

MANOLIS KOUTLIS

In the Shadow

THE GREEK COLONIES
OF NORTH AMERICA AND THE ATLANTIC
1500 BC – 1500 AD

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IN THE SHADOW

The Greek colonies

of North America and the Atlantic

1500 BC – 1500 AD

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To Homer

"It is not enough to hear the tumult of ancestors within you. It is not enough to feel them battling at the threshold of your mind. All rush to clutch your warm brain and to climb once more into the light of day.

Enlighten the dark blood of your ancestors, shape their cries into speech, purify their will, widen their narrow, unmerciful brows. This is your second duty".

—N. Kazantzakis, *Ascesis*

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Prologue

During the summer of 2016, I took a trip with my mate to Greenland. There we had the chance to meet the “real” Atlantic Ocean in a way which we had never imagined it: Calm like the Aegean Sea on its smoothest moments, during the “long daylight” days, with beautiful colors and wonderful icebergs.

On our return trip, passing by the Faroe islands north of Britain, Lia noticed on the map that the westernmost island of the group is called “Mykines” (see map 1). At first, we wondered if it was simply a coincidence that its name is the same as that of the ancient Greek city of Mycenae (“Μυκίνας” in Greek), or if some lover of Greek antiquity had given the name to the island.



Map 1: The island of “Mykines” in the Faroe island cluster

Searching for an answer, the following references were found at the website of the island,⁴³ which is maintained by Katrina Johannesen.*

There are many explanations of the origin of the name and spelling of Mykines. The name of Mykines can be spelled in many different ways: Mykines, Mykiness, Míkines, Míkínees, Míkjunes, Mygenes, Mygenass and Myggeass.

The oldest known way of spelling is Mykiness and is from around 1400 and the name is said to origin[ate] from the Celtic word Muc-innis, which should mean “the island of pigs”.

* Katrina Johannesen is a permanent resident of Mykines and operates the sole hotel on the island. She was born and raised in Mykines, studied Applied Economics at the University of East London, and returned to the island to live there. She declares that: “This island has attracted me all my life.”



Mykines
web-site

The first part of the word, "Myki", has also been explained as [meaning] "many forelands", originating from the Faroese word "mikið", meaning "many", "a lot of", "enough of".

Lucas Debes uses in his book: "Færøernes beskrivelse" (A Description of the Faroe), from 1673 the word Myggenæs, which remind much of the Danish "myg", mosquito. But that name has probably nothing to do with "normal" mosquitoes, as none live on Mykines. But one can be stung by a "mitter", a very tiny, 1-2 mm long species of mosquitoes which can be found on Mykines.

J. Chr. Svabo uses in his [book]: "Indberetninger fra en rejse i Færøe 1781 – 1782" (Report from a journey in the Faroe 1781 – 1782), and also mentions the following spellings: Mikjinees, Mykines and Myggenæs, but without trying to give any explanation of the origin of the words.

In [the] beginning of the 19th century, the word Mikines was often used [by local residents] and can still be seen on the nameplate of older boats, as well [as] on the paintings of Samuel Joensen, who added Mikines to his name as an artist.

Nowadays the word Mykines is the only one used.

These sound like "desperate attempts" for an etymology of the name: "island of pigs" for an island with no pigs, "island of abundant forests" for a treeless island, and "mosquito island", when no mosquitos are found there. Is there a chance that the origin of the name really relates to the Greek city of Mycenae? But how could this be possible? Were there Greeks in the region? If yes, when, how and why?

This research started with the aim of providing answers to these questions, and it soon evolved into an exciting adventure.

The research would not be possible without the aid of the powerful tools of our digital era, which provide one with the means to readily access and manipulate all kinds of data in various ways, as listed below.

- Ability to visualize the globe with satellite imagery, to measure distances, and to change the viewing angle at will (NASA WorldWind, Google Earth, etc).
- Access to old books and publications that have been digitized and are routinely found in the public domain (e.g. archive.org, Gallica, digital libraries of universities, etc) as well as scientific articles available through the collaboration system of public and private libraries.
- Ability to combine information from a large variety of sources (online encyclopedias, websites, blogs and libraries).
- Ability to browse geo-coded photos and information that have been "uploaded" by large user groups (e.g. Google Maps, Flickr and other similar services).

- Ability for automatic translation between languages.

Moreover, all of these resources are available without even having to leave one's office... A true "digital excavation".

Regarding the methodological approach, the research is mainly driven by geographic and spatial analysis, and is combined with supporting documentation, including local myths and traditions, geological information, botanical data, etc.

As for the sources, the following were used:

- Original texts of ancient authors (Plutarch, Homer, Hesiod, Plato, Dioscorides, Strabo, Pliny and others), with accompanying translation (in some cases, alternative translations are used comparatively).
- Contemporary studies from published research in refereed journals and scientific books.
- Reports, publications and data from official bodies (e.g. scientific and governmental organizations).

The mapping/globe visualizations were done with the NASA WorldWind software platform (developed in collaboration with the European Space Agency),* ¹ together with NASA Blue Marble² and Bing Maps³ satellite imagery.

Overall, the current work is an alternative approach to a number of issues that are more or less considered as "established". However, a novel perspective usually has something to contribute.

Finally, it should be noted that we are aware of many other works and studies of other writers on some of the issues addressed here. We chose to avoid an item-per-item documentation of the differences and disagreements, as this would make the book lengthy and tiring.

* Superscript numbers refer to bibliographic references which are listed at the end of the book.

Plutarch's Ogygia

Plutarch* describes travel experiences in the “seas west of Britain” in his “De facie quae in orbe lunae apparet” (part of the “Moralia” collection of works).

H. Cherniss** in the Prologue of his translation of the above work,⁵ makes the following comment:

*In the dialogue as it stands the first speaker is Sulla. His chief function is to recount the myth which he mentions in the first extant words which occupies the final fifth of the work; ... He [Sulla] is a Carthaginian***...*

The last part of the [dialogue's] narration consists entirely of Sulla's myth in Sulla's own words; this myth, Sulla himself says, is a story told to him by an unnamed stranger, whom he quotes first indirectly and then directly to the end.

The stranger explained to Sulla how, from the continent on the other side of the Atlantic he came to the Isle of Cronus, one of several that lie westwards of Britain, and thence, after having served thirty years, travelled to Carthage where he met Sulla.

Sulla's narrative

Let's have a look at the passage in which Sulla describes the trip to the “great mainland” and the information that can be drawn from it.†⁵

941-A

ἐγὼ μὲν οὖν ὑποκριτὴς εἰμι,
πρότερον δ' αὐτοῦ φράσω τὸν ποιητὴν ὑμῖν...
εἰ μὴ τι κωλύει,
καθ' Ὅμηρον ἀρξάμενος.
«Ὡληγὴ τις νῆσος ἀπόπροθεν εἰν ἂν κείται,
δρόμιον ἡμερῶν πέντε Βρεττανίας ἀπέχουσα
πλέοντι πρὸς ἑσπέραν· ἕτεροι δὲ τρεῖς ἴσον ἐκείνης
ἀφεστῶσαι καὶ ἀλλήλων πρόκεινται μάλιστα κατὰ
δυσμὰς ἡλίου θερινάς.

*Well, I am but the actor of the piece, but first I shall
say that its author began for our sake –if there be
no objection– with a quotation from Homer:
An isle, Ogygia, lies far out at sea,
a run of five days off from Britain as you sail
westward; and three other islands equally distant
from it and from one another lie out from it in the
general direction of the summer sunset.
In one of these, according to the tale told by the
natives, Cronus is confined by Zeus, and the antique*

* Plutarch (45–120 AD) was a Greek historian biographer and essayist from the town of Chaeronea. During his last 29 years he served as one of the two priests at the temple of Apollo at Delphi, and his duties involving the interpretation of Pythia's oracles.

** Harold Cherniss (1904–1987), American classicist and historian of ancient philosophy.

*** Carthage was an ancient city in today's Tunisia. It was founded by Phoenician colonists in the first millennium BC and had been the center of the Carthaginian Empire that had spread throughout the Mediterranean.

† The text and writing conventions are exactly as they appear in Cherniss original.

