

Occurrence of Elaterite, or Elastic Bitumen, in a Fluorite Vein at Madoc, Ontario.

By CYRIL W. KNIGHT.

The attention of the Ontario Bureau of Mines having been called to the occurrence of a peculiar bituminous substance in the fluorite vein of the Canadian Industrial Minerals, Limited, at Madoc, Hastings County, Ontario, the writer spent a short time in the early part of May, 1919, examining the deposit. Mr. R. C. Bryden, manager of the company, very kindly took the writer through the mine, and pointed out the location of the material. Specimens were collected and forwarded to Ledoux and Company of New York, and the material was determined to be "elastic bitumen," or "elaterite." Elaterite has not previously been found in the Province of Ontario, and its occurrence is not mentioned in Johnston's "List of Canadian Mineral Occurrences" published by the Geological Survey of Canada.

The fluorite veins at Madoc have been known for many years. They contain, in addition to fluorite, the minerals barite and calcite. It was only during the Great War that they were worked to any large extent. Mr. T. F. Sutherland describes sixteen properties around Madoc in which fluorite is found.† The deposits are also described in this Journal for June 15th, 1918, and in the Twenty-Second Report of the Ontario Bureau of Mines, Part II.

The veins intersect granites, schists, crystalline limestones and other rocks of pre-Cambrian age, and also fossiliferous limestones of Black River (Paleozoic) age. The deposit owned by the Canadian Industrial Minerals, Limited, occurs in a red and grey granite and has been worked to a depth of 200 feet. The elaterite was found on the 200-foot level, and was seen at the time of examination to occur sparingly—less than half a pound altogether—for several feet along the vein where the latter is two or three feet wide. It is not found in economic quantities. It has a dark brown color and occurs in vugs in the vein material. In the specimens collected these vugs are from a fraction of an inch to one or two inches in length and fractions of an inch in width. It was reported by Mr. Bryden that larger masses of the material had been found.

The description of the identification of elaterite by Ledoux and Company is given below:

"After superficial examination of the sample of bituminous substance associated with fluorite, barite, calcite minerals referred to in your favor of May 10th, 1919, especially with regard to the manner in which it melts and burns and the action of organic solvents upon it, we have little hesitation in expressing the opinion that it is elaterite, known also as mineral caoutchouc or elastic bitumen.

"Elaterite and similar bitumens are subject to change in composition due, in part, to more or less oxidation. There are a number of closely related compounds which have been given different names by

different observers. The original mineral appears to be an unoxxygenated hydrocarbon containing 86 per cent. of carbon and 13 to 14 hydrogen.

"The only way to positively identify the compound would be by ultimate analysis, but the sample submitted is insufficient for this purpose; at least, it is impossible to separate enough of the hydrocarbon perfectly free from the associated inorganic minerals to obtain an accurate analysis. We do not believe it is necessary to go to the considerable expense of ultimate analysis for the purpose of classification, since, if the mineral is not elaterite, it is at least something very close to it, and, furthermore, such authorities as there are on these minerals differ as to the composition.

"We would also call your attention to the fact that the bitumen in the sample is not uniform, part of it being more or less sticky and fluid, while the rest is of the consistency of crude rubber. This variation in consistency (and also in composition) is noted in Dana's Mineralogy."

It may be added that Mr. R. C. Bryden told the writer that he considered the material to be elaterite. This was before the sample was forwarded by the Ontario Bureau of Mines to Ledoux and Company for definite identification.

The origin of the elaterite in the fluorite vein is obscure. It may have been deposited at the same time as the fluorite, calcite and barite which now compose the deposit. If this is true, then possibly the elaterite may have had a volcanic origin, since fluorite is often considered to have been deposited from gases and vapours given off by igneous rocks. There are, however, no known igneous rocks cutting the Paleozoic beds between Madoc and Lake Ontario.

Another suggestion as to the origin of the elaterite is that the material descended into the vein from pools of oil which might have been present at some time prior to erosion in the overlying beds of Paleozoic limestones.

Whatever may be the origin of the material it is interesting to speculate as to the possible occurrence of a large vein of the material in the Madoc area, hidden somewhere in a valley or other depression. South-eastern Ontario has produced an amazing variety of minerals, some of them in paying quantities, such as talc, fluorspar, feldspar, graphite, mica, iron pyrites and other minerals. Perhaps the region has in store another surprise in the form of workable deposits of elaterite, or some other closely related hydrocarbon.

It is worth while recalling in this connection the deposit of the hydrocarbon known as albertite, which was found in New Brunswick many years ago. The occurrence is described by Frederick G. Clapp in a publication (No. 291, Vol. 2, page 59) of the Department of Mines, Ottawa, as follows:

"In 1849 Dr. A. Gesner discovered on Frederick brook near the present site of the Albert mines, a vein or bed of a bright, jet-black, shiny mineral, after-

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†Ont. Bur. Mines, Vol. 27, 1918, pp. 136-138.