

The Mount Hamilton Lava Caves

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The Mount Hamilton lava caves are among the most interesting in Victoria, if not in the world: they are the longest complete tunnel system, the most elaborate in plan, and they contain a wealth of well-preserved volcanic formations and mineral deposits.

The caves are situated on the southern flank of the extinct volcano, Mount Hamilton, at Nerrin Nerrin, about 30 miles west-south-west of Skipton and about 110 miles west of Melbourne.

To reach the caves from Nerrin Nerrin, pass the homestead and take a boundary track which runs anti-clockwise around the base of the mountain until a clump of trees on the southern flank is reached. These mark a closed depression, and the entrance to the caves is in open ground about 150 yards to the east. The entrance is a tight squeeze and involves a twelve-foot drop into the main chamber. Because of the lack of footholds near the bottom, a short length of rope is advisable, especially for the climb out. The wire netting and stones which block the hole should be replaced at the end of a visit. The entrance leads into a large collapse chamber floored with rockfall. This is in the middle of the system, and a number of passages lead from the chamber both uphill and down. The passages repeatedly branch, an unusual feature of lava caves that is far more common in Mount Hamilton Cave than in any other lava cave so far described.

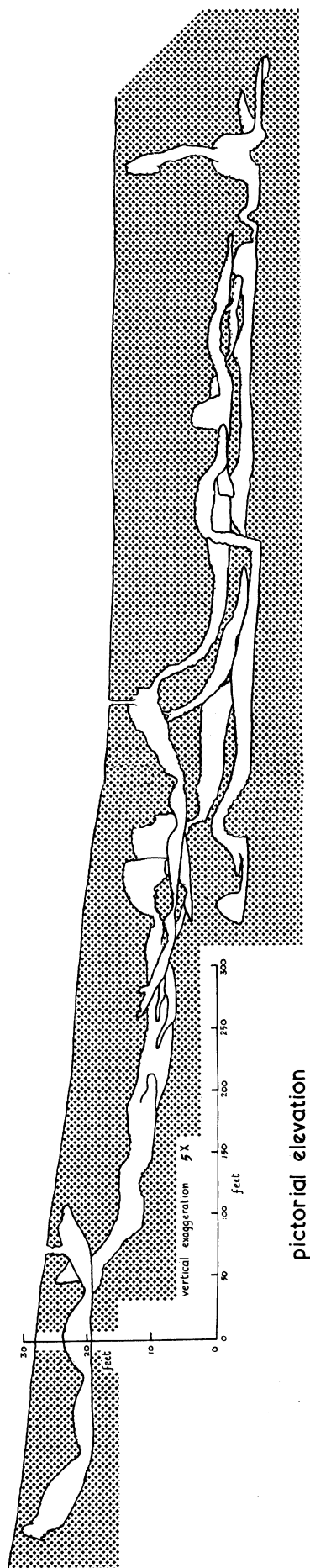
The aggregate length of all known passages in the system is 3162 feet and the total distance from the northernmost to the southernmost extremity is 1000 feet. The volume of air inside the cave is so large that a considerable draught blows out of the cave during the day and into it during the night.

The passages are typically tunnel shaped, and many are quite perfect in form with arched roofs up to 15 feet high, and smooth even floors up to 20 feet wide. The cross sectional shapes is generally semi-circular but becomes horseshoe-shaped in one of the western passages. Some are remarkably straight in plan, and the best follow straight courses with uniform cross section for about 50 yards. Others are more irregular, and the passages are often linked by larger chambers. Branching and anastomosing are encountered, and a very fine example of a bifurcation, with a column left between two tunnels, is seen in the small passage east of the entrance.

