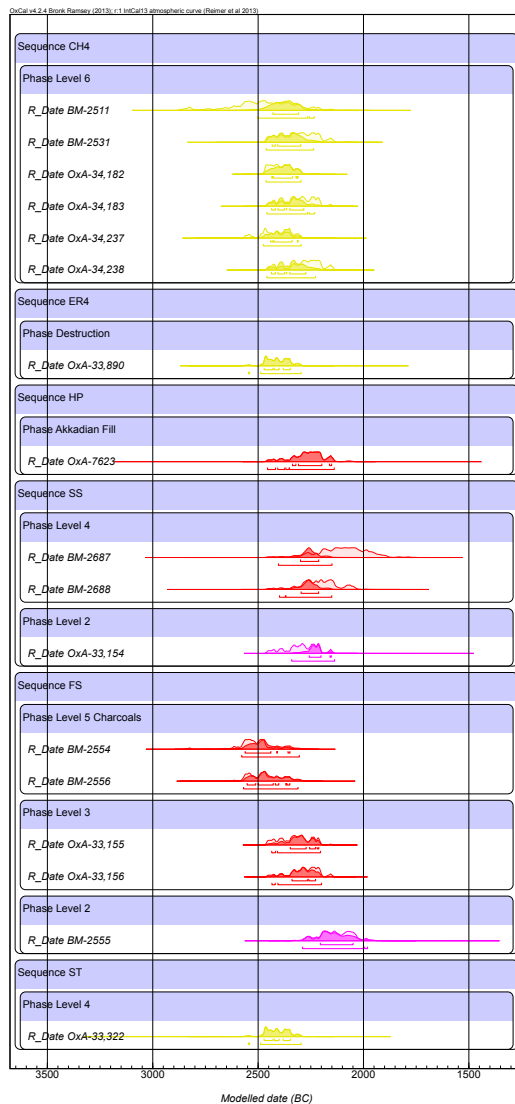
**ED - Post-Akkadian** The situation is much less clear when one considers the later periods at Brak (**Graph 35**). While the three OxA- readings (OxA-7623, -33,155, -33,156) attributed to the Akkadian period are consistent with one another, the BM-dates seem either older (BM-2554, -2556) or younger (BM-2687, -2688). Similarly, the Post-Akkadian Phase N, represented by only two dates, shows a similar pattern, with BM-2555 being slightly younger than OxA-33,154. At this moment, it is impossible to determine whether this difference reflects the real span of the phase, or whether it is due to the questionable reliability of the BM dates.

**Summarised Results** The summarised date estimates for Tell Brak are shown in **Graph 36** and **Table 9**. It is important to mention that the model for the master sequence at Brak falls short of the acceptable agreement index by a minuscule margin ( $A_{\text{model}}=59.1\%$ ; (Bronk Ramsey 2009b)). The date which affects the agreement index



Graph 34: Calibrated radiocarbon dates on the Ninevite 5 and Early Dynastic contexts at Tell Brak.

most adversely was OxA-7,539 (31% chance of being an outlier), which appears to be slightly earlier than the remainder of HS1 Phase 6 dates. Therefore, the results have to be considered with some reservations. The currently-available dates do not allow us to make any conclusions regarding the earlier periods (Phases F-J). The apparently long duration of Phase F is caused by the single date BM-2914, as well as the lack of any dates attributable to the Phases G-J. The remainder of the sequence, however,



Graph 35: Calibrated radiocarbon dates on the Early Dynastic and Akkadian contexts at Tell Brak.

paints a more coherent picture of progression, with the Ninevite 5 culture spanning c. 2750-2500 BC, and ED c. 2500-2300 BC.

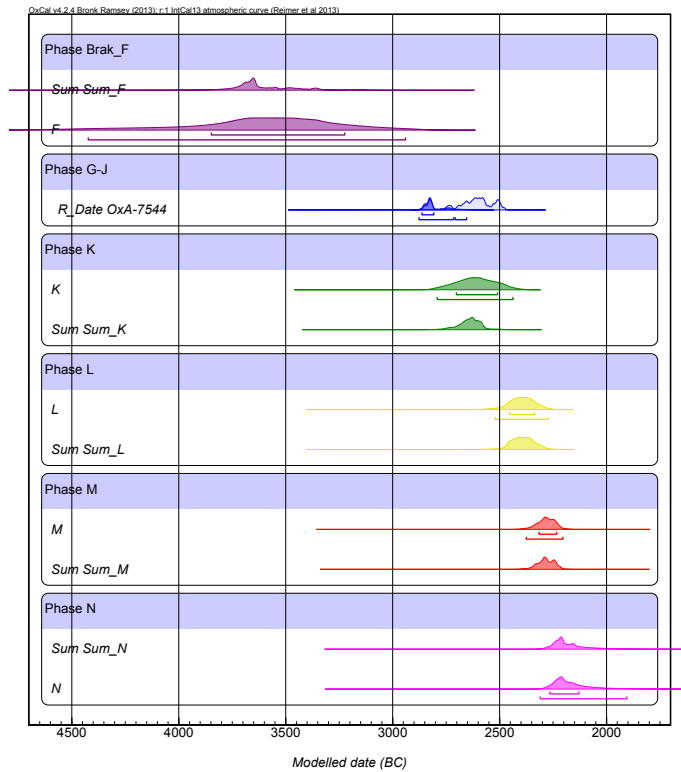
**Boundaries** A more nuanced situation can be seen in **Graph 37** and **Table 10**, which depicts the start boundaries of the consecutive phases. In it one can see that the calculations place the most likely start date for the Early Dynastic after 2500 BC. For reasons described above, the start dates of Phases F and G remain problematic.

Table 10: Calibrated date estimates (*Boundary()* function) for the beginning and end dates of archaeological phases at Tell Brak.

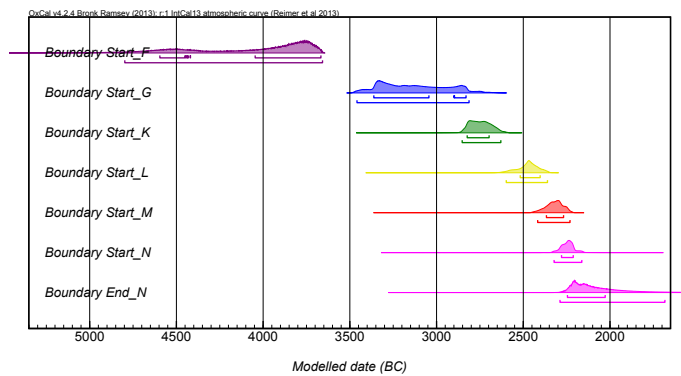
<b>Period</b>	<b>Boundary</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Start LC 3	Start F	4010 - 3661	4696 - 3653
Start LC 5	Start G	3368 - 2837	3463 - 2819
Start EJ I/II	Start K	2817 - 2687	2849 - 2626
Start EJ III	Start L	2526 - 2405	2607 - 2364
Start EJ IV	Start M	2359 - 2259	2415 - 2230
Start EJ V	Start N	2278 - 2212	2319 - 2163
End EJ V	End N	2248 - 2060	2293 - 1767

Table 11: Calibrated date estimates (*Interval()* function) for the duration of archaeological phases at Tell Brak.

<b>Period</b>	<b>Phase</b>	<b>68.2% range (yr)</b>	<b>95.4% range (yr)</b>
LC 3/4	F	308 - 1005	233 - 1751
LC 5 - EJ 1	G-J	256 - 678	0 - 702
EJ I/II	K	184 - 376	39 - 436
EJ III	L	50 - 238	0 - 321
EJ IV	M	0 - 92	0 - 183
EJ V	N	0 - 162	0 - 473

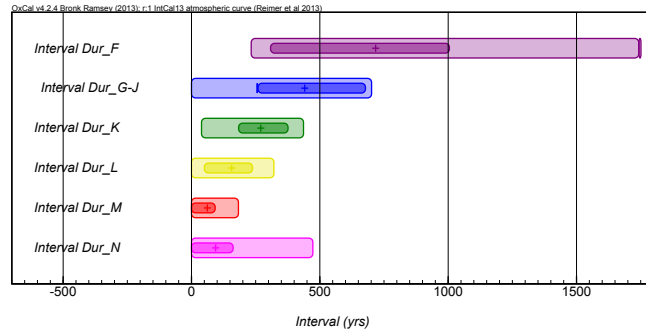


Graph 36: Master sequence for the archaeological phases at Tell Brak.



Graph 37: Boundary estimates for the archaeological phases at Tell Brak.

**Duration** The estimated durations of the consecutive phases at Brak are shown in **Graph 38** and **Table 11**. The uncertainties of these estimates do allow us to draw only the most general conclusions. The Akkadian period at the site, as expected, is relatively short. Interestingly Phase K (Ninevite 5 period) appears noticeably longer



Graph 38: Duration estimates for the archaeological phases at Tell Brak.

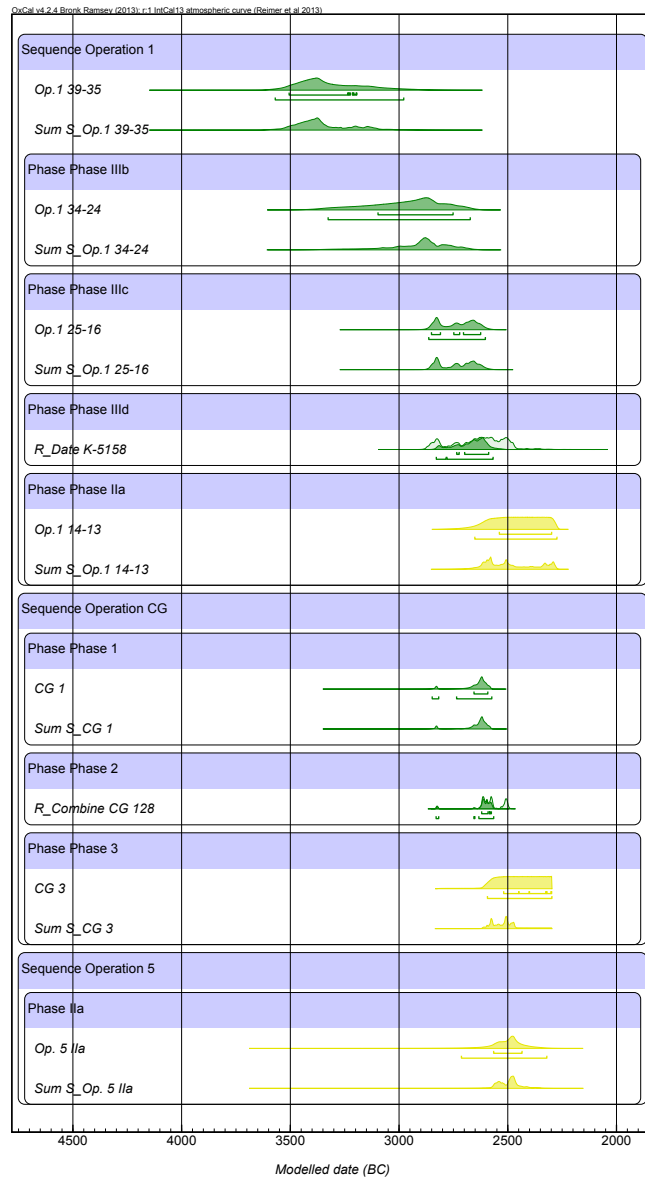
than the subsequent Early Dynastic, perhaps by some 100-200 years.

## 7.6 Tell Leilan

**Uruk - Early Dynastic** The summarised Uruk, Ninevite 5 and Early Dynastic dates from individual contexts are shown in **Graph 39**. The graph demonstrates a good fit between the relative and absolute dates for the individual contexts. For example, the Ninevite 5 contexts from Operation CG do indeed seem to be contemporary with the final phase of the culture (IIIId) in the Operation 1 sounding. The *Sum()* distributions show that while the ED dates from the Operation 1 sounding represent the entirety of the period's span, the dates from Operations 5 and CG cluster around 2600-2500 BC, likely indicating the very earliest appearance of the ED material.

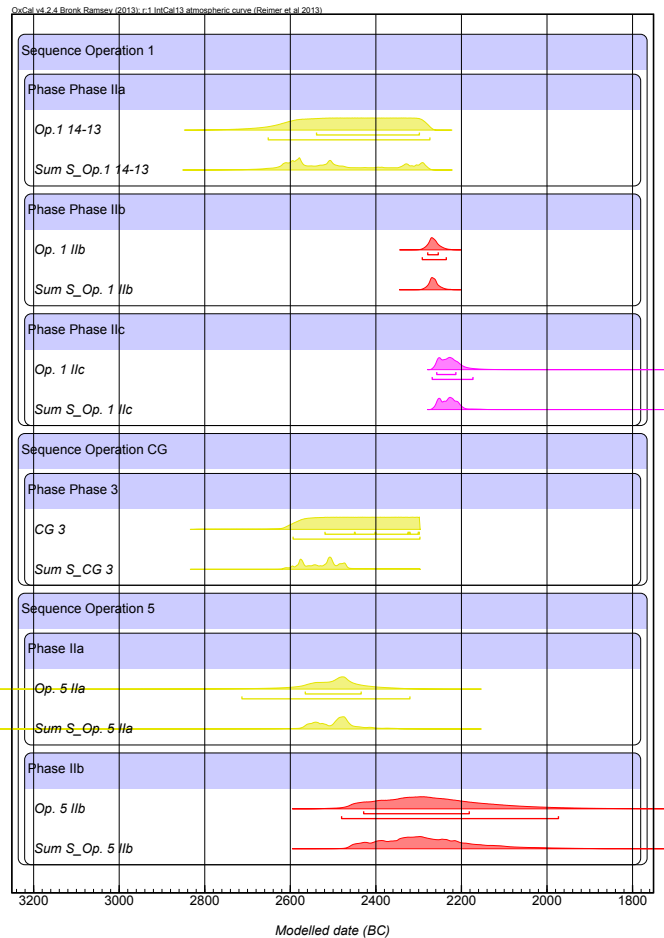
**Early Dynastic - Akkadian** The dates from Akkadian contexts, compared with the earlier Early Dynastic samples, broken down into individual sequences, are shown in **Graph 40**. As visible, the Operation 1 dates are the main source of chronological information from Leilan. The Akkadian dates from Operation 5 are very imprecise, but consistent with Operation 1.

**Summarised Results** It is important to note that the model of the master sequence had a relatively low agreement index ( $A_{\text{model}} = 47.2\%$ ), due to the inclusion of 2 aberrant combined samples (CAMS-130596-130596 and CAMS-134350-134352).



Graph 39: Calibrated radiocarbon dates for the Ninevite 5 and Early Dynastic contexts at Tell Leilan.

The remaining dates, however (with the exception of the mixed Post-IIc phase) are remarkably consistent. The Outlier analysis does not give them more than 10% chance of being an outlier to any of the dates. These diagnostics, as well as the large number of samples from Leilan, make the model a reliable estimate for the chronology of the site. The averaged results for the sequence presented in **Graph 41** and **Table 12** reveal certain interesting patterns. Firstly, the IIIa-d sequence illustrates the entirety



Graph 40: Calibrated radiocarbon dates for the Early Dynastic and Akkadian contexts at Tell Leilan.

of the span of the Ninevite 5 culture at the site. While the dating of the IIIa period relies on a number of older dates, and IIIb is represented by only a single date, it does seem that IIIb can easily be considered the longest part of the Ninevite 5. This agrees well with the stratigraphy of Operation 1, where this period corresponds to 10 different strata. The *Sum()* function for the Early Dynastic (IIa) seems to suggest that the available dates from this period cluster towards the beginning of the period.

**Boundaries** Graph 42 and Table 13 are of particular importance, because they provide us with the ages for the start dates of the Phases IIIId, IIa, IIb and IIc. As these were the periods of great cultural innovation and political changes, the high

Table 12: Calibrated date estimates (*Date()* function) for the Leilan sequence.

<b>Period</b>	<b>Phase</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
EJ I	IIIa	3510 - 3199	3577 - 2969
EJ II	IIIb	2908 - 2703	3011 - 2647
EJ II	IIIc	2679 - 2608	2778 - 2583
EJ II	IIId	2623 - 2594	2645 - 2570
EJ III	IIa	2550 - 2322	2595 - 2290
EJ IV	IIb	2284 - 2254	2298 - 2234
EJ V	IIc	2257 - 2211	2268 - 2173
EJ V - OAss	I	2200 - 1873	2241 - 1364

Table 13: Calibrated estimates (*Boundary()* function) for the beginning and end dates of archaeological phases at Tell Leilan.

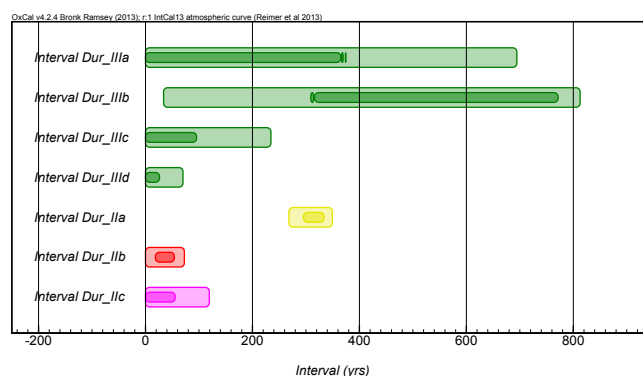
<b>Boundary</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Start IV	3668 - 3432	3956 - 3356
Start IIIa	3545 - 3375	3633 - 3198
Start IIIb	3446 - 3022	3498 - 2768
Start IIIc	2727 - 2614	2868 - 2600
Start IIId	2633 - 2599	2663 - 2576
Start IIa	2616 - 2589	2623 - 2563
Start IIb	2297 - 2273	2311 - 2262
Start IIc	2266 - 2238	2272 - 2220
End IIc	2253 - 2182	2261 - 2129



Table 14: Calibrated date estimates (*Interval()* function) for the duration of archaeological phases at Tell Leilan.

Phase	68.2% range (yr)	95.4% range (yr)
IIIa	0 - 375	0 - 694
IIIb	309 - 772	34 - 813
IIIc	0 - 96	0 - 235
IIId	0 - 26	0 - 70
Ila	295 - 334	268 - 349
Ilb	19 - 54	0 - 73
Ilc	0 - 55	0 - 119

and after the Akkadian domination.



Graph 43: Duration estimates for the archaeological phases at Tell Leilan.

**Duration** Several conclusions can be drawn from the results presented in **Graph 43** and **Table 14**. Firstly, despite the uncertainties of the estimates for the Ninevite 5 subphases, one can say that IIIc was notably shorter than IIIb. This is significant, given that the levels were represented by 10 and 9 different archaeological layers respectively. It therefore clearly demonstrates that the thickness of archaeological deposits can be deceptive when it comes to determining the timespan of cultural processes where absolute dating is unavailable. The same holds true for phases IIId and Ila. The two periods were represented by 2 layers each, and yet their durations differed by several centuries. The duration estimates for Phases IIId, Ilb and Ilc

Table 15: Calibrated date estimates (*Boundary()* function) for the beginning dates of the Akkadian period at Tell Beydar.

Sounding	Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Field B	Start Akkadian (EJ IV)	2438 - 2292	2470 - 2203
Field F	Start Akkadian (EJ IV)	2519 - 2411	2590 - 2349

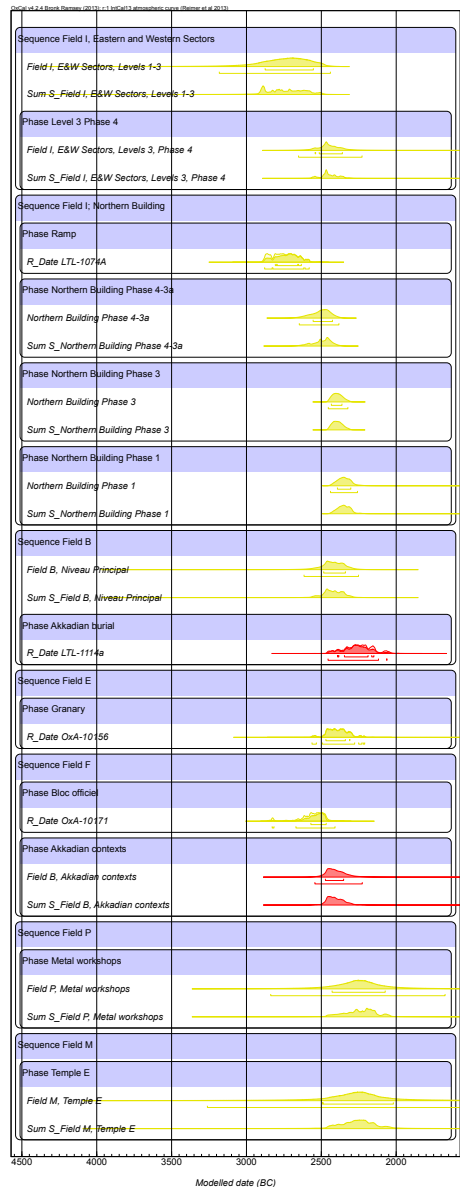
are much more secure and show a progression of relatively short periods (less than 100yrs), with the exception of IIa, which seems to have lasted around three centuries.

## 7.7 Tell Beydar

**Early Dynastic - Akkadian** The dated ED and Akkadian contexts from different soundings at Beydar are presented in **Graph 44**. The results are puzzling. The earliest dates for the Early Dynastic (Field I) seem to go as far back as 2700 BC. The youngest contexts (Fields M and P) fall well within the Akkadian period time estimates (2200 BC). This suggests that the archaeological ages of the individual contexts need to be re-assessed, specifically Temple E. Moreover, the two sequences which provide dates for the ED-Akkadian transition (Fields B and F) diverge by ca. 100 years. Arranging the Tell Beydar dates into a master sequence proved impossible without making the arbitrary choice between the higher and lower estimates for the beginning of the Akkadian period and excluding a substantial number of  $^{14}\text{C}$  dates. In order to avoid this, two estimates of the ED-Akkadian transition at Beydar will be used for the remainder of the analysis, represented by the *Boundary()* functions at Field B and Field F (see **Graph 45** and **Table 15**).

## 7.8 Khuera, Ziyadeh, Kazane, Mozan, Raqa'i, Kurran

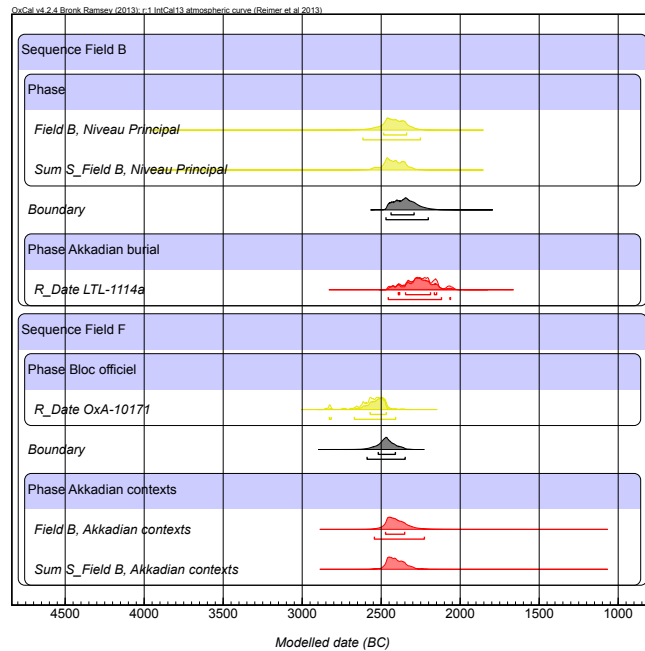
**Ninevite 5 - Early Dynastic** The summed Ninevite 5 and Early Dynastic dates for the other Syrian sites are shown in **Graph 46** and **Table 16**. The dates are mostly consistent with the archaeological dating, but a few subtle difference can be



Graph 44: Master sequence for the archaeological phases at Tell Beydar.

discerned. For example, the Ninevite 5 contexts from Raqa'i seem relatively young, potentially encroaching on 2500 BC. This is in accordance with the archaeological sequence at the site, where they immediately predate ED contexts. Tell Khuera Ic phase seems to be the earliest occurrence of ED material.

**Averaged Results** The Ninevite 5 and ED dates from these six sites were arranged into a single sequence composed of two consecutive phases. The results are shown in



Graph 45: Boundaries for the archaeological phases at Tell Beydar.

**Graph 47** and **Table 17**. The model's agreement index fell within an acceptable range ( $A_{\text{model}} = 63.9\%$ ), thus indicating that the sites can be considered parts of the same cultural continuum. The dates which were singled out as problematic by the Outlier Model were KN-5730 and -5732 (10% chance of being outliers). These estimates were indeed older than the remainder of Ic at Khuera and can be considered anomalous.

## 7.9 Jezirah Comparison

Despite the individual differences listed above, the dates did lend themselves to creating a single master sequence for all of the Syrian Jezirah (see **Graph 48**). The results are shown in **Graph 49**, **Graph 50**, **Table 18** and **Table 19**.

**Ninevite 5 (EJ I/II)** The emerging picture is a complex one. Firstly, the issue of dating the beginning of the Ninevite 5 period is still problematic. If the date for the beginning of the Leilan IIIa period is taken as an estimate for the earliest appearance

Table 16: Calibrated date estimates (*Date()* function) for the archaeological phases at Khuera, Mozan, Ziyadeh, Raqa'i and Kazane.

