Logic and Text Tree Mind Maps

An Exercise in Mind Mapping Ancient Text

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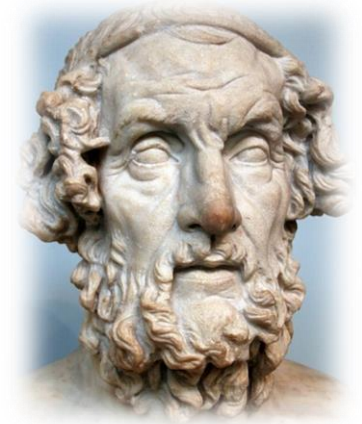P.vanEmdeBoas@uva.nl, ILLC-FNWI, University of Amsterdam.
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Odysseus and the Sirens,
British Museum

Homer

Homer, Odyssea

The ***Iliad*** and the ***Odyssey,*** are the two ancient Greek epic poems attributed to Homer.

The Odyssea follows the Greek hero Odysseus, king of Ithaca, and his journey home from Troy where he stayed for ten years.
His journey lasted for ten additional years, during which time he encountered many perils and all his crew mates were killed.

Odysseus and the Sirens, Roman mosaic, second century AD

On the later stages of Odysseus' journey, they sailed past the land of the Sirens. All of the sailors had their ears plugged up with beeswax, except for Odysseus, who was tied to the mast as he wanted to hear the song. He told his sailors not to untie him as it would only make him drown himself.
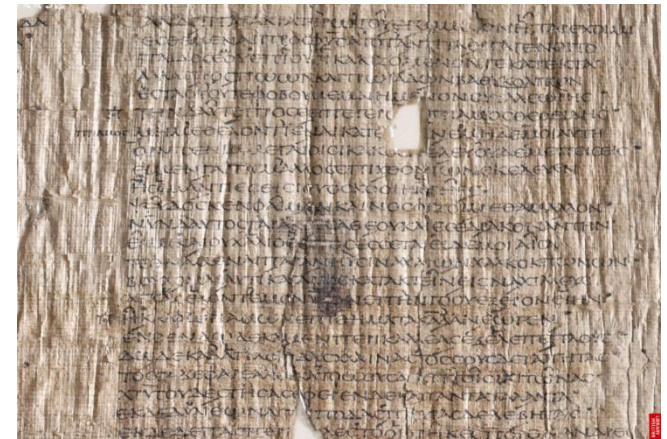
Early Representation of Text

A piece of Homer's Odyssea:

"Then, being much troubled in mind, I said to my men, 'My friends, it is not right that one or two of us alone should know the prophecies that Circe has made me, I will therefore tell you about them, so that whether we live or die we may do so with our eyes open. First she said we were to keep clear of the Sirens, who sit and sing most beautifully in a field of flowers; but she said I might hear them myself so long as no one else did. Therefore, take me and bind me to the crosspiece half way up the mast; bind me as I stand upright, with a bond so fast that I cannot possibly break away, and lash the rope's ends to the mast itself. If I beg and pray you to set me free, then bind me more tightly still.'

"I had hardly finished telling everything to the men before we reached the island of the two Sirens, for the wind had been very favourable. Then all of a sudden it fell dead calm; there was not a breath of wind nor a ripple upon the water, so the men furled the sails and stowed them; then taking to their oars they whitened the water with the foam they raised in rowing. Meanwhile I look a large wheel of wax and cut it up small with my sword. Then I kneaded the wax in my strong hands till it became soft, which it soon did between the kneading and the rays of the sun-god son of Hyperion. Then I stopped the ears of all my men, and they bound me hands and feet to the mast as I stood upright on the cross piece; but they went on rowing themselves. When we had got within earshot of the land, and the ship was going at a good rate, the Sirens saw that we were getting in shore and began with their singing.