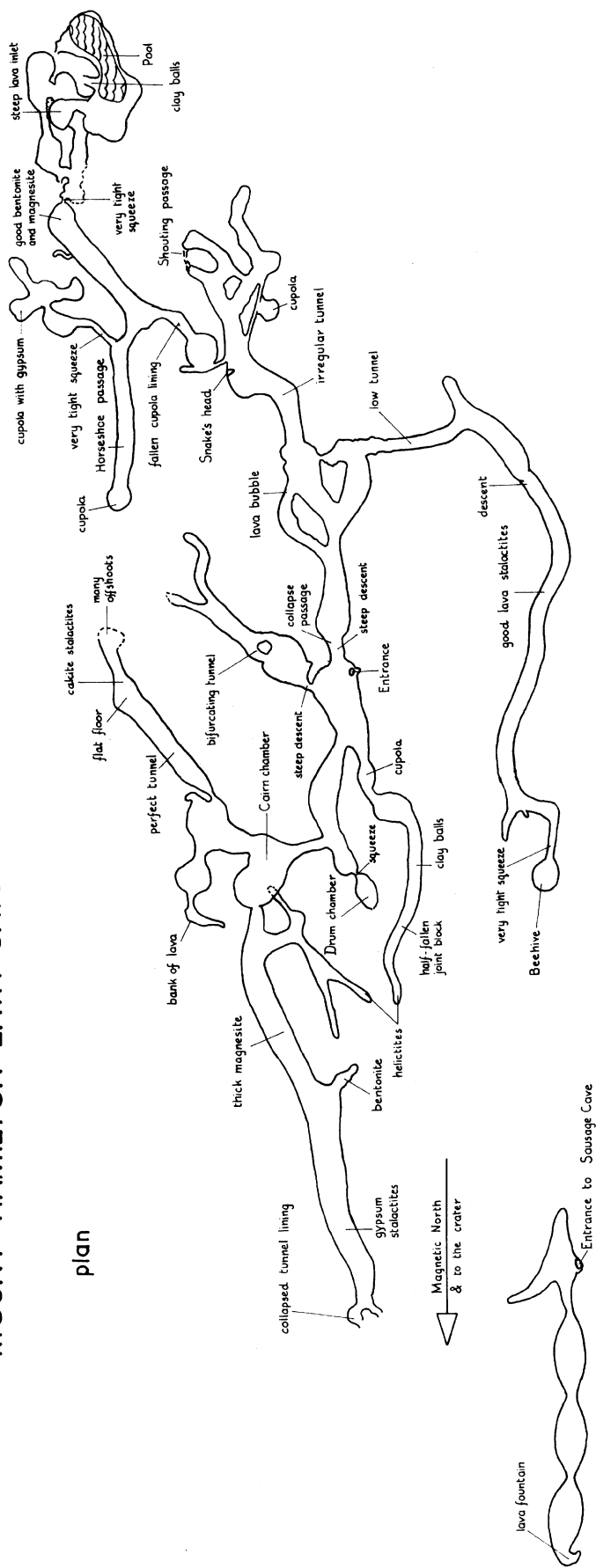
Some of the passages shown on the map are very low and can be negotiated only by slim people. The entrance to the Beehive is a good example and, incidentally, has a particularly rough lava floor to add to discomfort. Sometimes the passages expand upwards into domes or cupolas, which are frequently found at the end of passages but can also occur along their length. The Beehive is a very fine example, being about ten feet high, completely lined with an unbroken lava skin and almost circular in plan. The big chamber at the entrance is evidently due to collapse for, as seen in long section, the tunnels above and below appear to be continuous except for the floor of this chamber.

Small tributary tunnels join the main tunnel occasionally. These usually have a horizontal, lenticular cross-section and appear to have been squashed flat when they lost their lava, having been more circular when full. They usually extend for only a few feet, and sometimes there are vertical strands of lava joining the top and bottom surfaces, like treacle stretched between two pieces of bread.

Many of the tunnels have a lining of lava, which was left behind when most of the lava drained away. It was evidently still somewhat liquid, and dripped down to form lava stalactites. These are fairly abundant in many of the passages, and are of different sorts depending on the viscosity of the lava from which they formed. Some are broad and stumpy, others are frothy and irregular, but none are very long. The biggest lava stalactite so far reported from Mount Hamilton Cave is seven inches. The lining has sometimes pulled away from the wall of the tunnel. In one spot a large gas pocket was formed behind the lining and then burst, and the frothy flanges of the broken bubble are still perfectly



MOUNT HAMILTON LAVA CAVE



preserved. In another place the lining of a cupola has collapsed in one piece, and now rests like an inverted cup of lava on the floor.

