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SAMPLE OF TIN ORE FROM ZEEHAN TIN DEVELOPMENT N.L.

Locality is  
(Tomkins Tin  
Zeehan)

Duplicate

795/37 G. B. S. for M. M.

The sample assayed 2.71% of tin and 26.5% sulphur (equivalent to 49.5% pyrite). The tin occurs as cassiterite; stannite is not present.

As preliminary examination of the sample showed the cassiterite to be of extremely small particle size, several samples were prepared to ascertain the actual particle size of the cassiterite in the ore. These samples were selected from lumps of the higher grade sulphide and also of the total ore after crushing and screening; a product of -44+85 mesh B.S.S. only being used for examination. These samples were chemically treated to remove all minerals except cassiterite, after which same was microscopically examined for particle size with the following results:

Lump Sample

Number of particles observed	23
Mean diameter	20.7 microns
Largest	160 X 60 "
Smallest	8 X 6 "

Twelve of the 23 particles were smaller than 20 microns.

-44+85 Sample

Number of particles observed	95
Mean diameter	12.5 microns
Largest	60 X 40 "
Smallest	1 micron or less

Seventy eight of the 95 particles were smaller than 20 microns. The dimensions of all particles examined are available if required. No cassiterite observed showed crystalline form.

A flotation test produced a sulphide concentrate representing 52% by weight of the ore, resulting in the following distribution of the tin values:

Concentrate	16.4%
Tailings	83.6%

Further testing would probably result in improved distribution.

Concentration of flotation tailings by tabling was not possible, as the laboratory is not equipped with gravity concentration testing machines. However, a flotation concentrate tailing assaying 5.25% tin was concentrated by panning. Tailings were re-treated several times, and it was observed that a small but similar amount of concentrate was produced by each re/treatment. The concentrate represented 4.56% by weight, assayed 48.2% tin and represented a recovery of 42%.

SUMMARY.

The cassiterite in the sample is extremely fine, and it is considered that this fact will be the major factor as regards treatment. Pan concentration tests gave very poor recoveries, and it is suggested that closely controlled plant tests be undertaken to assess the recovery obtainable with commercial machines. In this regard, chemical assays of plant products are essential.

Of the 118 particles examined, 90 were smaller than 20 microns. Tin dressing authorities vary somewhat in opinion as to the ultimate size that can be satisfactorily recovered. It is of interest to quote W. H. Cropp, formerly Chief Metallurgist of Toyo Tin, Ltd., Kyushu, Japan: "Concentration of cassiterite is difficult at 25 microns and non-recoverable at 10 microns".

Separation of the sulphide gangue by flotation would probably be the preferred method of treatment.

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