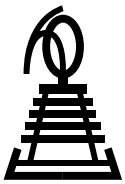
Enki & Ptah

Journal of Technology and Trade in Ancient Egypt and Western Asia

Vol. 1 / 2025

UNIVERSITÀ DEGLI STUDI DI MILANO



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Milano University Press

Cover illustration
The workshop area of Level 3b at Logardan, ©FArMQaD, French Archaeological Mission in the Qara Dagh

Address
Milano University Press – University of Milan
Via Festa del Perdono 7
20122 Milan, Italy
https://riviste.unimi.it/index.php/enkiandptah

The volume was published with the contribution of Dipartimento di Studi Letterari, Filologici e Linguistici – University of Milan

ISSN:

Index

Editorial

Articles

Reviews

How to cite: Cavagna, A., Peyronel, L. 2025. Editorial, *Enki & Ptah* 1: 7-10.
DOI: https://doi.org/10.54103/eap/29345

ENKI & PTAH
Journal of Technology and Trade in Ancient Egypt and Western Asia

Editorial

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It is with great pleasure that we introduce the first issue of *Enki & Ptah. Journal of Technology and Trade in Ancient Egypt and Western Asia*, a new peer-reviewed scientific publication dedicated to the study of technology, scientific knowledge, crafts, exchange in the ancient societies of Egypt, Nubia, the Eastern Mediterranean and Western Asia. Ranging from prehistory to the Hellenistic and Roman periods, the journal offers an interdisciplinary platform for exploring the material foundations of ancient economies and the cultural dynamics that shaped them. *Enki & Ptah* was conceived with the ambition to bring together complementary perspectives from archaeology, history, and philology, and to foster a cross-regional and diachronic approach to the study of ancient technologies and exchange interactions. By placing Egypt, the Eastern Mediterranean and South-Western Asia within a shared analytical framework, the journal highlights the interconnected worlds of technological innovation, craft specialisation and long-distance trade, and the many ways in which these shaped social and economic structures over time. Rooted in the long-standing Italian tradition of Egyptology and Near Eastern studies, the journal aims to serve as an intellectual meeting ground for scholars investigating the technological, economic and social dynamics of pre-modern cultures, while also fostering methodological innovation and new interpretative frameworks. Its scope embraces a broad thematic and chronological range, inviting contributions on raw-material procurement and processing, production and distribution systems, archaeometric and scientific analyses, as well as textual and iconographic sources on technology and know-how. Particular value is placed on studies that illuminate the transmission of technical knowledge across regions or periods, or that explore the relationship between innovation, environment, agency and local traditions. A defining feature of *Enki & Ptah* is its commitment to interdisciplinary dialogue. The journal encourages the integration of archaeological, scientific and textual evidence, offering a space in which methodological reflection and theoretical perspectives can inform new understandings of ancient technologies and economies. We especially welcome research that challenges disciplinary boundaries or proposes innovative approaches to the study of craft practices and exchange networks. Co-directed by its editors together with a dynamic board of early-career researchers from the University of Milan, *Enki & Ptah* adopts a double-blind peer-review

system and benefits from the guidance of an international scientific committee composed of leading specialists in Egyptology, Assyriology, and the history and archaeology of ancient Western Asia. The journal consists of a section of research articles and a section dedicated to reviews of recent volumes relevant to its areas of interest. Published by the Milano University Press in open access, with print-on-demand options, *Enki & Ptah* reflects the University of Milan's commitment to fostering high-quality, accessible and interdisciplinary research, according to the FAIR principles. This first issue opens with a substantial collaborative article by a team of scholars from the Centre of Excellence in Ancient Near Eastern Empires at the University of Helsinki. Their contribution offers a far-reaching comparative analysis of the relationship between kingship and economic structures in ancient Western Asia, a field of research that has recently experienced a notable revival, enriched by new methodological perspectives. The article presents a systematic diachronic comparison spanning more than a millennium, examining the economic foundations of kingship and, to a lesser extent, queenship, across seven major empires (Neo-Assyrian, Neo-Babylonian, Teispid-Achaemenid, Seleucid, Ptolemaic, Arsacid and Roman). Particular attention is given to the distinction between "state" and "royal" assets and expenditures, explored here to an unprecedented degree. Massimo Maiocchi's article addresses the methodological and historiographical challenges surrounding the study of the earliest writing systems of southwestern Asia and northern Africa: proto-cuneiform, proto-hieroglyphic and proto-Elamite. A reassessment of the scholarly debate reveals persistent disciplinary biases and the modern prestige attributed to literacy, which have long shaped narratives that overstate writing as the primary marker of civilisation. By exposing these ideological assumptions, the study advocates for a more balanced interpretive framework that situates the origins of writing within the broader cultural, technological and social dynamics of the late 4th millennium BCE. The contribution by Padovani and Zingarello examines the mechanisms of control and management of ceramic production during the late Early Bronze Age in northern Mesopotamia, adopting an explicitly archaeological perspective grounded in the analysis of manufacturing contexts, particularly in light of recent discoveries in Iraqi Kurdistan. Focusing on the site of Logardan, the authors present newly uncovered workshops equipped with large and technically sophisticated firing installations. Drawing on fresh spatial, architectural and technological data from ongoing excavations, the study reassesses longstanding assumptions about the political, technical and socio-economic dimensions of pottery manufacture under the first empires of the 3rd millennium BCE, highlighting an incipient trajectory towards proto-industrialisation. Ilaria Sieli's article investigates the relationships between Lower Nubia and Egypt through the analysis of three cemeteries belonging to different phases of the A-Horizon, the earliest cultural horizon of the region. By tracing changes in funerary customs and their implications for Nubian society, and by emphasising regional distinctions within Lower Nubia, the study highlights episodes of contact, tension and divergence with Egypt, as well as instances of creolisation that made Lower Nubia a key interface between distinct cultural spheres. The final contribution, by Ahmed Mansour, turns to the emerging field of ancient Egyptian metallurgy. Despite numerous scientific analyses on metal

composition and technology, our understanding of early manufacturing processes and working conditions remains fragmentary. By examining the written evidence that accompanies Old Kingdom metallurgical scenes, the article integrates textual and visual data to clarify technical procedures, operational stages and the demanding working environment of ancient metalworkers. Together, these sources offer a more accurate and coherent reconstruction of one of Egypt's most specialised industries.

As this inaugural issue brings together diverse perspectives on handicraft production, exchange, and economic systems across ancient societies, we invite our readers and contributors to join us in a shared space where new findings, approaches and ideas may converge, shedding fresh light on the complex interactions and cultural meanings that shaped the procurement, transformation and circulation of materials and products in ancient Egypt and Western Asia.

How to cite: Maiocchi, M. 2025. A Critical Examination of the Current Paradigms on the Origins of Writing in Mesopotamia, *Enki & Ptah* 1: 85-100. DOI: https://doi.org/10.54103/eap/27180

ENKI & PTAH
Journal of Technology and Trade in Ancient Egypt and Western Asia

A Critical Examination of the Current Paradigms on the Origin of Writing in Mesopotamia

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Abstract

This article explores the methodological and historiographical challenges that persist in examining the complex topic of the origins of writing in antiquity, with focus on the earliest writing systems from Southwestern Asia and Northern Africa (proto-cuneiform, proto-hieroglyphic, and proto-Elamite). A review of scholarly literature reveals a lack of consensus regarding who invented writing first and when. This disagreement seems to stem from ideological factors, as scholars in different fields often advocate for the region they specialize in as the birthplace of writing. This situation is ultimately rooted in the prestige associated with writing in modern societies, which has led to historical narratives that overemphasize the role of this technology as a marker of civilization in antiquity. This study aims to highlight this phenomenon and lay the groundwork for a more nuanced paradigm that fully considers the interconnected cultural, technological, and social factors of the late 4th millennium BCE.

