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 production 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.

As a highly specialized art and science, piano tuning has reached a stage where new methods are rare and the methods are stabilized into a fairly classical pattern of tuning by fourths and fifths.

Right now things are mildly teeming in piano tuning circles for from France has come a new method of tuning by tenths. This new method appeared in a report by Jean de Bremaeker in Musique et Instruments. *The Journal of the Acoustical Society* of America has just published an abstract in English.

Like all methods of piano tuning, the Bremaeker method achieves its results by putting the piano out of tune and then gradually comparing beat notes until correct register of tone is accomplished.

But the new method does this by spreading the work out over about a third of the piano keyboard while the current methods utilize only a single octave, if possible, for this original "laying the bearings" as the piano tuners call it.

A claim for the Bremaeker system is that all octaves are true octaves and not distorted as in current methods. Mr. Bremaeker insists that the "stretching" of octaves in the upper and lower registers is a "barbarous practice" whereby brilliant music is obtained at the expense of pathetic.

William Braid White, acoustical consultant of Chicago, and Doctor of Music has tried out the new method and informs Science Service that it is in no way better suited to give results more accurate than are reached by the best of American tuners. With this lack of superiority comes a great increase in the complexity of an already complex job.

Science News Letter, November 12, 1938

PHYSICS

Scientists Seek to Simplify World's 2,000 Color Names

SCIENCE is nearing the end of its task of trying to set up a few simple names for colors which will bring order out of the more than 2,000 designations which colors now have.

In a report to the Optical Society of America, Dr. Deane B. Judd, of the National Bureau of Standards, disclosed that only a few revisions remain in the task of finding 320 designations for all colors.

Actually only a few names are needed in the system devised by the Inter-Society Color Council. Eight adjectives—strong and weak, light and dark, and pale, deep, dusky and brilliant—are applied to each hue name to make up the total of 320.

The agreed upon names are: pink, red, orange-pink, red-orange, red-brown, orange, brown, yellow-orange, yellow-brown, yellow, olive-brown, olive, yellow-green, green-olive, green, blue-green, blue, purple-blue, purple, purple-pink, red-purple. And in addition, white, grey and black.

The scientific classification of colors, Dr. Judd said, was undertaken at the request of the American Pharmaceutical Association to simplify the color designation of drugs and chemicals.

In its broadest aspects the new system of simplified colors could be applied to all fields of activity where colors are used.

However, scientists realize that manufacturers might be averse to putting out a color known as a "weak" pink or a "weak" blue, even if it is scientifically accurate. Thus Twilight Mauve, Titian Tan, Patio Blue and the other new fall shades will probably be around for awhile.

Artificial Daylight Studied

A two-year study on artificial illumination in the color grading of cotton and other farm produce, shows that the extreme intense light previously suggested is not necessary.

Ninety footcandles has been the minimum illumination recommended. But checks at the various stations of the U. S. Department of Agriculture show that 45 footcandles is sufficient in most cases, reported Dorothy Nickerson of the U. S. Bureau of Agricultural Economics. Only on dark overcast days in December was an illumination of more than 100 footcandles required.

The search for proper standards for artificial daylight was described in another paper by Dr. Deane B. Judd of the National Bureau of Standards. A correct light simulating daylight must preserve color differences.

That is, if one of two samples appears just noticeably redder than the other in daylight it should also appear just noticeably redder under the artificial rays.

Science News Letter, November 12, 1938

When the Menai Bridge was built in Wales over 100 years ago, it was a wonder of its age; now it is being reconstructed for heavy traffic.

● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the Jesuit Seismological Association resulted in the location of the following preliminary epicenter:

Saturday, Nov. 5, 5:43.3 p. m., Japan Time.

On Japanese coast, about 150 miles northeast of Tokyo. Latitude 38 degrees north, longitude 140.7 degrees east.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs see SNL August 13.