was milled from the target plates in layers of ca. 100 mg.cm.$^{-2}$. Each of the layers was processed separately to yield radiochemically pure plutonium fractions. Standard alpha and beta-particle measurements with the purified plutonium samples revealed the presence of no radiations which could not be accounted for on the basis of the radiations from previously known plutonium isotopes. Investigation of the very low energy beta spectrum, however, indicated the presence of beta-particles with ca. 20 kev maximum energy. The measurements were made in an apparatus designed by Raynor[4], in which window and gas absorption of the particles to be counted is reduced to ca. 300 micrograms per cm^2. In this case provision was made for absorption measurements using a limited number of absorbers made from thin calibrated films of cellulose nitrate. The beta-particle range was estimated visually on a semilogarithmic plot of the counting data to be 600-800 micrograms per cm^2, which corresponds to 20 kev maximum energy as obtained from the range-energy data of Schonland[5] for low energy electrons. Absorption curves for the 20 kev beta-particle component of the plutonium activities from the first and third layers of the activated uranium target are given in Figure 1, in which beta-particle intensities are normalized to the Pu^{239} alpha-particle activities in each sample. Thus, the lower intensities shown for the first layer indicate that the yield of the isotope responsible for the beta-particle activity increases relative to the yield of Pu^{239} as the depth of penetration of the helium ion increases. From the data compiled by Livingston and Bethe[6] on the relative stopping power of various elements for helium ions, the maximum energy of the ions in the first and third uranium layers was calculated to be 38 Mev and 28 Mev, respectively. At the lower energy, the ratio of yields, (α, 3n) to (α,3n) should be greater than at a higher energy.

Fig. 1