Keywords: Early writing systems, Proto-cuneiform, Proto-hieroglyphic, Proto-Elamite, Late 4th millennium BCE

1. Introduction

What is the oldest known writing system? This seemingly straightforward question ultimately proves to be a challenging one to answer. Ask an Assyriologist, and the answer might be proto-cuneiform; an Egyptologist would argue for proto-hieroglyphic, while an Iranist could suggest both proto-Elamite and proto-cuneiform are equally viable. The current understanding of the emergence of literacy in antiquity is, in fact, invariably affected by a number of biases and logical fallacies, some of which are addressed below. The goal of this article is to increase awareness of the current paradigms regarding the origin of writing and to highlight the main issues that prevent a balanced view on the matter from being reached. The subject is of course vast. The key avenues of research include technological innovations (usually addressed through the lens of historical materialism), intellectual achievements and the transmission of knowledge (as part of intellectual history, but with ramifications in the fields of philology and/or epigraphy of ancient sources), the social setting of the earliest records (social history and anthropology), as well as their primary context (archaeology). Addressing such a wide-ranging subject exhaustively in a single article is exceedingly challenging; thus, the following discussion shall serve as a brief

overview and research guide, in the hope that it may be useful in the development of a revised framework for understanding the origin of writing in antiquity.[1]

2. Terminological remarks on writing and proto-writing

Before proceeding, a terminological clarification is necessary. This article makes a strict distinction between proto-writing and writing. Proto-writing is defined as a communication system composed of discrete visual elements (graphemes) and specific rules for their arrangement to convey semantic information alone.[1] By definition, proto-writing is not tied to spoken language; thus, its information can be verbalized in various ways depending on the chosen language and the syntactic structure of sentences in that language. Writing, by contrast, shares certain structural elements with proto-writing but includes the critical ability to convey both semantic and phonetic information, inherently linking it to speech. Consequently, a written text may allow only a limited range of verbal interpretations – often just one in alphabetic systems, aside from suprasegmental elements like stress, intonation, junctures, and duration. However, limited flexibility may still exist in cases where texts rely heavily on logography or fixed expressions. The definitions provided here are sufficient for the scope of this article but are not entirely satisfactory for broader generalization. Specifically, undeciphered scripts, regardless of their sophistication, fall into categories of proto-writing or pseudo-writing. This includes the debated Vinča (or Tărtăria) script[2] and the impossible Dispilio tablet script (as-yet unpublished). Additionally, the notable points of contacts between artistic representations and proto-writing remain somehow difficult to address in proper terms. To clarify the situation, further (or revised) definitions are needed, although achieving scholarly consensus may be difficult. Introducing such distinctions could also complicate this article unnecessarily, diverting focus from the primary arguments.[3] It is also worth clarifying the use of the prefix *proto-* in terms such as proto-cuneiform, proto-hieroglyphic, and proto-Elamite. In these cases, *proto-* suggests that the language, if any, underlying the inscriptions cannot be determined – either due to insufficient quality or quantity of evidence or because proto-writing was not intended to express specific spoken utterances in the first place. Tentative linguistic identifications may exist, as with proto-cuneiform, though these often remain debated (see below). As for proto-Elamite, the term is somewhat misleading because it implies a connection to the Elamite language (also known as Hatamtite), which is first attested in the mid-third millennium BCE. However, no definitive link between proto-Elamite and the Elamite language has been established, as proto-Elamite sources remain undeciphered, aside from numerical signs, metrological systems, and a few signs referring to commodities (see below, §6). The survival of certain graphemes from a proto-writing system over centuries, eventually appearing in

[1] For slightly different definitions see for instance Daniels (1996: 3): "A system of more or less permanent marks used to represent an utterance in such a way that it can be recovered more or less exactly without the intervention of the utterer"; Woods (2010: 44): "The unambiguous visual representation of speech".

[2] See most recently Lazarovici and Merlini (2016).

[3] For instance, the author is inclined to favor the label 'sophisticated semiographies' over 'proto-writing', as the latter term has unfortunate teleological connotations (Chambon 2022).

later written records (often in a modified form), does suggest a continuity of proto-literate practices. However, this continuity cannot be used to argue that the language represented by the original proto-writing was the same as that expressed in later historical sources.

3. Methodological notes on chrono-historical approaches.

Before proceeding with the discussion, some remarks on the use of absolute dating techniques in reconstructing the distant past are necessary. Establishing an absolute chronology for the vast region encompassing Southwestern Asia and Northern Africa is a challenging endeavor, requiring methodologies drawn from both the humanities and the hard sciences. Analysis typically begins with a carefully curated selection of sample evidence that meets rigorous standards. For example, samples must come from well-defined stratigraphic contexts, remain uncontaminated by recent organic material (particularly relevant for C14 analysis), and be recovered from areas free of disrupting factors. Despite technological and statistical advances over the past forty years, significant uncertainties still persist in both absolute and relative dating when evaluating evidence for the origins of writing. Terms like "old wood problem", "(chronological) plateau", and "calibration issues" frequently appear in the literature, reflecting the challenges inherent in absolute dating. Consequently, while C14 dating and similar techniques are invaluable, they alone are insufficient to conclusively answer questions like "Who invented writing, and when?". Therefore, broad historical evaluations often supplement absolute dating in discussions on proto and early writing. However, the resulting historical narratives are prone to biases of various kinds. Indeed, historical considerations often inform chronological data rather than vice versa. To an extent, refining the dating of selected archaeological samples based on existing knowledge is acceptable and even natural. However, it is crucial to be aware of the potential pitfalls of this approach. Circular reasoning, for instance, can arise, especially when historians hit the limits of probability curves in C14 dating – as seen in the accepted dating of proto-cuneiform (see §4 below). Such situations do not necessarily invalidate the proposed chronological reconstructions, but they should certainly raise caution in the scholarly community, given the potential for cascading effects on related historical topics. One way to identify potentially flawed paradigms is to revisit the *status quaestionis* and the history of research on the subject. It is important to track how academic consensus (or disagreement) has evolved over time and why. What matters is not only *what* we know but also *how* we arrived at that knowledge. As this article will show, scholarly conclusions often depend on the specific academic disciplines and methodological frameworks applied in studies of proto-writing (e.g., positivism, structuralism, post-structuralism, holism). Borrowing a concept from physics and social sciences, it may be useful to consider the notion of *intellectual hysteresis* – the tendency for current research paradigms to persist even after the conditions that produced them have changed. For instance, a recalibrated C14 date might have little impact on historical models deeply rooted in prior interpretations. In the following discussion, the author aims to outline major trends in the academic debate on the origins of writing over the past fifty years. However, readers should be aware that a complete bibliographic survey of this vast topic would require considerably more space than is available here.

