



Sächsische Akademie
der Wissenschaften
zu Leipzig



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SunoikisisDC Digital Classics: Session 3: Working with Egyptian texts

Tuesday, March 18, 2025, 15:00-16:30 GMT.

Youtube link: https://youtu.be/XST2LNGv4_0

GitHub link: <https://github.com/SunoikisisDC/SunoikisisDC-2024-2025/wiki/3-Egyptian-Texts>

Agenda

- 1) Introduction to class & Resources
- 2) Discussion of aspects of the required readings
- 3) Short Introduction in Ancient Egyptian Languages and Scripts
- 4) Unicode for Ancient Egyptian: *status quaestionis*
- 5) News from the TLA – the Thesaurus Linguae Aegyptiae
- 6) Further tools for Demotic
- 7) Digital Editions of Egyptian Texts – and once again the Rosetta Stone
- 8) Bonus: Claude LLM and Neural Machine Translation
- 9) Exercises

Outline

This session introduces basic digital tools and instruments used to decipher and analyze Ancient Egyptian Texts. We begin with a thorough introduction to Ancient Egyptian languages and scripts, including Hieroglyphic, Demotic and Coptic. The main digital tool discussed is the [Thesaurus Linguae Aegyptiae](#) (TLA), which recently received a major makeover, and to which new functionalities are added every year. Other topics covered include text alignment (with Ugarit), and the state of the art of Unicode for Egyptian scripts.

Required readings

- S. Rosmorduc. 2015. "Computational Linguistics in Egyptology." In J. Stauder-Porchet, A. Stauder & W. Wendrich (eds.), *UCLA Encyclopedia of Egyptology*. Los Angeles.
Available at: <https://escholarship.org/uc/item/0fk4n4gv>
- W. Wendrich. 2023. "Chapter 1 Ethics of Digital Representation in Egyptology." In *Ancient Egypt, New Technology*. Leiden: Brill.
DOI: https://doi.org/10.1163/9789004501294_002

Further readings

- M. Amin, A. Barmpoutis. M. Berti, E. Bozia, J. Hensel & F. Naether. 2022. "The Digital Rosetta Stone Project." In R. Lucarelli, J. Roberson & S. Vinson (eds.), *Ancient Egypt, New Technology. The Present and Future of Computer Visualization, Virtual Reality and Other Digital Humanities in Egyptology*. Harvard Egyptological Studies 17. Leiden / Boston: Brill. DOI: https://doi.org/10.1163/9789004501294_004.
- M. Berti & F. Naether (eds.). 2016. Altertumswissenschaften in a Digital Age – Egyptology, Papyrology and Beyond. Proceedings of a Conference and Workshop in Leipzig, November 4-6, 2015. Available: <http://nbn-resolving.de/urn:nbn:de:bsz:15-qucosa-201500>.
- F. Elwert, S. Gerhards & S. Sellmer. 2017. "Gods, graves and graphs – social and semantic network analysis based on Ancient Egyptian and Indian corpora." *Digital Classics Online* 3,2. Available: <https://doi.org/10.11588/dco.2017.0.36017>.
- U. Henny, J. Blumtritt, M. Schaeben & P. Sahle. 2017. "The life cycle of the *Book of the Dead* as a Digital Humanities resource." *Digital Classics Online* 3,2. Available: <https://doi.org/10.11588/dco.2017.0.35896>.
- T. Konrad. 2023. "Hieroglyphs in a Multidimensional Space. A Case Study on the Application of Digital Palaeography on Cursive Hieroglyphs" In Ola El-Aguizy & Burt Kasparian (Hgg.), *ICE XII. Proceedings of the Twelfth International Congress of Egyptologists, 3rd - 8th November 2019*, Cairo, Bibliothèque Générale 71, Kairo: Institut Français d'Archéologie Orientale, 787-794. Available: https://www.ifao.egnet.net/uploads/publications/enligne/BIGEN071_art_06.pdf
- R. Lucarelli. 2023. "From Virtual Reality to virtual restitution: How 3D-Egyptology can contribute to decolonizing the field and the question of digital copies vs the original." In: Palladino C. & Bodard G (eds.), *Can't Touch This*. London: Ubiquity Press. DOI: <https://doi.org/10.11588/dco.2017.0.35896>.
- S. Polis & V. Razanajao. 2016. "Ancient Egyptian Texts in Context: Towards a conceptual data model (the THOT data model – TDM)." *Bulletin of the Institute of Classical Studies* 59: 24-41. Available: <https://doi.org/10.5334/bcv>
- S. Schweitzer. 2013. "Dating Egyptian literary texts: Lexical approaches." In G. Moers, A. Giewekemeyer & K. Widmaier (eds.), *Dating Egyptian literary texts: Proceedings of the Conference Göttingen 9.-12.6.2010*, Lingua Aegyptia Studia Monographica 11, pp. 177-190. Hamburg: Widmaier Verlag, <https://onlinelibrary.wiley.com/doi/10.1111/j.2041-5370.2016.12036.x>.
- On the TLA, see also:
- S. Grallert, T. S. Richter, D. A. Werning, "TLA – Introduction", <https://thesaurus-linguae-aegyptiae.de/info/introduction>.
 - D. A. Werning, "TLA Development", <https://thesaurus-linguae-aegyptiae.de/info/tla-development>.

Resources

Tools

- [Thesaurus Linguae Aegyptiae*](#)
- [Ugarit iAligner](#)
- [Arethusa](#)
- [THOT Thesauri](#)
- [Digital Rosetta Stone Project*](#)
- [The Rosetta Stone Online*](#)

Earlier Egyptian (Old and Middle Egyptian, Egyptien de tradition)

- [TLA datasets on huggingface \(for ML tasks\)](#)
- [Egyptian-UJaen treebank](#)
- [Persons and Names of the Middle Kingdom and early New Kingdom project, see especially the 'tools' section](#)
- [AKU-Pal: Paläographie des Hieratischen und der Kursivhieroglyphen](#)
- [Karnak](#)

Later Egyptian (Late Egyptian, Demotic, Coptic)

- [Ramsès \(beta\)](#)
- [Deir el-Medine Database](#)
- [The Demotic Palaeographical Database Project \(DPDP\)*](#)
- [Coptic Scriptorium](#)
- [Database and Dictionary of Greek Loanwords in Coptic \(DDGLC\)](#)
- [papyri.info](#)
- [Egyptological museum search \(meta search\)](#)
- [Bibliography of egyptological datasets and databases](#)
- [Thot Sign List](#)
- [Trismegistos](#)

Discussion of the required reading, 1: Rosmorduc

- Computational linguistics, also referred to as Natural Language Processing
- Long tradition since the 1960s, aim: “automated translation”
- Annotations: TEI, Epidoc
- Text representation: „Manuel de Codage“ and the Extended Library, Unicode
- Text databases and dictionaries – providing also faceted searches, metadata, tags, tree-banking, further tools for analysis (classification, lexicostatistics)
- Optical Character Recognition (also of interest for modern publications/handwritings)

Discussion of the required reading, 2: Wendrich

- Ethical concerns
- Authorship, open science, open access, biases, sustainability (The London Charter for the Computer-based Visualization of Cultural Heritage)
- FAIR/CARE principles
- Official „Egyptological“ languages and the case of Arabic
- Digital colonization, eurocentrism, male gaze
- Standardization, best practice (file) formats, metadata, paradata
- Clear indication of uncertainty, ambiguity etc.
- Not mentioned – ethics of LLMs (also issues of biases, ecology, digital vulnerability etc.)

Ancient Egyptian Languages and Scripts

Language stages:

(Early/Pre-Old Egyptian, ca. 3300-2700 BC)

Earlier Egyptian:

Old Egyptian (ca. 2700-2000 BC)

Middle Egyptian (ca. 2000-1300 BC)

Later Egyptian

Late Egyptian (ca. 1300-700 BC)

Demotic (ca. 700 BC-500 AD)

Coptic (ca. 100-1400 AD)

Scripts:

Hieroglyphic

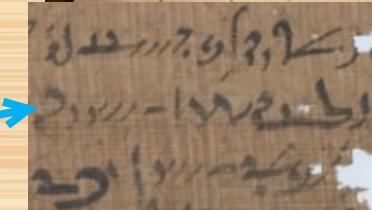
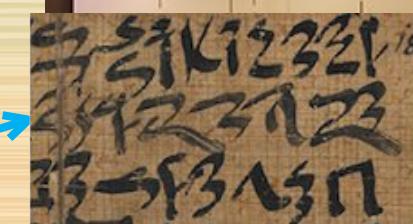
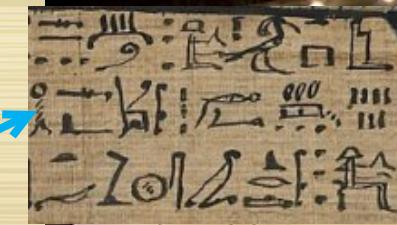
Ptolemaic

