UNIVERSITA' DEGLI STUDI DI VERONA

DIPARTIMENTO DI

Culture e Civiltà

SCUOLA DI DOTTORATO DI

Scienze Umanistiche

DOTTORATO DI RICERCA IN

Scienze Archeologiche, Storico-Artistiche e Storiche

CICLO XXXVI /ANNO 2020

TITOLO DELLA TESI DI DOTTORATO

Numeracy in Early Syro-Mesopotamia. A study of accounting practices from Fāra to Ebla

S.S.D. L-OR/03

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AKNOWLEDGMENTS

With great gratitude, I wish to express my deep appreciation for the contributions of Professors Federico Giusfredi, Luigi Turri, and Amalia Catagnoti, who have provided invaluable guidance and unwavering encouragement during these intense three years of study. I would also like to thank Professor Walther Sallaberger, who welcomed me to München, granting me the opportunity to spend 17 months at the Institut für Assyriologie und Hethitologie (Ludwig-Maximilians-Universität). This experience has played a fundamental role in shaping my personal and professional development, enriching my research in ways I could never have imagined. Furthermore, I cannot fail to mention Doctor Marco Bonechi, with whom I have discussed many details of my work and who has consistently provided essential advice and encouragement for my professional growth.

My gratitude also extends to those who have shared this journey with me. In particular, to Geraldina, whose presence by my side during challenging times and sharing in the joys of my successes has contributed to forming a second family during my time in München. To Elisabetta, who has continued to support me from afar and with whom I have been fortunate to thoroughly discuss various aspects of my work. And, of course, to Vittorio, for his support and the hours we have devoted to our philosophical discussions.

Lastly, but by no means less important, I want to convey my deepest gratitude to my family. To my grandparents Miriam and Riccardo, who have supported me in every possible way. To my mother, Ginevra, her husband, Massimo, and my sister, Olga, for making me feel close to them despite the distance, making this academic journey even more meaningful through their constant love and support.

München, 13.10.2023

ABSTRACT

This dissertation delves into the role of numeracy in the texts of 3rd millennium Syro-Mesopotamia, with a particular emphasis on a comparative analysis of cuneiform documents sourced from diverse archaeological sites: Ebla, Mari, Nabada (Pre-Sargonic), Šuruppag, and Tell Abū Ṣalābīḫ (ED IIIa). The overarching goal is to explore the utilization of numerals, metrological and lexical signs, as well as the proficiency of scribes in numeracy within these textual records. Through this investigation, the dissertation seeks to enlighten the intricate interplay between numeracy, literacy, and the expertise of scribes within the 3rd millennium Syro-Mesopotamian context. This analysis tackles philological, cultural, and historical questions while yielding valuable insights into the intricacies of document production. The dissertation is divided into five chapters, covering corpus presentation, numeracy in administrative practice, and theoretical applications for scribes. It concludes with insights on the interaction between theory and practice in scribal activities and the broader implications of numeracy.

TABLE OF CONTENTS

INTRODUCTION **10**

0.1. Research goals and *status quaestionis* **10**

0.2. Methodological approach **11**

0.3. Delimitation of geographical and historical boundaries of research .. **18**

CHAPTER 1. OVERVIEW OF THE DOCUMENTATION **22**

1.1. Tell Mardīkh (Ebla) **22**

1.1.1. The Palace G Archives **23**

1.1.2. Distribution and typology of Pre-Sargonic tablets found in Tell Mardīkh 29

1.2. Tell Harīrī (Mari) and Tell Beydar (Nabada) **34**

1.2.1. Distribution and typology of the Pre-Sargonic tablets found in Tell Harīrī 36

1.2.2. Distribution and typology of the Early Jezirah IIIb tablets found in Tell Beydar 48

1.3. Tell Fāra (Šuruppag) and Tell Abū Ṣalābīḫ **62**

1.3.1. On the excavations in Šuruppag and the findings of the Tell Fāra Tablets 63

1.3.1.1. Distribution and typology of ED IIIa tablets found in Tell Fāra . 65

1.3.2. Distribution and typology of ED IIIa tablets found in Tell Abū Ṣalābīḫ 74

CHAPTER 2. PRACTICE IN SCRIBAL ACTIVITY: NUMBERS AND UNITS OF MEASUREMENT IN ADMINISTRATIVE AND CHANCERY TEXTS **85**

2.1. On numbers and units of measurement **85**

2.2. Numbering and measuring systems **87**

2.2.1. Enumeration of items 87

2.2.1.1. Ebla (Tell Mardīkh) 88

2.2.1.2. Mari (Tell Harīrī) 90

2.2.1.3. Nabada (Tell Beydar) 92

2.2.1.4. Šuruppag (Tell Fāra) 94

2.2.1.5. Tell Abū Ṣalābīḫ 96

2.2.1.6. General discussion 98
2.2.2. References to time and dates 103
2.2.2.1. Ebla (Tell Mardīkh) 104
2.2.2.2. Mari (Tell Harīrī) 106
2.2.2.3. Nabada (Tell Beydar) 108
2.2.2.4. Šuruppag (Tell Fāra) 109
2.2.2.5. General discussion 110
2.2.3. Weight measures 118
2.2.3.1. Ebla (Tell Mardīkh) 119
2.2.3.2. Mari (Tell Harīrī) 121
2.2.3.3. Nabada (Tell Beydar) 122
2.2.3.4. Šuruppag (Tell Fāra) 123
2.2.3.5. General discussion 125
2.2.4. Capacity measures 138
2.2.4.1. Ebla (Tell Mardīkh) 139
2.2.4.2. Mari (Tell Harīrī) 145
2.2.4.3. Nabada (Tell Beydar) 148
2.2.4.4. Šuruppag (Tell Fāra) 150
2.2.4.5. Tell Abū Ṣalābīḫ 154
2.2.4.6. General discussion 155
2.2.5. Surface measures 166
2.2.5.1. Ebla (Tell Mardīkh) 167
2.2.5.2. Šuruppag (Tell Fāra) 169
2.2.5.3. Tell Abū Ṣalābīḫ 172
2.2.5.4. General discussion 174
2.2.6. Measuring wool quantities in the Ebla texts 178
2.2.6.1. Ebla (Tell Mardīkh) 179
2.2.6.2. General discussion 182
2.2.7. Other uses of numerals 199
2.2.7.1 Numerals as qualifiers 200
2.2.7.1.1. Ebla (Tell Mardīkh) 200
2.2.7.2. Distributive notational formula 206
2.2.7.2.1 Ebla (Tell Mardīkh) 207
2.2.7.2.2 Mari (Tell Harīrī) 208
2.2.7.2.3 Nabada (Tell Beydar) 208
2.2.7.2.4 Šuruppag (Tell Fāra) 209
2.2.7.3. Further uses 209
2.2.7.3.1. Ebla (Tell Mardīkh) 210
2.2.7.3.2. Šuruppag (Tell Fāra) 213

CHAPTER 3. COMPUTATION AND ACCOUNTING PRACTICES IN ADMINISTRATIVE TEXTS 215

3.1. Summaries and totals 215

3.2. Scribal errors and arithmetic computation 229
3.2.1. Ebla (Tell Mardīkh) 229

3.2.2. Šuruppag (Tell Fāra) 234
3.2.3. Mari (Tell Harīrī), Nabada (Tell Beydar), and Tell Abū Ṣalābīẖ 238
3.2.4. General discussion 239
CHAPTER 4. THEORY IN SCRIBAL ACTIVITY: THE CASE OF MATHEMATICAL TEXTS AND LISTS OF NUMBERS........................... 248
4.1 Ebla (Tell Mardīkh)... 248
4.2. Šuruppag (Tell Fāra).. 264
4.3. General Discussion.. 272
CHAPTER 5. CONCLUSIONS... 274
5.1. Between theory and practice... 276
5.2. The role of numeracy in the scribal culture: Communication, development, and identity formation.. 279
BIBLIOGRAPHY.. 285
LIST OF ABBREVIATIONS... 309
LIST OF FIGURES.. 314

INTRODUCTION

0.1. Research goals and *status quaestionis*

The focus of this dissertation is to investigate the role of numeracy in 3rd millennium texts from the Syro-Mesopotamian area. In detail, the study proposes a comparison between the texts of Pre-Sargonic Ebla (Tell Mardīkh) and those contemporaneous from Mari (Tell Harīrī) and Nabada (Tell Beydar), as well as the previous corpora of Early Dynastic (ED, onwards) IIIa Šuruppag (Tell Fāra) and Tell Abū Ṣalābīḫ.[1] This comparison seeks to establish a dialogue among these sets of documentation, aiming to comprehend the use of numerals within the written language and the degree of integration among such diverse elements as numerical, metrological, and lexical signs. Moreover, the research extends its gaze to the competence level of scribes in the domain of numeracy and the pivotal role that such proficiency played in shaping their professional development. By investigating these dimensions, the dissertation aspires to shed light on the multifaceted interplay among numeracy, literacy, and scribal expertise within the context of 3rd millennium Syro-Mesopotamian texts. By doing so, the proposed analysis addresses questions of philological, cultural, and historical nature, while also yielding valuable insights into the dynamics of document production.

Studies investigating the role of numeracy in the development of ancient Near Eastern administrative practices have largely focused on the emergence of writing and proto-cuneiform texts.[2] Numerical notation in cuneiform sources has been the object of a comparative study by Chrisomalis[3] and has been sporadically studied by

[1] Whose ancient name is still unknown; see 1.3.

[2] See, *e.g.*, Nissen *et alii* 1993, and Englund 1998.

[3] Chrisomalis 2010.

other scholars within the context of more specific publications.[4] Metrology and units of measure in 3rd millennium Syria and Mesopotamia have been studied mainly by Powell, in the fundamental and encyclopedic entry "Maße und Gewichte" for the *Reallexikon der Assyriologie und vorderasiatischen Archäologie* (*RlA*)[5] and, more recently, by some specific but comparative-oriented works such as that of Chambon[6] (on capacity and weight measures in 2nd and 3rd millennium Syria) and Bartash (on weight measures in 4th and 3rd millennium Mesopotamia).[7] Individual measurement systems have been discussed in a number of specific contributions, as in the case of wool measures in Ebla, which has been studied by Zaccagnini.[8] As for early mathematics, that topic has been the object of multiple studies, both comparative—like the comprehensive contributions of Friberg, in *RlA*[9] and in his book *A Survey of Publications on Sumero-Akkadian Mathematics, Metrology, and Related Matters*[10]—or specific, as in the case of the Ebla mathematical texts.[11] However, at present, very few studies are devoted entirely to the phenomenon of numeracy transmission and its role in scribal culture and activity, comprehensively examining texts of both practical and theoretical nature, as well as the actual procedures involved in writing a text and the daily utilization of numeracy.

0.2. Methodological approach

From a structural point of view, the work has been developed on distinct levels, each corresponding to one or more chapters.

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[4] See, *e.g.*, Englund 1998 for the proto-cuneiform texts from Uruk or, in the same volume, Krebernik 1998, which lists the type of signs used in the Šuruppag and Tell Abū Ṣalābīḫ texts to write numbers and units of measurement.

[5] Powell 1987–1990.

[6] Chambon 2011.

[7] Bartash 2019.

[8] See, *e.g.*, Zaccagnini 1984.

[9] Friberg 1987–1990.

[10] Friberg 1982.

[11] Friberg 1986.

The first chapter is dedicated to presenting each corpus. This presentation is necessary because each of the sites was excavated at a different time and in a different way, resulting in the retrieval of a disomogeneous scenario of cuneiform sources. Consequently, the available information on each site and its related documentation is inconsistent in terms of quantity and type, demanding a comprehensive discussion.

The second and third chapters revolve around the use of numeracy within scribal practice. In particular, the second chapter focuses on studying numeracy in connection with administrative practice, specifically by exploring numerical notation and metric measurement systems, along with their predominant usage in administrative texts and chancery documents (which can be classified as *textes de la pratique*). The third chapter delves into the summaries found at the conclusion of administrative texts and examines the application of numeracy in administrative calculations. The objective of the third chapter is to analyze the use of numbers while identifying calculation errors and inconsistencies in text composition. The aim of both chapters is to gain a deeper comprehension of the process involved in crafting administrative texts and their intended purpose.

Conversely, the fourth chapter deals with numeracy within those texts that constitute the 'theoretical' application for scribes' proficiency in handling numbers (*textes théoriques*). This encompasses mathematical texts and, to a certain extent, also lexical texts.

Finally, the dissertation concludes with the insights drawn from the findings described in previous chapters. First, these insights are pertinent to the question of the relationship between "theory" and "practice" in scribal activity (specifically with regards to numeracy), as well as the categorization of specific textual genres within this dichotomy. Second, the concluding insights constitute a more general discussion regarding the role of numeracy in scribal practice, including by examining its role within the dynamics of cultural contact and cultural evolution.

Before proceeding with this dissertation, a number of methodological clarifications are necessary. Naturally, some of them concern the definition of numeracy and what revolves around it.

Numeracy is the culturally developed ability to work with numbers through an external system of storing and processing information. *Numerical notation* is an invented technology that is used to externally describe and represent numerical data. Numerical notation is a visual, relatively permanent, and primarily non-phonetic (*i.e.*, mainly symbolic) structured system for representing numbers.[12] Numerical notation facilitates the recording, storage, and use of numerical information. It is intended to be as accessible as possible: specific quantities are represented by groups of one or more numeral signs (numerical notational phrases) that are structured in accordance with key rules that maximize their accessibility and comprehensibility.[13] In its simplest form, numerical notation corresponds to a numerical phrase consisting of a set of signs with a coherent numerical value, based on a direct correspondence between the signifier and the signified (*i.e.*, the sign and the number represented by it). The reading order of signs follows the hierarchical order of powers[14] of the base[15] on which the numerical phrase is structured. This fact makes it easier to catch the quantitative value of the numerical notation while reading.[16] Numerical phrases are usually structured using powers, in both intra- and inter-exponential dimensions. The intra-exponential dimension determines the organization, constitution, and combination of numeral signs within each power; it

[12] For the definition of numerical notation, see Chrisomalis 2010: 3.

[13] According to the fundamental principles of cognitive science, information is more useful when structured. Thus, numerical notational systems—being a human-invented technology—are structured to facilitate information processing (Chrisomalis 2010: 3, with literature).

[14] Power is a number *n*, multiplied by itself a certain number of times, *i.e.*, 10^1; 10^2; 10^3. (For a definition, see Chrisomalis 2010: 437).

[15] Bases are natural numbers whose powers are specially denoted within a numerical system. (For a definition, see Chrisomalis 2010: 435).

[16] By doing so, the reader follows a process of successive approximation (Greenberg 1978: 274).

can be classified as one of three types: cumulative,[17] ciphered,[18] or multiplicative.[19] The inter-exponential dimension determines how the values of the signs within each power level are combined and, therefore, how to obtain the quantitative value of the numeral phrase; it can be additive[20] or positional[21] in the arrangement.

Any discussion of numerical notation will involve references to issues such as the formatting of the sequences of signs that make up expressions containing elements with numeric and metrological values. For this reason, it is appropriate to dwell on the nomenclature traditionally used to define these elements. An updated nomenclature was recently provided by Colonna d'Istria in his contribution on numbers and units of measurements in the book *Sumerisch: Eine Einführung in Sprache, Schrift und Texte*, edited by himself and Sallaberger.[22] This nomenclature is partly based on the approach provided by Mycenaeologists,[23] which was taken up in Assyriology by Proust[24] and by Colonna d'Istria[25] himself within his dissertation. In particular, I will use their functional classification of graphemes (signs), which distinguishes among:

- *Arithmograms*: signs representing integer numerical values

[17] In cumulative organization, the numerical value of a certain power is expressed by taking the sum of multiple identical signs. (For a definition, see Chrisomalis 2010: 435).

[18] In ciphered organization, the numerical value of a certain power is expressed in a single sign (for a definition, see Chrisomalis 2010: 435).

[19] In multiplicative organization, the numerical value of a certain power is expressed using two signs—a unit sign and a power sign—whose values are multiplied. (For a definition, see Chrisomalis 2010: 436).

[20] In additive arrangement, the total value of a numerical phrase is equal to the sum of the signs for each power expressed. (For a definition, see Chrisomalis 2010: 435).

[21] In positional arrangement, the value of a power's intra-exponential signs is affected by its position or place within the numeral phrase and is also known as "place value." (For a definition, see Chrisomalis 2010: 437).

[22] Sallaberger – Colonna d'Istria 2023.

[23] See (as quoted in Colonna d'Istria 2009: 305) Bennett 1963; Bennett 1972; Godart – Olivier 1996: 12.

[24] See, *e.g.*, Proust 2007 and Proust 2009.

[25] Colonna d'Istria 2009: 305–306.

- *Klasmatograms*: signs representing fractional numerical values
- *Metrograms*: Signs used exclusively for units of measurement
- *Arithmo-metrograms*: signs representing both a numerical and metrological value

These grapheme classes complement the following elements, which can be written logographically or phonographically:

- Units of measurement
- Measured or counted items

Often, certain types of arithmograms are associated with specific sets of units of measurement. (In other words, a numerical notation system is often associated with a metrical system.) Chambon[26] has emphasized the difficulty of separating the notion of numerical value per se from the intrinsic numerical values of certain signs and expressions themselves. Chambon points out that some signs can have a dual aspect, *i.e.*, both a notional and a quantitative value. Chambon defines these signs as *metrograms*, departing from the terminology introduced by Proust,[27] given that the division between arithmograms and metrograms would, in the case of certain expressions, lead to a dissociation of the notions of number and unit of measurement, which would prove to be fictitious in these expressions themselves. However, the nomenclature by Colonna d'Istria also fits (given the presence of arithmo-metrograms) those cases discussed by Chambon. The most widely known example is the set of signs indicating quantities of, *e.g.*, ban$_2$ (see 2.2.4.4.). Moreover, such a more complex nomenclature fits perfectly with all the cases concerning the use of numbers and units of measurement in the administrative script. In this sense, the case of weight measures in the Ebla texts (see 2.2.3.1.) is fitting. Here, minas (ma-na) are indicated using arithmograms (standard curviform numerals that are indeed the same used for representing quantities of discrete items) and klasmatograms (both lexically and symbolically written fractions). On the other

[26] See the complete discussion in Chambon 2011: 42–43, and fn. 141.

[27] See, specifically, Proust 2007: 65; Proust 2009: 7

hand, submultiples of the minas, *i.e.*, shekels (giĝ$_4$-DILMUN or simply giĝ$_4$) are represented by cuneiform numerals that may stand alone, unaided by the presence of the units of measure. In these specific instances, these cuneiform numerals function as arithmo-metrograms. Nonetheless, in more general and discursive contexts, the term “numerals” is used with a broader meaning, *i.e.*, mostly referring to arithmograms and arithmo-metrograms.

Another issue concerns the rendering of numerical notation within the transliteration of the texts. In fact, in the 3rd millennium texts, one can observe a wide variety of symbols associated to individual units of measurement.[28] Now, a question arises: How can we preserve this differentiation and the peculiarity of each numerical notation in an efficient, user-friendly fashion? Of course, I am not the first to ponder this problem. Indeed, it is a persistent challenge in the field of Assyriological studies. Such an approach is necessary when considering the paleography of numerical notation because it can provide helpful information that may be lost if one does not explicitly indicate the type of numeral signs used by the scribe. In fact, by simply transliterating the number 3, instead of specifying that a certain sign (*i.e.*, ) has been repeated three times by the scribe, one provides only a translation of the term using a modern notational system and merely offers subjectively mediated and non-neutral information. To address this question, one must consider several strategies that have been employed in Assyriology for rendering numerical notation. The better known are those developed by Englund for transliterating archaic Uruk texts,[29] and that used in the CDLI database, which also stems from Englund’s work.[30] A very similar approach is proposed by Cavigneaux in his edition of Pre-Sargonic Mari texts,[31] and also by Sallaberger in

[28] Furthermore, it is important to acknowledge that the signs have been transcribed in alignment with the canonical orientation commonly employed in ancient Near Eastern studies. However, it is worth considering that their original orientation was rotated by 90 degrees, given that the tablets were likely read in this way.

[29] Englund 1998: 119.

[30] One example is available at https://cdli.mpiwg-berlin.mpg.de/artifacts/10721.

[31] Cavigneaux 2014: 291.

his paleographic study of Nabada texts.[32] More recently, yet another strategy has been employed by Molina in his edition of early Sargonic texts.[33]

These approaches have the great merit of bringing attention to numerical notation, particularly in the transliteration of administrative texts. However, when I embarked on the task of writing this dissertation, I found that none of these rendering methods truly suited the case of Ebla texts, especially considering the significant variability of symbols used in the texts of the Small Archive (L. 2712), as well as in other cases, such as the rhomboidal sign used in the Central Archive to express shekels' tens units (and other elements, *e.g.*, numbers of days or years).

Thus, to present an argument that was as precise and clear as possible, I found it necessary to develop a new tool. In specific, I chose to interpolate signs directly into the script using a font made with vectorial images. During the development of this tool, several methodological challenges arose, particularly regarding the usability and clarity of this rendering system.

One initial challenge pertains to the writing of numerals. As one can see from previous rendering strategies, there are various ways to represent the same numeral. For instance, in the CDLI notation, and in Englund's work in general, the original script is faithfully replicated. Here, for example, it is written that a certain symbol is repeated *n* number of times, as in:

TSŠ 627 o. i 8[34]: 2(gesz2@c@d) AN-nu-me

Although this notation is highly precise and formally impeccable, it requires the reader to calculate the final quantitative value. On the other hand, Molina's rendering system prioritizes the readability of the text by directly including the value of each numeral and juxtaposing one or more cursive letters to indicate the type of sign used:

[32] Sallaberger 1996e: 119.

[33] Molina 2014: 39.

[34] The following passage is quoted verbatim from CDLI (https://cdli.ucla.edu/P010869).

CL 269 o. i 1[35]: 3*ac* ⸢simug⸣

Hence, my transliteration of the text takes the following form:

> [1] *MEE* 7.13 o. ii 5: gu$_2$:an-še$_3$ 1-*RI$_2$-BAB* 4-*LI*<-*IM*> 6-*MI-AT* 10 5 ^{ĝeš}gu<-gag-gid$_2$> zabar "Sum: 14,615 bronze spearheads."

> [2] *ARET* 20.20 r. vi 4: 60 40-la$_2$-2 pa$_4$:ses "98 valets."

The compound 40 is used to represent 4 times 10, as in [2]. The actual value of the notation is thus immediately obtained as in Molina's notation. The interpolation of hyphens is used only in correspondence with lexical signs, such as for the minus sign la$_2$ in [2] and the lexical numerals *MI-AT* "100" and *LI-IM* "1,000" in [1]. On the other hand, hyphens are not used when juxtaposing different types of symbols in the absence of lexical numerals, so as not to create ambiguity with the arithmetic minus sign—as would happen, for example, in the passage for 10 5 in [1].[36]

A different case is that of units concerning surface measurements (especially in Mesopotamian corpora, such as that of Šuruppag), where the arithmo-metrograms are quite various and complex:

> [111] WF 55 (= EDATŠ no. 59) r. i 4: 30 7 (bur$_3$) 1 (eše$_3$) 3 iku "37(bur$_3$-) 1(eše$_3$-) 3iku measures."

Moreover, here, the name of the unit of measurement has been repeated in brackets.

0.3. Delimitation of geographical and historical boundaries of research

As already mentioned, this work focuses on five corpora from the 3rd millennium, all of them situated in the area encompassing Mesopotamia and northern Syria. These are: Ebla (Tell Mardīkh), Mari (Tell Harīrī), Nabada (Tell Beydar), Šuruppag (Tell Fāra), and Tell Abū Ṣalābīḫ. I chose to start with Ebla as the primary focus

[35] Quoted in Molina 2014: 213.

[36] The ambiguous notation would be "10-5."

and gradually extended my research to the other corpora.[37] Mari and Nabada are part of the Syrian region, and their contacts with Ebla are well documented.[38] The research then expanded to Šuruppag and Tell Abū Ṣalābīḫ, two sites much farther to the south, which share many common elements with Ebla. This commonality extends not only from the lexical and literary perspectives[39] but also in terms of metrology and the use of numeracy, which is indeed the focus of this dissertation. Certainly, these sites are not the only ones that have yielded documentation dating back to the Early Bronze Age (particularly the ED IIIa – Pre-Sargonic period); however, they provide a clear and comprehensive overview covering this arc of time and space.

When discussing Ebla, Mari, and Mesopotamia, one cannot avoid mentioning the model (and implications) of the so-called "Kiš Civilization," a paradigm developed by Gelb following various research efforts involving diverse epigraphic documents from the 3rd millennium. The initial model was that of the "Kiš Tradition," a Semitic tradition distinct from that of southern Mesopotamia, and which developed around the city of Kiš during the ED period.[40] Subsequently, thanks to epigraphic

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[37] The choice to start with the administrative texts of Ebla was informed not only by the richness of the documentation but also by the fact that these texts offer an ideal foundation for comprehensive work on the integration methods between numeracy and literacy, for they stand as some of the earliest experiments in writing systems beyond the Sumerian context. Additionally, the Eblaite documentation facilitates a study not only of texts as a whole but also of the peculiarities of individual archival contexts, which can be compared typologically and chronologically.

[38] In the case of Nabada, through Nagar (Tell Brak), which unfortunately does not yield texts pertaining to this phase.

[39] See, *e.g.*, the presence of the *Hymn to Šamaš of Sippar* at Ebla both and Tell Abū Ṣalābīḫ, as well as many lexical lists having comparable sources in Uruk, Šuruppag, and Ebla, such as the list known as "Archaic Metals" (see 2.2.3.4.).

[40] The bilingual royal inscriptions of Sargon and Rīmuš employ different traditions of writing Sumerian logograms depending on whether the text is in Akkadian or Sumerian. Gelb interprets this difference as a reflection of two distinct "scribal traditions": one originating from northern Mesopotamia, which would have utilized logograms derived from Sumerian, but also distinct from them; the other employing classical Sumerian, which would be of southern Mesopotamian tradition. This difference is also noticeable in the *Kudurrus* of the ED period. Furthermore, the presence of

discoveries at Ebla starting in 1974, Gelb expanded the cultural concept from the "Kiš Tradition" to the "Kiš Civilization."[41] According to this model, the Semitic tradition from Kiš would have spread northwards through Mesopotamia, reaching Ebla via Mari. In this sense, the documented contacts between Ebla and Mari are noteworthy.[42] For example, the colophon of both *MEE* 3.47+ (r. ii 1–7) and *MEE* 3.50 (r. ii 1–7) recites:

Ti-ra-il dub-mu-sar *Ib-dur-i-šar* dub-zu-zu *in* u_4 dumu-ninta-dumu-ninta dub-sar e_3 *aš*$_2$*-du Ma-ri*$_2^{ki}$

"*Ti-ra-il* is the one who wrote the tablet, *Ib-dur-i-šar* is the one who taught the text, when the young scribes (from Ebla) went up (the Euphrates coming) from Mari."[43]

Moreover, some degree of contact between Ebla and Kiš emerges, such as that evidenced by the text *MEE* 3.73, a mathematical text known as "The problem of the scribe of Kiš." The contacts with Tell Abū Ṣalābīḫ, which would have also participated in this same *koinè*, are also well established.[44]

Two foundational elements of the "Kiš Civilization" are relevant to numbers and units of measurement. The first is the decimal numerical system, attested in Tell

Akkadian-type personal names in northern Babylonia led Gelb to suggest that in ED period, this region had a Semitic substratum (see the discussion in Gelb 1977: 13.).

[41] Gelb 1992: 123. As for the Kiš tradition, see Gelb 1997: 13–14.

[42] Additionally, political contacts are also referenced in Ebla's texts (see, *e.g.*, Archi – Biga 2003).

[43] See Bonechi 2016b: 15, fn. 51, translated: "*Ti-ra-il* è colui che ha scritto la tavoletta, *Ib-dur-i-šar* è colui che ha insegnato il testo; quando i giovani scribi (di Ebla) risalirono (l'Eufrate provenendo) da Mari." For a more detailed discussion of this issue, see Pettinato 1986: 182–183 (and, further on, Pettinato 1999: 309): "allorquando i giovani scribi salirono da Mari"; Archi 1992: 20: "the notation in two tablets written by Tira-Il [..] seems to indicate that some of the Eblaite scribes got their education in the Mari school"; as well as Archi 2006b: 102: "we must consider the idea that the [Ebla] scribes drew up the manuscripts in another scriptorium *i.e.* that of Mari." Lastly, Fronzaroli 2014: 419 noted how the aforementioned colophon may document the influence of the Mari scribal school on that of Ebla.

[44] For example, see again the matter concerning the *Hymn to Šamaš of Sippar*.

Abu-Ṣalābīḫ, Mari, and Ebla, where the numerals *miʾat* (100); *līm* (1,000) are used.[45] The second is the supposed difference between the different position of units of measurement and measured items within the texts. To write the sentence "*n* shekels of silver," in texts of Sumerian *substratum*, the writing *n* ku3 giĝ4 would have been used. In those of Akkadian *substratum*, the writing *n* giĝ4 ku3-babbar would have been used. However, this last element presents some difficulties. For instance, regarding the texts of Šuruppag and Tell Abū Ṣalābīḫ, one must consider the general instability of the position of signs within the cases, which is typical of this period.[46]

Although the paradigm of the "Kiš Civilization" deserves credit for highlighting the points of contact between Ebla, Mari, and the Mesopotamian cities, it is important to note that (like any paradigm) it tends to prioritize synthesis and generalization over the intricacies of cultural interactions and the dissemination of cuneiform writing beyond Mesopotamia. The temptation to employ such a paradigm to elucidate the connections between Mesopotamia and Syria, however strong it may be, must be approached with caution. Cultural interactions tend to be highly intricate, marked by shifts in intensity over time, and cannot be explained by singularly referring to the unilateral influence of the city of Kiš, *insignia* of the semitic-speaking population in the ancient Near East. The study of the transmission of cuneiform culture and its diversification throughout the 3rd millennium must consider a multitude of factors and must necessarily be revisited and probed more deeply.

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[45] The same terminology is also used in the Nabada texts; however, these were published posthumously to Gelb's work.

[46] See discussion in Krebernik 1998: 260, fn. 203: "Skeptisch insbesondere zum ersten Kriterium äußert sich Wilcke 1996, 8f. Bei der Platzierung von Zahlzeichen und Maßen sind jedoch tatsächlich Regelmäßigkeiten zu beobachten die sich von der sonstigen, freien Zeichenanordnung abheben."

CHAPTER 1. OVERVIEW OF THE DOCUMENTATION

The first chapter presents an overview of the documentation analyzed in this dissertation, which comes mainly from Ebla (Tell Mardīkh), Mari (Tell Harīrī), and Šuruppag (Tell Fāra), accompanied by some insights on the corpora from Nabada (Tell Beydar) and Tell Abū Ṣalābīḫ. Each of the three principal sites was excavated at different times, in different ways, and retrieved cuneiform material from a disomogeneous scenario. Accordingly, because the information available on each site and documentation is inconsistent in number and typology, each paragraph will be structured differently according to the peculiarity of each case. A general discussion of all corpora follows.

1.1. Tell Mardīkh (Ebla)

This section concerns the description of the amount, type, and location of cuneiform texts found at Tell Mardīkh (ancient Ebla). The site is located about 60 kilometers southwest of Aleppo and was investigated from 1964 to 2010 by the Archaeological Mission of the University of Rome "La Sapienza," directed by Paolo Matthiae. Here I will focus on the documentation which pertains to the Royal Palace (Palace G), whose destruction can be dated to the 24th century BC (around 2350 BC).[47]

[47] On the chronology concerning the destruction of Ebla, see, *e.g.*, Matthiae 2008: 95.

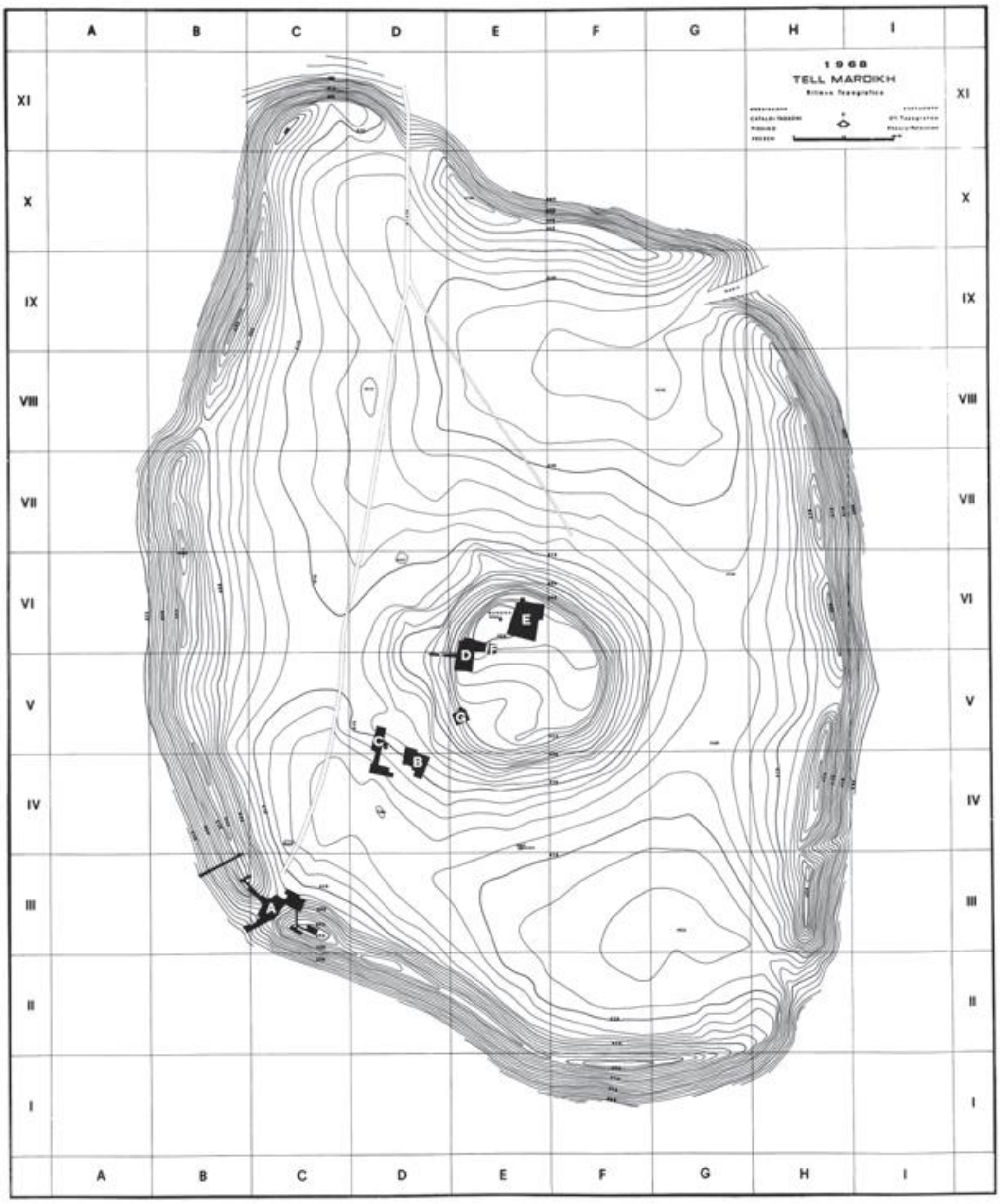

Fig. 1 – Topographical Map of Tell Mardīkh (Ebla), drawn in 1968 (Matthiae – Marchetti 2013: 31, Fig. 0.5).

1.1.1. The Palace G Archives

Since beginning the excavation of the western part of Palace G in 1974, the archaeologists of the University of Rome "La Sapienza" have unearthed more than

15,000 cuneiform-inscribed objects.[48] The estimated number of tablets in the Palace Archives is approximately 4,000–5,000 pieces,[49] making Ebla the largest cuneiform archive of the 3rd millennium BC.[50] The tablets, preserved *in situ* due to a destructive fire, were distributed across nine findspots. Most of the tablets were kept in the so-called Great Archive (L. 2769) **[C]**, to which the groups of tablets found in the Audience Court (L. 2752) **[D]** and the Vestibule (L. 2875) **[F]** also belong. Other archives are the so-called Small Archive (L. 2712) **[B]** and the Trapezoidal Archive (L. 2764) **[E]**. Additional groups of tablets have been found in L. 2586 **[A]**, L. 3143+3462+3474 **[G]**, and L. 8778 **[H]**. A single (older) tablet came from the northwest wing of the Central Complex (L. 8606) **[I]**. Most of the Ebla texts have been published in the volumes of the two series *Archivi Reali di Ebla, Testi* (*ARET*) and *Materiali Epigrafici di Ebla* (*MEE*). Other texts have been quoted or published—mostly in excerpts—throughout many articles.[51]

48 Scarpa 2023: 2.

49 Matthiae 2008: 80, Catagnoti 2012: 1 *contra* Archi 2015a: 84 "3,000/3,500."

50 See, most recently, Sallaberger 2018: 2 "Il punto di partenza è il più antico e probabilmente il più completo archivio palatino mai scoperto: l'archivio principale del Palazzo G di Ebla del periodo protodinastico, datato al tardo XXIV secolo a.C."

51 A list of unpublished texts and their bibliographic references up to 1992 is available in Conti 1992. A list of the tablets retrieved in Ebla (with information regarding their field number and location) is available in *MEE* 1 (Pettinato 1979).

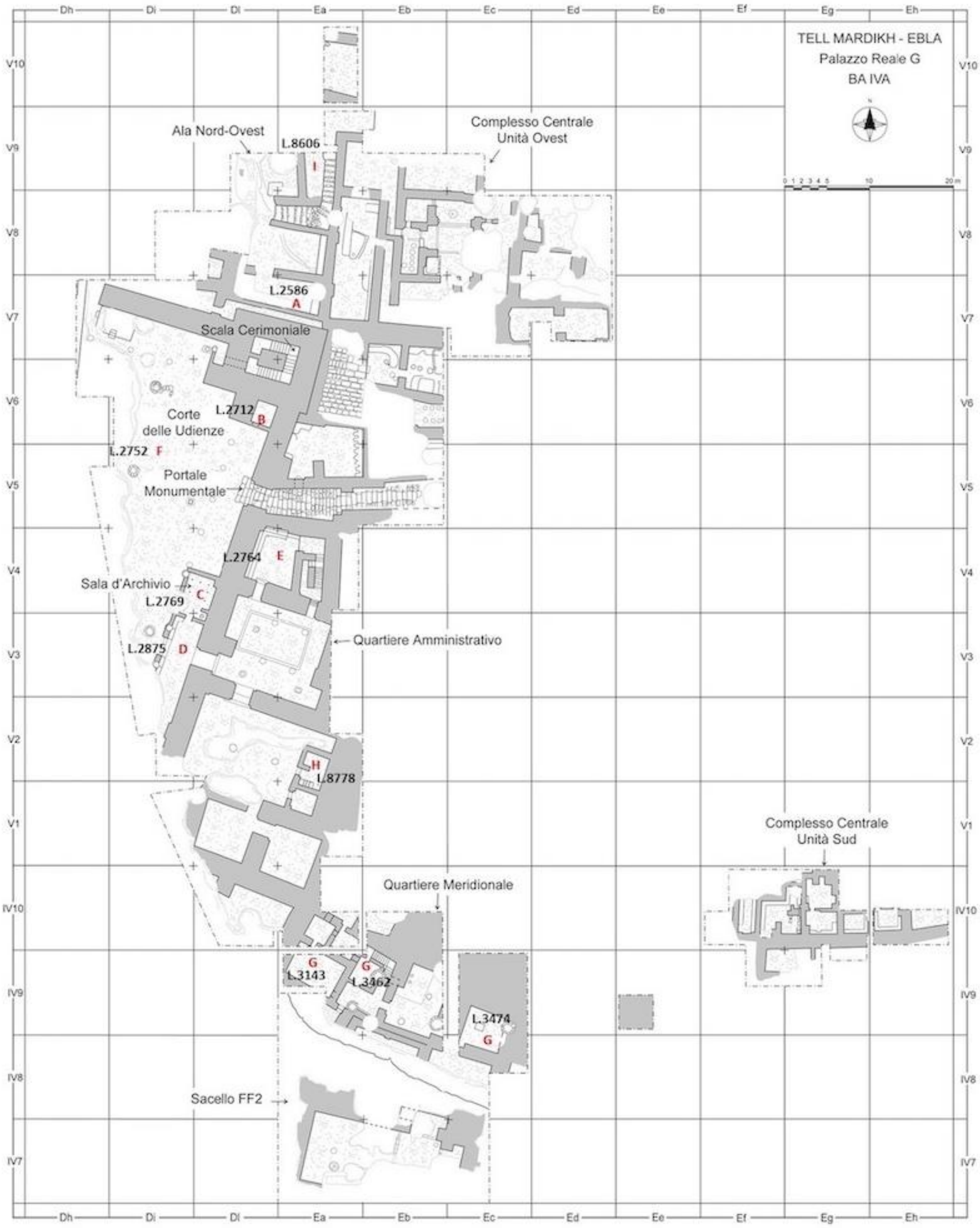

Fig. 2 – Distribution of the findspots of the 3rd millennium tablets in the Royal Palace G. The image is available in Catagnoti (2022b) MNAMON: 10.25429/sns.it/lettere/mnamon043.

According to Matthiae's reconstruction,[52] the Great Archive (L. 2769) **[C]**, the Small Archive (L. 2712) **[B]**, and the Trapezoidal Archive (L. 2764) **[E]** constitute the group of rooms where the tablets were originally stored (either permanently or temporarily). More than 15,000 inventory numbers (tablets and fragments) were collected in L. 2769, nearly 900 in L. 2712, and more than 500 in L. 2764.

[C] L. 2769

The Great Archive (L. 2769) was discovered during the 1975 campaign in a room built under the eastern portico of the Audience Court, directly connected to it. The archive yielded 757 tablets, 4,875 fragments, and many thousands of chips.[53] In this archive, along with administrative documents, were preserved texts of various types (*e.g.*, chancery,[54] diplomatic, lexical, literary), which were originally arranged on a three-compartment wooden shelf leaning against three walls of the room.[55]

[B] L. 2712

The Small Archive (L. 2712) is a consistent archive discovered in 1975. It is located in the northeast corner of the Audience Court. L. 2712 yielded approximately 250 texts, including 211 entire tablets and numerous fragments.[56] Most of the tablets found in L. 2712 concern the supply of foodstuffs (including cereals, beer, and bread) for the entire palace. According to Matthiae's reconstruction, the tablets preserved inside the room were to be arranged on two overhead brackets attached to the north and east walls and possibly consisting of wooden support plastered with clay.[57]

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[52] Matthiae 1986: 57–58.

[53] For the definition of "chips," meaning "small fragments with only a few cases or parts of cases," see Archi 1986: 78.

[54] The chancery texts are published in Fronzaroli – Catagnoti 2003 (*ARET* 13), Catagnoti – Fronzaroli 2010 (*ARET* 16) and Catagnoti – Fronzaroli 2020 (*ARET* 18), a volume that mainly concerns chancery documents from the Vestibule L. 2875.

[55] Archi 1986: 77–86, Archi 1996a: 60–62.

[56] Milano 1988: 288.

[57] Matthiae 1989: 223.

[E] L. 2764

Texts from the Trapezoidal Archive (L. 2764), a store located north of the administrative area and accessible through the corridor L. 2913, were found in the 1976 campaign (215 fragments and 960 chips, originally belonging to a dozen large tablets recording precious metals, sheep, and draught animals.[58] The tablets were probably stored on platforms made of unbaked bricks.

According to Matthiae,[59] Room L. 2586 and the Vestibule (L. 2875) of the Great Archive may constitute those rooms where the tablets were kept for consultation:

[A] L. 2586

Room L. 2586 is situated in the northwest wing. The first 42 tablets were found here in 1974, together with a *bulla*. The documents found in L. 2586 are administrative texts concerning mostly precious metals.[60]

[F] L. 2875

Possibly, the Vestibule (L. 2875) of the Great Archive was a consultation room and a writing post.[61] About 100 tablets (276 inventory numbers, including fragments) must have been stored in the Vestibule (L. 2875), whose typology is very similar to that of the texts in the Great Archive (L. 2769) (letters,[62] royal ordinances, and agricultural administrative texts) dated to the very late period of the city. The tablets, mostly lenticular and arranged on a clay bench near the northeast and

[58] The texts on animal deliveries are very similar to those in archive L. 2769, but unlike them, cattle and sheep are counted together in the documents of L. 2764 (Archi 2015a: 79).

[59] Matthiae 1986: 58.

[60] Archi 1986: 75–76; Archi 1996b: 65; Biga 1988a: 285–287.

[61] The hypothesis was originally proposed by Matthiae (1981: 156, later 1986: 58, and fn. 7) and is supported by the finding of a "small steatite tool, rhomboid in shape, whose surface has been polished by use." According to Matthiae, this object may have been used to erase certain lines or columns of writing by pressing its edge or face. As for some fragments of bone sticks, these can only doubtfully be considered as styluses since their tips have been lost.

[62] See *ARET* 18 (Catagnoti – Fronzaroli 2020).

northwest corners, had been recovered on the floor, *i.e.*, near the entrance to the Great Archive.[63]

Tablets were also retrieved in other rooms of Palace G, which were dislocated from the area of the Great Archive:

[G] L. 3143, L. 3462, and L. 3474

In 1982, the Southern Quarter (Rooms L. 3143, L. 3462, and L. 3474) yielded five administrative texts.[64] These few tablets, found in peripheral sectors of the palace, dealt with subjects different from those of the documents in the other archives of the administrative quarter.[65] This may suggest that other archives—still to be identified—could have been found in other sectors of the palace.[66]

[H] L. 8496 + L. 8778 and L. 8495

In 2004, in the two compartments L. 8496 + L. 8778 and L. 8495, located along the east wall of the Throne Room L. 2866, were found 13 lenticular tablets (in part fragmentary), a clay sealing with seal impressions, and some small objects, among

[63] Archi 1986: 76–77; Archi 1996b: 62–63; Biga 1988b: 291–299; Matthiae 2008: 72.

[64] Archi 1993b.

[65] Archi 1996b: 65–66 "Sembra dunque che esse non facessero parte di un archivio, ma che in quel settore fosse alloggiato un ufficio che rendicontava le assegnazioni di vino e di malto per la produzione di birra (tavolette 3–5). Testi di quel genere non sono presenti nell'Archivio Centrale, dove si trovano solo registrazioni di vino in entrata: o nei documenti che riguardano consegne di prodotti agricoli dai villaggi, oppure nei rendiconti mensili di assegnazioni di tessuti, dove il dono di un quantitativo di vino è la causale di una consegna di vesti. Gli altri due testi fanno pensare che in quel quartiere operasse anche un'autorità che aveva grandi responsabilità amministrative, forse il visir stesso. Un primo documento autorizza tre figli del re a utilizzare parte dei redditi provenienti da vaste superfici agricole e da numerose mandrie di bestiame di pertinenza del sovrano. ll secondo è un conteggio di beni come terreni, quantitativi di orzo, bestiame di competenza del sovrano e dei principi; ad essi si aggiungono altri generi di beni il cui valore è calcolato in argento oppure in oro, come del legno di bosso e di cedro appartenenti al visir e valutato ben 799 kg. d'argento."

[66] Matthiae 2008: 91.

them a piece of jewelry.[67] These texts were considered to be related to transactions that took place in the Throne Room itself, and may have been transferred to the Great Archive after a short time.[68]

[I] L. 8606

In 2003, a tablet was found with a votive plaque in L. 8606, located in the northwest wing of the Central Complex. According to Archi, the tablet should belong to a period before the archives.[69]

1.1.2. Distribution and typology of Pre-Sargonic tablets found in Tell Mardīkh

As far as the Ebla corpus is concerned, I have chosen to analyze mainly administrative, chancery, mathematical,[70] and lexical texts, as these provide the most useful information on the practice of numbers and units of measures. Some further information, especially regarding references to time and dates, has been drawn out from the Ebla kingship rituals[71] and the liturgical calendar TM.75.G.12287+.[72] The chart below concerns the distribution of each genre among the published material:

Genre	Findspot	Topic	Edition
Administrative	**[C]** L. 2769	Textiles, wool, objects, metals, foodstuff, lists of personnel	*ARET* 1; *ARET* 2; *ARET* 3 (fragments); *ARET* 4; *ARET* 7; *ARET* 12 (fragments); *ARET* 14; *ARET* 15; *ARET*

[67] Archi 2015b: 9.

[68] Matthiae 2008: 75.

[69] Archi 2016: 2, fn. 8.

[70] For the definition of "mathematical texts," see Chapter 4.

[71] Edited in *ARET* 11 (Fronzaroli 1993).

[72] Catagnoti 2019a.

			19; *ARET* 20; *MEE* 2; *MEE* 5; *MEE* 7; *MEE* 10; *MEE* 12
	[B] L. 2712	Foodstuff, lists of personnel	*ARET* 9; TM.75.G.427[73]
	[D] L. 2752	Textiles, wool, metals	*ARET* 8; *ARET* 14; *MEE* 5
	[H] L. 8496	Metals	TM.04.G.73; TM.04.G.74; TM.04.G.145; TM.04.G.150; TM.04.G.154; TM.04.G.160; TM.04.G.151; TM.04.G.146; TM.04.G.147; TM.04.G.149; TM.04.G.148; TM.04.G.180[74]
Chancery	**[C]** L. 2769		*ARET* 13; *ARET* 16
	[F] L. 2875		*ARET* 18
Mathematical[75]	**[C]** L. 2769		*MEE* 3.54; *MEE* 3.72; *MEE* 3.73; *MEE* 3.74; TM.75.G.2346[76]
Lists of numbers and numerals[77]	**[C]** L. 2769		*MEE* 3.48+49; *MEE* 3.63; *ARET* 5.23 *MEE* 15.23; *MEE* 4.78; *ARET* 3.683 +

[73] Pettinato 1974–1977.

[74] Published in Archi 2015a.

[75] See the full discussion in Chapter 4.

[76] Published in Archi 1989: 1, Fig. 1.

[77] See the full discussion in Chapter 4.

			MEE 4.63 + *MEE* 4.64 + *MEE* 4.71; *MEE* 4.78
Kingship-rituals and liturgical calendar	**[C]** L. 2769		*ARET* 11; TM.75.G.12287+[78]

Fig. 3 – Distribution of texts typology among the archives of Ebla Palace G (Tell Mardīkh).

As one can see in the chart, administrative texts on different topics have been found in different rooms. Particularly important is the distinction between **[C]** L. 2769 and **[B]** L. 2712. These two archives present some substantial differences in the chronologies and genres of yielded documentation, and more generally concerning the editing of the tablets. These differences are most striking when one considers that these two archives belong to the rooms where the tablets were originally stored.[79] In this light, such peculiarities reveal different operational groups of scribes, each concerning one of the two archives.

[B] L. 2712 is an archive whose documentation refers to the very last period before the destruction of Ebla. Indeed, the texts preserved in L. 2712 pertain to two years (except for TM.75.G.427,[80] a summary text that refers to a period of seven years), as the documents contained in L. 2712 appear to have been destroyed periodically (possibly every two years or so).[81] L. 2712 contained texts on the management of cereals and their by-products (mainly flour, semolina, beer, and bread) and olive oil, all destined for the palace.[82] Other foodstuffs, such as wine, were registered in other archives, together with most of the meat stocks (particularly in L. 2875 and

[78] Published in Catagnoti 2019a.

[79] See Matthiae 1986: 57–58.

[80] Pettinato 1974–1977.

[81] Milano 1988: 290.

[82] Milano 1988: 290.

L. 2769).[83] The texts from L. 2712 are all dated according to a local calendar.[84] In the case of months 8, 9, and 10, a few variant denominations are also attested.[85] Overall, the combination of these peculiarities makes it possible to speak of L. 2712 as an archive both in a topographical and technical way, *i.e.*, a place representing a precise bureaucratic reality.[86]

[C] the Great Archive (L. 2769), covers a much wider chronological span. The Great Archive consists mainly of documentation written under the last two kings of Ebla: Yirkab-damu and Yiṯġar-damu, with some texts pertaining to Yigriš-Ḫalab.[87]

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[83]Archi 1986: 74. On the izi-gar ceremony, see Archi 2003a: 39–42.

[84] On this topic, see also Pettinato 1974–1977: 1–36 and Milano 1990a: 353–354.

[85] Milano 1990a: 353.

[86] Milano 1990a: VII.

[87] Archi 2023: VII. Archi (2023: VII, and previously, *e.g.*, 2015a: 165) dates the construction of the Archive L. 2769 to when Arru-LUM was "minister" (on this topic, see below). As for the introduction of cuneiform writing in Ebla, the problem further unravels. See the following contributions, in chronological order: Archi 2003b: 19 "writing might have been introduced in Ebla via Mari during the reign of Igriš-Halab, or immediately before 2400 BC"; Archi 2006b: 101 "the oldest written documents do not go back before Igriš-Ḫalab the third but last king, who died about 45 years before the destruction of Ebla. There is some evidence that writing was introduced at Ebla no earlier than the reign of Igriš-Ḫalab"; Archi 2006a: 658 "i documenti piu antichi conservati potrebbero essere stati anche le prime prove con le quali si cimentarono gli scribi eblaiti. Non sembra probabile che la scrittura fosse stata introdotta già precedentemente nella Siria occidentale. È comunque certo che l'interesse ad un più alto grado di letterarietà si sviluppò solo 30–40 anni prima della catastrofe finale"; Fronzaroli 2006: 19 "l'introduction de l'écriture cunéiforme à Ébla pourrait avoir eu lieu peu de temps avant la période couverte par les textes conservés dans les archives ou immédiatement à son début" (as later in Tonietti 2010: 69–72); Milano 1995: 1220–1221 "the speed of the urbanization process at Ebla, once it was initiated, increased very rapidly: the introduction of writing cannot antedate the brief phase of proto-urban adaptation of the EB IV A1, and yet in a span of about two hundred years a good deal of the Sumerian literary and school tradition had been assimilated by the Ebla scribes, who also adopted the cuneiform script to write original works in their own language"); and Liverani 2014: 127 "Eblaite writing was similar to the cuneiform of the Early Dynastic IIIa period (attested in Fara and Abu Salabih), also found in Pre-Sargonic Mari. This indicates that writing had been in use at Ebla before the construction of Palace G (whose preceding version has only been detected through surveys), possibly in connection with the rise of the Eblaite dynasty (ca. 2500 BC)."

Over the years, Alfonso Archi, Maria Giovanna Biga, and Francesco Pomponio have developed a detailed chronological sequence of the Ebla archives.[88] According to this reconstruction, the chronological depth of the archives goes back at least 45–50 years.[89] This main chronology refers to the three "ministers"[90] of the Ebla kingdom, namely Arru-LUM, Yibrium, and Yibbiʾ-Ḏikir, who operated under the reign of the last two kings of Ebla. However, Marco Bonechi has often criticized this mainstream chronology, specifically pointing out that numerous monthly records of textiles are dated to the same month and year, which he presents as evidence that they belonged to a single dossier.[91] Here, for the sake of simplicity and concision, I distinguish four main chronological phases:

[88] Some fundamental studies on this topic are: Biga – Pomponio 1990; Biga – Pomponio 1993; Archi 1996a; Biga 1996; Archi – Biga 2003; Biga 2003; and Archi 2015c. The latest chronological subdivision, based mainly on Archi's interpretation of the mu-DU texts, has been provided by Archi (2023: V "Contents" and *passim*), who attributes 36 years to the king, Yirkab-damu (referred as Išʿar-damu) and 12 years to his predecessor Yiṯġar-damu (referred as Irkab-damu). However, there is no consensus on this reconstruction (see below).

[89] The following passages are also quoted in Bonechi 2020a: 106, fn. 25. Biga 2003: 358 "The principal archive [L. 2769] spans a period of approximately 45 to 50 years"; Archi 2015c: 164 "The last two kings [*Iš*$_{11}$*-ar-da-mu* and *Ir*$_{3}$*-kab-da-mu*] reigned together for about 46-47 years"; and Archi 2016: 3 "we must bear in mind that it was only with the start of the mandate of minister Arrukum (40 years before the destruction of Ebla) that the documents were systematically collected and stored in the Central Archive, located in a room (L. 2769) which was built, halfway through the reign of Irkab-damu, under the portico of the Audience Hall, near the entrance of the administrative sector of the royal palace. Only around 70 earlier tablets were considered important enough to be chosen and transferred to this archive."

[90] The term "minister" is an anachronistic convention commonly used in the Ebla studies and meant to facilitate the chronological subdivision of the Ebla Archives (mostly in the mainstream chronology). It is based on the importance held by Arru-LUM (wr. *Ar-ru*$_{12}$-LUM), Yibrium (wr. *Ib-ri*$_{2}$*-um*), and Yibbiʾ-Ḏikir (wr. *I-bi*$_{2}$*-zi-kir*) in their prominent position in the administration of the Ebla Kingdom. Nevertheless, it should be noted that there is no function name qualifying this role in the texts.

[91] See the following quotations in order. Bonechi 2001: 60 "In general terms, during the short span of time covered by the Palace G archives (in any case not more than 50 years and, I think, more likely not more than 12 or 15 years) …" Bonechi 2020a: 106, fn. 25: "In general, an alternative and more careful approach to the chronological overlapping of the Palace G texts will lead to a drastic

I. Texts predating king Yirkab-damu

II. Texts dating to king Yirkab-damu (as minister Arru-LUM was alive)

III. Texts dating to king Yiṯġar-damu, in the first phase of his reign (as minister Yibrium was alive)

IV. Texts dating to king Yiṯġar-damu, in the second phase of his reign (as minister Yibbiʾ-Ḏikir was alive)

1.2. Tell Harīrī (Mari) and Tell Beydar (Nabada)

This section concerns the description of the amount, typology, and location of cuneiform texts found at Tell Harīrī (ancient Mari) and Tell Beydar (ancient Nabada).

The archaeological site of Mari (Tell Harīrī) is located in Syria, on the western bank of the middle Euphrates River, about 120 kilometers southeast of Deir ez-Zor and

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reduction of the time frame covered by them. It is currently thought to have been of around 45/50 years [...] but to me L. 2769 was built by *Iš*$_{11}$*-ar-da-mu* few years before the fire of Palace G, as part of his building works, I discussed elsewhere, and see for the moment Bonechi 2016a: 24). A more realistic estimate instead suggests roughly 12 years for the bulk of the documentation, complemented by a few older texts (see Bonechi 2001:60; Marchesi – Marchetti 2011: 138 fn 48, and Marchetti – Vacca 2018: 318 and fn. 64)." For more on intercalary months, see p. 150: "Rather, the data discussed in the present investigation should be understood as a further indication in favour of a much shorter duration of the Ebla Palace G archives than commonly thought, implying an extremely short reign of *Ìr-kab-da-mu* followed by a reign of *Iš*$_{11}$*-ar-da-mu*'s lasting less than 10 years." Bonechi, 2020b: 328, fn. 27: "Among the clues that Archi's relative chronology of the Ebla Palace G texts is unconvincing to me is the remark about *ARET* XX 17 on p. 124: "The king of Mari, *ḪI-da-ar*, is mentioned in § 43. In § 44, the queen is followed by thirteen 'women of the king,' among whom is *Ra-ù-tum*, as in the texts nos. 6, 7, 15, 16, 19, 22, 24: this document does not belong, therefore, to the very last years of Ebla, as is instead the case of *ARET* VIII 542 (cfr. Tonietti 1989, pp. 108–109)"; and p. 334: "Here I cannot subscribe to the statements on p. 189 according to which *ARET* XX 1 is 'an account concerning two of the first six years of king Irkab-damu (the years 46–41 before the fall of Ebla),' and that *Iš*$_{11}$*-ar-da-mu*'s reign lasted thirty-five years, because I prefer a much shorter time frame for the reigns of the last two Palace G kings."

about 30 kilometers from the Iraqi border. Excavations at Mari were begun in 1933 by French archaeologist André Parrot and then resumed in 1979 by Jean-Claude Margueron. The texts analyzed in this thesis are dated to 2550–2220 BC and are roughly contemporary with the archives of the G Palace at Ebla.[92]

The Nabada site is located in the northern Mesopotamian region of the "Khabur Triangle," 35 kilometers northwest of al-Ḥasaka. Excavations were conducted from 1992 until 2010 by a joint Syrian and European team (European Center for Upper Mesopotamian Studies and Directorate General of Antiquities and Museums of Syria), led by Marc Lebeau and Antoine Suleiman.[93] In this dissertation, I will focus on the Early Jezirah IIIb (hereinafter "EJ IIIb")[94] tablets and relating to ancient Nabada, a site under the control of the Nagar (Tell Brak) kingdom and functioning as a relay station along a trade route.[95]

Although the Nabada texts have not been studied extensively in this dissertation, a discussion of these tablets' findspot was duly included in this chapter because they provide precious information. However, that discussion has been paired with that concerning Mari's texts, as historically these two corpora present numerous points of contact, not only chronologically and geographically,[96] but also linguistically (see, *e.g.*, the section on capacity measures, 2.2.4.).

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[92] Margueron 2014: 25.

[93] Progressive reports of the excavations at Tell Beydar may be found in Lebeau – Suleiman 1997; 2003; 2007; 2011.

[94] On the synchronism between EJ IIIb and ED IIIb, see Lebeau 2004: 1. See also Sallaberger 2005: 91 "The texts from Tell Beydar, however, belong precisely to the last phase of the flourishing urban culture before the decline, which is designated as Early Jezirah IIIb, and which corresponds to the Pre-Sargonic period in South Mesopotamia (ca. 24th century BC)."

[95] See the discussion in Sallaberger – Ur 2004: 65–69.

[96] See, *e.g.*, the discussion in Sallaberger 1998 and in Archi 2015c.

1.2.1. Distribution and typology of the Pre-Sargonic tablets found in Tell Harīrī

Between 1952 and 1974, Parrot found a total of 20 Pre-Sargonic tablets (all pertaining to the 3rd millennium, and the so-called Ville II).[97] Later, starting in 1980, during the second campaign by Jean-Claude Margueron, 16 more Pre-Sargonic tablets were discovered. All the materials recovered from 1952 to 1980 were published in two consecutive studies by Dominique Charpin.[98] In 1987, Charpin published 37 tablets from all five loci: **[A]** the Sanctuary P. 25, **[B]** the so-called "Maison Rouge," **[C.1]** the area of the "Communs" and of **[C.2]** "Chantier H" located west of the esplanade, **[D]** the Pre-Sargonic building located under the Palace of Zimri-Lim, and **[E]** the "Chantier B." In 1990, Charpin published five more tablets from **[E]** the "Chantier B." Later, Harumi Horioka[99] published eight more tablets retrieved from the antique market that almost certainly belonged to the Pre-Sargonic Mari documentation. Lastly, Antoine Cavigneaux[100] published the new material found during the archaeological excavations by J.C. Margueron up to the beginning of the War in Syria. These texts come from further findspots: **[C.2]** "Chantier H," **[D.2]** "Palais, Quartier Nord," **[F]** "Sondage Palais, Espace 4," and **[G]** "Secteur G, Chantier Temple Nord 1 (TN1)."

[97] On the "Ville II," see Margueron 2014: 25–31; 50–58; 68–80; 84–86; 82–92; 96–99; 101–112; 127; 142–147.

[98] Charpin 1987; Charpin 1990.

[99] Horioka 2009.

[100] Cavigneaux 2014.

Fig. 4 – Topographic Map of Tell Harīrī (Mari) (Charpin 1987: 67).

Fig. 5 – Schematic plan of the "Quartier Nord" of the "Pre-Sargonic Palace" (Cavigneaux 2014: 292, Fig. 1).

[A] The Sanctuary P. 25

In 1952, one Pre-Sargonic tablet (Charpin 1987, no. 1) was retrieved by Parrot in Sanctuary P. 25. The precise location of the tablet is not preserved in the official documents of the Damascus Museum, but in the archaeological record published by Parrot, it is possible to deduce that this tablet belonged to a lower lever (Pre-Sargonic), which was characterized by features of a disruptive fire.[101]

[B] "Maison Rouge"

In 1954, in the so-called "Maison rouge," located in sector R. 28, Parrot discovered three Pre-Sargonic administrative tablets also burnt by a fire[102] (Charpin 1987, nos. 2–4). These tablets have a quadrangular layout and a peculiar paleography.[103] Moreover, they contain no clear chronological indication (as they are undated). As for metrology, these tablets have all been written using the a-gar$_{13}$ measurement system (see 2.2.4.2.).

[C.1] "Communs"

The so-called "Communs"-area is located west of the Pre-Sargonic Dagan's Temple and was excavated in 1963. The area yielded eight tablets (Charpin 1987, nos. 5–12) and some seal impressions.[104] Concerning the layout, the tablets in the "Communs" are quite different from those in the "Maison Rouge" in that they have a thicker, rounded shape. All eight documents are administrative texts concerning cereals and their by-products; only six of them are dated.[105]

[C.2] "Chantier H"

Three administrative tablets were found in "Chantier H,"[106] which is located in the same sector as **[C.1]**; they are Cavigneaux 2014, nos. 25–27. However, they differ

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[101] Charpin 1987: 66, erroneously quoting Parrot 1954: 201, to be amended Parrot 1953: 201.

[102] Parrot 1955: 197–198; Dossin 1964: 309; Charpin 1987: 68.

[103] Charpin 1987: 68.

[104] Charpin 1987: 70 directly quotes Parrot 1965: 7 "le déblaiement de la salle 16, outre une abondante céramique cassée (jarres, assiettes, bols), nous a permis de recueillir le lot précieux de huit tablettes présargoniques et de plusieurs empreintes de même époque." See also Dossin 1964: 309.

[105] Charpin 1987: 70–71.

[106] Margueron 2004: 94–95.

in chronology and purpose from those edited by Charpin and pertaining to the "Communs" **[C.1]**. Indeed, according to Cavigneaux,[107] tablets from "Chantier H" look older than those published by Charpin; moreover, the destination of the "Chantier H" may have been an administrative unit in which women were involved, including those of the royal family.[108]

[D] Pre-Sargonic building located under the Palace of Zimri-Lim

[D.1] The "Palais Présargonique P.1"

A number of Pre-Sargonic tablets were also found at various discovery points in the 3rd millennium area beneath the Palace of Zimri-Lim (the area known as the "Palais Présargonique P.1"). Before the Second World War, Parrot unearthed a tablet (Charpin 1987, no. 13) whose precise location had been lost.[109] Subsequently, two tablets emerged in 1964 (Charpin 1987, nos. 14 and 15) and two more in 1969 (from Room LV), which correspond to Charpin 1987, nos. 16 and 17.[110] Finally, in 1974, three more tablets were unearthed in Room LXIV (Charpin 1987, nos. 18–20). Strange is the case of an isolated tablet found in 1966 in Corridor XXXI, mentioned in Charpin 1987. In fact, one of the tablets published in Charpin 1987 corresponds to the field number attributed to this tablet (T. 620). The tablets emerging from the subsequent campaigns pertained to two rooms and an area called "Sondage Palais, Espace 4," which will be discussed below **[F]**. The tablets Cavigneaux 2014, nos. 1–9 come from Room 89; and Cavigneaux 2014, nos. 10–23 come from Room 91 (both located in the "*Secteur Palais-quartier nord*").[111] In detail, Room 88 contains rations and lexical texts, whereas Room 89 contains textiles, metal, and animal offerings. However, if one examines the various sets of tablets for their coherence

[107] Cavigneaux 2014: 307.

[108] This interpretation is based on the seals discovered during the investigation and published by Beyer (2007: 237–244, nos. 4, 7 e 9). Also note the foreground position of women in the panel reproduced in Margueron 2007: 258, Fig. 12.

[109] Charpin 1987: 77.

[110] Prior to Charpin's comprehensive publication, these tablets had already been published by Maurice Lambert (Lambert 1970: 245 no. 2; Lambert 1970: 258–259, no. 8).

[111] Cavigneaux 2014: 292–294, especially Fig. 1 and Fig. 2.

in topic and shape, none of these sets—not even the one in the northern quarter of the palace—can be considered an archive.[112] Nevertheless, these coming from the northern part of the palace ("*Secteur Palais-quartier nord*"), excavated in these later campaigns, show a clearer stratigraphic situation: an ashen layer resulting from the brutal destruction of P-1; the height of this layer of destruction allows a relative chronology distribution of the tablets.[113] As for chronology and the dating of this destruction to the sequence of Mari kings; according to a first hypothesis, Išqi-Mari and his predecessor ḪI(ṭab$_6$)-*da-ar* were the last two kings of Mari.[114] The reign of the former would have lasted some 40 years,[115] the latter's being somewhat shorter. However, because Beyer[116] has also considered the seals found in the palace, a

[112] This does not necessarily mean that these rooms are the original storage place (Cavigneaux 2014: 310).

[113] Cavigneaux 2014: 310, with literature "Si l'on s'appuie sur les observations des fouilleurs et sur la comparaison des élévations des sols et des tablettes (fig. 2), on peut affiner la description, mais il ne me semble pas qu'on puisse distinguer des situations clairement différentes. On peut bien sûr distinguer «couche A » de « sol A », mais, si on n'identifie pas clairement de sol intermédiaire, on ne peut en tirer aucune conclusion chronologique certaine, au-delà de la simple constatation que les objets découverts dans l'une ou l'autre situation précèdent vraisemblablement de très peu la destruction, mais même cela n'est pas absolument certain. Le seul texte trouvé à un niveau clairement antérieur au sol de destruction est le no 9, daté de l'an. Comme on a dans la même pièce, au-dessus du sol de destruction, une tablette de l'an 33 (no 6) et deux de l'an 40 (no 1 et 7), le no 9 pourrait avoir été écrite en l'an 25 du règne de 40 ans; le sol de la pièce 89 aurait pu être légèrement surélevé durant ce règne. Pour le prouver, il faudrait pouvoir rattacher le no 9 à une série cohérente, ce qui est impossible. Si on prend pour hypothèse un unique règne de 40 ans, ce règne doit précéder un ou deux autres règnes brefs, mais nous n'avons pas encore la preuve que ce règne est celui de tel ou tel souverain, puisqu'on n'a pas d'empreintes associées au no 9. Les tablettes portant des numéros d'années élevés, étant relativement groupées (limitées à la pièce 89), pourraient être les reliquats d'un archivage un peu plus ancien et précéder immédiatement les tablettes portant des numéros d'années plus bas; pour l'instant, les tablettes ne donnent pas d'indice clair pour deux règnes brefs. Dans le quartier nord du palais, nous n'avons encore qu'une seule tablette portant une date basse (no 12, pièce 88, datée de l'an 3), mais ces dates sont bien documentées dans d'autres secteurs du bâtiment."

[114] Archi – Biga 2003: 30–35, followed by Charpin 2005 and Sallaberger 2007: 422.

[115] Cavigneaux 2014: 310, with literature "attribuer le règne de 40 ans à Jiplus-il (Iplul-il) ne concorde pas avec la situation archéologique et me semble arbitraire."

[116] Beyer 2007.

different situation has come into play. Besides an apparent absence of Ḫ̮I(ṭab$_{6}$)-*da-ar* in the seals, the names of two other king have appeared: *Iš*$_{11}$-LAGAB-*da-ar* (Iškur-Daʾar[117] or Jiḏkur-daʾar (?)[118]) and *I-ku*-[...] (possibly, Ikūn-Šamaš).[119] In this respect, Marchesi – Marchetti have proposed the following succession: Išqi-Mari, Ikūn-Šamaš, Jiḏkur-daʾar / Iškur-Daʾar, which, although plausible, must be confirmed.

[D.2] "Quartier Nord" of the "Pre-Sargonic Palace"

In the following years, Margueron discovered 24 new tablets in the northern sector of the Palace, "Quartier Nord," located southwest of the main entrance.[120] These texts were published by Cavigneaux.[121]

[E] "Chantier B"

The "Chantier B" yielded Pre-Sargonic tablets in Room V (Charpin 1987, nos. 21–30), Room VIII (Charpin 1987, nos. 31–36), and Room X (Charpin 1987, no. 37). This distribution corresponds to some differences in the chronological frame of the tablets. Tablets from Room V are to be dated to years 20–26, and those from Room VIII to years 33–35. These two groups may have been kept in different baskets, which were destroyed at the time of the destructive fire.[122] During a survey in 1986, in the southwest corner of Room I two tablets and three fragments of tablets have been found (Charpin 1990, nos. 38–42).

[F] "Sondage Palais, Espace 4"

[117] As in Marchesi – Marchetti 2011.

[118] Cavigneaux 2014: 311.

[119] As in Marchesi – Marchetti 2011.

[120] Margueron 2004: 206.

[121] Cavigneaux 2014: 292–304.

[122] Charpin 1987: 80.

The area of the "Sondage Palais, Espace 4" yielded only one fragmentary tablet,[123] also published by Cavigneaux (Cavigneaux 2014, no. 24).[124]

[G] "Secteur G, chantier Temple Nord 1"

Four more tablets (Cavigneaux 2014, nos. 28–31), of which only one is well preserved (Cavigneaux 2014, no. 28), have been discovered in the northern part of the "Massif Rouge" (*Secteur G, chantier Temple Nord 1*). According to personal communication of L. Ayache to Cavigneaux,[125] the tablets come from the area of locus 1, Room 6, located at the bottom of the north wall and partially amputated by the widening of the massif[126]; they were embedded in a very homogenous fill layer, rich in clay nodules, but poor in material.

The following chart summarizes the distribution (concerning both content and chronology) of the Pre-Sargonic tablets found in Mari and belonging to the administrative and legal genres. In contrast to Ebla and Šuruppag, no mathematical text has been found in Mari.

Findspot	Edition	Genre	Topic	Chronology
[A]	Charpin 1987, no. 1	Administrative	Metals	[?]
[B]	Charpin 1987, no. 2	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 3	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 4	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 5	Administrative	(?)	Year 6, month 9
[C]	Charpin 1987, no. 6	Administrative	Cereals and by-products	Year 6, month 9

[123] Margueron 2004: 95.

[124] Cavigneaux 2014: 304.

[125] Cavigneaux 2014: 307.

[126] Parrot 1952: 193.

