Mid-Term Excursion in Greece

October 5th - 13th, 2013

THE INTERNATIONAL MOLINOLOGICAL SOCIETY · T·I·M·S ·

TIMS

Dear TIMS members,

Welcome to all of you coming from Belgium, Cyprus, France, Germany, Hungary, Japan, the Netherlands, Romania, Switzerland, Sweden, USA, UK and, of course, Greece.

Greece is famous for its ancient ruins but very few know about its more recent past. So in this excursion we will come across a little antiquity (as always expected) but mainly sites of the last two centuries. That is windmills, watermills and animal driven mills producing the main staples, flour and olive oil. Also small factories, cotton gins, gun powder mills, fulling tubs and a Persian (water rising) wheel. We are going to visit three types of windmills and two types of watermills. Very important are the various constructions used to control and collect the water, since water was always scarce.

The number of mills we will visit is a very small one among the 30,000 water-driven installations and windmills of Greece and an unknown number of oil mills. Most are in ruin and as such we will need a lot of imagination to fully understand the working conditions.

Since the majority of the sites are small, please think of all the other members visiting the sites and do not stay long at each one. The purpose is that everybody should have his/her share of time at each site. So please keep moving. Everybody should be able to enjoy the trip!

We would like to express our sincere gratitude to the Piraeus Bank Group Cultural Foundation for allowing free access to the Dimitsana Open Air Water-Power Museum to all excursionists, and to the Kairis Library of Andros for offering the lunch on 10.10.2013.

The Greek organizing team wishes you a very good time

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and
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Name	Country
Bannister Gerry	UK
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Deffontaines Benoit	France
Deffontaines Dominique	France
Derbyshire Margaret Lilian	UK
Derbyshire Tom	UK
Eyquem Alain	France
Eyquem Chantal	France
Feldt Robert	USA
Feldt Trudy	USA
Hackney Graham	UK
Hodginson Judith	UK
Hurst Betsy	USA
Hurst Tom	USA
Igoumenidou Euphrosyne	Cyprus
IJzerman Yolt	Netherlands
Jones David	UK
Kosaka Katsunobu	Japan
Koster Wessel	Netherlands
Lajoie-Mazenc Claudine	France
Lajoie-Mazenc Michel	France

Name	Country
Lekou Olga	Greece
Meesters Ton	Netherlands
Midboe Dag	Sweden
Nomikos Stefanos	Greece
Oosterhuis Tjerk	Netherlands
Ozsváth Gábor Dániel	Hungary
Papaeftihiou Ioulia	Greece
Parton Holly	UK
Riggs Lisa	USA
Schuler Heinz	Switzerland
Solidakis Emmanuel	Greece
Speis George	Greece
Starmer Geoffrey	UK
Stoop Erik	Netherlands
Streza Marius	Romania
Toutouza Katerina	Greece
Van Berge Henegouwen Tarcis	Netherlands
Van Berge Henegouwen Wil	Netherlands
Van Bergen Iris	Germany
Van Bergen Willem	Germany
Van der Drift Leo	Netherlands
Van der Drift Peter	Netherlands
Wijnmalen Diederik	Netherlands
Witurouven Ria	Belgium
Yeske Charles	USA

Saturday 05.10.2013

No.*	Place name	Arrival	Departure	Remarks
	Athens	11.00	19.30	President Hotel - Registration
	Athens	18.00	20.00	Welcome drink and presentation of books about Greek mills (possibility to order books) – President Hotel
	Piraeus	20.30		Dinner

Sunday 06.10.2013

No.	Place name	Arrival	Departure	Remarks
	Athens		08.00	President Hotel
	Corinth Canal	09.15	09.30	Photostop
1	Kranidi	11.30	13.00	Windmills in different stage of preservation
	Ligourio	14.15	15.30	Lunch
2	Demaina	16.00	17.30	Restored watermill, “Persian wheel”, oil mill stones (small agricultural museum)
	Nafplio	18.30	19.30	Park Hotel
	Nafplio	20.00		Dinner

Monday 07.10.2013

No.	Place name	Arrival	Departure	Remarks
	Nafplio		08.00	Park Hotel
3	Karkalou	09.30	10.15	Watermill
4	Dimitsana	10.45	12.30	Open Air Water-Power Museum
	Vitina	13.00	14.30	Lunch
5	Vitina	14.45	15.30	Watermill ruins
6	Kefalovryso	16.15	17.30	Watermills
7	Plain of Argos	18.00	18.45	Windmill ruins (photostop)
	Nafplio	19.00	20.00	Town sightseeing
	Nafplio	20.00		Dinner

Tuesday 08.10.2013

No.	Place name	Arrival	Departure	Remarks
	Nafplio		08.30	Park Hotel
8	Prosymna	09.30	11.30	Watermill drop tower and aqueduct ruins
	Isthmia	12.30	14.00	Lunch
9	Pikermi	15.30	16.15	Watermill ruins (photostop)
	Rafina	16.45	17.30	Boat to Andros
	Gavrio (Andros)	19.30	19.45	
	Gavrio	20.00		Andros Holiday Hotel
	Gavrio	20.30		Dinner in Hotel

* The ‘’No.’’ indicates the mills on the maps.

Wednesday 09.10.2013

No.	Place name	Arrival	Departure	Remarks	
	Gavrio		08.00	Andros Holiday Hotel	
10	Piso Meria (Bouros)	09.15	11.30	Watermill ruins	
	Ormos Korthiou	12.00	13.30	Lunch	
11	Kalamonari	14.00	15.30	**Group A**	Watermill ruins (boat trip)
12	Hones	16.00	17.00		Horizontal windmill under restoration
12	Hones	14.00	15.00	**Group B**	Horizontal windmill under restoration
11	Kalamonari	15.30	17.00		Watermill ruins (boat trip)
13	Pitrofos	18.00	19.30	Cyclades Olive Museum	
	Gavrio	21.00		Dinner in Hotel	

Thursday 10.10.2013

No.	Place name*	Arrival	Departure	Remarks	
	Gavrio		08.00	Andros Holiday Hotel	
14	Stenies	09.15	11.15	Watermill ruins and “Fabrika” (steam and watermill ruins)	
	Andros (Hora)	12.00	13.30	Lunch	
15	Dipotamata	14.00	17.00	**Group A (difficult)**	Watermill ruins
16	Dipotamata	17.15	18.00		Restored watermill
16	Dipotamata	14.00	15.15	**Group B (easy)**	Restored watermill
	Dipotamata	15.30	16.00		Photostop at a “Belvedere”
15	Dipotamata	16.15	18.00		Watermill ruins
	Andros (Hora)	18.45	19.30	Town sightseeing	
	Gavrio	21.00		Dinner in Hotel	

