Cuneiform

This article is about the writing system. For other uses, see Cuneiform (disambiguation).

Cuneiform script[nb 1] is one of the earliest known systems of writing,[1] distinguished by its wedge-shaped marks on clay tablets, made by means of a blunt reed for a stylus. The name *cuneiform* itself simply means "wedge shaped", from the Latin *cuneus* "wedge" and *forma* "shape," and came into English usage probably from Old French *cunéiforme.*

Emerging in Sumer in the late 4th millennium BC (the Uruk IV period), cuneiform writing began as a system of pictographs. In the third millennium, the pictorial representations became simplified and more abstract as the number of characters in use grew smaller, from about 1,000 in the Early Bronze Age to about 400 in Late Bronze Age (Hittite cuneiform). The system consists of a combination of logophonetic, consonantal alphabetic and syllabic signs.[2]

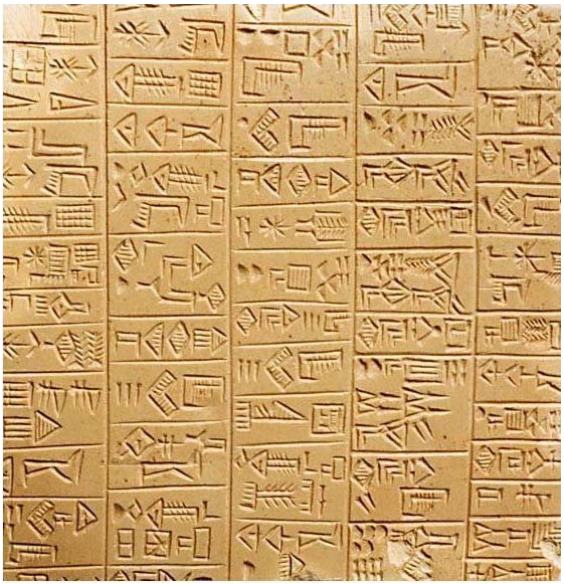
The original Sumerian script was adapted for the writing of the Akkadian, Eblaite, Elamite, Hittite, Luwian, Hattic, Hurrian, and Urartian languages, and it inspired the Ugaritic and Old Persian alphabets. Cuneiform writing was gradually replaced by the Phoenician alphabet during the Neo-Assyrian Empire. By the 2nd century AD, the script had become extinct, and all knowledge of how to read it was lost until it began to be deciphered in the 19th century.

Between half a million[3] and two million cuneiform tablets are estimated to have been excavated in modern times. Of these, only approximately 30,000[4] - 100,000 have ever been read or published. The British Museum holds the largest collection, c.130,000, followed by the Vorderasiatisches Museum Berlin, the Louvre, the Istanbul Archaeology Museums, the National Museum of Iraq, the Yale Babylonian Collection (c.40,000) and Penn Museum. Most of these have "lain in these collections for a century without being translated, studied or published,"[3] as there are only a few hundred qualified cuneiformists in the world.[4]

1 History

The cuneiform writing system was in use for a span of more than three millennia, through several stages of development, from the 34th century BC down to the 2nd century AD.[5] Ultimately, it was completely replaced by alphabetic writing (in the general sense) in the course of the Roman era and there are no Cuneiform systems in current use. It had to be deciphered as a completely unknown writing system in 19th-century Assyriology. Successful completion of its decipherment is dated to 1857.

1.1 Proto-literate period



Sumerian inscription in monumental archaic style, c. 26th century BC

The cuneiform script proper developed from pictographic proto-writing in the late 4th millennium BC. Mesopotamia's "proto-literate" period spans roughly the 35th to 32nd centuries. The first documents unequivo-

cally written in the Sumerian language date to c. the 31st century, found at Jemdet Nasr.

Originally, pictographs were either drawn on clay tablets in vertical columns with a sharpened reed stylus, or incised in stone. This early style lacked the characteristic wedge shape of the strokes.

Certain signs to indicate names of gods, countries, cities, vessels, birds, trees, etc., are known as determinatives, and were the Sumerian signs of the terms in question, added as a guide for the reader. Proper names continued to be usually written in purely "logographic" fashion.

The earliest known Sumerian king whose name appears on contemporary cuneiform tablets is Enmebaragesi of Kish. Surviving records only very gradually become less fragmentary and more complete for the following reigns, but by the end of the pre-Sargonic period, it had become standard practice for each major city-state to date documents by year-names commemorating the exploits of its *lugal* (king).

