

MAPPING THE CAVES OF THE HEADQUARTERS LAVA FLOW
LAVA BEDS NATIONAL MONUMENT, CALIFORNIA

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Knox and Gale (1959) have presented a summary of the geology and major cave features of Lava Beds National Monument, Siskiyou County, in northern California. Within the confines of the 75 square miles of the monument they reported the presence of 293 lava tube caves (of which 190 had been explored), with diameters up to 98 feet, lengths up to a mile, and a few with several levels, and/or year-round ice. Verification of this legendary number of 293 caves is needed. Most of this number probably represents segments of a comparatively few lava tube systems.

On a map of the monument (Knox and Gale, 1959) showing many cave locations (68 of which are named specifically), the greatest concentration is shown to occur on what is called the "cave loop road" at the Monument headquarters, in what I will call the "Headquarters Lava Flow." Here 16 named entrances occur on a part of the flow approximately one mile long and 1/2 mile broad.

Many of the caves along the cave loop road have been partially developed for visitors, with the installation of self-guiding trails, stairways, catwalks, ladders, and other unobtrusive constructions that minimally interfere with the natural state of the caves. Before 1963 the Monument supervisory personnel had neither maps nor sufficient knowledge of the extent of these caves that visitors were encouraged to explore. While a summer employee (student trainee, Park Naturalist) at the Monument in 1963 I presented a proposal to the administration to map these caves and it was accepted.

Approximately a month was spent making the surveys of the caves in the approximately 1/2 square mile cave loop road section of the Headquarters Flow. Notes on the methods of survey (using Brunton Pocket Transit and steel tape) are appropriate here. The survey of cave length began with the edge of the entrance, and did not include the collapse trench that preceded the entrance. However, when a cave was sectioned by a collapse at a point along its length, the length of the collapse trench was measured as the greatest distance parallel to the passage axis. The line of the survey axis was generally in the middle of the passage. Side passages and closures around pillars were tied into the nearest point on the survey axis, not to the nearest survey station. Thus, the following computed survey distances for the cave passages are minimal, and have not been inflated by any of the possible methods. The surveys are surprisingly accurate considering the legendary difficulty of making magnetic compass surveys in lava regions. One calculated error of closure was 2% (64 feet of error in 3,191 feet of surveyed loop in the Labyrinth section).

The following is an account of the name of the major segments of the system in the Headquarters Flow, followed by the surveyed length of underground and collapse trench passage, followed by the length of collapse trench passage in parenthesis, and then any existing auxiliary named entrances for the parts of the segments. Labyrinth Cave Section, 12,845 feet (1,310 feet). Indian Well, Devil's Mushpot, Lava Brook, Labyrinth, Thunderbolt, Golden Dome, Hopkins Chocolate Cup, Garden Bridges, and Blue Grotto. Most of the large amount of collapse trench reported above lies concentrated at one end of the system, in the Garden Bridges area. Hercules Leg - Juniper Caves Section, 4,419 feet. Catacombs Cave Section, 6,562 feet. It is interesting to note that an inscription at the entrance of this cave states that J. D. Howard and J. F. G. Cone surveyed 6,800 feet in 1920 and 1,495 feet in 1925 with instrument and chain. Their map is presumably lost. Sentinel Cave Section, 1,082 feet (70 feet). This cave contains an unsurveyed lower level in which I have seen at least 400 feet of additional passage. Paradise Alley - Ovis Caves Section, 1,920 feet (390 feet). Sunshine Cave Section, 466 feet.

Another cave, Crystal Cave, named because of the ice crystals it contains, lies in the Headquarters Flow. It was surveyed in 1961 by D. Smith, D. Tomer, R. Curl, W. Halliday, E. Hedlund, R. Wilt, J. McLean, M. Smith and A. I. Smith, to a total length of about 1,120 feet.

In summary, under only approximately 1/2 square mile of land surface of the Headquarters Lava Flow, there are 27,414 feet (5 1/4 miles) of surveyed lava tube caves and minor collapse trenches (a total of 1,770 feet of trench). Of this, five miles is open for human visitation. This system was probably continuous over the time span of its formation (less than 60,000 years ago), but now is broken into the seven above-named components through lava plugs, or extensive collapse trenches. The greatest length of tube not intersected or broken by a collapse has not been determined, but probably would be Catacombs Cave with 6,562 feet of passage.