ὧν ἐν μῦθ τὸν Κρόνον οἱ βάρβαροι καθεῖρχθαι
 μυθολογοῦσιν ὑπὸ τοῦ Διός, τὸν δ' ὡς υἱὸν ἔχοντα φρουρὸν
 τῶν τε νήσων ἐκείνων καὶ τῆς θαλάττης ἣν Κρόνιον
 πέλαγος ὀνομάζουσι, παρακατωκίσσθαι.
 τὴν δὲ μεγάλην ἡπειρον, ὑφ' ἧς ἡ μεγάλη
 περιέχεται κύκλῳ θάλαττα, τῶν μὲν
 ἄλλων ἔλαττον ἀπέχει, τῆς δ' Ἰγνυγίας περὶ
 πεντακισχιλίους σταδίους κωπήρεσι πλοίοις
 κομιζομένη· (βραδύπορον γὰρ εἶναι καὶ πηλῶδες
 ὑπὸ πλήθους ῥευμάτων τὸ πέλαγος· τὰ δὲ ῥεύματα
 τὴν μεγάλην ἐξίεναι γῆν καὶ γίνεσθαι προχώσεις
 ἀπ' αὐτῶν καὶ βαρεῖαν εἶναι καὶ γεώδη τὴν
 θάλατταν, ἣ καὶ πεπηγένηαι δόξαν ἔσχε).
 τῆς δ' ἡπείρου τὰ πρὸς τῇ θαλάττῃ κατοικεῖν
 Ἕλληνας περὶ κόλπον οὐκ ἐλάττωνα τῆς
 Μαιώτιδος, οὗ τὸ στόμα
 τῷ στόματι τοῦ Κασπίου πελάγους μάλιστα κατ'
 εὐθεῖαν κεῖσθαι· καλεῖν δὲ καὶ νομίζειν ἐκείνους
 ἡπειρώτας μὲν αὐτοὺς <νησιώτας δὲ τοὺς> ταύτην
 τὴν γῆν κατοικοῦντας, ὡς καὶ κύκλῳ περὶ ῥυτον
 οὔσαν ὑπὸ τῆς θαλάσσης·
 οἶεσθαι δὲ τοῖς Κρόνου λαοῖς ἀναμιχθέντας
 ὕστερον τοὺς μεθ' Ἡρακλέους παραγενομένους
 καὶ ὑπολειφθέντας ἦδη σβεπνόμενον τὸ Ἑλληνικὸν
 ἐκεῖ καὶ κρατούμενον γλώττῃ τε βαρβαρικῇ καὶ
 νόμοις καὶ διαίταις οἷον ἀναζωπυρῆσαι πάλιν
 ἰσχυρὸν καὶ πολλὸν γενόμενον· διὸ τιμὰς ἔχειν
 πρῶτας τὸν Ἡρακλέα, δευτέρας δὲ τὸν Κρόνον.

Ὅταν οὖν ὁ τοῦ Κρόνου ἀστήρ, ὃν Φαίνοντα
 μὲν ἡμεῖς, ἐκείνους δὲ Νυκτοῦρον ἔφη καλεῖν,
 εἰς Ταῦρον παραγένηται δι' ἐτῶν τριάκοντα,
 παρασκευασαμένους ἐν χρόνῳ πολλῷ τὰ περὶ
 τὴν θυσίαν καὶ τὸν ἀ... ἐκπέμπειν κλήρῳ λαχόντας
 ἐν πλοίοις τοσοῦτοις θεραπεῖαν τε πολλὴν καὶ
 παρασκευὴν ἀναγκαίαν μέλλουσι πλεῖν πέλαγος
 τοσοῦτον εἰρεσίαι καὶ χρόνον ἐπὶ ξένης βιοτεύειν
 πολλὸν ἐμβαλλομένους.
 ἀναχθέντας οὖν χρῆσθαι τύχαις, ὡς εἰκός· ἄλλους
 ἄλλαις, τοὺς δὲ διασωθέντας ἐκ τῆς θαλάττης

<Briareus>, holding watch and ward over those
 islands and the sea that they call the Cronian main,
 has been settled close beside him.

The great mainland, by which the great ocean is
 encircled, while not so far from the other islands, is
 about five thousand stades from Ogygia, the voyage
 being made by oar; for the main is slow to traverse
 and muddy as a result of the multitude of streams.
 The streams are discharged by the great land-mass
 and produce alluvial deposits, thus giving density
 and earthiness to the sea, which has been thought
 actually to be congealed.

On the coast of the mainland Greeks dwell about a
 gulf which is not smaller than the Maeotis and the
 mouth of which lies roughly on the same parallel
 as the mouth of the Caspian sea. These people
 consider and call themselves continentals <and
 the> inhabitants of this land <islanders> because
 the sea flows around it on all sides;
 and they believe that with the peoples of Cronus
 there mingled at a later time those who arrived in
 the train of Heracles and were left behind by him
 and that these latter so to speak rekindled again
 to a strong, high flame the Hellenic spark there
 which was already being quenched and overcome
 by the tongue, the laws, and the manners of the
 barbarians. Therefore Heracles has the highest
 honours and Cronus the second.

Now when at intervals of thirty years the star of
 Cronus, which we call 'Splendent' but they, our
 author said, call 'Night-watchman,' enters the sign
 of the Bull, they, having spent a long time in
 preparation for the sacrifice and the <expedition>,
 choose by lot and send forth <a sufficient number
 of envoys> in a correspondingly sufficient number
 of ships, putting aboard a large retinue and the
 provisions necessary for men who are going to
 cross so much sea by oar and live such a long time
 in a foreign land.

πρῶτον μὲν ἐπὶ τὰς προκειμένας νήσους
οἰκουμένας δ' ὅφ' Ἑλλήνων κατέσχειν καὶ τὸν
ἥλιον ὄραν κρυπτόμενον ὥρας μιᾶς ἑλαττον ἐφ'
ἡμέρας τριάκοντα· καὶ νύκτα τοῦτ' εἶναι, σκότος
ἔχουσιν ἐλαφρὸν καὶ λυκανγὲς ἀπὸ δυσμῶν
περιλαμπόμενον.

Now when they have put to sea the several
voyagers meet with various fortunes as one might
expect; but those who survive the voyage first put
in at the outlying islands, which are inhabited by
Greeks, and see the sun pass out of sight for less
than an hour over a period of thirty days, –and this
is night, though it has a darkness that is slight and
twilight glimmering from the west.

ἐκεῖ δὲ διατρίψαντας ἡμέρας ἐνενήκοντα μετὰ
τιμῆς καὶ φιλοφροσύνης, ἱεροὺς νομιζομένους
καὶ προσαγορευομένους, ὑπὸ πνευμάτων ἡδὴ
περαιοῦσθαι· μηδ' ἄλλους τινὰς ἐνοικεῖν ἢ σφᾶς τ'
αὐτοὺς καὶ τοὺς πρὸ αὐτῶν ἀποπεμφθέντας.

There they spend ninety days regarded with
honour and friendliness as holy men and so
addressed, and then winds carry them across to
their appointed goal. Nor do any others inhabit
it but themselves and those who have been
dispatched before them,

On the way to Ogygia

Fundamental to our research is the identification of the island of Ogygia and of its location, and the key towards that, is the proper reading of the text in terms of its geographical and topological consistency.

By “decoding” Plutarch’s text we get the following geographical information:

- Ogygia is five (5) days’ sail west of Britain.
- Ogygia is equidistant to three (3) other islands, which are also equidistant to each other.
- These three islands are lying in the direction of the summer sunset, i.e. northwest (315°).
- The three islands are closer to the *great mainland* than Ogygia is. Hence, the *great mainland* must lie in the same direction as the three islands, that is, northwest of Ogygia.
- The islands (including Ogygia) are “next to”, or more precisely, “in” a sea (called the “Cronian Sea”), which is surrounded by the *great mainland*. But since this sea is surrounded by the *great mainland* and the islands are within it, then the islands should also be surrounded by the *great mainland*. This fact, combined with the observation of the previous bulleted item, leads to the conclusion that either: a) the distance between the islands and the *great mainland* is smaller in the northwest direction than in all other directions, or b) the distance of the islands



Interactive
map



Map 2: The 46th N parallel that passes by the “mouth of the Caspian Sea” and Lake Maeotis (the present-day “Azov Sea”)

from the *great mainland* is measured based on the northwest direction because it probably defines a preferred route to the *great mainland*.

