

*FIG Working Week Rome 2012
Commission 6 - Positioning and Measurement
Geomatics and hypogeum oil mills in Lequile (LE-IT)*

Lecce Piazza Duomo


Lecce S. Croce


Lecce Anfiteatro Romano




Lecce is a small town famous for its Baroque monuments made of limestone. For its beauty it is called the Florence of the south.

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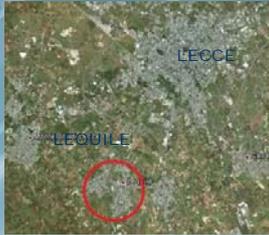
the wonderful coast of the province of Lecce

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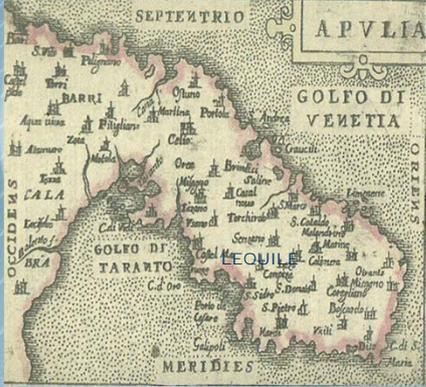
This is the position of the hypogeum mills in Lequile



Comune di Lequile (LE) - Ortofoto

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In the city of Lequile, in the province of Lecce (IT), hypogeum oil mills play an important role in the historical and cultural architecture, and represent the striking examples of industrial archaeological settlements of the Salento used for the production of olive oil.

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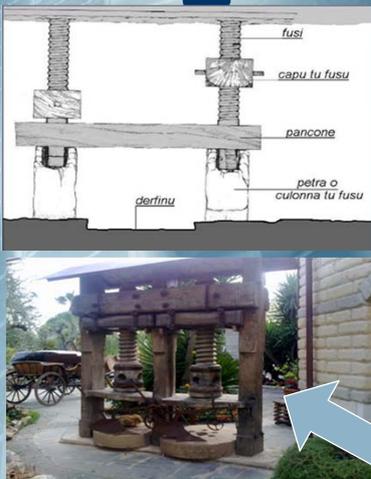


They are structures carved into the limestone in the subsoil and built in the years between 1400 and the end of 1700, by teams of experienced builders called li foggiani. The old land of Otranto was divided into four districts which included Lecce, Gallipoli, Taranto and Brindisi. The district, between 1880-1890 had 1800 hypogeum oil mills

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They were dug underground and specifically designed to optimize the preservation of the product. In fact, the environments for the pressing of the olives had to have a constant temperature between 18 and 20 degrees Celsius, so as to facilitate the flow of oil during the pressing and its settling into the wells.

Olive Press

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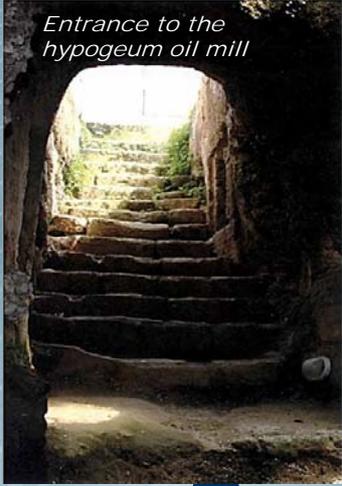
TIPOLOGIA AD IPOGEO O A GROTTA
fino ai primi dell'800



The trappiti ipogei are below the ground level and reach a depth ranging from 3.00 m to about 4.50 m: their average height in meters varies from 1.70 meters to 3.00 m.