The entire cave system of the Headquarters Flow is more extensive than here indicated. Several collapse trenches are visible in the flow on the topographic map upslope from the known caves. More caves could exist here. Downslope in the flow some ten additional caves are known but these are not generally open to the public, and have not been surveyed. Hence, when the Headquarters Flow is wholly explored and surveyed, it may rank as one of the world's largest concentrations of lava tubes, and most cavernous lava flows.

REFERENCE

Knox, Raymond G., and Gale, Richard R. 1959. The Land of the Burnt Out Fires, Lava Beds National Monument, California.

Bull. Nat. Speleological Soc., 21:55-66.

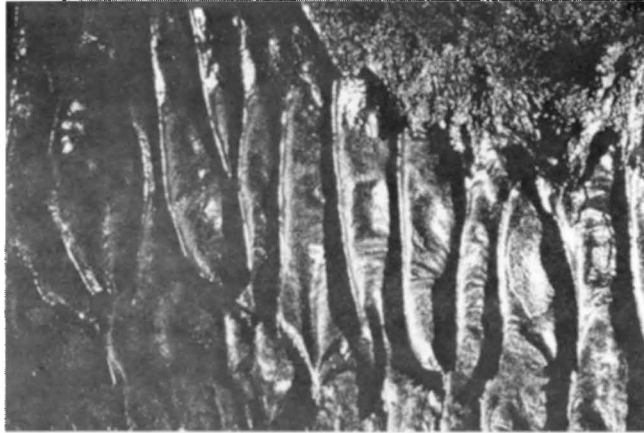


Figure 6-4: Ribbed wall in Golden Dome Cave.

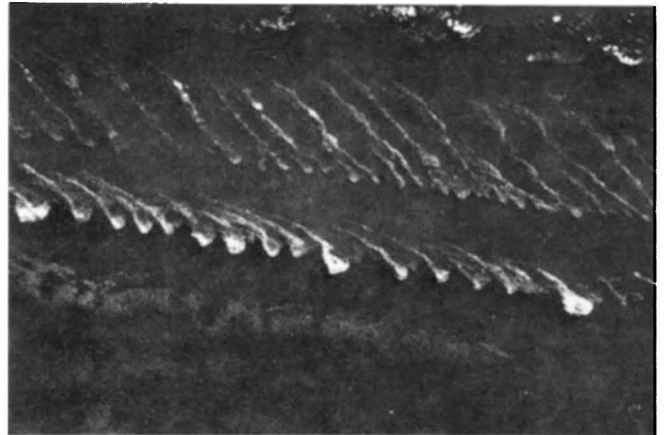


Figure 6-5: Features in Crystal Cave.



Figure 6-6: Ice speleothems on Crystal Cave.



Figure 6-7: Pictographs in Fern Cave.

Figure 6-1: LABYRINTH LAVA TUBE CAVE SYSTEM

LAVA BEDS NATIONAL MONUMENT

SISKIYOU COUNTY, CALIFORNIA

MAPPED BY THE NATIONAL PARK SERVICE JULY 22 - AUGUST 23, 1963

BRUNTON COMPASS & STEEL TAPE SURVEY BY:

STEWART PECK, STUDENT TRAINEE (PARK NATURALIST)

