

THE DUSTFALL OF NOVEMBER 13, 1933

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From the west on Monday, November 13, 1933, came strong westerly winds laden with dust which covered the city of Buffalo with a noticeable coating of grit. Fortunately, the city at the time was covered with several inches of snow. The writer collected a shovelful, taking only the top few inches so as to avoid possible contamination. The snow was melted, the resulting liquid filtered, and the residue dried. This was mounted in Canada balsam. Examination under polarized light showed that the grit was composed of mineral and organic matter, the following being identified:

1. Volcanic ash; 2. Quartz; 3. Feldspars (orthoclase, microcline, plagioclase); 4. Hornblende; 5. Tourmaline; 6. Zircon; 7. Mica; 8. Diatom tests; 9. Spores and pollen grains; 10. Plant hairs.

The dust particles varied in size from .005 to .5 mm.; the average of 80% of the whole sample examined being somewhat less than .02 mm. in size. While most of the particles were angular to subangular, several very tiny grains, too small to identify positively, but birefringent under crossed nicols, were distinctly rounded or subrounded. Since they showed abnormal blue interference colors, they may have been zoisite or vesuvianite.

The volcanic glass, in transmitted light showed the presence of two varieties. One colorless, containing inclusions which may have been either liquid or gaseous, and a black variety, suggestive of basaltic glass. The hornblende was light green in color, faintly pleochroic, and possessing well defined prismatic cleavage. Several euhedral grains of tourmaline were seen. The pleochroism of this mineral varied. In some grains it was brown and in others, blue. All the zircon crystals possessed prismatic and pyramidal faces and were colorless. The few flakes of mica present were, for the most part, muscovite, although several green flakes were seen, suggesting some variety of biotite. The feldspars were unaltered and were angular to subangular in appearance.

The quantity of organic matter present in the sample was large, estimated at 10-20% of the entire mass. About a dozen different species of diatom tests were identified. The spores and pollen grains varied in form and number. Some were smooth, others irregular, rough, or spinous. They possessed a variety of shapes, ranging from spheres to oblong and ovate bodies. Mrs. Imogene Robertson, as-

sistant curator of biology, at the Buffalo Museum of Science, kindly differentiated the organic matter for the writer.

It is interesting to note in this connection, that Winchell and Miller,<sup>1</sup> in a study of the dust particles of the dustfall which occurred over Wisconsin in 1918—found that the material consisted mainly of unaltered feldspar, quartz, minor amounts of accessory minerals, and some organic matter. Tests of diatoms were also recorded. Twenhofel<sup>2</sup> suggested that the place of origin of this dust was the semi-arid region of New Mexico, Arizona, and adjacent states. The assemblage of organic and inorganic matter found in the Buffalo grit is likewise characteristic for the most part of dried up playa lakes, ponds, or floodplain areas.

As to the probable source of this material, a consideration of the weather maps was deemed advisable. Mr. J. Patterson, meteorologist for the Toronto Weather Bureau, kindly forwarded complete weather data showing the place of origin of the storm and the trend that it subsequently followed. The low pressure area originated in Alaska, moved southeastward to British Columbia, and then turned east, the center of the low pressure area keeping to the north of the International boundary. Dust however, was reported as far south as the Carolinas on the same day that it fell in Buffalo, New York.

An article in the New York Times, Jan. 7, 1934; states that a dustfall occurred at Montreal on Dec. 17, 1933. Geologists at McGill University considered the dust to be a volcanic ash, consisting mainly of quartz, feldspar, and mica.

The writer believes that the Buffalo dust originated in Alaska, to account for the presence of volcanic glass. However, as the storm progressed across Canada and the United States; large quantities of grit were picked up, as in the Dakotas for example, and added to that derived from the far north. The dust that fell in western New York State therefore probably represents a mixture of materials derived from widely scattered sources in the west and northwest.<sup>3</sup>

<sup>1</sup> Winchell, A. N., and Miller, E., The Dustfall of March 9, 1918: *Am. Jour. Sci.*, vol. 46, pp. 600-603, 1918.

<sup>2</sup> Twenhofel, W. H., *Treatise on Sedimentation*: Williams and Wilkins Co., p. 68, 1932.

<sup>3</sup> Watson, E. H., Note on the Dust Storm of November 13, 1933: *Science*, vol. 79, No. 2049, p. 320, 1934.