

Tantalum Combines Strange Properties

Metallurgy

Engineers Hear of the Wonders of Rare Metal

STRANGE tantalum, the metal rarer than gold, which absorbs 740 times its volume of hydrogen gas, successfully resists attack by the strongest mineral acids, and changes alternating into direct current, is finding greater use for dental instruments, surgical tools, pen points, hypodermic needles and acid proof pumps, Prof. George W. Sears, of the University of Nevada, reported recently to the American Institute of Mining and Metallurgical Engineers.

Even though tantalum was used for electric light filaments in 1906, until the past few years it has been only a rarity. It forms a much smaller portion of the earth's crust than gold, it is estimated. The production in 1928 was 35,000 pounds.

Because it absorbs gas so well, it is used for the metal parts of vacuum tubes.

Although there are other substances, which when used as an electrode of an electrolytic cell permit the passage of electricity in only one direction, tantalum is the best, said Prof. Sears. Electrolytic rectifiers for charging storage batteries contain it.

"Aqua regia, which readily dissolves both platinum and gold, has no action on this metal," continued Prof. Sears.

Hydrofluoric is the only acid successful in attacking it. Strong alkalis have no effect on it.

Tantalum can be cold rolled to a sheet one thousandth of an inch thick. It is found in the Black Hills of South Dakota and in Australia.

Colored Gold

FOUR comparatively common metals—silver, copper, nickel and zinc—fulfill milady's desire for precious gold in varying blends and shades of yellow, green and white.

Alloying gold not only makes for hardness and produces different karat values but, artistically done, it reveals the precious metal in color schemes, Edward A. Capillon, a metallurgist of Attleboro, Mass., told the same meeting.

"The gold-silver-copper alloys vary in color from light greenish-white through green, yellow and red, depending on the relative amounts of the three metals," Mr. Capillon explained. "Green or yellowish-green golds are also obtained by combining

relatively large amounts of zinc with gold, copper and small amounts of silver."

The bluish-white color of "white golds" depends on the presence in the alloy of both nickel and zinc, the metallurgist said.

Slicing a Hill

A QUARTER-INCH, three-stranded steel wire, 1400 feet long, driven by an old four-cylinder automobile engine, is sawing huge slabs of marble from a hillside in the Ozark region of Arkansas.

Wire sawing has already proved its value in slate quarrying in Pennsylvania, and this is one of the first applications of the method to other fields, W. M. Weigel, mineral technologist of the Missouri Pacific Railroad, told the meeting.

Sand, hand-fed into the artificial crevice the wire makes, does the actual cutting. The wire travels 20 feet per second and cuts a complete section from the hill without wearing out and breaking. The entire operation is carried on by one man.

Vertical Copper

FOR years metallurgists have been content to roll and draw copper wire from wire bars cast horizontally—until J. Walter Scott and L. H. DeWald, of the Western Electric Company, found a better way.

These two began to cast their bars vertically, and by so doing literally got their metal in a "much better shape" for wire manufacture. The new method does away with the heavy wrinkles and skin oxide which form on top of the horizontally cast bar and cause defects in the final product, they say.

And strangely the electrical conductivity of vertically cast copper is about two-tenths of one per cent. higher than that of corresponding horizontally cast copper, tests show.

Smoke Damage

SIMPLE, apparently inevitable chemical reaction makes common locomotive smoke the dread enemy of the catenary trolley systems on electrified railways of today.

The smoke mixes with exhaust water vapor and forms sulfurous and then sulfuric acid from the hydrogen

sulphide it contains. This acid is absorbed by soot and tarry matter on overhead metal and immediately begins to eat the metal away.

Alloys of catenary wire and fixtures which stand up well under other forms of corrosion fail when subjected to the corrosive action of smoke. This is the conclusion reached by F. L. Wolf, chief engineer of the Ohio Brass Company.

Mr. Wolf speeded up his tests by putting the specimens in the smoke jack of a roundhouse. He found that one month of exposure there corresponds to about two years of moderately severe service.

The only apparent way of overcoming this corrosive menace is by running only electric trains on electrified roads. This practice is economically unjustifiable in most cases.

Explosive Dust

NATURE'S disastrous dust explosions in coal and metal mines are retaliation against man's feeble blasting. Such is the inference of Oscar A. Glaeser's explanation of the cause of dust explosions in a copper mine at Jerome, Arizona.

"The first few shots to go off charge the atmosphere with their own dust and stir up the dust that has accumulated during the shift," Mr. Glaeser said. "Finally some shot with considerable flame ignites this suspended dust and an explosion occurs."

Classes of Coal

FOURTEEN scientists and engineers presented as many technical papers, totaling 140 printed pages, before a section of the American Institute of Mining and Metallurgical Engineers as a step in the classification of the various grades of coal, ranging from lowly peat to the most highly metamorphosed forms of anthracite.

They are carrying on a work begun in November, 1926. Their papers described the product of practically all the coal fields of the United States. They are attempting to bring together the diverging classifications of science and commerce.

Science News-Letter, March 1, 1930

Only three feet under the surface of the ground the temperature is as cool at midday as at midnight.