G. GILBERT SOPER, PARK RANGER (GENERAL)

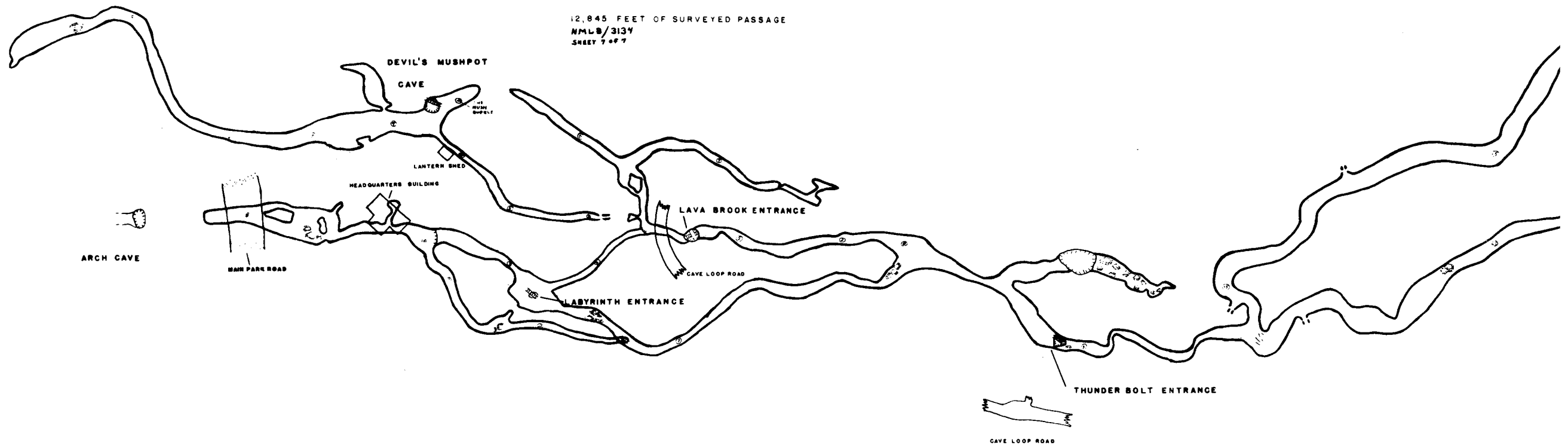
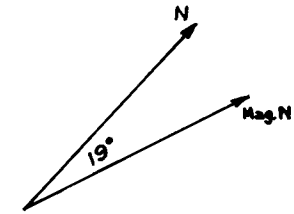
RONALD MODAFFERI, FIRE CONTROL AIDE