Hieratic

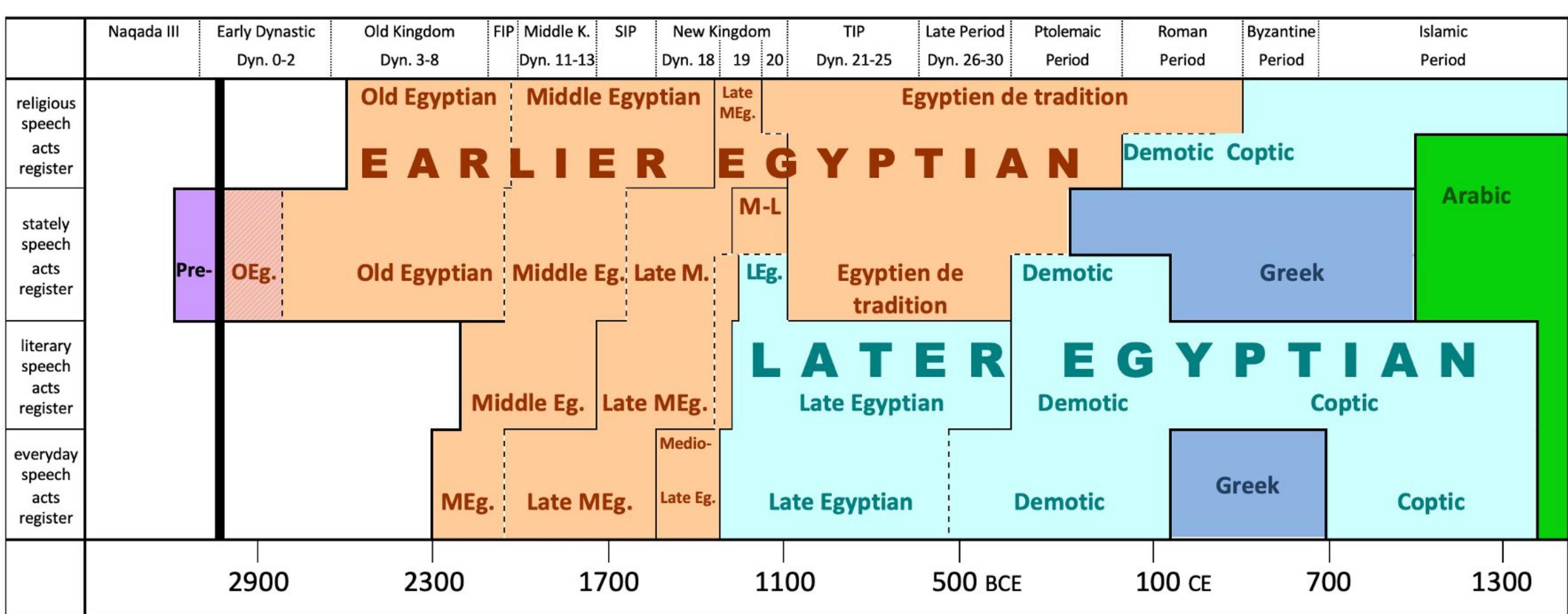
Abnormal Hieratic

Demotic

Coptic



Ancient Egyptian Languages and Scripts



Based on: Junge, Friedrich. 1985. 'Sprache', in: Helck, Wolfgang & Wolhart Westendorf (ed.s), *Lexikon der Ägyptologie*, Vol. 5, Wiesbaden: Otto Harrassowitz, 1176–1211; modified after: Kammerzell, Frank. 1998. *Sprachkontakt und Sprachwandel im Alten Ägypten*, Georg-August-Universität Göttingen (Habilitation, unpublished); Richter (2017).

Pre-Unicode: Status quaestionis for Egyptian scripts I

Egyptological transliteration – **Former** standard

Former standard, now becoming obsolete:

- The *Manuel de Codage* (MdC) was developed as a standard for encoding Egyptian transliteration using only ASCII characters (Rosmorduc 2015)
- Specialized fonts ("Betocode-style fonts") such as *Transliteration.ttf* and *Umschrift_ttn.ttf*, render these ASCII-encoded texts in proper Egyptological transliteration.

> Look okay, Encoding not okay

Transkription / Manuel de Codage

Manuel de Codage	Manuel de Codage	Manuel de Codage
ȝ A	b b	zz
j j (Hier.)	p p	ss
i i (Demot.)	f f	š S
y y (Hier.)	mm	qq
j j (Demot.)	n n	kk
ȝ i (Hier.)	r r	gg
e e (Demot.)	l l	t t
' ' (Hier.)	h h	ȝ T
ȝ a	ȝ H	ȝ V (Demot.)
ww	ȝ x	dd
ȝ u (Hier.)	ȝ X	ȝ D
p p	ȝ v (Demot.)	

Unicode: Status quaestionis for Egyptian scripts II

Egyptological Transliteration – **New Standard**

- All relevant characters are available in **Unicode**
- Fonts that can display all characters of Unicode transliteration, e.g.
 - Charis SIL
 - Junicode
 - New Athena Unicode
 - ...
- Keyboard layouts available, e.g. on the website of the project „[Structure and Transformation in the Vocabulary of the Egyptian Language](#)“ (Berlin)
- [Leiden Unified Transliteration](#) (LUT, 2023)

Sign	Trans.
	ȝ
	i
	y
	ڻ
	z
	s
	t
	ȝ
	d
	d

Pre-Unicode: Status quaestionis for Egyptian scripts III

How to write Hieroglyphs?

- With JSesh!
- Open source software by Serge Rosmorduc:
<https://jsesh.genherkhopeshef.org/>
- Download and tutorials: see videos on the website
- Sunoikisis session from 2018: <https://github.com/SunoikisisDC/SunoikisisDC-2017-2018/wiki/Digital-Rosetta-Stone>
- Course material (in German): https://www.ianus-fdz.de/datenportal/collections/view/2016-00005_DIP#collection-start
(Kursbaustein 5)



Unicode: Status quaestionis for Egyptian scripts IV

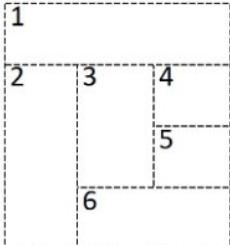
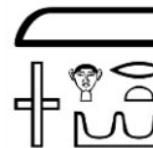
“The two principles that guided this effort to encode Egyptian quadrats are:

- Structural completeness — Unicode encoded text in Egyptian Hieroglyphs must be able to faithfully render the structures inherent to the writing system
- Feasibility — Rendering text must be possible using existing font technologies”

[Glass et al. 2017 \(Unicode Proposal\)](#), p. 2

—> control and shading characters included since Unicode 15.0 ([current version is 16.0](#))

Complex quadrat showing alternative encoding schemes

	Source	Abydos temple of Ramesses II, p. 531–2		
	Symbolic	J15 : Z11 * (D2 * (D21 : X1) : N25)		
	Characters	𓏏 + 𓏏 𓏏 - 𓏏		
	Code points	U+1341D U+133F6 U+13077 U+1308B U+133CF U+13209		
	Encoding	Example		
	Paired controls	[: 1 [* 2 [: [* 3 [: 4 5 :] *] 6 :] *] :]		
	Polish notation	: 1 * 2 : * 3 : 4 5 6		
	Explicit controls	1 = 2 > 3 * 4 . 5 : 6		
	Combined controls	1 : _1 2 * _1 3 * _2 4 : _3 5 : _2 6		
	Repeated controls	1 : 2 * 3 * * 4 :: : 5 :: 6		
	Parentheses	1 : 2 * (3 * (4 : 5) : 6)		

Unicode: Status quaestionis for Egyptian scripts V

Egyptian hieroglyphs – in Unicode

- 1071+1 hieroglyphs available since Unicode 5.2 (2009)
 - Including all signs in the Gardiner list (Gardiner 1957)
 - Additional hieroglyphs from the Greco-Roman period
 - Hieratic texts transliterated into hieroglyphs can be almost completely encoded
- Major addition in Unicode 12.0.0 (2019) and 15.0 (2022):
 - Control characters for quadrat formation (incl. Insertion, enclosure, overlay)
 - Rotation (via variation selectors)
 - Lost signs (partial, full)
 - Damaged signs (**shading**)
 - Description and examples in the official [Unicode documentation](#)

Image	Symbolic	Character Sequence
	F4 □ X1	<13102, 13432, 133CF>
	I10 □ A1	<13193, 13433, 13000>
	D17 □ X1	<13087, 13434, 133CF>
	G25 □ X1	<1315C, 13435, 133CF>
	D36 □ V28	<1309D, 13436, 1339B>
	N37 □ O34	<13219, 13439, 13283>
	D28 □ J1	<13093, 1343A, 1340D>
	D32 □ V28	<13098, 1343B, 1339>

	G1	□	<1313F, 13447>
	I10	□	<13193, 13452>
	G25	□	<1315C, 13454>
	L1	□	<131A3, 13455>

Unicode: Status quaestionis for Egyptian scripts VI

Egyptian hieroglyphs – in Unicode

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 - Control characters for quadrat formation (incl. Insertion, enclosure, overlay)
 - Rotation (via variation selectors)
 - Lost signs (partial, full)
 - Damaged signs (shading)
 - Description and examples in the official Unicode documentation
 - Font Egyptian Text (eot.ttf) by Microsoft (Andrew Glass)
- > Encoding okay, Look okay

Image	Symbolic	Character Sequence
𓁑	F4 □ X1	<13102, 13432, 133CF>
𓁒	I10 □ A1	<13193, 13433, 13000>
𓁓	D17 □ X1	<13087, 13434, 133CF>
𓁔	G25 □ X1	<1315C, 13435, 133CF>
𓁕	D36 □ V28	<1309D, 13436, 1339B>
𓁖	N37 □ O34	<13219, 13439, 13283>
𓁗	D28 □ J1	<13093, 1343A, 1340D>
𓁘	D32 □ V28	<13098, 1343B, 1339

	G1	□	<1313F, 13447>
	I10	□	<13193, 13452>
	G25	□	<1315C, 13454>
	L1	□	<131A3, 13455>

Thot Sign List

“... its first aim is *to document the functions* attested for individual signs in order to indicate which standardized character may be used in which context.” ([Website](#))

The screenshot shows the homepage of the Thot Sign List (TSL) website. The header features a logo with a stylized ibis bird above the letters 'TSL'. The title 'Thot Sign List' is displayed next to the logo. A navigation bar below the header includes links for Home, Browse, Search, About, and Contact, with 'Home' underlined. To the right of the navigation are links for 'Registering for TSL' and 'Login'. The main content area has a large blue background with the text 'THOT SIGN LIST' in white capital letters. Below this text is the TSL logo. At the bottom of the page, there are three blue buttons labeled 'Browse', 'Search', and 'About', each with a corresponding descriptive sentence below it.