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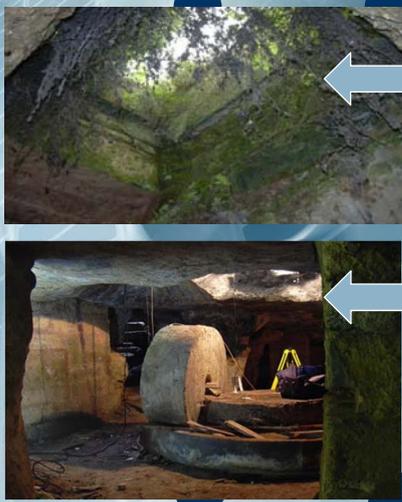
Entrance to the hypogeum oil mill



The workforce was made up of one nachiro (a leader), 4 trappitari (mill workers), two donkeys and a mill boy called a turlicchiu, who was usually the younger brother of one of the trappitari or someone less ab

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From above the mill, the farmer unloaded the olives, which fell into the trappeto through a hole located at ground level and into the storeroom



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The entrance consists of a stairwell carved into the rock, covered with a half-barrel ceiling. Situated at the foot of the stairs was the primary workroom.



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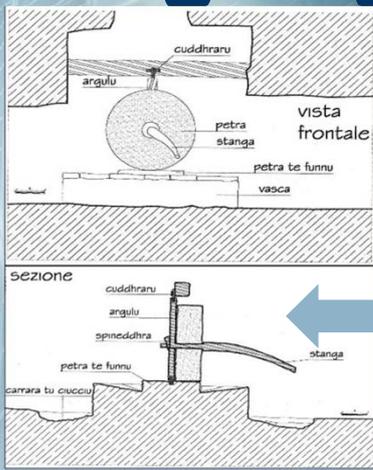


On either side of the workroom were located some rooms called *sciave*. These were always dug into the stone, and were used to store the olives which were waiting to be pressed.



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The "Petra te Trappitu" (the grindstone), was about 1.50 to 1.60m in diameter, and 0.55m thick.



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It was formed from a single block of stone in a cylindrical shape, and placed vertically on a circular track around the edge of the tank.



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The topographic operations needed to acquire the geometry of these structures, which also require the cartographic representation of a geo-referenced underground environment, represent the Survey of the Hypogeum



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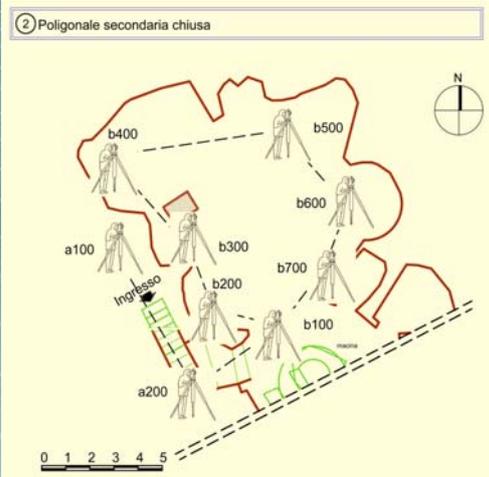
In almost all the oil mills, there were two vertical connections with the outer surface, the openings located at the load of olives. The points are measured with the G.P.S. and georeferenced in WGS84 coordinates.



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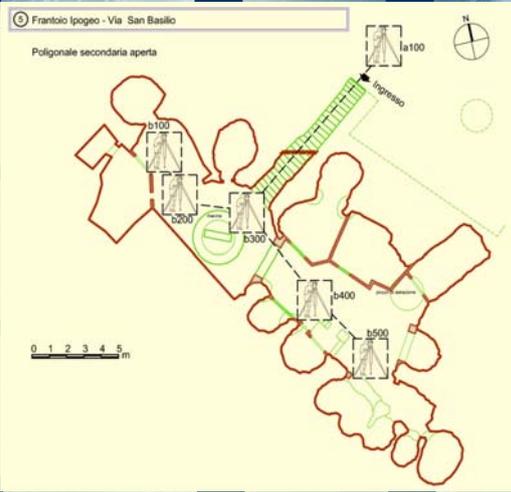


All measurements were made by the entrances of the hypogeum oil mills, measuring the azimuth angles and distances between two consecutive vertices. Also measured were the height of the vault and the distance between the walls to draw more of the underground room.



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The interiors of the underground cavity were measured with the aid of main and small secondary traverses.

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The main feature of the traverse has been to have some points hooked to the points which were detected with the GPS described above, and carefully screened on the floor inside the hypogeum with a proper plumb-line.