DRAFTSMAN: STEWART PECK

12,845 FEET OF SURVEYED PASSAGE

NMLB/3134

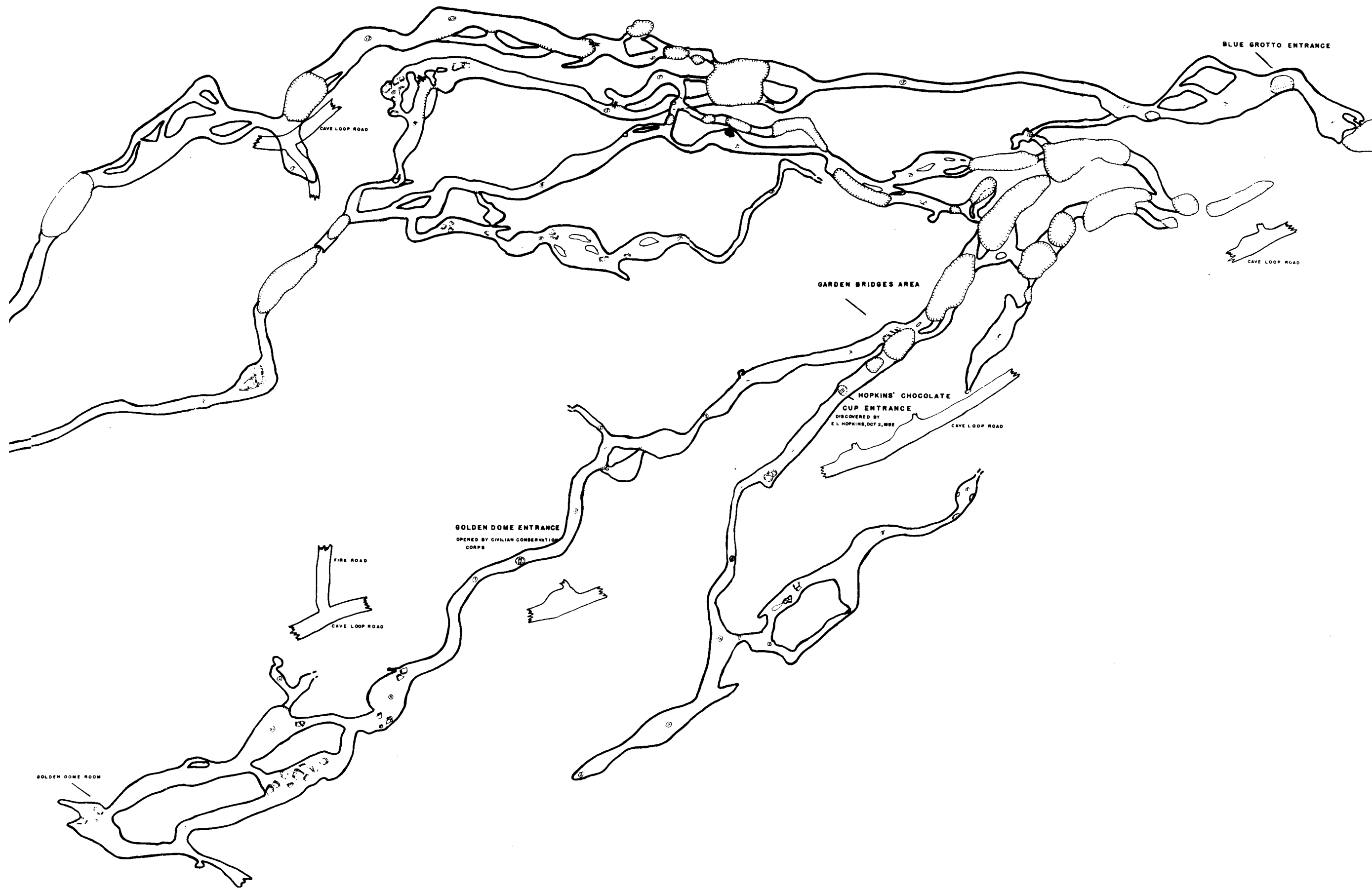
SHEET 7 OF 7



KEY

- PASSAGE CEILING COLLAPSE SINK
- PASSAGE ELEVATION CHANGE, HACHURES ARE DOWNSLOPE
- BREAKDOWN ROCK
- PASSAGE CEILING HEIGHT
- INDEFINITE PASSAGE TERMINATION
- STAIRS OR LADDER

NOTE; The map on foldout pages 22 and 23 is available in assembled form in a separate PDF file.



BLUE GROTTO ENTRANCE

CAVE LOOP ROAD

CAVE LOOP ROAD

GARDEN BRIDGES AREA

HOPKINS' CHOCOLATE
CUP ENTRANCE
DISCOVERED BY
E. L. HOPKINS, OCT 2, 1892

CAVE LOOP ROAD

GOLDEN DOME ENTRANCE
OPENED BY CIVILIAN CONSERVATION
CORPS

FIRE ROAD

CAVE LOOP ROAD

GOLDEN DOME ROOM

NOTE: The map on foldout page 24 and page 25 is available in assembled form in a separate PDF file.