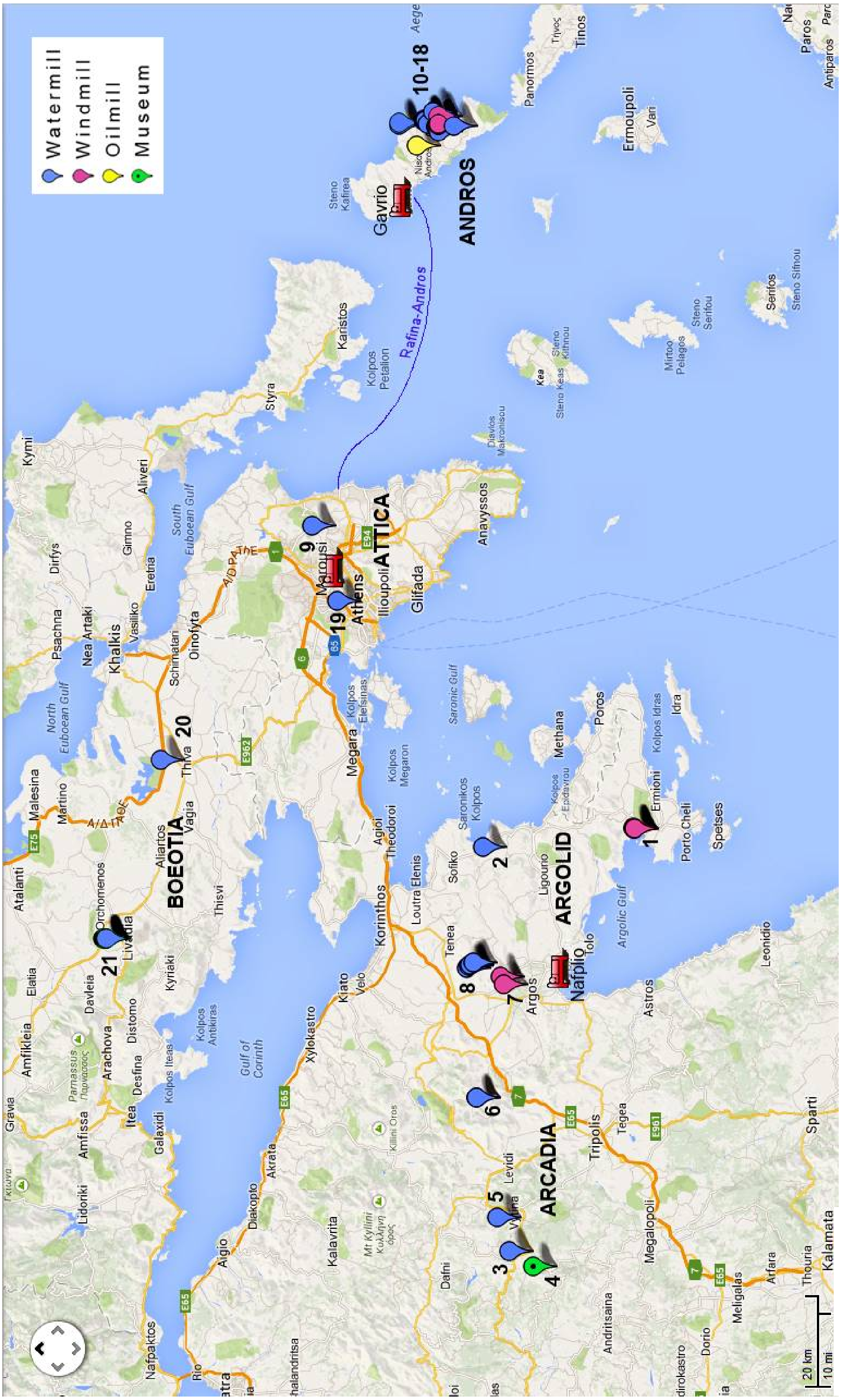
Friday 11.10.2013

No.	Place name	Arrival	Departure	Remarks
	Gavrio		08.00	Andros Holiday Hotel
17	Piskopio	09.30	12.00	Watermill ruins, picnic
18	Prophet Elias Hill	12.30	14.00	Stone towers, horseshoe shape and horizontal windmill ruins
	Gavrio	15.30	16.30	Boat to Rafina
	Rafina	18.30	19.00	
	Athens	20.00		President Hotel
	Athens	21.00		Dinner in Hotel

Saturday 12.10.2013

No.	Place name	Arrival	Departure	Remarks
	Athens		08.00	President Hotel
19	Athens (Ancient Agora)	08.30	10.00	Watermill ruins, millstones
20	Thiva	12.00	12.30	Watermill ruins (photostop)
	Livadia	13.45	15.15	Lunch
21	Livadia	15.30	17.00	Water-driven industries ruins
	Athens	19.30	20.30	President Hotel
	Center of Athens	21.00		Dinner

* There may be some changes depending on the number of participants in the groups.
Note: Times may be subject to change due to unforeseen circumstances.


Watermill
Windmill
Oilmill
Museum
10-18
ANDROS
Gavrio
Rafina-Andros
ATTICA
Athens
Marousi
9
19
20
Thiva
BOEOTIA
21
Livadia
ARGOLID
Nafplio
Argos
Tenea
1
2
7
8
ARCADIA
Tripolis
Levidi
Vytina
3
4
5
6
Ermioni
Korinthos
20 km
10 mi

Map with the places in Argolid and Arcadia we will visit.

ARCADIA

Mills of the Dimitsana area

Lousios River located in the Dimitsana area in central Peloponnese, increases its volume downriver by its tributaries from many springs. More than 90 water-powered workshops worked, usually in groups, in its riverbed and along its tributaries.

A survey, in 1988-1989, recorded 27 watermills, 18 outdoor or indoor fulling tubs, 20 gunpowder mills, 2 tanneries, etc., and some ruins of unknown use. These mills were all "Eastern" type watermills with small horizontal waterwheel, serving the 23 area villages. The same happened with the fulling tubs. The gunpowder mills initially had a vertical waterwheel. They worked using wooden hammers, but in more recent years, they were equipped with small horizontal waterwheels and a truncated conical millstone. Their gunpowder was sold in distant places and during the War of Independence they worked exclusively to provide gun powder for the revolutionaries who fought for the establishment of a Greek state. Finally, the tanneries ground tanning material for the local tanning industry.

The various mills can be classified into 3 categories:

- those built between the 16th and 18th century, single spaced with small dimensions and with a roof of stone vaults
- those in the19th century, much larger, two-storey, with the miller's house on the second floor and with a roof of wooden beams and tiles,
- those of the late 19th century and early 20th century, small buildings carelessly built with cheap materials.

The largest group of workshops with 17 mills, mainly gunpowder mills, is located along the tributary originating from the spring by the Church of St. John, in the ravine below

Dimitsana. There, the Open-Air Water Power Museum was established, which we are going to visit, presently owned by the Piraeus Bank Group Cultural Foundation, which is a TIMS member.

Watermill in Karkalou 3 (Monday 07.10.2013)

The first group of water-driven installations of the river Loussios, lies in the village of Karkalou, a little distance before Dimitsana. It consisted of 3 separate buildings comprising on the whole 3 watermills, 3 fulling tubs and 1 sawmill.

All 3 buildings were of two storeys; the miller's family lived on the first floor, the watermill was on the ground floor and the fulling tub in a separate side site.

We are going to visit the third watermill, known as "Panaras' mill", which is the only one still working in the area. Its fulling tub fell apart in 1957.

The building of the watermill in Karkalou.

Downstream view of the under-house of the mill.

The Open Air Water-Power Museum in Dimitsana 4 (Monday 07.10.2013)

The Open Air Water-Power Museum in Dimitsana in central Peloponnese is a thematic museum centred on the importance of hydraulic power in traditional societies, which presents the basic pre-industrial techniques using water as their main source of energy to produce various goods.

The Open Air Water-Power Museum opened to the public in the summer of 1997. The project was co-funded by the Second and Third European Community Support Frameworks, with the support of the local Region. In an area covering 1,000m2, a complex of water-powered installations and machinery has been restored, so as to integrate them into a museum on waterpower.