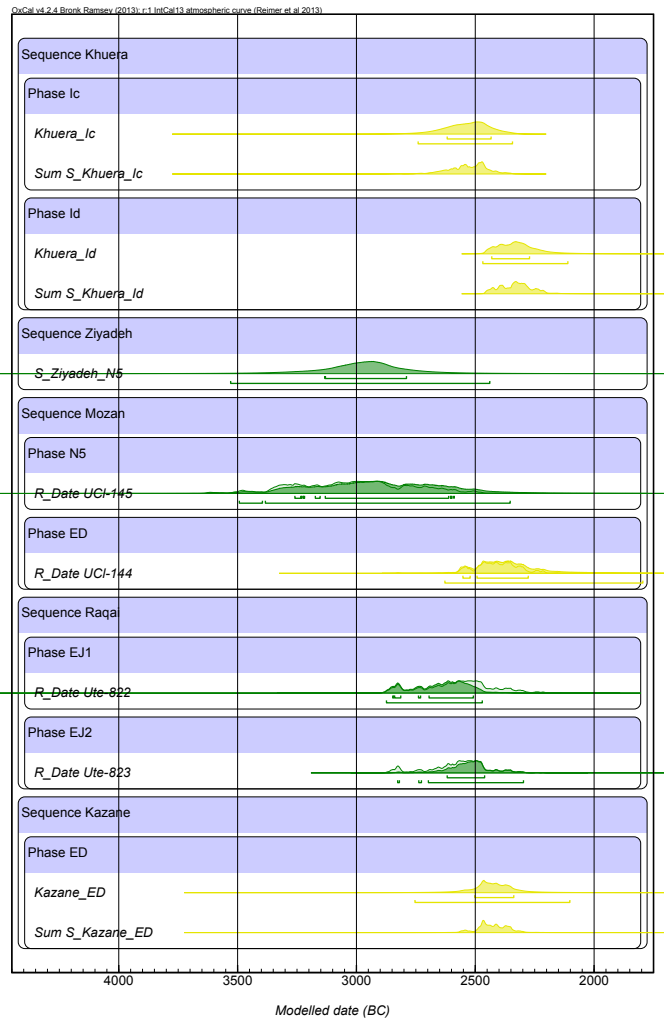
Site	Phase	68.2% range (yr BC)	95.4% range (yr BC)
Khuera	Ic (EJ IIIa)	2619 - 2434 - 2741	2344
Khuera	Id (EJ IIIb)	2431 - 2272 - 2469	2111
Ziyadeh	N5 (EJ I/II)	3132 - 2790 - 3529	2439
Mozan	N5 (EJ I/II)	3260 - 2590	3493 - 2354
Mozan	ED (EJ III)	2552 - 2277	2628 - 1795
Raqa'i	EJ I	2848 - 2508 - 2874	2471
Raqa'i	EJ II	2619 - 2461	2827 - 2298
Kazane	ED (EJ III)	2503 - 2338	2754 - 2103

Table 17: Calibrated date estimates (*Date()* function) for the archaeological phases in the Khabur River region.

Phase	68.2% range (yr BC)	95.4% range (yr BC)
N5	3047 - 2688	3197 - 2539
ED	2556 - 2360	2698 - 2228

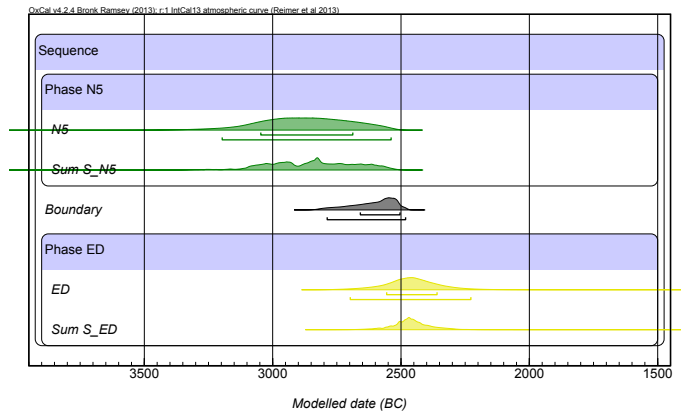
of the Ninevite 5 culture, we can see that it closely corresponds to the onset of the Late Uruk period in Southern Mesopotamia. The appearance of Ninevite 5 material at Brak, occurring during or right after Phase J, occurs much later than at Leilan.

**Early Dynastic (EJ III)** The “Early Dynastic” period of the Jezirah displays further complications. At Leilan, the beginning of the IIa period (and probably IIIId) correspond with the appearance of the Fara-period texts in Southern Mesopotamia. Brak Phase L, on the other hand, appears to have begun during or shortly after the onset of ED IIIb, i.e. most likely immediately after the construction of the Royal Cemetery of Ur. The date for the transition from the Ninevite 5 to ED at other Syrian sites, though relatively imprecise, seems to correspond best to the Leilan IId-IIa phases rather than Brak L or ED IIIb in Southern Mesopotamia which, again, stand out as slightly later.



Graph 46: Calibrated dates for Tell Khuera, Tell Ziyadeh, Kazane Höyük, Tell Mozan, Tell Raqa'i and Tell Kuran.

**Akkadian and Post-Akkadian (EJ IV/V)** The dates for the beginning and end of the Akkadian presence at Leilan, Brak, and Beydar are plotted in **Graph 51**. Leilan remains our most reliable estimate for these events due to the large number of available dates and high precision, and are consistent with the less precise dates from Brak. As described in **Section 7.7**, the two Beydar estimates are problematic. The estimate derived from the Field F samples corresponds relatively well with the Leilan and Brak dates, while the Field B samples seem to place the transition around the same time as the beginning of the ED IIIb in Southern Mesopotamia, making

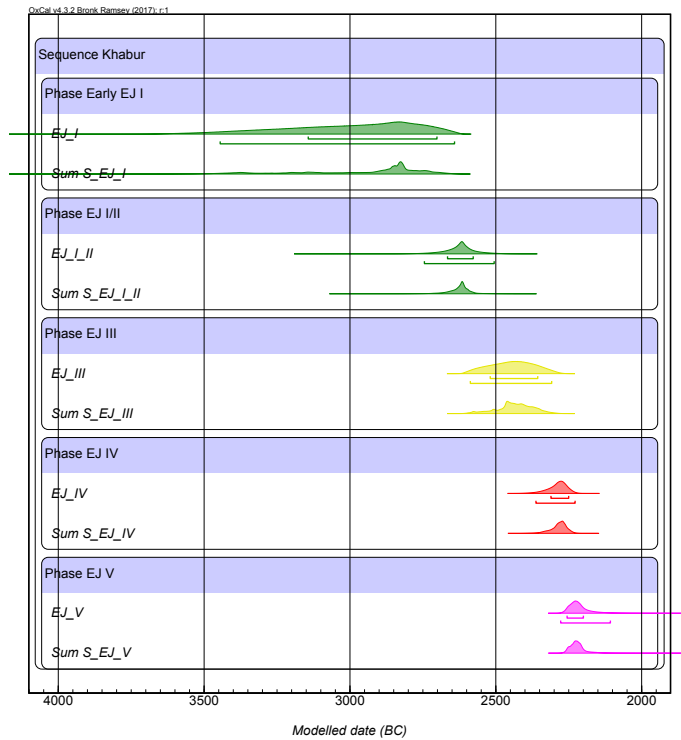


Graph 47: Master sequence for the sites in the Khabur River valley.

	Brak	Leilan		Beydar	
EJ I	J	IIIa	IIIb		
EJ III	K	IIIc	IIId	II-IIIa	
EJ III	L	IIa		IIIa-IIIb	IIIb
EJ IV	M	IIb		Akkadian	
EJ V	N	IIc			

Graph 48: A schematic representation of the master sequence Bayesian model for Syrian Jezirah.

it highly implausible. If we accept the Leilan, Brak, and Beydar Field F dates as accurate estimates for the beginning of the Akkadian period in the Jezirah, one may try to interpret them in a historical context. The four main historical dates for the 1<sup>st</sup> year of Sargon suggested in the literature have been plotted in **Graph 51**. Regardless of whether one considers “Sargon 1” as the date of his birth or ascension to the throne, the archaeological signature of the Akkadian must surely post-date this event. Even more so when one considers the city-states of the Jezirah, where the Akkadian conquest was likely to have occurred some time after the consolidation of the empire in Southern Babylonia. Despite the large uncertainties of these dates, it is evident that only the High and Middle Chronologies fulfil this condition, i.e.



Graph 49: Master sequence for the archaeological periods in the Syrian Jezirah.

they predate 2300 BC. Given that the scholarly debate focused on deciding between the Middle Chronology in its different variants on the one side and the Low or New Chronologies on the other, it seems that the date estimates provided here offer yet another argument in favour of the Middle Chronology.

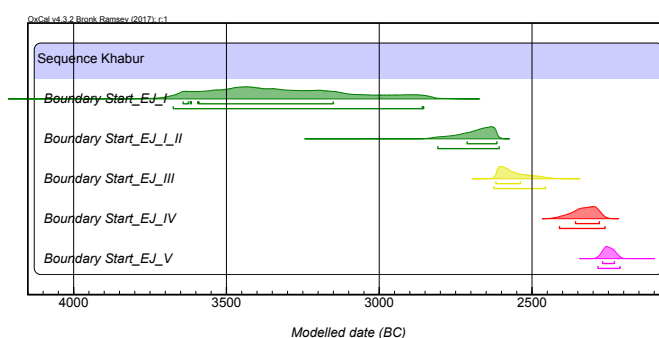
**Master sequence** The first thing which becomes evident is that the EJ I date is heavily skewed by the inclusion of Leilan IIIa dates, which fall in the 3500-3000

Table 18: Calibrated date estimates (*Date()* function) for the archaeological phases in the Syrian Jezirah.

Phase	68.2% range (yr BC)	95.4% range (yr BC)
EJ I	3144 - 2702	3445 - 2642
EJ III	2666 - 2578	2745 - 2506
EJ III	2520 - 2357	2588 - 2309
EJ IV	2311 - 2251	2363 - 2229
EJ V	2256 - 2200	2278 - 2108

Table 19: Calibrated estimates (*Boundary()* function) for the beginning dates of the archaeological phases in the Syrian Jezirah.

Phase	68.2% range (yr BC)	95.4% range (yr BC)
EJ I	3144 - 2702	3445 - 2642
EJ III	2666 - 2578	2745 - 2506
EJ III	2520 - 2357	2588 - 2309
EJ IV	2311 - 2251	2363 - 2229
EJ V	2256 - 2200	2278 - 2108

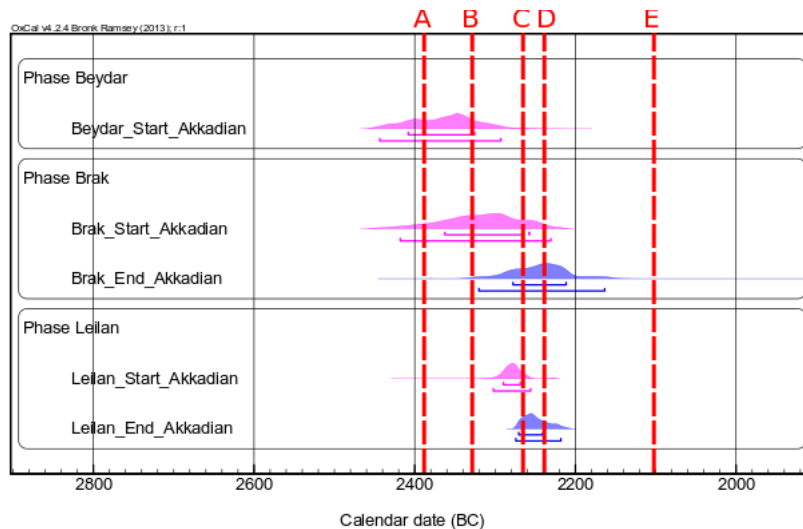


Graph 50: Boundary estimates for the archaeological periods in the Syrian Jezirah.

BC range. This would suggest that the Ninevite 5 period could have lasted for an extremely long time, ca. 3400-2600 BC. The final stages of the Ninevite 5 (EJ 2), equivalent to the “second urban revolution”, was, by comparison, extremely short. The onset of the Early Dynastic period most likely occurred before 2500 BC, which suggests that development was independent, rather than following the establishment of the Sumerian city-states in the south.

## 7.10 Susa and Farukhabad

Dates from Susa and Farukhabad are shown in **Graph 52** and **Table 20**. The table also lists the *Boundary()* estimate for the transition between levels 21 and 22 in the “Chantier de la haute terrasse” at Susa. As described in **Section 6.2**, this transition is likely to correspond with the onset of the Susa II period, i.e. the beginning of the Uruk influence in the Susiana plain. The date seems remarkably early, falling

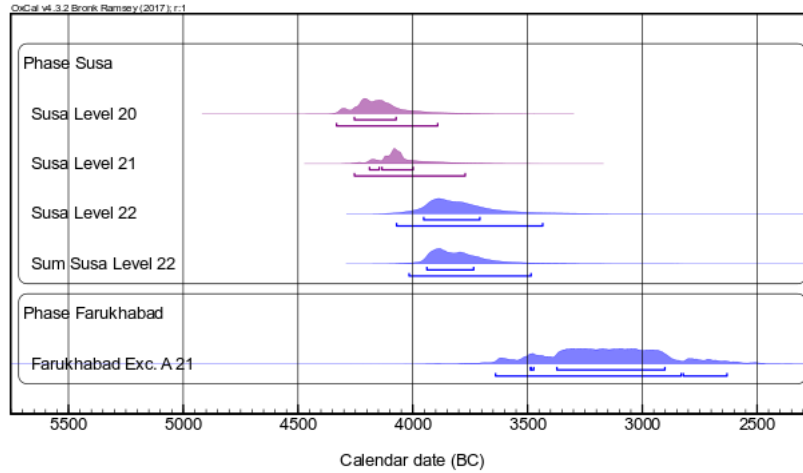


Graph 51: Estimates for the beginning and end of the Akkadian period at Tell Beydar, Tell Brak and Tell Leilan. The dotted red lines represent historical events: A) Sargon 1 High Chronology (2390 BC); B) Sargon 1 Middle Chronology (2335 BC); C) Sargon 1 Low Chronology (2270 BC); D) Sargon 1 New Chronology (2239 BC); E) Ur-Namma 1 Middle Chronology (2110 BC).

somewhere between ca. 4000 BC and 3700 BC. The suggestion of an early date for the beginning of Susa II period is reinforced by the supposedly contemporary date from Farukhabad. Despite its imprecision, the Farukhabad date can surely be placed in the second half of the 4<sup>th</sup> mill. BC, and thus most likely represent Late rather than Middle Uruk.

Table 20: Calibrated date estimates (*Date()* and *Boundary()* functions) for the archaeological sequences at Susa and Farukhabad.

Site	Context/Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Susa	Level 20	4255 - 4073	4333 - 3892
Susa	Level 21	4189 - 3999	4255 - 3772
Susa	Boundary 21/22	4087 - 3882	4168 - 3736
Susa	Level 22	3953 - 3708	4071 - 3435
Farukhabad	Exc. A 21	3488 - 2902	3640 - 2632



Graph 52: Calibrated dates for the contexts at Susa and Farukhabad

Table 21: Calibrated date estimates (*Date()* function) for the archaeological phases at Tal-i Malyan.

Phase	68.2% range (yr BC)	95.4% range (yr BC)
Early Banesh	3574 - 3060	3998 - 2985
Middle Banesh	3132 - 2959	3251 - 2888
Late Banesh	2995 - 2440	3058 - 1978
Kaftari	2066 - 1632	2560 - 1481

## 7.11 Tal-i Malyan

**Individual sequences** Graph 53 shows the summarised dates from individual sequences at the site. The single date assigned to the early Banesh from ABC is consistent with our estimates for the Late Uruk. The Middle Banesh contexts from ABC are consistent with those from TUV. With the Late Banesh period, the situation becomes slightly more problematic. The city gate By8 samples, although coming from similar contexts, seem to fall on both sides of the 3000 BC point, thus are potentially contemporary with the Middle Banesh. The Kaftari dates from ABC and GGX seem to cover a long period of time, spanning from the second half of the 3<sup>rd</sup> into the first half of the 2<sup>nd</sup> mill. BC. Inspecting the difference between the *Date()* and *Sum()* estimates for the date of the ABC sequence clearly demonstrates the hiatus

Table 22: Calibrated estimates (*Boundary()* function) for the start dates of the archaeological phases at Tal-i Malyan.

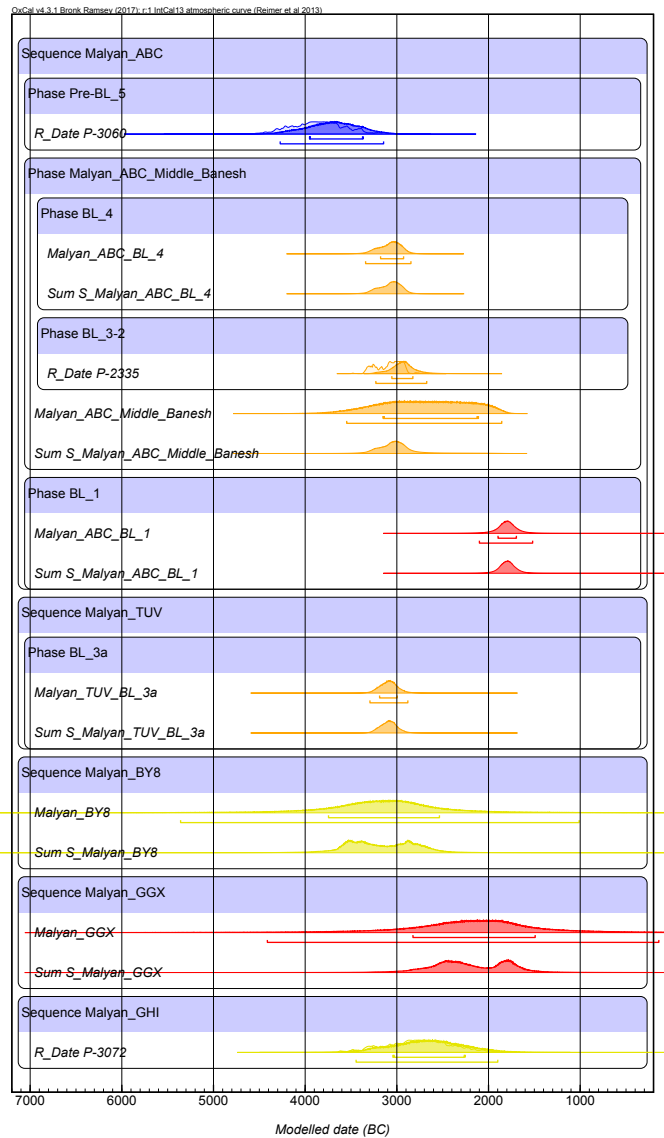
<b>Boundary</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Start Early Banesh	3901 - 3075	5083 - 2975
Start Middle Banesh	3215 - 3019	3323 - 2952
Start Late Banesh	3070 - 2900	3186 - 2796
Start Kaftari	2653 - 1768	2835 - 1750

in occupation between the Middle Banesh (B.L. 4-2) and Kaftari (B.L. 1) contexts, confirming the theory that ABC was not used during the Late Banesh phase.

**Averaged results** **Graph 54** and **Table 21** shows the results of a generalised model for the entire site, and the date estimates for the start *Boundary()* functions are presented in **Graph 55** and **Table 22**. What is striking about these figures is that the Middle Banesh dates seem to cluster ca. 3100-3000 BC, potentially representing a short period of time. On the other hand, while the Late Banesh samples also seem to indicate the 3000 BC date point, the results point to a period of about 300-500 years (until ca. 2500-2000 BC) between the last Late Banesh and the earliest Kaftari contexts. It is therefore prudent to ask whether the hiatus observed in the ABC sequence was a site-wide phenomenon, with contexts such as By8 or GHI, originally assigned to the Late Banesh period, in fact merely final stages of the Middle Banesh activity prior to a lengthy disruption in the occupation.

## 7.12 Kureh, Spid, Norabad

**Individual sequences** The dates for the three smaller sites in the Fars province belonging to the Lapui-Banesh-Kaftari cultural sequence were modelled separately and the results shown in **Graph 56**. The issue of the transition from the Lapui to Banesh is difficult to discern, considering that the Tol-i Spid sequence contained no context which could be assigned to the Early Banesh phase, as was the case for the other sites. Nonetheless, it seems fair to say that we can see the transition occurring



Graph 53: Calibrated dates for the contexts at Tal-i Malyan.

at different times across the three sites. Whilst the first Banesh ceramics seem to appear at Spid around, or even before, ca. 3500 BC, Lapui and transitional cultures continue well into the second half of the 4<sup>th</sup> mill. BC at the other two sites. Moreover, the Kaftari dates from Tol-i Spid demonstrate quite well that the period was a lengthy one, spanning late 3<sup>rd</sup> and probably much of the first half of the 2<sup>nd</sup> mill. BC.

Table 23: Calibrated date estimates (*Date()* function) for the archaeological phases in the Fars region.

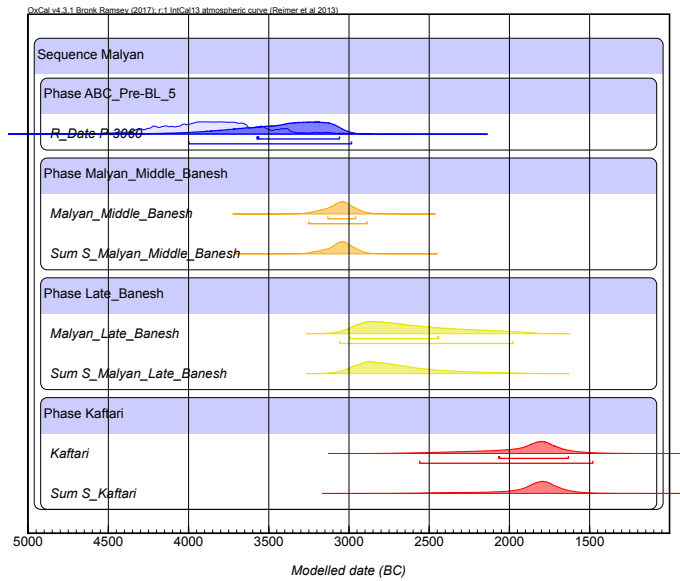
<b>Phase</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Lapui	3829 - 3567	4043 - 3417
Lapui-Banesh Transitional	3522 - 3331	3590 - 3218
Early Banesh	3324 - 3138	3385 - 3054
Middle Banesh	3151 - 2979	3256 - 2906
Late Banesh	2939 - 2362	3038 - 2055
Kaftari	2013 - 1640	2340 - 1516

Table 24: Calibrated estimates (*Boundary()* function) for the start dates of the archaeological phases in the Fars region.

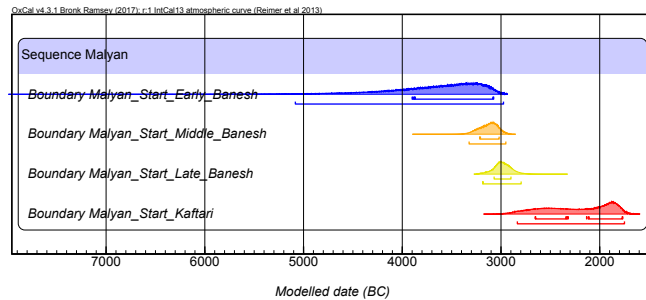
<b>Boundary</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Start Lapui	3989 - 3730	4274 - 3674
Start Lapui-Banesh Transitional	3614 - 3394	3672 - 3362
Start Early Banesh	3404 - 3228	3458 - 3114
Start Middle Banesh	3231 - 3046	3316 - 3001
Start Late Banesh	3079 - 2904	3192 - 2809
Start Kaftari	2939 - 2362	3038 - 2055

Table 25: Calibrated date estimates (*Interval()* function) for the duration of archaeological phases in the Fars region.

<b>Period</b>	<b>68.2% range (yr BC)</b>	<b>95.4% range (yr BC)</b>
Lapui	169 - 430	88 - 626
Lapui-Banesh Transitional	98 - 316	4 - 396
Early Banesh	50 - 251	0 - 333
Middle Banesh	33 - 239	0 - 360
Late Banesh	654 - 1074	312 - 1177
Kaftari	299 - 704	215 - 1063

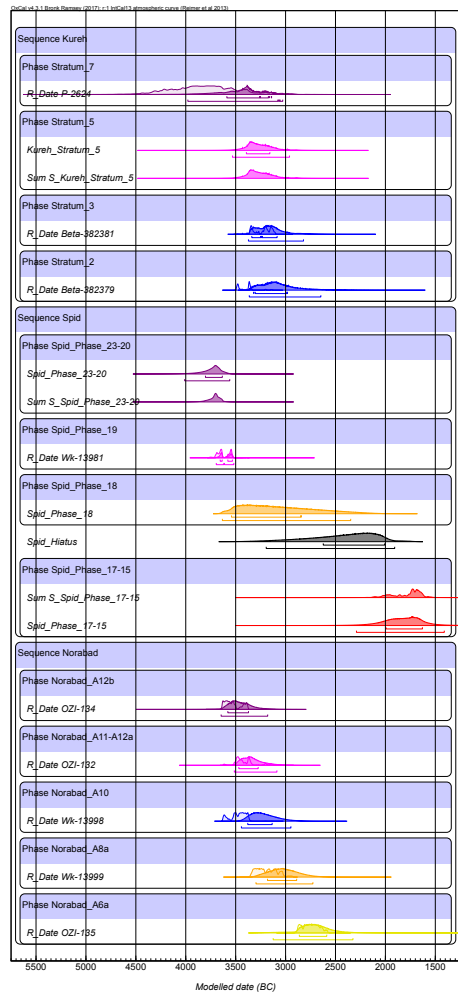


Graph 54: Master sequence for the archaeological phases at Tal-i Malyan.