- Ogygia is about 5000 stadia, i.e. 925km* from the *great mainland*, and according to the two previous points, this distance must be in the northwest direction. Boats must be rowed (rather than sailed) through this area because the water is muddy and dense due to both the sediments deposited by rivers flowing into the sea from the mainland, and the freezing condition of the sea.
- In the *great mainland*, there is a gulf as big as Lake “Maeotis” (the present-day Azov Sea), whose mouth is at the same parallel as the “mouth of the Caspian Sea”. Most likely, this refers to the the mouth of the river Volga, which is the largest river mouth in the Caspian, lying at 46° North (see map 2). The fact that the reference to this gulf immediately follows the description of the voyage to the *great mainland* probably means that this gulf is at the point of approach to the *great mainland*.
- The arriving travelers stay at the “islands beyond” (that is, the three islands adjacent to Ogygia), and “they see the sun hiding for less than an hour for thirty days”.

* This measurement is based on the length of traditional ancient Attic stadium which is equal to about 185m. There are a number of variations depending on the city and the time period of reference (e.g. the Attic Stadium is 184.98m, the Olympic Stadium is 192.27m, the Travelers' Stadium is 157.5m and the Delphi Stadium is 177.55m).

The topology defined by the above is depicted in figures 1 and 2. The only difference between them is the interpretation of the second part of the phrase “Ogygia is equidistant to three (3) other islands, which are also equidistant to each other”.

Although the first version of the topological mapping (figure 1) reflects this statement more accurately, it automatically violates the other two: that the other islands are in the direction of 315° to Ogygia and that they are closer to the *great mainland* than this (in any configuration,

only two of the three islands can be in the direction of 315° and closer to the *great mainland* at the same time.)

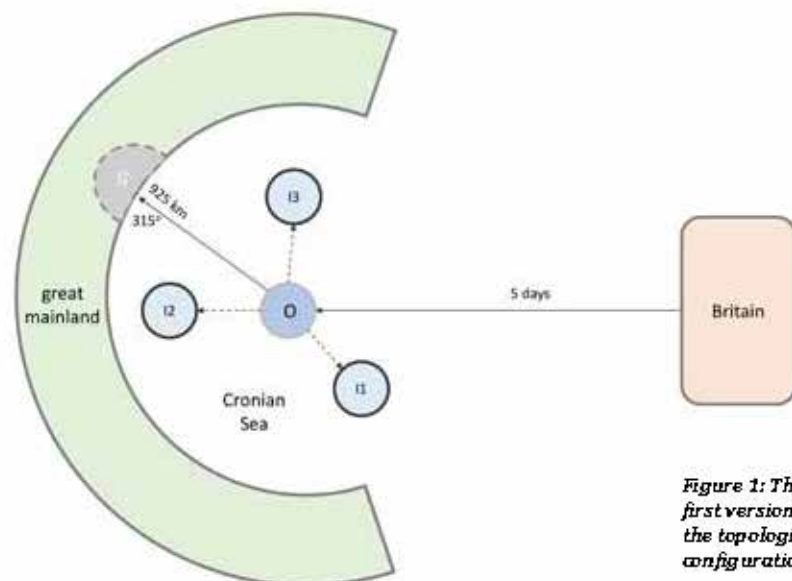


Figure 1: The first version of the topological configuration

The second version of the topological mapping depicted in figure 2, although not geometrically strictly compatible with "other islands, which are also equidistant to each other" (as the first one is spaced with the second, as the second is spaced with the third, but this is not true for the pair of the first and the third), is compatible with the other two conditions, namely that the other islands are in the direction of 315° and closer to the *great mainland* than Ogygia.

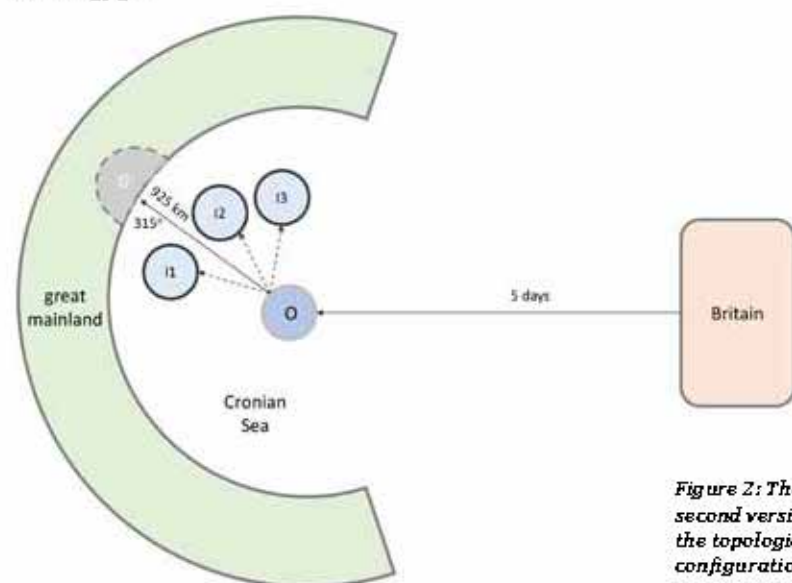


Figure 2: The second version of the topological configuration



Map 3: The potential target areas for the approach point to the "great mainland" around the 46th parallel

Considering that Sulla's description was not intended to be geometrically strict, but rather to faithfully attribute the topological description at the level of an oral dialogue, we consider that the second version is closest to the intended meaning since it fulfills most of the conditions.

Therefore, Ogygia must be searched for according to the topological arrangement of figure 2 around the 46th parallel to the west of Britain, areas depicted in map 3.

This description, however, generates both a question and a contradiction.

The question is: If Ogygia were a five (5) days' sail from Britain, and if the great mainland were just 925km further on, i.e. a few more days of traveling, then the great mainland would have to be relatively close to Britain, and thus easily reachable and well known.

As for the contradiction, it involves descriptions of the area in the translated text 941d, ¶2 above: the phenomenon of the "sun passing out of sight for less than an hour per day" and the characterization of the corresponding night-time as "a darkness that is slight and twilight shimmering from the west" (i.e. the night is not that dark), can only be observed in latitudes around the Arctic Circle (at latitudes around 67° north, see map 3) during the summer months. This cannot be observed at the latitudes of 46° where, as we said, the islands adjacent to Ogygia are located, near the entrance to the gulf of the great mainland.*

This inconsistency results from the unsatisfactory translation of the following sentence:

* Indicatively for June, at latitude 67° north, the sun is visible for the whole day; while at 46° north latitude it is hidden for at least 8 hours.

τοὺς δὲ διασωθέντας ἐκ τῆς θαλάττης πρῶτον
μὲν ἐπὶ τὰς προκαίμενας νήσους οἰκουμένας δ' ὕφ'
Ἑλλήνων κατίσχειν καὶ τὸν ἥλιον ὄρᾶν κρυπτόμε-
νον ὥρας μᾶς ἑλαττον ἐφ' ἡμέρας τριάκοντα·

but those who survive the voyage first put in at the
outlying islands, which are inhabited by Greeks,
and see the sun pass out of sight for less than an
hour over a period of thirty days

In particular, the rendering of “ὄρᾶν” as “they see”, i.e. at present tense (specifically in historical present tense, since it is a narrative), suggests that “after” the surviving travelers have reached their destination, “then” they “see the sun hiding for less than an hour for thirty days”.

Also important for the understanding of this passage is the fact that a key punctuation mark (a raised dot / colon) which is present in the original (Manuscript Code E, see reference below) after the word “κατίσχειν”* was omitted.

With the valuable contribution of experienced philologists, it appears that the proper translation of “ὄρᾶν” in the context of the passage should be “were seeing” and not “see”**, so the new rendering of the sentence is:

τοὺς δὲ διασωθέντας ἐκ τῆς θαλάττης πρῶτον
μὲν ἐπὶ τὰς προκαίμενας νήσους οἰκουμένας δ' ὕφ'
Ἑλλήνων κατίσχειν καὶ τὸν ἥλιον ὄρᾶν κρυπτόμε-
νον ὥρας μᾶς ἑλαττον ἐφ' ἡμέρας τριάκοντα·

but those who survive the voyage first put in at the
outlying islands, which are inhabited by Greeks; and
they were seeing the sun pass out of sight for less than
an hour over a period of thirty days;

This version, dramatically changes the meaning of the passage, which now reads: the surviving travelers “were seeing” the sun hiding for less than one hour for thirty days, suggesting “while they were traveling”, apparently in areas where this phenomenon can be observed, i.e. in areas around the Arctic Circle.

Thus, the contradiction of the text with regard to the latitude of the islands of destination and the phenomenon of the short duration of the night is eliminated.

