

best carrier compounds and best oxidizing and reducing agents, had not yet been discovered. Dr. S. G. Thompson is largely responsible for the conception and early development of the process which was finally chosen. I cannot, of course, give recognition individually to the large group of scientists who participated so successfully in the diverse phases of this over-all problem. In addition, although this lecture is concerned primarily with the basic chemistry and physics of the trans-uranium elements, mention should be made of the outstanding contribution of the chemists and engineers of the du Pont Company in the adaptation of the plutonium process for industrial operation and in the plant design, construction and operation.

The laboratory investigations were conducted on the tracer scale, and it soon became apparent that tests would be necessary under conditions where the plutonium concentration would be the same as that anticipated in the production plant. This proved a great difficulty since no one had actually seen any plutonium up to this time, and the design of the separation plants had to begin immediately so that the construction of these plants could take place at the same time as the construction of the chain reacting units. This problem was solved by producing an actual weighable amount of plutonium by bombarding large amounts of uranium with neutrons from the cyclotron, the first time a weighable amount of any transmutation product had been produced with a particle acceleration machine, and by working with this material in such extremely small volumes that ordinary concentrations would prevail. The field which embraces the study of chemical material on this, the microgram scale of operation, has been given the name of "ultramicrochemistry"