

*Traditional patterns in Pyrgi
of Chios (Greece):
Their Role in the Community
and the Mathematical Ideas
Incorporated in them*

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The identity of the research

- **What's about?** Xysta: a traditional designing activity. The patterns designed and constructed on houses' plaster are characterized for their geometrical forms and this element makes this tradition interesting in the framework of an ethnomathematical approach.
- **Where?** At Pyrgi: a village of Chios island (Greece).
- **Data:** first hand material selected on the spot last summer.
- **What is examined:** the role of xysta for the community and the mathematical ideas incorporated in them.



Pyrgi in the past and now

~~Pyrgi village is located in the south of Chios Island~~
one of the Aegean islands.

Chios is well-known as the place where Homer, the epic poet was born. Today is famous thanks to mastic, a product that comes from the mastic tree.

Pyrgi is one of the mastic villages as well as one of the medieval villages of Chios.

There is no safe information about the exact time of the settlement's construction but it is referred that the village existed before the possession of Genobian (1346-1566).

Also it is referred that the inhabitants of Pyrgi and of the close settlements were unified for safety purposes.

The architect-researcher Maria Xyda (2000:37) reports that the conquerors unified them in order to fortify and organize in a single settlement the ex-Byzantine settlements that produced mastic.

She estimates that the designing of the village happened in another place.

She states that the fact that buildings such as churches were not included in the original design of the village shows that the designing happened at Genoa. To support this argumentation she also notices that Chios' medieval villages were designed in the same way as Liguria's villages.

The houses of the old part of the village are very similar as far as the way of construction and the material are concerned. Usually the houses constitute of 3 or 4 floors.

The type and the arrangement of the place dictate corresponding practises.

First of all since the inhabitants live very close to each other, they have a direct everyday contact with their neighbours, voluntary or not.

What is of great importance here for our research is the fact that since their houses are narrow and dark they spend a lot of time outside.

So, the whole social life regarding the population happens in the central square, in the streets around the square as well as on the pavements outside homes.

The origin of xysta

Genobian used to put carpets outside home, on facades. After they left Chios, the habitants replaced them with xysta. So the motives are influenced by Genobian tradition as well as of the near east. It is referred that designs similar to xysta exist at Kapadokia (Turkey).

A few pictures of the village are presented now:











