CHEMISTRY

Uranium Sources

It occurs in various chemical forms in Czechoslovakia, Belgian Congo, Canada, Utah and Colorado. Prewar radium-uranium ore obtained from Congo and Canada.

➤ URANIUM, classed by chemists as a minor metal but now perhaps playing a major part in atomic bombs, occurs in various chemical forms in widely scattered countries of the world on at least three continents, North America, Europe and Africa. Pitchblende, a form of uranium oxide, is mined in the Belgian Congo, in Bohemia in Czechoslovakia, and at Great Bear Lake, Northwest Territory, Canada. Carnotite, a uranium and vanadium salt of potassium, is found in Utah and Colorado.

Nearly the entire world output of radium-uranium ore prior to the war was mined at Great Bear Lake and in the Belgian Congo. Mines in both countries were inoperative during 1941, but the Canada company had stockpiles at its refinery at Port Hope, Ontario, and enjoyed its best sales year that year. Mining began again in 1942. The German occupation of Belgium in May, 1940, closed the Belgian refinery at Oolen, near Antwerp, where the African ore was refined, but the Germans captured no stocks there.

The German supply of radium-uranium ore, during the war, was the relatively small amount available from St. Joachimsthal in Czechoslovakia. The Germans did not use the Belgian refinery because there was no ore for it. The stocks at Oolen, including all of the radium and part of the uranium, had been moved to the United States before the invasion.

During the European war, the United Nations were in a favorable position as regards radium and uranium. These countries possessed an estimated two-thirds of the world radium supply and three-fourths of the uranium. Also they controlled approximately 95% of all the known ore reserves.

The carnotite ore mined in western Colorado and eastern Utah yields radium, uranium and vanadium. The production did not meet domestic needs, however, and considerable radium salts, radioactive substitutes, and uranium oxide and salts were imported.

The principal uses of uranium (not including its use in atomic bombs) is in ceramics, luminescent paints, tool steels and chemicals. Uranium oxides color pottery glazes and porcelain bodies black, gray, brown or green in a reducing environment, and yellow, orange, or red under oxidizing conditions. Sodium uranate and sodium uranyl carbonate produce the fluorescence typical of uranium glasses.

Uranium salts are incorporated in luminescent paints, either for their own fluorescence, or as activators for such accessory compounds as zinc-cadmium sulfide and beryllium oxide. Uranium imparts desirable properties to steel tools. It is used in the steel as a ferrouranium or in an alloy with nickel. It is used in obtaining a stainless silverware, and as a catalyst in a number of organic chemical reactions.

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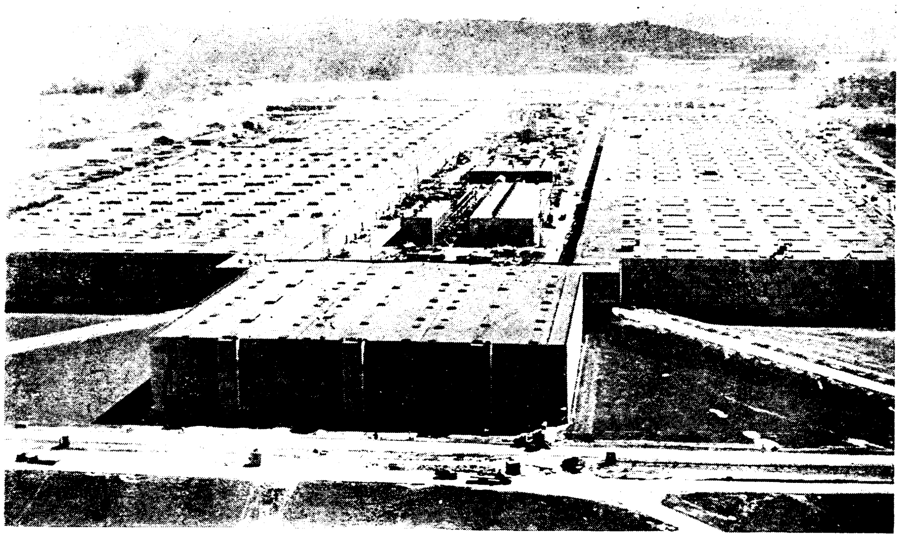

ATOMIC FISSION PLANT—Another view of one of the gigantic production areas at the Clinton Engineer Works at Oak Ridge, Tenn. Shown on the front cover of this SCIENCE NEWS LETTER, is one of the production areas at the Hanford Engineer Works near Pasco, Washington.

PHYSICS

Atoms Are Like Miniature Solar Systems

➤ THE ATOM is the one fundamental unit of matter in the universe. Everything is made of atoms. The only difference between the coal in your furnace, the phosphorus in the match that lights it and the oxygen in the air that makes them burn is that their atoms are made of slightly different arrangements of the same electrical forces. It is these electrical forces that disintegrate the atom and give out atomic power.

Atoms are like miniature solar systems, whose suns are spots of positive electricity and whose planets are electrons. The atoms of the various chemical elements are built of different numbers of electrons. The atoms of uranium are the largest known. Scientists believe they are too large to hold together and that this accounts for the fact that this heavy metal is constantly breaking down into lighter elements, thorium, radium and lead, giving off the strange gas, radon, which is heavier than lead, and showing loss of energy by glowing in the dark.

For nearly half a century the fact of atomic disintegration has been known. But no one knew how to make use of the energy given off by the exploding atoms. Here and there a few electrons would break away from their tiny orbits, throwing the system into confusion, liberating energy as heat and light. Compared to the size of the atom, the quantities of energy liberated are enormous. But no one could predict just when the