

For the temperature of the air in the cavern the following factors are, in general, of decisive importance: (1) When the temperature of the air outside is less than that of the cavern, the external colder and heavier air flows down into the cavern; (2) when the external air is being pushed into the cavern by the wind through the entrance and in much smaller measure through the narrow clefts in the rocks of the mountain; (3) the air which has come into the cavern, when above 0° C., melts the ice in the cavern, whereby it cools down and is only partly active in increasing the temperature of the cavern; (4) the rocky walls of the cavern, cooled to a considerable depth during winter, are acting against the warming of the cavern through the intruding external air during summer.

On the days when the external temperature is less than that of the air in the cavern, a well-pronounced and regular diurnal change of temperature could be observed, the range of which is 0.37° C., mean of the months October–April, and the range in the cavern is, in general, proportional to the range outside; on the days when the air outside is warmer than that in the cavern, this diurnal range is only 0.02° C. The rôle of the temperature differences between cavern and external air can not strictly be separated from the factor (3) of the temperature variation of the cavern, mentioned above, because a positive temperature difference between cavern and external air—the difference taken in the sense cavern-external air—is in general connected with a temperature of the intruding air below 0° C., and a negative difference with an external temperature above 0° C.

The hygrograph in summer invariably traces a straight line; the air in the cavern is saturated. At this time also the temperature of the cavern is almost invariable. The heat of the intruding air is chiefly employed in melting ice, and by the vapor of the ice water the air becomes saturated. In winter, on the contrary, the hygrograph sometimes registers considerable change of the relative humidity and in this respect the following regular features could be stated: When the temperature of the air in the cavern is less than that of the external air, the air in the cavern is saturated or very nearly so; when the temperature in the cavern is higher than outside, the relative humidity decreases and varies according to the amount of vapor contained in the intruding air as long as the temperature of the air in the

cavern has remained less than that of the air outside; at this moment the relative humidity begins to increase and by and by augments until the state of saturation is reached. From the days in the winter half year, on which the temperature in the cavern is higher than outside, the following diurnal change of the relative humidity could be determined:

		A. M.							
Hour.....		2	4	6	8	10	12		
Per cent.....		+0.23	+0.25	+0.27	+0.24	+0.20	-0.08		

  

		P. M.						Mean.	Range.
Hour.....		2	4	6	8	10	12		
Per cent.....		-0.42	-0.48	-0.32	-0.15	+0.06	+0.19	88.79	0.75

The conditions which determine the change of temperature in the cavern are also decisive for the change of the relative humidity.

SEVERE HAILSTORM NEAR WEST CHESTER, PA.<sup>1</sup>

On August 31, 1922, there occurred near West Chester, Pa., a hailstorm of remarkable intensity.

It was reported to this office by Mr. J. T. Brosius, superintendent of the Philadelphia & West Chester Traction Co., from which we quote as follows:

"At 7:30 p. m., about three hours after the storm had ceased, I left the Fair Grounds for Philadelphia. When about 3 miles out I noticed that some fields were still almost entirely covered with hail, which was blown or washed into ridges several inches deep. On the south side of the road there was a bank about 70 feet long with a maximum depth estimated at 3 feet. I had it measured at 10:00 a. m. of the following day and found a maximum depth of 26 inches."

"On September 1, I was informed that there was a great amount of hail washed into the flat part of a field about a quarter of a mile south of West Chester road. I went there about noon, 20 hours after the storm, and found more than an acre of ground entirely covered with hail from a depth of a few inches to more than 2 feet by actual measurement. The average depth was about 1 foot."

<sup>1</sup> Communicated by Geo. H. Bliss, meteorologist, Philadelphia, Pa.