

RADIUM

How Wonder Element has developed From Salt, Australian Army Education Journal

AT JOACHMYSTHAL, in Czechoslovakia, Bohemians for centuries mined silver. They dug out large quantities of the metal, so large that the dollar (thaller) was named after the mine. So large, too, that in time huge dumps of the black ore, pitchblende, which contained the silver, surrounded the mines. The Bohemians were blissfully ignorant that, in this pitchblende, they were throwing away the world's most precious metal—the magical radium.

In the gay "nineties," pitchblende's habit of glowing brightly in darkness came to be regarded as a pleasant drawing-room divertisement—until a piece got mixed up with a photographic plate in a dark pigeonhole in the laboratory of a French scientist, Henri Becquerel. This piece printed its image on the photographic plate. Tests showed that pitchblende's radiance was not due to fluorescence (the storing of applied light), but came from some internal substance. M. Becquerel assigned a young Polish refugee, Marie Curie, and her French husband, Pierre, to the job of tracking down the source of this light.

The Curies decided that the radiation from pitchblende and X-rays were similar. For four years they delved among the several tons of residue from the Joachmysthal dumps, which they had been given by the mine-owners, until they collected a pinch of salt which was a compound of saline and almost pure radium.

The pinch of salt led to the greatest somersault science has had to make in modern times. There was an old and well-authenticated belief that all basic elements—gold, oxygen, &c.—were indestructible. It was now revealed that radium, emanating heat, light, and energy at uncountable speed, physically disintegrates like an irresponsible comet, but that such is its power that it loses

only half its energy in 1,690 years and continues at this rate to eternity.

There were other amazing properties. A particle of this lustrous white metal, about half the weight of an equivalent volume of silver, gives off one million times as much energy as an equal weight of burning coal. One ton of radium would boil 1,000 tons of water for a year. It electrifies air. A grain of radium held over the spine of a mouse would paralyse it and kill it in fifteen hours.

Scientists were jolted into feverish activity at the sight of an atom smashing itself. They hastened to find uses for this new-found power, called for larger supplies.

The Joachmysthal earth was meticulously refined. The result was disappointing. The yield was only a few grains a year. Then in 1912, in Colorado and Utah (U.S.A.), greater quantities were found in carnotite deposits. About 75,000 tons of this ore produced an ounce. The market price was about £25,000 a gram—one twenty-eighth of an ounce. There was a heavy demand. Mineral with a small radium content was found in Portugal and Madagascar.

Deposits of uranium containing radium were discovered in 1906 near Olary on the railway-line between Broken Hill and Adelaide, and in 1911 at Mount Painter in the Northern Flinders Range, but the last war terminated the venture. It has since been regarded as too costly a proposition to be a commercial success.

Pitchblende from a copper-mine in tropical Belgian Congo was refined in 1922 in Belgium and, at approximately £15,000 a gram, monopolized the world market.

Then, from a rocky outcrop on the shores of Great Bear Lake in the Arctic wastes of north-west Canada in 1930, Gilbert LaBine, prospecting for silver, hacked out "a tiny dark piece of ore