

## XVII International Congress on Dry Stone

“Dry stone perspectives: challenges after the UNESCO inscription”

Cavtat, Croatia, October 1-2 2021

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### «Dry stone Walling as a valuable intangible asset regards Tourism in Troodos Unesco Geopark- Publication in progress»

#### Dry stone heritage in Troodos UNESCO Geoparks

*Cyprus presents a unique geology identity due to the procedure of its evolution from the sea. This personality is exposed on the variety and composition of the rock materials and expressed through the landscape management of a man through drystone technique.*

*Hard rock material of Troodos cannot be treated but only be formed by the fist cutting on the natural mountain rocky field. Large stone pieces at the base, smaller but big and heavy in size pieces above form the drystone walling. Rock as naturally exist, by slide cutting is used as floor, applied for pavements and threshing floors.*

*The unique geology history through the corresponding drystone technique is a rich valuable base for tourism.*

#### Publication in progress

TDrystone art and technique are the theme of an ambitious edition made by Antonia Theodosiou and Anastasia Pitta.

Knowledge by research, investigated and studied, is included and based on our adventurous exploration journey through 33 years, and of course it continues.

Unique Geology Identity in Drystone



17<sup>th</sup> international congress on dry stone  
KONAVLE 2021



### **Dry stone heritage in Troodos UNESCO Geopark**

Cyprus has a unique geology identity due to the procedure of its evolution from the sea. This personality is exposed on the variety and composition of the rock materials and expressed through the landscape management of a man, through drystone technique.

**Troodos Geopark** area includes not only the top of the mountain area but also the peripheral areas of Nicosia, Limassol and Paphos, where the characteristic igneous rock expands and joints with lower geological zones characterized by lime rock. Troodos geology is characterized by volcanic ophiolites, Gabbro and Diabase formations, and with high and huge level differentiation of the landscape.

**Hard rock material of Troodos** cannot be treated but only be formed by the fist cutting on the natural mountain rocky field. Large stone pieces at the base and smaller but big and heavy in size pieces above form the drystone walling. Rock as naturally exist, by slide cutting is used as floor, applied for pavements and threshing floors.

**The igneous rocks of Troodos** are divided into plutonic, intrusive and volcanic rocks depending on the depth at which they were formed in the ocean crust. Volcanic rocks -pillow lavas form the periphery of the Troodos range; Diabase -multiple dyke system and Plutonic rocks.

The plutonic rocks (harzburgite, dunite, wherlite, gabbro, plagiogranite) were formed in magmatic chambers at a depth of 4-6 km beneath the oceanbed. These magmatic chambers constitute a dynamic open system, with a continuous supply of magma from the fusion of the upper mantle of the earth. The cooling of the magma promotes crystallisation at various depths. The first rock produced was harzburgite followed by dunite, wehrlite, gabbro and plagiogranite.

Along the openings of the ocean crust magma moves upwards into the ocean floor forming submarine pillow lavas. Part of the magma solidified in the multiple

channels that fed the volcanic rocks and formed the diabase in the form of a multiple dyke system.

### **The characteristics of the types of igneous rocks of Troodos are :**

#### **1.Volcanic rocks (pillow lavas that form the periphery of the Troodos range)**

Scientific name: Basaltic pillow lavas

Name used in the building industry: Petra Troodous

Physical properties: The pillow lavas have a spherical to elliptical form with diameters ranging from 30-70 cm. Their outer part is glassy and is produced by the chilling of the magma during the sub-aqueous extrusion. The rest of the pillow consists mostly of glassy material with minor silicate minerals such as plagioclase, pyroxene and olivine. Vesicles are very common and are formed from the escape of the magma gases during cooling. They are pink to grey in colour. It is a soft rock compared to the other igneous rocks and its use in the building industry was very limited. Pebbles of pillow lavas from river beds and the beaches were used as building stone for foundations.

Where does it occur? The pillow lavas cover the periphery of the Troodos range. They are also common in the river beds and the beaches of southern Cyprus.

#### **2 Diabase (multiple dyke system)**

Scientific name: Diabase

Name used in the building industry: Petra Troodous, sideropetra

Physical properties: It is hard compact holocrystalline rock, very resistant to abrasion and weathering. It is quarried extensively for the production of crushed gravel and sand for the building industry. It is grey in colour and was used extensively as a building stone in the Troodos villages.

Where does it occur? The diabase covers more than one third of the Troodos range forming an elliptical rim around the plutonic rocks. It is used in the building industry more than any other igneous rock of Troodos (Pitsilia, Kykkos, Orini Larnaca's).