The mode of formation of the caves is very complex and will be described in detail elsewhere, but in brief they originate by something like the following mechanism:

The caves were formed after the surface of a large lava flow from the crater cooled into solid rock. (At Mount Hamilton the surface is very smooth, so the lava was emitted in large liquid sheets, not as viscous individual lobes as often happens.) Beneath the surface crust the lava was slower to cool, and so remained liquid for longer. When most of this lava had reached a viscous or plastic stage the remaining liquid lava became segregated in domes and cylinders. Then there was a breach in the lava crust, and the liquid lava ran out leaving voids or gas-filled chambers behind. For some reason they were not completely drained but remained partly full of lava at the end, so they have semi-circular cross sections. Since their formation there has been some rockfall, especially in the larger chambers, and there is an accumulation of rockfall debris on some of the floors.

Other interesting features of the cave are of non-volcanic origin. Gypsum crystals occasionally line roofs and walls, and it is probable that they were once far more plentiful than nowadays, for the best examples are only found in remoter passages. The gypsum is usually in the form of curved, tusk-like crystals, and in a few places there are beautiful delicate helictites of gypsum, with branching spiral form, which grow up to five inches long. It is to be hoped that future visitors will not collect or destroy these splendid formations, which, as far as Victoria is concerned at least, are unique to the Mount Hamilton Cave.

A few rather poor specimens of calcite stalactites are also found, mostly in the northern passages.

Rock salt is encrusted on the roofs of at least one passage, but the exact location of this mineral in the cave has been lost.

Many of the floors have a covering of clay, and in parts there is an abundance of beautiful specimens of a brown variety of bentonite, probably a type of nontronite. This occurs as small blocks, with very shiny surfaces revealing many parallel layers of clay, looking like highly polished



View of Pool Chamber at Mount Hamilton, showing lava stalactites and water. Photo: N. A. Wakefield.

wood. Bentonite, derived from weathering basalt, has a remarkable power to absorb water, which causes it to expand. If specimens from the cave are very gently heated to drive off water, cooled and then placed in water, they absorb water so fast that the blocks break up into small flakes with quite audible cracking sounds. The best specimens of bentonite are found at the end of the passage just north of the squeeze to Pool Chamber.

Many of the clay floors sound hollow, as in Drum Chamber, which is named from the noise made by kicking the floor. Possibly the shrinking clay causes hollow spaces below the floor. In other places, as near the pool, the clay takes the form of clay balls which range from marble to cricket ball size, and may completely cover the floor.

In a few localities there are irregular deposits of white earthy material within the clay, which consist of magnesite, another mineral resulting from the weathering of basalt. Again, the best specimens come from near the squeeze north of Pool Chamber.

The cave has evidently been a death trap for many animals, and bones are quite common in some passages, especially south of the entrance. These include remains of several species no longer surviving in Victoria, and they will be described in a separate article.

North of the main cave is a smaller separate one, called Upper Mount Hamilton Cave, or Sausage Cave (because of its shape). Apart from a short broad branch near the entrance, it consists of a single straight cave running uphill. It is constricted both laterally and vertically in several places, so that there are narrow squeezes between several easy sections. At the top end the cave finishes in a chamber about ten feet high, with a small but impressive lava fountain where lava formerly entered the tunnel. The roof here is irregular and gives the impression of being very close to the surface, and gypsum helictites are fairly abundant.

Finally, visitors to Mount Hamilton may like to add extra interest by climbing the slopes up to the crater itself, one of the best in Victoria. The whole system is one of the most notable features on this third largest lava plain in the world.

ACKNOWLEDGEMENTS

Thanks are due to members of the Victorian Cave Exploration Society for help in exploring and surveying the caves, and to Mr. W. Collins, manager of the Mount Hamilton Property for his generous hospitality.

NOTES ON THE SURVEY

The cave was surveyed by prismatic compass, reinforced linen tape and abney level. Pool Chamber and Beehive Passage were surveyed by C. D. Ollier and K. W. W. Double, and the rest of the cave was surveyed by C. D. Ollier, P. Mathews and J. Noonan. The survey was plotted by C. D. Ollier and P. Mathews.

Plotting of caves presents difficulties because the width is variable and a floor level plan would not be the same as a roof level plan. The same problem is present with the cave profile, for the maximum height is not always in the centre of the passage, and might be considerably different from the average height. The map therefore shows accurate lengths and directions, but heights and widths are necessarily rather subjective. The pictorial elevation shows the passages as seen from the west, projected on to a north-south vertical plane. Some of the eastern passages are therefore hidden behind the western ones which are in front.