	Charpin 1987, no. 7	Administrative	Cereals and by-products	Year 7, month 8
	Charpin 1987, no. 8	Administrative	Cereals and by-products	Year 8, month 2
	Charpin 1987, no. 9	Administrative	Cereals and by-products	Year 8, month 2
	Charpin 1987, no. 10	Administrative	Cereals and by-products	Year 8, month 2
	Charpin 1987, no. 11	Administrative	Cereals and by-products	Year 7, month 10
	Charpin 1987, no. 12	Administrative	Cereals and by-products	[?]
[C.2]	Cavigneaux 2014, no. 25	Administrative	Cereals and by-products	[?]
	Cavigneaux 2014, no. 26	Administrative	Cereals and by-products	Year 7 or 8, month 8
	Cavigneaux 2014, no. 27	Administrative	Cereals and by-products	[?]
[D]	Charpin 1987, no. 13	Administrative	Metals	[?]
	Charpin 1987, no. 14	Administrative	Textiles	[?]
	Charpin 1987, no. 15	Administrative	Textiles	[?]
	Charpin 1987, no. 16	Administrative	Cereals and by-products	Year 3, month 5
	Charpin 1987, no. 17	Administrative	Cereals and by-products	Year 8, month 2
	Charpin 1987, no. 18	Administrative	Textiles	Year 5, months 1, 6, 10
	Charpin 1987, no. 19	Administrative	Figurines	Year 7, month 8
	Charpin 1987, no. 20	Administrative	Foodstuff	Year 4, month 8
[D.2]	Cavigneaux 2014, no. 1	Administrative	[?]	Year 40, month 2

	Cavigneaux 2014, no. 2	Administrative	Wool	Year n+6, month 11
	Cavigneaux 2014, no. 3	Administrative	Metals (objects)	[?]
	Cavigneaux 2014, no. 4	Administrative	Animals	[?]
	Cavigneaux 2014, no. 5	Administrative	[?]	[?]
	Cavigneaux 2014, no. 6	Administrative	Textiles	Year 33, month 8
	Cavigneaux 2014, no. 7	Administrative	Animals	Year 40, month 2
	Cavigneaux 2014, no. 8	Administrative	Textiles	[?]
	Cavigneaux 2014, no. 9	Administrative	[?]	Year 25, month (?)
	Cavigneaux 2014, no. 10	Administrative	Cereals + Metals	Year (?), month (?)
	Cavigneaux 2014, no. 11	Administrative	Animals + Textiles	[?]
	Cavigneaux 2014, no. 12	Administrative	Personnel	Year 3, months 10, ...
	Cavigneaux 2014, no. 13	Administrative	Cereals and by-products	[?]
	Cavigneaux 2014, no. 14	Administrative	Cereals and by-products	[?]
	Cavigneaux 2014, no. 15	Administrative	Cereals and by-products	[?]
	Cavigneaux 2014, no. 16	Administrative	Cereals and by-products	[?]
[E]	Charpin 1987, no. 21	Administrative	Cereals and by-products	Year 20, month 2
	Charpin 1987, no. 22	Administrative	Cereals and by-products	Year 20, month 3

	Charpin 1987, no. 23	Administrative	Cereals and by-products	Year 22, month 6
	Charpin 1987, no. 24	Administrative	Cereals and by-products	Year 22, month 10
	Charpin 1987, no. 25	Administrative	Cereals and by-products	Year 23, month 2
	Charpin 1987, no. 26	Administrative	Cereals and by-products	Year 23, month 11
	Charpin 1987, no. 27	Administrative	Cereals and by-products	Year 25, month 1
	Charpin 1987, no. 28	Administrative	Cereals and by-products	Year 26, month 2
	Charpin 1987, no. 29	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 30	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 31	Legal	Various	Year 33, month 4
	Charpin 1987, no. 32	Administrative	Account of Years	Year 34, month 11
	Charpin 1987, no. 33	Administrative	Cereal and by-products	Year 35, month 5
	Charpin 1987, no. 34	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 35	Administrative	Cereals and by-products	[?]
	Charpin 1987, no. 36	Administrative	Animals	[?]
	Charpin 1987, no. 37	Administrative	Cereals and by-products	[?]
	Charpin 1990, no. 38	Administrative	Cereals + Animals	Year 18, month 4
	Charpin 1990, no. 39	Administrative	Cereals + Animals	Year 20, month 2

	Charpin 1990, no. 40	Administrative	Cereals and by-products	Year [?], month 4
	Charpin 1990, no. 41	Administrative	Cereals and by-products	Year 22+, month 10
	Charpin 1990, no. 42	Administrative	Cereals and by-products	[?]
[F]	Cavigneaux 2014, no. 24	Administrative	[?]	[?]
[G]	Cavigneaux 2014, no. 28	Administrative	Animals	[?]
	Cavigneaux 2014, no. 29	Administrative	Cereals and by-products	[?]
	Cavigneaux 2014, no. 30	Administrative	[?]	[?]
	Cavigneaux 2014, no. 31	Administrative	[?]	[?]
[?]	Horioka 2009, no. 1	Administrative	Cereals and by-products	Year 18, month 6
	Horioka 2009, no. 2	Administrative	Metals	[?]
	Horioka 2009, no. 3	Administrative	Cereals and by-products	Year 18, month 9
	Horioka 2009, no. 4	Administrative	Cereals and by-products	Year 7, month 11
	Horioka 2009, no. 5	Administrative	[?]	[?]
	Horioka 2009, no. 6	Administrative	Cereals and by-products	Year 23, month 2
	Horioka 2009, no. 7	Administrative	Cereals and by-products	Year 23, month 5
	Horioka 2009, no. 8	Administrative	Cereals and by-products	Year 23, month 5

Fig. 6 – Distribution of texts typologies in found in Tell Harīrī (Mari).

1.2.2. Distribution and typology of the Early Jezirah IIIb tablets found in Tell Beydar

The 3rd millennium tablets from Tell Beydar (EJ IIIb) can be dated to 2475–2380 BC.[127] These inscribed documents come from six different areas, known respectively as "Chantier B" **[A]**, "Chantier E" **[B]**, "Chantier F" **[C]**, "Chantier J" **[D]**, "Chantier I" **[E]** and "Chantier M/O" **[F]**. These inscribed documents (mainly tablets) have been published in two volumes: *Subartu* 2 (Ismail *et alii* 1996), and *Subartu* 12 (Milano *et alii* 2004). Each volume concerns the campaigns conducted in 1993–1995 and 1996–2002. The written documents edited in the first volume are cited as *Subartu* 2.1–147,[128] and those pertaining to the second, as *Subartu* 12.148–216.

[127] The Nabada corpus can be dated to the Early Jezirah IIIb (Beydar IIIb = ED IIIb), and more precisely to an advanced phase of this period situated at some point between ca. 2475 and ca. 2380 BC, likely near the middle of this interval, as indicated by the C_{14} analysis (Lebeau 2004: 1).

[128] Specifically, tablets 1–52, 54–69 were found in the 1993 season; 53, 70–144 in 1994; and 145–146 in 1995 (Van Lerberghe 1996: 123).

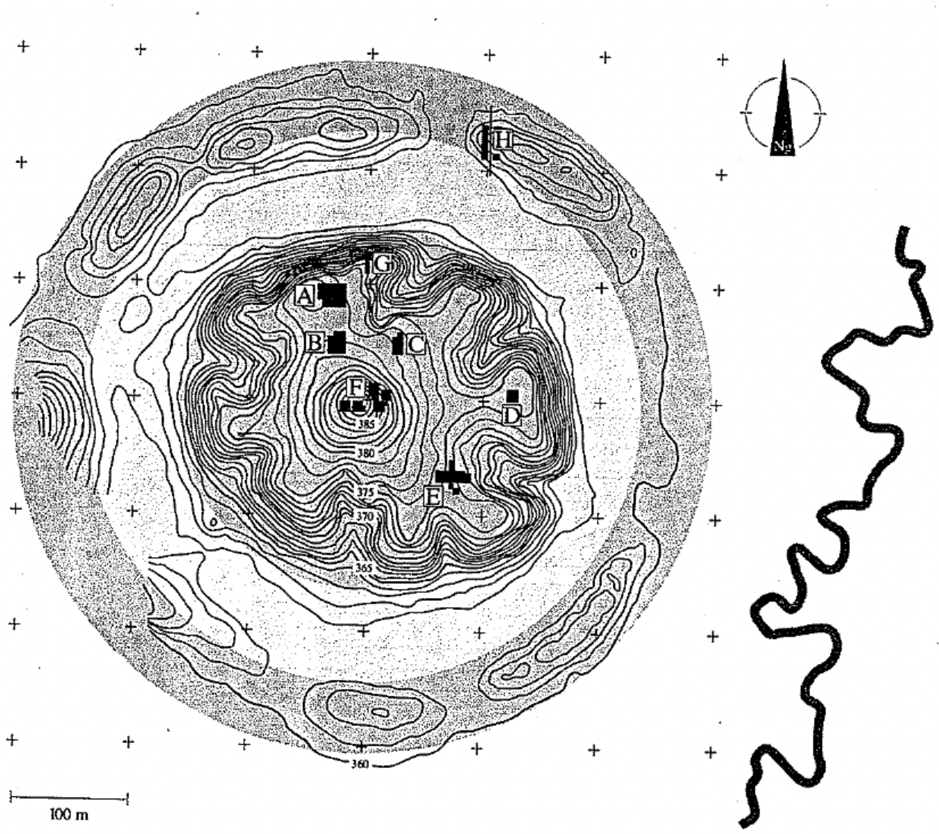

Fig. 7 –Topographic Map of Tell Beydar (Lebeau 1996a: 12, Fig. 1).

[A] "Chantier B"

The "Chantier B" is located in the northern area of the acropolis. Most (140 of 147) tablets retrieved during the campaigns conducted between 1993 and 1995 were found here.[129] In correspondence with the EJ IIIb (Beydar IIIb)[130] layers, located on the northern slope, multiple domestic buildings have been identified. Among them, two yielded written documents: the "Maison aux Tablettes" **[A.1]** and the adjacent "Neighbor House" **[A.3]**. Two other tablets come from a locus slightly superelevated in respect to the "Maison aux Tablettes," namely L. 2634 **[A.2]**. Since

[129] Lebeau 1996a: 8 and Lebeau 2004: 1.

[130] Lebeau 2004: 2.

the 1998 enlargement of "Chantier B" to join "Chantier F" ("Bloc Officiel" EJ IIIb), further documents have been found.[131] This junction area has been identified as a district possibly linked to activities of an artisanal nature and, more precisely, associated with animal husbandry (stables; open areas with installations linked to milking and shearing of small livestock).[132] During the 1996–2002 campaigns, some coins were found on the door linking P. 2645 and P. 2611 **[A.1.4]** (concerning the "Maison aux Tablettes"), and in the area concerning the above-mentioned area, related to animal husbandry **[A.4]**.[133]

[A.1] "Maison aux Tablettes"

The "Maison aux Tablettes" is a domestic building consisting of three rooms, which yielded most of the written documentation from Tell Beydar (135 tablets).

[A.1.1] Room P. 2645

To this room (P. 2645) belong three loci: L. 2700, L. 2701, and L. 2702. The first locus (L. 2700), a succession of fine packed-earth floors, was excavated in 1994. Here, 61 tablets (*Subartu* 2.73–133) were retrieved in context with ceramic sherds, flint blades, an "anepigraphic clay pellet," a clay bead, fragmentary animal bones, seeds, and shells. The locus L. 2701 corresponds to a stratum of soil located immediately below the base of L. 2700, where a tablet (*Subartu* 2.134) was found. L. 2702, corresponds to a blackish, compact, and ashy-earth floor, on which lay a further tablet (*Subartu* 2.135) as well as a few sherds, a pestle, a wheel, a basalt weight, and a caprid horn.[134]

[A.1.2] Room P. 2611

Inside Room P. 2611, which was excavated during the 1993–1994 campaigns, 19 cuneiform tablets (*Subartu* 2.54–72) were recovered slightly below the base of layer

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[131] Lebeau 2004: 2–3.

[132] Lebeau 2004: 3.

[133] Lebeau 2004: 3–4.

[134] Lebeau 1996a: 7.

L. 2640, in an unnamed layer. The material associated with these documents includes a ceramic bowl and numerous sherds, small bivalve shells, a bracelet, and a bronze needle.[135]

[A.1.3] Room P. 2574

L. 2617 corresponds to a layer of loose, ashy soil within Room P. 2574. A tablet (*Subartu* 2.1) was found near the base of this layer, just a few centimeters higher than floor L. 2629. In this layer, two fragmentary flint blades and a fragmentary terracotta figurine were also found. Locus L. 2629 was excavated in 1993. This locus is also located inside Room P. 2574 and corresponds to a slightly sloping packed earth floor. Here, 50 tablets (*Subartu* 2.2–51) were found encased in a cluster consisting of numerous shattered pottery sherds, animal bone fragments and small bivalve shells, together with objects of various kinds, mainly work tools and ornaments.[136]

[A.1.4] Doorway linking P. 2645 and P. 2611

During the 1996 campaign, the "Maison aux Tablettes" underwent minor work, mainly the removal of the door sills. Here, a tablet (*Subartu* 12.148) was discovered under the base of the mud-brick doorway linking Rooms P. 2645 and P. 2611. This tablet clearly belongs to the corpus of tablets discovered in 1993 and 1994 in the "Maison aux Tablettes" and can be dated, like the corpus as a whole, to an advanced phase of the EJ IIIb.

[A.2] L. 2634

Two tablets (*Subartu* 2.52 and *Subartu* 2.53) have been discovered at a level slightly higher than that of the walls of the "Maison aux Tablettes" (L. 2634), a few centimeters below the base of the Seleucid-Parthian level. This peculiar stratigraphic situation has been explained by disturbances associated with the

[135] Lebeau 1996a: 7.

[136] Lebeau 1996a: 6–7. These conditions underlie the frequent erosion or abrasion of one side of the tablets.

excavation of the foundation trenches of the Seleucid-Parthian house mentioned above, as their appearance and nature do not allow them to be distinguished from the documents found inside the "Maison aux Tablettes."[137]

Regarding the original arrangement of the tablets inside the "Maison aux Tablettes," Lebeau[138] cautiously suggested—in agreement with Sallaberger—that at least some of the tablets may have been stored inside baskets of some sort, as most were concentrated in small groups. However, each group of tablets had different typologies of documents in it and was, therefore, not thematically arranged[139]:

Findspot		**Edition**	**Topic**
[A.1.1]	**Group 1**	*Subartu* 2.73–110.	Individuals[140]; grains[141]; sheep

[137] Lebeau 1996a: 6.

[138] See the discussion in Lebeau 1996a: 8–9.

[139] Tablets have been regrouped under the dominant topic (as given in Ismail *et alii* 1996: 123–126; Milano *et alii* 2004: 83–84), *e.g.*, "Fodder for animals" was regrouped under the category "Grains," and "She-goats grouped with persons" under the category "Sheep and goats." In the case of "Rations given to persons," persons (*i.e.*, "Individuals") has been considered the dominant topic.

[140] To this topic category belong the following types of tablets: "Persons grouped with gate," "Persons grouped with place-names," "Women grouped with officials (ba-lá)," "Fragment concerning mainly women (ba-lá)," "Personnel with officials (ba-lá)" "Person grouped with place-names and gate(s)," "Personnel list," "List of persons," "Rations given to persons," "Fragment concerning personnel," "Personal names," "Agricultural personnel," "Fragment concerning persons," "Plough workers grouped with cereals," "Gates with numbers of persons," "Shepherds (?) with PN," "List of women," "Persons 'sitting' in Imu^{ki}," "Persons and place-names," "Men grouped with place-names," "Workers for harvest with officials," and "List of persons."

[141] To this topic category belong the following types of tablets: "Grain for persons," "Fodder for animals," "Grain for the ruler('s donkeys)" "Fragment(s) (grain)," "Rations," "*zalatum*-flour with officials," "Fodder for donkeys," "Grain expenditure," "Grain account," "Account of grain," and "Grain for (donkeys of) ruler."

			and goats[142]; cattle.[143]
[A.1.1]	**Group 2**	*Subartu* 2.111–120, 123.	Individuals; grains; sheep; fragments.[144]
[A.1.1]	**Group 3**	*Subartu* 2.126–131.	Individuals; sheep and goats; fragments; donkeys and oxen.[145]
[A.1.1]	**Uncertain**	*Subartu* 2.121, 122, 124, 125, 132, 133.	Individuals; grains; oxen and donkeys; school tablets.
[A.1.2]	**Group 1**	*Subartu* 2.67–69.	Individuals; grains.
[A.1.2]	**Group 2**	*Subartu* 2.54–60.[146]	Individuals; sheep and goats; fragments.
[A.1.2]	**Uncertain**	*Subartu* 2.61–63, 70–72.	Individuals; sheep and goats; school tablets; cattle.

[142] To this category belong the following types of tablets: “Sheep from PNs,” “Sheep for offerings,” “Sheep,” “Sheep for plucking,” “Goats,” “Record of income (sheep?),” “Sheep as offerings for the kitchen,” “Offerings of sheep,” “Sheep plucked,” “Delivery of sheep,” and “She-goats grouped with persons.”

[143] To this topic category belong the following types of: “Offering, small cattle,” “Small cattle (?, kuš),” “Small cattle with PN,” and “Delivery of small cattle.”

[144] To this category belong the fragments whose topic is unspecified.

[145] To this topic category belong the following types of tablets: “Assignment of plough teams,” “Fragment (donkeys?),” “Donkeys and fodder,” “Donkeys with their fodder,” “Donkeys (kuš),” “Donkeys,” “Donkeys in place-names,” and “Oxen and donkeys assigned to persons and place-names.”

[146] Lebeau 1996a: 9 “les fragments 57a et 57b n’ont pas été retrouvés à proximité l’un de l’autre.”

[A.1.3]	**Group 1**	*Subartu* 2.2–4, 10, 23, 29, 39a.	Individuals; donkeys and oxen; cattle.
[A.1.3]	**Group 2**	*Subartu* 2.17, 26, 32–34, 36–38, 39b, 40–42.	Individuals; grains; sheep and goats; donkeys and oxen; fragments.
[A.1.3]	**Group 3**	*Subartu* 2.24–25; 27–31, 35, 43, 44, 47–49.	Individuals; grains; legal; donkey and oxen; fragments; school tablets.
[A.1.3]	**Group 4**	*Subartu* 2.5–9, 11–16, 18–20, 22, 46, 50.	Individuals; sheep and goats; various;[147] donkeys and oxen; fragments; grains; cattle.
[A.1.3]	**Uncertain**	*Subartu* 2.21.	Sheep and goats.

Fig. 8 – Reconstruction of groups of tablets found inside the "Maison aux Tablettes" (based on the scheme in Lebeau 1996a: 8–9).

This does not help determine the function of the "Maison aux Tablettes." It is not possible to say whether it was a private house, an annex of the central administration, a scribe's workshop, or a "district office" dedicated to specific activities.[148] However, it is true that the "Maison aux Tablettes" was located near the political center of the city (see below, "Chantier F" **[B]**).

[A.3] "Neighbor House"

[147] To this topic category belong two types of tablets: "Purchase of wine for wool" and "Wool and capacity measures (grain)."

[148] Lebeau 1996a: 11.

On the west side of the "Maison aux Tablettes" is the adjacent "Neighbor House," where other five tablets have been retrieved. Although the appearance and nature of these documents suggest that they belong to the archival groups from the "Maison aux Tablettes," there is no direct communication between the "Maison aux Tablettes" and the "Neighbor House."[149] In L. 2813, a floor pertaining to Room P. 2811, two tablets (*Subartu* 2.136 and *Subartu* 2.137) were found near a vase holder and a jar with an inverted neck.[150] On the upper, beige-colored floor of Room P. 2806 (L. 2816), only one tablet (*Subartu* 2.138) has been retrieved.[151] One tablet (*Subartu* 2.139) pertains to L. 2818, a layer underlying L. 2816 in Room P. 2806. This sherd-rich layer is characterized by the presence of small fragments of clay and a few fragments of raw brick. The tablet was found in context with a clay ball, a zoomorphic terracotta figurine, a bronze pin, and a fragmentary flint blade.[152] L. 2845 yielded one more tablet (*Subartu* 2.140); this locus corresponds to part of the floor of Room L. 2845. In addition to this tablet, about forty sherds and some fragments of pure clay were also collected here.

[A.4] Animal Husbandry District, P. 28514

In 1999, 39 documents (*Subartu* 12.173–211), mainly *bullae* and some fragments, were discovered on both sides of the southern wall (L. 28020) of Room P. 28514, one of the large rooms belonging to the stable complex.[153] The 26 tablets (*Subartu* 12.173–198) come from the loci L. 28513+28508 (in context with collapsed brick fragments and animal bones), which is a layer of destruction contemporary with the EJ IIIb phase of the "Bloc Officiel."[154] To this same layer (L. 28020), one must associate two tablet fragments (*Subartu* 12.213 and *Subartu* 12.214) discovered in

[149] The presence of a pit dug that can be dated to the Seleucid-Parthian level is not sufficient to explain this singular location. Lebeau 1996a: 7 attributes it to a possible recording error during excavation procedures.

[150] Lebeau 1996a: 8.

[151] Lebeau 1996a: 8.

[152] Lebeau 1996a: 8.

[153] Lebeau 2004: 3.

[154] Lebeau 2004: 3.

2001. This context may be the same as that of loci L. 2629 and L. 2640 ("Maison aux Tablettes") from which no fewer than 67 tablets were discovered during the 2nd and 3rd excavation campaigns (see above).[155]

[B] "Chantier E"

The "Chantier E" is located near the outer limit of the upper city, in the extension of one of the main entrances to the ancient city and to the southeast of the central acropolis. It was excavated during the 1992–1995 campaigns. In correspondence with the "Chantier E" is an official building, namely a "bâtiment officiel," composed of four rooms in a row (P. 583, P. 5506, P. 5508, and P. 5593) and datable to the EJ IIIb.[156] Here, two tablets (Sallaberger – Talon 1996, nos. 141–142) were associated with L. 5713, the brickwork of the space formed by Room P. 5506 being in context with ceramics of the EJ IIIb.[157] In 1996, during the excavation of the house (EJ IIIb) adjacent to the northern wall of the granary found in "Chantier E,"[158] a clay seal (*Subartu* 12.149) was found in a secondary position.[159]

[C] "Chantier F"

The "Chantier F" corresponds to the central area of the Tell Beydar acropolis. Here, tablets have been retrieved in three areas: the "Bloc Officiel" **[C.1]**, the "Bâtiment SE" **[C.2]**, and the "Bâtiment NO" **[C.3]**. In 1996, a raw clay sealing (*Subartu* 12.149) was found in Room P. 5809 (L. 5924).[160]

[C.1] "Bloc Officiel"

Among the buildings excavated in the "Chantier F," archaeologists have identified a large official building pertaining to the EJ IIIb period, which has been identified

[155] Lebeau 2004: 3–4 and, previously, Lebeau 1996a: 6–7.

[156] Lebeau 1996b: 20.

[157] Lebeau 1996b: 20–21.

[158] Lebeau – Suleiman 2003: 243–268.

[159] It was in Room P. 5809, near the northern face of wall L. 5899, in a gap (L. 5924) between this wall and a set of bricks probably collapsed in a compact manner (L. 5921).

[160] Lebeau 2004: 4.

with a reception block of a palatial nature, the "Bloc Officiel."[161] The building was heavily modified during the EJ IIIb[162] (*phase* II); during the 1994–1995 campaign, tablets pertaining to this phase were excavated. In 1994, four tablets (in fragmentary or eroded states) were retrieved within the "Bloc Officiel" from spaces pertaining to this phase. The first fragment (Sallaberger – Talon 1996, no. 143) was discovered in 1994 on the paved floor of Courtyard L. 6233, on the northeast corner of the building. One fragment (Sallaberger – Talon 1996, no. 145) was found in the filling of Room P. 6284 (locus L. 6281). In 1995, another fragment (Sallaberger – Talon 1996, no. 146) and an erased tablet (Sallaberger – Talon 1996, no. 147) were found in courtyard P. 6335 (in L. 6347 and in correspondence with the door L. 6335–6142, respectively). Floor L. 6966 (*phase* III) of Room P. 6954, in the north part of the Official Block, yielded a further 17 tablets (Milano – Sallaberger – Talon nos. 151–167)[163] during the 1996 campaign. In 1996, one tablet (Milano – Sallaberger – Talon no. 150) was also discovered on floor L. 6948 of courtyard P. 6233 of the "Bloc Officiel"; this floor also corresponds to *phase* III.[164] The numerical tablet *Subartu* 12.169 was found—in two fragments[165]—during the partial dismantling of the vertical drain (L. 6034) associated with a toilet-type installation dating from

[161] Lebeau 1996b: 22.

[162] For a full description of the building in this phase, see Lebeau 1996b: 22–23. The phase can be dated—based on evidence concerning ceramic and glyptic—to the years between 2425 and 2350 BC (Lebeau 1996b: 24).

[163] See Lebeau 2004: 1, the precise location of two of them (nos. 166 and 167) could not be determined with certainty. The other 15 tablets were grouped in the southern part of the room, concentrated predominantly in the southwest corner. Either they came from a shelf arranged against the north face of the south wall (L. 6960) of Room P. 6954, or they were gathered in one or two baskets. It should be noted, however, that the north face of wall L. 6960 does not show any evidence of a shelf.

[164] The tablet in question was retrofitted to the base of the wall formed by two small benches surrounding the base of the E pillar. It should be noted that numerous fragments of crushed ceramics were found in the vicinity of this tablet.

[165] These two fragments are not in the same state of preservation and were found at different altitudes, which clearly confirms the fact that they are discarded material (Lebeau 2004: 2).

phase III of the Palace, fitted out in Room P. 6712, *i.e.*, at the east end of the "Bloc Officiel."

[C.2] "Bâtiment SE"

An inscribed tablet (*Subartu* 12.168) was discovered outside, on the east side of the "Bâtiment SE" located on the acropolis, on a sloping surface (possibly a glacis).[166]

[C.3] "Bâtiment NO"

The western part of the upper terrace of the acropolis is occupied by a building with massive walls, whose function remains uncertain. Inside this building, a large tablet fragment (*Subartu* 12.212) was found in L. 32204,[167] a locus datable to *phase* III of the "Bloc Officiel" **[C.1]**.[168]

[D] "Chantier J"

"Chantier J" is the result of a survey campaign (1993) of the archaeological levels of the lower city (Beydar II) in correspondence with the lower city,[169] located west of the mound. Here, in a stratigraphic context datable to the Mittani period,[170] an exceptional find was made: a small school tablet pertaining to the EJ IIIb period.

[E] "Chantier I"

The "Chantier I" was excavated during the 2002 campaign. Here, several architectural units—presumably private houses of the EJ IIIb period—were found partially fitted out within a monumental older complex datable to the EJ IIIa. A fragment of a tablet (*Subartu* 12.216) was found in one of these rooms (P. 61443), likely the entrance room of a modest house, traversed by a rather crude pipe.

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[166] Lebeau 2004: 2.

[167] During the dismantling of the drain associated with the seat tablet (Lebeau 2004: 2).

[168] Lebeau 2004: 2.

[169] The area is located to the west of the circular site of the 3rd millennium and was occupied mainly during the Mittani and Neo-Assyrian periods (Lebeau 1996b: 24).

[170] Lebeau 1996b: 24.

[F] "Chantier M/O"

The "Chantier M/O" area may have been devoted to the processing of foodstuff. Situated to the west of the "Temple B" and "Workshops B-C" (EJ IIIb),[171] it is crossed by a relatively narrow street (L. 58071), where a written document (*Subartu* 12.215, an inscribed *bulla*), was discovered.

Topic[172]	Area	Locus	Edition
Individuals	**[A.1.1] Room P. 2645**	L. 2700	*Subartu* 2.73; *Subartu* 2.102; *Subartu* 2.104; *Subartu* 2.119; *Subartu* 2.123; *Subartu* 2.124; *Subartu* 2.129; *Subartu* 2.131.
		L. 2701	Subartu 2.134.
	[A.1.2] Room P. 2611	L. 2640	*Subartu* 2.54; *Subartu* 2.57–59; *Subartu* 2.63 64; 69; *Subartu* 2.71; *Subartu* 2.72.
	[A.1.3] Room P. 2574	L. 2617	*Subartu* 2.1.
		L. 2629	*Subartu* 2.2; *Subartu* 2.5; *Subartu* 2.8; *Subartu* 2.10; *Subartu* 2.19; *Subartu* 2.27–29; 36; *Subartu* 2.40; *Subartu* 2.43–45; *Subartu* 2.49.
		L. 2617	*Subartu* 2.15; *Subartu* 2.17.
	[A.2] L. 2634	L. 2634	*Subartu* 2.52; *Subartu* 2.53.
	[A.3] Neighbor House	L. 2813	*Subartu* 2.136; *Subartu* 2.137.
		L. 2845	*Subartu* 2.140.
	[A.4] P. 28514	L. 28920	*Subartu* 12.213.
	[B] "Chantier E"	L. 5713	*Subartu* 2.142.

[171] Lebeau 2004: 4.

[172] See above, Fig. 8.

	[C.1] "Bloc Officiel"	L. 6233	*Subartu* 2.143.
		L. 6281	*Subartu* 2.145.
		L. 6948	*Subartu* 12.150.
Grains	**?**	L. 61819	*Subartu* 12.216.
	[A.1.1] Room P. 2645	L. 2701	*Subartu* 2.134.
		L. 2700	*Subartu* 2.74–81; *Subartu* 2.83–93; *Subartu* 2.96–101; *Subartu* 2.106–116; *Subartu* 2.121; *Subartu* 2.122.
	[A.1.2] Room P. 2611	L. 2640	*Subartu* 2.67.
	[A.1.3] Room P. 2574	L. 2629	*Subartu* 2.15; *Subartu* 2.17; *Subartu* 2.38; *Subartu* 2.47.
	[A.4] Room P. 28514	L. 28513+28508	*Subartu* 12.179; *Subartu* 12.199; *Subartu* 12.200; *Subartu* 12.207; *Subartu* 12.211.
Sheep and goats	**[A.1.1] Room P. 2645**	L. 2702	*Subartu* 2.135.
		L. 2700	*Subartu* 2.82; *Subartu* 2.94; *Subartu* 2.95; *Subartu* 2.103; *Subartu* 2.117; *Subartu* 2.118; *Subartu* 2.127; *Subartu* 2.130.
	[A.1.2] Room P. 2611	L. 2640	*Subartu* 2.56; *Subartu* 2.60; *Subartu* 2.61.
	[A.1.3] Room P. 2574	L. 2629	*Subartu* 2.7, *Subartu* 2.21, *Subartu* 2.33; *Subartu* 2.34; *Subartu* 2.42; *Subartu* 2.50; *Subartu* 2.51.
	[A.3] Neighbor House	L. 2816	*Subartu* 2.138.

<table>
<tr><td rowspan="2"></td><td>[A.4] Room P. 28514</td><td>L. 28513+28508</td><td>Subartu 12.180.[173]</td></tr>
<tr><td>[C.1] “Bloc Officiel”</td><td>L. 6966</td><td>Subartu 12.151–167.</td></tr>
<tr><td rowspan="3">Cattle</td><td>[A.1.1] Room P. 2645</td><td>L. 2700</td><td>Subartu 2.105.</td></tr>
<tr><td>[A.1.2] Room P. 2611</td><td>L. 2640</td><td>Subartu 2.70; Subartu 12.148.</td></tr>
<tr><td>[A.1.3] Room P. 2574</td><td>L. 2629</td><td>Subartu 2.4; Subartu 2.22.</td></tr>
<tr><td rowspan="4">Donkeys and oxen</td><td rowspan="2">[A.1.1] Room P. 2645</td><td>L. 2700</td><td>Subartu 2.126; Subartu 2.133.</td></tr>
<tr><td>L. 2700</td><td>Subartu 2.125.</td></tr>
<tr><td>[A.1.2] Room P. 2611</td><td>L. 2640</td><td>Subartu 2.70; Subartu 12.148</td></tr>
<tr><td>[A.1.3] Room P. 2574</td><td>L. 2629</td><td>Subartu 2.3, Subartu 2.11; Subartu 2.14; Subartu 2.23; Subartu 2.26; Subartu 2.30; Subartu 2.31</td></tr>
<tr><td rowspan="2">Various</td><td>[A.1.2] Room P. 2611</td><td>L. 2640</td><td>Subartu 2.66.</td></tr>
<tr><td>[A.1.3] Room P. 2574</td><td>L. 2629</td><td>Subartu 2.6.</td></tr>
<tr><td>Numerical</td><td>[C.1] “Bloc Officiel”</td><td>L. 6034</td><td>Subartu 12.169.</td></tr>
</table>

Fig. 9 – Distribution of tablets (topic, location, and text numbers) in Tell Beydar (Nabada).

[173] Milano *et alii* 2004: 83 “Tablet or bulla” “Record of income (sheep?).”

1.3. Tell Fāra (Šuruppag) and Tell Abū Ṣalābīḫ

This section concerns the description of the amount, typology, and location of cuneiform texts found at Tell Fāra (ancient Šuruppag) and Tell Abū Ṣalābīḫ, whose ancient name remains unknown.

Ancient Šuruppag (modern Tell Fāra) is located in south-central Iraq, on the banks of the Euphrates River, 55 kilometers south of Nippur. The site was excavated in 1902–1903 by the Deutsche Orient-Gesellschaft (D.O.G.) under the supervision of Ernst Heinrich and Ernst W. Andrae. Afterward, in 1931, a joint expedition was carried out by the University of Pennsylvania Museum and the American School in Baghdad under the leadership of Erich Schmidt. In 1973, Harriet Martin conducted a three-day survey of the urban area.[174] Since 2016, the multi-university project FARSUP (Fāra Regional Survey Project) has been surveying the area between Tell Fāra (ancient Šuruppag) and Ishan Bahriyat (ancient Isin).[175] The texts discussed in this thesis are from the ED IIIa phase, dated to the 26th century BC.[176]

Tell Abū Ṣalābīḫ lies within Al-Qādisiyyah Governorate (Iraq), some 150 kilometers southeast of Baghdad. The site corresponded to a still-unknown 3rd millennium city,[177] which has been tentatively identified with Kiš,[178] Ereš,[179] and

[174] Martin 1988.

[175] See the full description at https://www.vorderas-archaeologie.uni-muenchen.de/forschung/fara/index.html.

[176] On ED II-III in Tell Fāra, see Martin 1988: 117.

[177] Biggs 1974: 5 "The site lies approximately 12 miles northwest of the important city of Nippur and was undoubtedly linked to it in antiquity by the Euphrates or a major canal. The ancient name of Tell Abu Salabikh is not known, although there has been an attempt to identify the site with the name of a city mentioned in ancient texts."

[178] Adams 1958: 103, and later Jacobsen 1960: 176. Krebernik 1998: 254 "Zugunsten von Keš konnte zwar die Existenz der Keš-Hymne in TAS sprechen, doch ist diese Kultstätte der Muttergöttin wohl in der Nähe von Adab zu suchen". At the same time, the ancient city of Kiš was also identified with the modern Tell Ingharra, near Tell al-Uhaymir, located 80 kilometers south of Baghdad. On the identification of Kiš, see already Thureau-Dangin 1909.

[179] Biggs 1974: 34; Postgate 1976: 160–161. Krebernik 1998: 254 "Ein 'König von Ereš' wird am Ende eines fragmentarischen Wirtschaftstextes, der von Versorgungsfeldern handelt, erwähnt" (fn. 157, IAS 505).

Gišgi.[180] Tell Abū Ṣalābīḫ consists of several mounds, some of which are mainly Early Dynastic. In 1963 and 1965, under the direction of D.P. Hansen and V.E. Crawford, excavations were carried out at two sites ("Area A" and "Area E") on the northernmost central mound. These campaigns yielded numerous textual finds, and the excavation was resumed in later years (1975–1990) under the direction of Postgate.

As for Nabada in § 1.2., the texts from Tell Abū Ṣalābīḫ will be studied together with those derived from Tell Fāra (Šuruppag) due to their comparable cultural, chronological,[181] and geographical horizons.[182] Furthermore, the latter texts are few and fragmentary.

1.3.1. On the excavations in Šuruppag and the findings of the Tell Fāra Tablets

The ED IIIa texts from Šuruppag can be regrouped according to three different provenances:

(a) The largest number of Tell Fāra tablets came from the D.O.G. excavations (1902–1903). During these campaigns, 847 tablets and 133 fragments (concerning administrative, legal, lexical, and literary texts) and many bullae with seal impressions were discovered. Most of these tablets are preserved in museums in Berlin and Istanbul. However, most of their find numbers[183] have been lost—and, thus, so too has been a great deal of

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[180] Cohen 1976. Krebernik 1998: 254 "Auf Gišgi und die Göttin Lisin bezieht sich die ungewöhnlich ausführlich gestaltete Schlußstrophe der- nur in TAS dokumentierten – 'za$_3$-me-Hymnen.'"

[181] The texts from Tell Abū Ṣalābīḫ are roughly contemporary with (and perhaps slightly later than) those from Šuruppag (see the discussion in Sallaberger – Schrakamp 2015: 61–65).

[182] Krebernik 1998: *passim*.

[183] It is still being determined when the tablets were separated from their excavation numbers. (The Istanbul Museum baked its tablets; this would have burned away their field numbers.). Also, neither Deimel nor Jestin referred to the tablets' excavation numbers or the findspots when publishing them. The records of the Staatliche Museum zu Berlin have preserved some field numbers, whereas the Istanbul Museum tablets are now marked with their museum numbers only.

precious information regarding their context. The Berlin tablets were published by Anton Deimel,[184] while Raymond Jestin published the Istanbul tablets.[185]

(b) The 1931 joint expedition by the University of Pennsylvania Museum and the American School in Baghdad excavated 96 tablets, all of which are preserved in the University Museum and have been published in a single volume.[186]

(c) Many tablets were purchased on the market and came from illegal excavations.[187]

Two comprehensive lists of the texts from Tell Fāra, together with those of Abū Ṣalābīḫ, were later provided by Dietz Otto Edzard[188] and Manfred Krebernik.[189]

Some tablets from Šuruppag have been (re)published in a number of other publications.[190]

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[184] Deimel 1922; Deimel 1923.

[185] Jestin 1937; Jestin 1957.

[186] Martin *et alii* 2001. Tablets unearthed by the D.O.G and by the University of Pennsylvania excavation show some substantial differences (mainly in shape and dimension). However, this discrepancy may reflect the differences in their excavation techniques. In fact, during the excavations carried out by the D.O.G. in 1902–1903, many small-sized tablets were left unidentified (for more, see Martin *et alii* 2001: 15).

[187] Martin *et alii* (2001: 3): "For example, a group of Fāra texts, also kept in the University Museum and consisting of 17 tablets, does not originate from the excavations of the University Museum. 12 of these tablets record fats, grains, and other goods. They mention the same temple household as the D.O.G. tablets and the other group of University Museum texts."

[188] Edzard 1976.

[189] Krebernik 1998.

[190] See, *e.g.*, Gelb *et alii* 1991; Pomponio – Visicato 1994; Visicato 1995; Steible – Yıldız 2015.

1.3.1.1. Distribution and typology of ED IIIa tablets found in Tell Fāra

Here follows a discussion on the known findspot of ED IIIa texts in Tell Fāra and the contents of the tablets discovered there. ED IIIa tablets found from D.O.G. (1902–1903) came from nine findspots **[A–I]**,[191] whereas Schmidt's (1931) ED IIIa tablets came from three further findspots **[L–N]**.

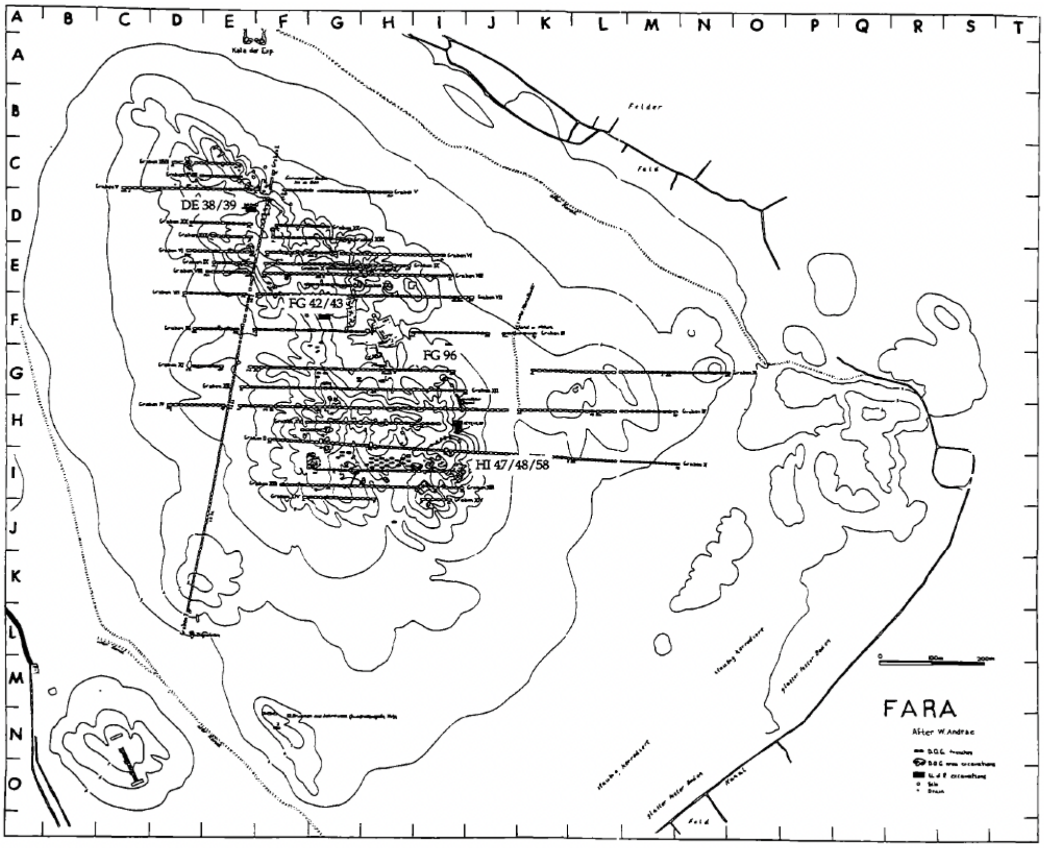

Fig. 10 – Map of Tell Fāra showing the D.O.G. excavation trenches and the University of Pennsylvania grid and excavated areas (Martin *apud* Martin *et alii* 2001: 16, Fig. 10).

[A] XV h ("Tablet House") and XV f

One-third to one-half of the tablets excavated at Tell Fāra were found at the "Tablet House." This findspot is described in the find register as being "north of XVh."[192] The only room within the "Tablet House" mentioned by the D.O.G.'s archaeologist

[191] The order of findspots presented here is that provided by Martin (1988: 82–103), albeit with some additional details in the headings.

[192] Martin 1988: 86.

is the “East Room,” where seven tablets have been found.[193] Nonetheless, the group of rooms farthest to the west, north of XV j and XV k, may have yielded tablets: their long, narrow shape is ideally suited for housing tablet archives. However, information from the D.O.G. concerning the excavations is quite scarce.[194] Three tablets, and some other items, have been found in XV f (a spot to the east of the “Tablet House,” which was excavated immediately afterward). The documents found in the “Tablet House” comprise 100% of donkey texts,[195] 94% of field allotment texts,[196] 93% of barley ration texts,[197] and 58% of the lexical and literary texts,[198] but zero contracts and zero practice writing tablets.[199] The administrative data found in the “Tablet House” suggest that it stored the archives of an organization that oversaw rations, fields, and a team of donkeys[200] and that dealt with large numbers of people (possibly also employed by this same organization).[201]

[B] XV a–d

[193] The only identified tablet among these is WF 8 = F 2350. For these correspondences (fns. 193–221) see also the lists in Krebernik 1998.

[194] Martin 1988: 87.

[195] These texts correspond to: WF 1, WF 3, WF 4, WF 5, WF 6, WF 7, WF 8, WF 9, WF 11, WF 12, WF 13, WF 14, WF 15, WF 16, WF 18, WF 19, WF 20, WF 22, WF 23, WF 24, WF 25, WF 26, WF 27, WF 28.

[196] These texts correspond to: WF 43, WF 44, WF 45, WF 46, WF 48, WF 49, WF 50, WF 51, WF 52, WF 55, WF 56, WF 57, WF 58, WF 59, WF 60.

[197] These texts correspond to: WF 61, WF 64, WF 66, WF 67, WF 68, WF 69, WF 70, WF 71, WF 72, WF 74, WF 75, WF 76, WF 77, WF 78.

[198] These texts correspond to: SF 1, SF 5, SF 6, SF 7, SF 9, SF 10, SF 12, SF 13, SF 15, SF 16, SF 18, SF 19, SF 20, SF 23, SF 26 (joins TSŠ 124), SF 27 (joins NTSŠ 294 and TSŠ 327), SF 29, SF 33, SF 36, SF 40, SF 42, SF 43, SF 55, SF 56, SF 57, SF 58, SF 59, SF 60, SF 63, SF 64, SF 69, SF 72, SF 75, SF 81.

[199] These figures, given by Martin (1988: 89), concern only the D.O.G. findings.

[200] Martin 1988: 89, fn. 4 refers to Lambert 1953: 202–204.

[201] Martin 1988: 89 “of the personal names found on Fāra texts, approximately 75% occur on tablets from the ‘Tablet House’ archives, primarily donkey texts. Of the remaining 25%, 10% occur on tablets with no known provenance, including many that probably came from the ‘Tablet House.’”

The findspot XV a–d is a large, disjointed house with two or more courtyards located east of the "Tablet House." In this area, 17 tablets and some fragments have been discovered. The only identified tablet[202] records the allocation of fields to various individuals for their use. The evidence of the inscriptions (mainly consisting in seals and tablets) suggest that this was an establishment controlling an extended amount of land, possibly farmland.[203]

[C] XIII f–i

The second largest excavated house lies in XIII f–i. The architecture is well preserved and has one of the best-ordered and neater house plans at Tell Fāra. The house yielded numerous seal impressions, one seal, and more than 99 tablets[204] (of which only three have been identified).[205] This house was possibly connected to a temple building, as it has been compared with the "House D" in the Oval Temple area at Khafaje, as well as the household complex retrieved in the "Area E" in Tell Abū Ṣalābīḫ (see below).

[D] VII u

Thirteen tablets were found in the building in VII u, but none have yet been identified. Since two seal impressions were also recovered in these findspots, the tablets were possibly of administrative type.[206]

[E] IX ac (+ IX aa tablets)

[202] SF 47 = F 1494.

[203] Martin 1988: 92 "Regardless of its other functions, the XV a-d house must have contained the offices and archives of a 'household' substantial enough to have owned 356 iku of plow land (about 250 acres), divided among 26 individuals (for cultivation)."

[204] Martin 1988: 93–95.

[205] WF 82 = F 1116 (ration text dealing with barley and flour); WF 145 = F 1175 (ration text dealing with figs); SF 80 = F 1122 (small fragment of a lexical text).

[206] Martin 1988: 97.

The building in IX ac is square in plan and has a wall running northeast to southwest, which divides it almost in half.[207] Two tablets have been found in IX ac; however, both are unidentified. Because spot IX aa lies within the outline of the IX ac house (inside the house or just outside its walls), they may belong to the same context. Deimel has published nine tablets from IX aa, which are of literary and lexical character (albeit incomparable to those from the Tablet House or IX g).[208] As such, Martin postulates that this building may have been a scribal school.[209]

[F] XVII c, d

Located in XVII, c, d is a large building with many rooms (although the communication pattern remains unclear). The house yielded 99 tablets, 22 of which have been published by Deimel.[210] Most of them concern lists of male personnel (guruš). Although find numbers are unknown from any of the texts in Istanbul, several of the texts published by Jestin[211] are similar to those from XVII c, d, and may be well from the same archive.[212] Based on the type of texts retrieved in XVII c, d, Martin[213] foreshadows the connection of this building with the institution of the *Hexapolis*, as later reconstructed by Pomponio and Visicato (see further below).[214]

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[207] Martin 1988: 96. Although the plan of the house does not resemble that of a "courthouse," it possible that the western limits of the building as indicated by Heinrich's plan are incorrect. Thus, the house's layout may be different (Martin 1988: 97).

[208] These texts correspond to: SF 2, SF 30, SF 31, SF 45, SF 47, SF 48, SF 49, SF 50, SF 51.

[209] Martin 1988: 97.

[210] Livestock allotments: WF 129, WF 132, WF 134. Miscellaneous/Inventories: WF 144, WF 147, WF 150; Miscellaneous rations: WF 84, WF 85, WF 86. Offering list: WF 152. Guruš List: WF 92, WF 93, WF 94, WF 95, WF 98, WF 99, WF 100, WF 101, WF 102, WF 103, WF 104. Misc. Muster List: WF 118.

[211] TSŠ 242, TSŠ 292, TSŠ 135, TSŠ 613 (cf. WF 93), TSŠ 648, TSŠ 671, TSŠ 50, TSŠ 245, TSŠ 456, TSŠ 574 (cf. WF 104).

[212] Martin 1988: 98–99

[213] Martin 1988: 99.

[214] On the *Hexapolis,* see Pomponio – Visicato 1994: 10–20.

[G] XVI i–l

Traces of architecture have been found in XVI i–l, possibly belonging to a house.[215] Some tablets and two seal impressions have been found in clusters in the remains of the burned buildings. The two known tablets coming from this findspot are administrative texts.[216]

[H] XVI d–e

In XVI, d–e have been found only traces of walls, also belonging to a house.[217] Of the finds, only one fragmentary tablet (possibly a school text) can be identified.[218]

[I] IX f–g

Area IX f–g yielded fragmentary walls of a building, perhaps a house comparable in scale to that in XIII f–i.[219] Several tablets have been discovered within the debris of a fire-burnt area, 33 of them (along with additional fragments) found carefully preserved within a lead box. Many of these documents are very similar to other tablets found in Tell Fāra.[220] As it concerns the identified texts from IX f, one of them is a list of offerings; the other pertains to the Miscellaneous Muster Lists.[221]

[L] DE 39 (DP 7)

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[215] Martin 1988: 100.

[216] WF 130 and WF 141.

[217] Martin 1988: 100.

[218] SF 68 = F 1775.

[219] Martin 1988: 101.

[220] Three of them have been identified as school texts: two parallel vocabulary lists recovered in the Tablet House (SF 21 // SF 20 and SF 24 // SF 23) and the third is similar to a tablet of unknown provenance (SF 37 // SF 38). A fourth text from IX g, but not from the lead box, has duplicates coming from the area of XV h and II cm (SF 76) and parallels four tablets: two from XV h, one from II cm, and one from an unknown findspot [SF 75, SF 33 (XV h), SF 35 (II cm), SF 34 (unknown findspot)].

[221] WF 153 and WF 117, respectively.

Some 34 or 35 tablets, as well as a number of fragments, have been recovered from a drainpipe (DP 7) in square DE 39. These tablets have standardized content, size, and shape. More than half of these texts record offerings of kids (maš$_2$)[222] delivered by an individual named Urni, or Urani, (wr. Ur$_2$-ni).

[M] HI 47/48/49

Also, Level 1 of HI 47/48/49 yielded ED IIIa tablets of standardized shape, size, and ductus. Except for two tablets (FTP 75 and FTP 76, which are illegible), they all record information concerning cereals and their by-products. Considering their findspots, as well as the similarity—and homogeneity—of the goods recorded and the individuals mentioned in these documents, they may belong to a center that managed grains, *i.e.*, "the house of the milling products" (e$_2$-ar$_3$).[223]

[N] Pit II

Only one tablet (FTP 92) found in Pit II belongs to ED IIIa.

During the excavations at Tell Fāra, numerous tablets have been found independent of any architecture. Many of these tablets may have belonged to houses built of mud brick not hardened by fire (like those found by Schmidt) and that had therefore been overlooked by the D.O.G.[224] The charts below show the percentage of identified texts out of the total excavated text and the distribution of tablets by topic and findspot.[225] (Unfortunately, many published tablets from Šuruppag have no information concerning the findspot.)[226]

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[222] The recipients are, in most cases, temples. However, some exceptions appear to confirm that these tablets were written to record the expenditures of an administrative center rather than offerings to gods (Martin *et alii* 2001: 19).

[223] Martin *et alii* 2001: 21–22.

[224] Martin 1988: 101.

[225] For the attribution of individual texts to specific typologies and topics, see Krebernik 1998: 246–252 and Pomponio – Visicato 1994: 3–9.

[226] See also the discussion in Martin *et alii* 2001: 115, fn. 5.

Campaign	Findspot	Excavated texts	Identified texts
D.O.G. (1902-1903)	CD – XVII c, d	96	22
D.O.G. (1902-1903)	CD – V s	2	1
D.O.G. (1902-1903)	CD – I d, e	14	2
D.O.G. (1902-1903)	DE – XIX s	2	1
D.O.G. (1902-1903)	EE – IX f	3	2
D.O.G. (1902-1903)	EE – IX g	14	3
D.O.G. (1902-1903)	EG – IX aa	26	11
D.O.G. (1902-1903)	EH – VIII h	2	2
D.O.G. (1902-1903)	FE – III ad, ae	6	3
D.O.G. (1902-1903)	HG – II cn	11	1
D.O.G. (1902-1903)	HH – XVI i-l	37	2
D.O.G. (1902-1903)	HI – II bh	3	1
D.O.G. (1902-1903)	HI – IV y	4	1
D.O.G. (1902-1903)	HI – XVI d, e	7	1
D.O.G. (1902-1903)	HJ – II i	22	8
D.O.G. (1902-1903)	II – XIII f, g	82	3
D.O.G. (1902-1903)	II – XIV s-u	1	1
D.O.G. (1902-1903)	II – XV b	12	1
D.O.G. (1902-1903)	II – XIV h	305	106
D.O.G. (1902-1903)	II – XIV , e. rm.	17	1
D.O.G. (1902-1903)	II – XV f	3	1
D.O.G. (1902-1903)	IL – II ak	2	1
D.O.G. (1902-1903)	JE – I bu	1	1
D.O.G. (1902-1903)	JE – I ck	1	1
Schmidt (1931)	DE 39 – DP 7	34/35	34/35
Schmidt (1931)	HI 47/48/49	56	56
Schmidt (1931)	Pit II	1	1

Fig. 11 – Distribution of identifiable documentation *per* findspot in Tell Fāra (Šuruppag).

Topic	Findspot	Tot. Texts
Donkey	II – XV h	23
	II – XV h / rm.	1
Livestock (mainly cattle and sheep)	CD – XVII c, d	3
	HH – XVI i-l	2
	II – XV h	2
Fields	II – XV b	1
	II – XV h	15
Miscellaneous / inventories	CD – XVII c, d	3
	CF I d, e	1
	DE – XIX s	1
	EH – VIII h	1
	II – XIV s-u	1
	II– XV h	4
	II – XV f	1
Cereals and by-products	EG – IX aa	1
	II – XV h	14
	HI 47/48/49	56
	Pit II	1
Miscellaneous rations	CD – XVII c, d	3
	HG – II cn	1
	II – XIII f, g	2
Offering Lists	CD – XVII c, d	1
	II – XV f	1
Offerings	DE 39 – DP 7	35
Guruš Muster Lists	CD – XVII c, d	11
Miscellaneous Muster Lists	CD – XVII c, d	1
	CF – I d, e	1
	EE – IX f	1
Legal texts	CD – V s	1
	FE – III ad, ae	3
	HI – II bh	1
	JE – I bu	1
	KD – Ick	1
Literary and Lexical	EE – IX g	3
	EG – IX aa	6
	EH – VIII h	1

	HI – IV y	1
	HI – XVI d, e	1
	HJ – II i	7
	II – XIII f, g	1
	II – XV h	36
Practice	EE – IX g	1
	EG – IX aa	4
	HJ – II i	1

Fig. 12 – Distribution of identifiable documentation *per* topic in Tell Fāra (Šuruppag).

Regarding chronology, Pomponio and Visicato suggested that the whole ED IIIa Tell Fāra documentation should be dated to one year. This proposal has been made on prosopographical grounds, by looking at the text concerning the assignment of donkeys for ploughing to various individuals.[227] However, most recently, Sallaberger[228] has suggested that the parallels between the ploughing lists are insufficient to substantiate the conclusion by Pomponio – Visicato (1994). The repetition of names in a similar order has been known from various administrative archives for several years; Pomponio and Visicato themselves already suggested this possibility in 1994.[229] Nonetheless, although the chronology of Šuruppag (ED IIIa) texts continues to be debated, it is necessary to improve our understanding of the different offices and findspots.

[227] Pomponio – Visicato 1994: 8 "In conclusion, it is very likely that almost the whole documentation of Fara, produced, as we have seen above, by a single organization, refers to a single year. This must have been the last year of the existence of ED IIIa Šuruppak, brusquely interrupted by a fire probably caused by an enemy incursion. It follows that in the city all the documents of allocation of goods at a fixed expiry date, very probably the end of the year, were destroyed or reused and, in any case, no longer preserved in the archives where the current documentation was kept."

[228] Sallaberger 2022: 98; moreover, on the chronological stratification of the Šuruppag texts, see Picchioni 1981: 116, Mander 1984: 341, and Krebernik *et alii* 2014.

[229] Pomponio – Visicato 1994: 8, fn. 5 "On the other hand, it cannot be completely excluded that, at the end of every year when all the registrations of the accounts were destroyed, at least the essential data were recorded and preserved in short account summaries like, for example, 1 (cf. infra, p.21). But documents of this kind relative to previous years have not been found in the documentation of Fara."

1.3.2. Distribution and typology of ED IIIa tablets found in Tell Abū Ṣalābīḫ

Tell Abū Ṣalābīḫ is composed of three mounds. The site, and especially the eastern mound, was extensively occupied by the ED period (until ED IIIa or shortly thereafter), after which it was never reoccupied. During the 1963–1965 campaigns, cuneiform tablets were found in a domestic context on the eastern mound (Area E), the highest part of the mound, located slightly north of center, where at least two[230] buildings (not extensively excavated) have been retrieved. Almost all of the tablets found in 1963–1965 were unbaked and very fragile, and only some of them came from layered contexts.[231] These were published by Biggs in *OIP* 99.[232] Tablets from the 1975–1977 campaigns have been found in Area A[233] (IAS 516) and Area E (IAS 517–532). These were published by Biggs and Postgate (*Iraq* 40).[234] Other text finds that pertain to the subsequent campaigns (1978–1979, 1985–1986, and 1988–1989) have been inconsistently published.[235]

[230]See, however, Krebernik 1998: 254 "1963 und 1965 wurden in 'Area E' etwa 40 Räumlichkeiten eines Gebäudekomplexes freigelegt, in denen über 500 Tafeln und Fragmente geborgen werden konnten."

[231] Biggs 1974: 16–17 "The only tablets which were found in a stratified context were those from the courtyard (Room 44) and the one from Room 39 in the southern unit. The rest are from fill and cuts made in antiquity. The stratified texts date the building to the time of the Fara tablets, which have been traditionally assigned to Early Dynastic IIIA. According to R. Biggs, there are few differences between the earliest tablets and the later ones from Level IA or even later, for example, the hoard in Room 31, beyond the usual scribal peculiarities. 5 Since there are several architectural levels of the buildings, it may well be that the writing stage of the 'Fara texts' covered a relatively long period of time." Biggs 1974: 11 "All the tablets pertaining Level IB were found in cuts or in fill, none of them clearly pertained to a preserved floor." Moreover, Biggs 1974: 5 "Both buildings suffered from ancient cuts as well as from many holes made by modern robbers. It is not clear when these holes were made, or what the robbers found or hoped to find."

[232] Biggs 1974.

[233] From Area A come mainly tablets from cuts and fillings (some examples of findings are given in Postgate 1980: 100; Postgate 1984: 97, 100; Postgate 1990: 101).

[234] Biggs – Postgate 1978. These tables were numbered as "IAS 516–532" following the previously published text volume (*OIP* 99). Biggs – Postgate 1978: 101 "As it concerns the cuneiform texts

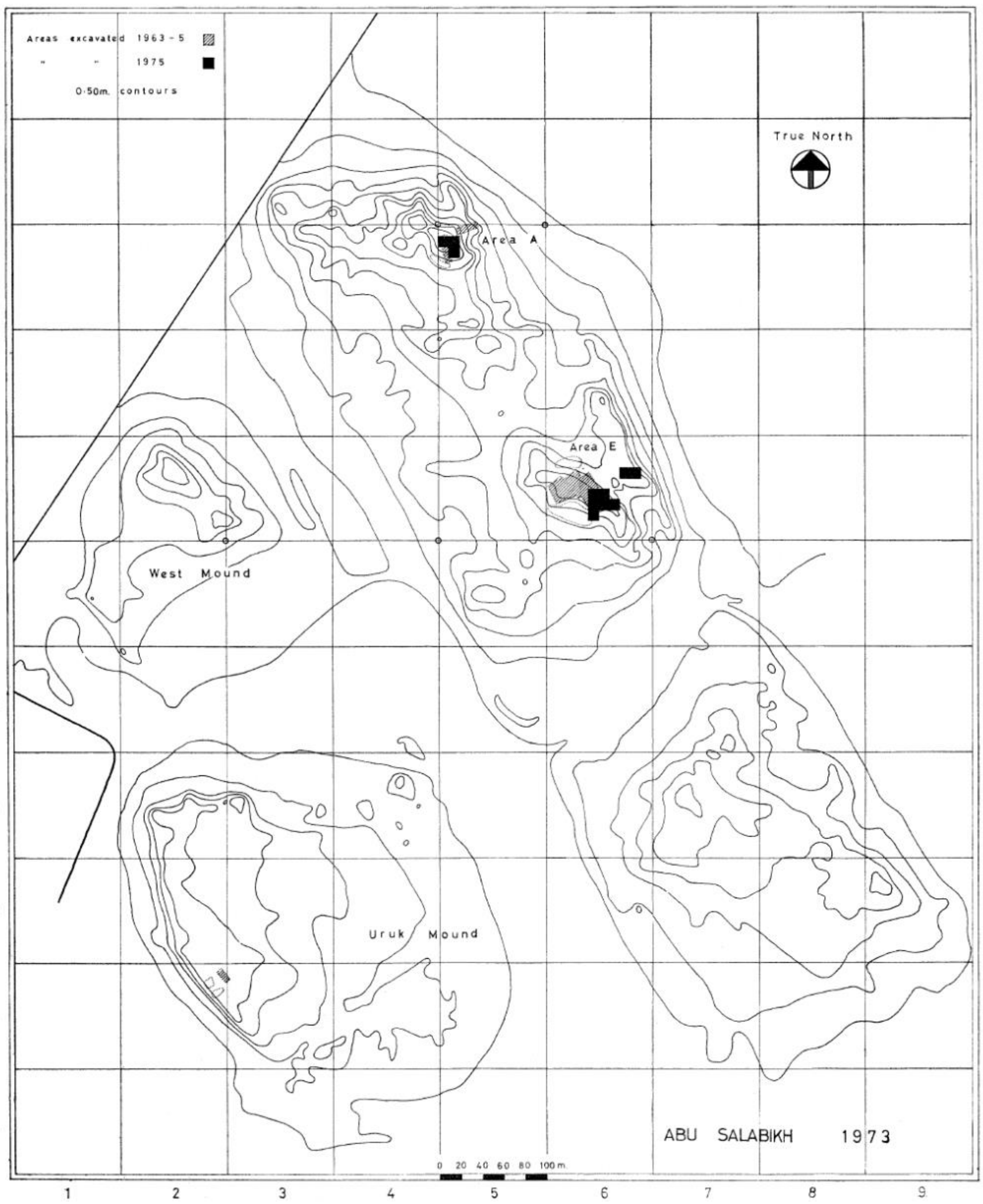

Fig. 13 – Topographic Map of Tell Abū Ṣalābīḫ (Postgate – Moorey 1976: 136, Fig. 1).

found at Abū Ṣalābīḫ during the excavations of 1975 (by Postgate, British Archaeological Expedition to Iraq), a few of them come from a variety of provenances, while others are associated with a stratigraphic context. These are the tablets numbered as 6G65: 235–250."

[235] Krebernik 1998: 257 with literature. Unfortunately, none of these findings are from a clear stratigraphic context, with the exception of AbS-T. 1739 (coming from the ash-tip) and AbS-T. 2060 (from Court 80). See below on this topic.

The excavated spots that yielded cuneiform tablets, and which are stratigraphically documented, refer to some room pertaining to a household quarter located in Area E **[A]**.[236] In this area, as well as in Area A, other tablets have been found, however, their stratigraphic context is often unclear, as they have been often retrieved in "cuts," "pits," and "grave fillings."[237]

As for their purpose, the rooms excavated in Tell Abū Ṣalābīẖ have been compared with both "House D" in the Temple Oval at Khafaje, which has a comparable floor plan, and with "House XIII f" at Tell Fāra (see above).[238] Therefore, if "House D" (Khafaje) were identified as the "residence of a person of high rank connected with the temple, probably its high priest,"[239] the household unit(s) found at Tell Abū Ṣalābīẖ[240] would represent the residential or administrative dependencies of a temple that has yet to be found in the immediate vicinity of Area E.

[A] Area E, Southern Unit

[A.1] Room 39

Room 39 was the largest and most important room in the Southern Unit, accessed through a door in the western wall of the courtyard. Here, a tablet (IAS 507) has

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[236] Biggs 1974: 5, 7 (Fig. 4), 17–18. The structural remains of the buildings can be dated to three phases: Levels IA, IB and IC. Most of the tablets are out of context, for which a possible explanation is offered in Biggs – Postgate 1978: 104 "The sequence of events would be as follows: after the IA phase of the Southern Unit a radical rebuilding was planned, which involved the abandonment of the courtyard area; to provide bricks for the new walls a large pit was therefore dug where the Southern Unit had been, to a depth of a good 2 m, through the floors, fill, and walls of the IA down to below the IC phases. In the process various things, including the majority of the tablets, were turned up, and since they were unsuitable ingredients for mud bricks, they were used to fill up holes elsewhere, while the area of the erstwhile Southern Unit was left to accommodate a gradual accumulation of ashy debris."

[237] Extensive information on this topic can be found in the catalogues of *OIP* 99, *Iraq* 40 and scattered through the subsequent publications (Postgate 1976; 1978; 1980; 1984; 1990; Postgate – Moorey 1976; Postgate – Moon 1982).

[238] Biggs 1974: 17 (with literature).

[239] Biggs 1974: 17 quoting Delougaz – Lloyd 1942: 262.

[240] Accordingly, a similar destination may be suggested for "House XIII f" at Tell Fāra (see above).

been retrieved from the IC floor.[241] To this same level pertain unbaked clay objects that show evidence of burning. These may have been used as a tripod to support a light vessel.[242]

[A.2] Room 44

Room 44, where tablets have been retrieved *in situ*,[243] is part of a courtyard of the household building(s) located in Area E. The tablets, pertaining to the oldest phase (level IC),[244] were found in the northwest corner of this room[245] on a finely plastered floor.[246] These tablets are IAS 001,[247] IAS 003,[248] IAS 004, IAS 005, IAS 018, IAS 019, and IAS 391.[249] None of them is an administrative text. Some of these tablets (IAS 18–19) were already baked, unlike those from Room 48 (see below). It is possible that these two stratified groups (*i.e.*, Rooms 44 and 48) represent the extreme survivors of a single large deposit, most of which was actually removed from a late intrusive pit.[250]

[A.3] Room 48

A number of tablets was retrieved from a single stratum in the most westerly surviving part of Room 48, possibly corresponding to the eastern end of a range of

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[241] Biggs 1974: 11; Biggs – Postgate 1978: 102.

[242] Similar clay objects were found in "House D" of the Temple Oval at Khafaje (Biggs 1974: 11; Delougaz 1940: 53, Fig. 51).

[243] Biggs – Postgate 1978: 102 "Except for a piece from a IC floor of Room 39 (IAS 507), the only well-stratified tablets from 1963 and 1965 came from the north-west corner of Room 44 at Level IC, floor 2, on a finely plastered floor " (IAS 1, 3, 4, 5, 18, 19, and 391).

[244] Biggs 1974: 6–7.

[245] See Biggs 1974: 7.

[246] This type of floor is usually associated with temple buildings.

[247] AbS-T. 144a; AbS-T. 144b.

[248] AbS-T. 144a; AbS-T. 144b.

[249] Room 44, Level IC, floor 2.

[250] Biggs – Postgate 1978: 102; previously Postgate 1976: 153–154.

narrow rooms running the length of the southern side of the Southern Unit.[251] The immediate surroundings of the tablets suggested that they had been carelessly cast aside, for they were found in a random arrangement among soil mixed with sherds and animal and fish bones.[252] Tablets from Room 48 are similar to those of the earlier seasons. Like those found in Room 31 (whose stratigraphic context is, however, unclear), the 1975 tablets were mixed with rubbish.

[A.4] Court 80

Court 80 is the third identified courtyard of the Household Complex located on the southeastern corner of Area E. It has a bitumen pathway running along its west side, and a bitumen doorsill (which leads into the room to the west). On its northwest corner, a large pottery vessel has been found, presumably to hold water.[253] In the area of the doorsill, leading to an internal room, on one of the floors was a piece of lexical tablet (AbS-T. 2060).[254]

Topic	Edition
Individuals	IAS 490, IAS 516, IAS 532, AbS-T. 1739.[255]
Grains	IAS 492, IAS 494, IAS 495, IAS 500, IAS 507, IAS 512, IAS 531.
Cattle	IAS 510, IAS 519, IAS 530.
Donkeys and Oxen	IAS 491.

[251] Biggs – Postgate 1978: 101 "see the plan in *Iraq* 38 (1976), 144, and here, Fig. 1." *ivi*: 102 "The floors in Room 48 cannot be correlated exactly with those in Room 39, the only other part of the Southern Unit where a substantial sequence survived. Nevertheless, there is no reason to doubt that the 8 · 25 m floor in Room 48 was part of the general renovation in the IB phase, or that our tablets were deposited during IC, certainly before the digging of Grave 1 in Room 39."

[252] Biggs – Postgate 1978: 102 describes the surface of the upper layer as pitted, as if it had been exposed to rain. Above is a layer of clayey fill of a brick-like nature, covered by another layer of fill mixed with charcoal. Finally, the entire sequence is stratigraphically sealed by a yellowish clay floor.

[253] Postgate – Moon 1982: 132.

[254] Postgate – Moon 1982: 132 "a list of woods or trees, a forerunner of Harra-hubullu III."

[255] Postgate 1980: 93, 104, Pl. XIa-I. ASE 4: 135; Abb, 7.772.

Fields	IAS 493, IAS 497, IAS 499, IAS 504, IAS 506, IAS 508, IAS 511, IAS 518, IAS 528, IAS 529.
Various	IAS 502,[256] IAS 503,[257] IAS 505.[258]
Metals	IAS 501.
Unknown	IAS 496, IAS 498, IAS 509, IAS 513–515, IAS 517, AbS-T. 1740,[259] AbS-T. 1885,[260] AbS-T. 2488,[261] AbS-T. 2513.[262]

Fig. 14 – Distribution of topics within the administrative tablets from Tell Abū Ṣalābīḫ.

[A.5] "Ash-tip," 6G75

In 1980, during an attempt to recover plant seeds for botanical study, a small sector of the ash-tip lying against the southeast side of the building,[263] in square 6G76, was selected. Although the operation yielded no useful information on the botanical side,[264] the investigation of the "ash-tip" revealed the presence of a variety of objects such as discs, animal figurines, miniature pottery vessels, human figurines and about 150 clay sealings (mainly ED III date). A fragmentary tablet, AbS-T. 1739, was found in the ash-tip as well.

1.4. General discussion

The corpora examined in this dissertation differ in their locations and chronologies, as well as in the types of administrative reality from which they derive. The results from the analysis of each corpus in the following chapters must be correctly

[256] Biggs 1974: 76 "Deals with barley and jugs (of beer?) and quantities of copper."

[257] Deals both with barley and fields (Biggs 1974: 76).

[258] Biggs 1974: 76 "Deals with rations."

[259] Green 1993: 135; Abb. 7.772.

[260] Green 1993: 135; Abb. 7.772.

[261] Matthews – Postgate 1987: 100f, Pl. XXIV.

[262] Matthews – Postgate 1987: 100f, Pl. XXIV.

[263] Postgate 1980: 91–93. The area was possibly associated with a temple (*e.g.*, figurines).

[264] Postgate 1980: 91 "Unfortunately, it emerged with clarity that seeds were virtually absent: neither water-sifting nor flotation yielded plant seeds in any quantity, although we know from seeds recovered from Room 119 in 6G36, for instance, that the method in use was not seriously at fault."

contextualized according to the type of archival documentation they represent and their dating. In fact, because they address the same topics, the only noteworthy differences among the texts concern their production (*i.e.*, the institutions that produced them, their purpose, and the moment when they were produced); these differences are meaningful in the study of archival practice and its historical implications.

In particular, working with different corpora requires an analysis that is both "vertical" and "horizontal." By "vertical" analysis, we mean the collocation of the text over a chronological context, whereas "horizontal" analysis indicates the archival destination of the individual document, namely the type of institution that produced it. With these two coordinates, it is not only possible to describe the individual corpus, but also to compare the different corpora with each other without incurring ahistorical overlaps or biases.

With regard to the "vertical" analysis, the texts analyzed in this dissertation are divided into two major groups:

(A) Texts belonging to the period ED IIIa (2600–2450 BC)
(B) Texts belonging to the period ED IIIb (= EJ IIIb = Pre-Sargonic) (2450–2350 BC)

To Group (A) belong the texts from ancient Šuruppag (Tell Fāra) as well as those from Tell Abū Ṣalābīḫ, which are roughly datable to 2500 BC, whereas to the second Group (B) belong the texts from Nabada (Tell Beydar), Mari (Tell Harīrī) and Ebla (Tell Mardīkh), which are datable to the period between 2400 and 2350 BC.

On the other hand, as far as "horizontal" analysis is concerned, the corpora show a sharper differentiation. Palace G at Ebla is the only corpus that yielded unequivocally palatial-type documentation. In particular, the documentation of Archive L. 2769, to which must be added the tablets of the Vestibule L. 2875 and of the Audience Court (L. 2752; see above), presents not only texts that clearly refer to the distribution of luxury "palace-goods" within the palatial economy,[265] but also official texts such as letters and other chancery texts.

As far as Pre-Sargonic Mari is concerned, apart from the texts edited by Horioka (whose context remains unclear), the other documents can be attributed to different contexts. Unfortunately, the data displayed on tablets retrieved from the Sanctuary (P. 25) and the "Maison Rouge" are not sufficient to draw firm conclusions about the administration that produced these texts. The same is true of tablets from "Chantier B," which offer information too scant to substantiate anything beyond speculation about the archive to which they belonged.[266] As for the tablets from the Pre-Sargonic building located under the Palace of Zimri-Lim, they are closely related to the tablets recovered from the "Communs," in both context[267] and archaeology.[268] This area clearly evidenced the centralized organization of Mari, where there existed an archive overseen by the administration of both the palace (e_2-gal) and the temples (e_2-diĝir-diĝir).[269]

Among the Nabada texts, two groups stand out: (1) those from "Chantier B" (a residential area, from which the "Maison aux Tablettes" texts come) and (2) those from "Chantier F" (where a governmental complex has been identified, most likely

265 Sallaberger 2013: 220–223.

266 Charpin 1987: 93 "Rien n'indique d'ailleurs qu'on ait affaire à l'administration d'autre chose que d'un grand domaine: on retiendra en ce sens les mentions d'animaux de bât ou de trait, ainsi que les rations versées à divers artisans. Certains individus apparaissent de façon récurrente (comme Mesar ou Zira), mais leur titre ne nous est jamais donné."

267 They are linked up such that the information missing from one group can be restored using that contained in the others. Charpin 1987: 93 "De plus, ces tablettes sont exactement contemporaines: celles du groupe C datent des années 6, 7 et 8 tandis que l'éventail des tablettes du palais est un peu plus large, puisqu'il couvre les années 3, 4, 5, 7 et 8" and fn. 30.