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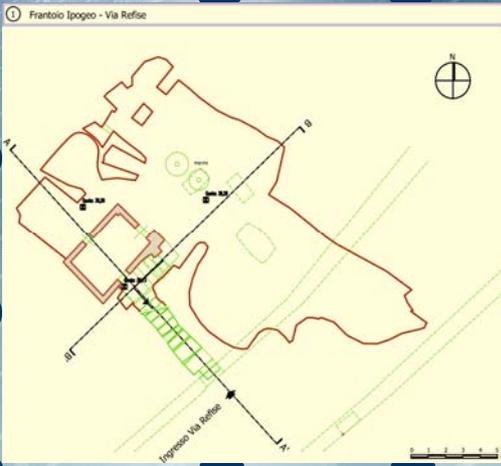


The secondary corridors leading from the main cavity, were measured trilaterally and radially with a laser meter. The reference points used for the radial measurements had been previously defined with the total station laser

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This slide features a map of the Frantoio Ipogeo - Via Refise site. The map shows a complex layout of rooms and corridors. A central area is highlighted in green, representing the main cavity. Several secondary corridors are shown in red. Measurement points are indicated by black dots and lines. A north arrow and a scale bar are also present. The text on the right explains that secondary corridors were measured trilaterally and radially with a laser meter, and that reference points for radial measurements were previously defined with a total station laser.

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The survey of the aforementioned reference points, was completed by stopping at a know point of the main traverse, at the central point of the space; and executing, as a result, the measurements to some significant points on the perimeter.

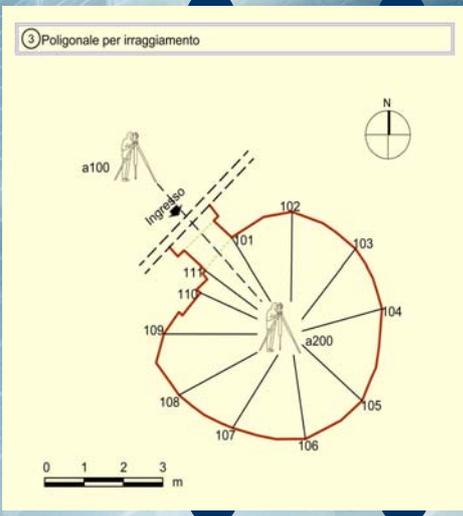
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This slide features a map of the Frantoio Ipogeo - Via Refise site, similar to the one in the first slide. It shows the same layout of rooms and corridors. However, it highlights the survey of reference points. A central point is marked, and lines radiate from it to various points on the perimeter. A north arrow and a scale bar are also present. The text on the right explains that the survey of reference points was completed by stopping at a known point of the main traverse, and that measurements were executed to significant points on the perimeter.

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③ Poligonale per irraggiamento



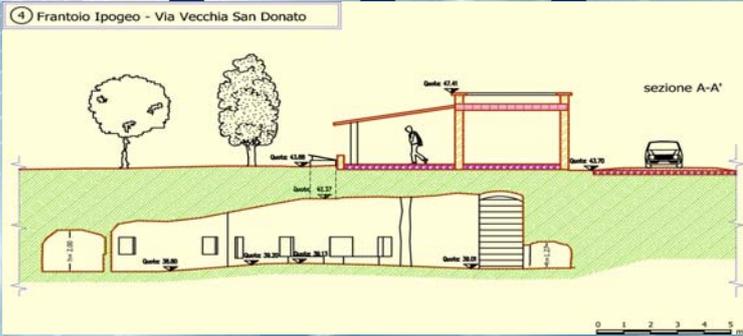
It was also necessary, in this case, to measure the lengths of the sides of each triangular constituent. This method of radial measurement, in general, is faster and certainly the most convenient, so the operator does not have to move from his position

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④ Frantolo Ipogeo - Via Vecchia San Donato

