

as well as amplify, it can be used to produce standard frequency tones and for other use.

Among other little-known metals already in use in engineering are zirconium, tantalum, columbium, vanadium and hafnium. The public will have little occasion to use these names as these metals will find their greatest uses in alloys and in special manufacturing.

### Zirconium Quite Common

Zirconium is not a rare metal, being more common in the earth than copper, nickel and lead. But it is hard to separate from its ores and even when separated usually contains hafnium in quantities of from one-half to three percent. For most purposes the presence of the hafnium is not objectionable.

However, in the construction of atomic piles for the atomic energy program, in which most of the zirconium now produced is used, a low hafnium content is needed. zirconium and has somewhat similar properties. It has a low thermal neutron absorption coefficient.

When more zirconium is produced, it will have a special application in corrosion-resisting alloys, particularly for equipment used with hydrochloric acid. The metal hafnium, which is not available commercially as yet, occurs in nature associated with zirconium and has somewhat similar properties.

Tantalum and columbium, the latter known as niobium in some parts of the world, are usually found together in the same mineral and they have similar properties. Separation is a chemical process, carried out with difficulty. An interesting use of tantalum is in surgery, such as in skull plates and surgical wire, because of its resistance to corrosion from chemicals in the human body.

### Tantalum Resists Corrosion

Corrosion resistance is one of tantalum's outstanding properties and the one for which it is most widely used. Another important application is in radar and other electronic tubes. Its oxides and carbides are used in high-speed cutting tools. In laboratories, tantalum substitutes for platinum alloy in certain types of utensils.

Columbium in stainless steel improves the alloy's weldability, creep strength, impact strength and corrosion resistance. The metal is a component part of certain permanent magnet alloys, and it is also used in electronic tubes which are subjected to severe service.

Vanadium can not be regarded as a rare metal because it is widely spread and is as plentiful as nickel and zinc. Annual production in the United States is over 2,000,000 pounds a year, much of which is taken by the Atomic Energy Commission for purposes not revealed. In the form of ferrovanadium, the metal is used in the manufacture of tool steels, engineering steels,

high-strength structural steels and special wear-resistant cast irons.

Important in the list of minor metals now finding wider application are lithium, which is only half as heavy as water, beryllium, gallium, indium, boron, cerium, cesium, selenium, tellurium and thallium.

Lithium is used to a slight extent in hardening copper, lead, aluminum and magnesium alloys. Its more common applications, however, are in its chemical compounds.

Beryllium is an important minor metal and would have extensive applications except that the supply is quite limited. It has an outstanding ability to improve mechanical properties of alloys when added in small proportions. Beryllium also is corrosion resistant and seems to have the ability to make the metals with which it is alloyed more able to resist corrosion.

### Boron Adds Hardness

A tiny bit of boron, basis of borax, adds hardness to steel. The principal application of cerium is in sparking flints for cigarette lighters, but it is also used in electronic tubes, and its oxide helps to make gas mantles glow.

Cesium, sometimes spelled caesium, is used in photoelectric cells because it gives up one electron more readily than any other element.

The principal application of indium is in heavy-duty composite metal bearings, although it is also added to solder and brazing alloys to give a low-melting alloy.

A valuable property of selenium is its change in electrical conductivity when exposed to light. For this reason it is used in the so-called electric eyes which not only make doors open automatically, but also help to sort, count and scan a wide variety

of things, from money to tin cans. Selenium can also rectify electric currents.

Both selenium and tellurium improve copper alloys. Tellurium is used to tone silver prints.

The chief application of thallium has been as a rodent poison in grains, but there is a present interest in some of its compounds. One of these will transmit wavelengths in the infra-red region and was used in sniperscopes during the war to detect enemies prowling about in the night by the heat given off from their bodies.

Science News Letter, May 10, 1952

### TECHNOLOGY

## New Brick Lowers Cost Of Masonry Dwellings

➤ A COST-CUTTING brick which should bring masonry dwellings within the pocket-book range of more persons has been introduced by the Structural Clay Products Institute in Washington.

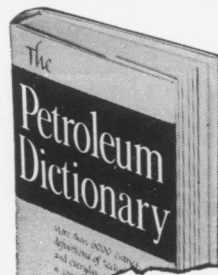
Robert B. Taylor, director of research for the Institute, reported that the new SCR brick could be used to build one-and-a-half story houses at a price competitive with high-quality frame dwellings of the same size.

A five-room pilot house was built using the new brick in the outside walls. The brick's performance was satisfactory and acceptable under major national building codes.

Actual construction tests under normal conditions showed that a mason can build from 60% to 100% more wall area per day using the new brick. That equals about 100 square feet of wall per day. This figure is considered conservative by the Institute.

Science News Letter, May 10, 1952

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