From about 2900 BC, many pictographs began to lose their original function, and a given sign could have various meanings depending on context. The sign inventory was reduced from some 1,500 signs to some 600 signs, and writing became increasingly phonological. Determinative signs were re-introduced to avoid ambiguity. Cuneiform writing proper thus arises from the more primitive system of pictographs at about that time (Early Bronze Age II).

1.2 Archaic cuneiform

Further information: Liste der archaischen Keilschriftzeichen

In the mid-3rd millennium BC, writing direction was changed to left to right in horizontal rows (rotating all of the pictographs 90° counter-clockwise in the process), and a new wedge-tipped stylus was used which was pushed into the clay, producing wedge-shaped ("cuneiform") signs; these two developments made writing quicker and easier. By adjusting the relative position of the tablet to the stylus, the writer could use a single tool to make a variety of impressions.

Cuneiform tablets could be fired in kilns to provide a permanent record, or they could be recycled if permanence was not needed. Many of the clay tablets found by archaeologists were preserved because they were fired when attacking armies burned the building in which they were kept.

Letter sent by the high-priest Lu'enna to the king of Lagash (maybe Urukagina), informing him of his son's death in combat, c. 2400 BC, found in Telloh (ancient Girsu).

The script was also widely used on commemorative stelae and carved reliefs to record the achievements of the ruler in whose honor the monument had been erected.

The spoken language consisted of many similar sounds, and in the beginning similar sounding words such as "life" [til] and "arrow" [ti] were described in writing by the same symbol. After the Semites conquered Southern Mesopotamia, some signs gradually changed from being pictograms to syllabograms, most likely to make things clearer in writing. In that way the sign for the word "arrow" would become the sign for the sound "ti". If a sound would represent many different words the words would all have different signs, for instance the syllable "gu" had fourteen different symbols. When the words had similar meaning but very different sounds they were written with the same symbol. For instance "tooth" [zu], "mouth" [ka] and "voice" [gu] were all written with the symbol for "voice". To be more accurate they started adding to signs or combine two signs to define the meaning. They used either geometrical patterns or another cuneiform sign.[2]

As time went by the cuneiform got very complex and the distinction between a pictogram and syllabogram became vague. Several symbols had too many meanings to permit clarity. Therefore, symbols were put together to indicate both the sound and the meaning of compound. The word "Raven" [UGA] had the same logogram as the words "soap" [NAGA] "name of a city" [ERESH] and "the patron goddess of Eresh" [NISABA]. Two phonetic

complements were used to define the word [u] in front of the symbol and [gu] behind. Finally the symbol for "bird" [MUSHEN] was added to ensure proper interpretation. The written part of the Sumerian language was used as a learned written language until the 1st century AD. The spoken language died out around the 18th century BC.[2]

1.3 Akkadian cuneiform

A list of Sumerian deities, c. 2400 BC

The archaic cuneiform script was adopted by the Akkadians from c. 2500 BC, and by 2000 BC had evolved into Old Assyrian cuneiform, with many modifications to Sumerian orthography. The Semitic equivalents for many signs became distorted or abbreviated to form new "phonetic" values, because the syllabic nature of the script as refined by the Sumerians was unintuitive to Semitic speakers. At this stage, the former pictograms were reduced to a high level of abstraction, and were composed of only five basic wedge shapes: horizontal, vertical, two diagonals and the *Winkelhaken* impressed vertically by the tip of the stylus. The signs exemplary of these basic wedges are

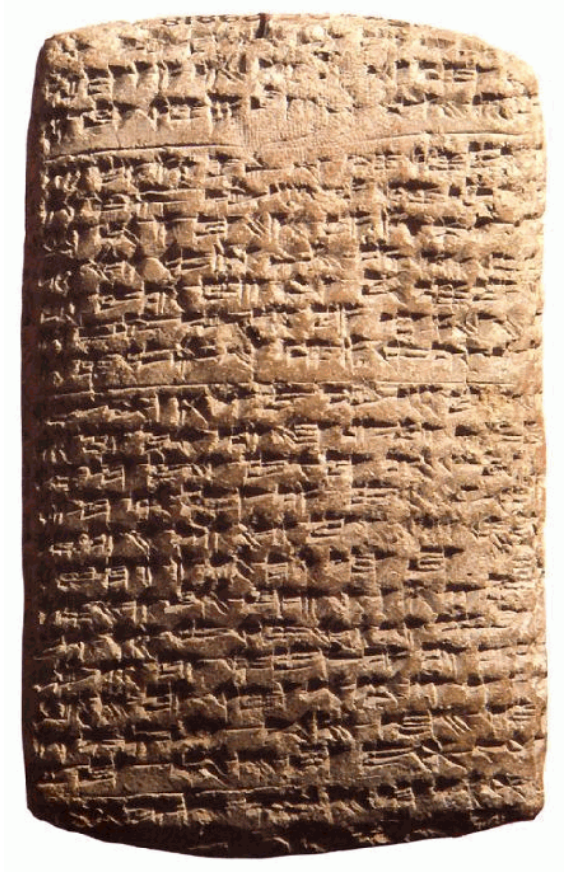
- AŠ (B001, U+12038) 𒀸: horizontal;
- DIŠ (B748, U+12079) 𒁹: vertical;
- GE_{23}, DIŠ *tenû* (B575, U+12039) 𒀹: downward diagonal;
- GE_{22} (B647, U+1203A) 𒀺: upward diagonal;
- U (B661, U+1230B) 𒄩: the *Winkelhaken*.

