**Why were the roofs of the buildings in Masada dismantled?**

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Abstract: During Yadin’s excavations, it became clear that the wooden beams of most of the ceilings of the buildings in Masada were dismantled before the Roman occupation. Furthermore, around one hundred baking ovens were discovered at the site. However, no traces were found of the alternative wooden wall built by the besiegers but burned down by the Romans, as described by Josephus Flavius. It seems instead that the besiegers used ceiling beams as fuel for baking their bread.

**Keywords**: Masada, baking oven, casemate wall, wooden wall.

Josephus Flavius details the course of the Romans’ conquest of Masada, writing that they broke through the stone wall with an iron ram. The Sicarii then built an alternative wall out of wooden beams that the Romans set on fire (JW 7, 311-–314).

Netzer sees confirmation of this in the fact that the extensive excavations conducted on the summit of Masada by the Yadin expedition ( 963-1965) revealed that over 90% of the wooden ceilings of the buildings and casemate wall on the mountain had been dismantled (Netzer 1989, Figures 3, 4, 6, 9). According to Netzer’s assessment, the zealots had at their disposal approximately 4000, four- to five-meter-long wooden beams, several dozen longer beams, and hundreds of shorter, two- to three-meter-long beams of an approximate width of 20–25 cm, with which they built the replacement wall (Netzer 1989, 313-–312; Figures 2, 3; Fig. 1).

However, Netzer simultaneously points out that the wooden beams may not have been used to build an alternative wooden wall as the **excavations “did not bring up direct evidence of the existence of the wooden and earthen wall**. The section of the wall in the section located in front of and above the earthen embankment that the Romans poured here... but **no unusual fire remains, or earthen were found** here more than usual” (Netzer, 1989, 311).

**Baking ovens in Masada**

The oven, which was built into the ground, assumes the shape of a truncated cone with an average inner diameter of about 60 cm and a similar height. The body of the oven is comprised of two layers. The inner one is of fine clay that turns reddish when the oven is heated. The outer layer, which consists of local mud combined with pottery sherds and/or flat stones, serves as insulation.

Jewish sources refer to the opening at the top of the oven as “the oven's mouth” and to its portable lid as a *srida*. Another opening in the oven—round and small, with a fist-sized diameter—is situated at ground level and was used to regulate the heat and allow air to enter the oven. Jewish sources call it the “eye of the oven” (Mishnah, Kelim 8: 3, 7).

The preparation of the bread in the oven required three steps: heating, baking, and removing the loaf once it was baked. During the heating phase, the fuel—wood—was inserted into the oven's mouth and lit. The baker then waited until the flames subsided, leaving behind the glowing coals. Once the oven was hot enough, the pita bread was inserted for a short time and then removed.

A study conducted in Tunisia with an oven similar in size and shape to those in Masada and Ein Gedis reveals that the heat can rise as high as 780° C degrees during the heating stage, but then drop, after half an hour, to 475° C degrees. It is at this point that the pita – *Khobz*—is inserted for five minutes. A dozen pitas can be baked at the same time. Within two hours, the internal temperature drops to 100° C degrees, allowing foods to be cooked in slow mode (Portillo et al. 2017, 142; Figs 4a, 5).

In an article based on the excavation plans of Masada published by Netzer, Reich lists 146 ovens, most of which, he claims, were found in the casemate wall (Reich 2003, 141; Tables 1, 2). My excavations at Ein Gedi (see below) have led me to an estimate of only about 100 active ovens at the time of Masada's destruction. Since an oven is a brittle device, a new one is built next to it once the older one falls out of use. Thus, of the three ovens visible in the plan of Room Tower 1264 at Masada, only the one on the left was still active, as is evident from its better state of preservation (Netzer 1991, Ill. 696; Fig. 2).