268 Charpin 1987: 93–94.

269 On this topic, see Charpin 1987: 93; Charpin 2008: 222; and Cavigneaux 2014: 309, with literature, and in detail: "J.-Cl. Margueron pour sa part, au terme d'une longue réflexion sur les palais mésopotamiens, voit désormais dans le « palais » un temple-manufacture."

belonging to Nabada's administration).[270] However, the provincial Nabada organization did not deal with the "palace goods" well attested in the texts from Ebla's Palace G. If the Nabada documents also come from a central administration, the difference lies in the role of the central administration within the site.[271] In fact, Nabada is indeed an administrative hub, a provincial city located in the Khabur region within the kingdom of Nagar (Tell Brak),[272] where a central palatial administration (like that of Ebla) may have been located.

As it concerns ancient Šuruppag (Tell Fāra), although the majority of the published texts from this corpus are administrative, it has proved extremely difficult to analyze its evidence and to give a coherent picture of Šuruppag's administration(s). The difficulties arise mainly to the scatteredness of the documentation and the scarce stratigraphical information. Given these difficulties, it has frequently been assumed that all of the Tell Fāra tablets belong to one archive and are all contemporary, however, this may not be necessarily true (see the above discussion above). Nonetheless, some information may be drawn from the available texts.[273] The texts found in the "Tablet House" (XVII c, d) mention two main principal centers, the e$_2$-gal, "palace," which alone provided employment for at least 2,000 people,[274] and the iri, "city," which included the city organizational structures, and

[270] See, *e.g.*, Sallaberger 2004: 95 "The number of persons employed seems to indicate that the central institution of our archive comprised the complete settlement." Further on the Nabada Administration can be found in Ismail *et alii* 1996.

[271] Sallaberger 2013: 226.

[272] On the relationship between Nabada and Nagar, see Van Lerberghe 1996: 120–121.

[273] For example, already Visicato 1995: 138 provides an organization chart, which, within the limits of the documentation, outlines the hierarchical organization of the administration of Šuruppag.

[274] Moreover, among the texts from Tell Fāra, a few tablets are identifiable that mention those "palace-goods" known, for example, from the Ebla texts (Gori 2023: 164-166); while the text TSŠ 881, besides being similar in structure to the Eblaite documents of L. 2712 (see above), already presents an early mention of individuals from Mari at Šuruppag (see Sallaberger 2022: 98). Other foreigners are mentioned in connection with the e$_2$-gal (Martin *et alii* 2001: 121–122).

dealt mainly with handcrafts, husbandry, boats, and fishing.[275] Other institutions attested in the Šuruppag texts, and possibly related to the "iri" are the temple households.[276] For example, it is very likely that the documents concerning ghee and cheese belonged to the archive of the temple household of Sud, possibly a multi-building center,[277] to which the site and HI 47/48/58 (two further small archives found by the D.O.G. at sites XVI i–l and XVI d, e)[278] may pertain. On the other hand, other documents concerning barley and its by-products that have been found in the same area were probably connected with the "House of the milling products" (e$_2$-ar$_3$). A number smaller households[279] were linked to certain individuals, such as Urni, which was an official who provided kids, beer, and barley.[280] The texts related to this household have been mainly retrieved from Drainpipe 7, during the excavations conducted by Schmidt and the University of Pennsylvania Museum.

[275] Martin *et alii* 2001: 115. In detail, the texts concerning the e$_2$-gal are EDATŠ 1–13 (discussed in Pomponio – Visicato 1994: 28–34); those concerning the iri are EDATŠ 14–37 (discussed in Pomponio – Visicato 1994: 94–102).

[276] Martin *et alii* 2001: 115, with literature "The main temple households of Fara, those of Sud, Gibil, and Kinnir, were involved in husbandry, which was linked to the uru administration […] Among the centers involved in this activity was the é-lugal," fn. 4: "Apart from these temple centers, the é-gu$_4$ is mentioned. It is unknown to which institution the é-gu$_4$ belonged." Martin *et alii* 2001: 116 "It is highly probable that at least one text, TSŠ 886, was written by a temple administrator." Martin *et alii* 2001: 120 "The temple household in Fara might have been organized as a large structure, grouping together households of different size, kind, and activity."

[277] Martin *et alii* 2001: 116 "we know from the D.O.G.'s documents that the people mentioned in these new texts belonged to the temple household of Sud," later "But if the household in question is that of Sud, it is possible that it consisted of several buildings or houses. Probably, some of them were unearthed by the D.O.G., but others escaped the excavator."

[278] Martin *et alii* 2001: 116, previously, Martin 1988: 88 (see also above).

[279] Other households were possibly linked to other individuals, as discussed in Martin *et alii* 2001: 117–120.

[280] The same individuals also occur as a recipient of barley and its by-products in documents from site HI 48 Level 1. The name Urni is attested in a variety of other contexts (Martin *et alii* 2001: 116–117); however, given the dubious attribution of all the attestations to the same individual, it may be revised based on a wider length of the Šuruppag archives.

The nearby documentation of Tell Abū Ṣalābīḫ is also affected by a substantial lack of clarity as it regards the archaeological context. However, most of the tablets come from a domestic building located on the southeastern part of "Area E." If one compares the architectural structure of this building with that of "House XIII f" at Tell Fāra and "House D" at Khafaje, one may assume that it was a domestic building related to a temple area. Therefore, the tablets found in Abū Ṣalābīḫ may refer to a temple or economy.[281] As it concerns "Area A," *i.e.*, the other mound where tablets have been retrieved (albeit without clear stratigraphic context), its character has not been clearly determined.[282]

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[281] See also Biggs 1974: 44 (with literature) "Mention of the lugal, 'king,' and ensi$_2$, 'governor,' suggests that the source of the tablets was the administrative office of some city authority. I can see no specific evidence in the texts which would clearly decide the matter in favour of either a temple adjunct or a palace office. On the other hand, they are clearly not the archives of a private person or family." Postgate 1980: 87–88 "In Area E our main task was to pursue further the layout, in ED III times, of the large building which had housed the main archive of tablets, and which we now call the Central Complex. As the plan expands each season, we seem to be almost further from recovering the entire layout, but as it grows the importance of the complex, and its character as a public institution, become more and more conspicuous, even if its exact identity as palace or temple remains in doubt." Postgate 1980: 100 compares the findings of Tell Abū Ṣalābīḫ to those of Tell Fāra, quoting Martin (1975: 181): "The find spots established for the Shuruppak tablets support the theory that the economy of an Early Dynastic city state depended on many separate household units. None of the Shuruppak archives can be proven to come from a palace or temple, although one names about 1,200 men and another lists up to 6,580 men," then adding "Exactly how this conclusion should be related to the apparent layout of the West Mound (*i.e.*, Area E) at Abu Salabikh it is early to say; what applies to one city cannot uncritically be transferred to another, however near, and because the German excavators only traced the houses they encountered to the limits of each individual structure, it is impossible to know whether their houses were independent units standing in open enclosures, or stood cheek by jowl like houses in later cities constrained by the pressure on urban space." Given the peculiarity of a palatial economy (as that of Ebla), I find it difficult—given the lack of evidence—to postulate such an economy in the case of texts from Tell Abū Ṣalābīḫ, whereas a temple economy would fit better.

[282] Postgate – Moorey 1976: 160.

CHAPTER 2. PRACTICE IN SCRIBAL ACTIVITY: NUMBERS AND UNITS OF MEASUREMENT IN ADMINISTRATIVE AND CHANCERY TEXTS

This chapter deals with numbers and units of measurement, mainly in administrative and chancery texts, with the aim of analyzing numeracy in scribal practice. To facilitate its reading and consultation, the chapter is structured as a catalogue. Each section is devoted to a specific aspect related to the use of numbers and units of measurement, and each section is divided into subsections that present data from those corpora to shed light on the subject.

2.1. On numbers and units of measurement

In Mesopotamia, as in some parts of the ancient Mediterranean,[283] numerical notational and metric systems originated as a tool to improve and facilitate accounting practices. In administrative texts, each metric or calculation system was related to a certain range of numbers expressed through a precise set of signs with numerical and/or metrical value, *e.g.*, *arithmograms*, *klasmatograms*, *arithmo-metrograms*. Nonetheless, the choice of using multiple systems is not purely stylistic and cannot be explained by resorting to the theory of Damerow,[284] who linked the multiplicity and semantic divergence of the proto-cuneiform numerical notational systems to an incomplete concept of abstract numbers. This multiplicity traces back to the deep chore of administrative practice. Differently shaped signs were not a primitive representation of unformed thoughts; they worked as scribal tools, providing double information about the quantity and quality of the items to

[283] Such as in the Aegean world (see, *e.g.*, Valério – Ferrara 2020; Corazza *et alii* 2020).

[284] Damerow 1996.

be counted and measured. However, this scribal strategy had advantages and disadvantages. On the one hand, it facilitated accounting, becoming ideal for an efficient administrative system with limited users, such as the scribes. On the other hand, it required major memorization skills.[285] Numeracy, although employed in a form of communication, is not limited to transmitting the amounts recorded in the texts (be they predictive or factual).[286] Writing and using numbers and units of measure were simultaneously part of the performative process of administration, resulting in the planning, calculation, and writing of information. As it happens for literacy, the study of numeracy transmission in the Ancient Near East concerns the diffusion of cuneiform writing and its impact on the development of scribal identity outside Mesopotamia. However, although closely connected to literacy and language development, numerical notation differs slightly from them. It can be quickly understood and acquired even without specific linguistic knowledge. It is more easily transmitted, even in situations of contact between linguistically unrelated societies. It requires less modification and adaptation compared to the transmission of written language. Nevertheless, because numerical notation is often conveyed through texts that are linguistically significant in that they contain complete sentences and lexical items, both linguistic and numerical information are often transmitted together, with the understanding of one being contextually dependent on the other. On the other hand, metrology and metric notation are closely linked to the use of certain standards and weights, also understood as material artefacts, and go back to concepts such as identity, tradition, innovation, and cultural contact.[287] For this reason, the comparison of enumeration and measurement systems in the different corpora analyzed in this thesis can provide

[285] However, the same memorization capacity is required by cuneiform writing, which has a strong mnemonic character. This feature allowed the reader to relate certain synthetic spellings to forms of speech they already knew, placing them correctly in the general sense of the sentence. For example, it is the same mechanism that is activated when a Semitic speaker uses a Sumerian logogram without inserting a reading gloss to indicate its *casus*.

[286] See below in Chapter 3.

[287] Nonetheless, like some more purely linguistic *phenomena* such as lexical borrowing, also the structure of numerical notation is not only the result of cultural contact but is also itself one of the catalysts of contact and integration between different societies, as well as a marker of identity.

useful information on the dynamics of cultural contact and local development of forms of accounting practice.

2.2. Numbering and measuring systems

2.2.1. Enumeration of items

This section deals with the enumeration of items. Data on the topic are provided by all corpora (*i.e.*, Ebla, Mari, Nabada, Šuruppag, and Tell Abū Ṣalābīḫ).

2.2.1.1. Ebla (Tell Mardīkh)

Selected bibliography[288]: Bonechi 2021; Chrisomalis 2010: 245–247; Gelb 1992: 182–183; Kogan – Krebernik 2021: 856.

Notational system (type of signs used):

LEXICAL[289]: *MI*-*AT*[290] (100)[291]; *LI*-*IM* (1,000)[292]; *RI*2-*BAB* (10,000)[293]

CURVIFORM:  (1)[294];  (1)[295];  (10)[296];  (60)[297]

CUNEIFORM:  (1)[298]

Notational phrase:

[A][299]

# unit signs illustrated = *u*	*u* = 0, …, 9
# ten signs illustrated = *d*	*d* = 0, …, 5
# sixty signs illustrated = *s*	*s* = 0, 1
# hundred compounds illustrated = *c*	*c* = 0, …, 9

[288] Specific references are discussed below.

[289] At present, other lexical numerals, including *MA*-*I*-*AT* and *MA*-*ḪU*-*AT* (on which see 2.2.4.1. and Bonechi 2021), have not yet been identified in the enumeration of items, but exclusively associated with units of measurement. On the other lexical numerals, see Gelb 1992: 182–183; Kogan – Krebernik 2021: 856; and Bonechi 2021: 33.

[290] In the context of Ebla texts, the lexical numerals are rendered as Semitograms (*i.e.*, with capital italics). This implies that the terms symbolized by these unchanging sequences of symbols have origins rooted in Akkadian or Semitic languages and are employed within Ebla texts as grammatically invariant and crystallized components (pseudo-logographic).

[291] See, *e.g.*, *MEE* 7.12 r. v 1.

[292] See, *e.g.*, *MEE* 7.12 r. v 1.

[293] See, *e.g.*, *MEE* 7.12 r. v 1.

[294] See, *e.g.*, [18].

[295] See, *e.g.*, *MEE* 7.12 r. v 1.

[296] See, *e.g.*, *MEE* 7.12 r. v 1.

[297] See, *e.g.*, *MEE* 7.12 r. v 1.

[298] This numeral is employed in subtractive notation. See, *e.g.*, [4].

[299] As in [1].

thousand compounds illustrated = *m* | *m* = 0, …, 9
tens of thousands compounds illustrated = *r* | *r* = 0, …, 9
$x = 10{,}000\, r + 1{,}000\, m + 100\, c + 60\, s + 10\, d + u$

[B][300]
unit signs illustrated = *u* | *u* = 0, …, 9
ten signs illustrated = *d* | *d* = 0, …, 5
sixty signs illustrated = *s* | *s* = 0, 1
$x = 60\, s + 10\, d + u$

Normally, the notational phrase has cumulative additive structure for numbers $< 10^2$ [1] and a multiplicative additive structure for numbers $\geq 10^2$ [3].[301] In one case, the numeral 10^2 is written with a cumulative additive notation [2]. To write numbers that end in 7, 8, or 9 units (*e.g.,* 7, 18, 29) subtractive notation is sometimes attested [4]:

[1] *MEE* 7.13 o. ii 5: gu$_2$:an-še$_3$ 1-*RI$_2$-BAB* 4-*LI*<-*IM*> 6-*MI-AT* 10 5 $^{\text{ĝeš}}$gu<-gag-gid$_2$> zabar "Sum: 14,615 bronze spearheads."

[2] *ARET* 20.20 r. vi 4: 60 40-la$_2$-2 pa$_4$:ses "98 valets."

[3] *MEE* 10.47 o. i 1: 4[+*n*]-*MI-AT* 60 20 7 tu$_9$-tu$_9$ "*n*+487 textiles."

[4] *MEE* 7.14 r. vi 2: 30-la$_2$-1 aktum^{tu9} "29 tunics."

[300] As in [2].

[301] On this topic, see further below.

2.2.1.2. Mari (Tell Harīrī)

Selected bibliography[302]: Colonna d'Istria 2009: 307–316; Gelb 1992: 182–183.

Notational system (type of signs used):

LEXICAL: *mi-at* (100)[303]

CURVIFORM: ▷ (1)[304]; ◖ (10)[305]; ◗ (60)[306]

Notational phrase:

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, 1$
# hundred compounds illustrated = c	$c = 0, \ldots, 9$

$x = 100\,c + 60\,s + 10\,d + u$

The notational phrase has cumulative additive structure for numbers < 10^2 [5] and a multiplicative additive structure for numbers ≥ 10^2 [6].[307] To write numbers that end in 7, 8 or 9 units (*e.g.*, 7, 18, 29) subtractive notation is sometimes attested [7]:

> [5] Charpin 1987, no. 18 o. i 1: 1▷-*mi-at* 30◖ *nab-ra-ru*^{tu9} "130 *n.*-textiles."

> [6] Charpin 1987, no. 19 o. i 1: 2▷ ^{ĝeš}peš$_2$ "2 figs."

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302 Specific references are discussed below.

303 See, *e.g.*, Charpin 1987, no. 31 o. iv 1.

304 See, *e.g.*, [7].

305 See, *e.g.*, [5].

306 See, *e.g.*, Charpin 1987, no. 31 o. iv 1.

307 In Mari's texts there are no attestations of powers above 10^2 (*i.e.*, Ebla's *LI-IM*, *RI*$_2$*-BAB*). However, it is worth noting that Pre-Sargonic Mari texts are few and, in some cases, poorly preserved. Therefore, this lack does not necessarily mean that these lexical numerals were not used but is rather attributable to a gap in the documentation. Indeed, they occur both in the contemporary Nabada documentation (Chambon 2011: 65–68) as well as in later Mari texts from the Šakkanakku and Old Babylonian periods (Colonna d'Istria 2009: 310).

[7] Cavigneaux 2014, no. 11 o. i 3: ... 20⸢-la$_2$-2⸣ udu ... "… 18 sheep …"

2.2.1.3. Nabada (Tell Beydar)

<u>Selected bibliography[308]:</u> Sallaberger 1996b.

<u>Notational system (type of signs used):</u>

LEXICAL: *mi-at* (100)[309]; *li-im*? (1,000)[310]

CURVIFORM: (1)[311]; (10)[312]; (60)[313]

CUNEIFORM: (1)[314]

<u>Notational phrase:[315]</u>

(A)[316]

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, 1$
# hundred compounds illustrated = c	$c = 0, \ldots, 9$

$x = 100\,c + 60\,s + 10\,d + u$

[308] Specific references are discussed below.

[309] See, *e.g.*, [8].

[310] As far as the term *li-im* (1,000) is concerned, it usually appears in connection with capacity measures, and not for the enumeration of items. However, there is a possible but yet unclear attestation where *li-im* may be referred to the enumeration of items, that is *Subartu* 2.35 r. ii 1–3: 1 ˹*li*˺ -[*im*] / GIŠ.E$_2$-˹x˺ / [1] *li-im*.

[311] See, *e.g.*, *Subartu* 2.82 o. ii 4.

[312] See, *e.g.*, [9].

[313] See, *e.g.*, [9].

[314] This numeral is employed in subtractive notation. See, *e.g.*, [10].

[315] Quite often, in Nabada texts numbers are written after the entity counted, as in [10]. When associated with units of measurement, numbers usually precede them. Particularly so in the case of texts concerning sheep transactions. No clear rule can be discerned in these texts, other than the fact that the numerical notation changes to avoid ambiguities of meaning (on this topic, Sallaberger 1996b: 81, fn. 3)

[316] As in [8].

(B)[317]

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, 1$

$x = 60\,s + 10\,d + u$

The notational phrase has cumulative additive structure for numbers < 10^2 [8] and a multiplicative additive structure for numbers ≥ 10^2 [8]. In some instances, the numeral 10^2 is written with a cumulative additive notation [9].[318] To write numbers that ends in 7, 8 or 9 units (*e.g.*, 7, 17, 27 ...) subtractive notation is sometimes attested [10]:

> [8] *Subartu* 2.118 o. i 3–ii 1: 1𒁹-*mi-at* / 60𒁹 5𒁹 “100 (+) 65.”
>
> [9] *Subartu* 2.50 o. i 3: 60𒁹 40𒌋 “100.”
>
> [10] *Subartu* 2.39 o. iv 2: [ḪAL]-*ti* 20𒌋-la$_2$-2𒀹 “18 (pertain to) PN.”

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[317] As in [8].

[318] On this topic see further below.

2.2.1.4. Šuruppag (Tell Fāra)

Selected bibliography[319]: Chrisomalis 2010: 241–245; Friberg 1987–1990: *passim*; Krebernik 1998: 303–304.

Notational system (type of signs used):

CURVIFORM (WITH THE INTERPOLATION OF CUNEIFORM ELEMENTS): (½)[320]; (1)[321]; (1)[322]; (10)[323]; (60)[324]; (120)[325]; (600)[326]; (1.200)[327] (3,600)[328]

Notational phrase[329]:

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, 1$
# double sixty signs illustrated = d	$d = 1, \ldots, 5$
# six-sixty signs illustrated = x	$x = 0, 1$
# twelve-sixty signs illustrated = g	$g = 0, \ldots, 2$
# sixty-sixty signs illustrated = i	$i = 0, \ldots, 9$

$x = 3.600\, i + 1.200\, g + 600\, x + 120d + 60\, s + 10\, d + u$

[319] Specific references are discussed below.

[320] In his description of Šuruppag notational system, Krebernik (1998: 303) also adds the fraction $^1/_3$. However, this fraction is used exclusively when referred to weight measures; therefore, it will be discussed below. As it concerns the fraction ½, this is rarely used for counting discrete objects. See, *e.g.*, TSŠ 629 o. i 5.

[321] See, *e.g.*, [11].

[322] See, *e.g.*, TSŠ 629 o. i 5.

[323] See, *e.g.*, RTC 11 r. iv 1.

[324] See, *e.g.*, [21].

[325] See, *e.g.*, TSŠ 627 o. i 1.

[326] See, *e.g.*, WF 97 r. i’ 1.

[327] See, *e.g.*, TSŠ 969 r. ii 2.

[328] See, *e.g.*, WF 97 r. i’ 1.

[329] The numeral (36,000) is not attested in the enumeration of items.

The notational phrase has cumulative additive structure [11]. To write numbers that end in 7, 8 or 9 units (*e.g.*, 7, 18, 29) subtractive notation is sometimes attested [12]:

[11] NTSŠ 114 (= BŠ 189) o. ii 2’: 8 KA-ni-zi “8 (to/from) PN.”

[12] *WVDOG* 143.17 r. v 6: 40-la$_2$-4 anše-apin “36 onagers.”

2.2.1.5. Tell Abū Ṣalābīḫ

<u>Selected bibliography[330]:</u> Chrisomalis 2010: 241–245; Friberg 1987–1990: *passim*; Krebernik 1998: 303–304.

<u>Notational system (type of signs used):</u>

LEXICAL: *mi-at* (100)[331]; *li-im* (1,000)[332]

CURVIFORM: (1)[333]; (1)[334];  (10)[335]; (60)[336];

<u>Notational phrase:</u>

(A)[337]

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, 1$
# hundred compounds illustrated = c	$c = 0, \ldots, 9$
# thousand compounds illustrated = m	$m = 0, \ldots, 13$

$x = 1{,}000\, m + 100\, c + 60\, s + 10\, d + u$

(B)[338]

# unit signs illustrated = u	$u = 0, \ldots, 9$
# ten signs illustrated = d	$d = 0, \ldots, 5$
# sixty signs illustrated = s	$s = 0, \ldots, 2$

$x = 60\, s + 10\, d + u$

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[330] Specific references are discussed below.

[331] See, *e.g.*, [14].

[332] See, *e.g.*, [14].

[333] See, *e.g.*, [14].

[334] See, *e.g.*, IAS 490 o. ii 5.

[335] See, *e.g.*, IAS 490 o. i 1.

[336] See, *e.g.*, IAS 490 o. i 1.

[337] As in [14].

[338] As in [15].

The notational phrase has cumulative additive structure for numbers < 10^2 [13] and a multiplicative additive structure for numbers ≥ 10^2 [14]. In one case, the numeral 10^2 is written with a cumulative additive notation [15].

[13] IAS 490 o. ii 1: 40 guruš "40 male workers."

[14] IAS 519 r. ii 1: šu-niĝen$_2$ 10 3-*li-im* 9 -*mi-at* ... "Total: 13,900 ..."

[15] IAS 494 o. i 1: 60 40 "100."

2.2.1.6. General discussion

This section deals with the primary and fundamental use of numbers, namely the enumeration and accounting of elements.[339] In dealing with this topic, some specific aspects require further investigation, namely: the relationship between the sexagesimal and decimal systems, the use of certain strategies adopted by scribes to facilitate accessibility and comprehension of the text (such as the use of subtractive notation), and alternating orientation of numbers within the same case.

The initial aspect pertains to the interplay between the sexagesimal and decimal systems as well as their alignment with the numerical notational systems employed in the studied corpora. Notably, the only site that does not clearly feature elements relevant to the decimal system is Šuruppag,[340] whose notational system indeed shares many similarities with that of 4th millennium Uruk. Nonetheless, like its predecessors, the Šuruppag notational system is not a pure base-60 system. Firstly, each sequent numeral alternates by factors of 10 and 6, as this system has a sub-base of 10.[341] Secondly, it contains bi-sexagesimal elements, as the value 120 comes after 60 (a factor of 2). The presence of a sub-base 10 emerges from the presence of a specially designated sign for the tens (), and specially designated signs for products of this sub-base and the powers of the primary base, *i.e.*,  (n = 600, 60×10).[342] Clearly, both the sub-base and the presence of a multiplicative factor 2 improve the concision of the system itself.[343] On the other hand, one can observe the inclusion of components associated with the decimal system (especially lexical numerals denoting powers of 10) in four out of the five corpora: Ebla, Mari,

[339] This section deals exclusively with the enumeration method without any aspect of multiplication (as it is instead the case of the distributive notation in 2.2.7.2.).

[340] Here, the number 10 is used as a sub-base and not as a base, as it occurs instead in the decimal system (see below).

[341] Chrisomalis 2010: 241–242.

[342] Unlike bases, the powers of sub-bases are not specially designated. It is, rather, the products of a sub-base and the powers of the primary base that are specially designated (Chrisomalis 2010: 4).

[343] Chrisomalis 2010: 391.

Nabada, and Tell Abū Ṣalābīḫ. Chronologically, the first attestation concerning lexical numerals related to the decimal system comes from Tell Abū Salabih [14].[344]

The texts from Tell Abū Ṣalābīḫ and the Syrian corpora combine the elements of the sexagesimal and decimal systems, displaying a strong influence of this latter system,[345] which governs the notational phrase, also modifying its structure.[346] Some curviform signs used in Šuruppag are retained, as in the cases of the unit sign (, rotated), the tens sign () and the sixty sign (or). Nevertheless, in most of these corpora, numbers surpassing 10^2 are typically expressed through lexical numerals as *mi-at* (100), *li-im* (1,000) and so on,[347] which are inherent to the decimal counting system.[348]

Nevertheless, alongside this notation, the corpora of Ebla [3], Nabada [9], and Tell Abū Ṣalābīḫ [15], occasionally show the use of an additive cumulative notation also to represent numbers ≥ 102. By contrast, Mari's records of attestations of numbers ≥ 10^2 are few in number, but they always present the lexical numerals, as in [5] and:

> [16] Charpin 1987, no. 31 o. iv 1–2: 8-*mi-at* 60 ĝešpa 2-*mi-at* [ĝe]šḫašḫur*-gid$_2$ / *zi-ra* [š]u ba-ti "860 wood-branches (and) 200 long(-branches? of) apple-wo[od], PN has [r]eceived."

The presence of elements related to the decimal system in the texts is generally considered a semitic peculiarity. This trait is indeed notably prominent within Syrian sites like Ebla, Mari (particularly in later periods), and Nabada; it is also evident from an early stage at Tell Abū Ṣalābīḫ. However, this aspect appears to be

[344] Krebernik 1998: 270 and Biggs – Postgate 1978: 105.

[345] These systems can be defined decimal, as the powers of the base 10 are specifically designated within this system.

[346] The interpolation within the notational phrase of lexical numbers to represent powers of the base changes its structure. In fact, whereas the Šuruppag system is purely cumulative additive, the system adopted at Ebla, Mari, Nabada and Tell Abū Ṣalābīḫ also displays a multiplicative additive structure.

[347] Note that 10^2 is the successive power of the base 10 within the decimal system.

[348] The documentation provided by each of these corpora is different; however, Ebla has the highest number of attestations.

lacking in the case of Šuruppag. This corpus, although including elements that refer to the Semitic substrate,[349] has a particularly strong proximity to the 4th millennium notational system (Uruk). Therefore, on one side, sites like Ebla, Mari, Nabada, and Tell Abū Ṣalābīḫ consistently show the use of lexical numerals. Even though these may not be as efficient as purely symbolic notations, they offer benefits such as a clearer connection to the decimal system; this clarity ensured that they were maintained in later periods. However, these corpora also show occasional connections to the additive cumulative notation and elements of the Uruk system. These may emerge in the sporadic use of additive cumulative notation for numbers $\geq 10^2$, in measurement systems of sexagesimal ratio,[350] or in the presence at Ebla of mathematical texts deriving from the Mesopotamian tradition and employing this same notational system.[351]

A notable aspect that brings together several corpora analyzed in this dissertation revolves around the alternation of the orientation of arithmograms ( ). This technique finds its primary usage in Ebla, where it serves to streamline the record-keeping of multiple items recorded under the same context. Here, it finds application in both administrative [17] and chancery [18] documents, serving to alternate the enumeration of diverse items within a single context, as well as in representing consecutive powers of the base 10 [17]. As for the other corpora, the frequency of this particular feature varies somewhat. Mari [20] and Tell Abū Ṣalābīḫ [14] display only one example each, and it is conspicuously absent in Nabada; however, this technique finds extensive usage in the Šuruppag texts (as in [21] and [22]):[352]

> [17] *ARET* 1.27 (= *MEE* 12.6) o. i 1: 1-*LI*-*IM* 8-*MI*-*AT* 60 10-la$_2$-3 ib$_2$-4-tu$_9$ gunu$_3$ "1867 fourfold multicolor waistbands (or skirts)."

[349] Krebernik 1998: 260–270.

[350] On which see below.

[351] See *MEE* 3.73 (Chapter 4.).

[352] One can see, for example, the case of [21], a text in which alternation functions as an element that promotes the concise composition of the text. Also, *WVDOG* 143.133 records allocations of small livestock to persons. Here, this difference is also highlighted in the subtractive notation.

[18] *ARET* 16.1 r. i 14: lu$_2$ 1 gud 1 IGI.NITA "For (his) ox and (his) donkey."

[19] *ARET* 1.3 o. v 4: 3 *ʾa$_3$-da-um*^{tu9}-2 2 *ʾa$_3$-da*-um^{tu9}-1 5 aktum^{tu9} ... "3 double cloaks, 2 single cloak, 5 tunics ..."

[20] Cavigneaux 2014, no. 28 o. i 1: 5 udu 6 sila$_4$$^!$(E$_2$) maš$_2$ "5 sheep, 6 baby-goats."

[21] Steible – Yıldız 2000: 990–1031 o. i 1–2:[353] 2 2 tu$_9$ / 1 za:gin$_3$ "2 (wool) textiles, 2 (linen) textiles, 1 (collier) of lapis lazuli."[354]

[22] *WVDOG* 143.133 o. ii 2–3: 20-la$_2$-2 ur-ab-ba$_6$ / 10-la$_2$-1 ^{d}sud$_3$-MI^{mušen} "18: PN$_1$, 9: PN$_2$."

Another noteworthy feature concerns the writing of numbers containing 7, 8 and 9 units. These are alternatively written using a subtractive and additive notation. Subtractive notations are most often used to reduce the length of numerical sentences. In these instances, the subtrahend is placed underneath the minus sign (la$_2$). This well-known and widespread feature exhibits some peculiarities in the case of the Ebla[355] [4] and Nabada [10] texts,[356] where subtraction is always done with cuneiform (vertical or oblique) signs placed under the minus sign la$_2$. Furthermore, in the Ebla corpus,[357] this form of notation consistently maintains its

[353] The text has been re-edited in Gori 2023.

[354] For the interpretation of the text, see Gori 2023.

[355] Although most instances of subtractive notations typically involve a minuend with a value between 1 < n < 3, a limited number of subtractions with a minuend of n > 3 can also be identified, as in TM.75.G.1383 o. vi 1 (Archi 1986: 194–195): 40-la$_2$-4 ^{ĝeš}silig ^{ĝeš}dašgari "36 fir stool" and *ARET* 7.11 o. viii 9: 1-la$_2$-6 *-MI-AT ra-ʾa$_3$-tum* "94 handles."

[356] In Mari and Šuruppag, curviform signs are normally used. Moreover, in Šuruppag texts there are also a few cases in which the subtrahend falls outside the usual range of 1 < *n* < 3. Besides] see also 4 r. iv 1 and WF 97 r. i' 1.

[357] Similarly, also in Nabada texts, subtractive notations are also written using cuneiform signs when referring to the enumeration of items; however, they present a consistent and adequate notation when used for units of measurements (*i.e.*, the precise unit to subtract is written under the minus sign).

formal structure, even when applied to units of measurement. This feature, unique to the Ebla corpus, is somewhat surprising, as the entire Ebla notational system (in terms of both the enumeration of items and the different units of measurement) tends to be extremely precise and unambiguous. In contrast, the presence of a single notational style for subtractions creates a very strong ambiguity, especially when it concerns different units of measurement within the same system (see the discussion in 2.2.3.).

Although both subtractive and cumulative additive notations appear in most corpora,[358] the former tend to be more frequently attested than the latter. On this issue, the Ebla corpus presents some information regarding the chronology of the texts and their writing. In particular, cumulative additive notations appear much more frequently—though not exclusively—in texts relating to *phase* II (see Chapter 1). However, although cumulative additive notations prevail in *phase* II, additive and subtractive notations co-occur in about half of the texts that constitute this phase.[359] Such co-occurrences show how none of these notations should be viewed as a style that belongs to a single scribe, but rather to the accounting mechanism. On the one hand, it is likely that the use of one or the other notation depended on matters of space and choices made on the spot. On the other hand, it is possible that the monthly tablets collated parts copied from individual tablets. Monthly accounts of textiles (MAT) are in fact *Sammeltafeln* (*i.e.*, texts containing information from smaller records). Because these earlier records are not available, it is impossible to determine whether each was written in one or the other notational style.

[358] And especially in Ebla and Šuruppag.

[359] See, *e.g.*, *ARET* 15.4 o iv 6 (7) and *ARET* 15.4 r. xiii! 1 (10 -la$_2$-1); *ARET* 15.7 (= *MEE* 2.32) o. x 1 (10 7) and *ARET* 15.7 (= *MEE* 2.32) o. ii 1 (20 -la$_2$-1).

2.2.2. References to time and dates

This section deals with the use of numerals as references to time and dates—and, to some extent, to time computation.[360] Data on the topic are provided by four out of five corpora (*i.e.*, Ebla, Mari, Nabada, and Šuruppag).

[360] The definition of units of measurement in reference to this topic is controversial. Within a significant portion of cuneiform records, reference is made to the concept of "year," "month," "week" solely in date formulas. However, the documentation analyzed in this dissertation attests some cases where the relationships between different units of time are delineated and computed. These cases make it possible to speak of concepts like "year," "month," "week," and "day" not only as chronological markers but also as units of measurement for temporal calculations. To maintain coherence with the remaining segments of this chapter, these instances have been incorporated into the sections labelled "units of measurements" and discussed accordingly.

2.2.2.1. Ebla (Tell Mardīkh)

<u>Selected bibliography:</u> Archi 2017; Biga 2010; Catagnoti 2019a; Charpin 1982; Charpin 1993; Cohen 1993: 23–34, and *passim*; Cohen 2015: 19–24, and *passim*; Michalowski 1987: 173; Pettinato 1974–1977; Pettinato 1977b; Shea 1980; Shea 1981a; Shea 1981b.[361]

<u>Units of measurement:</u>

mu, “year”; iti, “month”; *sa-ba-tum*, “week”[362]; u4 “day”

<u>Ratio of the measurement system:</u>

1 year : 12/13 months[363] : 4 weeks : ~ 7 days[364]

<u>Notational system (type of signs used):</u>

mu

CURVIFORM:  (10)[365]

CUNEIFORM/RHOMBOIDAL:  (DIŠ)[366];  (1)[367];  (1)[368];  (10)[369]

iti

CURVIFORM:  (10)[370]

[361] Specific references are discussed below.

[362] Catagnoti 2019a: 30 “its four parts (*i.e.*, the months) identified above must refer to four seven-day (*circa*) periods (*sa-ba-tum*).”

[363] Depending on the presence of the intercalary month.

[364] As for the numbers of days in a month, see Catagnoti 2019a: 30 “the Ebla month was a lunar month, the length of which corresponded to 29 or 30 days.”

[365] See, *e.g.*, *ARET* 16.29 o. i 5–6.

[366] See, *e.g.*, [36]. On this topic, see further below.

[367] See, *e.g.*, [30].

[368] See, *e.g.*, *ARET* 16.29 o. i 6.

[369] See, *e.g.*, *MEE* 7.39 o. iv 2.

[370] See, *e.g.*, [24].

CUNEIFORM/RHOMBOIDAL: (DIŠ)[371]; (1)[372]; (1)[373]; (10)[374]

u$_4$

CURVIFORM: (10)[375]

CUNEIFORM/RHOMBOIDAL: (1)[376]; (10)[377]

<u>Notational phrase:</u>

The notational phrase has a cumulative additive structure [23]. In some instances [24], subtractive notation is attested.

> [23] *ARET* 9.8 r. v 9: 10 5 u$_4$ "15 days."

> [24] *ARET* 9.20 r. I 5: 10-la$_2$-2 iti "8 months."

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[371] See, *e.g.*, *ARET* 16.12 (= *ARET* 2.33)]o. iv 12]–v 5. On this topic, see further below.

[372] See, *e.g.*, [39].

[373] See, *e.g.*, *ARET* 2.17 (= *MEE* 7.19) o. iii 2.

[374] See, *e.g.*, [39].

[375] See, *e.g.*, *ARET* 13.15 o. viii 11.

[376] See, *e.g.*, TM.75.G.12287+ r. iii' 3' (Catagnoti 2019a: 15–34).

[377] See, *e.g.*, TM.75.G.12287+ r. iii' 3' (Catagnoti 2019a: 15–34).

2.2.2.2. Mari (Tell Harīrī)

<u>Selected bibliography:</u> Charpin 1982: 1–6; Charpin 1987: 68–70, 90–91; Charpin 1993: 47–48; Cohen 1993: 2; 9–24; Cohen 2015: 9–24.[378]

<u>Units of measurement:</u>
mu, "year"; iti, "month"; u_4 "day"

<u>Ratio of the measurement system:</u>
1 year : 12/13 months : 29/30 days[379]

<u>Notational system (type of signs used):</u>
mu

CURVIFORM (WITH LINEAR IMPRESSIONS): [380] (10)[381]

CUNEIFORM/RHOMBOIDAL:  (1)[382];  (1)[383]  (10)[384]; [385] (10)[386]

u_4

CURVIFORM:  (10)[387]

CUNEIFORM/RHOMBOIDAL:  (1)[388];  (1)[389];  (10)[390]

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[378] Specific references are discussed below.

[379] It is most likely that the length of the month in Pre-Sargonic Mari, was consistent with that of Ebla.

[380] The sign is not impressed but rather partially engraved on the tablet.

[381] See, *e.g.*, [26].

[382] See, *e.g.*, [45].

[383] See, *e.g.*, [31].

[384] See, *e.g.*, [25].

[385] The sign is not impressed but rather engraved on the tablet.

[386] See, *e.g.*, Cavigneaux 2014, no. 9 r.

[387] See, *e.g.*, Charpin 1990, no. 39 o. i 2.

[388] See, *e.g.*, Horioka 2009, no. 8 o. i.

[389] See, *e.g.*, Charpin 1987, no. 11 r. i 2.

[390] See, *e.g.*, Cavigneaux 2014, no. 29 r. ii' 3'.

Notational phrase:

The notational phrase has a cumulative additive structure [25]. In some instances [26], subtractive notation is attested.

[25] Cavigneaux 2014, no. 28 r. i 3: 10 3 mu "Year 13."

[26] Horioka 2009, no. 1 r. i: iti *i-ri*$_2$*-sa* 20-la$_2$-2 mu "MN, year 18."

2.2.2.3. Nabada (Tell Beydar)

Selected bibliography: Sallaberger 1996a; Cohen 2015: 27–25.[391]

Units of measurement[392]:

iti, "month"; u_4 "day"

Ratio of the measurement system:

1 months : 29/30 days[393]

Notational system (type of signs used):

iti

CUNEIFORM: (1)[394]

u_4

CURVIFORM: (10)[395]; (1)[396]

CUNEIFORM: (1)[397]

Notational phrase:

The numerical notation has a cumulative additive structure [27]. In some instances [28], subtractive notation is attested.

> [27] *Subartu* 2.67 o. i 5: *in* 20 4 u_4 "In 24 days."
>
> [28] *Subartu* 2.31 o. ii 4: *in* 10-la_2-1 "In 9 days."

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[391] Specific references are discussed below.

[392] In Nabada texts, the year is never given (Sallaberger 1996a: 85).

[393] It is most likely that the length of the month in Nabada, was consistent with that of Ebla.

[394] See, *e.g.*, *Subartu* 2.67 o. ii 2.

[395] See, *e.g.*, [42].

[396] See, *e.g.*, *Subartu* 2.111 iv 5.

[397] See, *e.g.*, *Subartu* 2.47 o. i 4.

2.2.2.4. Šuruppag (Tell Fāra)

Selected bibliography: Cohen 1993: 8, 99, 130; Cohen 2015: 1, 22, 75, 100, 112; Krebernik 1998: 257–259.[398]

Units of measurement:

mu, “year”; iti, “month”; u$_4$ “day”

Ratio of the measurement system:

1 year : 12 months[399] : 29/30 days

Notational system (type of signs used):

iti

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS):  (½)[400]

CUNEIFORM:  (1)[401];  (1)[402]

u$_4$

CUNEIFORM:  (1)[403];  (1)[404];  (10$^?$)[405]

Notational phrase:

The numerical notation has a cumulative additive structure [29].

[29] TSŠ 882 o. ii 1: iti 3 ½ “(For) 3 (and) ½ months.”

398 Specific references are discussed below.

399 The intercalary month is not attested; however, the calendar is possibly lunar.

400 See, *e.g.*, [29].

401 See, *e.g.*, [29].

402 See, *e.g.*, TSŠ 837 (= EDATŠ no. 66) o. ii 1–2.

403 See, *e.g.*, FTP 32 o. i 5.

404 See, *e.g.*, [35]. The numeral is associated with the element -kam$_4$.

405 See, *e.g.*, FTP 56 o. i 1–ii 1. The numeral is associated with the element -kam$_4$.

2.2.2.5. General discussion

When discussing entries related to time, it is important to differentiate between two broader categories. The first category involves the computation of time, where days, weeks, months, and years serve as units for calculating durations of events or determining specific timeframes. The second category pertains to the existence of a calendar system and the consequent establishment of a framework for dating individual events,[406] which follow each other based on either a linear logic (such as the sequence of years) or a cyclical pattern (the alternating months within a year). This section deals with references to time and dates and covers both categories.

The computation of time and the establishment of a calendar system are fundamental characteristics linked to numeracy. Specifically, they form basic requirements for regulating work and other human activities and serve as the foundation for the development of bureaucracy and administration. Before the invention of sundials and hourglasses, the computation of time had to rely on concrete measurements using units such as days, weeks, months, and years.[407] The relationship between these chronological units is twofold. On the one hand, there is an empirical bias. This is evident, for example, in the synchronization of the calendars of the ancient Near East with the lunar cycle[408] and in the very concept

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[406] Note how a calendar is also a physical record of such a system, or a physically recorded list of planned or recurrent events, such as religious ceremonies. A date is the designation of a single and specific occasion within such a system. An example of such a calendar is provided by the Ebla Liturgical Calendar (published in Catagnoti 2019a).

[407] However, the terminology for specific times of the day is well known in Akkadian (see Streck 2017). On the distinction within night and day in the Old Assyrian Calendar, see also Michel 2010. As for Ebla, see Catagnoti 2019a: 24, fn. 41.

[408] Cohen 2015: 1. Also, see Cohen 1993: 3, with literature "The Mesopotamians were aware of the difference between the lengths of the lunar and solar years, and eventually the moon (the god Nanna in Sumerian and Sin in Akkadian) achieved dominance over the sun (the god Utu in Sumerian and Shamash in Akkadian) as the determiner of the year: "[Nanna], fixing the month and the new moon, [setting] the year in its place."

of "year."[409] It is known that, at least at Ebla, a month was composed of four lunar phases, which align with the modern concept of a week,[410] and, consequently, the length of the month itself varied in a seemingly irregular fashion (between 29 and 30 days)[411]. Likewise, the length of the year was variable and sometimes required the addition of an intercalary month to account for the irregular number of days in a year. On the other hand, there is a theoretical connection (mostly in terms of standard duration) between these time units and the sexagesimal factor of 60. Ideally, the numerical relationships between individual units of time adopt a pseudo-sexagesimal system. A year comprises 12 months ($12 \times 5 = 60$), a month comprises 30 days ($30 \times 2 = 60$), and therefore, a year without an intercalary month consists of 360 days ($360:6 = 60$).[412]

In the corpora of Ebla, Mari, Nabada, and Šuruppag, the words for "day" (u_4), "month" (iti), and "year" (mu) are frequently accompanied by numerical signs.[413] Nonetheless, as it concerns the calendar, the prevailing custom was to assign numerical values to years and days, while months were identified and arranged by their respective names when referencing the calendar.[414] This practice is well-documented in the records of Ebla, Mari, and Nabada, although a few attestations

[409] Cohen 1993: 3 "Ancient man's concept of 'year,' recurring cycles by which he could count the length of his life and measure the span between major events, was an inevitable development, one based on the cycle of seasons. There was no need for man to scan the heavens to determine the beginning and end of a cycle he felt it; it affected him personally."

[410] The Ebla corpus presents the notion of week (in the sense of moon phase), expressed by the term *šabaʿtum* (Catagnoti 2019a: 29–30).

[411] On the length of the lunar month, see Bloch 2012: 20 and Catagnoti 2019a: 30.

[412] The first relation has as its cause the presence of astronomical phenomena (moon phases) and as its effect the structuring of the calendar based on these. The presence of the sexagesimal element arises as a descriptive necessity of an existing system. Hence, perhaps, a wider use of sexagesimal ratios extended to other measurement systems.

[413] No numeral is associated with the week.

[414] Unlike today, where one can express a month by its name and number (*i.e.*, the 1st of January can be also written as 01.01, 01/01, etc.).

from Šuruppag[415] and Tell Abū Ṣalābīḫ[416] can predate it.[417] Notably, the texts of Mari, Ebla and Tell Abū Ṣalābīḫ share a common calendar,[418] with month names in a Semitic language.[419] In the Ebla texts, this calendar is utilized in all documents of the Great Archive (L. 2769), except for 20 monthly records related to the final phase of the city, which instead feature the local calendar as preserved in the Small Archive (L. 2712).[420]

Overall, references to time and dates in these texts can be categorized into four main groups, with the first two possibly pertaining to a calendar-like notion, and the others relating to the computation of time.

The first group of attestations concerns those passages that attest the presence of a precise date or chronological reference. This feature is attested at Ebla, Mari, and Šuruppag.[421] Within the Ebla corpus, it is used to list sequences of years [30], to

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415 FTP 108A r. ii 2: iti ur$_2$-NUN-U$_5$; TSŠ 882 r. i 6: iti ur$_2$-NUN-U$_5$; FTP 107 r. iii 1: iti ur$_2$-NUN-U$_5$; and, perhaps, TSŠ 363 r. i 1: 60-la$_2$-3 iti ur$_2$-NUN-ku$_6$. Another month name, possibly related to a fish, appears in the "school-text" VAT 12693 o. iv 15: iti a-^{gir7}gir$_7$^{ku6}. On this topic see Cohen 2015: 1, fn. 2, with literature "cf. the month name ab-gir-gu$_7$-^{d}En-ki-ka at Early Dynastic Ur."

416 In the documentation from Tell Abū Ṣalābīḫ, the months *i-si* and *za-ʾa*$_3$*-tum* (both attested in Mari and Ebla) appear: IAS 508 o. iv: 1'-2': 2 mu ⸢iti⸣ *i-si*; IAS 513 r. 1': [iti] *za-ʾa*$_3$*-tum*.

417 There is no evidence of the use of some sort of dating or calendar in the earliest economic documents from the end of the 4th millennium (Cohen 2015: 1).

418 On the Ebla and Mari calendar, see also, in order: Pettinato 1977b: 272–274; Charpin 1982: 1–6; Charpin 1987: 68–70; Michalowski 1987: 173; Charpin 1993: 47–48; Cohen 2015: 9–24.

419 This calendar is attested also along the middle Tigris at Gasur; to the east along the Diyala at Ešnunna; and in the south at Tell Abu Ṣalābīḫ, Adab, Lagaš, Nippur, and Umma. In this respect, Cohen (2015: 9) observes how the fact "that none of these month names refers to a specific deity or festival may have facilitated the far-ranging adoption of a calendar that may reflect the influence of Kiš" On the problems related to the paradigm of "Kiš Tradition" and "Kiš Civilization," see the Introduction.

420 In the first group of documents, surely written by scribes of the Central Archive, the Semitic local calendar was employed instead. Based on the presence of the local calendar, and the fact that the documents of L. 2712 were possibly written by another group of scribes, Archi (2006b: 193) suggests that the documents concerning the single months were compiled in another office.

421 In general, among the Šuruppag texts, attestations related to time and dates are few, especially when considering the overall number of texts coming from ED IIIa Tell Fāra. The Šuruppag texts

date a text to a specific year [32], or to provide information about the exact day on which a certain event occurred [33] and perhaps also in [34].[422] Similarly, in Mari texts it is used to date a text to a specific year [31], while Šuruppag texts present the use of the copula "-kam$_4$" to indicate specific dates [35].[423]

[30] *ARET* 7.21 r. i 1 – ii 7: 1 *MI-AT* 40 *gu-zi*-mug / libir / 8 mu / 2-*LI-IM* 60 *gu-zi*-mug / 7 mu / 2 *LI*-[*IM*] 60 *gu-zi*-mug / 6 mu … "140 old *g.*-cloaks in the 8^{th}(-to-last?) year; 2060 *g.*-cloaks in the 7^{th}(-to-last?) year; 2060 *g.*-cloaks in the 6^{th}(-to-last?) year …"

[31] Charpin 1987, no. 7 r. ii 3: iti *ḫa-li* 7 mu "5^{th} month, year 7."

[32] *ARET* 14.12 r. vi 5: 7 mu "Year 7."

[33] TM.75.G.12287+ r. iii' 1'-5':[424] 4 u$_4$ / *in* / 20 8 u$_4$ *wa-ti-a-ti* / *ḫu-mu* / ^{d}*ga-mi-iš* "For 4 days (starting) from the 28^{th} day of the Accomplished (Moon Phase) (of the 10^{th} month) the *ḫu-mu*-rite of DN (is celebrated)."[425]

[34] *ARET* 9.64 o. ii 1–5: 1 *ba-ri*$_2$*-zu* 1 niĝ$_2$-sagšu ½ zi$_3$-ziz$_2$ / inda$_3$ abba$_2$ / *in* u$_4$ 9 / *nu*-LUL-GU-*ak* / *in* 3 u$_4$ "1 *p.*-measure, 1 (and) ½ n.-

are normally undated, if not for a few exceptions, on which see above. On the discussion about the formula "bala PN" at the end of purchase documents see Krebernik 1998: 257 with literature.

[422] As for [12], Milano (1990a: 200) suggested that the two expressions "in u$_4$ *n*" and "in *n* u$_4$" may be translated as cardinal and ordinal numbers, respectively. This same order appears in *ARET* 16.22 (= *ARET* 2.29 = *MEE* 7.42) r. iv 10: […] mu 6 "On the 6^{th}(?) year." However, this fact remains to be demonstrated because there are no further attestations of this type of notation besides those discussed here.

[423] The element -kam$_4$ may be omitted, as for example in FTP 32 o. ii 3: u$_4$ 2 "(payment for the) 2^{nd} day."

[424] The text has been published in Catagnoti 2019a.

[425] The translation is given in Catagnoti 2019a: 16 "For 4 days (starting) from the 28^{th} day of the Accomplished (Moon Phase) (of the 10th month) the *ḫu-mu*-rite of ^{d}*Ga-mi-iš* (is celebrated)."

measures (of) emmer flour, (which) on the 9th day was not reimbursed (?) – for 3 days (?)."[426]

[35] FTP 54 o. i 1–2: 20 1 -la$_2$-2 dabin lid$_2$-ga / u$_4$ 9 𒌋-kam$_4$ "20 l.- (and) 40 s.- measures (of) barley flour, delivered on the 9th day."

The second group of attestations is peculiar to the Ebla texts and concerns those instances in which the notion of "year" [36] is combined with the numeral 𒁹 (to be read DIŠ) which has a determinative function "the year (in which)..." In some instances, the expression DIŠ mu *ga-tim*, "the previous year" is attested, as in [37].[427] This type of attestation sometimes is also associated with months [38]. Nevertheless, in such cases, the numeral used is 𒌋 and not 𒁹, as shown in [36] and [37]. No example of this type refers to the accounting of days.

[36] *ARET* 1.20 (= *MEE* 10.11) r. iii 1–3: DIŠ 𒁹 mu / niĝ$_2$-kas$_4$ / *aš$_2$-da-rum$_2$*^{ki} "The year of the expedition to GN."

[37] *ARET* 9.95 o. ii 6[428]: DIŠ 𒁹 mu *ga-tim* "The previous year."

[38] *ARET* 16.12 (= *ARET* 2.33) o. v 11: DIŠ! 𒌋 iti kurum$_6$ "the 12th month."

The third group of attestations concerns units of time as durative, *i.e.*, those units that indicate time intervals of the type "for *n* days/months/years." This feature is attested in the texts from Ebla [39], [40], [43], Mari [41],[429] Nabada [42] and

[426] See the translation in Milano 1990a: 200 "l p. (e) l Y2 (?) ns. di farina d'emmer: pane per gli Anziani, (che) nel 9° giorno non è stato rimborsato (?) - per 3 giorni." The meaning of the verb LUL.GU-ak is unclear. On this topic, see Milano 1990a: 288. As for the translation "repayment," see Pomponio 1982: 95–96 and Mander 1990: 55 (previously: Edzard 1981: 132; Milano 1980a: 2, 5).

[427] The term can be translated as "anterior, previous" and is the absolute state of *ga-ti-mu* **qadim*; VE 721 igi-tum$_3$ / *ga-ti-mu* (Catagnoti – Fronzaroli 2010: 232).

[428] See also *ARET* 14.91 (= *ARET* 8.535 = *MEE* 5.15) r. iii 1–2; *ARET* 9.30 r. ii 1; *ARET* 9.95 o. ii 6; *ARET* 9.95 o. iv 2.

[429] A peculiar case in the Mari corpus is Charpin 1987, no. 11 r. i 2: *in* ˹5˺ u$_4$ "In 5 days." Here the number of days is preceded by the preposition *in*.

Šuruppag [29].[430] In the Ebla corpus, this feature is more common for days and months, and appears predominantly in the texts of L. 2712,[431] and only exceptionally in those from the other archives.[432] Occasionally, some texts also use years as units of time, as [43].

[39] *ARET* 2.17 (= *MEE* 7.19) r. iv 3–4: še-ba / 10 2 iti "Allotment for twelve months."[433]

[40] *ARET* 9.24 o. iv 5 – r. i 5: 20 1 zi$_3$ *GU$_2$-BAR* / lu$_2$ inda$_3$ / 5 še *GU$_2$-BAR* / ŠE+TIN / 60 20 4 e$_2$-duru$_5^{ki}$ / gu$_7$ / *in* 1 u$_4$ / gu$_2$:an-še$_3$ 3 *MI-AT* 10 5 še *GU$_2$-BAR* / lu$_2$ inda$_3$ / 60 10 5 še *GU$_2$-BAR* / ŠE+TIN / gu$_7$ / guruš-guruš / *in* 10 5 u$_4$ "21 *k.*-measures of bread flour, 5 *k.*-measures of beer barley, as food (provisions) for 84 teams of (male workers for) 1 day; sum: 315 *k.*-measures of bread barley$^!$, 75 *k.*-measures of beer barley, as food (provisions for the) male workers, for 15 days."

[41] Horioka 2009, no. 4 o. ii 1: 20 4 u$_4$ "(For) 24 days."

[42] *Subartu* 2.67 o. i 5: *in* 20 u$_4$ "In 20 days."

[43] *ARET* 7.18 r. iii 5–iv 1: niĝ$_2$-ki-za / en / lu$_2$ 2 mu "Assets (of the Ebla) king: that of two years."

[430] One should note how in this passage, the concept of three and a half months is used, instead of counting the days.

[431] Here, the notions of "day" and "month" are mainly used as a unit of time in the allocation system, as "for *n* days/months." For example, out of a total of 164 occurrences of the Sumerogram u$_4$ in association with a numeral (found on EbDA, accessed on 09.06.2023), 127 pertain to the Small Archive L. 2712.

[432] Some examples are: *ARET* 2.51 r. ii 3–4, *ARET* 13.15 o. viii 8–13, TM.75.G.12287+ r. iii' 6'–7' (Catagnoti 2019a: 16).

[433] Interestingly, in this passage the notation "twelve months" is used here instead of "one year."

Lastly, in the fourth group of attestations, years can be associated with a number to indicate the age of animals and livestock (usually donkeys) as in [44]. Remarkably, this feature is only attested in the Ebla corpus.

> [44] *MEE* 10.42 o. i 1–ii 1: 1-*MI-AT* 60 20 5 sur$_x$(EREN$_2$)-kunga$_2$ / 20 kunga$_2$ 3 mu / [*n*]+2 kunga$_2$ 2 mu / 10 7 kunga$_2$ 1 mu
> "185 pulls of mules, 20 three-year-old mules, *n*+2 two-year-old mules, 17 one-year-old mules."

When examining numerical notation and the signs used, several recurring features can be highlighted. In the Ebla corpus, cuneiform signs (or) are employed to represent units in attestation concerning days and months, when referring both to calendar and time computation. Interestingly, there is no substantial difference between these variants, as they are sometimes consistently present within the same texts.[434] Also, in this group, there is no distinction in usage between the rhomboidal () and the curviform () numeral. However, when it comes to years, curviform tens () are used to denote a unit of time "for *n* mu."[435] On the other hand, rhomboidal ones () are used to represent chronological sequences. Moreover, for numbers corresponding to (*n* +)7, (*n* +)8, and (*n* +)9, both additive and subtractive notations are consistently found in all three categories (years,[436] months,[437] and days).[438]

In the Pre-Sargonic Mari texts, the number always precedes the term mu, "year" or u$_4$, "day." The standard dating formula is sometimes[439] mentioned at the end of the

434 See, *e.g.*, *ARET* 14.91 (= *ARET* 8.535 = *MEE* 5.15), *ARET* 7.18, *MEE* 7.39.

435 *ARET* 16.29 o. i 5–6: *si-ma* / 10 mu "For ten years."

436 Regarding years, additive notations are more numerous than subtractive notations. To my knowledge, subtractive notations are attested only in the following passages (all pertaining to the same text): *MEE* 7.39 o. iv 2: 20-(*erased* la$_2$-1) mu "year 20$^!$"; *MEE* 7.39 o. iv 5: 20-la$_2$-1-(*erased* 1) mu "year 19$^!$"; *MEE* 7.39 o. vii 7: 10-(*erased* la$_2$-1) mu "year 10$^!$."

437 Regarding months, subtractive notations are more numerous than additive notations.

438 Regarding days, subtractive notations are more numerous than additive notations.

439 For example, the texts Charpin 1987, no. 2 and Charpin 1987, no. 3. The texts Charpin 1987, no. 13; Charpin 1987, no. 14; and Charpin 1987, no. 29 are clearly undated.

texts in the following order: month (name of the month) and year (*n* mu). Curviform signs of the vertical type ( ) [45] or, more commonly oblique ( ) [31], are always used to represent units in these texts. Notably, in some instances, the tens are not merely impressed but rather carved into the tablet, resulting in irregular shapes ranging from an almost curviform mark ( ),[440] with internal incisions, to more quadrangular forms ( ).[441] Alongside these, there are also some clearly cuneiform impressions ( ).[442]

[45] Charpin 1987, no. 20 r. iv: iti ʾ*a*₅-*nun* 4 mu "8th month, year 4."

In the dating *formulae* of the Nabada texts, days and years are not mentioned, but the names of the months are often recorded. However, for time computation, curviform signs (,) are consistently employed, as in [28], with the exception of the subtractive notation, as in [27]. This last feature resembles a characteristic of the Ebla texts (see above 2.2.2.1).

In Šuruppag texts, as far as units are concerned, signs are always of cuneiform type ( ), as in [29]. For the fractional value ½, the sign   is used, as in [29]. Notably, the sign AŠ ( ) is possibly used to write tens in FTP 56 o. i 1–ii 1.

From a notational perspective, one observes a predominance of cuneiform signs over curviform ones, with the exception of Nabada. Consistent with basic rules of numerical notation, there is the presence of subtractive notation, with variable occurrence depending on the context. Noteworthy are the variations in the use of notations for the tens; with the exception of the case of Nabada, we can observe a general variability. At Ebla, for example, in the computation of years, different notations are used to express different concepts, such as punctuality and durability. At Mari, we can observe a pseudo-rhomboidal notation reminiscent of that used at Ebla. (Also, for the first time a clearly cuneiform notation for the tens is attested,

[440] Horioka 2009, no. 7 r. i.

[441] Cavigneaux 2014, no. 9 r.

[442] Cavigneaux 2014, no. 28 r. i 3.

which later became the standard.)[443] Finally, at Šuruppag, the exceptional use of the horizontal sign AŠ to express the tens is attested.[444] These attempts at diversification can perhaps be traced back to the need to differentiate time notation from other notational and measurement systems.

2.2.3. Weight measures

This section deals with weight measures mostly for metal and wool quantities. Data on the topic are provided by four out of five corpora (*i.e.*, Ebla, Mari, Nabada and Šuruppag).

[443] Chrisomalis 2010: 243, with literature "By 2500 BC, the transition from the older Sumerian script to cuneiform signs had been completed, except for the numerals. Beginning in the Presargonic period (c. 2600–2350 BC), the older curviform numerals began to be replaced with a set cuneiform numeral-signs, while remaining virtually unchanged structurally."

[444] As in FTP 56 o. i 1–ii 1.

2.2.3.1. Ebla (Tell Mardīkh)

Selected bibliography[445]: Archi 1987a, Archi 1987b; Ascalone – Peyronel 2000, *passim*; Ascalone – Peyronel 2006, *passim*; Brugnatelli 1990; Chambon 2011: 58–61, and *passim*.

Units of measure:
ma-na, giĝ$_4$(-DILMUN)

Ratio of the measurement systems:

ma-na	1	
giĝ$_4$(-DILMUN)	60	1

Notational system (type of signs used):

ma-na

LEXICAL: šušana$_x$(ŠU$_2$+ŠA) (⅓)[446]; TAR (½)[447]; šanabi$_x$(ŠA.PI) (⅔)[448]; *MI-AT* (100)[449]; *LI-IM* (10,000).[450]

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (½)[451]; (1)[452]; (10)[453]; (60)[454]

CUNEIFORM: (1)[455]

giĝ$_4$(-DILMUN)

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[445] Specific references are discussed below.

[446] See, *e.g.*, *ARET* 20.25 o. ii 2.

[447] See, *e.g.*, [83].

[448] See, *e.g.*, *ARET* 20.16 r. vi 5.

[449] See, *e.g.*, *ARET* 14.2 (= *MEE* 12.27) o. ii 1.

[450] See, *e.g.*, *ARET* 14.2 (= *MEE* 12.27) o. i 1.

[451] This notation is, however, only exceptionally employed in *ARET* 2.6 r. ii 5.

[452] See, *e.g.*, *ARET* 14.2a o. i 3.

[453] See, *e.g.*, *ARET* 14.2b o. i 1.

[454] See, *e.g.*, *ARET* 14.79 (= *ARET* 3.758+) r. iii’ 1’.

[455] See, *e.g.*, *ARET* 3.756 o. i’ 3’.

LEXICAL (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): 2-NI (⅔)[456];3-NI ($^1/_3$)[457]; 4-NI ($^1/_4$)[458]; 5-NI ($^1/_5$)[459]; 6-NI ($^1/_6$)[460]

CURVIFORM: (1)[461]; (10)[462]

CUNEIFORM: (½)[463]; (1)[464]; (1)[465]; (10)[466]

Notational phrase:

The notational phrase is cumulative additive [46]. In some instances [47], subtractive notation is attested.

> [46] *ARET* 2.4 (= *MEE* 7.17) o. iii 7: 20 2 ma-na šanabi$_x$(ŠA.PI) giĝ$_4$(-DILMUN) ku$_3$:babbar "22 minas (and) 40 shekels (of) silver."

> [47] *ARET* 1.30 (= *MEE* 7.28) r. xi 5: 2 ma-na 50 la$_2$-2 giĝ$_4$(-DILMUN) ku$_3$-si$_{22}$ "2 minas (and) 48 shekels (of) gold."

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456 See, *e.g.*, *ARET* 1.45 o. v 4'.

457 See, *e.g.*, *ARET* 2.2 o. ii 5.

458 See, *e.g.*, *ARET* 2.47 r. i 5.

459 See, *e.g.*, *MEE* 10.20 o. xx 28.

460 See, *e.g.*, *ARET* 7.27 o. i 1.

461 See [75]. See in detail below.

462 See [75]. See in detail below.

463 See, *e.g.*, [65].

464 See, *e.g.*, *ARET* 7.18 r. iii 3.

465 See, *e.g.*, [47].

466 See, *e.g.*, *ARET* 7.18 r. iii 3.

2.2.3.2. Mari (Tell Harīrī)

Selected bibliography[467]: Charpin 1987: 91–92; Chambon 2011; Colonna d’Istria 2009.

Units of measure:

ma-na, giĝ$_4$(-DILMUN)

Ratio of the measurement systems:

ma-na	1	
giĝ$_4$(:DILMUN)	60	1

Notational system (type of signs used):

ma-na

LEXICAL: šu$_2$-2 -ša-na (⅓)[468]

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (1)[469]

giĝ$_4$(:DILMUN)

CURVIFORM: (1)[470]; (10)[471]

Notational phrase:

The notational phrase is cumulative additive [48].

> [48] Charpin 1987, no. 31 o. ii 3: 10 giĝ$_4$:DILMUN ku$_3$-babbar “10 shekels of silver.”

467 Specific references are discussed below.

468 See [82].

469 See, *e.g.*, Horioka 2009, no. 2 o. ii 4–5

470 See, *e.g.*, Charpin 1987, no. 2 o. ii 5.

471 See, *e.g.*, [48].

2.2.3.3. Nabada (Tell Beydar)

<u>Selected bibliography[472]:</u> Sallaberger 1996b

<u>Units of measure:</u>

ma-na

<u>Ratio of the measurement systems:</u>

-

<u>Notational system (type of signs used):</u>

ma-na

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (1)[473]

<u>Notational phrase:</u>

The numerical notation is cumulative additive [49].

> [49] Subartu 2.66 o. i 1–4: siki / *tab-la-⌜a-lim⌝* / [(x)] / 6 ma-na
> “Wool (of) PN ... 6 minas ....”[474]

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[472] Specific references are discussed below.

[473] See, *e.g.*, [49].

[474] On this passage, se the discussion below.

2.2.3.4. Šuruppag (Tell Fāra)

<u>Selected bibliography[475]:</u> Krebernik 1998: 305; Powell 1987–1990.

<u>Units of measure:</u>

ma-na, giĝ$_4$

<u>Ratio of the measurement systems:</u>

ma-na	1		
giĝ$_4$	60	1	
NINDA$_2$×ŠE.1-ma-na	180	3	1

<u>Notational system (type of signs used):</u>

ma-na

LEXICAL: NINDA$_2$×ŠE.1-ma-na ($^1/_{180}$)[476]; NINDA$_2$×ŠE.2 ($^1/_{90}$)[477]; šu$_2$-1 ($^1/_3$)[478]

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (½)[479]; 2 ($^2/_3$)[480]; (1)[481]; (10)[482]; (60)[483]

CUNEIFORM: (½)[484]; (1)[485]

giĝ$_4$

[475] Specific references are discussed below.

[476] See, *e.g.*, [78]. Note the factor 1:180 (mina : little mina), possibly depending on the weighing practices, from which this notation stems.

[477] See, *e.g.*, [77].

[478] See, *e.g.*, RTC 14 o. i 1.

[479] See, *e.g.*, [50].

[480] See, *e.g.*, [79].

[481] See, *e.g.*, Cavigneaux 2020: 240–258 o. i 2.

[482] See, *e.g.*, Cavigneaux 2020: 240–258 o. i 2.

[483] See, *e.g.*, TSŠ 411 o. i 1.

[484] See, *e.g.*, *CT* 50.9 r. i 6.

[485] See, *e.g.*, *CT* 50.9 r. i 6.

CURVIFORM: (1)[486]; (10)[487]

<u>Notational phrase:</u>

The numerical notation is cumulative additive [50]. In some instances, subtractive notation is attested [51].

> [50] WF 32 o. iv 6: 1 ½ uruda ma-na “1 (and) ½ minas (of) copper.”
>
> [51] WF 33 o. i 6: 2-la$_2$-2 uruda ma-na “8 minas (of) copper.”

[486] See, *e.g.*, WF 139 o. i 1.

[487] See, *e.g.*, RTC 14 o. i 4.

2.2.3.5. General discussion

Weight measures show great consistency in the nomenclature of basic units of measure, as well as being one of the most ancient measurement systems.[488] Already in the 3rd millennium, one may observe the formulation of coherent systems of weight measures.[489] Nonetheless, this consistency in nomenclature clashes with a multiplicity of weight standards and weights used locally.[490] Different weights are attested by both archaeological and textual sources. For example, the absolute value of the Ebla weight measures was different from that used in other areas of the Ancient Near East. At Ebla the so-called "Western" system is attested, which was based on a mina of about 470 g (60 shekels of about 7.8 g), which differs from the Mesopotamian standard with its 490 g mina and 5–8.3 g shekel. However, the Ebla mina was also compatible with other standards in use in the Western area,[491] namely the "Levantine" system, with a shekel of about 9.4 g, and the "Anatolian" system, with a shekel of about 11.7 g. The 470 g mina in use at Ebla corresponded to 50 "Levantine" shekels of 9.4 g and 40 "Anatolian" shekels of 11.4 g.[492] Archaeological finds also attest that the 7.80 g shekel persisted during the Middle Bronze Age.[493] Moreover, a mina of approximately 470 g is attested in Syria for the 1st millennium as well—for example, at Arslan-Taş.[494] As for textual sources, traces

[488] On this topic, see Powell 1987–1990: 508: "Probably younger than the other primary systems (length, capacity)." The first data available on this system come from ED I-II Šuruppag and Ur (Bartash 2019: 40).

[489] During the 3rd millennium, the system for measuring weight is rooted in the mina (ma-na) and the shekel giĝ$_4$, whereas the talent (gun$_2$) is not yet attested. See the discussion in Gori 2023: 161, and fn. 6.

[490] See, *e.g.*, the multiplicity of weights found at Ebla (Archi 1987a).

[491] Peyronel 2016: 58 (with literature): "The other two 'subsystems' of the western area were also known: the 'Levantine' with a shekel of c. 9.4 g and the 'Anatolian' with a shekel of c. 11.7 g. These originated in the coastal Levant and Anatolian regions respectively and were connected by a shared mina which was equivalent to 50 units in the first case and 40 in the second."

[492] Peyronel 2016: 58.

[493] See Archi 1987a: 50.

[494] Archi 1987a: 52, with literature.

of different standards are also found in in *ARET* 13.15,[495] a text concerning norms regarding trade relations between Ebla and Mari:

> [52] *ARET* 13.15 o. viii 14–r. i 8: *wa* / i$_3$-na-šum$_2$ / *i-si-lum* / 2⊤ ku$_3$:babbar / 1⊃ ⸢*gu*$_2$⸣-[*li-lum*] / [ ] / al-kurum$_6$ / siki / *mi-ne-iš-a* / *al*$_6$ / na$_4$ / lugal / *la* gul:tuku$_x$(ḪUB$_2$) ... "And PN gave 2 (shekels of) silver (and) 1 br[acelet...] to transfer the wool, so as not to lose the gain by weighing according to the king's weight ..."[496]

> [53] *ARET* 13.15 r. iii 10–iv 6: *wa* / *ir*$_3$*-ra-tum-*SU$_3$ / šu ba$_4$-ti / *mi-ne-iš-a* / *al*$_6$ / na$_4$ / lugal / *la* gul:tuku$_x$(ḪUB$_2$) / dam-gara$_3$ / *ib-la*^{ki} / tu$_9$-tu$_9$ / niĝ$_2$-sa$_{10}$ / *aš*$_2$*-ti* / *ma-ri*$_2$^{ki} "And he took his strong (weight) so as not to diminish the earnings of the merchant of Ebla (by weighing) according to the weight of the king, for the cloths bought by Mari."[497]

> [54] *ARET* 13.15 r. iii 10–iv 6: *wa* / *u*$_9$*-za-an* / ku$_3$:babbar / *ib-la*^{ki} / *al*$_6$ / *ir*$_3$*-ra-ti-*SU$_3$ / ʾ*a*$_5$*-ti-ma* / ugula KI:LAM$_7$ ... "And weigh the silver of Ebla heavy (weight) until the market superintendent (says) ..."[498]

One issue connected to the presence of different standards is related to the use of the spelling giĝ$_4$-DILMUN (or more precisely, to be read NI.TUK) in Pre-Sargonic Ebla and Mari texts.[499] In the Ebla texts, giĝ$_4$-DILMUN is much more common than

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[495] Here the term *ir*$_3$*-ra-tum* indicates a "strong weight," a standard different from the "king's weight" (na$_4$ / lugal) and comparable with the subsequent *ina abnim rabītim* (Fronzaroli – Catagnoti 2003: 167). See also Kogan – Krebernik 2021: 958, fn.1331

[496] Fronzaroli – Catagnoti 2003: 167 "E Yiširum diede 2 (sicli) d'argento (e) 1 br[acciale...] per trasferire la lana, in modo da non perdere il guadagno (pesando) secondo il peso del re."

[497] Fronzaroli – Catagnoti 2003: 168 "Ed egli prese il suo (peso) forte in modo da non diminuire il guadagno del mercante di Ebla (pesando) secondo il peso del re, per i tessuti comprati da Mari."

[498] Fronzaroli – Catagnoti 2003: 168 "E pesa l'argento di Ebla con il suo (peso) forte finché il sovrintendente del mercato (dice)."

[499] However, it disappears in the later Mari texts. On later Mari weight system, see Colonna d'Istria 2009: 321–233. Nonetheless, this trait denotes—among other things—a clear connection between the Ebla and Mari texts.

giĝ$_4$,[500] and it also appears in association with the fractions of the mina, *i.e.*, šušana$_x$(ŠU$_2$+ŠA)[501] TAR,[502] šanabi$_x$(ŠA.PI).[503] The question of the definition of giĝ$_4$-DILMUN has already been addressed by numerous scholars.[504] As it concerns the administrative use of the shekel and its two variants, giĝ$_4$ and giĝ$_4$-DILMUN, Maiocchi suggested that the Ebla administration had used two different standards: a standard Syrian shekel (giĝ$_4$) weighing 7.8 g, and a giĝ$_4$-DILMUN shekel corresponding to the Anatolian weight of 11.75 g.[505] Most recently, Chambon revisited this possibility,[506] underling the question concerning the relation of the giĝ$_4$-DILMUN shekel and these different standards. However, not only is the shekel giĝ$_4$-DILMUN used in Ebla for both internal and external operations, but it also corresponds exactly to the shekel giĝ$_4$, as may be suggested by the fact that in some texts, the long spelling giĝ$_4$-DILMUN is not repeated in the total.[507] Secondly, the attestation in archaic texts of the "DILMUN" shekel next to an unspecified shekel,

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500 See on EbDA, accessed on 02/15/2023: giĝ$_4$-DILMUN (2681 attestations) *vs* giĝ$_4$ (569 attestations).