Now, however, another important inconsistency appears: the information that Ogygia is five (5) days’ sail west of Britain does not match with that of “the travelers traveled for at least thirty (30) days”.

Earlier, we had made a note of the problematic character of the “five-day distance from Britain”, and the above inconsistency now comes to add another factor to this concern, making it even more intense.

The adventure of the transcripts

Where in the text could the cause of the inconsistency lie? Probably in the erroneous transcription of the word “five” at some stage of the process of creating the many copies of the transcripts of the original

* The use of the raised dot (the ancient Greek punctuation mark used as a colon or semi-colon) before «καὶ τὸν ἥλιον ὄρᾶν κρυπτόμενον» in the ancient text signifies the transition from the meaning of the previous sentence to that of the next. Its omission from subsequent manuscripts causes confusion and misinterpretation.

** The historical present tense that Plutarch uses in the narration for achieving a dramatic effect is represented by the past tense in Modern Greek translation. The use of a past tense is further supported by the phrase “for thirty days”, which reflects a recurring fact in the past.

work over the centuries.
But is this possible?

Let's take a look at the history of the transcriptions and publications of Plutarch's work, which is currently preserved through two original manuscripts known as:

- Parisinus-gre code 1672, also known as Code-E.⁶ This manuscript dates back to the 14th century and is made of parchment.
- Parisinus-gre code 1675, also known as Code-B.⁷ This manuscript dates back to the 15th century and is made of paper.

Both manuscripts are held in the National Library of France (Bibliothèque nationale de France), which provides them as digitized publications on the internet (see accompanying QR-codes).

The archetype from which the above copies were made is, according to S. Larsen,* worn and damaged papyri of the 5th or 6th century AD.⁸ It is unknown whether manuscripts B and E were the original written versions of the works, or if they were themselves copied products from older originals. Furthermore, there are different views about whether or not these two manuscripts B and E in fact depict the same archetype. Some experts claim the manuscripts to be two independent works based on the same prototype, and others argue that B is a derivative of E, through an intermediate manuscript created by someone with a different handwriting, which is now lost.⁵

The first printed version of "*De facie quae in orbe lunae apparet*" was made in 1509 by A. Manutius,** who published a large collection of Plutarch's works translated into Latin, called "*Moralia*". It was followed by the publication of the work by W. Xylander*** in Latin in 1570, and in Greek in 1574. There were many other translated versions made over the centuries.

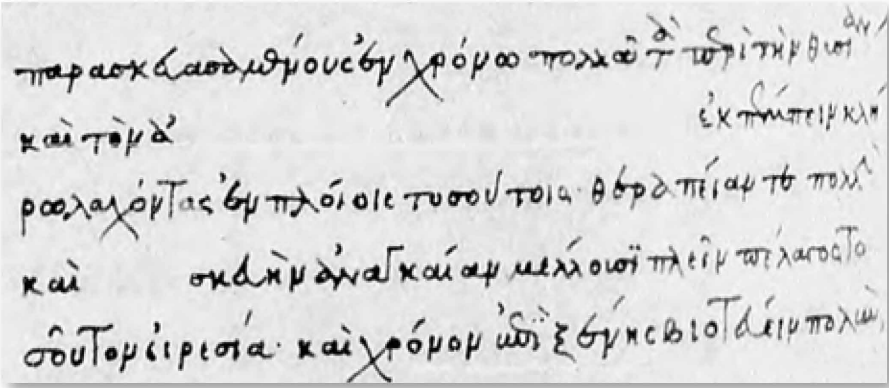
Each version had its own "peculiarities", and it is worthwhile to look at a typical example based on the small excerpt shown in pictures 1 and 2, where some "gaps" in the manuscripts are evident. This is probably due to damage on the prototype from which the transcription was made, making parts of the prototype illegible.

The first difference that we can observe between the two excerpts is that the gap shown in Code E, in the penultimate line after "*καί*", does not appear in Code B (in the second half of the last line), either because the scribe was able to better read the original, or because he had no doubt that his correction (i.e. adding a "*παρα-*" before "*σκευήν*" so that the word reads "*παρασκευήν*", meaning "preparation") was appropriate, thus automatically adding his subjective "touch" into the text (which could be right, but perhaps not), without a hint to point out –as he should have– the fact of his intervention.

* Sofus Larsen
(1855–1938).
Danish Philologist
– Librarian.

** Aldus Manutius
(1449–1515).
Italian a humanist,
scholar and
educator, known
for his interest in
and preservation
of Greek
manuscripts.

*** Wilhelm
Xylander (1532–
1576). German
classical scholar
and humanist.



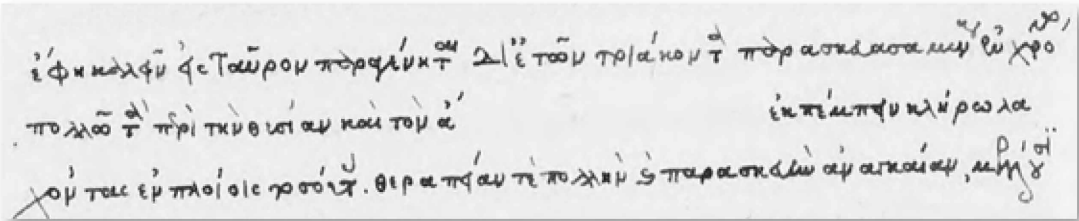
Picture 1: Excerpt from Code Parisinus-gre 1672 (E)



Manuscript
of Code E,
page 817



Manuscript
of Code B,
page 416



Picture 2: Excerpt from Code Parisinus-gre 1675 (B)

Let's look at the translations of this passage in later, representative versions.

<i>Aldus Manutius</i> (1509) ⁹ <i>Wilhelm Xylander</i> (1574) ¹⁰	παρασκευασαμένους ἐν χρόνῳ πολλῶ, τὰ περὶ τὴν θυσίαν καὶ τὸν ἄ * ἐκπέμπειν κλήρῳ λαχόντας πέλαγος τοσοῦτον εἰρεσία...
<i>Gregorius Vernardakis*</i> (1888) ¹¹	παρασκευασαμένους ἐν χρόνῳ πολλῶ τὰ περὶ τὴν θυσίαν καὶ τὸν ἀπόπλουν ἐκπέμπειν κλήρῳ λαχόντας ἐν πλοίοις τοσούτοις θεραπείαν τε πολλὴν καὶ παρα- σκευὴν ἀναγκαίαν μέλλουσι πλεῖν πέλαγος τοσοῦτον εἰρεσία...
<i>Harold Cherniss</i> (1957) ⁴	παρασκευασαμένους ἐν χρόνῳ πολλῶ τὰ περὶ τὴν θυσίαν καὶ τὸν ἀπόστολον θεωροὺς ἱκανοὺς> ἐκπέμπειν κλήρῳ λαχόντας ἐν πλοίοις τοσούτοις θεραπείαν τε πολλὴν καὶ παρασκευὴν ἀναγκαίαν μέλλουσι πλεῖν πέλαγος τοσοῦτον εἰρεσία...



Moralia, Aldus
Manutius
edition, 1509,
page 949



Moralia,
Wilhelm
Xylander
edition, 1574,
page 614

As we can observe:

- In the first editions of Manutius and Xylander, the gap in the manuscript is noted with an asterisk (*), but then, for an unknown reason, eleven full words are omitted, without any explanation.

* Gregorius
Vernardakis
(1848–1925).
Greek
philologist and
paleographer.

- In Vernardakis' edition, the gap of the original is filled with the word "*ἀπόπλουν*" (although in the manuscript the initial letter of the word before the gap is "*ἄ*" and not "*ἀ*"); however, this intervention is noted in the book's memorandum.
- In the Cherniss edition, the gap of the original is filled with the words "*ἀπόστολον θεωρούς ικανούς*" (although, again, in the manuscript the initial letter of the word letter before the void is "*ἄ*" and not "*ἀ*"); this intervention is noted both in the text as well as in the book's memorandum.

The above is just one of many similar examples of "interventions" which are the subject of study and often strictly criticized by scholars.

The conclusion for our own research is that the possibility of a wrong reference to "five" days of sail from Britain to the west cannot be ruled out; on the contrary, it is reinforced by the combination of the two factors:

- Five (5) days of travel is in clear contradiction to the (at least) thirty (30) days' journey that the travelers made, as is implied by the text.
- There are, as we saw, many possible causes of alteration of the original texts, both from physical damage and from oversight or conscious interventions during the replication of the manuscripts, either by scribes producing handwritten copies, or by the typesetters of printed publications.