(The Project Gutenberg eBook of The Odyssey, book XII, by Homer, translator Samuel Butler)

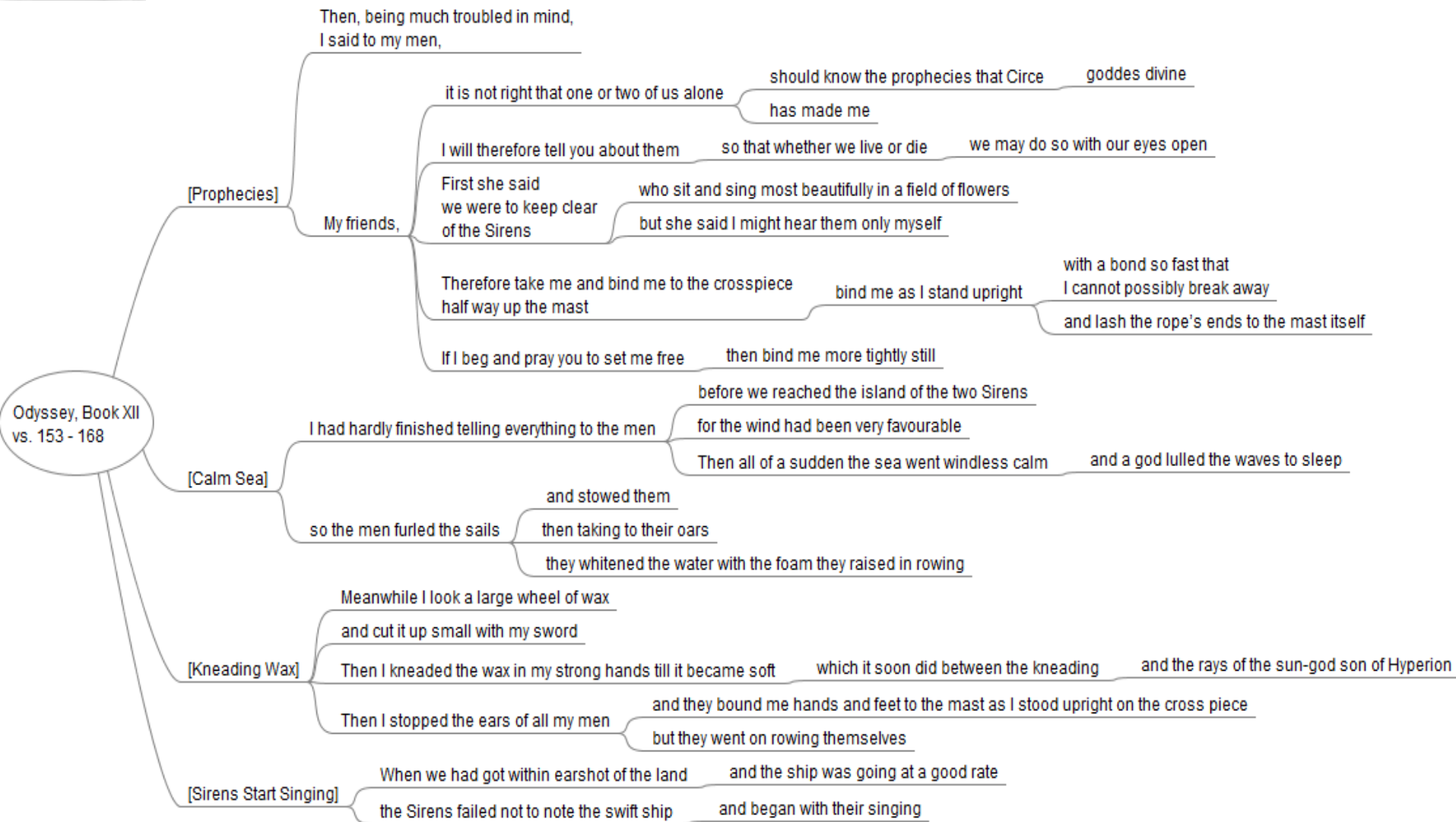Early papyrus rolls

Medieval representation

Greek text in Hexameters

δὴ τότ᾽ ἐγὼν ἑτάροισι μετηύδων ἀχνύμενος κῆρ·
‘ὦ φίλοι, οὐ γὰρ χρὴ ἕνα ἴδμεναι οὐδὲ δύ᾽ οἴους
θέσφαθ᾽ ἅ μοι Κίρκη μυθήσατο, δῖα θεάων·
ἀλλ᾽ ἐρέω μὲν ἐγών, ἵνα εἰδότες ἤ κε θάνωμεν
ἤ κεν ἀλευάμενοι θάνατον καὶ κῆρα φύγοιμεν.
Σειρήνων μὲν πρῶτον ἀνώγει θεσπεσιάων
φθόγγον ἀλεύασθαι καὶ λειμῶν᾽ ἀνθεμόεντα.
οἶον ἔμ᾽ ἠνώγει ὄπ᾽ ἀκουέμεν· ἀλλά με δεσμῷ
δήσατ᾽ ἐν ἀργαλέῳ, ὄφρ᾽ ἔμπεδον αὐτόθι μίμνω,
ὀρθὸν ἐν ἱστοπέδῃ, ἐκ δ᾽ αὐτοῦ πείρατ᾽ ἀνήφθω.
εἰ δέ κε λίσσωμαι ὑμέας λῦσαί τε κελεύω,
ὑμεῖς δὲ πλεόνεσσι τότ᾽ ἐν δεσμοῖσι πιέζειν.’
ἦ τοι ἐγὼ τὰ ἕκαστα λέγων ἑτάροισι πίφαυσκον·
