

# An ancient bronze device could be the world's first computer, some say

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*Visitors look at a tentative reconstruction of the over 2,000-year-old Antikythera Mechanism, believed to be the earliest surviving mechanical computing device, at the National Archaeological Museum in Athens, Greece, Nov. 30, 2006. Photo: AP Photo/Thanassis Stavrakis*

When a shoebox-size chunk of bronze was pulled from an ancient shipwreck off the Greek island of Antikythera in 1901, it did not attract much attention. Archaeologists had their hands full with far more impressive finds. There were life-size statues of warriors and horses, delicate glass bowls and scores of ceramic vessels called amphorae.

Decades would pass before scientists realized that the unassuming bronze was the biggest treasure of all.

The device is now called the Antikythera Mechanism. It is made up of a series of intricate, interlocking gears. They were designed to predict eclipses and calculate the positions of the sun, moon and planets as they swept across the sky.

The machine was more sophisticated than anybody dreamed could have been made 2,000 years ago, when it was built. People in Europe did not make anything as advanced as it was until more than a thousand years later. Some scholars describe the Antikythera Mechanism as the world's first analog computer.

## Found In 1900

"The amazing thing is the mechanical engineering," says James Evans. He is a scientist and historian at the University of Puget Sound in Tacoma, Washington. Evans is a member of an international group working to figure out the device's origins and purpose. Evans recently added a new twist, suggesting the device came from 205 B.C. — as much as a century earlier than previously believed.

If he's right, it is more likely that the Antikythera Mechanism was inspired by the work of the legendary Greek mathematician Archimedes. It would also mean the device was built at a time when scientific traditions from multiple cultures were coming together to create a new view of the cosmos.

"Pushing the date back is exciting," Evans said. "We think it would be highly significant because it could change the picture of the development of Greek astronomy."

Greek sponge divers stumbled across the wreck of the Roman galley in 1900. They had been blown off course and took shelter near a tiny island north of Crete. During underwater excavations the next year, they hauled up one of the richest bounties of Greek artifacts ever uncovered.

One diver died and two others were injured from working at depths of up to 200 feet.

## **Breakthrough In 2005**

French explorer Jacques Cousteau visited the site in the 1950s and 1970s. He used an underwater vacuum to reveal buried objects.

Scientists think the ship sunk around 60 B.C.

Archaeologists eventually identified more than 80 pieces believed to be part of the Antikythera Mechanism. They included a shoebox-size piece with dials and gears clearly visible on the surface.

The real breakthrough in understanding came in 2005. Then, a team of scientists used X-rays to peer through the encrusted metal and reveal the layers of gears inside. Digital methods yielded the first sharp images of the inscriptions on the dials and casings.

The studies revealed at least 30 interlocking gears. Researchers believe the device held at least two dozen more.

The assembly was housed in a wooden box and operated by a hand crank. Elaborate dials traced the movement of heavenly bodies. Meanwhile, special gears mimicked the fluctuating speeds at which the moon crosses the night sky, even though the ancient Greeks had no understanding of the moon's curving orbit.

## **Built In 205 B.C.?**

One dial plotted the four-year cycle of Olympic Games. Another predicted the timing of eclipses of the sun and moon, apparently down to the hour.

That was the dial that Evans and Christian Carman, of the University of Quilmes in Argentina, focused on for their new

study. Their work was published in the Archive for History of Exact Science.

Previous estimates said the device was built between 150 and 100 B.C. The estimates were based on the style of the Greek lettering on the device. But Evans and Carman took an astronomical approach. They compared eclipse dates on the device to Babylonian eclipse records and an eclipse catalog done by NASA, the U.S. space agency.

They concluded that the “start date” for the eclipse predictor was 205 B.C.

That doesn't prove the device was built then, but Evans thinks it was. “For us, it seems most likely that it was built close to the period for which it would have worked best,” he said.

## **A Story From 212 B.C.**

The 205 B.C. date is important because it would bring the device closer to the lifetime of Archimedes. He was the Greek genius who revolutionized geometry and invented compound pulleys. Archimedes was killed in 212 B.C. during the Roman conquest of the Greek city state of Syracuse, on the island of Sicily.

A story later told by the Roman orator Cicero claimed that the general who sacked Syracuse brought a mechanical brass sphere created by Archimedes back to Rome. The sphere modeled the movements of the heavenly bodies — planets and stars.

But the famous inventor died seven years before 205 B.C., and there's no way to link him to the Antikythera Mechanism.

“People should be leery of trying to associate it with any one particular person,” Evans said. “But you would have to think that whoever built this must at least have made use of what Archimedes had done, or came out of a tradition that started with Archimedes.