[Home](#) [Browse](#) [Search](#) [About](#) [Contact](#)

[Registering for TSL](#) [Login](#)

THOT SIGN LIST

[Browse](#)

Browse the list of hieroglyphic signs

[Search](#)

Search the list of hieroglyphic signs

[About](#)

Information about the project

Thot Sign List



TSL_1_2330

Description: A leg with a bend knee.

Bibliography

Codes

Cite as

Credits

Functions Tokens Distribution

Modern Lists Palaeographies

Classifier (2 function(s))

Phonetic value	Semantic value	Use	
—	leg, foot	regular	▼
—	movement	regular	▼

Logogram (1 function(s))

Phonetic value	Semantic value	Use	
<i>rd</i>	foot	regular	▼

Phonemogram (4 function(s))

Phonetic value	Semantic value	Use	
<i>gh(s)</i>	—	regular	▼
<i>pds</i>	—	regular	▼
<i>sbq</i>	—	regular	▼
<i>wcr</i>	—	regular	▼

Unicode: Use hieroglyphs ... just like any other script

... In Google (or other search engine)

Search term: 

Thesaurus Linguae Aegyptiae (TLA)

New: <https://thesaurus-linguae-aegyptiae.de/home>

Old: <http://aaew.bbaw.de/tla/> (Login required)

TLA Thesaurus Linguae Aegyptiae 2.2.1.1

Q Search TLA ▾ Lemma Lists ▾ Text Corpus ▾ Listings ▾ Help ▾

Home / EN | DE | ε

Welcome to the *Thesaurus Linguae Aegyptiae*

Immerse yourself in a wealth of Egyptian texts.



Live demonstration

Slips from the Zettelarchiv

Search the TLA

News from the TLA

Last major update: Nov 2024

Last (minor) update: Febr 2025

More news on the [Development page of the TLA](#)

(1) Developments in the Web Application*

- Web site (user interface and information) in *Arabic*.
- *Hieroglyphic lemma spellings* on the lemma pages, extracted from the corpus
- *Improved sorting* of lemma search results (sorting by alphabetic order, date, frequency) and lemma attestations (by date).
- Basic lemma *collocation* search within a sentence, now also for *three (different) lemmata*.
- [Text/object hierarchy](#) for the corpus

(2) Developments in the Lemma Lists*

- New: Demotic lemma list in *English*.
- New: Hieroglyphic/hieratic lemma list in *French* (main POS).
- New: Parts of the hieroglyphic/hieratic lemma list in *Arabic* (about 35% of the main POS).

(3) TLA goes *Linked* and *Open*

- [API for the lemma lists](#)
- lemma list in Wikidata,
e.g. [*pr-c₃*](#) ‘pharaoh, palace’

The screenshot shows a Wikidata item page for the lemma *pr-c₃*. At the top, there's a navigation bar with the Wikidata logo, a search bar, and tabs for 'Lexeme' and 'Discussion'. Below the header, the lemma name *pr-c₃* is displayed with its Wikidata ID (L7922). To the right of the lemma name is a small icon of a pharaoh's head and a link to another Wikidata item (egy-x-Q132659). At the bottom of the page, it specifies the language as Egyptian and the lexical category as noun.

Projects using the TLA Data

- The current TLA research in a website – Science in Ancient Egypt: https://sae.saw-leipzig.de/en/welcome-to-the-website-science-in-ancient-egypt?set_language=en
- Cult Practices in Ancient Egyptian Literature, Franziska Naether
- Lexical Networks, [Frederik Elwert, Simone Gerhards & Sven Sellmer \(2017\)](#)
- [Lemmatization and PoS-Tagging for Earlier Egyptian, Demotic and Coptic, Aleksi Sahala & Eliese-Sophia Lincke \(2024\)](#)
- Machine Translation, [Mattia De Cao, Nicola De Cao, Angelo Colonna & Alessandro Lenci \(2024\)](#)
- Visualizing text similarity, [Ralph Birk, N. Alexia Raharinirina, Konstantin Fackeldey, Tonio Sebastian Richter & Marcus Weber](#)
- Dictionary app, Simon Schweitzer, [Ancient Egyptian Dictionary \(AED\)](#), App for Android only
- Text alignment on token level, [Heidi Jauhainen, Machine Readable Texts for Egyptologists \(MaReTE\)](#)
- , , ,

Demotic Word List (to search for classifiers)

<http://www.dwl.aegyptologie.lmu.de/suche.php>

New 2024: virtual word search (to look up unattested Demotic successors
predecessors of hieroglyphic/Coptic words)

Nummer
[\(Hinweise\)](#)

oder

enthält ▾ **Wort**
[\(Hinweise\)](#)

[erweiterte Suchoptionen >>](#)

exakt Teil Wortanfang Wortende

UND ▾ **Determinativ**
[\(Hinweise\)](#)

[erweiterte Suchoptionen >>](#)

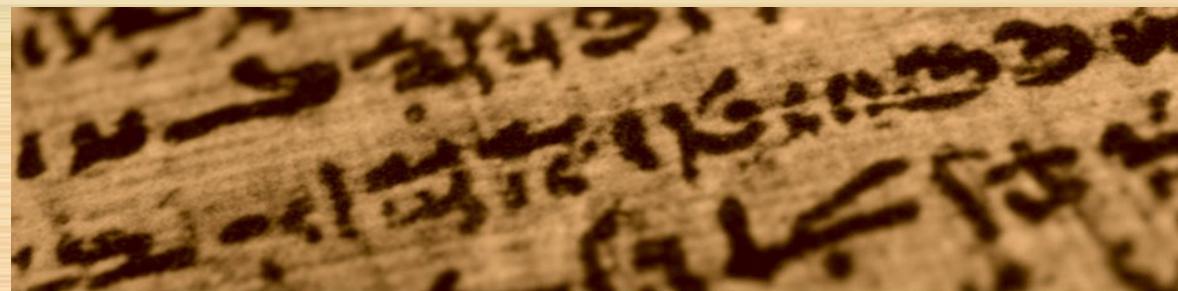
exakt Teil unscharf
 auch leere Einträge zulassen

UND ▾ **Übersetzung**
[\(Hinweise\)](#)

Suche starten

How to write Demotic, Hieratic, Meroitic...?

- there was a font for demotic (Chicago)
- there are a few betacode fonts with a small number of signs (no solution)
- there is a new font used by the DPDP Project - the [Demotic Palaeographical Database Project](#)
- facsimile (usually based on photographs)
- Early Demotic: hieroglyphic transcription
- Meroitic: available now! :-)



the Demotic Palaeographical Database Project



djehuti
(limited access)



corpus



palaeography



full text search



words

Digital Editions – Text Alignment

see also the previous session on [Text alignment](#), Thursday, March 13, 2025:
(Megan Bushnell, Chiara Palladino, Farnoosh Shamsian)

Applications of text alignment tools in education:

- reading environments
- learning tools
- crowdsourcing efforts to collect training data for statistical machine translation

Alpheios Translation Alignment Editor (<https://alpheios.net/>)

- Allows to create word-by-word alignments between two texts
- Data must be saved locally and downloaded
- Some alignments are used for the reading interface
- Parallel text and interlinear text view

The screenshot shows the Alpheios interface with two main panes. The left pane displays a parallel text view with two columns of text: Greek at the top and Latin at the bottom. The right pane displays an interlinear text view where each word in the Greek text has a corresponding box below it containing its translation or analysis. A toolbar at the top includes 'Redo', 'Add Comment', 'Export XML', 'Export Display', and a 'Show interlinear text' checkbox. Below the toolbar, there are several tabs and dropdown menus.

Below the screenshots is a large block of Greek text from a classical source, followed by a detailed English translation and analysis.

Greek Text:

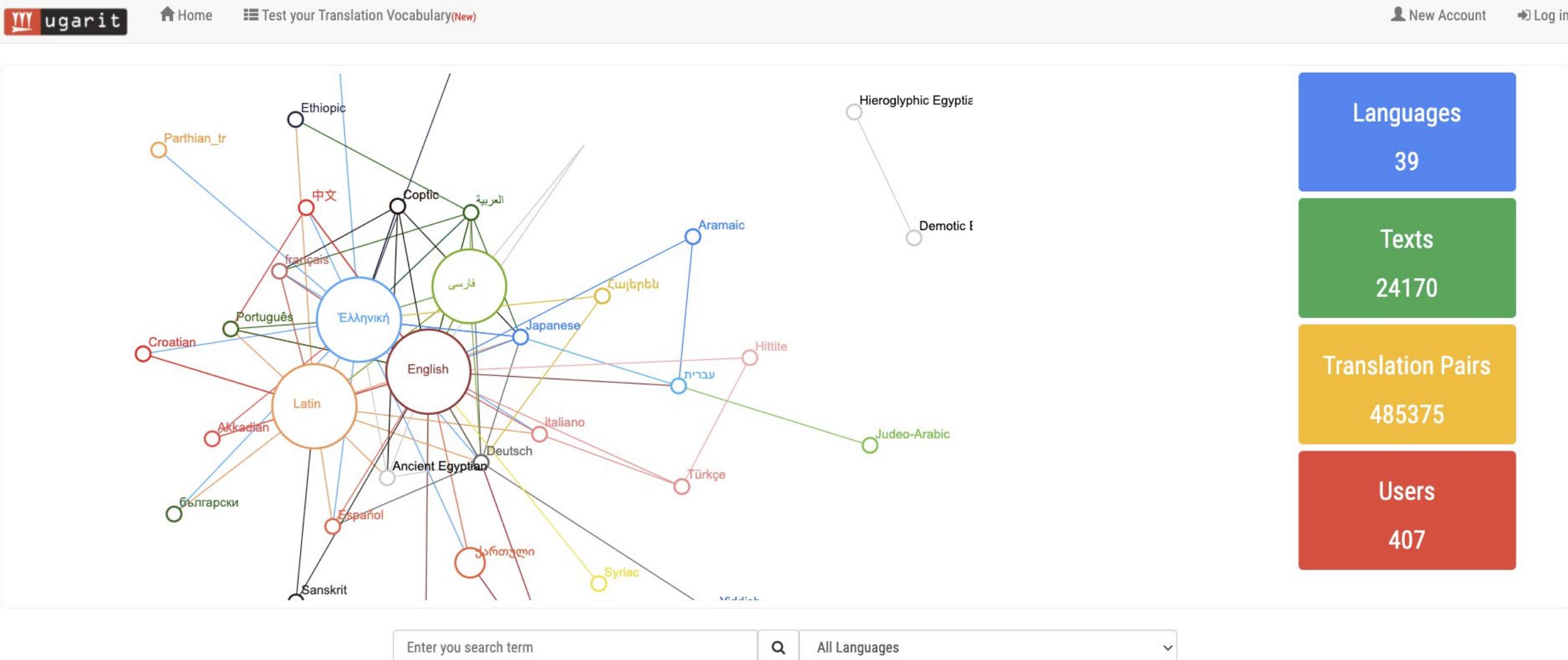
Περὶ ποιητικῆς αὐτῆς τε καὶ τῶν εἰδῶν αὐτῆς, ἣν τίνα δόναμον ἔκαστον ἔχει, καὶ πος δεῖ συντάσσων τοὺς μόνους, εἰ μέλλει καλώς ξεῖν ή ποίησις. ἐπὶ δὲ ἐκ τῶν καὶ ποίων ἑταῖροι μόριον, ὄμοιώς δὲ καὶ περὶ τῶν ἄλλων δύο τῆς αὐτῆς ἐντὸν μεθόδου, λέγουμεν, ἀδέξαντοι κατὰ φύσιν πρότονον ἀπὸ τῶν πρότοτον ποιητικῆς αὐτῆς τε καὶ τῆς αὐλοποίησης ἡ πλεύση καὶ καθαριστικής, πάσοις Εποποίᾳ δὴ καὶ η τῆς τραγοδίας ποίησις, ἐπὶ δὲ καμῳδία καὶ η διδυμωμποτηκή καὶ τῆς αὐλοποίησης ἡ πλεύση καὶ καθαριστικής, πάσοις Τραγάνουνοιν οὖσαι μαρτυρίες τὸ σύνολον. Διαφέροντο δὲ τῷ ποιητοῦ τοιστοῦν ταῦτα ποιεῖσθαι, εἴ τις τοῦτον τὸν τρόπον τραγίδην μετέπειταν. ἡ τῷ ἑτέρῳ, ἡ τῷ ἑτέρῳ μάρτυρας, μὴ μή τον τούτον τὸν τρόπον. Θετερὶ γάρ καὶ χρώματα καὶ σχήματα πολλὰ μοιρύνται πινες ἀπεικόνισταις, οἱ μὲν διὰ τέχνης τέχναις, ἑτέροι δὲ διὰ τῆς φωνῆς, οὕτω καὶ ταῖς εἰρημέναις τέχναις, ὅπουσι μετὰ ποιεῖσθαι τὸν ὄντημα διὰ λόγου καὶ ἀρμόνιον, τούτοις δὴ τῷ χωρὶς ή μεμρυνοῦσι, οἷον Ἀρμονία [μὲν] καὶ ἔνθιμοι χρώματα μόνον ἡ τε αὐλοποίηση καὶ καθαριστικής, καὶ τὸν εἶτε τέρτιον τοῦτον διά της φωνῆς, οὕτω καὶ ταῖς εἰρημέναις τέχναις, ὅπουσι μετὰ ποιεῖσθαι τὸν ὄντημα διὰ λόγου καὶ ἀρμόνιον, τούτοις δὴ τῷ χωρὶς ή μεμρυνοῦσι, οἷον Ἀρμονία [μὲν] καὶ ἔνθιμοι χρώματα μόνον ἡ τε αὐλοποίηση καὶ καθαριστικής, καὶ τὸν εἶτε τέρτιον τοῦτον διά της φωνῆς, οὕτω καὶ ταῖς εἰρημέναις τέχναις, οἵ τις διὰ τραγέτουν καὶ τῶν ἄλλων τινῶν τῶν τοιούτων ποιοτοῦ τὴν μόριον πλήν τοῦ ἀνθρώπου γι την ποντικότητας τοῦ μέτρου τοῦ ποιεῖσθαι τὸν προσαγορεύοντας, οἷς τὸς τοῦς κατὰ μόριον ποιηταις ἄλλα κοινῇ κατὰ τὸ μέτρον προσαγορεύονταις. Καὶ γὰρ οὗτον τοὺς μοινούκοιν τὸν μέτρον ἐκρύπτουν, οὗτοι καλεῖν εἰώθασιν. Οὐδὲν δὲ κοινὸν ἔστιν Όμήρος καὶ Ἑπειδοντεῖ πλὴν τὸ μέτρον διὸ τὸν ποιητὴν δόλαιον καλεῖν, τὸν δὲ φυσιολόγον μᾶλλον η ποιητὴν. Ομοίως δὲ καὶ εἰς τὰς ἀπαντα τὰ μέτρα μόριον ποιεῖσθαι τὸν μόριον, καθάπερ Χαροπίδης ἐποίεις Κέανον ποιητὴν ἐγνωσθεὶς ἔτι τόπον τῶν μέτρων, οὐτὸς ίδη καὶ ποιητὴν προσοργεύετεν. Περὶ μὲν οὖν τούτων διωρίσθω τὸν τόπον. Εἰσὶ δέ τινες οἱ πάια χρόνται τοῖς εἰρημένοις, λέγο δὲ οἰον ὄντημα καὶ μέλει καὶ μέτροι, πάντοτε η τὸν διδυμωμποτηκὸν ποιητοῦς καὶ η τὸν νόμον καὶ η τε τραγοδία καὶ η καμῳδία διαφέρουσι δὲ, διὸ οἱ μὲν ἄμα παῖσιν αἱ διαφοραὶ μεταξύ τοῦ ποιητοῦ καὶ τοῦ ποιητοῦ τοῦ μέτρου τοῦν εἰσὶν θεαταῖς.

English Translation and Analysis:

The text discusses various forms of art and their relationship to music and poetry. It distinguishes between different genres like tragedy and comedy, and how they are performed (e.g., with instruments like the aulos). It also touches on the concept of metrical feet (μέτρον) and how they are used in different contexts. The analysis is provided in Greek, with English annotations and analysis below each line.

Περὶ ποιητικῆς αὐτῆς τε καὶ τῶν εἰδῶν αὐτῆς, ἣν τίνα δόναμον ἔκαστον ἔχει, καὶ πος δεῖ συντάσσων τοὺς μόνους, εἰ μέλλει καλώς ξεῖν ή ποίησις. ἐπὶ δὲ ἐκ τῶν καὶ ποίων ἑταῖροι μόριον, ὄμοιώς δὲ καὶ περὶ τῶν ἄλλων δύο τῆς αὐτῆς ἐντὸν μεθόδου, λέγουμεν, ἀδέξαντοι κατὰ φύσιν πρότονον ἀπὸ τῶν πρότοτον ποιητικῆς αὐτῆς τε καὶ τῆς αὐλοποίησης ἡ πλεύση καὶ καθαριστικής, πάσοις Εποποίᾳ δὴ καὶ η τῆς τραγοδίας ποίησις, ἐπὶ δὲ καμῳδία καὶ η διδυμωμποτηκή καὶ τῆς αὐλοποίησης ἡ πλεύση καὶ καθαριστικής, πάσοις Τραγάνουνοιν οὖσαι μαρτυρίες τὸ σύνολον. Διαφέροντο δὲ τῷ ποιητοῦ τοιστοῦν ταῦτα ποιεῖσθαι, εἴ τις τοῦτον τὸν τρόπον τραγίδην μετέπειταν. ἡ τῷ ἑτέρῳ, ἡ τῷ ἑτέρῳ μάρτυρας, μὴ μή τον τούτον τὸν τρόπον. Θετερὶ γάρ καὶ χρώματα καὶ σχήματα πολλὰ μοιρύνται πινες ἀπεικόνισταις, οἱ μὲν διὰ τέχνης τέχναις, ἑτέροι δὲ διὰ τῆς φωνῆς, οὕτω καὶ ταῖς εἰρημέναις τέχναις, οἵ τις διὰ τραγέτουν καὶ τῶν ἄλλων τινῶν τῶν τοιούτων ποιοτοῦ τὴν μόριον πλήν τοῦ ἀνθρώπου γι την ποντικότητας τοῦ μέτρου τοῦ ποιεῖσθαι τὸν προσαγορεύοντας, οἷς τὸς τοῦς κατὰ μόριον ποιηταις ἄλλα κοινῇ κατὰ τὸ μέτρον προσαγορεύονταις. Καὶ γὰρ οὗτον τοὺς μοινούκοιν τὸν μέτρον ἐκρύπτουν, οὗτοι καλεῖν εἰώθασιν. Οὐδὲν δὲ κοινὸν ἔστιν Όμήρος καὶ Ἑπειδοντεῖ πλὴν τὸ μέτρον διὸ τὸν ποιητὴν δόλαιον καλεῖν, τὸν δὲ φυσιολόγον μᾶλλον η ποιητὴν. Ομοίως δὲ καὶ εἰς τὰς ἀπαντα τὰ μέτρα μόριον ποιεῖσθαι τὸν μόριον, καθάπερ Χαροπίδης ἐποίεις Κέανον ποιητὴν ἐγνωσθεὶς ἔτι τόπον τῶν μέτρων, οὐτὸς ίδη καὶ ποιητὴν προσοργεύετεν. Περὶ μὲν οὖν τούτων διωρίσθω τὸν τόπον. Εἰσὶ δέ τινες οἱ πάια χρόνται τοῖς εἰρημένοις, λέγο δὲ οἰον ὄντημα καὶ μέλει καὶ μέτροι, πάντοτε η τὸν διδυμωμποτηκὸν ποιητοῦς καὶ η τὸν νόμον καὶ η τε τραγοδία καὶ η καμῳδία διαφέρουσι δὲ, διὸ οἱ μὲν ἄμα παῖσιν αἱ διαφοραὶ μεταξύ τοῦ ποιητοῦ καὶ τοῦ ποιητοῦ τοῦ μέτρου τοῦν εἰσὶν θεαταῖς.

