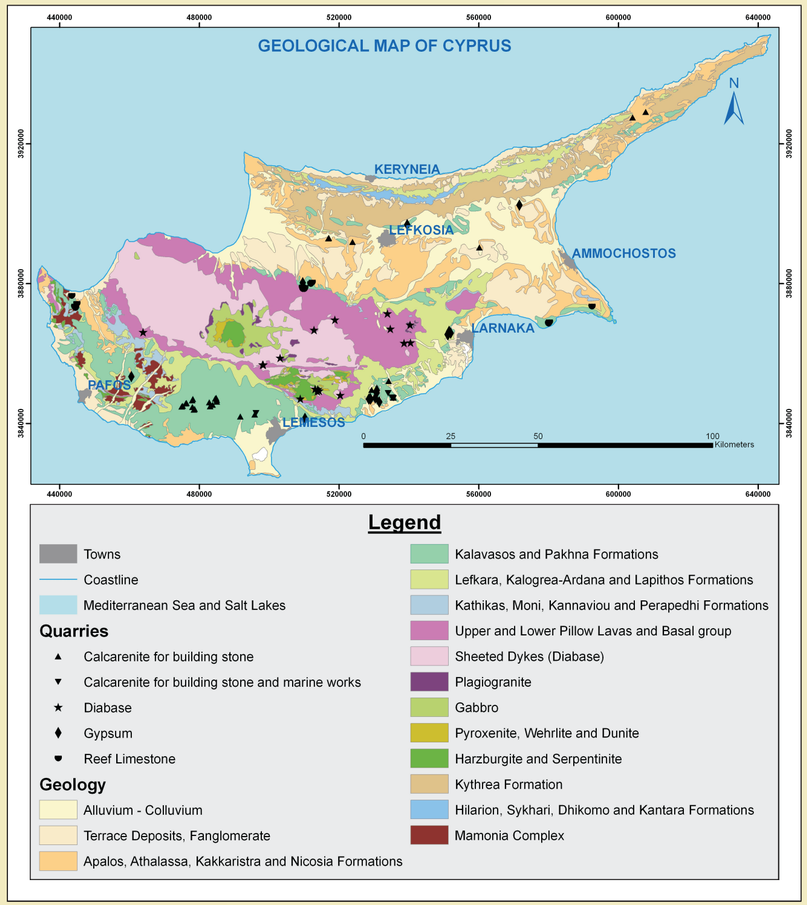
CYPRUS GEOLOGICAL SURVEY

MINISTRY OF AGRICULTURE,
RURAL DEVELOPMENT AND ENVIRONMENT

REPUBLIC OF CYPRUS

BUILDING AND DECORATIVE STONES OF CYPRUS



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The Sanctuary of Apollo Hylates built with ashlar stones

The Castle of Kolossi built with ashlar stones

Modern building cladded with calcarenite

Restored preserved stone-built house with calcarenite

The building stones in antiquity

Humans from the early periods of antiquity recognised the need for protection from the various meteorological phenomena (rains, snow, storms, floods etc.), wild animals and raids of hostile tribes. As a result, they used stones as primary building material, initially in natural form (rubble stone), i.e. as they are found in nature. Later on, humans started cutting and carving the stones (ashlar stone), thus this ashlar stone became the basic building material for most of the historical and traditional buildings of Cyprus. In all prehistoric and historic periods of Cyprus, the building stone that was used, was extracted mainly from the surrounding environment of the settlements.

In the earliest periods of antiquity (prehistoric period), the buildings were constructed by rubble stones such as gravels and pebbles of various types and forms with or without mortar. In these structures, a wide range of sedimentary rocks such as chalks, reef limestone, calcarenite, silicified chalks (chert) along with igneous rocks (diabase, gabbro etc.) was used.

During the last prehistoric period (1200 B.C.), the first urban centres in Cyprus were constructed with different architecture based accordingly on the use of the buildings (administrative, religious etc.). For the first time the use of the ashlar stone prevails. Based on the structures built with this stone and the construction method used, the building stones present a big variety of type and origin.

The raw material for the ashlar stone was excavated from local outcrops of limestone from various geological formations, which were easily cut and extracted and also were durable under natural conditions. Calcarenites, reef limestones and chalks were the main types of rocks used. In recent periods, an increased use of laminated gypsum for internal floor covering is observed.

The building stones in the modern construction industry

The use of natural rock as basic construction material in new buildings decreases continuously, mainly due to economic reasons. This type of stone continues to be used today mainly in the cases of repair and maintenance of preservable stone-built houses with traditional architecture and lithic archaeological monuments.

In modern society, where the use of contemporary materials such as concrete, bricks, steel etc., dominate, modern architecture tries to combine the industrialised materials with processed natural stones mainly for cladding and pavement of internal and exterior walls and floors. Consequently, an ascending tendency is observed in the use of natural rocks as a decorative construction material.

The building and decorative stones excavated and used today in Cyprus are:

- **gypsum**,
- **massive chalks**,
- **silicified chalks**,
- **chalks**,
- **calcarenites**,
- **pebbles** and **gravels**,
- **diabase** and
- **reef and other limestones**

Their description is given in the next pages.

Gypsum

Gypsum belongs to the geological formation of Kalavasos. In Cyprus, gypsum appears as laminated, i.e. in thin alternating layers, as laminated with concretions and as selenite with twin crystals. In the construction industry, the laminated gypsum used is widely known with the commercial name "gypsomarmaro".

The laminated gypsum is composed of alternating layers of gypsum with thickness varying from 1-5mm. Its colour also varies from light to dark.