501 See on EbDA, accessed on 02/15/2023: šušana$_x$(ŠU$_2$+ŠA) (842 attestations in total); šušana$_x$(ŠU$_2$+ŠA) alone (479 attestations); šušana$_x$(ŠU$_2$+ŠA) + giĝ$_4$(-DILMUN) (363 attestations).

502 See on EbDA, accessed on 02/15/2023: TAR (952) / TAR + giĝ$_4$ (DILMUN) (100, of which 85 attestations containing the term DILMUN).

503 See in EbDA, accessed on 02/15/2023: giĝ$_4$-DILMUN (2681 attestations) *vs* giĝ$_4$ (569 attestations). šanabi$_x$(ŠA.PI) (637 attestations in total); šanabi$_x$(ŠA.PI) alone (370 attestations in total); šanabi$_x$(ŠA.PI) + giĝ$_4$(-DILMUN) (267, tutte contenenti l'elemento DILMUN).

504 See a detailed overview in Chambon 2011: 59.

505 Maiocchi 2005: 49.

506 Chambon 2011: 59–61. Although the problem remains open, Chambon suggests a possible relation between the giĝ$_4$-DILMUN shekel and the heaviest standard, pointing out at the equivalence dilmun = *kabtu*, "heavy," in a 2nd millennium lexical list (Ea II 39).

507 See, *e.g.*, *ARET* 7.12. On a side note, albeit more difficult to identify, another exciting feature regards the lexical notation of shekel quantities: in approximately $^1/_3$ of the entries regarding metal quantities, the term giĝ$_4$(-DILMUN), which lexically identifies the shekels, is not written. Although it is true that, in general, the disambiguating notation between quantities of minas and shekels allows the scribe to omit the term for "shekel," some questions behind this omission are yet to be answered; the term's presence would be especially appropriate in cases involving subtractive notation between minas and shekels. In this sense, one should ask whether this choice depends on the individual scribe or if it can be traced back to deeper and more complex dynamics, which could go beyond the speeding up of administrative practice, right to the core of bureaucratic writing.

certainly of local use, testifies commercial activities between Ebla and Mari, well attested elsewhere.[508] Therefore, the simple writing giĝ$_4$ is most likely an abbreviated variant of the full writing giĝ$_4$-DILMUN.

Nonetheless, the question of what DILMUN(NI.TUK) means remains open. An interesting insight on this debate comes from the Late Uruk lexical composition "Archaic Metals," which records several varieties of aga$_3$(GIN$_2$), "axe."[509] The same sequence is attested in lexical lists from Šuruppag and Ebla:

<u>Synopsys:</u>

A: Uruk (ATU 3: 27)
B: Šuruppag (VAT 12751+ o. iv 13–17)
C: Ebla (TM.75.G.1396+ o. ii 6–10)

(1)	A B C	gal aga$_3$(GIN$_2$)
(2)	A B C	2𒀸 šu aga$_3$(GIN$_2$)
(3)	A B C	1𒀸 šu aga$_3$(GIN$_2$)
(4)	A	AL aga$_3$(GIN$_2$)
	B	TUK aga$_3$(GIN$_2$)
	C	aga$_3$(GIN$_2$)
(5)	A B C	DILMUN(NI.TUK) aga$_3$(GIN$_2$)

One may notice how the fifth entry, DILMUN GIN$_2$ (and, thus, GIN$_2$:DILMUN), corresponds with the Ebla and Mari denomination for the shekel, *i.e.*, giĝ$_4$-DILMUN and giĝ$_4$:DILMUN, respectively. On one hand, these occurrences show at least a lexical tradition concerning this spelling and starting in Uruk (ATU 3: 27), spreading to Šuruppag (VAT 12751+, o. iv 13–17), Ebla (TM.75.G.01396+, o. ii 6–10), and perhaps Mari.[510] Nonetheless, if one patches together this occurrence

[508] Archi 1985b.

[509] See also Bartash 2019: 60.

[510] Unfortunately, no version of this list is attested in Pre-Sargonic Mari, as its lexical corpus is practically inexistent, but the term appears in [48] and perhaps also in Charpin 1987, no. 1 o. i 1

with the entries of the *VE* 409 (Source A) ĜEŠ.DILMUN = *wa-za-num*$_2$/*nu-um*,[511] and *VE* 409 (Source V) and ĜEŠ.DILMUN = *ša-gi*-LUM, a further possible scenario is revealed. Based on these two entries, Archi already proposed interpreting the element DILMUN as indicating a translation "weighed (*i.e.*, standard) shekel"[512] of giĝ$_4$-DILMUN, as *wa-za-num*$_2$/*nu-um* can be compared to the Arabic *wazn*, "weight" and *wazana*, "to weigh," while *ša-gi*-LUM can be compared to the Akkadian *šaqâlum*, "to weigh." From this perspective, the lexical sequence concerning axes, coming from the "Archaic Metals" lexical list—coupled with the entries in *VE* 409—might suggest that the scribes of Ebla sought to find common ground between giĝ$_4$(GIN$_2$), "shekel" and aga$_3$(GIN$_2$), "axe," while giving a meaning to the attribute DILMUN.[513] Nonetheless, in the absence of further evidence, the question remains quite impenetrable.

Besides this spelling, the Ebla texts present other peculiarities. In this corpus is attested a specific way of representing certain quantities of metal which correspond to *n* minas + (44, …, 59) shekels. These quantities are represented using a subtractive notation between minas and shekels. This peculiar notation can be identified in a small group of texts:

> [55] *ARET* 1.29 (= *MEE* 7.41) r. iii 2–3: 2-la$_2$-9 ma-na ku$_3$:babbar "1 mina (and) 51 (shekels of) silver."

> [56] *ARET* 1.30 (= *MEE* 7.28) o. x 1: 1 ĜEŠ.ŠU$_2$ 2-la$_2$-5 ma-na ku$_3$:babbar "1 Ĝ.-object (of) 1 mina (and) 55 (shekels of) silver."

> [57] *ARET* 3.399 o.[?] iii' 4: 1-la$_2$-2 ma-na ku$_3$:babbar "58 (shekels of) silver."

[511] On this specific entry, see Krebernik 1983: 16, Fronzaroli 1984: 149; Conti 1990: 130 (Source D). For a complete overview on the topic, see Hajouz 2013: 714–717.

[512] Archi 1987b: 86.

[513] On the disambiguating value of the DILMUN-element, Michalowski (1990: 6–7) suggested interpreting it simply as a gloss of the grapheme giĝ$_4$ that removes a reading ambiguity. The aim was to mark the difference between the sign GIN$_2$ referring to the weight unit "shekel" and the sign TUN$_3$, very similar the former but representing a measure of capacity (see below).

[58] *ARET* 14.79 (= *ARET* 3.763+) o.$^?$ i 1’: 3-la$_2$-3 ma-na ku$_3$:babbar “2 minas (and) 57 (shekels of) silver.”

[59] *ARET* 4.5 r. i 3–9: 1-la$_2$-2 ma-na ku$_3$:babbar “58 (shekels of) silver.”

[60] *ARET* 7.4 r. viii 1: gu$_2$:an-še$_3$ 2-*MI-AT* 7-la$_2$-1 ma-na 3 ku$_3$:babbar “Sum: 206 minas (and) 59 (shekels plus) 3 (shekels of) silver.”

[61] *ARET* 7.9 r. vi 5: 10 8 ma-na-la$_2$-10 ku$_3$:babbar “17 minas (and) 50 (shekels of) silver.”

[62] *ARET* 7.18 o. i 1: 5-la$_2$-5 ma-na ku$_3$-si$_{22}$ “4 minas (and) 55 (shekels of) gold.”

[63] *ARET* 7.48 (= *MEE* 12.11) o. iii 1–3: šanabi$_x$(ŠA.PI)-la$_2$-1 2-NI ku$_3$-si$_{22}$ ... 2-la$_2$-5 ma-na ku$_3$-si$_{22}$ “39 $^2/_3$ shekels (of) gold ... 1 mina (and) 55 (shekels of) gold.”

[64] *ARET* 7.50 o. ii 2: 3-la$_2$-1 ma-na ku$_3$:babbar “2 minas (and) 59 (shekels of) silver.”

[65] *ARET* 7.63 o. iii 5: 1-la$_2$-1 ½ ma-na ku$_3$-si$_{22}$ “59 (and) ½ shekels (of) gold.”

[66] ARET 7.90 o. i 1: 10-la$_2$-9 ma-na ku$_3$:babbar “9 minas (and) 51 (shekels of) silver.”

[67] ARET 7.94 o. ii 1: 1-la$_2$-1 ½ ma-na ku$_3$:babbar “59 (and) ½ shekels (of) silver.”

[68] *ARET* 14.91 (= *ARET* 8.535 = *MEE* 5.15) o. i 1: 5-la$_2$-3 ma-na ku$_3$-si$_{22}$ “4 minas (and) 57 (shekels of) gold.”

[69] *ARET* 12.858 o. ii’ 1: 3-la$_2$-3 [m]a-na [...] “2 [m]inas (and) 57 (shekels) […]”

[70] *ARET* 14.87 (= *MEE* 12.3) o. vi 14–17: 2-la$_2$-1 ma-na ku$_3$:babbar … 3-la$_2$-5 ma-na ku$_3$:babbar “1 mina (and) 59 (shekels of) silver ... 2 minas (and) 55 (shekels of) silver.”

[71] *ARET* 14.87 (= *MEE* 12.3) r. v 8: 10-la$_2$-1 ma-na ku$_3$:babbar “9 minas (and) 59 (shekels of) silver.”

[72] TM.75.G.1233 o. ii 1:[514] 6-la$_2$-10 6 ma-na ku$_3$:babbar “5 minas and 44 shekels (of) silver.”

[73] TM.75.G.1353 o. v 6:[515] 4-la$_2$-6 ma-na ku$_3$-si$_{22}$ “3 minas and 54 shekels (of) gold.”

[74] TM.75.G.1353 r. iv 1:[516] 1-la$_2$-1½ ma-na ku$_3$-si$_{22}$ “59 (and) ½ shekels (of) gold.”

Some of these documents are connected, such as *ARET* 7.18, *ARET* 8.535 (= *MEE* 5.15), and *MEE* 12.3 and, therefore, can be related to a homogeneous time frame. However, the chronological distribution of this subtractive notation is quite varied. Indeed, it does not refer to a specific period, but it is scattered throughout the lifespan of the Ebla archives:

No.	**Text**	**Chronology**
[55]	*ARET* 1.29 (= *MEE* 7.41)	*phase* II[517]
[56]	*ARET* 1.30 (= *MEE* 7.28)	*phase* II[518]
[57]	*ARET* 3.399	*phase* III / IV(?)[519]

[514] Archi 1981: 145–154

[515] Milano 1980a: 12–15.

[516] Milano 1980a: 12–15.

[517] Archi 1985: 180.

[518] Archi 1985: 187.

[519] See *ARET* 3.399 o.? i' 3’–4’: *en-na-il* / lu$_2$ *ša-u$_3$-um*; *ARET* 20.19 r. xiii 7 *en-na-ni-il* / lu$_2$ *ša-u$_3$-um i.e.*, pertaining to *phase* IV; *ARET* 20.24 o. ix 19–20 *en-na-ni-il* / lu$_2$ *ša-u$_3$-um*; *MEE* 7.34 r. xvii 18’–19’: *en-na-ni-il* / lu$_2$ *ša-u$_3$-um* (corresponding to Yibrium, year 14 in Archi 1996a: 77;

[58]	*ARET*14.79 (= *ARET* 3.763+)	*phase* IV[520]
[59]	*ARET* 4.5	*phase* IV(?)[521]
[60]	*ARET* 7.4	*phase* II(?)[522]
[61]	*ARET* 7.9	*phase* II[523]
[62]	*ARET* 7.18	*phase* IV[524]
[63]	*ARET* 7.48 (= *MEE* 12.11)	*phase* II[525]
[64]	*ARET* 7.50	*phase* ?
[65]	*ARET* 7.63	*phase* IV[526]
[66]	*ARET* 7.90	*phase* ?
[67]	*ARET* 7.94	*phase* ?
[68]	*ARET* 14.91 (= *ARET* 8.535 = *MEE* 5.15)	*phase* IV[527]
[69]	*ARET* 12.858	*phase* IV(?)[528]
[70]	*ARET* 14.87 (= *MEE* 12.3)	*phase* IV[529]
[71]	*ARET* 14.87 (= *MEE* 12.3)	*phase* IV[530]
[72]	TM.75.G.1233[531]	*phase* II (?)

corresponding to Yibrium, year 15 in Archi 2015c: 168, Archi 2000a: 72), *i.e.*, pertaining to *phase* III.

520 Archi 2000a: 44 (corresponding to Yibbiʾ-Ḏikir, year 3), *i.e.*, pertaining to *phase* IV.

521 Biga – Milano 1984: 53.

522 See the presence of the Ebla lugal *ig-na-da-mu* (*ARET* 7.4, *passim*), on which see, *e.g.*, Archi 2002a: 101 "The first section of this document records expenditures by the palace. It seems that the administration reimburses expenses incurred by one of its officials during a journey to Mari. Igna-damu, the UL.KI, was a "lord," lugal, in the period preceding minister Arrukum."

523 Archi 2016: 8.

524 See the presence of the PNs *na-zu-mu* and *iš-ma*$_2$*-da-mu*, often quoted in texts pertaining to *phase* IV. For example, *MEE* 12.35 o. vii 20–21; *MEE* 12.35 o. xiii 5–6.

525 Waetzoldt 2001: 135.

526 This text, together with *ARET* 7.30 and *ARET* 7.31 is to be dated *phase* IV (Gori *in press*).

527 Archi 2015c: 168 (corresponding to Yibrium, year 13).

528 See *ARET* 12.858 r. ii 1'-2' *iš-ma*$_2$-NI / *ma-ri*$_2$^{ki}; *ARET* 20.25 r. vi 4–6: *iš-ma*$_2$-NI / lu$_2$-kar / *ma-ri*$_2$^{ki}. *ARET* 20.25 pertains to *phase* IV.

529 Archi 2011: 47 (corresponding to Yibrium, year 11), *i.e.*, pertaining to *phase* IV.

530 Archi 2011: 47 (corresponding to Yibrium, year 11), *i.e.*, pertaining to *phase* IV.

531 Archi 1981: 145–154.

[73]	TM.75.G.1353[532]	*phase* II (?)
[74]	TM.75.G.1353[533]	*phase* II (?)

Fig. 15 – Chronological chart of the attested subtractive notation between minas and shekels.

This non-trivial notation between minas and shekels is graphically identical to the subtractive notation between coherent units of measure or items. This conceptual difficulty, paired with an anonymous notation, raises issues in some cases for the scribes who perform the calculation; this may lead to notational errors as in [60]. So, although the use of such a subtractive notation likely stems from the scribal need to express a quantity using as little space as possible,[534] on the other hand, the presence of this visual ambiguity makes it difficult to perform the calculation. This type of subtractive notation within different measures is attested not only at Ebla. For example, similar examples are already attested in Mari[535] and Šuruppag.[536] What is surprising in the case of Ebla is the use of a completely ambiguous notation, especially if one considers how Ebla scribes paid greater attention to creating different notational systems within different measurement systems.

Another peculiarity is the unorthodox notation that appears in an accounting of metal and grain allotments, found in L. 2712, where curviform (instead of cuneiform) signs are used to note metal quantities:

> [75] *ARET* 9.106 r. ii 1: 2 ma-na 10 5 giĝ$_4$-DILMUN ku$_3$:babbar "2 minas (and) 15 shekels (of) silver."

[532] Milano 1980a: 12–15.

[533] Milano 1980a: 12–15.

[534] The space the scribe uses to write 4 minas plus 57 shekels exceeds that used to write 5 minas minus 3 shekels.

[535] See, *e.g.*, Charpin 1987, no. 31 o. ii 2–iii 4 (concerning capacity measures).

[536] See, *e.g.*, MVN 10.82 o. i 3 (concerning surface measures).

This notation could be explained by the fact that the scribes who operated L. 2712 were used to recording grain and liquid capacities, rather than metals. This fact could have led to a habit of using curviform numbers by default.

One further issue concerns the writing of minas and shekel fractions within the corpora studied in this dissertation. It is common knowledge that in Ebla texts, fractions of shekels are expressed with horizontal wedges () preceding the sign NI (= *n*-NI).[537] Nonetheless, the element -NI is also used in one peculiar Mari text:

> [76] Charpin 1987, no. 2: 5 še gur 3 a-gar$_{13}$ / 3 še gur *iš i-ti-/aš-tar*$_2$ / 1 a-gar$_{13}$ *in* gegge / 1 ag-ga / -NI / *a-mu-da-ab* / 6 -NI *bu*$_3$*-zu*$_2$*-zu*$_2$ / 3-NI / *sa-ma* / 1-NI / *ga-da-me* / 5 giĝ$_4$ ku$_3$ / šu$_2$-2 -ša<-na>* / 4 giĝ$_4$ / *sa-ma* / 2 giĝ$_4$ / *bu*$_3$*-zu*$_2$*-zu*$_2$ / še / *iš ku-ku*

Cases o. i 1–5 and o. iii 1–2 refer to še, "barley"; cases o. ii 5–10 refer to ku$_3$, "silver." As for cases o. i 7–o. ii 4, Charpin[538] has proposed that these always refer to silver, based on the presence of the sign NI, used in Ebla texts to define fractions of the shekel. Against this hypothesis, however, it is worth noting that ku$_3$ "metal" is not mentioned before o. ii 5, and it is unlikely that this type of commodity is referred to in the preceding cases. One hypothesis would be to read the NI sign (o. i 5, o. i 7, o. ii 1, o. ii 3) as i$_3$, "oil, fat, ghee." Nevertheless, the notations (o. i 5), 3 (o. ii 1) and 1 (o. ii 3) remain to be explained.[539]

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[537] This notation is also employed in one pharmaceutical text, albeit in a context unrelated to weight measures, TM.75.G.1623 o. ii 5–iii 7: mu / u$_2$ / zu$_2$-ku$_5$$^!$(A) / *sa-ša*$^!$(BUR)*-bu*$_3$ / 1 -NI / *ti-ri*$_2$*-šu* / 2 -NI / *wa* / *a ma-i-ḫum* / ta$_3$ / šub "(Its) name (is) «salve (lit.: herb) for a bite»: vegetable latex (or: milk) one third, (and) must, two thid; then, on the wound, apply by smearing" (see the translation in Bonechi 2003: 19; a first edition of the text was given in Fronzaroli 1998).

[538] Charpin 1987: 69 "On sait d'autre part qu'à Ebla, NI sert à noter les fractions de sicle [see Pomponio 1980: 179–182] S'il en est de même ici, 6-NI = 1/6 de sicle et 3-NI = 1/3 de sicle." However, in the Ebla texts, the signs preceding -NI are always horizontal (); here, those in o. i 9 are vertical (); moreover, the writing 1 -NI has no clear meaning.

[539] The notation 6 (o. i 9) would correspond to the numerical notation known for sila$_3$ units.

On the other hand, the sign  also remains unclear,[540] also because an interpretation of the sign as a defective writing for sila$_3$ remains be demonstrated.[541]

Shekel's fractions—later known as "little minas"[542]—are attested in Šuruppag as NINDA$_2$×ŠE+*n*.[543] The origin of this unit of measure is debated,[544] although his connection with the "N-system" of the Uruk period is quite straightforward (see also the discussion in Chapter 4).[545]

> [77] FTP 98 o. v 2:[546] ku$_3$ NINDA$_2$×ŠE+2D "2 little minas of silver."
>
> [78] RTC 14 o. v 5: 1D ku$_3$ giĝ$_4$ NINDA$_2$×ŠE+D-ma-na "$^1/_3$ shekel (*i.e.*, little mina of silver)."

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[540] See Charpin 1987: 69 "Le premier signe n'est pas PAP."

[541] It seems difficult to think of a defective writing for sila$_3$ (*i.e.*, without the vertical wedge).

[542] Bartash 2019: 90 "We know that their Sargonic successors were called ma-na-tur 'little mina' and še 'barleycorn.'" It has a value of 2.77 g (Bartash 2019: 74).

[543] Indeed, two of the first attestations of NINDA$_2$×ŠE+*n* come from Šuruppag (Bartash 2019: 79). Another early attestation possibly comes from Uruk (UVB 10: 13 pl. 26b o. i 4; cf. Krebernik 1998: 243, no. 73). During ED IIIa, the writing NINDA$_2$×ŠE+1D ma-na was the only means of expressing "one-third shekel," which will be later replaced by igi-3-ĝal$_2$, starting from the ED IIIb onward, whereas the writing NINDA$_2$×ŠE+2D continues to be attested for all the Pre-Sargonic Period (Bartash 2019: 79–80).

[544] The case of the grapheme NINDA$_2$ × ŠE + *n* and the metrological units hiding behind it is one of the most intricate in the discussion of the Sumerian system of weight measures. See the full discussion in Bartash 2019: 83–89 (see also Powell 1971: 217; Powell 1979: 98; Friberg 1999: 133; Friberg 2005: 4; Friberg 2007: 427).

[545] Bartash 2019: 74.

[546] The fraction does not present the element -ma-na, unlike the fraction $^1/_3$ (see Krebernik 1998: 305).

Whereas shekel fractions show little correspondence within these corpora, for mina fractions one can appreciate a greater correspondence between Šuruppag ([79], [80], and [81]),[547] Mari ([76] and [82]), and Ebla ([46], [169], and [83]).[548]

[79] Visicato – Westenholz 2002: 1–4 o. i 1: 6 (and) $^{2}/_{3}$ uruda ma-na "6 $^{2}/_{3}$ minas (of) copper."

[80] SF 20 o. v 22–vi 1:[549] 1 uruda ma-na / 2 ša$_4$(DU)-na-bi uruda / ½ uruda ma-na / šu$_2$-1 -ša$_4$(DU)-na uruda "1 mina (of) copper, $^{2}/_{3}$ (mina of) copper, ½ mina (of) copper, $^{1}/_{3}$ (mina of) copper."

[81] *CT* 50.9 o. ii 6: 5 ½ uruda <ma>-na "5 (and) ½ minas (of) copper."

[82] Cavigneaux 2014, no. 10 o. ii 1: [šu$_2$-1+]1 -ša-na ku$_3$:babbar "$^{1}/_{3}$ (mina of) silver."

[83] *ARET* 1.30 (*MEE* 7.28) r. v 1: 3 ma-na TAR ku$_3$:babbar "3 (and) ½ minas (of) silver."

Fractional Value	**Šuruppag**	**Mari**	**Ebla**
$^{2}/_{3}$	2 ša$_4$(DU)-na-bi	-	šanabi$_x$(ŠA.PI)
$^{1}/_{2}$	;	-	TAR;
$^{1}/_{3}$	šu$_2$-1 -ša$_4$(DU)-na	šu$_2$-2 -ša-na	šušana$_x$(ŠU$_2$+ŠA)

Fig. 16 – Mina fractions in Ebla, Mari and Šuruppag.

[547] See, however, a different notation in [79]: 6 $^{2}/_{3}$ uruda ma-na "6 $^{2}/_{3}$ minas (of) copper."

[548] In Šuruppag, one may observe how the term ma-na is missing from the fractions $^{1}/_{3}$ and $^{2}/_{3}$ in instances when no whole mina value is indicated (Bartash 2019: 46, and fn. 136). The same happens for Mari as well. In Ebla, these fractional values are often associated with shekels (see above). The same happens in the Umma version of the EDPV-B.

[549] Šuruppag version of the EDPV-B. See the edition in Bartash 2019: 45.

One last issue pertains to the use of weight measures for the accounting of wool and textiles. Indeed, although metal quantities are the most common weighed items, in the Ancient Near Eastern documentation, the practice of weighting wool and textiles is also quite widespread.[550] The Ebla corpus has its own way of accounting wool (2.2.6.), although it remains uncertain whether the weight system rooted in minas and shekels was also used at Mari to measure quantities of wool. In fact, Pre-Sargonic Mari texts yield only one attestation concerning wool—in which, notably, wool is not measured by weight:

> [84] Cavigneaux 2014, no. 2: 1 U$_2$ GU$_2$ siki sa$_6$ / ˹x˺ [x (x)] / 1 U$_2$ GU$_2$ [siki] / *bu*$_3$*-r*[*a*$^?$-...] / 1 U$_2$ GU$_2$ siki / *bu*$_3$*-ri*$_2$*-za*? [x?] / *blank* / *blank* / *blank* / [...]-*zu-um* / [iti] ˹x˺ SAG / [n +] ˹6 ˺ mu "1 ... (of) good quality wool, [...], 1 ... [(of) wool], 1 ... (of) wool (to/from) PN [...]-PN?"

The spelling U$_2$ GU$_2$ remains to be clarified, although perhaps it refers to a finished product.[551] Although it is not possible to know whether the wool was measured by weight, it likely was, given comparison with later Mari texts.[552] As for contemporary Nabada texts, only in [49] is the unit ma-na attested as a measure of weight for wool. The context remains unclear, as ma-na and/or capacity measures are listed with the personal names[553]:

> [49] Subartu 2.66 o. i 1–4: siki / *tab-la-*˹*a-lim*˺ / [(x)] / 6 ma-na "Wool (of) PN ... 6 minas ..."

In Šuruppag, wool and textiles quantities are accounted using weight measures, as in:

> [85] TSŠ 411 o. i 1: 420 40 siki ma-na "460 wool minas."

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[550] On this topic, see Bartash 2019: 215–221.

[551] Cavigneaux 2014: 295.

[552] See, *e.g.*, *ARM* 23.583 3: 9 MA.NA SIG$_2$ SAG.

[553] Sallaberger (1996b: 82) suggests the possibility that this notation may imply a partial compensation in barley(?) for the wool.

[86] Steible – Yıldız 1996: 149–159 o. ii 2: 5 tu$_9$ ma-na “5 textiles minas.”

In the context of units of measurement within the weight system, such as the shekel and the mina, their presence is widespread across all the corpora examined in this dissertation. However, they exhibit a complex array of points of convergence and divergence. These aspects serve as diagnostic elements of significant relevance, as they allow for the elucidation of transmission mechanisms, as seen in the case of the “DILMUN” shekel or the nomenclature of mina fractions. Simultaneously, unique features and differences also come to light, such as the distinctive subtractive notation between the mina and shekel units in Ebla, or the substantial disparity in the nomenclature of shekel fractions, together with the discontinuity in the use of this measurement system to account for quantities of wool and textiles.

2.2.4. Capacity measures

This section deals with capacity measures both for dry and liquid products. Data on the topic are provided by all corpora (*i.e.*, Ebla, Mari, Nabada, Šuruppag, and Tell Abū Ṣalābīḫ).

2.2.4.1. Ebla (Tell Mardīkh)

<u>Selected bibliography</u>[554]: Brugnatelli 1990; Chambon 2004; Chambon 2011: 50–58, and *passim*; Fronzaroli 1980: 39–40; Milano 1987a, *passim*; Milano 1990a: 323–352; Milano 1996, *passim*.

<u>Units of measure:</u>

(D)[555] *GU*$_2$-*BAR*[556]; *ba-ri*$_2$-*zu*[557]; TUN$_3$[558]; niĝ$_2$-saĝšu[559]; *an-zam*$_x$(LAK 340).[560]

(L)[561] la-ḫa[562]; dug[563]; dar-ab$_2$[564]; sila$_3$; *an-zam*$_x$(LAK 340).

554 Specific references are discussed below.

555 D = Capacity measurements for dry products. Concerning exceptions regarding the division of units by liquid or solid products, see below.

556 On *GU*$_2$-*BAR*, see the discussion in Chambon 2011: 50–51, fn. 147. The writing *GU*$_2$-*BAR* for *kubārum* is translated as *k.*-measure.

557 Chambon 2011: 50; Milano 1990a: 350. The writing *ba-ri*$_2$-*zu* for *parīsu* is translated as *p.*-measure.

558 Chambon 2011: 51, fn. 148.

559 Chambon 2004.

560 Chambon 2011: 51–52, fn. 150. See the lexical entry VE 788 *an-zam*$_x$(LAK 340) = *a-za-mu-mu* (A) /*ansammum*/. See further in Gelb 1957: 54, Catagnoti – Lahlouh 2006: 516, Krebernik 1982: 30. See also Pasquali 2005: 41 the *an-zam*$_x$(LAK 340) container, sometimes fitted with a lid (pad), must have had a capacity of 1/6 of sila$_3$.

561 L= Capacity measurements for liquid products. Concerning exceptions regarding the division of units by liquid or solid products, see below.

562 On la-ḫa, see Milano 1987b: 529, Sallaberger 1996d.

563 Milano 1990a: 351 "Tra le misure per i liquidi (olio, vino, birra) è di impiego frequente anche la «giara» (dug), la cui capacità doveva essere variabile. Un testo specifica infatti che per 70 giare d'olio si è utilizzata la giara pari a 20 sìla: 70 dug *ša-ti* 20 sìla (dunque 1 dug = $^2/_3$ la-ḫa)."

564 See *VE* 935 dar-ab$_2$ = *zi-ru*$_{12}$-*um*. Generally, it appears as a container for the beverage ŠE+TIN in texts listing various amounts of the product from which this beverage is apparently derived, *i.e.*, ĜEŠGAL-tidab (MUNU$_4$.LU$_2$). Only a total for the amounts of ĜEŠGAL-tidab is provided in these cases. Because the ratios between la-ḫa-measures of ĜEŠGAL-tidab and dar-ab$_2$-measures of ŠE+TIN are different every time, no conclusion can be drawn about the value of the dar-ab$_2$ (see, *e.g.*, *ARET* 9.60 and *ARET* 9.61).

Ratio of the measurement systems[565]:

D1[566] 1 *GU*$_2$-*BAR* = 20 niĝ$_2$-saĝšu = 120 *an-zam*$_x$(LAK 340)

GU$_2$-*BAR*	1				
ba-ri$_2$-*zu*	2	1			
TUN$_3$	5	2 ½	1		
niĝ$_2$-saĝšu	20	10	4	1	
an-zam$_x$(LAK 340)	120	60	24	6	1

D2[567] 1 *GU*$_2$-*BAR* = 24 niĝ$_2$-saĝšu = 120 *an-zam*$_x$(LAK 340)[568]

GU$_2$-*BAR*	1				
ba-ri$_2$-*zu*	2	1			
TUN$_3$	6	3	1		
niĝ$_2$-saĝšu	24	12	4	1	
an-zam$_x$(LAK 340)	120	60	20	5	1

D3[569] 1 *ba-ri*$_2$-*zu* = 50 *an-zam*$_x$(LAK 340)

ba-ri$_2$-*zu*	1

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[565] According to Chambon (2011: 51–52, fn. 150), the use of D1 or D2 (*ibid*, C1 and C2) reveals two different ways of filling the same capacity standards, which correspond to the names of containers (*i.e.*, units of measures). In D1 the containers are filled up to total of their capacity, and in D2 up to 5/6 of their capacity. The choice may depend on the social rank of the recipients and practical constraints. Indeed, the relationship between the smallest unit, *an-zam*$_x$(LAK 340), and the bigger one, *GU*$_2$-*BAR*, is always the same; only the ratio between *k*.- and n.-measures changes. The nomenclature of each measure is maintained, although the absolute value of each measure changes.

[566] Texts written according to D1 are the most numerous.

[567] In *ARET* 9.15, there is an explicit reference to D2, where at the end of an account, the phrase *ba-ri*$_2$-*zu* 12 niĝ$_2$-saĝšu, "1 *p*.-measure (equals) 12 n.-measure" is added at the end of the text (r. ii 1–2). This precisely demonstrates the exceptional use of this ratio between units of measure. However, D2 is undoubtedly attested in other Eblaite documents, particularly those referring to quantities of grain for sowing, *e.g.*, TM.76.G.188 (Milano 1987a: 181–182).

[568] Milano 1990a: 349 suggests a different ratio, *i.e.*, 144 an-zam$_x$(LAK 340) = 1 *GU*$_2$-*BAR*.

[569] As regards D3 (*ibid.* C3), according to Chambon (2011: 131–133) it could be attested in the text *ARET* 2.51 with reference to the last section *ARET* 2.51 r. ii 3: 2 ½ še *ba-ri*$_2$-*zu* ku$_2$ 5 guruš 1 niĝ$_2$-saĝšu "2 (and) ½ *p*.-measure (of) barley (are the) food for 5 men, 1 niĝ$_2$-saĝšu-measure each."

niĝ$_2$-saĝšu	10	1			
an-zam$_x$(LAK 340)	50	5	1		

L	1 la-ḫa = 180 *an-zam*$_x$(LAK 340)				
la-ḫa	1				
dug	1 ½	1			
dar-ab$_2$	2	1			
sila$_3$	30	20	10	1	
an-zam$_x$(LAK 340)	180	120	60	6	1

<u>Notational system (type of signs used):</u>

(D) *GU$_2$-BAR*

LEXICAL: *MI*<-*AT*> (100)[570]; *LI*<-*IM*> (1,000)[571]; *RI$_2$-BAB* (10,000)[572]; *MA-I-AT* (100,000)[573]; *MA-ḪU-AT* (1,000,000$^?$)[574]

CURVIFORM: (½)[575]; (1)[576]; (10)[577]

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS)[578]: ($^1/_5$, $^1/_6$); (¼); (¼); ($^2/_5$, $^2/_6$); ($^3/_5$, $^3/_6$); ($^4/_5$, $^4/_6$)

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[570] See, *e.g.*, [87].

[571] See, *e.g.*, [87].

[572] See, *e.g.*, *MEE* 7 8 r. I 1.

[573] See, *e.g.*, *MEE* 7 8 r. i 1.

[574] See, *e.g.*, TM.82.G.267 o. i 1–ii 1 (Archi 1993b: 4–5). As for *MA-ḪU-AT* = 1,000,000$^?$, see Bonechi 2021.

[575] Referred to *GU$_2$-BAR*, *i.e.*, indicating the value of a *ba-ri$_2$-zu* (= ½ *GU$_2$-BAR*). See, *e.g.*, *ARET* 2.51 r. ii 3.

[576] See, *e.g.*, *ARET* 9.68 o. vi 2.

[577] See, *e.g.*, *ARET* 9.8 o. v 1.

[578] The alternating values $^1/_5$, $^1/_6$, etc. depend on the capacity level of the container (D1 *vs* D2), as explained in Chambon 2011: 53, 56–58. In *ARET* 9.15 and *ARET* 9.57, the *GU$_2$-BAR* fractions ($^1/_5$; $^1/_6$); ($^2/_5$; $^2/_6$); ($^3/_5$; $^3/_6$); ($^4/_5$; $^4/_6$) appear together with the sign TUK. On this topic, see Milano 1990a: 174 "Quanto al significato, le espressioni TUK e šu ba$_4$-ti non si escludono a vicenda, come ci si aspetterebbe. Ci si può chiedere se TUK non sia qui un indicatore numerico che determina il significato della frazione." In this sense, it could be functionally related to the sign NI, which, for its part, functions as an indicator of shekel fractions. Elsewhere, TUK is attested in *ARET* 7.141 r. iii 2:

CUNEIFORM: ($^1/_6$)[579]; ($^1/_5$); (¼)

(D) *ba-ri$_2$-zu*

LEXICAL: niĝ$_2$-a$_2$-ĝa$_2$-2 (½)[580]

CURVIFORM: (1)[581]; (1)[582]

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (½)[583]; (½)[584]

CUNEIFORM: (½)[585]; (1 ¼)[586]

(D) TUN$_3$

CURVIFORM: (1)[587]; (1)[588]

CUNEIFORM: (1)[589]; (1?)[590]; (2?)[591]

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5 an-na TUK šum. However, the editor (Archi 1988: 159) does not translate it, nor is the context connected to those of *ARET* 9.15 and *ARET* 9.57.

[579] As in *ARET* 9.5 o. i 1 (see the discussion in Chambon 2011: 55).

[580] As for fractions, one should note the case of the Sumerian expression niĝ$_2$-a$_2$-ĝa$_2$-2, which corresponds to "one half (of one *ba-ri$_2$-zu*)," as in *ARET* 9.42 r. iv 1–8, *ARET* 9.13 r. iv 4–9 and *ARET* 9.14 r. iv 13–v 8. On niĝ$_2$-a$_2$-ĝa$_2$-*n*, see below.

[581] Horizontal units represent the standard notation, as in [87].

[582] When the *GU$_2$-BAR* measures are missing, the horizontal curviform represents the *ba-ri$_2$-zu*. Such attestation pertains to D3, in which the *ba-ri$_2$-zu* is the bigger measure (Chambon 2011: 52). It is clear how in this system, the *ba-ri$_2$-zu* takes the place of the *GU$_2$-BAR* as the greater scale unit and, therefore, its notational style, as in *ARET* 2.51 r. ii 3.

[583] See the hapax *ARET* 9.13 o. iii 6. Here the sign is used to avoid an ambiguity with ½, which corresponds to ⅙ in this same text (Chambon 2011: 52).

[584] See, *e.g.*, *ARET* 9.32 o. iii 7. This variant is used when a quantity is expressed in both units, *GU$_2$-BAR* and *ba-ri$_2$-zu*, or when the latter is not explicitly mentioned (Chambon 2011: 52).

[585] See, *e.g.*, *ARET* 9.49 o. i 3. This variant is used when the expression does not include the *GU$_2$-BAR* unit—which is, however, mentioned (Chambon 2011: 52).

[586] This sign is attested only in *ARET* 9.37 o. ii 4 and *ARET* 9.108 o. i 1.

[587] See, *e.g.*, *ARET* 9.49 o. ii 1.

[588] See, *e.g.*, *ARET* 9.38 o. iii 1.

[589] See, *e.g.*, *ARET* 9.48 o. i 9.

[590] As in *ARET* 9.16 r. ii 1 (see the discussion in Chambon 2011: 54, with literature).

[591] As in *ARET* 9.20 o. ii 2 (see the discussion in Chambon 2011: 54, with literature).

(D) niĝ$_2$-saĝšu

CURVIFORM:  (1)[592];  (1)[593]

CUNEIFORM:  (1)[594]

(D, L) an-zam$_x$(LAK 340)

CUNEIFORM: (1)[595]

(L) la-ḫa

LEXICAL: *MI*<-*AT*> (100)[596]; *LI*<-*IM*> (1,000)[597];

CURVIFORM:  (1)[598];  (1)[599]

(L) dug

CURVIFORM:  (1)[600];  (1)[601]

(L) dar-ab$_2$

CURVIFORM:  (1)[602]

(L) sila$_3$

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592 See, *e.g.*, *ARET* 9.10 o. i 7.

593 See, *e.g.*, *ARET* 9.68 r. i 1.

594 See, *e.g.*, *ARET* 9.68 o. vi 2.

595 See, *e.g.*, *ARET* 9.68 o. vi 2 (A) and *ARET* 9.81 r. ii 5 (L).

596 See, *e.g.*, *ARET* 2.20 o. iii 2.

597 See, *e.g.*, *ARET* 2.20 o. iii 2.

598 See, *e.g.*, *ARET* 9.61 o. iv 9.

599 See, *e.g.*, *ARET* 9.61 o. iv 9.

600 See, *e.g.*, *ARET* 2.91 o. i 3.

601 See, *e.g.*, *ARET* 9.14 r. i 10.

602 See, *e.g.*, *ARET* 14.59a (= *ARET* 2.13 = *MEE* 10.40) o. v 5. The dar-ab$_2$ measures appear only in first and third positions when listed with other measures in the same case; therefore, there is no need to use the numeral.

CURVIFORM: (1)[603]; (10)[604]; (60)[605]

CUNEIFORM: (1)[606]

<u>Notational phrase:</u>

The notational phrase has a cumulative additive structure [87]. In some instances [88], subtractive notation is attested.

> [87] *ARET* 2.17 (= *MEE* 7.19) r. iii 4: šu-niĝen$_2$ 2-*LI*<-*IM*> 6- *MI*<-*AT*> še *GU$_2$-BAR* "Grand Total: 2600 *k*.- measures (of) barley."

> [88] *ARET* 9.23 r. iv 1: 10-la$_2$-2 zi$_3$ *GU$_2$-BAR* "8 *k*.- measures (of) flour."

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[603] See, *e.g.*, *ARET* 9.94 o. iv 4.

[604] See, *e.g.*, *ARET* 9.94 o. iv 1.

[605] See, *e.g.*, *ARET* 9.94 o. iv 4.

[606] See, *e.g.*, *ARET* 9.75 o. i 4.

2.2.4.2. Mari (Tell Harīrī)

Selected bibliography[607]: Chambon 2011: 63–66, and *passim*; Charpin 1987: 91–92; Colonna d'Istria 2009: 326–331; Powell 1987–1990: 494–497; Sallaberger 1996b: 82–84.

Units of measure:

a-gar$_{3/13}$[608]; gur; bariga; ban$_{2}$; sila$_{3}$; giĝ$_{4}$:DILMUN.[609]

Ratio of the measurement system:

a-gar$_{3/13}$	1					
gur	10	1				
bariga?	100	10	1			
ban$_{2}$?	600	60	10	1		
sila$_{3}$	6,000	600	60	10	1	
giĝ$_{4}$:DILMUN	360,000	36,000	3,600	600	60	1

Notational system (type of signs used):

a-gar$_{3/13}$

CURVIFORM: (1)[610]

gur

LEXICAL (WITH INTERPOLATION OF CURVIFORM ELEMENTS): ŠU$_{2}$-2-ŠA-na ($^{1}/_{3}$)[611]; TAR (½?)[612]

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[607] Specific references are discussed below.

[608] On the alternation of the two spellings, see below.

[609] This unit of measure is attested in Cavigneaux 2014, no. 15 o. ii' 1–2: 4 ir$_{11}$ 2 sila$_{3}$ inda$_{3}$ 3 sila$_{3}$ inda$_{3}$ AŠ.TAG / -la$_{2}$-6 giĝ$_{4}$:DILMUN inda$_{3}$ "4 servants, 2 sila$_{3}$ of bread, 3 sila$_{3}$ of AŠ.TAG bread, minus 5 giĝ$_{4}$:DILMUN measures of bread." For the interpretation of giĝ$_{4}$:DILMUN as submultiple of the sila$_{3}$, see also Cavigneaux 2014: 302.

[610] See, *e.g.*, Charpin 1987, no. 21 o. iii 3.

[611] See, *e.g.*, Cavigneaux 2014, no. 16 o. ii 1'.

[612] See, *e.g.*, Cavigneaux 2014, no. 14 o. iii 3'. See further in the discussion below.

CURVIFORM: (1)[613]; (10)[614]

bariga$^?$

CURVIFORM: (1)[615]

(ban$_2$)

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): ($^1/_6$)[616]; ($^2/_6$)[617]; ($^3/_6$)[618]; ($^4/_6$)[619]; ($^5/_6$)[620]

sila$_3$[621]

CUNEIFORM: (1)[622]; (1)[623]

giĝ$_4$:DILMUN

CUNEIFORM: (1)[624]

<u>Notational phrase:</u>

The notational phrase has a cumulative additive structure [89]. In some instances [90], subtractive notation is attested.

> [89] Charpin 1987, no. 4 o. i 4: 3 še gur "3 g.-measure of barley."

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613 See, *e.g.*, [89].

614 See, *e.g.*, Cavigneaux 2014, no. 26 o. ii 3.

615 See, *e.g.*, Charpin 1987, no. 23 r. i 3.

616 See, *e.g.*, Charpin 1987, no. 33 o. i 1.

617 See, *e.g.*, Cavigneaux 2014, no. 13 o. ii 2'.

618 See, *e.g.*, Cavigneaux 2014, no. 12 o. i 1.

619 See, *e.g.*, Cavigneaux 2014, no. 12 o. i 3.

620 Attested only in Charpin 1987, no. 23 o. i 1.

621 Read through its Akkadian equivalent *qa* by Charpin 1987, *e.g.*, on p. 91.

622 See, *e.g.*, Cavigneaux 2014, no. 16 o. ii 1'.

623 See, *e.g.*, Charpin 1987, no. 23 r. i 3.

624 To my knowledge, the only attestation is Cavigneaux 2014, no. 15 o. ii' 2.

[90] Cavigneaux 2014, no. 15 o. ii 2: la_2-5  $gi\hat{g}_4$:DILMUN $inda_3$ “*n*-5 $gi\hat{g}_4$:DILMUN-measures of bread.”

2.2.4.3. Nabada (Tell Beydar)

<u>Selected bibliography[625]:</u> Chambon 2011: 61–63, 65–66, and *passim*; Sallaberger 1996b; Sallaberger 1996c; Colonna d'Istria 2009: 329, 334.

<u>Units of measure:</u>

li-im; *mi-at*; gur; bariga; ban$_2$; sila$_3$

<u>Ratio of the measurement system:</u>

li-im	1					
mi-at	10	1				
gur	100	10	1			
bariga$^?$	1,000	100	10	1		
ban$_2$$^?$	6,000	600	60	6	1	
sila$_3$	60,000	6,000	600	60	10	1

<u>Notational system (type of signs used):</u>

li-im

CURVIFORM: (1)[626]

mi-at

CURVIFORM: (1)[627]

gur

CURVIFORM: (1)[628]

bariga$^?$

[625] Specific references are discussed below.

[626] See, *e.g.*, *Subartu* 2.49 o. i 2.

[627] See, *e.g.*, *Subartu* 2.49 o. i 3.

[628] See, *e.g.*, *Subartu* 2.54 o. i 3.

CURVIFORM: (1)[629]

ban$_2$?

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): ($^{1}/_{6}$)[630]; ($^{2}/_{6}$)[631]; ($^{3}/_{6}$)[632]; ($^{4}/_{6}$)[633]; ($^{5}/_{6}$)[634]

sila$_3$

CURVIFORM: (1)[635]

CUNEIFORM: (1)[636]

<u>Notational phrase:</u>

The notational phrase has a cumulative additive structure [91]. In some instances [92], subtractive notation is attested.

> [91] *Subartu* 2.23 o. i 3: *ga-ga* 2 EREN$_2$ 1 $^{4}/_{6}$ "PN: 2 donkeys, 1 (and) $^{4}/_{6}$ (g.-measure)."

> [92] *Subartu* 2.109 o. i 5: *šu* ḪAR-*da-nu* 10-la$_2$-2 "of PN, 8 (g.-measures)."

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[629] See, *e.g.*, *Subartu* 2.54 o. i 4.

[630] See, *e.g.*, *Subartu* 2.57 o. ii 1.

[631] See, *e.g.*, *Subartu* 2.54 o. i 5.

[632] See, *e.g.*, *Subartu* 2.68 o. ii 1.

[633] See, *e.g.*, *Subartu* 2.72 o. i 4.

[634] See, *e.g.*, *Subartu* 2.115 o. i 2.

[635] The only two examples are *Subartu* 2.143 r. i 1 and *Subartu* 2.145 r. i 1

[636] See, *e.g.*, *Subartu* 2.23 o. ii 3.

2.2.4.4. Šuruppag (Tell Fāra)

Selected bibliography[637]: Krebernik 1998: 305; Martin *et alii* 2001: 125–130; Powell 1987–1990.

Units of measure:

(1) $guru_7$[638]; gur-maḫ[639]; gur[640]; bariga; ban_2; $sila_3$

(2) lid_2-ga[641]; bariga; ban_2; $sila_3$

Ratio of the measurement system:

(1)

$guru_7$	1					
gur-maḫ	2.400	1				
gur	4,800	2	1			
bariga	19,200	8	4	1		
ban_2	115,200	48	24	6	1	
$sila_3$	1,152,000	480	240	60	10	1

(2)

[637] Specific references are discussed below.

[638] Powell 1987–1990: 495, with literature "The 'granary' ($guru_7$) has an unusual structure (1 152 000 sìla) that has raised doubts about its existence [...] but it is probably to be explained as 1 gur-maḫ × 1 lid_2-ga × 10 = (2 × 240) × 240 × 10 sìla = 2 × $(4,0)^2$ × 10, a structure that facilitates both sexagesimal and decimal counting and calculation."

[639] Powell 1987–1990: 495 "The sizes of larger units of the dry capacity system seem to have been determined by agricultural factors. The lidga, identical in structure (and probably in size) with the standard gur saĝĝal, contains the seed needed for 1 bur of land; its doublet, the 'greater gur' (gur-maḫ), contains the seed and feed needed to sow 1 bur."

[640] Powell 1987–1990: 493 "In Fāra texts is first explicitly attested the large capacity unit gur (here so named for brevity but actually called by various names and qualifications) [...] This gur was the most widely used large capacity unit down into the Akkad period, when it began to be replaced by the Akkad gur of 300 sìla (structural difference: Fāra gur = 4 bariga; Akkad gur = 5 bariga)."

[641] Powell 1987–1990: 494, with literature "The unit lidga is possibly an Akkadian loanword: < **litk* + *a*, 'true / standard measure,' which agrees with other evidence for Semitic influence at Fāra."

lid$_2$-ga[642]	4,800	2	1			
bariga	19,200	8	4	1		
ban$_2$	115,200	48	24	6	1	
sila$_3$	1,152,000	480	240	60	10	1

<u>Notational system (type of signs used):</u>

guru$_7$

CURVIFORM: (1)[643]

gur-maḫ

CURVIFORM: ($^1/_2$)[644]; (1)[645]; (10)[646]; (60)[647]; (600)[648]

CUNEIFORM: ($^1/_2$)[649]

gur

CURVIFORM: ($^1/_2$?)[650]; (1)[651]; (10)[652]; (60)[653]; (600)[654]; (3600);[655] (36,000)[656]

lid$_2$-ga

[642] Krebernik 1998: 304 “Wie ersichtlich, konkurrieren ab gur bzw. lid$_2$-ga zwei Systeme miteinender, die sich durch den Wert des gur unterscheiden.”

[643] See, *e.g.*, TSŠ 50 o. i 1.

[644] See, *e.g.*, WF 90 (= EDATŠ no. 61) o. i 1.

[645] See, *e.g.*, WF 83 o. i 1.

[646] See, *e.g.*, WF 65 (= EDATŠ no. 2) r. vi 6.

[647] See, *e.g.*, WF 85 (= EDATŠ no. 40) o. i 1.

[648] See, *e.g.*, TSŠ 442 (= EDATŠ no. 41) o. i 1.

[649] See, *e.g.*, WF 61 (= EDATŠ no. 16) r. iii.

[650] See, *e.g.*, WF 84 (= EDATŠ no. 38) o. iii 4.

[651] See, *e.g.*, WF 84 (= EDATŠ no. 38) o. iii 4.

[652] See, *e.g.*, TSŠ 58 (= EDATŠ no. 18) r. vii.

[653] See, *e.g.*, WF 84 (= EDATŠ no. 38) o. i 1.

[654] See, *e.g.*, TSŠ 247 r. i 1.

[655] See, *e.g.*, TSŠ 50 o. i 1.

[656] See, *e.g.*, TSŠ 50 o. i 1.

CURVIFORM:  (1)[657];  (10)[658];  (60)[659]

CUNEIFORM:  (1)[660];  (1)[661];  (1)[662];  (10)[663]

bariga[664]

CURVIFORM:  (1)[665]

ban$_2$

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS):  ($^{1}/_{6}$)[666];  ($^{2}/_{6}$)[667];  ($^{3}/_{6}$)[668];  ($^{4}/_{6}$)[669];  ($^{5}/_{6}$)[670]

sila$_3$

CURVIFORM:  (1)[671]

CUNEIFORM:  (1)[672];  (1)[673]

<u>Notational phrase:</u>

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[657] See, *e.g.*, *CUSAS* 11.344 o. ii 2.

[658] See, *e.g.*, *CUSAS* 11.344 r. iii 1.

[659] See, *e.g.*, TSŠ 78 (= EDATŠ no. 46) r. ii 1.

[660] See, *e.g.*, *CT* 50.8 o. ii 3.

[661] See, *e.g.*, TSŠ 483 o. i 5.

[662] See, *e.g.*, TSŠ 483 o. i 1.

[663] See, *e.g.*, TSŠ 483 o. i 5.

[664] Amount of bariga sometimes exceeding the value of 6 as in FTP 52 o. I 1: 7 dumu-nun-šita "7 bariga-measures (to) PN" (Krebernik 1998: 304, fn. 700).

[665] See, *e.g.*, FTP 108 r. ii 3.

[666] See, *e.g.*, Visicato – Westenholz 2000: 1117–1119 (n. 4) o. iv 6.

[667] See, *e.g.*, Visicato – Westenholz 2002: 1–4 o. ii 2.

[668] See, *e.g.*, FTP 108 r. ii 3.

[669] See, *e.g.*, FTP 36 o. ii 1.

[670] See, *e.g.*, FTP 52 o. i 1. The sign  ($^{6}/_{6}$) in TSŠ 209 o. i 1 is probably to be emended as $^{5}/_{6}$ (Krebernik 1998: 304, fn. 699).

[671] See, *e.g.*, [98].

[672] See, *e.g.*, WF 115 r. ii 3.

[673] See, *e.g.*, FTP 65 o. i 1.

The notational phrase has a cumulative additive structure [93]. In some instances [94], subtractive notation is attested.

[93] FTP 67 o. i 1: 1 $^{3}/_{5}$ kaš sila$_3$ “1 (and) $^{3}/_{5}$ s.-measures (of) beer.”

[94] FTP 68 o. i 1: 10-la$_2$-1 kaš sila$_3$ “9 s.-measures (of) beer.”

2.2.4.5. Tell Abū Ṣalābīḫ

Selected bibliography[674]: Krebernik 1998: 305; Powell 1987–1990.

Units of measure[675]:

gur; bariga

Ratio of the measurement system:

gur	1	
bariga	4	1

Notational system (type of signs used):

gur

CURVIFORM  (600)[676];  (60)[677];  (10)[678];  (1)[679]

bariga

CURVIFORM: (1).[680]

Notational phrase:

The notational phrase has a cumulative additive structure [95]. No subtractive notation is attested.

[95] IAS 494 o. ii 3 10 2 še gur "12 g.-measures (of) barley."

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[674] Specific references are discussed below.

[675] The capacity measures at Tell Abū Ṣalābīḫ likely work in the same way as those at Šuruppag.

[676] The sign appears only in IAS 495 r. i 5'.

[677] See, *e.g.*, IAS 494 r. ii 1.

[678] See, *e.g.*, IAS 494 o. iii 1.

[679] See, *e.g.*, [95].

[680] See, *e.g.*, FTP 494 o. ii 4.

2.2.4.6. General discussion

In the Ancient Near East, capacity measures were employed for quantifying both liquids and arids, such as grains, bread,[681] flour, beer, and oil. Modern understanding of such capacity measures, like weight measures, is based on both textual and archaeological sources. Textual sources provide invaluable insights into the interrelations between different units of measurement and the operational mechanisms of the capacity system; these sources encompass calculations and conversions that facilitate the decipherment of these aspects. Vessels and containers, with roles analogous to that of stones for weight measures, furnish information about capacity measures and the absolute value associated with them. However, unlike the weight system, which exhibits widespread use of the concepts of mina and shekel throughout the Near East, the capacity system exhibits greater variability in terms of the nomenclature assigned to individual units of measurement, particularly within the Syrian area. This difference can be attributed to the need to transport and exchange metals (measured in terms of weight) over long distances, whereas the distribution of grains (measured in terms of capacity) takes place mainly within local contexts or over shorter distances. This reality leads to greater standardization on the one hand and greater local variability on the other. Furthermore, it can be observed that in Mesopotamia, the capacity system retains a certain level of rigidity over time as well as a strong interconnection with other measures, including length, area, and volume.[682] This evidence underscores the strength of the measurement system, which exhibits a high degree of integration within the administrative practice. However, these features do not emerge from the textual evidence found in Ebla, Mari, and Nabada. In fact, these sites reveal highly

[681] Bread and other prepared solids may have measured while still in a semi-solid form—that is, a form that can be measured by a capacity standard, such as dough. These attestations concerning the measurement of bread clearly refer to the product and not to the flour or cereals needed to produce it (see Milano 1990a: 330).

[682] These links, as shown by Powell 1987–1990: 477–478, can be reconstructed based on a diachronic study of these units of measure, from the 3rd to the 1st millennia BC.

localized practices and a mixed terminology influenced by various factors (see below).

Nonetheless, of particular interest are the relationships that exist between these various measurement systems used during the 3rd millennium in the ancient Near East, especially when exploring the shared elements (common units of measurement or practices), as well as the discrepancies or variations, that characterize each system in relation to the others. Furthermore, understanding how these measurement systems interface with administrative reality provides valuable insights into administrative procedures in their respective contexts, thereby offering a better understanding of the broader socio-economic, cultural, and historical dimensions associated with measurement systems.

As for Mesopotamian sources, this dissertation primarily examines the abundant documentation from Šuruppag, along with a few additional texts from Tell Abū Ṣalābīḫ.[683] The measurement system employed in these corpora has already undergone extensive study[684] and is widely regarded as "canonical," for it served as the standard for subsequent measurement systems utilized in later Mesopotamian texts.[685] Nevertheless, when compared to the Syrian systems, it offers valuable comparative information. Moreover, it provides significant insights into the paleography of numerals and the graphotactic strategies that will be further explored below.

As for the Syrian corpora, Chambon has conducted a comparative study of the documentation coming from Ebla, Mari, and Nabada.[686] Nonetheless, some questions remain open and may call for re-evaluation. Moreover, in the meantime,

683 Texts found in Tell Abū Ṣalābīḫ that concern capacity measures are IAS 492, IAS 494, IAS 495, IAS 503, IAS 507, and IAS 512.

684 As quoted above, Powell 1987–1990: 494–505; Krebernik 1998: 304; Martin *et alii* 2001: 304.

685 On the units of measure and their *ratio*, see 2.2.4.4.

686 Chambon 2011.

Cavigneaux has published further texts from Mari that Chambon did not discuss.[687] Here, each corpus will be briefly presented before a general discussion.

First of all, as far as Ebla is concerned, a significant portion of modern knowledge pertaining to Eblaite capacity measures is derived from the Small Archive (L. 2712),[688] an autonomous administrative unit, whose documentation can be dated to the final three years of the Palace G. Relatively fewer texts are sourced from L. 2769[689] (1.1.1. and 1.1.2.). Although all texts from L. 2712 can be attributed to the last three years of the palace, one sees from TM.75.G.427[690] that these measurements may have been employed earlier, as the document covers a seven- to eight-year time frame. The measurement framework found in Ebla exhibits a distinct local character marked by well-defined conventions within the archive.[691] It is based primarily on the specific use of containers and the techniques employed to fill them. A noteworthy feature of the Ebla capacity measurement system is its differentiation between arid substances and liquids,[692] which contrasts with the unified system prevalent in other regions, where a single measurement system is employed for both types of products. This differentiation is, however, very tenuous. In fact, in the Ebla corpus, the ĜEŠGAL-tidab "a type of malt for the preparation of a fermented beverage"[693] can be reckoned in la-ḫa (a measure for liquids)[694] or in

[687] Cavigneaux 2014.

[688] Half of these texts have been published in *ARET* 9 (Milano 1990a); the other half awaits publication by Archi and Biga (*ARET* 10).

[689] Mainly published in *ARET* 2 (Edzard 1981) as, for example: *ARET* 2.16; *ARET* 2.17 (= *MEE* 7.19); *ARET* 2.18 (= *MEE* 7.22); *ARET* 2.19; *ARET* 2.20; *ARET* 2.21; *ARET* 2.22.

[690] Published in Pettinato 1974–1977.

[691] As shown by the numerical notation employed in *ARET* 9.106 (see above).

[692] Moreover, the Ebla scribes distinguish three different ways of filling arids capacity standards; see 2.2.4.1, and fn. 566.

[693] Milano 1990a: 387.

[694] As in *ARET* 9.37 r. iii 4–5.

GU$_2$*-BAR* (and the other units of the same series), even when it is qualified as nag, "drink,"[695] as in:

> [96] *ARET* 9.67 o. vi 1–3: 3 *GU*$_2$*-BAR* ĜEŠGAL-tidab / naĝ / dumu-ninta en "2 *k.*-measures of Ĝ., (as) drink (for) the son of the king."

In what would appear, at first glance, to be a general isolation—due mainly to the nomenclature of the measurement units and their relationships—the Ebla texts show many points of contact with the Mesopotamian area (and especially with the corpus of Šuruppak), as evidenced by the presence of the sila$_3$—a well-known Mesopotamian measure—within the measurement systems for liquids. Nonetheless, establishing the precise value of sila$_3$ at Ebla presents a challenging task. In this respect, Chambon[696] posits that, based on the division of both sila$_3$ (for liquids) and niĝ$_2$-saĝšu (for arids) into 6 *ansammu* (2.2.4.1), the volume represented by sila$_3$ may correspond to that of niĝ$_2$-saĝšu, and may have an actual value of 3 liters.[697] Conversely, Milano[698] has long argued that the *ansammu*, being the smaller

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[695] Milano 1987b: 529 "The same happens for the *za-la-tum*, 'semolina,' and to other flours and the ŠE+TIN, a beer-like fermented beverage, whose amounts are generally given according to the dry measures, but also using sometimes the dug-measure, as in TM.75.G.530 r. i 9: 3 dug ŠE+TIN."

[696] Chambon 2011: 66.

[697] According to Chambon (2011: 57), the value of niĝ$_2$-saĝšu is determined by the presence of a container found in Mari (2nd millennium) that bears the inscription "dug ½ saĝšu" and has a volume of 1.5 liters.

[698] Milano 1987b: 547–548 "From what we have so far established about the cereal rations issued to the male and female dependents of the royal palace, it follows that the absolute value of the Eblaite sila$_3$-measure of capacity *could not* be the same as in contemporary Mesopotamia. Rations such as 3, 2, or 1 an-zam$_x$ a day would be otherwise too small in volume to make sense [...] by comparing at least the Eblaite with the Mari measures of capacity, we notice that the ratio between sila$_3$ and gur at Mari is the same as the ratio between the an-zam$_x$, and *gu*$_2$*-bar* at Ebla, *i.e.*, 1:120. On this base it seems plausible to assume a relationship between the value of the Mesopotamian sila$_3$ and the value of the Eblaite an-zam$_x$. As regards the absolute value of the an-zam$_x$ [...] tentatively, we can only guess the value of the Eblaite an-zam$_x$ to have been close to the value of the Pre-Sargonic sila$_3$, *i.e.*, 0.85 liters" (see also Milano 1996: 146 and Pettinato 1977a: 26). Elsewhere, Milano 1990a: 351 "Va sottolineato che una scomposizione del sìla (come è per il nì-sagšu) in 6 an-zam$_x$ non implica in nessun modo che il valore del sìla sia corrispondente a quello del nì-sagšu."

unit of measurement and one commonly used in the capacity systems of Ebla, should be equivalent to the Mesopotamian sila$_3$ and thus correspond to 1 liter.[699] This would suggest that the Ebla sila$_3$ has a value of 6 liters. One further argument has been proposed by Archi,[700] regarding the problems with such high values for the sila$_3$ and the *ansammu* at Ebla. He argues that, if we consider the ratio of 1 la-ḫa = 30 sila$_3$, and that oil was also delivered in la-ḫa, a "jar" of approximately 180 *ansammu* = 180 litres (*i.e*., ca. 165 kg of oil)[701], such weight would not be easily transportable. The problem does not currently have a valid solution because, nonetheless Chambon's argument regarding the value of niĝ$_2$-saĝšu certainly makes sense and it is difficult to imagine a different value for the *ansammu* in the measurement system of both liquids and arids.

On a side note, the capacity of one sila$_3$ is quoted in a pharmaceutical text from Ebla, TM.75.G.1645 o. iii 1–3[702] which records: *in* u$_4$ / sila$_3^{\text{ma-sar}}$ ⸢a⸣ / *ra-aq* "When the container of water of the capacity of one s.-measure is empty."

Nevertheless, one element unites the Mesopotamian and the Eblaite sila$_3$. In the Ebla corpus, both the sila$_3$ and the *ansammu* measures are usually written with cuneiform signs ().[703] In some instances, however, especially when accounted alone, sila$_3$ are also written with curviform signs ():

699 However, see Powell 1987–1990: 495, who estimates the size of the Fāra sila$_3$ at ca. 1 liter based upon its traditional nomenclature, the sowing rates, the structure of the capacity system, and the evidence for continuity of this system. Pomponio – Visicato 1994: 32, fn. 4 "The documentation of Fara does not provide sufficient information to clarify the problem" later "the capacity of the sila at Fara, at least in the gur-maḫ system, was much less than that of subsequent periods, possibly near to 0.5 liter."

700 Archi 2014–2015: 74–75.

701 This information is contained in TM.03.G.1000, paraphrased in Archi 2014–2015: 73–74.

702 Fronzaroli 2005: 95.

703 See, *e.g., ARET* 9.75 o. i 4 (sila$_3$) and *ARET* 9.81 r. ii 5 (*ansammu*).

[97] TM.75.G.520 r. iii 10–12[704]: 2 sila$_3$ naĝ / 3 e$_2$-duru$_5$^{ki} / si$_7$ “2 s.-measures of (malt), (as) drink (for) 3 teams (of 20) goldsmiths.”

Moreover, it is not uncommon for values even higher than 30 sila$_3$ to be expressed without using the higher unit (1 dar-ab$_2$ = 20 sila$_3$)[705]; on the other hand, fractional values of sila$_3$ other than ½ are not documented.[706]

The same occurs in Šuruppag texts as well:

[98] WF 99 r. iv 1: 60 20-la$_2$-1 160urus / zi$_3$ ba / 6 3 5 sila$_3$ / 5 sila$_3$ šu ba-ti “79 male workers, flour allotments, 6 (bariga) 3 (ban$_2$) 5 sila$_3$, 5 sila$_3$ (each) received.”[707]

In [98], the case may be of disambiguating between the whole amount of flour, for which the curviform () is used, and the distributive element (5 sila$_3$ each), which is indicated trough a cuneiform () notation.[708] Moreover, in some instances of the Šuruppag corpus, the sila$_3$ are indicated as if they were containers (*i.e.*, as discrete items) and not as units of measure in the lid$_2$-ga-system (see below).[709] Most such cases are concentrated in the documents from the University of Pennsylvania excavations (see Chapter 1)[710] and a few others.[711]

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[704] Milano 1987b: 529. In the sum it is clarified that the text refers to ĜEŠGAL-tidab. I would like to thank Alfonso Archi for providing me with information on the paleography of the numbers in the text TM.75.G.520.

[705] As in [100] and [101].

[706] Milano 1990a: 350.

[707] The calculation is correct: 79 × 5 = 6 (bariga) 3 (ban$_2$) 5 sila$_3$.

[708] On other uses of the cuneiform notation at Šuruppag (as displayed in 2.2.4.4), see the section dedicated to numerical notation (2.2.1).

[709] On this topic, see already Martin *et alii* 2001: 126.

[710] See FTP 66 o. i 1–2; FTP 67 o. i 1–r. ii 1; FTP 68 o. i 1–ii 1; FTP 69 o. i 1–ii 2; FTP 70 o. i 1–ii 2; FTP 71 o. i 1–2; FTP 72 o. i 1–r. i 2’; FTP 73 o. i 1–r. i 4; FTP 105 o. iii 3.

[711] See, *e.g.*, *CT* 50.14 o. i 1–3; NTSŠ 118 o. i 1–3.

On a side note, one should observe how this variability between cuneiform (𒁹) and curviform (ᗤ) signs is also attested in the documentation from Nabada, and peculiarly in the documents coming from the “Chantier F” (see Chapter 1).[712]

Another interesting correspondence can be observed in how, similarly to the texts from Ebla, those from Šuruppag also demonstrate significant interference due to the use of containers. These containers are occasionally employed to measure products as if they were units of the capacity system. For example, olive oil (i$_3$-ĝeš) can be reckoned according to a standardized container called *gu*$_2$*-pum*, which is a measure of capacity for arids attested only much later in the West Semitic area.[713] The *gu*$_2$*-pum* can sometimes take the place of the sila$_3$. It may be that in such cases i$_3$-ĝeš, indicates something solid—perhaps an ointment made with oil:

> [99] *ARET* 9.103 o. i 1–ii 3: 1ᗤ-*MI-AT g*[*u*$_2$]*-pum* i$_3$-ĝeš / lu$_2$ $^{\text{ĝeš}}$šem / 1 *gu*$_2$*-pum* i$_3$-ĝeš / lu$_2$ $^{\text{ĝeš}}$AD$_2$ / 50◖ *gu*$_2$*-pum* i$_3$-ĝeš / *šar*$_x$(NE)*-mi-num*$_2$/ ⸢NI⸣-*ba*-NI / aga$_3$-us$_2$[714] “100 baskets of (solidified?) oil, that (aromatized with) cedar resin, 1 basket of (solidified?) oil, that (aromatized with) myrtle resin, 50 baskets of (solidified?) cypress-aromatized oil for PN, the soldier.”

> [100] *ARET* 9.94 o. iv 1–r. i 3: 50◖ sila$_3$ i$_3$-ĝeš $^{\text{ĝeš}}$šem / *wa* / $^{\text{ĝeš}}$AD$_2$ / 60D 10◖ 3ᗤ sila$_3$ i$_3$-ĝeš / *šar*$_x$(NE)*-mi-num*$_2$ / *a-bu* / šu ba$_4$-ti “50 s.-measures of cedar-aromatized oil, 73 s.-measures of cypress-aromatized oil, PN has received.”

> [101] *ARET* 9.84 r. v 1–7: 50◖ sila$_3$ i$_3$-ĝeš du$_{10}$ / $^{\text{ĝeš}}$šem / *wa* / $^{\text{ĝeš}}$AD$_2$ / 60D 10◖ 3ᗤ sila$_3$ i$_3$-ĝeš-du$_{10}$ / *šar*$_x$(NE)*-mi-num*$_2$ / *a-bu* / šu ba$_4$-ti “50

[712] Sallaberger 1996c: 82 “While curvilinear figures (N$_1$ in the sign table) are used for the first three of these, the amount of sìla is written with cuneiform figures (N$_4$) except in texts 143 and 145 from field F.” The two texts are: *Subartu* 2.143 and *Subartu* 2.145.

[713] See, however, the loanword in Akk. *quppu*(*m*), a reed “basket” (CAD Q: 307 and AHw: 928 *quppu*(*m*) II).

[714] On *šar*$_x$(NE)*-mi-num*$_2$, see Catagnoti 2022a: 138–141. Previously transliterated as *ne-mi-lum* (Milano 1987b: 528, with literature).

s.-measures of cedar- and cypress-essence, 73 s.-measures of cypress-aromatized oil, PN has received."

Another standard employed at Ebla is the bešeĝ,[715] a sort of basket used only to count quantities of malt (babir). In *ARET* 9.24 1 *GU*$_2$*-BAR* of semolina (*za-la-tum*) is used as a component of 1 "basket" (bešeĝ) of malt. Its capacity remains unknown.

> [102] *ARET* 9.24 o. iii 3–8: 1⊃ *GU*$_2$*-BAR* *za-la-tum* / 1⊃ bešeĝ babir / 1 ⊃ *GU*$_2$*-BAR* *za-la-tum* / 10◖ inda$_3$-sig$_{15}$ / gu$_7$ / *in* 1 u$_4$ "1 *k.*-measure (of) semolina, 1 basket of malt, 1 *k.* of semolina, 10 einkorn-bread pieces, (are the) food (provisions) for one day."

Another known container—although sporadically attested—is the *zi-lum*, usually employed for flour and malt[716]:

> [103] *ARET* 9.103 o. iii 3–8: 10◖ *zi-lum* še-zi$_3$-gu / Puzur$_4$*-ra-ma-lik* "10 z.-jars of š. flour to PN."

The Šuruppag corpus reveals a practice wherein containers are employed to represent capacity measures. This can be observed through the use of the dun$_3$ vessel, which serves as a substitute for bariga measures.[717] A similar pattern emerges in the Ebla texts, where the TUN$_3$ assumes a corresponding role as a measure for dry substances, aligning with the capacity of a specific container (see above):

> [104] TSŠ 160 (= EDATŠ no. 54) o. iii 1–2: 1⊃ TUN$_3$ / ad-KID "1 T. container, PN."

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[715] Milano 1987b: 531 "The gloss *zi-a-lum*, corresponding to bešeĝ in the bilingual vocabularies (VE 1320') can be explained by looking at the Akkadian *sallu*, *se/illu*."

[716] Milano 1990a: 350. This term is comparable with the Hebrew *sîr* and the Akkadian *ṣîru* B (CAD Ṣ: 213), which indicate a type of large vessel.

[717] Pomponio – Visicato 1994: 197, fn. 67.

Another container, the dug "jar"—also attested in Ebla (2.2.4.1)—is used to measure capacities in the Šuruppag text FTP 74:

> [105] FTP 74 o. i 1–ii 1: 60 40 1 dug niĝ$_2$-naĝ / naĝ guruš / izim-da "101 drink containers, (as) drink (for) the male workers (of) PN."

The term ba-an (var. ba-an⊢tur,[718] both presumably coming from ban$_2$)[719] also refers to a container ^{dug}ban$_2$, measuring 10 sila$_3$:

> [106] TSŠ 881 o. ii 4': 4 dug lunga$_3$ ⊢ ba-an "..."

> [107] FTP 106 o. i 2': 2 [ba-a]n⊢tur gara$_2$ "..."

A final point of connection between Ebla and Šuruppag lies within the liquid capacity system employed at Ebla. Here, the ratio between *ansammu* and dar-ab$_2$ (60:1) is clearly sexagesimal, which is a typical feature of the Mesopotamian capacity system. The same is true for the fractions of the *GU$_2$-BAR* within D1; indeed, each corresponds in both and *ratio* and format to the ban$_2$, which are fractions of the gur and lid$_2$-ga systems.[720]

As for the rest the rest of the Syrian area, with the exceptions of some connections with the Ebla texts[721] that reside mainly in the presence of a Semitic decimal accounting system, the texts coming from Mari and Nabada exhibit interconnections and contextual associations that extend beyond each individual site. Pertaining specifically to Nabada, it is crucial to acknowledge its administrative subordination to Nagar, thereby implying the probable adoption of the same measurement system in that location as well. Consequently, this amalgamation of administrative ties between Nabada and Nagar, along with the

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[718] Martin *et alii* 2001: 60 "In all probability, it should be related to the horizontal wedge of the sign BÁN—already in the ED IIIb Ĝirsu texts the sign AŠ had disappeared in the phonetic writing of this vessel."

[719] PSD B: 81.

[720] On this topic, see Chambon 2011: 55–57.

[721] Chambon 2011: 65–66.

expansive geographic influence of Mari, establishes a substantial user base for this shared horizon.