4. Proto-cuneiform

Proto-cuneiform texts have been extensively described in the past.[4] As is well known, the epigraphic evidence from the late Uruk period is divided into two main groups, corresponding to the Uruk IV and Uruk III periods. The Uruk IV corpus consists of 1,790 tablets,[5] all originating from Uruk. To this collection, another 45 tablets from illicit excavations, with uncertain provenance, must be added.[6] The Uruk III inscribed materials are more numerous, comprising 4,437 items from various sites in southern Mesopotamia, including Uruk, Umma, Adab[?], Larsa[?], Jemdet Nasr, Tell Uqair, Kish, and Ešnunna. This article primarily focuses on Uruk IV materials, whose language remains a subject of debate due to the archaic nature of the texts. Based on a few selected spellings in the Uruk III inscriptions, many scholars argue that Sumerian was also the language of the Uruk IV texts.[7] Be it as it may, the consensus is that phonetic spellings in the Uruk IV tablets are at best extremely limited, indicating that the system was not well-suited to recording spoken language. Turning to the archaeological context, the Uruk IV texts were excavated prior to the establishment of stratigraphic methods, and as a result, the precise find-spots for most tablets are unknown, aside from a few exceptions (discussed below). The tablets were found in secondary contexts, used as fill in leveling the acropolis area in the early Uruk III period. Recent C14 dating of pinewood samples from the roof of the Eanna Building C (also known as Temple C), combined with dendrochronological analysis, has provided anchor points for a small group of seven proto-cuneiform tablets of administrative nature.[8] These tablets were either brought into Building C after its construction or produced there locally. The excavators unearthed them on the floor just below the collapsed roof. In terms of absolute dating, the *terminus post quem* for the roof's construction is now set at 3275-3250 BCE (1σ) or 3290-3245 BCE (2σ). Although the building's period of activity is unknown, it is plausible that these tablets were produced shortly before the building ceased to be used, as there is nothing in their content that suggests the need to keep them over a period of several years. Assuming a few decades of use, a reasonable date for the proto-cuneiform texts from Building C is around 3250 BCE, with some Uruk IV texts potentially being slightly older.[9] Highly

[4] Standard treatment by Englund (1998: 18-41), with previous references. Since then, some 650 proto-cuneiform tablets appeared on the black market as result of illicit excavations. Most materials are now published in three major volumes, namely CUSAS 1, CUSAS 21, and CUSAS 31. On the overall historical and intellectual setting of proto-cuneiform see further Woods 2010; Fales and Del Fabbro 2017; Steinkeller 2017: 24-28; 50-55; Renn 2019; Cancik-Kirschbaum and Schrakamp 2022.

[5] Data from the CDLI project (accessed August 2024).

[6] These tablets are now hosted at the Oslo Schøyen Collection. Englund (2004a: 28 wn 7) thinks of Adab or Umma as possible origin for these materials; contra Veldhuis (2014: 32).

[7] Englund (2009: 7-10) offers a systemic review of the proposed attempts of identifying phoneticism in proto-cuneiform records. His list of candidate Sumerian words in the archaic text in now to be updated as to include Monaco 2014b. On this topic see further Damerow 2006: 4-7; Cooper 2016: 54; Selz 2022.

[8] Green and Nissen 1987: 36-40, 50-51; Englund 1998: 41 wn 81-82; Ess and Heußner 2015: 22. The tablets received excavation numbers W 21300, 1-7. Photos and copies in ATU 2 pl. 1-3 and on CDLI as https://cdli.ucla.edu/P004357 and subsequent IDs (up to P004363), providing also museum numbers and additional information.

[9] Cf. also Sürenhagen (1993: 57-70) for a proposal of dating of selected proto-cuneiform texts to the Uruk V period. Englund initially expressed reservations about this idea, but subsequently considered it a potential avenue for further investigation (Englund 2004b: 148 wn 36), apparently in order to contrast the idea that Egyptian writing is older than proto-cuneiform.

pictographic inscriptions, such as the renowned Uruk tags, almost certainly belong to an earlier stage of the script.[10] Most scholars agree on a relatively swift development for proto-cuneiform palaeography. As Nissen et al. (1993: 7) observed:

> "The text corpus of script phase IV (…) seems itself so homogeneous that one is inclined to date all its tablets to a relatively short period".

As for content, all proto-cuneiform texts are either administrative or lexical in nature, with the possible exception of the so-called AD-GI$_4$ list (also known as World List C or "Tribute"), which may contain a narrative section.[11] Be it as it may, examining how the accepted dating of Uruk IV texts has evolved in scholarly literature over the past forty years is instructive. In the 1980s, the Uruk IV period was typically dated to 3100-3000 BCE and Uruk III to 3000-2900 BCE.[12] This dating was largely based on historical considerations rather than C14 data, which at the time gave an uncalibrated date of 2815 ± 15 years (Lenzen 1965: 20-21). Scholars chose to disregard this figure, aiming instead to place the Late Uruk period before the Early Dynastic period, whose absolute chronology was more securely established. At that time, proto-cuneiform was almost universally considered the earliest script, from which all other scripts either derived or were inspired. In the 1990s, the dating of the Uruk IV period was shifted back by a century to around 3200-3100 BCE, with Uruk III adjusted accordingly to 3100-3000 BCE.[13] This updated dating rested also on new C14 data, which allowed some flexibility.[14] In the early 2000s, Glassner (2000: 54-65) proposed an even earlier date for the invention of "writing" (or proto-writing, in the terminology used here). If the present author correctly reads Glassner's argument,[15] he suggests that proto-writing quickly developed from pre-existing accounting devices, such as bullae, numerical and numero-ideographic tablets.[16] He also takes in due consideration stratigraphic and C14 data from various sites where these devices have been found, including Jebel Aruda, Habuba Kabira, Tell Brak, Godin Tepe, Hacinebi, Tell Sheikh Hassan, and Tell Qraya. Taking dating uncertainties into account, Glassner concludes that 3400-3300 BCE is the most plausible range for the Uruk IV proto-cuneiform tablets, arguing that proto-writing in Mesopotamia predates that in Egypt. It is beyond the scope of this paper to fully address Glassner's work on writing's origins, which is not limited to chronology. Within the Assyriological community, his idea that Sumerian was the underlying language of proto-cuneiform encountered criticism.[17] Despite this, the idea of an earlier date for proto-cuneiform has proven influential. While 3400 BCE may

[10] See most recently Szarzyńska1 1994; cf. Englund 1998: 57.
[11] On this peculiar text see Civil 2013. Such interpretation remains controversial, but this is not relevant here. On archaic lexical lists in general see Veldhuis (2014: 27-59).
[12] See for instance Damerow and Englund 1989: viii; Nissen 1986. The bibliography is vast, only a few minimal references are provided here and in the notes below in order to substantiate the argument.
[13] See for instance Englund 1994: 11 wn 4; Englund 2001: 1 wn 2; Woods 2010: 33 still retains this dating.
[14] Boehmer (1991: 223) has data on three samples, whose combined probability distribution suggests a dating of 3510-3370 BCE for the felling of the trees used as roof beams of Building C (cf. remarks by Wright and Rupley 2001: 92, with notes on overall methodological approach).
[15] See remarks by Desset 2012: 69.
[16] Selected iconographic motives from cylinder seals also played a role in the development of the proto-cuneiform repertoire, see most recently Ross 2014; Kelley et al. 2024.
[17] See the review by Englund 2005; cf. also Selz 2000; Dalley 2005.

be ambitious, since the mid-2000s, many scholars have adopted a further revised date range of 3300-3200 BCE for the Uruk IV materials (Englund 2004a: 25-26). It must be noted that support for this revised dating came around ten years after its initial proposal, in the form of new calibrated C14 data.[18] This academic trend towards earlier dating is evident in the literature, with Englund (2006a: 2) suggesting 3350-3200 BCE as a plausible compromise. This range is presently used by the Cuneiform Digital Library Initiative (CDLI), which is the result of years of meticulous work by Englund and his team.[19] While revisions to absolute chronology are common and welcome in the study of ancient history, setting an upper limit of 3350 BCE for the earliest Uruk tablets, though not impossible, seems unlikely. The publication history of Egypt's earliest inscribed objects may, in fact, explain the apparent Assyriological community's will for positioning the Uruk IV materials as early as possible within this revised timeframe.