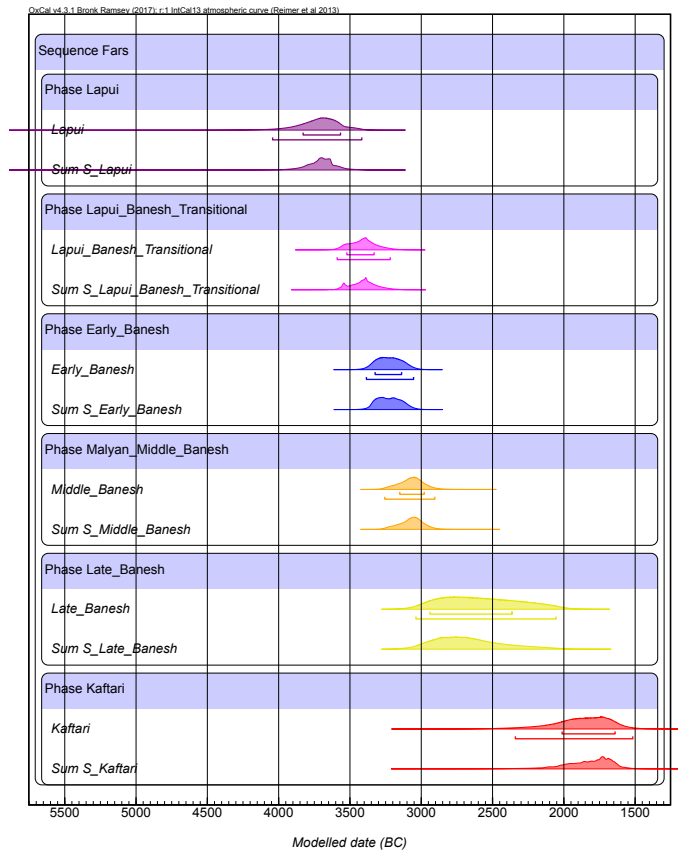
Graph 55: Boundaries for the archaeological phases at Tal-i Malyan.

**Fars master sequence** As discussed above, given the significant gaps in the local sequences, discerning cultural patterns in the Fars region runs into multiple problems. Therefore, the dates from Malyan, Kureh, Spid, and Norabad were placed in a single sequence model, and the results are shown in **Graph 57**, **Table 23**, **Table 24**, and **Graph 58**. A quick inspection of the graphs allows to draw some pertinent conclusions. Firstly, the all-important Middle Banesh period, corresponding to the Proto-Elamite culture, started around 3100 BC and in all probability ended by ca. 3000 BC. This short timespan should be contrasted with the succeeding Late Banesh period, which spanned most of the first half of the 3<sup>rd</sup> mill. BC. Unfortunately, the

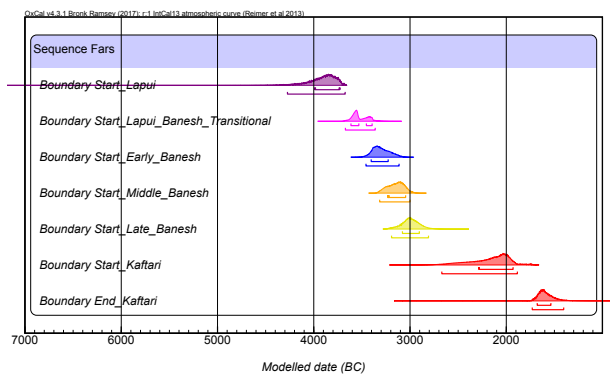


Graph 56: Calibrated radiocarbon dates for the contexts at Tal-i Kureh, Tol-i Spid, and Tol-i Norabad.

uncertainty associated with the Banesh-Kaftari transition does not allow us to say when it happened with any precision. Nonetheless, the emerging pattern is clear: the cultural developments in the region can be subdivided into three main phases based on the pace of cultural developments. Firstly, the Lapui-Middle Banesh phase consisted of a sequence of rapidly developing cultural complexes. Hence, the Late Banesh phase most likely represented a period of long-lasting stabilisation. Finally, the Kaftari culture, with its numerous novel features, replaced the previous order for about half a millennium. This point is further reinforced by the estimates for the *Interval()* functions, showing the durations of the phases (see **Graph 59** and

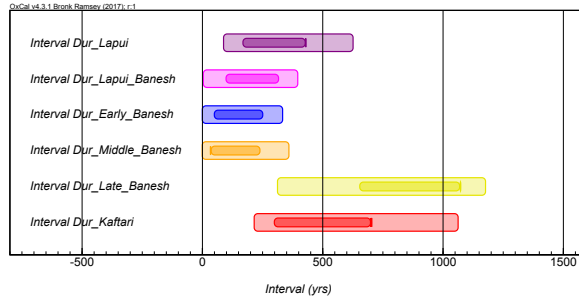


Graph 57: Master sequence for the archaeological phases in the Fars region.



Graph 58: Boundaries for the archaeological phases in the Fars region.

Table 25).



Graph 59: Duration estimates for the archaeological phases in the Fars region.

Table 26: Calibrated date estimates (*Date()* function) for the archaeological phases at Tepe Yahya.

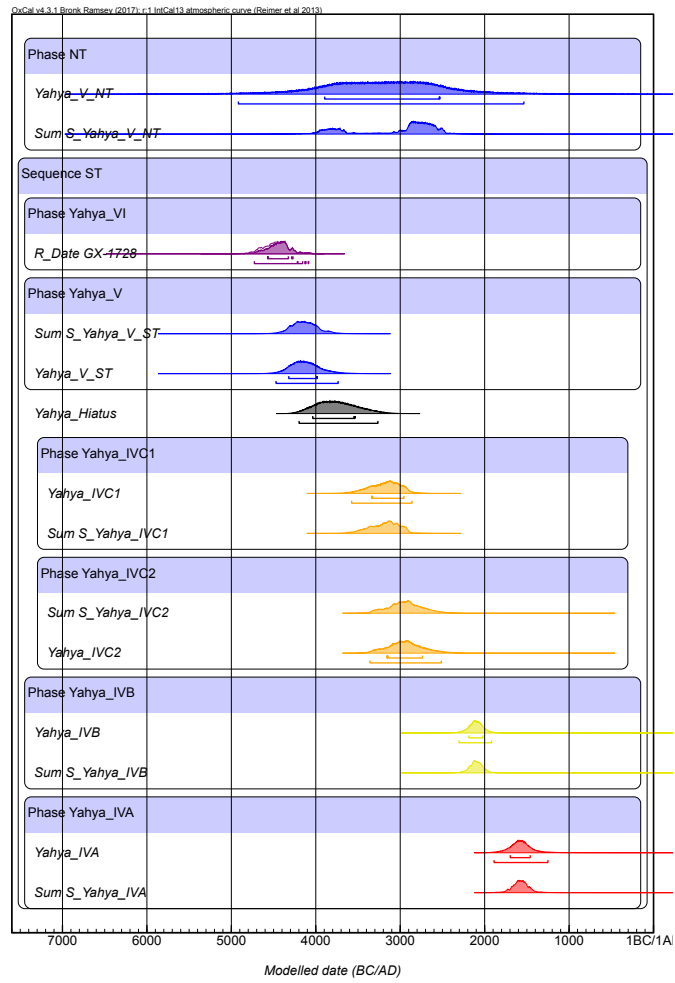
Context/Phase	68.2% range (yr BC)	95.4% range (yr BC)
NT Yahya V	3895 - 2531	4917 - 1536
ST Yahya VI	4570 - 4270	4728 - 4084
ST Yahya V	4321 - 3984	4472 - 3735
ST Yahya IVC1	3339 - 2957	3576 - 2861
ST Yahya IVC2	3155 - 2736	3358 - 2513
ST Yahya IVB	2187 - 2021	2303 - 1919

## 7.13 Tepe Yahya and Konar Sandal

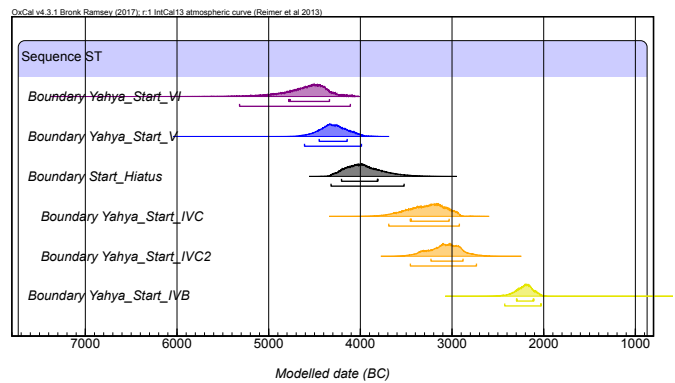
**Tepe Yahya** The dates from the North (NT) and South Trenches (ST) were modelled separately and are depicted in **Graph 60** and **Table 26**. As visible, the model follows the suggestion of Potts 2001 to split IVC into two consecutive periods. The first thing which becomes apparent is that the two sequences can in no way be synchronised. The North Trench dates, supposedly dating to Yahya V, are spread across

Table 27: Calibrated estimates (*Boundary()* function) for the start dates of the archaeological phases at Tepe Yahya.

Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Start Yahya VI	4782 - 4337	5318 - 4109
Start Yahya V	4450 - 4144	4610 - 3988
Start Yahya IVC1	3456 - 3032	3691 - 2920
Start Yahya IVC2	3230 - 2880	3455 - 2734
Start Yahya IVB	2297 - 2109	2426 - 2029



Graph 60: Calibrated radiocarbon dates for the contexts at Tepe Yahya.



Graph 61: Boundary estimates for the contexts at Tepe Yahya.

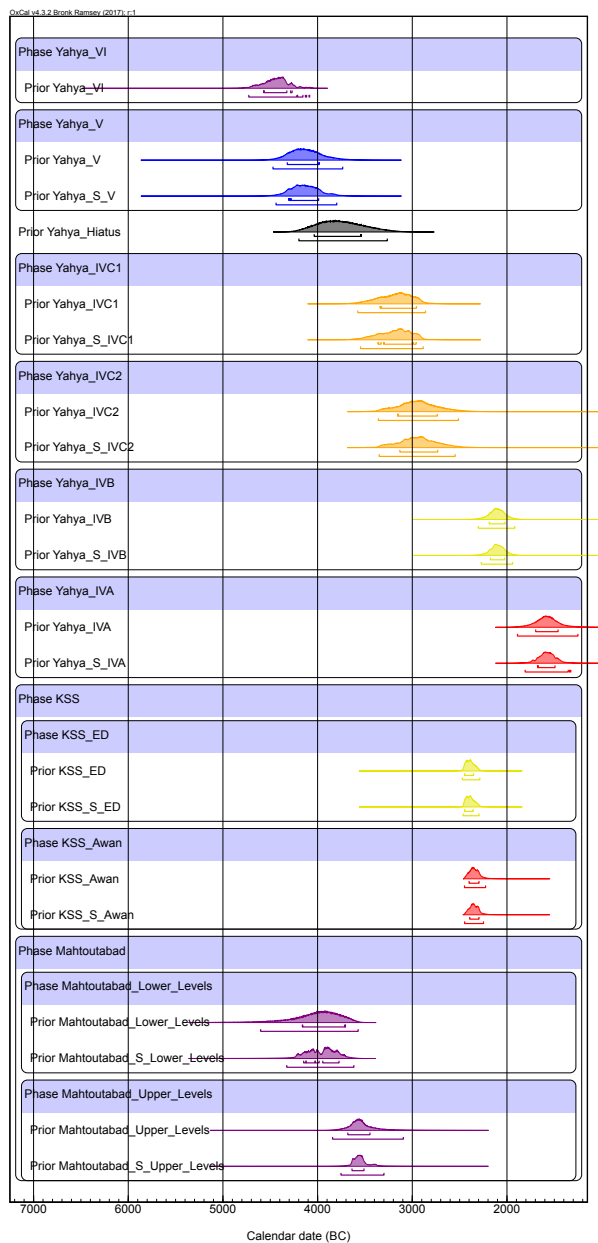
Table 28: Calibrated date estimates (*Date()* function) for the archaeological phases of the Konar Sandal complex.

Site	Context/Phase	68.2% range (yr BC)	95.4% range (yr BC)
Konar Sandal South	ED	2448 - 2354	2471 - 2287
Konar Sandal South	Awan	2401 - 2296	2449 - 2226
Mahtoutabad	Lower Levels	4161 - 3706	4603 - 3572
Mahtoutabad	Upper Levels	3682 - 3447	3842 - 3095

a long period of time, clustering between ca. 3700 BC and 2700 BC. Both of these dates are too young for the pre-Uruk contexts, therefore only the South Trench dates will be considered. The start *Boundary()* estimates for the South Trench sequence are shown in **Graph 61** and **Table 27**. The date and span of the hiatus, corresponding to the Aliabad phase at other Kerman sites and Late Uruk period elsewhere, falls within the expected range. The beginning of IVC phase, equated with the Proto-Elamite culture, is placed before 3000 BC, roughly corresponding to the Jemdet Nasr period in Southern Mesopotamia. Interestingly, the subphase IVC2, believed to have corresponded to the infilling of the Proto-Elamite structure, occurs around the 3000 BC point. But perhaps the most notable result is the date for IVB. Originally believed to have been ED IIIa/b in date due to the large number of chlorite bowls, the readings for the contexts seem to consistently point to a later, Akkadian or post-Akkadian date.

**Konar Sandal** The summarised modelled dates from Konar Sandal can be found in **Table 28**. The first main conclusion which can be drawn from the results is that the Mahtoutabad I covers a long period ca. 4100-3300 BC. This would encroach well onto what one would expect to be the Uruk presence at the site. Unfortunately, without any radiocarbon dates for the contexts containing Uruk ceramics, it is impossible to say at what point the transition from pre- to Uruk phases occurred. Secondly, the two radiocarbon dates from the Awan Dynasty period appear to be surprisingly early, potentially predating 2250 BC. This would suggest that, according to the Middle

Chronology, they would correspond to the beginning of the Akkadian period, and would thus represent the very first phase of the period.



Graph 62: Comparison of radiocarbon dates for the Jiroft region.

**Jiroft Comparison** Graph 62 shows the comparison of dates from Yahya and the Konar Sandal sequence. The most obvious mismatch is the aforementioned late date of Mahtoutabad I. It becomes evident that these contexts correspond to the hiatus

Table 29: Calibrated date estimates (*Date()* function) for the archaeological phases at Godin Tepe and Hasanlu.

Site	Phase	68.2% range (yr BC)	95.4% range (yr BC)
Godin	Oval Complex (VI/V)	3354 - 3110	3367 - 3096
Godin	Post Oval (VI/V)	3337 - 3067	3351 - 3020
Godin	Hiatus	3090 - 2855	3204 - 2741
Godin	IV	2880 - 2682	2969 - 2607
Godin	III:6	2680 - 2531	2844 - 2498
Godin	III:5	2658 - 2500	2840 - 2474
Hasanlu	VII	2608 - 2431	2779 - 2268

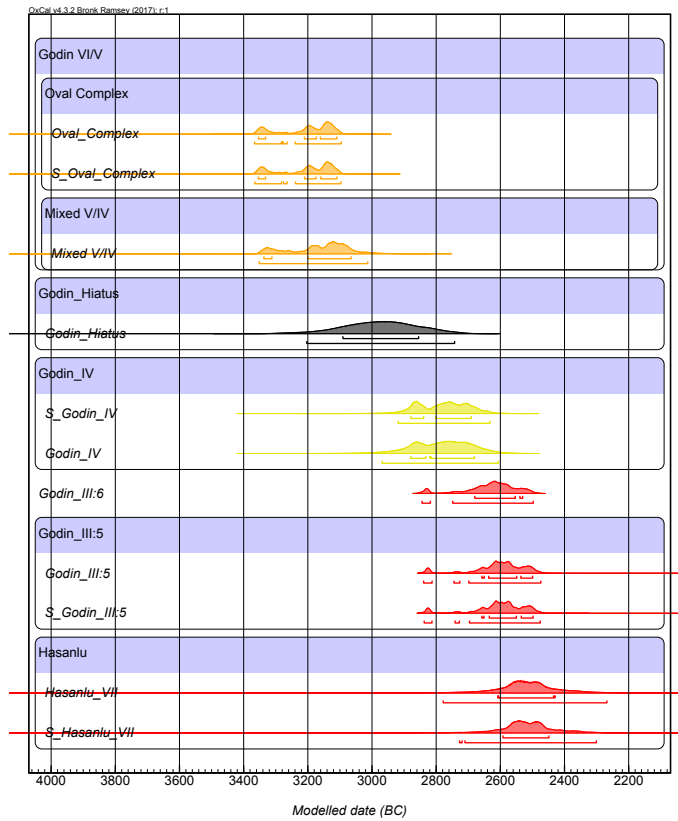
Table 30: Calibrated estimates (*Boundary()* function) for the start dates of the archaeological phases at Godin Tepe.

Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Start IV/V	3394 - 3130	3589 - 3105
Start Hiatus	3090 - 2855	3204 - 2741
Start IV	2965 - 2758	3081 - 2684
Start III:6	2840 - 2598	2864 - 2555
Start III:5	2666 - 2511	2842 - 2489

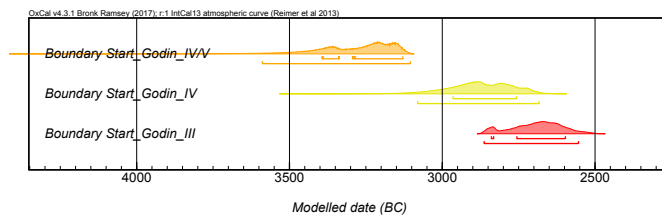
in the Yahya sequence, contemporary with the Aliabad (Late Uruk) phase. Assuming that the Mahtoutabad I dates are reliable, it would appear that the succeeding Mahtoutabad II phase, containing the earliest bevelled-rim bowls, corresponded to the Proto-Elamite/Jemdet Nasr phases. The Konar Sandal dates, on the other hand, fall into the gap between Yahya IVC and Yahya IVB. Should the radiocarbon dates be reliable, this would imply that Yahya was relative latecomer to the cultural and political developments in the Jiroft region during the 3<sup>rd</sup> mill. BC.

## 7.14 Godin Tepe and Hasanlu

**Averaged results** The master sequence for Godin Tepe is illustrated in **Graph 63** and **Table 29**, while the start *Boundary()* estimates are shown in **Graph 64** **Table 30**. The estimates are weakened by a considerable degree of imprecision. Nonetheless, certain general observations can be made. Firstly, it is important to



Graph 63: Master sequence for the archaeological phases at Tepe Godin.



Graph 64: Boundary estimates for the archaeological phases at Tepe Godin.

note that dates for the Godin VI/V Oval Complex, usually taken as a prime example of Late Uruk architecture outside of Mesopotamia proper, cluster around and after ca. 3200 BC, which would place it the final stages of Uruk IV, and potentially even Jemdet Nasr. Secondly, the modelled dates seem to indicate that the hiatus between final Uruk covers the 3000 BC. This can be compared to the apparent break between the Jemdet Nasr and Early Dynastic I/II dates in Southern Mesopotamia

Table 31: Calibrated estimates (*Date()* and *Boundary()* functions) for the dates of the archaeological phases in the Sialk region, based on the radiocarbon samples from Tepe Ghabristan and Arisman.

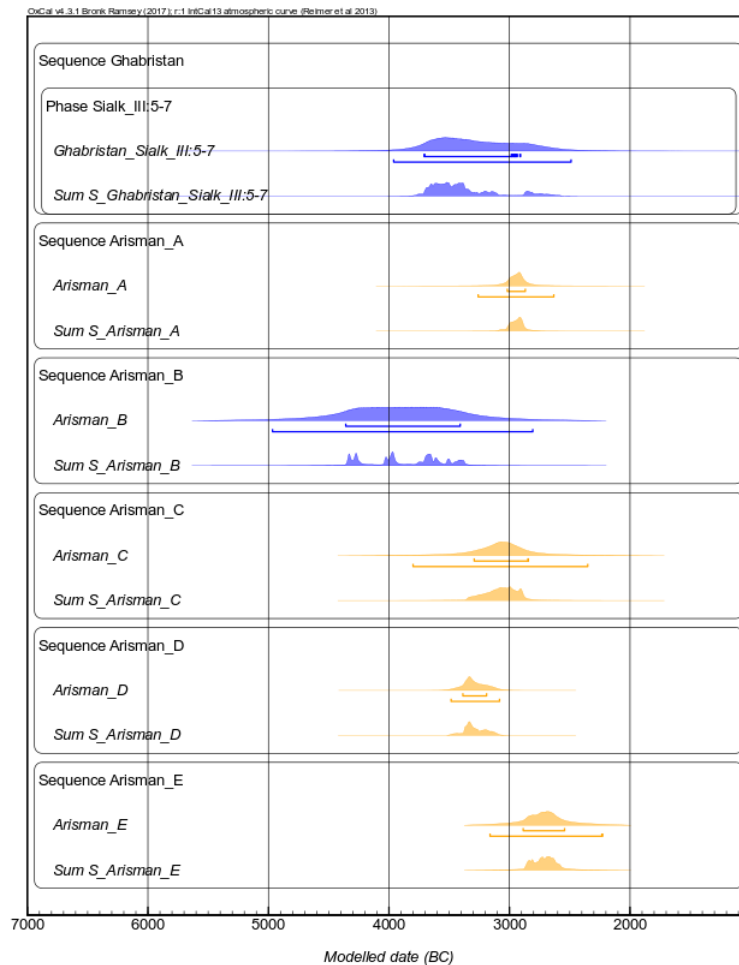
Phase/Boundary	68.2% range (yr BC)	95.4% range (yr BC)
Sialk III	3671 - 3328	3900 - 3179
Start Sialk IV	3351 - 3203	3421 - 3087
Sialk IV	3177 - 2823	3314 - 2697

(Section 7.4). Thirdly, the date of Godin III:6, believed to have been roughly contemporary with the earlier part of the ED IIIb in Southern Mesopotamia appears remarkably early, with its median around 2600-2650 BC, making it roughly contemporary with the Royal Cemetery of Ur. Nonetheless, the rough Middle Chronology estimates for the rule of the Ur-Nanše dynasty do fit within the  $2\sigma$  uncertainty range. The Hasanlu dates for phase VII have been shown for comparison. Despite their imprecision, it is apparent that they correspond well with Godin III:5, corroborating the archaeological dating.

## 7.15 Tepe Ghabristan and Arisman

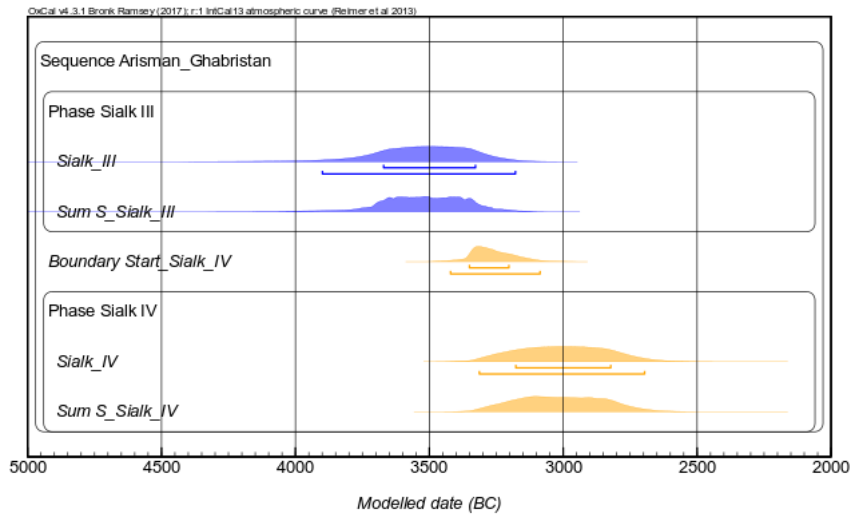
**Individual sequences** In Graph 65, the individual contexts of Arisman and Ghabristan were modelled separately. It becomes evident that there is a considerable degree of differences in the age of contexts assigned to the same phases. For example, while the Sialk III dates from Ghabrestan seem to fall in the final stages of the period, while Arisman B samples represent quite a long period of time, spanning the second half of the 5<sup>th</sup> and the first half of the 4<sup>th</sup> mill. BC. Similarly, the Sialk IV (post-Uruk, Proto-Elamite) contexts at Arisman extend from the late 4<sup>th</sup> to the early 3<sup>rd</sup> mill. BC.

**Summarised results** Notwithstanding these complications, the dates of Ghabristan and Arisman allow for the construction of a single master sequence composed of two phases (Sialk III and Sialk IV). The agreement index for the model narrowly



Graph 65: Calibrated radiocarbon dates for the contexts at Arisman and Tepe Ghabristan.

passes the robustness test ( $A^{\text{model}} = 60.1\%$ ). The single date which negatively influenced the agreement index was Gif-10409 (with 100% chance of being an outlier according to the outlier analysis). The summarised results for the two phases, as well as the calculated transitional *Boundary()* are shown in **Graph 66** and **Table 31**. Unfortunately, the imprecision of these readings does not allow to pinpoint the transition between Sialk III and Sialk IV, placing it vaguely in the mid-4<sup>th</sup> mill. BC.

