CHEMISTRY

Made to Order

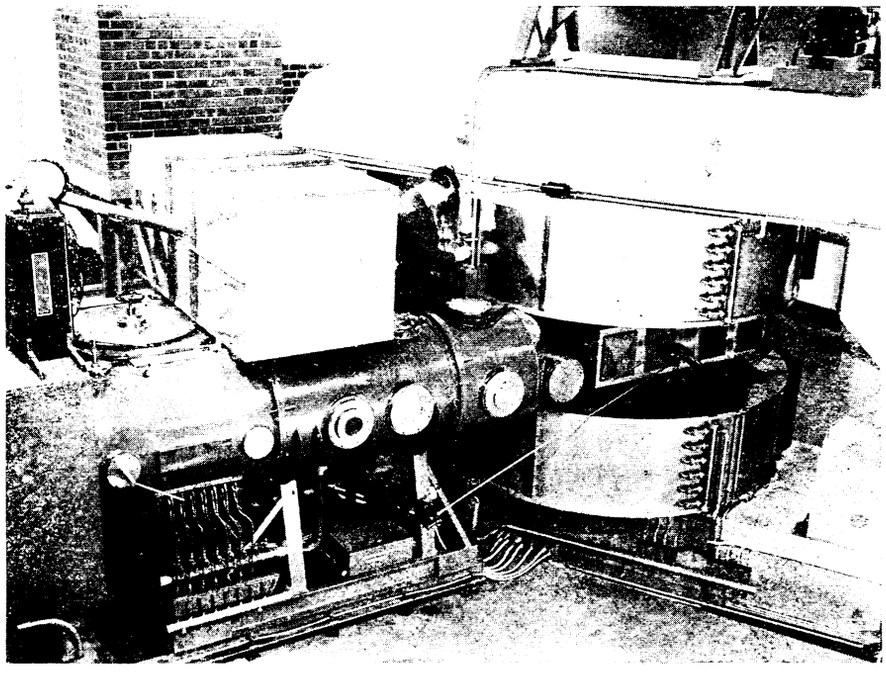
Two elements produced from scientific blueprints to get power for atomic bomb. Have been named Plutonium and Neptunium following names of planets.

➤ CREATION, on a large scale, of two new chemical elements not found in nature was one of the feats accomplished by scientists who developed the atomic bomb. Some of the details of this achievement, which outstrips the wildest dreams of ancient alchemists striving to transform one metal into another, are related by Dr. H. D. Smyth, of Princeton University, in the technical report released by the War Department.

The new elements were planned and then made to order out of uranium to obtain power for the atomic bomb. Scientists had known of their existence. Before 1940, however, the knowledge had been about that which a man has of a woman whose beautiful face flashes by him as he looks from a train window into the windows of another train going in the opposite direction.

Uranium had long been projected as the material from which atomic power might some day be obtained. Occurring in a number of similar forms, known to the chemists as isotopes, only one isotope was found to be useful for the atom-splitting process from which atomic power is practical. In the course of the investigations leading to the atomic bomb invention, it was found that it would be easier to use the uranium as it comes from the ore to create an entirely new element, and then split that new element, than it would to separate uranium's isotopes and remove the more abundant kind which is useless for direct production of energy.

An extremely minute amount of material which it was thought might be one of the elements heavier than uranium, which are theoretically possible, had been made before the war. The Italian chemist Fermi believed he had traces of more than one of these heavy metals, which he called the "transuranian elements." These elements were believed on theoretical grounds to be radioactive. Beyond this, nothing was known of them, and many scientists doubted their existence.



ATOM SMASHER—This is the cyclotron at the Carnegie Institution of Washington used in research on atom splitting. This photograph was first used on the front cover of SNL, June 3, 1944.

Reasoning from analogy with behavior of other radioactive elements in changing into one another spontaneously, physicists of the War Department's research teams worked out methods which should build uranium into these heavier elements, and succeeded in creating two of them.

They are the next neighbors of uranium in the chemist's periodic table of elements. Uranium is element number 92, the new elements are 93 and 94.

As soon as these new elements began to be manufactured in quantity it was necessary to have names to call them by. Borrowing the names of the planets in our solar system, the new elements were named Neptunium (symbol Np) and Plutonium (symbol Pu). Neptunium is 93, Plutonium is 94.

The atomic weights of all these elements are very close together. Due to the large number of isotopes which uranium forms, its weight may be anywhere from 234 to 239. The kind whose weight is 235 is the one most active in atomic disintegration.

Both the new elements seem to claim 239 as their atomic weights. The atomic weight of an element depends on the number of protons and neutrons which make up the heart of its atom.

Science News Letter, August 18, 1945

METALLURGY

Laboratory Ware Material Combines Platinum Alloys

➤ A NEW platinum material, for laboratory ware such as crucibles and other articles now made of platinum alone, has been developed in Baltimore, Md., and is a combination of all platinum-family alloys. The new product, developed because of war necessity and now thoroughly tested in actual use, is claimed to be superior to the platinum ware it may replace.

The new material is a product of the Oscap Manufacturing Company, and it has been tested over months in Army, industrial and university chemical laboratories, and found satisfactory in all, it is declared.

The color of the new material is the silver gray of regular platinum, but slightly darker. It is non-oxidizable, has high tensile strength and flexibility, and is resistant to all acids except boiling aqua regia, a mixture of concentrated hydrochloric and nitric acids.

Science News Letter, August 18, 1945

Young *hawks* must be fed every two hours from daybreak until dark.