But if the writing of "five" ("*πέντε*" in Greek) days is wrong, what word could be the right one? In our analysis we will consider the word "fifty" ("*πεντήκοντα*" in Greek) as the appropriate one, because:

- Lexicographically, "fifty" is closely related to "five". For example, it could be that due to the poor condition of the prototype, only the first letter ("*π ...*") of the word was readable, so the transcriber rewrote it as "*πέντε*" (five), because a trip of "*πεντήκοντα*" (fifty) days could sound impossibly long.
- Fifty days of sailing are geographically compatible with the requirements of the described trip, as we will see next.

* The color convention used in all maps of the book is: contemporary place names appear in yellow and cyan, while ancient place names appear in white.

The identification of Ogygia

The island that satisfies the geographical conditions described in Plutarch's text (as well as in other sources, as we will see later on), is "St. Paul" at the entrance of the gulf of St. Lawrence and today belongs to Canada (see map 4).*



Interactive map

Map 4: The location of the island of Ogygia (today's St. Paul) in the entrance of the Gulf of St. Lawrence

To document and support this hypothesis, let's examine the conditions one by one:

1. Travel time:

- Starting from Great Britain, and most likely from the western coast of Ireland (point A), and following the ocean currents (see insert A), travelers most likely sailed the route shown on map 5, ending in Ogygia (point O).
- The total length of the route is 7,100km, and based on the assumption that a total of 50 days of sailing is required, the average speed is 142km per day, which is reasonable and compatible with the sailing performance of other sail trips that we'll meet in the following.



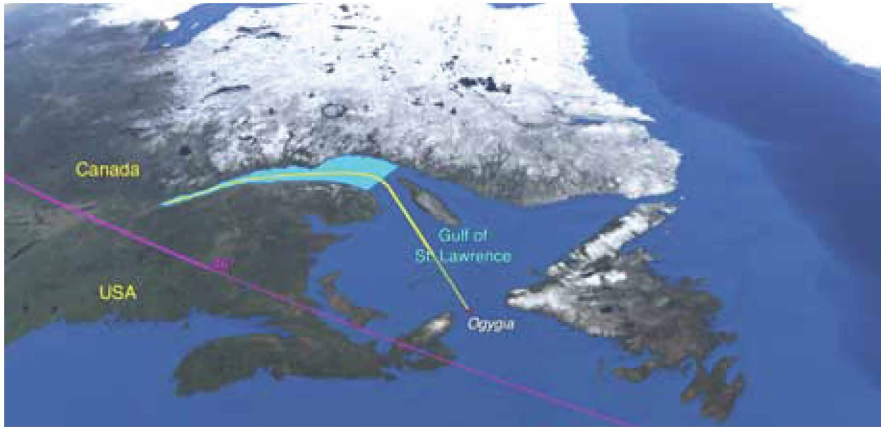
Interactive map

Map 5: The estimated route of the travel to Ogygia described by Sulla in Plutarch's text (depicted in yellow)



Map 6. Relative position of Ogygia to the Magdalen islands, Entry and Brion

- The section of the trip from B to C, between the parallels of 59° –where in June the sun shines for 18 hours each day– and of 67° – where the sun shines for 24 hours each day– is a total of 4,100km. This distance, at a mean speed of 142km per day, would take 29 days to be travelled, which is very close to the 30 days of Sulla's narrative, where he says that the sun was hidden for less than an hour a day, and that the night was not very dark.
 - The 30 days of sailing around the Arctic Circle account for 60% of the total journey time (based on the "fifty" days hypothesis), while at the same time that distance is 58% of the total. The correspondence of the ratios, which is probably not coincidental, reinforces the initial assumption of the number of "fifty" required days of sailing: The relationships based on both the distance of the estimated route and the required travel time are totally compatible.
2. Ogygia (St. Paul) is equidistant from three (3) islands lying to the northwest (see map 6):
 - The Magdalene islands (French: Îles de la Madeleine). Although today it is regarded as a cluster of islands loosely connected by sand dunes, at the time of Sulla's narrative (1st century AD) the sea level was about 5m lower than today,¹² rendering the Magdalen cluster a "solid" island.
 - The Entry Island (French: Île-d'Entrée).
 - The Brion island (French: "Île Brion").
 3. These three islands are (almost) equidistant to each other (see map 6).
 4. The three islands are closer to the great mainland than is Ogygia (see map 7).



Interactive
map

Map 7: The bay at the point of approach to the Great Continent (in cyan color), the route from Ogygia to the great mainland (yellow line) and the 46° parallel (magenta)

5. Ogygia is at a distance of about 980km from the great mainland, along the route depicted in map 7 in yellow, a distance which is very close to the “approximately 5,000 Stadia” or 925km mentioned in the text.
6. At the point of the approach to the great mainland, there is a Bay (depicted in map 7 in cyan) whose mouth is at the 49° north parallel. This location is approximately at the latitude of the Caspian Sea which is at the 46° north parallel (shown in magenta on map 7), that is, by a mere 3° difference.
7. The area of this Bay is about 29,000 km², roughly the same as the size (area) of Lake Maeotis (today’s Azov Sea), which is about 27,000 km².
8. On the way to the Bay of the great mainland, the sea has a lot of sediments from mainland rivers that empty into the Gulf of St. Lawrence. (It is worth mentioning that at this point in his publication, Cherniss points out the similarities of Plutarch’s description with those of Plato in the “*Timaeus*” and “*Critias*” dialogues relating to the location of the Atlantis, similarities that Cherniss attributes to Plato’s influence on Plutarch. But as we will see in the course of this book, the reason for these similarities should be sought elsewhere!)
9. During some months of the year, the sea is frozen. Although the climatic conditions in the area at the time of Sulla’s narrative were milder, the frozen sea that is mentioned can be seen today in satellite images (see accompanying QR-code).

What is Ogygia today? It is a virtually uninhabited (the lighthouse keeper being its only resident) and hard-to-access island (see picture 3), known today as the island of St. Paul. If we were to choose a single phrase to describe the main characteristic of the island, it would



Satellite
image
of the Gulf
of St.
Lawrence

be “the cemetery of the Gulf of St. Lawrence”, a name that has been attributed to it because of the large number of shipwrecks that have occurred in the area: Almost every spot on its coastline has the name of a wreck that has happened there.¹³

Reports from early explorers characterize the island as follows:¹⁴

The situation of this island, in the very entrance of the great thoroughfare leading from the Atlantic to the Gulf and River St. Lawrence, together with the abrupt nature of its shore and the depth of the sea around, admitting a ship to run her jib boom against the cliff before she strikes the bottom; the frequent fogs and tempestuous weather; the uncertain currents; and, at the opening of the navigation of the St. Lawrence, the large bodies of ice; all these circumstances combine with the inaccuracy of many of the charts in general use, to render the island of St. Paul probably the most dangerous to shipping that is to be found on the coast of British America.

It has been the scene of innumerable wrecks since the first settlement of the colonies, many, perhaps most of which, are only told by the relics strewed upon the rocks. So constant are these disasters, that it is the custom of the inhabitants of Cheticamp to visit the island regularly every spring for the purpose of collecting the spoil.*

The destruction of life and property on this fatal spot has been incalculable.



*Flying over
the St. Paul
island*



Picture 3: The island of St. Paul today

* A French settlement on the north-west coast of Cape Breton.

Keep this description in mind, we will come back to it later on.

Life in the “great mainland”

Returning to Sulla’s narrative, the “stranger” describes the conditions of life on the island (where he seems to have performed a term of religious service) as idyllic.

941-Εξείναι μὲν γὰρ ἀποπλεῖν οἴκαδε τοὺς τῷ θεῷ
τὰ τρεῖς δέκ’ ἔτη συλλατρεύσαντας, αἰρεῖσθαι
δὲ τοὺς πλείστους ἐπιεικῶς αὐτόθι κατοικεῖν,
τοὺς μὲν ὑπὸ συνηθείας τοὺς δ’ ὅτι πόνου
δίχα καὶ πραγμάτων ἄφθονα πάρεστι πάντα,
πρὸς θυσίας καὶ χορηγίας ἢ περὶ λόγους
τινὰς αἰεὶ καὶ φιλοσοφίαν διατρίβουσι·
θαυμαστὴν γὰρ εἶναι τῆς τε νήσου τὴν φύσιν
καὶ τὴν πραότητα τοῦ περιέχοντος ἀέρος·

for, while those who have served the god
together for the stint of thirty years are
allowed to sail off home, most of them usually
choose to settle in the spot, some out of habit
and others because without toil or trouble
they have all things in abundance while they
constantly employ their time in sacrifices and
celebrations or with various discourse and
philosophy, for the nature of the island
is marvelous as is the softness of the
circumambient air.