Each of the buildings housing the old traditional workshops has been renovated and now has a permanent exhibition whose thematic content concerns the workshop it is in:

The first building houses a fulling tub and a flourmill. Up to the mid-20th century, a score of fulling tubs functioned in the vicinity of Dimitsana, where woven woolen fabrics were washed (different kinds of blankets, bedcovers and rugs).

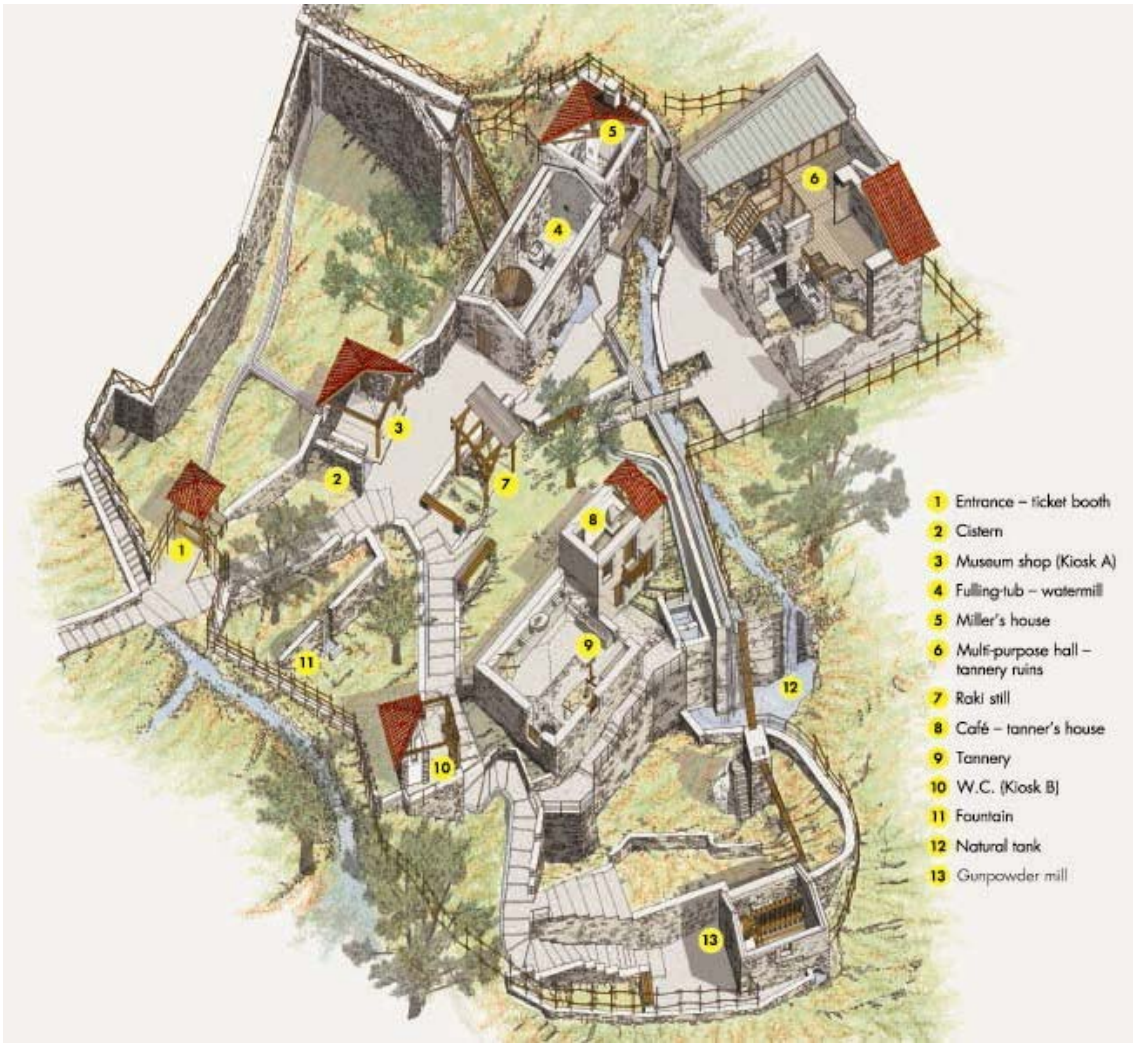
Next to it, a flourmill with a horizontal paddle-wheel has been restored. Here the visitor can drop corn kernels into the grain hopper and watch how they are ground by the millstones and via the meal spout fall into the flour bin. In particular, the water is channelled into the headrace (or millrace) and, via the flume, is projected onto the paddles (or blades) of the waterwheel and rotates it. The spindle, a vertical wooden shaft, transmits the motion to the upper millstone (the runner stone), while the lower one (the bed stone) is fixed immovably to the floor and remains stationary. The grain is placed in the hopper (an open-topped, tapered container). A small wooden rod, the damsel, connects the hopper to the runner stone, to which the rattler ("vardalistra"), a circular piece of wood with notches, is affixed. Due to the vibrations caused by the rotary motion, the grain falls through and is ground between the two millstones. The meal is then collected in the meal box, from where it is removed with a wooden scoop.

The adjoining small room with a fireplace was the miller's house, where his -usually large- family spread out the bedding each night in the loft and slept in rows side by side. Outside the mill, a rough shelter was erected, similar to the one protecting the raki still that was set up after the grape harvest each year to make tsipouro (a kind of schnapps or eau de vie) from the skins of the pressed grapes, and which would function night and day for 3-4 days.

Right opposite it, there is a two-storey building, with the tanner's house above and the tannery just below it. The workshop's interior is divided into "zones" corresponding to the different stages of processing animal hides. The first is for the "waters" (the soaking process), the liming and the preparatory stages in general (scudding, deliming, bating). The second contains a series of "limbes" (vats) for the actual tanning, followed by a well-ventilated zone, used for hanging out and drying the tanned hides in the shade. Finally, a well-lit corner was reserved for the retanning or currying work (which gives the leather the required properties depending on the use it is destined for).

The stone-paved path leads to a flat area, where a natural reservoir has formed, and ends at the gunpowder mill. Dimitsana was one of scores of villages where, from the 16th century onwards, raw potassium nitrate (saltpetre) was collected and handed over to the Ottoman Turks as a tax in kind. During the 1821 Greek War of Independence against Ottoman rule, the inhabitants of Dimitsana played an active part in providing the Greek combatants with the necessary material for ammunition.

Gunpowder is a strong element of the region's cultural identity and remains alive in the memory and tales of its inhabitants. It is precisely this historical identity that the Museum brings to the fore by reconstructing the type of powder mill with pestles, which was used in Dimitsana during the 1821 Revolution and up to the early 20th century, simultaneously preserving this particular technology of gunpowder production, which disappeared in the rest of Europe in the 18th century.



Overview plan of the Open Air Water-Power Museum.

Interior of the watermill with the fulling tub.

The gunpowder mill.

Watermill in Vitina 5 (Monday 07.10.2013)

Along the river Mylaonas, which lies below Vitina, in central Peloponnese, there were 4 fulling tubs and 12 watermills in function, all of them having a horizontal wheel. 2 of them belonged to local monasteries. Today all of these mills are ruined and only very few parts of their mechanism still exist.

We are going to visit only one of these watermills, owned by the Tselepi family who also owned a fulling tub in a separate building.

By the other small rivers around Vitina there were 5 more watermills, which worked only in winter because the water was not enough; they used to collect it in a water tank during the night so as to be able to work in the morning.



