

# PAMUKKALE. A NATURAL WONDER IN TURKEY

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This high cliff of white marble, with scallop-shaped basins of water and waterfalls is to be found about 20 km from Denizli in the southwestern part of Turkey. The brilliant white ledges that form the pools are made of travertine.



*First Day cover of the stamps issued by Turkey in 1958 showing the world famous spring and terraces in Pamukkale.*

Because of the whiteness and the sculptured landscape of this area, the village is named Pamukkale which stands for Cotton Palace.

The white cliff is over 200 meters high and consists of thousand of pools and ponds which form a petrified waterfall, falling down in a succession of terraced basins. The site has been known for a long time. The kings of Pergamon established thermal spas there at the end of the 2<sup>nd</sup> century B.C.

The Greeks and the Romans built a number of monuments, including a theater, a colonnaded street, thermal baths and a necropolis. The site that was then known as Hierapolis.

***The geology of travertine formation is as follows.***

Travertine, as the mineral forming the pool edges is called, is a low density form of limestone. It is a banded rock composed of calcium carbonate, in the calcite form. It is light in color and may be highly polished. It is often used as an ornamental stone in many buildings. For example, there is a very large deposit of travertine around Rome that has been exploited for hundreds of years. Travertine taken from a quarry at Tivoli was used to cover the outer walls of the Coliseum in Rome.

Ground water passing through a limestone bed dissolves the calcium carbonate. This process is controlled by many parameters the main ones being the water temperature and the amount of carbon dioxide (CO<sub>2</sub>) in the air.

This carbonate laden water contains dihydrogen calcium carbonate. As long as it is underground, as long as the water temperature and the CO<sub>2</sub> atmosphere do not change, this salt remains dissolved in the water. However, when the spring arrives in open air, where the concentration of calcium dioxide is less, CO<sub>2</sub> is released in the atmosphere and calcium carbonate which is not water soluble is deposited.



*Turkey has issued three sets of stamps depicting the Pamukkale travertine. It was shown on a Europa set in 1977 and then in a two-value set for the promotion of tourism in Turkey in 1993. The regular postmark of the town of Denizli also bears a schematic rendition of the site.*

Nowadays the site of Pamukkale is listed among the World Heritage Sites of UNESCO.





“Petrifying Springs” as these sources are also called often yield works of art. This occurs when the carbonated spring is made to run through a mold carved in wood. Nowadays, wood has been replaced by gutta-percha. After a year or so, a relatively thick piece of carbonate is deposited. The carbonate piece is then released from the mold and the relief (3 D) picture carved in the mold is revealed.



*Example of a calcium carbonate relief picture (80% of actual size) from Fontaine Saint-Alyre in Clermont-Ferrand, France.*