Xerxes Canal

Why did Xerxes decide to construct a canal across the Athos Peninsula, what was the best location, how was it achieved and who was involved in the exhausting labour and in its planning and design? These are just some of the questions in a fascinating snippet of Greek history. As a starter for ten, in Greek tradition, it is helpful to have a hypothesis with underpinning questions that seek to test out the rationale and logic. Even if confirmed any rationale is then open to further exploration and examination.

The hypothesis in this case was that reasons existed why a fairly circuitous sea route could not be used and that there was a convincing case to construct a canal across the narrowest point of what is an isthmus. This hypothesis was tested using several reputable websites and cross-relating these and then applying what I hope is logic. This last step involves maths, best fit and plausibility and yes, my take on the 'facts'.

What results from these researches is an account that appears to have a similarity of 'evidence' although details such as measurements and size of armies do vary. Does this matter? Wide variations at times do not detract from the emerging central theme and overall veracity. By interpolation and use of logic it is possible to arrive at what Grayling may describe as a plausible answer. The account of Herodotus and recent scientific and geological investigations are of immense importance. In spite of some misgivings in philosophy about the accuracy of Herodotus accounts there seems a reasonable correlation on most of the details of construction, if not the size of armies.

The Persian triremes, each with about 170 oarsmen, had to round a long and jutting peninsula notorious for rough seas, storms and dangerous tidal movements. In 492 BC the Persian fleet under the command of Mardonius had come to grief and in high winds and broadside on the ships were at the mercy of rocks and attackers. Another solution had to exist. The most practical answer was to construct a canal across the narrowest point of the isthmus where the ground was relatively flat.

The idea of a canal was mooted as the technical ability to construct similar canals had its origins in Babylonia, Assyria and probably Uratu, a kingdom existing between the 9th and 6th centuries BC in what we know as Armenia. Where high land ends on the landward side a promontory is formed. This long, narrow finger of land has a neck of about 2k at its narrowest point. Between circa 483 and 480 BC captured men from various nations, including Athos itself, were put to work in their thousands. Under a lash and labouring in shifts they had to dig a canal of vast proportions. The scale of the enterprise was not only colossal but mind-boggling in the extensive use of slave labour and for the logistics involved.

When the trench reached a certain depth, labourers at the bottom passed soil up to others standing on ladders. Soil was passed in baskets higher still in relays, until finally they were hoisted to the top. No pulleys were used for lifting but ropes lowered the baskets and, on completion of the canal, the triremes. The process was repeated for each section, ensuring at all times not only the correct width but depth as otherwise numerous problems could arise including loss of life if there was a landslip. Imagine what would have happen with water flow if the depth of one end differed from the other or/and if sections along it differed too.

Persians and other nationalities initially made the mistake of cutting the same width top and bottom with the result the sides caved in. It was the Phoenicians with their technical skills who constructed a trench 30m wide at the top, double the prescribed width. By sloping the sides evenly, using the correct angle, they descended 15.7m to sea level. They could now achieve the desired width of some 15m at the bottom and create a channel to accommodate two triremes sailing alongside each other.

Some accounts say it was merely ostentation and bravado that led Xerxes to build a canal of this magnitude rather than haul the boats overland and that he wanted to exert his power and leave a legacy of his achievement. That may well be the case but arrogance may have taken another form in addition. His clear message to the Greeks appeared to be that we are invincible and nothing can deter us.

More logical reasons may exist too. Had an overland route been used boats may well have been damaged on rocks and stones and from mishandling. Digging out rock and sand, albeit under supervison, demands mostly brute-strength whereas hauling boats such a great distance requires skill and guile. Of immense concern was hauling boats initially from the shoreline to flatter inland areas but even here haulage would have had been exceedingly difficult. For all we know they may have experimented with this method first. Once constructed a canal could then continue to be used for decades if not centuries, but strangely no evidence seems to exist that it was.

British and Greek scientists, starting in the 1990's, used geological evidence gathered several metres below the surface where the structure lay. A detailed map was drawn to show the dimensions and course of the canal. Relatively advanced mathematics may well have been used by the Persians. They would have compared the width of the canal to the circumference of the isthmus that may have been approx 60k. Had, for example, the perimeter been a mere 20k they may have been inclined to wait for favourable sea conditions, knowing the journey would not take long. A few boats might perish at worst but almost certainly not the entire fleet.

Maths was critical to calculate the width of the canal at the top and bottom in order to achieve the optimum gradient along the sides. The angle of these sides had to be sufficient to achieve the desired width at the bottom and no greater, and yet shallow enough to avoid debris cascading down, only to be dug out again. This may have resulted in loss of life too but probably more important to the Persians it would have delayed completion. Even today, without using calculators or Excel formulas, it is not easy to calculate the best solution to achieve the desired depth, and the width at the bottom, and build a navigable canal in the least time. Technical computations would be required to determine how many relays and tiers were needed and the size of the baskets to ensure these could be lifted and also handled without spillage.

Upon completing the canal the Persian fleet made it safely to the Aegean Sea where the fleet was joined by land troops from the north. The ships were then able to storm the coast enabling Persian armies to sweep deep into Greek territory. In the euphoria of victory the canal was forgotten. It had achieved its purpose.

The references below, amongst others, were especially helpful. The conclusions, and in particular the use of maths, are my own conjecture. As a hypothesis this is open to further debate and analysis and different interpretations and conclusions! In spite of possible errors and omissions on my part, this account of event offers a glimpse if not flavour of the life and times in Greece nearly two and a half thousand years ago.

References:

Livius.org – Herodotus, The Histories: 7.22-7.24; 7.117
Annual of the British School at Athens 89 (1994); article by B.S.J. Isserlin et al pp 277-284.
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