5. Proto-hieroglyphic

In the interest of space, the following overview of the proto-hieroglyphic script focuses on materials that most significantly influenced scholarly debates on early writing. The discussion begins with an examination of the famous Abydos tags and related items discovered in 1988 in the royal cemetery at Umm el-Qaab. Fully published a decade later (Dreyer et al. 1998), this find challenged the previously accepted chronological supremacy of Mesopotamian writing. The artifacts were found in the monumental tomb labeled U-j, dated to the Naqada IIIA period. Although looted in antiquity, the tomb still contained materials valuable for historical analysis, including pottery, luxury items, and 186 small ivory and bone tags inscribed with proto-hieroglyphic signs, carved and painted. In the early 1990s, this tomb was dated to approximately 3150 BCE, about half a century earlier than the proto-cuneiform texts from the Uruk IV period, based on prevailing scholarly views back then (Boehmer et al. 1991: 65). Prior to the complete publication of the Abydos materials, there were also those who advanced arguments in favour of an even earlier dating. For example, Kaiser (1990) suggested that (proto-)writing in Egypt could date back to the Naqada IIc period, approximately a century earlier than Naqada III. In the late 1990s, Dreyer et al. (1998) tentatively proposed a date of 3320 BCE for Tomb U-j in the Naqada IIIA period.[20] This dating was corroborated by a second set of C14 data from two wood samples found in room U-j 6, which were paired with considerations of an archaeological nature. In those years, proto-hieroglyphics appeared not only to precede proto-cuneiform but also to be more advanced in its potential to record spoken language. In fact, the excavators put forth the proposal to decipher the inscriptions on the tags and related materials in terms of toponyms indicating the place of origin of the goods shipped to Abydos, some possibly including phonetic elements. If accurate, this would imply that writing, in the strict sense, first emerged in Egypt. In 2001, the concept of a potential chronological supremacy of proto-hieroglyphic was popularised by Lawler (2001).[21] In the 2010s, however, the

[18] Ess and Heußner 2015, followed for instance by Nissen 2016: 34.
[19] Accepted in many subsequent academic studies, with nuances. For instance, Ross (2014: 298) cautiously places the earliest proto-cuneiform tablets at the very end of the available range for the Uruk IV period (i.e. shortly before 3200 BCE).
[20] Görsdorf et al. 1998; see also Joffe 2000 on the historical implications.
[21] Lawler (2001: 2420) also takes in consideration Harappan inscriptions as a possible third contender.

proposed decipherment of the Abydos tags was met with criticism from within the Egyptological community.[22] Nevertheless, this did not affect the overall argument that proto-hieroglyphic was the oldest of the proto-writing systems. Meanwhile, attention shifted to other mid-fourth-millennium BCE proto-writing candidates, such as rock inscriptions from el-Khawi and Gebel Tjauti, the Coptos colossi, decorated luxury items (e.g., ceremonial knives and combs), and motifs on painted pottery from the late Naqada II period (the so-called Decorated Ware). The current consensus is that such diverse evidence should not be classified as writing proper, as it contains no phoneticism whatsoever. Instead, it represents a visual communication code that was exploited (with modifications) later on when writing first emerged. In more detail, these symbols are to be regarded as elements of partly overlapping and restricted semiographic systems (Vernus 2016; Stauder 2022). The restriction is operative at both the semantic and functional levels. On the one hand, the system appears to be inherently limited in its capacity to convey complex semantic information. On the other hand, the deployment of such a system seems to be primarily driven by the desire to enhance power and prestige (Baynes 2007: 98-103). The earliest known examples of phonetic signs are found in the late Naqada III period, specifically in elite names and toponyms attested in the decades immediately preceding Narmer (ca. 3200 BCE). Going back to scholarly debate on proto-writing, in parallel with the re-evaluation of the U-j materials, the validity of the samples used for dating the Abydos archaeological evidence as a whole has been called into question. The revision already started in in mid-2000s, with a more pronounced emphasis in the 2010s.[23] The arguments are quite complex. It suffices to note here that uncertainties encompass not only issues with row data calibration, but also with the relative length of the 0th and subsequent dynasties. Köhler (2013) has proposed a date of approximately 3300-3100 BCE for Naqada IIIA1/2, which aligns well with the currently accepted Uruk IV period. Bayesian statistical models were employed by Dee et al. (2013: 5,8) to yield a slightly earlier dating of the entire Naqada III period, namely 3377-3238 BCE (95% highest posterior density range). In accordance with the findings of these authors, the introduction of proto-writing is likely to be placed around 3300 BCE.[24]

6. Proto-Elamite

In more recent years, a further contender has emerged in the academic debate on the earliest (proto) writing systems. The corpus of proto-Elamite texts comprises approximately 1,750 tablets. The majority of the evidence originates from Susa (1,630 tablets, according to CDLI), although smaller collections of epigraphic materials have been retrieved from numerous sites scattered across the vast Iranian plateau: Anshan (32 tablets), Tepe Yahya (27), Tepe Sialk (5[?]), Tepe Sofalin (16, plus numerous unpublished texts), Tall-i Ghazir (1), Tepe Ozbaki (1), and Shahr-i Sokhta (1). In comparison with Uruk IV, the proto-Elamite cultural horizon is undoubtedly more diverse, as expected on the basis of the extensive geographical area covered by the sources (Saeedi 2021). From a typological perspective, all the documents are of an administrative nature, with the exception of a single peculiar text that may have

[22] Regulski 2010: 53-64. See most recently Vernus 2016: 117-119; Stauder 2022: 227-31. On the earliest full-fledge sentence in Egypt cf. also Regulski 2014: 1 fn 1.

[23] See for instance the mild criticism by Baines (2004: 154, 2007: 118-121).