τόφρα δὲ καρπαλίμως ἐξίκετο νηῦς ἐυεργὴς
νῆσον Σειρήνοιιν· ἔπειγε γὰρ οὖρος ἀπήμων.

αὐτίκ᾽ ἔπειτ᾽ ἄνεμος μὲν ἐπαύσατο ἠδὲ γαλήνη
ἔπλετο νηνεμίη, κοίμησε δὲ κύματα δαίμων.
ἀνστάντες δ᾽ ἕταροι νεὸς ἱστία μηρύσαντο
καὶ τὰ μὲν ἐν νηὶ γλαφυρῇ θέσαν, οἱ δ᾽ ἐπ᾽ ἐρετμὰ
ἑζόμενοι λεύκαινον ὕδωρ ξεστῇς ἐλάτῃσιν.
αὐτὰρ ἐγὼ κηροῖο μέγαν τροχὸν ὀξέι χαλκῷ
τυτθὰ διατμήξας χερσὶ στιβαρῇσι πίεζον·
αἶψα δ᾽ ἰαίνετο κηρός, ἐπεὶ κέλετο μεγάλη ἲς
Ἠελίου τ᾽ αὐγὴ Ὑπεριονίδαο ἄνακτος·
ἑξείης δ᾽ ἑτάροισιν ἐπ᾽ οὔατα πᾶσιν ἄλειψα.
οἱ δ᾽ ἐν νηί μ᾽ ἔδησαν ὁμοῦ χεῖράς τε πόδας τε
ὀρθὸν ἐν ἱστοπέδῃ, ἐκ δ᾽ αὐτοῦ πείρατ᾽ ἀνῆπτον·
αὐτοὶ δ᾽ ἑζόμενοι πολιὴν ἅλα τύπτον ἐρετμοῖς.
ἀλλ᾽ ὅτε τόσσον ἀπῆμεν ὅσον τε γέγωνε βοήσας,
ῥίμφα διώκοντες, τὰς δ᾽ οὐ λάθεν ὠκύαλος νηῦς
ἐγγύθεν ὀρνυμένη, λιγυρὴν δ᾽ ἔντυνον ἀοιδήν·

