

The remains of the text

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What Remains of the Text in the Heart of Those Who Remain?



The remains of the text ...



... the co-text ...



... the context ...



<https://www.pinterest.it/pin/492299802983409038/>

... and the reuse

Overview

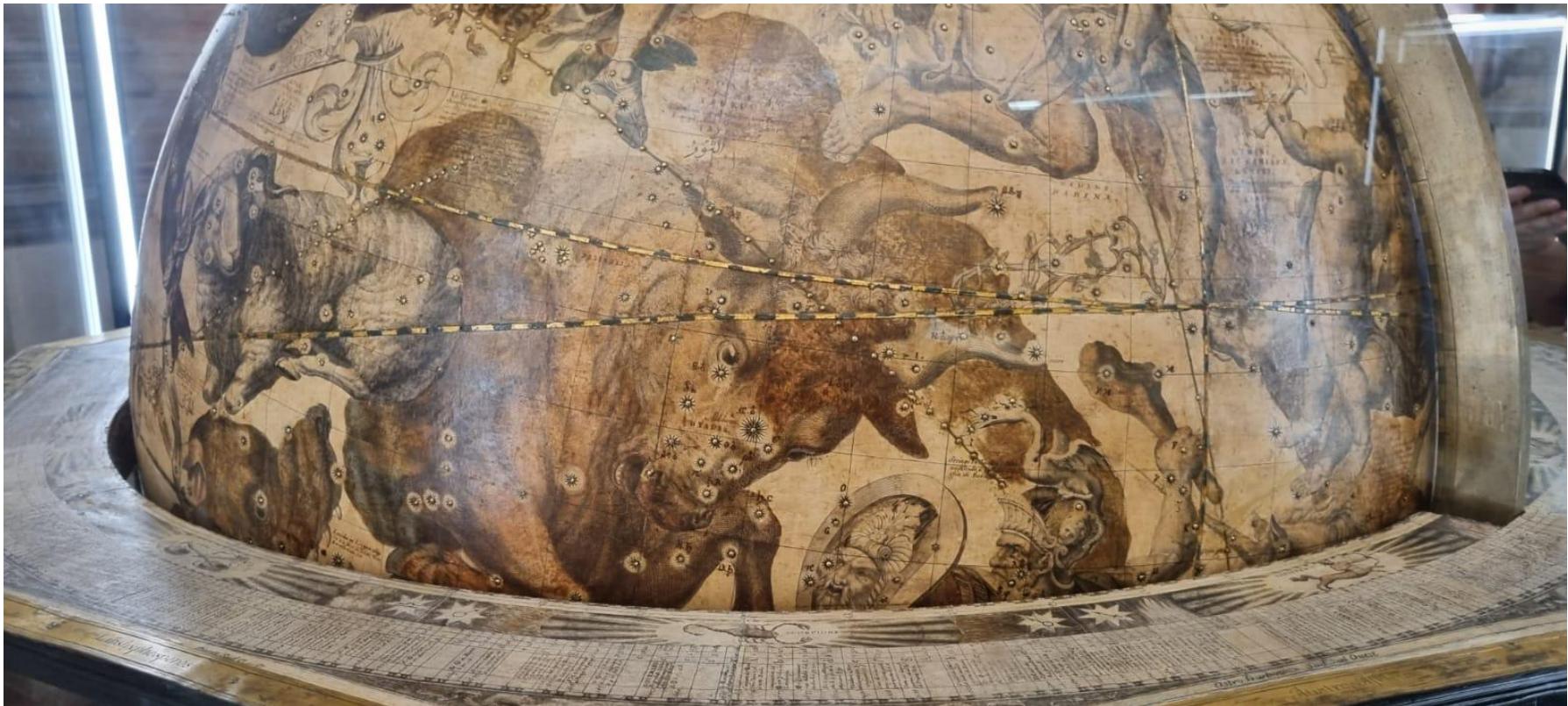
- Coronelli's *Epitome Cosmografica*
- Aratus' *Phaenomena* and the art of composing acrostics
- Latin poets between astronomy and mythology
- Lemmatisation and Semi-automated linguistic analysis of Latin texts
- Musisque Deoque: a powerful instrument to study intertextuality

... and then...

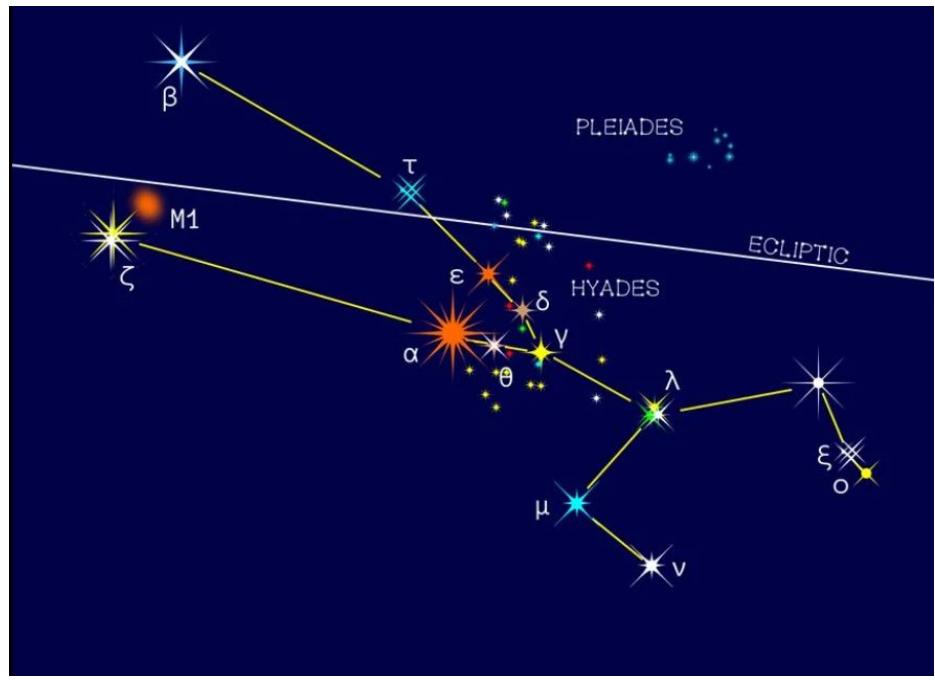
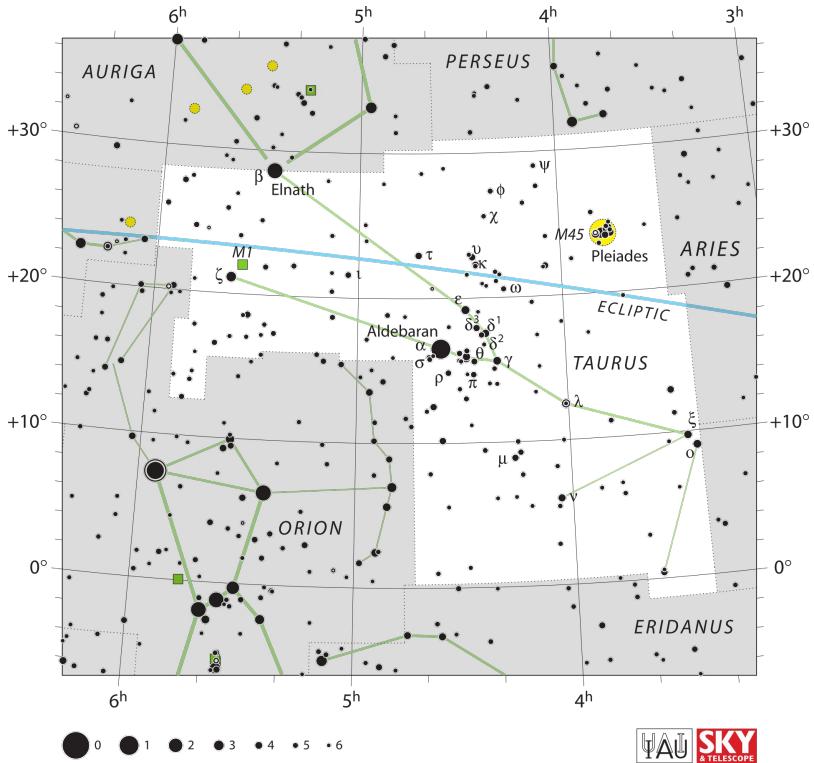
HANDS ON THE TEXTS!