#### **3 Plutonic rocks**

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Scientific name: Plutonic rocks, harzburgite, dunite, wehrlite, gabbro, plagiogranite

Name used in the building industry: Petres Troodos, sideropetres

Physical properties: Gabbro is hard, compact, coarse grained, in dark grey colours, difficult to dress and resistant to weathering. Dunite and harzburgite are hard, compact, coarse grained, dark grey-green in colour, with a reddish colour in weathering zones because of the presence of a thin film of iron oxide. It is difficult to dress and resistant to weathering.

Where does it occur? The plutonic rocks are found in two areas of the ophiolite complex of Troodos. The first is the central part of the peak of Troodos. The dunite covers extensive areas from Olympus to Ayios Nikolaos Kakopetria. The second area is in the Limassol forest.

**Drystone technique in Troodos** presents sophisticated structures by the igneous rocks for retaining land, for water management, for settlements tissue support, to form routes, shelters kilns.

Walling: large slightly treated, or without treatment, form the corners with alternative position building. The largest stones form the foundation and the base. The body of the wall combines large stones almost untreated with smaller stones at the joints incorporated in the structure of the wall construction. Substantial importance for the function of the retaining wall as drainage system is the back filling of the outer built skin of wall by small gravel in various sizes, in sophisticated, thick arrangement so that the pile of this accumulation is balanced and stable. The coping is formed usually by large flat shaped stones or stones untreated in linear terrace settlement, or accumulated stable gravel higher than the soil of terrace.

Hard rock in large pieces of stone projected from the wall and incorporated in the terrace walls form the steps of ladders. Stairs by large stone steps form ladders parallel to the wall or in corners jointing the end of walls

End of retaining wall can support soil ramp leading to next layer of terrace.

**Horizontal surfaces in threshing floors, pavements streets:** The hard rock surface offers the necessary floor for threshing floor and pavements. Stones are arranged with their even side horizontally and their sharp nose inside the soil, combusted

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sublayer. Stones form a central or side linear drainage trench in order to guide surface water in the next drainage level. In mountaneous areas threshing floors are formed usually on rock, on which a trench is formed by hand curving, to collect the grain

**Kilns:** Hard rock stones form earthen kilns and stone base of charcoal production installations  
and large rock pieces form antierosion bedding in the rivers:

Drystone heritage traces from antiquity until the middle of 20th century.

**Shelters of Troodos:** Huts are formed by 1.00-1.50 m thick walling, wooden beams by tree trunks and covered by a pile of vineyard branches

The unique geology history through the corresponding drystone technique is a rich valuable base for tourism.: Natural trails can guide to kilns, shelters, threshing floor, village paths, rivers with diversion walls and water springs. Through these routes visitors can have guidance presenting the pre-industrial history, agriculture tradition, water management



*foto 1 = Man and goat shelter in Alona Nicosia {Troodos}*



*Foto 2= Thrashing floor in Polystypos Nicosia {Troodos}*

### **Publication in progress**

Drystone art and technique are the theme of an ambitious edition of Antonia Theodosiou and Anastasia Pitta on behalf of «Petra stin Petra Foundation». Knowledge collected by research, investigation, practice and studies is included and based on our adventurous exploration journey through 33 years; research which continues.

Reference in each chapter is made on drystone heritage until the recent years, including, geology, and history. In analysis the chapters of the edition are :

- Introduction in drystone technique, tools, accessories, procedures
- Drystone as technique, function and form, is described in each category of structures :
- Walling for terracing:
- Diversion walls for water management, retaining land, boundaries, incorporated drystone built hives
- Water: surface and underground management structures,: wells, water pits, water pump wheels, underground water channels
- Pavements, routes in fields, routes in villages

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- Threshing floors: with rocks, with stone slabs pavement, with stone gravel paving, with soil
- Kilns: lime kilns, plaster kilns, tar kilns, charcoal production installations
- Shelters: shelters on limestone, pens and folders, rocky stone in cave shelters, mountainous huts
- Curved stone technique: vessels, installations for irrigation, grape pressing, water supply
- Biodiversity. flora and fauna traced on drystone is described in types of plants and founa creatures



*Foto 3= Inia Village in Akamas peninsula*



*Foto 4= Animal shelters in Rizocarpaso Carpasia Peninsula*

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**Sources of all photographs** = the personal archive of Anastasia Pitta and Antonia Theodosiou («Petra stin Petra Foundation»)

**Short biographies of authors:**

*ANASTASIA PITTA*

*Architect Engineer, Master in rehabilitation of Monuments and traditional buildings*

*Born in Nicosia 1954.*

*Research and studies, relative presentations in seminars, international conferences, workshops on Traditional Architecture and Drystone - participation in international conferences of SPS on Drystone since 1992*

*Publications of books and articles. Architectural projects mostly on rehabilitation of Monuments and Traditional buildings*

*Vice president and founding member of «Petra stin Petra» foundation*

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