

Early attempts at weather prediction and climate description in 19th century Greece

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In the preface of one of the best books in the history of meteorology, namely *Meteorology in America, 1800-1870*, James Fleming wrote:

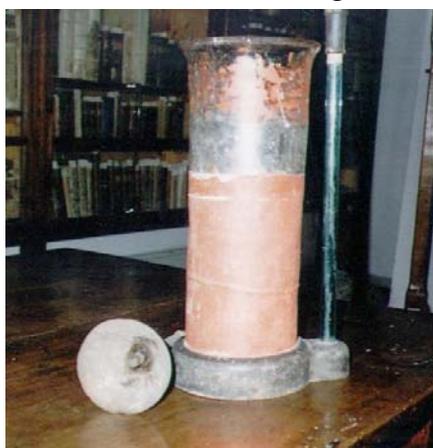
“Meteorology in the nineteenth century experienced a rapid and dramatic expansion of its scientific horizons. On many levels-theoretical, empirical, institutional, technological- it encouraged inquiry, demanded discipline and attracted controversy”

Inspired by this argument I thought it would be interesting to be examined the context of the reappearance of the science of meteorology in Greece of the 19th century, a new born independent state, with a long and famous cultural tradition but insecure steps towards the future.

Should Greeks content themselves only with Aristotle’s “Meteorologica” written more than two thousands years ago or would they respond to the challenge of the time developing what we have in mind when we speak about meteorology?

Though the question seems interesting, one must have in mind that answering such “peripheral” problems was out of the mainstream of the favorite subjects of History of Science. Therefore, the difficulties one could face if would wish to be engaged with a relevant research are obvious.

Nevertheless, we thought it was worth the effort.



Before the establishment of the independent state we find some basic meteorological scientific knowledge in textbooks of Physics and Geography written by the Greek scholars the Modern Greek Revival (1750-1821).

In his π (Florilegium of Physics), Vienna, 1790, Rigas Velesinlis, a wellknown Greek intellectual discusses several meteorological phenomena. In the chapter “About rain” he discusses the causes of the rain and how one can predict a rainy weather using the barometer. He discusses also the use of anemometer in the chapter “About the winds”.

A rain-meter survived in the Library of Milies

Meteorological observations for educational purposes performed during that period and a number of relevant instruments from those days still preserve in the Library of Milies, a small village, but great educational center for the Greeks during that period.

A number of popular beliefs concerning the weather and thunder prediction were also presented in manuscripts circulated among the people called “ » (Books concerning the thunders) and « » (Books concerning the Moon).

Some sporadic articles on the subject were also presented in the most readable Greek “scientific” journal of the period, *Hermes the Scholar* (1811-1821).

Consequently , it is easy for anyone to realize that there were already established two distinctive traditions concerning meteorology in general and weather prediction in particular. A scientific tradition and a popular one.

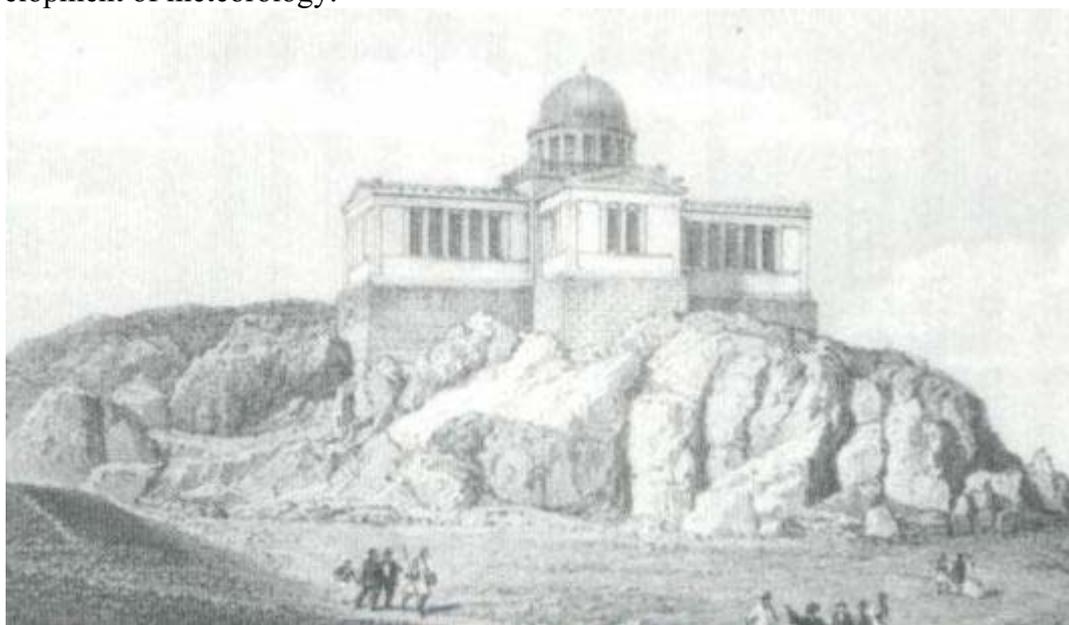
Though here we'll discuss more what we called “scientific tradition” we have to admit that the popular alternative had, and continues to have in a great extent,