CORONELLI'S SKY GLOBE

Coronelli's Sky Globe

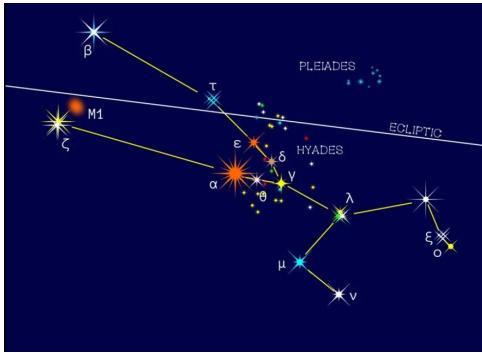


Coronelli's Sky Globe

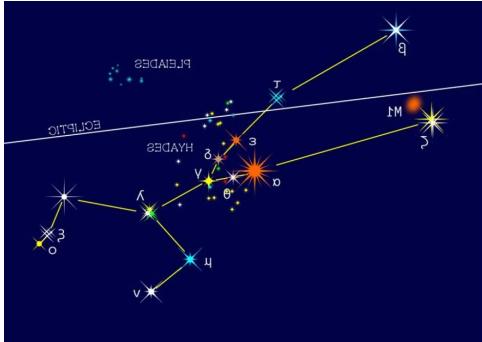


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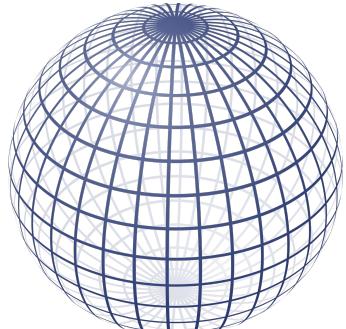
Inside or Outside the Sphere?



flip horizontally



Inside the celestial sphere



Outside the celestial sphere



Coronelli's *Epitome Cosmografica* (1693)

EPITOME COSMOGRAFICA,

COMPENDIOSA INTRODUZIONE

All'Astronomia, Geografia, & Idrografia,

Per l'Uso, Dilucidazione, e Fabbri-

Delle

SFERE, GLOBI, PLANISFERI, ASTROLABI,
E TAVOLE GEOGRAFICHE,

E particolarmente degli stampati, e spiegati nelle
PUBLICHE LETTIONI

DAL P. MAESTRO

VINCENZO CORONELLI M.C.
COSMOGRAFO
DELLA

SERENISSIMA REPUBLICA DI VENETIA,
e Lettore di Geografia in quella Università,
per l'Accademia Cognografica

DEGLI ARGONAUTI.



COLONIA, M DC LXXXIII.

Ad istanza di Andrea Poletti in Venetia.

CON PRIVILEGJ.

94 EPITOME COSMOGRAFICA

D E L T O R O

Costellazione XXX. e II. del Zodiaco.

Il Toro, ò Taurus, è la seconda Costellazione del Zodiaco, chiamata *Bibulum Caput, Bos, Portitor Europa, Istr*; dagli Arabi *Altair*, & *Attaww*, e da' Greci *Taurus*. Fù, conforme alle favole de' Poeti, trasportato da Giove in Cielo, in memoria di quando convertito in Toro, gli riusci di godere Europa; mà perché si vede solo nella Testa, e nel Petto, alcuni vollero dar questo nome ad Iō, figliuola d'Inaco, pur dalo stesso Giove goduta in forma di Vacca, e dagli Egizij adorata col nome d'Iside; mentre anche Ovidio disse:

*Vacca sit, an Taurus non sit cognoscere promptum;
Pars prior apparet, posteriori latent.*

Riceve la forma da 53 Stelle, 21 Settentroniali, fra le quali sono celebri le Pleiadi, e 32 Australi, che comprendono le Hiadi, più riguarderò. Le Pleiadi sono chiamate altrimenti *Septuaginta*, e *Vergili* dalla parola *Ver*, che significa Primavera, perchè compariscono nel fine di quella; fei si vedono chiare, l'ultima non si osserva mai; perciò il medesimo Ovidio scrisse nel terzo de' Fatti:

Quae septem dici, sex tamen esse solent.

& i nomi di queste furono *Elettra*, *Alcione*, *Celene*, *Taigeta*, *Asterope*, *Maià*, e della settima *Merope*, la quale favoleggiarono, che si nascosta, perchè si sposò a Sifiso, huomo mortale, mentre erano figlie d'Atlante, e della Ninfa Pleione, con la quale ebbe commercio Giove, e dal nome di essa furono dette Pleiadi.

Altri vogliono, che fossero figliuole di Licurgo, e di Nasso Ninfa, poi convertita in Isola, e che pe' l'merito d'haver allevato Bacco, e Giove le habbia unite alle Stelle.

Nel mezzo di queste ve ne sono altre 40 quasi invisibili; mà il Galileo nella sua Carta del Cielo le numerò solamente 36.

Maste-

LIBRO PRIMO.

95

Mastelino ne ha scoperto fin à 14. Gio: Battista Zuppo le calcolò 50 col Cannocchiale del Fontana.

Michiel Langreno alle sei ne aggiunse due, cioè il Padre Atlante, e la Madre Pleione; tutte 8 sono state collocate nel nostro Globo unite con l'altre all'Epoca 1700.

Altre sette fono le *Hiadi*, vicine al Palilio, detto Aldebarano, & all'occhio Austral del Toro, figliuole anch'esse d'Atlante, ed Etra, Sorelle d'Hiate, il quale pereferire stato lacerato da un Leone, si rilasciarono in così contenuto disperato pianto, che si ridussero vicine all'estremo; impietosifono perciò Giove, le trasferì nel Cielo, e dal nome del Fratello furono Hiadi chiamate, benche' i loro nomi distinti fossero *Ambrosia*, *Eudora*, *Pastore*, *Coronis*, *Pleauris*, *Pithe*, e *Tiche*.

No. ne mo. est. mo. Besi-	Co- ordi- nat. ezi-	NOMI DELLE STELLE	Regi- no del Zo- stico	Locus- dines.	Latit- udine.	Gradi- ezza.	Seri- le di taua di Gi-
G. M. S.	G. M. S.	G. M. S.	G. M. S.	G. M. S.	G. M. S.	G. M. S.	
25 1 q	Le Pleiadi, Elecira, ♂ ♂	26 43 0	4 8 40	V.	808		
25 2 q	Celene, ♂ ♂ ♂ ♂ ♂	24 45 10	4 15 35	VIII.	804		
25 3 q	Taygeta, ♂ ♂ ♂ ♂ ♂	24 52 10	4 13 36	VL	805		
25 4 q	Asterope, ♂ ♂ ♂ ♂ ♂	24 56 50	4 30 30	VIII.	806		
33 5 q	Merope.	24 59 30	3 52 30	VL	807		
33 6 q	Maià, ♂ ♂ ♂ ♂ ♂	25 0 20	4 22 36	VL	808		
33 7 q	La Padre Atlante.	25 46 20	3 50 20	VL	809		
33 8 q	La Madre Pleione.	27 47 20	3 53 0	VIII.	810		
32 9 w	Alcione, detta in Baiera <i>Lucida Pleiadum, ♂ ♂</i>	25 54 37	3 59 0	III.	811		
34 10 A	Nel Collo, ♂ ♂	29 14 0	1 12 30	V.	812		
34 11	Quella di mezzo nel Col- lo.	0 45 30	6 32 50	V.	813		
32 12	La boreale nel Collo, ♂	1 8 30	7 54 50	V.	814		
32 13	L'autralic ivi, ♂	1 27 0	5 15 50	VI.	815		
32 14	La boreale delle due sopra	3 48 30	5 45 40	V.	816		
32 15	L'autralic, ♂ ♂	3 57 0	3 57 10	V.	817		
32 16	L'autralic delle due sopra	4 1 0	0 27 30	IV.	818		
22 17	La boreale, ♂	4 17 0	1 40 20	V.	819		
20 18	Nel mezzo del Fronte, ♂	7 38 0	0 40 30	V.	820		
41 19 K	La precede, delle due nella Cima della Testa.	11 45 0	1 35 0	VI -	821		
20	La seguente.	13 15 0	0 38 0	VI -	822		
21	Nell'estremo del Corno boreale, ò nel Calzogno d'Auriga, ♂ ♀	18 22 47	5 20 30	II.	823		Stelle