The English Text as a Text Tree Mind Map

Odyssey, Book XII vs. 153 - 168

[Prophecies]

Then, being much troubled in mind, I said to my men,

My friends,

it is not right that one or two of us alone — should know the prophecies that Circe — goddes divine — has made me

I will therefore tell you about them — so that whether we live or die — we may do so with our eyes open

First she said we were to keep clear of the Sirens — who sit and sing most beautifully in a field of flowers — but she said I might hear them only myself

Therefore take me and bind me to the crosspiece half way up the mast — bind me as I stand upright — with a bond so fast that I cannot possibly break away — and lash the rope's ends to the mast itself

If I beg and pray you to set me free — then bind me more tightly still

[Calm Sea]

I had hardly finished telling everything to the men — before we reached the island of the two Sirens — for the wind had been very favourable — Then all of a sudden the sea went windless calm — and a god lulled the waves to sleep

so the men furled the sails — and stowed them — then taking to their oars — they whitened the water with the foam they raised in rowing

[Kneading Wax]

Meanwhile I look a large wheel of wax

and cut it up small with my sword

Then I kneaded the wax in my strong hands till it became soft — which it soon did between the kneading — and the rays of the sun-god son of Hyperion

Then I stopped the ears of all my men — and they bound me hands and feet to the mast as I stood upright on the cross piece — but they went on rowing themselves

[Sirens Start Singing]

When we had got within earshot of the land — and the ship was going at a good rate

the Sirens failed not to note the swift ship — and began with their singing

The English Text as a Text Tree Mind Map

Then, being much troubled in mind,
I said to my men,

it is not right that one or two of us alone

I will therefore tell you about them   so t[...]

[Prophecies]

My friends,

First she said
we were to keep clear
of the Sirens

who sit and sin[...]

but she said I m[...]

Therefore take me and bind me to the cross[...]
half way up the mast

If I beg and pray you to set me free   the[...]

before [...]

I had hardly finished telling everything to the men   for the [...]

Then al[...]

Odyssey, Book XII vs. 153 - 168

[Calm Sea]

and stowed them

so the men furled the sails   then taking to their oars

they whitened the water with [...]

Meanwhile I look a large wheel of wax

and cut it up small with my sword

[Kneading Wax]   Then I kneaded the wax in my strong hands till it became [...]

and they boun[...]

Then I stopped the ears of all my men

but they went [...]

[Sirens Start Singing]

When we had got within earshot of the land   and the ship was going at a good rate

