

Canadian Graphite.

BY H. P. H. BRUMELL.

Notwithstanding the present activity of mining in the Provinces of Ontario and Quebec, but little seems to be known of the extent and richness of the ores of graphite, the value of the industry or the variety of uses to which the mineral is put. Without going into details it may be stated that by far the most important use of graphite is in the steel, copper and copper-alloy industries as a refractory material in making crucibles, retorts, muffles, boxes, stirrers, etc. Other important uses are for lubricating, foundry facings, stove-polish, paints, electrotyping and pencils.

The two well-defined trade divisions of this mineral are "amorphous" graphite and "crystalline" graphite. The former is usually of lower grade and more suitable for facings, paint, pipe-joint grease and stove-polish, although the better qualities, particularly from Bavaria and Mexico, are used also in the manufacture of pencils and electrotyping, while for crucible making, lubrication, high grade stove-polish and electrotyping, the purer or crystalline variety is generally necessary. The principal source of supply of crystalline graphite is the Island of Ceylon, from whence the ore is shipped in its crude form, after being sorted and sized, the grades being "lump," "chip," "dust" and "sweepings." The first two sizes form the bulk of the output used by crucible makers, while the "dust" and the "sweepings" are utilized for lubrication stock.

Amorphous graphite is found principally in Nova Scotia and New Brunswick, where it occurs as graphitic shale and clay. The most important deposits are those in the vicinity of St. John, N.B., others of lesser note occurring in Kings and Westmoreland Counties, N.B., and at Lochaber, N.S. In Ontario several deposits of amorphous graphite have been found in Haliburton and Hastings Counties, while in Brougham Township, Renfrew County, a very extensive deposit occurs, having associated with it a considerable proportion of flake or crystalline graphite. This property is being operated by the Ontario Graphite Company, which has lately installed an expensive plant, and is now refining and shipping the product.

The largest known deposits of crystalline graphite are in the Counties of Ottawa and Argenteuil, Quebec. Smaller deposits occur in Lanark, Leeds and Frontenac Counties, Ontario. Of this quality there are two distinct classes of ore, "lump" and "disseminated," the former usually occurring in limestone, as nodules, or filling pockets and small veins. There are also many minor occurrences where the lump ore constitutes small veins in diorite or other igneous rocks. As yet no discovery of lump has warranted systematic mining. Disseminated graphite ore is practically a Sillimanite or other gneiss carrying graphite in a flaky or crystalline form, and varying in graphite content from a trace to 35 per cent. These bands of gneiss are found in the Townships of Buckingham and Lochaber, Ottawa County, many beds having a thickness of over 20 ft., and assaying on an average about 20 per cent. of graphite. A number of beds have been opened and ore extracted and treated at the different mills in the district, more especially in later years at those of the North American Graphite Company, the Buckingham Company, and the Walker Mining Company.

As in many other industries the process of manufacture adopted by the different producers has been jealously guarded, the different "secrets" being considered the individual property of the refiner. Irrespective of secret methods, the practice adopted may be divided into wet and dry processes. No mill confining its operations to the dry or air method has as yet been commercially successful, because the similar gravity of the component minerals prevents a satisfactory separation. Several pneumatic separators lately put on the market have been partially successful, although they have not been able to eliminate the mica.

The wet or water separation method has been successful to a marked degree and high-grade graphite is being produced in this manner by the North American Graphite Company, of Buckingham, which is, at present, the only company in operation in the Province of Quebec. It is expected that the plant of the Walker Mining Company will soon be at work. In the process of concentration used by these companies the ore is crushed and stamped wet, and a coarse separation made by stationary bud'les. The concentrates are then dried, ground by buhr-stones and screened. An improvement, resulting in a saving in cost of about 25 per cent. has lately been made by the use of the Brumell separator, which treats the ore after drying by flotation upon, rather than immersion beneath, the surface of the water. By the wet method a higher degree of concentration is obtained than by the dry process, and the ground and finished concentrates retain their size of

particle to a marked degree. As a consequence, those companies, which employ wet methods are enabled to put upon the market the largest sized and purest flake crucible and lubricating stock.

Analyses of picked samples of graphite made by the Geological Survey of Canada have shown the following results:

| Locality. | Carbon per cent. |
|--|---------------------|
| Buckingham Township, Quebec (foliated) | 99.675 |
| Buckingham Township, Quebec (columnar) | 97.626 |
| Grenville Township, Quebec (foliated) | 99.815 |
| Grenville Township, Quebec (columnar) | 99.757 |
| Ticonderoga, N.Y. (foliated) | 99.656 |
| Ticonderoga, N.Y. (columnar) | 97.422 |
| Ceylon (foliated) | 99.679 |
| Ceylon (columnar) | 99.792 |

It is a generally accepted fact that the world's supply of crystalline graphite needs to be increased because of the growth of the iron and steel industry, the largely extended use of copper and its alloys, the wider application of electricity and the increased needs for graphite lubrication. Flake graphite is known to exist only in crystalline rocks which, in the Laurentian series, has the greatest development in Canada, a feature which presents a promising future for the graphite industry of the Dominion.

Cape Breton Coal, Iron and Railway Company.—This company is preparing to develop its coal areas at Cochrane's Lake and Black Brook, Mira. The company controls 57 square miles of territory, containing seams of coal of various thicknesses, 12 square miles have passed Government inspection as being 5.5 ft. thick. The coal is pronounced of excellent quality. The company is capitalized at \$1,000,000, the shares being \$100 each. There is considerable American capital back of the company, but it is understood that the Royal Bank of Canada will take the bulk of the stock.

Sale of Valuable Zinc Mine IN CANADA

Pursuant to the order of the High Court of Justice, for the winding up of the Grand Calumet Mining Company, there will be offered for sale by Public Auction at the Local Master's Office, in the Court House, in the City of Ottawa, in the Dominion of Canada,

On the Sixth day of October, 1903,

AT 2.30 P.M.

Mining location 30 T, in the District of Thunder Bay, in the Province of Ontario, containing 160 acres, and known as "The Zenith Zinc Mine." The property is about twelve miles from Rosspoint Station on the C. P. Railway. A considerable amount of development has been done, and about 2,000 tons of ore have been extracted.

The property will be offered for sale subject to a reserve bid, and to a royalty of \$3.00 per ton on all ore to be mined thereon. With it will be put up for sale, a quantity of mining plant and machinery, consisting of engine, derricks, cables, drills, carpenter's tools, blacksmith's tools, bar steel and iron, rope, saws, stoves, &c.

A detailed inventory of the chattels, an expert analysis of the ore, and any other information may be obtained from the liquidator.

Ten per cent. of the purchase money must be paid at the time of sale, and the balance in thirty days.

Dated the 13th day of June, 1903.

E. A. LARMONTH,
Liquidator,
48 Elgin St., Ottawa, Canada.

W. L. SCOTT,
Local Master
at Ottawa.