Except for the *Winkelhaken* which has no tail, the length of the wedges' tails could vary as required for sign composition.

Signs tilted by about 45 degrees are called *tenû* in Akkadian, thus DIŠ is a vertical wedge and DIŠ *tenû* a diagonal one. If a sign is modified with additional wedges, this is called *gunû* or "gunification; extquotedbl if signs are crosshatched with additional *Winkelhaken*, they are called *šešig*; if signs are modified by the removal of a wedge or wedges, they are called *nutillu*.

Cuneiform tablet from the Kirkor Minassian collection in the US Library of Congress, c. 24th century BC.

"Typical" signs have usually in the range of about five to ten wedges, while complex ligatures can consist of twenty



One of the Amarna letters, 14th century BC.

Neo-Assyrian ligature KAxGUR$_7$ (𒍑); the KA sign (𒅗) was a Sumerian compound marker, and appears frequently in ligatures enclosing other signs. GUR$_7$ is itself a ligature of SÍG.AḪ.ME.U, meaning "to pile up; grain-heap" (Akkadian kamāru; karû*).*

or more (although it is not always clear if a ligature should be considered a single sign or two collated but still distinct signs); the ligature KAxGUR$_7$ consists of 31 strokes.

Most later adaptations of Sumerian cuneiform preserved at least some aspects of the Sumerian script. Written Akkadian included phonetic symbols from the Sumerian syllabary, together with logograms that were read as whole words. Many signs in the script were polyvalent, having both a syllabic and logographic meaning. The complexity of the system bears a resemblance to Old Japanese, written in a Chinese-derived script, where some of these Sinograms were used as logograms, and others as phonetic characters.

1.4 Assyrian cuneiform

This "mixed" method of writing continued through the end of the Babylonian and Assyrian empires, although there were periods when "purism" was in fashion and there was a more marked tendency to spell out the words laboriously, in preference to using signs with a phonetic complement. Yet even in those days, the Babylonian syllabary remained a mixture of logographic and phonemic writing.

Hittite cuneiform is an adaptation of the Old Assyrian cuneiform of c. 1800 BC to the Hittite language. When the cuneiform script was adapted to writing Hittite, a layer of Akkadian logographic spellings was added to the script, thus the pronunciations of many Hittite words which were conventionally written by logograms are now unknown.

In the Iron Age (c. 10th to 6th centuries BC), Assyrian cuneiform was further simplified. From the 6th century, the Assyrian language was marginalized by Aramaic, written in the Aramaean alphabet, but Neo-Assyrian cuneiform remained in use in literary tradition well into Parthian times (250 BC - 226 AD). The last known cuneiform inscription, an astronomical text, was written in 75 AD.[6]

1.5 Derived scripts

The complexity of the system prompted the development of a number of simplified versions of the script. Old Persian was written in a subset of simplified cuneiform characters known today as Old Persian cuneiform. It formed a semi-alphabetic syllabary, using far fewer wedge strokes than Assyrian used, together with a handful of logograms for frequently occurring words like "god" and "king". The Ugaritic language was written using the Ugaritic alphabet, a standard Semitic style alphabet (an *abjad*) written using the cuneiform method.

2 Decipherment

For centuries, travellers to Persepolis, in modern-day Iran, had noticed carved cuneiform inscriptions and were intrigued.[7] Attempts at deciphering these Old Persian writings date back to Arabic/Persian historians of the medieval Islamic world, though these early attempts at decipherment were largely unsuccessful.[8]

In the 15th century the Venetian Barbero explored ancient ruins in the Middle East and came back with news of a very odd writing he had found carved on the stones in the temples of Shiraz and on many clay tablets.

In 1625 the Roman traveler Pietro Della Valle, coming back from Mesopotamia and Persia, brought back a tablet written with cuneiform glyphs he had found in Ur, and also the copy of five characters he had seen in Persepolis. Della Valle understood that the writing had to be read from left to right, following the direction of wedges. However he didn't attempt to decipher the scripts.