The ruins of the watermill in Vitina.

ARGOLID

General information

In the Argolid there have been recorded approximately 130 watermills, 55 windmills, 16 fulling tubs and one gunpowder mill. Unfortunately today very few examples of this pre-industrial technology survive. However, some grinding mechanisms have been restored in an attempt to reopen the mills for tourists. They occasionally operate grinding mainly cereals for animal feeding. Besides the flour mills, there are oil mills, since olive oil was a staple diet in rural Greece.

The earliest evidence for the existence and operation of a mill in the area is dated in 1212 (Frankish period). Later in 1479 there is a record about mills in treaty between the Venetians and the Turks. The written testimonies on mills multiply around 1800.

The ownership of mills varies, following the socio-political changes and conditions of each era. One can point out that the mills were built by the occasional invaders, Franks, Venetians, Turks, those owned by the State, the Church (monastic) and those that were self-managed. The mill was an important asset and always had been a great investment.

Watermills, scattered almost throughout the Argolid, were important economic centers. Their necessity in converting grain into flour made them a key element in making bread and other products. Today we meet mill groups of 2-3 to 11 mills. These groups of mills were operating by the water flow of the same creek flowing downhill in a sequential use of water. In some cases we find a water mill along with a fulling tub.

The geography of the Argolid favored the construction and operation mainly of watermills. However, also windmills are recorded, whose life cycle ended earlier (30-40 years) compared with that of watermills. They began to decline shortly after 1920 and until the war almost everyone had stopped working.

The windmills of Argolid belong to the type of common Mediterranean tower wind mill. It had three levels, the ground floor (basement) was for the transaction with customers, the loft where the system of regulating the millstones was installed and the upper floor where the grinding mechanism was placed.

In the Argolid we will visit the following mills:

Windmills in Kranidi **1** (Sunday 06.10.2013)

Kranidi is currently the only surviving windmill area, “mylotopos”, in the Argolid. There were seven mills on the hill from which 4 have survived. One of them has been recently repaired and parts of the mechanism have been preserved. This windmill operated up to 1943. The windmill area was created later than 1840, when the great development of Kranidi begins. The extensive facilities testify large grain production.

Two of the windmills in Kranidi.

Details of the mechanism.

Windmills on the plain of Argos 7 (Monday 07.10.2013)

In the wider region of Argos, despite the fact that the ground is not hilly, at least 15 windmills once worked, from which we will visit two. Both were built around 1840-1850 and today only their stone towers survive in good condition. One of them belongs to the Stergiou family who were traditional millers. We know that it stopped working in the mid 1920s.

The two windmills we are going to visit in the Plain of Argos.

Watermill in Demaina 2 (Sunday 06.10.2013)

The watermill is within walking distance from the village of Demaina. It was recently restored and it is part of a small museum including, besides the mill, the miller's house, an oven, a persian (water-lifting) wheel and millstones of an olive press.

The miller's house and the watermill in Demaina.

The interior of the mill.

The persian (water-lifting) wheel.

Millstones of an olive press.

Watermills in Kefalovryso 6 (Monday 07.10.2013)

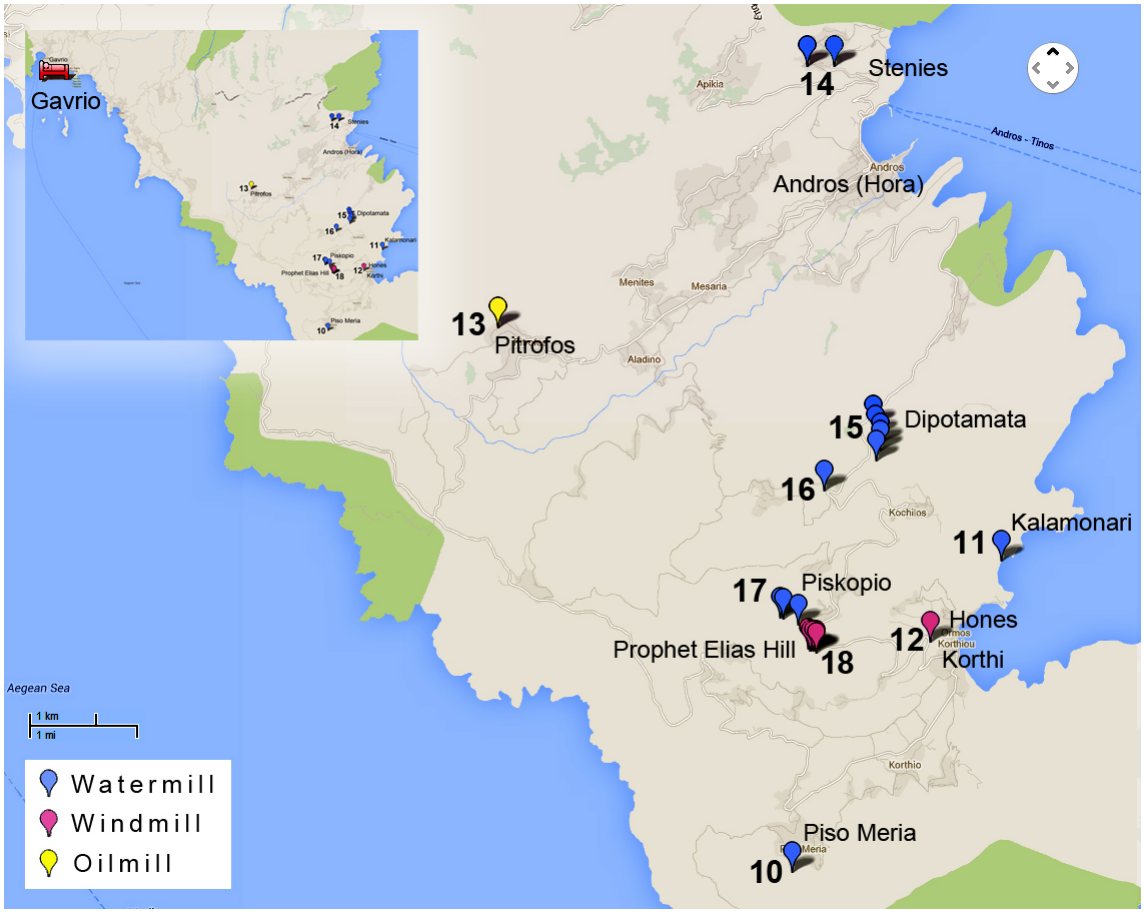
The village of Kefalovryso lies at an altitude of 700meters. It has taken its name from the spring in a cave. The mill area is located at the entrance of the village, next to this cave. The spring water moved the wheels of seven mills, two of which will be visited. In one of the two mills the whole mechanism survives and had been working until recently. The other mill (without roof) is buried under dense vegetation and only the metallic pressure pipe survives. It stopped working in the 1970s.

The metallic pressure pipe and the grinding mechanism of one of the two mills we are going to see.

Watermills in Prosymna 8 (Tuesday 08.10.2013)

The watermills in Prosymna are located along the ancient Asterion creek having its source in Mycenae. There were five mills from which we will visit the ruins of three or four of them inside olive groves near the ancient road connecting ancient Mycenae with Prosymna. The main feature is the long aqueduct and the stone water (drop) towers. We know that two of them stopped working in the 1940s.


The aqueducts and the water towers of two of the watermills in Prosymma.



Part of the map of Andros with the places we will visit.