the Sirens failed not to note the swift ship   and began with their singing
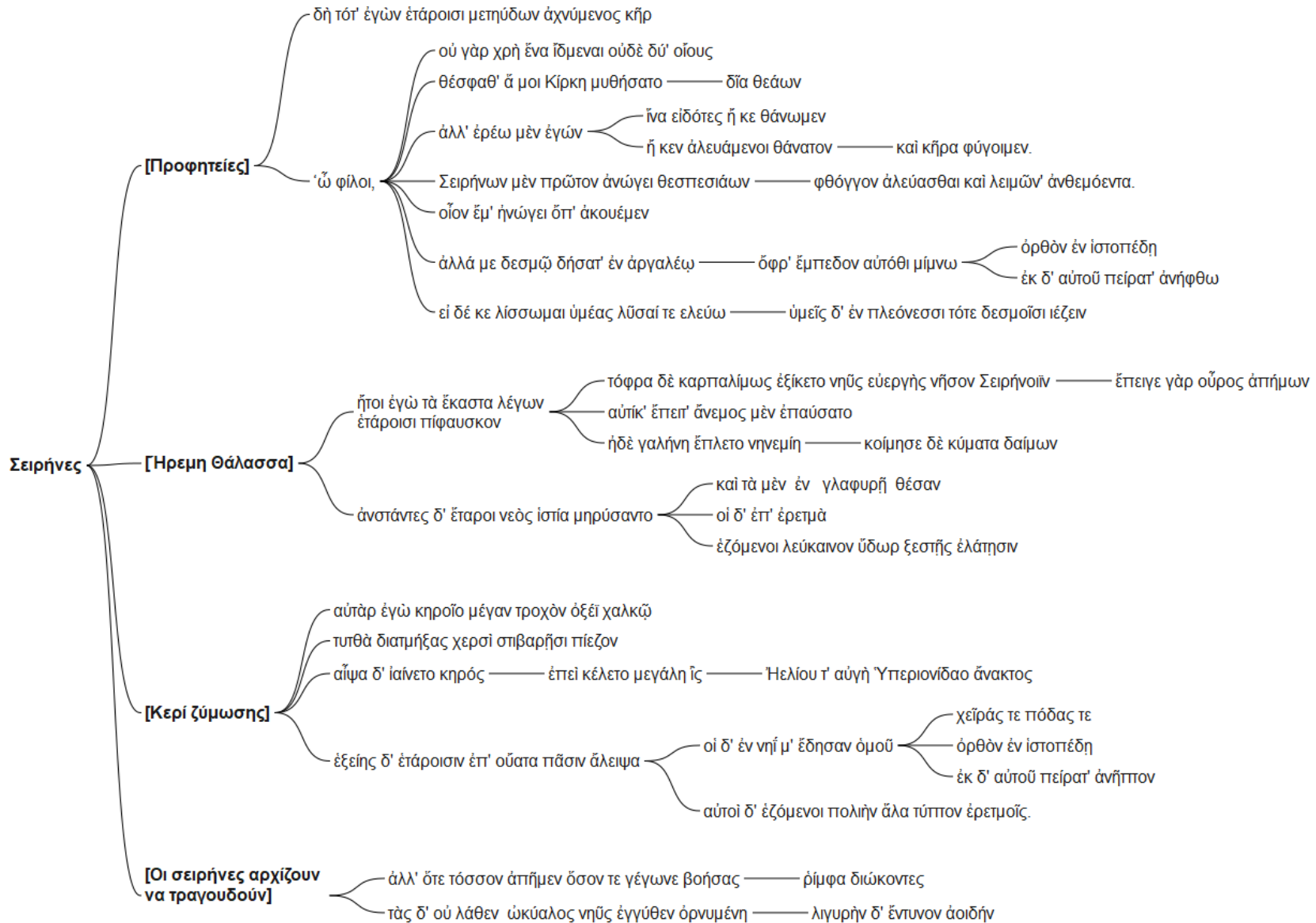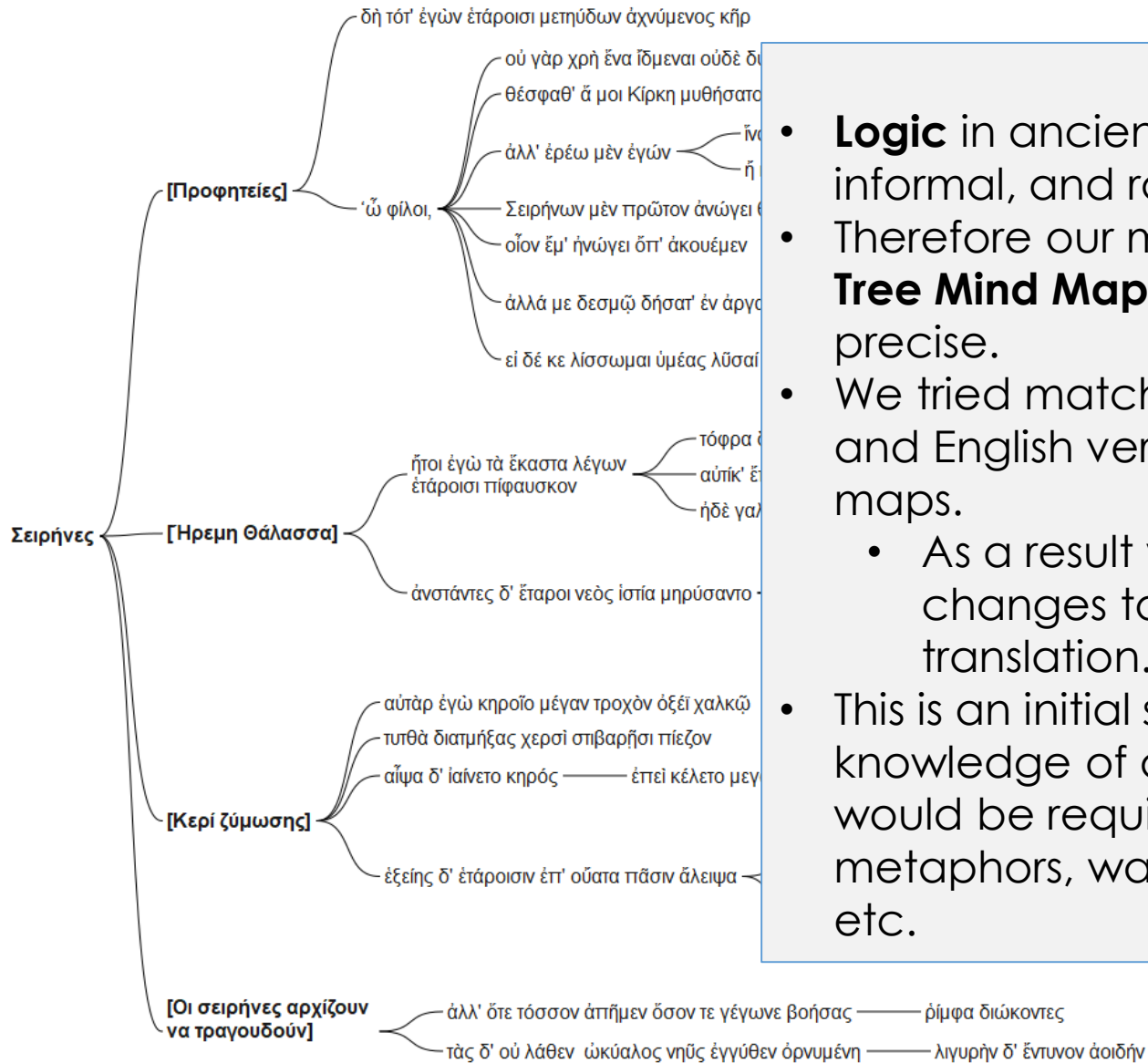