Englishman Sir Thomas Herbert, in the 1634 edition of his travel book *A relation of some yeares travaile*, reported seeing at Persepolis carved on the wall "a dozen lines of strange characters…consisting of figures, obelisk, triangular, and pyramidal" and thought they resembled Greek. In the 1664 edition he reproduced some and thought they were 'legible and intelligible' and therefore decipherable. He also guessed, correctly, that they represented not letters or hieroglyphics but words and syllables, and were to be read from left to right.[7] Herbert is rarely mentioned in standard histories of the decipherment of cuneiform.

Carsten Niebuhr brought the first reasonably complete and accurate copies of the inscriptions at Persepolis to Europe.[7] Bishop Friedrich Münter of Copenhagen discovered that the words in the Persian inscriptions were divided from one another by an oblique wedge and that the monuments must belong to the age of Cyrus and his successors. One word, which occurs without any variation towards the beginning of each inscription, he correctly inferred to signify "king".[7] By 1802 Georg Friedrich Grotefend had determined that two king's names mentioned were Darius and Xerxes (but in their native Old Persian forms, which were unknown at the time and therefore had to be conjectured), and had been able to assign correct alphabetic values to the cuneiform characters which composed the two names.[9] Although Grotefend's Memoir was presented to the Göttingen Academy on September 4, 1802, the Academy refused to publish it; it was subsequently published in Heeren's work in 1815, but was overlooked by most researchers at the time.[10]

In 1836, the eminent French scholar Eugène Burnouf discovered that the first of the inscriptions published by Niebuhr contained a list of the satrapies of Darius. With this clue in his hand, he identified and published an alphabet of thirty letters, most of which he had correctly deciphered.[7][11][12]

A month earlier, a friend and pupil of Burnouf's, Professor Christian Lassen of Bonn, had also published his own work on *The Old Persian Cuneiform Inscriptions of Persepolis*.[12][13] He and Burnouf had been in frequent correspondence, and his claim to have independently detected the names of the satrapies, and thereby to have fixed the values of the Persian characters, was consequently fiercely attacked. According to Sayce, whatever his obligations to Burnouf may have been, Lassen's "contributions to the decipherment of the inscriptions were numerous and important. He succeeded in fixing the true values of nearly all the letters in the Persian alphabet, in translating the texts, and in proving that the language of them was not Zend, but stood to both Zend and Sanskrit in the relation of a sister".[7]

Meanwhile, in 1835 Henry Rawlinson, a British East India Company army officer, visited the Behistun Inscriptions in Persia. Carved in the reign of King Darius of Persia (522–486 BC), they consisted of identical texts in the three official languages of the empire: Old Persian, Babylonian, and Elamite. The Behistun inscription was to the decipherment of cuneiform what the Rosetta Stone was to the decipherment of Egyptian hieroglyphs.[14]

Rawlinson correctly deduced that the Old Persian was a phonetic script and he successfully deciphered it. In 1837 he finished his copy of the Behistun inscription, and sent a translation of its opening paragraphs to the Royal Asiatic Society. Before his article could be published, however, the works of Lassen and Burnouf reached him, necessitating a revision of his article and the postponement of its publication. Then came other causes of delay. In 1847 the first part of the Rawlinson's Memoir was published; the second part did not appear until 1849.[15][nb 2] The task of deciphering the Persian cuneiform texts was virtually accomplished.[7]

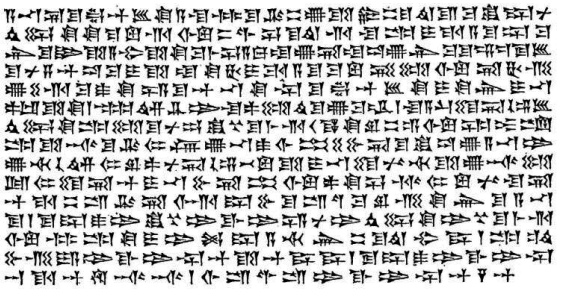
After translating the Persian, Rawlinson and, working independently of him, the Irish Assyriologist Edward Hincks, began to decipher the others. (The actual techniques used to decipher the Akkadian language have

never been fully published; Hincks described how he sought the proper names already legible in the deciphered Persian while Rawlinson never said anything at all, leading some to speculate that he was secretly copying Hincks.[16]) They were greatly helped by Paul Émile Botta's discovery of the city of Nineveh in 1842. Among the treasures uncovered by Botta were the remains of the great library of Assurbanipal, a royal archive containing tens of thousands of baked clay tablets covered with cuneiform inscriptions.