General information

In the Cyclades islands, the main source of energy for grinding grain, was the wind, which had the appropriate volume of more than 310 days a year, since most of the islands had no running water. But in those few, where water was in sufficient quantities, watermills were built, since they had numerous advantages (lower cost of construction, operation and maintenance; it was a safer investment since there was much less danger of sudden destructive weather changes). In Andros, which is the northernmost island of the Cyclades, windmills were built along with watermills to utilize to the fullest the existence of large volumes of water flow. Their number is about four times that of the windmills, making the island a unique phenomenon in the Cyclades.

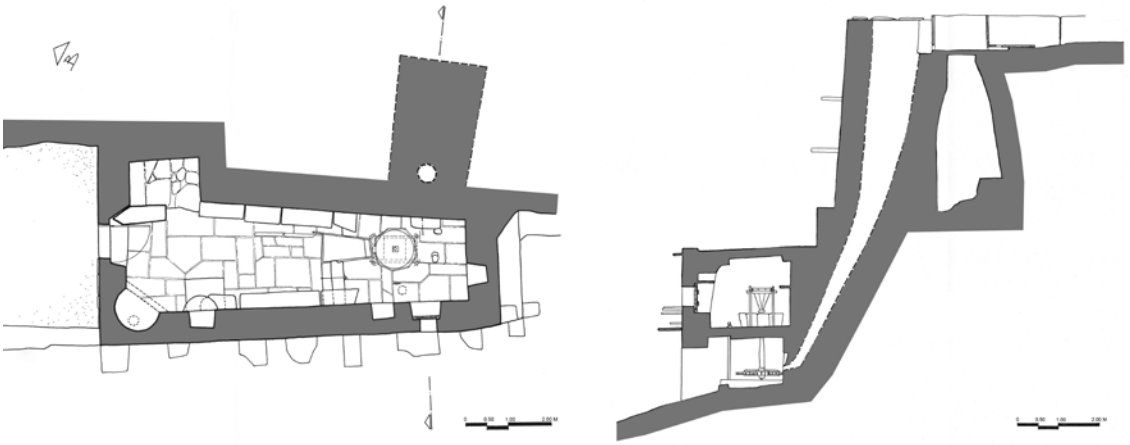
The oldest information on the existence of water-mills on the island, certify documents (on inheritance and sales) from the second half of the 16th century, referring to existing mills in three districts. From the 18th century onwards, the information increases providing data on other areas of the island.

From the research so far made, about 208 watermills, 60 windmills and 10 fulling tubs are recorded, regardless of their conservation status (registered and known positions, even those without any traces left). Common names exist as the "windmill" on the hill tops, indicating the existence of mills in the past.

We find watermills and windmills individually or in small or large groups. They were built by feudal lords who established clauses very unfavorable to professional millers, because of the high construction cost. Rarely, they were church property.

These water mills were all of the “Mediterranean” type, with small horizontal waterwheels except one underneath the village of Aidonia with a relatively small vertical waterwheel and the “Fabrica” in the village of Stenies with a great waterwheel, regarded as one of the largest in Europe. Most of the mills had already ceased to operate by 1920, but several reopened during the WW II.

In the creeks with sufficient water throughout the year, the mill worked with flow. In other situations, when it was scarce, it was necessary to construct hydraulic works for collection, storage, transport and diversion to the waterwheels. In narrow spots stream dams were built, creating ponds for irrigation and watermill operation. Water conduits and channels began from the dams, leading to the water tank of each mill, whose shape depended on the form of the ground.



Plan and section of a watermill with horizontal wheel.

The water flow upon the water wheel of the watermills was either through stone water (drop) towers, or wooden exterior ducts, usually curved out of whole cypress tree trunks, later replaced by metal ducts. The wheels were originally wooden, but were later replaced by metal ones.

The windmills found in Andros are of three types: The stone Mediterranean windmill cylindrical tower (which is the predominant one), the horseshoe (only one identified) and the latest horizontal windmill. In some cases horizontal windmills resulted from the conversion of older cylindrical tower windmills that had been deserted.

The Mediterranean stone tower windmill is similar to those described in the Argolid. We find, however, some different construction methods: built only with slates, with arches in the basement and triangular bases in the mezzanine and the floors constructed on large plates resting on inside walls.

The horizontal windmill is cylindrical with a lower and larger in diameter building than a common windmill. It has three spaces in respective levels: the roof, the main mill and the basement. The mechanism of conversion of kinetic energy into rotational located on the roof, the grinding mechanism located in the main area; finally, the mechanism to increase the rotational movement located in the basement. Throughout the building, all three spaces are traversed by the main shaft. It is a peculiar folk machine, which, according to oral tradition, was created by Thanasis Chrysostratis in the late 19th and early 20th century.

The cultivation of olive trees in the Cyclades, in Andros too, compared with other parts of Greece was insignificant. Even at the time when the dominant crops can be considered traditional, the between the Wars period, the annual average production of olive oil in Greece was 112,000 tons, while for the Cyclades the equivalent production was 1,000 tons.

The olive tree in Andros must have been cultivated from the earliest times, but it seems the production was never large enough to be a key marketable item, as in other places. Statistics show that in Andros the olive mills in 1830 were around 65, while in 1880 there were 82. The old animal driven olive mills worked until after WW II. Slowly, some were renovated with motorized operation and, until recently, completely abandoned.

The olive mill is an oblong building for grinding the olive paste using animal driven mill stones, on one side. On the other side, they were pressing the olive paste to get the oil out, using an iron press. The olive press in Andros is a building determined in shape by its function. It was especially built to become an oil-mill. The main reason is the size and volume of the stone slab, which should be placed first, and then the building would be built around it. The opposite would require the tearing down of a wall making the building at best structurally weak. Usually the olive mill was located in the basement of a village house.

In Andros we will visit the following mills:

Watermills in Piso Meria (Bouros) 10 (Wednesday 09.10.2013)

A group of 12 watermills by the Bouros stream served the Piso Meria hamlet. According to local information, in the past there was also a fulling tub, something which cannot be confirmed today. We are going to visit 5-6 mills in the ravine.

Map of the area showing the watermills we are going to visit.

Watermills in Kalamonari 11 (Wednesday 09.10.2013)

A group of five watermills in the Kalamonari stream served the village of Exo Rogo. These watermills were seasonal, since the stream has not got enough water. One of these mills has not been identified. We know about it only from local information. You will see two of the mills, from which one is the last one right on the beach. Today, only the water tower and the basin can be seen because it has been destroyed by the waves.

Map of the area showing the watermills we are going to visit.

Watermills in Stenies 14 (Thursday 10.10.2013)

In the Stenies area six water mills were operating from which one had a vertical waterwheel and is known today as the "Fabrica". We are going to visit one mill that is in a ruinous condition, but it is a characteristic one of the wooden pressure pipe remaining today in situ and it is one of the few surviving on the island.

The "Fabrica" in Stenies was a large flour mill and pasta factory, using alternatively water and steam power for processing grain. Its size was large for the 19th century Aegean. It was built in 1876 by Con. Empeirikos who built the mill to process wheat imported from Romania with his own sailing ships. It operated successfully until the early 1930s. The great competition, which had begun at that time, and the absence of roads made it extremely difficult to transport raw materials and manufactured products. This led to its decline and eventually made the plant to shut down. During the German/Italian occupation, the islanders opened the mill only to grind flour and after the WW II it stopped operating permanently. The abandonment brought about the deterioration of the building, while a fire around 1970 was the cause of the total destruction of wooden elements and parts of machinery.