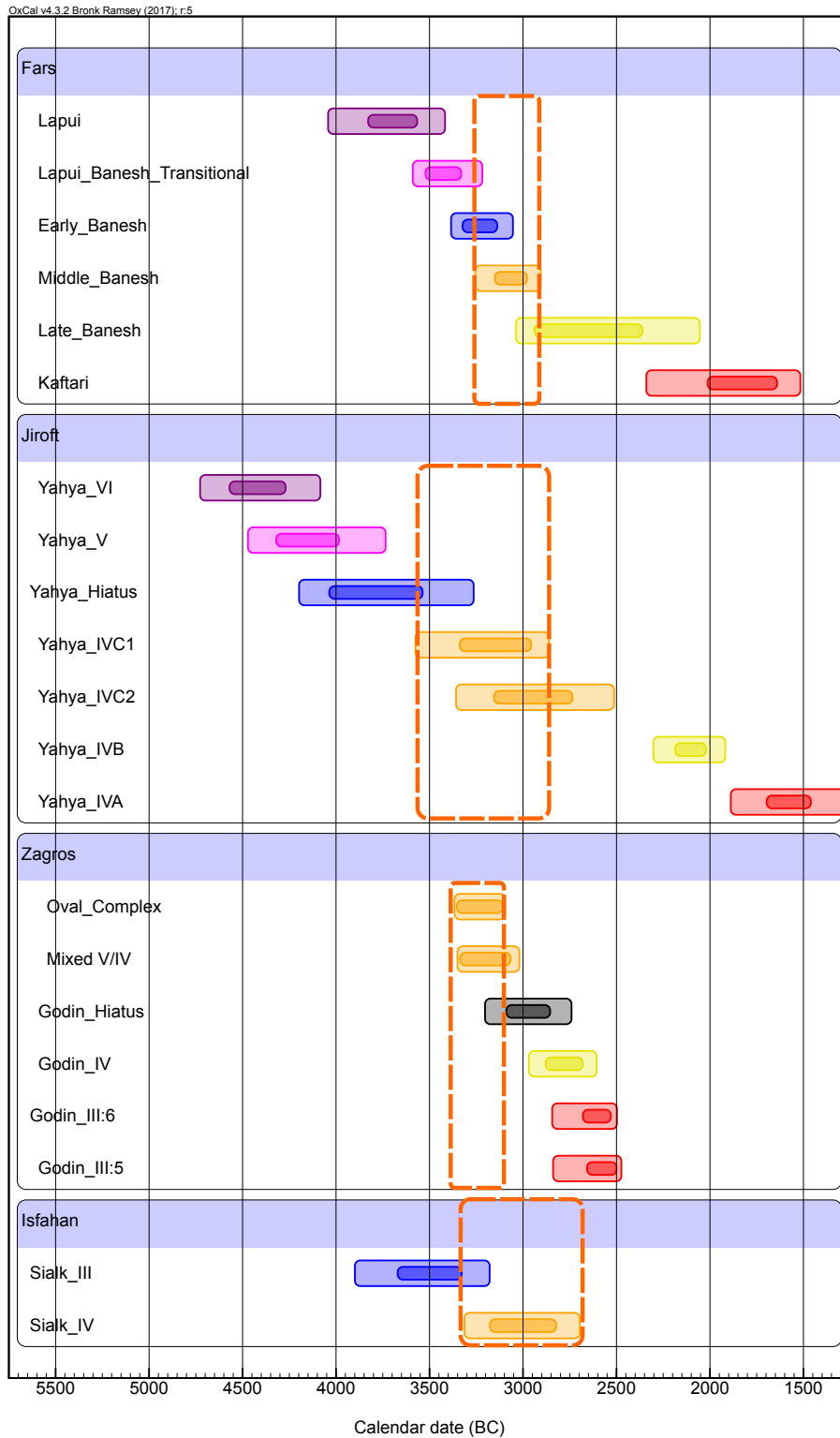


Graph 66: Master sequence for the archaeological phases in the Isfahan region.

## 7.16 Iran Master Sequence

**General comparison** The summarised results for the main archaeological sequences for four different regions in Iran have been represented in **Graph 67**. The main focus of this investigation is cross-dating the Uruk- and Proto-Elamite-yielding contexts. The orange boxes highlight the dates for contexts containing inscribed tablets, both numerical and Proto-Elamite. Before any meaningful analysis can be performed, it is important to keep in mind that the sequences are imperfect, and the date estimates are based on a relatively small number of dates. That being said, one important pattern which emerges from the graph is that the emergence (and potentially end) of the prehistoric Iranian civilisation can be placed within a relatively short period of time spanning 3500-3000 BC. The only exception is the Sialk IV estimate. Nonetheless, it is pertinent to mention that this estimate has been derived from the samples recovered from the sites of Ghabristan and Arisman, which did not yield any tablets, and were indirectly linked to the Sialk sequence. The Yahya sequence dates clearly demonstrate that, despite the similarities in archaeological material between phases IVC and IVB, there is a significant separation between the Proto-Elamite and the Early Dynastic contexts. The other important point, already

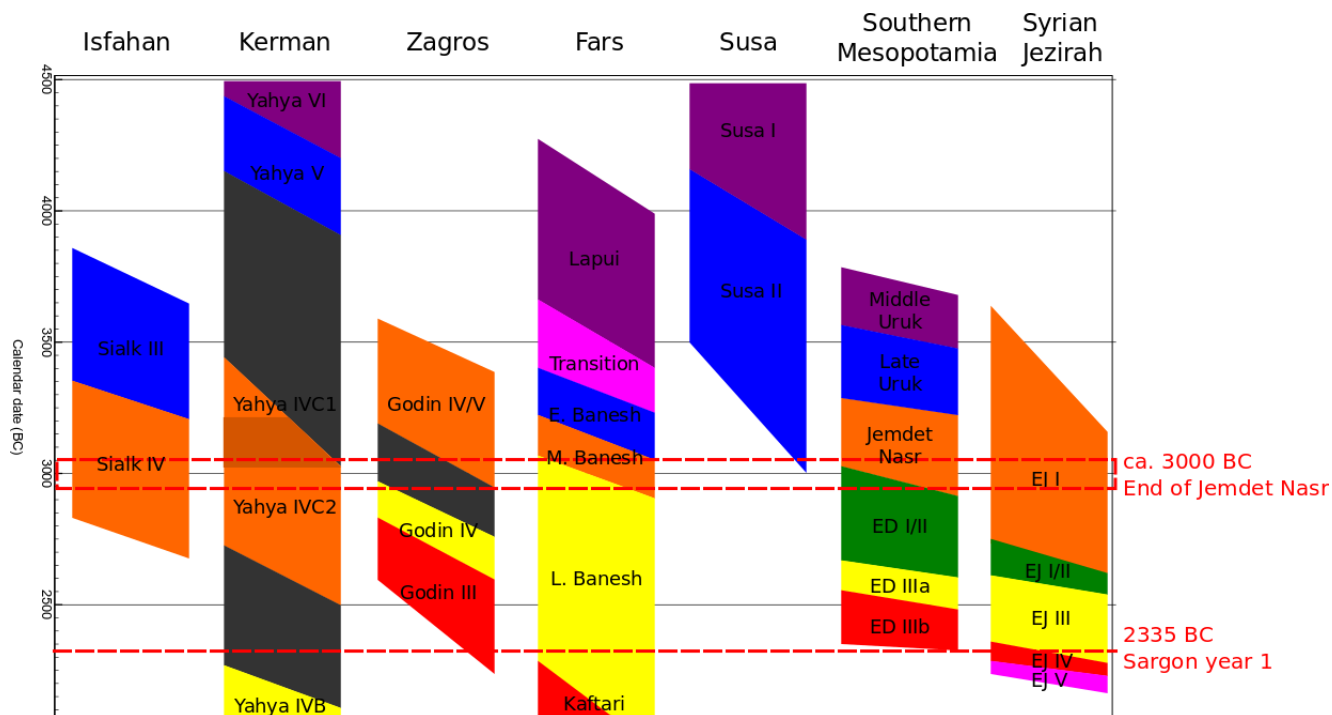
noted by Petrie 2014 (pp. 148-151), is that the Proto-Elamite contexts in the Malyan and Yahya sequence seem to be contemporary or immediately follow the Godin VI/V Oval Complex, traditionally placed in the Late Uruk category. Petrie's interpretation was to suggest that the Proto-Elamite culture originated in the Susiana region while the "Late Uruk" colonies still thrived in Syria and Iran. This interpretation was based on the *a priori* dating of the Late Uruk period to span ca. 3500-3200 BC. However, given the new <sup>14</sup>C information from Southern Mesopotamian contexts, this proposition is no longer tenable. Though by no means certain, the safest assumption is to equate the Proto-Elamite culture, as well as at least some "Iranian Late Uruk" contexts, with the Jemdet Nasr in Southern Mesopotamia.



Graph 67: Comparison of radiocarbon dates for contexts across Iran. The orange boxes approximate the span of the Proto-Elamite culture.

# Chapter 8

## Conclusions, Discussion and Evaluation



Graph 68: Master <sup>14</sup>C chronology for Southern Mesopotamia, Syrian Jezirah and Iran. The overlapping areas represent the uncertainties of the *Boundary()* dates within  $1\sigma$  (68.2% certainty). The Yahya IVC2/IVC1 transition proved difficult to date, and is the uncertain area is marked with a darker colour. Dark gray areas represent hiatuses.

## 8.1 Theoretical Considerations

With the results described above, it strikes me as important to consider some theoretical and methodological issues which present themselves. The patterns identified in the data have to be interpreted within the framework of all the assumptions made during the investigation. These assumptions can be pictured as pillars on which the whole argument rests. It so happens that the pillar which is the most crucial to the structural integrity of the argument is, at the same time, the most shaky. This pillar is also one of the most burning problems in archaeological theory in general. I am referring to the process of defining the units of archaeological inquiry: sites, assemblages, cultures, periods, horizons, etc. It is by no means obvious if such spatio-temporal units should be defined according to the presence or absence of individual “type fossils”, or perhaps follow the Clarkeian statistical method of defining assemblages based on relative frequencies of archaeological types (Clarke 1968). As stated in **Section 3.1.1**, this project has purposefully avoided getting too embroiled in such methodological discussions, by adopting a reductionist approach closer to the former of the two ends of the spectrum. In order to address the various problems associated with this approach (regional traditions, different types of objects evolving at a different pace, holdovers etc. see e.g. Gibson and McMahon 1997: 10-11), the analysis operated with individual contexts and soundings as basic units of comparison. The problem of defining a “Late Uruk” culture was circumvented by discussing “Abu Salabikh Late Uruk” as a separate entity to “Nippur Late Uruk”. Instead of arguing about the chronological value of seal glyptics as opposed to pottery, the analysis is interested solely in the sequence of contexts from which the radiocarbon samples were collected.

This approach can be seen as a logical next step in the development of archaeological praxis which, since at least the 1960’s, was to move away from sweeping generalisations about the fate of tribes, nations, races, and empires, and instead focused on

the under-represented facets of the ancient communities. The new developments in the archaeological theory show this tendency: the move away from ritual and elite contexts to settlement archaeology, the study of past economies through palaeobotany and palaeozoology, the interest in core-periphery interactions, finally including feminist and queer theory approaches. In theory, every new set of data and every new perspective enriches our understanding of the past. In practice, however, these studies have to attempt to link their findings to some sort of an overarching narrative lest they become irrelevant collections of highly specific information, akin to Victorian cabinets of curiosities. Similarly, this chronological project could not escape the dangers associated with the creation of typological periodisations. In fact, the very process of Bayesian modelling relied heavily on said methodology. Should that be the case, how is one to interpret the chronology constructed here (**Graph 68**)? How is it different (to avoid saying “better”) to all the previous traditional periodisation schemes?

Perhaps the most important point to make is to underline that despite its apparently mathematical and scientific character, the chronological theme presented here does not claim to be either “objective” or “final”. By its very definition, Bayesian process presupposes informed yet subjective choices made by the observer, and predicts the estimates to change as new information becomes available. Herein lies the first great strength of my methodology. The chronology constructed in this project can only be criticised in two ways: either by questioning one of the assumptions made in the process, or by adding new ones. That in itself is not dramatically different from a standard approach to building chronologies. The second great strength, however, is that the process of Bayesian modelling of radiocarbon dates necessitates that these assumptions be made explicit, meaning that they are easier to identify, challenge, and expand (Buck and Meson 2015: 573; Bayliss 2015: 680). Every choice regarding the inclusion or exclusion of a  $^{14}\text{C}$  date in a grouping such as a phase, the arrangement of these phases into sequences etc. - every such choice is clearly visible in the

model. Therefore, even if the results turn out to be incorrect or, perhaps more likely, insufficient, this work offers a useful framework to build upon further.

Highlighting the subjective priors presupposed in the analysis is, however, not enough to deal with the problems outlined in the first two paragraphs. What remains to be done is to establish an interpretative paradigm which would take advantage of the methodological transparency of the Bayesian model. Perhaps a loose analogy with the famous Hawkesian ladder of inference (Hawkes 1954) can be made to better illustrate a proper interpretation of the results of a Bayesian chronological project. **Graph 69** is a schematic representation of the interpretative process. The table is by no means exhaustive, it merely lists some of the types of research problems tackled by archaeologists at different levels of the analysis, and the assumptions made (implicitly or explicitly) to arrive at a given stage of the analysis. It is important to note that the numbers of priors grow cumulatively. The increasing number of assumptions makes the conclusion increasingly less secure. The inevitable result is that heightened “importance” or “relevance” of the questions asked is compensated by the increasing number of assumptions which are needed to formulate an answer. Archaeology is an ever-evolving project which will never arrive at a single, perfect, all-encompassing picture of the past, and its chronological aspect is no different. Assumptions and conjectures are necessary to advance the field, and our best way of minimising errors is by making these assumptions as explicit as possible to facilitate future scholarly efforts. The procedures outlined above are relevant to a study which attempts to account for the imperfections of the radiocarbon measurements through the introduction of priors derived from archaeological and textual studies. In this case, the absolute radiocarbon chronology can be perceived as the “variable” of the inquiry, while the priors become the “constant”. Nevertheless, the statistical analysis of radiocarbon results can be approached from the other end, whenever one wants to use it in order to test the validity of a thesis, or to compare several possible models. Examples of this approach to the problem include simulations and exploratory modelling (see

e.g. **Section 7.2** and **Section 7.4**). When using this approach, the priors are the “variables” to be scrutinised on the basis of radiocarbon dates which are treated as “constants”. This approach is, however, advisable only when the available dataset is seen as robust and reliable.

Level	Aims of the Analysis	Priors Required to Formulate an Answer	No. of Priors
<b>1) Archaeological context</b>	- The nature of the context (hearth, fill, dump, grave etc.) - The age of the context	- The context was correctly identified and excavated - The samples were associated with the context - The samples were sufficiently well preserved, pretreated and studied	<b>3</b>
<b>2) Sounding</b>	- The function of the area (domestic, economic, ritual, administrative, etc.) - The life history of the area	- The sequence of contexts was correctly reconstructed - The sequence was undisturbed post-deposition	<b>5</b>
<b>3) Site</b>	- The nature of the site (city, village, fortress, cultic complex etc.) - The life history of the site - Political and economic history of a city-state polity	- The individual sequences were correctly linked on the basis of typology or stratigraphy	<b>6</b>
<b>4) Region</b>	- Political and economic history of a kingdom/empire - Contacts and interaction among different communities - Responses to climatic changes	- The individual site sequences were correctly linked on the basis of typology - Regional differences in material culture are meager and/or can be accounted for	<b>8</b>

Graph 69: A schematic representation of a chronological research problem. The number of assumptions needed to address a specific question increases with every level of inference. Since the strength of the argument depends on the validity of every single assumption, it becomes more interpretative and speculative.

## 8.2 Prehistory and Early History of Mesopotamia and its Neighbours Reconsidered

Overall, the results of this analysis do not change the standard chronological model drastically. The narrative sketched out in **Chapter 2** still holds as a general overview, although a number of specific changes are needed. The paragraphs below attempt to reconstruct the developments in Southern Mesopotamia and its neighbouring regions as visible in the <sup>14</sup>C results.

### 8.2.1 Middle (ca. 3750-3500 BC) and Late (ca. 3500-3250 BC) Uruk

*“Eana - Inana, the great overseer of heaven and earth, you have erected a house in your land, you have taken seat on your pedestal ”* - Enheduana’s Temple Hymns <sup>110</sup>

Though still quite imprecise, the dates from Susa clearly show that the Susa II contexts, displaying the most similarities with the Uruk material in Southern Babylonia, can be securely aligned with the Middle Uruk period, most likely continuing into the later Late Uruk. This clearly demonstrates how the Susiana Plain was well within the Uruk zone of influence prior to 3500 BC. It is interesting to compare the transition Susa I → Susa II to that of Lapui → Banesh in the Fars region. In both cases, local painted pottery was replaced by an exogenous Uruk material dominated by undecorated types. One would, therefore, be excused to assume some degree of contemporaneity between the two events. The results, however, unequivocally show that the Lapui period corresponds well with the Middle Uruk material and, most plausibly, with Susa II. Southern Mesopotamian influences in the Tal-i Malyan region most likely became prominent only during the mature phase of the Late Uruk period. The monumental structures of the Eana IV complex in Warka are often considered emblematic of the Late Uruk civilisation and the supremacy of Warka within the

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<sup>110</sup>ETCSL 4.80.1 207) un-gal an ki-a <sup>d</sup>inana-ke<sub>4</sub> 208) e<sub>2</sub>-an-na muš<sub>3</sub>-za e<sub>2</sub> bi<sub>2</sub>-in-gub bara<sub>2</sub>-za dur<sub>2</sub> bi<sub>2</sub>-in-ġar

system. Nonetheless, as shown in **Section 7.4**, most of the imposing buildings appear to be relatively young when compared to other Late Uruk contexts, especially those of the Nippur sequence. One may therefore interpret the splendour of the Eana and the White Temple of Kullab as the swan song of the Uruk civilisation. Perhaps around the same time, the Oval Complex of Godin Tepe was first established, not as a testament to the dominance of Uruk, but rather as a final, perhaps desperate, attempt to exercise control. The presence of military equipment within the context should be quite telling. It may well be that the Proto-Elamite culture of Iran started budding around the same time, as attested by the period IVC1 in Yahya, the texts in the Early Banesh contexts in the TUV area at Tal-i Malyan, the Sialk III:5-6 culture in the Isfahan region and, most probably, Susa Acropole I 18. It would be interesting to know more about the exact timing of the appearance of the Ninevite 5 culture in Syria. At this point, it is difficult to say whether, or for how long it could have existed alongside the Southern Mesopotamian Late Uruk. The main conclusion which would emerge from this interpretation is that the standard narrative of the Late Uruk monolith dominating the ancient Near East to later split into the Ninevite 5, Jemdet Nasr and Proto-Elamite cultural complexes (e.g. Nissen 2001: 175-177; Matthews 2002: 36) may be too constraining. Given the results, one may be tempted to say that perhaps the proverbial writing on the wall was well visible during the construction of the Eana IV context, and the important changes in the political and cultural makeup of the region between the Syrian Jezirah and the Zagros were already germinating.

### 8.2.2 Jemdet Nasr (ca. 3250-3000 BC)

*“Fierce winds and all the gentle breezes came together; The Flood swept over the entire volume [of the World]”* - Sumerian Flood Story <sup>111</sup>

Whatever internal and/or external forces brought the Late Uruk world system to an end, they may have already been at work during the final phases of the period.

<sup>111</sup>ETCSL 1.7.4 D 1) im-hul-im-hul im-si-si-ig du<sub>3</sub>-a-bi teš<sub>2</sub>-bi i<sub>3</sub>-su<sub>8</sub>-ge-eš 2) a-ma-ru ugu kab dug<sub>4</sub>-ga ba-an-da-ab-ur<sub>3</sub>-e

This does not change the fact that with the new data from Abu Salabikh and Warka, the so-far elusive Jemdet Nasr period in Southern Mesopotamia does seem to form a coherent and well-defined chronological unit. It was during this period that the Proto-Elamite culture in Iran, as represented by the late Early and Middle Banesh in the Malyan region and the late Yahya IVC1 contexts in Fars, took shape and matured. It is interesting to note that Godin Oval Complex was largely contemporary with the Proto-Elamite culture and the Jemdet Nasr. It may therefore be possible that the community of Godin did not follow the same path as that of Susa, where the Acropole I 18-17 transition clearly shows a shift from numeric to fully-developed Proto-Elamite, and instead continued some of the Late Uruk administrative practices. The potential existence of a Late Uruk *diadochos* at Godin gives testament to the diverse ways in which the communities of ancient Iran adopted to the end of Uruk civilisation.

Although we may no longer have problems with placing the Jemdet Nasr period in time, the period itself remains enigmatic due to the cardinal difficulty of Near Eastern archaeology: the stubborn persistence of some cultural features accompanied by dramatic changes in other areas of human activity. The Jemdet Nasr or Uruk III texts are usually viewed as a more systematised version of the Uruk IV proto-cuneiform and, although they are palaeographically distinguishable, represent a clear continuation of the earlier writing tradition (Veldhuis 2014: 28; Sallaberger and Schrakamp 2015: 53). As far as their content is concerned, innovations are visible in the introduction of new genres of texts, such as the so-called Tribute List (see **Section 2.2**), and the City List (Matthews 1993: 49; Wagensohn 2016: 239). Although the proto-cuneiform texts are difficult to interpret, studies on the titles of officials mentioned in the administrative and lexical texts (Charvát 1993; Charvát 1998; Johnson 2014b) seem to suggest that the overall power structure in the Jemdet Nasr community remained largely similar to that of the preceding Uruk IV, with the officials (or institutions) designated with the signs EN (lord, priest), UNĜEN (assembly) and various titles containing the NAM<sub>2</sub> (esp. NAMEŠDA) featuring prominently. The existence of

City Lists and City Seals clearly demonstrates the existence of some kind of a superarching regional network of political, economic and cultural interrelations among the cities of Southern Mesopotamia, with Uruk most likely maintaining a privileged position (Matthews 1993; Steinkeller 2002). All things considered, referring to this 250-300 year-long period as “Terminal Uruk” does it a great disservice. Considering the establishment and flourish of the Proto-Elamite culture in Iran, and the spread of the Ninevite 5 culture in Syria, the period ca. 3300-3000 BC was a significant stage in the development of the Near Eastern civilisation. It may be that the culture of the Middle Uruk, by this time overextended geographically, began a period of contraction and centralisation already at the time when the Eana IV complex was being constructed. This process of intensification achieved its pinnacle during the Jemdet Nasr period in Southern Mesopotamia. In Iran, the rise, growth and demise of the Proto-Elamite culture with its elaborate writing and accounting systems most likely occurred within a period of about 300 years. The Syrian Jezirah, on the other hand, followed a different path, one of non-urban communities sharing a common elite culture of elaborately decorated pottery.

But perhaps the most puzzling aspect of the Jemdet Nasr period is its sudden, as suggested by the <sup>14</sup>C results, disappearance. To reiterate, no occupation or activity context could be dated to the period ca. 3000 BC, suggesting a hiatus, albeit a short one, between the Jemdet Nasr and the Early Dynastic. Coincidentally, the same seems to be true for the Fars sequence, with the transition from the Proto-Elamite Middle Banesh to the Early Dynastic Late Banesh seemingly taking place at the same time. The destruction of the Yahya IVC1 complex seems to have been contemporary with these events. The Oval Complex at Godin was probably long abandoned at this point. There is insufficient evidence to say whether these abrupt changes affected the Ninevite 5 culture in the north. Searching for archaeological evidence of past catastrophes has long been decried by archaeologists, for three main reasons: academic mistrust of sensationalism, the impact of the processual school of

archaeological theory which emphasised ecological and social processes rather than events (Ur 2010: 391), and its unpleasant associations with literal interpretations of ancient mythical and religious texts. In the case of Mesopotamian archaeology, the search for the archetypical Flood, one of the most persistent mythical and literary topoi, has always fascinated scholars working on the Near Eastern material, and the “flood levels” at sites such as Fara or Kiš were often quoted as evidence for the veracity of the ancient written sources. Since then it became apparent that said “flood levels” at different sites correspond to different moments in time (Hallo 1990: 194). Of the two sites, only the one at Fara corresponds to the end of the Jemdet Nasr. This analysis does not argue for the actual occurrence of a cataclysm which put an end to the Jemdet Nasr society. Every aspect of the Mesopotamian state and administration was built around the need to manage the floodings of the Euphrates and, to a lesser degree, the Tigris. Its advanced administrative techniques and sophisticated systems of food and resource redistribution show readiness to deal with economic shortages. Instead of looking for a single blow which could have caused this change, one should try to consider why the system was too weak at the exact thing it was designed to deal with (Yoffee 1988: 4). Notwithstanding this reservation, the timing of the cultural transition around 3000 BC allows us to speak of a collapse, understood as “*rapid, significant loss of an established level of sociopolitical complexity*” within “*no more than few decades*” (Tainter 1988: 4). It is a great shame that we do not possess any <sup>14</sup>C dates for the JN-ED transition in the Nippur Inana sequence, where the change in the archaeological material seem to have appeared gradually. Such results would provide the final refutation or confirmation for this hypothesis.

