ciated with Mr. Fraser in much of his work, such men as his brother, Mr. Simon A. Fraser, Mr. Thomas Cantley, and Mr. Harvey Graham, have won prominence.

Mr. Fraser is a most unassuming, pleasant Pictou County Scotchman. Intelligent industry and unswerving integrity have been the keystones of his success.

## ROASTING OF THE ARGENTIFEROUS COBALT-NICKEL ARSENIDES OF TEMISKAMING, ONT., CANADA*

CYRIL W. KNIGHT.

The Cobalt ores consist essentially of arsenides of cobalt and nickel, together with native silver. In going over the literature on roasting of arsenides, no definite data could be found which gave accurate information regarding the temperature at which arsenic is expelled during roasting operations. A few experiments

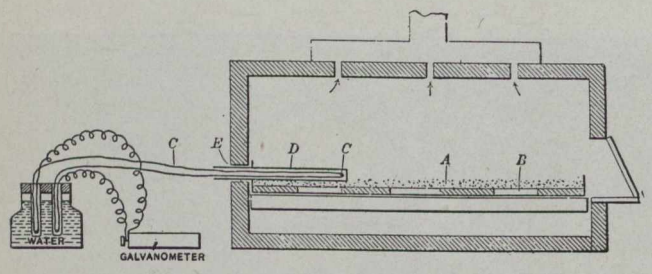


FIG. 1.

were therefore undertaken, with the object of throwing some light on this point; and it was also thought that the metallurgical plants now being erected in Ontario to treat our Cobalt ores, might, perhaps, obtain some information from the work.

The roasting was done in an American Gas Furnace Company's oven, No. 2 (Fig. 1), 27 inches long and 20 inches wide inside.

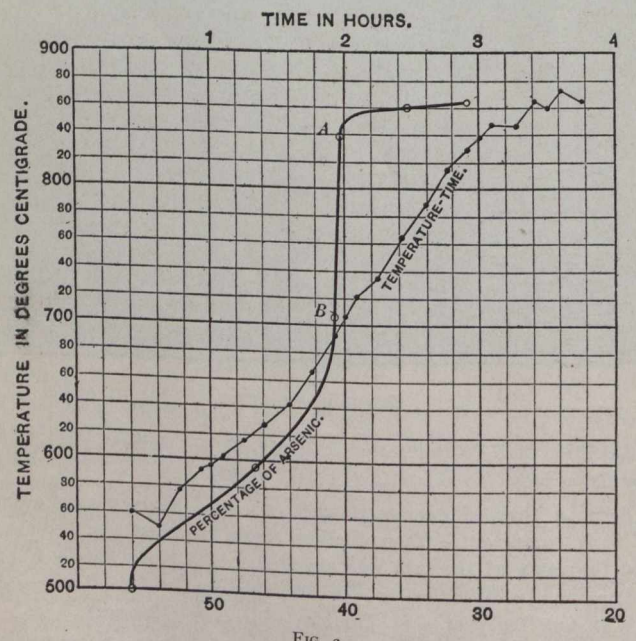


FIG. 2.

The ore was held in iron pans, lined with 0.5 inch fire-brick, B. "The temperature was measured by means of a Le Chatelier pyrometer. The thermo-couple, C, was protected from arsenic and other fumes by a porcelain tube, D, and was placed immediately above the ore, A. It entered through a circular hole, E, in the back of the furance, and was connected with a Keiser and Schmidt galvanometer, standardized by means of the melting-points of zinc, aluminium and copper. The temperature was recorded and the ore rabbed every ten minutes. In none of the roasts was any fritting or clogging of the ore noticed.

The first object was to ascertain the temperature at which the arsenic is most rapidly expelled. The ore treated was ground to pass a 20-mesh sieve. The furnace was gradually heated at the rate of 120 degrees C. per hour to a maximum of 870 degrees C. It was found that, during this roast, 27 per cent. of the total arsenic was expelled below 700 degrees C. That practically no arsenic was expelled between 700 degrees C. and 840 degrees C., but that, on reaching the latter temperature, expulsion again became rapid. This is diagramatically shown in Fig. 2. These results tend to prove that the behavior of smaltite resembles that of pyrite, of which the first atom of sulphur is removed at a much lower temperature than the second.

The second object was to ascertain how thoroughly arsenic can be expelled at 890 degrees C. (a temperature a little above that at which it was found that arsenic is rapidly driven off). The furnace was raised quickly to 890 degrees C., and held near that temperature for four hours. The arsenic content at the end of the roast was about 17 per cent. During the first three hours it fell to 19.3 per cent.; the effect of the last hour of roasting only reduced it to 17 per cent. Fig. 3 gives a curve showing diagramatically the results of the test.

It was found that charcoal, whether added at the beginning or towards the end of the roast, failed to increase the expulsion of the arsenic. In one experiment the ore treated was ground to pass a sieve of 100 meshes to the linear inch. This did not increase the amount of arsenic driven off.

*Summary of a paper published in the Transactions of the American Institute of Mining Engineers, April, 1907, by Henry M. Howe, LL.D., William Campbell, Ph.D., and Cyril W. Knight, B.Sc., respectively professor, instructor and student of metallurgy in the School of Mines of Columbia University, in the city of New York.

## ASBESTOS DISCOVERIES IN FOREIGN COUNTRIES

BY FRITZ CIRKEL, MINING ENGINEER, MONTREAL.

Those familiar with the asbestos market are aware that the present supply of asbestos is not sufficient to meet the world's demand. This is principally due to the increasing uses and applications of the mineral for industrial purposes. It may be affirmed that the output of all the existing asbestos mines is insufficient to satisfy two-thirds of the demand for this product, and the leading manufacturing firms interested in this industry are diligently searching for new deposits. As a matter of fact, European manufacturers, who find the supply insufficient and irregular, have endeavored to acquire asbestos mines in Canada, but have been confronted with many difficulties, especially in the comparatively small Thetford-Black Lake asbestos area, there being comparatively few productive mines, and these can only be had at exorbitant prices. For this reason, European manufacturers, for the last year or two, have been informing themselves of opportunities in other countries. Thus, Englishmen propose to acquire some recent discoveries in Western Australia, in the vicinity of Perth, where, it is reported, asbestos of quality equal to the Canadian product has been found, although information regarding the location and extent of the deposits is being kept a close secret.

We hear also that renewed attention is being paid to the Ural (Russian) deposits, but whether they ever will assume the importance of the Canadian mines remains to be seen. Two deposits of asbestos were discovered last summer on the Ural, one in the Verchotursky and the other in the Ekaterinbourg districts of the Province of Perm. In the first named district prospecting is carried on by a mining engineer, Mr. A. L. Simchowitch, in a locality called Znamenskaia Datcha. By order of the chief administrator of the Ural mines, the above area was declared free for exploration, and the right to prospect was granted to Mr. Simchowitch for a period of five years.

These asbestos deposits were discovered quite accidentally last