KRETAUmweltInfo
CRETEEnvironmentInfo
Info-bulletin-No. 351 • 11/E

NATURWISSENSCHAFTLICHE ARBEITSGEMEINSCHAFT OBERTSHAUSEN - MOSBACH e.V.
NATIONAL COMMITTEE ENVIRONMENT CRETE
(Ecological awardees 1984 of county Offenbach a.M.; certified with European Ecological Award 1987)

ISSN-Nr. 1614-5178

Publisher: NAOM eV● Public relation, H. EIKAMP / U. KLUGE ☎ +49 (0)6104 - 490614 Alexanderstraße 42
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Informationen zur Umwelt und für Naturreisende auf Kreta:
Information about the Environment and for travellers in Crete:

The watermills of Crete

Probably in operation already 1000 years ago on the island!

[An article from our NLUK-members *Diana P. Bailey* & *Maria Eleftheria*, Crete]

Bats, watermill Kamaraki

The graceful and often photographed windmills of the Lassithi plateau are world-renowned, less known is that in the past in many places in Crete also stately watermills were operated, whose walls now mostly are ruinous and overgrown by plants. Should you once meet on a road trip across the island such unusual building as on the following images (this building is located between **Arghoules** and **Rodakino** on the right roadside), it is most likely the ruins of a former watermill. Please be careful when you enter the old buildings, because these are often very dilapidated and partly inhabited by bats.

With the relatively narrow, horizontal waterwheel („*rteroti*“), which was installed in the building and was originally made of wood and later of iron, the watermills in Crete belong to the "Eastern" or “Greek” type. During operation, this type of mills proved of less demanding than the vertically mounted mills, what allowed a construction in rough and mountainous terrain. The building also claimed relatively little space, thereby permitting the construction costs. In addition it was an approved construction especially in waters with low or strongly varying volume of water.
These mills combined several hydraulic functions: water holding („*nerocrates*“) for the collecting of water, water channels („*neravlaka*“) for the transport, cisterns („*sternes*“) as water reservoir and last but not least cylindrical water towers („*zourgia*“) for the canalisation of the water to put the mechanism of the mill in motion.

The water of a stream was routed through an aqueduct to a chimney-like down-pipe. At the lower end it streamed out of a nozzle on the blades of small (diameter ~ 1 m) wooden or iron wheel mounted perpendicular axis. Thus the wheel drove the mill-stone with kinetic energy only. Grain mills with horizontal water wheel are also called “Stock-“ or “Click mill”, in Crete also know as “one-eyed” (monocular, „*monopthalmi*“) because they drive only one set of mill stone. In Northern Europe, by the way, the horizontal water wheel is proven since the Viking age.