By 1851, Hincks and Rawlinson could read 200 Babylonian signs. They were soon joined by two other decipherers: young German-born scholar Julius Oppert, and versatile British Orientalist William Henry Fox Talbot. In 1857 the four men met in London and took part in a famous experiment to test the accuracy of their decipherments. Edwin Norris, the secretary of the Royal Asiatic Society, gave each of them a copy of a recently discovered inscription from the reign of the Assyrian emperor Tiglath-Pileser I. A jury of experts was empanelled to examine the resulting translations and assess their accuracy. In all essential points the translations produced by the four scholars were found to be in close agreement with one another. There were of course some slight discrepancies. The inexperienced Talbot had made a number of mistakes, and Oppert's translation contained a few doubtful passages which the jury politely ascribed to his unfamiliarity with the English language. But Hincks' and Rawlinson's versions corresponded remarkably closely in many respects. The jury declared itself satisfied, and the decipherment of Akkadian cuneiform was adjudged a *fait accompli*.

In the early days of cuneiform decipherment, the reading of proper names presented the greatest difficulties. However, there is now a better understanding of the principles behind the formation and the pronunciation of the thousands of names found in historical records, business documents, votive inscriptions, literary productions and legal documents. The primary challenge was posed by the characteristic use of old Sumerian non-phonetic logograms in other languages that had different pronunciations for the same symbols. Until the exact phonetic reading of many names was determined through parallel passages or explanatory lists, scholars remained in doubt, or had recourse to conjectural or provisional readings. Fortunately, in many cases, there are variant readings, the same name being written phonetically (in whole or in part) in one instance, and logographically in another.

3 Transliteration



Extract from the Cyrus Cylinder (lines 15–21), giving the genealogy of Cyrus the Great and an account of his capture of Babylon in 539 BC.

Cuneiform has a specific format for transliteration. Because of the script's polyvalence, transliteration requires certain choices of the transliterating scholar, who must decide in the case of each sign which of its several possible meanings is intended in the original document. For example, the sign DINGIR in a Hittite text may represent either the Hittite syllable *an* or may be part of an Akkadian phrase, representing the syllable *il*, it may be a Sumerogram, representing the original Sumerian meaning, 'god' or the determinative for a deity. In transliteration, a different rendition of the same glyph is chosen depending on its role in the present context.

Therefore, a text containing DINGIR and MU in succession could be construed to represent the words "ana", "ila", god + "a" (the accusative ending), god + water, or a divine name "A" or Water. Someone transcribing the signs would make the decision how the signs should be read and assemble the signs as "ana", "ila", "Ila" ("god extquotedbl+accusative case), etc. A transliteration of these signs, however, would separate the signs with dashes "il-a", "an-a", extquotedblDINGIR-a" or extquotedbl^{D}a". This is still easier to read than the original cuneiform, but now the reader is able to trace the sounds back to the original signs and determine if the correct decision was made on how to read them. A transliterated document thus presents both the reading preferred by the transliterating scholar as well as the opportunity to reconstruct the original text.

There are differing conventions for transliterating Sumerian, Akkadian (Babylonian) and Hittite (and Luwian) cuneiform texts. One convention that sees wide use across the different fields is the use of acute and grave accents as an abbreviation for homophone disambiguation.

Thus, *u* is equivalent to u_1, the first glyph expressing phonetic *u*. An acute accent, *ú*, is equivalent to the second, u_2, and a grave accent *ù* to the third, u_3 glyph in the series (while the sequence of numbering is conventional but essentially arbitrary and subject to the history of decipherment). In Sumerian transliteration, a multiplication sign 'x' is used to indicate ligatures. As shown above, signs *as such* are represented in capital letters, while the specific reading selected in the transliteration is represented in small letters. Thus, capital letters can be used to indicate a so-called Diri compound – a sign sequence that has, in combination, a reading different from the sum of the individual constituent signs (for example, the compound IGI.A – "water" + "eye" – has the reading *imhur*, meaning "foam"). In a Diri compound, the individual signs are separated with dots in transliteration. Capital letters may also be used to indicate a Sumerogram (for example, KÙ.BABBAR – Sumerian for "silver" – being used with the intended Akkadian reading *kaspum*, "silver"), an Akkadogram, or simply a sign sequence of whose reading the editor is uncertain. Naturally, the "real" reading, if it is clear, will be presented in small letters in the transliteration: IGI.A will be rendered as imhur_4.