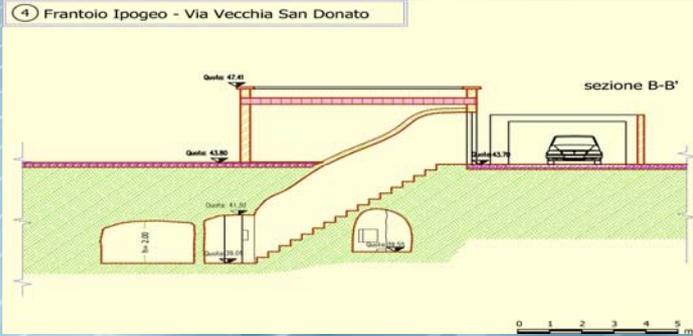


The altimetry, i.e., the measurements of the differences in height in reference to the points on the surface, was determined by both the laser Total Station and the meter laser level. Each secondary corridor branching from the main workroom was classified by a lower case letter.

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4) Frantoio Ipogeo - Via Vecchia San Donato



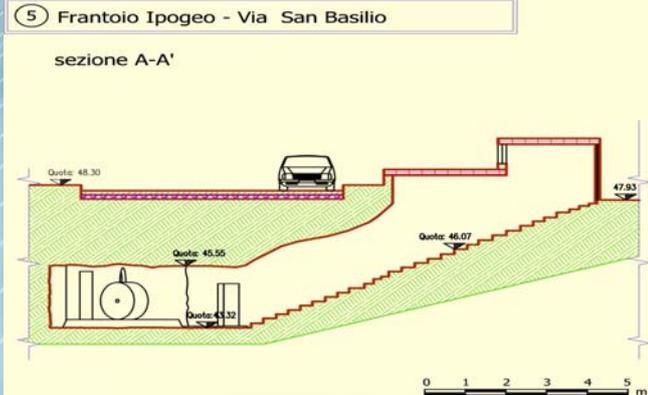
sezione B-B'

They are the representations obtained by projecting the planimetric measurements of the underground space on a horizontal plane. These drawings depict the cavities using the maximum planimetric breadths and provide an altimetric indication only related to floor quotas.

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5) Frantoio Ipogeo - Via San Basilio



sezione A-A'

The longitudinal sections are the representation of the elevation obtained by the intersection of the cavity, with consecutive but not-aligned vertical planes

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Therefore, in the drawings, the representation of the elevation is taken along a broken line extended in a longitudinal direction



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thereby perfectly reproducing the sharp edges of the side of the cavity, with all the vertical elements included (any unevenness, such as stairs, wells and chimneys, etc.).



