Decoded, an ancient Roman board game

Archaeologists used AI to analyse wear patterns on a limestone chunk. **Franz Lidz** reports

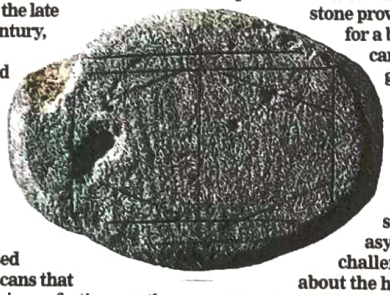
For decades, a small, worn rock, etched with a pattern of rectangles and lines, sat quietly in a Dutch museum. Now, a study in *Antiquity* proposes that this unassuming artefact was actually an ancient Roman board game.

By employing artificial intelligence to analyse wear patterns on the 21-by-14.5-centimetre chunk of limestone (in pic) and running thousands of simulations, researchers believe that they have brought a forgotten pastime back to life, rediscovering how it was played and solving an archaeological mystery in the process.

Ancient Romans enjoyed a good distraction and they regularly played tabletop games. Tracing that history is challenging, however, because many games were played on sketches in the sand or with perishable sticks. Yet, historical writings and archaeological remnants suggest a sophisticated culture of play. Games included *rota* (resembling tic-tac-toe), *ludus calculorum* (similar to the Japanese board game Gomoku) and *ludus latrunculi* (a precursor to chess).

"Romans made a lot of objects for play, and we happen to have a fair number of texts," said Walter Crist, an archaeologist at Leiden University in the Netherlands and lead author of the new paper.

In 2020, while visiting the Het Romeins Museum in the Dutch city of Heerlen — formerly the Roman town of Coriovallum — Crist, a specialist in ancient games, was drawn to the oval-shaped slab. The object, discovered in the late 19th or early 20th-century, featured a peculiar pattern. He examined the surface and noticed distinct signs of wear.



"Players had, over and over again, pushed game pieces across the rock," Crist said. Researchers used high-resolution 3D scans that mapped microscopic imperfections on the limestone board, revealing telltale grooves. The data was then fed into Ludii, an AI platform that had been trained on roughly 100 ancient Roman board games. By generating dozens of potential rule sets and pitting bots against each other in mock matches, the AI pinpointed a few specific, engaging variants that conformed to the physical wear pattern.

Programmers ran 130 rule combinations, testing thousands of scenarios against the grooves on the board. The simulation successfully matched the rub marks to nine plausible sets of rules, indicating that the stone provided a playing surface for a blocking game. Gamers can now test these strategies themselves by playing this once-forgotten battle of wits against a bot on Ludii.

Named *ludus coriovalli* or the Coriovallum game, the surprisingly modern, asymmetrical recreation challenges previous ideas about the history of gaming. The reconstructed game likely involved two players sliding small pieces of glass, bone or earthenware along the lines, with one party trying to immobilise the other. However, games that require complex blocking strategies were thought to have emerged much later, in the Middle Ages.

Veronique Dasen, an archaeologist at the University of Fribourg in Switzerland who was not involved in Crist's research, said the study tackled an important problem in the archaeology of games: how to infer rules from material remains. She suggested that many other unidentified items found at Roman sites could also be game boards.

Not everyone is convinced by the study. Ulrich Schadler, an archaeologist at the University of Fribourg and director of the Swiss Museum of Games, is sceptical of the notion that the curiously etched stone is a genuine Roman relic. Unlike, say, typical, crudely scratched *ludus latrunculi* game boards, he said, the Heerlen artefact features straight-edged, noncoherent lines, making it an outlier.

Does *ludus coriovalli* represent a breakthrough or just a bored stonemason's doodle? Schadler has bet on the latter, arguing that our deep knowledge of Roman culture makes this oddment a product of modern projection rather than historical proof. "Draw a geometrical pattern and I will invent a game to be played on it," he said.

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