

# Complex engineering and metal-work discovered beneath ancient Greek 'pyramid'

Latest find on Cyclades' Keros includes evidence of metal-working and suggests the beginnings of an urban centre, say archaeologists

[Maev Kennedy](#)



The promontory of Dhaskalio, rising from the Aegean sea, was once joined to the major sanctuary of Keros.  
Photograph: Michael Boyd

More than 4,000 years ago builders carved out the entire surface of a naturally pyramid-shaped promontory on the Greek island of Keros. They shaped it into terraces covered with 1,000 tonnes of specially imported gleaming white stone to give it the appearance of a giant stepped pyramid rising from the Aegean: the most imposing manmade structure in all the Cyclades archipelago.

But beneath the surface of the terraces lay undiscovered feats of engineering and craftsmanship to rival the structure's impressive exterior. Archaeologists from three different countries involved in an ongoing

excavation have found evidence of a complex of drainage tunnels – constructed 1,000 years before the famous indoor plumbing of the Minoan palace of Knossos on Crete – and traces of sophisticated metalworking.



The entrance staircase from above: the sea level was much lower in the early bronze age Photograph: Michael Boyd

The Dhaskalio promontory is a tiny island as the result of rising sea levels, but 4,500 years ago was attached by a narrow causeway to Keros, now uninhabited and a protected site. In the third millennium BC Keros was a major sanctuary where complex rituals were enacted. [Earlier excavations by the team from the University of Cambridge](#), the Ephorate of Antiquities of Cyclades and the Cyprus Institute have uncovered thousands of [marble Cycladic sculptures](#) – the stylised human figures which inspired western artists, including Pablo Picasso – and which appear to have been [deliberately broken elsewhere and brought to the island for burial](#).

Maintaining as well as constructing the settlement would have taken a huge

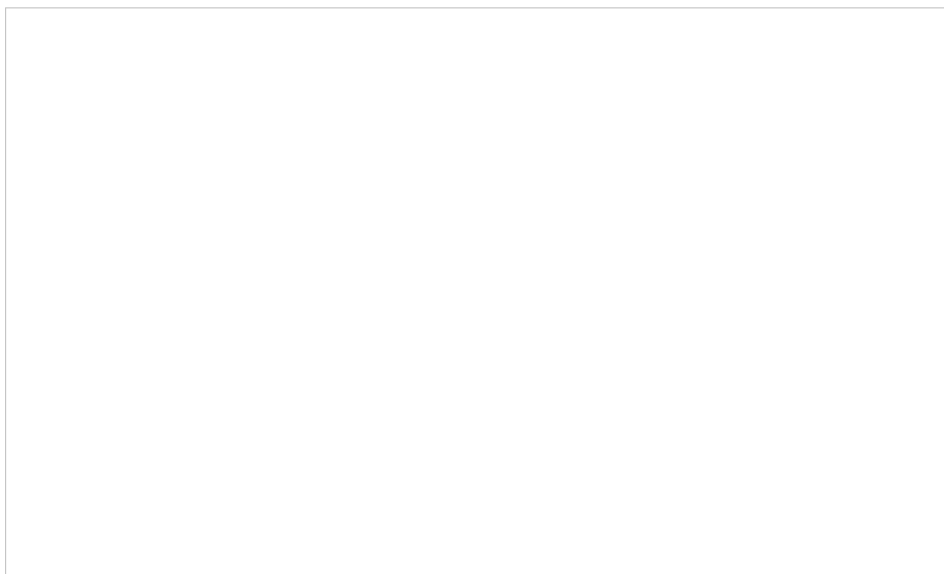
communal effort. The now-deserted slopes of Dhaskalio were once covered with structures and buildings, suggesting that 4,500 years ago it was one of the most densely populated parts of the islands – despite the fact that it could not have been self-sufficient, meaning that most food, like the stone and the ore for metal working, had to be imported.

The first evidence of metal-working was found in excavations 10 years ago. The new finds have uncovered two workshops full of metalworking debris, and objects including a lead axe, a mould for copper daggers and dozens of ceramic fragments from metalworking equipment including the mouth of a bellows. Archaeologists will return to excavate an intact clay oven, found at the very end of the last season.

Joint director of the excavation Michael Boyd, of the [University of Cambridge](#), said metalworking expertise was evidently concentrated at Dhaskalio at a time when access to both skills and raw materials was very limited.

“What we are seeing here with the metalworking and in other ways is the beginnings of urbanisation,” he said. Far-flung communities were drawn into networks centred on the site, craft and agricultural production was intensified, and the architecture became grander, gradually overshadowing the original importance of the sanctuary.

Excavated soil reveals food traces including pulses, grapes, olives, figs and almonds, and cereals, including wheat and barley. Evi Margaritis of the Cyprus Institute said: “Much of this food was imported: in the light of this evidence we need to reconsider what we know about existing networks to include food exchange.”



A researcher holds a mould for making a spearhead from molten copper. Photograph: Michael Boyd

The pyramid of terraces would have blazed in the Greek sun, visible from far off, covered in white stone imported from Naxos 10 kilometres away. The complex of drainage tunnels was discovered when archaeologists were excavating an imposing staircase in the lower terraces: research continues to discover whether they were for fresh water or sewage.

Lord Renfrew, joint director of the excavation, former Disney professor of archaeology at Cambridge and now the senior fellow at the McDonald Institute for archaeological research, first landed on Keros as a student and has returned often throughout his long career. He believes the promontory may originally have become a focus for development because it guarded the best natural harbour on the island, with wide views across the Aegean.

The excavations are being recorded digitally, using the iDig programme running on iPads for the first time in the Aegean. This creates three-dimensional models using photogrammetry recording of the entire digging process, giving everyone involved access to all data in real time.

- This article was amended on 18 January 2018 to correct an erroneous reference to the palace of Knossos, which is Minoan, not Mycenaean.

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