The capacity system employed in Pre-Sargonic Mari is referred to as the "a-$gar_{3/13}$ system." The spelling a-gar_{13}[722] is specific to the Pre-Sargonic texts discovered in the *Maison Rouge* (see Chapter 1),[723] while the variant a-gar_3 is also attested in 2nd millennium texts from Mari.[724] However, it remains uncertain whether the quantity represented by the a-gar_3 system remained constant throughout the 3rd and 2nd millennia,[725] although it is evident that this system was maintained over successive centuries, indicating the persistence of a strong regional tradition. This observation is further corroborated by the Nabada documentation, which is based on the *mi-at* measurement system, whose resemblance to the a-$gar_{3/13}$ system is particularly significant[726]:

Mari	**Nabada**				
-	*li-im*	1			
a-$gar_{3/13}$	*mi-at*	10	1		
gur	gur	100	10	1	
bariga$^?$	bariga$^?$	1,000	100	10	1

722 On the reading a-gar_{13}, see Chambon 2011: 64 "D. Charpin a transcrit cette mesure a-ḪAR+DIŠ et a proposé de la considérer comme une variante épigraphique ou orthographique de a-gàr, la mesure de capacité connue à Mari à l'époque paléobabylonienne (Charpin 1987: 69). Son hypothèse est confirmée si on lit les deux derniers signes non pas ḪAR+DIŠ mais TE.*gunû* avec la valeur gar_{13}."

723 They are: Charpin 1987, no. 2 o. i 1; Charpin 1987, no. 2 o. i 5; Charpin 1987, no. 3 o. iii 1; Charpin 1987, no. 3 o. iii 5; Charpin 1987, no. 4 o. iii 1.

724 As mentioned, the case of Pre-Sargonic Mari shows a particular continuity with later documentation. In detail, documentation dated to the *Šakkanakku* period from Tuttul, Terqa, or Mari attests to the use of the a-gar_3 unit (Colonna d'Istria 2009: 95).

725 The equivalence of 1 a-gar_3 = 10 gur in Pre-Sargonic documentation from Mari appears likely but cannot be established with certainty. However, this correspondence is also suggested by the *Šakkanakku* documentation (Colonna d'Istria 2009: 95).

726 Sallaberger (1996c: 84) has previously highlighted the striking similarities between the functioning of the *mi-at* system and the a-$gar_{3/13}$ system employed in Mari.

ban$_2$?	ban$_2$?	6,000	600	60	6	1	
sila$_3$	sila$_3$	60,000	6,000	600	60	10	1

From a historical point of view, the connection between the Nabada and Mari documents is confirmed at least in *Subartu* 2.23, a text mentioning *Pa*$_4$*-ba*$_4$,[727] the wife of the king *Ip*-LUL-*Il* of Mari,[728] on the occasion when the lord of Nagar AMAR.AN also came to Nabada. Nevertheless, neither the texts of Mari nor those of Nabada show close enough commercial or cultural contacts between these two centers, contrary to the case of Ebla.[729] One possibility for understanding the close correspondence between the capacity system of Mari and that of Nabada may be a shared substrate of Syrian origin.

What stands out above all is a mixture of sexagesimal elements (clearly of Mesopotamian origin) as well as decimal elements, whose affiliation to the Semitic *substratum* is linguistically confirmed by the *mi-at* (one hundred) and *li-im* (one thousand) elements (see 2.2.2.1). Thus, the smallest units, which represent the core of the Mesopotamian system, are:

(bariga)	1		
(ban$_2$)	6	1	
sila$_3$	60	10	1

Whereas the larger capacity measures clearly refer to the Semitic decimal system:

-	*li-im*	1			
a-gar$_{3/13}$	*mi-at*	10	1		
gur	gur	100	10	1	
(bariga)	(bariga)	1,000	100	10	1

[727] As for the Mari sources, the PN is mentioned also in Charpin 1987, no. 4. Moreover, the following documents can be dated to this same time span: Charpin 1987, no. 4; Horioka 2009, no. 1; Horioka 2009, no. 3; Horioka 2009, no. 4; Horioka 2009, no. 6; and Horioka 2009, no. 7 (Horioka 2009: 135).

[728] On *Ip*-LUL-*Il*, see the discussion in Chapter 1.

[729] See, *e.g.*, the discussions in Sallaberger 1998 and Archi 2015c.

This may reflect a need to adapt an imported system to local needs, just as in the case of numerical notation for counting individual objects (see 2.2.2.1). Of course, the Mesopotamian system also has very high value units, such as guru$_7$, lid$_2$-ga, and the gur itself.[730] However, these do not fit into the Mari and Nabada numerical notational system, where the presence of the decimal element is too strong and also influences other measurement systems.

Therefore, in the Syrian area, one observes a diversified panorama of influences and local features that intertwine in a distinct manner at each site, giving rise to systems that are simultaneously interconnected yet strongly localized, revealing a complex pattern of strong local substrates and cultural contacts (which extend as far as the Mesopotamian region).

2.2.5. Surface measures

This section deals with surface measures. Data on the topic are provided by three out of five corpora (*i.e.*, Ebla, Šuruppag, and Tell Abū Ṣalābīḫ).

[730] Note, in fact, how the ratio between gur and bariga in Mesopotamia is 1:6, whereas in Mari and Nabada it is 1:10.

2.2.5.1. Ebla (Tell Mardīkh)

Selected bibliography[731]: Archi 1980a; Archi 1993b; Archi 2014–2015; Chambon 2011: 131–133; Milano 1987a; Milano 1990b; Pomponio 1983.

Units of measure:
gana$_2$-keše$_2$-ki (var. gana$_2$-keše$_2$, gana$_2$-ki, keše$_2$-ki)

Ratio of the measurement systems:
-

Notational system (type of signs used):
LEXICAL: *MI-AT* (100)[732]; *LI-IM* (1,000)[733]; *RI*$_2$<-*BAB*> (10,000)[734]; *MA-I-AT* (100,000)[735]

CURVIFORM: (1)[736];  (10)[737];  (60)[738]

CUNEIFORM:  (1)[739]

Notational phrase: Normally, the notational phrase has cumulative additive structure for numbers < 10^2 [108] and a multiplicative additive structure for numbers > 10^2 [109]. In some instances [110], subtractive notation is attested.

> [108] TM.75.G.02143 o. ii 3: 30 6 gana$_2^{ki}$ ... “36 gk.-measures (of land) ...”

[731] Specific references are discussed below.

[732] See, *e.g.*, *ARET* 3.774 r. i’ 3.

[733] See, *e.g.*, *MEE* 7.33 r. iii 2.

[734] See, *e.g.*, *MEE* 7.33 r. iv 1.

[735] See *ARET* 3.774+ r. iii’ 3 (as quoted in Bonechi 2021: 36).

[736] See, *e.g.*, *ARET* 7.154 o. v 5. Units appear only when combined with lexical numerals.

[737] See, *e.g.*, *ARET* 7.154 o. iii 5.

[738] See, *e.g.*, *MEE* 7.45 o. i 1.

[739] See, *e.g.*, [110]. This notation appears only in subtractive notations.

[109] *ARET* 7.154 o. ii 3: 4-*LI*<-*IM*> gana$_2$-ki “4000 gk.-measures (of land).”

[110] *ARET* 3.378 o.$^?$ i’ 4’: 10-la$_2$-2 gana$_2$-keše$_2$-ki ^{ĝeš}ĝeštin “8 gkk.-measures (of vineyards).”

2.2.5.2. Šuruppag (Tell Fāra)

<u>Selected bibliography[740]:</u> Cripps 2007: 3; Krebernik 1998: 304; Powell 1987–1990.

<u>Units of measure:</u>

šar$_{2}$-gal; šar$_{2}$; bur$_{3}$; eše$_{3}$; iku; šar

<u>Ratio of the measurement systems:</u>

šar$_{2}$-gal	1					
šar$_{2}$	60	1				
bur$_{3}$	3600	1000	1			
eše$_{3}$	10,800	3000	300	1		
iku*	64,800	18,000	1800	180	1	
šar	180,000	18,00	1800	600	100	1

* iku	1		
½ iku (ubu)[741]	2	1	
¼ iku	4	2	1

<u>Notational system (type of signs used)[742]:</u>

šar$_{2}$-gal

CURVIFORM (WITH INTERPOLATION OF LEXICAL ELEMENTS):  (1)[743]

šar$_{2}$

CURVIFORM:  (1)[744]

bur$_{3}$

[740] Specific references are discussed below.

[741] See below.

[742] Each of these units of measures (multiple and sub-multiple) has its own peculiar notation.

[743] See, *e.g.*, TSŠ 188 o. i 2.

[744] See, *e.g.*, TSŠ 91 (= EDATŠ no. 108) o.

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (1)[745]; (10)[746]; (10)[747]; (600)[748]

eše$_3$

CURVIFORM: (1)[749]; (1)[750]

iku

CURVIFORM: (¼)[751]; (½)[752]; (1)[753]

šar

LEXICAL (WITH INTERPOLATION OF CURVIFORM ELEMENTS): šu$_2$- ($^1/_3$)[754]; ($^2/_3$)[755]

CURVIFORM: (1)[756]

<u>Notational phrase:</u>

The notational phrase has a cumulative additive structure [111]. In some instances [112], subtractive notation is attested.

> [111] WF 55 (= EDATŠ no. 59) r. i 4: 30 7 (bur$_3$) 1 (eše$_3$) 3 iku "37(bur$_3$-) 1(eše$_3$-) 3iku measures."

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[745] See, *e.g.*, [112].

[746] See, *e.g.*, TSŠ 102 (= EDATŠ no. 69) r. i 4.

[747] See, *e.g.*, WF 53 (= EDATŠ no. 68) r. vii 3. Unlike Krebernik (1998: 304, fn. 693), I cannot recognize the form in SF 82.

[748] Krebernik 1998: 304 "Die letzten beiden Einheilen kann ich nur in TSŠ 188 (Math Übung?) belegen" (o. i 2–3).

[749] See, *e.g.*, WF 53 (= EDATŠ no. 68) r. vii 3.

[750] See, *e.g.*, [111].

[751] See, *e.g.*, TSŠ 188 o. ii 3.

[752] See, *e.g.*, Cavigneaux 2020: 240–258 o. i 1.

[753] Half an iku is called ubu ( ). See, *e.g.*, Cavigneaux 2020: 240–258 o. i 1.

[754] See, *e.g.*, MVN 10.85 o. i 3 (see also Bartash 2019: 58).

[755] See, *e.g.*, FTP 96 o. i 3 (see also Bartash 2019: 58).

[756] See, *e.g.*, MVN 10.85 o. i 3.

[112] WF 45 r. vi 2: 20-la_2-1 (bur_3) “ 198 (bur_3-measures).”

2.2.5.3. Tell Abū Ṣalābīḫ

Selected bibliography[757]: Krebernik 1998: 304; Powell 1987–1990.

Units of measure[758]:

šar$_2$-gal; šar$_2$; bur$_3$; eše$_3$; iku; ubu; šar

Ratio of the measurement systems[759]:

šar$_2$	1					
10 bur$_3$	10	1				
bur$_3$	100	10	1			
eše$_3$	300	30	3	1		
iku	1800	180	18	6	1	
šar	1800	600	100	50	25	1

Notational system (type of signs used):

šar$_2$

CURVIFORM:  (1)[760]

bur$_3$

CURVIFORM:  (1)[761];  (10)[762]

eše$_3$

CURVIFORM:  (1) [763]

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757 Specific references are discussed below.

758 Not all the units of measurement in the system are attested in the texts of Tell Abū Ṣalābīḫ, yet the system's operation is likely parallel to that of Šuruppag.

759 See fn. 758.

760 See, *e.g.*, IAS 493 r.? i 2.

761 See, *e.g.*, IAS 499 i 2'.

762 See, *e.g.*, IAS 493 r.? i 2.

763 See, *e.g.*, IAS 508 r. iii 1.

iku

CURVIFORM: (1)[764]

šar

CURVIFORM: ($^{2}/_{3}$)[765]

Notational phrase: Cumulative additive [113].

[113] IAS 499 i 3’: 10 6 [...] “16 (bur$_3$ measures) [...]”

[764] See, *e.g.*, IAS 505 r. i’ 7’.

[765] See, *e.g.*, IAS 507 r.$^?$ ii 1. Here the šar-measure is combined with cuneiform arithmo-metrograms (Krebernik 1998: 304, fn. 691).

2.2.5.4. General discussion

Historically, in Mesopotamia, surface area measurements are related to those of length and volume, in both nomenclature and, of course, in the fact that they form sequential dimensional sets. The 3rd millennium texts analyzed here, *i.e.*, those from the ED IIIa and Pre-Sargonic periods, show different sets of measure units. In the cases of Šuruppag and Tell Abū Ṣalābīḫ, the attested sets of measures are less complete than those attested in later texts; nevertheless, these texts show a certain continuity with the later norm, and as such they will not be discussed here.[766] In the case of the Pre-Sargonic Mari texts, surface measures are not attested, whereas the case of Ebla is quite peculiar.

In the Ebla texts, most data on agriculture (*e.g.*, crops, field yields, farming) and the distribution of agricultural products remains unpublished. Because the paucity of such data is a serious hindrance to the study of texts dealing with field management, the available information on the latter remains conspicuously fragmentary and incomplete. Moreover, it has so far been unclear to what extent the Ebla measures correspond in terms of absolute value to those attested in Mesopotamia, which are certainly better known. Unfortunately, no surface measures are attested in Pre-Sargonic Mari texts, which could have given us a more precise idea of the matter. Three names for the same unit of measure are attested at Ebla: gana$_2$-ki, gana$_2$-keše$_2$, gana$_2$-keše$_2$-ki, and keše$_2$-ki—the latter glossed by the Eblaite term *zi-ti-a-lu* (respectively: VE 842, 843, and 844).[767]

The key text concerning the surface measures of Ebla is *ARET* 2.51.[768] This text is divided into several sections dealing with different issues, one of which (r. ii 1–2) concerns the amount of barley for sowing at Ebla in relation to the measure gana$_2$-

[766] Powell 1987–1990: 477–478.

[767] Milano 1987a: 197–198, fn. 22.

[768] Editions of the text can be found in Edzard 1981: 98 (editio princeps); Pomponio 1983: 6–7; Milano 1987a. The same text has been studied by Chambon (2011: 131–133), albeit with a focus on the rations given to male workers for sowing the field (*ARET* 2.51 r. ii 2–4).

keše$_2$.[769] A number of equivalence proposals were derived from this text, based mainly on the rendering of fields in other 3rd millennium texts. According to Pomponio[770] (and later Archi), the gana$_2$-keše$_2$ measure of surface may be equivalent to $^1/_{10}$ of the Mesopotamian iku, given that the ED IIIa documents from Šuruppag and Lagaš attest, respectively, sowing rates of 15 sila$_3$ and 12 sila$_3$ per iku:

15 sila$_3$: 1 iku (Šuruppag) = 15 sila$_3$[771] : 10 gana$_2$-keše$_2$ (Ebla).

Milano,[772] relying on the sowing rates attested in Nuzi,[773] proposes a different ratio between gana$_2$-keše$_2$ and iku measures, *i.e.*, 1 gana$_2$-keše$_2$ = $^1/_6$ iku (= 588 m^2 = 0.0588 ha). The sowing rates attested at Gasur/Nuzi during the 3rd millennium correspond to 60 sila$_3$ of barley per iku, *i.e.*, ca. 75.5 liters per hectare[774]:

60 sila$_3$: 1 iku (Šuruppag) = 60 sila$_3$: 6 gana-keše$_2$ (Ebla).

[769] See *ARET* 2.51 r. ii 1–2: 6 ½ še *gu$_2$-bar* še-nuĝun / 1-*MI*<-*AT*> gana$_2$-keše$_2$ 1 ½ niĝ$_2$-saĝšu “6 (and) ½ gubar (of) cereals, (are) the seed (for a field measuring) 100 gana$_2$-keše$_2$ (at a rate of) 1 (and) ½ niĝ$_2$-saĝšu (for gana$_2$-keše$_2$).”

[770] On this equivalence, see Pomponio 1983: 12; Archi 1993b: 12–13; and Archi 2014–2015: 75 (cf. previously Archi 1980a: 9: 1 gana$_2^{ki}$ = 1 Mesopotamian SAR = $^1/_{100}$ Mesopotamian iku).

[771] On the correspondence sila$_3$ and niĝ$_2$-saĝšu, see above.

[772] Milano 1987a: 188–189.

[773] Milano 1987a: 186 “In the light of these arguments, the best comparison to the Ebla sowing rates is provided by the evidence coming from the Kirkuk area, namely the texts from the 3rd and 2nd millennium strata of Gasur/Nuzi. The documentation from Lower and Central Mesopotamia, on the other hand, where agriculture was entirely depending on irrigation and where salinity affected in various ways the process of the land exploitation, should be very useful for the determination of the limits of fluctuation compatible with the Ebla maximum and minimum values.”

[774] On this topic, see Zaccagnini 1975: 182–184, 217–219; Zaccagnini 1979: 849–856.

These seeding rates for barley also occur in TM.75.G.2143,[775] together with emmer, and einkorn[776]:

Section	Cereal	Seed an-zam$_x$(LAK 340)	Surface gana$_2$-ki	Seed Rate (T)	Seed Rate (C)
o. i 1–5	barley	335	100	3	3.35
o. ii 1–3	einkorn	144	36	4	4
o. ii 4–5	barley	180	24	1 ½ (n.-measures)	7.5
r. i 1–3	emmer	240	24	2 (n.-measures)	10

Fig. 17 – Seed Rates in TM.75.G.2143.

Section	Cereal	Seed an-zam$_x$(LAK 340)	Surface gana$_2$-ki	Seed Rate (T)	Seed Rate (C)
r. ii 1–2	barley	780	100	1 ½ (n.-measures)	7.8

Fig. 18 – Seed Rates in *ARET* 2.51.

According to these data, the two main theories concerning the equivalences for the Ebla surface measures are:

a. 1 gana$_2$-ki (0.036 ha) = $^1/_{10}$ of Mesopotamian iku (1 iku = 0.36 ha)
b. 1 gana$_2$-ki (0.06 ha) = $^1/_6$ of Mesopotamian iku (1 iku = 0.36 ha)

[775] Milano 1987a: 184 describes TM.75.G.2143 as “being a real bureaucratic report, whereas” *ARET* 2.51 “seems to refer to a standard, and somehow artificial, rate.”

[776] See TM.75.G.2143 o. i 1–5: 2 ½ sig$_{15}$ *GU$_2$-BAR* 7 niĝ$_2$-saĝšu / še-nuĝun / 1-*MI-AT* gana$_2$-ki 3 an-zam$_x$(LAK 340) / *ar-si-<a>-hu* / iti *ʾa$_5$-nun* “2 (and) ½ *k.*-measures (and) 7 n.-measures (of einkorn): seed (for) 100 gk-measures (of field, at) 3 *a.*-measures (per gk), (that of) PN. 8th month.”

Nonetheless, all these reconstructions are open to debate, given that the value of the sila$_3$ at Ebla has not yet been established with certainty (see above). In fact, all these possible reconstructions concerning the extension of the gana$_2$ rely on the value ascribed to the sila$_3$.

As far as nomenclature is concerned, we observe how the three terms appear with more or less equal frequency in the edited texts of Ebla.[777] Three texts mention different nomenclatures simultaneously[778]: *ARET* 2.27a (mentioning gana$_2^{ki}$ and gana$_2$-keše$_2$)[779] and *ARET* 3.104 and *ARET* 3.774 (both mentioning gana$_2$-keše$_2$ and gana$_2$-keše$_2$-ki).[780] Regarding the alternation of gana$_2$-keše$_2$ and gana$_2$-keše$_2$-ki, it seems likely that the -ki element may be understood as a determinative, gana$_2$-keše$_2^{(ki)}$, or at least as an additional element. Nonetheless, in *ARET* 2.27a, the gana$_2$-ki are not accounted for in the total section (gu$_2$:an-še$_3$), where only the gana$_2$-keše$_2$ appear.[781] On the contrary, the text *MEE* 7.33[782] lists gana$_2$-ki measures, which are accounted for in the total as gana$_2$-keše$_2$-ki.[783]

[777] To my knowledge, there are 65 attestations of gana$_2$-ki, 60 attestations of gana$_2$-keše$_2$, and 65 attestations of gana$_2$-keše$_2$-ki. The data had been processed using the EbDA database, accessed on 03/02/2022.

[778] Unfortunately, most of the texts concerning surface measures that are currently edited are fragments found in *ARET* 3. Therefore, it is possible that some of these fragments may belong to the same texts.

[779] See, *e.g.*, *ARET* 2.27a o. i 1–2: 1𒀸-*LI-IM*-7𒁹-*MI-AT* gana$_2$-ki / *ša-dab$_6^{ki}$* "1700 gana$_2$-ki measures (of land in) GN"; *ARET* 2.27a o. iii 5–iv 1: 2𒀸-*LI*<-*IM*> gana$_2$-keše$_2$ / *dar-da-u$_3^{ki}$* "200 gana$_2$-keše$_2$ measures (of land in) GN."

[780] See, *e.g.*, *ARET* 3.104 o. i 2'–i 4': 1𒀸-*LI-IM* gana$_2$-keše$_2$-ki / *i-bi$_2$-šum* / lu$_2$ *i-gi* " 1000 gana$_2$-keše$_2$-ki measures (to) PN$_1$, that of PN$_2$"; *ARET* 3.104 o. iii 4'–6': 2𒀸-*MI-AT* gana$_2$-keše$_2$ / *mi-ga*-NI / dab$_6$-ru$_{12}^{ki}$ "200 gana$_2$-keše$_2$ measures (to) PN in GN"; *ARET* 3.774+ o. i 2'–3': 1𒀸-*MI-AT* gana$_2$-keše$_2$ / *ir$_3$-am$_6$-ma-lik* "100 gana$_2$-keše$_2$ measures (to) PN"; *ARET* 3.774+ r. i' 3: 8𒀸-*MI-AT* gana$_2$-keše$_2$-ki ... "800 gana$_2$-keše$_2$-ki measures."

[781] *ARET* 2.27a r. ii 5–iv 1: gu$_2$:an-še$_3$ / 9𒀸-*LI-IM* gana$_2$-keše$_2$ / ⸢ki⸣-ki / *ti-ša-li-im* / *ru$_{12}$*-[z]*i-da-mu* / *a-ti-ir* "Sum: 9000 gana$_2$-keše$_2$ measures (are the amount of the) lands (of) PN$_1$, PN$_2$, PN$_3$."

[782] See also Archi 1980a: 9–10.

[783] See *MEE* 7.33 r. iii 2–4: 5𒀸-*LI*<-*IM*> gana$_2^{ki}$ / [x]-*uš-bu^{ki}* / ba-ra "5000 gana$_2$-ki measures (in) GN, have been flooded"; later r. iv 1: GU$_2$.AN.ŠE$_3$ 1𒀸-*RI$_2$-BAB*-2𒁹-*LI*<-*IM*>-5𒀸-*MI*<-*AT*> gana$_2$-keše$_2^{ki}$

2.2.6. Measuring wool quantities in the Ebla texts

This section deals with wool as measured in the Ebla texts.

"Sum: 12,500 $gana_2$-$keše_2$-ki-measures." The first passage is excluded from the total because the term ba-ra may be interpreted as a Sumerian verbal form, possibly meaning "flooded (fields)" (see the full discussion in Milano 1987a: 198, fn. 22).

2.2.6.1. Ebla (Tell Mardīkh)

Selected bibliography[784]: Biga 2011; Biga 2014; Peyronel 2014; Zaccagnini 1984; Zaccagnini 1990, *passim*; Zaccagnini 1999–2001, *passim*.

Units of measure[785]:

zi-ri$_2$$^?$; $^{(\hat{g}e\check{s})}$kiĝ$_2$; na$_4$; $^{(\hat{g}e\check{s})}$bala

Ratio of the measurement systems:

zi-ri$_2$$^?$	1			
$^{(\hat{g}e\check{s})}$kiĝ$_2$	2	1		
na$_4$	4	2	1	
$^{(\hat{g}e\check{s})}$bala	?	?	?	1

Notational system (type of signs used):

zi-ri$_2$$^?$

LEXICAL: *MI-AT* (100)[786]; *LI-IM* (1,000)[787]

CURVIFORM:  (1)[788];  (10)[789];  (60)[790]

CUNEIFORM:  (1)[791]

$^{(\hat{g}e\check{s})}$kiĝ$_2$

LEXICAL: *MI-AT* (100)[792]; *LI-IM* (1,000)[793]; *RI*$_2$*-BAB* (10,000)[794]

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[784] Specific references are discussed below.

[785] As for the variants maḫ and tur, see the discussion below.

[786] See, *e.g.*, *ARET* 20.7 (= *MEE* 7.35) r. xiv 4.

[787] See, *e.g.*, *ARET* 20.7 (= *MEE* 7.35) r. xiv 4.

[788] See, *e.g.*, *ARET* 4.11 r. xiv 9.

[789] See, *e.g.*, *ARET* 4.11 r. xiv 9.

[790] See, *e.g.*, *ARET* 4.11 r. xiv 9.

[791] See, *e.g.*, *ARET* 4.11 r. x 15

[792] See, *e.g.*, *ARET* 4.13 r. vii 1.

[793] See, *e.g.*, *ARET* 4.13 r. vii 1.

[794] See, *e.g.*, ARET 20.7 (= *MEE* 7.35) r. xiv 1.

CURVIFORM (WITH INTERPOLATION OF CUNEIFORM ELEMENTS): (½)[795]; (½)[796]; (1)[797]; (10)[798]; (60)[799]

CUNEIFORM: (½)[800]; (1)[801]

na$_4$

LEXICAL: *MI-AT* (100)[802]; *LI-IM* (1,000)[803]; *RI*$_2$*-BAB* (10,000)[804]

CURVIFORM: (1)[805]; (10)[806]; (60)[807]

CUNEIFORM: (1)[808]; (1)[809]; (1)[810]

$^{(ĝeš)}$bala

CURVIFORM: (1)[811]

<u>Notational phrase:</u> Cumulative/multiplicative additive [114]. In some instances [115], subtractive notation is attested.

> [114] *ARET* 12.1179 r. i' 3': 1-*MI-AT* 60 30 4 na$_4$ siki si-udu-ur$_4$
> "194 na$_4$ measures (of) plucked wool."

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795 See, *e.g.*, [116].

796 See, *e.g.*, *ARET* 19.16 r. iv 4.

797 See, *e.g.*, *ARET* 12.494 r. ii' 2'.

798 See, *e.g.*, *ARET* 12.490 r. vi' 9'.

799 See, *e.g.*, *ARET* 12.490 r. vi' 9'.

800 See, *e.g.*, *ARET* 4.13 r. xiv 13–l.e.1.

801 See, *e.g.*, [115].

802 See, *e.g.*, *ARET* 1.6 r. xi 17.

803 See, *e.g.*, *ARET* 20.8 r. x 11.

804 See, *e.g.*, *MEE* 7.39 r. vi 1.

805 See, *e.g.*, [114].

806 See, *e.g.*, [114].

807 See, *e.g.*, [114].

808 See, *e.g.*, *ARET* 1.6 r. xi 17.

809 See, *e.g.*, [131]. On this attestation, however, see the discussion below.

810 See, *e.g.*, [128].

811 See, *e.g.*, [118].

[115] *ARET* 1.8 (= *MEE* 7.3) r. xvii 24: 30-la_2-3 $kiĝ_2$ siki “27 $kiĝ_2$ measures (of) wool.”

2.2.6.2. General discussion

In Ebla texts, one can observe a peculiar way of recording wool quantities. As for units of measure, the Ebla system differs from that used in Mesopotamia.[812] Based on the accounting operations recorded in the Ebla texts,[813] Zaccagnini proposed three units of measure: *zi-ri*$_2$, kiĝ$_2$,[814] and na$_4$, with a subsequential ratio of 1:2. However, this system entails some particularities that must be considered. Wool quantities are often expressed directly in na$_4$ (perhaps for accounting utility); however, na$_4$ measures greater than 2 never appear in the same square together with kiĝ$_2$, as in [114]. The kiĝ$_2$ and na$_4$ measures are almost always accounted together in the totals section, and they are usually converted into kiĝ$_2$ measures, *i.e.*, the largest unit.[815] Only in two texts is the sum converted into na$_4$ measures.[816] The na$_4$ measure is divisible, as shown in:

> [116] *ARET* 15.50 r. i 2: 1 ½ siki na$_4$ sa$_6$ "1 (and) ½ na$_4$ measure (of) good quality wool."

---

[812] In Mesopotamia, sexagesimal measures—mina (ma-na), and shekel (giĝ$_4$)—are used to weigh wool (see above). Zaccagnini (1984: 189, later 1999–2001: 51) compares Ebla's units of measure with those of Middle Babylonian texts from Nuzi. The wool measures attested at Nuzi consist of *šeḫtunnu*, *kuduktu*, and *nariu*, with a subsequent ratio of 1:2:4. Each measure corresponds to 40, 80, and 160 shekels, respectively.

[813] See, especially, *ARET* 15.16 (Zaccagnini 1984: 198–200).

[814] The sign was provisionally transliterated as kin$_x$ (Pettinato 1980: 34) because it visually differs from LAK 174.

Regarding the Palace G texts, it has been hypothesized that this spelling may indicate a wooden container for wool, and that the determinative ĝeš would precisely indicate wooden material (Pettinato 1980: 34; Zaccagnini, 1984: 189–194; Pasquali 1997: 223, fn. 32). However, again, to assume that the name of a measure of wool derives from the practice of putting it into a container is not very likely. It is more likely that the term $^{(ĝeš)}$kiĝ$_2$ refers to the wool that can be gathered from a sheep's fleece in a work session (kiĝ$_2$) (see below), perhaps with a wooden (ĝeš) comb(?).

[815] As in *ARET* 4.11, *ARET* 4.12, *ARET* 19.1, *ARET* 19.6, and *ARET* 19.20.

[816] *ARET* 20.16 and *ARET* 20.17 (most likely for the same accounting utility as [117]).

An additional unit of measure smaller than the na$_4$,[817] the $^{(\hat{g}e\check{s})}$bala, appears sporadically.[818] The attestations show a certain paleographic variability—for example:

> [117] *ARET* 12.1189 o.$^?$ iii’ 5’: 2◗ na$_4$ 6◗ $^{(\hat{g}e\check{s})}$bala […] “2 na$_4$ measures and 6 $^{(\hat{g}e\check{s})}$bala measures.”

> [118] *ARET* 12.1204 o.$^?$ i’ 3’: 6◗ bala siki “6 bala measures (of) wool.”

> [119] *ARET* 1.3 r. x 4–5: 2◗ bala$_x$* siki gegge / 2◗ bala$_x$* siki babbar “2 bala measures (of) black wool, 2 bala measures (of) white wool.”

> [120] *ARET* 4.11 r. vi 13: 6◗ bala$^!$(KUL)* siki “6 bala measures (of) wool.”

> [121] *ARET* 15.12 o. xii 16 – r. i 1: 2◗ bala$^!$(KUL) siki babbar / 2◗ bala$^!$(KUL) siki gegge “2 bala measures (of) white wool, 2 bala measures (of) black wool.”

The identification of the *zi-ri*$_2$ as a unit of measure, so far widely accepted, presents some challenges. It is true that *zi-ri*$_2$ shares the same attributes with ki$\hat{g}_2$ and na$_4$ measures, such as quality type and color of the wool, as in the following examples:

> [122] *ARET* 15.12 r. i 10: 30◖ *zi-ri*$_2$ siki *ba-ra-u*$_9$ babbar “30 *zi-ri*$_2$ (of) selected white wool.”

> [123] *ARET* 15.26 r. vi 21: 1◗ ki$\hat{g}_2$ siki *ba-ra-u*$_9$ “1 ki$\hat{g}_2$ measure (of) selected wool.”

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[817] Biga 2014: 142 “the wool of a spindle, was possibly the smallest measure for wool.” This fact is confirmed by attestation no. [117]. At present, their value cannot be determined because they are not calculated in the sums.

[818] In the *editio princeps*, Archi (1984: 30) transliterates the measurement unit as X. The EbDA (#6) transliteration is c707. As a reference for bala$_x$, see *Subartu* 2.35 (bala$_x$); *ARET* 12.749 o. iii’ 9’.

[124] *ARET* 4.11 r. ix 10: ⌜2◗⌝ ^ĝeš^kiĝ₂ siki babbar "2 ^ĝeš^kiĝ₂ measures (of) white wool."

[125] *ARET* 8.541 (= *MEE* 5.21) r. x 1': 3◗ na₄ siki babbar "3 na₄ measures (of) white wool."

However, the *zi-ri*₂ are generally accounted separately in the totals section,[819] and not only does *ARET* 3.798 [128] provide two different sums, but the kiĝ₂ measures also precede the *zi-ri*₂, which would logically contradict the definition of the *zi-ri*₂ as the larger unit. In the available documentation, no *n* ½ *zi-ri*₂ is ever attested, whereas there is mention of *n* ½ kiĝ₂[820] and *n* ½ na₄.

[126] *ARET* 15.16 r. xiii 15–16: gu₂:an-še₃ 10◐ 2◗ *zi-ri*₂ siki / 1◗-*LI-IM* 2◡ *MI-AT* 20◐1◗ ½◡ kiĝ₂ siki "Sum: 12 *zi-ri*₂ (of) wool, 1221 (and) ½ kiĝ₂ measures (of) wool."

[127] *ARET* 3.798 r. iv' 2'–3': gu₂:an-še₃ 30◐ gu-mug^tu9^ / 40◐ kiĝ₂ siki 2◗ *zi-ri*₂ siki "Sum: 30 gu-mug-skirts, 40 kiĝ₂ measures (of) wool, 2 *zi-ri*₂ (of) wool."

[128] *ARET* 19.6 o. i 8: 4◗ ½◡ kiĝ₂ siki "4 (and) ½ kiĝ₂ measures (of) wool."

[116] *ARET* 15.50 r. i 2: 1◗ ½◡ siki na₄ sa₆ "1 (and) ½ na₄ measures (of) good quality wool."

The only mention of *zi-ri*₂ and kiĝ₂ together (*i.e.*, in the same square) records 1 *zi-ri*₂ and 3 kiĝ₂, which, otherwise, should correspond to 2 *zi-ri*₂ and 1 kiĝ₂.[821] Furthermore, the etymology of *zi-ri*₂ itself would suggest that it should be considered a preform product, rather than a unit of measure. The term can be traced

[819] The only exception is *MEE* 2.11, where they are converted into kiĝ₂, *i.e.*, the smaller unit.

[820] The spelling *n* ½ kiĝ₂ does not conflict, per se, with the existence of a unit system.

[821] See *ARET* 4.12 r. i 13: 1◗ *zi-ri*₂ siki 3◗ ^ĝeš^kiĝ₂ siki "1 *zi-ri*₂ (of) wool, 3 ^ĝeš^kiĝ₂ measures (of) wool."

back to the root *zwr* "to turn,"[822] in Akkadian "to twist; to weave" (CAD Z: 72 *zâru* A) and in the derived adjective *zēru*(m), "woven" (CAD Z, *zēru*).[823] It is therefore not unreasonable to assume that *zi-ri*₂ siki referred to a "woolen braid" or a "woven woolen band" or, more precisely, a "woven ball of wool" ("skein, yarn") that could be used independently or even reworked to make cloth, as in:

> [129] *ARET* 4.11 r. x 4–9: 2𒀸 *zi-ri*$_2$ siki u$_2$-ḫab$_2$ / 10-la$_2$-2 *zi-ri*$_2$ siki *ba-ra-i* / 5 *zi-ri*$_2$ siki *ba-ra-i* gegge / 6 *zi-ri*$_2$ siki *ma-ri*$_2^{ki}$ / tu$_9$-tu$_9$ / *du-si-gu*$_2$ "2 yarns (of) red wool, 8 yarns (of) chosen wool, 5 yarns (of) chosen black wool, 6 yarns (of) Mari's wool, (for) the textiles of PN."

> [130] *MEE* 2.11 o. iii 5–6: 1𒀸 *zi-ri*$_2$ siki / tu$_9$-tu$_9$ "1 yarn (of) wool (for) textiles."

A possible hint at the use of yarns of wool can be found in iconographic sources. Indeed, an Urkeš seal shows a woman bidder holding a ball of wool in her hand[824]:

[822] Pasquali 1997: 267, with literature "La radice è attestata anche nel rituale eblaita nel termine *zi-il* 'svolta; bivio.'"

[823] Pasquali 1997: 267–268 "La stessa etimologia qui proposta per l'eblaita *zi-rí* risulta valida anche per i termini $^{(túg)}$*zīrum* di Mari, g ú - ḫ a *zīrāti* di Tell al-Rimaḫ e s i k i *zīrtu*(*m*) di Emar. Ad Emar in particolare, s i k i *zīrtu*(*m*), genericamente tradotto 'fascia di lana,' ricorre sia nel ritual relativo all'investitura della sacerdotessa entu (Emar 369.75) come offerta per ^{d}*Ḫu-le-lu,* sia nel testo riguardante la cerimonia della sacerdotessa mašʾartu (Emat 370.87'), dove viene posto sulla testa della statua della dea Aštarte. Anche per gli *zi-rí* s i k i dei testi Eblaiti è possible supporre, almeno in certe occasioni, un uso rituale."

[824] Porada 1948: 245; Buccellati – Kelly-Buccellati 1996: 72; Buccellati – Kelly-Buccellati 1997: 80.

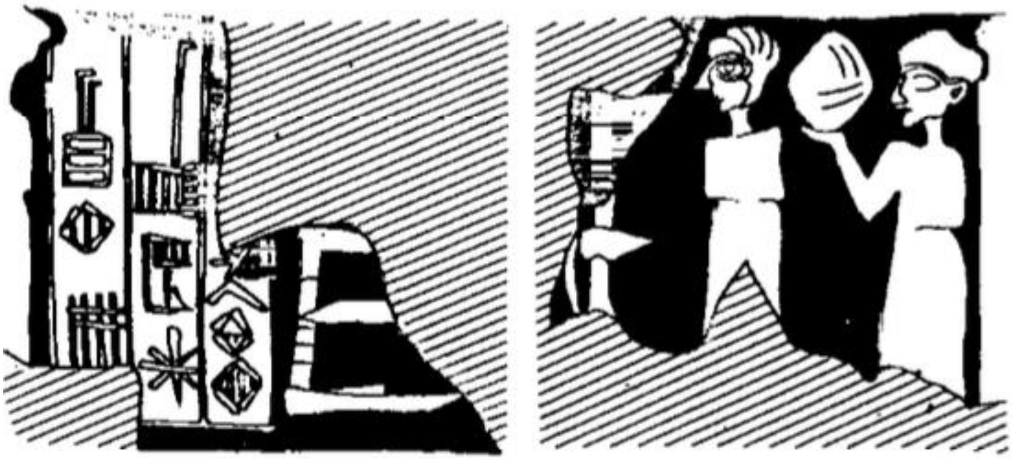

Fig. 19 – King's seal (k1) from Urkeš (Buccellati – Buccellati 1996: Fig. 6, detail).

In one attestation related to the opening ceremony of the door(s) of the temple of the goddess Ganana,[825] the expression "*zi-ri*$_2$ lu$_2$ kiĝ$_2$ siki" is found in place of "*zi-ri*$_2$ tur":

> [131] *ARET* 12.313+318 v. vii 8'–12': 1D *zi-ri*$_2$ siki / lu$_2$ kiĝ$_2$ siki / ĝeš-ĝal$_2$-taka$_4$ / kan$_4$ / ^{d}*ga-na-na* "1 yarn of wool, (corresponding to a) kiĝ$_2$ measure of wool, for the opening (ceremony) of the door of (the temple) of DN."

> [132] *ARET* 3.467 r. viii 16–19: 1D *zi-ri*$_2$ siki tur / ĝeš-ĝal$_2$-taka$_4$ / kan$_4$ / ^{d}*ga-na-na* "1 small yarn of wool, for the opening (ceremony) of the door of (the temple) of DN."

> [133] *ARET* 4.25 r. v 1–4: 1D *zi-ri*$_2$ siki tur / ĝeš-ĝal$_2$-taka$_4$ / 2 ⟨ kan$_4$ / ^{d}*ga-na-na* "1 small yarn of wool, for the opening (ceremony) of two doors of (the temple) of DN."

As a rule, lu$_2$ is used to specify the individual value of each piece of a group of stored textiles, expressed in measures of wool:

[825] On this ritual, see Pasquali 2013.

> [134] *ARET* 1.12 (= *MEE* 2.21) o. iii 4–8: 1◗ gu-dul$_3$^{tu9} gegge / lu$_2$ 10 ◖ siki na$_4$ “1 black g. textile, (that made of) 10 na$_4$ measures of wool.”

Thus, the attribute “tur” refers to a *zi-ri*$_2$ consisting of a kiĝ$_2$ and not 2 kiĝ$_2$. This evidence would suggest that *zi-ri*$_2$ should be identified with preform wool product, although likely further processable, rather than a unit of measure. The value of a *zi-*ri$_2$ would normally correspond to the value of 2 kiĝ$_2$ measures, and in its tur variant to 1 kiĝ$_2$ measure:

> [135] *ARET* 12.1303 o.? i’ 1–2[826]: 1◗ kiĝ$_2$ siki [*z*]*i-ri*$_2$ / ĝeš-ĝal$_2$-taka$_4$ … “1 kiĝ$_2$ measure of wool (in the form of) a yarn for the opening (ceremony) …”

Furthermore, a number of measurement standards emerge from the Ebla texts, often indicated by the presence of the preposition *al*$_6$. It establishes the value of the standard, which corresponds either to na$_4$ maḫ or na$_4$ tur[827]:

> [136] *ARET* 1.15 (= *MEE* 2.2) r. x 6–8: 3◗ *MI-AT* kiĝ$_2$ siki / *al*$_6$ / na$_4$ maḫ “300 kiĝ$_2$ measures of wool, according to the heavy standard.”

> [137] *ARET* 20.12 r. v 12–vi 7: 4◗ *MI*<-*AT* > 60◗ 20◖ kiĝ$_2$ siki / 4◗ *MI*<-*AT* > 60◗ 20◖ guruš / 2 ∢ na$_4$ siki / šu ba$_4$-ti / *ap* / 2◗ na$_4$ siki / ⸢*al*$_6$⸣ / 2 ∢ na$_4$ maḫ “480 kiĝ$_2$ measures of wool, (for) 480 male workers (at a rate of) 2 na$_4$ measures of wool (each) have been received, also

[826] In the photograph (kindly shown to me by Amalia Catagnoti), there is no room for a number preceding the term *zi-ri*$_2$.

[827] According to Powell (1971: 198–202), in the Sargonic and Ur III periods, the na$_4$ maḫ did not represent a separate standard but instead referred to imprecise one-talent stone weights (Bartash 2019: 134ff.). Unlike later documents, in Ebla texts the meaning of na$_4$ maḫ clearly refers to a heavier standard used for wool. This expression is mentioned in EDPV-A no. 101 (Civil 2008: 79). Here a translation of the passage *ARET* 1.15 (= *MEE* 2.2) r. x 7–8: *al*$_6$ / na$_4$ maḫ is given as: “according to the heavy weight system.” Although unattested in Ebla Lexical Lists, the same should apply to na$_4$ tur. *Contra* Archi 2018: 35 understands the expression siki na$_4$ maḫ as “wool for the skilled (men)” and na$_4$ tur as “wool for the unskilled (men).”

(these) 2 na$_4$ measures of wool (are to be counted) according to the heavy standard."

Some attestations show a crasis of the expression "na$_4$ *al*$_6$ na$_4$ tur/ maḫ":

[138] *ARET* 15.22 r. vii 11: 30 siki kiĝ$_2$ na$_4$ maḫ "30 kiĝ$_2$ measures of wool, (according to the) heavy standard."

[139] *ARET* 12.909 r. v' 11–12: 20 kiĝ$_2$ siki *ba-ra-i* / 10-la$_2$-2 dumu-mim 5 na$_4$ maḫ "20 kiĝ$_2$ measures of selected wool (for) 8 daughters (of the king), 5 na$_4$ measures each, (weighed according to the) heavy standard."

[140] *ARET* 20.9 o. x 21 – xi 8: 60 3 kiĝ$_2$ siki *ba-ra-i* / 2 na$_4$ tur / tu$_9$-tu$_9$ / abba$_2$ / al$_6$-tuš / $^{\text{ĝeš}}$uštil "63 kiĝ$_2$ measures of chosen wool, 2 na$_4$ measures each (according to the) light (standard), (for) the textiles of the elderly who sat at the throne (of the king)."[828]

Other passages of more difficult interpretation are[829]:

[141] *ARET* 3.231 r. v' 3–6: 1 siki na$_4$ niĝ$_2$-sam$_2$ 1 ib$_2$-3 -tu$_9$ babbar / 20 1 siki kiĝ$_2$ maḫ / *i-ti-a-gu*$_2$ / šu ba$_4$-ti "1 na4 measure (of) wool (is) the price of 1 triple folded white waistband (or skirt), 21 kiĝ2 measures (according to) the heavy standard(?), PN has received."

[142] *ARET* 4.13 r. xiv 13–le.1: šu-niĝen$_2$ 4 *LI-IM* 30 2 ½ $^{\text{ĝeš}}$kiĝ$_2$ siki maḫ / iti *ḫa-li-du* "Grand Total: 4,032 ½ ĝeškiĝ2 measures (according to) the heavy standard(?), 5th month."

[828] Archi 2018: 221 "elders who sat at the throne (of the king)," possibly referring to the elderly at the court of the king.

[829] It is unclear whether these passages can be referred to an even shorter crasis of the same expression; in any case, they likely refer to two different variants, *i.e.*, light (tur) and heavy (maḫ), of different units of measure.

> [143] *ARET* 15.39 r. iv 17–v 4: 2D siki kiĝ$_2$ *ba-ra-u*$_9$ maḫ / 1D tu$_9$:du$_8$ / en / *nu-za-ru*$_{12}$ / šu ba$_4$-ti "2 kiĝ2 measures (of) selected wool (according to) the heavy standard(?), (for) 1 felt, (for) the King, PN has received."

> [144] *ARET* 4.13 r. xiii 5–9: 1D $^{\hat{g}e\check{s}}$kiĝ$_2$ siki tur / i$_3$-ĝeš-saĝ / ^{d}*ga-na-na* / *in* u$_4$ / *a-ba-i* ""1 kiĝ2 measure (of) wool (according to) the light standard(?), (for) the "(rite of) the olive oil (used) for head (cleaning of) DN in occasion (of the rite in the) ipogeum."

In addition to administrative texts, the weight standards are also present in Ebla chancery texts, where two passages refer to the "na$_4$ lugal" (*i.e.*, the weight (standard) of the king) which is well attested in later texts from Mari[830] (see above). As for the actual weight of each measure, Ebla texts do not record the shekel equivalent of the wool; therefore, the absolute value of the measures referring to the wool must be derived elsewhere. In this sense, the archaeological findings of Palace G and some comparable standards of wool measures can be helpful. Two hemispherical basaltic weights found in L. 2712 can be related to the weighing of wool (666.1 g and 1132 g, respectively).[831] These two weights are marked by a vertical groove with horizontal incisions[832] (Fig. 20).

[830] Chambon 2011: 147–148. Note how the general context of the chancery text *ARET* 13.15 also refers to Mari.

[831] Archi 1987a: 58–59, nos. 23, 25; Ascalone – Peyronel 2006: 90–92, 113–121, 186–189, cat nos. 56, 58; Peyronel 2014: 127. They were found together with the other three weights in L. 2712.

[832] For the interpretation of the two incisions, see below.

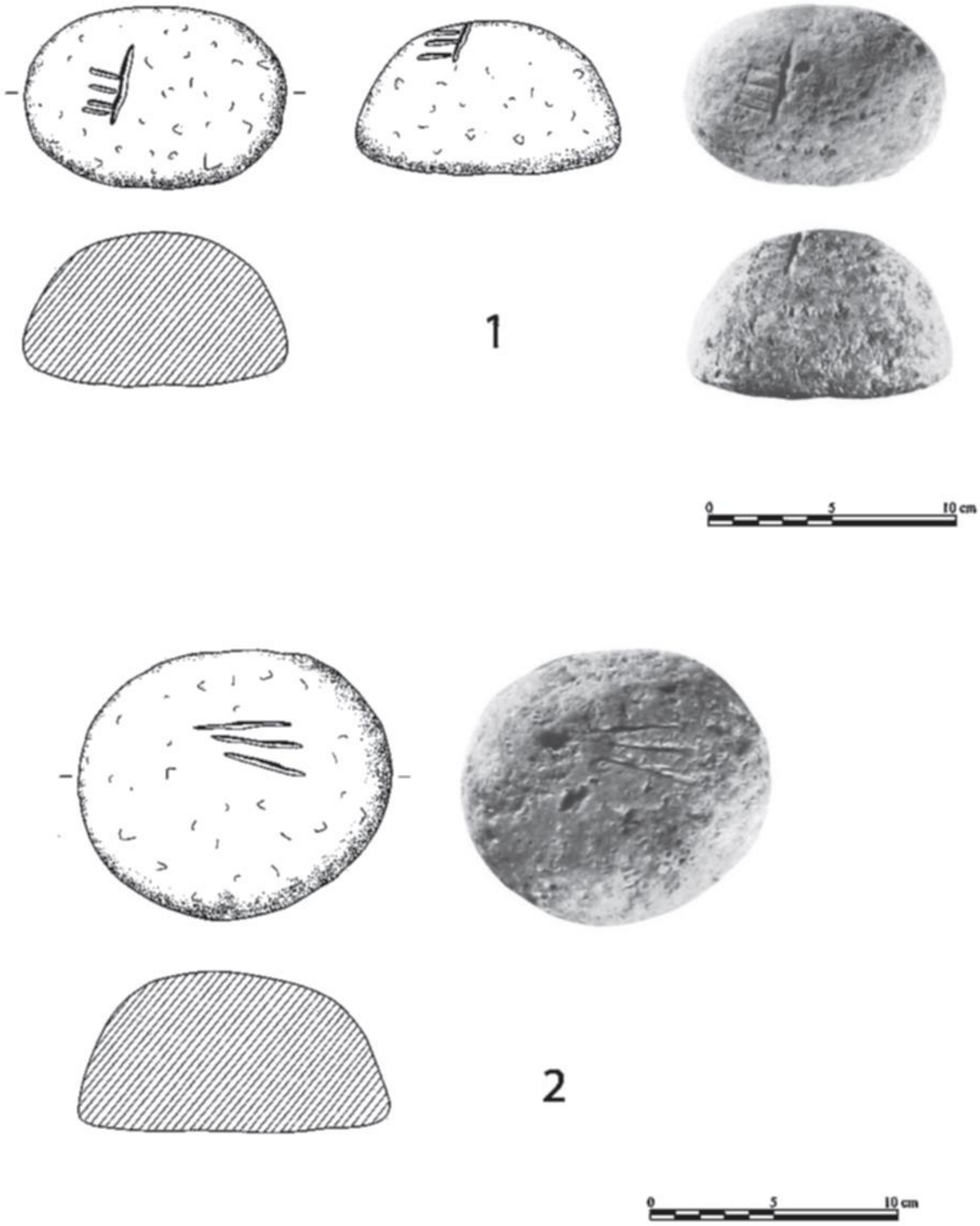

Fig. 20 – Balance stone weights (1: TM.75.G.1207; 2: TM.75.G.1210) from Royal Palace G related to the wool system used within the Great Archive (L. 2769). (Peyronel 2014: 127).

Although there is no direct evidence of a correlation between this weighing system and the metrological measures attested by the written documents, the use of weights linked to the wool system has also been noticed elsewhere outside Mesopotamia.[833] Moreover, the set of Ebla weights could indeed fit the measurement system used in the texts. We know that the middle Babylonian Nuzi's measure *kuduktu* corresponded to 80 shekels[834] and probably weighed ~ 664–680 g; moreover, it is known to have represented the weight of one sheep's fleece.[835] If we look at Ebla's weight of 666.1 g, it fits perfectly within this weight range. Moreover, both interpretations evince a correlation with finding a weight from ED IIIb Lagaš, which weighs 680.5 g and bears the inscription "one wool mina…"[836] In Ebla sources, the fact that the kiĝ$_2$ corresponded to the wool of a sheep is determined by comparing the ritual (*ARET* 11.1, *ARET* 11.2) and the administrative texts. In both versions of the ritual for the renewal of the royalty, the queen gives a woman the wool of two sheep for the weaving of the *maš-da-bu*$_3$ (a particular textile used in the ritual):

> [145] *ARET* 11.1 o. v 8–15: [tu$_9$-nu-tu]ku$_5$ / [*ma-ri*$_2$*-a-tim*] / [*ma-lik-tum*] / ḫ[i-mu-du] / si[ki] / [2 udu] / [*maš-da-bu*$_3$] / [*ma-ri*$_2$*-a-tim*] "To the weaver of the robes in the style of Mari the queen gives the wool of

[833] At Tepe Gawra, a double mina of 680 g was found. At Byblos, fractional values of the wool mina ($^1/_2$ and $^1/_4$) are attested. Moreover, their absolute values fit well into the above-mentioned Eblaic system (Ascalone – Peyronel 2006, 301–302, TGA. 27 (Tepe Gawra), 281–282, BI. 128–129, 146 (Byblos). However, these latter weights cannot be precisely dated and may be later than the Gawra and Ebla specimens (Peyronel 2012: 128).

[834] Zaccagnini 1999–2001: 52 assumes a tolerable approximation for the Mesopotamian shekel (*i.e.*, 8.3–8.5 g).

[835] Zaccagnini 1999–2001: 52; previously, Zaccagnini 1990: 316 and Wilhelm 1988: 278–279.

[836] The actual inscription is: 1 ma-na du-du saĝĝa URU×A^{ki} "1 mina, Dudu, the chief administrator of (the city) Arawa" (see Bartash 2019: 130). The piece, as a unit of 80 Mesopotamian shekels, weighs 8.5 g (Zaccagnini 1990: 317). Also, Zaccagnini pointed out how, at the end of the 3rd and beginning of the 2nd millennia, there is also some evidence for fleeces whose weight was established at 1 $^1/_3$ mina (80 shekels) (Waetzoldt 1972: 22).

two sheep for the flounces of the robes in the style of Mari <to be woven>."[837]

[146] *ARET* 11.1 o. vii 2'-11': *wa* / tu$_9$-nu-tuku$_5$ / *ma-ri*$_2$*-a-tim* / *ma-lik-tum* / ḫi-mu-du / siki / 2𒁹 udu / *maš-da-bu*$_3$ / *ma-ri*$_2$*-a-tim* / tu$_9$-nu-tuku$_5$ "To the weaver of the robes in the style of Mari the queen gives the wool of two sheep for the flounces of the robes in the style of Mari <to be woven>."

In administrative texts, the amount of wool given to weaving the *maš-da-bu*$_3$ corresponds to 2 kiĝ$_2$ or a *zi-ri*$_2$, sometimes together with a tu$_9$-NI.NI:

[147] *ARET* 15.9 (= *MEE* 2.33) r. vi 9–13: 2𒀸 siki kiĝ$_2$ / dam / kin$_5$-AK / *maš-da-bu*$_3$ / NE-*na-aš*$_2$^{ki} "2 kiĝ$_2$ measures of wool to the woman (for) preparing the *m.* of DN."

[148] *ARET* 15.10 (= *MEE* 2.37) r. xi 12–15: 1𒀸 *zi-ri*$_2$ siki / dam / kin$_5$-AK / *maš-da-bu*$_3$ "1 yarn of wool to the woman (for) preparing the *m.* of DN."

[149] *ARET* 15.13 (= *MEE* 2.41) o. iii 9–13: 1𒀸 tu$_9$-NI.NI 2𒁹 kiĝ$_2$ siki / dam / kin$_5$-AK / *maš-da-bu*$_3$ / NE-*na-aš*$_2$^{ki} "1 soft textile, 2 kiĝ$_2$ measures of wool to the woman (for) preparing the *m.* of DN."

Considering that a sheep's wool yield varies according to breed, age, climate, and diet, it has been estimated from textual sources that the raw wool yield per mature sheep (in one year) in Mesopotamia would have been about 0.7–1.12 kg. At the same time, 0.5–1 kg (with a concentration of just over 750 g) in the societies of the Aegean.[838] Regarding Ebla sources, Archi estimates that 80,000 head of mature

[837] Fronzaroli (1993: 55) translates as: "Alla tessitrice delle vesti alla foggia di Mari la regina consegna la lana di due pecore per le balze delle vesti alla foggia di Mari 'da tessere'." On the *maš-da-bu*$_3$, see Pasquali 2013: 50ff and fn. 58, with literature.

[838] Andersson Strand 2014: 44 with literature. For other coherent examples, see Abrahami 2014: 290 with literature.

sheep produced an average of 800 grams of wool each.[839] However, he does not elaborate on his statement. Considering the weight of 666 g found at Ebla, it almost agrees with the figures estimated for Mesopotamia and the Aegean. Nonetheless, Ebla sheep may have been sheared twice a year, making the figure of 666 g that of a single shearing operation; or, on the other hand, it is possible that this quantity was the weight of refined (*i.e.,* polished and spun) wool.[840] Accordingly, the Ebla basaltic weight of 666.1 g would correspond to the kiĝ$_2$, and the weight of 1132 g to its double (corresponding to a *zi-ri*$_2$). Therefore, the na$_4$, kiĝ$_2$, and *zi-ri*$_2$ would correspond to 40, 80, and 160 Mesopotamian shekels (8.3 g), respectively.[841] The kiĝ$_2$ measure would correspond to the weight of one sheep's fleece,[842] as the "Ebla's wool mina," which interrelates with other balance standards[843]:

TM.75.G.1210

1,332 g = 1 "Ebla double wool mina"

= 1 Dilmun mina 1,332 g[844]

= 160 Mesopotamian shekels (8,32 g) = 2 $^2/_3$ minas of 499.5 g

[The engraved indication on the weight stone is 3 Western minas (-6%) of 444 g][845]

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839 Archi 1993a: 47.

840 Andersson Strand 2014: 44 on weight loss in the preliminary elaboration of wool.

841 Accordingly, 1 na$_4$ would have weighed 333 g.

842 *Contra* Peyronel (2014: 128) postulates that the heavier unit, the *zi-ri*$_2$, corresponded to the mina of wool as the equivalent fixed weight of a sheep's fleece. However, the correspondence between Nuzi's *kuduktu* and Ebla's kiĝ$_2$ shows otherwise.

843 Zaccagnini 1999–2001: 40, 48–49. The marks indicate the metrological relation between the western mina of c. 470 g and the other minas (see below). *Contra* Archi (1987b: 47–48) wrote that the marks might be interpreted as 1+$^1/_5$, 1 +$^2/_5$, whereas De Maigret (1980: 165–167) considered the signs to indicate 1+$^1/_6$, 1 +$^1/_3$.

844 Zaccagnini 1990: 318.

845 Zaccagnini 1999–2001: 50.

TM.75.G.1207

666 g = 1 $ki\hat{g}_2$ "Ebla wool mina"

= 100 shekels of 6.66 g[846] (*i.e.*, ½ Dilmun mina of 1,332 g)

= 80 Mesopotamian shekels of 8.32 / 8.5 g = 1 $^1/_3$ Mesopotamian mina of 499.2 g (alternatively, 1 3/5 of a 50-shekel Mesopotamian mina of 416 g

= 70 shekels of 9.51 g (*i.e.*, 1 $^2/_5$ western mina of 475.71 g)

[The engraved indication on the weight stone is 1 $^2/_5$ western mina][847]

This richness of wool attestations, which are distributed throughout the whole life span of the Palace G archives, proves a useful tool for dating the Ebla texts. Indeed, by carefully studying the tablets that record allocations of wool quantities, it is possible to highlight certain graphotactics trends and paleographic styles that can be anchored to precise chronological phases. In the Ebla texts, with the same syntactic elements, certain graphotactics variants can be distinguished, which in turn can be anchored in three of the four different phases of the archive (Chapter 1), namely *phases* II, III and IV. In general, the variety of attestations can be traced back to two main types, depending on the graphotactic order of the unit of measurement[848]:

(A) *n* · M · siki

[846] Also, several small spherical hematite weights from the palace have masses clustered around the value of 6.6 g or its ten-fold multiple of 66 g. (Peyronel 2014: 126).

[847] Zaccagnini 1999–2001: 50.

[848] Although it is unclear whether—and to what extent—one can speak of *zi-ri*$_2$ as a unit of measure, for these elements describing a fixed quantity of wool (corresponding to two $ki\hat{g}_2$) behave consistently like $ki\hat{g}_2$ and na_4.

(B) *n* · siki · M

The presence of the syntactic variant (B) "*n* · siki · M" clearly emerges in texts datable to *phase* II. In these attestations, the signs are freely arranged in the tablet where space allows; however, the reading order is clearly indicated by the presence of the metrical element that precedes the typological siki element. In general, looking at the charts, one can see that 87.2% of the attestations referable to this phase are of type (B) "*n* · siki · M." In detail, we observe how in the case of na$_4$, all attestations are of type (B). In the case of the kiĝ$_2$ measures, 87% are of type (B) and only 13% of type (A), whereas for *zi-ri*$_2$, 90% are of type (B) and only 10% of type (A):

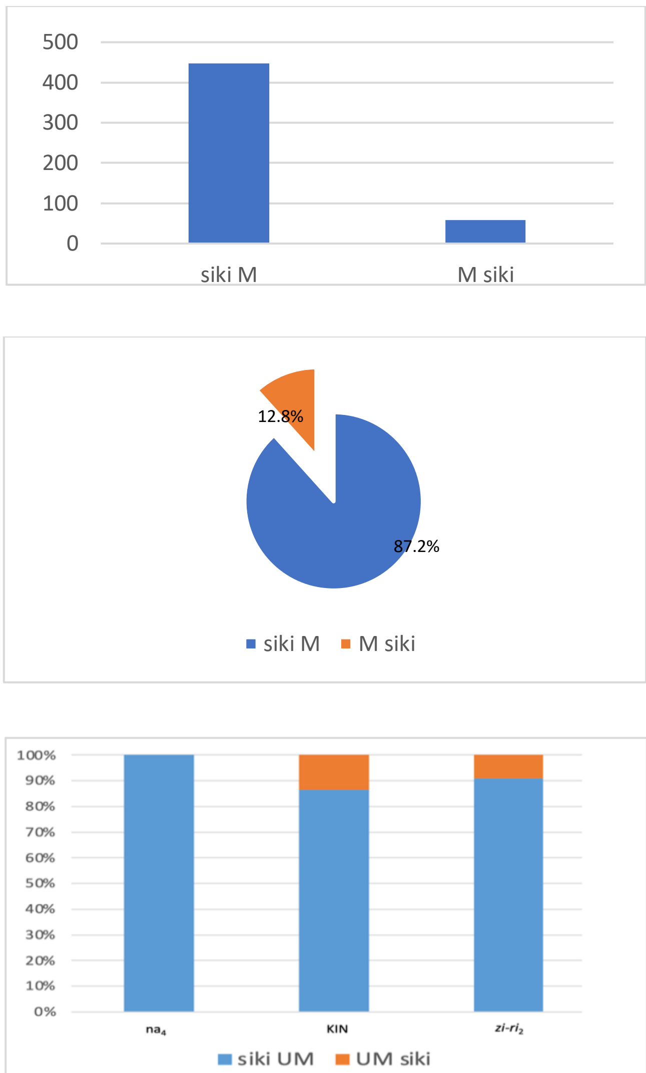

Fig. 21 – Distribution of attestations in the texts dated to *phase* II.

From an analysis of the texts, it can be seen that type (B) *n* siki kiĝ$_2$ and *n* siki *zi-ri*$_2$ attestations can be dated only to *phase* II, whereas type (B) *n* siki na$_4$ attestations also appear in later texts. Therefore, we observe how the presence of the spelling *n* siki na$_4$ is not in itself sufficient to date a text to *phase* II, but it is necessary for one of the variants, *n* siki *zi-ri*$_2$ or *n* siki kiĝ$_2$, to co-occur:

> [150] *ARET* 19.1 o. iv 9–12: 10◐-la$_2$-2ᐸ siki na$_4$ / dumu-mim dumu-mim / NE-di / sa-za$_x$(LAK 384)^{ki} "8 na$_4$ measures (of) wool, (to) the young female dancers (of) GN."

> [151] *ARET* 15.9 (= *MEE* 2.33) r. vii 6–7: 20◐ siki kiĝ$_2$ / *a-du-ur* "20 kiĝ$_2$ measures (of) wool to PN."

> [152] *ARET* 15.9 (= *MEE* 2.33) r. viii 4–6: 1ᗪ siki *zi-ri*$_2$ / ugula sur$_x$(EREN$_2$)-kunga$_2$ / *kam*$_4$*-da-mu* "1 yarn (of) wool (to the) overseer of mule teams, PN."

In fact, the text [150] pertains to *phase* III, whereas both [151] and [152] pertain to the same text written during *phase* II. As for the lower percentages displayed in Fig. 21—that is, the cases in which the variants (A) *n* kiĝ$_2$ siki and *n zi-ri*$_2$ siki appear—it is worth noting a few elements. Starting with *zi-ri*$_2$, the 10% of attestations shown in the chart amount to only five cases, which can be traced to a total of three texts: *ARET* 15.16, *ARET* 15.28 and *ARET* 15.37:

> [153] *ARET* 15.16 r. viii 14: 5ᗪ *zi-ri*$_2$ siki sa$_6$ "5 yarn (of) good quality wool."

> [154] *ARET* 15.16 r. viii 16: […] 1ᗪ *zi-ri*$_2$ siki "1 yarn (of) wool."

> [155] *ARET* 15.16 r. ix 3: 5ᗪ *zi-ri*$_2$ siki "5 yarns (of) wool."

> [156] *ARET* 15.28 r. ix 12: 1ᗪ *zi-ri*$_2$ siki "1 yarn (of) wool."

> [157] *ARET* 15.37 o. xii 6: 1ᗪ *zi-ri*$_2$ siki "1 yarn (of) wool."

In *ARET* 15.16, together with the syntax *n zi-ri*$_2$ siki, one can find the two variants, (A) *n* kiĝ$_2$ siki and (B) *n* siki kiĝ$_2$. Attestations concerning type (A) appear only in the following passages:

> [158] *ARET* 15.16 r. xii 4: 4ᗞ kiĝ$_2$ siki sa$_6$ "4 kiĝ$_2$ measures (of) good quality wool."

> [159] *ARET* 15.16 r. xii 5: 2ᗞ kiĝ$_2$ siki ḫulu "4 kiĝ$_2$ measures (of) low quality wool."

> [160] *ARET* 15.16 r. xiii 16: 1ᗞ-*LI-IM* 2ᑌ-*MI-AT* 20◖1ᗞ ½ᑌ kiĝ$_2$ siki "1221 (and) ½ kiĝ$_2$ measures (of) wool."

In both *ARET* 15.28 and *ARET* 15.37, one can find only the variant (A) *n* kiĝ$_2$ siki. Both texts are dated to the months *za-ʾa*$_3$*-na-ad* (*ARET* 15.28) and *ʾa*$_5$*-nun-na-ad* (*ARET* 15.37) instead of the most common spellings, *za-ʾa*$_3$*-na* e *ʾa*$_5$*-nun-na*.[849] This point may suggest the presence of a common scribal style, at least for these two texts. Moreover, it is known that in the texts after *phase* II, writings with kiĝ$_2$ and *zi-ri*$_2$ are always of type (A). As for the *zi-ri*$_2$ is involved, the arrangement of the signs in the case, while maintaining this order, is quite free—whereas for kiĝ$_2$, the arrangement of this sign and the siki sign tends to crystallize into a standardized interlocking structure:

> [161] *ARET* 20.24 r. ix 5: 1ᗞ-*MI-AT* [5]0◖ kiĝ$_2$ siki "150 kiĝ$_2$ measures (of) wool."

> [162] *ARET* 15.28 r. i 11: 2ᗞ tu$_9$-NI.NI 2ᑌ siki kiĝ$_2$ "2 soft textiles, 2 kiĝ$_2$ measures (of) wool."

> [163] *ARET* 15.28 r. x 1: 2ᗞ kiĝ$_2$ siki "2 kiĝ$_2$ measures (of) wool."

849 The text *ARET* 16.16 is dated to the 1st month.

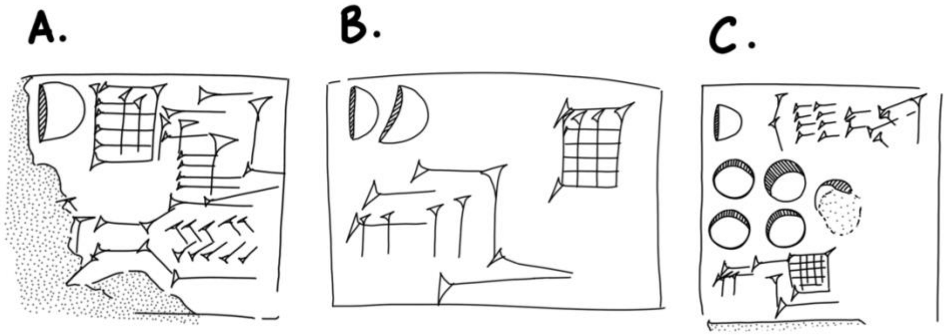

Fig. 22 – *ARET* 3.180 o. v’ 1 (A); *ARET* 15.28 r. i 11 (B); *ARET* 20.24 r. ix 5 [161] (C).

The development of this standardized and interlocking structure can be identified in those cases that are datable to *phase* II but in which the graphotactic variant *n* kiĝ2 siki appears. In detail, *ARET* 15.28 shows the presence of different graphotactic techniques leading to the formation of the interlocking structure. In *ARET* 15.28 v. i 11, the graphotactics arrangement is of the n siki kiĝ2 type, whereas in r. x 1, an interlocking structure is seen:

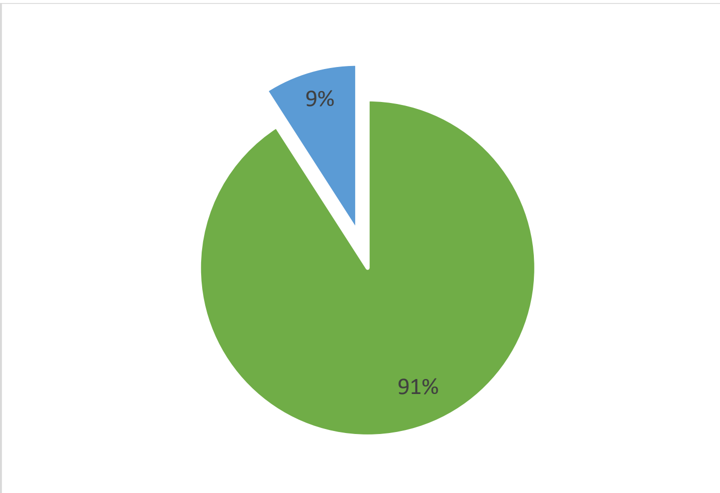

Fig. 23 – Distribution of the attestations of the type *n* siki *zi*-*ri*2.

The second chronological marker concerns the unit of measure kiĝ2, and in particular the presence of its variant ĝeškiĝ2. A complete examination of the available documentation made it possible to attribute, with certainty, the texts containing the writing ĝeškiĝ2 to *phase* III. Even if all texts containing the variant

^{ĝeš}kiĝ$_2$ pertain to *phase* III, not all documents belonging to this phase present this sole variant. In fact, some of the texts have both variants or, alternatively, only the kiĝ$_2$ variant[850] Moreover, as already mentioned above, we observe how the presence of variant (B) *n* siki na$_4$ continues homogeneously in *phase* III:

[164] *ARET* 4.12 r. v 14: 6 ^{ĝeš}kiĝ$_2$ siki "6 ^{ĝeš}kiĝ$_2$ measures (of) wool."

Finally, the last chronological marker concerns the unit of measure na$_4$, which appears in variant (A) *n* na$_4$ siki, only in the texts attributable to *phase* IV. As in the case of the spelling ^{ĝeš}kiĝ$_2$ for *phase* III, also in this case, the variant (A) *n* na$_4$ siki, although present exclusively in the texts of *phase* IV, does not appear as the only variant, but rather appears together with the spelling (B) *n* siki na$_4$.[851]

[165] *ARET* 20.19 r. xii 13: … 4 -*MI*-*AT* 60 10 2 na$_4$ siki ib$_2$-4 ^{tu9}
"… 472 na$_4$ measures (of) wool (for) quadruple folded waistbands (or skirts)."

The in-depth study of graphotactics, approached from a diachronic dimension, reveals a perspective on the development of strategies in the organization of signs within boxes, but also information on the chronology of Ebla's texts relating to the monthly allotments of textiles, a category of texts that, per se, presents few chronological indications.

2.2.7. Other uses of numerals

This section deals with the other uses of numerals. Data on the topic are provided by four out of the five corpora (*i.e.*, Ebla, Mari, Nabada, Šuruppag). Because it does not concern sets of units, this section is structured differently from the others. In particular, it does not include the descriptive charts found elsewhere in this chapter.

[850] However, to determine whether this fact depends on a precise scribal style or other factors, a deeper study of the paleography of the texts at our disposal is necessary.

[851] In this sense, see, *e.g.*, all texts referable to *phase* III published in *ARET* 19.

2.2.7.1 Numerals as qualifiers

This first feature is attested only in the Ebla corpus. Here, numbers are also used to qualify names (regardless of whether they refer to individuals or different items).

2.2.7.1.1. Ebla (Tell Mardīkh)

In Ebla texts, cuneiform numbers are often placed within or after lexical signs (*i.e.*, syllabic clusters and or logograms) with the purpose of defining and classifying the noun itself.[852] Most frequently attested are names referring to textiles, which are often classified according to their quality type. For example, one can distinguish the following quality types of fabrics, which usually compose a set of fabrics given to individuals related to the palace administration.

(1) ʾ*a*$_3$(-*da-um*^{tu9})

Fabrics of the ʾ*a*$_3$(-*da-um*^{tu9}) type have been interpreted as “cloak” or “robe.”[853] These fabrics are qualified with cuneiform arithmograms ranging from 1 to 3 ($1 < n < 3$). More frequently, these fabrics are qualified through oblique cuneiform signs (𒀹),[854] and much less frequently through vertical cuneiform (𒁹)[855] or horizontal cuneiform (𒀸) signs.[856] Because cuneiform numerals usually convey a multiplicative value, the numeral may indicate that it was single (-1𒀹) or “folded” (-2𒀹).[857] Because the oblique disposition of numerals reduces ambiguity in the

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[852] The use of cuneiform signs depends on several criteria. Firstly, cuneiform numbers are smaller than curviform numbers and fit better within other signs. Secondly, such notation allows disambiguation between the number of items counted and its classification. Thirdly, cuneiform arithmograms often convey the presence of multiplication, which may be functional to the classification of the item itself. For example, ib$_2$-3𒁹^{tu9} are fabrics folded three times (3×).

[853] Archi 1999b: 45; cf. Pasquali 1997: 218–220. The etymology may be related to Ug. **ḥtl* “to wrap, to cover,” from a root characterizing wrapped clothes.

[854] See, *e.g.*, *ARET* 1.1 o. iv 3.

[855] See, *e.g.*, *ARET* 12.343 o. i 4.

[856] See, *e.g.*, *ARET* 12.712 r. iii’ 1’.