Ugarit (<http://ugarit.ialigner.com/>)



What is Ugarit?

- web-based tool for manual alignment of parallel corpora
- the first aim was to generate accurate training dataset for our automatic word alignment system
- translation pairs are downloadable in different formats
- crowdsourcing project (cumulative results)
- serves also as reading environment and learning tool

Ducat (<https://github.com/eumaeus/ducat>)

- “Daughter of Ugarit” Citation alignment tool
- For alignment between citable passages of texts
- Integrated with CITE and CTS protocols (<http://cite-architecture.org/ctsurn/>)

Ducat “Daughter-of-Ugarit Citation Alignment Tool.” Version 1.3.0
urn:cts:greekLit:tlg0012.tlg001.allen:5.655 ▲ Add Text Load Passage from URN Clear All

Saved Alignments: 0 1 2 3 4 5 6 7 8 9

New alignment:

All Versions Load Texts for 10 Alignments remove

Homeric Epic, Iliad (Perseus Greek, following Allen) urn:cts:greekLit:tlg0012.tlg001.allen:5

5
5.655 ὡς φάτο Σαρπηδών , ὁ δ' ἀνέσχετο μεῖλινον ἔγχος
5.656 Τληπόλεμος · καὶ τῶν μὲν ἀμαρτῆ δούρατα μακρά
5.657 ἐκ χειρῶν ἤίξαν · ὁ μὲν βάλεν αὐχένα μέσσον
5.658 Σαρπηδών , αἰχμὴ δὲ διαμπερές ἥλθ' ἀλεγεινή ·
5.659 τὸν δὲ κατ' ὄφθαλμῶν ἐρεβεννῇ νῦν ἐκάλυψε .
5.660 Τληπόλεμος δ' ἄρα μηρὸν ἀριστερὸν ἔγχεῖ μακρῷ
5.661 βεβλήκειν , αἰχμὴ δὲ διέσσυτο μαιμώσα
5.662 ὀστέω ἐγχρυμφθεῖσα , πατήρ δ' ἔτι λοιγὸν ἄμυνε .
5.663 οἱ μὲν ἄρ' ἀντίθεον Σαρπηδόνα διοι ἑταῖροι
5.664 ἐξέφερον πολέμοιο · βάρυνε δέ μιν δόρυ μακρὸν
5.665 ἐλκόμενον · τὸ μὲν οὖ τις ἐπεφράσατ' οὐδὲ νόησε
5.666 μηροῦ ἐξερύσαι δόρυ μεῖλινον ὄφρ' ἐπιβάνη
5.667 σπευδόντων · τοῖον γάρ ἔχον πόνον ἀμφιέποντες .

All Versions Load Texts for 10 Alignments remove

Alexander Pope, Iliad (Furman Ed. 2019) urn:cts:fufolio:pope.iliad.fu2019:5.68

5.68
5.68.1 He said: both javelins at an instant flew;
5.68.2 Both struck, both wounded, but Sarpedon's slew;
5.68.3 Full in the boaster's neck the weapon stood,
5.68.4 Transfix'd his throat, and drank the vital blood;
5.68.5 The soul disdainful seeks the caves of night,
5.68.6 And his seal'd eyes for ever lose the light.

All Versions Load Texts for 5 Alignments remove

CITE/CTS is ©2002–2019 Neel Smith and Christopher Blackwell. Licensed under the GPL 3.0. Sourcecode on GitHub.

http://folio2.furman.edu/ducats/iliad_example.html?urn=urn:cts:greekLit:tlg0012.tlg001.allen:5&urn=urn:cts:fufolio:pope.iliad.fu2019:5.68&urn=

Resources

Link to [Ugarit iAligner](#)

[More Information on the Digital Rosetta Stone project](#)

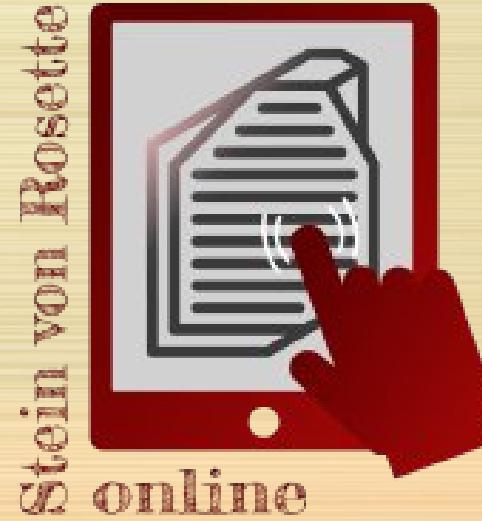
“The Digital Rosetta Stone: textual alignment and linguistic annotation.”

(Slides by Monica Berti, Julia Jushaninowa, Franziska Naether, Giuseppe G. A. Celano, Polina Yordanova.)

Available at:

https://www.academia.edu/25184052/The_Digital_Rosetta_Stone_Textual_Alignment_and_Linguistic_annotation

Two Projects on the Rosetta Stone



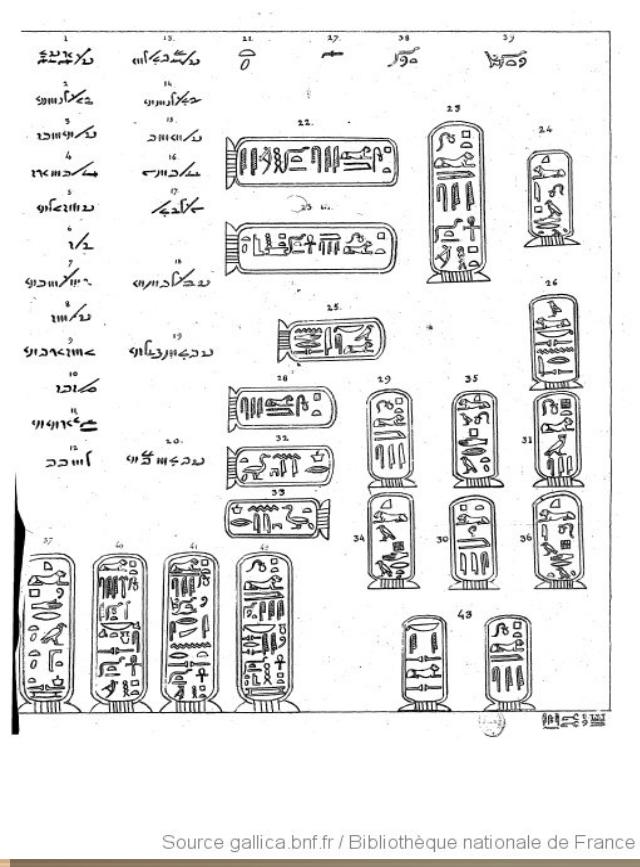
The British Museum



Sächsische Akademie
der Wissenschaften
zu Leipzig



J. F. Champollion (1790-1832) and the decipherment of Egyptian (1822)



[Joconde database](#): entry [000PE000522](#),
public domain

The DFHG Project



<http://www.dfhg-project.org>

FRAGMENTA
HISTORICORUM GRÆCORUM

HECATÆI	ANTIOCHI	CLITODEMI
CHARONIS	PHILISTI	PHANODEMI
XANTHI	TIMÆI	ANDROTIONIS
HELLANICI	EPHORI	DEMONIS
PHERECDYDIS	THEOPOMPI	PHILOCHORI
ACUSILAI	PHYLARCHI	ISTRI

A POLLODORI BIBLIOTHECA
CUM FRAGMENTIS.
AUXERUNT, NOTIS ET PROLEGOMENIS ILLUSTRARUNT,
INDICE PLENISSIMO INSTRUXERUNT
CAR. ET THEOD. MULLERI.
* ACCEDUNT MARMORA PARIUM ET ROSETTANUM,
HOC CUM LETRONNII, ILLUD CUM G. MULLERI COMMENTARIIS.



PARISIIS,
EDITORE AMBROSIO FIRMIN DIDOT,
INSTITUTI REGII FRANCÆ TYPOGRAPHO.
M DCCC XL.

INSCRIPTION GRECQUE
DE ROSETTE.