Since the Sumerian language has only been widely known and studied by scholars for approximately a century, changes in the accepted reading of Sumerian names have occurred from time to time. Thus the name of a king of Ur, read *Ur-Bau* at one time, was later read as *Ur-Engur*, and is now read as Ur-Nammu or Ur-Namma; for *Lugal-zaggisi*, a king of Uruk, some scholars continued to read *Ungal-zaggisi*; and so forth. Also, with some names of the older period, there was often uncertainty whether their bearers were Sumerians or Semites. If the former, then their names could be assumed to be read as Sumerian, while, if they were Semites, the signs for writing their names were probably to be read according to their Semitic equivalents, though occasionally Semites might be encountered bearing genuine Sumerian names. There was also doubt whether the signs composing a Semite's name represented a phonetic reading or a logographic compound. Thus, e.g. when inscriptions of a Semitic ruler of Kish, whose name was written *Uru-mu-ush*, were first deciphered, that name was first taken to be logographic because *uru mu-ush* could be read as "he founded a city" in Sumerian, and scholars accordingly retranslated it back to the original Semitic as *Alu-usharshid*. It was later recognized that the URU sign can also be read as *rí* and that the name is that of the Akkadian king Rimush.

4 Syllabary

The tables below show signs used for simple syllables of the form CV or VC. As used for the Sumerian language, the cuneiform script was in principle capable of distinguishing at least 16 consonants, transliterated as

b, d, g, g̃, ḫ, k, l, m, n, p, r, ř, s, š, t, z

as well as four vowel qualities, *a, e, i, u*. The Akkadian language had no use for *g̃* or *ř* but needed to distinguish its emphatic series, *q, ṣ, ṭ*, adopting various "superfluous" Sumerian signs for the purpose (e.g. *qe*=KIN, *qu*=KUM, *qi*=KIN, *ṣa*=ZA, *ṣe*=ZÍ, *ṭur*=DUR etc.) Hittite as it adopted the Akkadian cuneiform further introduced signs for the glide *w*, e.g. *wa*=PI, wi_5=GEŠTIN) as well as a ligature I.A for *ya*.

5 Sign inventories

See also: List of cuneiform signs

The Sumerian cuneiform script had on the order of 1,000

Cuneiform writing in Ur, southern Iraq

distinct signs (or about 1,500 if variants are included). This number was reduced to about 600 by the 24th century BC and the beginning of Akkadian records. Not all Sumerian signs are used in Akkadian texts, and not all Akkadian signs are used in Hittite.

Falkenstein (1936) lists 939 signs used in the earliest period (late Uruk, 34th to 31st centuries). With an emphasis on *Sumerian* forms, Deimel (1922) lists 870 signs used

in the Early Dynastic II period (28th century, “LAK”) and for the Early Dynastic IIIa period (26th century, extquotedblŠL”). Rosengarten (1967) lists 468 signs used in Sumerian (pre-Sargonian). Lagash and Mittermayer (“aBZL”, 2006) list 480 Sumerian forms, written in Isin-Larsa and Old Babylonian times. Regarding *Akkadian* forms, the standard handbook for many years was Borger (“ABZ”, 1981) with 598 signs used in Assyrian/Babylonian writing, recently superseded by Borger (“MesZL”, 2004) with an expansion to 907 signs, an extension of their Sumerian readings and a new numbering scheme.

Signs used in Hittite cuneiform are listed by Forrer (1922), Friedrich (1960) and the *HZL* (Rüster and Neu 1989). The HZL lists a total of 375 signs, many with variants (for example, 12 variants are given for number 123 *EGIR*).

5.1 Numerals

Main article: Babylonian numerals

The Sumerians used a numerical system based on 1, 10 and 60. The way of writing a number like 70 would be the sign for 60 and the sign for 10 right after. This way of counting is still used today for measuring time as 60 seconds per minute and 60 minutes per hour.[2]

6 Unicode

Main articles: Cuneiform (Unicode block) and Cuneiform Numbers and Punctuation (Unicode block)

Unicode (as of version 6.0) assigns to Sumero-Akkadian Cuneiform script the following ranges:

> U+12000–U+123FF (879 assigned characters) extquotedblCuneiform extquotedbl
>
> U+12400–U+1247F (103 assigned characters) extquotedblCuneiform Numbers and Punctuation extquotedbl

The final proposal for Unicode encoding of the script was submitted by two cuneiform scholars working with an experienced Unicode proposal writer in June 2004.[17] The base character inventory is derived from the list of Ur III signs compiled by the Cuneiform Digital Library Initiative of UCLA based on the inventories of Miguel Civil, Rykle Borger (2003), and Robert Englund. Rather than opting for a direct ordering by glyph shape and complexity, according to the numbering of an existing catalog, the Unicode order of glyphs was based on the Latin alphabetic order of their “last” Sumerian transliteration as a practical approximation.