[24] Dee et al. (2013) speak of writing *tout court*, but it is clear they mean proto-writing, see §2 above.

originated from school practice.[25] Until recently, proto-Elamite was universally considered to be a secondary invention, derived from proto-cuneiform by cultural contact (Englund 2004b; 2006b: 22; Dahl 2012: 2; Dahl et al. 2013: 353; Glassner 2018: 450-51; Robson 2020: 26). Up until the late 1980s, the earliest texts from ancient Iran were in fact assigned a dating that was roughly contemporary to Jemdet-Nasr/ Uruk III in Mesopotamia (Damerow and Englund 1989: viii). In absolute terms, and acknowledging the typical uncertainties associated with chronological reconstruction, this would translate in a dating between 3000 and 2800 BCE. The arguments for such a late dating were based on a combination of C14 data and considerations of an archaeological nature, such as the presence or absence of Uruk material culture within Iranian sites where proto-Elamite texts had been recovered.[26] Furthermore, the presence or absence of objects deemed precursors to writing (bullae, numerical tablets, numero-ideographic tablets[27]) was regarded as a diagnostic feature for establishing relative dating, with particular reference to the proposed alignment of the Uruk and Susa stratigraphic evidence, which continues to present a significant challenge. This is particularly the case with regard to the pivotal levels Eanna IVa/b in Uruk and Acr. I 17A/B in Susa (Butterlin 2018: 309-321). Historical considerations also contributed in solidifying the idea that proto-cuneiform must precede the other scripts. In particular, (proto-)writing was conceptualised as one of numerous elements that were disseminated throughout the Ancient Near East as part of the Uruk expansion.[28] In that period, the prevailing view was that these developments were the result of a purely colonial process. This perspective posited a unidirectional, monolithic influence of the Uruk culture over all sites where Uruk material culture had been recovered, extending from Northern Mesopotamia to ancient Iran. The rationale for situating the proto-Elamite evidence in a temporal context preceding the Uruk IV period was predicated on considerations pertaining to the relative magnitude of the settlements. The argument can be summarised as follows: as Uruk eventually grew larger than Susa, it must have had a bigger political impact, which in turn implies a more complex society, as well as the need for sophisticated administrative tools, such as proto-cuneiform, which is therefore earlier than proto-Elamite (Dittmann 1986: 347). The underlying assumption is that (proto-) writing must be a product of a large urban centre, given that the majority of inscribed evidence currently available is intimately related to city administration.[29] However, the argument is flawed due to a lack of understanding of complexity in the context of network science. In particular, the relative size of a settlement may be employed as a proxy for social complexity, although this is subject to certain limitations. It is acknowledged that a settlement of a few inhabitants is less complex than a well-developed urban system. However, a city of 100,000 inhabitants or more might as well be as complex as one having half the population. Going back to proto-cuneiform and proto-Elamite scripts, there are points of contact, which

[25] MDP 26 71. The author is grateful to C. Kelley for pointing this text out to him. See further Dahl 2018: 386, with an overview of the content of the text corpus as a whole.
[26] See for instance Damerow and Englund 1989: viii on the evidence from Tepe Yahya.
[27] Englund 1998: 42-51; 2004a: 25-28.
[28] The model is of course now outdated, cf. Stein 1999: 10-64; Algaze 2005.
[29] In this view, proto-cuneiform lexical lists are primarily conceived as an ancillary tool to perpetuate the system (see Michalowski 2012); Glassner (2000) has a more nuanced view of lexical lists, conceptualising them as the outcome of intellectual endeavour by early humanists.

used to be regarded as direct evidence of the latter being inspired by the former. Elements in common include two metrological systems,[30] as well as non-numerical signs, which are remarkably similar in both their visual properties and meaning (such as for instance the sign for sheep and goats).[31] In the late 1990s, both the upper and lower boundaries in the time range of proto-Elamite were revised in order to align with the period 3100-2900 BCE (Englund 1998: 22). This dating was considered to be "almost secure" (ibid.). Such a revision was necessary in order to maintain the chronological proximity of the proto-Elamite horizon to the Jemdet-Nasr/Uruk III period, whose dating had been adjusted accordingly. The revised chronology had no impact on the contemporary understanding of the origins of writing in ancient Southwestern Asia. However, it may have contributed to familiarize scholars with the idea that proto-writing in ancient Iran also emerged in the late fourth millennium, as is also the case with proto-cuneiform. The recent reappraisal of the extant evidence appears to have been prompted by the accumulation of significant archaeological discoveries in Iran over time, which collectively constituted a substantial challenge to the prevailing paradigm. Based on ceramic analysis, already Butterlin (2003: 387-314) proposed a gradual and uninterrupted development in Susa throughout the Early Uruk period, which suggests that the urbanisation process was not influenced by external factors. In the early 2010s, the situation reached a new and more dramatic turning point. Pittman (2013: 322) presents a novel synthesis of the iconographic evidence from ancient Iran, which was previously interpreted as exhibiting clear Mesopotamian influence. This synthesis is based on the analysis of recently published materials from both Uruk and Susa (in particular, Boehmer 1999; Le Brun 1999). By filtering out the analysis of unreliable materials that cannot be dated with reasonable certainty, Pittman is able to identify the original motives in the glyptic repertoire from fourth-millennium Iran. The new evaluation demonstrates that prior to the invention of proto-cuneiform in Uruk, Susa was not culturally subordinated to Mesopotamia. As Pittman puts it (2013: 329-330):

> "The most conservative interpretation of this situation is that there was a millennium-long period of parallel cultural evolution in southern Mesopotamia and neighbouring Susiana that reflected a period of intense contact between Mesopotamia and Susiana. The most radical interpretation would be that the material forms that define Uruk administrative culture, before the invention of writing at Uruk in Eanna IVa, were borrowed from Susiana by southern Mesopotamia".

Roughly in the same years, Desset (2012; 2016) presents a further assessment of the proto-Elamite epigraphic evidence, which resonates with the revised understanding of the archaeological context. This author posits that the proto-Elamite and proto-cuneiform scripts should be considered contemporary, spanning approximately 3300-3100 BCE. In more detail, it is proposed that they should be regarded as descendants from a common

[30] Desset 2016: 76-78. On proto-cuneiform metrological systems see further Englund 1998: 111-127; as for proto-Elamite see Englund 2004b: 104-119.

[31] See most recently Kelley 2024: 82-83, providing an estimate of at least 30 signs in common between proto-cuneiform and proto-Elamite, plus another 50 signs as possible candidates. Importantly, the shared repertoire includes complex graphemes and signs that seem not pictographic in nature. These observations allow us to rule out the possibility that the visual similarity of selected proto-cuneiform and proto-Elamite signs is merely due to the fact that they represent the same object.

ancestor, namely from the accountable system(s) attested in bullae (with associated tokens), as well as in the numerical and numero-ideographic tablets from the mid fourth millennium BCE.[32] Desset's argument is based on a cumulative reading of the available C14 data. His evaluation is paired with the consideration that the stratigraphic context of diagnostic archaeological finds from ancient Iran is better understood than those of Uruk, particularly in the context of recent excavations outside of Susa. In particular, the site of Anšan appears to offer substantial evidence in support of this perspective (Desset 2016: 90). It is beyond the scope of this author's expertise to assess the soundness of Desset's interpretation of C14 data. As Dahl et al. (2013: 375) warn us:

> "The existence of a substantial plateau in the radiocarbon calibration curve has been highlighted as a major impediment to understanding the absolute chronology of the fourth millennium BC, which in turn hinders our understanding of the socio-economic dynamics of the ancient Near East at that time. Many of the extant problems of absolute chronology will only be resolved through renewed excavations targeting specific chronological problems".

With this in mind, it must be acknowledged that, to the best of the present author's knowledge, Desset's theory has yet to be disproved. The question of whether the theory is correct or not is a separate issue. Indeed, it is this author's suspicion that the theory may be incomplete, as it does not fully elucidate the intricacies of numerical and numero-ideographic (or logo-numerical) tablets, which deserve a more in-depth examination than is currently permitted. Furthermore, the historical mechanism underlying the spread of (proto-)writing technology across the vast area extending from the Zagros Plateau to Northern Africa remains unexplored. To be fair, it should be noted that Desset's arguments were never intended to address these issues in the first place. Furthermore, it is important to acknowledge that a theory that is based on a subset of available data can be highly beneficial, as it allows for future enhancements and generalisations.