Improved readability using a TTMM
- The order of the text is preserved, but:
- It may be clear now that there are 4 subjects.
- At first, Odysseus tells his men about the prophesies from Circe,
- Second, the circumstances at sea are described.
- Then, the kneading of the wax which is put in the ears of the men and Odysseus' tying to the mast is told.
- Finally, they reach the island of the Sirens.
- Text is hybrid from several translations

The Greek Text as a Text Tree Mind Map

Σειρήνες

[Προφητείες]

δὴ τότ' ἐγὼν ἑτάροισι μετηύδων ἀχνύμενος κῆρ

ὦ φίλοι,

οὐ γὰρ χρὴ ἕνα ἴδμεναι οὐδὲ δύ' οἴους

θέσφαθ' ἅ μοι Κίρκη μυθήσατο —— δῖα θεάων

ἀλλ' ἐρέω μὲν ἐγών

ἵνα εἰδότες ἤ κε θάνωμεν

ἤ κεν ἀλευάμενοι θάνατον —— καὶ κῆρα φύγοιμεν.

Σειρήνων μὲν πρῶτον ἀνώγει θεσπεσιάων —— φθόγγον ἀλεύασθαι καὶ λειμῶν' ἀνθεμόεντα.

οἶον ἔμ' ἠνώγει ὄπ' ἀκουέμεν

ἀλλά με δεσμῷ δῆσατ' ἐν ἀργαλέῳ —— ὄφρ' ἔμπεδον αὐτόθι μίμνω

ὀρθὸν ἐν ἱστοπέδῃ

ἐκ δ' αὐτοῦ πείρατ' ἀνήφθω

εἰ δέ κε λίσσωμαι ὑμέας λῦσαί τε ελεύω —— ὑμεῖς δ' ἐν πλεόνεσσι τότε δεσμοῖσι ἰέζειν

[Ηρεμη Θάλασσα]

ἤτοι ἐγὼ τὰ ἕκαστα λέγων ἑτάροισι πίφαυσκον

τόφρα δὲ καρπαλίμως ἐξίκετο νηῦς εὐεργὴς νῆσον Σειρήνοιϊν —— ἔπειγε γὰρ οὖρος ἀπήμων

αὐτίκ' ἔπειτ' ἄνεμος μὲν ἐπαύσατο

ἠδὲ γαλήνη ἔπλετο νηνεμίη —— κοίμησε δὲ κύματα δαίμων

ἀνστάντες δ' ἕταροι νεὸς ἱστία μηρύσαντο

καὶ τὰ μὲν ἐν γλαφυρῇ θέσαν

οἱ δ' ἐπ' ἐρετμὰ

ἑζόμενοι λεύκαινον ὕδωρ ξεστῇς ἐλάτῃσιν

[Κερί ζύμωσης]

αὐτὰρ ἐγὼ κηροῖο μέγαν τροχὸν ὀξέϊ χαλκῷ

τυτθὰ διατμήξας χερσὶ στιβαρῇσι πίεζον

αἶψα δ' ἰαίνετο κηρός —— ἐπεὶ κέλετο μεγάλη ἲς —— Ἠελίου τ' αὐγὴ Ὑπεριονίδαο ἄνακτος

ἑξείης δ' ἑτάροισιν ἐπ' οὔατα πᾶσιν ἄλειψα

οἱ δ' ἐν νηΐ μ' ἔδησαν ὁμοῦ

χεῖράς τε πόδας τε

ὀρθὸν ἐν ἱστοπέδῃ

ἐκ δ' αὐτοῦ πείρατ' ἀνῆπτον

αὐτοὶ δ' ἑζόμενοι πολιὴν ἅλα τύπτον ἐρετμοῖς.

[Οι σειρήνες αρχίζουν να τραγουδούν]