Traditional craftsmen constructing xysta



The material: cement, sand, lime

The tools: a lath, a dividers and a fork



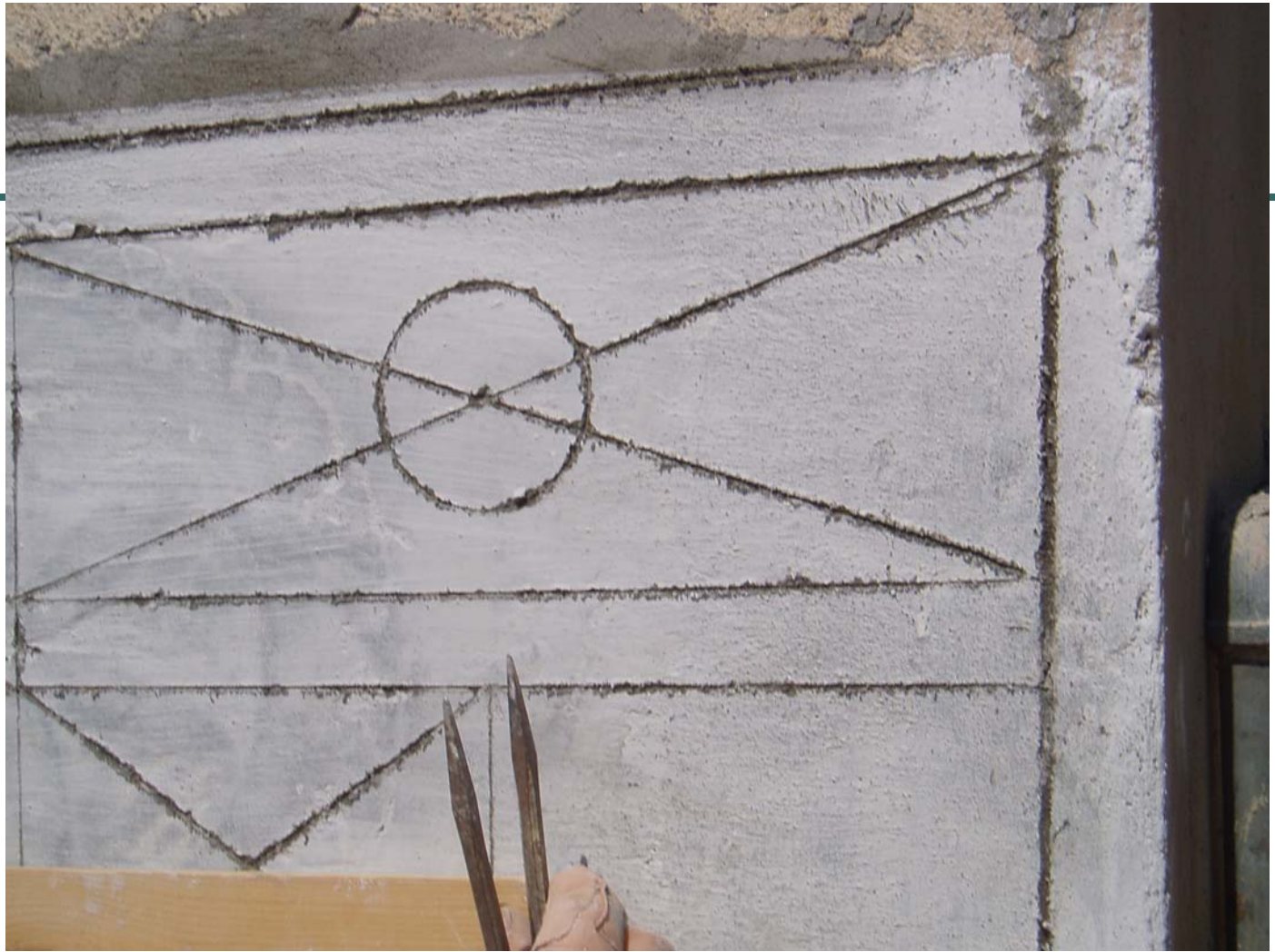
















The identity of Pyrgi's habitants and xysta

The tradition of Xysta is of great importance for the inhabitants of Pyrgi as they are connected to their identity.

The majority of the inhabitants consider the *xysta* and their traditional dance, 'pyrgousiko' to be the main elements that distinguish their community from the 'others' -not only within the island but in general-. Some also added the traditional clothing—'pyrgoysiki'.

The following discussion with an 80 year old man is characteristic:

- Why do you like to have *xysta* at your house?
- Because I'm Pyrgouis (=habitant of Pyrgi). Jesus Christ was born in the crib and the crib is what he remembers.

Many others answered the question about their interest in *xysta* in a similar way, saying that they like *xysta* because ‘they are their tradition’.

In some other cases it was tourist purposes that were emphasized: ‘The *xysta* is a means of promotion for Pyrgi, the place is famous because of its *xysta*’.

Also it was observed that some modern buildings like some hotels were decorated with *xysta*. In the next figure the interior of a modern hotel is depicted. This hotel is located in the closest village of Pyrgi. The majority of its habitants—including the owner of the hotel—came from Pyrgi. So by using the *xysta* in the hotel’s interior they declare the continuity of the tradition.



Patterns and mathematical ideas

When studying the tradition of *xysta* in the framework of culture and mathematics, it is of great importance to understand how this tradition was developed in this particular culture and what is the meaning of it for the community.

On the other side, it is important to explore the mathematical ideas that are incorporated in them, with the notice that it is about informal mathematical cognition as *xysta* are products of craftsmen who have acquired this cognition without having been taught at school but through partnership.

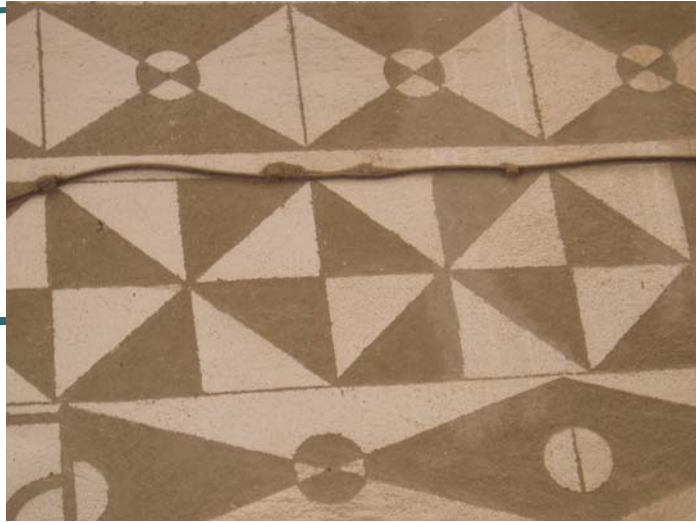
Here the notion of gold section as well as symmetry are considered.

As we can see in the following pictures the patterns are arranged in strips and they constructed some designs with circular shapes only at the cases there were not enough places to develop a complete configuration. These stripes are divided in rectilinear shapes: quadrangles or rectangles.

As I observed the dimensions of the rectangular were of importance since the majority of the pairs of length and width were these: (35, 56), (35, 23), (49, 30), (40, 25). The proportion of every pair is: $56/35 \approx 1,65$, $35/23 \approx 1,52$, $49/30 \approx 1,63$, $40/25 \approx 1,6$.

Although I can't put out complete statistical data through the above observation it is obvious that the proportion tends towards the gold section. Here it seems that even the traditional craftsmen construct patterns in this way.

either spontaneous or influenced by the tradition.



In the same pictures also we notice symmetry: The translation, rotation, reflection. In these pictures we can see almost all of these types of transformation. In the majority of the strips we can notice the translation while in about all the patterns with axe symmetry there are more than one axes.

As mentioned above they make circular shapes in the case there isn't enough place for developing rectilinear ones. In the next pictures we can see circular motives. In these as well as in the ones craftsmen were constructing there are more than one axe symmetries apart from central symmetry that is obvious.





Summary

- Mathematical ideas are incorporated in every culture. Sometimes in order to contribute to practical solutions other times just for decorative purposes. In any case the way people select to use the universal activities (counting, measuring, locating, designing, playing, explaining) characterizes the corresponding community.
- This tradition of *xysta* as a result of the contribution of both east and west—since the island of Chios is connected with east and west—is of interest not only as a decorative art but also as a recourse of mathematical ideas. The fact that patterns are made by craftsmen taught by traditional craftsmen reveals that a lot of informal mathematical cognition is produced and used in everyday activities.
- Finally it was ascertained one more time that symmetry and gold section are mathematical ideas met in every culture.