Coronelli's Description of the Constellation Taurus

- Position in the Zodiac
- Latin names
- Arabic names
- Greek name
- Myth of Europa
- Myth of Io (alternative explanation)
- First Ovid's quotation
- Description of the stars
- Description of the Pleiades (some information by Hyginus)
- Second Ovid's quotation
- Myth of the Pleiades
- Variant of the myth
- Observations by telescope (Galileo, Mastelino, Zuppo)
- Description of the Hiades
- Myth of the Hiades

Translation

Taurus is the second Constellation of the Zodiac, called Bubulum Caput, Bos, Portitor Europae, Isis; by the Arabs Altaur and Attauuro, and by the Greeks Taupόc. It was, as the fables of the Poets say, transported by Jupiter to Heaven, in memory of when, converted into a bull, he succeeded in possessing Europa; but because it is seen only in the Head and Chest, some wished to give this honor to Ios, daughter of Inachus, also possessed by the same Jupiter when she had the form of a Cow, and by the Egyptians worshipped under the name of Isis. Ovid [Fasti, 4, 717-718] also said:

Whether it is cow or bull, it is not known.

The front part is clearly visible; the back part is hidden.

It receives its form from 53 Stars, 21 Northern, among which the Pleiades are famous, and 32 Southern, which include the more valuable Hiades. The Pleiades are also called Septistellium and Vergiliae from the word Ver, meaning Spring, because they appear at the end of that season; 6 are visible, the last one can never be seen. Therefore, Ovid himself wrote in the third book of the Fasti [4, 170]:

They are said to be seven, but they are only six.

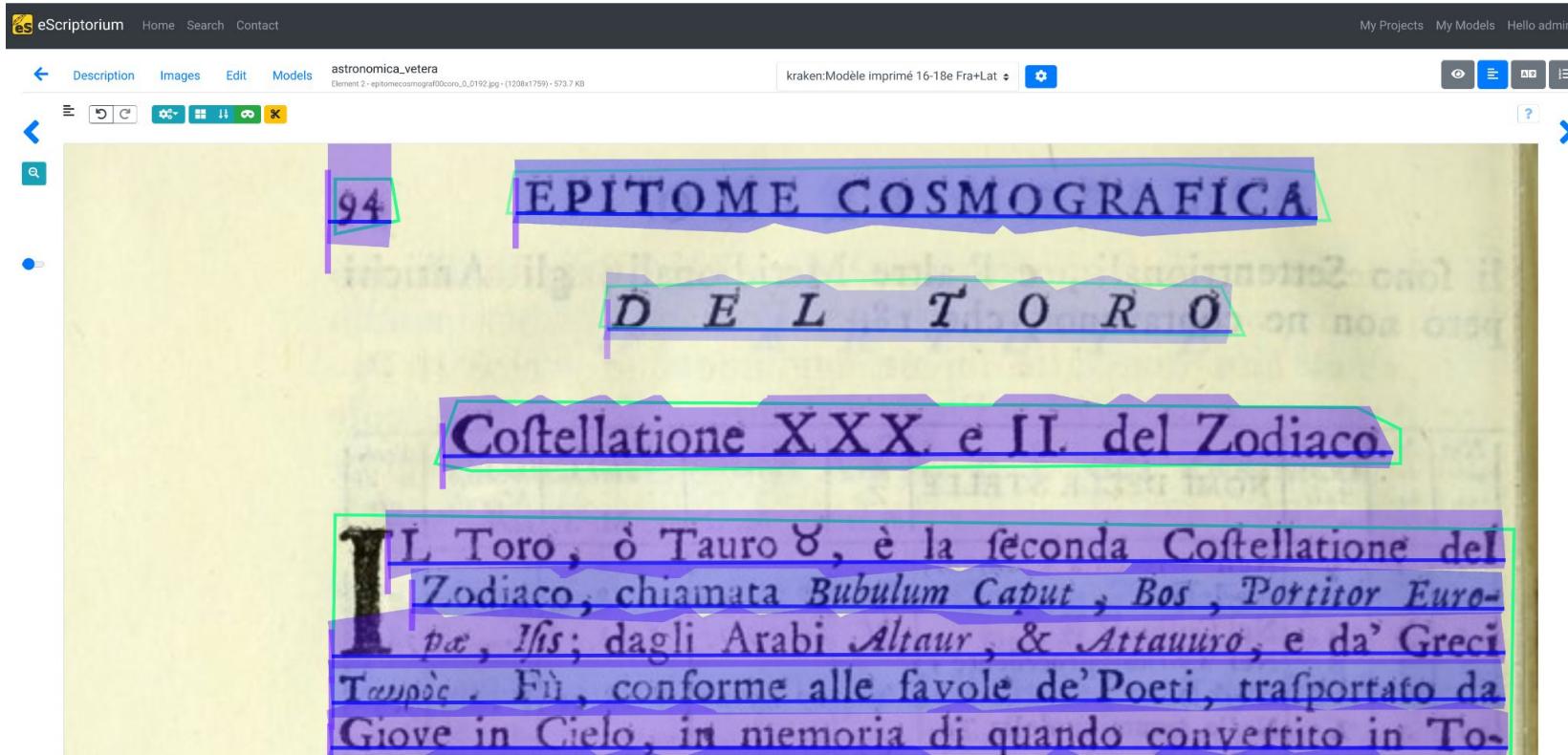
And the names of these were Electra, Alcyone, Celene, Taigeta, Asterope, Maia, and of the seventh Merope, who some narrate is hidden, because she married Sisyphus, a mortal man, although they were daughters of Atlas and the nymph Pleione, with whom Jupiter had dealings, and from her name they were called the Pleiades. Others tell that they were the daughters of Lycurgus and the Nymph Naxos, later converted to the Island, and that for the merit of having raised Bacchus and Jupiter she united them with the Stars. In the middle of these are another 40 almost invisible; but Galileo in his Chart of the Sky counted only 36. Mastelino discovered as many as 14; Giovanni Battista Zuppo counted 50 with Fontana's Cannocchiale. Michiel Langreno to the previous six added two, namely Father Atlas and Mother Pleione; all 8 were placed in our Globe along with the others. There are seven others, called Hiades, near the Palilicum, called Aldebaranus, and the Southern eye of Taurus, daughters also of Atlas et Etra, Sisters of Hiante, who for being torn by a Lion, gave themselves up to a despairing and uninterrupted weeping, that they strayed to the extremity; therefore Jupiter, moved by the situation, transferred them to Heaven, and by the name of the Brother they were pitied Hiadi, though their names were Ambrosia, Eudora, Pasitoe, Coronis, Plexauris, Pitho, and Tiche.

Text Acquisition by eScriptorium: Layout Analysis

The screenshot shows a digital interface for managing historical documents. At the top, there's a navigation bar with links for Home, Search, Contact, My Projects, My Models, and Hello admin. Below the header, the document title is 'astronomica_vetera' and the element number is 'Element 2 - epitomecosmografico_0192.jpg - (1208x1759) - 573.7 KB'. The main content is a page from a printed book. The page has a green header bar with the text 'EPITOME COSMOGRAFICA' and a green subtitle bar below it with the text 'Costellazione XXX. e II. del Zodiaco.' and the number '94'. The main text block begins with a large, bold, black capital letter 'I'.

IL Toro, ò Tauro ♂, è la seconda Costellazione del Zodiaco, chiamata *Bubulum Caput*, *Bos*, *Portitor Europæ*, *Isis*; dagli Arabi *Altaur*, & *Attauiro*, e da' Greci *Taupòς*. Fù, conforme alle favole de' Poeti, trasportato da Giove in Cielo, in memoria di quando convertito in To-

Text Acquisition by eScriptorium: Masks and line Bases



Text Acquisition by eScriptorium: OCR

eScriptorium Home Search Contact

Element 2 - epitomecosmografico_00000_D_0192.jpg - (1208x1799) - 573.7 KB

astronomica_vetera

← Description Images Edit Models kraken:Modèle imprimé 16-18e Fra+Lat ⚙

Line #12

L' **Toro**, o **Tauro**, è la seconda Costellazione del Zodiaco, chiamata **Bubulum Caput**, **Bos**, **Portitor Europa**; dagli Arabi **Altaur**, & **Attauuro**, e da' Greci **Taurac**. Fù, conforme alle favole de' Poeti, trasportato da Giove in Cielo, in memoria di quando convertito in Toro, gli riuscì di godere Europa; mà perchè si vede solo nella Testa, e nel Petto, alcuni vollero dar questo honore ad Iò, figliuola d'Inaco, pur dallo stesso Giove goduta in forma di Vacca, e dagli Egittij adorata col nome d' Iside; mentre anche Ovidio diffe:

Vacca sit, an Taurus non est cognoscere promptum?
Pars prior apparet, posteriora latent.