The "Fabrica" is actually a group of buildings, dominated by the five-storey mill. Next to it there is a smaller four-storey building for accommodation and packaging and two small structures for steam engine machinery. The development phases of the complex are associated with the gradual modernization and expansion of the production line. The first one constructed in 1876 is the five-storey building with a large iron waterwheel (diameter about 13m.) It was operating using the water fall and the grinding mechanism had four pairs of millstones. Then in 1880 the mill used also steam. The boiler and steam engine were placed west of the mill.

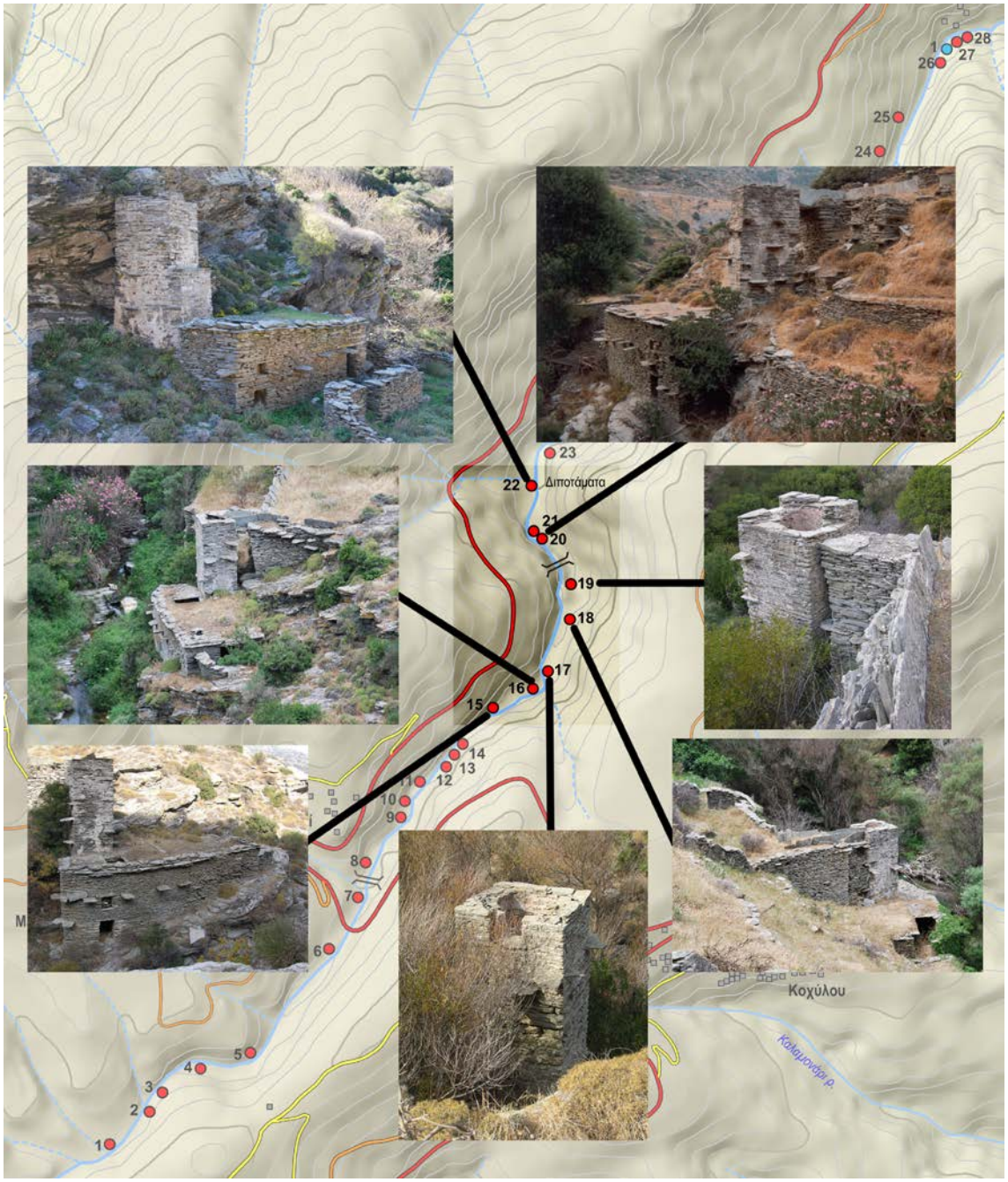
The production of pasta started before the end of the 19th century. While the production was held in the main building of the mill, the drying of pasta was held in a new building attached to the south side of the main one. In 1912 there was a major renovation, during which flour grinding machinery was added along with electricity lighting.

Map with the two watermills we are going to visit.

Watermills in Dipotamata 15 (Thursday 10.10.2013)

Presently by the Dipotamata ravine 28 mills and a fulling tub have been identified, but the exact number of installations operated in the past is unknown. During a big storm in 1845 (or 1849), the river swelled so much, that some mills were completely drifted

away and many others seriously damaged. Some were repaired while others were abandoned. All of them today are in ruins, except one that has been repaired. We will visit some of them.



The Dipotamata ravine and views of the watermill ruins we are going to visit.

Restored watermill in Dipotamata **16** (Thursday 10.10.2013)

The Loussidis' family watermill is located beneath the village of Exo Vouni in the ravine of Dipotamata. Its dimensions are about 10,30 X 3,00 m. The building was in good condition before its restoration. On the contrary, from the mechanism only the millstones and the frame of the iron wheel remained.

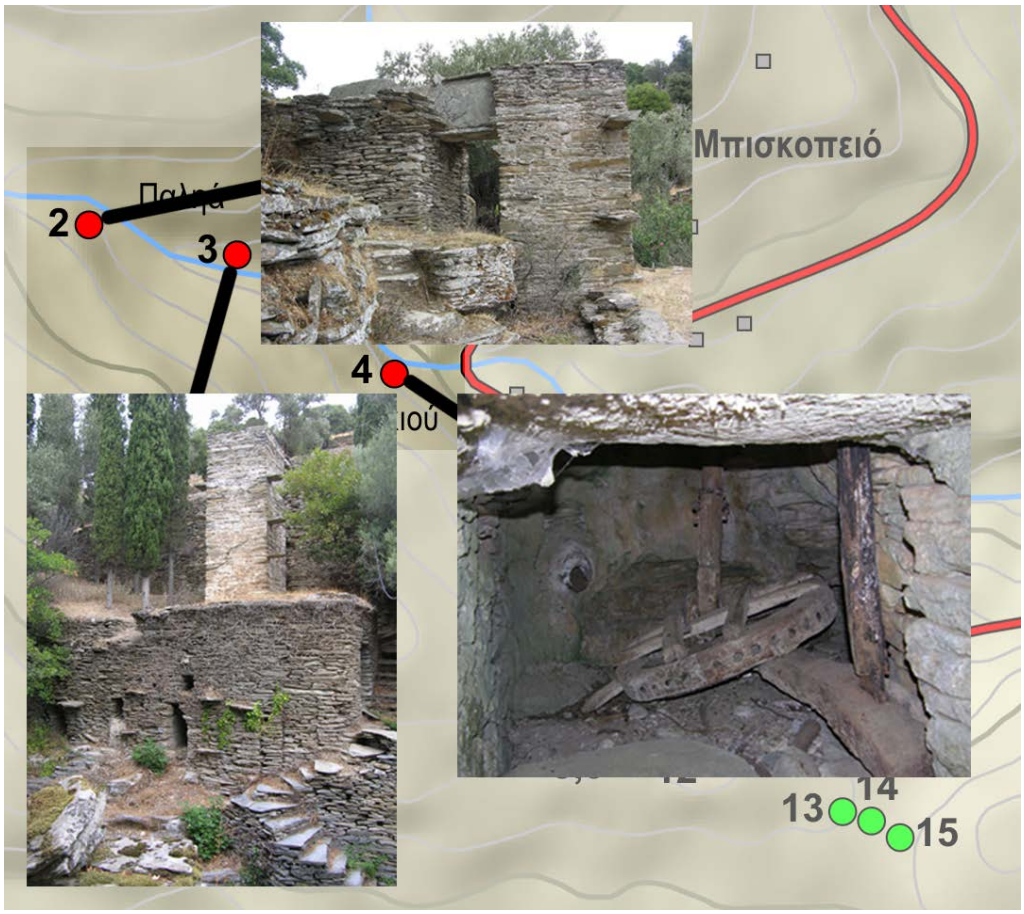
In 1996 its owner, grandson of the last miller, who lives in the USA, donated the mill to the local Community with the condition to have it restored and re-functioning, as it was done in 1999. Since then, it has been occasionally working some times each year, mainly for educational reasons.

