

## THE CRYSTAL ICE CAVES LAVA FIELD

This tiny lava field contains a surprising variety of volcanic features, only a few of which will be mentioned here. The map shows the entire field and the nearby edge of the Wapi Lava Field. Many of the more interesting and prominent features are named. The Great Rift bisects the field and disappears under the north edge of the Wapi Field. Notice that a secondary system of fissures occurs about 1,700 feet on each side of the main rift. There is no evidence that any lava flowed from these secondary fissures.

A brief study of the Crystal Ice Caves reveals an interesting sequence of volcanic events. The first lavas from the rift flowed over a soil layer. This soil is exposed in the King's Bowl and can be examined close-up at the entrance of the Caves. Here, completely burned blades of grass are conspicuously visible on the bottom of the first flow. Also, roots found in the soil can be radiocarbon dated. This will tell the age of the lava flows and the caves. No other carbon material has ever been discovered under any of the recent lava fields of the Snake River Plain, thus the obvious importance of this find.

After the original outburst of lava took place, a withdrawal followed and the lava surface in the rift receded to a depth of at least several hundred feet. This pattern was repeated over and over again throughout the entire molten phase of the eruption. This fluctuation formed what is known as a composite dike. The dike can be seen by visitors as it is all through the caves. Each vertical layer on one side of the center of the dike has a corresponding layer on the other side. Each one of these sets represents one eruption. Therefore, the number of times the lava fluctuated up and down at any one place can be counted.

The width of the dike at the Crystal Ice Caves is about six feet-- the distance between the two walls of the Great Rift.

The way in which the caves were formed is not completely understood. The following brief account sums up the essential events.

When the molten phase of the eruption ended, the lava receded again in the rift to a depth well below the water table, which is almost 800 feet. This left large openings in the rift both above and below the water table. Water is abundant under the Snake River Plain which is one of the world's great squifers. When this water began to encroach upon the cooling rift, great quantities of steam were generated. The flowing back of lava at the surface had partially blocked the top of the rift, and the outrushing steam was greatly restricted.

This resulted in a tremendous build-up of pressure within the rift. Finally, the surface rock gave way and the gigantic explosion which followed scattered rock over a wide area. The King's Bowl was formed by this explosion. It is located at one of the two focal points of the explosion.

The other, Hades, is one and three-fourths miles to the north and consists of a series of deep pits. All of the fine debris from Hades and the King's Bowl areas was deposited on the east side of the rift by what must have been a strong westerly wind. The lavas to the east of the King's Bowl are covered to a depth of four feet. This explosion must have left the caves in approximately the form we see them in today. Most of the changes since then have probably been caused by ice.

### Why Ice?

Cold air entering the Crystal Ice Caves through natural openings in the winter chills the air and rock, even in the deepest chambers. Water entering these chambers freezes.

In the summer, the warm, light, outside air tends to float on top of the colder, heavy air in the caves. Mixing of the warmer air with colder air is relatively slight. This is the reason ice caves are referred to as cold air traps.

When slight warming does occur, some of the ice melts, and in so doing absorbs heat. This has the effect of keeping the caves at the freezing point all summer.

The ice and water in the caves are a great stabilizing factor in keeping the temperature near 0° C. (32° F.) all year around. They absorb heat all summer, and give off heat all winter.