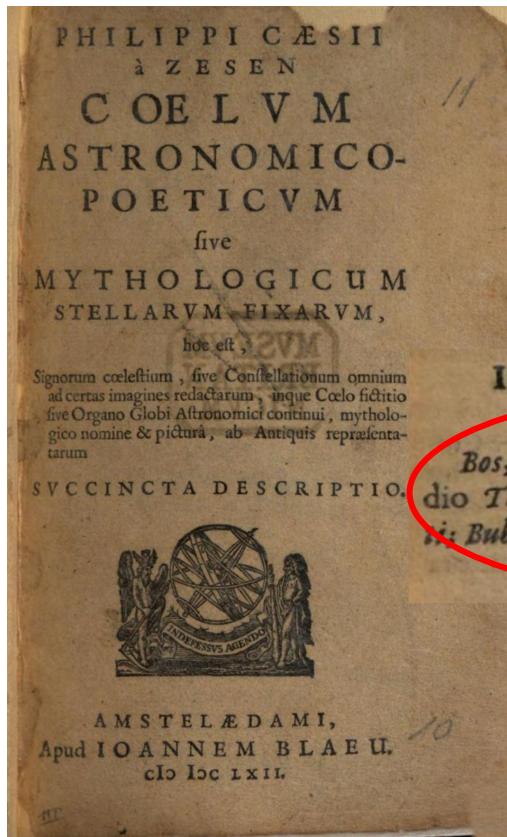
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Caesius' *Coelum astronomico-poeticum* (1662)



Taurus, qui recentioribus tantum dimidiis pingitur, Plinio, & Vitruvio integer erat; ac in cauda ejus Pleiades, quæ nunc in fronte, locabantur: quamquam & aliis eadem seorsim à Tauro sint effictæ. Cæterum Vacca, an Taurus constellatio hæc censerit, & utrum ad Iovem, an ad scortum ejus referri debeat, inter ipsos fabularores antiquos ambigitur. Hinc Ovidius: Vacca sit, an Taurus, non est cognoscere promptum. Pars prior apparet, posteriora latent. Seu tamen est Taurus, five hoc est femina signum, Iunone invita munus amoris habet.

II. TAURVS, der Stier / sive der Farre:

Bos, Portitor Europeæ, Proditor Europeæ; Ovidio Taurus Candidus; Manilio Princeps armenii; Bubulum caput; Io, Ovidio Inachis, Virgilio; Georg.

Has nempe à cæsura Tauri ad originem cervicis traduxere polteri. Idem l. 4 Faistorum, verl. 167, & seqq. Pleiades incipiunt humeros relevare paternos; quæ septem dici, sex tamen esse solent:

Ovid's Quotations in Coronelli

Iside; mentre anche Ovidio disse:

*Vacca sit, an Taurus non est cognoscere promptum;
Pars prior appetet, posteriora latent.*

Iside; mentre anche Ovidio disse:

```
<quote source="#Ovid???>
    <i n="???">Vacca sit, an Taurus non est cognoscere promptum;</i>
    <i n="???">Pars prior appetet, posteriora latent.</i>
</quote>
```

missing
information

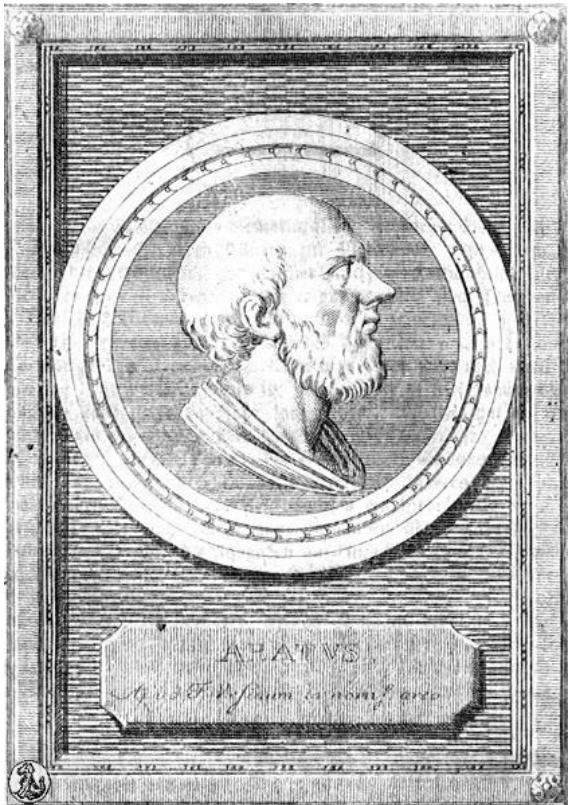
medesimo Ovidio scrisse nel terzo de' Fasti:
Quæ septem dici, sex tamen esse solent.

medesimo Ovidio scrisse nel ~~<choice><sic>terzo</sic><corr>??</corr></choice>~~ de' Fasti:

```
<quote source="#Ovid_fasti_???">
    <i n="???">Quæ septem dici, sex tamen esse solent.</i>
</quote>
```

ARATUS

Aratus and the *Phainomena*



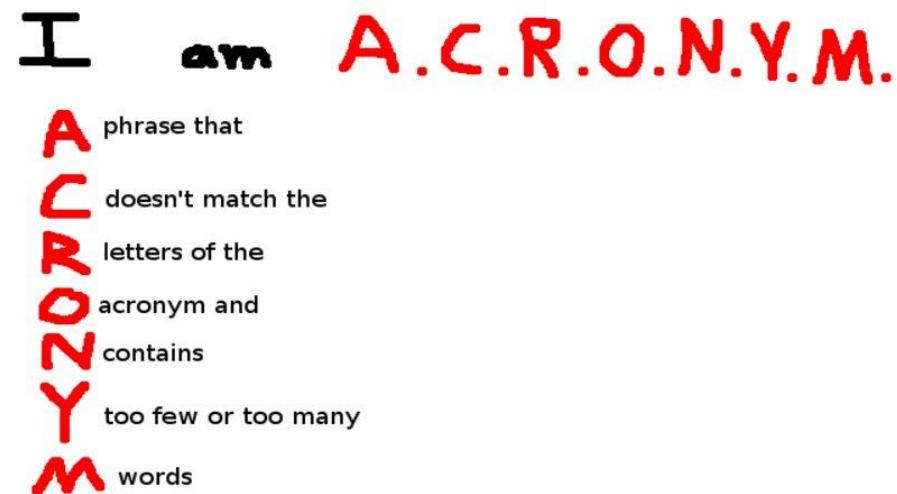
Aratus of Soli (3rd century BC) was a Greek didactic poet who wrote a poem in hexameters about the stars and their appearance (hence the title of his most famous work, **Phainómena**) and on the interpretation of astronomical signs for weather forecasting.

From the Hellenistic period until the late Middle Ages, the **Aratea** (a corpus of Latin translations and adaptations of Aratus' poem) were a common sourcebook for scholars interested in the study of **constellations**, the path of the Sun in the **Zodiac** and astronomical **meteorology**.

Aratus in Context

One of the most striking features of Hellenistic poetry is its emphasis on **stylistic experimentation**. Our attention today will be focused in particular on Aratus' **acrostics**, a literary device that we can identify also in epigraphic poems written in stone.

An **acrostic** is a poem or other composition in which the first letter (or syllable, or word) of each line (or paragraph, or other recurring feature in the text) spells out a word, message or the alphabet). The acrostic has to be intentional!