### 8.2.3 Early Dynastic I/II (ca. 2900-2650 BC)

“*Where are the great kings the likes of whom, since the ancient times until now, had not been begotten, had not been born?*” - The Poem of Ancient Rulers <sup>112</sup>

<sup>112</sup>Cohen 2012: 139 17) me-e lu-gal gal-e-ne<sub>2</sub> u<sub>2</sub>-saḡ-ḡa<sub>2</sub>-ta e-ne<sub>2</sub>-e-še-ta 18) nu-peš-ša-me-en nu-tu<sub>3</sub>-da-am-m[e-en]

While the dramatic events accompanying a collapse make it a popular research subject (e.g. Tainter 1988; Yoffee 1988; Weiss and Bradley 2001; Lawler 2010), the issue of what follows a societal disintegration is no less deserving of scholarly attention (e.g. Cowgill and Schwartz 2006; Ur 2010). The radiocarbon results show that the period designated here as ED I/II appear to be relatively longer than what came before and what followed. This observation may be the result of the decision to join two previously separate chronological units, ED I and II, into a single superunit. As described in **Section 2.2**, the distinction between these two archaeological periods is by no means easy to make. However, even if the distinction in pottery assemblages or seal glyptics is valid, it does not change the fact that, in term of textual resources and socio-political dynamics, the period between the fall of the Jemdet Nasr society and the establishment of the historical Sumerian city-states of the Early Dynastic III is rather underwhelming. The gradual rise of large households, often in areas previously dedicated to administrative or industrial activities at sites such as Ur, Uruk, and Kiš are the main feature of the changes occurring at this time. It is also with the start of the Early Dynastic period that cemeteries become more visible in the archaeological record following the virtual absence of mortuary record during the Uruk period in Southern Mesopotamia. In terms of textual records, the Archaic Texts of Ur remain the one and only major source of information about the setup of the administrative system during the period, and it is unfortunately silent about any major changes in power structure (Charvát 1998: 90; Steinkeller 2002: 257). It is therefore probable that during this period temple administration maintained its central role in the society, although it may have been relegated to a primarily cultic role, with the economic and political focus moving downwards, towards the large households. It seems very telling that, as noted by Johnson 2014a (p. 5), of the two main profession lists of the Uruk period, NAMEŠDA (lord?) and UNĜEN (assembly), only the latter continues to evolve, while the former is frozen in a standardised form. One may therefore wonder whether the rise and growth of various types of assemblies occurred during this long period, leaving the literary echoes interpreted by Jacobsen

1943 as evidence for the existence of a “primitive democracy” amongst the ancient Sumerians. A similar pattern of decentralisation can be observed in other regions. For example, one can consider the hiatus in the building sequence in the ABC area in Malyan, corresponding to the beginning of the ED I/II. Although there is evidence for the construction of large structures at Yahya during the IVC2, the break in continuity is apparent (Potts 2001: 5). It took the Godin acropolis another 200 years to recover from the collapse of the Oval Complex. In the Khabur River, communities continue their non-urban lifestyles.

In the opening chapters of this work the ED I/II period was labelled a “dark age”, due to the apparent lack of textual innovation and the absence of monumental architecture. This rather simplistic term most certainly does not do justice to the complexity of changes occurring in the Near Eastern society at this time. It was not uncommon for the archaeologists working during the late 19<sup>th</sup> and early 20<sup>th</sup> to speak of a society entering a phase of “degeneration”. It would perhaps be more accurate to say that the focus of the social and cultural dynamics moved away from temples and palaces towards individual houses, smaller towns and villages - contexts which the early practitioners of archaeology often found uninteresting, and which the philologists disregarded altogether. The abruptness of developments in the succeeding ED IIIa suggest that the socio-cultural processes which caused them must have been in development during the deceptively uneventful ED I/II. It is a conjecture commonly held amongst philologists that the protoplasts of the later mythological rulers such as the Urukian Lugalbanda, Gilgameš, Enmerkar, if they had indeed existed, or the powerful yet poorly-attested historical kings such as the Kishite Mesilim, Aga or Enmebaragesi lived and ruled during this period. Perhaps they were merely successful “Big Men” who acquired power and recognition in a community which had abandoned the vertical political structures which could formally accommodate and commemorate them as rulers. Their deeds were therefore immortalised in the cultural memory and

later literature, while leaving almost no written or archaeological records of their exploits.

## 8.2.4 Early Dynastic IIIa (ca. 2650-2500 BC)

*“In those days, words were not written on clay. But on that day, under the Sun, it was indeed so. The Lord of Kullab wrote the words on clay as if on a tablet. It was just like that.”* - Enmerkar and the Lord of Aratta <sup>113</sup>

I believe it is no exaggeration to regard the ED IIIa as a veritable revolution in the socio-political development of Southern Mesopotamia. The importance of many of the innovations in writing, artistic design, pottery, architecture and mortuary practices of this phase has been long recognised by scholars. What this study highlights is the relative short time in which they occurred. The picture painted by the results is one of many experiments in governance, artistic expression and literary genres. Some of these experiments later became the cornerstones of the Mesopotamian cultural and political traditions. Others disappeared without a trace. Be it the appearance of the first royal inscriptions or the increase in monumental mortuary practices, all the evidence seems to point to the rise of a well-established aristocratic class. Although the traditional dictum of Near Eastern archaeology speaks of a transition from a cult-oriented *Tempelstaat* to a military-focused feudalism, it is important to remember that temples remained at the centre of the Mesopotamian politics as evident from the archives of Fara and Abu Salabikh, as well as the very contents of the early royal inscriptions. Nonetheless, the relationship between the kings and the temples must have changed drastically, with the former finding new ways of communicating their power. This period corresponds almost perfectly with the Early Jezirah II phase in the Syrian Jezirah, i.e. the so-called “second urban revolution”. EJ II, best represented in the Leilan sequence, is especially notable for the almost instantaneous appearance of large, fortified citadel-cities across the region. It is also at this time that the Godin sequence entered the Godin III phase. Given the stress put on the military nature of this new elite, it may be suggested that, for the first time since the collapse of the

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<sup>113</sup>ETCSL 1.8.2.3 504) u<sub>4</sub>-bi-ta inim im-ma gub-bu nu-ub-ta-ġal<sub>2</sub>-la 505) i<sub>3</sub>-ne-eš<sub>2</sub> <sup>d</sup>utu u<sub>4</sub> ne-a ur<sub>5</sub> he<sub>2</sub>-en-na-nam-ma-am<sub>3</sub> 506) en kul-ab<sup>ki</sup>-a-ke<sub>4</sub> inim dub-ġen<sub>7</sub> bi<sub>2</sub>-in-gub ur<sub>5</sub> he<sub>2</sub>-en-na-nam-ma

Late Uruk system, we see the emergence of regional polities competing militarily on a large scale. One interesting point about the international contacts during the ED IIIa period is the so-called Intercultural Style of carved chlorite objects, especially bowls. As noted, these objects are usually found in contexts traditionally dated to the late ED IIIa - early ED IIIb. Nonetheless, the <sup>14</sup>C dates from Yahya suggest that the large-scale centralised production of said objects did not start until the Akkadian context. The chlorite vessels from Kerman were circulated across the Near East throughout the ED III period and later; however, it seems that before the centralisation of political power under Sargon, the production must have been small scale. Akkadian involvement in maritime trade in the Persian Gulf is well attested, and so it is no wonder that the rise of the empire provided the infrastructure necessary for large-scale international trade. The rise of the Early Dynastic ruling class, while certainly interested in eastern luxuries as seen in the grave goods, seems to have had a limited effect on the transformations within Iran. The importance of this evidence is twofold. Firstly, it should serve as a cautionary tale against relying solely on typological correlations in constructing chronologies without reference to external sources of information. Secondly, it shows that the patterns in the Mesopotamian demand for exotic prestige goods, important as it may have been, was only one of the driving forces behind the development of the ancient Iranian cultures. An alternative interpretation might be to consider a site other than Yahya, perhaps the Konar Sandal Complex, as the centre of chlorite manufacturing during the Early Dynastic, with the production shifting to Yahya only during the 24<sup>th</sup> c. BC.

The texts from Fara and Abu Salabikh and, to a lesser extent, Nippur and Kiš, have been repeatedly quoted as evidence for major cultural development during the ED IIIa period. Most importantly, it was the appearance of a new and varied literary tradition which attracted considerable attention. The most recent attempts to study these new types of texts have been undertaken by Johnson 2014b. His analysis focuses on the fact that the obscure texts which are very different from later compositions

tend to be organised around writing the same or similar words and expressions with a number of alternative spellings<sup>114</sup>. In at least some cases, the rationale behind the pairings or groupings of alternative spellings seems to be phonetic<sup>115</sup>, which is particularly interesting, considering that the Fara-period texts are generally seen as imperfect in terms of recording a spoken language. According to Johnson, this points to the existence of several strands of literature existing prior to the appearance of the Fara-period texts, with the UD.GAL.NUN texts (see **Section 4.3**) being one of them. The main achievement of the Fara-period scribes, according to this interpretation, was to compile and systematise these different traditions. Although Johnson 2014b (p. 29) claims that some of these large compilations had their predecessors amongst the Archaic Ur texts, no actual evidence is given. Although this theory is entirely possible, it suffers from the same weaknesses as Nissen's theory regarding the mysterious ED II (see **Section 2.2**) - there is simply no evidence for the immediate precursors of the Fara tablets. It therefore appears much more plausible that the puzzling compendia of alternative spellings represent the exact opposite - an exercise in experimentation, a creative game in producing new spellings and meanings through the application of the *rebus* principle. The existence of a large and heterogeneous body of phonetic spellings at a time when Sumerian was still spoken shows a written language in its infancy, trying to settle on its spelling traditions. In a typically evolutionary manner, it produces a plethora of possibilities, only some of which survive and thrive. It is important to note that phonetic spellings remain an important feature of the later Old Sumerian texts, for example the inscriptions of Irinimgina of Lagaš<sup>116</sup>.

<sup>114</sup>E.g.: NTSS 82 = CDLI P010488 vii 3) BU BU<sub>tenū</sub> NU<sub>2</sub> HAR LI NUN LU<sup>3</sup> KI, vii 22) BU BU<sub>tenū</sub> NU<sub>2</sub> HAR AK LU<sub>3</sub> KI; TSS 126 = CDLI P010757 rev. i 5) NI ŠU DU<sub>8</sub> 6) GA ŠU DU<sub>8</sub>

<sup>115</sup>SF 63 = CDLI P010654 obv. i 2) DAL PI(tal<sub>2</sub>) 3) DAR PI(tal<sub>2</sub>) 4) DA DA; TSS 126 = CDLI P010757 obv iii 6) KUR NUN TUG<sub>2</sub> UNU UG (Nergal?); NTSS 168+269+300+328+978+979+980 = CDLI P010486 i 19') ...] UTTU(KI+KI) DU<sub>6</sub> U<sub>2</sub>; iii 5') DIĜIR PIRIĜ BAD X AGA(mir) GAL 6') NE IR GAL

<sup>116</sup>RIME 1.9.9.1 = CDLI P222608 iii 8) anše u<sub>2</sub>-du-le, 12) u<sub>3</sub>-mu<sub>2</sub>u<sub>2</sub>-mu<sub>11</sub>; v 1) tug<sub>2</sub> ġeštu d<sup>nin</sup>-kilim<sup>gi<sub>4</sub>-li<sub>2</sub>-na</sup>

## 8.2.5 Early Dynastic IIIb (ca. 2500-2335 BC) and Akkadian (2335 - ca. 2250 BC)

*“My king - the wide country given to you as booty is of one voice and one mind. Its people, just like sheep, flock around Šulgi, the shepherd whose word is firm. To the populace of the upper and lower land - you are their god” - Letter from Aradġu to Šulgi regarding the country* <sup>117</sup>

The comparison between the Fara texts and the ED IIIb Lagasite tablets is even more pertinent considering that, according to the radiocarbon results, the gap between the two is much shorter than expected. If the construction of the Royal Cemetery of Ur is taken as the arbitrary start point of the ED IIIb, the Fara texts would be only slightly earlier. If the alternative interpretation of the Abu Salabikh sequence (see **Section 7.2**) is correct, the Fara texts stand a good chance of being contemporary with the early kings of the first dynasties of Ur and Lagaš. This possibility has previously been suggested on palaeographic grounds (Krispijn 2000). If the appearance of the Fara tradition was roughly contemporary with the rapid evolution of kingship in the South, the traditional model for the appearance of the Sumerian city-states needs to be reconsidered. It has been suggested that Abu Salabikh, and perhaps Fara and Nippur as well, fell within the sphere of influence of the hypothetical “Kiš civilisation”, which extended into Northern Iraq and Syria. In fact, the literary texts from Abu Salabikh find their closest parallels in the tablets from Ebla (Biggs 1981; Archi 1987; Krecher 1992; Mander 1995). On the other hand, Kiš has been traditionally viewed as the origin of kingship - by the ancient scribes as well as modern scholars. It is interesting to consider the appearance of the Fara literature as a regional development, specific to the Kishite cultural complex. While the communities of the Syrian Jezirah were defending themselves behind spectacular city walls, and the rulers of Ur were sacrificing retainers to follow them into the afterlife

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<sup>117</sup>ETCSL 3.1.4 A 3) [lugal]-ġu<sub>10</sub> ma-da daġal-la niġ<sub>2</sub> nam-ra-aš mu-ra-an-šum<sub>2</sub>-ma-a 4) gu<sub>3</sub> teš<sub>2</sub>-a si<sub>3</sub>-ge<sub>5</sub> dim<sub>2</sub>-ma-bi 1-am<sub>3</sub> 5) uġ<sub>3</sub> u<sub>2</sub>-ġen<sub>7</sub> lu-lu <sup>d</sup>šul-gi-ra sipa inim gi-na-bi 6) nam-lu<sub>2</sub>-ulu<sub>3</sub> si<sub>11</sub> igi-nim-ma diġir-bi za-e-me-en

by the dozens, the scribes of the Kishite civilisation were pushing the boundaries of scholarship and literature. This reconstruction is purely speculative; however, it is worth considering, if only to dispel the common view of the North Mesopotamian communities as conquerors and aggressors. The chronological framework presented here highlights the variable ways in which the societies across the Near East adapted to the rapid changes in the socio-political landscape during the short ED IIIa period.

The duration of the ED IIIb as estimated by the  $^{14}\text{C}$  dates appears to be anywhere between 150 and 220 years. This is longer than the reconstruction based on the historical sources, though not by much (Sallaberger and Schrakamp 2015: 82-84). This would imply the possibility of one or two rulers of the Lagaš Dynasty missing between the formation of the Ur cemetery and the reign of Lugalzagesi. It may also suggest that Akurgal, Ur-Nanše's elusive son, ruled longer than previously thought. Therefore, the dates agree quite well with the historical Middle Chronology. The same can be said about the dates for the start and end of the Akkadian period, although it is necessary to reiterate that these estimates rely solely on samples from the Khabur River Valley region. The  $^{14}\text{C}$  date from the two main sites analysed in this study (Brak and Leilan) can be interpreted as evidence for an abrupt end to Akkadian control of the Jezirah. As with the end of the Jemdet Nasr and the mythological Flood, the collapse of the Akkadian Empire never disappeared from the Mesopotamian history and literature as a truly disastrous event. Although the  $^{14}\text{C}$  dates support the traditional view of a sudden end to the Sargonid hegemony, abrupt does not imply uncausal. If the invasion of Gutians, Lullubians, or any other warlike people did in fact occur, accompanied by a deterioration in climate conditions, it must have given the *coup de grâce* to an overextended colossus ridden with internal problems. This date is also significant because it allows us to estimate the length of the Gutian Interregnum. Assuming, according to the standard chronology, that Ur-Namma of the Ur III dynasty emerged as the undisputed ruler of Mesopotamia around 2100 BC, the  $^{14}\text{C}$  dates seem to support the long chronology, with the Interregnum

lasting 100-150 years (Steinkeller 2015b), as opposed to shorter 35-50 years interval suggested on prosopographic grounds (Hallo 1990; Visicato 2000: 451; Hallo 2005).

### 8.3 Evaluation and Future Prospects

The most obvious shortcoming of this analysis is the relatively small number of datapoints. Unfortunately, most of the reasons behind this state of affairs are beyond our control. Poor preservation of osteological and botanical samples will always remain the main limitation of  $^{14}\text{C}$  studies in Mesopotamian contexts. The only way to further research in this area is to produce new archaeological material through excavation. The best way to maximise the chance of producing datable material is to ensure that sample soils are collected for flotation. Palaeobotanical samples can double as radiocarbon material. Although the political situation in the region remains highly volatile, ongoing archaeological projects at sites such as Abu Tbeirah (Romano and D'Agostino 2016), Tell Khaiber (Campbell et al. 2016), or Nina/Tell Surghul (Nadali and Polcaro 2016) give hope for more accessible material in the future. As far as regions outside of Southern Mesopotamia are concerned, the re-analysis of important Iranian sites such as Susa, Tepe Sialk and Tepe Yahya is of utmost importance. Although it may be problematic to re-excavate such large and significant sites, a comprehensive  $^{14}\text{C}$  study of the long archaeological sequences is imperative to resolving the periodisation of the different ancient cultural complexes. The  $^{14}\text{C}$  dating project on the material from Uruk (Ess 2015), as well as the dating of Abu Salabikh and Brak samples in this work, show just how research projects on museum objects from old excavations can be highly productive. A similar approach could be applied on the Iranian material. In the case of the Syrian Jezirah, more samples are required especially for the beginning of the Ninevite 5 period, as this material culture, so important for the periodisation of the region, remains underdefined in terms of its earliest phases. Despite the problems and limitations of using ancient seeds as radiocarbon samples, this work's reliance on palaeobotanical samples underlines the

importance of such analysis in the modern archaeological research. The recovery and study of ancient micro- and macrofossils is not only essential to the reconstruction of past economies, but may also constitute the only chance for producing absolute chronologies for certain sites.

Considering that this analysis had to rely heavily on legacy data from older  $^{14}\text{C}$  projects, the pretreatment, measurement and statistical methods used here were purposefully designed to be as standard as possible in order to ensure that the  $^{14}\text{C}$  dates are comparable to one another. There is, however, room for innovation in the radiocarbon dating of Mesopotamian material. More specifically, given the poor preservation of bone and tooth collagen, apatite dating appears to be the most promising avenue of future research. Although the experiments clearly showed the scientific limitations of the technique, the offsets of the apatite-derived dates could be accounted for, and perhaps reduced, using Bayesian models. The development of adequate statistical methods to tackle this problem is likely to be a challenging, yet rewarding research strategy. Another important point to make is that a visual inspection of all the dates used in the Bayesian models listed in **Appendices** shows that quite a few of them were highlighted as outliers. This can be viewed as a sign of the data not corresponding to the underlying model. Nonetheless, considering the amount of data which came from older publications of questionable quality, this should come as no surprise. For a large majority of these dates, there were easily discernable archaeological and technical reasons for excluding these measurements. Therefore, the considerable amount of outliers is more likely to be a result of the poor quality of data rather than the priors adopted during the modelling process.

Notwithstanding the problems mentioned above, I believe the analysis presented in this work provided a number of important insights. As long as it is kept in mind that the results are very much work in progress and are likely to change as more representative datasets become available, they can be safely used as a framework for

discussing the rise of early historic civilisation in the Near East. The contributions of this work can be divided into two main categories. Firstly, it has demonstrated that  $^{14}\text{C}$  dating can, contrary to some statements (e.g. Cryer 2000), indeed be used to test the veracity of claims made on the basis of material and textual culture or, at the very least, highlight the most plausible out of several hypotheses. Secondly, the methodology of analysing radiocarbon data at a number of different levels (context → sounding → site → region) helped to identify and study in greater detail problems with the absolute dating of archaeological contexts. This methodology proved particularly useful at sites where different the stratigraphies of different soundings proved difficult to align (6H *versus* A and E at Abu Salabikh; Fields B *versus* F at Tell Beydar; CH *versus* ER at Tell Brak).

Finally, as opposed to traditional archaeological and textual studies, the ability to produce absolute time estimates allowed this study to discern the durations of individual phases and transitions. This was then used to argue against the view of the development urbanism and literacy as a slow and gradual process. Matthews 2003b (p. 131) writes that “*During the centuries of the early third millennium, from the Jemdet Nasr period onwards, writing develops steadily in Lower Mesopotamia as part of the evolution of a truly Sumerian civilization (...)*”. Similarly, Marchetti and Marchesi 2011 (p. 88) describe the history of writing as a tale of “*gradual changes of innovation and survival*”. Terms such as “steady” and “gradual” belong to the domain of absolute chronology, yet absolute chronology is the one field where such statements find little support. Some of the most important innovations and defining features of the Mesopotamian civilisation seem to have formed during short periods of activity. The invention and proliferation of the Proto-Elamite script in Iran, the rapid development of the cuneiform literature and the political organisation of the ED IIIa/b in Southern Mesopotamia, or the “second urban revolution” in the Syrian Jezirah are the best examples of such *floruits*. At the same time, the continuity of the ancient Mesopotamian civilisation was punctuated by sudden changes which affected

communities spread over a vast geographical area. It is rather uncontroversial to see historical events, for example the rise and fall of the Sargonid dynasty as such events. The results of this work hint at the existence of such groundbreaking changes in the prehistoric and protohistoric times, esp. the end of the Jemdet Nasr/Proto-Elamite period around 3000 BC. It has been argued throughout this work that the propensity of modern archaeological theory to focus on long periods of time and gradual changes derives in part from the nature of archaeological material, in part from the evolutionary and processual theories, and in part from the mistrust towards theories advocating dramatic changes in human societies attributed to a single overarching cause. Nonetheless, the complexity of social, cultural, political, and economic situations created by human communities may well lead to the creation of systems which can rise, peak, and collapse within a generation or two. <sup>14</sup>C dating has previously been instrumental in highlighting such occurrences in prehistory. Perhaps most famously, the “megalithic culture” of the Neolithic Europe turned out to be a rather short-lived cultural experiment on an enormous scale in communities we think much smaller and less complex than those of the Bronze Age Mesopotamia (Bayliss et al. 2007; Whittle, Healy, and Bayliss 2011). It may perhaps be prudent not to discard “explosions”, “invasions”, “collapses” etc. as viable theoretical concepts to be used in archaeological practice. Absolute dating techniques such as dendrochronology and radiocarbon dating are the best tools for identifying such events. They can therefore rehabilitate the ancient dictum by Seneca the Younger:

*“Nec est mirum ex intervallo magna generari: mediocria et in turbam nascentia saepe fortuna producit, eximia vero ipsa raritate commendat.”*<sup>118</sup>

*“It is no wonder that great things occur once in a long time: the Fate often brings the mediocre in large numbers, but She only rarely commends the truly exceptional.”*

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<sup>118</sup>Lucilio suo salutatem XLII 1

# Sumerian Spelling and Grammar Conventions

*“It is a joke well known among Assyriologists that there are as many Sumerian languages as there are Sumerologists.” - Diakonoff 1976: 99*

This work follows the rules of Sumerian grammar outlined by Jagersma 2010, Foxvog 2011 and Zólyomi, Jáka-Sövegjártó, and Hagymássy 2016. Lowercase plain text represents Sumerian words and sentences; lowercase italic is used to write Akkadian words. If the value of a sign is uncertain in a given context, it is written in plain uppercase. For sign readings, the author follows the readings self-published by Attinger on the University of Bern website, which are in close accordance with Mittermeyer 2006. For the sake of consistency, the shortest lexically-attested reading is always chosen for transcription. The sign / $\tilde{g}$ / is used to represent nasalised velar stop while / $\tilde{r}$ / is used to write the Sumerian phoneme of uncertain pronunciation, identified at the end of certain consonant-final stems displaying /d/-/r/ alternation. The supposed labialised velar stop / $g^b$ / or / $g^w$ / (Diakonoff 1976: 111, fn. 20) is not accounted for as the evidence for this phoneme is still scant. The author does not support the theory of a “second /l/”, e.g. in Enlil, existing in Sumerian (see Jagersma 2010: 51) and therefore the difference between the hypothetical liquids is not reflected in writing.

The final stops on words are written only if followed by a vowel (hence Meskalamdu, not \*Meskalamdug; Ĝeššakidu, not \*Ĝeššakidug) or if no lexical short reading for a bound syllable is attested (e.g. DUG, TUG<sub>2</sub>). *Plene* writing of word-final consonants

preceding a grammatical suffix is not represented in transcription (hence Mesanepada, not \*Mesanepadda; Inana, not \*Inanna or \*Inannak). Sumerian personal and geographical names composed of more than one semantic element are written as single words, unless they contain theophoric elements (hence Aakalamdu, not \*Aa-kalamdu; Ur-Nanše, not \*Urnāše). Akkadian names which can be understood as sentences are broken down into their smallest Names and common words with problematic or disputed readings will be discussed on an individual basis.

# Abbreviations

Akk. Akkadian language

ARET Archivi Reali di Ebla. Testi, Rome

AS *Acta Sumerologica*

CDLI Cuneiform Digital Library Initiative, UCLA; <http://cdli.ucla.edu>

CTMMA Corpus of Cuneiform Texts in the Metropolitan Museum of Art, New York

ETCSL The Electronic Text Corpus of Sumerian Literature, Oxford; <http://etcsl.orinst.ox.ac.uk>

FTP Martin, H.P. 2001 *The Fara tablets in the University of Pennsylvania Museum of Archaeology and Anthropology*. Bethesda, Md: CDL Press.

IAS see Biggs 1974

Nisaba Studi Assiriologici Messinesi, Messina

NTŠŠ Jestin, R. 1957 *Nouvelles tablettes sumriennes de Šuruppak*. Paris: Maisonneuve.

OAss Old Assyrian period

OECT Oxford Editions of Cuneiform Texts

OIP Oriental Institute Publications, University of Chicago

ORACC The Open Richly Annotated Cuneiform Corpus, Philadelphia; <http://oracc.museum.upenn.edu>

RIME The Royal Inscriptions of Mesopotamia, Early Periods

SF/WF Deimel, A. 1922-24 *Die Inschriften von Fara. Schultexte/Wirtschaftstexte.*  
Leipzig: J.C. Hinrichsches Buchhandlung

Sum. Sumerian language

TŠŠ Jestin, R. 1937 *Tablettes sumériennes de Šuruppak.* Paris: De Boccard.

UET Ur Excavations, Texts.

# Appendices

Appendix 1: Published  $^{14}\text{C}$  dates from Southern Iraq. Outliers are marked in red.

