The cross-sections obtained were as follows:

$1.86 \times 10^{-26} cm^2$ for $Ag^{109}(\gamma\ n)Ag^{108}$

$1.68 \times 10^{-26} cm^2$ ror $Ag^{107}(\gamma.\ n)Ag^{106}$.

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3. Accelerating Tube for Neutron Production

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The accelerating tube for neutron production have recently been improved and reconstructed.

The main points of the improvements and the constructions of the tube were as follows.

1. Ion source.

A new type magnetic ion source without hot cathode was applied. The discharge was produced in a small cylindrical space which was formed by a pair of iron cathodes and an anode of annular shape. The necessary magnetic field of about 400 gauss was made between those cathodes and the discharging voltage was 2000 volts. The stable deuterium ion beam of about 190μA was introduced to the accelerating portion of the tube through a canal of 3 mm. in diameter and 7 mm. in length. The electric powers consumed by the ion source were about 70 watts for the magnetic field and 20 watts for the discharge.

2. Accelerating electrodes.

The cylindrical electrodes of three stages, each of which had a bottom with an edgeless hole of 2 cm. in diameter, were set coaxially and comparatively close to each other for the purpose of shortening the ion path as possible. The distance between the ion source and the first electrode was 9.5 cm. and the distances between each accelerating electrode were 5.5 cm. The electric fiield formed by the holes converged the ion beam. Therefore the ions which issued from the ion source were accelerated to the energy of several hundreds kilovolts when passing through about 25 cm. in length and 70 to 80 percent of the ions would bombard the target.

3. Vacuum system.

We have preliminary measured the relations between the heater inputs and the pumping speed of the diffusion pump for the case of deuterium gas. The maximum pumping speed was found to be about 130 litre / sec at 800 watt heater input. By these experiments we examined quantitatively the size of the evacuating pipes and the gas leak quantity. Therefore, during the experiments, the accelerating tube was maintained at the vacuum pressure of about 6×10^{-5} mmHg. under the gas inlet of 15 cc/hr.

After these fundamental considerations and experiments, we bombarded beryllium by the deuterium ion beam of 120 μA having energy of about 340 kilovolts and found the production of neutrons equivalent to about 1 gr. Ra+Be neutron source.

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4. The Intensity Distribution of Slow Neutrons in $KMnO_4$ Solutions

The Production of Radioactive Manganese by Irradiation of Neutrons

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The target of beryllium was bombarded by the 340 Kev deuteron beam accelerated by the high voltage machine of Cockcroft-Walton type. The Be-D neutron source was placed in the center of the water held in a bottle with the diameter and the depth of 29cm and 30cm respectively, and a glass ampoule containing a small quantity of 5% $KMnO_4$ solution was hung at various distances from the source. The distribution of the slow neutron intensity in the water was measured using the induced activity of radioactive manganese Mn^{56} produced in the ampoule, and the NR^2 curve was plotted, where N was the intensity of the neutron flux and R was the distance from the source. The peak of the NR^2 curve was found at R=10cm.

In the same way, the distribution of the slow neutron intensity in the 5% $KMnO_4$ solution and the yield of the radioactive manganese were observed with the small quantity of $KMnO_4$ solutions.

In both cases, the distribution of the slow neutron intensity seemed to be nearly equal. The intensity of Be-D neutrons producod by our machine was equivalent to that of 1gr Ra-Be neutron source. The yield of the radioactive manganese produced from 8 litres of $KMnO_4$ solution during three hours was estimated to be about 1.5μc.

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5. On the Energy Distribution of the Compton Electrons by Co^{60}-γ

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The energy spectrum of gamma-rays from Co^{60} (1.17 Mev and 1.33 Mev), reported in the preceding issue of this Bulletin (**26**, 63 (1951)), has been fur-