The Lepté Acrostic

785

λεπτή μὲν καθαρή τε περὶ τρίτον ἡμαρ ἔοῦσα
εὔδιός κ' εἶη, **λεπτή** δὲ καὶ εὖ μάλ' ἐρευθῆς
πνευματίη, **πταχίων** δέ καὶ ἀμβλείησι κεραίαις
τέτρατον ἐκ **τριτάτοιο** φώως ἀμενηνὸν ἔχουσα
ἢ νότῳ ἀμβλυνται **ἢ** ὕδατος ἐγγὺς ἔόντος.

(Arat. 783-787)

If [the Moon is] **slender** and clear about the third day, she will bode fair weather; if **slender** and very red, wind; if the crescent is thickish, with blunted horns, having a feeble fourth-day light after the third day, either it is blurred by a southerly or because rain is in the offing.

(transl. D. Kidd)

Acrostic “discovered” by Jean-Marie Jacques, October 21st 1959

AcroFinder (in Aratus and beyond)

A simple **Python tool** to identify acrostics in a literary corpus.

Two elements needed: the **text** and a **vocabulary** that matches the outputs with a list of possible words in a specific language (plus an eventual **character map** that adapts uppercase characters to lowercase).

```
for i in range(1,lineListLen):
    if i>lineListLen-minLen:
        continue
    for j in range(0,maxLen):
        uw=''
        if j<minLen:
            continue
        for k in range(0, j):
            try:
                uw=''.join([uw,ucm.getUpperWord(lineList[i+k][1][0])])
            except:
                pass
        try:
            result=ucm.getLowerWordList(uw)[0]
            if len(result)>(minLen-1) and not('' in result):
                print(f'{result}')
                for idx in range(i, i+len(result)):
                    print(f'{lineList[idx][0]}\t{lineList[idx][1]}')
                print()
        except:
            pass
```

AcroFinder Results

Cycling Aratus' poem through AcroFinder, the tool identified 55 possible instances of acrostics. Let's give (a couple of) them a closer look!

785	εῦδιός κ' εῖη, λεπτὴ δὲ καὶ εὗ μάλ' ἐρευθὴς πνευματίη· παχίων δὲ καὶ ἀμβλείησι κεραίαις τέτρατον ἐκ τριτάτοιο φόως ἀμενηνὸν ἔχουσα ἡὲ νότου ἀμβλύνετ' ἡ ὕδατος ἐγγὺς ἔόντος.	240	ἀμφοτέρης, ἡ δ' οὕτι τόση, μάλα δ' ἐστὶν ἐτοίμη εύρεσθαι· περὶ γὰρ πολέων εὐάστερός ἐστιν. Τῶν ὀλίγον Κριοῦ νοτιώτεροι ἀστέρες εἰσίν. Οἱ δ' ἄρ' ἔτι προτέρω, ἔτι δ' ἐν προμολῆσι νότοιο Ἰχθύες. Ἄλλ' αἰεὶ ἔτερος προφερέστερος ἄλλου,
-----	--	-----	---

O Tell me the Truth about...Acrostics

«In deciding whether the pattern is fortuitous, the length of the [acrostic] is important. Continuation of the message beyond four letters would prove that it was intended, though it might be disputed just how many more letters would be needed for proof. The converse is not true: the pattern may be intentional, even if it only covers one four-letter word and nothing significant follows. In that case, only additional evidence [...] would tell us for certain» (Hendry 1994)

«"Pray, Mr. Macaulay, do not you think that Buonaparte was the Beast?" "No, Sir, I cannot say that I do." "Sir, he was the Beast. I can prove it. I have found the number 666 in his name. [...] If you write Napoleon Buonaparte in Arabic, leaving out only two letters, it will give 666."» (Letter of July 1, 1834 in *Life and Letters of T. B. Macaulay*)

A Poem about Stars

Look at the stars!

Look how they shine for you,

Shine bright like a diamond

To infinity and beyond.

All that glitters is gold:

Rocket man,

Fly me to the Moon.

See you, space cowboy.

LLS
LLST
LLSTA
LLSTAR
LLSTARF
LLSTARFS ...

LST
LSTA
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LSTARF
LSTARFS ...

STA
STAR
STARF
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TARF
TARFS ...



LATIN POETS BETWEEN ASTRONOMY AND MYTHOLOGY

Index

1. Publius Vergilius Maro
2. Publius Ovidius Naso
3. Hyginus
4. Marcus Manilius
5. Marcus Valerius Martialis
6. Anthologia Latina
7. Martianus Capella
8. Basinio Basini
9. Giovanni Pontano

1. Publius Vergilius Maro

Vergilius (Mantua 70 BC, Brindisi 19 AD)

One of the greatest poets of the Augustan age, his major works include: *Bucolics*, *Georgics*, *Aenid*
Georgics are a didactic epic poem in 4 Books, written in hexameter.

IV Book: in the description of bees, honey harvesting is regulated on the Pleiades and the appearance of Taigete
(star belonging to the constellation Taurus)

→ Quotation from the IV Book:

Twice a year honeycombs are cleaned | twice it is harvest time: | as soon as, among the Pleiades, Taigete |
shows her graceful face to the earth | and scornfully repels with her foot the waves into the sea. | Or when,
fleeing the rainy stars of Pisces, | it descends sadly from the sky into the waters of winter.

SOURCES AND/OR MODELS: **Aratus**, *Phaenomena*: a didactic poem in which astronomical and meteorological topics are also dealt with.

2. Publius Ovidius Naso

Ovidius (Sulmona 43 BC - Tomi 17/18 AD)

Augustan age poet, his major works are the *Metamorphoses* and *Fasti*, with several points referring to the fields of astronomy and astrology. Also author of a (lost) compendium on the *Phaenomena* of Aratus.

Metamorphoses : Epic-mythological poem in 15 Books, a kind of encyclopedia of classical mythology. At least 3 explicit catasterisms are present. **Catasterism** = from greek καταστερίζω 'I place among the stars,' a process by which a hero or deity is turned into a star or constellation.

→ f.i.: the event of Callisto transformed into Ursa Major (II Book, vv. 505-507):

But the Omnipotent prevented it: removing them both, he removed | the crime, and lifting them into the air with a wind turbine, | placed them in the sky making them two contiguous constellations.

SOURCES AND/OR MODELS: **Aratus** (*Phaenomena*), **Eratosthenes** (*Catasterisms*)

3. Hyginus

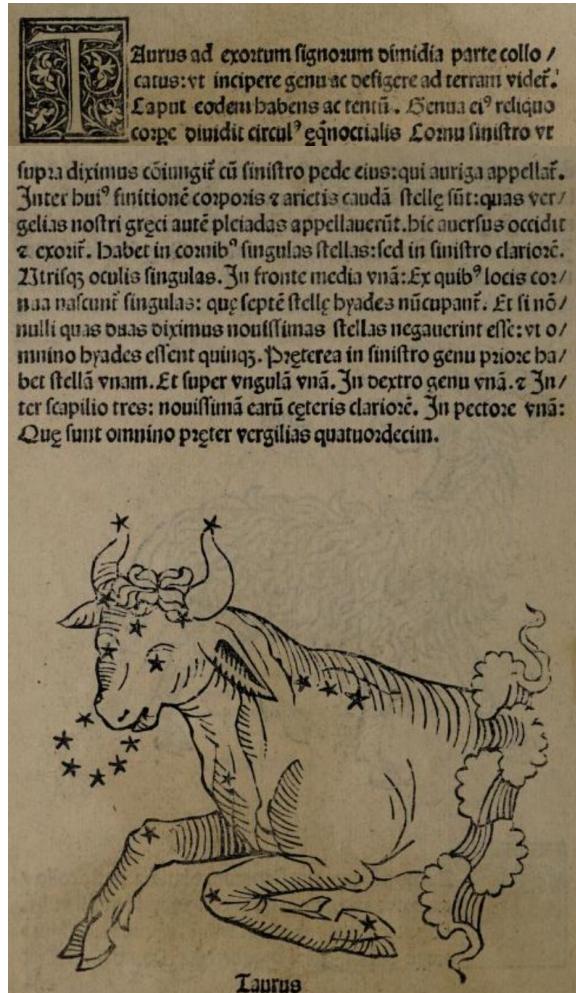
Hyginus, called the Astronomer (lived around the 1st century AD)

DE ASTRONOMIA: prose work divided into 4 Books and dedicated to the description of the Universe: stars, planets, constellations,...