Site	Lab. no.	Date (yr BP)	Period	Material	Source
Abu Salabikh	AA-10170	4760 $\pm$ 50	Middle Uruk	charcoal	Wright and Rupley 2001
Abu Salabikh	AA-10169	5005 $\pm$ 60	Middle Uruk	charred barley	Wright and Rupley 2001
Abu Salabikh	AA-5289	4785 $\pm$ 65	Middle Uruk	charred barley	Wright and Rupley 2001
Abu Salabikh	AA-5288	4790 $\pm$ 60	Middle Uruk	plant remains	Wright and Rupley 2001
Abu Salabikh	AA-10168	4900 $\pm$ 50	Middle Uruk	seeds	Wright and Rupley 2001
Nippur	P-530	4672 $\pm$ 74	Late Uruk	charcoal	Stuckenrath 1963
Uruk	UGAMS-12440	4650 $\pm$ 25	Late Uruk	cedar wood	Ess 2015
Uruk	UGAMS-12441	3860 $\pm$ 25	Late Uruk	pine wood	Ess 2015
Uruk	UGAMS-12442	4660 $\pm$ 30	Late Uruk	pine wood	Ess 2015
Uruk	UGAMS-12443	4640 $\pm$ 30	Late Uruk	juniper wood	Ess 2013
Uruk	UGAMS-12435	4980 $\pm$ 25	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-12436	4630 $\pm$ 25	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-12137	4930 $\pm$ 25	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-12438	4540 $\pm$ 25	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-12439	4700 $\pm$ 25	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-20148	4570 $\pm$ 20	Late Uruk	bone apatite	Ess 2015
Uruk	UGAMS-20149	5350 $\pm$ 30	Late Uruk	carbonised straw/reeds	Ess 2015
Uruk	UGAMS-20152	4460 $\pm$ 20	Jemdet Nasr	straw/reeds	Ess 2015
Uruk	UGAMS-20153	4460 $\pm$ 20	Jemdet Nasr	poplar wood	Ess 2015
Uruk	UGAMS-20154	4530 $\pm$ 20	Jemdet Nasr	ash	Ess 2015
Uruk	UGAMS-20155	4790 $\pm$ 25	Jemdet Nasr	ash	Ess 2015
Uruk	UGAMS-20156	4990 $\pm$ 25	Jemdet Nasr	ash	Ess 2015
Uruk	UGAMS-20157	7380 $\pm$ 30	Jemdet Nasr	ash	Ess 2015
Girsu	UGAMS-8185	4150 $\pm$ 30	ED I	charcoal	Hritz et al. 2012
Nippur	P-803	4221 $\pm$ 53	ED I	charcoal	Stuckenrath and Ralph 1965
Nippur	P-801	4590 $\pm$ 65	ED I	charcoal	Stuckenrath and Ralph 1965
Nippur	P-798	4145 $\pm$ 59	ED I	charcoal	Stuckenrath and Ralph 1965
Nippur	P-800	4157 $\pm$ 62	ED I	charcoal	Stuckenrath and Ralph 1965

Nippur	P-820	4090 ± 62	ED I	Charcoal	Stuckenrath and Ralph 1965
Nippur	P-819	4272 ± 65	ED I	Charcoal	Stuckenrath and Ralph 1965
Nippur	P-807	4090 ± 64	ED II	Charcoal and dirt	Stuckenrath and Ralph 1965
<b>Nippur</b>	<b>P-806</b>	<b>4345 ± 66</b>	<b>ED II</b>	<b>Charcoal</b>	<b>Stuckenrath and Ralph 1965</b>
Nippur	P-804	4095 ± 52	ED II	Charcoal	Stuckenrath and Ralph 1965
Nippur	P-805	4006 ± 62	ED II	Charcoal	Stuckenrath and Ralph 1965
Abu Salabikh	BM-1365A	3938 ± 54	ED IIIa?	charcoal	Burleigh and Matthews 1982
Abu Salabikh	BM-1365B	3963 ± 57	ED IIIa?	charcoal	Burleigh and Matthews 1982
<b>Abu Salabikh</b>	<b>BM-1365C</b>	<b>3826 ± 47</b>	<b>ED IIIa?</b>	<b>charcoal</b>	<b>Burleigh and Matthews 1982</b>
Abu Salabikh	BM-1365D	3916 ± 50	ED IIIa?	charcoal	Burleigh and Matthews 1982
<b>Abu Salabikh</b>	<b>HAR-1877</b>	<b>3830 ± 70</b>	<b>ED IIIa?</b>	<b>?</b>	<b>Burleigh and Matthews 1982</b>
<b>Abu Salabikh</b>	<b>BM-1366</b>	<b>3869 ± 56</b>	<b>ED IIIa</b>	<b>wood</b>	<b>Burleigh and Matthews 1982</b>
Abu Salabikh	BM-2328R	4010 ± 130	ED II-III	charcoal	Bowman, Ambers, and Leese 1990
Abu Salabikh	BM-1390	4267 ± 85	ED II-III	charcoal	Burleigh and Matthews 1982
Ur	BM-76	3390 ± 150	ED IIIa	Bone	Barker and Mackey 1961
Ur	BM-70	4030 ± 150	ED IIIa	Bone	Barker and Mackey 1961
Ur	BM-64	3920 ± 150	ED IIIa	Bone	Barker and Mackey 1961
Ur	P-724	3959 ± 59	ED IIIa	Wood	Stuckenrath and Ralph 1965
Kish	OxA-28,283	3905 ± 27	ED III b	Bone	Zaina 2015
Nippur	P-810	4074 ± 64	EDIII b	Charcoal	Stuckenrath and Ralph 1965

Appendix 2:  $^{14}\text{C}$  dates produced during this research. Outliers are marked in red.

Site	Sample	Lab. no.	Date (yr BP)	Period	Material
Shuruppak	Penn 33-13-432	OxA-33,185	4178 $\pm$ 35	ED I/II	bone collagen
Abu Salabikh	AbS 6416 (A)	OxA-33,151	3899 $\pm$ 32	ED IIIb	charred seeds
Abu Salabikh	AbS 6416 (B)	OxA-33,152	3947 $\pm$ 33	ED IIIb	charred seeds
Abu Salabikh	AbS 2683 (A)	OxA-33,321	3931 $\pm$ 33	ED IIIb	charred seeds
Abu Salabikh	AbS 2683 (B)	OxA-33,153	3949 $\pm$ 35	ED IIIb	charred seeds
Abu Salabikh	AbS 5381	OxA-34,581	4727 $\pm$ 30	ED I/II	charred seeds
Abu Salabikh	AbS 5381	OxA-34,587	4797 $\pm$ 29	ED I/II	charred seeds
Abu Salabikh	AbS 5443	OxA-34,582	4433 $\pm$ 30	ED I/II	charred seeds
Abu Salabikh	AbS 5443	OxA-34,588	4488 $\pm$ 32	ED I/II	charred seeds
Abu Salabikh	AbS 5535	OxA-34,407	4197 $\pm$ 34	ED I/II	charred seeds
Abu Salabikh	AbS 5535	OxA-34,499	4283 $\pm$ 31	ED I/II	charred seeds
Abu Salabikh	AbS 5607.2	OxA-34,408	4777 $\pm$ 36	Late Uruk	charred seeds
Abu Salabikh	AbS 5607.2	OxA-34,500	4842 $\pm$ 32	Late Uruk	charred seeds
Abu Salabikh	AbS 8512	OxA-34,583	4113 $\pm$ 32	ED IIIa	charred seeds
Abu Salabikh	AbS 8512	OxA-34,589	4098 $\pm$ 29	ED IIIa	charred seeds
Abu Salabikh	AbS 8614	OxA-34,180	4015 $\pm$ 36	ED IIIa	charred seeds
Abu Salabikh	AbS 8670	OxA-34,181	4024 $\pm$ 34	ED IIIa	charred seeds
Abu Salabikh	AbS 5602	OxA-34,234	4524 $\pm$ 38	Jemdet Nasr	charred seeds
Abu Salabikh	AbS 8667	OxA-34,235	4080 $\pm$ 40	ED IIIa	charred seeds
Abu Salabikh	AbS 5412	OxA-34,236	4325 $\pm$ 40	ED I/II	charred seeds
Tell Brak	Brak SS 142/65	OxA-33,154	3838 $\pm$ 31	N	charred seeds
Tell Brak	Brak FS 1067	OxA-33,155	3849 $\pm$ 33	M	charred seeds
Tell Brak	Brak ST 105/27	OxA-33,322	3,827 $\pm$ 33	L/M	charred seeds
Tell Brak	Brak ER 29.4/23	OxA-33,890	3923 $\pm$ 31	M	charred seeds
Tell Brak	Brak FS 351	OxA-33,156	3873 $\pm$ 33	M	charred seeds
Tell Brak	Brak CH485/45	OxA-34,182	3906 $\pm$ 33	L	charred seeds
Tell Brak	Brak CH495/46	OxA-34,183	3838 $\pm$ 33	L	charred seeds

Tell Brak	Brak CH484/29	OxA-34,237	3937 ± 38	L	charred seeds
Tell Brak	Brak CH485/18	OxA-34,238	3819 ± 39	L	charred seeds
Ur	BM 1935,0116.87	OxA-33,848	4166 ± 32	ED IIIa/b	wood
Ur	BM 1935,0116.87	OxA-34,011	4211 ± 32	ED IIIa/b	wood
Ur	BM 1935,0116.17	OxA-X-2685-8	3992 ± 36	ED IIIa/b	enamel apatite
Ur	BM 1935,0113.791	OxA-33,157	2705 ± 31	?	date pits
Ur	BM 1935,0116.39	OxA-33,158	2552 ± 31	?	pomegranate seeds
Abu Salabikh	AbS 5942	OxA-34,975	4255 ± 35	Late Uruk	charred seeds
Abu Salabikh	AbS 5535	OxA-34,976	4121 ± 31	ED I/II	charred seeds
Abu Salabikh	AbS 5431	OxA-34,977	4236 ± 30	ED I/II	charred seeds
Abu Salabikh	AbS 7228	OxA-34,978	4158 ± 31	ED I/II	charred seeds
Tidlington	TR82 131/4 cattle mandible no. 169	OxA-X-2685-7	1909 ± 34	Roman	enamel apatite

Appendix 3: Published  $^{14}\text{C}$  dates from the Syrian Jezirah. Outliers are marked in red.

Site	Lab. no.	Date (yr BP)	Period	Material	Source
Brak	OxA-7544	4070 $\pm$ 45	J	charred seeds	Matthews 2003b
Brak	OxA-7545	4105 $\pm$ 45	J-K	charred seeds	Matthews 2003b
Brak	OxA-7490	4155 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7546	3990 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7348	4730 $\pm$ 100	K	charred seeds	Matthews 2003b
Brak	OxA-7548	4150 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7547	4110 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7491	4395 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7492	4090 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7549	4110 $\pm$ 45	K	charred seeds	Matthews 2003b
Brak	OxA-7479	4040 $\pm$ 40	K	charred seeds	Matthews 2003b
Brak	BM-2511	3960 $\pm$ 90	L	humic acids	Oates, Oates, and McDonald 2001
Brak	BM-1971R	3860 $\pm$ 100	L	charred seeds	Oates, Oates, and McDonald 2001
Brak	BM-2531R	3840 $\pm$ 50	L	humins	Oates, Oates, and McDonald 2001
Brak	BM-1972R	3710 $\pm$ 100	L	charred seeds	Oates, Oates, and McDonald 2001
Brak	BM-1973R	3870 $\pm$ 100	L	charcoal	Oates, Oates, and McDonald 2001
Brak	BM-1760R	4240 $\pm$ 100	L	charcoal	Oates, Oates, and McDonald 2001
Brak	BM-1763R	3730 $\pm$ 100	L	charred seeds	Oates, Oates, and McDonald 2001
Brak	BM-1764R	3710 $\pm$ 100	L	charred seeds	Oates, Oates, and McDonald 2001
Brak	BM-2717	3680 $\pm$ 50	L	charred seeds	Oates, Oates, and McDonald 2001
Brak	OxA-7483	3915 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7484	3695 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7485	3860 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7481	3870 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7480	3790 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7489	3830 $\pm$ 40	L	charred seeds	Matthews 2003b
Brak	OxA-7482	3880 $\pm$ 40	L	charred seeds	Matthews 2003b

Khuera	KN-5730	4120 ± 40	Ic	charcoal	Weninger, Neef, and Meyer 2010
Khuera	KN-5731	3985 ± 35	Ic	seeds	Weninger, Neef, and Meyer 2010
Khuera	KN-5732	4105 ± 40	Ic	charcoal	Weninger, Neef, and Meyer 2010
Khuera	KN-5733	3870 ± 30	Id	charcoal	Weninger, Neef, and Meyer 2010
Khuera	KN-5734	3825 ± 30	Id	charcoal	Weninger, Neef, and Meyer 2010
<b>Khuera</b>	<b>KN-5735</b>	<b>3970 ± 40</b>	<b>Ic</b>	<b>seeds and charcoal</b>	<b>Weninger, Neef, and Meyer 2010</b>
Khuera	KN-5736	3975 ± 40	Ie	charcoal	Weninger, Neef, and Meyer 2010
Khuera	KN-5737	3965 ± 35	Ic	seeds and charcoal	Weninger, Neef, and Meyer 2010
Khuera	KN-5738	3905 ± 35	Ic	seeds	Weninger, Neef, and Meyer 2010
Beydar	OxA-10184	4255 ± 40	II-IIIa	seeds	Lebeau and Milano 2003
Beydar	LTL-1074A	4163 ± 50	II-IIIa	seeds	Milano and Rova 2008
<b>Beydar</b>	<b>LTL-1070A</b>	<b>4131 ± 45</b>	<b>II-IIIa</b>	<b>seeds</b>	<b>Lebeau and Bianchi 2011</b>
<b>Beydar</b>	<b>OxA-10285</b>	<b>3800 ± 40</b>	<b>II-IIIa</b>	<b>charcoal</b>	<b>Lebeau and Milano 2003</b>
Beydar	OxA-10170	4070 ± 45	II-IIIa	seeds	Lebeau and Milano 2003
Beydar	LTL-1069A	4091 ± 45	IIIa-IIIb	seeds	Lebeau and Bianchi 2011
Beydar	OxA-10232	3934 ± 30	IIIa-IIIb	seeds	Lebeau and Milano 2003
Beydar	OxA-10150	3935 ± 65	IIIa-IIIb	seeds	Lebeau and Milano 2003
Beydar	OxA-10157	3955 ± 40	IIIa-IIIb	seeds	Lebeau and Milano 2003
Beydar	LTL-1116A	4016 ± 45	IIIa-IIIb	charcoal	Milano and Rova 2008
Beydar	LTL-1113A	3945 ± 45	IIIa-IIIb	charcoal	Milano and Rova 2008
Beydar	LTL-1112A	3940 ± 50	IIIa-IIIb	charcoal	Milano and Rova 2008
Beydar	LTL-1068A	3884 ± 45	IIIa-IIIb	seeds	Milano and Rova 2008
Beydar	LTL-1073A	3878 ± 45	IIIa-IIIb	seeds	Milano and Rova 2008
Beydar	LTL-1081A	3851 ± 45	IIIa-IIIb	charcoal	Lebeau and Bianchi 2011
Beydar	LTL-1075A	3925 ± 50	IIIa-IIIb	seeds	Lebeau and Bianchi 2011
Beydar	LTL-1067A	3894 ± 50	IIIb	charcoal	Milano and Rova 2008
Beydar	OxA-10151	3970 ± 55	IIIb	charcoal	Lebeau and Milano 2003

Beydar	OxA-10155	3965 ± 45	IIIb	charcoal	Lebeau and Milano 2003
Beydar	OxA-10156	3910 ± 45	IIIb	seeds	Lebeau and Milano 2003
<b>Beydar</b>	<b>OxA-10171</b>	<b>4025 ± 50</b>	<b>IIIb</b>	<b>charcoal</b>	<b>Lebeau and Milano 2003</b>
Beydar	OxA-10158	3885 ± 45	IIIb	charcoal	Lebeau and Milano 2003
Beydar	LTL-1115A	3852 ± 45	IIIb	charcoal	Milano and Rova 2008
Beydar	LTL-1072A	3900 ± 35	IIIb	seeds	Milano and Rova 2008
Beydar	LTL-2956a	3895 ± 35	IIIb	seeds	Lebeau and Bianchi 2011
<b>Beydar</b>	<b>LTL-2957a</b>	<b>3755 ± 40</b>	<b>IIIb</b>	<b>seeds</b>	<b>Lebeau and Bianchi 2011</b>
<b>Beydar</b>	<b>LTL-2958a</b>	<b>3755 ± 45</b>	<b>Akkadian</b>	<b>seeds</b>	<b>Lebeau and Bianchi 2011</b>
Beydar	LTL-1114a	3801 ± 55	Akkadian	charcoal	Lebeau and Bianchi 2011
Beydar	LTL-1065a	3902 ± 40	Akkadian	wood	Lebeau and Bianchi 2011
<b>Beydar</b>	<b>OxA-10168</b>	<b>3970 ± 45</b>	<b>Akkadian</b>	<b>seeds</b>	<b>Lebeau and Milano 2003</b>
Beydar	OxA-10169	3855 ± 40	Akkadian	seeds	Lebeau and Milano 2003
Beydar	LTL-2954A	3820 ± 60	Akkadian	charcoal	Lebeau and Bianchi 2011
Beydar	LTL-2955A	3800 ± 80	Akkadian	charcoal	Lebeau and Bianchi 2011
Mozan	UCI-145	4340 ± 170	Ninevite 5	charcoal	Buccellati and Kelly-Buccellati 1995a
Mozan	UCI-144	3930 ± 60	ED	charcoal	Buccellati and Kelly-Buccellati 1995a
Raqa'i	Ute-822	4020 ± 90	Ninevite 5	seeds	Curvers and Schwartz 1990
Raqa'i	Ute-823	4020 ± 70	Ninevite 5	seeds	Curvers and Schwartz 1990
Kazane	AA-68981	3939 ± 41	ED	seeds	Creekmore 2008
Kazane	AA-68983	3911 ± 44	ED	burnt material (probably wood)	Creekmore 2008
Kazane	AA-68982	3958 ± 44	ED	burnt barley	Creekmore 2008
Kerna	OxA-2082	4230 ± 70	Ninevite 5?	charred seeds	Saghieh 1991
Kerna	OxA-2083	4100 ± 70	Ninevite 5?	wood charcoal	Saghieh 1991
Ziyadeh	AA-30483	4210 ± 50	Ninevite 5	seeds	Hole 2001
Ziyadeh	AA-30484	4445 ± 50	Ninevite 5	seeds	Hole 2001
Ziyadeh	AA-30486	4415 ± 50	Ninevite 5	seeds	Hole 2001

Ziyadeh	AA-30485	4385 ± 50	Ninevite 5	seeds	Hole 2001
Tell Kuran	Beta 75959	4710 ± 60	Late Uruk	?	Hole 2001
Tell Kuran	AA30487	4625 ± 70	Late Uruk	?	Hole 2001
Brak	OxA-7538	5015 ± 55	F	ash	Felli 2003
<b>Brak</b>	<b>OxA-7541</b>	<b>3875 ± 45</b>	<b>F</b>	<b>charred seeds</b>	<b>Felli 2003</b>
<b>Brak</b>	<b>OxA-7542</b>	<b>5140 ± 50</b>	<b>F</b>	<b>charred seeds</b>	<b>Felli 2003</b>
Brak	OxA-7540	4900 ± 50	F	charred seeds	Felli 2003
Brak	OxA-7543	4895 ± 45	F	charred seeds	Felli 2003
Brak	OxA-7539	4750 ± 45	F	charred seeds	Felli 2003
Brak	OxA-7629	4875 ± 45	F	ash	Felli 2003
Brak	BM-2900	4660 ± 35	F	grain	Oates and Oates 1994
Brak	BM-2901	4570 ± 35	F	grain	Oates and Oates 1994
Brak	BM-2914	5670 ± 60	F	charred wood	Oates and Oates 1994
Brak	BM-2915	4650 ± 50	F	charred wood	Oates and Oates 1994
Brak	OxA-7544	4070 ± 45	J	seeds	Matthews 2003b
Brak	OxA-7545	4105 ± 45	J-K	seeds	Matthews 2003b
<b>Brak</b>	<b>BM-1758R</b>	<b>3720 ± 100</b>	<b>K</b>	<b>charcoal</b>	<b>Oates 1982</b>
<b>Brak</b>	<b>BM-1759R</b>	<b>3770 ± 110</b>	<b>K</b>	<b>charcoal</b>	<b>Oates 1982</b>
Brak	BM-1761R	4210 ± 210	K	ash	Oates and Oates 1994
Brak	OxA-7490	4155 ± 45	K	seeds	Matthews 2003b
<b>Brak</b>	<b>OxA-7546</b>	<b>3990 ± 45</b>	<b>K</b>	<b>seeds</b>	<b>Matthews 2003b</b>
<b>Brak</b>	<b>OxA-7348</b>	<b>4730 ± 100</b>	<b>K</b>	<b>seeds</b>	<b>Matthews 2003b</b>
Brak	OxA-7548	4150 ± 45	K	seeds	Matthews 2003b
Brak	OxA-7547	4110 ± 45	K	seeds	Matthews 2003b
<b>Brak</b>	<b>OxA-7491</b>	<b>4395 ± 45</b>	<b>K</b>	<b>seeds</b>	<b>Matthews 2003b</b>
Brak	OxA-7492	4090 ± 45	K	seeds	Matthews 2003b
Brak	OxA-7549	4110 ± 45	K	seeds	Matthews 2003b

Brak	OxA-7479	4040 ± 40	K	seeds	Matthews 2003b
Brak	BM-2511	3960 ± 90	L	humic acids	Oates, Oates, and McDonald 2001
Brak	BM-1971R	3860 ± 100	L	seeds	Oates, Oates, and McDonald 2001
Brak	BM-2531	3840 ± 50	L	humins	Oates, Oates, and McDonald 2001
Brak	BM-1972R	3710 ± 100	L	seeds	Oates, Oates, and McDonald 2001
Brak	BM-1973R	3870 ± 100	L	charcoal	Oates, Oates, and McDonald 2001
Brak	Beta-110930	4040 ± 50	M	carbonised seeds	Courty 2001
Brak	Beta-125320	4170 ± 40	M	carbonised seeds	Courty 2001
Brak	BM-1760R	4240 ± 100	L	charcoal	Oates, Oates, and McDonald 2001
Brak	BM-1763R	3730 ± 100	L	seeds	Oates, Oates, and McDonald 2001
Brak	BM-1764R	3710 ± 100	L	seeds	Oates, Oates, and McDonald 2001
Brak	BM-2717	3680 ± 50	L	seeds	Oates, Oates, and McDonald 2001
Brak	BM-1765R	3680 ± 100	L	grain	Oates and Oates 1994
Brak	OxA-7483	3915 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7484	3695 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7485	3860 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7481	3870 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7480	3790 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7489	3830 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7482	3880 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7488	3850 ± 45	L	seeds	Matthews 2003b
Brak	OxA-7486	3825 ± 40	L	seeds	Matthews 2003b
Brak	OxA-7487	3780 ± 40	L	seeds	Matthews 2003b
Brak	Comb. CH Level 6	3846 ± 38	L	combined	Lebeau and Bianchi 2011
Brak	OxA-7623	3815 ± 40	M	seeds	Matthews 2003b
Brak	BM-2554	3990 ± 50	M	charcoal	Oates, Oates, and McDonald 2001
Brak	BM-2556	3960 ± 50	M	charcoal	Oates, Oates, and McDonald 2001

Brak	BM-2687	3700 ± 80	M	charcoal	Oates, Oates, and McDonald 2001
Brak	BM-2688	3780 ± 50	M	charcoal	Oates, Oates, and McDonald 2001
<b>Brak</b>	<b>BM-1970R</b>	<b>3820 ± 100</b>	<b>N</b>	<b>charcoal</b>	<b>Oates, Oates, and McDonald 2001</b>
Brak	BM-2555	3730 ± 50	N	charcoal	Oates, Oates, and McDonald 2001

Appendix 4: <sup>14</sup>C dates from Tell Leilan

Lab. no.	Date (yr BP)	Period	Material	Context	Source
UM-1817	6580 ± 100	VIa	wood, grain	Stratum 58	Schwartz 1988
UM-1812	4705 ± 85	IV	grain	Straum 44	Schwartz 1988
UM-1813	4735 ± 110	IIIa	grain	Stratum 38	Schwartz 1988
UM-1815	4625 ± 85	IIIa	wood, grain	Stratum 35	Schwartz 1988
UM-1814	4890 ± 70	IIIb	grain	Stratum 34	Schwartz 1988
N-3899	4210 ± 85	IIIb	grain	Stratum 34	Schwartz 1988
UM-1777	4090 ± 70	IIIc	grain	Stratum 20	Schwartz 1988
UM-3099	4060 ± 60	IIIc	grain	Stratum 20	Schwartz 1988
N-3898	4070 ± 70	IIIc	grain	Stratum 20	Schwartz 1988
N-3897	3970 ± 85	IIIc	grain	Stratum 20	Schwartz 1988
UM-3098	2870 ± 130	IIIc	grain	Stratum 19	Schwartz 1988
N-3896	4980 ± 80	IIIc	wood	Stratum 19	Schwartz 1988
Beta-1777	4090 ± 70	IIIc	carbonised seeds	Acrop NW Stratum 20	Weiss et al. 1993
K-5154	3850 ± 85	IIIc	charred seeds	Acrop NW Stratum 15	Weiss et al. 1993
K-5158	4060 ± 70	IIIc	carbonised seeds	Acrop NW Stratum 15	Weiss et al. 1993
Beta-3099	4060 ± 60	IIIc	charred seeds	Acrop NW Stratum 20	Weiss et al. 1993
CAMS-81869	4075 ± 25	IIa	seeds	44W13 15	Weiss et al. 2002
CAMS-81870	4065 ± 25	IIa	seeds	44W13 15	Weiss et al. 2002
CAMS-81871	4070 ± 25	IIa	seeds	44W13 15	Weiss et al. 2002
CAMS-81872	4060 ± 25	IIa	seeds	44W13 15	Weiss et al. 2002
CAMS-81873	4075 ± 25	IIa	seeds	44W13 15	Weiss et al. 2002
K-5153	3870 ± 100	IIa	charred seeds	Op. 1 Stratum 14	Weiss et al. 1993
K-5155	4070 ± 85	IIa	charred seeds	Op. 1 Stratum 14	Weiss et al. 1993
K-5156	4090 ± 85	IIa	charred seeds	Op. 1 Stratum 14	Weiss et al. 1993
K-5157	4140 ± 85	IIa	charred seeds	Op. 1 Stratum 14	Weiss et al. 1993
CAMS-130605	3815 ± 25	IIa	seeds	L06 44T16 38.15	Weiss 2012