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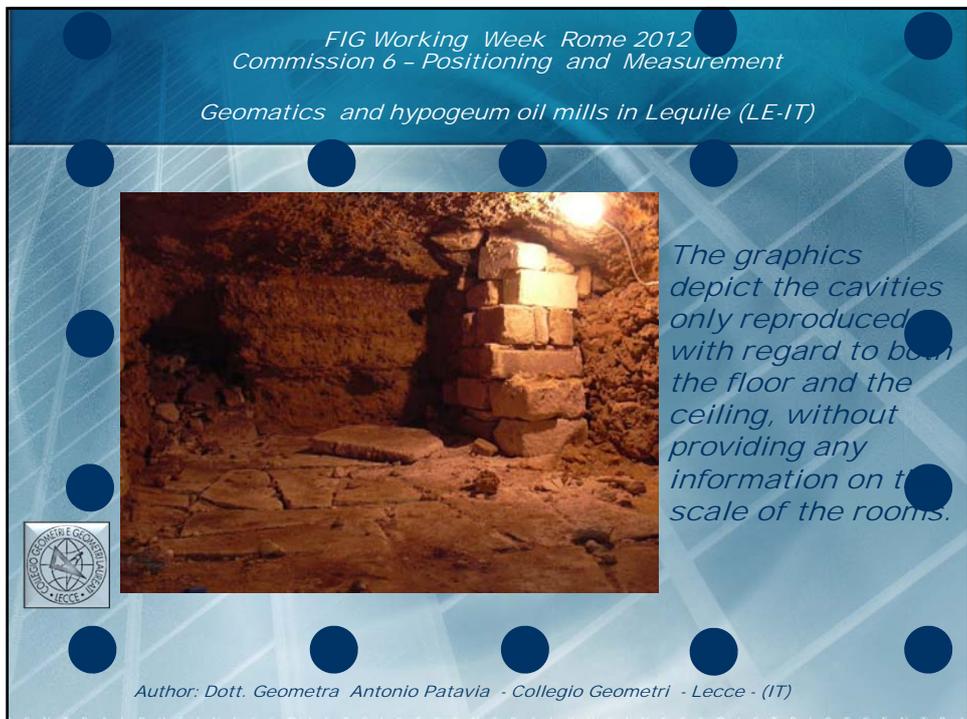
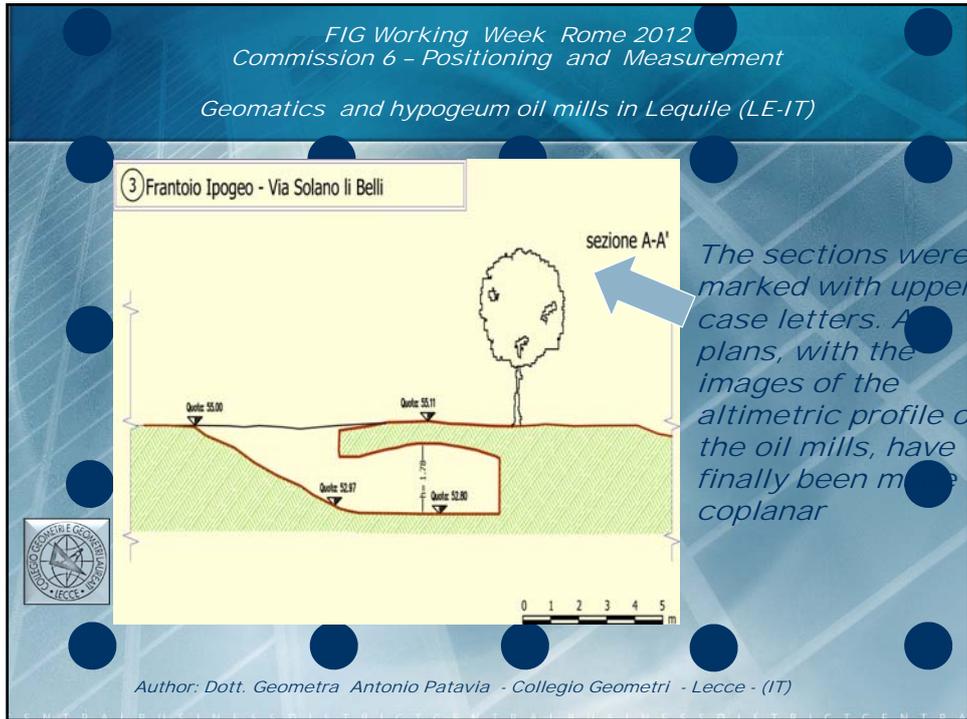
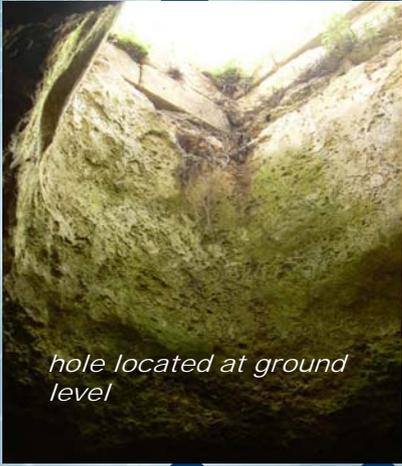


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hole located at ground level

The plan and cross-section are almost never sufficient to represent, realistically, the exact shape of the contours of the underground rooms. In fact, generally, in a common representation, the plan and the cross-section can show countless shapes detectable solely with cross sections.



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These cross-sections, in addition to providing a clear idea of the feasibility, also enable us to formulate realistic assumptions on the morphology of the cavity.



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