→ Incipit constellation of Taurus (III Book)

Taurus is set toward the east, in the central part of the sky occupied by the zodiac signs; his knees point toward the ground; his head is slightly raised.

Also for him, sources and/or models are from the Greek tradition:
Aratus and **Eratosthenes**.



4. Marcus Manilius

Latin poet of Berber origin, born in the 1st century BC, in the Augustan age.

ASTRONOMICA: a didactic poem in 5 Books on astronomy and astrology: cosmos, constellations, planets. First work to deal extensively with the horoscope, that is the influence of the stars on man's destiny.

→ 1 book:

First Aries resplendent in its golden fleece marveling | looks back at Taurus rising in the direction opposite.] who with face and bowed forehead calls to Gemini, | to whom comes after Cancer, to Cancer Leo, Virgo to Leo.

[The underlined description also returns in Hyginus and Basinus]

SOURCES AND/OR MODELS: **Ovidius** (*Metamorphoses*), **Lucretius** (*De rerum Natura*) and **Aratus** (*Phaenomena*)

5. Martialis

Martialis (Augusta Bilbilis, Spain 38 AD - 104 AD) - poet of the Imperial Age

EPIGRAMMES: short, verse compositions featured by satire and parody of everyday events. Reuse of mythological elements in a polemical, satirical key.

6. The *Anthologia Latina*

ANTHOLOGIA LATINA: collection of verse compositions (6th century) - Late Imperial Age

It is a set of poems with didactic intent on various topics: poetry, medicine, hunting,...

Among them:

→ *Pervigilium Vèneris*: anonymous poem in which the figure of Venus is celebrated as the lady of life and rebirth, with mythological cues. One of the last pagan-inspired compositions of Latin literature, with reuse of mythological materials from the classical tradition

SOURCES AND/OR MODELS: **Vergilius** (*Georgics*), **Ovidius** (*Tristia*)

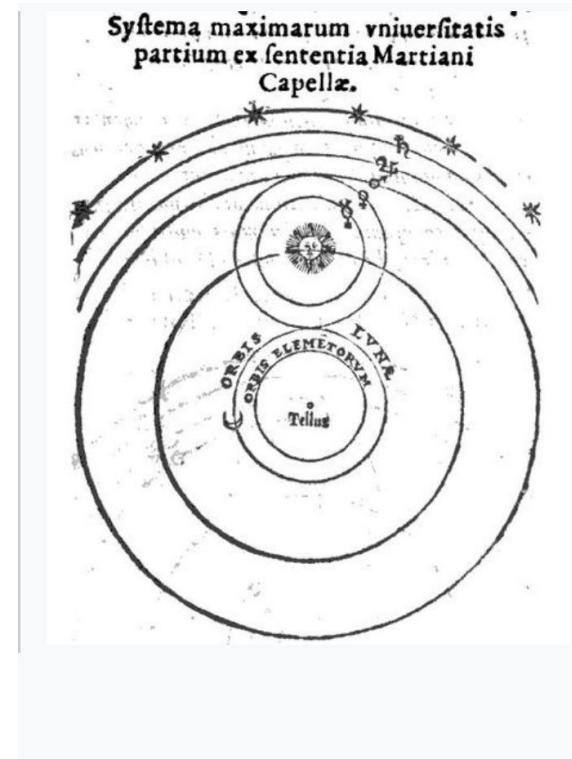
7. Martianus Capella

Martianus Capella was an African writer who lived at the turn of the 4th and 5th centuries, in late Imperial Age. He wrote the allegorical novel *De nuptiis Philologiae et Mercurii*.

De nuptiis Philologiae et Mercurii is a prosimeter, a mix of verse and prose, divided in 9 books. Is an allegorical work on the liberal arts (grammar, geometry, music,...). The VIII Book is on astronomy.

The figure illustrates the geo-heliocentric model of Heraclides Ponticus (a Greek philosopher) described by Martianus Capella.

SOURCES AND/OR MODELS for the astronomical Book:
Eratosthenes, Hyginus.



8. Basinio Basini

Basinio Basini, called Basinus Parmensis, was born in the XV century.

One of his works is ASTRONOMICA: it is a didactic poem in hexameters, divided into 2 Books, with an evident astronomical inspiration.

There are described constellations, planets, weather phenomena, ... This poem is the first attempt of Italian Humanism to refound the Latin tradition of astronomical subjects, after the work of Manilio.

→ ASTRONOMICA (I Book)

And indeed on the circle that equals nights to days, | Aries is the first sign, facing the eastern quarters,| which the great figure of the Triangle covers in snout and head.

SOURCES AND/OR MODELS: **Cicero** (*Somnium Scipionis*) known in the commentary of **Macrobius**, **Ovid** (*Fasti*), **Hyginus** (*De Astronomica*) and **Manilius**.

9. Giovanni Pontano

Giovanni Pontano was an important Italian philosopher, politician and diplomat of the XV century.

One of his works is URANIA, an astrological poem in hexameters that concerns the constellations and their influences on worldly phenomena. The writing expresses a naturalistic vision of astrological knowledge which refers to the modern rediscovery of the Ptolemaic astrological doctrine.

SOURCES AND/OR MODELS: **Ovid** (*Metamorphoses*), **Manilius** (*Astronomica*), **Basinus** (*Astronomica*)

LEMMATISATION

A Brief Introduction to Lemmatisation

1. What?

2. Why?

3. How?

3.1. Universal Dependencies

3.2. CoNLL-U

3.3. UDPipe

4. Let's try!

```
1 Hic hic PRON p-s---mn- Case=N
2 dicitur dico VERB v3spip---
3 inter inter ADP r----- _ 4
4 astra astrum NOUN n-p---na-
5 esse sum VERB v--pna--- Tens
6 constitutus constituo VERB v-
7 , , PUNCT u----- _ 8 punct
8 quod quod SCONJ c----- _
9 Europam europa NOUN n-s---fa
10 incolumem incolumis ADJ a-s-
11 transuerxit transuo VERB
12 Cretam Creta NOUN n-s---fa
13 , , PUNCT u----- _ 14 pu
14 ut ut SCONJ c----- _ 16
15 Euripides Euripides NOUN n-
16 dicit dico VERB v3spia---
17 . . PUNCT u----- _ 2 punc
```

1. What is Lemmatisation?

A Short Definition

- Lemmatization is one of the procedures of linguistic analysis
- Lemmatisation is the process of reducing an inflected form of a word to its canonical form
- The canonical form, or dictionary form, or citation form, or base form is called lemma
- A lemma is usually represented by a single word, disambiguated from those that have the same spelling

For example, in Latin:

1. *lego, legas, legavi, legatum, legare* ('to delegate') ≠ 2. *lego, legis, legi, lectum, legere* ('to collect, to read')

2. Why Lemmatise?

The Advantages of an In-depth Analysis

Lemmatisation

- allows a in-depth analysis of the language and its morphology
- identifies not only the base form of the word but also its part of the speech, a step necessary for the *Part-of-speech tagging*, i.e. the process of marking up a word (called *token*) in a text (*corpus*) as corresponding to a particular part of speech, based on both its definition and its context

Lemmatisation + POS-tagging

- are preparatory to the study of the syntactic structure of the period to which those single words belong
- the results of this kind of study are called *Treebanks*, i.e. parsed text corpus that annotates syntactic or semantic sentence structure following specific linguistic theory (e.g. phrase or dependencies structure)

3. How to Lemmatise?

Two Methods

Method #1

We can add specific attributes to the words/tokens of an XML document (see *Musisque Deoque*)

Method #2

We can refer to the format Conll-U, where multiple levels of analysis are represented: it shows not only the results of the lemmatization but also of the syntactic analysis and of the relationships between the parts of speech, according to the standard of *Universal Dependencies*

3.1. Universal Dependencies

<https://universaldependencies.org>

Universal Dependencies (UD) is a framework for consistent annotation of grammar (parts of speech, morphological features, and syntactic dependencies) across different human languages