CAMS-130606	3835 ± 25	seeds	IIa	L06 44T16 38.15	Weiss 2012
CAMS-130607	3855 ± 25	seeds	IIa	L06 44T16 38.15	Weiss 2012
CAMS-104161	3845 ± 35	seeds	IIb3	L02 44W16 415	Ristvet 2011
CAMS-104162	3840 ± 30	seeds	IIb3	L02 44W16 415	Ristvet 2011
CAMS-130631	3820 ± 25	seeds	IIb2	L06 44T15 Jaws 7	Weiss 2012
CAMS-130632	3850 ± 25	seeds	IIb2	L06 44T15 Jaws 7	Weiss 2012
CAMS-130596	3770 ± 25	seeds	IIb2	L02 44V15 200.3:5	Weiss 2012
CAMS-130617	3840 ± 20	seeds	IIb2	L06 44S16 114:7	Weiss 2012
CAMS-130618	3770 ± 20	seeds	IIb2	L06 44S16 114:7	Weiss 2012
CAMS-130619	3790 ± 20	seeds	IIb2	L06 44S16 114:7	Weiss 2012
CAMS-131478	3775 ± 20	seeds	IIb2	L06 44S16 114:7	Weiss 2012
CAMS-131479	3800 ± 20	seeds	IIb2	L06 44S16 114:7	Weiss 2012
CAMS-130620	3760 ± 20	seeds	IIb2	L06 44S16 209:10	Weiss 2012
CAMS-130621	3800 ± 25	seeds	IIb2	L06 44S16 209:10	Weiss 2012
CAMS-130622	3825 ± 25	seeds	IIb2	L06 44S16 209:10	Weiss 2012
CAMS-131480	3760 ± 20	seeds	IIb2	L06 44S16 209:10	Weiss 2012
CAMS-131481	3770 ± 20	seeds	IIb2	L06 44S16 209:10	Weiss 2012
CAMS-130611	3820 ± 25	seeds	IIb2	L06 44T15 43.24	Weiss 2012
CAMS-130612	3800 ± 20	seeds	IIb2	L06 44T15 43.24	Weiss 2012
CAMS-130613	3815 ± 20	seeds	IIb2	L06 44T15 43.24	Weiss 2012
CAMS-130629	3835 ± 25	seeds	IIb2	L06 44T16 100.19	Weiss 2012
CAMS-130630	3850 ± 25	seeds	IIb2	L06 44T16 100.19	Weiss 2012
CAMS-130597	3745 ± 25	seeds	IIb2	L06 44V15 200.3	Weiss 2012
CAMS-130598	3765 ± 25	seeds	IIb2	L06 44V15 200.9	Weiss 2012
CAMS-130602	3810 ± 25	seeds	IIb2	L06 44V15 200.9	Weiss 2012
CAMS-130603	3815 ± 25	seeds	IIb2	L06 44V15 200.9	Weiss 2012
CAMS-130604	3825 ± 25	seeds	IIb2	L06 44V15 200.9	Weiss 2012

CAMS-130599	3770 ± 20	IIb2	seeds	L06 44V15 42.7	Weiss 2012
CAMS-130600	3795 ± 20	IIb2	seeds	L06 44V15 42.7	Weiss 2012
CAMS-130601	3785 ± 25	IIb2	seeds	L06 44V15 42.7	Weiss 2012
CAMS-134347	3785 ± 25	IIb1	seeds	44S15 13:89	Weiss 2012
CAMS-134348	3800 ± 20	IIb1	seeds	44S15 13:89	Weiss 2012
CAMS-134349	3820 ± 20	IIb1	seeds	44S15 13:89	Weiss 2012
CAMS-134350	3780 ± 25	IIb1	seeds	44S16 210 L1: 31	Weiss 2012
CAMS-134351	3740 ± 20	IIb1	seeds	44S16 210 L1: 31	Weiss 2012
CAMS-134352	3735 ± 20	IIb1	seeds	44S16 210 L1: 31	Weiss 2012
CAMS-130623	3825 ± 25	IIb1	seeds	L06 44S16 206:16	Weiss 2012
CAMS-130624	3790 ± 25	IIb1	seeds	L06 44S16 206:16	Weiss 2012
CAMS-130625	3775 ± 25	IIb1	seeds	L06 44S16 206:16	Weiss 2012
CAMS-131482	3765 ± 20	IIb1	seeds	L06 44S16 206:16	Weiss 2012
CAMS-131483	3745 ± 20	IIb1	seeds	L06 44S16 206:16	Weiss 2012
CAMS-130626	3795 ± 30	IIb1	seeds	L06 44S16 210.4:13	Weiss 2012
CAMS-130627	3835 ± 25	IIb1	seeds	L06 44S16 210.4:13	Weiss 2012
CAMS-130628	3805 ± 30	IIb1	seeds	L06 44S16 210.4:13	Weiss 2012
CAMS-130608	3820 ± 25	IIb1	seeds	L06 44T15 21.30	Weiss 2012
CAMS-130609	3830 ± 20	IIb1	seeds	L06 44T15 21.30	Weiss 2012
CAMS-130610	3810 ± 20	IIb1	seeds	L06 44T15 21.30	Weiss 2012
CAMS-130633	3835 ± 25	IIb1	seeds	L06 44S16 113.15	Weiss 2012
CAMS-130634	3885 ± 25	IIb1	seeds	L06 44S16 113.15	Weiss 2012
CAMS-130635	3870 ± 25	IIb1	seeds	L06 44S16 113.15	Weiss 2012
CAMS-130636	3815 ± 25	IIb1	seeds	L06 44S16 113.15	Weiss 2012
CAMS-81861	3810 ± 25	IIc	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81862	3835 ± 25	IIc	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81863	3825 ± 30	IIc	seeds	L99 44W16 29	Weiss et al. 2002

CAMS-81864	3840 ± 25	IIC	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81865	3865 ± 25	IIC	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81866	3805 ± 25	IIC	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81867	3800 ± 25	IIC	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-81868	3830 ± 30	IIC	seeds	L99 44W16 29	Weiss et al. 2002
CAMS-134344	3825 ± 20	IIC	seeds	44S16 R3 105	Weiss 2012
CAMS-134345	3830 ± 20	IIC	seeds	44S16 R3 105	Weiss 2012
CAMS-134346	3800 ± 20	IIC	seeds	44S16 R3 105	Weiss 2012
CAMS-104154	3775 ± 35	IIC	seeds	L02 44S16 33	Ristvet 2011
CAMS-104155	3790 ± 35	IIC	seeds	L02 44S16 33	Ristvet 2011
CAMS-104156	3765 ± 35	IIC	seeds	L02 44S16 33	Ristvet 2011
CAMS-104157	3755 ± 35	IIC	seeds	L02 44S16 33	Ristvet 2011
CAMS-130614	3815 ± 20	IIC	seeds	L06 44S16 108:16	Weiss 2012
CAMS-130615	3800 ± 20	IIC	seeds	L06 44S16 108:16	Weiss 2012
CAMS-130616	3760 ± 20	IIC	seeds	L06 44S16 108:16	Weiss 2012
CAMS-131476	3830 ± 20	IIC	seeds	L06 44S16 108:16	Weiss 2012
CAMS-131477	3815 ± 20	IIC	seeds	L06 44S16 108:16	Weiss 2012
CAMS-144000	3610 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.1	Weiss 2012
CAMS-142773	3770 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.1	Weiss 2012
CAMS-144001	3705 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.1	Weiss 2012
CAMS-142774	3680 ± 30	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.2	Weiss 2012
CAMS-142775	3620 ± 20	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.2	Weiss 2012
CAMS-142776	3700 ± 20	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.3	Weiss 2012
CAMS-143997	3770 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.3	Weiss 2012
CAMS-144002	3940 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 39 s3.3.2	Weiss 2012
CAMS-142811	3605 ± 25	Post-IIC or residual	seeds	L99 44W17 Lot 44 s19	Weiss 2012
CAMS-142812	3810 ± 20	Post-IIC or residual	seeds	L99 44W17 Lot 44 s19	Weiss 2012

CAMS-143998	3785 ± 30	Post-IIc or residual	seeds	L99 44W17 Lot 44 s19	Weiss 2012
CAMS-143999	3590 ± 30	Post-IIc or residual	seeds	L99 44W17 Lot 44 s19	Weiss 2012
CAMS-142813	3650 ± 30	Post-IIc or residual	seeds	L99 44W17 Lot 44 s20	Weiss 2012
CAMS-104158	2810 ± 30	Post-IIc or residual	seeds	L02 44S16 30	Weiss2012
CAMS-104159	3990 ± 30	Post-IIc or residual	seeds	L02 44S16 30	Weiss 2012
CAMS-104160	3875 ± 30	Post-IIc or residual	seeds	L02 44S16 30	Weiss 2012
CAMS-94333	4040 ± 30	IIIId	charred seeds	L02 CG Lot 128 Phase 2	Ristvet2004
CAMS-94331	4070 ± 35	IIIId	charred seeds	L02 CG Lot 128 Phase 2	Ristvet2004
CAMS-94332	4065 ± 30	IIIId	charred seeds	L02 CG Lot 128 Phase 2	Ristvet2004
CAMS-94335	4145 ± 30	IIIId	charred seeds	L02 CG Lot 130 Phase 1	Ristvet2004
CAMS-94336	4065 ± 35	IIIId	charred seeds	L02 CG Lot 130 Phase 1	Ristvet2004
CAMS-94334	4045 ± 30	IIIId	charred seeds	L02 CG Lot 130 Phase 1	Ristvet2004
CAMS-94325	4085 ± 30	IIa	charred seeds	L02 CG Lot 126 Phase 3	Ristvet2004
CAMS-94326	4030 ± 30	IIa	charred seeds	L02 CG Lot 126 Phase 3	Ristvet2004
CAMS-94327	4025 ± 30	IIa	charred seeds	L02 CG Lot 126 Phase 3	Ristvet2004
CAMS-94330	4085 ± 30	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94329	4045 ± 30	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94328	4040 ± 30	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94324	4070 ± 30	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94322	4045 ± 30	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94323	4090 ± 35	IIa	charred seeds	L02 CG Lot 127 Phase 3	Ristvet2004
CAMS-94319	3970 ± 30	IIa	charred seeds	L02 CG Lot 110 Phase 3	Ristvet2004
CAMS-94321	3940 ± 30	IIa	charred seeds	L02 CG Lot 110 Phase 3	Ristvet2004

CAMS-94320	4010 ± 30	Charred Seeds	IIa	L02 CG Lot 110 Phase 3	Ristvet2004
AA7022	4020 ± 65	IIa	seeds	Op. 5 Phase 7	Weiss et al. 1993
AA-7023	4020 ± 60	IIa	seeds	Op. 5 Phase 7	Weiss et al. 1993
AA7-025	3940 ± 60	IIa	seeds	Op. 5 Phase 7	Weiss et al. 1993
AA-7026	3930 ± 60	IIa	seeds	Op. 5 Phase 7	Weiss et al. 1993
AA-7028	4005 ± 65	IIa	charred seeds	Op. 5 LTS Phase 6	Weiss et al. 1993
AA-7020	3935 ± 65	IIa	charred seeds	Op. 5 LTS Phase 6	Weiss et al. 1993
AA-7200	3905 ± 60	IIa	charred seeds	Op. 5 LTS Phase 6	Weiss et al. 1993
AA-7019	3960 ± 80	IIb	charred seeds	Op.5 LTS Phase 5	Weiss et al. 1993
AA-7024	3915 ± 65	IIb	charred seeds	Op.5 LTS Phase 5	Weiss et al. 1993
AA-7203	3855 ± 65	IIb	charred seeds	Op.5 LTS Phase 5	Weiss et al. 1993
AA-7204	3780 ± 70	IIb	charred seeds	Op.5 LTS Phase 5	Weiss et al. 1993
AA-7021	3745 ± 60	IIb	charred seeds	Op.5 LTS Phase 5	Weiss et al. 1993
AA7201	3825 ± 65	IIb Terminal	seeds	Op.5 Phase 4	Weiss et al. 1993
AA-8659	3805 ± 75	IIb Terminal	charred seeds	Op.5 Phase 4	Weiss et al. 1993
AA-8661	3610 ± 75	IIb Terminal	charred seeds	Op.5 Phase 4	Weiss et al. 1993
AA-7202	3885 ± 65	IIb	charred seeds	Op.5 LTS Phase 4	Weiss et al. 1993

Appendix 5:  $^{14}\text{C}$  dates from Iran. Outliers are marked in red.

Site	Lab. no.	Date (yr BP)	Period	Material	Source
Farukhabad	M-2419	3800 ± 160	Exc. B, L. 23	charcoal	Crane and Griffin 1972
Farukhabad	M-2151	3990 ± 180	Exc. B, L. 23	charcoal	Crane and Griffin 1972
Farukhabad	M-2152	4460 ± 190	Exc. A, L. 21	charcoal	Crane and Griffin 1972
Farukhabad	M-2153	5760 ± 200	Exc. B, L. 45	charcoal	Crane and Griffin 1972
Susa	TUNC-58	5665 ± 121	Susa I	charcoal	Bovington, Mahdavi, and Masoumi 1973
Susa	TUNC-59	4650 ± 90	Susa I	charcoal	Bovington, Mahdavi, and Masoumi 1973
Susa	P-912	5418 ± 40	Susa II?	charcoal and ash	Stuckenrath, Coe, and Ralph 1966
Susa	Gif-180	3175 ± 250	Susa II?	ashes with remains of bones	Delibrias, Guillier, and Labeyrie 1970
Susa	IRPA-25	5093 ± 105	Susa IV?	charcoal (Salix or Populus)	Schreurs 1968
Susa	IRPA-26	3140 ± 150	Susa IV?	charcoal (Salix or Populus)	Schreurs 1968
Susa	P-913	3703 ± 124	Susa I?	ash	Stuckenrath, Coe, and Ralph 1966
Susa	SPr-46	2269 ± 140	Susa III?	ash and charcoal?	Steve and Gasche 1971
Susa	SPr-43	4740 ± 220	Susa II	ash and charcoal?	Steve and Gasche 1971
Susa	GrN-6051	5040 ± 40	Susa II	charcoal	Steve and Gasche 1971
Susa	GrN-6053	5015 ± 90	Susa II	ash and charcoal?	Steve and Gasche 1971
Susa	GrN-6052	5370 ± 40	Susa I	ash and charcoal?	Steve and Gasche 1971
Susa	GrN-6054	5275 ± 75	Susa I	ash and charcoal?	Steve and Gasche 1971
<b>Tepe Yahya</b>	<b>GX-1737</b>	<b>3290 ± 120</b>	<b>VIB1</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	GX-1728	5610 ± 140	VIB1/2	?	Prickett 1986
<b>Tepe Yahya</b>	<b>Beta-6477</b>	<b>6870 ± 550</b>	<b>VIA</b>	<b>?</b>	<b>Prickett 1986</b>
<b>Tepe Yahya</b>	<b>TF-1139</b>	<b>4195 ± 110</b>	<b>VI</b>	<b>charcoal</b>	<b>Agrawal and Kusumgar 1973</b>
Tepe Yahya	GX-1736	3290 ± 120	VC	?	Prickett 1986
Tepe Yahya	Beta-6476	5210 ± 130	VB	?	Prickett 1986
Tepe Yahya	WSU-872	5580 ± 280	VA	?	Prickett 1986
Tepe Yahya	Beta-6469	4650 ± 230	IVC2	?	Prickett 1986
Tepe Yahya	GX-1730	4590 ± 180	IVC2	?	Prickett 1986
<b>Tepe Yahya</b>	<b>GX-5161</b>	<b>3720 ± 175</b>	<b>IVC2</b>	<b>?</b>	<b>Prickett 1986</b>

Tepe Yahya	GX-5159	4310 ± 195	IVC1	?	Prickett 1986
Tepe Yahya	GX-5160	4150 ± 275	IVC1	?	Prickett 1986
<b>Tepe Yahya</b>	<b>TUNC-37</b>	<b>4725 ± 115</b>	<b>IVB6</b>	<b>?</b>	<b>Prickett 1986</b>
<b>Tepe Yahya</b>	<b>Beta-6472</b>	<b>3560 ± 140</b>	<b>IVB6</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	New-series-2	3665 ± 140	IVB5	seeds	Potts 2001
Tepe Yahya	New-series-3	3690 ± 55	IVB5	charcoal	Potts 2001
Tepe Yahya	New-series-4	3835 ± 55	IVB5	charcoal	Potts 2001
Tepe Yahya	New-series-6	3790 ± 55	IVB5	charcoal	Potts 2001
Tepe Yahya	New-series-7	3690 ± 65	IVB5	charcoal	Potts 2001
Tepe Yahya	New-series-8	3715 ± 90	IVB5	charcoal	Potts 2001
Tepe Yahya	New-series-9	3675 ± 110	IVB5	charcoal	Potts 2001
<b>Tepe Yahya</b>	<b>GX-1726</b>	<b>2595 ± 120</b>	<b>IVB5</b>	<b>grain</b>	<b>Prickett 1986</b>
<b>Tepe Yahya</b>	<b>Beta-6475</b>	<b>2950 ± 60</b>	<b>IVB5</b>	<b>grain</b>	<b>Prickett 1986</b>
<b>Tepe Yahya</b>	<b>GX-1727</b>	<b>4430 ± 360</b>	<b>IVB5</b>	<b>?</b>	<b>Prickett 1986</b>
<b>Tepe Yahya</b>	<b>TF-1143</b>	<b>4150 ± 130</b>	<b>IVB5</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	New-series-1	3800 ± 135	IVB5/4	seeds	Potts 2001
Tepe Yahya	New-series-5	3675 ± 55	IVB2	charcoal	Potts 2001
<b>Tepe Yahya</b>	<b>GX-1735</b>	<b>11140 ± 360</b>	<b>IVB1</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	Beta-6470	3610 ± 70	IVB1	?	Prickett 1986
Tepe Yahya	GX-1734	5320 ± 170	IVB4-1	?	Prickett 1986
<b>Tepe Yahya</b>	<b>WSU-876</b>	<b>5395 ± 310</b>	<b>IVB?</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	Beta-6473	3300 ± 70	IVA?	?	Prickett 1986
<b>Tepe Yahya</b>	<b>Beta-6471</b>	<b>2530 ± 70</b>	<b>IVA?</b>	<b>?</b>	<b>Prickett 1986</b>
Tepe Yahya	Beta-6474	3240 ± 120	IVA?	?	Prickett 1986
Tepe Yahya	TUNC-38	4254 ± 84	VB	?	Prickett 1986
Tepe Yahya	TF-1136	4130 ± 85	VA/B	charcoal	Agrawal and Kusumgar 1973
Tepe Yahya	Beta-6483	4060 ± 83	VA	?	Prickett 1986

Tepe Yahya	Beta-6560	5060 ± 110	VA	?	Prickett 1986
Tepe Yahya	TUNC-39	3859 ± 73	IVB?	?	Prickett 1986
Tale Malyan	P-3060	5040 ± 270	Early Banesh	charcoal	Sumner 2003
Tale Malyan	P-2335	4390 ± 90	Middle Banesh	charcoal	Fishman and Lawn 1978
Tale Malyan	P-2334	4460 ± 70	Middle Banesh	charcoal	Fishman and Lawn 1978
Tale Malyan	P-2336	4630 ± 260	Middle Banesh	charcoal	Fishman and Lawn 1978
Tale Malyan	TUNC-31	4671 ± 88	Middle Banesh	charcoal	Bovington, Mahdavi, and Masoumi 1973
Tale Malyan	P-2187	4370 ± 60	Middle Banesh	charcoal	Fishman and Lawn 1978
Tale Malyan	P-3266	4410 ± 60	Middle Banesh	charcoal	Sumner 2003
Tale Malyan	P-3063	4430 ± 70	Middle Banesh	charcoal	Nicholas 1990
Tale Malyan	P-2985	4450 ± 60	Middle Banesh	charcoal	Nicholas 1990
Tale Malyan	P-3269	4480 ± 50	Middle Banesh	charcoal	Sumner 2003
Tale Malyan	P-3061	4490 ± 70	Middle Banesh	charcoal	Nicholas 1990
Tale Malyan	P-3050	4500 ± 60	Middle Banesh	charcoal	Nicholas 1990
Tale Malyan	P-3268	4520 ± 70	Middle Banesh	charcoal	Sumner 2003
Tale Malyan	P-2986	4590 ± 70	Middle Banesh	charcoal	Nicholas 1990
Tale Malyan	P-2333	4150 ± 250	Middle Banesh	charcoal	Fishman and Lawn 1978
Tale Malyan	P-2984	4770 ± 290	Late Banesh	charcoal	Sumner 2003
Tale Malyan	P-2981	4780 ± 60	Late Banesh	charcoal	Sumner 2003
Tale Malyan	P-2982	4260 ± 70	Late Banesh	charcoal	Sumner 2003
Tale Malyan	P-2063	3430 ± 60	Kaftari	charcoal	Fishman and Lawn 1978
Tale Malyan	P-2062	3560 ± 60	Kaftari	charcoal	Fishman and Lawn 1978
Tale Malyan	TUNC-28	3510 ± 63	Kaftari	charcoal	Bovington, Mahdavi, and Masoumi 1973
Tale Malyan	TUNC-29	3526 ± 61	Kaftari	charcoal	Bovington, Mahdavi, and Masoumi 1973
Tale Malyan	TUNC-30	3531 ± 63	Kaftari	charcoal	Bovington, Mahdavi, and Masoumi 1973
Tale Malyan	P-2186	3670 ± 60	Kaftari	charcoal	Sumner 2003
Tale Malyan	P-3067	4150 ± 210	Kaftari	charcoal	Sumner 2003



Tal-e Malyan	P-3068	3980 ± 80	Kaftari	charcoal	Summer 2003
Tal-e Malyan	P-3347	3510 ± 50	Kaftari	charcoal	Summer 2003
Tal-e Malyan	P-3072	4170 ± 260	Kaftari	charcoal	Summer 2003
Tal-e Kureh	Beta-382381	4540 ± 30	Early Banesh	bone	Alden and Petrie 2015
Tal-e Kureh	Beta-382379	4600 ± 30	Early Banesh	bone	Alden and Petrie 2015
Tal-e Kureh	P-2624	5000 ± 290	Lapui	charcoal	Meulengracht, McGovern, and Lawn 1981
Tal-e Kureh	P-2626	4550 ± 280	Lapui/Banesh Transitional	charcoal	Meulengracht, McGovern, and Lawn 1981
Tal-e Kureh	P-2627	4360 ± 230	Lapui/Banesh Transitional	charcoal	Meulengracht, McGovern, and Lawn 1981
Tal-e Kureh	Beta-382382	4680 ± 30	Lapui/Banesh Transitional	bone	Alden and Petrie 2015
Tal-e Kureh	Beta-382380	4230 ± 30	Lapui/Banesh Transitional	bone	Alden and Petrie 2015
Godin	GaK-1074	4730 ± 120	Godin VII	?	Cuyler Young 1969
Godin	GaK-1073	5710 ± 100	Godin VII	?	Cuyler Young 1969
Godin	GaK-1075	6700 ± 110	Godin VI	?	Cuyler Young 1969
Godin	Beta-231151	4600 ± 60	Godin VI/V	wood	Gopnik and Rothman 2008
Godin	SI-2677	4290 ± 80	Godin VI/V	?	Voigt and Dyson 1992
Godin	SI-2673	4580 ± 75	Godin VI/V	?	Dyson 1987
Godin	SI-2678	4465 ± 75	Godin VI/V	?	Dyson 1987
Godin	SI-2671	4520 ± 80	Godin VI/V	?	Dyson 1987
Godin	SI-2672	4570 ± 80	Godin VI/V	?	Dyson 1987
Godin	SI-2681	4570 ± 55	Godin VI/V	?	Dyson 1987
Godin	SI-2682	4350 ± 90	Late Godin VI/V	?	Voigt and Dyson 1992
Godin	GaK-1071	3803 ± 120	Late Godin IV	?	Cuyler Young 1969
Godin	GaK-1072	4340 ± 100	Early Godin IV	?	Cuyler Young 1969
Godin	SI-2674	4180 ± 80	Godin IV	?	Voigt and Dyson 1992
Godin	SI-2676	4090 ± 80	Godin IV	?	Voigt and Dyson 1992
Godin	Beta-231150	4220 ± 60	Godin IV:1b	?	Gopnik and Rothman 2008
Godin	Beta-231149	4160 ± 50	Godin IV:1a	?	Gopnik and Rothman 2008