7. Writing and civilization

The notion that the invention of writing represents a fundamental milestone in urban society's development is hard to debunk, especially in literate societies. This perspective is shared by many scholars across fields related to the ancient Near East and Northern Africa, as well as by linguists. Algeo and Butcher (2013: 6), for instance, state in their discussion of English:

> "If speaking makes us human, writing makes us civilized".[33]

Yet, from a historical standpoint, this claim is certainly wrong. There are numerous examples of highly civilised peoples who did not possess the capacity to encode language in visual form. For example, the Incas never developed a

[32] On tokens see most recently Bennison-Chapman (2018, with discussion on previous studies). The author makes the important point that Neolithic tokens did not originate as a means of administration. However, her analysis does not invalidate Desset's idea, which ultimately rests on numerography as attested in the proto-literate period (see also remarks by Chambon 2022).

[33] As for Mesopotamian studies see for instance Matthews (1995: 309): "Writing and civilization are inextricably connected. Today we cannot conceive of one without the other. To be civilized is to be self-conscious, critical, aware, capable of assimilating and producing large quantities of fixed and fluid information, and capable of recording, transmitting and receiving that information for contemporary and future reference."

full-fledged writing system (Urton 2003; Maiocchi 2019: 397). Defining what constitutes civilization – and determining which markers justify the term *civilized* – is a challenging task, open to numerous biases, including cultural, social, and educational perspectives.[34] Ironically, advocates of writing as a universal marker of civilization are themselves invariably literate. Alphabet users may similarly view their writing system as superior for achieving literacy.[35] The close involvement of scholars with their subject matter often shapes these perceptions, making claims about writing as a universal measure of civilization seem less objective. This is not to diminish the significance of written sources for historical reconstruction or the transformative role writing has played in cultural development. Writing enhances knowledge transmission, preservation, and symbolic representation, with important cognitive implications. However, it is notable that scholars engaged in the various disciplines of research thus far have seldom, if ever, considered the possibility that the origins of writing may lie outside the boundaries of their respective fields of expertise. This is a cause for concern, as there is a risk that such practices could result in forms of academic supremacism, whereby the remote past is appropriated for the sake of disciplinary prestige. Nevertheless, the intentions that have driven the debate thus far are undoubtedly good, and the conceptual gain to our understanding of cultural development throughout history is considerable.

8. Conclusions

The numerous issues pertaining to the origins of writing in antiquity are particularly challenging to resolve. This is not only due to the lack of conclusive data, but also because current approaches are inherently influenced by ideological preconceptions derived from the prestige attached to writing in modern societies. Nevertheless, it seems fair to say that the paradigm of proto-cuneiform as the pristine writing system *par excellence* has been significantly undermined over time. With it, the glorification of Uruk as *the* first city[36] is now in urgent need of revision. The numerous points of contact between Mesopotamia and Egypt in the fourth millennium BCE, and those between ancient Iran and Mesopotamia, strongly suggest that a significant piece of the historical puzzle regarding the origin and diffusion of writing remains elusive in current reconstructions. From a broader historical perspective, it is important to recognize that the writing technology is just one element of a shared cultural framework, which includes other significant aspects such as monumental architecture, artistic motifs, ceramic typologies, accounting devices, and so on. These elements are equally important to our understanding of the social, political, and intellectual context of the earliest written records. Questions of *who, how, why,* and *when* writing emerged may ultimately remain unanswerable, or indeed may prove to be nonsensical. Nevertheless, this should not prevent scholars from endeavouring to address these questions to the best of their ability. It

[34] On this subject see further the comments of Pinarello 2018: 12-15, which can easily be extended to most disciplines concerned with literacy in antiquity.

[35] See for instance the claims of the now outdated but very influential book by Gelb (1963: 15; 236-40), which sets the very foundations of the field of grammatology.

[36] As per the title of the influential book by Liverani (1997). Liverani posits Uruk as a case study for the investigation of urban phenomena in the fourth millennium BCE. The title of his book, however, has subsequently been repeated as a sort of mantra in numerous articles within and beyond the field of Assyriology, to the extent that a case study has almost become paradigmatic. On the topic of urbanization in Mesopotamia as product of Sumerian culture see further Cooper 2016.

is, however, important to acknowledge the uncomfortable fact that chrono-historical arguments in current historical narratives on the origin of writing are dependent on the scholarly field(s) that produced them. It is, of course, possible that future archaeological discoveries may alter the current state of affairs. In the meanwhile, the aforementioned considerations are intended to serve as a cautionary reminder to scholars, including the present author, to maintain a certain degree of emotional detachment from the subject matter of their study.

Abbreviations

ATU 2: Green and Nissen 1987
CDLI: Cuneiform Digital Library Initiative: https://cdli.mpiwg-berlin.mpg.de
CUSAS 1: Monaco 2007
CUSAS 21: Monaco 2014a
CUSAS 31: Monaco 2016
MDP 27: Scheil 1935

Bibliography

Algaze, G.
2005 *The Uruk World System: The Dynamics of Expansion of Early Mesopotamian Civilization* (second edition), Chicago.
Algeo, J. and Butcher, C.A.
2013 *The Origins and Development of the English Language* (seventh edition), Boston.
Baines, J.
2004 The Earliest Egyptian Writing: Development, Context, Purpose, in D. Houston (ed.), *The First Writing: Script Invention as History and Process*, Cambridge: 150-189.
2007 *Visual and Written Culture in Ancient Egypt*, Oxford.
Bennison-Chapman, L.E.
2018 Reconsidering 'Tokens': The Neolithic Origins of Accounting or Multifunctional, Utilitarian Tools? *Cambridge Archaeological Journal* 29: 233-259.
Boehmer, R.M.
1991 C14-Daten aus Uruk und Abydos - Ägyptisches (?) im frühen Nordsyrien, Sumer und Elam , *Baghdader Mitteilungen* 22: 223-230.
1999 *Uruk: früheste Siegelabrollung* (Ausgrabungen in Uruk-Warka Endberichte Band 24), Mainz-am-Rhein.
Boehmer, R.M., Dreyer, G. and Kromer, B.
1991 Einige frühzeitliche C14-Datierungen aus Abydos und Uruk, *Mitteilungen des Deutschen Archaologischen Instituts, Abteilung Kairo* 49: 63-68.
Butterlin, P.
2003 *Les Temps proto-urbains de Mésopotamie: Contacts et acculturation à l'époque d'Uruk au Moyen-Orient*, Paris.
2018 *Architecture et société au Proche-orient ancien: les bâtisseurs de mémoire en Mésopotamie*, Paris.
Cancik-Kirschbaum, E. and Schrakamp, I.
2022 Transfer, Adaption und Neukonfiguration von Schriftund Sprachwissen in den Keilschriftkulturen Vorderasiens: Eine Annäherung, in E. Cancik-Kirschbaum and I. Schrakamp (eds), *Transfer, Adaption und Neukonfiguration von Schrift- und Sprachwissen im Alten Orient* (Episteme in Bewegung 25), Wiesbaden: 1-79.
Chambon, G.
2022 Postface de D. Schmandt-Besserat, *La Genèse de l'écriture*, Paris: 217-266.
Civil, M.
2013 Remarks on AD-GI$_4$ (A.K.A. "Archaic Word List C" or "Tribute"), *Journal of Cuneiform Studies* 65: 13-67.
Cooper, J.S.
2016 Was Uruk the First Sumerian City?, in G. Bartoloni, M. G. Biga and A. Bramanti (eds), *Not Only History. Proceedings of the Conference in Honor of Mario Liverani Held in Sapienza-Università di Roma, Dipartimento di Scienze dell'Antichità, 20-21 April 2009*, Winona Lake, IN: 53-56.
Dahl, J.
2012 The Marks of Early Writing, *Iran* 50: 1-11.