▶  Irish	2	131K		IE, Celtic
▶  Italian	8	858K		IE, Romance
▶  Japanese	8	2,849K		Japanese
▶  Javanese	1	2K		Austronesian, Javanese
▶  Kaapor	1	<1K		Tupian, Tupi-Guarani
▶  Kangri	1	2K		IE, Indic
▶  Karelian	1	3K		Uralic, Finnic
▶  Karo	1	2K		Tupian, Purubora-Ramarama
▶  Kazakh	1	10K		Turkic, Northwestern
▶  Khunsari	1	<1K		IE, Iranian
▶  Kiche	1	10K		Mayan
▶  Komi Permyak	1	<1K		Uralic, Permic
▶  Komi Zyrian	2	10K		Uralic, Permic
▶  Korean	3	446K		Korean
▶  Kurmanji	1	10K		IE, Iranian
▶  Latin	5	977K		IE, Italic

3.2. CoNLL-U Format

<https://universaldependencies.org/format.html>

The .conllu format is divided into columns, where each column represents a level of analysis, from the first indicating the token number, to the last indicating the position of that particular token in the sentence, through the declaration of the identification number of the character(s) in the parsed string, useful for reconstructing the original text

Id	Form	Lemma	UPosTag	XPosTag	Feats									
						Head	DepRel	Deps	Misc					
# generator = UDPipe 2, https://lindat.mff.cuni.cz/services/udpipe														
# udpipe_model = latin-lct-ud-2.6-200830														
# udpipe_model_licence = CC BY-NC-SA														
# newdoc														
# newpar														
# sent_id = 1														
# text = Ego sum.														
1	Ego	ego	PRON	p p[1 s - - m n]	Case=Nom Gender=Masc Number=Sing Person=1 PronType=Prs	2	nsubj	_	TokenRange=0:3					
2	sum	sum	AUX	v v[1 s p j a - -	Mood=Ind Number=Sing Person=1 Tense=Pres VerbForm=Fin Voice=Act	0	root	_	TokenRange=4:7					
3	.	.	PUNCT	Punc	_	2	punct	_	SpaceAfter=No TokenRange=8:9					

1. **ID**: Word index, integer starting at 1 for each new sentence; may be a range for multiword tokens; may be a decimal number for empty nodes (decimal numbers can be lower than 1 but must be greater than 0)
2. **FORM**: Word form or punctuation symbol
3. **LEMMA**: Lemma of word form
4. **UPOS**: [Universal part-of-speech](#) tag (17 categories)
5. **XPOS**: Language-specific part-of-speech tag, underscore if not available
6. **FEATS**: List of morphological features from the [universal feature inventory](#) or from a defined [language-specific extension](#)
7. **HEAD**: Head of the current word, which is either a value of ID or zero (0)
8. **DEPREL**: [Universal dependency relation](#) to the HEAD ([root](#) if HEAD = 0)
9. **DEPS**: Enhanced dependency graph in the form of a list of head-deprel pairs
10. **MISC**: Any other annotation (e.g. Token Range)

3.3. UDPipe for a Semi-automated Analysis

<https://lindat.mff.cuni.cz/services/udpipe/>

UDPipe is a trainable pipeline for tokenization, tagging, lemmatization and dependency parsing of CoNLL-U files. UDPipe is language-agnostic and can be trained given annotated data in CoNLL-U format. Trained models are provided for nearly all UD treebanks.

Steps:

1. Choose a tokenized text
2. Choose the model
3. Input the text and process
4. Check and eventually correct the results
5. View the graphic representation of the treebank

4. Let's Try to Lemmatise!

Exercise. Choose the model *lttb*; enter the following Latin sentence in UDPipe and process; check the results (cols. 1–4): are they correct?; if not, what should we do?

Hic dicitur inter astra esse constitutus ,
quod Europam incolumem transuixerit
Cretam , ut Euripides dicit .

*[The Bull] was placed among the stars
because it carried Europa safely to Crete,
as Euripides says*

Hyginus, *Astronomica*, II, XXI: Taurus

If at first you don't succeed, try, try again!

i.e. Change the model and choose a more appropriate one for the language you are dealing with.

MUSISQUE DEOQUE

MQDQ Galaxy: *Corpora* and Technology



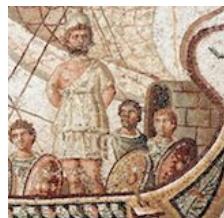
Musisque Deoque

- Poetic texts in Latin language from **origin** to **VII sec.** A.D.
- 276 authors, 642 works, 343.709 verses, 170.785 word-types, 2.300.000 tokens ca.



Poeti d'italia in lingua latina

- Poetic texts in Latin concerning Italian culture from **1250** to **1600**
- 315 authors, 839 works, 486.404 verses, 169.549 word-types, 3.200.000 tokens ca.



Hellenica

- Small corpus of Greek texts
- 10 authors, 31 works, 116.316 verses, 94.998 word-types, 880.000 tokens ca.



Pedecerto: Metrical scanning of Latin Texts

Musisque Deoque: Components and Process

Critical apparatus encoding

Encoding varia lectio (readings) for the available critical texts

2

Metrical analysis of the verses

Critical texts are analyzed by a rule-based metrical processor

4

Web exploitation and presentation

Query the corpus via Web Graphical User Interface

5

1
Texts encoding
Editing and encoding for data and metadata

3
Digital Archive and indexing
Textual processing to provide scholars with an advanced search engine

Official github site:
<https://github.com/mqdq-galaxy>



XML/TEI: Text Encoding (*Ouidius fasti* 4, 717-718)

```
<TEI xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.tei-c.org/ns/1.0">
    <teiHeader>
        <fileDesc> ...
        </fileDesc>
        <encodingDesc> ...
        </encodingDesc>
        <profileDesc> ...
        </profileDesc>
    </teiHeader>
    <text>
        <body>
            <div1 xml:id="d001" type="section" decls="#md" met="E">
                <head> ...
                </head>
                <!-->
                <l xml:id="d0041715" n="715">De duce lanigeri pecoris, qui prodidit Hellen,</l>
                <l xml:id="d0041716" n="716">Sol abit: egresso uictima maior adest.</l>
                <l xml:id="d0041717" n="717">Vacca sit an taurus non est cognoscere promptum:</l>
                <l xml:id="d0041718" n="718">Pars prior apparent, posteriora latent.</l>
                <l xml:id="d0041719" n="719">Seu tamen est taurus siue est hoc femina signum,</l>
                <l xml:id="d0041720" n="720">Iunone inuita munus amoris habet.</l>
                <!-->
            </div1>
        </body>
    </text>
</TEI>
```

XML/TEI: Critical Apparatus Encoding

```
<1 xml:id="d071l6" n="6">
  <w xml:id="d071w32">Concordem</w>
  <w xml:id="d071w33">satiat</w>
  <w xml:id="d071w34">sed</w>
  <w xml:id="d071w35">rudis</w>
  <w xml:id="d071w36">agna</w>
  <w xml:id="d071w37">famem.</w>
</1>
<1 xml:id="d071l7" n="7">
  <w xml:id="d071w38">Quid</w>
  <w xml:id="d071w39">meruit</w>
  <w xml:id="d071w40">terror</w>
  <w xml:id="d071w41">Nemees,</w>
  <w xml:id="d071w42">quid</w>
  <w xml:id="d071w43">portitor</w>
  <w xml:id="d071w44">Helles,</w>
</1>
<1 xml:id="d071l8" n="8">
  <w xml:id="d071w45">Vt</w>
  <w xml:id="d071w46">niteant</w>
  <w xml:id="d071w47">celsis</w>
  <w xml:id="d071w48">lucida</w>
  <w xml:id="d071w49">signa</w>
  <w xml:id="d071w50">poli?</w>
</1>
```

Available via CLARIN VLO at <http://hdl.handle.net/20.500.11752/OPEN-555>

```
<app from="#d071w43" to="#d071w43">
  <lem wit="#lw1-22 #lw1-32">portitor
    <add type="intertext">Cfr. Colum. X 155 <emph style="font-style:italic">mox ubi nubigenae
      Phixi nec portitor Helles</emph>; Lucan. IV 57 <emph style="font-style:italic">sidera
      respiciens delapsae portitor Helles</emph>; Ioh. Hauv. <emph
      style="font-style:italic">architr.</emph> IX 20 <emph style="font-style:italic">cui magis
      accedit trepidantis portitor Helles</emph>; 48 <emph style="font-style:italic">versa,
      priorque venit, quam pisces portitor Helles</emph></add>
  </lem>
  <rdg wit="#lw1-31">proditor
    <add type="intertext">Cfr. <emph style="font-style:italic">AL</emph> 616, 1<emph
      style="font-style:italic"> proditor est Helles et proditor Europaeus</emph></add>
    <ident n="d071w43">PRODITOR</ident>
  </rdg>
</app>
```

Martialis epigrammata 9, 71

Reference basis text: W. M. Lindsay, 1929

Editing of the digital edition: A. Fusi, 2010

MQDQ for the summer school: <http://omega.ilc.cnr.it/mqdq>

Texts for the Summer School: MQDQ & poetiditalia

aetas Augusti et Tiberii

Vergilius 70 - 19 a.



