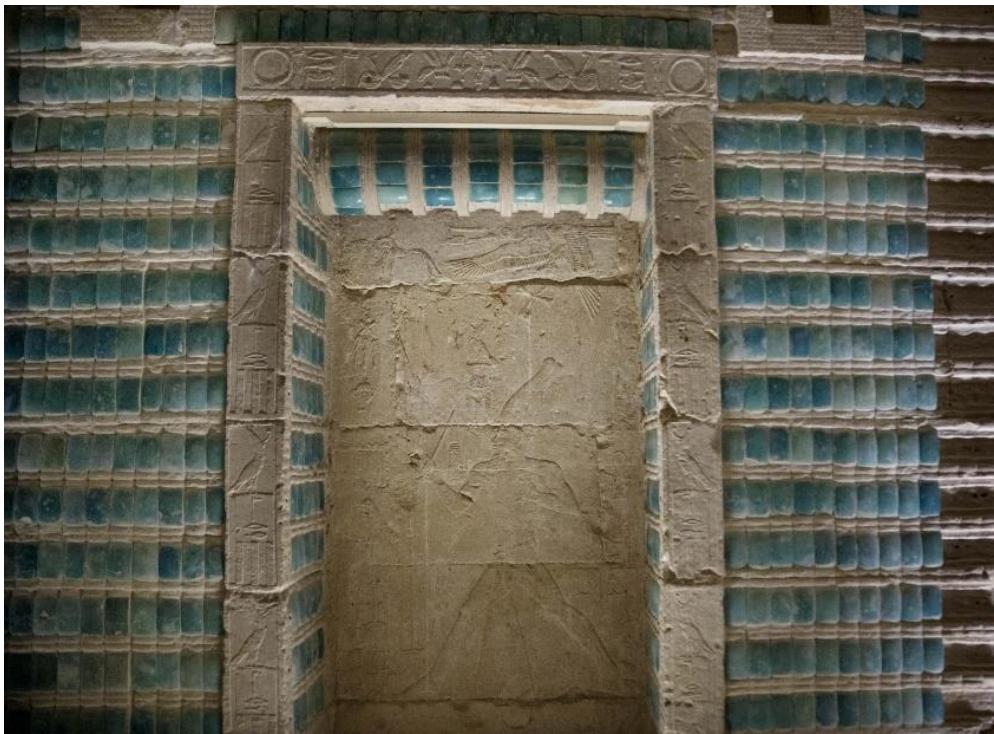


A tile from the tomb of a pharaoh, 4700 years old



Almost five thousand years ago the Egyptian pharaoh Djoser and his chancellor Imhotep constructed the first ever stone pyramid as Djoser's memorial and tomb. This pyramid still stands today at Saqqara. Early in the 19th century, adventurers and archaeologists dug deep into the pyramid. Thirty metres below ground level they found the burial chamber, a network of rooms and about four miles of passages. In several of these rooms the walls were lined with thousands of small blue glazed tiles, together with narrow bands of limestone mouldings. There is general agreement that these tiles imitate the reed matting that would have lined the walls of Djoser's palace and it has been suggested that it also represents the 'field of reeds' – a paradise where the pharaoh expected to reside after his death. The limestone bands supposedly represent the ropes used to tie the bunches of reeds together. Sadly, most of the tiles were removed in the 19th century, long before modern concepts of protecting such unique historical sites, but you can get some idea of the original appearance of these chambers from paintings made early in the 19th century and also from small sections of tiles that remain or have been restored in the tomb (see photo at the top of the next page).

The tile in the photograph at the head of this note, nearly 6 cm tall, has almost certainly come from Djoser's tomb. It was made over a thousand years before the first glazed pottery and it is not made of clay, but of a material called Egyptian faience. This potentially confusing name, originally used because it was erroneously thought to be similar to the Italian tin-glazed pottery called faience (named after the town of Faenza), has gained such widespread currency that it is still generally used. In fact, the material contains up to 99% silica, probably obtained by crushing quartz pebbles (possibly after cracking them by sudden heating and cooling). To this quartz is added up to 5% alkali (mainly soda) as a flux to help the quartz melt and bind together when fired. Some lime is also present, though it isn't clear whether this is a deliberate addition. For the soda the makers probably used the ash of plants which lived in a saline environment and so contained lots of salt.



As it contains no clay, this mix of mainly quartz powder is not easy to shape and has no plasticity. This meant it had to be wet to just the right consistency and then modelled with the hands or pressed into moulds. Because the soda is soluble in water, as the newly-shaped tile dries and water from the interior moves to the surface and evaporates, the water carries soda with it and a concentration of soda builds up at the surface. When the tile is fired this high concentration of flux at the surface creates a glaze. In fact, the fired quartz powder underneath the glaze is still weak and friable after firing and the tile relies on the glaze for much of its strength.

