

me that they thought it was essentially impossible because we had no large source of plutonium. But I thought we could irradiate large amounts of uranium with the neutrons from cyclotrons since the indications were that we probably could produce sufficient plutonium, *if* we could learn to work on the microgram or smaller-than-microgram scale. That way we could get concentrations as large as those that would exist in the chemical separation plant.

I knew rather vaguely about two schools of ultramicrochemistry--the School of Anton Benedetti-Pichler at Queens College in New York and the School of Paul Kirk in the Department of Biochemistry at the University of California at Berkeley.

I went to New York in May 1942, looked up Benedetti-Pichler, and told him that I needed a good ultramicrochemist. He introduced me to Michael Cefola, and I offered him a job, which he accepted immediately. That he was on the job about three weeks later illustrates the pace at which things moved in those days.

Then, early in June, I took a trip to Berkeley, where I looked up my friend Paul Kirk and put the same problem to him. I could not tell any of these people why we wanted to work with microgram amounts or what the material was, but this did not seem to deter their willingness to accept. Paul Kirk introduced me to Burris Cunningham. When I asked him if he would come to Chicago, he accepted and was in town by the end of the month. He told me as soon as he arrived that he had a fine student, Louis Werner, he would like to invite, and I was, of course, delighted. Werner came along in a few weeks.

These, then, are the people who began the task of isolating plutonium from large amounts of uranium. We brought from Berkeley a little cyclotron-produced sample prepared by Wahl. It contained a microgram or so of plutonium mixed with several milligrams of rare earths. Using that sample, the ultramicrochemists Cunningham, Cefola, and Werner, isolated the first visible amount--about a microgram--of pure plutonium in the form of the fluoride. It was not weighed, but it could be seen! We were all very excited when we were the first to see a man-made element on August 20, 1942 (Figure 6).

In the meantime, hundreds of pounds of uranium were being bombarded with neutrons produced by the cyclotron at Washington University, under the leadership of Alex Langsdorf, and at the 60-Inch Cyclotron at Berkeley, under the leadership of Joe Hamilton. This highly radioactive material was then shipped to Chicago. Art Jaffey, Truman Kohman, and Isadore Perlman led a team of chemists who put this material through the ether extraction process and the oxidation and reduction cycles to bring it down to a few milligrams of rare earths containing perhaps 100 micrograms of plutonium. This was turned over to Cunningham, Werner and Cefola. These men