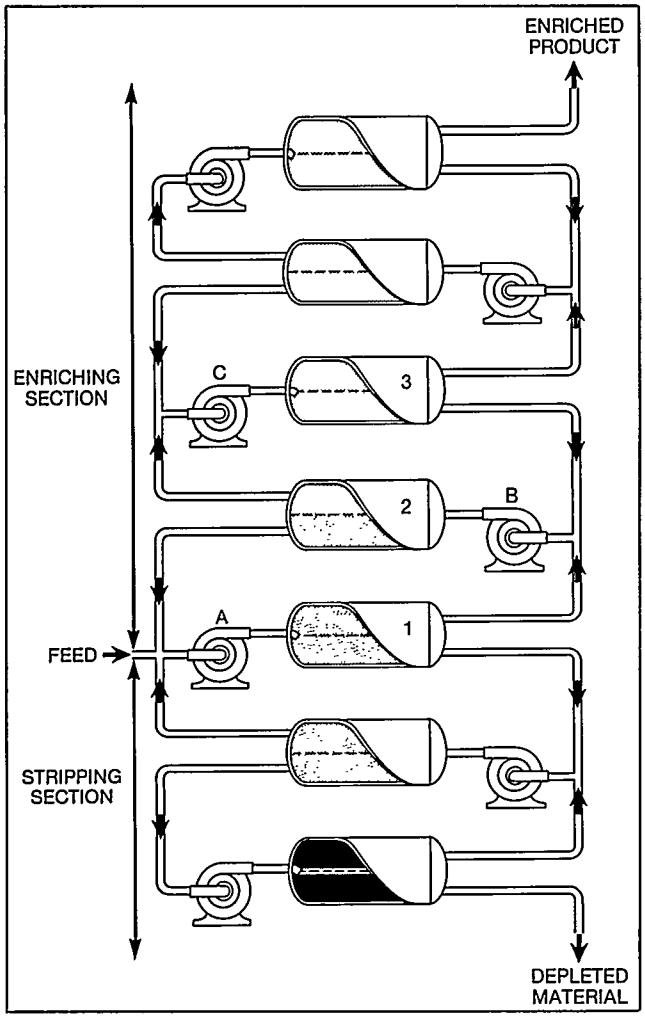
Part II:
Early Government Support



Schematic Diagram of Flow of Process Gas in Gaseous Diffusion Cascade. Reprinted from Richard G. Hewlett and Oscar E. Anderson, Jr., *The New World, 1939-1946,* Volume I of *A History of the United States Atomic Energy Commission* (University Park: Pennsylvania State University Press, 1962).

The Uranium Committee

President Roosevelt responded to the call for government support of uranium research quickly but cautiously. He appointed Lyman J. Briggs, director of the National Bureau of Standards, head of the Advisory Committee on Uranium, which met for the first time on October 21, 1939. The committee, including both civilian and military representation, was to coordinate its activities with Sachs and look into the current state of research on uranium to recommend an appropriate role for the federal government. In early 1940 the Uranium Committee recommended that the government fund limited research on isotope separation as well as Fermi's and Szilard's work on chain reactions at Columbia.

Isotope Separation

Scientists had concluded that enriched samples of uranium-235 were necessary for further research and that the isotope might serve as a fuel source for an explosive device; thus, finding the most effective method of isotope separation was a high priority. Since uranium-235 and uranium-238 were chemically identical, they could not be separated by chemical means. And with their masses differing by less than one percent, separation by physical means would be extremely difficult and expensive. Nonetheless, scientists pressed forward on several complicated techniques of physical separation, all based on the small difference in atomic weight between the uranium isotopes.

The Electromagnetic Method

The electromagnetic method, pioneered by Alfred O. Nier of the University of Minnesota, used a mass spectrometer, or spectrograph, to send a stream of charged particles through a magnetic field. Atoms of the lighter isotope would be deflected more by the magnetic field than those of the heavier isotope, resulting in two streams that could then be collected in different receivers. The electromagnetic method as it existed in 1940, however, would have taken far too long to separate quantities sufficient to be useful in the current war. In fact, twenty-seven thousand years would have been required for a single spectrometer to separate one gram of uranium-235.[9]

Gaseous Diffusion

Gaseous diffusion appeared more promising. Based on the well-known principle that molecules of a lighter isotope would pass through a porous bar-