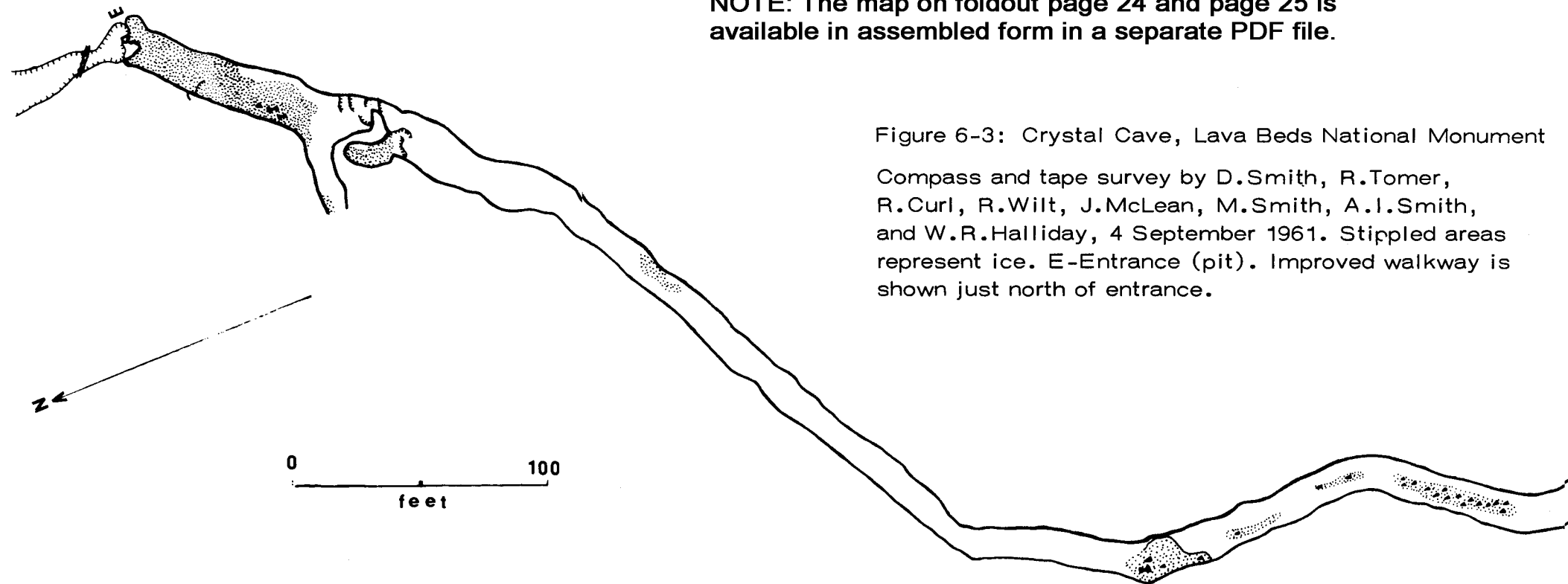
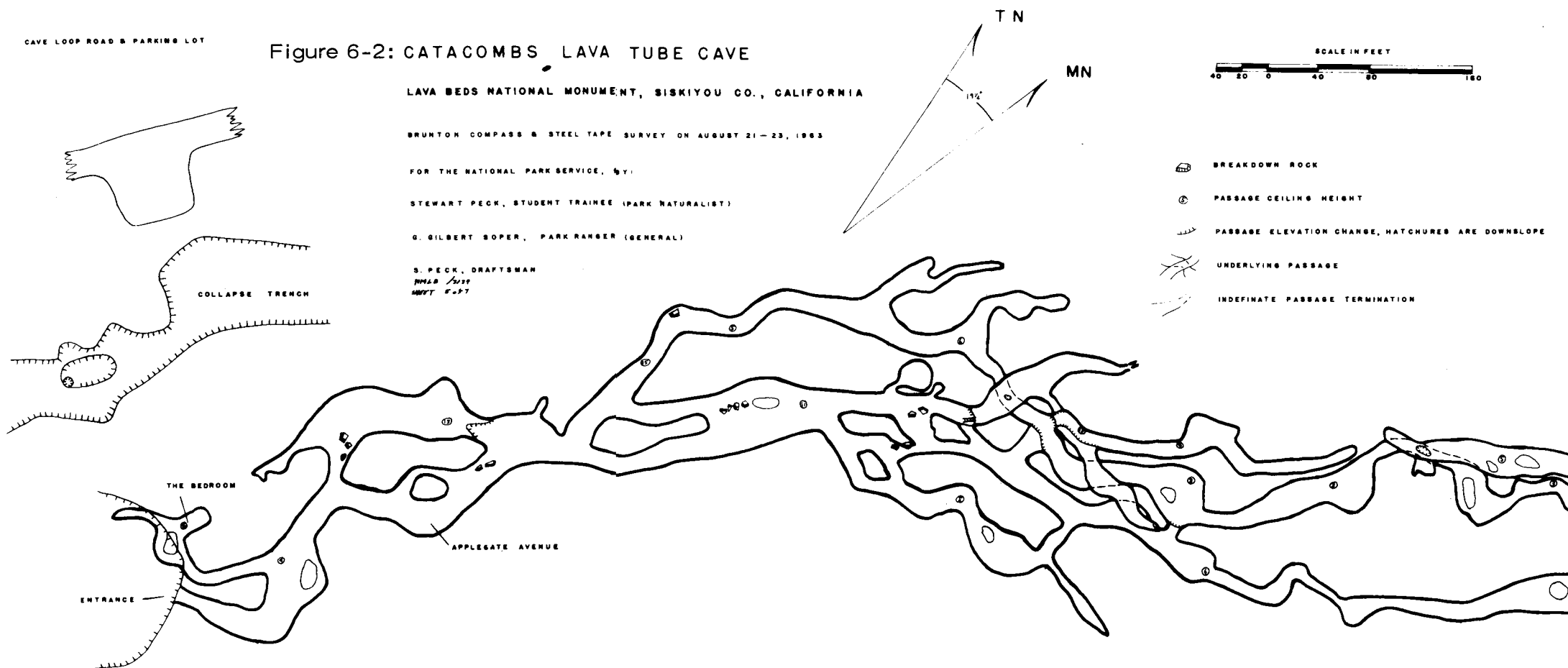
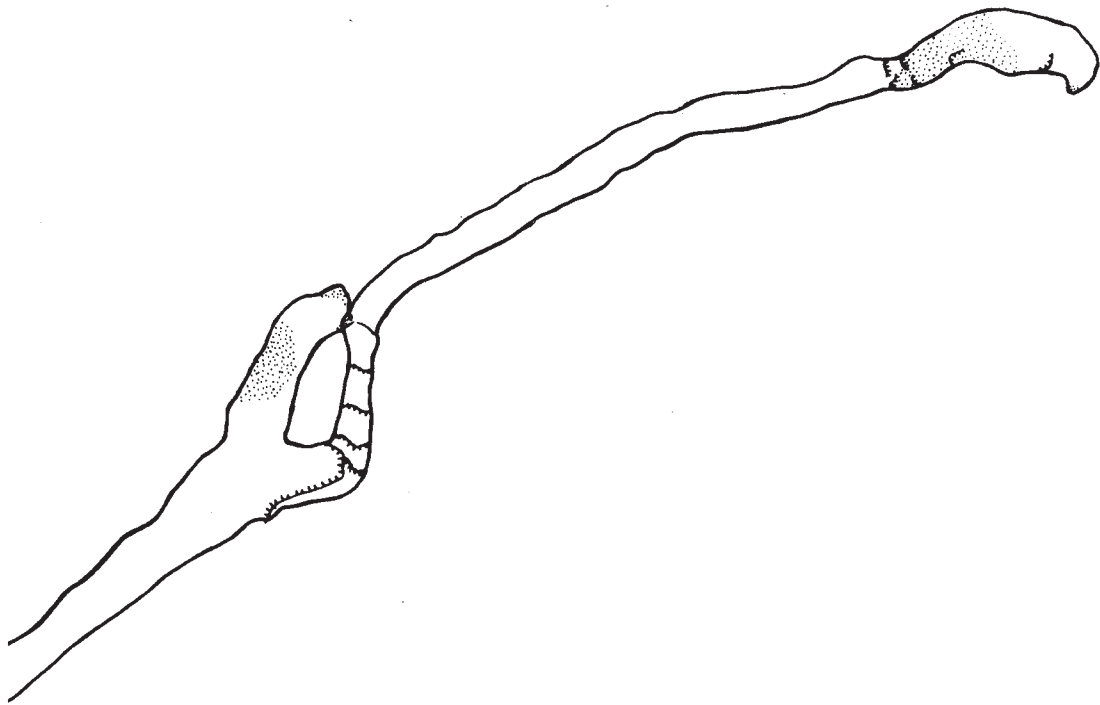


Figure 6-3: Crystal Cave, Lava Beds National Monument

Compass and tape survey by D. Smith, R. Tomer, R. Curl, R. Wilt, J. McLean, M. Smith, A. I. Smith, and W. R. Halliday, 4 September 1961. Stippled areas represent ice. E-Entrance (pit). Improved walkway is shown just north of entrance.





4502 FEET SURVEYED PASSAGE

DISCOVERED MARCH 2, 1918 BY J.D. HOWARD

J.D. HOWARD — J.F.S. CONE SURVEY: 6800' IN 1920 & 1495' IN 1925; MAP LOST