Next he refers to Cronus,* who is punished by Zeus and condemned to eternal sleep.

941-F ἐνίοις δὲ καὶ τὸ θεῖον ἐμποδῶν γίνεσθαι διανο-
ηθεῖσιν ἀποπλεῖν ὥσπερ συνήθεσι καὶ φίλοις
ἐπιδεικνύμενον. οὐκ ὄναρ <γὰρ> μόνον οὐδὲ
διὰ συμβόλων, ἀλλὰ καὶ φανερώς ἐντυγχάνειν
πολλοὺς ὄψεσι δαιμόνων καὶ φωναῖς.
αὐτὸν μὲν γὰρ τὸν Κρόνον ἐν ἄντρῳ βαθεῖ
περιέχεσθαι πέτρας χρυσοειδοῦς καθεύδοντα
(τὸν γὰρ ὕπνον αὐτῷ μεμηχανῆσθαι δεσμὸν ὑπὸ
τοῦ Διός), ὄρνιθας δὲ τῆς πέτρας κατὰ κορυφὴν
εἰσπετομένους ἀμβροσίαν ἐπιφέρειν αὐτῷ, καὶ
τὴν νήσον εὐωδίᾳ κατέχεσθαι πᾶσαν, ὥσπερ ἐκ
πηγῆς σκιδαμένη τῆς
πέτρας· τοὺς δὲ δαίμονας ἐκείνους περιέπειν καὶ
θεραπεύειν τὸν Κρόνον, ἑτάρους αὐτῷ γενομέ-
νους, ὅτε δὴ θεῶν καὶ ἀνθρώπων ἐβασίλευε·
καὶ πολλὰ μὲν ἀφ’ ἐαντῶν μαντικούς ὄντας
προλέγειν, τὰ δὲ μέγιστα καὶ περὶ τῶν μεγίστων
ὡς ὀνείρατα τοῦ Κρόνου κατιόντας ἐξαγγέλλειν·

Some when they intend to sail away are even
hindered by the divinity which presents itself to
them as to intimates and friends not in dreams
only or by means of omens, but many also come
upon the visions and the voices of spirits manifest.
For Cronus himself sleeps confined in a deep
cave of rock that shines like gold – the sleep
that Zeus has contrived as a bond for him –,
and birds flying in over the summit of the rock
bring ambrosia to him, and all the island is
suffused with fragrance scattered from the rock
as from a fountain; and those spirits mentioned
before tend and serve Cronus, having been his
comrades what time he ruled as king over gods
and men.
Many things they do foretell of themselves,
for they are oracular; but the prophecies that
are greatest and of the greatest matters they

* In Greek mythology Cronus (Κρόνος, in Greek) was the leader of the Titans, the divine descendants of Οὐρανός (the sky) and Γαῖα (the earth). He overthrew his father and ruled during the mythological Golden Age, until after a vast war called Τιτανομαχία (war of the Titans), he was overthrown by his own son Zeus (the king of the gods of Mount Olympus) and imprisoned (there are various versions in the myths about the location of his prison).

ὅσα γὰρ ὁ Ζεὺς προδιανοεῖται, ταῦτ' ὄνειρο-
πολεῖν τὸν Κρόνον, ἐπειδὴν στασιάζοντα τὰ
τιτανικά πάθη καὶ κινήματα τῆς ψυχῆς ἐν αὐτῷ
παντάπασιν ὁ
ὑπνος <κατακοιμήσῃ> καὶ γένηται τὸ βασι-
λικὸν καὶ θεῖον αὐτὸ καθ' ἑαυτὸ καθαρὸν καὶ
ἀκήρατον.

come down and report as dreams of Cronus, for
all that Zeus premeditates Cronus sees in his
dreams and the titanic affections and motions
of his soul make him rigidly tense <until> sleep
<restores> his repose once more and the royal
and divine element is all by itself, pure and
unalloyed.

The references to the sweetness of life on the island and the dreams of Cronus will come up in our analysis again later on, though in a very different context.

During his mission, the “stranger”, among his other duties, deals with astronomy and nature research, and he is involved in ceremonies for which he gives no further reference. After the thirty years* of his compulsory tenure, the stranger chooses to make his return journey to the European continent with the aim of going to Carthage where Cronus enjoys great honors, and there he meets Sulla.

Ἐνταῦθα δὴ κομισθεὶς, ὡς ἔλεγεν, ὁ ξένος καὶ
θεραπεύων τὸν θεὸν ἐπὶ σχολῆς, ἀστρολογίας μὲν
ἐφ' ὅσον γεωμετρήσαντι πορρωτάτω προελθεῖν
δυνατὸν ἐστὶν ἐμπειρίαν ἔσχε, φιλοσοφίας δὲ τῆς
ἄλλης τῷ φυσικῷ χρώμενος.
ἐπιθυμίαν δέ τινα καὶ πόθον ἔχων γενέσθαι τῆς
μεγάλης νήσου θεατῆς (οὕτως γὰρ ὡς ἔοικε τὴν
παρ' ἡμῖν οἰκουμένην ὀνομάζουσιν) ἐπειδὴ τὰ
τριάκοντ' ἔτη διήλθεν, ἀφικομένων τῶν διαδό-
χων οἴκοθεν, ἀσπασάμενος τοὺς φίλους
ἐξέπλευσε, τὰ μὲν ἄλλα κατεσκευασμένους
εὐσταλῶς ἐφόδιον δὲ συχνὸν ἐν χρυσοῖς ἐκπιώ-
μασι κομίζων.

Here then the stranger was conveyed, as he said,
and while he served the god became at his leisure
acquainted with astronomy, in which he made as
much progress as one can by practicing geometry,
and with the rest of philosophy by dealing with so
much of it as is possible for the natural philosopher.
Since he had a strange desire and longing to
observe the Great Island (for so, it seems, they
call our part of the world), when the thirty years
had elapsed, the relief-party having arrived from
home, he saluted his friends and sailed away,
lightly equipped for the rest but carrying a large
viaticum in golden beakers.

942-B

ἃ μὲν οὖν ἔπαθε καὶ ὅσους ἀνθρώπους
διήλθεν, ἱεροῖς τε γράμμασιν ἐντυγχάνων ἐν τε
τελεταῖς πάσαις τελούμενος, οὐ μᾶς ἡμέρας
ἔργον ἐστὶ διελθεῖν, ὡς ἐκεῖνος ἡμῖν ἀπήγγελλεν,
εὖ μάλα καὶ καθ' ἕκαστον ἀπομνημονεύων ὅσα δ'

Well, all his experiences and all the men whom
he visited, encountering sacred writings and
being initiated in all rites – to recount all this
as he reported it to us, relating it thoroughly
and in detail, is not a task for a single day; but

942-C

* The term of the Cronus priests lasted for 30 years, probably because this is the period of the planet Cronus' circumnavigation around the sun.

οἰκεῖα τῆς ἐνεσιώσης διατριβῆς ἐστίν, ἀκούσατε.

πλείστον γὰρ ἐν Καρχηδόνι χρόνον διέτριψεν, ἅτε
 δὴ παρ' ἡμῖν μεγάλας <τοῦ Κρόνου τιμὰς> ἔχο-
 ντος, καὶ τινας, ὅθ' ἡ προτέρα πόλις ἀπώλλυτο,
 διφθέρας ἱερὰς ὑπεκκομισθείσας κρύφα καὶ δια-
 λαθούσας πολὺν χρόνον ἐν γῇ κειμένας ἐξευρὼν
 τῶν τε φαινομένων θεῶν ἔφη χρῆναι καὶ μοι
 παρεκελεύετο τιμᾶν διαφερόντως τὴν Σελήνην,
 ὥς τοῦ βίου κυριωτάτην οὔσαν ... ἐχομένην.

listen to so much as is pertinent to the present discussion.