TEXT ET TRADUCTION LITTÉRALE,
ACCOMPAGNÉE
D'UN COMMENTAIRE CRITIQUE, HISTORIQUE ET ARCHÉOLOGIQUE,
PAR M. LETRONNE,

MEMBRE DE L'INSTITUT ROYAL DE FRANCE; MEMBRE ÉTRANGER DES ACADEMIES DES SCIENCES DE BERLIN,
DE COPENHAGUE, DE MUNICH ET DE TURIN; MEMBRE HONORAIRE DE LA SOCIÉTÉ ROYALE DE LONDRES.

AVEC UN FAC-SIMILE DU TEXTE GREC, ET PLUSIEURS DESSINS GRAVÉS SUR BOIS.



PARIS,
FIRMIN DIDOT FRÈRES, LIBRAIRES-ÉDITEURS.
IMPRIMEURS DE L'INSTITUT DE FRANCE,
RUE JACOB, 56.
M DCCC XLI.
TYPOGRAPHIE DE FIRMIN DIDOT FRÈRES.



Digital Epigraphy and Archaeology project

www.digitalepigraphy.org *

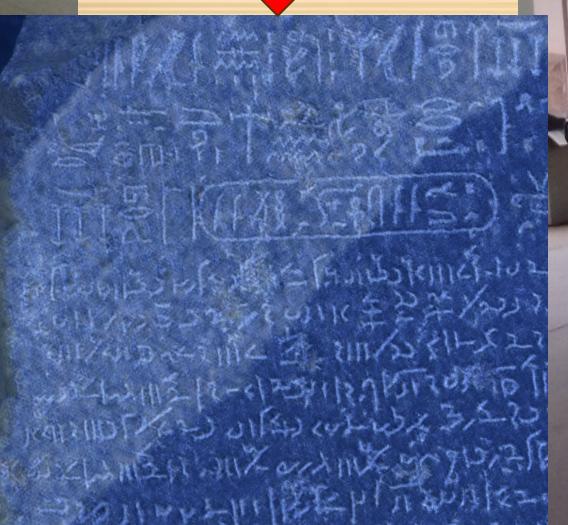
The screenshot displays the Digital Epigraphy Toolbox (v2.5 beta) interface. On the left, a large image of a paper cast of a Greek inscription from Column IG I3 475 is shown. The inscription consists of several lines of ancient Greek text in a square font. Below the image is a toolbar with icons for rotation, zoom, and other functions. To the right of the image, there is descriptive text: "Greek Column IG I3 475", "Description: Paper cast from the collection of the University of California Berkeley", "Material: Paper pulp", "Present location: University of California Berkeley", and "IG Number: I3 475". On the far right, a sidebar titled "Aleshire" lists several collections: "Digital Epigraphy and Archaeology database" (selected), "Epidaurica" (a collection of inscriptions from Epidaurus), "Tampa Museum of Art" (which contains archaeological exhibits from the Tampa Museum of Art), "The National Archives" (digitized exhibits from The National Archives [UK]), and "Monumentum Ancyranum" (a collection of fragments from the Res Gestae Divi Augusti inscription from Monumentum Ancyranum). The sidebar also features a search bar, a user icon, and a gear icon for settings.

* Made possible with initial funding from the National Endowment for the Humanities, Grant HD-51214-11

Scanning Setup



Foto: Gianluca Cumani



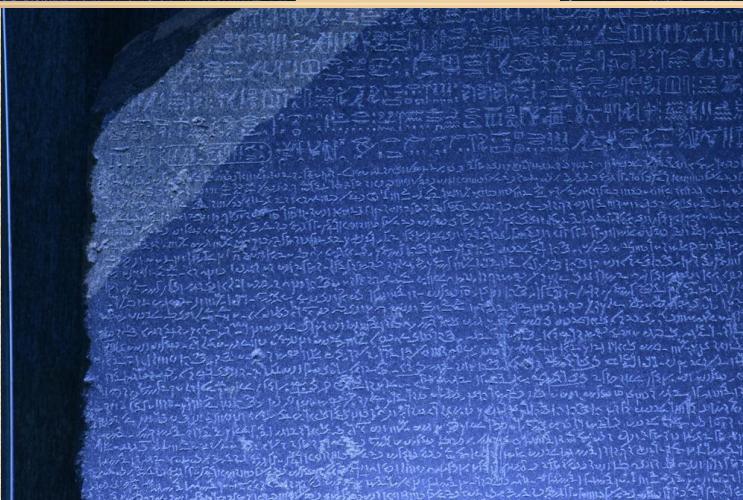
Shape from Shading (SFS)



