

What Caused This Hole?

Crater or Cavern?

By JESSE GREEN

ABOUT 2½ MILES SOUTHWEST of the town of Armington, situated 26 miles southeast of Great Falls is a cylindrical hole in the earth approximately 156 feet in diameter and 120 feet deep. It is known locally as the "Meteor Crater," but careful examination of the surroundings shows no evidence of a meteor having fallen here. Furthermore a meteor would have driven a sloping hole, while this one is vertical.

There are no indications of the action of water in or around the hole. In the bottom are the remains of buffalo, which presumably Indians had driven in for slaughter.

Likely Explanation

A most likely explanation is that the hole was caused by the earth caving into a cavern below. The rocks on the surface and for an unknown depth are sandstone. The hole is in a formation consisting of massive sandstone layers. However, it is known that a limestone stratum extends under the entire region along Belt creek. At this point it is very deep and covered with sandstone.

Subterranean caverns always occur in limestone, and it is believed that one exists here. Water passes through lime, and by the action of a slight acidity due to dissolved carbon dioxide, the lime rock is dissolved away. Great open spaces are thus formed in lime formations, which we call caverns.

In this particular case it is probable that a large room was dissolved out of the rock just below the hole indicated at "A" in the drawing. The roof of the room was so large that it would not support the weight of the rock above, which fell in, making the pile of rock at "B" in the drawing.

Mining Method

The process in nature is exactly similar to the process in mining known as the "block and cave method," in which the miner works out a large block or room, removes the timbers, and without drilling or blasting, even solid rock in the roof falls in because of the weight above. In this case a stream of water was the miner, washing out a great room, the roof of which could not stand the strain of the weight above, and gave way, causing a hole, the "Meteor hole."

The drawing illustrates the possibility of the cavern running east and west at right angles to Belt creek. However, this is purely speculative. In this case an existing Spring creek at a much higher elevation at the west perhaps has worked down through the lime strata into Belt creek and dissolved out the cavern.

Another good possibility is that the cavern was dissolved out by Belt creek. In that case the cavern would run north and south, more or less, parallel to the present site of Belt creek.

Some of these facts will develop with continued study of the problem. An ambitious explorer, who may be just a boy, may sometime find an entrance to the cavern. In making the search any small hole in the earth should be examined.

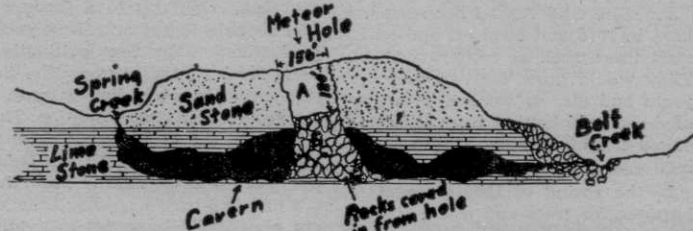
The hole should be tested for the movement of air, either in or out. This can be done with a lighted match or with the smoke of a cigaret.

The draft from a cavern will be either in or out, depending upon the difference in atmospheric pressure in the cavern and on the outside.

Test Would Be Easy

If there were enough incentive the cavern could easily be located by drilling at a little slope in the outer edge at the bottom of the meteor hole, that is, by giving the drill enough slope to miss the pile of rocks below "B" in the cavern. The depth to be drilled is not evident, and may be a considerable distance. It may be expected, however, that the height of the room in the cavern is somewhat less than the depth of the meteor hole "A." As the material in the hole fell into the room it spread out as in the column "B," which would not have a total height equal to the depth of the hole.

The cavern is on the ranch prop-



This drawing illustrates how a limestone cavern beneath the "craier" might have caused the "meteor hole."

Connoisseurs Declare

Montana Endives Superior To Imported Varieties

By ALICE M. WOODY

FOUR ACRES OF FRENCH endive growing and flourishing in Montana soil are seen in the Van Aken gardens near Whitefish, where natives of Holland are engaged in its production.

This acreage was seeded in May, four rows being seeded at one time. Preparation of the ground is the same as for carrots or other root vegetables, with some manure and some commercial fertilizer being used. The ground is cultivated every week or

10 days with a four row cultivator.

An overhead sprinkling system is used about every 10 days, the water being pumped from the Flathead river. The expense for this irrigation comes to about \$117 a year.

Endives make a full, leafy growth from 1½ to 2 feet high. Some of the finest of the plants are kept for seed, which was formerly imported from Belgium.

Growth Forced in Cellars

In September the endives are plowed up and the leafy tops cut off about an inch from the stock. The leaves are plowed under for fertilizer and the roots are taken to cellars or forcing houses where they are planted close together in beds, and covered to a depth of about 8 inches with fine, black soil.

Only part of the roots are planted at this time, the rest being placed in crates made of slats and kept in the cellars to be planted later when replacements are necessary in the beds. The temperature is kept at 60 to 55 degrees.

In four or five weeks the endives are ready to be cut from the roots and prepared for shipment. The roots, which are very bitter, are fed to livestock. The endives are cleaned and packed in 5-pound boxes and refrigerated before shipment.

Pete Van Aken, who is carrying on the business started by his father, the late Herman Van Aken, says his biggest markets are in San Francisco and Los Angeles, though he ships to Chicago, St. Louis, Cincinnati, Minneapolis and St. Paul and other



(Photos Courtesy of Times-Monitor, Kallispell.) Cleaning and packing endive for shipment. Seated are Mrs. Theresa Drent, a recent arrival from Holland, and Herman Raiber. In the background is Mrs. Herman Raiber, mother of Pete Van Aken.



—Photos by Jesse Green

Is this a "meteor crater?" The author has another theory for the cause of this hole or depression located near Armington.

erty belonging to Mr. Sam Yaklich who has resided there for many years. The writer has conferred with Mr. Yaklich, and also wishes to give credit for help on this problem to Mr. Floyd Cranston of the Belt high school, and especially to Mr. A. H. McDonald of Armington.

Other holes caused in the way described in this article probably exist in other parts of the state.

places in the west.

The Van Aken's feel they cannot compete with the eastern markets as they are supplied directly from Belgium with expressage of only 1 cent per pound compared with 12 cents per pound from Montana to New York. Also, they have markets for all they can raise.

Average 45 Cents

Most of the product is sold through jobbers, but many private orders are received, especially for Christmas gifts. The Great Northern Railway Co. has a standing order for endive for their dining cars. The price averages 45 cents per pound F. O. B. Whitefish.

The marketing time for French endive is from November and December to about the first of June. Endives when ready for market are about 8 inches long and about 1½ inches at the base, cone shaped, and creamy white with closely folded leaves.

Connoisseurs who have eaten the imported endives and the Montana grown have a decided preference for the Montana product.

It is said there are only five or six places in the United States where French endive is grown, and Whitefish, Mont., is one of them.

Conservation Tour Set June 18-24

EASTERN MONTANA land and water conservation practices will be studied at first hand June 18-24 during the Montana Conservation caravan, sponsored by the Montana Conservation council. A chartered bus will take community minded leaders and citizens of the state on the tour of resource management problems in this area.

On the 6-day tour schedule beginning Monday, June 19, are stops at the U. S. Range Experiment station, Fort Keogh; Custer national forest; Medicine Lake bird refuge; Fort Peck Indian reservation; Fort Peck dam; Nashua diversion dam and Buffalo Rapids irrigation project. Observations will also be made of dryland and irrigated farming as well as range management practices along the entire route through this 11-county area of eastern Montana.



Gathering endives from a cellar forcing bed.