The same phenomenon came to light during the excavations of all the courtyards of the residential dwellings in the village of Ein Gedi from the second temple period (Hadas, 2016, 89). Here, the remains of several ruined ovens were uncovered close to each other, and next to them a complete oven that was still active at the time of the destruction of the village. Yet, even this active oven was built atop a ruined one. (Hadas & Peleg-Barkat, forthcoming). Figs. 3, 4)

**Where did the besiegers get fuel with which to heat their baking ovens?**

The number of people living in Masada increased after the revolt of 66 CE and reached its peak during the siege of the town in 73 CE, when the population amounted to about a thousand men, women, and children (JW 7: 400). Located on a large and isolated rock cliff whose summit was surrounded by a wall, Masada was actually a fortified place of refuge that did not require much strength to defend. It was also equipped with large water reservoirs and dry food warehouses, though its residents could only obtain fresh food by raiding nearby settlements like Ein Gedi (JW 4: 401-405).

The many ovens found on Masada's summit indicate that they were constructed there to provide bread for all of the town’s residents. A great deal of firewood was needed to fire these baking ovens. The daily per-capita consumption of firewood for baking bread in Masada has been estimated at 1.6 kg (Lev-Yadun et al. 2010, 781). Assuming that a typical family there consisted of five people, the ovens would have required a large quantity of wood—as much as 307 kg per day (960:5 x 1.6). Indeed, they consumed even more, as fuel was needed not only for cooking but also for heating.

Until the outbreak of the rebellion, the residents of Masada most likely gathered heating materials for their baking and cooking needs from the nearby desert, which was sparsely vegetated with *Anabasis articulata*, *Hammada salicornica* and *Zygophyllum dumosum* (Liphshitz and Lev-Yadun 1989, 28). During the siege, however, the need for fuel increased. The only way to supply ovens with fuel was by cannibalizing the town’s buildings, that is, by dismantling doors, door jambs, and large roof beams, which was more energy efficient than using desert bushes (Reich 2003, 153).

This is why over a thousand wood samples have been uncovered at the excavations of Masada. The wood comes from buildings, firewood, tools, furniture, etc. About 23 different types of wood have been identified. The most frequently found wood here does not come from trees that grow in the immediate vicinity: Phoenician juniper (556 specimens) and sycamore (118 specimens), which are characterized by long, straight trunks, seem to have been used for the roofs of the buildings at Masada. Specimens of the cedar of Lebanon have likewise come to light (99) and may have been used for building palaces and producing quality furniture (Lipschitz & Lev-Yadun 1989, 27-28).

In short, the besiegers’ need for lots of firewood with which to bake bread was satisfied with wooden beams that could be obtained from the roofs of buildings, including the casemate wall. This weakened the casement wall and left its outer wall standing free and exposed to the impact of the stone volleys of the Roman *ballistae* that eventually pierced it (Figs. 5, 6). Subsequent earthquakes may too have caused great destruction to the outer wall, as is visible even today.

**To sum up**, the besiegers most likely used the wooden roof beams of buildings at Masada as fuel for baking their bread. This is why no evidence of any wooden wall has ever been found; it was simply never built. Although the Romans started constructing the siege ramp, they had no intention of completing it. Thus a siege tower with an iron ram to breach the stone wall was never built. The purpose of the ramp was simply to mislead the besiegers at Masada regarding the pre-planned breaching location, which was through the town’s southern gate (Hadas, 2023).

**Captions**:

1. Proposed reconstruction of a cross-section of the wooden wall built by the besiegers (Netzer 1989, Fig. 2).

2. Three baking ovens in Masada; only the oven on the left is well preserved (Netzer 1991, Ill. 696).

3. Three baking ovens in the Beit ha-Halukim courtyard in the Ein Gedi village (Hadas and Peleg-Barkat, forthcoming). (Hadas).

4. Two baking ovens, one built on top of the other, in the courtyard of Beit ha-Halukim in the village of Ein Gedi (Hadas & Peleg-Barkat, forthcoming), (Hadas).

5. Proposed reconstruction of a cross-section of the casemate wall (Based on Fig. 1).

6. Proposed reconstruction of the cross-section of the casemate wall once the wooden roof beams were dismantled (Based on Fig. 1).

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