Left



Top

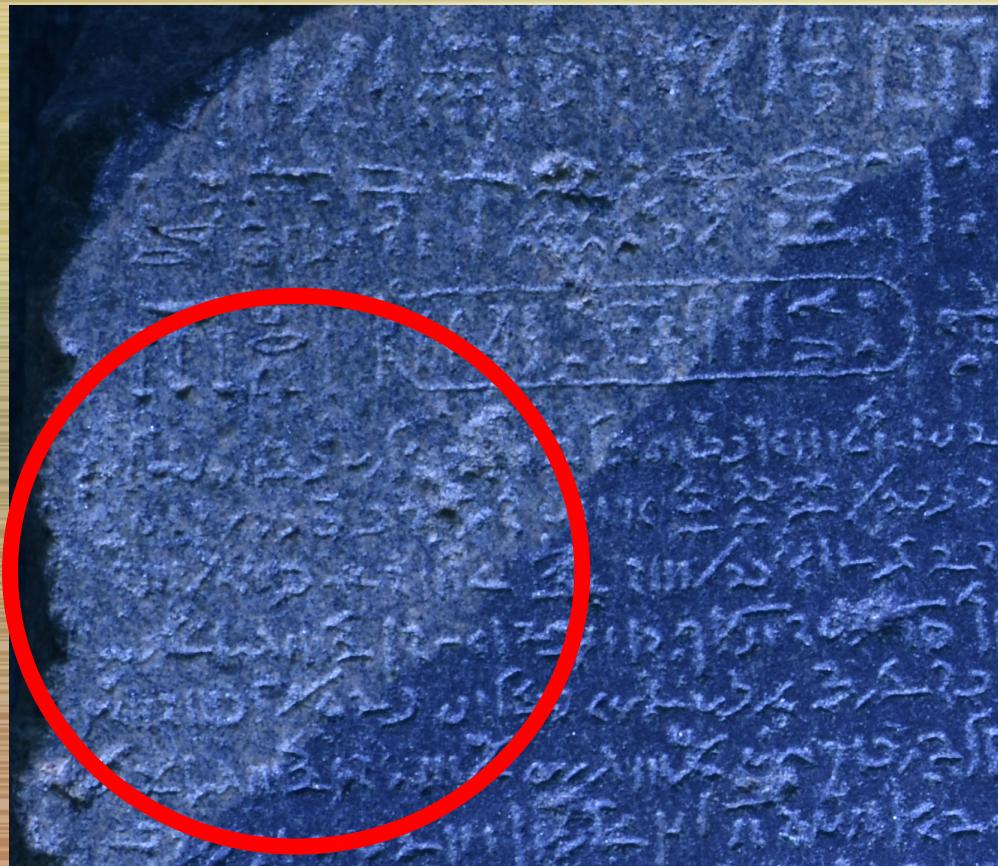


Bottom

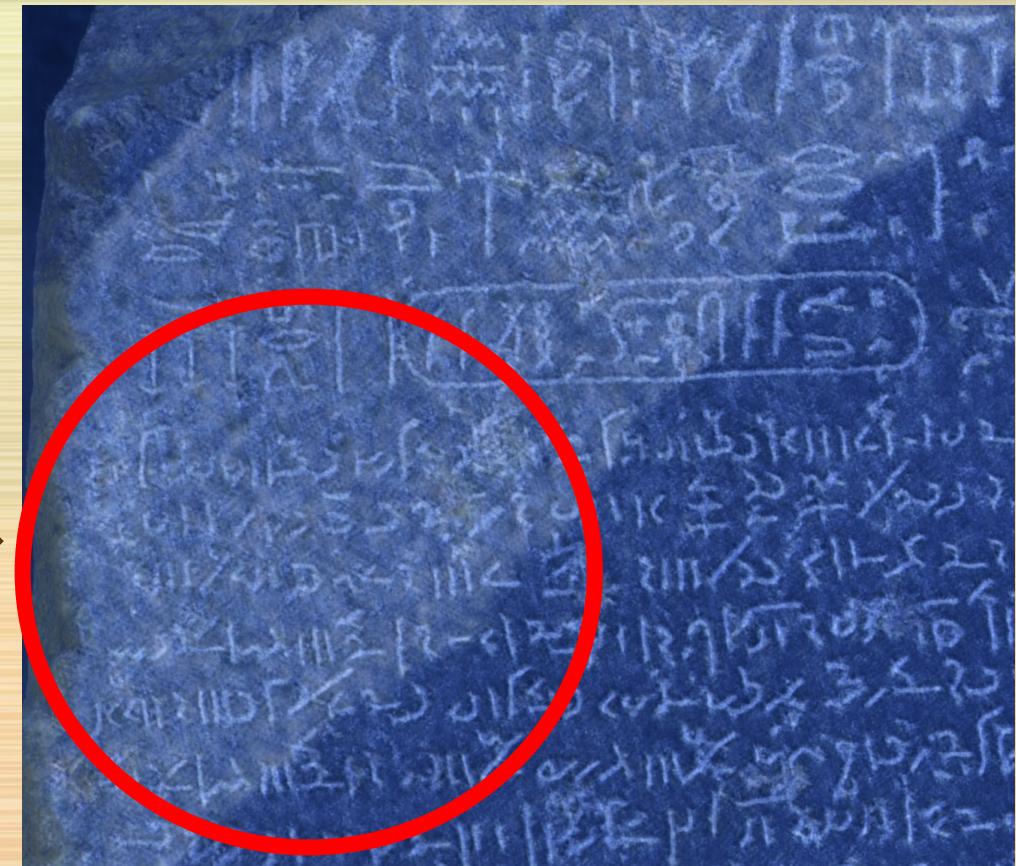


Right

Light from four Directions



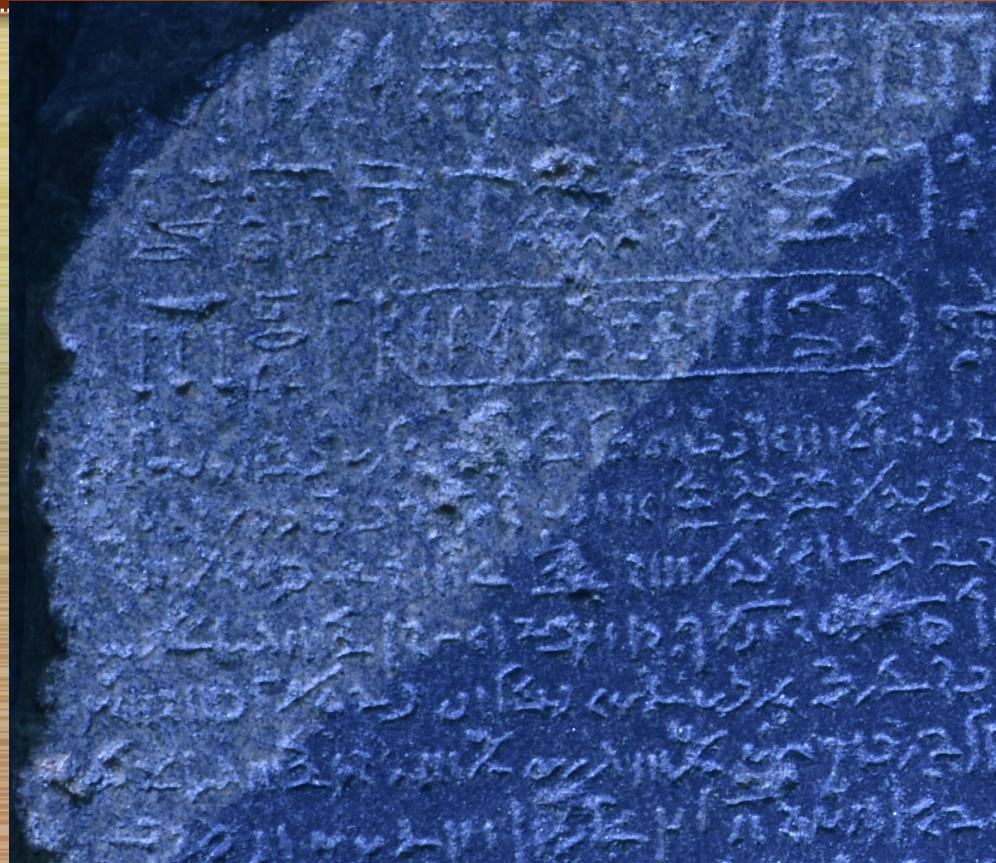
Raw Photograph



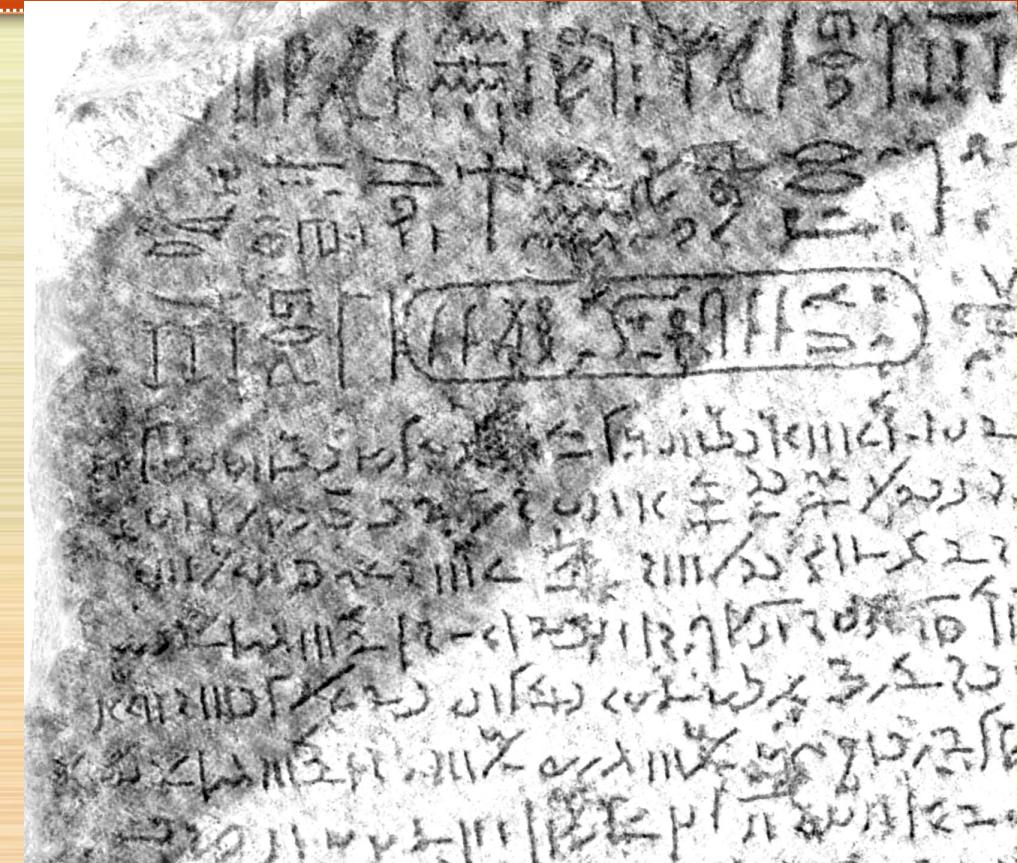
Quadri-directional lighting Shape-From-Shading*

* A. Bampoutis, E. Bozia, and R. Wagman (2010) "A novel framework for 3D reconstruction and analysis of ancient inscriptions", *Journal of Machine Vision and Applications* 21(6), pp. 989-998. <https://doi.org/10.1007/s00138-009-0198-7>

Reconstruction of Depth



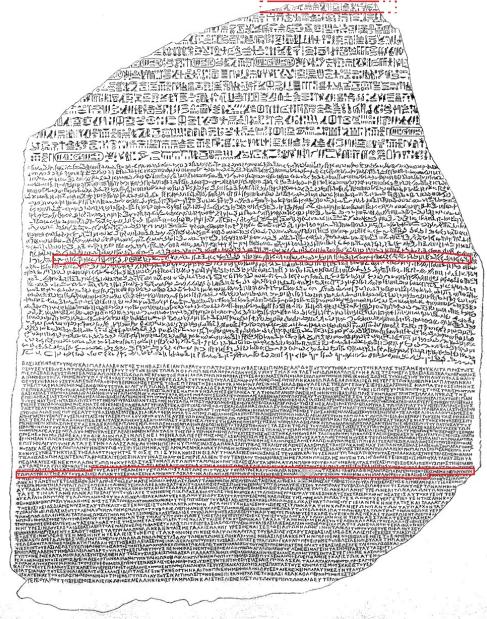
Raw Photograph



Reconstructed Depth Trace*

* R. Gallen, D. Eastop, E. Bozia, and A. Barmpoutis (2015) "Digital imaging: the application of shape-from-shading to lace, seals and metal objects" *Journal of the Institute of Conservation* 38(1), pp. 41-53.
<https://doi.org/10.1080/19455224.2014.999004>

The Rosetta Stone in synopsis - example (§27)



[Embed](#) [Show Translation Pairs](#) [Alignment Statistics](#)



Synopsis HDG 27

Digital Rosetta Stone / The Rosetta Stone (synoptic version II)

Created on 2018-07-24 10:50:58

Modified on 2024-07-24 09:08:51

Translated by Quirke/Andrews 1988: 16-22

Aligned by Digital Rosetta Stone

Hieroglyphic Egyptian

|x+1 [...] [sbj . w] [j] sk ddb . w mš' wn=sn m tp=sn s :
tnm=sn [t (?)] š . w thj (?) =sn jdb . w-Hr [...]

|x+1 [...] as for those who gathered troops **and** were at their head , disturbing the nomes **and** injuring the banks of Horus [...]

Demotic Egyptian

n³ sb³ . w i . ir twtw mš' iw=w hpr h̄t=w r tbth n³ tš . w iw=w
gm' r n³ irpy . w iw=w h̄t p³ myt n Pr-⁹ irm p̄i=f it . t̄ di n³ ntr .
w ir=f ir-shy n-im=w (n) Mn-nfr hn p³ h̄b n p³ šsp t̄ l̄w (. t)
(n) Hri r-ir=f (n-) dr . t p̄i=f it . t̄ di=f sm³=w st (n) p³ ht

The enemies who had assembled an army **and** were at its head to disturb the nomes **and** do harm to the temples , abandoning the path of Pharaoh **and** his father , the gods granted that he prevail over them at Memphis during the festival of the assumption of the supreme office which he inherited from his father : he had them slain **at the stake** .