The interior of the watermill.

The restored waterwheel.

Watermills in Piskopio 17 (Friday 11.10.2013)

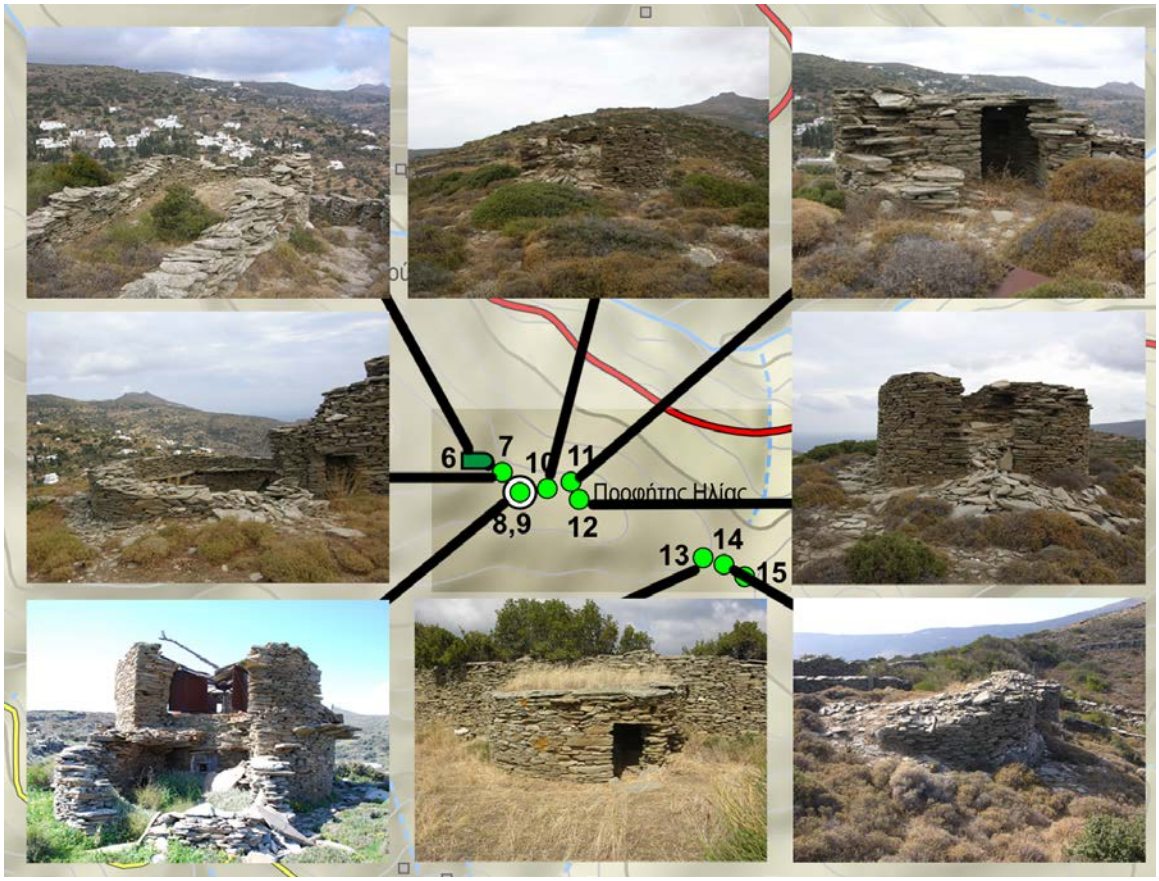
Near the village of Piskopio three watermills survive in very good state. We will visit all three of them. In one of them parts from the mechanism survive. We know that the first of them (from top to bottom) had been working until about 1930, while the other two until WW II.



Map of the area with the three watermills we are going to visit.

Windmills in Prophet Elias Hill 18 (Friday 11.10.2013)

On the hill of Prophet Elias there was a group of windmills. It was the largest in the island, built on a saddle pass close to the village of Piskopio, which they served. Today the ruins of 10 windmills survive, from which one is of a horseshoe type (the only one on the island) and another was a horizontal windmill, the mechanism of which survives today in ruined condition. The horizontal windmill started working in 1906 with a wooden wheel, which was replaced by an iron one in 1909 and worked up to the end of WW II. One of the windmills had been covered with a roof to be used as a store house.



Map with the position of the windmills we are going to visit.

Horizontal windmill in Hones 12 (Wednesday 09.10.2013)

The horizontal windmill of Foleros, served the village of Hones. It was built in place of an older common windmill. The wheel was initially made out of wood and later it was replaced by a metal one. The building and the mechanism have been today restored (except the wheel).

The building of the horizontal windmill.

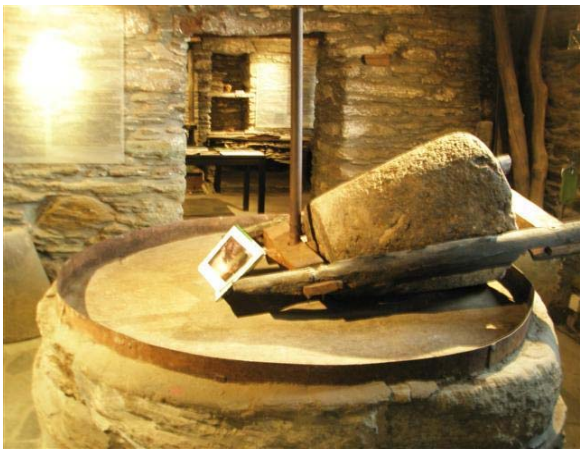
Part of the machinery.

