



The first of a series of holes melted with the subterrene at Bandelier National Monument was in the floor of a kiva. In addition to members of Group Q-23 who operated the subterrene, many visitors from the National Park Service were present.

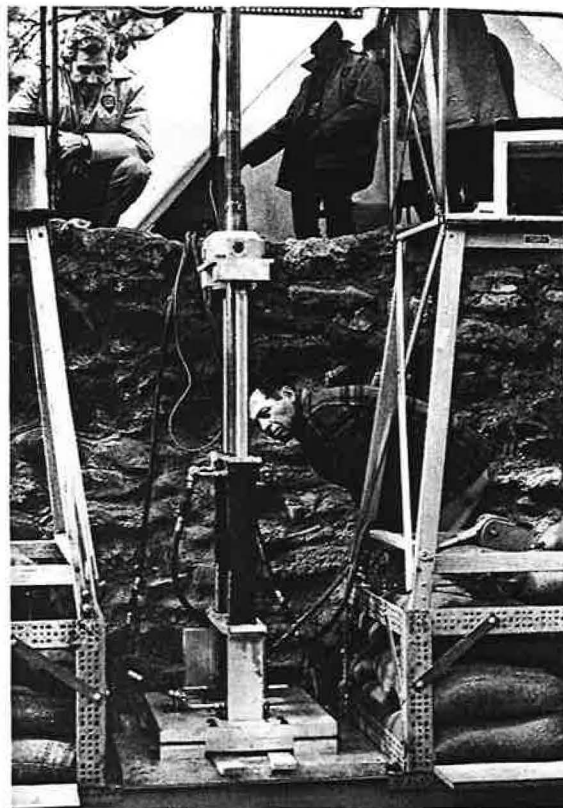
The First Practical Application of the Subterrene

The subterrene, a rock-melting penetrator being developed at the Los Alamos Scientific Laboratory, has been used to bore drainage holes in ruins at Bandelier National Monument, near Los Alamos. The event marks the first practical application of the device, which has been under development at LASL for about three years.

The subterrene used at Bandelier is a portable unit built with funds provided by the National Science Foundation. While, to date, it has been operated at Bandelier by Group Q-23's Test Section, headed by Ed Williams, a National Park Service team will eventually be trained in its use. The portable unit will then be loaned to the NPS for more drainage-control service at Bandelier and at other of the many historic sites for which the NPS is responsible.

In all, the LASL contingent bored
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Ray Olivas, Q-23, checks subterrene operation in the bottom of the kiva. Above are Larry Hupke and Jim Griggs, both of Q-23.



Visitors to Bandelier National Monument stop to read information about the subterrene at Tyuonyi ruin. In background, Ed Williams, Q-23 Test Section leader, checks melting operation.





Olivas checks melting rate by viewing measuring stick on stem of subterrene through telescope.

View from the ground at Tyuonyi where LASL scientists used the subterrene to bore three drainage holes close together.



The view from the top of trail at Bandelier was of the old and new—the old Tyuonyi ruin and the new subterrene.

five holes at Bandelier to drain water that might otherwise erode the ruins. All were vertical holes between six and 12 feet deep and two inches in diameter.

"There is a lot of loose rock below the surface here at Bandelier," said Williams. "It seems that you only need to bore a hole into these areas and surface water drains away quite rapidly."

The first of the drainage holes melted was in a floor of a kiva, near the Rainbow House ruin, just off the main road entering Bandelier National Monument. The second

hole was bored in a room at the Rainbow House. The remaining three holes were melted in the center of the circular ruin Tyuonyi, one of the most popular sites at Bandelier.

Although the only evidence of the subterrene's presence in the kiva, and at the Rainbow House, is a small hole in the ground, the bores in the Tyuonyi ruin will not be visible. Three subterrene holes, close enough together to fit inside a 55-gallon drum, were melted in a shallow dugout, prepared by National Park Service personnel. "A

drum will be slipped over the group of holes," said Lin Jackson, NPS supervisor at the monument. "There will be openings in the sides of the drum to allow surface water to enter the drainage holes, but the top of the drum will be covered over with soil so the visitor will never see the holes in Tyuonyi's plaza.

"We haven't had any long-term experience yet, but the subterrene is doing something for which there has long been a need. It's portable, lightweight and almost motionless. It appears to be just the thing for some of our drainage problems."