[857] In this respect, Archi 1999a: 311 (and, previously, Archi 1985: 227) also suggested a possible meaning related to a weaving technique.

reading of the case, one may assume that it is the preferable choice. No difference in meaning appears to occur in this variation. A possible “three folded(?)” cloak is attested in *ARET* 12.343 o. i 4, *ARET* 12.343 o. i 14 and *ARET* 12.93 o. i 4. However, by looking at the photos of the texts, only the attestation in *ARET* 12.343 o. i 4 presents this variant.[858]

(2) dul$_{3}^{\mathrm{tu9}}$

The term dul$_{3}$-tu$_{9}$ indicates a cloak of some kind[859]; it is sporadically attested as a qualified item. Here, arithmograms shaped as cuneiform oblique signs (𒀹) may indicate “folded” variants of the cloak, like for *ʾa*$_{3}$(*-da-um*$^{\mathrm{tu9}}$) fabrics. To my knowledge, only seven attestations are available.[860]

(4) ib$_{2}^{\mathrm{tu9}}$

Fabrics of the ib$_{2}^{\mathrm{tu9}}$ possibly indicate a belt in the form of a waistband,[861] or alternatively a skirt that can be rolled up the hips.[862] The term ib$_{2}$ (lit. “hips”) appears as a bilingual entry in the *VE* 867: ib$_{2}$ = *ga-ba-a*, which may be possibly reconstructed as a dual /qablā(n)/, meaning “the two hips.”[863] In most cases followed by a numeral between 1 and 6. In those case where the numeral is embedded within the sign (ib$_{2}$+*n*), the type of numeral used is vertical (𒁹),[864] whereas in those case where the numeral is placed outside within the sign (ib$_{2}$-*n*),

[858] I would like to thank Amalia Catagnoti for personally providing me with this information.

[859] Archi 1999b: 50, no. 6.

[860] They are: *ARET* 7.133 o. ii 3; *ARET* 4.2 r. vii 15; *ARET* 4.11 r. vi 6; *ARET* 3.378 o.$^{?}$ iv’ 4’; *ARET* 4.11 r. iii 1; *ARET* 4.11 r. iv 4; *MEE* 10.20 r. ii 14.

[861] Waetzoldt 1980–1983: 23; Archi 1999b: 45.

[862] Pasquali 1997: 71.

[863] Hajouz 2013: 541–542 (with bibliographical references) and, more recently, Bonechi – Catagnoti 2020: 167.

[864] See, *e.g.*, *ARET* 1.5 (= *MEE* 5.10) o. xi 5 and *ARET* 1.1 r. ix 8.

the type of numeral used is oblique ().[865] This type of notation occurs only with 1 < *n* < 3.[866]

(5) gu-mug^{tu9}

Textiles of the gu-mug^{tu9} type[867] may represent cheap woolen cloth, perhaps made with leftover wool scraps; it could be a simple a kilt, originally made of shoddy wool.[868] The term is attested as an entry in the VE 862, although it is not glossed. The gu-mug^{tu9} occasionally appears in two alternative versions qualified by arithmograms (1 or 2), usually written with vertical signs ().[869]

Concerning objects that are different from textiles and fabrics, qualifications of wagons (^{ĝeš}gigir$_2$) are also attested:

(6) ^{ĝeš}gigir$_2$

The term ^{ĝeš}gigir$_2$ means "wagon."[870] The lexicon concerning this type of wagon has been studied in depth by Giovanni Conti.[871] In the VE, the following entries (VE 355–358) appear: ^{ĝeš}gigir$_2$-e$_2$-4, ^{ĝeš}gigir$_2$-4, ^{ĝeš}gigir$_2$-2, and ^{ĝeš}gigir$_2$-šum$_2$-4. Conti interprets them as wagons with different sets of wheels, but this interpretation has yet to be proven. Some of them are often quoted in administrative texts. One example is the ^{ĝeš}gigir$_2$-2/,[872] "two-wheel(?) wagon."[873] Less frequent

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[865] The ib$_2$+*n* notation is mostly used in *phase* III and *phase* IV texts, with a few exceptions in *phase* II texts. In this phase, many occurrences are of type ib$_2$-*n*.

[866] See, *e.g.*, *ARET* 12.135 r. iii' 1' (with 1); *ARET* 1.8 (= *MEE* 7.3) o. i 1 (with 2); and *ARET* 12.36 i' 3 (with 3).

[867] Civil 1984: 85–86; Archi 1999b: 47; Pasquali 2016.

[868] Archi 1999a: 313. See also Sallaberger 2009: 256 "Wollrest-Fade-Tücher."

[869] See, *e.g.*, *ARET* 3.9 o.$^{?}$ ii' 5.'

[870] Catagnoti – Lahlouh 2006: 539.

[871] Conti 1997.

[872] See, *e.g.*, *ARET* 2.15 (= *MEE* 7.20) r. vi 1. See also the following variant in *ARET* 3.185 o.$^{?}$ i 2: 2 ^{ĝeš}gigir$_2$-šum$_2$-2 *ša-bir*$_5$*-gi-nu* "2 two-wheel transport wagon."

[873] Conti 1997: 23.

are the $^{\text{ĝeš}}$gigir$_2$-4 /,[874] “four-wheel(?) wagon”[875] and the $^{\text{ĝeš}}$gigir$_2$-e$_2$-4 /,[876] “four-wheel(?) covered wagon.” Last, and least attested, is the $^{\text{ĝeš}}$gigir$_2$-šum$_2$-4 /, “four-wheel(?) transport wagon,”[877] also attested in Mesopotamia.[878] Furthermore, the following variant is also attested[879]:

> [166] *ARET* 15.39 r. iv 14: 4 siki kiĝ$_2$ 1 $^{\text{ĝeš}}$gigir$_2$-2 1

However, I cannot provide a clear translation for this type of attestation.

The numerical system for qualification is used for the following types of manufactures:

(7) *sa-ḫa-wa*

The term *sa*-(*ḫa-wa*)[880] /šaḫawa-ā(n)/, which means “(a pair of) pendants,”[881] is a dual form that may be compared with the lexical entry VE 388 $^{\text{ĝeš}}$geštu-la$_2$-KA[882] = *sa-ḫa-wa-tum* from **šḫw/y*, a form parallel to **šḫḫ* “to get loose, to lower oneself.”[883] The term is often written as *sa-ḫa-wa*-2. The number 2 may function to convey the idea of the dual (a pair of pendants).

> [167] *ARET* 2.7 r. ii 2: 5 *gu*$_2$ *sa-ḫa-wa*-2 “5 bracelets (with) a pair of pendants.”

[874] See, *e.g.*, *ARET* 15.27 r. xii 9.

[875] Conti 1997: 24

[876] See, *e.g.*, *ARET* 7.44 o. i 3.

[877] Fronzaroli 1993: 155 $^{\text{ĝeš}}$gigir$_2$-šum$_2$ “carro da trasporto (con quattro ruote).”

[878] Conti 1997: 26.

[879] In *ARET* 12.309, *passim*, the occurrences $^{\text{ĝeš}}$gigir$_2$-2-dele() should be emended as $^{\text{ĝeš}}$gigir$_2$-2-1. I thank Amalia Catagnoti for providing me with this information.

[880] Pasquali 2005: 173.

[881] See, *e.g.*, Edzard 1981: 137; Fronzaroli 1990: 118; Catagnoti – Lahlouh 2006: 567; Archi 2018: 272; Catagnoti 2019b: 93.

[882] Edzard 1981: 137.

[883] Fronzaroli 1990: 118, and fn. 27, with literature.

The hapax writing *sa-ḫa-wa*-1 in [168] may be an otherwise unattested form, possibly indicating a single pendant:

> [168] *ARET* 12.335+ r. iii 5’-6’: 3 ⸢*gu*$_2$⸣-*li-lum* [a-gar$_5$] ⸢ku$_3$⸣-si$_{22}$ [*sa-ḫa*]-*wa*[-2$^?$] / 1 *gu*$_2$-*li-lum* a-gar$_5$ ku$_3$-si$_{22}$ *sa-ḫa-wa*-1 “5 bracelets of brass and gold (with) a pair of pendants, 1 bracelet of copper and gold, (with) one single(?) pendant.”

(8) *gu*$_2$-*li-lum*

The term *gu*$_2$-*li-lum* means “bracelet.”[884] This type of jewelry and its abbreviated forms *gu*$_2$ and *gu*$_2$-*li*-[885] may be compared with the Akk. (Mari) *kulīlum*,[886] Variants of *gu*$_2$-*li-lum* are qualified through -1 or -2 arithmograms, possibly indicating single or double bracelets, respectively[887]:

> [169] *ARET* 7.114 o. i 1–2: šušana$_x$(ŠU$_2$+ŠA) ku$_3$-si$_{22}$ / 1 *gu*$_2$-*li-lum*-1 “20 (shekels) of gold, 1 single bracelet.”

> [170] *ARET* 7.59 o. i 1–2: 6 2-NI ku$_3$-si$_{22}$ / 1 *gu*$_2$-*li-lum*-2 “6 $^2/_3$ (shekels), 1 double bracelet.”

(9) *ab-si*

The term *ab-si*, with the meaning “embedded,”[888] often referred to *gu*$_2$-*li-lum*-bracelets and is mainly associated with the numeral -2.[889] Its meaning may

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[884] Catagnoti – Lahlouh 2006: 543 “bracciale.”

[885] Pasquali 2005: 137.

[886] See Pasquali 2005: 138 and Fronzaroli 1990: 118, fn. 26. He also refers to Pettinato 1979: 188, fn. 23; Edzard 1981: 127.

[887] Other arithmograms attached to the term *gu*$_2$-*li-lum* indicate the value (in shekels) of the object itself.

[888] Catagnoti – Lahlouh 2006: 512 and Archi 1988: 203 “incastonato.”

[889] In two instances, the numeral ‘1’ is attested (in *ARET* 7.116 o. i 1 and *ARET* 12.789 o.$^?$ ii’ 7). However, I can provide no satisfactory explanation for these two passages.

refer to a double form of the bracelets themselves, as they are often made of brass (a-gar$_5$) and gold (ku$_3$-si$_{22}$).

> [171] *ARET* 20.22 o. x 12: … 1 *gu$_2$-li-lum* a-gar$_5$ ku$_3$-si$_{22}$ *ab-si*-2 "1 bracelet with a double embedding of copper and gold."

(10) Intercalary months

In addition to classifying items, this notation is used to indicate the intercalary month, both in its version *ig-za*-2/ (found most often in the texts from the Great Archive [L. 2769]) and še-gur$_{10}$-ku$_5$-2[890] (mainly found in the texts from the Small Archive [L. 2712]).

> [172] *ARET* 19.15 (= *MEE* 2.40) r. viii 12: iti *ig-za*-2 "2nd intercalary month"

> [173] *ARET* 9.8 r. v 3: iti še-gur$_{10}$-⸢ku$_5$-2⸣ "2nd intercalary month"

(11) Personal and function names

Furthermore, the notation is used to disambiguate personal names in case of homonymy, as in:

> [174] *ARET* 1.13 (= *MEE* 2.7) o. xiii 23–xiv 1: *dab$_6$-da-ar* / *dab$_6$-da-ar*-2 "PN, PN-bis."

This notation also appears in association with some geographical names. This occurs when the geographical name is used metonymically in place of personal names, *e.g.*, for people from that area.[891] Here, attestations of type signs are predominant[892]:

[890] The numeral 2 is often transliterated as MIN$_3$. In *ARET* 9.104 r. ii 1, iti še-gur$_{10}$-ku$_5$-1 is attested.

[891] See, *e.g.*, *ARET* 8.524 (= *MEE* 5.4) r. viii 5: *gar$_3$-da*-NE-*du*^{ki}-2 "The man of GN-bis."

[892] See, *e.g.*, *ARET* 1.5 (= *MEE* 5.10) o. ix 14.

Lastly, this notation is used for the professional designation gu3-di-2𒌋 “evoker,”[893] as an alternative variant of gu3-di,[894] and for the professional designation ses-2𒁹/𒌋-ib, used to indicate the members of a religious congregation.[895] One final unclear occurrence pertains to the chancery text *ARET* 16.11, where the odd spelling maškim-2𒌋-ga occurs twice[896]:

> [175] *ARET* 16.11 r. iv 11–14: *wa /* du11-ga / *si-in* / 2𒌋 maškim-2𒌋-ga “instruct your two commissioners.”[897]

> [176] *ARET* 16.11 r. v 11–vi 4: *an-da /* maškim-e-ge4-*ma* / 2𒌋 maškim-2𒌋-ga / udu / šu mu-taka4 “You send your two commissioners the sheep mentioned above (in the tablet of PN).”[898]

2.2.7.2. Distributive notational formula

This feature is attested in the Ebla, Mari, Nabada, and Šuruppag corpora. Another use of numerals appears in some specific structured sentences. Here, arithmograms are used to express a distributive relation between different items involved in the sentence—for example, as in: “*y* items have been given to *x* people, and each of these people has therefore received K items”:

$$y = \mathrm{K} \cdot x$$

This feature is not consistently attested in the documentation analyzed in this dissertation, and it presents some differences in structure and occurrence.

893 See, *e.g.*, *ARET* 1.14 (= *MEE* 2.20) o. iii 12. Fronzaroli 1993: 155 “invocatore” (cf. LL gu3-di-2𒌋 / *ba-a-lu-um*, ⌜*ba-la-lum*⌝, *ba-a-lum*, **pll*). The term is further discussed in Bonechi 1989: 135–137; Conti 1990: 95; Fronzaroli 1992: 172.

894 See, *e.g.*, *ARET* 20.8 r. ix 21.

895 The term has been studied in Archi 2002b.

896 Catagnoti – Fronzaroli 2010: 87 dismiss the sign maškim-{2}-ga.

897 See the translation in Catagnoti – Fronzaroli 2010: 86 “ordina ai tuoi due commissari.”

898 See the translation in Catagnoti – Fronzaroli 2010: 87 “Tu invia ai tuoi due commissari le pecore messe per iscritto (nella tavoletta di Ilum-Baʿal).”

2.2.7.2.1 Ebla (Tell Mardīkh)

The Ebla texts present a quite straightforward version of this type of notation. Indeed, one may observe that in some instances, the cuneiform signs of the type 𒀸, 𒁹, and 𒌋, when repeated *n* times, serve as arithmetic tools to indicate the distribution of "*n* elements per item/individual." Here some examples:

> [177] *ARET* 16.12 (= *ARET* 2.33) o. i 5–7: 5◗ *MI-AT* ma-na ku$_3$:babbar / še-ba / 6◗ *LI*<-*IM*> [gu]ruš ⸢5𒁹⸣ "500 minas of silver (are) the allotment, for 6,000 [male wor]kers, with 5 (shekels of silver) each."

> [178] *ARET* 1.44 o. i 9–13: 20◐ 5◗ ma-na ku$_3$:babbar / še-ba / 2◗ *MI*<-*AT*> 50◐ guruš-3𒌋 / 2◗ *MI*<-*AT*> 50◐ dam-3𒌋 / *ʾa$_3$-daš* "25 minas of silver (are) the allotment for: 250 male workers, 3 (shekels of silver) each, (and) 250 female workers, 3 (shekels of silver) each, (that of) PN."

The disambiguation between cuneiform and curviform signs with numerical value (which are always placed after the name to which they refer) serves to indicate this distributive relation.

The same kind of notation is used to express the gold countervalue in silver using an exchange rate, which is expressed through cuneiform numbers placed after the amount of gold, as in:

> [179] *ARET* 7.83 o. i 1–3: 40◐-la$_2$-3𒌋 ma-na 50◗ 2𒁹 ku$_3$:babbar / šu bala-AK / 10◐-la$_2$-1𒌋 ma-na šušana$_x$(ŠU$_2$+ŠA) 8𒁹 3𒀸-NI ku$_3$-si$_{22}$ 4𒁹 "37 minas (and) 52 (shekels of) silver in exchange (for) 9 minas and 28 + $^1/_3$ (shekels) of gold (at a change rate of 4)."

> [180] *ARET* 12.662 o.? i 3–5: šušana$_x$(ŠU$_2$+ŠA) 5𒁹 ku$_3$:babbar / šu bala-[AK] / 10◗ ku$_3$-si$_{22}$ 2𒁹 ½ "25 (shekels of) silver in exchange (for) 10 shekels of gold (at a change rate of) 2.5."

Nonetheless, one may observe how this coefficient is specified only in some instances and appears only in those texts where it corresponds to values of 1½, 2½, or 4.[899]

2.2.7.2.2 Mari (Tell Harīrī)

The presence of a distributive notation in Pre-Sargonic Mari is unclear. The available material is very scarce, and the only numerical notation built with cuneiform signs (typical of a distributive-like notation) and that are not referable to metrograms (*e.g.*, 𒁹 sila$_3$) pertain to two small tablets recording just one entry:

> [181] Charpin 1987, no. 14 o. i 1: 4𒁹 aktum^{tu9} lugal "4 tunics, the king."

> [182] Charpin 1987, no. 15 o. i 1: ⸢2𒁹⸣ tu$_9$ lugal "2 textiles, the king."

2.2.7.2.3 Nabada (Tell Beydar)

Although the Mari texts do not offer clear data on this topic, the Nabada documentation shows the presence of a vaguely distributive notation, identifiable in the expression "in *n* kaskal," which can be translated as "for *n* expeditions" (see above [166]). Here, the combination of the preposition *in*, as well as the use of cuneiform numbers in place of curviform numbers, may suggest a slightly distributive value:

> [183] *Subartu* 2.75 i 3: *in* 3𒁹 kaskal 2◡ 2▭ "for three expeditions, 2(bariga) and 2(ban$_2$)."

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[899] Normally, the conversion coefficient between silver and gold corresponds to 5, as the gold/silver ratio is 1:5. In these cases, it is never specified by means of cuneiform numbers. See *ARET* 2.6 o. 1–3: 10◐ ma-na ku$_3$:babbar / šu bala-AK / 2▷ ma-na ku$_3$-si$_{22}$ "10 minas (of) silver, in exchange (for) 2 minas (of) gold." The topic of gold-to-silver conversion has been discussed in depth by Gori (*in press*).

2.2.7.2.4 Šuruppag (Tell Fāra)

The Šuruppag texts, to some extent, present problems similar to those arising from Mari. A notation with cuneiform numbers is indeed attested; however, the lack of totals and the presence of an extremely concise style make it difficult to spot the presence of a clear distributive notation. In detail, a few Šuruppag texts contain cuneiform arithmograms placed at the end of the case, although their exact meanings remain unclear:

> [184] NTSŠ 154 o. ii 3–4: 1ᗞ zabar ma-na 1𒌋 / 1ᗞ LAK 610-me? ma-na 3𒌋 “1 mina (of) copper, 1 ... mina 3 ...”

> [185] TSŠ 924 r. i 4: 3𒌋 ugula? “3 ... ugula.”

> [186] TSŠ 878 o. i 1: 360ᗞ30◖-la2-3𒈦 LAK 20 “387 ...”

> [187] TSŠ 878 o. i 3: 1ᗞ 3𒌋 du6-du6 “1 ... 3 ...”

A case of pseudo-distributive notation may be that of TSŠ 648, which includes cuneiform signs with numerical value functions as a multiplier, indicating how many loaves (inda3) are to be calculated for each male or female worker.

> [188] TSŠ 648 o. i 4–o. ii 1[900]: 40◖ 5ᗞ guruš / 1𒌋 inda3 šu ti “45 male workers, 1 loaf of bread (for each one of them): received.”

2.2.7.3. Further uses

Uses of numerals as purely arithmetical elements are not limited to the counting of discrete items and the building of a distributive notational formula; indeed, they extend to other types of features.

[900] The text is also quoted in Powell 1976: 436, fn. 19; Damerow – Englund 1987: 151, fn. 33.

2.2.7.3.1. Ebla (Tell Mardīkh)

Conceptually, the accounting of individuals belongs to the same system used to count other discrete items. Nonetheless, when the number of individuals refers to a small group of addressees (usually, n < 10) to whom the aforementioned items are allocated, the notational phrase is set up differently:

X items (for) Y people

In some cases, the number of item allocated to people is expressed with cuneiform signs of the type ⊢, ⊤, ∠, which precede the term indicating the category of personnel to whom the items are allocated, or the number of items among which something is apportioned:

> [189] *ARET* 8.521 (= *MEE* 5.1) o. viii 23–ix 1: 2ᐅ kiĝ2 siki / 1∠ dam-*SU*3 "2 kiĝ2-measures of wool (for) one (of) his women(?)."

> [190] *ARET* 4.4 (= *MEE* 2.3) r. i 8–10: 4ᐅ ʾ*a*3-*da*-*um*-tu9-1∠ / 4⊢ dumu-ninta / en "4 single cloaks, (for) 4 sons (of) the King."

This notation is also used for the distribution of wool for textiles and other items for objects, as in:

> [191] *ARET* 15.12 r. i 6–7: 6ᐅ kiĝ2 siki / 6⊤ SAL-tu9 "6 kiĝ2-measures of wool (for) 6 textiles of the SAL-type."

Nonetheless, this relation between terms is not always expressed through cuneiform numbers: in a few texts that can be dated to *phase* II (on which see Chapter 1), cuneiform arithmograms also appear:

> [192] *ARET* 15.6 (= *MEE* 2.29) o. ii 2–3: 2ᐅ tu9-NI.NI / 2ᐅ dam "2 soft textiles (for) 2 women."

> [193] *ARET* 15.6 (= *MEE* 2.29) r. ii 6–7: 2ᐅ tu9-NI.NI 2▽ ib2+3⊤-tu9 gunu3 / 2ᐅ guruš "2 soft textiles, 2 triple folded multicolor waistbands (or skirts, for) 2 male workers."

[194] *ARET* 15.9 (= *MEE* 2.33) r. viii 13–15: 10 siki kiĝ$_{2}$ NI-*za-u*$_{3}$ / 10 ib$_{2}$+3 babbar / 10 nar “10 kiĝ$_{2}$-measures of snatched(?)[901] wool, 10 triple folded white waistbands (or skirts), (for) 10 singers.”

[195] *ARET* 15.50 o. iv 11–14: 1 gu-dul$_{3}^{tu9}$ 4 SAL-tu$_{9}$ 4 *gu-zi*-mug$^{\langle tu9\rangle}$ / 10-la$_{2}$-1 guruš / bur-gul / *ma-ri*$_{2}^{ki}$ “1 textiles of the gu-dul$_{3}$-type, 4 textiles of the SAL-type, 4 textiles of *gu-zi*-type, (for) 9 male workers of the stonecutter of GN.”

[196] *ARET* 15.54 r. v 4–6: 30 3 siki kiĝ$_{2}$ / 20 5 guruš-gunu$_{3}$ / ib$_{2}$+3^{tu9} gunu$_{3}$ “33 kiĝ$_{2}$-measures of wool, (for) 25 male dyers (employed for the making of) triple folded multicolor waistbands (or skirts).”

In some cases, the texts display an internal ordering that is expressed through the placement of cuneiform arithmograms at the end of the term to which they refer. This type of notation conceptually refers to a multiplicative structure, which should be understood here as an ordinal sequence. An illustrative example is provided by the text *ARET* 7.4, which shows a sequence of deliveries (šu mu-taka$_{4}$):

[197] *ARET* 7.4 o. v 5: *in* šu mu-taka$_{4}$ 5 “In (occasion of the) 5th delivery.”

[198] *ARET* 7.4 o. vi 4: *in* šu mu-taka$_{4}$ 6 “In (occasion of the) 6th delivery.”

To the same text belongs two passages, conceptually consistent with the others, but with a different notation:

[199] *ARET* 7.4 r. i 3: 10-la$_{2}$-1 *in* šu mu-taka$_{4}$ “In (occasion of the) 9th delivery.”

[901] See Pasquali 1997: 220–223, 236 “lana svelta”; later Pomponio 2008b: 109; Pasquali 2010: 173 “laine arraché.”

[200] *ARET* 7.4 r. iii 3: 10 1 *in* šu mu-taka$_4$ "In (occasion of the) 11th delivery."

In the Ebla texts, the sign 1 (;)[902] with determinative use is attested. This sign is used mainly in chancery texts[903]; however, when referring to years (as in 2.2.2.), it also appears in administrative texts:

[201] *ARET* 18.7 r. iii 6–7: *in* / 1 iri^{ki} "In the city."

[202] *ARET* 18.7 r. iii 10: 1 dumu<-ninta> / *in* 1 iri^{ki} "1 son ... in the city."

[203] *ARET* 16.11 r. i 4: 1 dub "The tablet."

Another recurrent expression is 2 -šu, "the (two) hands," where the numeral 2 serves precisely to reinforce the concept of the dual[904]:

[204] *ARET* 9.37 r. iv 2: lu$_2$ 2 -šu *il*$_2$-*zi* "Those who pertain (lit. that in the two hands) to PN."

[205] *ARET* 13.15 r. vii 5–6: 1 amar / *in* 2 -šu-*SU*$_3$ "A calf that belonged to him (lit. that was in his two hands)."

Further technical terms that contain numerals and refer to division are za$_3$-10, the "tithe,"[905] niĝ$_2$-a$_2$-ĝa$_2$-*n*,[906] a term that refers to a subdivision of an initially unitary

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[902] In some instances, even within the same text, as in *ARET* 16.1.

[903] In general, a variability in the use of cuneiform and curviform arithmograms is observed in chancery texts. This alternation may depend on the grammatical role assumed by the term to which the numeral refers. See, *e.g.*, how arithmograms linked to the possessive pronoun suffix -*SU*$_3$ are always cuneiform. See *ARET* 13.9 r. i 23: 2 gud-*SU*$_3$; *ARET* 16.22 (= *ARET* 2.29 = *MEE* 7.42) r. v 9: 2 til- *SU*$_3$.

[904] Peculiar is the case of *MEE* 10.27 r. i 8–9: 2 an-dil$_2$ / 2 -šu 2 -DU 2 -saĝ, where šu, "hand," and DU, "foot," are to be counted in pairs (two for each statue), whereas saĝ "head" is to be counted alone (one for each statue).

[905] See, *e.g.*, *ARET* 13.15 o. iv 8 (Fronzaroli – Catagnoti 2003: 311 "decima (cf. zag-10 = acc. *ešrētu*)."

[906] See, *e.g.*, TM.75.G.1452 o. iv 1: niĝ$_2$-a$_2$-ĝa$_2$-2 ; *ARET* 7.154 r. vii 2: niĝ$_2$-a$_2$-ĝa$_2$-3 ; *ARET* 7.155 r. vi 7: niĝ$_2$-a$_2$-ĝa$_2$-4 .

set of goods into parts,[907] and the related verb a$_2$-ĝa$_2$-*n*,[908] "to distribute (in) *n* parts."[909]

One last notable application of numbers within the Ebla texts is found in the enumeration of tablets. Indeed, some tablets (both administrative and chancery documents) feature numerical impressions (mainly oblique cuneiform signs, but also incisions of linear and rounded shape) positioned within the blank space of the reverse or in proximity to the total section, often associated with the date of the text. A few instances of this are seen in the text *ARET* 14.25 r. v 4 (an administrative text of the mu-DU type), and *ARET* 16.7 r. v 6 (a letter from king Yiṯġar-damu to minister Yibbiʾ-Ḏikir). Although it cannot be stated with certainty, these numbers likely played a role in organizing the sequence of tablets within a dossier, perhaps grouping together different mu-DU-texts written during the same year.[910]

2.2.7.3.2. Šuruppag (Tell Fāra)

As it concerns Šuruppag, the use of the cuneiform numeral 1𒀹 in TSŠ 467 (= BŠ no. 216) may be comparable to a *Personenkeil*, a practice functional to the listing of individuals on the obverse side of the tablet. For example:

> [206] TSŠ 467 (= BŠ no. 216) o. i 1–3: 1𒀹 mes-ki-na / 1𒀹 a-si$_4$ / 1𒀹 maš-lugal ... "PN$_1$, PN$_2$, PN$_3$."

Another text, TSŠ 627, shows the presence of repeated cuneiform arithmograms, always in association with curviform ones. The text is a *Sammeltafel* that combines the information contained in the following texts: TSŠ 415, WF 142, TSŠ 369, and

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907 The term is frequently mentioned in documents establishing the inheritance of landed property (*e.g.*, those quoted in fn. 906). See the discussion in Fronzaroli 1980: 40. In contexts of distribution of rations, it indicated an "allotment equal to half" of the ration mentioned earlier in the same list (see discussion in 2.2.4.1.).

908 See, *e.g.*, *ARET* 13.20 o. i 12: a$_2$-ĝa$_2$-2𒀹.

909 See the discussion in Archi 2000b: 16.

910 The topic is discussed in Archi 2023: 171–172.

TSŠ 736.[911] Nevertheless, cuneiform numerals are never used in any of these texts. Therefore, in the *Sammeltafel* TSŠ 627, the use of cuneiform signs 𒀸, 𒌋 may be related to the counting of the entries (as if the scribe had marked the occurrences of the numbers to help himself in the calculation), or to the copying procedure of the text.[912]

[911] A complete edition of the text and its parallels is provided in Visicato 1992. The author, however, does not transliterate or comment on the presence of these cuneiform marks.

[912] The marks in TSŠ 627 r. iii' 1–2 refers to the accounting of years (cf. Visicato 1992: 98).

CHAPTER 3. COMPUTATION AND ACCOUNTING PRACTICES IN ADMINISTRATIVE TEXTS

This chapter deals with the summaries at the ends of the administrative texts, and, in detail, with numeracy as applied to administrative calculation. The aim is to analyze the use of numbers, as well as the presence of calculation errors and inconsistencies in the drafting of texts, in order to gain a deeper understanding of the reading practices of administrative texts and the purpose of these texts—distinguishing, for example, between *a priori* or *a posteriori* writing and the resulting predictive or descriptive purpose of the administrative documentation.

3.1. Summaries and totals

Summaries of administrative texts are analogous to colophons[913] in lexical and literary texts, providing information such as the date and number of entries. They are usually placed in the last column on the reverse side of the tablet. As such, they enable readers to obtain as much information about the text as possible, without necessarily having to read it in its entirety. In addition, they allow the texts to be arranged according to the date of writing, *i.e.*, in chronological order, with the summary visible (as if it were the label of a binder on the shelf of a modern archive). Often the summary is separated from the text by a blank space. Moreover, the reading order of the summary section is reversed; that is, if the columns on the reverse side of the tablet are ordered from right to left, the summary section is read from left to right. These summaries usually comprise one or more of the following elements:

[913] For the definition of colophon in 3rd millennium texts, and for its relationship with administrative summaries, see Krebernik – Lisman 2020: 187.

(a) gu$_2$-an-še$_3$ (usually, gu$_2$:an-še$_3$) “sum” and/or šu-niĝen$_2$ “(grand) total”[914] + sum of the figures listed in the text
(b) mu “year” + date expressed in numbers
(c) iti “month” + month-name
(d) u$_4$ “day” + date expressed in numbers.

Elements (a), (b), (c), and (d) may co-occur together, but one is sufficient to identify the presence of a summary. Furthermore, regarding element (a), sometimes the terms gu$_2$:an-še$_3$ and šu-niĝen$_2$ are not written and the quantity relative to the sum of the figures listed in the text is directly indicated.[915]

Concerning the element (a), the term gu$_2$:an-še$_3$ “sum” literary means “total of the above,” from gu$_2$, “the whole, the totality,” and an-še$_3$, “to(wards) the upper part, the top (contextually speaking, of the tablet).” On the other hand, šu-niĝen$_2$ means “grand total” and in later texts corresponds to the Akkadian *nagbu* “(the) whole, entirety”[916] or *napḫaru*(*m*) “total, sum; (the) whole, entirety.”[917] The 3rd millennium sources provide no useful information on the possible Semitic equivalent of either term; in the *Vocabolario di Ebla* (VE), the two entries concerning gu$_2$:an-še$_3$ (VE 796, wr. AN.ŠE$_3$.GU$_2$) and šu-niĝen$_2$ (VE 503) are not glossed.

The texts from Ebla and Šuruppag, being the two largest corpora, offer more attestations. In particular, most of the published documents from Ebla are *Sammeltafeln* recording monthly allocations of textiles and other objects to the palace personnel. Another quite large group is that of the recently published mu-DU texts, recording the income (mostly in precious metals and textiles) of the palace.[918] Lastly, a third large group consists of texts concerning food rations

[914] On the translation and use of these two terms in each corpus, see below.

[915] An example is TSŠ 102 (= EDATŠ no. 69) r. iv.

[916] CAD N/1: 111, s.v. *nagbu* B.

[917] CAD N/1: 292.

[918] Archi translates the term mu-DU as “deliveries”; however, the word for delivery is šu-mu-taka$_4$ (see, *e.g.*, the title of ARET 14 “Annual Documents of Deliveries (mu-DU) to the Central Administration (Archive L. 2769)”; and Archi 2013: 14 “Deliveries to the Administration (mu-DU).”

(mostly in cereals and by-products), which come from the Small Archive (L. 2712) (on the distribution of texts within the archives, see Chapter 1). In Ebla, the attestations of gu_2:an-$še_3$ and šu-niĝen_2 well exceed one thousand (if one considers the unpublished texts, only in part available in quotations and distributed throughout numerous articles).[919] On the EbDA database, the data available indicate 664 total appearances of gu_2:an-$še_3$ and 245 of šu-niĝen_2.[920] In the specific case of the Ebla texts, each of these two totals represents a sum of a different type. On the one hand, the totals of type gu_2:an-$še_3$ (spelled AN.ŠE_3.GU_2) generically indicate partial totals, *i.e.*, the sum of a number of elements (as the etymology of the term itself indicates, generally those preceding the sum) and are found either in the middle or at the end of the text—whereas totals of type šu-niĝen_2 refer to final totals or, more specifically, "grand total" (*i.e.*, the sum of the elements listed in totals of type gu_2:an-$še_3$). In many Ebla administrative texts, gu_2:an-$še_3$ and šu-niĝen_2 totals occur together, and frequently gu_2:an-$še_3$ precedes šu-niĝen_2. However, there also are many texts in which only one of these two kinds of total was recorded. Frequently, both were written at the end of the tablet, but this is not a rule. In fact, sometimes one finds gu_2:an-$še_3$ or šu-niĝen_2 written long before the end of the tablet, and even in its initial parts:

L. 2769	n	%
TOT.	272	100%
gu_2:an-$še_3$ (wr. AN.ŠE_3.GU_2)	120	44.1%
šu-niĝen_2	4	1.5%
gu_2:an-$še_3$ (wr. AN.ŠE_3.GU_2) + šu-niĝen_2	148	54.4%

L. 2712	n	%

[919] As it concerns the occurrences of GU_2:AN.ŠE_3 in the Ebla texts, they have been partially listed by Pettinato – D'Agostino 1996: 129–150, whereas for šu-niĝen_2, no complete collection of occurrences has been made until now. Marco Bonechi stated at the Workshop of the Rome Research Unit of the PRIN 2017, "Big Data and Early Archives (Big-DEA)" (03/31/2022–04/01/2022) that he knew of 717 occurrences for gu_2:an-$še_3$ and 356 for šu-niĝen_2.

[920] The database has been accessed on 03/27/2022. Simply by looking at the data displayed by EbDA, one can see how the number of gu_2:an-$še_3$ attestations exceeds that of šu-niĝen_2.

TOT.	58	100%
gu$_2$:an-še$_3$ (wr. AN.ŠE$_3$.GU$_2$)	20	34.5%
šu-niĝen$_2$	0	0%
gu$_2$:an-še$_3$ (wr. AN.ŠE$_3$.GU$_2$) + šu-niĝen$_2$	38	65.5%

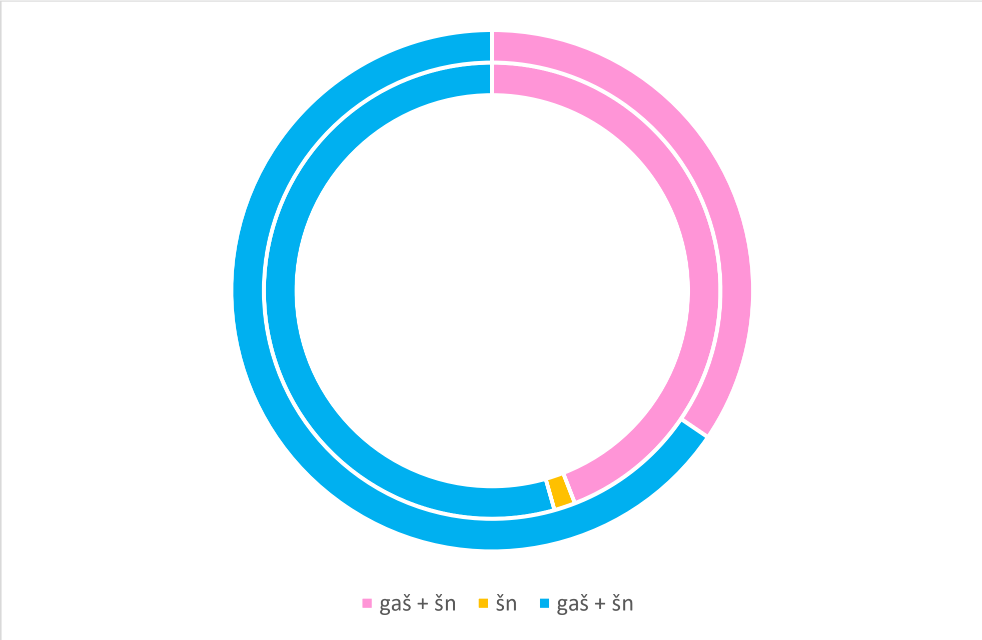

Fig. 24 – Percentage distribution of gu$_2$:an-še$_3$ and šu-niĝen$_2$ totals in L. 2712 (outer circle) and L. 2769 (inner circle).

However, a study of the recently published mu-DU texts has revealed that the use of gu$_2$:an-še$_3$ and šu-niĝen$_2$ in the Ebla texts does not unambiguously follow this rule. For example, in *ARET* 14.85, the total for the first section is of type šu-niĝen$_2$, while the text is followed by several other totals of type gu$_2$:an-še$_3$, with which the text also concludes. Nevertheless, in *ARET* 14.78 the total gu$_2$:an-še$_3$, although used within the text (as a total related to the first section), is structured as a total of type šu-niĝen$_2$.

> [207] *ARET* 14.78 o. iii 6–8: gu$_2$:an-še$_3$ 3 *LI-IM* 1 *MI-AT* 60 tu$_9$-tu$_9$ / mu-DU / *i-bi$_2$-zi-kir* "Sum: 3160 textiles (are) the income from Yibbiʾ-Ḏikir."

In fact, generally speaking, the difference between totals of type gu2:an-še3 and šu-niĝen2 is also structural: the former typically refers to a specific sum and comprises a defined list of counted objects, whereas the latter has a more general meaning and—as a rule—presents the generic and final totals of the objects listed in the previous gu2:an-še3. Moreover, in some texts, the total gu2:an-še3 may occur alone. This occurs predominantly in two types of cases: some very small texts that consist solely of gu2:an-še3 totals,[921] or other texts (such as mu-DU and monthly accounts of textiles) that have only gu2:an-še3 totals at their ends—and possibly also within them, at the head of one or more sections.[922]

A special case in the panorama of the Ebla texts, but also more generally of the corpora used in this dissertation, is the recording of wool quantities in the summary section. In fact, wool is not always accounted for in the form of final sums (either gu2:an-še3 or šu-niĝen2) in all texts mentioning it; rather, only a few of them report this type of summary information on wool. Most of the texts from Ebla that mention quantities of wool are monthly accounts of textiles: excluding fragments, these amount to 148 texts, 33 (22.3%) of which are summaries (mostly in the form of totals) relating to quantities of wool. These texts are:

Edition	gu2:an-še	šu-niĝen2	Unmarked	Month	Chronology
ARET 19.1	X			7th	*phase* III
ARET 4.11	X			-	*phase* ?
ARET 19.6	X			-	*phase* III
ARET 15.8			X	12th	*phase* II
ARET 15.9 = *MEE* 2.33	X			2nd	*phase* II
ARET 19.16			X	8th	*phase* III
ARET 15.12			X	11th	*phase* II
ARET 4.12			X	6th	*phase* ?
ARET 15.16	X			1st	*phase* II
ARET 19.20		X		4th	*phase* III
ARET 15.20		X		7th	*phase* II

[921] These texts have been discussed in Bonechi 2016c.

[922] See, *e.g.*, *ARET* 14.26.

ARET 4.13		X		5th	*phase* ?
ARET 15.23			X	3rd	*phase* II
ARET 15.26	X			7th	*phase* II
ARET 20.7 = *MEE* 7.35		2X		9th	*phase* IV
MEE 7.39	X			-	*phase* ?
ARET 20.6	X*	X*		[...]	*phase* IV
MEE 10.21		X		[...]	*phase* ?
ARET 15.41 = *MEE* 10.26			X	8th	*phase* II
ARET 20.11	X (2x)			8th	*phase* IV
ARET 20.12	X*			7th	*phase* IV
ARET 15.43	X			6th	*phase* II
MEE 12.18			X	4th	*phase* ?
ARET 20.16	X			10th	*phase* IV
ARET 20.17	X			11th	*phase* IV
ARET 20.2	X			1st	*phase* IV
ARET 20.15	X			7th	*phase* IV
ARET 20.8	X			[...]	*phase* IV
ARET 15.54	X			12th	*phase* II
ARET 20.3 = *ARET* 3.96[923]		X		6th	*phase* IV
ARET 20.22		X		8th	*phase* IV
ARET 15.58			X	9th	*phase* II
ARET 8.533 = *MEE* 5.13	X			[...]	*phase* IV

* The total is inserted within the text and not at the end

Fig. 25 – List of occurrences of totals containing wool.

[923] *ARET* 3.96 corresponds to TM.75.G.3111+.

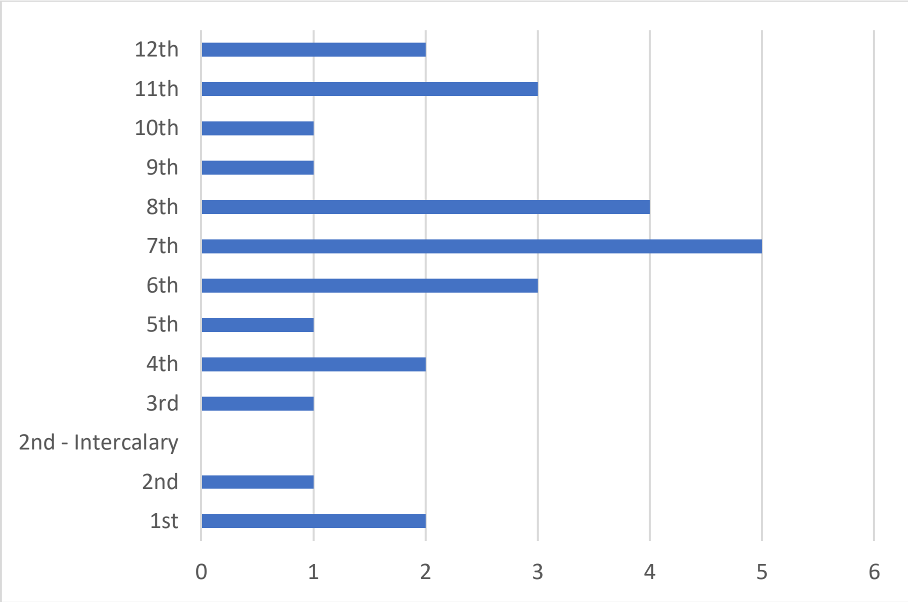

Fig. 26 – occurrences of wool-related totals by month.

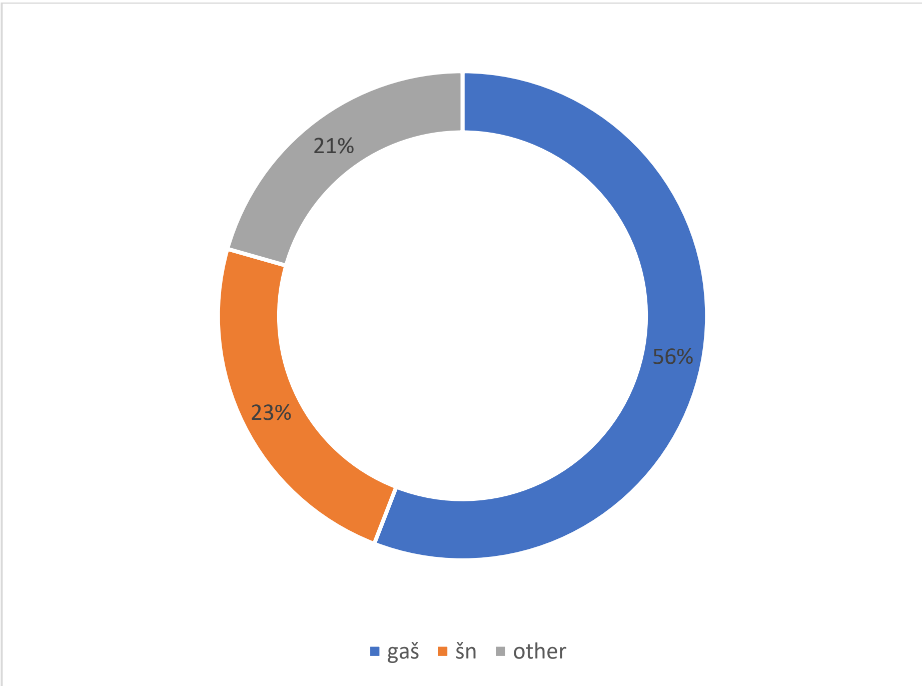

Fig. 27 – Percentage of occurrences of relative sums in the various types of totals.

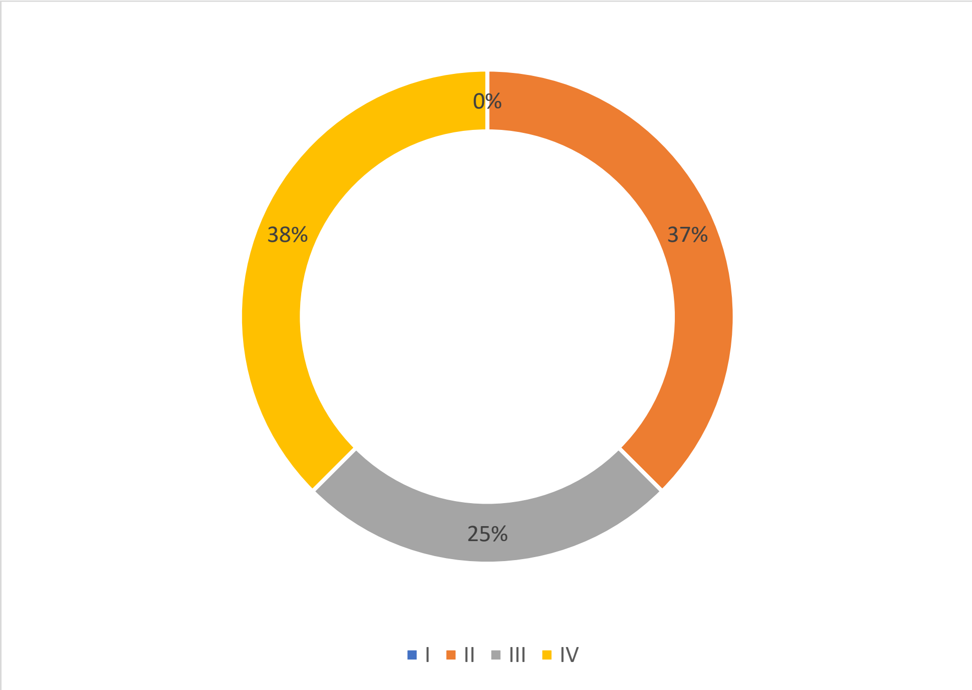

Fig. 28 – Percentage of occurrences of wool-related totals in the various archive phases.

Looking at the charts, one can see that one finds particularly few attestations for the 2nd, 3rd, 5th, 9th, and 10th months; none for the 2nd intercalary month. However, it remains to be clarified whether this disparity in documentation can be attributed to a simple documentation gap or to an actual disparity in the distribution of wool.[924]

The presence of fewer texts (and mainly totals) containing amounts of wool among the monthly account of textiles is a well-established fact. This deficiency may be attributable to different factors, such as the presence of sporadically general accounting of wool, or the presence of more documents attributing several monthly

[924] Shearing is a process that generally takes place between May and June (3rd month = *za-ʾa$_3$-tum*), so it is possible that there would be an acute shortage of wool in the 2nd and 3rd months. Even allowing for a second shearing (on this matter, see Andersson Strand 2014: 44–45; and, in this dissertation, 2.2.6.), this would possibly take place around October, *i.e.*, the 8th month, *ʾa$_5$-nun*(*-na*). In fact, if shearing takes place twice a year, it makes sense that it is generally done in early spring and late summer or early autumn; sheep need at least six weeks to grow enough wool to keep them warm in winter. This fact would contradict the dearth of attestations concerning the 9th and 10th months.

allotments of textiles to the same month and year. For example, this is the case with *ARET* 15.47, *ARET* 15.10 (= *MEE* 2.37) , and *ARET* 15.33, whose contemporaneity is ensured by the presence of the offering at the burial (E$_2$×PAP)[925] of ArruLUM in *ARET* 15.47 and by the mourning ceremony with the anointing of the head (i$_3$-ĝeš-saĝ)[926] performed by his wife and daughter in *ARET* 15.10 (= *MEE* 2.37) [927] and *ARET* 15.33,[928] respectively. This correspondence ensures that, because these are two files of the same dossier, *ARET* 15.47 should precede *ARET* 15.10 (= *MEE* 2.37) and *ARET* 15.33, given that the ceremony of anointing the head follows the offering at the tomb after about 15 days of mourning.[929] Thus, *ARET* 15.47 is not

[925] On the E$_2$×PAP, see the discussion in Biga 2007–2008: 250–256; Biga 2007–2008: 252 "tomb, burial"; Archi 1996a: 17 "cérémonie funèbre."

[926] On the i$_3$-ĝeš-saĝ, see the discussion in Biga 2007–2008: 265–266, and, specifically, on page 25 "After the mourning rites and the burial, some members of the family of the deceased person were purified" and Archi 2012: 25–26; Biga 2007–2008: 266 (also Archi 2012: 25) "anointing of the head."

[927] *ARET* 15.10 (= *MEE* 2.37) r. vi 12–vii 1. On the contemporaneity between *ARET* 15.10 (= *MEE* 2.37) and *ARET* 15.47, see Archi 2015c: 167 "*ARET* 15, 47 (dated to month I, i t i *i-si*) § 53 lists gifts for Arrukum's funerary ceremony: 1+1+2+2 clothes, 1 plate of 1 mina gold, 1 belt of 1 mina gold, 1 Amorite dagger […] *ar-ru*$_{12}$*-gum*$_2$ E$_2$×PAP. *ARET* 15, 10 (also dated to month I, i t i *i-si*) registers in § 70 'the purification ceremony of the spouse of Arrukum,' i$_3$-ĝiš-saĝ dam. A following section, § 81, with wool and 2 clothes for 'the house of Arrukum,' confirms that the ceremony concerned Arrukum's death. These two MATs pertain, exceptionally, to the same month"; Archi 2023: 142 "The funerary gifts given for Arrukum's death are registered in *ARET* XV 47 § 53, a text dated to month *i-si* (month I), while the gifts for the 'purification rite,' ì-giš-sag, of his 'spouse,' dam, (for this death) is registered in *ARET* XV 10 § 70 (a delivery of wool for his house is mentioned in § 81), which is a document of the same month." On a side note, see how Bonechi (2020b: 341) translates E$_2$×PAP as "grave" and i$_3$-ĝeš-saĝ as "(rite of) the olive oil (used) for head (cleaning)," whereas Biga (2007–2008: 250) translates E$_2$×PAP as "tomb" and i$_3$-ĝeš-saĝ as "purification ritual" (Biga 2007–2008: 265).

[928] *ARET* 15.33 o. ii 5–9. Archi 1996a: 21, fn. 46 "Dans 75.1727 f. II 7–9, une fille d'Arrukum, *Téš-ma-zi-kir* se soumet à une cérémonie de purification. Ì-giš-sag. Peut-être à cause de la mort du père," where 75.1727 corresponds to *ARET* 15.33.

[929] On the duration of mourning and the ablution (represented at Ebla by the i$_3$-ĝeš-saĝ) performed at the end of it, see Biga 2007–2008: 262 "From the Ebla texts we can glean information about the existence of mourning and rites even though we cannot determine how long these lasted"; Biga 2007–2008: 265 "it is clear that the purification ceremony was performed not long after the death,

the only one belonging to this exact month.[930] By looking at these texts, one can see how not all texts pertaining to the same month contain mention of wool, as in the case of *ARET* 15.47. On the other hand, both *ARET* 15.10 (= *MEE* 2.37) and *ARET* 15.33 do contain entries related to wool allotments; however, this is not accounted for in the total. Another piece of evidence in favor of a possible composition of the files pertaining to a single month on the basis of several texts can be provided by the total for wool in *ARET* 15.9. Indeed, this text presents a quantity of kiĝ_2 measurements that is difficult to understand solely on the basis of the data provided in the text.[931] However, it should be noted that even the wool listed in the other texts relevant to this month (and therefore potentially contemporary)[932] is not sufficient—if only counting kiĝ_2 measurements and not na_4 (which in itself exceeds the quantity given in the total)—to make a correct sum. Nonetheless, the presence of such a conspicuous inconsistency[933] suggests the presence of calculations and entries relating to the same month, and of which there is no trace.

In the other corpora discussed in this dissertation (Nabada,[934] Abū Ṣalābīḫ, and Šuruppag), this distinction is not invoked; rather, the two terms are used

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and in any case less than 30 days after, although we have some purification gifts registered in a tablet of month following the death (it depends of course on precisely when in the month the death occurred).” Possibly, the mourning period was to last much less than 30 days, about 15 days, considering that the three texts *ARET* 15.47, *ARET* 15.33 and *ARET* 15.10 all belong to the same month. On this topic, see also Felli 2016: 85). On the mourning period in Old Babylonian Mari, see further Charpin 2008.

[930] On the other hand, both *ARET* 15.16 and *ARET* 15.19 contain totals concerning wool but are datable to a time when ArruLUM was still alive, for he is mentioned as a recipient in both texts. *ARET* 15.16 o. iii 11–12 1 gada sa_6 / *ar-ru*$_{12}$-LUM; *ARET* 15.19 r. i 14–16 1 gada-TUG_2 / IGI.NITA / *ar-ru*$_{12}$-LUM; *ARET* 15.19 r. viii 1–5 10 kiĝ_2 siki saĝ / 3 tu_9-du_8 / *ar-ru*$_{12}$-LUM / *nu-za-ar* / šu-⸢ba_4-ti⸣.

[931] Pomponio 2008a: 88 “Infine, della lana sono calcolati due an-še_3-gu_2: quello della lana semplice (708 ‘KIN’) e quello della lana *ni-za-ù* (16 ‘KIN’). Il calcolo del secondo è esatto, ma per la lana semplice abbiamo indicate nel corso del testo tutte le sue differenti misure: ‘KIN’ (112 complessive), na_4 (1666) e *zi-rí* (3): come dalla loro somma si possa arrivare al 708 ‘KIN’ del totale sfugge alla nostra comprensione.”

[932] *ARET* 15.2; *ARET* 15.13 (= *MEE* 2.41); *ARET* 15.21; *ARET* 15.46.

[933] On inconsistencies, see below.

[934] Ismail *et alii* 1996: 185 “no difference in use recognizable.”

interchangeably and do not appear to have the value of generic total and final total, as occurs at Ebla. In texts from Nabada, the use of šu-niĝen$_2$ is much more frequent than gu$_2$:an-še$_3$ (wr. AN.ŠE$_3$.GU$_2$), which appears in only two texts: *Subartu* 2.71 r. iv 1, and *Subartu* 2.99 r. i 1. Judging from the position of the total within the tablet (reverse) and the fact that this type of total is not assigned to a specific text type, there is no evidence to suggest substantial difference in the use of gu$_2$:an-še$_3$ or šu-niĝen$_2$. The administrative texts of Abū Ṣalābīḫ are very fragmentary, yet their structure (short texts that do not show coexistence of the two totals) appears to demonstrate the non-existence of a difference between gu$_2$:an-še$_3$ (written AN.ŠE$_3$.GU$_2$) and šu-niĝen$_2$. In detail, the case of Abū Ṣalābīḫ offers only two administrative texts that mention the total gu$_2$:an-še$_3$. In Abū Ṣalābīḫ documents, the term šu-niĝen$_2$ appears quite often (30% of the attestations).[935] Other administrative texts from Abū Ṣalābīḫ (published in IAS nos. 490–515) are fragmentary or show no mention of totals. As far as Šuruppag texts are concerned, the administrative texts preserving the totals of gu$_2$:an-še$_3$ (generally written AN.ŠE$_3$.GU$_2$, but in some sporadic cases also as AN.GU$_2$.ŠE$_3$)[936] and šu-niĝen$_2$ account for approximately 22% of all such attestations. Of these, 33% have more or less substantial *lacunae*, which make it impossible to make a calculation as to whether there were calculation errors or inconsistencies in the drafting of the documents. Another small group of documents (representing 8% of the total) features some information *lacunae* that are nevertheless recoverable and make it possible to estimate the presence of errors. The remaining 59% of the texts present sufficient data to reconstruct the calculations that led to the writing of the total. With regard to this sample, most attestations (78%) show the presence of a gu$_2$:an-še$_3$. Of these, in a very small minority of cases (5%) the signs are arranged in the order AN.GU$_2$.ŠE$_3$, whereas in most cases (95%) the signs are arranged in the order AN.ŠE$_3$.GU$_2$ (as at Ebla, see above). The occurrences of šu-niĝen$_2$ are around 15% of

[935] Biggs 1974: 44, fn. 8 "There appears to be no distinction between GU$_2$.AN.ŠE$_3$ and šu-nigín, since there is free variation even in identical contexts."

[936] The spelling AN.GU$_2$.ŠE$_3$ appears in the following text TSŠ 052 (= *WVDOG* 143.065 = EDATŠ no. 158); TSŠ 251; WF 004 (= *WVDOG* 143.043 = EDATŠ no. 164); WF 014 (= *WVDOG* 143.070 = EDATŠ no. 155); *WVDOG* 143.017; *WVDOG* 143.059; *WVDOG* 143.060.

the cases. In 7% of the cases (only 11 occurrences known to me), the total is calculated without either gu$_2$:an-še$_3$ or šu-niĝen$_2$. Curiously, it should be noted that the texts from the rooms excavated by the University of Pennsylvania team have no total. They are in fact, for the most part, small texts that refer to an early stage, *i.e.*, contingent, and short registrations of goods.

Šuruppag Texts	n	%
gu$_2$:an-še$_3$ (wr. AN.ŠE.GU$_2$)	123	73.7%
gu$_2$:an-še$_3$ (wr. AN.GU$_2$.ŠE)	7	4.2%
šu-niĝen$_2$	26	15.6%
implicit	11	6.5%

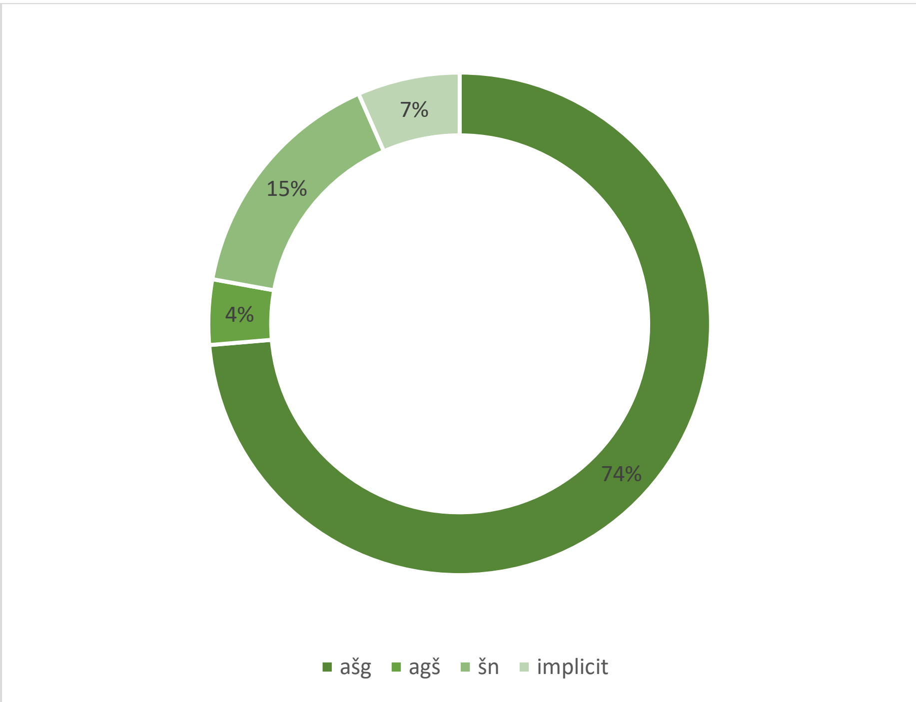

Fig. 29 – Percentage distribution of totals in texts from Šuruppag.

The case of the Šuruppag texts presents some difficulties.[937] Generally speaking, the gu$_2$:an-še$_3$ totals and the šu-niĝen$_2$ totals are interchangeable, as demonstrated

[937] It is worth noting that the texts found in the excavations at the University of Pennsylvania do not show any totals.

by the parallel[938] texts WF 68 (= EDATŠ no. 24) and WF 69 (= EDATŠ no. 25), respectively:

> [208] WF 68 (= EDATŠ no. 24), r. vi 1–2: šu-niĝen2 / 100 ½ še gur-maḫ "Grand Total: 100 (and) ½ g.-maḫ measures of barley."

> [209] WF 69 (= EDATŠ no. 25), r. vi 1–3: AN.ŠE3.GU2 / 100 ½ še gur-maḫ / še lu2-ma2 nu-ag3 "Total: 100 (and) ½ g.-maḫ measures of barley, (are) the barley of the boatmen."

Moreover, the two texts show some parallel passages with WF 67 (= EDATŠ no. 067), which reports a larger quantity than the other two, although marking it as gu2:an-še3 (AN.ŠE3.GU2):

> [210] WF 67 (= EDATŠ no. 24), r. vii 1–3: dub lu2-ma2 / AN.ŠE3.GU2 / 117 ½ še gur-maḫ "Boatmen tablet. Total: 117 (and) ½ g.-maḫ measures of barley."

On the other hand, only one case is attested where the relationship between the gu2:an-še3 and šu-niĝen2 totals follows the pattern of the Ebla texts, namely in WF 22 (= *WVDOG* 143.001 = EDATŠ no. 115) and WF 25 (= *WVDOG* 143.002 = EDATŠ no. 116). The quantities of the former (which has a total of the type gu2:an-še3) are counted in the total of the latter, indicated as šu-niĝen2. However, the opposite remains true in most texts. This fact is also demonstrated by the administrative procedure of transcribing data from one text to another. In this regard, Visicato[939] was able to identify a number of groups of texts belonging to different drafting phases: primary texts, partial summaries, and *Sammeltafeln* (or general summaries).[940] As a rule, primary texts often do not present any totals; exceptions include, *e.g.*, *CT* 50.20, which may have a partially destroyed an-še3-gu2

[938] On the relationship between these three texts see Pomponio – Visicato 1994: 129–130.

[939] Visicato 1995: 21–24.

[940] For instance, a group of texts referring to wool (assigned in pieces and not by weight) consists of primary texts (*CT* 50, 16; *CT* 50, 17; *CT* 50, 18; RTC 10, TSŠ 411), partial summaries (*CT* 50, 25; RTC 9), and the *Sammeltafeln* (RTC 11).

total on the reverse side, as it is also attested in TSŠ 927. Partial summaries have either šu-niĝen$_2$ totals (*e.g.*, RTC 9; TSŠ 424; TSŠ 969) or gu$_2$:an-še$_3$ totals (*e.g.*, TSŠ 260; TSŠ 834; WF 137; WF 148). In some cases, these have an unmarked total (*e.g.*, TSŠ 369). The *Sammeltafeln* also have both types of totals, *i.e.*, šu-niĝen$_2$ (*e.g.*, TSŠ 627), or gu$_2$:an-še$_3$ (*e.g.*, WF 68 = EDATŠ no. 24; TSŠ 503; TSŠ 630). The text WF 133,[941] which does not have a total, probably also belongs to this category, as does RTC 11, which has a final total, marked as neither gu$_2$:an-še$_3$ nor as šu-niĝen$_2$, but written directly in o. iv, a spot on the tablet separated by a blank space from the rest of the text.

Not all administrative texts have a summary section, and not all summaries refer to administrative texts. Indeed, among lexical colophons from Ebla and Šuruppag, a few examples of summaries are attested, such as:

> [211] *MEE* 3.53, r. i-ii: gu$_2$:an-še$_3$ 2𒁹 -*MI-AT* 4𒁹 // 1𒁹 -*LI-IM* 1𒁹 -*MI-AT* KUR.NIĜ$_2$.DU "Sum: 204. 1100 ..."

> [212] SF 5 o.? v 11: 50◐ 1▷ diĝir-diĝir "51 god-(name)s."

> [213] SF 6 r. i 1–2: šu-niĝen$_2$ 20◐ 8▷ / diĝir ku$_6$-gu$_7$ "Total: 28 fishing gods."

Another comparable case is that of *MSVO* 1.243 from Jemdet Nasr,[942] a list of place names summarized as:

> [214] *MSVO* 1.243, r. i 1–2: 40◐ 3▷ iri BA "43 cities ..."

These colophons function as summaries in that they record the number of entries listed in the tablet. However, the second part of [211] remains unclear.[943]

[941] Visicato 1995: 24.

[942] On this topic, see Krebernik – Lisman 2020: 187.

[943] KUR.NIĜ$_2$.DU = kur-gar-ra$_2$ "cult-priest"?

3.2. Scribal errors and arithmetic computation

Dealing with summaries means dealing with the calculations within them—which may entail encountering errors. Therefore, another important question of method concerns defining an "error" and determining what types of error are attested. Error types are distinguished, above all else, based on their magnitude. Indeed, when errors involve very small figures, they are usually defined as simple miscalculations. However, errors involving very large figures are usually treated as inconsistencies (*e.g.*, copying errors such as skipped passages). To conduct this analysis, a list of texts was compiled for each corpus analyzed in this thesis, recording the presence of a summary (indicated by the presence of a gu$_2$:an-še$_3$ total, šu-niĝen$_2$ total, both, or neither). Next, the texts were assessed for calculation errors and inconsistencies within these summaries, with the goal of determining the statistical error rate in each corpus.[944]

3.2.1. Ebla (Tell Mardīkh)

Despite the sophisticated accounting techniques used by palace bureaucracy,[945] numerous miscalculations and inconsistencies (*e.g.*, additions, redactional intrusions) were found in the texts. In order to fully comprehend why this is so, I have conducted a statistical analysis to inventory the various error types. The first chart shows occurrences of errors in the Small and Great Archives (L. 2712 vs L. 2769, respectively). In L. 2712, texts with calculation errors and inconsistencies

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[944] A similar study was done by Sasson (1982) for the *naptan šarrim* texts from Mari (2nd millennium), a group of texts that deal precisely with the consumption of food in the Palatine sphere. However, Sasson (1982: 332) makes a much more detailed division of errors, including: addition, copying, rounding off, ingredient errors, carelessness and miscellaneous. Nevertheless, the texts analyzed in this thesis (except for Šuruppag's) do not present written evidence of subsequent copying of individual texts into summary texts, as is the case with Sasson's texts (see, however, the discussion in Sasson 1982: 338–339 on the actual veracity of these summary reductions). Moreover, I considered the "rounding off" not as errors but as a conscious choice of the scribe.

[945] See, *e.g.*, the presence of extremely precise conversions in the calculation of the change rate between gold and silver (Gori *in press*).

have a similar percentage, but together they do not exceed that of the texts without errors. In L. 2769, texts with calculation errors are the most numerous, whereas those with inconsistencies account for approximately 50%. In any case, the texts with no errors are very few.

L. 2712	n	%
TOT.	13	100.0%
gu$_2$:an-še$_3$	12	92.3%
šu-niĝen$_2$	1	7.7%
gu$_2$:an-še$_3$ + šu-niĝen$_2$	0	0.0%

L. 2769	n	%
TOT.	137	100.0%
gu$_2$:an-še$_3$	107	78.2%
šu-niĝen$_2$	15	10.9%
gu$_2$:an-še$_3$ + šu-niĝen$_2$	15	10.9%

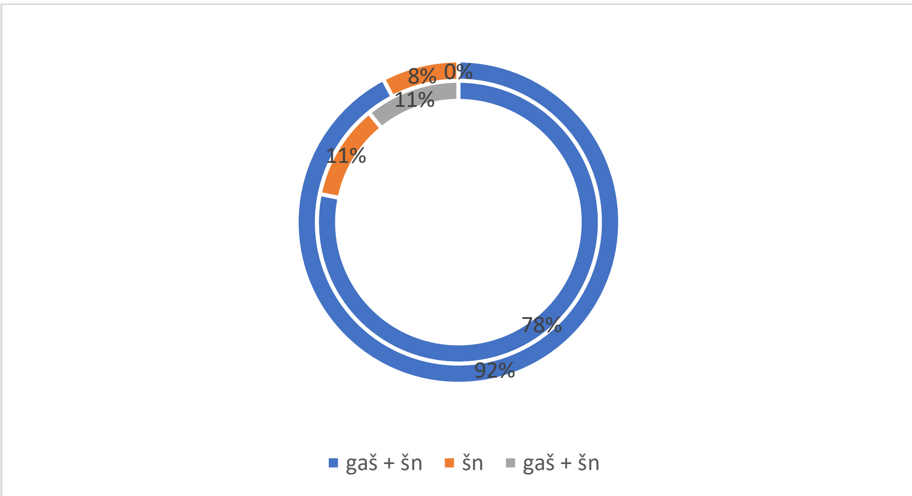

Fig. 30 – Lists and percentage occurrences of miscalculations in gu$_2$:an-še$_3$ and šu-niĝen$_2$ totals in L. 2712 (outer circle) and L. 2769 (inner circle).

The second chart shows occurrences of errors in two iconic groups of texts, edited in *ARET* 9 and *ARET* 15, respectively; the former collects texts (from L. 2712) that can be dated to the last years of the Palace G archives, whereas the latter collects nearly every administrative text (from L. 2769) that can be dated to *phase* II, when Yirkab-damu was king (see Chapter 1). This analysis allows us to compare different administrative bureaus.

ARET 15	n	% TOT.
TOT.	40	100.0%
Miscalculations	37	92.5%
Inconsistencies	23	57.5%
Both types of errors	19	47.5%
Erasures	1	4.0%
Addendums	0	0.0%
Irregular notation	1	4.0%

ARET 9	n	% TOT.
TOT.	56	100%
Miscalculations	14	25%
Inconsistencies	13	23.20%
Both types of errors	4	7.10%
Erasures	21	37.50%
Addendums	10	17.90%
Irregular notation	6	10.70%

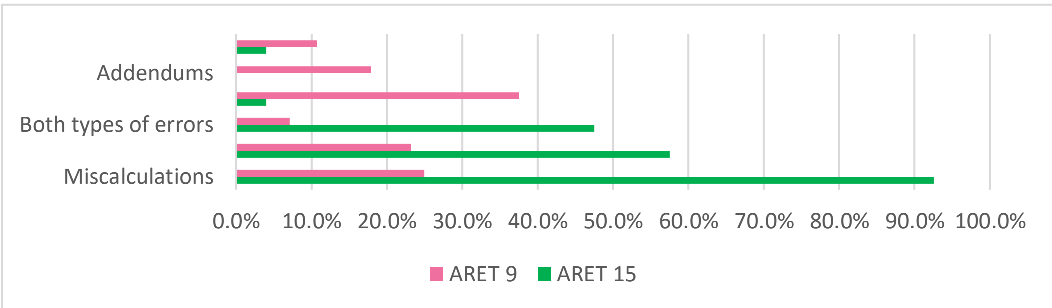

Fig. 31 – Lists and percentage distribution of errors and inconsistencies in *ARET* 9 (L. 2712) and *ARET* 15 (L. 2769).

In general, the texts of *ARET* 9 (L. 2712) have far fewer errors than those of *ARET* 15 (L. 2769), which are represented here by the homogeneous sample of *ARET* 15.

Most likely, this divergence in the frequency of occurrences can be attributed to the intrinsic differences in these two types of texts (see below).

The following chart shows a statistical analysis of error occurrences in diverse typologies of accounting texts.[946]

TEXT TYPOLOGY	TOT.[947]	Miscalculations	Inconsistencies	Both	None
Textiles and wool	229	48.80%	19.20%	11.70%	20.30%
Metals	98	27.60%	12.40%	15.80%	44.20%
Foodstuffs	75	23.90%	22.40%	7.10%	46.60%
Sheep and cattle	37	12.50%	12.50%	12.50%	62.50%
Land management	5	0%	33.40%	0%	66.66%

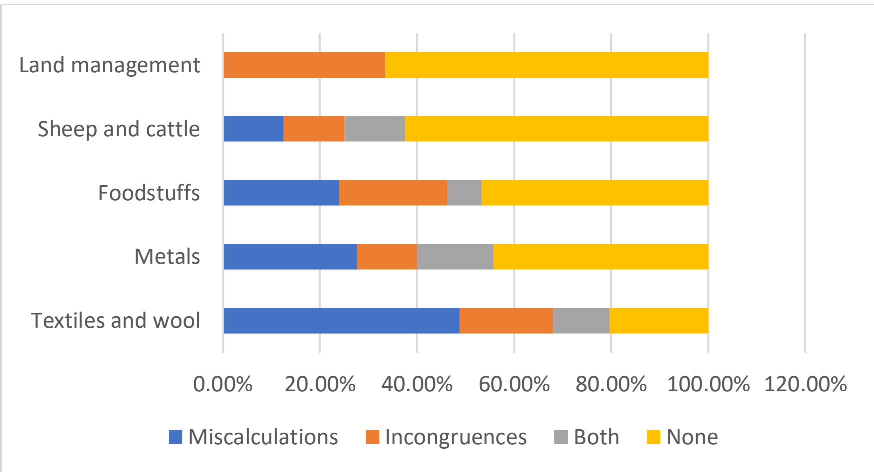

Fig. 32 – List and percentage distribution of errors within different types of texts.

[946] In this table, the totals for wool have been grouped together with those for textiles because they often appear together and, in addition, because wool is not always accounted for.

[947] The total corresponds to the number of texts that can be used for error detection, *i.e.*, those with no major *lacunae*.

Exemplary of *Sammeltafel*, with its editorial inconsistencies and miscalculations, is *ARET* 2.13 (= *MEE* 10.40 = *ARET* 14.59a). The tablet contains a mu-DU text listing textiles, precious objects, and quantities of weighed metal; it is divisible into several sections[948]:

[A] § 1–9
[B] First subtotal (§ 2–9)
[C] § 10–14
[D] Second subtotal (§ 10–14)
[E] § 15
[F] Total of metals and textiles (§ 1–15)
[G] Grand total of textiles.