7 List of major Cuneiform tablet discoveries

This list is incomplete; you can help by expanding it.

8 See also

- List of museums of ancient Near Eastern art
- Elamite cuneiform
- Hittite cuneiform
- Journal of Cuneiform Studies
- List of cuneiform signs
- Old Persian cuneiform
- Ugaritic alphabet

9 Notes

[1] /kjuːˈniːɪfɔrm/ *kew-**NEE**-i-form* or /ˈkjuːnɪfɔrm/ ***KEW**-ni-form*

[2] It seems that various parts of Rawlisons' paper formed Vol X of this journal. The final part III comprised chapters IV (Analysis of the Persian Inscriptions of Behistunand) and V (Copies and Translations of the Persian Cuneiform Inscriptions of Persepolis, Hamadan, and Van), pp. 187–349.

10 References

[1] Egyptian hieroglyphs also have a claim, and it is unsettled which system began first. See *Visible Language. Inventions of Writing in the Ancient Middle East and Beyond*, Oriental Institute Museum Publications, 32, Chicago: University of Chicago, p. 13, ISBN 978-1-885923-76-9

[2] Lo 2007.

[3] "Cuneiform Tablets: Who's Got What? extquotedbl, *Biblical Archaeology Review* **31** (2), 2005

[4] Watkins, Lee; Snyder, Dean (2003), *The Digital Hammurabi Project*, The Johns Hopkins University, "Since the decipherment of Babylonian cuneiform some 150 years ago museums have accumulated perhaps 300,000 tablets written in most of the major languages of the Ancient Near East - Sumerian, Akkadian (Babylonian and Assyrian), Eblaite, Hittite, Persian, Hurrian, Elamite, and Ugaritic. These texts include genres as variegated as mythology and mathematics, law codes and beer recipes. In most cases these documents are the earliest exemplars of their genres, and cuneiformists have made unique and valuable contributions to the study of such moderns disciplines as history, law, religion, linguistics, mathematics, and science. In spite of continued great interest in mankind's earliest documents it has been estimated that only about 1/10 of the extant cuneiform texts have been read even once in modern times. There are various reasons for this: the complex Sumero/Akkadian script system is inherently difficult to learn; there is, as yet, no standard computer encoding for cuneiform; there are only a few hundred qualified cuneiformists in the world; the pedagogical tools are, in many cases, non-optimal; and access to the widely distributed tablets is expensive, time-consuming, and, due to the vagaries of politics, becoming increasingly difficult."

[5] Adkins 2003, p. 47.

[6] Marckham Geller, "The Last Wedge," *Zeitschrift für Assyriologie und vorderasitische Archäologie* 86 (1997): 43–95.

[7] Sayce 1908.

[8] El Daly, Okasha (2004). *Egyptology: The Missing Millennium : Ancient Egypt in Medieval Arabic Writings*. Routledge. pp. 39–40 & 65. ISBN 1-84472-063-2.

[9] Heeren 1815.

[10] Ceram, C.W., *Gods, Graves and Scholars*, 1954

[11] Burnouf 1836

[12] Pritchard 1844, p. 30–31

[13] Lassen.

[14] Adkins 2003.

[15] Rawlinson 1847.

[16] Daniels 1996.

[17] http://std.dkuug.dk/jtc1/sc2/wg2/docs/n2786.pdf

[18] Bertman 2005, p. 8.

[19] Bertman 2005, p. 17.

[20] Bertman 2005, p. 20.

[21] Bertman 2005, p. 25.

[22] Bertman 2005, p. 27.

[23] Bertman 2005, p. 28.

[24] Bertman 2005, p. 30.

[25] Archival practices at Old Babylonian/Middle Bronze Age Alalakh (Level VII)

11 Bibliography

- Adkins, Lesley, *Empires of the Plain: Henry Rawlinson and the Lost Languages of Babylon*, New York, St. Martin's Press (2003) ISBN 0-312-33002-2
- Bertman, Stephen (2005), *Handbook to Life in Ancient Mesopotamia*, Oxford University Press, ISBN 9780195183641
- R. Borger, *Assyrisch-Babylonische Zeichenliste*, 2nd ed., Neukirchen-Vluyn (1981)
- Borger, Rykle (2004). Dietrich, M. Loretz, O., ed. *Mesopotamisches Zeichenlexikon*. Alter Orient und Altes Testament **305**. Münster: Ugarit Verlag. ISBN 3-927120-82-0.
- Burnouf, E. (1836). "Mémoire sur deux Inscriptions Cunéiformes trouvées près d'Hamadan et qui font partie des papiers du Dr Schulz", Impr. Roy, Paris.
- Daniels, Peter; Bright, William (1996). *The World's Writing Systems*. Oxford University Press. p. 146. ISBN 0-19-507993-0.