Cyclades Olive Museum in Pitrofos 13 (Wednesday 09.10.2013)

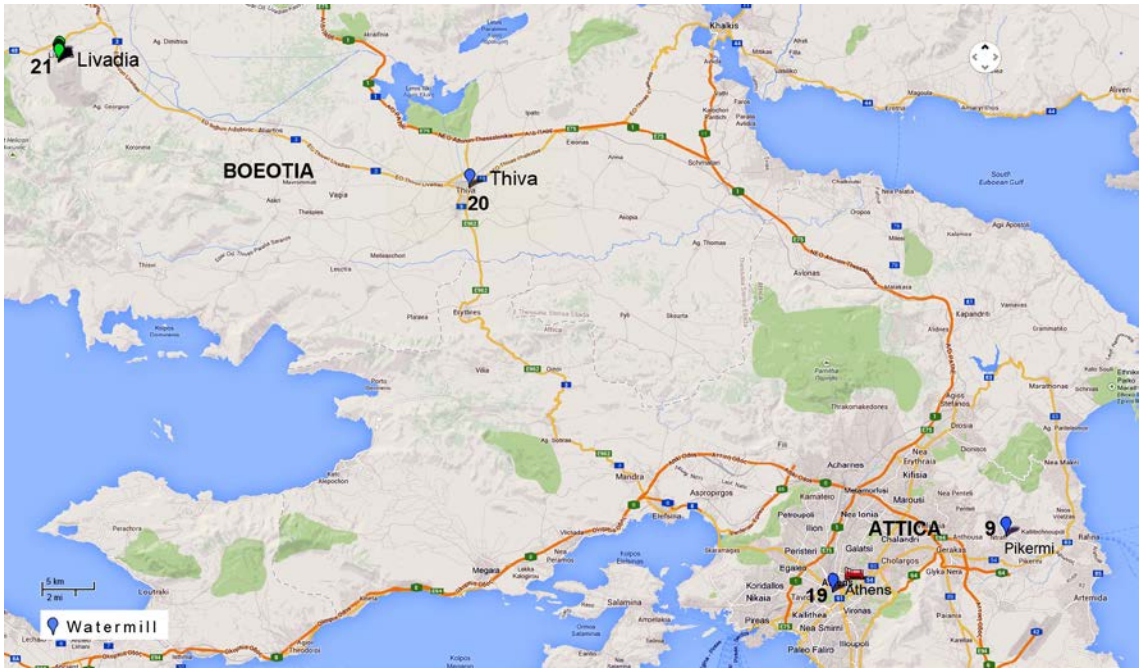
The olive mill in Pitrofos, also known as the Pitrofos "vida", is a part of a two floor building and occupies a big part of the ground floor, while the home of the owner is on the upper floor. It is a fine example of a small pre-industrial, animal powered olive oil producing unit. With a well-looked-after facade and inner stonework, it presents interesting architectural elements, generally characterizing the agricultural and architectural functionality on Cycladic islands. This specific oil mill presents something uncommon; it has many rooms, in contrast to most olive mills in Andros, where the whole procedure was confined in only one room.

The building dates back earlier than 1823. Various preserved elements, such as three mill stones, two stone milling-plates and other structural details, prove that it was operational during the 18th century. The building is also known as "despotiko", since Filotheos Karkakes the Bishop ("Despotis") of Varna, a city in Bulgaria, originating from Pitrofos, spent in this olive mill the last years of his life and died in 1823.

The building of the Cyclades Olive Museum.



The olive mill stone.



Map with the places we will visit in Attica and Boeotia.

ATTICA

Watermills in Pikermi 9 (Tuesday 08.10.2013)

In the area of Drafi there are the ruins of two watermills, one built in 1876, according to an inscription found in the water tower “ΜΙΛΟΣ ΤΟΥ Ν.Δ.Η.Π. 1876”. The water was channeled by a long channel starting from a large water basin, the walls of which are reinforced with buttresses. The initial building of the mill has not survived apart from a trace of the roof on the water tower wall. The stone structures in front of the water tower are newer additions.

Very close to the mill another water tower survives, formerly with a channel starting from the same water supply feeding the tank and the large waterwheel. The final part of the channel is covered with strong salt crusts. The building of this mill has not survived apart from part of one wall.


The ruins of the two watermills in Pikermi.

Watermill in the ancient Agora of Athens 19 (Saturday 12.10.2013)

The Ancient Agora is one of the most well-known archaeological sites in Athens. Its long history starts in the prehistoric times and lasts until the beginning of the 20th century, when the excavation of the site began. During the ancient times the Agora served as the administrative and commercial center of Athens.

The Agora watermill is one of the best preserved ancient watermills due to the fact that a great part of it was set into the bedrock. It was constructed during the second half of the 5th century A.D., but soon, in the second half of the 6th century A.D., it was destroyed by fire.

It should be noted that watermills had already been invented within the 2nd. and 1st centuries B.C. Vitruvius describes watermills and raising water machines in his books on architecture, written in the 1st century B.C.

The watermill consists of two rooms: a. the wheel-race, a rectangular, slot-like room on the west side and b. the mill room, a square room on the east side. The rooms were annexed on a town's wall, which is older, dating in the 3rd century A.D.

The wheel-race was about 5 m. long and 1 m. wide. The water was brought into the wheel-race through a channel on the south side. The water wheel was vertically overshot. It was probably made of wood and its diameter measured 3.24 m.

In the mill room a vertical and a horizontal gear wheels were set, connected to the water wheel through a long horizontal axle. Two millstones rested on a platform above the horizontal gear wheel. When the mill was fed with water, the water wheel would spin the axle, which would make the gear wheels spin. As a result the upper millstone would spin grinding wheat into flour.

The ruins of the watermill in Agora.

Millstones in Agora.

BOEOTIA

Watermill in Thiva 20 (Saturday 12.10.2013)

Along the river Isminios in Thiva, a big number of watermills were in function. The first ones, according to historical data, were built in the 10th century by the local bishop John Kaloktenis.

Their number remains unknown and the surviving ones went permanently out of function before 1960. Today the ruined buildings of 9 mills are still preserved as well as a few remnants of their mechanism. Some of them are double with 2 pairs of millstones, since the water always used to be plenty.

We are going to stop for a short time at the Villioti watermill which is inside the town and has got an enormous, impressive metal wheel.

The ruins of the watermill in Thiva.

Water-driven industries in Livadia 21 (Saturday 12.10.2013)

The water-driven industrial complex of Erkina, in Livadia, is one of the most important pre-industrial water-driven complexes of the whole Greek area. At the beginning of the 20th century, the complex consisted of 8 cotton gins, 1 spinning mill, 1 weaving mill, 1 dyeing workshop, 4 flour mills, 4 spinning workshops, 1 watermill, 1 tannery, at least 2 fulling tubs, 1 rolled mill and one workshop, used for the production of “tsipouro”, a strong local alcohol drink, made from grapes. One of the industries, formerly a rice mill, was later converted into a gin factory.

In all probability, the good exploitation of the water springs of Erkina and especially of the so called “Xerias” stream, goes deep back in time. Livadia, as its history shows that it was flourishing financially until the 12th century, and all this progress and wealth has always been connected to the water-driven mills.

Yet, since the 17th century, many of those workshops, have been mentioned by the travelers who visited the city. The French historian Buchon, reports “the unceasing exploitation of the Erkina water which rolls the wide wheels, that are used for the grinding of the grains and fulling of the “Parnassos’ wools”. We, also, have similar information from the travelers visiting Livadia later. In 1862, Livadia produced 1400 cut of the total 1520 tons of the whole ginned cotton production.

Map of the industrial zone in Livadia at the beginning of the century where the various workshops can be seen.

Old cotton gin and fulling tub, a Folklore Museum today.

The water wheel of an old cotton gin and watermill, converted into a restaurant today.

All data concerning the articles of the tour guide have been taken from books or articles or have been specially written for the Mid-Term Excursion by the following:

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