Ouidius 43 a. - 17/18 p.



Manilius aetate Tiberii



saec. I me. - II

Martialis fere 40 - 103



saec. IV me. - V

Martianus Capella saec. V

saec. VI - VII ex.

Boethius † 524



aetatis uariae

anthologia Latina aetatis uariae



carmina epigraphica aetatis uariae



Da Dante a Petrarca (1250 - 1374)|From Dante to Petrarca (1250 - 1374)

Alberico da Marcellise Venezia post 1340 - 1398

Umanisti del Quattrocento (1374 - 1494)|Humanists of the XVth century (1374 - 1494)

Basinio da Parma Tizzano 1425 - Rimini 1457

Pontano, Giovanni Gioviano Cerreto di Spoleto 1429 - Napoli 1503

Giovanni Gioviano Pontano

Cerreto di Spoleto 1429 - Napoli 1503

- *Uraniae libri* (B. Soldati, 1902)
- *meteororum liber* (B. Soldati, 1902)
- *de hortis Hesperidum* (B. Soldati, 1902)
- *eglogae* (B. Soldati, 1902)
- *Parthenopeus* (B. Soldati, 1902)
- *de amore coniugali* (B. Soldati, 1902)
- *de amore coniugali* (B. Soldati, 1902)
- *de amore coniugali* (B. Soldati, 1902)
- *de tumulis* (B. Soldati, 1902)
- *de tumulis* (B. Soldati, 1902)
- *de laudibus divinis* (B. Soldati, 1902)
- *hendecasyllabi* (B. Soldati, 1902)
- *iambici* (B. Soldati, 1902)
- *lyra* (B. Soldati, 1902)
- *Eridanus* (B. Soldati, 1902)
- *anecdota* (B. Soldati, 1902)

MQDQ Multi-word Search Using Wildcards: *vacc?*

Do Clear ?

Vacc? taur*

all the words any position in the verse +

Distance/Order

5 interposing words ▾

- 0 interposing words
- 1 interposing word
- 2 interposing words
- 3 interposing words
- 4 interposing words
- 5 interposing words**
- 6 interposing words
- 7 interposing words
- 8 interposing words
- 9 interposing words
- In text's unit

Search for LEMMAS ?

wild cards

Metres

Authors/works

715 Dě důcě lánigěří | pěcōrís, | quī | prōdīdit Héllen,
Sól ābít: ēgrēssō || uíctímā māiör ādést.
Váccă sít ān | taurús | nōn ēst | cōgnōscērē prōmptum:
Párs priör áppárét, || póstériórā lätént.
Séu tāměn ēst | taurús | sīuést | hōc | fémřnā sígnum,

Home Search Co-occurrences Indices M

: **vacc? near taur*** ↑ Indexes Export New search

OVID. am. 1, 10, 27 ► Non equa munus *equum*, non *taurum* uacca poposcit,
OVID. am. 3, 5, 38 ► Tu uir et in *uacca* compare *taurus* eras.
OVID. am. 3, 5, 41 ► Quod cunctata diu *taurum* sua *uacca* reliquit,
OVID. met. 4, 755 ► Ara louis media est; mactatur *uacca* Mineruae,
OVID. met. 13, 871 ► Surgit et, ut *taurus* *uacca* furibundus adempta,
OVID. fast. 4, 717 ▼ De duce lanigeri pecoris, qui prodidit Hellen,
Sol abit: egresso uictima maior adest.
Vacca sit an *taurus* non est cognoscere promptum:
Pars prior appetat, posteriora latent.
Seu tamen est *taurus* siue est hoc femina signum,

DDDS
DS—|DD—
DSSS
DS—|DD—
DSSS

MQDQ Lemma Search and Ambiguities (*late*)

Key

Distance/Order
3 interposing words Interval Search in the entered order only

Feature
 Search for FORMS Search for LEMMAS Show word-forms while using wild cards

Selection of lemmas	
LATE	<input checked="" type="checkbox"/> <i>fēro, ferre</i>
	<input checked="" type="checkbox"/> <i>lātē</i>
	<input checked="" type="checkbox"/> <i>lātēo, -ēre</i>
	<input checked="" type="checkbox"/> <i>lātūs, -a, -um</i>

Ok Annul

OVID. fast. 4, 718	Sol abit: egresso uictima maior adest. Vacca sit an taurus non est cognoscere promptum: Pars prior appetet, posteriora latent . Seu tamen est taurus siue est hoc femina signum, Iunone inuita munus amoris habet.
OVID. fast. 4, 726	► Saepe tuli plena, februa tosta, manu;
BASINIO carm. 20, 127	► Lucanum, cursu fertur qui semper eodem.
BASINIO carm. 20, 274	► Nigrantis late nemoris, uiridante uel herba,
PONTANO Uran. 1, 20, 14	► Lustrabo, tumuloque feram solennia dona
PONTANO Uran. 1, 20, 158	► Inclusit, laterique auratum accinxit etensem.



The selection of lemmas does not prevent the interception of homographic forms belonging to other previously excluded lemmas

Varia Lectio Feature in MQDQ (*Portitor* - *Proditor*)

MQDQ

Home Search Co-occurrences Indices Metrical typology Epigraphica

7 occurrences for the key: **proditor**

OVID. am. 2
OVID. am. 3,
OVID. am. 4,
MART. epigr. 2, 1, 1, 1, 1
ANTH. Lat. 616, 1
CARM. epigr. CLE 01340, 1

portitor T *y* Cfr. Colum. X 155 *mox ubi nubigenae Phrixi nec portitor Helles; Lucan.*
IV 57 sidera respiciens delapsae portitor Helles; Ioh. Hauv. architr. IX 20 cui magis
accedit trepidantis portitor Helles; 48 versa, priorque venit, quam pisces portitor
Helles

proditor B *Cfr. AL 616, 1 proditor est Helles et proditor Europaeus*

consensus codicum LPQf

heui perlit auriga tyranni
horum gaudent nec mitibus herbis,
Concordem satiat sed rudis agna *famem.*
Quid meruit terror Nemees, quid **portitor** Helles,
Vt niteant celsi lucida signa poli?
Sidera si possent pecudesque feraeque mereri,

▼ 122 (= 616 R) HYLASIVS
Proditor est *Helles et proditor Europaeus*
Et Gemini iuuenes et pressus ab Hercule Cancer,
Horrendusque Leo sequitur cum Virgine *sancta*

► [Munde, tuas fug]io insidias, uale **proditor**: at t[e]

7

Exercises

Musisque Deoque website: <http://omega.ilc.cnr.it/mqdq>

Exercise #1. Search for: *portitor, proditor, taur**, *Europ**.

Exercise #2. Search for forms and lemmas of: *fero* (hint: for the forms, use *fer**, *tul**, *lat**).

Exercise #3. Consider the verse 490 from the second book of the *Astronomica* by Manilius:

Europam dorso retinentem cornua laeua

and search for Manilius' possible model(s).

Exercise #4. Search for co-occurrences of *corn** (lemma: *cornu*) and *aurat** (lemma: *auratus*) and evaluate possible relations among the texts.

Exercise #5. Are you able to find other interesting relations among Latin authors?

Thank you!

The remains of the text

Federico Boschetti,
CNR-ILC&VeDPH

Angelo Mario Del Grosso,
CNR-ILC&VeDPH

Agnese Macchiarelli,
VeDPH

Federico Tanozzi,
VeDPH

Jessica Puliero,
VeDPH



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Venice, July 12, 2022

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