He spent a great deal of time in Carthage inasmuch as <Cronus> receives great <honour> in our country, and he discovered certain sacred parchments that had been secretly spirited off to safety when the earlier city was being destroyed and had lain unnoticed in the ground for a long time. Among the visible gods he said that one should especially honour the moon, and so he kept exhorting me to do, inasmuch as she is sovereign over life <and death>, bordering as she does <upon the meads of Hades>.

The identification of the surrounding area

Having located Ogygia, we can now identify other geographical entities mentioned in Sulla's narrative. Specifically:

- **The Sea of Cronus:** This must refer to the Gulf of St. Lawrence. Although today it is called a "gulf", its large size, which is about the same as for example that of the Aegean Sea,* justifies it to be called "sea".
- **Cronus' cave:** the cave in which "*Cronus is condemned to sleep, which is made of a rock that shines like gold*" fits well with the caves of Cap-aux-Meules on the Magdalen islands, which today are a tourist attraction. Picture 4 depicts one of them, the so-called "Cathedral". The rocks of the cave and of the whole area are quartz, covered with a thin layer of iron oxide, which gives them a strong, golden red color (see picture 5).
- **Areas inhabited by Greeks:** According to Sulla's narrative, the areas inhabited by Greeks include the three islands (Magdalen, Entry, Brion), the areas around the bay (depicted in map 7), and some land which is encircled by the sea. Most probably, this is today's Nova Scotia, which looks like an island as it is connected to the mainland through a narrow strait, Chignecto. These areas are depicted on map 8 in red. According to Sulla's narrative, the Greek culture was declining in these regions and subjugated to the barbaric language, laws and way of life, but was revived with the advent of Heracles and the Greeks who had come with him. These "newcomers" mingled with the already present "*peoples of Cronus*".

* Area of the Gulf of St. Lawrence: 236.000km².
 Area of the Aegean Sea: 240.000km².



*Visit to the
cave "La
Cathédral"*



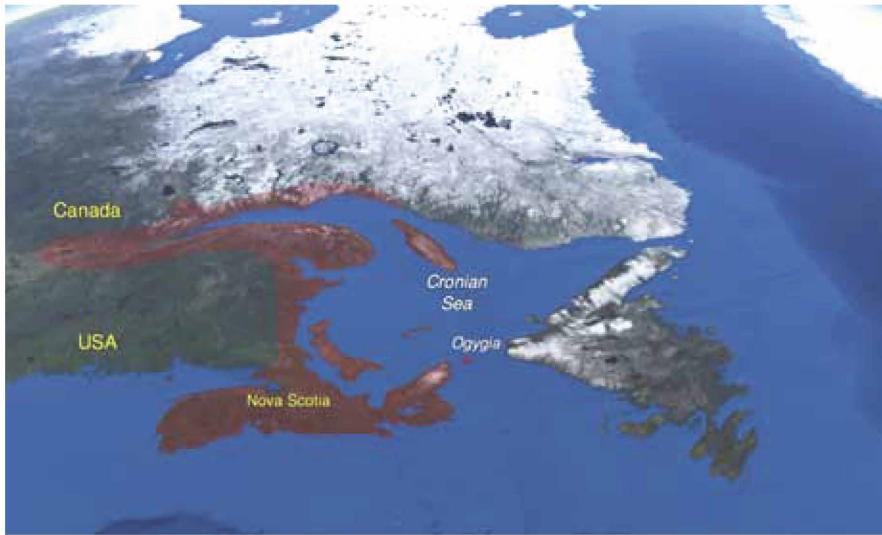
Picture 4: The cave "La Cathédral" in "Cap-aux-Meules" of the Magdalen islands, could be one of the caves in which "Cronus was sleeping"



*Visit to
the golden
shores of
Magdalen*



Picture 5: The golden-colored rocks of a typical landscape of the Magdalen islands



Interactive
map

Map 8: The areas inhabited by Greeks according to Sulla's narrative (in red)

The aftermath

Commenting on the reception of Sulla's narrative Cherniss mentions:⁵

This geographical introduction has aroused the wildest speculations. Kepler was convinced that the trans-Atlantic continent was America, and he tried to identify the islands mentioned in the myth.*

*In Theatrum Orbis Terrarum Abrahami Ortelii** (Antwerp, 1593), this passage of Plutarch was used, apparently for the first time, to prove that the ancients knew the American continent.*

*W. Christ*** in 1898 still could assert that Plutarch's continent is «obviously America» and proves that about AD 100 sailors reached the North American coast via Iceland, Greenland, Baffinland.*

Therefore, Plutarch's narrative about ancient travel to North America seems to be based on fact, and since the 16th century, well-known scholars such as Kepler, Ortelius and Christ, seem to have been convinced that the ancient world had knowledge of the American continent.

But how is it possible that such an important piece of information is not mentioned in other sources and is not widely known?

I soon realized that this journey, in every detail, could not have been told "louder" through the centuries than it was...

... through Homer's "Odyssey"!

* Johannes Kepler (1571–1630). German mathematician and astronomer.

** Abraham Ortelius (1527–1598). Flemish cartographer and geographer.

*** Wilhelm von Christ (1831–1906). German classical scholar.

Insert A: Ocean currents of the North Atlantic

Sea travel to the North Atlantic Ocean are central to this study. Therefore, Atlantic sailing conditions are of particular importance, especially with regard to the ocean currents, for which it would be useful to know some of their basic features, since, as we shall see, they determined to a large extent the paths of the sea routes.

Map 9 gives a general picture of the ocean currents, which illustrates that the ocean is an ever flowing mass of water.