ἀλλ' ὅτε τόσσον ἀπῆμεν ὅσον τε γέγωνε βοήσας —— ῥίμφα διώκοντες

τὰς δ' οὐ λάθεν ὠκύαλος νηῦς ἐγγύθεν ὀρνυμένη —— λιγυρὴν δ' ἔντυνον ἀοιδήν

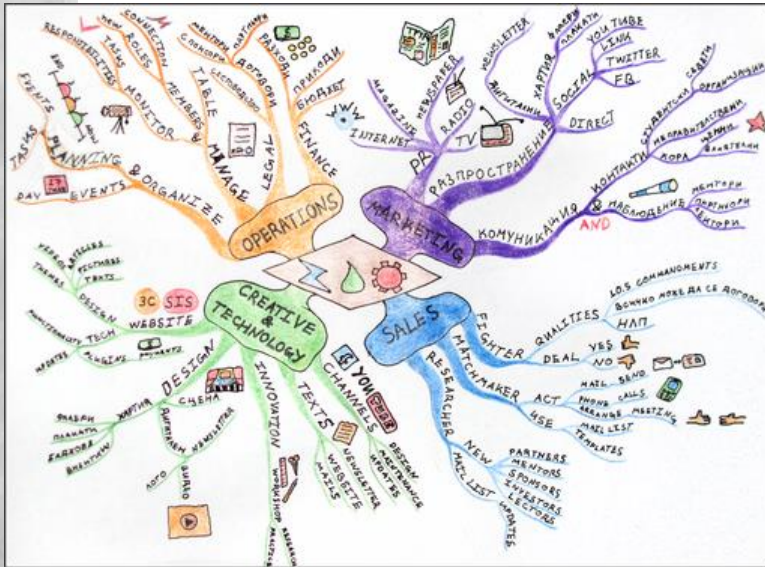# The Greek Text as a Text Tree Mind Map

- **Logic** in ancient time was very informal, and rather abstract.
- Therefore our method using **Text Tree Mind Maps** cannot be precise.
- We tried matching the Geek and English versions of the mind maps.
  - As a result we made changes to the English translation.
- This is an initial study, more knowledge of ancient Greek would be required, about verse, metaphors, way of speaking, etc.

Definition of a Text Tree

- A **Text Tree** is an oriented (or rooted) tree structure consisting of arcs (lines or associations), and
- Vertices (nodes), where each vertex is the end of exactly one arc,
  - except the root that has no arc pointing to it.
  - The arcs starting at a specific vertex are ordered
- See Knuth, page 373 [1]

1. Donald E. Knuth, The Art of Computer Programming, Volume 1, Addison-Wesley, 1997.

What is a Mind Map?

➡ A **mind map** is a diagram used to visually organize information.

➡ A mind map is hierarchical and shows relationships among pieces of the whole.

➡ It is often created around a **single concept**, drawn as an image in the center of a blank page, to which associated representations of ideas such as images, words and parts of words are added.

➡ Major ideas, **topics**, are connected directly to the central concept, and **other ideas** branch out from those major ideas.

➡ https://en.wikipedia.org/wiki/Mind_map

➡ Mind maps are made popular by Tony Buzan around 1970.

Text Tree Mind Map Definition

- A combination of Text Tree and Mind Map, where:
- The mind map is shown as a tree, in a left-right orientation.
- *Chapter titles* represents the Central Theme.
- To the chapter title, only *topic-nodes* can be attached.
- Other topic-nodes or *text-nodes*, can be attached to topic nodes.
- Other text-nodes or topic-nodes, can be attached to text-nodes.
- The text-nodes contain the text in the chapter, split into parts as follows:
  - Each paragraph is split into sentences.
  - A sentence is split into sentence parts.
- **The tree is strictly unidirectional, left-right and top down.**

Are TTMM's Really Mind Maps?

You could question whether TTMM's are mind maps.

It is certainly true that TTMM's contain a **central theme**, the chapter title, to which **topics** are attached, which is the *primary requirement* for a mind map.

Therefore, we think that enough of the essence of a mind map is preserved to call a TTMM a **mind map**.

Advantages of analyzing a text with a TTMM

- The **use of mind mapping software**! (e.g. Freemind)
- – Text can easily be imported.
- – Manipulation of nodes.
- Software could be developed to assist in sentence splitting, importing and exporting text.
- The initial splitting of the text into text nodes can be done manually quite easily, or with help of some text scripts.
- The transformation of text to a text tree mind map (TTMM) is a lossless operation.
  - When the mind map is traversed from left to right and top to bottom, the **original text** will reappear.
- If desired, the topic titles can be used as section titles.
- It is possible to give nodes additional attributes, like coloring, to show meaning.

Possible Applications

➡ Discovering Patterns in Text

➡ Visualizing Logical Structure

➡ Comparing source text and translation

➡ Narrative study

Reference to our earlier study concerning ancient Chinese: https://squaringthecircles.com
Other references:
- Homer, *Od.* 12.142-183 (text and translation Murray, rev, Dimock, *Loeb Classical Library Online*)
- The Project Gutenberg eBook of The Odyssey, book XII, by Homer, translator Samuel Butler
- The Chicago Homer, https://homer.library.northwestern.edu/