a great impact on the Greek society. In a 1886 diary published in Athens (see its frontispiece in the picture) we read for example that “ animals predict better the changes of the weather than the barometers, hydrometers and thermometers. When the raven crows and the frogs croak the weather will be humid and oppressive. When the donkeys bray are louder than usual then it is going to rain”.

That is because Greeks, for reasons quite different from the English people, were equally, if not more interested in the weather conditions.

The reason was the regular shortage of rain for long periods and the sudden appearances of storms, which would cause severe troubles in their cultivations and the transport system, especially in the windy Aegean Sea.

So that one can easily understand why the first scientific research institute of the Independent Greek State, the Athens Observatory, included in its priorities the development of meteorology.



Nineteenth century engraving of the Athens Observatory on the hill of the Nymphs.

Athens Observatory founded in 1846. It was built and it functioned during the course of the century due to a generous donation by the Greek tycoon Baron George Sinas.

Its first Director George Vouris performed systematic meteorological observations in Athens, since November 1839,, published in 1843 under the title *Meteorological Observations performed in Athens from November 1st 1835 until Jun 30th 1842*. Two years earlier, in 1841, a physician, Konstantinos Mavrogiannis had published the book *Remarks on the climate of Athens and its influence on the animals*.

After Vouris resignation in 1853, a new series of observations started by A. Papadakis on the 1-10-1857, which hadn't been interrupted ever since.

But it is Vouris' successor as Director of the Observatory, Julius Schmidt who may be considered as the founder of modern meteorology in Greece.

In Dimitrios Eginitis words, the most important meteorologist in Greece until the World War II, " Schmidt's meteorological observations from December 1858 until 1884" contributed extensively to the awareness of the climatic conditions of our country. Similarly the observations on various meteorological phenomena, such as storms, hurricanes, etc. performed by him are characterized by their fineness, their descriptive accuracy, the richness of their details and their perfection in general."

Following a continuous progress, in the methodology performed for the observations a sufficient network of thirty-three meteorological stations established in the small independent Greece in 1893.

This network was a result of Eginitis efforts. He became director of Athens Observatory in 1890 and he was the first who processed statistically the series of observations that have been collected until then as a whole.

Based on the results of this analysis and a number of qualitative observations he published a well-documented book entitled *The Athens Climate* in 1895, which had a positive reception from the international meteorological circles.

One of the significant contributions of the book was the introduction and establishment of the meteorological terminology in Greece.

Ideologically, Eginitis' book served towards the proof that the climate of Greece remained unchanged since antiquity and therefore there was no doubt that Greeks were the inhabitants of the region all the time.

The positive reception of meteorology in Greece is also reflected in the regular publication of daily weather reports and forecasts in the newspapers and journals. figure on the left there is a meteorological based on the observations of the Athens Observatory and published in the bi-monthly journal *Athineon*.

In the table

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Μετεωρολογικὰ παρατηρήσεις κατιστοιχηθείσας
ἐκ τοῦ Ἀστεροσκοπίου Ἀθηνῶν.

1876. Ἰαννουάριος (E. N.).

Βαρομετρικόν.

Μέση θλιψίς 759,72 γμ.
Μεγίστη » 769,38 (τὴν 24^{ην}).
Ἐλαχίστη » 744,66 (τὴν 5^{ην}).

Θερμότητων.

Μέση θερμοκρασία 8,02 ἐκ.
Μεγίστη » 16,5 (τὴν 5ην).
Ἐλαχίστη » -3,4 (τὴν 2ην).

Ἡμέρας βροχῆς 5 (ποσὸν τοῦ καταπιπτόντος ὕδατος 2,35 γμ.),
πάγχου 2.

* Ἄνεμοι ἐπέυσαν κατὰ 5 ἡμέρας ΝΔ, 1 Α, 2 Βδ, 19 ΒΑ,
1 ΝΑ, 3 Ν.

books

is a

Φεβρουάριος.