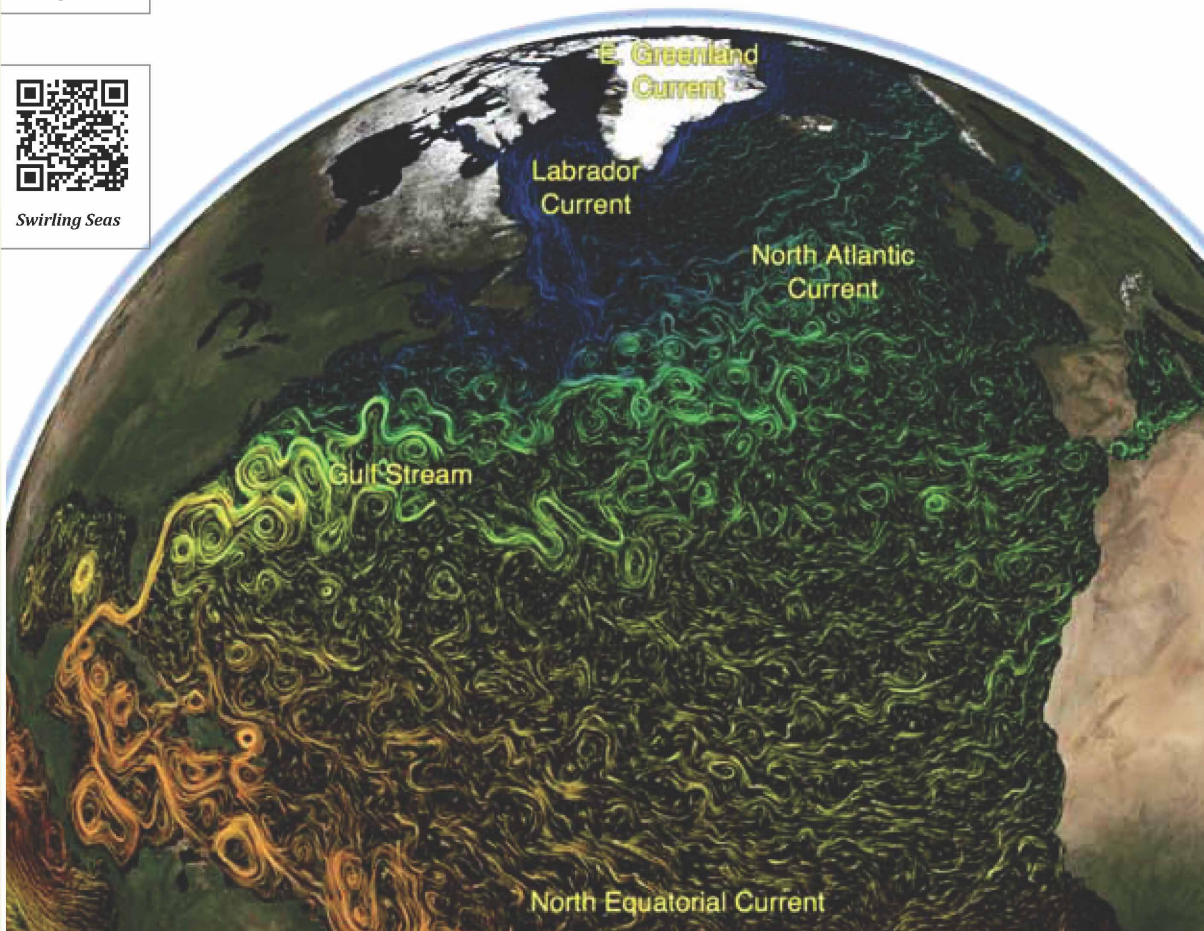


*Global Sea
Surface
Currents and
Temperature*



Swirling Seas

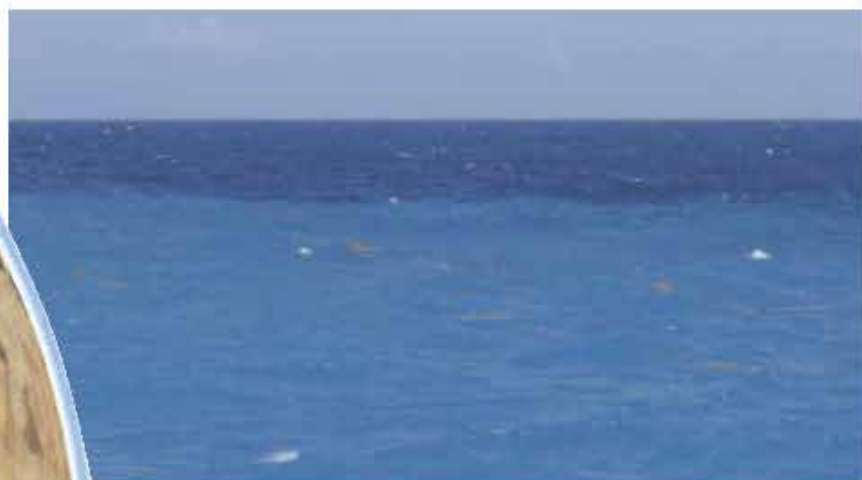
Map 9: Visualization of ocean current flows based on (mostly) satellite measurements (source: NASA). Colors correspond to the temperature of the currents, ranging from red for the hottest to blue for the colder



The Gulf Stream

M.F. Maury's* "*Physical Geography of the Sea*", published in 1856, has been an oceanography and navigation reference book for decades. Maury describes the Gulf Stream as follows:¹⁵

There is a river in the ocean. In the severest droughts it never fails, and in the mightiest floods it never overflows. Its banks and its bottoms are of cold water, while its current is of warm. The Gulf of Mexico is its fountain, and its mouth is in the Arctic Seas. It is the Gulf Stream. There is in the world no other such majestic flow of waters. Its current is more rapid than the Mississippi or the Amazon, and its volume more than a thousand times greater. Its waters, as far out from the Gulf as the Carolina coasts, are of an indigo blue. They are so distinctly marked that their line of junction with the common sea-water may be traced by the eye.



Picture 6: The characteristic color of Gulf Stream, which is visible on the top side of the photo

* Matthew Fontaine Maury (1806–1873). American astronomer, naval officer, historian, oceanographer, cartographer, meteorologist, geologist and educator.

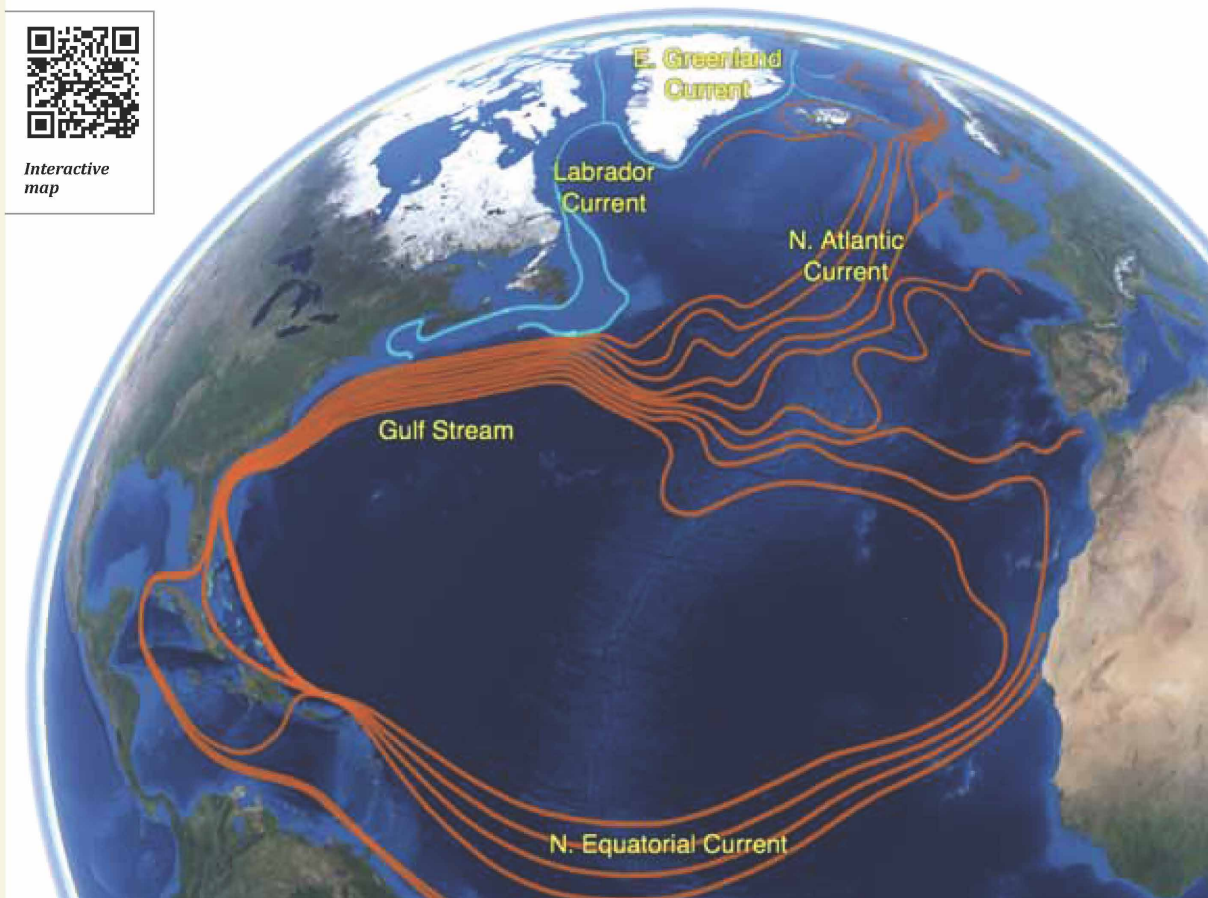
The main features of Gulf Stream include:¹⁶

- Maximum speed: 9km/h, or 216km per 24h.
- Average Speed: 6.4km/h, or 154km per 24h.
- Minimum speed (northern branches): 1.6km/h, or 38km per 24h.
- Carries about 10 million cubic meters of water per second, which is greater than the quantity transported from all the rivers of the world together.
- The current is warm. At many points in its flow the temperature is as much as 10°C higher than that of neighboring waters, which often results in the formation of fog above the current's flow.

The main branches of the Gulf Stream (the largest of which is the N. Atlantic current) are depicted in a simplified form on map 10 in dark



Interactive
map




orange. Among other sources, the Gulf Stream is fed by the North Equatorial Current which starts from the west coast of Africa and moves from east to west. These two currents create the so called North Atlantic Gyre, that flows in the cyclic route shown in map 10.^{17, 18, 19, 20, 21, 22, 23}

The East Greenland and Labrador currents

The cold current of East Greenland and the cold stream created in Labrador travel from north to south along the North American coasts, influencing the climate of these areas and contributing to their biodiversity. On Map 10, these current flows are shown in cyan color.

The main data known about these currents are:²²⁰

- They are cold, with temperatures below 0°C, and have low salinity.
- They are restricted to the continental shelf and reaches depths slightly more than 600m.
- The volume of water transport varies from about 3.5 to 5.4 million cubic meters per second, and carry several thousand icebergs each year to the south.
- They are of the slowest currents of the ocean. They usually run at speeds ranging from 0.4 km/h to 2-3 km/h, that is, 10-72km per 24h.



Map 10: The main ocean currents of the Atlantic and their branches