2018 The Proto-Elamite Writing System, in G.P. Basello and J.Álvarez-Mon (eds), *The Elamite World*, London - New York: 383-396.

Dahl, J., Petrie, C. and Potts, D.

2013 Chronological Parameters of the Earliest Writing System in Iran, in C.A Petrie (ed.), *Ancient Iran and its Neighbours: Local Developments and Long-Range Interactions in the Fourth Millennium BC*, Oxford - Oakville: 353-378.

Dalley, S.

2005 Review of The Invention of Writing by Jean-Jacques Glassner, *Technology and Culture* 46: 408-409.

Damerow, P.

2006 The Origins of Writing as a Problem of Historical Epistemology, *Cuneiform Digital Library Journal* 2006/1: 1-10.

Damerow, P. and Englund, R.K.

1989 *The Proto-Elamite Texts from Tepe Yahya*, Harvard.

Daniels, P.

1996 The Study of Writing Systems, in P. Daniels and W. Bright (eds), *The World's Writing Systems*, New York - Oxford: 3-18.

Dee, M., Wengrow, D., Shortland, A., Stevenson, A., Brock, F., Flink, L.G. and Ramsey, B.C.

2013 An Absolute Chronology for Early Egypt Using Radiocarbon Dating and Bayesian Statistical Modelling, *Proceedings of the Royal Society A* 469/2159: 1-10.

Desset, F.

2012 *Premières écritures iraniennes: les systèmes proto-élamite et élamite linéaire* (Series Minor 76), Naples.

2016 Proto-Elamite Writing in Iran, *Archéo-Nil* 26: 67-104.

Dittmann, R.

1986 Seals, Sealings and Tablets, in U. Finkbeiner and W. Röllig (eds), *Ǧamdat Naṣr: Period Or Regional Style?: Papers Given at a Symposium Held in Tübingen, November 1983* (Beihefte zum Tübinger Atlas des vorderen Orients 62), Wiesbaden: 332-366.

Dreyer, U., Hartung, U. and Pupenmeier, F.

1998 *Umm el-Qaab. Volume 1: Das prädynastische Königsgrab U-j und seine frühen Schriftzeugnisse* (Deutsches Archäologisches Institut, Abteilung Kairo, Archäologische Veröffentlichungen 89), Mainz.

Englund, R.

1994 *Archaic Administrative Texts from Uruk: The Early Campaigns* (Archaische Texte aus Uruk 5), Berlin.

1998 Texts from the Late Uruk Period, in J. Bauer, R. K. Englund and M. Krebernik (eds), *Mesopotamien: Späturuk-Zeit und Frühdynastische Zeit* (Orbis Biblicus et Orientalis 160/1), Göttingen: 15-233.

2001 Grain Accounting Practices in Archaic Mesopotamia, in J. Høyrup and P. Damerow (eds), *Changing Views on Ancient Near Eastern Mathematics* (Berliner Beiträge zum Vorderer Orient 19), Berlin: 1-35.

2004a Proto-Cuneiform Account-Books and Journals, in M. Hudson and C. Wunsch (eds), *Creating Economic Order: Record-keeping, Standardization and the Development of Accounting in the Ancient Near East*, Bethesda: 23-46.

2004b The State of Decipherment of Proto-Elamite, in S. Houston (ed.), *The First Writing: Script Invention as History and Process*, Cambridge: 100-149.

2005 Review of The Invention of Cuneiform: Writing in Sumer by Jean-Jacques Glassner, Zainab Bahrani and Marc Van De Mieroop, *Journal of the American Oriental Society* 125: 113-116.

2006a An Examination of the 'Textual' Witnesses to Late Uruk World Systems, in Y. Gong and Y. Chen (eds), *A Collection of Papers on Ancient Civilizations of Western Asia, Asia Minor and North Africa*, Beijing: 1-38.

2006b Proto-Elamish, *Reallexikon der Assyriologie und vorderasiatischen Archäologie* 11: 22-26.

2009 The Smell of the Cage, *Cuneiform Digital Library Journal* 2009/4: 1-27.

Ess, M. van and Heußner, K.U.
2015 Absolute Chronology of the Uruk and Jemdet Nasr Periods at Uruk, Southern Mesopotamia: The Interpretation of Additional C14 Samples, *Zeitschrift Für Orient-Archäologie* 8: 10-37.
Fales, F.M. and Del Fabbro, R.
2017 From Drawing to Symbol: Numbering, Recording, Authenticating, in F.M. Fales and R. del Fabbro (eds), *Signs Before the Alphabet. Journey to Mesopotamia at the Origins of Writing*, Venice: 49-65.
Gelb I.J.
1963 *A Study of Writing*, Chicago.
Glassner, J.J.
2000 *Écrire à Sumer: L'invention du cunéiforme*, Paris.
2018 Writing in Elam, in G.P. Basello and J. Álvarez-Mon (eds), *The Elamite World*, London and New York: 450-463.
Görsdorf, J., Dreyer, G. and Hartung, U.
1998 C14 Dating Results of the Archaic Royal Necropolis Umm el-Qaab at Abydos, *Mitteilungen des Deutschen Archaologischen Instituts, Abteilung Kairo* 54: 169-175.
Green, M.W. and Nissen, H.J (eds)
1987 *Zeichenliste Der Archaischen Texte Aus Uruk* (Archaische Texte aus Uruk 2), Berlin.
Joffe, A.H.
2000 Egypt and Syro-Mesopotamia in the 4th Millennium: Implications of the New Chronology, *Current Anthropology* 41: 113-123.
Kaiser, W.
1990 Zur Entstehung des gesamtägyptischen Staates, *Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo* 46: 287-299.
Kelley, C.
2024 Images Hidden in Script: The Invention of Writing in Ancient Iran, in S. Ferrara, M. Cartolano and L. Ottaviano (eds), *Talking Images: The Interface between Drawing and Writing*, New York: 71-94.
Kelley, K. Cartolano, M. and Ferrara, S.
2024 Seals and Signs: Tracing the Origins of Writing in Ancient Southwest Asia. *Antiquity* 2024: 1-19. doi:10.15184/aqy.2024.165.
Köhler, E.C.
2013 Early Dynastic Egyptian Chronologies, in A.J. Shortland, C.B. Ramsey, M. Dee and F. Brock (eds), *Radiocarbon and the Chronologies of Ancient Egypt*, Oxford: 224-234.
Lawler, A.
2001 Writing Gets a Rewrite, *Science* 292: 2418-2420.
Lazarovici, G. and Merlini, M.
2016 Tărtăria Tablets: The Latest Evidence in an Archaeological Thriller, in L. Nikolova, M. Merlini and A. Comsa (eds), *Western-Pontic Culture Ambience and Pattern: In memory of Eugen Comsa*, Warsaw: 53-142.
Le Brun, A.
1999 Hacinebi et Suse, *Paléorient* 25: 139-40.
Lenzen, H.
1965 Uruk IV, in H. Lenzen (ed.), *XXI. vorlaufiger Bericht über die von dem Deutschen Archäologischen Institut und der Deutschen Orient-Gesellschaft aus Mitteln der Deutschen Forschungsgemeinschaft unternommenen Ausgrabungen in Uruk-Warka: Winter 1962/63* (Abhandlungen Der Deutschen Orient-Gesellschaft 10), Berlin: 16-21.
Liverani, M.
1997 *Uruk la prima città*, Roma.
Maiocchi, M.
2019 Writing in Early Mesopotamia: The Historical Interplay of Technology, Cognition, and Environment, in A. Love (ed.), *Beyond the Meme: Development and Structure in Cultural Evolution* (Minnesota Studies in the Philosophy of Science 22), Minneapolis: 395-424.
Matthews, R.
1995 Writing and Civilization in Early Mesopotamia, *Cambridge Archaeological Journal* 5: 309-314.

