

of the running time. The next third it was between 700 deg. and 800 deg. The highest temperature at the end of the run was 870 deg.

Total time 4 hours 23 minutes. Stops 29 minutes. Running time 3 hours 54 minutes. Oil used 60 gallons.

#### Gas Tests.

Time	Temperature Centigrade	Per cent Sulphur dioxide	Remarks on Hydrogen Sulphide
10.16	380	...	Trace with lead acetate
10.30	630	...	Trace with lead acetate
10.52	700	0.18	Rapid discoloration of lead acetate
11.13	695	0.12	Same
11.35	675	0.20	Same
1.45	860	0.20	Same

#### Sulphur in Calcines.

No. 1—Picked pieces, blackened, showing core of sulphides. Content 20.9 per cent. sulphur.

No. 2—Sample taken from close to the bottom of the ore column. Content 5.97 per cent. sulphur.

No. 3—Same as No. 2. Content 4.1 per cent. sulphur.

The furnace filler in this case was limestone and this was completely calcined, slacking violently when thrown into water.

Before the next run, the small 15 gallon oil tank was replaced by a 110 gallon drum in order to avoid the hourly stops for oil.

Tabulated observations taken during this run follow: April 24, 1915.

Charge and general starting conditions were the same as in the previous run. Started furnace at 1.30 p.m.

Time.	Temperature Centigrade	Vacuum Cm. Hg.	Water Pressure Lbs. per sq. in.
1.55	360	9	32
2.05	400	9	32
2.15	500	9	32
2.25	575	9	32

Started to add steam—gradually increased amount.

2.35	560	9	32
2.45	600	9	32

Adjusted draft and oil to increase the temperature.

2.55	700	25	30
3.05	850	20	30
3.15	925	30	29

Maximum steam supply on.

3.25	965	31	29
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Reduced the temperature.

3.35	920	47	28
3.45	925	37	29
3.55	925	37	29
4.05	920	37	29
4.15	900	37	29
4.25	905	37	29
4.35	900	37	29
4.45	905	37	29
4.55	890	37	29
5.05	910	37	29
5.15	900	37	29
5.25	890	12	31
5.35	890	12	31
5.45	900	12	31
5.55	880	12	31

Total time, 4 hours 25 minutes.

No stops.

Oil used—50 gallons.

#### Gas Tests.

Time	Temperature Centigrade	Per cent. sulphur dioxide	Remarks on Hydrogen Sulphide
2.31	570	...	Good test
2.54	700	0.21	Strong test
3.26	965	0.12	Strong test
5.30	890	0.14	Strong test

The calcines obtained from this run, with the exceptions of a few pieces near the brick work at the top, were perfect in appearance, and analysis showed the sulphur content to have been reduced to from 3.9 per cent. to 5 per cent.

During all the runs made a thick, black precipitate was caught in the water tank consisting, for the most part, of unburned carbon and metallic sulphur. When dried, this burned readily with the sulphur flame, giving off quantities of sulphur dioxide.

An analysis made on similar material brought from Herault after the experiment made there showed:

Sulphur, 61.52 per cent.; silica, 4.94 per cent.; Ferric oxide, 15.12 per cent.; copper, trace; carbon, 20.0 per cent plus or minus.

The recovery of pure sulphur from this precipitate is a simple matter and requires no comment here.

**Smelting.**—During the preliminary runs such evidence of high temperature obtainable in the zone of fusion were noted as to make a special smelting run on the calcines unnecessary. In these runs fire clay, sulphide ore and lime were fused rapidly and, as already stated, it was only by cutting out one burner and the use of magnesite filling that a roasting temperature could be obtained in the space available.

#### Commercial Possibilities of the Process Applied to Sulphide Ores.

Considering the results obtained, with the possibility of commercial success for the process in view, it is a fact that no difficulties were encountered or suggested which were not easily overcome and that the desired results were satisfactorily accomplished. Furnace conditions easy to maintain and necessary adjustments throughout the operations were few, all being simple and involving no delay. All observations made seem to justify the development of the process on a larger scale and no doubt this action will be taken in the near future.

The complete plant herein described was designated for one special type of ore, but it was obvious that the basic principle embracing the vacuum draught and the perfect washing of the flue products resulting from this feature, might well be applied to the reduction of other ores requiring either roasting or smelting alone.

#### THE COPPER CLIFF BAND.

Elk Lake, July 16.

The Copper Cliff Band, which is the regimental band of the 97th Regiment, has remitted to Col. H. E. McKee, \$116, proceeds of a concert given by the band at Copper Cliff. This money is for buying comforts for the members of the regiment in the trenches, and is being sent by the commanding officer to the front for that purpose. The Copper Cliff Band is one of the best bands in Ontario and took part in the musical programme at Toronto Exhibition last year. It is maintained by the Canadian Copper Company, and is a great acquisition to the 97th Regiment, the members being very public-spirited and enthusiastic musicians. Under the leadership of Bandmaster John Gribble, the organization has reached a high state of perfection.