Ελληνική

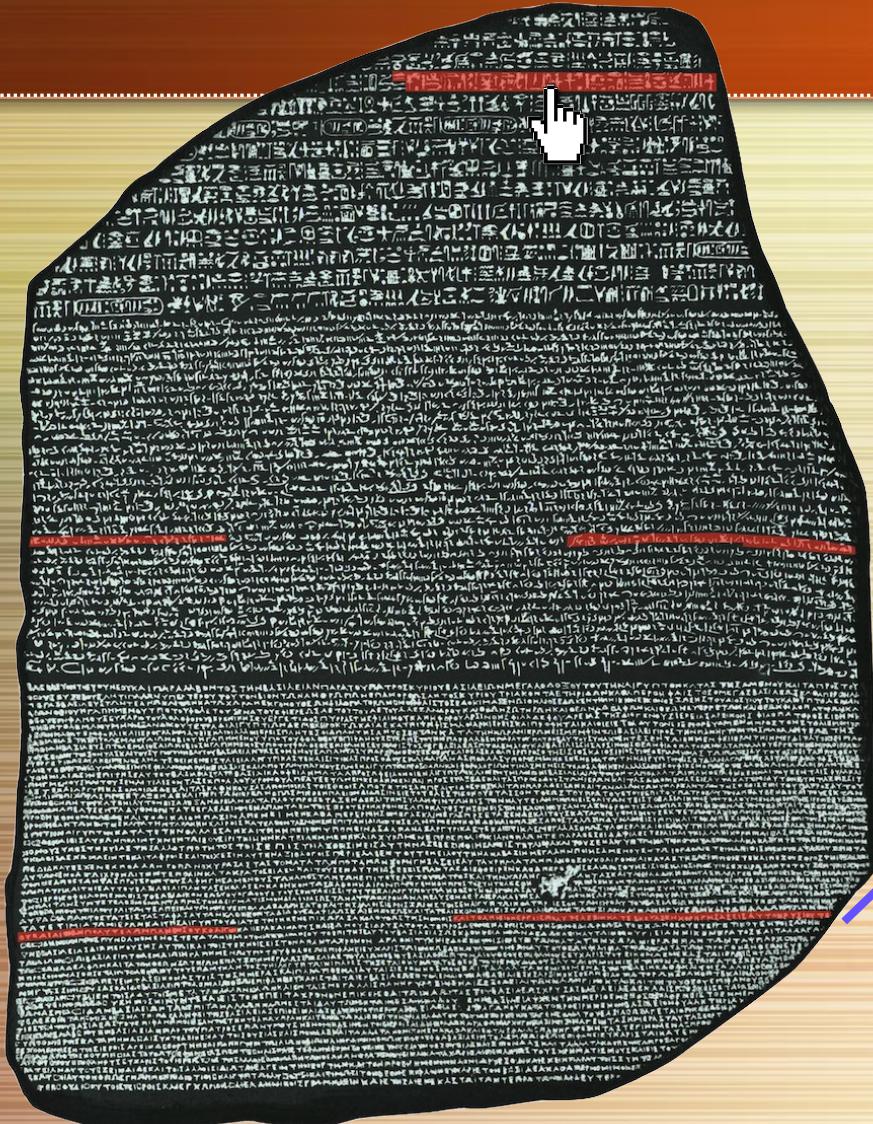
τοὺς δὲ ἀφηγησαμένους τῶν ἀποστάντων ἐπὶ τοῦ ἑαυτοῦ πατρὸς
καὶ τὴν χώραν ἐνο [χλήσ] αντας καὶ τὰ ιερὰ ἀδικήσαντας
παραγενόμενος εἰς Μέμφιν , ἐπαμύνων |28 τῷ πατρὶ καὶ τῇ
ἑαυτοῦ βασιλείᾳ , πάντας ἐκόλασεν καθηκόντως καθ' ὃν καιρὸν
παρεγενήθη πρὸς τὸ συντελεσθῆναι [αὐτῷ τ] ἀ προσήκοντα
νόμιμα τῇ παραλήψει τῆς βασιλείας

Those who had led the rebels in the time of his father **and** had troubled the land **and** done wrong to the temples , **when he came to Memphis , defending |28 his father and his kingdom , all he punished fittingly at the time he attended the celebrations of the proper ceremonies for the assumption of the kingship .**

Results

- There is *no* Rosettana decree in three languages
- The decree contains three rather free translations of the same content with variations:
 - 1:1 translations
 - (partial) omissions
 - additions (rare; uncertain cases because of lacunae)
 - changes in sequences (mostly nouns; rare)
 - (possible) mistakes
- These differences lead to some rather elaborated or elliptic passages
- Potential for further research

Visualization



```
<sentence sentenceID="sen_28">
  <language lang="demotic">
    <transcription>
      <line nr="19">di=f nb hd pr.t 'š?y irm k.t-h.t nkt wb? t? s.t Hp di=f mnq=w t?
      <line nr="20">(r) n?-̄n=s m-šs</line>
    </transcription>
    <translation trans-lang="ger">
      <line nr="19">Er gab viel Gold, Silber, Getreide und andere Dinge für das Apiei
      <line nr="20">(von) übermäßiger Schönheit (wörtl.: sie ist sehr schön).</line>
    </translation>
    <coordinates coordID="dem_028a">43,547,236,545,236,552,41,557</coordinates>
    <coordinates coordID="dem_028b">857,565,857,557,824,551,798,548,771,546,750,545,718
  </language>
  <language lang="ancient_greek">
    <transcription>
      <line nr="33">καὶ τὸ Ἀπιεῖον ἔργοις πολυτελέσιν κατεσκεύασεν χορηγήσας εἰς αὐτὸ χρ
      <line nr="34">ου καὶ λίθων πολυτελῶν πλῆθος οὐκ ὀλίγον</line>
    </transcription>
    <translation trans-lang="ger">
      <line nr="33">Und er hat den Apis-Tempel mit kostbaren Arbeiten ausgestattet, i
      <line nr="34">und kostbaren Steinen versah;</line>
    </translation>
    <coordinates coordID="grc_033">460,920,514,919,564,918,604,918,634,918,666,918,684,
    <coordinates coordID="grc_034">247,938,247,932,224,932,205,931,185,931,172,933,161,
  </language>
</sentence>
```

More about the project

- Online exhibition (DE/ENG):
<https://ausstellungen.deutsche-digitale-bibliothek.de/rosetta-stone/>
- TED-Ed talk:
https://youtu.be/Z8dZSySRX_g?feature=shared
- Coming up soon: release of the photos, the 3D data and the Demotic treebanking
- SunoikisisDC Summer 2018 - Common Session 12:
<https://www.youtube.com/watch?v=s2zHi1OiN-A>



The Rosetta Stone Online

Leipzig project: <http://rosetta-stone.dh.uni-leipzig.de/rs/the-digital-rosetta-stone/visual-alignment-demo>

New website: <https://www.digital-rosetta-stone.org/>

Berlin project: <http://rosettastone.hieroglyphic-texts.net/>

ID no.:	PTOL_2940	PTOL_2945	PTOL_2950	PTOL_2955	PTOL_2960	PTOL_2965	PTOL_2970	PTOL_2975
Original spelling:								
Spelling analysis:	j-s	j-r-1-1-f	sw-w	wn-n	s	m	ARM&HAND/c-ARM&HAND/c-w-i	wn-n-n-y-CL-I
Traditional transliteration:	js	jr{i}f	sw(t)	wn(n)	=s	m	c.wi	wnn.y(w)
Glossing transliteration (with links to dictionary):	js	jr <i>f</i>	sw <i>t</i>	w <i>nn</i>	-s	m=	c-w <i>i</i>	w <i>nn:y-w</i>
Linguistic gloss:	PTCL	PTCL	PTCL	be:SBJV	-3SG.F	in=	arm&hand(M)-DU.STC=	be:PTCP.DISTR-M.PL
Word by word:	also	so	and	may_be	-it	in	hands_of	beings
Wort für Wort:	auch	somit	und	mag_sein	-es	in	Hände_von	Seiende

Translation (Quirke & Andrews 1988):

Furthermore, it will be possible for those who so wish to set up a likeness of this shrine of the God who appears, possessor of goodness, and to cause it to be in their homes and to celebrate these festivals and processions every month and every year ||

EXPERIMENTAL: Neural Machine Translation for Coptic

[Coptic Translator](#), Andrew Megala and Maxim Enis

Coptic Translator



English ▾



Sahidic ▾

Type or paste English text here

Sahidic Coptic translation

EXPERIMENTAL: Large Language Models and Egyptian

THOTH AI:

Translation and analysis for Egyptian and Coptic

based on Claude LLM

by So Miyagawa

古代オリエント博物館クローズアップ展特設ページ

[Click to get to So Miyagawa's website
for the THOTH AI Teacher](#)

THOTH: Ancient Egyptian AI Teacher



Exercise 1

TLA Exercise:

- Go to the latest version of the [Thesaurus Linguae Aegyptiae \(TLA\)](#), the electronic corpus of Egyptian texts.
- Familiarize yourself with the text corpus by searching for a literary text: the Late Egyptian wisdom text "The Teaching of Amenemope" from the period of the New Kingdom ('cheat sheet': relevant German terms are "Weisheitslehre", "Neuägyptisch", "Die Lehre des Amenemope")
- Look at the attestations. How many copies of the text do exist, which parts of the wisdom text do they preserve, and how are they dated?
- Load the papyrus with the sentences of the beginning of the text. Check out the different view of hieroglyphs, transliteration, (German) translation etc., and switch on/off the different options of the "annotation/block view", including the linguistic glossing.
- Check out the word "sbȝ.yt". What does it mean? When and where is it attested? What else does the TLA offer to find out about this word?

Exercise 2

Rosetta Stone exercise:

- Go to the [visual alignment](#) on the Digital Rosetta Stone.
- Hover over a line on the photograph. A transliteration of the line will appear, and matching passages in the other versions of the text will also be displayed. Click on a line to go to the aligned translation.
- Do this for several different lines. What words align perfectly? What words align imperfectly, or not at all? What words are missing across the texts? What is the overall percentage of matches? Are there any differences you can see between the various versions of the text?