Reconstructing the calculations in [B], [D], [F], and [G], one can observe that § 1 is not included in [B], as one would expect (being the first subtotal following it) but is instead counted directly in [F]. The quantity written in [B] differs by 7 shekels from the sum of the items.[949] The subtotal [B] accounts only for silver (both by weight and as price of items). The second subtotal [D] returns only if the quantities "taka4" are added together with "mu-DU." Quantities of gold are not included in the subtotals; instead, they are calculated directly in the total [F], whereas quantities of metal defined as "nu-mu-DU" are not added up anywhere. The total [F] returns if it is calculated on the basis of the corrected total in [B] and not the registered total as the sum of [§ 1] + [B] + [D]. The final textiles total [G] contains a calculation error

[948] See the following correspondence between cases and §, as already provided by Mander 1990, and corresponding to that of Archi 2023: [A] § 1 [o. i 1–iii 3]; § 2 [o. iii 4–9]; § 3 [o. iii 10–iv 4]; § 4 [o. iv 5–8]; § 5 [o. iv 9–v 6]; § 6 [o. v 7–vi 1]; § 7 [o. vi 2–6]; § 8 [o. vi 7–vii 5]; § 9 [o. vii 6–viii-1]; [B] [o. viii 2–r. i 8]; § 10 [r. i 9–ii 10]; § 11 [r. ii 11–iii 1]; § 12 [r. iii 2–6]; § 13 [r. iii 7–10]; § 14 [r. iii 11–iv 9]; [C] [r. iv 10–13]; § 15 [r. iv 14–vii 3]; [F] r. ix! 1–viii! 7]; [G] [r. vii! 4].

[949] The quantity given in the text is 37 minas and 3 shekels of silver, as opposed to 37 minas and 10 shekels calculated based on the entries listed in § 2–9.

corresponding to one digit.[950] Furthermore, not all textiles are accounted for in the subtotal [F], on which the counting of the final total [G] is subsequently based.[951]

3.2.2. Šuruppag (Tell Fāra)

The Šuruppag texts contain far fewer errors and inconsistencies than the Ebla texts, with 14% of the analyzed texts containing calculation errors and only 2% containing inconsistencies attributable to redactional errors.

ERRORS TYPOLOGY	n	%
Miscalculations	16	13.7%
Inconsistencies	2	1.7%
None	99	84.6%

ERRORS / TEXT TYPOLOGY	Tot.	Preserved	Error %
Barley and grain-based products	23	13	11.9%
Oil and fat-based products	4	2	1.8%
Wool	4	3	2.8%
Vegetal fibers and textiles	8	3	2.8%
Metals (silver and copper)	5	4	3.7%
Various goods (miscellaneous)	5	4	3.7%

[950] The quantity given in the text is 1,043 textiles (excluding, as usual, ib$_2$), as opposed to 1,044 calculated based on the entries listed in [F].

[951] See the following errors and inconsistencies: the *ʾa$_3$-da-um*-tu$_9$ textiles are recorded as 86 (against 76 actual), the tu$_9$ gun$_3$ and dul$_3^{tu9}$ are not accounted for, as the ib$_2$-3^{tu9}, the gu-dul$_3$ are recorded as 90 (against 92 recorded in the text), the aktum-tu$_9$ are recorded as 80$^{!}$ (82 recorded in the text), ib$_2$-3^{tu9} sa$_6$ gun$_3$ textiles are recorded as 54 (against 53 recorded in the text), and ib$_2$-3^{tu9} gun$_3$ as 100 (against 101 actually recorded in the text). Interestingly, for SAL textiles, a total of 650 is given, against only 140 recorded in the text (the figure is wrong, even if one also considers the 8 ib$_2$-3^{tu9} u$_2$-hab$_2$ SAL in o. ii 8). The count of ib$_2$-3^{tu9} u$_2$-hab$_2$ SAL alone is correct.

Parcels of land	25	16	14.7%
Personnel	23	17	15.6%
Equids for ploughing	50	41	37.6%
Animals (oxen and sheep)	8	2	1.8%
Fishing and boats	3	1	0.9%
Carts	3	2	1.8%
Lexical lists	1	1	0.9%

TYPE OF ERROR / TEXTS TYPOLOGY	Miscalculations		Inconsistencies		None	
Barley and grain-based products	0	0%	1	33.3%	12	– 13.3%
Oil and fat-based products	0	0%	0	0%	2	– 2.2%
Wool	1	6.3%	0	0%	2	– 2.2%
Vegetal fibers and textiles	0	0%	0	0%	3	– 3.3%
Metals (silver and copper)	0	0%	0	0%	4	– 4.4%
Various goods (miscellaneous)	0	0%	0	0%	4	– 4.4%
Parcels of land	3	18.8%	1	33.3%	12	– 13.3%
Personnel	6	37.5%	0	0%	11	– 12.2%
Equids for ploughing	5	31.1%	1	33.3%	35	– 38.8%
Animals (oxen and sheep)	0	0%	0	0%	2	– 2.2%
Fishing and boats	0	0%	0	0%	1	– 1.1%
Carts	1	6.3%	0	0%	1	– 1.1%

Lexical lists	0	0%	0	0%	1	– 1.1%

Fig. 33 – List of occurrences of miscalculations and inconsistencies per topic in Šuruppag.

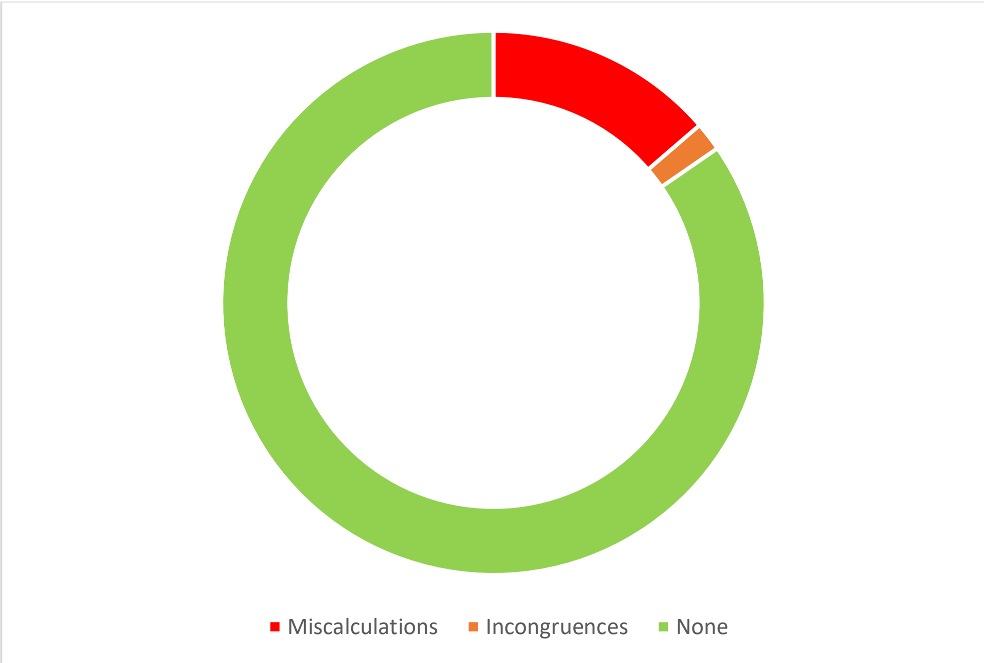

Fig. 34 – Distribution of different types of errors in Šuruppag.

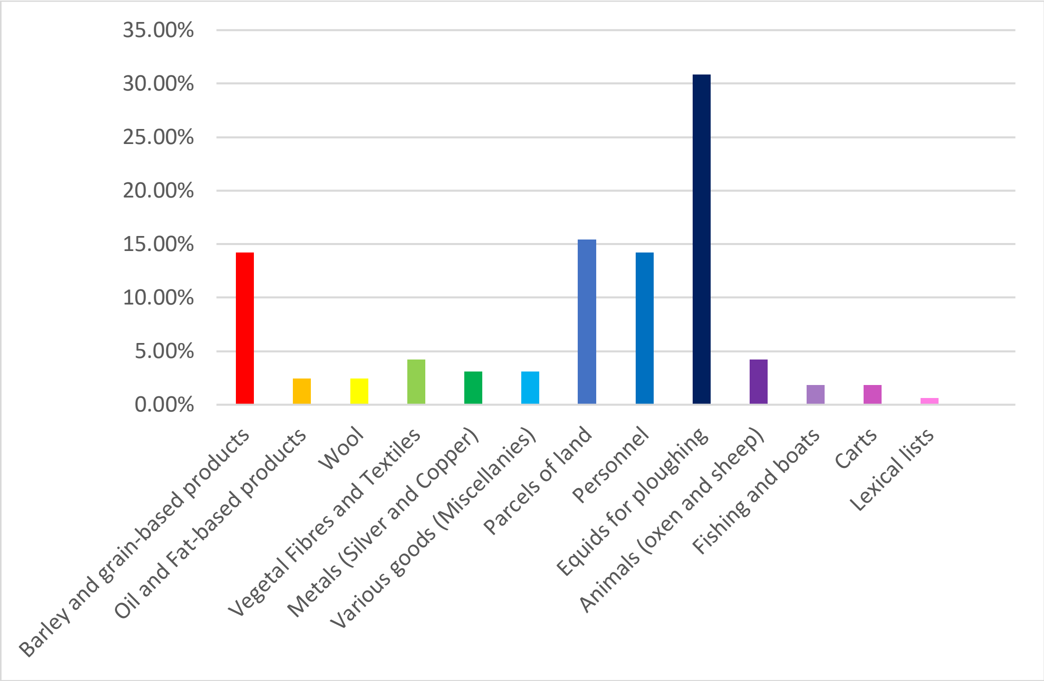

Fig. 35 – General distribution of different types of texts in Šuruppag.

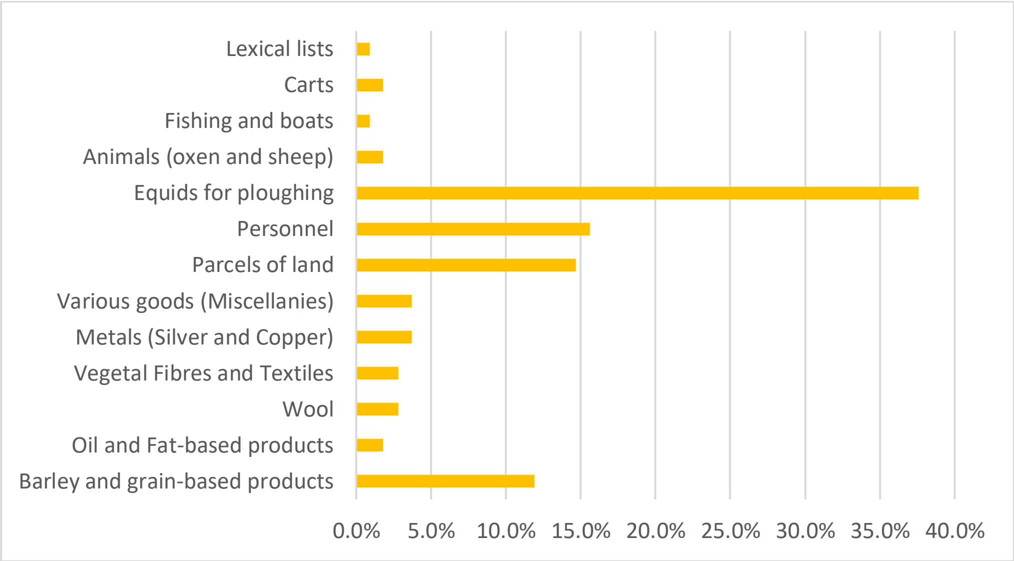

Fig 36 – Total percentage of errors and inconsistencies per type of text in Šuruppag.

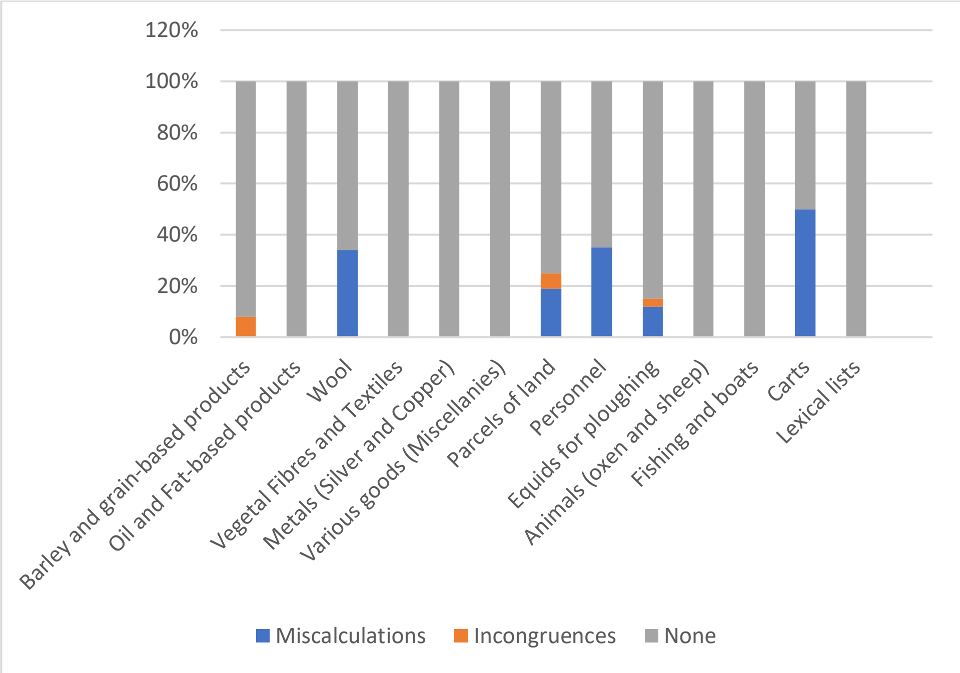

Fig. 37 - Distribution of errors and inconsistencies per type of texts in Šuruppag.

3.2.3. Mari (Tell Harīrī), Nabada (Tell Beydar), and Tell Abū Ṣalābīḫ

The Mari corpus has virtually no attestation of totals. In fact, the only Mari tablet with any sort of total is Horioka 2009, no. 4. However, one may note that the sum of the text entries is 305, while the number 6710 is recorded at the bottom of the tablet. This could be an annotation, or a general total, referring to a group of tablets; however, in the absence of other comparable texts, it is difficult to give a definitive answer.

Nabada presents 30 tablets that mention a total (gu$_2$:an-še$_3$, or šu-niĝen$_2$), and none of the Nabada documentation contains calculation errors or inconsistencies. Because the only minor inconsistencies present in *Subartu* 2.78, *Subartu* 2.92, *Subartu* 2.109, and *Subartu* 2.115 can be hardly explained in the light of two different capacity "systems," as in the case of Ebla,[952] perhaps the difference of a few figures is due to approximation.

[952] Sallaberger 1996b: 83, fn. 8.

Although the administrative texts from Abū Ṣalābīḫ are few and incomplete, in some cases they can be positively reconstructed—as in the case of IAS 490, which contains a calculation error: 382 guruš are recorded in the total gu$_2$:an-še$_3$, as opposed to the 381 that can be calculated from the figures recorded in the text. Instead, in the case of IAS 494, the result of 154 gur appears to be a rounded figure for the actual result of 153 gur and 1 bariga.

3.2.4. General discussion

The problem of errors and inconsistencies in the summary section of administrative documents raises three main questions: (1) How were the calculations performed? (2) What was the process of collecting, copying, and collating data in the tablets? (3) What was the purpose of the administrative tablets?

The corpora studied here contain a variety of data, both in terms of the number of records that can be processed, as well as the results that can be obtained from them. The most substantial and useful records for these evaluations are those of Ebla and Šuruppag—which, however, differ in certain respects. The Ebla texts derive from a centralized palatial administration (*i.e.*, that of Palace G) but refer to at least two offices, namely the Great Archive (L. 2769), to which the tablets coming from the Audience Court (L. 2752) also belong, and the Small Archive (L. 2712). They also refer to four distinct chronological phases: *i.e.*, *phase* I (texts predating king Yirkab-damu), *phase* II (texts dating to king Yirkab-damu, as minister ArruLUM was alive), *phase* III (texts dating to king Yiṯġar-damu, in the first phase of his reign, as minister Yibrium was alive), and *phase* IV (texts dating to king Yiṯġar-damu, in the second phase of his reign, as minister Yibbiʾ-Ḏikir was alive). On the other hand, the documents pertaining to the Šuruppag corpus come from different areas of the archaeological site of Tell-Fāra and do not present clear stratigraphic data. Moreover, their chronology (and the fact that they belong to a single, short phase lasting one year) may need to be reconsidered (see Chapter 1)—above all, when one considers how the only documents belonging to a clearly documented phase and area of the site (the tablets excavated by Schmidt and the University of Pennsylvania Museum team) present no data on totals.

Regarding the first issue (*i.e.*, how the calculations were carried out), the texts provide mostly negative information. In the case of Ebla, one knows that weights and measurement standards were found (see Chapter 2) that could provide a very useful and necessary support in the calculation and conversion practices between the units of weight and capacity as well as their recording in the documents kept in the archives of Palace G. The structure of some documents, such as those that recorded monthly allotments of textiles (and, thus, individual items rather than units of measurement), show how the calculation may also have been performed using the tablet itself as the calculation tool. Here, the distribution of the numerical elements on the left side of the case[953] and the rotation of the numerals in alternating rows was likely a useful tool for a calculation performed on the spot.

This difference could also be suggested by, for example, the greater incidence of calculation errors in texts about allocations of textiles (L. 2769) compared to those of rations of grain, oil, etc. (L. 2712) and those texts concerning quantities of metal measured by weight (still inherent to L. 2769). In particular, one sees how conversions between units, despite being more complex calculations, are generally correct, whereas monotonous operations (*e.g.*, the sum of the elements listed on a tablet) have a higher incidence of calculation errors. Therefore, although calculations involving the counting of discrete objects are simple, and unit conversions present less trivial calculations, most errors do not appear to be concentrated in this second type of operation, but rather in the first. The larger number of calculation errors in the monthly account of textiles can be explained rather simply. The scribe(s) had to count so many objects, and deal with so many numbers, that calculation errors were inevitable. The occurrence of errors does not lie in the type of specific text, nor in the individual file, but more precisely in the

[953] In this sense, the distribution of the numbers in the footnotes in Nabada corpus is peculiar and, as far as the material that has been preserved is concerned, appears to be free of calculation errors. Consequently, one must conceive of a practice of calculation with the help of external instruments.

type of object counted and—more specifically—in the calculation strategy adopted.[954]

One must bear in mind that the main purpose of numbers is to represent, not to calculate, and the use of large quantities of recorded numbers as a calculation tool, no matter how neatly arranged on the tablet, leads to errors and miscalculations. In fact, the greatest number of errors and miscalculations are concentrated in the sums involving lists of textiles, and possibly other objects that are summarized together in the total section. Such a number of errors could indicate that at least the calculations concerning the mere counting of objects were perhaps done on the spot by a scribe looking at the entries and doing the sum. In this sense, the presence of fewer errors in the totals of type šu-niĝen$_2$ may be attributable to the fact that they consist of the sum of the items listed in gu$_2$:an-še$_3$ and could be handled better. The texts containing counts of sheep and other animals are generally shorter, and in any case, there is not a sufficiently large number of these texts available for them to be considered statistically representative.

In contrast, all those calculations requiring unit conversions—such as those concerning metals and grains or liquid products—necessarily required the support of different tools. Accordingly, part of the calculation, especially concerning the use of these units of measurement, may have also relied on other objects such as wax tablets,[955] tokens,[956] and, of course, weights and containers (at least at an early stage of administrative practice, *i.e.*, when the data were first processed and registered). Also, some accounting strategies were already employed in the writing of the tablet, such as the use of disambiguating notations (see Chapter 2). The

954 However, it is evident that not all texts containing errors are completely wrong; they also often have parts that are correctly calculated. This happens within the same gu$_2$:an-še$_3$, for example, even if this concerns textiles (see, *e.g.*, *ARET* 14.87), or for different types of goods, such as metals, and individuals within the same text (see, *e.g.*, *ARET* 14.81.).

955 Unfortunately, no wooden tablets have been found in the Ebla context, but they are known from other Near-Eastern contexts (on this topic, see most recently, Cammarosano *et alii* 2019).

956 Tokens are a well-known accounting device used during the 4th millennium (see, recently, Schmandt-Besserat 2013); however, beads of uncooked clay or other materials also may have aided calculations later.

presence of such aids—and perhaps the greater attention required by the difficulty of the calculations—must have led to a lower occurrence of errors in the sections of text dealing with these types of goods. In fact, most of the differences in results can be attributed to approximations.[957] Nonetheless, also the texts from L. 2712, which mainly record conversion between capacity measures, are not free of errors. One example is *ARET* 9.36, a text with clear erasures, corrections and bad handwriting, plus some inconsistencies.[958] In *ARET* 9.79, part of the text has been erased by the scribe using oblique lines.[959] As for *ARET* 9.69, the inconsistencies in the sums and the extensive erasures suggest that this text was a sort of draft.[960] In *ARET* 9.71,[961] the marks on the reverse side were made when the tablet was already dry. Also, in these texts, the provisional total and the grand total (gu$_2$:an-še$_3$ and šu-niĝen$_2$, respectively) do not coincide. Lastly, in *ARET* 9.80, the total is incongruent with the text; the šu-niĝen$_2$ may include figures from another source.[962]

The sums concerning the counting of individuals—in particular, those that can be found in the *ARET* 20 texts[963]—confirm that the number of errors is associated mainly with the presence of sums containing many elements. On the other hand, in some contexts, the presence of multiplications and a distributive notion between quantities of objects and individuals leads to a revision of the calculation and to greater care in the same.[964] Moreover, the number of errors may also depend on individual scribes' proficiency and the quality of their work.

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[957] As an example, see how rounding and approximations (mainly concerning precious metal quantities) are present in at least 28% of the mu-DU texts. Notably, approximations are also used in these texts for gu-dul$_3^{tu9}$ (as in the case of *ARET* 14.89).

[958] Milano 1990: 109.

[959] Milano 1990: 248.

[960] Milano 1990: 227.

[961] Milano 1990: 230.

[962] Milano 1990: 252.

[963] Although most of the sums attested are not usable, due to *lacunae* in the text.

[964] See, *e.g.*, *ARET* 20.6 and *ARET* 20.18, where the calculations are correct. Although in the case of *ARET* 20.7, the total gu$_2$:an-še$_3$ is correct (where there is a multiplicative/distributive calculation), the total šu-niĝen$_2$ contains calculation errors.

Additional errors, such as missing items in totals, could also be due to the fact that, very often, Ebla's administrative records are monthly reports that collect data from other tablets. Naturally, copying and summarizing data can lead to errors and inconsistencies.[965] This is also the case of *ARET* 2.13 (= MEE 10.40), and *ARET* 2.44,[966] a text that may be unfinished. In other instances, texts showing a series of approximations are *ARET* 2.1,[967] *ARET* 15.17[968] and *ARET* 15.43.[969] On the other hand, the presence of major inconsistencies can be traced back to the presence more tablets pertaining to the same exact month (and, of course, the same exact year), as may be the case of the wool summary in *ARET* 15.9, as seen above, and in *ARET* 1.26.[970] Lastly, certain discrepancies—which have not been treated as inconsistencies in the present work because they clearly are intentional—are to be regarded as recurring "administrative patterns." For example, in monthly allotments of textiles, items of type ib_2-*n*-tu_9 are generally not counted in the grand total šu-niĝen$_2$, but only in the subtotals of type gu_2:an-še$_3$.[971]

Nonetheless, other corpora, such as those of Šuruppag and Nabada, have a much lower incidence of errors, for several reasons. In the case of Nabada, the documents are usually shorter than those of Ebla, and most require conversion calculations

[965] As for the process of collecting, copying, and collating data in larger tablets, and the presence of errors and inconsistencies, some insight may be provided by the *naptan šarrim* documentation (2nd millennium, Mari). In this respect, Sasson poses two provocative questions: "Can we always presume that the Mari scribe had at his disposal an 'original' when he worked on a list?" and "Can we, moreover, always assume that the transfer of information went only in the direction of 'original' to list?" Concerning the second question, Sasson (1982: 341) postulates the number of errors may be due in part to a later reworking of some of the texts: "the scribe may have still proceeded with filling, in the proper slot, a fictious entry, and have 'covered his tracks,' by producing an 'original' to suit the occasion." Although the Ebla documentation does not provide any answers, which remain of great interest, as they may be pertinent to the Ebla case itself.

[966] Edzard 1981: 94.

[967] Edzard 1981: 10.

[968] Pomponio 2008a: 172.

[969] Pomponio 2013: 59.

[970] Archi 1985: 175.

[971] See the calculations in *ARET* 15.20 r. xiv 1–2 and *ARET* 15.20 r. xiii! 1.

between units of capacity measure. Whereas the documents from Šuruppag, although very similar to those from Ebla in the length of many texts (e.g. large Sammeltafeln) have far fewer errors.[972] In these texts, the presence of fewer errors is perhaps due to a more controlled writing process. This is confirmed in the numerical correspondences that emerge when comparing the smaller texts with their related Sammeltafeln.

The study of calculations can provide further insight into the purpose of documents. Besides having fewer errors, the texts of the Small Archive (L. 2712), as well as the texts concerning food rations, show an entirely different structure and purpose. In fact, in these texts one certainly finds fewer errors and more precision in both structure and calculation. Indeed, some inconsistencies found in Ebla texts from L. 2712 onwards suggest that at least a number of the documents contained in this archive reflected an economic expectation, rather than being faithful records of events. Indeed, in some texts, such as *ARET* 9.8 and *ARET* 9.9, the final quantities seem to be adjusted on the basis of a certain expectation (and recurrence of the data).[973] The presence of predictive calculations may also be spotted in *ARET* 9.6, where the accounted sum is then calculated for six as well as eight months. The same applies to *ARET* 9.28, where calculations are made for five months and then four years.[974] In these instances, one text provides rations for one month (in analytical form) as well as for several months, the latter being a simple arithmetic product of the former, although it is known that some variations in absolute figures could, in fact, appear in subsequent months. For example, even some of the Ebla letters show that the king was concerned about supplies for the first two months because these would be relied upon during the time immediately preceding the harvest season.[975] These recurring features could suggest that the nature of these documents is very often one of estimation, rather than balances founded upon a real basis. However, this finding would not be surprising, as part of the administrative

[972] See the group of texts discussed in Pomponio – Visicato 1994, and the discussion above

[973] Milano 1990a: 25, 30.

[974] Milano 1990a: 90.

[975] See Catagnoti *et alii* (in press).

texts with provisional purpose fits very well in the stream of the Mesopotamian tradition,[976] where two different kinds of accounting—balances and estimates—are consistently attested.[977] In texts concerning quantities of precious metals entering and leaving the palace, the incidence of errors is reduced, as in the case of documents concerning the managements of animals (sheep and cattle) and of land properties. These latter categories (*i.e.*, those concerning animal and land management) may also stem from different bureaus, charged with dealing with this specific information. With regard to Archive L. 2769, the question of how so many errors were tolerated also leads one to reflect on the purpose of this archive. One possible answer is that these texts were no longer consulted, and nobody noticed these errors—or that, instead, only the totals were consulted, which in any case provided representative information (albeit with a number of scattered calculation errors). This consideration, of course, applies to the texts originally belonging to the Great Archive (L. 2769) as well as to those in the Small Archive (L. 2712), although the purpose of the latter is largely predictive and not merely descriptive. This cannot be said for the texts in L. 2769, which, considering their structure and subject matter, are clearly more descriptive in nature. Textile accounts derive from a daily record of what was happening in the palace and reflect the role of the redistribution of the palace's objects, especially textiles and valuables, which are part of the redistributive mechanism of valuable goods that creates a close link between the palace and the people who live and work in it.[978] However, these substantial differences in the presence of errors and their quality tend to coexist within the same administrative system (*i.e.*, the palace system), but this does not

[976] On this topic, for Ebla sources see Milano 1987b. For the Mesopotamian sources, see Liverani 1976; Maekawa 1982; and Woods 2015.

[977] As for Ebla, see Milano 1987b: 549. A good example of final balance in the Ebla documentation has been shown by Milano 1980b: 12–21. In this respect, see the observation of Steinkeller (2004: 77–78), who argued regarding later Ur III documentation that administrative texts, despite specifying who received what from whom, and where, actually occupied a distinct virtual bookkeeping reality. In this sense, the purpose of compiling written administrative records was to enable a given office to provide the top management with summary—or statistical—information that would permit economic planning.

[978] On the palace economy and its mechanism, see Sallaberger 2013.

generate a contradiction insofar as different documents serve different functions. For example, it is possible that those documents concerning land and animal management collected data from outside, whereas the documents concerning cereal rations—partly by virtue of the presence of forecasting calculations—had to be consulted several times in order to derive information from them concerning the rations of the staff, the king's household, and so on. This, on the other hand, was likely not the case for the texts concerning the monthly allocation of textiles, which fulfilled their task and purpose in the simple act of recording and collecting in monthly tablets.

The destinations of most documents pertaining to other corpora differ from those of most Ebla documents. Virtually none of the Šuruppag texts can be traced to the type of texts expressing palatine administration, and the few that are available lack either very long sequences of entries[979] or the total (as in the case of TSŠ 881). These are mostly official documents recording the allocation of fields (which, as such, must be reliable) or animals and barley (which, as one can also see from the Ebla texts, have fewer errors, as they mainly contain conversion within units of measure or because they clearly rely on a set of parallel and progressive records). It is quite evident that the presence of errors and their "tolerability" ties in with the problem of the credibility of these texts, and of the bureaucracy itself—and it does so in two ways. On the one hand, it is appropriate to ask the question whether anyone actually double-checked these texts and consulted their contents, as well as their summaries; on the other hand, one can also question the actual degree of control and trust by the "administration" toward the bureaucrats (*i.e.*, scribes) who worked for it. For instance, it is clear from some different contexts how some scribes manipulated documentation. One case is that of the *naptan šarrim* texts from Mari, written during the 2nd millennium (see above), studied by Sasson.[980] Another is the case of the Ur III documentation concerning the inspections of the work gangs on behalf of the foremen (ugula personnel), for which Molina has recently

[979] See the discussion in Gori 2023: 161-164.

[980] Sasson 1982.

demonstrated a certain degree of manipulation of data by the scribes.[981] However, this is not always the case at Ebla (except for some forecasting calculations in the texts of *ARET* 9 L. 2712, as seen above). Moreover, the manipulation described by Molina has in itself a certain intentionality and "culpability" in turning the accounts in one's favor[982]; whereas the one described by Sasson likely refers to the work of scribes who had to compile reports despite incomplete data and adjusted the editing.[983]

[981] Molina 2020.

[982] Molina 2020: 17.

[983] Sasson 1982: 338–339.

CHAPTER 4. THEORY IN SCRIBAL ACTIVITY: THE CASE OF MATHEMATICAL TEXTS AND LISTS OF NUMBERS

This chapter addresses two categories of texts: (1) mathematical texts and (2) lexical lists containing references to numbers and units of measurement. They are derived from three of the five principal corpora, namely Ebla, Šuruppag, and Tell Abū Ṣalābīḫ.[984] However, a text cannot always be precisely categorized as mathematical (especially within the context of early 3rd millennium archives); many lack a standardized structure and are intertwined to varying degrees with other forms of text, such as administrative records. To define mathematical texts for the purposes of this discussion, we recognize those that steer clear of specific factual events or individual references, instead embracing a more abstract and theoretical nature. This framing delves not only into the dichotomy between "theory" and "practice" but also into how specific textual genres can be classified within this framework. Although this chapter offers a brief exploration of this topic, a more comprehensive treatment awaits in the concluding chapter of this dissertation.

4.1 Ebla (Tell Mardīkh)

Among the documentation retrieved from the archives of Ebla Palace G, there are six whole tablets and four lexical excerpts that concern numerals and mathematics.

[984] The sources of Tell Abū Ṣalābīḫ, being few, will be discussed in context with the other two corpora.

In his article “Mathematik” in the *RlA*, Jöran Friberg[985] states that only two texts can be considered mathematical *stricto sensu*[986]:

The first is TM.75.G.2346,[987] a small lenticular tablet with writing on both the obverse and reverse sides. The text is built as a conversion table composed of five double entries, which clarify and facilitate the use of the second system of capacity known from the Ebla texts, [988] *i.e.*, that with one niĝ$_2$-saĝšu containing five *an-zam*$_x$(LAK 340).[989] (See also the discussion above in 2.2.4.1.).

The second text is *MEE* 3.74,[990] for which a new interpretation is proposed here. The text records the execution of a computation achieved through a series of subsequent approximations that lead to the total in r. i 3.[991] The starting correspondence is written in the first column of the obverse, and the final figure is written in the last column of the reverse:

o. i 1	3 *GU*$_2$*-BAR* 4 *an-zam*$_x$(LAK 304)	3 *k*.-measures (and) 4 *a*.-measures (= 3 $^1/_{30}$ *g*.)
o. i 2	1 *MI*<*-AT*> *GU*$_2$*-BAR*	(correspond to) 100 *k*.-measures
r. iii 1	lu$_2$ 2 *MA-I-AT*$^!$(ḪU) 6 *RI*$_2$*-BAB* (blank)	(That of) 260,000?

[985] Friberg 1987–1990: 531–585.

[986] See Friberg 1987–1990: 540 “Apart from lexical texts with entries related to Sumerian numerals and number notations (§ 3.5), only two mathematical Ebla texts are known.”

[987] Published in Archi 1989: 1, Fig. 1.

[988] An administrative text written according to this system (B) is *ARET* 2.51 (see Brugnatelli 1990; Chambon 2011: 130–131; cf. Archi 1989: 2). Interestingly, it pertains to the Great Archive (L. 2769), just as the conversion table TM.75.G.2346, and not to the Small Archive (L. 2712), from which most texts concerning allocations of cereals and related by-products have been retrieved. In L. 2712, most texts are written according to the system (A).

[989] And therefore, 1 *ba-ri*$_2$*-zu* = 50 *an-zam*$_x$(LAK 340).

[990] The text was first considered administrative by Pettinato 1979: 155. Pomponio (1981: 270–280) identified the text as “mathematic.” For further references, see below.

[991] Thus, the text should be understood as a problem rather than a simple computational table. On this topic, see Brugnatelli 1982: 31; Friberg 1986: 16. On the contrary, TM.75.G.2346, a computational table, has no total section (cf. Archi 1989: 2–5).

The other columns bear the progressive calculations to solve this non-trivial algorithmic problem.[992] The aim of the scribe who wrote *MEE* 3.74 was to solve an equivalence between two ratios, *i.e.*, a proportion.[993] The known data in o. i 1–2 lack information about the actual counted object. This object is indicated only in the query (r. i 1): gu$_2$:an-še$_3$ 7 *LI*<-*IM*> 8 *MI*<-*AT*> 60 20-la$_2$-1 še *GU*$_2$-*BAR*, and it corresponds to the barley (še). With this in mind, a modern formulation of this problem would be:

3 $^1/_{30}$ *k.*-measures : 100 *k.*-measures = x : 260,000 *k.*-measures.

[A] : [B] = x : [D]

Considering the problem as a proportion, one must recognize that figure [B] 100 *k.*-measures (o. i 2) is also calculated in barley, as it is related to [D]. Nonetheless, it is very unusual for a scribe not to specify the object measured in [A] and, therefore, in x. Indeed, the scribe would have specified the object measured in [A] and x if it had been different from the barley mentioned in [D] and implied in [B]. Therefore, I propose that the measured quantity is always barley. If so, this tablet may show a percentage calculation (in loss or gain)[994] of barley, measured in *GU*$_2$-*BAR* and its submultiples (namely, the an-zam$_x$(LAK 340) and the niĝ$_2$-saĝšu).[995] The starting point of *MEE* 3.74 would be, therefore:

[992] Friberg (1987–1990: 540) defines the text as “a mathematical text with an algorithm for division by a non-regular decimal number,” and “The metro-mathematical exercise TM.75.G.1392 (MEE 3 74), contains an elegant algorithmic solution, in decimal numbers, to a division problem not unlike the one in TSŠ 50.”

[993] As suggested the presence of a notation with cuneiform numerals in the query. For further detail on multiplicative and distributive notation with cuneiform numerals, see 2.2.7.2.

[994] Please note how the ratio between [A] and [B] is 3.03, a suitable figure for a gain or loss percentage.

[995] For different interpretations, see Brugnatelli 1982: 31–32: “se 3 gubar e 4 anzam di orzo corrispondono a 100 gubar di qualche cos’altro, quanto orzo corrisponderà a 260.000?” Friberg (1986: 16–22) suggests that the text should be intended as a division problem of the type: “Given that you have to count with 1 *gu*$_2$-*bar* for 33 persons, how much do you count with for 260.000 persons?” Friberg translates the spelling lu$_2$ as “person” and emends *gu*$_2$-*bar* where needed: (o. i 2)

“If $^{1}/_{30}$ *k.*-measures <of barley> are (the gain/loss) per 100 *k.*-measures (of barley), how many *k.*-measures (of barley) are gained/lost per 260,000 *k.*-measures of barley?”

Besides TM.75.G.2346 and *MEE* 3.74, most texts retrieved in Ebla concerning numerals and mathematical elements are lexical.

The text *MEE* 3.72[996] is a small rectangular tablet with writing on only the obverse side. It contains a short list with 10 entries of šar$_2$ () elements, nearly identical to TSŠ 190 (see the discussion above).[997]

Furthermore, the first section of the list concerning “Numerals and Foodstuffs”[998] (ll. 1–18) also bears a sequence of signs metrograms, klasmatograms, arithmograms, and arithmo-metrograms. The list includes 102 entries and belongs to the Uruk tradition (*ATU* 3); later, it was copied (with several changes) at Šuruppag (SF 15, SF 16, SF 17), Tell Abū Ṣalābīḫ (*OIP* 99 5, *OIP* 99 6), Ebla, and Susa (*MDP* 18 21; *MDP* 27 196). At Ebla, the list is known from the manuscript *MEE* 3.48 + *MEE* 3.49. A further source from Ebla, *MEE* 3.63, is a syllabic version of the list, which duplicates ll. 1–49. Here I will only discuss the first section,[999] *i.e.*, that concerning numerals (ll. 1–18)[1000]:

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1 *MI*<*-AT*> *gu*$_2$*-bar* “gubar for 100 <people>”; (o. ii 3) lu$_2$ 1 *LI* “< *gu*$_2$*-bar*> for 1,000 people.” In this respect, Archi (1989: 3) suggests how in such a syntactic position, lu$_2$ corresponds to the Akk. *ša*. Therefore, if the numeral had referred to, *e.g.*, “1000 people,” it would have been spelled 1 *LI*<*-IM*> *na-se*$_{10}$ (or, *na-se*$_{10}$*-na-se*$_{10}$) and not lu$_2$ 1 *LI*<*-IM*>.

[996] Pettinato 1981a: 266.

[997] In this respect, see Friberg 1987–1990: 538 “The text from Ebla ends with ..., šár | šár diri, šár-šu-nu-gi$_4$, the text from Šuruppak with šár-an-[ki-bi-da], in both cases possibly names for ‘unreachable’ or ‘cosmic’ numbers (exact meaning not clear),” cf. Pettinato 1979: 252–253.

[998] See also the definition given by Cavigneaux (1980–1983: 614) “liste associant termes mathemathiques et termes économiques.”

[999] The sources from Susa (*MDP* 18 21; *MDP* 27 196) and the Ebla source *ARET* 5.23 (which duplicates ll. 50–57) do not concern the first part. Therefore, I will not discuss them.

[1000] According to Civil (1982: 2), the first section appears to have been included in the list to teach how to measure or count food portions. This first section was already discussed by Deimel (1923:

Synopsis:

W	*ATU* 3: 142–145
A	SF 15 o. i 1–ii 1
B	SF 16 o. i 1–18
C	SF 17 o. i 1–ii 1
D	IAS 5 o. i 1–18
E	IAS 6 o. i 1–ii 3
F	*MEE* 3.48 + *MEE* 3.49 o. i 1–17
S	MEE 3.63 o. iii 4–6

[1]

W C D E F	NINDA$_2$×10◐
A	◗ NINDA$_2$×10◐
B	[…]
S	[g]u$_2$*-sa-ma[1001]

[2]

W E F	NINDA$_2$×2◗
D	NINDA$_2$×3◗
A	◗ NINDA$_2$×3◗
B	[◗ NI]NDA$_2$×3◗
C	NINDA$_2$×20◐
S	[me]*-ne-sa-ma[1002]

[3]

W	1◡

21–22), who published the sources from Šuruppag (SF 15, SF 16, and SF 17), emphasizing its metrological contents.

[1001] I thank Marco Bonechi for the useful suggestion regarding the reading gu$_2$ instead of (x)-*sa-ma* as in Pettinato 1981a: 25.

[1002] I thank Marco Bonechi for the useful suggestion regarding the reading me instead of *gu*$_2$$^?$*-sa-ma* as in Pettinato 198a1: 25.

D E	NINDA$_2$×1𒀸
A B	𒀸 NINDA$_2$×2𒁹
C F	NINDA$_2$×2𒁹
S	en-da
[4]	
W	<om.>
A	𒀸 2𒁹
B	𒀸 NINDA$_2$×2𒁹 (LAK–101)
C	2𒁹
D E	NINDA$_2$×1𒁹
F	NINDA$_2$×2𒁹 (LAK–101)
S	en-da sur$_x$(ḪUŠ)-ru$_{12}$
[5]	
W	<om.>
C D E	20𒁹
A B	𒀸 2𒁹
F	2𒀸
S	[me]-ne
[6]	
W	<om.>
D E	2𒁹
A B	𒀸 2𒀸
C	20𒌋
F	2𒀸
S	m[e]-ne sur$_3$-ru$_{12}$
[7]	
W	<om.>
D F	2𒀸
A	𒀸 ⸢3𒀸⸣
B	𒀸 2𒀸

C	20◐ [erased +]10◐
S	me-ne ba-du

[8]

W	<om.>
D	3◗
A	◗ ⌜4◗⌝
B	◗ 3◗
C	⌜40◐⌝
F	3$^!$(2)◗
S	iš-ši$_2$ ba-du

[9]

W	30◐
D F	4◗
A	◗ ⌜5◗⌝
B	◗ 4◗
C	⌜50◐⌝
S	lem$_x$(LAM){-NI}-mu$^!$(NUN$^{!?}$) ba-tum

[10]

W	50◐
D F	5◗
A	◗ ⌜6◗⌝
B	◗ 5◗
C	⌜60◐⌝
S	u$_9$-i$_3$-a ba-tum

[11]

W	60◐
D F	6◗
A	◗ ⌜7◗⌝
B	◗ 6◗
C	50◐ [+20◐]*

S u₉-iš ba-du

[12]

W 30◯

D F 7◗

A ◗ ⸢8◗⸣

B ◗ 7◗

C […]

S u9-ma-NE-nu <ba-du>

[13]

W ⸢KUR⸣

D F 8◗

A ◗ ⸢9◗⸣

B ◗ 8◗

C […]

S u9-iš-ši2 ba-tum

[14]

W 3◗ KUR

D 7◗ [+2◗]

A ◗ 10◯

B ◗ 9◗

C […]

F 9◗

S u9-lu ši-zi ba-du

[15]

W D F 10◯

A ◗ SUR

B ◗ 10◯

C […]

S u9 NINDA2×ŠE

[16]

W ⸢SUR?⸣

D [x]

A KUL

B SUR

C […]

F SUR

S SUR

[17]

W

A 40

B C […]

F KUL

D [x]

S sur$_3$ NE-da-la

[18]

W

D 10 [+10 +] 20

B ⸢4⸣

C F 40

S u$_9$-mi-na ba-tu

As for the arithmo-metrograms listed in ll. 1–6, their numerical value is presumably in ascending order, *i.e.*, from smallest to largest, with decreasing divisors. Indeed, the larger the divisor, the smaller the value of the fraction.[1003] Later, in ll. 7–15, there follows a series of arithmograms (from 2 to 10), except for sources W (Uruk) and C (Šuruppag), which record sequences of tens rather than units. Lastly, in ll. 16–18[1004] follows a short sequence of terms

[1003] See Deimel 1923: 21 for an overview of the actual value of each measure.

[1004] In source W from l. 13, and in source A from l. 15.

(possibly indicating containers of a given capacity) and further arithmograms.[1005] As it concerns sources W, A, B, C, D, and F,[1006] one can spot some differences in the representation of numerals (mostly arithmograms). Entries belonging to source F (Ebla) tend to be more congruent with those of sources B (Šuruppag) and D (Tell Abū Ṣalābīḫ). However, sources D and B both present a succession of signs in a single row—whereas in sources A (Šuruppag) and F (Ebla), the signs are arranged in two rows (*i.e.*, according to the chunking rule), as in administrative texts. Uniquely, the two Šuruppag sources, A and B, have a sign to indicate each entry in the list. KUR in ll. 13–14 (Source W, from Uruk) may indicate a container. The same term appears in the later document from Mari, *ARM* 19.338.[1007]

MEE 3.63 (source S) contains a syllabic Sumerian version of the list.[1008] According to Friberg,[1009] the entries of source S may suggest that the first sub-section of the list (ll. 1–6) is somehow associated with the system Š (*i.e.*, the Proto-Sumerian system of the capacity of grain measures).[1010] The syllabic entries may confirm that ll. 1–6 list decreasing notations for fractional bread rations.[1011] The second sub-section (ll. 7–15) records the syllabic spelling of Sumerian numerals from "two" to "ten," and sub-section ll. 16–18, as in the other sources, records entries concerning containers with a given capacity (see the discussion above).

S: *MEE* 3.63 o. i 1–6

F: *MEE* 3.48 + *MEE* 3.49 o. i 1–6

[1]

F	NINDA$_2$×10
S	[g]u$_2$-sa-ma

[1005] See also the observations made by Friberg 1987–1990: 538 "The proto-literate 'mathematical list' or 'food list' begins with a series of numbers or measures, first a few entries of the type NINDA$_2$ x *n*, then the numbers 2, …,10, and finally ninda and halved and a quarter '10.' In later versions, from ED on, the quartered '10' is replaced by '40.'"

[1006] For source S, see the comment below.

[1007] See the discussion in Colonna d'Istria 2009: 334, with literature.

[1008] On *MEE* 3.63, see Civil 1982.

[1009] Friberg 1987–1990: 538.

[1010] On system Š, see Englund 1998: 119 and 188–204; Chrisomalis 2010: 233, 234, and Fig. 7.6.

[1011] Friberg 1987–1990: 538.

[2]

F NINDA$_2$×2

S [me]-ne-sa-ma

[3]

F NINDA$_2$×2

S en-da

[4]

F NINDA$_2$×2

S en-da sur$_x$(ḪUŠ)-ru$_{12}$

[5]

F 2

S [me]-ne

[6]

F 2

S m[e]-ne sur$_3$-ru$_{12}$

In MEE 3.63 o. i 1–6 one can spot the use of two "enclitic" elements, respectively -sa-ma [ll. 1–2] and sur$_x$(ḪUŠ)-/sur$_3$-ru$_{12}$ [l. 4 and l. 6]. In ll. 1–2, -sa-ma is the fixed element attached to gu$_2$ (l. 1) and me (l. 2). Logically, it is possible to suggest that gu$_2$ and me represent what it is inside the NINDA$_2$ sign, *i.e.*, gu$_2$: 10, and me : 2. Nonetheless, if me can be a short form of me-ne, "two," gu$_2$ cannot be easily explained as 10. As for ll. 4–6, the entry in l. 3 records en-da, and that in l. 4 records en-da sur$_x$(ḪUŠ)-ru$_{12}$. The entry in l. 5 records [me]-ne, while that in l. 6 m[e]-ne sur$_3$-ru$_{12}$. Possibly, sur$_x$(ḪUŠ)-/sur$_3$-ru$_{12}$ may be understood as a "-bis" element, given that in source F there is no difference between entries recorded in ll. 3–4 and ll. 5–6.

Another text, *MEE* 3.54 o. i 1–ii 4, parallels ll. 7–15 of S (*MEE* 3.63 o. ii 1–iii 3).[1012] *MEE* 3.54 is a small tablet, with writing on only the obverse side, which bears a list of the first ten

[1012] If one excludes the repetition of the element ba-du / ba-tum in *MEE* 3.63.

Sumerian numerals. The first numeral is written as an oblique wedge 𒀹, literally meaning '1.' Lexical numerals from "two" to "ten" are written phonetically,[1013] as they are in *MEE* 3.63.

MEE 3.54		Source S (*MEE* 3.63)	
o. i 1	𒀹		<om.>
o. i 2	me-nu	[7] o. ii 1	me-ne ba-du
o. i 3	iš$_{11}$-ša-am	[8] o. ii 2	iš-ši ba-du
o. i 4	le-mu	[9] o. ii 3	lem$_{x}$(LAM){-NI}-mu$^{!}$(NUN$^{?}$) ba-tum
o. i 5	ia$_{9}$(I)	[10] o. ii 4	u$_{9}$-i$_{3}$-a ba-tum
o. i 6	a-šu	[11] o. ii 5	u$_{9}$-iš ba-du
o. ii 1	u$_{3}$-me-nu	[12] o. ii 6	u$_{9}$-ma-nu {LU-NE$^{?}$} <ba-du>
o. ii 2	u$_{3}$-sa-am	[13] o. iii 1	u$_{9}$-iš-si$_{2}$ ba-tum
o. ii 3	i$_{3}$-le-mu	[14] o. iii 2	u$_{9}$-lu<-mu> ši-zi ba-du
o. ii 4	u$_{9}$-wu-mu	[15] o. iii 3	u$_{9}$-NINDA$_{2}$×ŠE <ba-du>

The meaning of each numeral is clear, as shown in the reconstruction made by Edzard[1014] and later collated by Friberg with the 2nd and 1st millennium attestations.[1015] Nonetheless, the element ba-du/tum in *MEE* 3.63 remains to be clarified.[1016] Source S (*MEE* 3.63 o. iii 4–6) also records a lexical version of ll. 16–18:

MEE 3.63

[16]

F SUR

S SUR

[17]

[1013] On *MEE* 3.54, see Edzard 1980; Pettinato 1981b; Diakonoff 1983; Friberg 1986: 4–8; Friberg 1987–1990: 538–539.

[1014] Edzard 1980. Previously, on sources A, B, and C, see Deimel 1923: 21. Friberg 1987–1990: 538 observes that "Sumerian numerals are not clearly sexagesimal. Neither are they constructed in a uniform way." (See Diakonoff 1983, who speaks of a quintal-ventagesimal system; Powell 1971: 48–49). Also, Diakonoff suspects that the Sumerian numerals originally existed in four variants with different application modes: without suffixes, with the suffixes /-u/ or /-a/, and with the copula.

[1015] Friberg 1986: 4–8. Further in Jagersma 2010: 242.

[1016] Friberg 1987–1990: 538, with literature.

F KUL

S sur$_3$ NE-da-la

[18]

F 40◐

S u$_9$-mi-na ba-tum

Concerning this section, Deimel suggested that because l. 18 records the arithmograms 40◐, accordingly the element SUR should correspond to a capacity 20 (gur),[1017] and KUL should correspond to a capacity of 30 (gur).[1018] As for source S, apart from the correspondence in l. 16, the last two lines remain to be explained. The ba-tum element in l. 18 suggest that this entry records a numeral, as those recorded in ll. 7–15 (S). Nonetheless, at the moment, I cannot connect u$_9$-mi-na to 40◐, spelled nimin. Moreover, also l. 17 in source S remains to be explained.

Three other lists from Ebla show a sequence of large Semitic lexical numerals, either alone or together with equally large Sumerian (symbolically notated) arithmograms:

[215] *MEE* 15.23 r. vii 3'–7': *MA-ḪU-AT* / *MA-I-AT* / *RI*$_2$*-BAB* / *LI-IM* / [*MI-AT*] / [...]

[216] *MEE* 4.78 r. i 6–ii 4: *MA-I-AT* / *MA-ḪU-AT* / šar$_2$(◐) // šar$_2$(◐)-gal / šar$_2$(◐)-KID / 2 šar$_2$(◐) / BUR(-)ḪI(-)*da-ri*$_2$*-ga*

[217] *ARET* 3.683 + *MEE* 4.63 + *MEE* 4.64 + *MEE* 4.71 r. iv 23'–24': *MA-I-AT* / *MA-*{*I-*}*ḪU-AT*

[1017] See Deimel 1923: 22.

[1018] See Deimel 1923: 21–22.

Excerpt [215] lists a decreasing sequence of large powers of ten.[1019] Excerpt [216] lists large numbers of the Semitic decimal system and the Sumerian sexagesimal system, although some elements remain to be clarified.[1020] Lastly, [217] repeats the sequence r. i 6–7 of [216].

Aside from these examples, also another text presents a sequence of numerals. *MEE* 3.73 is a small round tablet with the unwritten reverse[1021] and is commonly known as "the problem of the scribe of Kiš."[1022] The text shows a succession of powers of base 60. However, it remains to be determined whether it is simply a list of large numbers or conceals some actual counting (and to what extent).[1023]

1019 Most recently, Bonechi (2021: 37) proposed that *MA-ḪU-AT* means "one million." The matter is still debated. However, Bonechi argues that the spelling *MA-ḪU-AT*, *MA-I-ḪU-AT*, and *MA-I-ḪU* are not by-forms of the normal spelling *MA-I-AT* "one hundred thousand." Accordingly, *MA-ḪU-AT*, *MA-*{*I-*}*ḪU-AT* are two forms of the same lexical numeral, meaning "one million" (on this topic, see further on fn. 10, with literature).

1020 Specifically, the elements -gal (o. ii 1), -KID (o. ii 2), and BUR(-)ḪI(-)*da-ri*$_2$*-ga* (o. ii 4). The sole elements *MA-I-AT* / *MA-ḪU-AT* (o. I 6–7), which are listed decreasingly in [A], do not confirm that the list is built as a progressive succession of numerals. See the element (šar$_2$), which corresponds to n = 3,600, a number smaller than *MA-I-AT* and *MA-ḪU-At*.

1021 *MEE* 3.73 (Pettinato 1981a: 269–270) has been at first published in Archi 1980b: 63 (TM.75.G.1693). It has also been studied by Vino – Viola (1981: 278–285), and in Friberg 1986 (see also Friberg 1987–1990: 538).

1022 Pettinato 1981a: 269.

1023 Vino – Viola (1981: 280–281), agreeing with Pettinato, consider the tablet to be an exercise given by a master scribe from Kiš to some "young Ebla students." They were supposed to pass each other the tablet *MEE* 3.73 and write the result of the equation on their tablet. However, this whole scenario cannot be proven, especially because it remains to be proven that *Iš-ma*$_2$-NI is as a kišite PN (see below).

The first column of the text lists a sequence of large numerals of the *n*-gal type. As for its interpretation, a number of hypotheses have been suggested by Archi,[1024] Pettinato,[1025] Vino – Viola,[1026] and Friberg.[1027]

MEE 3.73

o. i 1 1◗šar$_2$(◖)-gal
o. i 2 šar$_2$(◖)-gal
o. i 3 10·šar$_2$(◖)-gal
o. i 4 -gal
o. i 5 6-gal nu-da-šid
o. ii 1 ki-gar
o. ii 2 dub-sar
o. ii 3 kiš^{ki}
o. ii 4 *iš-ma*$_2$-NI
r. (blank)

The most likely interpretations are that of Vino – Viola and Friberg. Vino and Viola interpreted text as an algebraic expression, where each case of the first column corresponds to an equation of the type:

$$A = D \cdot x$$

[1024] Archi (1980b: 63) interprets the tablet as a series of multiples of 60 and 10, namely, $60{\cdot}10$, 60^2, $60^2{\cdot}10$, 60^3, 60^4. Nonetheless, he fails to explain the -gal element affixed to each entry, defining it as “il termine gal ‘grande’ indica come si tratti di grandezze matematiche e non di misure di superficie.”

[1025] Pettinato 1981a: 269–270 interprets the sequence of numbers as representing: 600; 3,600; 36,000; 360,000; 2,160,000. Pettinato, however, recognizes the -gal element as having a complex value, although he cannot define it. He speculates that the text is likely a conversion table between the sexagesimal and decimal systems (see Pettinato 1979: 264). Pettinato (1981a: 269) and Archi (1980b: 63) .disagree on the translation of o. i 4, as Pettinato translates 360,000 vs Archi’s 216,000 (60^4).

[1026] Vino – Viola (1981: 278–285) suggest that the text records a problem concerning natural numbers (see Archi 1980b: 63 “grandezze matematiche”); however, they provide a more complex interpretation.

[1027] Friberg’s (1986: 10–15) interpretation partially relies on that of Vino – Viola (1981: 278–285) but departs from it.

Here, A is the known arithmogram written on the tablet, D = 60, the multiplicative factor (-gal)[1028] and x is the unknown to be calculated. Friberg's interpretation is very close to that of Vino and Viola in that he, too, recognizes the value of the -gal element as "60," *i.e.*, the basis of the sexagesimal system.[1029]

However, Friberg interprets the succession as a purely arithmetical multiplication:

$$A \cdot D = B$$

Here, B is the result already expressed by the numerical notation. Furthermore, he postulates that cases o. i 3 and o. i 4 represent the same number. However, this assumption is unlikely; in a text of this kind, one would expect a series of progressive entries.[1030]

Finally, the last numerical entry is followed by the explanation "cannot be counted."[1031] The second column bears the colophon: "(As) established by the scribe of Kiš. *Iš-ma*₂-NI."[1032]

[1028] On -gal as a representative element of the base of the sexagesimal system, see Neugebauer (1934: 96–97) and Menninger 1957: 66–70, as quoted in Vino – Viola 1981: 280.

[1029] The use of the sign GAL with a numerical value is also attested in Old-Babylonian Mari Documentation. Here, the sign GAL has a numerical value of n = 10,000. Here, GAL corresponds to the logographic writing for /ribbat/ or /rabbat/, elaborated from the semantic similarities of the Sumerogram GAL "large" and the root **rbb* "to be numerous" from which the terms /ribbat/ and /rabbat/ are derived. This root is also evident in the term *RI₂-BAB* used at Ebla to write the number 10,000. See the complete discussion in Colonna d'Istria 2009: 316, with literature.

[1030] In this sense, the explanation provided by Vino – Viola (1981: 279) appears more plausible.

[1031] This translation is proposed by Friberg 1986: 12. On {da} attested in negative forms, see Jagersma 2010: 455 "Sometimes the prefix {da} marks ability (Gragg 1973: 53–55). It then expresses that the person it refers to is able to perform the action expressed by the verb," cf. Old Babylonian: BE, 20/1 29 (= CBM 10990+), where 60^4 is denoted by the expression: šar$_2$-gal šu-nu-taka$_x$ *i.e.*, "šar$_2^2$ the hand does not reach."

[1032] Here, ki-gar is translated in agreement with Friberg 1986: 12. On this matter, see also Hallo – van Dijk 1968: 81 *šakānu*, "place (on the ground) establish" (cf. Legenda "chart of different notations for sexagesimal numbers" (F)). As for the PN *iš-ma*₂-NI, different interpretations have been proposed: the name has been interpreted both as a Kišite or Eblaite PN. Archi 1980b: 63 reads *iš-ma*₂*-ia*₃ /*Išmaya*/, "ordinamento/serie dello scriba di Kiš: *Išmaya*." Afterward, he states that nouns having as their first element a form of the verb *šama'um* are as frequent in Ebla as in Mesopotamia of the Old Assyrian period. Pettinato 1981a: 269 reads *iš-ma*₂*-ia*₃ */Išma-Ja/*. Biga 2021: 57 "TM.75.G.1693 it is written that the text is prepared by the scribe Išmaì of the city of Kiš." Alternatively, in Friberg 1986: 14: "Archi, in his turn, suggests (in a personal communication) that 'the most probable reading of the name is: *Iš-má-ì*, where *-ì* stands for *-i*(*l*).' This could be the Eblaic writing for: *Iš-má*/*ma*-DINGIR, a name attested also at Kish." Also, Friberg 1986: 14 (on the ground of un unpublished work by Fales) "Fales, on the

4.2. Šuruppag (Tell Fāra)

The identification of the number and typology of Šuruppag mathematical texts presents some challenges. In his article about the *Antecedents of Old Babylonian Place Notation,*[1033] Powell discusses what he considers the most crucial mathematical texts: SF 82, TSŠ 77, TSŠ 50, and TSŠ 671 (although some other tablet may be added to this short list). Clues to the identification of these texts come from different sources. On a side note, Powell already indicated some possible further mathematical texts, although without discussing them.[1034] However, in his general overview, Friberg does not discuss any of the texts proposed by Powell, neither in the *RlA*[1035] nor in his 1982 survey of the mathematical texts.[1036] Lastly, Krebernik, in his comprehensive work on Fāra and Abu Ṣalābīẖ, indicates the following as mathematical exercise texts: TSŠ 51, TSŠ 77, TSŠ 188, TSŠ 190, TSŠ 251, TSŠ 632, TSŠ 926, TSŠ 930, and TSŠ 969.[1037]

To my knowledge, other than SF 82, TSŠ 77, TSŠ 50, and TSŠ 671—which constitute the essential text discussed by Powell—only six other texts can be considered mathematical: TSŠ 51, TSŠ 188, TSŠ 190, TSŠ 251, TSŠ 632, and TSŠ 926.[1038]

The first text discussed by Powell is SF 82, a Sumerian multiplication table—or, more precisely, a table of squares that concerns the precise and straightforward calculation of areal measures.[1039] The second, TSŠ 77, is a geometrical exercise; unfortunately, it is only partially

other hand observed that a name like *Išma-Ya* with the theophorous element *-Ya* 'has a totally Eblaic ring about it.' Hence, Fales held it for unlikely that Ismaya himself was a scribe of Kišite origin."

1033 Powell 1976.

1034 Powell (1976: 346, fn. 19) lists: TSŠ 51, TSŠ 81, TSŠ 91, TSŠ 188, TSŠ 242, TSŠ 245, TSŠ 251, TSŠ 260, TSŠ 554, TSŠ 613, TSŠ 619, TSŠ 648, TSŠ 649, TSŠ 725, TSŠ 748, TSŠ 758, TSŠ 775, TSŠ 780, TSŠ 828, TSŠ 930, and TSŠ 969. Moreover, WF 93 and WF 125.

1035 Apart from TSŠ 190 (Friberg 1987–1990).

1036 See Friberg 1982. Nonetheless, I have found some notes by Friberg on CDLI, all concerning some of these texts. Each specific reference will be discussed below.

1037 Krebernik 1998: 313.

1038 Some of the texts quoted by other scholars have not been included in my list of mathematical texts because they record contingent information about people, toponyms, etc., and are therefore related to administrative and contingent practice, rather than to mathematical *calculus*.

1039 The tablet has been originally studied by Deimel 1923: 26–28. For a complete overview, see the reconstruction in Powell 1976: 430–431, with literature. He observes: "The number of bur on the obverse can be arrived at easily by multiplying each product (stated in šar) by the constant factor 2" (see also Powell 1972: 175–177, 219, about preserved on a fragmentary lenticular tablet. The purpose of the exercise may have been related to the question of the area of a circle, but no cuneiform inscription is preserved on the tablet.[1040] Lastly, the texts TSŠ 50[1041] and TSŠ 671 are two versions of the same exercise, concerning a problem of irregular numbers.[1042] Both texts work as a multiplication of the "dividend" by the reciprocal of the "divisor."[1043] In this sense, Friberg[1044] compares them to *MEE* 3.74 (see above), which he considers an algorithmic problem.[1045]

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the sexagesimal nature of bur areal measure). Another text like SF 82 is known from ancient Adab (*OIP* 14 70). It consists of a table of small units of length and their squares stated in standard metrological notation (Edzard 1969). See also Krebernik 1989: 313.

[1040] See also the copy in Powell 1976: 431 "The identical diagram appears in an Old Babylonian text [Saggs 1960, 133], but the cuneiform text describing the figure is broken out [Saggs 1960, text N]." See also Friberg 1987–1990: 540 "On the fragment TSŠ 77 are drawn four circles inscribed in a square. The accompanying text, if any, is lost. This text is the oldest known geometric problem (?) and is a precursor of the OB illustrated geometric theme text BM 15285 (§ 5.4h) – OIP 14 70."

[1041] Powell 1976: 432 "One of these texts [Jestin 1937, no. 50] was treated by Geneviève Guitel [1963], (mistakenly, I believe) as a problem in the division, and she posits a method of solution 'absolutely analogous to modern practice.' It is, however, precisely this close correspondence to modern practice that makes the solution suspect. If modern long division had been used in the Fara period, it is virtually that it would appear somewhere in Old Babylonian mathematical texts, which is not the case."

[1042] The two texts have been briefly catalogued by Edzard 1976: 170 (TSŠ 50) and 179 (TSŠ 671). Powell 1976: 433 "As one can see, the two problems are identical in type and form. No. 671, in addition to the handwriting errors, also has guruš (man = Latin vir) instead of lú (man = homo) and omits the verb form at the end because, as we shall see shortly, his solution did not require a remainder. A silo (guru) in this period contained 40,0 gur, each of which contained 8,0 sìla. Thus, the number 'divided' by 7 is 5,20,0,0. Seven is the only integer between 1 and 10 that will not produce an even result. Therefore, given this fact and the fact that two exercises dealing with the same problem have survived, the choice of 7 can hardly be coincidental." Krebernik (1998: 313) briefly mentions the two texts. However, he refers to the discussion in Powell 1976.

[1043] For a complete explanation of the problem, see Powell 1976: 433–434.

[1044] Jöran Friberg notes, available on CDLI: https://cdli.ucla.edu/dl/lineart/P010882_ld.jpg (TSŠ 671), and https://cdli.ucla.edu/dl/lineart/P010721_ld.jpg (TSŠ 50). See also Friberg 1987–1990: 540.

[1045] Indeed, both texts show a complex division problem. Further on TSŠ 50 and TSŠ 671, in Friberg 1987–1990: 540 "TSŠ 50 begins with the question še 1 guru$_7$ sìla / 7 1 lú šu-ba-ti / lú-bi '1 granary of barley, 7 sìla 1 man receives, its men?' Answer: 45,42,51 še 3 sìla šu-tag$_4$ '45 42 51 <men>, 3 sìla of barley remain.' The problem is a division exercise, and the solution is exact if the granary held 5,200,000 sila$_3$ (J. Høyrup 1982). TSŠ 671 is a simplified duplicate of the same exercise. In TSŠ 188, the square of 50,00 nindan is found to be 1,27,30 bùr. This result was probably derived from a table of squares, like SF 82 (Powell 1976)."

Among the texts that Powell does not discuss are some linguistic excerpts, such as sources A (SF 15), B (SF 16), and C (SF 17) of the list concerning “Numerals and Foodstuffs” and TSŠ 190. This latter text resembles *MEE* 3.72[1046]:

TSŠ 190		*MEE* 3.72	
o. i 1	𒌋 EŠ$_2$.GAN$_2$	o. i 1	𒌋 ki
o. i 2	𒌋 [ga]l?	o. i 2	𒌋 gal
o. i 3	[𒌋] KID×𒌋	o. i 3	𒌋 KID
o. i 4	⸢𒌋 DI⸣	o. i 4	𒌋 gur$_8$
o. i 5	𒌋 𒁹𒌋 diri(SI.A)	o. i 9	𒌋 𒁹𒌋 diri(A.SI)
o. i 6	𒌋 šu nu-ge	o. i 10	𒌋 šu nu-ge$_4$
o. ii 1	𒌋 niĝ$_2$-⸢bur$_2$⸣-gu$_7$	o. i 7	𒌋 nin-bara$_2$-gu$_7$
o. ii 2	𒌋 UD.NI-ge.gu$_7$	o. i 6	𒌋 UD.NI-ge.ku$_5$
o. ii 3	𒌋 u$_4$-u$_4$-u$_4$	o. i 8	𒌋 u$_4$-u$_4$-u$_4$
o. ii 4	𒌋 an[-ki]-b[i-da]	o. i 5	𒌋 an-ki-bi-da

The two texts are nearly identical, except for some variants; for example, in o. i 1 *MEE* 3.72, the element -ki is found instead of ŠE$_3$.GAN$_2$ of TSŠ 190.[1047] In o. i 3, TSŠ has KID×𒌋, whereas *MEE* 3.72 has only KID. In TSŠ 190 o. i 4, the sign DI, erased, could be what remains of gur$_8$. See also the alternation ku$_5$/gu$_7$ in *MEE* 3.72 o. i 6 and TSŠ 190 o. ii 2, as well as nin-bara$_2$ in *MEE* 3.72 o. i 3 versus niĝ$_2$-⸢bur$_2$⸣ in TSŠ o. ii 1. i. In the Šuruppag text, diri is written with the compound SI.A (TSŠ 190 o. i 5), whereas in Ebla, it is written as A.SI (*MEE* 3.72, o. i 9). Finally, see the variants šu-nu-ge$_4$ (*MEE* 3.72 o. i 10) and šu-nu-ge (TSŠ 190). Also compare the Ebla lexical excerpt [216].[1048]

All these texts possibly mention names very large numbers, that are defined as for “unreachable” or “cosmic” numbers by expressions such as an-ki-bi-da is “sky and earth” (TSŠ 190 o. ii 4, and *MEE* 3.72 o. i 5), and diri “surplus” (TSŠ 190 o. i 5, and *MEE* 3.72 o. i 9), *i.e.*, something that outreach a given quantity. As for the expression šu-nu-ge$_4$ (TSŠ 190 o. i 6, and

[1046] On *MEE* 3.72, see also Pettinato 1975–1976: 50–51 and Pettinato 1979: 252–253.

[1047] The ad-ge$_4$ list mentions, in l. 59 and l. 60, respectively, the entries -ki and -ki-ki, as the lexical text *MEE* 2.72 mentions -ki in o. i 1.

[1048] See the discussion above.

MEE 3.72 o. i 10), it may also refer to the same semantic topic, and may have the meaning "cannot be settled," derived from the verb šu ge_4 "to settle an account."[1049]

Here follows those mathematical texts from Šuruppag which are partially unpublished.[1050]

The first one is TSŠ 51, which has been studied by Friberg and Damerow.[1051]

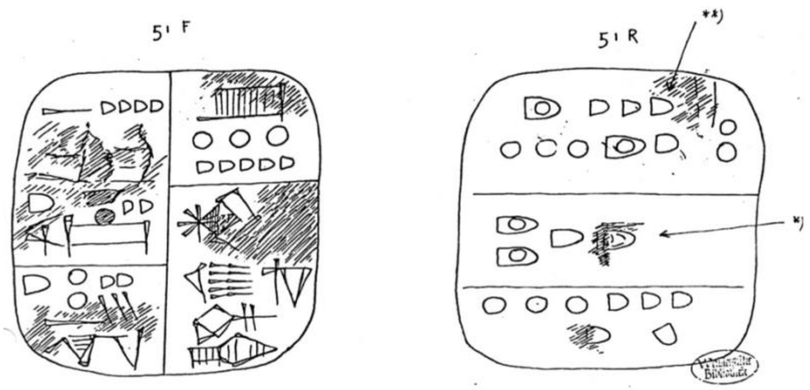

Fig. 38 – Handcopy of TSŠ 51 (Jestin 1937: XXII)

The text contains a calculation of areal measures, specifically an area of <4 bur_2>,[1052] which is divided into two lots: (A) measures 1 $eše_3$ 3 iku (o. i 1),[1053] and (B) is a rectangle whose length measurements are given in o. i 2 and o. i 3. In TSŠ 51, the starting data are given on the obverse side and are listed in columns—whereas on the reverse side, which is used for computation,[1054]

[1049] The $šar_2$ section of Ea V (Powell 1971: 74) again lists "unreachable" numbers: -gal šu nu-tag "big totality hand cannot touch" (iv 9, r. iv 8') (Friberg 1987–1990: 538). Syllabic spellings of Sumerian numerals for intermediate and large numbers are also given in the 'u' sections of Ea II and Aa II/4 (Friberg 1987–1990: 538).

[1050] The transliterations and discussions of these texts are available on CDLI in the form of handwritten notes by Damerow and Friberg. Specific references will be given below.

[1051] See the complete in CDLI: https://cdli.ucla.edu/dl/lineart/P010722_ld.jpg.

[1052] Friberg compares it with a Jemdet Nasr text (OECT 7 2.100).

[1053] The measure corresponding to 1 $eše_3$ in o. i 1 is written with cuneiform arithmo-metrograms; in r. i 1 it is repeated with a standard curviform notation.

[1054] Most likely, the numbers on the reverse side are intermediate results that were computed and recorded as a memory aid.

the signs are distributed into rows.[1055] The query is quite straightforward[1056] and aims to explore the connection between the length in lots of B and the area measurement in A.

The second is TSŠ 188, which represents area computation in three steps and presents some errors.[1057]

TSŠ 188
o. i 1 5 (eše$_3$) GAN$_2$
o. i 2 (šar$_2$)-GAL
o. i 3 1200 7 (bur) GAN$_2$
o. ii 1 5 (eše$_3$) ki$^!$(DI)
o. ii 2 *blank*
o. ii 3 50 (bur) 2 $^1/_4$ (iku)

Notably, in o. i 2, the notation (šar$_2$)-GAL is used. Friberg (in his handwritten notes, available on CDLI) suggested that it may have been a newly invented notation.[1058] Reflecting what he proposes for *MEE* 3.73,[1059] he considers both to be two variants of the same numeral (whose value corresponds to 10 x 60^2). However, they may also indicate the value of 10 [1060] and 600 [1061] bur, respectively.

TSŠ 251 records nothing but numbers and units of measure. However, because it lacks an explicitly counted object, it may be considered as a mathematical text.

TSŠ 251
o. i 1 gu 1 sila$_3$ 40-la$_2$-2 4
o. i 2 10 7 5
o. i 3 [*blank*]

[1055] To respect the arrangement of the signs in the space, I have chosen to insert the copy of the tablet directly.
[1056] The structure is not that of an algorithm; moreover, partial totals are likely approximated.
[1057] See the complete discussion at https://cdli.ucla.edu/dl/lineart/P010773_ld.jpg.
[1058] Nonetheless, it finds a parallel in *MEE* 3.73, where the element -GAL is possibly used to represent the factor 60 (on which see the discussion above).
[1059] Friberg 1986: 10–12.
[1060] See, *e.g.*, WF 53 (= EDATŠ no. 68) r. vii 3. See also Krebernik 1998: 304. See also 2.2.5.2.
[1061] Krebernik 1998: 304. See also 2.2.5.2.

r. i 1 gu2-an-še3 120 30-la2-4
r. i 2 [*blank*]

The sign gu in TSŠ 251 o. i 1 remains to be explained.

Additionally, TSŠ 632 may also be considered a mathematical text—albeit one that is challenging to decipher, as the tablet is partially broken.