Godin	Beta-231148	4110 ± 50	Godin IV:1a	?	Gopnik and Rothman 2008
Godin	SI-4908	3880 ± 50	Late Godin IV	?	Henrickson 1987
Godin	QU-1044	3580 ± 100	Godin III:5	?	Voigt and Dyson 1992
Godin	QU-1041	3660 ± 80	Godin III:5	?	Henrickson 1987
Godin	QU-1043	3580 ± 100	Godin III:5	?	Henrickson 1987
Godin	Beta-231147	4030 ± 40	Godin III:5	?	Gopnik and Rothman 2008
Godin	GaK-1070	4170 ± 100	Godin III:5	?	Cuyler Young 1969
Arisman	Bln-5392	5461 ± 33	Sialk III	charcoal	Görsdorf 2011
Arisman	Bln-5491	5177 ± 36	Sialk III	charcoal	Görsdorf 2011
Arisman	Bln-5531	4908 ± 38	Sialk III	charcoal	Görsdorf 2011
Arisman	Bln-5393	4700 ± 29	Sialk III	charcoal	Görsdorf 2011
Arisman	Bln-5772	4437 ± 33	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5770	4525 ± 35	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5771	4317 ± 42	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5768	4666 ± 39	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5767	4635 ± 35	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5766	4633 ± 39	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5769	4517 ± 41	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5769LI	4495 ± 48	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5769L	4474 ± 37	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5493	4564 ± 33	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5763	4537 ± 39	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5765L	4522 ± 37	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5764L	4518 ± 37	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5492	4514 ± 36	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5492L	4510 ± 37	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5396	4388 ± 35	Sialk IV	charcoal	Görsdorf 2011

Arisman	Bln-5395	4367 ± 34	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5394	4290 ± 36	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5773	4148 ± 31	Sialk IV	charcoal	Görsdorf 2011
Arisman	Bln-5774	4114 ± 38	Sialk IV	charcoal	Görsdorf 2011
Ghabristan	Gif-10227	4530 ± 45	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10409	4130 ± 50	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10408	4720 ± 70	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10225	4730 ± 70	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10411	4700 ± 80	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10412	4890 ± 50	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Ghabristan	Gif-10410	4690 ± 105	Sialk III	bone	Mashkour, Fontugne, and Hatte 1999
Mahtoutabad	LTL-4244A	5284 ± 45	Pre-Uruk	charcoal	Vidale and Desset 2013
Mahtoutabad	LTL-4240A	5038 ± 40	Pre-Uruk	charcoal	Vidale and Desset 2013
Mahtoutabad	LTL-4239A	4805 ± 45	Pre-Uruk	charcoal	Vidale and Desset 2013
Mahtoutabad	LTL-4241A	4745 ± 45	Pre-Uruk	charcoal	Vidale and Desset 2013
Konar Sandal South	Beta-207292	4130 ± 40	ED I/II	charcoal	Madjidzadeh and Pittman 2008
Konar Sandal South	Beta-207287	3830 ± 40	ED III	charcoal	Madjidzadeh and Pittman 2008
Konar Sandal South	Beta-207293	3880 ± 40	ED III	charcoal	Madjidzadeh and Pittman 2008
Konar Sandal South	Beta-207294	3910 ± 40	ED III	charcoal	Madjidzadeh and Pittman 2008
Konar Sandal South	Beta-207285	3920 ± 40	Awan Dynasty	charcoal	Madjidzadeh and Pittman 2008
Konar Sandal South	Beta-207286	3880 ± 40	Awan Dynasty	charcoal	Madjidzadeh and Pittman 2008
Tol-e Norabad	WK-13997	26999 ± 493	?	charcoal	Weeks et al. 2009
Tol-e Norabad	OZI-134	4750 ± 50	Lapui	charcoal	Weeks et al. 2009
Tol-e Norabad	OZI-132	4620 ± 50	Lapui	charcoal	Weeks et al. 2009
Tol-e Norabad	Wk-13998	4682 ± 51	Early Banesh	charcoal	Weeks et al. 2009
Tol-e Norabad	Wk-13999	4476 ± 46	Middle Banesh	charcoal	Weeks et al. 2009
Tol-e Norabad	OZI-135	4160 ± 50	Late Banesh	charcoal	Weeks et al. 2009

Tol-e Spid	OZI-139	5070 ± 60	Lapui	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13980	4981 ± 51	Lapui	charred material	Petrie et al. 2009
Tol-e Spid	OZI-140	4910 ± 40	Lapui	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13979	4821 ± 47	Lapui	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13981	4857 ± 48	Lapui/Banesh Transitional	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13982	4515 ± 46	Kaftari	charred material	Petrie et al. 2009
Tol-e Spid	OZI-141	3360 ± 50	Kaftari	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13983	3643 ± 43	Kaftari	charred material	Petrie et al. 2009
Tol-e Spid	OZI-142	3390 ± 40	Kaftari	charred material	Petrie et al. 2009
Tol-e Spid	Wk-13984	3425 ± 48	Kaftari	charred material	Petrie et al. 2009

# Figures

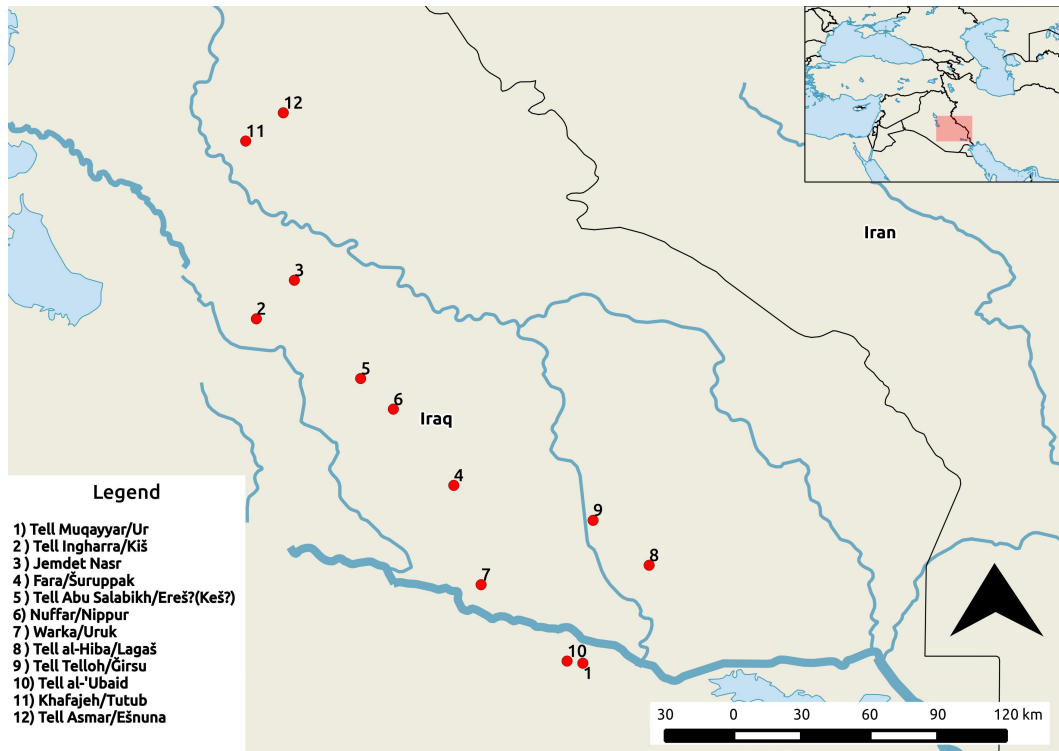


Figure 1: Map showing the location of the relevant Southern Mesopotamian sites

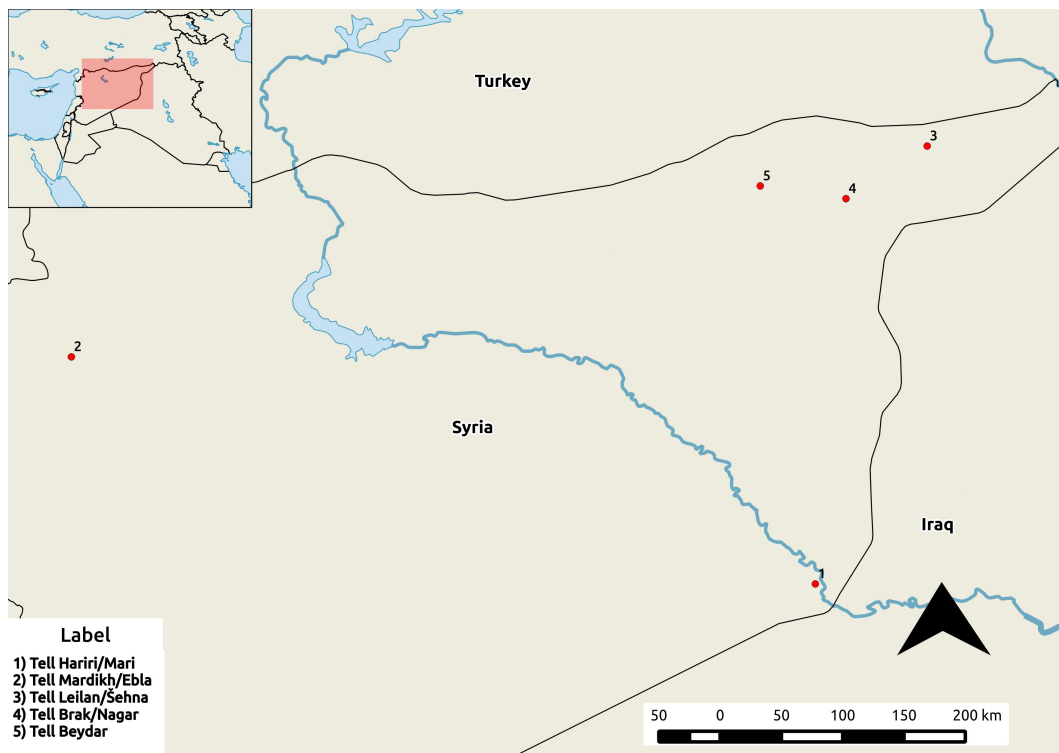


Figure 2: Map of relevant Syrian sites

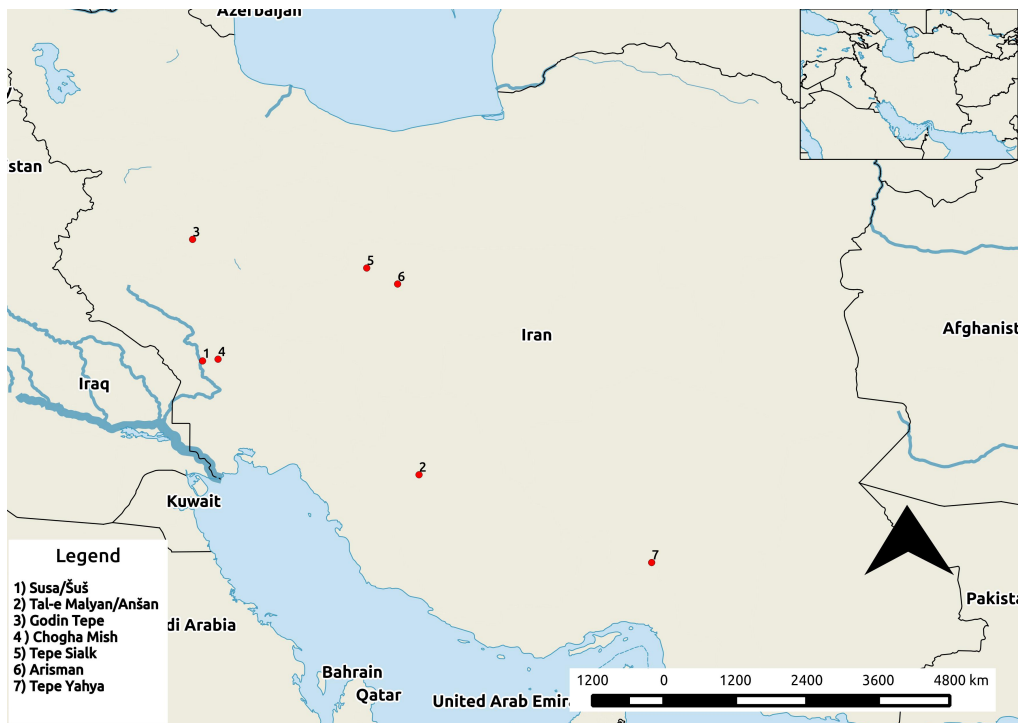


Figure 3: Map of relevant Iranian sites

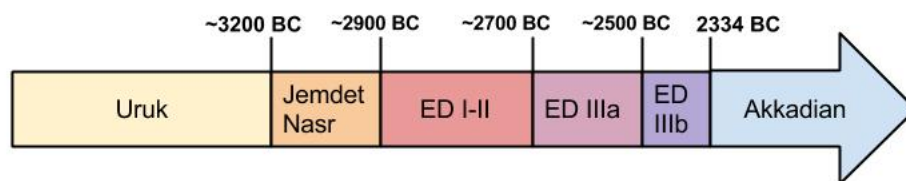


Figure 4: Conventional periodisation of Mesopotamia in the 4<sup>th</sup>-3<sup>rd</sup> millennia BC. Based on Mieroop 2016.



Figure 5: An aerial photograph showing looting at Tell Jokha/Umma, *Preussischer Kulturbesitz*



Figure 6: An 'Ubaid ophidian figurine from Ur; *Penn Museum, Philadelphia*

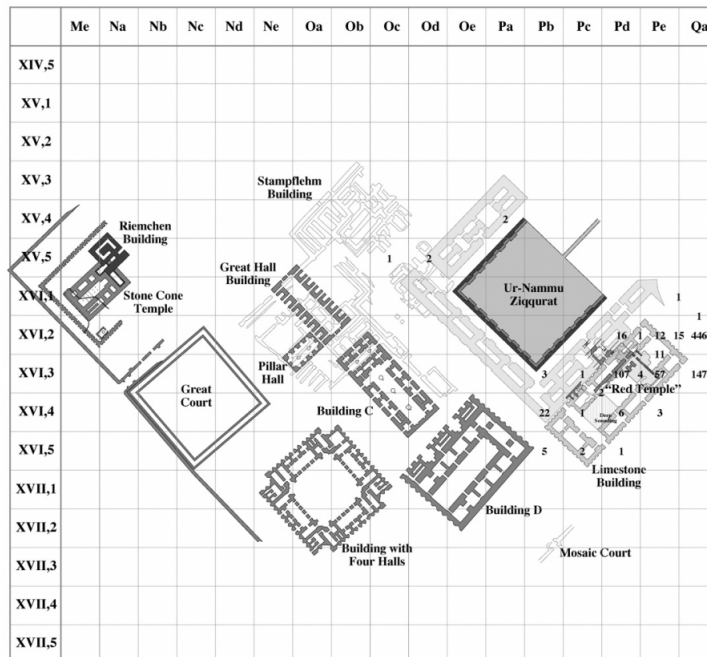


Figure 7: Plan of the monumental temples in the Eana Complex in Uruk; *cdli.ox.ac.uk*



Figure 8: An Uruk-period bevelled-rim bowl from Nineveh; *British Museum, London*



Figure 9: A proto-cuneiform administrative text from Uruk, Uruk Period, recording different types of sheep; *CDLI P001369*

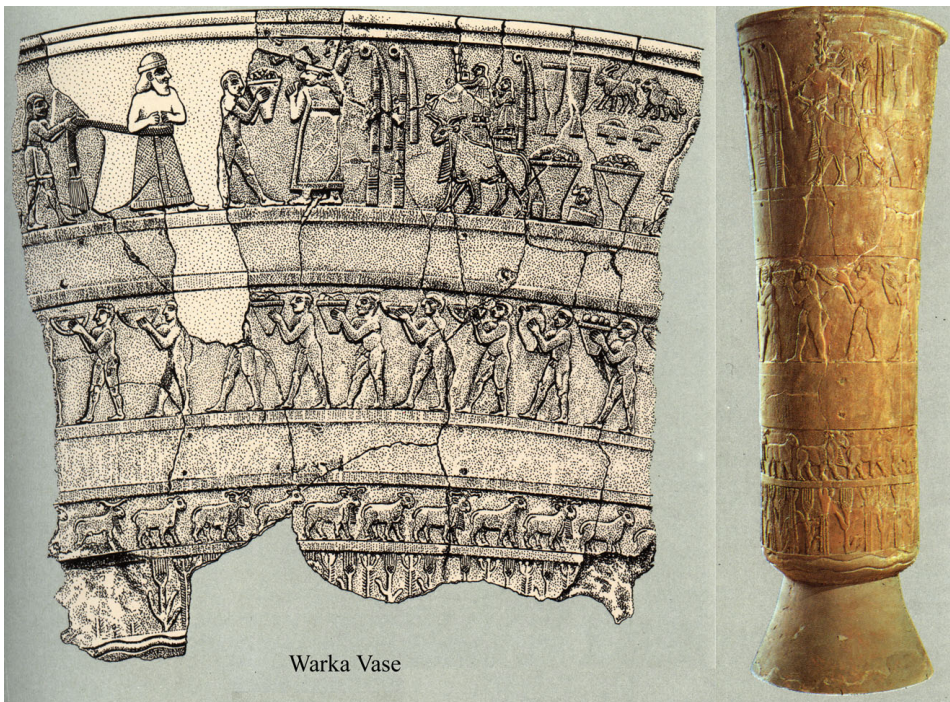


Figure 10: Warka Vase; *Roaf 1990*, p. 16

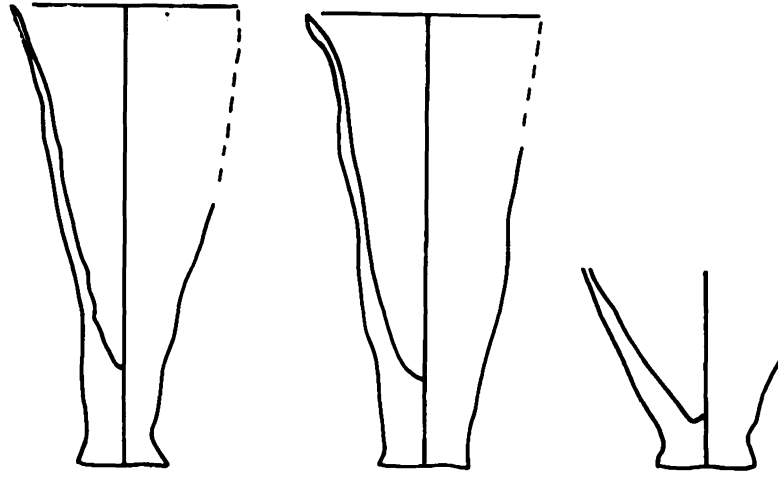


Figure 11: Drawing of profiles of solid-footed goblets (ED I) from Abu Salabikh; *Postgate 1982*, p. 111



Figure 12: Early Dynastic plano-convex brick arranged in a herringbone pattern at Nippur; *Gibson 1977*, p. 22

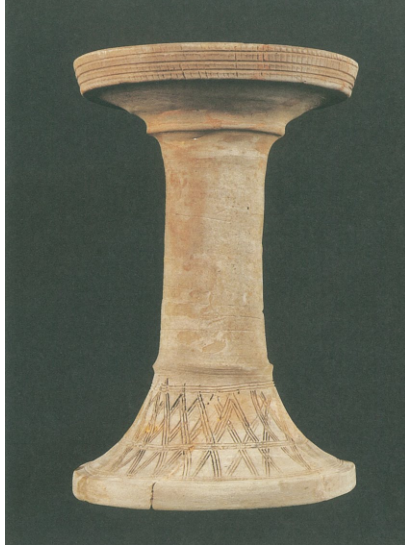


Figure 13: An Early Dynastic “fruit-stand” from Kiš; *Azaro 2012*, p. 269



Figure 14: Macehead of Mesilim; *CDLI P222741*



Figure 15: Seal of queen Pū-abi, depicting a banquet scene; *CDLI P222741*

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Figure 16: A drawing of an Akkadian cylinder seal of Šaba, daughter of Ibni-Ea depicting a presentation scene, *CDLI P274629*

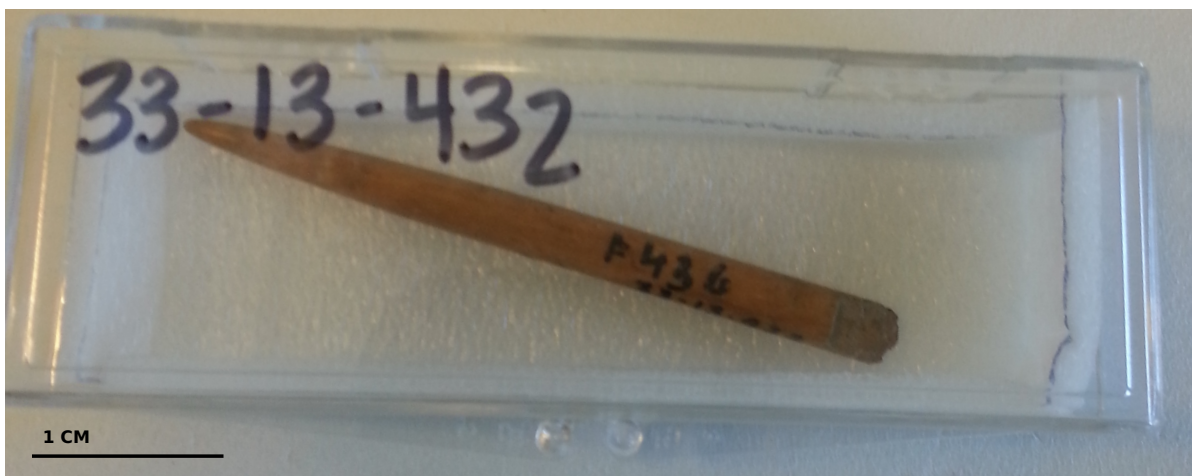


Figure 17: A photograph of the bone tool from Šuruppak (P39,852).

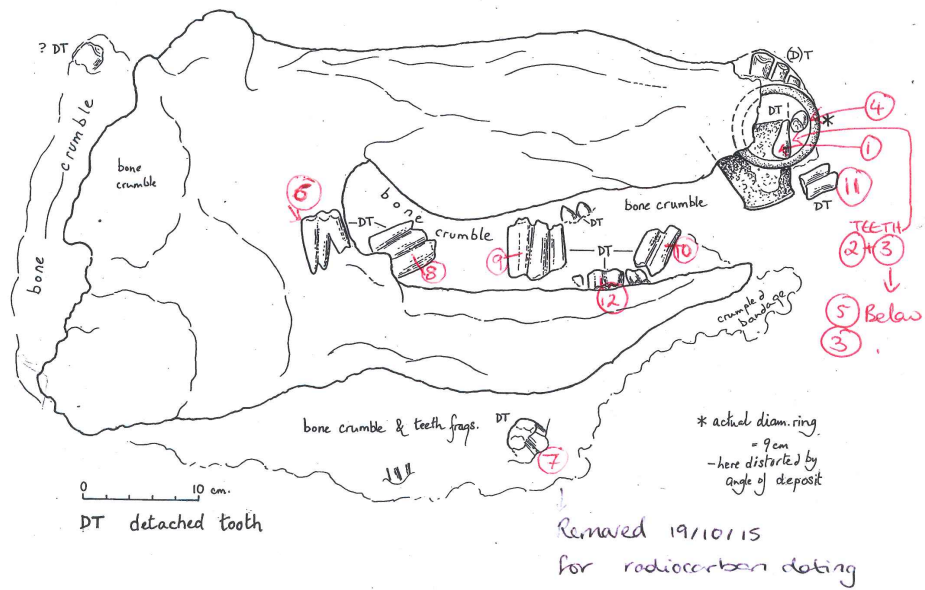


Figure 18: A drawing of the ox skull from the Royal Cemetery of Ur, PG789. The molar labelled was sampled for dating (P40,009).



Figure 19: An example of an early Ninevite 5 pot with painted decorations from Nineveh. *Ancient.eu*



Figure 20: An example of a Proto-Elamite texts from Susa. *CDLI P008135*

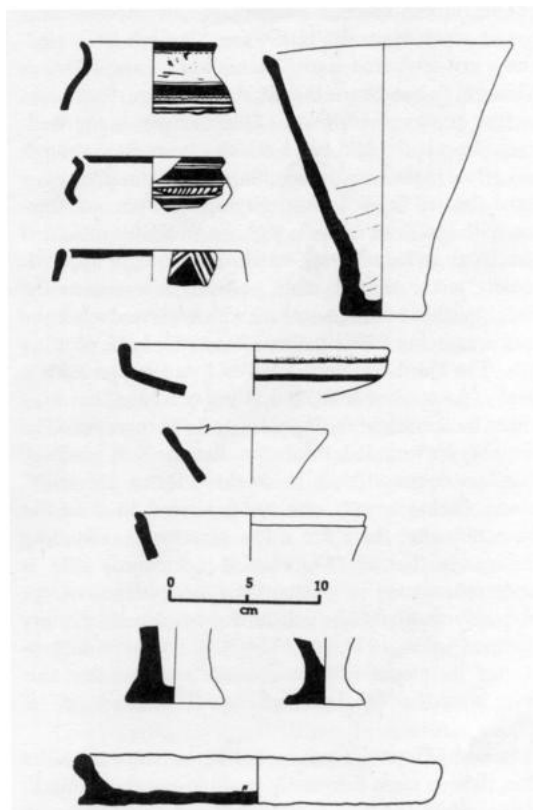


Figure 21: Examples of Banesh pottery types, including trays and pedestal-footed goblets. *Sumner 1991, Fig. 24*



Figure 22: An example of a Kaftari pot, with the easily recognisable “left-facing fat bird” decoration. *Carter 1998, Plate IV*

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