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## THE MANUFACTURE OF RADIUM, URANIUM AND VANADIUM IN CHICAGO

The Carnotite Reduction Company with works at 26th St. and Iglehart Court, Chicago, had been operating for the past year and is now producing regularly radium, as the principal product and uranium and vanadium as important byproducts. Probably most chemists know that the mineral carnotite is by far the most important source of radium and also that the only extensive deposits in the world of this mineral are found in Colorado and adjoining parts of Utah. Carnotite is essentially a vanadate of potassium and uranium and like all other minerals containing the last named element contains also radium, in the proportion of one part by weight of radium to three million parts of uranium.

The ordinary grade of so-called carnotite is a sand-stone in which pure carnotite is present, as a cementing material in small proportion, corresponding to one and a half to two per cent of uranium. Such ore contains from four to six milligrams of radium per ton. The practicable recovery is eighty to ninety per cent.

The company owns and operates its own mines in Colorado and Utah, Geo. B. Pickett, Nucla, Colorado, being the western representative. The present capacity of the plant is one ton daily of carnotite.

The process is that represented by the patents of Dr. H. N. McCoy. The ore, ground to twenty mesh is mixed with sulfuric acid and baked, thus converting everything except the quartz sand into sulfates. The product is then agitated with water, which gives a separation into slimes, containing the radium, a solution containing uranium and vanadium sulfates, and sand tailings, free

from values. Radium accompanies barium and is finally separated from the slimes a radium per kilo. The barium sulfate is converted into chloride which is then worked for radium by the McCoy process of fractional crystallization of barium hydroxide in which the radium rapidly concentrate in the mother liquors. The radium is put barium sulfate, containing one milligram o



DR. H. N. MCCOY

on the market as bromide or sulfate, the uranium as uranium yellow and uranium nitrate; the vanadium as pentoxide, so called vanadic acid, or as iron vanadate containing seventy to seventy-five per cent of vanadium pentoxide. Dr. E. D. Leman is in charge of the works.