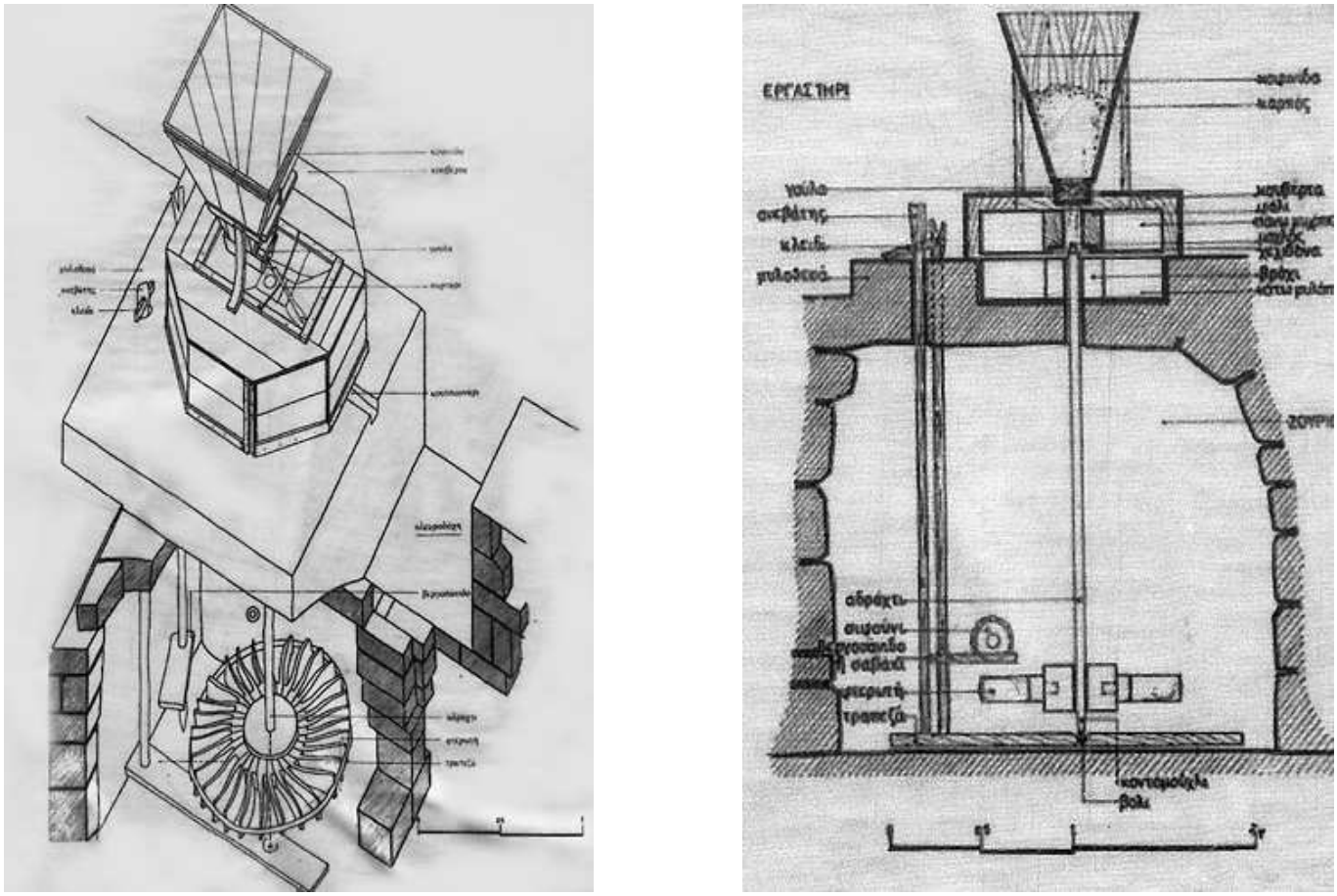

Fig. sketches to the above description

Most of the Cretan watermills were either individually or in small groups nearby settlements. There usually were one-story buildings, but occasionally there were also two-floor mills, which offered more storage space. The mill in conjunction with the Miller's house was built according to the traditional architecture of the area, using available nearby construction materials.
Originally the roofs of the mills were flat, only over time they went over to cover them with bricks. Because the construction of a mill was an expensive affair, which individuals could barely afford, many mills were owned by monasteries, churches and towns, and were managed by servants or tenants.

Fig left: Watermill at Gortys and **fig. right**: Watermill at Kamaraki

Scholars disagree are on where and when the water wheel was invented or the first water mill was made into operation. Under discussion are – once again - the Romans, the ancient Greeks, but also the Sumerians, whose farmers irrigate their dry fields already in the 6th Millennium before Christ birth with a network of canals the water of the rivers Tigris and Euphrates.
In regards to Crete the mills are first mention in written during the 2nd Byzantine period (961-1211). The new technique which used the power of flowing water to replace human or animal, was quickly spread. Often new mills were built on the foundations of the old Byzantine mills during the early Venetian period in the 13th and 14th Century. In this time there was a special blooming in the use of mills. A decline in the use was recorded in the 15th Century and in the first half of the 16th Century. The majority of the Venetian Mills was repaired and put back into service during the Ottoman regime in Crete.


Fig.: Interior of the water mill at Kamaraki with hidden millstone and the water wheel

Occasionally the mills were also combined with other water-powered devices *("nerotrives"*) who were outside the mill and were used for washing of hand-woven fabrics, or with "*mantania*" - devices of wood for processing or treatment of wool or fabrics. Such a system has already been presented in our info leaflet 326-10/E (see at: [http://www.kreta-umweltforum.de/Merkblaetter_en/326-10E.pdf]). A whole village addict e.g. the flour manufacturing in Myli (therefore see our leaflet 317-09/E at: [http://www.kreta-umweltforum.de/Merkblaetter_en/317-09E.pdf]).

Below I would like to introduce a mill complex in Armeni which also has a special feature. Here the builder saved the aqueduct and built the building just above the stream course, who in his course is divided into two parts by small watergate's and thus allowed the operation of two millstones. The lead is still good to see in the hewn stone, where seal tiles regulated the water cycle.


Within the building, which is now difficult to access, since the masonry is entwines with brier wood, are the two mill-stones with the connection to the mill wheel still remain.

In addition there are several replacement mill stones and water wheels to see.

In the adjoining room was once the above mentioned *„mantania“* – devices of wood for processing and handling of fabrics. Originally it was intended to restore these buildings and create a museum here, but there is still a lack the financial resources. Therefore the facility is abandon to ruin.

If you would like to visit this former mill plant, you reach the ruin when driving from Kalives (on the North coast of Crete, in the district Chania) to Armeni. On the village entrance is right at a sharp angle a small road downhill to a large plane tree. The stream is good to see from there. If you follow him, the unimposing building is covert below dense green about 100 metres away.