The "gypsomarmara" are manufactured in situ by cutting and removing the gypsum layers. The layers are cut in various dimensions using electric diamond disk suitable for the cutting of rocks. The cut layers of gypsum with the desirable dimensions are separated to make tiles by using a wedge. The thickness of the tiles varies approximately 1-2 cm. The "gypsomarmara" are used as tiles for internal floors mainly in buildings of traditional architecture that are under restoration. Today small quarries of "gypsomarmara" are operating in Aradippou, Tochni and Eledhio.

Internal floor covered with gypsum ("gypsomarmara")

Massive chalks

Massive chalks belong to the geological formation of Lefkara, are white to pale yellow in colour and bear the commercial name "Petra (stone) of Lympia". They are mostly extracted in blocks that require industrial treatment. The treatment essentially includes the cutting of the block in plates and tiles of various dimensions. The tiles are mainly used for the cladding of external walls and, occasionally, for external floor covering.

House cladded with processed massive chalks.

Silicified chalks

Silicified chalks also belong to the geological formation of Lefkara and are commercially known as "klimara". These chalks are found as isolated layers of various thicknesses within a sequence of alternating layers of white and grey marly chalks. They are often extracted in the form of rectangular blocks of various dimensions due to the tectonism that they have undergone. These blocks do not require industrial treatment, on the contrary they are usually used in the form they are extracted or require only slight modification of their size during their placement.

Silicified chalks are hard and durable rocks. Their colour varies from white to grey and reddish. They are used mainly for cladding of exterior walls and pavement of external floors. They are very rarely used as building stone for the construction of double-faced walls.

House cladded with silicified chalks

Chalks

Building stones from chalks also belong to the geological formation of Pachna, often found as alternating layers or laminations with marls and fine grained calcarenites. Their commercial name is "klimara". This type is extracted in plates of various dimensions and shapes. Their thickness usually varies from 2-5cm and their colour between white to pale yellow. They are used exclusively for external floor covering.

External floor covered with chalks (klimara) of the geological formation of Pachna

Calcarenites

The calcarenites represent the main type of natural stone used today on a pancyprian scale, both as building and decorative stone. They originate from the geological formation of Pachna and are known with the commercial name "Petra ton Kyvidon" when extracted from the region of Kyvides and Anogyra, and "Petra tis Tohnis" when extracted from the region of Tohni and Ayios Theodoros villages.

This type of rock is mainly extracted in rough blocks of various dimensions which are then transported to specialised factories for natural stone processing, producing various types of products.

The treatment of the final products includes surfaces of various forms such as smooth, rough, combed, polished, sandblasted and other.

Treated calcarenite with rough surface for cladding of external walls

The main uses of calcarenite are as building stone for double face walls and as decorative stone for cladding of internal and external walls and floors.

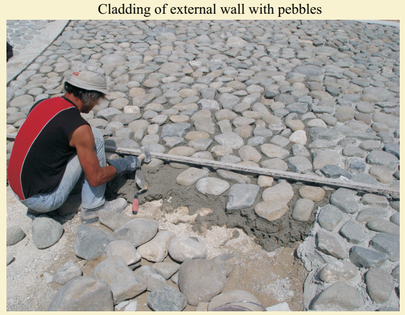
The use of computers gives the opportunity to produce specialised final products of calcarenite such as the exact replicas of sculptured designs in preservable stone-buildings with traditional architecture. The production of these replicas is also possible due to the physical, chemical and mechanical properties of the calcarenite that allows such treatment.

Specialised sculpture of calcarenite in a monument

Pebbles and gravels

The pebbles and gravels come either from the geological formation of Fanglomerate or from recent Alluvium or Colluvium deposits. In general, they are hard and durable and they originate from diabase, gabbro, silicified chalks, limestone and other igneous and sedimentary rocks. Petrographically they represent the proportion of the types of the rocks that are present in the flow basin of each river.

Cladding of external wall with pebbles



Paving of a floor with pebbles

In the modern construction industry, pebbles and gravels are mainly used for cladding of external walls and external floor pavement. Occasionally, they are used as building stone for the construction of double face walls mainly for restoration of old buildings with traditional architecture.

Construction of a double face wall with pebbles

Diabase and other igneous rocks

The diabase used as building or decorative stone derives from the geological formation of the Sheeted Dykes which covers big part of the Troodos Ophiolite.

The diabase is a hard rock and innocuous when used in combination with various mortars. It is extracted in angular pieces of various sizes with usually one or more of the surfaces flat so that they are easy to use them in the construction or the cladding of walls. This rock is used mainly in mountainous and semi-mountainous villages where diabase and other igneous rocks outcrop. They, therefore are in accordance with the natural environment of the region.

Often diabase is used in conjunction with gabbro, hartzburgite and other igneous rocks, also extracted from the Troodos Ophiolite.

Recently processed products of diabase and other igneous rocks, such as slabs and setts for external floorings have been launched in the market.

House cladded with diabase and other igneous rocks

Reef limestone and other limestones

The reef limestone is found in the outcrops of the Terra and Koronia members of the geological formation of Pachna. This type of limestone is extracted from the quarry zones of Mitsero, Xylofagou and Androlykou where crushing plants are operating for the production of aggregates. As a building stone, the reef limestone is mainly used in rough or semi-rough slabs or blocks of various sizes that are suitable for the construction of double face walls.

As a decorative stone, the reef limestone is used after industrial treatment of selected suitable blocks.

Rock-bilted fence with reef limestone