Βαρομετρικόν.

Μέση θλιψίς 753,43.
Μεγίστη » 760,85 (τὴν 1^{ην}).
Ἐλαχίστη » 744,13 (τὴν 9^{ην}).

Θερμότητων.

Μέση θερμοκρασία 11,20.
Μεγίστη » 20,0 (τὴν 1ην).
Ἐλαχίστη » 4,5 (τὴν 4ην).

Ἡμέρας βροχῆς 9 (ποσὸν τοῦ ὕδατος 7,45 γμ.), θιχίσου 3
(ποσὸν τοῦ ὕδατος 0,10 γμ.), ἀστράλων 2, βροντῶν 1.

* Ἄνεμοι ἐπέυσαν κατὰ 5 ἡμέρας ΝΑ, 5 Α, 2 Βδ, 6 ΒΑ,
3 ΝΑ, 8 Ν.

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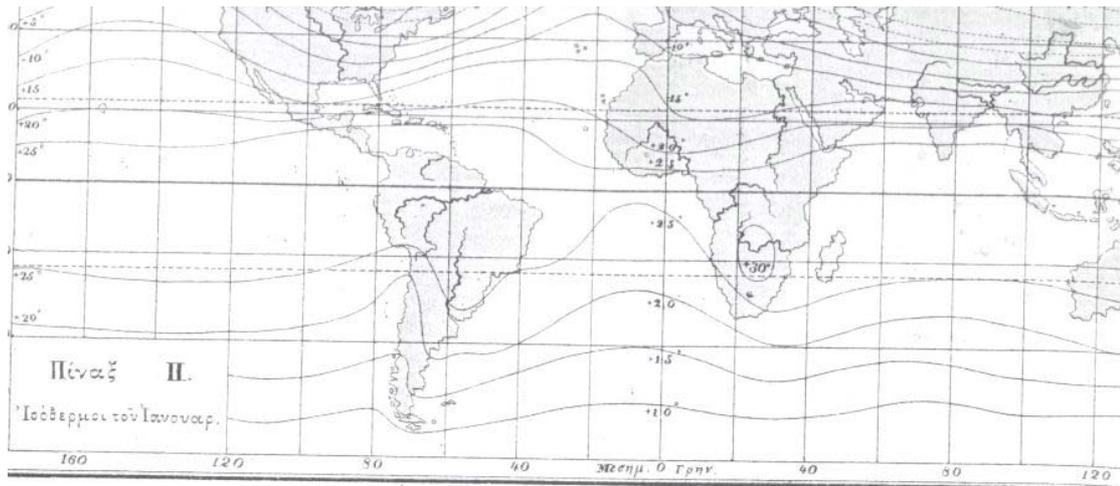
Basic mathematical foundations of meteorology are found also in Physics' of the period. For instance Andreas Spatharis book _____

_____ (Elements of Experimental Physics), Athens 1886, among others, there chapter of synoptic meteorology, aiming obviously at the possibility of weather forecast. Spatharis discusses also the cause winds, rain, snow and hailstone.

another book of Physics, Timoleon Argyropoulos' _____ (Elements of Physics) there is also a

chapter concerning meteorology and climatology.

In this chapter one read among others a description of some meteorological instruments like the graduated cylinder and the anemometer.



World chart showing the isothermal lines during January

Conclusions

As it becomes obvious there is a continuous interest about meteorology during the course of the 19th century. Despite this interest meteorology failed to be served by professionals as an exclusive scientific discipline and scientists engaged with the study of meteorological observations were mainly physicists and astronomers. Due to the general political and financial situation Greece had not as a priority to establish an independent meteorological agency. Hellenic Meteorological Agency established just in 1931. Until then it was only the Athens Observatory which had a reliable network of meteorological stations used mainly for collecting observations used for the determination of the climate and not for forecasting. Besides that though in other scientific disciplines like astronomy, chemistry, physics, oceanography and botany Greek scientists had a number, small but adequate, of original contributions, this did not happen for meteorology. This science had to wait for the twentieth century to find the proper impetus for a real development in Greece. This development was mostly due to the needs of the Hellenic Navy at the beginning and the Hellenic Air Force later and we should say that it was quite remarkable.

References

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Biographical Sketch: George N. Vlahakis is Fellow Research for Neohellenic Research / National Hellenic Research Foundation and tutor of “History of Philosophy and Sciences in Greece” at the Hellenic Open University. His main research interests cover the scientific thought in Greece during the 18th and 19th century.. He has written books and many papers published in international journals .