PERSIAN CANAL DISCOVERY A TESTAMENT TO PERSIAN ENGINEERING SKILLS

In 480 B.C., King Xerxes of Persia ordered his men to build a canal a mile and a quarter long through a peninsula in northern Greece — conceivably one of the biggest engineering assignments of its time.

The canal was critical to Xerxes' plan of invading Greece, a goal that his general, Mardonius, had unsuccessfully attempted 12 years earlier. Mardonius' fleet was destroyed in a storm while sailing around the tip of the peninsula, and Xerxes wanted to avoid a similar setback by building the canal.

Xerxes went on to invade Greece, starting a brief period of Persian conquest in Europe. In the 2,500 years since, historians have debated whether the famed Canal of Xerxes was really dug all the way from coast to coast. Some have doubted its existence, pointing to a rocky plateau that they argue would have made the construction an impossible task for workers of that day.

Now, scientists from Britain and Greece have come up with what they say is conclusive evidence that the canal was indeed built. Using geological information gathered from several yards below the earth's surface, where the structure now lies buried, the scientists have drawn a map detailing the canal's dimensions and course. The findings confirm the description given in an account by the ancient Greek historian Herodotus, which some scholars have long regarded with skepticism.

Buried under centuries of silt and alluvium, the structure is testament to remarkable military strategy, work-force management and civil engineering. It also tells of shortsightedness and haste, and of a king who was probably in such a hurry to conquer that he never thought of preserving the canal as a permanent waterway.

"From the analysis of sediments in the canal, we know that it probably had a short lifetime," said Dr. Richard Jones, the lead researcher on the project and an archaeologist at the University of Glasgow. "The Persians did not think of it as a monument that would remain for centuries. Once their ships were through, that was the end."

Spanning about 100 feet at the surface, the canal was just wide enough for two war galleys to pass. Its sides sloped inward, forming a width of roughly 50 feet at the bottom, about 45 feet below the surface.
"It was a colossal enterprise," said Dr. Ben Isserlin, an archaeologist at the University of Leeds who started the canal exploration project in the early 90's. "There were no pulleys. So the workers had to shovel earth into baskets and pass them along, from one person to the next, all the way to the top."
The mapping of the canal was a laborious enterprise itself. Dr. Jones and his colleagues used a seismic method that has traditionally been used in oil and mineral prospecting. Essentially, they hit a piece of metal placed on the ground with a heavy hammer, sending shock waves into the earth. By analyzing the time it took the waves to travel back up, the scientists were able to draw a seismic profile — a kind of phantom image — of the buried waterway.

"This was too big a target for conventional archaeological techniques," said Dr. Vassilis K. Karastathis, a member of the team that conducted the seismic survey and a geophysicist at the National Observatory of Athens in Greece. The team's findings were reported in The Journal of Applied Geophysics.
The canal structure imaged by the geophysical team was confirmed by analyzing sediment samples drilled from different depths.

The construction was as much a feat of management as of engineering.
Upon completion of the canal, the Persian fleet made it safely to the Aegean Sea, where it was joined by the troops that had taken the land route from the north. The ships sailed on to Greece. Xerxes' soldiers stormed the coast and advanced deep into Greek territory.
They destroyed Athens but eventually lost to the Athenians in a battle that ended the Persians' fleeting imperial presence in Europe.
"The canal was forgotten," said Dr. Jones, the lead researcher.

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