The attractive turquoise blue colour of the tiles derives from deliberate additions of a copper-containing substance. The Egyptians clearly loved this colour and the way that the glaze reflected the light. In ancient Egyptian it was called tjehnet, which means brilliant or scintillating, like the sun or the moon. In this way faience was probably associated with Osiris, the Egyptian god of the moon. Osiris was also god of the afterlife and resurrection and therefore faience tiles would be a good way to decorate a tomb. Through its association with the gods and its unusual appearance it was considered by later Egyptians to have magical properties, and many amulets were made from it.

Beads with a fired blue-green glaze were actually made before the development of faience. In the last quarter of the fifth millennium BC, craftsmen in Egypt (and also in the Middle East and the Indus valley) started making beads from the soft rock steatite (soapstone). Firing the steatite makes it much harder and more durable. During firing the beads were buried in a mixture containing silica and copper oxide and the glaze was formed by the reaction between the mixture and the steatite. This technique was probably discovered during copper manufacture, which started about the same time. Shortly afterwards (around 4000 BC) craftsmen in Egypt and the Middle East started to make faience. Glazed steatite continued to be used for small carved items until about 500 BC, as its finer texture allowed more detailed carving than could be achieved with faience. However, faience objects were made in much greater quantity because the method of moulding was much quicker and the glaze on faience was brighter and had a stronger blue colour.

As well as beads and tiles, vessels were made of faience even before Djoser's time, and faience objects continued to be made in Egypt and the Near East for thousands of years. In later periods they also used another source of soda – natron, which is naturally occurring sodium carbonate formed from evaporating lakes. There were also other methods of applying the soda to create the glaze. Later, in the time of Ptolemy (around 300 BC) they started adding clay to the powdered quartz to give it plasticity and threw vessels of this modified faience on a potter's wheel.

Faience beads were even made in Britain in the bronze age. The manufacture of faience spread from Egypt and the Middle East to Crete, Northern Greece and Russia in the third millennium BC and then to Italy, France and Britain in the second millennium, so it was eventually made over much of Europe. We can tell that the beads found in Britain were made locally because they have a slightly different chemical composition (higher levels of tin).

It is interesting to examine the back of my tile (see photo below) as it has been carved to create a lug with a hole drilled through it, so it could be attached to the wall by a wire. Limestone ledges were made in the walls of the tomb and it appears that, when they were originally installed, the tiles were strung together with copper wire and then pressed into plaster on these ledges.



Parts of the back of my tile have blue glaze on them, some of the glaze very thin, and other parts have no glaze at all. Looking at the locations of the glaze on back I think that the lug on the back of the tile was shaped during the initial moulding of the tile, so as it dried glaze developed on these surfaces. If the tile was laid on a surface to dry, with the front face upwards, then most of the evaporation would occur from the exposed front face and the thickest glaze would develop on that face, as desired. The rear of the tile, laying on the supporting surface, would see less evaporation and so develop thinner glaze. Then once the tile had dried and could be handled more easily, the carving in the corners of the lug could be refined and the hole drilled, removing any concentration of soda and copper that might have developed in these areas and leaving just the white quartz that we see. It is even possible that the final carving and drilling were done after firing the tile, which would have made it more robust.

It is difficult to know whether the making of faience led eventually to the idea of glazing clay pottery. Glazed pottery first developed in Mesopotamia around the middle of the second millennium BC, using alkaline glazes (ash glazes started to be used in China around the same time). The lower levels of silica in clay meant that simply mixing the alkali with the clay and relying on diffusion to the surface would not work as it did with faience. Silica need to be added to the glaze mixture, which was applied to the surface of the pot. The earliest glass was being developed around the same period and the compositions of early pottery glazes are similar to those of that glass, so it is possible that the idea for glazing pottery came out of the development of glass.

When I first saw this tile in an auction, and I didn't know the history of Djoser's tomb, I was surprised that it was available and not protected in-situ in the tomb. Since I started buying old pots I have given a lot of thought to the ethics of owning antiquities. I know of archaeologists who disapprove of any private ownership of antiquities, arguing that anything which promotes the market in antiquities also encourages the looting and destruction of historical sites. It is certainly true that many sites have been despoiled to feed the desires of collectors and museums around the world. Most of this was done before modern concepts of protecting historical sites, but it has also occurred in recent times – for example in the 1960s the beautiful painted pottery of the ancient Mimbres people, in the southwest of the US, became highly desired and several ancient sites were levelled using bulldozers in the search for more pots. On the other hand, vast amounts of old pottery are held in the storerooms of museums and archaeology departments and never seen. It seems to me that there should be room both for private ownership and the protection of ancient sites in these more enlightened times. I have decided that I will not buy pots which came from a location that is currently at risk of looting or where there is any suggestion that the item may have been obtained or exported illegally. The Djoser pyramid is now in the guardianship of the Egyptian state and I believe well protected.

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