

## CHEMISTRY

# Chemists Find Way To Use Low Grade Italian Bauxite

**Treatment With Excess Sulfur at High Temperatures Makes Formerly Worthless Ore a Source of Aluminum**

A WAY has been discovered in Columbia University's electro-chemical laboratory to use low-grade bauxite ore from Italy as a valuable source of aluminum.

The discovery potentially breaks the semi-monopoly of the few sources of commercially acceptable high-grade bauxite ore. This bauxite ore has been a highly important "strategic" mineral in the maneuvering of nations for economic supremacy. It is vital in time of war.

In a report to the Electrochemical Society, Prof. Colin G. Fink of Columbia and graduate student V. S. de Marchi describe their new method of removing the excessive amount of iron oxide from low-grade Italian bauxite and producing, on a practical scale, a residue which will yield shining aluminum.

Bauxite is the name of rock containing hydrated alumina mixed with various oxides. White bauxite, very rare, is rich in alumina and low in iron oxide. It is used in ceramics and in the production of artificial gems. Red bauxite, more widely distributed, is used in the production of aluminum.

Ferruginous bauxite, very abundantly distributed in nature, contains so much iron oxide that it is not commercially used at present.

It is with this third type of bauxite that Prof. Fink and Mr. de Marchi worked. Their aim was to discover a way to remove most of the iron oxide and make possible the use of the once valueless ore as a source of commercial aluminum. Moreover, they sought to refine red bauxite and bring it into the class of the rare, white bauxite.

Chemically the steps in the new process consist of treating bauxites with high iron content with an excess of sulfur at high temperatures. By this treatment the iron oxide is converted into iron sulfide. The excess sulfur that does not react is boiled off.

Along with the change of iron oxide into iron sulfide the presence of sulfur changes over the other impurities present, titania and silica, into their sulfur compounds.

These sulfides are then treated with

an excess of chlorine and aluminum chloride results. "The chlorination of the sulfided Istrian (Italy) bauxite at 600 degrees Centigrade, removes 90 per cent. of the iron oxide, over 50 per cent. of the titanium dioxide and 14 per cent. of the silica," report the scientists. "The alumina losses were only 9 per cent. The reaction is complete within the first five minutes of chlorination.

"If the chlorination . . . is carried out at 920 degrees Centigrade, 94 per cent. of the iron oxide, and 66 per cent. of the titanium oxide are removed. The alumina losses are only 7 per cent."

Whether the cost of the treatment of the high iron content bauxite will be low enough to permit commercial pro-

duction at a peacetime price is still undetermined. But one can be sure that in event of war, where price is no object, the method probably would be used, not only in Italy but in many other nations which lack red bauxite deposits but do possess the now valueless ferruginous bauxites.

*Science News Letter, November 12, 1938*

## PHYSICS

## Piano Tuning Circles Puzzle Over New System

MOST OF US, whether we can now play the piano or not, can remember the thumping of the piano tuner as he worked his way back and forth over the instrument.

How beautiful chords and tones finally came out of the piano after the job was done, probably still lingers in most folks' minds as one of the minor miracles.

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