Monaco, S.
2007 *The Cornell University Archaic Tablets* (Cornell University Studies in Assyriology and Sumerology 1), Bethesda.
2014a *Archaic Bullae and Tablets in the Cornell University Collections* (Cornell University Studies in Assyriology and Sumerology 21), Bethesda.
2014b Proto-cuneiform and Sumerians, *Rivista di Studi Orientali* 87: 277-282.
2016 *Archaic Cuneiform Tablets from Private Collections*, (Cornell University Studies in Assyriology and Sumerology 31), Bethesda.
Michalowski, P.
2012 Early Mesopotamian Communicative Systems: Art, Literature, and Writing, in W. S. van Egmond and W.H. van Soldt (eds), *Theory and Practice of Knowledge Transfer. Studies in School Education in the Ancient Near East and Beyond. Papers Read at a Symposium in Leiden, 17-19 December 2008* (Publications de l'Institut historique-archéologique néerlandais de Stamboul 121), Leiden: 39-57.
Nissen, H.J.
1986 The Archaic Texts from Uruk, *World Archaeology* 17: 317-334.
1987 Datierung der Archaischen Texte aus Uruk, in M.W. Green and H.J. Nissen (eds), *Zeichenliste Der Archaischen Texte Aus Uruk* (Archaische Texte aus Uruk 2), Berlin: 21-52.
2016 Uruk: Early Administration Practices and the Development of Proto-Cuneiform Writing, *Archéo-Nil* 26: 33-48.
Nissen, H.J., Damerow, P. and Englund, R.K.
1993 *Archaic Bookkeeping: Early Writing and Techniques of Economic Administration in the Ancient Near East*, Chicago.
Pinarello, M.S.
2018 The Platypus Paradox: An Archaeological Approach to Ancient Egyptian Writing Practices, in F.A.J. Hoogendijk and S.M.T. van Gompel (eds), *The Materiality of Texts from Ancient Egypt. New Approaches to the Study of Textual Material from the Early Pharaonic to the Late Antique Period* (Papyrologica Lugduno-Batava XXXV), Leiden - Boston: 12-26.
Pittman, H.
2013 Imagery in Administrative Context: Susiana and the West in the Fourth Millennium BC, in C. Petrie (ed.), *Ancient Iran and its Neighbours: Local Developments and Long-Range Interactions in the 4th Millennium BC*, Oxford: 293-336.
Regulski, I.
2010 *A Palaeographic Study of Early Writing in Egypt*, Leuven.
2014 The Origins and Early Development of Writing in Egypt, *The Oxford Handbook of Topics in Archaeology* (online edition, Oxford Academic): 1-23. doi: https://doi.org/10.1093/oxfordhb/9780199935413.013.61
Renn, J.
2019 Learning from Kushim About the Origins of Writing and Farming, in J. Renn and M. Schemmel (eds), *Culture and Cognition. Essays in Honor of Peter Damerow* (Proceedings 11), Berlin: 11-27.
Robson, E.
2020 The Ancient World, in J. Raven (ed.), *The Oxford Illustrated History of the Book*, Oxford: 26-53.
Ross, J.C.
2014 Art's Role in the Origins of Writing: The Seal-Carver, the Scribe, and the Earliest Lexical Texts, in B.A. Brown and M.H. Feldman (eds), *Critical Approaches to Ancient Near Eastern Art*, Berlin: 295-317.
Saeedi, S.
2021 Proto-Elamite Communities under the Magnifying Glass, in A. Abar, M.B. D'Anna, G. Cyrus, V. Egbers, B. Huber, C. Kainert, J. Köhler, B. Ögüt, N. Rol, G. Russo, J. Schönicke and F. Tourtet (eds), *Pearls, Politics and Pistachios: Essays in Anthropology*

and Memories on the Occasion of Susan Pollock's 65th Birthday, Heidelberg: 61-87.

Scheil, V.
1935 *Textes de Comptabilité Proto-Élamites. Troisième Série* (Mémoires de La Mission Archéologique de Perse 26), Paris.

Selz, G.
2000 Schrifterfindung als Ausformung eines reflexiven Zeichensystems, *Wiener Zeitschrift für die Kunde des Morgenlandes* 90: 169-200.
2022 Beyond Speech. Advocating a Nonlogocentric View on the Evolution of Cuneiform Writing, in D. Wengrow (ed.), *Image, Thought, and the Making of Social Worlds* (Freiburger Studien zur Archäologie & Visuellen Kultur 3), Heidelberg: 213-249.

Stauder, A.
2022 Paths to Early Phoneticism: Egyptian Writing in the Late Fourth Millennium BCE, in L. Morenz, A. Stauder and B. Büma (eds), *Wege zur frühen Schrift: Niltal und Zweistromland* (Thot 3), Berlin: 217-289.

Stein, G.
1999 *Rethinking World-Systems: Diasporas, Colonies, and Interaction in Uruk*, Tucson.

Steinkeller, P.
2017 *History, Texts and Art in Early Babylonia* (Studies in Ancient Near Eastern Records 15), Boston - Berlin.

Sürenhagen, D.
1993 Relative Chronology of the Uruk Period, *Bulletin of the Canadian Society for Mesopotamian Studies* 25: 57-70.

Szarzyńska, K.
1994 Archaic Sumerian Tags, *Journal of Cuneiform Studies* 48: 1-10.

Urton, G.
2003 *Signs of the Inka Khipu: Binary Coding in the Andean Knotted-String Record*, Austin.

Veldhuis, N.
2014 *History of the Cuneiform Lexical Tradition* (Guides to the Mesopotamian Textual Record 6), Münster.

Vernus, P.
2016 La naissance de l'écriture dans l'Égypte pharaonique: une problématique revisitée, *Archéo-Nil* 26: 105-34.

Woods, C.
2010 The Earliest Mesopotamian Writing, in C. Woods, G. Emberling and E. Teeter (eds), *Visible Language. Inventions of Writing in the Ancient Middle East and Beyond* (Oriental Institute Museum Publications 32), Chicago: 33-50.

Wright, T. and Rupley, E.S.A.
2001 Calibrated Radiocarbon Age Determinations of Uruk-Related Assemblages, in M. S. Rothman (ed.), *Uruk Mesopotamia and its Neighbors: Cross-Cultural Interactions in the Era of State Formation*, Santa Fe: 85-122.