TSŠ 632

o. I 1	[x]-ma [x]-[ĝe]š?
o. ii 1	1 5-kam4!
o. ii 2	1-la2-2 6-kam4!
o. ii 3	1 7-kam4!
o. ii 4	[1+]7-kam4!
o. ii 5	[... 3+]⸢1+⸣4-kam4!
o. iii 1	1 9
o. iii 2	1 10 5 12
o. iii 3	10 2 1 12!(13)
o. iii 4	1 14
o. iii 5	1 15
o. iii 6	1 16
o. iii 7	[*blank*]
r. i 1	
r. i 2	
r. i 3	
r. i 4	
r. i 5	
r. i 6	
r. i 7	
r. i 8	
r. ii 1	
r. ii 2	
r. ii 3	
r. ii 4	
r. ii 5	
r. ii 6	
r. ii 7	
r. ii 8	
[x]	
r. iii 1’	
r. iii 2’	
r. iii 3’	
r. iii 4’	
r. iii 5’	
r. iii 6’	
r. iii 7’	
r. iii 8’	
r. iv 1’	[x]
r. iv 2’	[*n* +]20
r. iv 3’	[*n* +]30
r. iv 4’	[*n* +]40
r. iv 5’	[*n* +]4[+*n*]
[x]	

Although the text remains cryptic in appearance, one can clearly discern certain elements:

a. Note how the possible sign -kam$_4^!$(LAK 29) is missing part of the two PAB elements. However, it remains to be clarified whether this is a problem due to the copy mechanism or whether it represents an actual missing element.

b. On the obverse side, the numerals are placed in ascending order o. ii 1–o. iii 6.

c. The numerals , , are in neither ascending nor descending order. Moreover, they appear in only some cases.

d. On the reverse, three columns consist solely of entries with .

e. The fourth column of the reverse side comprises entries of type *n*, followed by one entry (r. iv 5') of type *n*.

The text could be an accounting with numerical successions of a distributive type (see possible element -kam$_4^!$), or it could record some partial calculations. In detail, the reverse side resembles an abacus of some kind. However, because the beginning and end of the tablet are missing, it is difficult to say with certainty what kind of calculations are recorded in TSŠ 632.

Lastly, TSŠ 926 may also be interpreted as a mathematical text. It records:

TSŠ 926

o. i 1	120 ninda$_x$(DU^{inda}) da
o. i 2	120 5 ninda$_x$(DU^{inda}) da
o. i 3	60 saĝ
o. i 4	60 10 saĝ
o. ii 1	[...]
o. ii 2	60
o. ii 3	20 saĝ
o. ii 4	60 10 saĝ

The text is quite unclear. Perhaps the term saĝ refers to the *Kopfend* of the field or, alternatively, to distribution *pro-capite*.

As it concerns lexical lists containing references to numerals and units of measurement, the Early Dynastic Practical Vocabulary B (EDPV-B), available in one source from Šuruppag (SF 20) and another of uncertain provenance (MS 2340/1 + MS 2340/2)[1062] possibly from Umma,[1063] is the earliest lexical composition that documents weight measures. Its initial section has been recently discussed by Bartash.[1064] The EDPV-B is particularly helpful, in gaining a better understanding of the mina as a unit of measure, together with its submultiples. The two sources differ considerably in their notation of the mina's fractional values, which would suggest that they originate from two different scribal traditions.[1065] In detail, the Šuruppag version records as follows:

SF 20

o. v 22	1 uruda ma-na	1 mina (of) copper
o. v 23	2 ša$_4$(DU)-na-bi uruda	$^2/_3$ mina (of) copper
o. v 24	½ uruda ma-na	½ mina (of) copper
o. v 25	šu$_2$-1 -ša$_4$(DU)-na uruda	$^1/_3$ mina (of copper)
o. v 26	⸢a(ZA)-ru$_{12}$-da^{uruda}⸣	copper
o. v 27	⸢MUŠ$_3$ ^{uruda}⸣	copper (?)[1066]
o. v 28	5$^?$ uruda giĝ$_4$	5$^?$ shekels (of) copper

[1062] See *CUSAS* 12.6.3.1.

[1063] Bartash 2019: 46, and previously Civil 1982: 5. Further discussion on this list can be found in Veldhuis 2014: 119–123.

[1064] See the edition in Bartash 2019: 45.

[1065] Bartash 2019: 47 "SF 20 offers the Šuruppag or 'standard' writings, that is, the way the fractions appear in the most Early Dynastic documents from southern Mesopotamia known to us currently. In contrast, MS 2340/1+ MS 2340/2 presents the writings of the mina's fractions how they appear in the Early Dynastic IIIb texts from the Umma city-state."

[1066] On this interpretation, see Bartash 2019: 45, *contra* Civil (2008: 87), who interprets MUŠ$_3$^{uruda} as weight (see also EDPV-A, no. 142).

o. v 29	☾ 3⊢? giĝ4	3? shekels (of) copper
o. v 30	☾ 2⊢ uruda giĝ4	2 shekels (of) copper
o. vi 1	☾ 1⊢ uruda giĝ4	1 shekel (of) copper”

The main differences between the Šuruppag and Umma versions lie in (1) the sign used to mark ½ mina, (2) in the fact that the Umma version has no phonetic complements after fractions 1/3 and 2/3, and (3) that here the term giĝ4, “shekel,” appears after these numbers for mina fractions. [1067] This third difference, as already explained by Bartash, has profound metrological implications. The presence of the element giĝ4 show that the scribes from Umma understood “one-third” and “two-thirds” of the mina as 20 and 40 shekels respectively.[1068] Interestingly, in the Ebla texts, fractions of minas are written phonetically and are often accompanied by the unit of measure giĝ4, but never by the ma-na (see above). Nonetheless, the only known attestation from Mari (šu2-2 ᗜ-ša)[1069] is phonetically complemented but does not display the presence of either of the two units of measure.

4.3. General Discussion

Numbers and signs with a numerical value play a pivotal role within administrative texts, particularly in those of the 4th and 3rd millennium. Indeed, they occupy a predominant position—both visually and technically—in these texts.[1070] In this same time, a range of lexical lists and texts dedicated exclusively to numbers and

[1067] Bartash 2019: 49, and fn. 146. The origins of the “standard” and the “Umma” signs for “half” are obscure. Nonetheless, the same grapheme appears in Early Dynastic texts as half of the area measure iku (see, *e.g.*, TSŠ 53 o. ii 3).

[1068] Bartash 2019: 47 argues that “this must have been a secondary development, an offshoot of the ‘standard tradition,’” therefore, in his understanding, these scribes “did not know about the original meaning of the sign šu2 in this context.”

[1069] See passage [77]. Here, different spellings for minas’ fractions and submultiples are also discussed.

[1070] One may think, for example, of the 4th millennium numerical tablets, or—for 3rd millennium texts—of the position they occupy in the cases, *i.e.*, almost always at the top left of the element they refer to.

calculations are attested, including mathematical texts and lexical lists containing references to numerical values and units of measurement. These two categories of texts have differences as well as similarities. Many lexical lists showcase more abstract, “theoretical” problems, as in the case of succession of numerals (*e.g.*, *MEE* 15.23, *MEE* 4.78, *ARET* 3.683+). In contrast, others are deeply rooted within one or more measurement systems, such as the EDPV-B or the “Numerals and Foodstuffs” list, and therefore have more “practical” goals. As for mathematical texts, most of them usually concern “real-world” problems; this can be clearly observed in instances such as the mathematical texts from Ebla (such as TM.75.G.2346 and *MEE* 3.74, which revolve around capacity measurements), as well as certain mathematical texts from Šuruppag (such as TSŠ 50 and TSŠ 671, which deal with surface measurements).

CHAPTER 5. CONCLUSIONS

This dissertation delves into numeracy in the 3rd millennium BC, focusing on Syria and Mesopotamia and closely examining five corpora: Ebla (Tell Mardīkh), Mari (Tell Harīrī), Nabada (Tell Beydar), Šuruppag (Tell Fāra), and Tell Abū Ṣalābīḫ. The topic of 3rd millennium numeracy has been assessed within these corpora through a comprehensive analysis of practical and theoretical texts.

In analyzing practical texts, particular emphasis has been placed on the study of metrology and numerical systems—especially their administrative applications and the creation of official documents such as chancery texts. Focusing on theoretical texts, the examination encompasses mathematical and lexical texts that contain references to numbers and units of measurement. This study sheds light on the intriguing relationship between practice and theory to underline the notional—as well as practical—significance of numeracy in scribal training, which persisted, remarkably, even during a period before the conventional scribal curriculum had become well defined. Consequently, the practical aspect of the research (perhaps more so than the theoretical component) brought into focus points of convergence and contrast among the various documents examined.

In the analysis conducted for this dissertation, the enumeration of items emerged as a consistent feature across all five corpora examined, thereby forming the foundational element of numeracy. This examination revealed certain commonalities among the Ebla, Mari, Nabada, and Tell Abū Ṣalābīḫ corpora, all of which employed lexical numerals to represent powers of ten and exhibited a strong influence from the decimal system. In contrast, Šuruppag was distinguished by its use of a sexagesimal system and indicated no apparent connection to the decimal system. Remarkably, in Ebla, lexical numerals extended beyond the first power of ten (10^2, *i.e.*, 100), with some numerals potentially reaching as high as 10^5 (1,000,000)! One notable numeral in Ebla, *RI$_2$-BAB* for 10^4 (10,000), had a distinctly West Semitic origin. Additionally, the use of subtractive notation in Ebla texts consistently followed a single method, leading to certain ambiguities.

When discussing times and dates, the primary focus was on time reckoning and calendars, which appeared intermittently in the texts. Ebla stood out in the realm of time reckoning, as exemplified by texts in L. 2712 that featured calculations of rations covering different time intervals. Calendar references (although irregular) exhibited variations across Ebla, Mari, Nabada, and Šuruppag. Interestingly, not all corpora adhered to the same conventions for dating texts. Furthermore, within Ebla texts, both in the monthly accounts of textiles and mu-DU texts, instances were found that appeared to refer to the same dossier, occasionally marked by numbers inscribed near the date. This diversity likely reflected the distinct archival requirements of individual offices and their esoteric conventions.

In the analysis of weight measurements, several points of similarity were noted—especially in nomenclature—between Mari and Ebla (and, to some extent, Šuruppag). In Mari and Ebla, the mina and the shekel—as well as fractions of the mina—exhibited pronounced commonalities. Additionally, the script $gi\hat{g}_4$ DILMUN appeared in both Ebla and Mari. However, the explanation for these parallels remains unclear. Conversely, the Šuruppag corpus shared no similarities with the Syrian region regarding values below the shekel, where notations such as $NINDA_2$×ŠE appeared.

Regarding capacity measurements, the most significant issues revolved around defining the value of the sila in Ebla and the presence of multiple capacity systems unique to this corpus, including systems for liquids and dry goods. These systems depended on the relationship between units of measurement and the way containers were filled. Moreover, there was a growing deviation from the canonical system used in contemporary Mesopotamia, which was found in Šuruppag and Tell Abū Ṣalābīḫ; the differentiation was evident in Mari and Nabada, which partially adhered to the system, but virtually no adherence was observed in Ebla texts.

As for surface measurements, the primary unresolved issue centered on the relationship between Mesopotamian surface measurements, attested in Šuruppag and Tell Abū Ṣalābīḫ, and those used in Ebla. In Ebla texts, land was measured in $gana_2$(-$keše_3$-ki), a singular measurement without multiples or submultiples, which may correspond to $^1/_6$ or $^1/_{10}$ of the Mesopotamian iku. Surface measurements were absent from the texts of Mari and Nabada.

Wool measurements in Ebla texts displayed peculiarities, employing a unique system distinct from the traditional Mesopotamian approach based on weighing wool and expressing it in units of measurement such as the talent (gu_2), mina (ma-na), and shekel ($gi\hat{g}_4$), which were related in a sexagesimal proportion. The Ebla terminology for recording wool quantities consisted of three distinct terms: *zi-ri*$_2$, $^{(\hat{g}e\check{s})}$kiĝ$_2$, and na$_4$, with successive ratios of 1:2. However, the absolute or empirical correspondence of these quantities remained undetermined. A parallel was found in the texts of Nuzi, where three different measurement standards existed, corresponding to 40:80:160 shekels and regulated with successive ratios of 1:2. Nevertheless, some uncertainties persisted regarding the definition of *zi-ri*$_2$ as a unit of measurement.

Other uses of numbers are also widespread and show interesting connections among some corpora, such as the presence of distributive notation in all but that of Tell Abū Ṣalābīḫ. In addition, texts from Ebla and Šuruppag show a notable presence of other features and a well-established use of numerals within administrative writing.

Notably, all these features highlight the diverse approaches to numeracy within different sites; Ebla is distinguished by its use of lexical numerals and expansive numerical representations, whereas Šuruppag's adoption of a sexagesimal system sets it apart. Time reckoning and calendar references vary across these corpora, showcasing unique conventions in dating texts. Weight and capacity measurements exhibit intriguing parallels and deviations among Ebla, Mari, and Šuruppag; surface measurements reveal distinctions in land measurement units, with Ebla's measurements having a distinct seti of measurements compared to the traditionally used Mesopotamian iku. Wool measurements in Ebla texts introduce a novel system with three distinct terms, demonstrating a departure from the traditional Mesopotamian approach. Moreover, the presence of distributive notation is a shared feature across all corpora except Tell Abū Ṣalābīḫ. Overall, this study underscores the complexity of numeracy in ancient contexts, highlighting both commonalities and unique characteristics among the examined corpora, shedding light on the evolution of mathematical and numerical systems in this period.

5.1. Between theory and practice

As we turn toward the relationship between administrative and chancery texts with lexical lists and mathematical texts, the concept of theory vs practice assumes a prominent role. On the one hand, theory (from late Latin *theorĭcus*, and Greek ϑεωρικός < ϑεωρέω "to contemplate, to meditate") itself refers to something abstract, general, and static, whereas practice (from the adjective "practical," Greek πρακτική (ἐπιστήμη) "science, practice") refers to something more contingent. However, the relationship between theory and practice is intricate yet ambiguous, being characterized by blurred boundaries. Both concepts are closely interconnected—two sides of one coin—and they can hardly exist independently of each other. Not only *intellectus speculativus extensione fit practicus,* but also practice frequently stems from a formative theoretical foundation, whereas each practical situation, conversely, serves as the bedrock for subsequent theoretical abstractions.

In the case of ancient Near Eastern written production, the question of the relationship between practice and theory is no less complex. As early as the 4th millennium, both *textes théoriques* (lexical lists) and *textes de la pratique* (administrative documents) are already attested. This fact is closely related to the question concerning the purpose of lexical lists, as well as their birth as a genre.[1071] During the Uruk period (4th millennium), in an environment of increasing specialization and growth in both social stratification and labor efficiency,[1072] writing needed to provide an external cognitive tool that helped track the swelling flow of workers, raw materials, production, and rations. In a similar context—and within such a process of growing bureaucratization—writing itself already constituted a specialized profession. It would have been these professional figures (*i.e.*, the scribes) who created not only administrative but also lexical lists, true symbols of their profession. Far from serving as mere institutional tools, lexical lists were also designed to encourage intellectual exploration while reinforcing the distinct identity of the scribes as a social stratum. Indeed, these lists represent the earliest instances of non-administrative applications of writing, showcasing the versatility and potential inherent within this system. This same idea elucidates the standardization and transmission of lexical lists across generations through instructional channels. If there is truth to the aphorism that "knowledge is power," the custodians of said knowledge must preserve and transmit it to safeguard their social position.[1073] Centuries later, in the 3rd millennium, these compositions were known by scribes throughout the Near East as ancient texts of indispensable traditional and educational value. During this concurrent period, spreading from Šuruppag and Tell Abū

[1071] On the different theories concerning the creation of lexical lists, see a complete discussion in Veldhuis 2014: 50–55.

[1072] See, *e.g.*, Algaze 2005.

[1073] Similarly, the archaic nature of the sources is preserved as a direct result of the multi-generational attempt to connect with traditional know-how. In light of these considerations, it is possible to understand how the rather heterogeneous group of archaic lexical lists has been preserved as a coherent whole in later times.

Ṣalābīḫ, the group of *textes théoriques* expanded as a direct outcome of the progressive evolution of scribal identity, now including religious, literary, and mathematical texts.

However, categorizing mathematical texts as either *textes de la pratique* or *textes théoriques* requires more granular considerations. Ancient Near Eastern mathematical texts tend to be rooted in real-life problems and represent a "sub-scientific" type of mathematics.[1074] Nonetheless, these same mathematical texts, when passed on through generations, tend to become models and references for future problems to be solved.[1075] As mentioned before, in this type of composition, the distinction between practice and theory tends to blur: theory is built upon practice, while practice rises to the level of theory. Indeed, these texts tend to oscillate along the theory–practice spectrum, and they differ from administrative texts (*textes de la pratique par excellence*) in one essential respect element: mathematical texts may refer to real-life situations or elements, but they do not refer to actual events and people.[1076] Thus, although mathematical texts may be said to have a practical use, they lack the contingency and uniqueness of the actions recorded in actual administrative texts.

Of course, it remains true that even an administrative text can be used as a reference for writing a subsequent text. Nevertheless, administrative texts are unique pieces (except for multiple copies of the same document or excerpt) produced at a specific time and for a specific reason. Consequently, their archival validity is that they are historical records of a definite moment, and it is in this event that they fulfil their *raison d'être*. On the other hand, the validity of texts such as lists, or some mathematical problems (*e.g.*, conversion tables, algorithms), is not contingent. They do not refer to any specific event but instead have a more general character. Therefore, they are eternal texts whose validity extends to the present day. For example, finding the area of a circle (assuming that this is indeed the problem represented in TSŠ 77) is a calculation that would be familiar to the Sumerian scribe, Greek mathematician, and contemporary scholar alike. Mathematics, understood as a science, is a human construct—a language humans use to describe the world. Like philosophical questions, mathematical questions transcend all eras. These may have one, many, or no solutions. However, their resolution does not determine their conclusion. A mathematical problem of a non-contingent nature—even once solved—does not cease to

[1074] This topic is extensively discussed in Høyrup 1990.

[1075] This happens mostly in the Old Babylonian period.

[1076] For example, apart from their colophons, personal names are not used.

be a problem; rather, it continues to exist as a possibility. On the other hand, an archival fact, once absolved, is preserved for future memory—but it has already happened and will never happen in the same way. Therefore, the real difference lies not between theory and practice but in the enduring validity of the things written within the texts.

5.2. The role of numeracy in the scribal culture: Communication, development, and identity formation

Any inquiry into the role of numeracy within scribal culture is inevitably intertwined with additional queries. First, one wonders about the influence of mathematics on scribal development. The second line of query probes the potential influence of scribes' administrative roles and their connection to the operating centers of power. Third and finally, one must understand the mechanisms that drive the cross-cultural dissemination of numeracy among scribes beyond Mesopotamia. Therefore, prior to tackling the primary inquiry (*i.e.*, the role of numeracy within scribal culture), one must first address these supplementary aspects.

As for the role of numeracy within the scribal culture of the ancient Near East, one may argue that it was integral to various aspects of scribes' own role within society. Mathematics played a pivotal role in shaping scribes' identities. In the context of the scribal culture—mostly from the Old Babylonian period onward—the process of transmitting mathematical knowledge can be categorized as reasoned teaching, given its broader philosophical implications.[1077] As such, the act of teaching mathematics was not solely a mechanism for knowledge transmission; it was inherent to the very essence of mathematics, as mathematical texts were one of the fundamentals of the scribal curriculum. Within the ancient Near Eastern scribal community, teaching and learning form essential pillars of scribal identity. This identity is *de facto* molded by the existence of an educational path, the visible culmination of which involves training new scribes and assembling a *compendium* of texts that collectively embody the essence of the scribal *curriculum*. Of course, together with literary and lexical knowledge, mathematics was also a part of this *curriculum*, as the scribes were to be proficient not only in literacy but also in numeracy,

[1077] Teaching is also a social endeavor influenced by factors such as the environment, individual and collective attributes of those engaged, societal standards, the objective of education, materials, and cultural and linguistic circumstances (Høyrup 1990: 2).

as their primary—and yet prosaic—role was to be bureaucrats. Indeed, the purpose of the training was to teach them the literacy techniques, accounting skills, etc. necessary for these functions. However, the professional ideology of the scribes and their identity went beyond acknowledging their mere utility (which was nonetheless crucial). Accordingly, the role of mathematics within the scribal culture extended to the development of coherence and unification of mathematical knowledge and included the administrative contexts in which scribes worked. As with lexical lists and literary texts, mathematical texts developed as a genre, designed to be part of the scribal training and form one of the foundations of the *curriculum*. In this sense, mathematical knowledge developed through teaching. Alongside these activities, the role of a scribe underwent a transformation into a distinct personal identity. The scribes derive pride from their skill in scribal arts rather than the utilitarian tasks those skills facilitate. This pride extends to a virtuosity that surpasses mere functional proficiency.[1078] As a result, the influence of mathematics on scribal culture is particularly evident in the formation of scribal identity. Through these texts, it is evident that scribes took pride in not just their practical roles, but also in their virtuosity as mathematicians. This unique identity was forged by their mastery of mathematics, embodying a professional pride that transcended mere utility. Mathematics in the scribal culture served as a conduit for communication, knowledge advancement, and identity establishment. As said before, this phenomenon becomes notably conspicuous in the periods following the scope of this dissertation, particularly during the Old Babylonian period. However, when examining the 3rd millennium, it becomes evident that the groundwork for this identity and culture had already been substantially laid. Some mathematical texts, for instance, reveal parallels between Šuruppag and Ebla, a trend similarly observed in lexical lists and literary compositions. Adding to this is a distinct feature—that of hermeticism—which is particularly pronounced in texts scripted in UD.GAL.NUN.[1079]

As it concerns the second question, *i.e.*, the role of the scribes as bureaucrats and their relationship to the center of power they serve, a possible answer comes from more indirect sources. The foundational element that legitimizes these relationships is trust. It is necessary to postulate that the scribes worked in line with a trust given to them by the administration, which—in the case of a palatial administration like that of Ebla—is embodied by the king. Naturally, it is inconceivable to think that the king could effectively

[1078] For example, the perfect mastery of a dead language like Sumerian, and the complete command of the multiplicity of meanings of cuneiform signs.

[1079] For a discussion on UD.GAL.NUN texts, see, *e.g.*, Krecher 1992; Zand 2009; Zand 2014.

oversee every transaction that took place in the palace, although he had some level of control. A hint to this effect is provided by a chancery text, *ARET* 16.23, which contains the following passage:

> [218] *ARET* 16.23 r. iii 3–9: *en-ma* / *en* / *u*$_9$-*ri*$_2$-*da-nu-ma* / i$_3$-na-šum$_2$-*SU*$_3$ / *ap* / su / 2 ½ "Thus, (spoke) the King: 'He, PN gave the gold (lit. it); so, change it at (a rate of) 2.5!.'"

This passage suggests that the palatial organization, epitomized by the king himself, must have played a key role in at least some administrative procedures.[1080] Of course the king, despite being at the top, could not act alone, as each administrative procedure may have involved several people, such as expert or unskilled workers, as well as officials and scribes. All these people acted on behalf of the king, dealing with the circulation of goods within the palatial administration. The role of the officials, and particularly of the scribes, was filled with responsibility. They were, in some way, the links of the chain that connected the king to the functioning of the palace—those upon whom the entire administration ultimately relied. The theme of faith emerges, among other things, from the *Hymn to Šamaš of Sippar*, which is known both from Ebla and Tell Abū Ṣalābīḫ, two corpora at the center of this dissertation. Most recently, Bonechi[1081] has published a join of a fragment that was found in Ebla and pertains to this composition. The new fragment reveals, *inter alia*, that Šamaš is described through the *epitheton* šu-du$_8$.[1082] This term, as it is used in the Ebla administrative and chancery texts, reveals the role of Šamaš as entrustee, rather than owner of the countries themselves. The importance of reliability and trust within administration clearly emerges from the role of Šamaš. This fact acquires even more value and meaning if one considers that the *Hymn to Šamaš of Sippar* was composed and transmitted (over some chronological and spatial distance!) by those same bureaucrats who worked as

[1080] This passage refers to a very precious good: gold. On this topic see, *e.g.*, Pinnock's (2006) article regarding the direct control by the king over the distribution of lapis lazuli. In fact, large quantities of the latter have been found in the spaces adjacent to the Throne Room.

[1081] Bonechi (*in press*).

[1082] The term has been translated both as a verb "prendere possesso; prendere in consegna" (Catagnoti – Lahlouh 2006: 585; Catagnoti – Fronzaroli 2010: 269, and Catagnoti – Fronzaroli 2020: 146) or "to take possession of" (Archi 2018: 275; Archi 2023: 571), as a noun "receveut, collecteur" (Biga – Pomponio 1993: 115, fn. 19, Pomponio 2003: 540, fn. 6); "collettore" (Pomponio 2013: 468), depending on the context. See also "(Steuer)sammler; Sammler von ...; besetzen, (die Verantwortung auf sich) übernehmen" (Samir 2019: 260–261, with literature).

trustees—albeit as dub-sar, "scribes"—for the administration. Trust becomes a literary theme, and celebrating divine trust become a self-performing act for those scribes whose social position relies on trust itself. They are the ones who, *de facto*, have control over the transactions and their veracity. Information passes through them and is endorsed by them, stamped in clay, and deposited in the archive. Their role as administrators is built upon a chain that includes other individuals, at various levels of supervision and workforce. As already mentioned, the scribes are, of course, not the only ones with responsibilities. Administration in the ancient Near East relied on a bureaucratic *apparatus*—more or less structured and widespread depending on the individual periods[1083]—that was based on the presence of different types of bureaucrats and functionaries.[1084] Nonetheless, the scribes are the ones who physically inscribe the tablets, albeit often in an anonymous capacity, thereby assuming the responsibility for their contents. In this light, an issue of almost philosophical nature arises when the texts from Ebla exhibit such a significant number of errors that they call into question these very mechanisms of trust. I cannot provide a solution to the actual motivation of such errors and reasons that lie behind their tolerability—the presence of which, nonetheless, remains a curious phenomenon.

Discussing numeracy and scribal education involves the concepts of cultural contact[1085] and cultural evolution.[1086] Although the modern definition of scribal culture is established, the

[1083] See, *e.g.*, the comparison between the Ur III and Neo-Assyrian periods in Postgate 2001.

[1084] We adopt here the definition of "bureaucrats" used by Hunt 1987: 149.

[1085] The concept of "cultural contact" refers to interactions, exchanges, and influences that occur when different cultural groups come into contact with one another. This contact can occur through various means, such as trade, migration, conquest, colonization, or even peaceful interactions like diplomacy. During this process, ideas, practices, technologies, and various cultural aspects are exchanged between groups. This can result in the borrowing, adaptation, and assimilation of elements from one culture into another. Cultural contact can lead to outcomes such as cultural diffusion (the spread of cultural elements), acculturation (the exchange and blending of cultures), syncretism (the merging of different cultural elements) and, occasionally, conflict when differing cultural values or practices clash.

[1086] Conversely, "cultural evolution" refers to the gradual changes and developments that transpire within a culture over time. This process is driven by factors such as social, economic, technological, and environmental changes. It involves the transformation of practices, beliefs, institutions, and other cultural aspects as societies adapt to new circumstances and challenges. This evolution does not necessarily require contact with other cultures; it can arise from internal innovations, adaptations to changing environments, shifts in social structures, and the accumulation of knowledge and very nature of cuneiform documentation suggests that scribes had a sense of belonging and participation in a culture that transcended the specific geographical and temporal confines of individual scribes. The interplay between these two levels—individual scribes operating within specific administrations and the cultural connection with their peers—forms a diverse and intricate panorama of contacts and cultural evolution. This becomes even more apparent considering that some of these scribes were mobile, carrying their culture with them as they moved. The transmission and development of scribal culture exhibit elements of continuity and disruption. This is reflected in the heterogeneity and discontinuity of the sources available for reconstructing this same panorama. Documentation emerges in scattered points over time and space, leaving both geographical and chronological gaps. As Van De Mieroop aptly puts it, "The ancient history of the Near East can be likened to a dark room with isolated points of light, some brighter than others, provided by the sources. They shine especially clearly on certain places and periods but leave much else concealed."[1087] This intricate pattern of influences and developments is perfectly mirrored in numeracy and its manifestations. In fact, each of the corpora analyzed in this dissertation presents elements of interaction with others, yet independent developments in measurement systems, numerical systems, bookkeeping procedures, and text composition, thus in the execution of accounting practices.

Having discussed these issues, one ultimately comes back to the main question, which is the value of numeracy, whether it is applied in theory and ideology (as in the case of mathematical and lexical texts) or in practice and the trusted role that scribes play within the administration. It is evident that administrative practice and, more specifically, numerical notation, are extremely powerful tools not only for calculation, but also for control, reliability, and communication by an administrative center.[1088] Moreover, numbers and units of measurement are an integral part of writing and, therefore, participate in the same creative process. Certainly, the power held by writing numbers as an activity is profound and multifaceted. Administrative writing is not merely a means of communication; it is an instrument of influence, preservation, and identity. It sets economics models and expectations, and it structures and organizes information, working as a system of external memory that can transcend time and space. Written records capture

experiences within society. Over time, cultural evolution can give rise to new cultural traits and practices, and even entirely new cultural systems.

[1087] Van De Mieroop 2013: 2.

[1088] This issue also concerns the question of the potential manipulability of sources.

more or less directly historical events, cultural traditions, and human knowledge. The act of putting facts and words into writing imparts a sense of authority and permanence. Written texts, whether legal contracts, economic documents, or official records, hold weight in various contexts. Written agreements establish commitments, and official documents provide a verifiable record of events. Lastly, they connect people, both within the same administration and outside its boundaries, ascending as a common trait of a scribal community that transcends individual boundaries and ideally connects all scribes together.

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LIST OF ABBREVIATIONS

AAAS	Annales archéologiques arabes syriennes. Revue d'archéologie et d'histoire.
ABAW	Abhandlungen der Bayerischen Akademie der Wissenschaften. Phil-hist. Klasse, NF = Neue Folge.
ADOG	Abhandlungen der Deutschen Orient-Gesellschaft.
AfO	Archiv für Orientforschung.
AHw	W. von Soden (1965–1981), *Akkadisches Handwörterbuch* I-III, Wiesbaden.
Akh Purattim	Akh Purattim – Les rives de l'Euphrate.
Akkadika	Akkadica. Périodique bimestriel de la Fondation Assyriologique Georges Dossin.
AOAT	Alter Orient und Altes Testament.
AOS	American Oriental Series.
ARCANE	Associated Regional Chronologies for the Ancient Near East III.
Archéo-Nil	Archéo-Nil. Revue de la Société pour l'Étude des Cultures Prépharaoniques de la Vallée du Nil.
ARES[1089]	Archivi reali di Ebla. Studi.
ARET[1090]	Archivi reali di Ebla. Testi.
ARM	Archives royales de Mari.
ASJ	Acta Sumerologica.
ATU 2	Green, M. – Nissen, H. (1987), *Archaische Texte aus Uruk vol. 2, Zeichenliste der archaischen Texte aus Uruk,* Berlin.

[1089] In bibliografia citati con la loro numerazione originale (I, II, III …) mentre nel testo, in conformità con la serie *ARET,* i volumi sono citati come *ARES* 4 etc.

[1090] In bibliografia citati con la loro numerazione originale (I, II, III …) mentre nel testo, per facilità di citazione i testi sono citati come es. *ARET* 1.13, *ARET* 2.24 etc.

ATU 3	Englund, R. – Nissen, H. (1993), *Die lexikalischen Listen der Archaischen Texte aus Uruk*, Berlin.
Babel und Bibel	Babel und Bibel. Ancient Near Eastern, Old Testament and Semitic studies.
BBVO	Berliner Beiträge zum Vorderer Orient.
BŠ	Visicato, G. (1995), *The Bureaucracy of Šuruppak. Administrative Centres, Central Offices, Intermediate Structures and Hierarchies in the Economic Documentation of Fara*, Münster.
CAD	The Assyrian Dictionary of the Oriental Institute of the University of Chicago.
CDLJ	Cuneiform Digital Library Journal.
CDOG	Internationales Colloquium der Deutschen Orient-Gesellschaft.
CL	Codex Lipit-Ištar.
CMAO	Contributi e Materiali di Archeologia Orientale. Archeologia et storia dell'arte del vicino Oriente antico.
CT	Cuneiform Texts from Babylonian Tablets in the British Museum.
CUSAS	Cornell University Studies in Assyriology and Sumerology.
EDATŠ	Pomponio, F. – Visicato, G. (1994), *Early Dynastic Administrative Tablets of Šuruppak*, Napoli.
FTP	Martin, H.P. – (2001), *The Fara tablets in the University of Pennsylvania Museum of Archaeology and Anthropology*, Bethesda.
IAS	Biggs, R.D. (1974), *Inscriptions from Tell Abu Salabikh*, Chicago (= OIP 99).
Iraq	Iraq (British School of Archaeology in Iraq).
JAOS	Journal of the American Oriental Society.
JCS	Journal of Cuneiform Studies.
JNES	Journal of Near Eastern Studies.
MAARAV	MAARAV, A Journal for the Study of the Northwest Semitic Languages and Literatures.

MAD	Gelb, I.J. (1952–1970), *Materials for the Assyrian Dictionary*, Chicago.
MARI	Mari, Annales de Recherches Interdisciplinaires.
MDP	Mémoires de la Délégation en Perse.
MEE	Materiali epigrafici di Ebla.
Mesopotamia	Mesopotamia. Rivista di archeologia, epigrafia e storia orientale antica.
MSAE	Materiali e Studi Archeologici di Ebla.
MSVO	Materialien zu den frühen Schriftzeugnissen des Vorderen Orients.
MVN	Materiali per il vocabulario neosumerico.
NABU	Nouvelles Assyriologiques Brèves et Utilitaires.
NTSŠ	Jestin, R. (1957), *Nouvelles tablettes sumériennes de Suruppak au musée d'Istanbul*, Paris.
OBO	Orbis Biblicus et Orientalis.
OIP	Oriental Institute Publications.
OLP	Orientalia Lovaniensia periodica.
OrAnt	Oriens Antiquus.
Orient	Orient. Report of the Society for Near Eastern Studies in Japan.
OrNS	Orientalia, Nova Series.
PIHANS	Publications de l'Institut historique-archéologique néerlandais de Stamboul
PSD	Å.W. Sjöberg (1984-), *The Sumerian Dictionary of the University Museum of the University of Pennsylavania*, Philadelphia.
QuSem	Quaderni di Semitistica.
QuSem Materiali	Quaderni di Semitistica. Materiali.
RA	Revue d'Assyriologie et d'Archéologie Orientale.
HANEM	History of the Ancient Near East. Monographs.
HSAO	Heidelberger Studien zum Alten Orient.

RlA	Reallexikon der Assyriologie und vorderasiatischen Archaologie.
RTC	Thureau-Dangin, F. (1903), *Recueil des tablettes chaldéennes*, Paris.
SANEM	Studies on the Ancient Near East and the Mediterranean.
SANER	Studies in Ancient Near Eastern Records.
SAOC	Studies in Ancient Oriental Civilization.
SciAnt	Scienze dell'Antichità.
SEb	Studi Eblaiti.
SEL	Studi Epigrafici e Linguistici sul Vicino Oriente Antico.
SF	Deimel, A. (1923), *Schultexte aus Fara*, Berlin.
SMS	Syro-Mesopotamian Studies.
StEbl	Studia Eblaitica.
Sumer	Sumer. Journal of Archaeology and History in Iraq.
Syria	Syria. Revue d'art oriental et d'archéologie.
Syria, Supplément	Syria. Revue d'art oriental et d'archéologie, Supplément.
TM	Find siglum Tell Mardīkh.
TSŠ	Jestin, R. (1937), *Tablettes sumériennes de Suruppak conservées au musée de Stamboul*, Paris.
UF	Ugarit-Forschungen.
UVB	Vorläufiger Bericht über die Ausgrabungen in Uruk-Warka.
VAT	Museum siglum of the Vorderasiatisches Museum, Berlin.
VO	Vicino Oriente. Annuario dell'Istituto di Studi del Vicino Oriente, Università di Roma.
WF	Deimel, A. (1924), *Wirtschaftstexte aus Fara*, Leipzig.
WO	Die Welt des Orients. Wissenschaftliche Beiträge zur Kunde des Morgenlandes.
WVDOG	Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft.
WZKM	Wiener Zeitschrift für die Kunde des Morgenlandes.

YNER	Yale Near Eastern Researches.
ZA	Zeitschrift für Assyriologie und Vorderasiatische Archäologie.

LIST OF FIGURES

Fig. 1 – Topographical Map of Tell Mardīkh (Ebla), drawn in 1968 (Matthiae – Marchetti 2013: 31, Fig. 0.5).

Fig. 2 – Distribution of the findspots of the 3rd millennium tablets in the Royal Palace G. The image is available in Catagnoti (2022b) MNAMON: 10.25429/sns.it/lettere/mnamon043.

Fig. 3 – Distribution of texts typology among the archives of Ebla Palace G (Tell Mardīkh).

Fig. 4 – Topographic Map of Tell Harīrī (Mari) (Charpin 1987: 67).

Fig. 5 – Schematic plan of the "Quartier Nord" of the "Pre-Sargonic Palace" (Cavigneaux 2014: 292, Fig. 1).

Fig. 6 – Distribution of texts typologies in found in Tell Harīrī (Mari).

Fig. 7 –Topographic Map of Tell Beydar (Lebeau 1996a: 12, Fig. 1).

Fig. 8 – Reconstruction of groups of tablets found inside the "Maison aux Tablettes" (based on the scheme in Lebeau 1996a: 8–9).

Fig. 9 – Distribution of tablets (topic, location, and text numbers) in Tell Beydar (Nabada).

Fig. 10 – Map of Tell Fāra showing the D.O.G. excavation trenches and the University of Pennsylvania grid and excavated areas (Martin *apud* Martin *et alii* 2001: 16, Fig. 10).

Fig. 11 – Distribution of identifiable documentation *per* findspot in Tell Fāra (Šuruppag).

Fig. 12 – Distribution of identifiable documentation *per* topic in Tell Fāra (Šuruppag).

Fig. 13 – Topographic Map of Tell Abū Ṣalābīḫ (Postgate – Moorey 1976: 136, Fig. 1).

Fig. 14 – Distribution of topics within the administrative tablets from Tell Abū Ṣalābīḫ.

Fig. 15 – Chronological chart of the attested subtractive notation between minas and shekels.

Fig. 16 – Mina fractions in Ebla, Mari and Šuruppag.

Fig. 17 – Seed Rates in TM.75.G.2143.

Fig. 18 – Seed Rates in ARET 2.51.

Fig. 19 – King's seal (k1) from Urkeš (Buccellati – Buccellati 1996: Fig. 6, detail).

Fig. 20 – Balance stone weights (1: TM.75.G.1207; 2: TM.75.G.1210) from Royal Palace G related to the wool system used within the Great Archive (L. 2769). (Peyronel 2014: 127).

Fig. 21 – Distribution of attestations in the texts dated to *phase* II.

Fig. 22 – *ARET* 3.180 o. v' 1 (A); *ARET* 15.28 r. i 11 (B); *ARET* 20.24 r. ix 5 [161] (C).

Fig. 23 – Distribution of the attestations of the type n siki *zi-ri*$_2$.

Fig. 24 – Percentage distribution of gu2:an-še3 and šu-niĝen2 totals in L. 2712 (outer circle) and L. 2769 (inner circle).

Fig. 25 – List of occurrences of totals containing wool.

Fig. 26 – occurrences of wool-related totals by month.

Fig. 27 – Percentage of occurrences of relative sums in the various types of totals.

Fig. 28 – Percentage of occurrences of wool-related totals in the various archive stages.

Fig. 29 – Percentage distribution of totals in texts from Šuruppag.

Fig. 30 – Lists and percentage occurrences of miscalculations in gu2:an-še3 and šu-niĝen2 totals in L. 2712 (outer circle) and L. 2769 (inner circle).

Fig. 31 – Lists and percentage distribution of errors and inconsistencies in ARET 9 (L. 2712) and ARET 15 (L. 2769).

Fig. 32 – List and percentage distribution of errors within different types of texts.

Fig. 33 – List of occurrences of miscalculations and inconsistencies per topic in Šuruppag.

Fig. 34 – Distribution of different types of errors in Šuruppag.

Fig. 35 – General distribution of different types of texts in Šuruppag.

Fig 36 – Total percentage of errors and inconsistencies per type of text in Šuruppag.

Fig. 37 - Distribution of errors and inconsistencies per type of texts in Šuruppag.

Fig. 38 – Handcopy of TSŠ 51 (Jestin 1937: XXII).

INDEX OF QUOTED TEXTS

Ebla (Tell Mardīkh)

ARET 1.1 o. iv 3	p. 200	
ARET 1.1 r. ix 8	p. 201	
ARET 1.3 o. v 4	p. 100	[19]
ARET 1.3 r. x 4–5	p. 183	[119]
ARET 1.5 (= *MEE* 5.10) o. ix 14	p. 205	
ARET 1.5 (= *MEE* 5.10) o. xi 5	p. 201	
ARET 1.6 r. xi 17	p. 180	
ARET 1.8 (= *MEE* 7.3) o. i 1	p. 202	
ARET 1.8 (= *MEE* 7.3) r. xvii 24	p. 180, p. 181	[115]
ARET 1.12 (= *MEE* 2.21) o. iii 4–8	p. 187	[134]
ARET 1.13 (= *MEE* 2.7) o. xiii 23–xiv 1	p. 205	[174]
ARET 1.14 (= *MEE* 2.20) o. iii 12	p. 206	
ARET 1.15 (= *MEE* 2.2) r. x 6–8	p. 187	[136]
ARET 1.15 (= MEE 2.2) r. x 7–8	p. 187	
ARET 1.20 (= *MEE* 10.11) r. iii 1–3	p. 104, p. 114	[36]
ARET 1.27 (= *MEE* 12.6) o. i 1	p. 100	[17]
ARET 1.29 (= *MEE* 7.41) r. iii 2–3	p. 129, p. 131	[55]
ARET 1.30 (= *MEE* 7.28) o. x 1	p. 129, p. 140	[56]
ARET 1.30 (= *MEE* 7.28) r. v 1	p. 119, p. 136	[83]
ARET 1.30 (= *MEE* 7.28) r. xi 5	p. 120	[47]
ARET 1.44 o. i 9–13	p. 207	[178]
ARET 1.45 o. v 4’	p. 120	
ARET 2.2 o. ii 5	p. 120	
ARET 2.4 (= *MEE* 7.17) o. iii 7	p. 120, p. 136	[46]
ARET 2.6 o. 1–3	p. 208	
ARET 2.6 r. ii 5	p. 119	
ARET 2.7 r. ii 2	p. 203	[167]
ARET 2.15 (= *MEE* 7.20) r. vi 1	p. 202	
ARET 2.17 (= *MEE* 7.19) o. iii 2	p. 105	
ARET 2.17 (= *MEE* 7.19) r. iii 4	p. 141, p. 142, p. 144	[87]
ARET 2.17 (= *MEE* 7.19) r. iv 3–4	p. 105, p. 114, p. 115	[39]
ARET 2.20 o. iii 2	p. 143	

ARET 2.27a o. i 1–2	p. 177	
ARET 2.27a o. iii 5–iv 1	p. 177	
ARET 2.27a r. ii 5–iv 1	p. 177	
ARET 2.47 r. i 5	p. 120	
ARET 2.51 r. ii 1–2	p. 175, p. 176	
ARET 2.51 r. ii 2–4	p. 174	
ARET 2.51 r. ii 3	p. 140, p. 141	
ARET 2.51 r. ii 3–4	p. 115	
ARET 3.9 o.$^{?}$ ii’ 5’	p. 202	
ARET 3.104 o. i 2’–i 4’	p. 177	
ARET 3.104 o. iii 4’–6’	p. 177	
ARET 3.185 o.$^{?}$ i 2	p. 202	
ARET 3.231 r. v’ 3–6	p. 188	[141]
ARET 3.378 o.$^{?}$ i’ 4’	p. 167, 168	[110]
ARET 3.378 o.$^{?}$ iv’ 4’	p. 201	
ARET 3.399 o.$^{?}$ i' 3’–4’	p. 131	
ARET 3.399 o.$^{?}$ iii’ 4	p. 129, p. 131	[57]
ARET 3.467 r. viii 16–19	p. 186	[132]
ARET 3.683+[1091] r. iv 23’–24’	p. 260, 261	[217]
ARET 3.756 o. i’ 3’	p. 119	
ARET 3.774+ r. iii’ 3	p. 167	
ARET 3.774+ o. i 2’–3’	p. 177	
ARET 3.774+ r. i’ 3	p. 167, 177	
ARET 3.798 r. iv’ 2’–3’	p. 184	[127]
ARET 4.2 r. vii 15	p. 201	
ARET 4.4 (= *MEE* 2.3) r. i 8–10	p. 210	[190]
ARET 4.5 r. i 3–9	p. 129, p. 132	[59]
ARET 4.11 r. iii 1	p. 201	
ARET 4.11 r. iv 4	p. 201	
ARET 4.11 r. vi 6	p. 201	
ARET 4.11 r. vi 13	p. 183	[120]
ARET 4.11 r. ix 10	p. 184	[124]
ARET 4.11 r. x 4–9	p. 185	[129]
ARET 4.11 r. x 15	p. 179	
ARET 4.11 r. xiv 9	p. 179	
ARET 4.12 r. i 13	p. 184	
ARET 4.12 r. v 14	p. 199	[164]

[1091] *MEE* 4.63 + *MEE* 4.64 + *MEE* 4.71.

ARET 4.13 r. vii 1	p. 179	
ARET 4.13 r. xiii 5–9	p. 189	[144]
ARET 4.13 r. xiv 13–le.1	p. 188	[142]
ARET 4.25 r. v 1–4	p. 184	[133]
ARET 7.4 o. v 5	p. 211	[197]
ARET 7.4 o. vi 4	p. 211	[198]
ARET 7.4 r. i 3	p. 211	[199]
ARET 7.4 r. iii 3	p. 212	[200]
ARET 7.4 r. viii 1	p. 128, p. 132, 133	[60]
ARET 7.9 r. vi 5	p. 128, p. 132	[61]
ARET 7.11 o. viii 9	p. 101	
ARET 7.18 o. i 1	p. 128, p. 132	[62]
ARET 7.18 r. iii 3	p. 118	
ARET 7.18 r. iii 5–iv 1	p. 114, p. 115	[43]
ARET 7.21 r. i 1–ii 7	p. 104, p. 112, p. 113	[30]
ARET 7.27 o. i 1	p. 120	
ARET 7.44 o. i 3	p. 203	
ARET 7.48 (= *MEE* 12.11) o. iii 1–3	p. 130, p. 132	[63]
ARET 7.50 o. ii 2	p. 130, p. 132	[64]
ARET 7.59 o. i 1-2	p. 130	[170]
ARET 7.63 o. iii 5	p. 120, p. 130, p. 132	[65]
ARET 7.83 o. i 1-3	p. 207	[179]
ARET 7.90 o. i 1	p. 130, p. 132	[66]
ARET 7.94 o. ii 1	p. 130, p. 132	[67]
ARET 7.114 o. i 1–2	p. 146, p. 104	[169]
ARET 7.116 o. i 1	p. 104	
ARET 7.133 o. ii 3	p. 201	
ARET 7.154 o. ii 3	p. 168	[109]
ARET 7.154 o. iii 5	p. 167	
ARET 7.154 o. v 5	p. 167	
ARET 7.154 r. vii 2	p. 212	
ARET 7.155 r. vi 7	p. 212	
ARET 8.521 (= *MEE* 5.1) o. viii 23-ix 1	p. 210	[189]
ARET 8.524 (= *MEE* 5.4) r. viii 5	p. 205	
ARET 8.541 (= *MEE* 5.21) r. x 1’	p. 184	[125]
ARET 9.5 o. i 1	p. 142	
ARET 9.8 o. v 1	p. 141	
ARET 9.8 r. v 3	p. 205	[173]
ARET 9.8 r. v 9	p. 105	[23]

ARET 9.10 o. i 7	p. 143	
ARET 9.13 o. iii 6	p. 142	
ARET 9.13 r. iv 4–9	p. 142	
ARET 9.14 r. i 10	p. 143	
ARET 9.14 r. iv 13–v 8	p. 142	
ARET 9.16 r. ii 1	p. 142	
ARET 9.20 o. ii 2	p. 142	
ARET 9.20 r. i 5	p. 104, p. 105	[24]
ARET 9.23 r. iv 1	p. 144	[88]
ARET 9.24 o. iii 3–8	p. 162	[102]
ARET 9.24 o. iv 5–r. i 5	p. 114, p. 115	[40]
ARET 9.32 o. iii 7	p. 142	
ARET 9.37 o. ii 4	p. 142	
ARET 9.37 r. iii 4–5	p. 157	
ARET 9.37 r. iv 2	p. 112	[204]
ARET 9.38 o. iii 1	p. 142	
ARET 9.42 r. iv 1–8	p. 142	
ARET 9.48 o. i 9	p. 142	
ARET 9.49 o. i 3	p. 142	
ARET 9.49 o. ii 1	p. 142	
ARET 9.61 o. iv 9	p. 143	
ARET 9.64 o. ii 1–5	p. 113	[34]
ARET 9.67 o. iv 1–3	p. 158	[96]
ARET 9.68 o. vi 2	p. 141, p. 143	
ARET 9.68 r. i 1	p. 143	
ARET 9.75 o. i 4	p. 144, p. 159	
ARET 9.81 r. ii 5	p. 143, p. 159	
ARET 9.84 r. v 1–7	p. 43, p. 161	[101]
ARET 9.94 o. iv 1	p. 144	
ARET 9.94 o. iv 1–r. i 3	p. 160, p. 161	[100]
ARET 9.94 o. iv 4	p. 144	
ARET 9.95 o. ii 6	p. 114	[37]
ARET 9.95 o. iv 2	p. 114	
ARET 9.103 o. i 1–ii 3	p. 161	[99]
ARET 9.103 o. iii 3–8	p. 162	[103]
ARET 9.104 r. ii 1	p. 215	
ARET 9.106 r. ii 1	p. 120, p. 133	[75]
ARET 9.108 o. i 1	p. 142	
ARET 11.1 o. v 8-15	pp. 191–192	[145]

ARET 11.1 o. vii 2’-11’	p. 192	[146]
ARET 12.36 i’ 3	p. 202	
ARET 12.135 r. iii’ 1’	p. 202	
ARET 12.313 + *ARET* 318 v. vii 8’-12’	p. 180, p. 186	[131]
ARET 12.335+ r. iii 5’–6’	p. 204	[168]
ARET 12.343 o. i	p. 200	
ARET 12.490 r. vi’ 9’	p. 180	
ARET 12.494 r. ii’ 2’	p. 180	
ARET 12.662 o.? i 3–5	p. 207	[180]
ARET 12.712 r. iii’ 1’	p. 200	
ARET 12.749 o. iii’ 9’	p. 183	
ARET 12.789 o.? ii’ 7	p. 204	
ARET 12.858 o. ii’ 1	p. 130, p. 132	[69]
ARET 12.858 r. ii 1’–2’	p. 132	
ARET 12.909 r. v’ 11–12	p. 188	[139]
ARET 12.1179+ r. i’ 3’	p. 180, p. 182	[114]
ARET 12.1189 o.? iii’ 5’	p. 182, p. 173	[117]
ARET 12.1204 o.? i’ 3’	p. 180, p. 183	[118]
ARET 12.1303 o.? i’ 1-2	p. 187	[135]
ARET 13.15 o. iv 8	p. 212	
ARET 13.15 o. viii 11	p. 103	
ARET 13.15 o. viii 14-r. i 8	p. 126	[52]
ARET 13.15 o. viii 8–13	p. 105	
ARET 13.15 r. iii 10–iv 6	p. 126	[53]
ARET 13.15 r. iv 7–14	p. 126	[54]
ARET 13.15 r. vii 5–6	p. 212	[205]
ARET 13.20 o. i 12	p. 213	
ARET 14.2 (= *MEE* 12.27) o. i 1	p. 119	
ARET 14.2 (= *MEE* 12.27) o. ii 1	p. 119	
ARET 14.2a o. i 3	p. 119	
ARET 14.2b o. i 1	p. 119	
ARET 14.12 r. vi 5	p. 113	[32]
ARET 14.59a (= *ARET* 2.13 = *MEE* 10.40) o. v 5	p. 143	
ARET 14.78 o. iii 6–8	p. 218	[207]
ARET 14.79 (= *ARET* 3.758+) r. iii’ 1’	p. 119	
ARET 14.79 (= *ARET* 3.763+) o.? i 1’	p. 130, p. 132	[58]
ARET 14.87 (= *MEE* 12.3) o. vi 14–17	p. 131, p. 132	[70]
ARET 14.87 (= *MEE* 12.3) r. v 8	p. 131, p. 132	[71]
ARET 14.91 (= *ARET* 8.535 = *MEE* 5.15) o. i 1	p. 130, p. 132	[68]

ARET 14.91 (= *ARET* 8.535 = *MEE* 5.15) r. iii 1–2	p. 114	
ARET 15.4 o iv 6	p. 102	
ARET 15.4 r. xiii 1	p. 102	
ARET 15.6 (= *MEE* 2.29) o. ii 2-3	p. 210	[192]
ARET 15.6 (= *MEE* 2.29) r. ii 6-7	p. 210	[193]
ARET 15.7 (= *MEE* 2.32) o. ii 1	p. 102	
ARET 15.7 (= *MEE* 2.32) o. x 1	p. 102	
ARET 15.9 (= *MEE* 2.33) r. vi 9-13	p. 192	[147]
ARET 15.9 (= *MEE* 2.33) r. vii 6-7	p. 196	[151]
ARET 15.9 (= *MEE* 2.33) r. viii 13-15	p. 211	[194]
ARET 15.9 (= *MEE* 2.33) r. viii 4-6	p. 196	[152]
ARET 15.10 (= *MEE* 2.37) r. vi 12–vii 1	p. 223	
ARET 15.10 (= *MEE* 2.37) r. xi 12–15	p. 192	[148]
ARET 15.12 o. xii 16–r. i 1	p. 183	[121]
ARET 15.12 r. i 10	p. 183	[122]
ARET 15.12 r. i 6–7	p. 210	[191]
ARET 15.13 (= *MEE* 2.41) o. iii 9–13	p. 192	[149]
ARET 15.16 o. iii 11–12	p. 224	
ARET 15.16 r. ix 3	p. 196	[155]
ARET 15.16 r. viii 14	p. 196	[153]
ARET 15.16 r. viii 16	p. 196	[154]
ARET 15.16 r. xii 4	p. 197	[158]
ARET 15.16 r. xii 5	p. 197	[159]
ARET 15.16 r. xiii 15–16	p. 184	[126]
ARET 15.16 r. xiii 16	p. 197	[160]
ARET 15.19 r. i 14–16	p. 224	
ARET 15.19 r. viii 1–5	p. 224	
ARET 15.20 r. xiv 1–2	p. 243	
ARET 15.20 r. xiii[!] 1	p. 243	
ARET 15.22 r. vii 11	p. 188	[138]
ARET 15.26 r. vi 21	p. 183	[123]
ARET 15.27 r. xii 9	p. 203	
ARET 15.28 r. i 11	p. 197	[162]
ARET 15.28 r. ix 12	p. 196	[156]
ARET 15.28 r. x 1	p. 197	[163]
ARET 15.33 o. ii 5–9	p. 223	
ARET 15.37 o. xii 6	p. 196	[157]
ARET 15.39 r. iv 14	p. 203, 208	[166]
ARET 15.39 r. iv 17–v 4	p. 188	[143]

ARET 15.50 o. iv 11–14	p. 211	[195]
ARET 15.50 r. i 2	p. 180, p. 182, p. 184	[116]
ARET 15.54 r. v 4–6	p. 211	[196]
ARET 16.1 r. i 14	p. 88, p. 100, p. 101	[18]
ARET 16.11 r. i 4	p. 212	[203]
ARET 16.11 r. iv 11–14	p. 206	[175]
ARET 16.11 r. v 11–vi 4	p. 206	[176]
ARET 16.12 (= *ARET* 2.33) o. i 5–7	p. 207	[177]
ARET 16.12 (= *ARET* 2.33) o. iv 12–v 5	p. 105	
ARET 16.12 (= *ARET* 2.33) o. v 11	p. 114	[38]
ARET 16.22 (= *ARET* 2.29 = *MEE* 7.42) r. iv 10	p. 112	
ARET 16.22 (= *ARET* 2.29 = *MEE* 7.42) r. v 9	p. 212	
ARET 16.23 r. iii 3–9	p. 281	[218]
ARET 16.29 o. i 5–6	p. 104, p. 116	
ARET 16.29 o. i 6	p. 104	
ARET 18.7 r. iii 10	p. 212	[202]
ARET 18.7 r. iii 6-7	p. 212	[201]
ARET 19.1 o. iv 9–12	p. 196	[150]
ARET 19.6 o. i 8	p. 184, p. 180	[128]
ARET 19.15 (= *MEE* 2.40) r. viii 12	p. 205	[174]
ARET 19.16 r. iv 4	p. 180	
ARET 20.7 (= *MEE* 7.35) r. xiv 4	p. 179	
ARET 20.7 (= *MEE* 7.35) r. xiv 1	p. 179	
ARET 20.8 r. ix 21	p. 206	
ARET 20.8 r. x 11	p. 180	
ARET 20.9 o. x 21–xi 8	p. 188	[140]
ARET 20.12 r. v 12–vi 7	p. 187	[137]
ARET 20.16 r. vi 5	p. 119	
ARET 20.19 r. xii 13	p. 199	[165]
ARET 20.19 r. xiii 7	p. 131	
ARET 20.20 r. vi 4	p. 18, p. 89	[2]
ARET 20.22 o. x 12	p. 205	[171]
ARET 20.24 o. ix 19–20	p. 131	
ARET 20.24 r. ix 5	p. 97, p. 98	[161]
ARET 20.25 o. ii 2	p. 119	
ARET 20.25 r. vi 4–6	p. 132	
MEE 2.11 o. iii 5–6	p. 185	[130]
MEE 3.47 r. ii 1–7	p. 20	
MEE 3.48 + *MEE* 49 o. i 1–17	p. 252–256	

MEE 3.48 + *MEE* 49 o. i 1–6	p. 257–258	
MEE 3.50 r. ii 1–7	p. 20	
MEE 3.54 o. i 1–ii 4	p. 258, p. 259	
MEE 3.63 o. i 1–iii 3	p. 252–256	
MEE 3.63 o. i 1–6	p. 257–258	
MEE 3.63 o. ii 1–iii 3	p. 259	
MEE 3.63 o. iii 4–6	pp. 259–260	
MEE 3.72	p. 266	
MEE 3.72 o. i 1	p. 266	
MEE 3.72 o. i 3	p. 266	
MEE 3.72 o. i 5	p. 266	
MEE 3.72 o. i 6	p. 266	
MEE 3.72 o. i 9	p. 266	
MEE 3.72 o. i 10	p. 266, p. 267	
MEE 3.73	p. 262	
MEE 3.74 o. i 1	p. 249	
MEE 3.74 o. i 2	p. 249	
MEE 3.74 r. i 1	p. 249, p. 250	
MEE 3.74 r. iii 1	p. 249	
MEE 4.78 r. i 6–ii 4	p. 260, 261, p. 266	[216]
MEE 7.12 r. v 1	p. 88	
MEE 7.13 o. ii 5	p. 18; p. 88; p. 89	[1]
MEE 7.14 r. vi 2	p. 88, p. 89, p. 101	[4]
MEE 7.33 r. iii 2	p. 167	
MEE 7.33 r. iii 2–4	p. 177	
MEE 7.33 r. iv 1	p. 167	
MEE 7.34 r. xvii 18’–19’	p. 131	
MEE 7.39 o. iv 2	p. 104, p. 116	
MEE 7.39 o. iv 5	p. 116	
MEE 7.39 o. vii 7	p. 116	
MEE 7.39 r. vi 1	p. 180	
MEE 7.45 o. i 1	p. 167	
MEE 10.20 o. xx 28	p. 120	
MEE 10.20 r. ii 14	p. 201	
MEE 10.27 r. i 8–9	p. 112	
MEE 10.42 o. i 1–ii 1	p. 116	[44]
MEE 10.47 o. i 1	p. 89, p. 99	[3]
MEE 12.35 o. vii 20–21	p. 132	
MEE 12.35 o. xiii 5–6	p. 132	

MEE 15.23 r. vii 3’–7’	p. 260, 261	[215]
TM.75.G.520 r. iii 10–12	p. 160	[97]
TM.75.G.530 r. i 9	p. 158	
TM.75.G.1233 o. ii 1	p. 131, p. 132	[72]
TM.75.G.1353 o. v 6	p. 131, p. 133	[73]
TM.75.G.1353 r. iv 1	p. 131, p. 133	[74]
TM.75.G.1383 o. vi 1	p. 101	
TM.75.G.1396+ o. ii 6–10	p. 128	
TM.75.G.1452 o. iv 1	p. 212	
TM.75.G.1623 o. ii 5–iii 7	p. 134	
TM.75.G.1645 o. iii 1-3	p. 159	
TM.75.G.2143 o. i 1–5	p. 176	
TM.75.G.2143 o. ii 1–3	p. 176	
TM.75.G.2143 o. ii 3	p. 167	[108]
TM.75.G.2143 o. ii 4–5	p. 176	
TM.75.G.2143 r. i 1–3	p. 176	
TM.75.G.12287+ r. iii’ 1’-5’	p. 113	[33]
TM.75.G.12287+ r. iii’ 3’	p. 105	
TM.75.G.12287+ r. iii’ 6’–7’	p. 115	
TM.82.G.267 o. i 1–ii 1	p. 141	

Mari (Tell Harīrī)

ARM 23.583 3	p. 137	
Cavigneaux 2014, no. 2	p. 137	[84]
Cavigneaux 2014, no. 9 r	p. 106, p. 117	
Cavigneaux 2014, no. 10 o. ii 1	p. 121, p. 136	[82]
Cavigneaux 2014, no. 11 o. i 3	p. 91	[7]
Cavigneaux 2014, no. 12 o. i 1	p. 146	
Cavigneaux 2014, no. 12 o. i 3	p. 146	
Cavigneaux 2014, no. 13 o. ii 2’	p. 146	
Cavigneaux 2014, no. 14 o. iii 3’	p. 145	
Cavigneaux 2014, no. 15 o. ii 2	p. 146, p. 147	[90]
Cavigneaux 2014, no. 15 o. ii’ 1–2	p. 145	
Cavigneaux 2014, no. 16 o. ii 1’	p. 146, 147	
Cavigneaux 2014, no. 26 o. ii 3	p. 146	
Cavigneaux 2014, no. 28 o. i 1	p. 100, p. 101	[20]
Cavigneaux 2014, no. 28 r. i 3	p. 106, p. 107	[25]
Cavigneaux 2014, no. 29 r. ii’ 3’	p. 106	
Charpin 1987, no. 1 o. i 1	p. 128	

Charpin 1987, no. 2	p. 135, p. 136	[76]
Charpin 1987, no. 2 o. i 1	p. 164	
Charpin 1987, no. 2 o. i 5	p. 164	
Charpin 1987, no. 2 o. ii 5	p. 121	
Charpin 1987, no. 3 o. iii 1	p. 164	
Charpin 1987, no. 3 o. iii 5	p. 164	
Charpin 1987, no. 4 o. i 4	p. 146	[89]
Charpin 1987, no. 4 o. iii 1	p. 164	
Charpin 1987, no. 7 r. ii 3	p. 106, p. 113, p. 117	[31]
Charpin 1987, no. 11 r. i 2	p. 106, p. 114	
Charpin 1987, no. 14 o. i 1	p. 208	[181]
Charpin 1987, no. 15 o. i 1	p. 208	[182]
Charpin 1987, no. 18 o. i 1	p. 90, p. 99	[5]
Charpin 1987, no. 19 o. i 1	p. 90	[6]
Charpin 1987, no. 20 r. iv	p. 117, p. 106	[45]
Charpin 1987, no. 21 o. iii 3	p. 145	
Charpin 1987, no. 23 o. i 1	p. 146	
Charpin 1987, no. 23 r. i 3	p. 146	
Charpin 1987, no. 31 o. ii 2–iii 4	p. 133	
Charpin 1987, no. 31 o. ii 3	p. 121, p. 128	[48]
Charpin 1987, no. 31 o. iv 1	p. 90	
Charpin 1987, no. 31 o. iv 1–2	p. 99	[16]
Charpin 1987, no. 33 o. i 1	p. 146	
Charpin 1990, no. 39 o. i 2	p. 106	
Horioka 2009, no. 1 r. i	p. 106, p. 107	[26]
Horioka 2009, no. 2 o. ii 4–5	p. 121	
Horioka 2009, no. 4 o. ii 1	p. 114, p. 115	[41]
Horioka 2009, no. 7 r. i	p. 117	
Horioka 2009, no. 8 o. i	p. 106	

Nabada (Tell Beydar)

Subartu 2.23 o. i 3	p. 149	[91]
Subartu 2.23 o. ii 3	p. 149	
Subartu 2.31 o. ii 4	p. 108, p. 117	[28]
Subartu 2.35 r. ii 1–3	p. 92	
Subartu 2.39 o. iv 2	p. 92, p. 93, p. 101	[10]
Subartu 2.47 o. i 4	p. 108	
Subartu 2.49 o. i 2	p. 148	
Subartu 2.49 o. i 3	p. 148	

Subartu 2.50 o. i 3	p. 92, p. 93, p. 99	[9]
Subartu 2.54 o. i 3	p. 149	
Subartu 2.54 o. i 4	p. 148	
Subartu 2.54 o. i 5	p. 149	
Subartu 2.57 o. ii 1	p. 149	
Subartu 2.66 o. i 1–4	p. 122, p. 137	[49]
Subartu 2.67 o. i 2	p. 115	[42]
Subartu 2.67 o. i 5	p. 108, 117	[27]
Subartu 2.67 o. ii 2	p. 108	
Subartu 2.68 o. ii 1	p. 149	
Subartu 2.71 r. iv 1	p. 225	
Subartu 2.72 o. i 4	p. 149	
Subartu 2.75 i 3	p. 208	[183]
Subartu 2.82 o. ii 4	p. 92	
Subartu 2.99 r. i 1	p. 225	
Subartu 2.109 o. i 5	p. 149	[92]
Subartu 2.111 iv 5	p. 108	
Subartu 2.115 o. i 2	p. 149	
Subartu 2.118 o. i 3–ii 1:	p. 92; p. 93	[8]
Subartu 2.143 r. i 1	p. 149	
Subartu 2.145 r. i 1	p. 149	

Šuruppag (Tell Fāra)

Cavigneaux 2020: 240-258 o. i 1	p. 170	
Cavigneaux 2020: 240–258 o. i 2	p. 123	
CT 50.8 o. ii 3	p. 152	
CT 50.9 o. ii 6	p. 136	[81]
CT 50.9 r. i 6	p. 123	
CT 50.14 o. i 1–3	p. 160	
CUSAS 11.344 o. ii 2	p. 152	
CUSAS 11.344 r. iii 1	p. 152	
FTP 32 o. i 5	p. 109	
FTP 32 o. ii 3	p. 113	
FTP 36 o. ii 1	p. 152	
FTP 52 o. i 1	p. 152	
FTP 54 o. i 1–2	p. 109, p. 113, p. 114	[35]
FTP 56 o. i 1–ii 1	p. 109, p. 112, p. 118	
FTP 65 o. i 1	p. 152	
FTP 66 o. i 1–2	p. 160	

FTP 67 o. i 1	p. 153	[93]
FTP 67 o. i 1–r. ii 1	p. 160	
FTP 68 o. i 1	p. 153	[94]
FTP 68 o. i 1-ii 1	p. 160	
FTP 71 o. i 1–2	p. 160	
FTP 72 o. i 1–r. i 2’	p. 160	
FTP 73 o. i 1–r. i 4	p. 160	
FTP 74 o. i 1–ii 1	p. 163	[105]
FTP 96 o. i 3	p. 170	
FTP 98 o. v 2	p. 135, p. 123, p. 272	[77]
FTP 105 o. iii 3	p. 160	
FTP 106 o. i 2’	p. 163	[107]
FTP 107 r. iii 1	p. 112	
FTP 108 r. ii 3	p. 152	
FTP 108a r. ii 2	p. 112	
FTP 494 o. ii 4	p. 154	
MVN 10.82 o. i 3	p. 133	
MVN 10.85 o. i 3	p. 170	
NTSŠ 114 (= BŠ 189) o. ii 2’	p. 94, p. 95	[11]
NTSŠ 118 o. i 1–3	p. 160	
NTSŠ 154 o. ii 3–4	p. 209	[184]
RTC 11 r. iv 1	p. 94, p. 101	
RTC 14 o. i 1	p. 123	
RTC 14 o. i 4	p. 124	
RTC 14 o. v 5	p. 123, p. 135	[78]
SF 5 o.? v 11	p. 228	[212]
SF 6 r. i 1–2	p. 228	[213]
SF 15 o. i 1–ii 1	pp. 252–256	
SF 16 o. i 1–18	pp. 252–256	
SF 17 o. i 1–ii 1	pp. 252–256	
SF 20 o. v 22–vi 1	p. 136	[80]
Steible – Yıldız 1996: 149-159 o. ii 2	p. 138	[86]
Steible – Yıldız 2000: 990–1031 o. i 1-2	p. 94, p. 100, p. 101	[21]
TSŠ 50 o. i 1	p. 151	
TSŠ 51	p. 267	
TSŠ 51 o. i 1	p. 267	
TSŠ 51 o. i 2	p. 267	
TSŠ 51 o. i 3	p. 267	
TSŠ 51 r. i 1	p. 267	

TSŠ 53 (= EDATŠ no. 88) o. ii 3	p. 272	
TSŠ 58 (= EDATŠ no. 18) r. vii	p. 151	
TSŠ 78 (= EDATŠ no. 46) r. ii 1	p. 152	
TSŠ 91 (= EDATŠ no. 108) o	p. 169	
TSŠ 102 (= EDATŠ no. 69) r. i 4	p. 170	
TSŠ 102 (= EDATŠ no. 69) r. iv	p. 216	
TSŠ 160 (= EDATŠ no. 54) o. iii 1–2	p. 162	[104]
TSŠ 188	p. 268	
TSŠ 188 o. i 2	p. 169	
TSŠ 188 o. ii 3	p. 170	
TSŠ 190	p. 266	
TSŠ 190 o. i 1	p. 266	
TSŠ 190 o. i 3	p. 266	
TSŠ 190 o. i 4	p. 266	
TSŠ 190 o. i 5	p. 266	
TSŠ 190 o. i 6	p. 266	
TSŠ 190 o. ii 4	p. 266	
TSŠ 247 r. i 1	p. 151	
TSŠ 251	pp. 268–269	
TSŠ 251 o. i 1	p. 279	
TSŠ 363 r. i 1	p. 112	
TSŠ 411 o. i 1	p. 137	[85]
TSŠ 442 (= EDATŠ no. 41) o. i 1	p. 151	
TSŠ 467 (= BŠ no. 216) o. i 1–3	p. 112, p. 113	[206]
TSŠ 483 o. i 1	p. 152	
TSŠ 483 o. i 5	p. 152	
TSŠ 627 o. i 1	p. 94	
TSŠ 627 o. i 8	p. 17	
TSŠ 627 r. iii' 1–2	p. 214	
TSŠ 629 o. i 5	p. 94	
TSŠ 632	p. 269	
TSŠ 648 o. i 4-o. ii 1	p. 209	[188]
TSŠ 837 (= EDATŠ no. 66) o. ii 1–2	p. 109	
TSŠ 878 o. i 1	p. 209	[186]
TSŠ 878 o. i 3	p. 209	[187]
TSŠ 881 o. ii 4'	p. 163	[106]
TSŠ 882 o. ii 1	p. 109, p. 115, p. 117	[29]
TSŠ 882 r. i 6	p. 102	
TSŠ 924 r. i 4	p. 209	[185]

TSŠ 926	p. 270	
TSŠ 969 r. ii 2	p. 94	
VAT 12693 o. iv 15	p. 112	
VAT 12751+ o. iv 13–17	p. 128	
Visicato – Westenholz 2000: 1117–1119 (n. 4) o. iv 6	p. 152	
Visicato – Westenholz 2002: 1–4 o. i 1	p. 123, p. 136	[79]
Visicato – Westenholz 2002: 1–4 o. ii 2	p. 152	
WF 32 o. iv 6	p. 123, p. 124	[50]
WF 33 o. i 6	p. 124	[51]
WF 45 (= EDATŠ no. 74) r. vi 2	p. 170, p. 171	[112]
WF 53 (= EDATŠ no. 68) r. vii 3	p. 170, p. 268	
WF 55 (= EDATŠ no. 59) r. i 4	p. 18, p. 170	[111]
WF 61 (= EDATŠ no. 16) r. iii	p. 151	
WF 65 (= EDATŠ no. 2) r. vi 6	p. 151	
WF 67 (= EDATŠ no. 23) r. vii 1–3	p. 227	[210]
WF 68 (= EDATŠ no. 24) r. vi 1–2	p. 227	[208]
WF 69 (= EDATŠ no. 25) r. vi 1–3	p. 227	[209]
WF 83 o. i 1	p. 151	
WF 84 (= EDATŠ no. 38) o. i 1	p. 151	
WF 84 (= EDATŠ no. 38) o. iii 4	p. 151	
WF 85 (= EDATŠ no. 40) o. i 1	p. 151	
WF 90 (= EDATŠ no. 61) o. i 1	p. 151	
WF 97 r. i’ 1	p. 94, p. 101	
WF 99 r. iv 1	p. 152, p. 160	[98]
WF 115 r. ii 3	p. 152	
WF 139 o. i 1	p. 124	
WVDOG 143.133 o. ii 2–3	p. 100, p. 101	[22]
WVDOG 143.17 r. v 6	p. 95, p. 101, p. 113	[12]

Tell Abū Ṣalābīḫ

IAS 5 o. i 1–18	pp. 252–256	
IAS 6 o. i 1–ii 3	pp. 252–256	
IAS 490 o. i 1	p. 96	
IAS 490 o. ii 1	p. 97	[13]
IAS 490 o. ii 5	p. 96	
IAS 493 r.? i 2	p. 172	
IAS 494 o. i 1	p. 97, p. 97, p. 99	[15]
IAS 494 o. ii 3	p. 154	[95]
IAS 494 o. iii 1	p. 154	

IAS 494 r. ii 1	p. 154	
IAS 495 r. i 5’	p. 154	
IAS 499 i 2’	p. 172	
IAS 499 i 3’	p. 173	[113]
IAS 505 r. i’ 7’	p. 173	
IAS 507 r.$^{?}$ ii 1	p. 173	
IAS 508 o. iv 1’-2’	p. 112	
IAS 508 r. iii 1	p. 172	
IAS 513 r. 1’	p. 112	
IAS 519 r. ii 1	p. 96, p. 97, p. 99, p. 100 [14]	

Others

ATU 3: 27	p. 128	
ATU 3: 142–145	pp. 252–256	
CL 269 o. i 1	p. 18	
UVB 10: 13 pl. 26b o. i 4	p. 135	
MSVO 1.243 r. i 1-2	p. 228	[214]