- A. Deimel (1922), *Liste der archaischen Keilschriftzeichen* ("LAK"), WVDOG 40, Berlin.
- A. Deimel (1925–1950), *Šumerisches Lexikon*, Pontificum Institutum Biblicum.
- F. Ellermeier, M. Studt, Sumerisches Glossar
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- A. Falkenstein, *Archaische Texte aus Uruk*, Berlin-Leipzig (1936)
- E. Forrer, *Die Keilschrift von Boghazköi*, Leipzig (1922)
- J. Friedrich, *Hethitisches Keilschrift-Lesebuch*, Heidelberg (1960)
- Jean-Jacques Glassner, *The Invention of Cuneiform*, English translation, Johns Hopkins University Press (2003), ISBN 0-8018-7389-4.
- Hayes, John L. (2000). *A Manual of Sumerian Grammar and Texts*. Aids and Research Tools in Ancient Near Eastern Studies **5** (2d ed.). Malibu: Undena Publications. ISBN 0-89003-197-5.
- Heeren (1815) "Ideen über die Politik, den Verkehr und den Handel der vornehmsten Volker der alten Welt", vol. i. pp. 563 seq., translated into English in 1833.
- Kramer, Samuel Noah (1981). "Appendix B: The Origin of the Cuneiform Writing System". *History Begins at Sumer: Thirty-Nine Firsts in Man's Recorded History* (3d revised ed.). Philadelphia: University of Pennsylvania Press. pp. 381–383. ISBN 0-8122-7812-7.
- René Labat, *Manuel d'epigraphie Akkadienne*, Geuthner, Paris (1959); 6th ed., extended by Florence Malbran-Labat (1999), ISBN 2-7053-3583-8.
- Lo, Lawrence (2007). "Sumerian". Retrieved June 5, 2009.
- Lassen, Christian. "Die Altpersischen Keil-Inschriften von Persepolis"
- Mittermayer, Catherine; Attinger, Pascal (2006). *Altbabylonische Zeichenliste der Sumerisch-Literarischen Texte*. Orbis Biblicus et Orientalis. Special Edition. Academic Press Fribourg. ISBN 978-3-7278-1551-5.
- O. Neugebauer, A. Sachs (eds.), *Mathematical Cuneiform Texts*, New Haven (1945).
- Patri, Sylvain (2009). L'adaptation des consonnes hittites dans certaines langues du XIIIe siècle. *Zeitschrift für Assyriologie und vorderasiatische Archäologie* 99(1): 87–126.
- Pritchard, James Cowles (1844). "Researches Into the Physical History of Mankind", 3rd Ed., Vol IV, Sherwood, Gilbert and Piper, London
- Rawlinson, Henry (1847) "The Persian Cuneiform Inscription at Behistun, decyphered and translated; with a Memoir on Persian Cuneiform Inscriptions in general, and on that of Behistun in Particular", The Journal of the Royal Asiatic Society, Vol X.
- Y. Rosengarten, *Répertoire commenté des signes présargoniques sumériens de Lagash*, Paris (1967)
- Chr. Rüster, E. Neu, *Hethitisches Zeichenlexikon* (*HZL*), Wiesbaden (1989)
- Sayce, Rev. A. H. (1908). "The Archaeology of the Cuneiform Inscriptions", Second Edition-revised, 1908, Society for Promoting Christian Knowledge, London, Brighton, New York; at pp 9–16 Not in copyright
- Nikolaus Schneider, *Die Keilschriftzeichen der Wirtschaftsurkunden von Ur III nebst ihren charakteristischsten Schreibvarianten*, Keilschrift-Paläographie; Heft 2, Rom: Päpstliches Bibelinstitut (1935).
- Wolfgang Schramm, *Akkadische Logogramme*, Goettinger Arbeitshefte zur Altorientalischen Literatur (GAAL) Heft 4, Goettingen (2003), ISBN 3-936297-01-0.

- F. Thureau-Dangin, *Recherches sur l'origine de l'écriture cunéiforme*, Paris (1898).
- Ronald Herbert Sack, *Cuneiform Documents from the Chaldean and Persian Periods*, (1994) ISBN 0-945636-67-9

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- Epigraphy at DMOZ
- Smarthistory, Cuneiform and the Invention of Writing
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