

# Minerals Separation Devises Process for

## Mixed Copper Ores

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### Tests in London Demonstrate Success of Preheating With Carbon and Salt, Followed by Flotation, With Prospect of Commercial Application to Northern Rhodesian Practice

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**S**ULPHIDE copper ores predominate in Northern Rhodesia, but large quantities of malachite and of chrysocolla exist, as well as admixtures of these ores with sulphide-ores, the treatment of which was expected to entail considerable difficulty. All the copper mines in Northern Rhodesia have such

mixed ores. N'Changa, for example, possesses large tonnages of carbonates, silicates, and mixed ores. To solve the problem of the economic and efficient treatment of the mixed ores, Minerals Separation has been engaged for three years in the development of a treatment process. It is known as the "Segregation Process." It consists of a heat-treatment of the ore at 600 to 700 deg. C. with 1 to 2 per cent carbon (charcoal, coal, or coke) and less than 0.5 per cent common salt. Instead of the usual chloridizing effect, an alternative reaction occurs. The copper leaves the gangue almost entirely, even particles of copper silicate ore up to 2 mm., and deposits as metal on the carbon, with which it forms segregations of varying size that are readily amenable to flotation.

At the experimental plant of Min-

erals Separation in London, tests have been made on ore from Northern Rhodesia and elsewhere, indicating an extraction of 95 per cent from oxidized ores and of 92 per cent from mixed ores. The installation consists of an ore feeder and two revolving cylinders, the preheaters; the reaction furnace, and a cooling cylinder, revolving at 1 r.p.m. Treatment comprises dry crushing to about 2 mm., segregation, and flotation of the segregated ore. Smelting and refining of the metallic copper obtained would follow in the normal course.

Crushed ore is fed into the preheater and then passes into the reaction cylinder, where it is mixed with the salt and carbon. The temperature of the furnaces is maintained at about 650 deg. C. The product from the reaction chamber is passed through the cooling cylinder, and then goes to flotation machines for treatment by ordinary methods. Copper separates out as finely divided particles of metal. The concentrate from the flotation machines, when examined under the microscope, revealed the presence of the fine metallic grains in association with small quantities of carbon and a negligible amount of quartz gangue. A pilot plant, in accordance with these principles of treatment, will probably be designed and sent to N'Changa Copper in the near future.

### Other News of the Week

**T**HE United States Senate, on Nov. 7, put manganese back on the tariff bill with a duty of 1c. a pound on metallic manganese ores and concentrates containing more than 10 per cent manganese. On this page.

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Inspiration Consolidated has completed important changes in its power plant, near Miami, Ariz., giving it a total capacity of 30,000 kw. Page 787.

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Broken Hill South will be able to dismantle the old wooden structures at its concentrator in the Broken Hill district, New South Wales, by the end of the month, as the new steel building is almost complete. Page 787.

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With higher copper prices prevailing, the Bingham district of Utah is enjoying its most prosperous and productive year. Notes on progress at this important Western camp. Page 788.

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Grootvlei, adjoining East Geduld on the Far East section of the Witwatersrand, Transvaal, will probably be developed through the latter's workings. Page 791.

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Between the 2,000 and 3,000 levels of Teck-Hughes, at Kirkland Lake, Ont., development has disclosed a continuation of its rich gold orebodies as favorable as in the levels above, according to the company's annual report. Page 790.

### Senate Puts Manganese Back on Tariff Bill

**A**FTER more than five hours of debate, during which the net profits of eight steel companies in six years of operation under the Fordney-McCumber tariff were disclosed, the United States Senate voted 60 to 18, on Nov. 7, to restore a duty of 1c. a pound on the metallic manganese content of manganese ores and concentrates.

The Senate not only rejected the Finance Committee amendment placing manganese ores on the free list, but it extended the duty to low-grade ores containing between 10 and 30 per cent of metallic manganese. Under the House bill and existing law, manganese ores containing less than 30 per cent of metallic manganese were entered free.

The Senate's action on manganese corresponded to that first taken by the Finance Committee majority before this group, in writing the tariff bill (H. R. 2667), reversed itself and placed manganese on the free list.

In the course of debates on manganese, Senator Ashurst, of Arizona, read into the record the profits of eight steel companies in the years since enactment of the 1922 tariff law through 1928. These net profits, he said, aggregated \$930,181,054.

The manganese amendment adopted by the Senate was presented by Senator Oddie, of Nevada, chairman of the Committee on Mines and Mining. As orig-

inally introduced, Mr. Oddie's proposal would have put a graduated rate on manganese ores dependent upon the metallic manganese content. All manganese ores containing 25 per cent of metallic manganese or more, the bulk of the imported product, would have been taxed at 1½c. a pound. Senator Oddie later modified his amendment to the form in which it was adopted.

On Nov. 2, the Senate rejected a committee amendment making the duty 5 per cent ad valorem on amorphous graphite. It is now 10 per cent and was unchanged by the House. It also adopted an amendment offered by Senator Black, of Alabama, to make the duty on crystalline graphite 2c. a pound. The Finance Committee recommended that the duty be 20 per cent ad valorem, as at present. The House bill increased the rate to 25 per cent.

### Barry Hollinger Must Alter Tailing Disposal

Justice T. E. Godson, judge of the Ontario Mining Court, has allowed Barry Hollinger Gold, operating near Kirkland Lake, Ont., ten days within which to submit plans for a new method of handling tailing. The order follows a hearing on the company's application for permission to deposit tailing from its 100-ton plant in a small creek near the mill, which later flows through farming lands.