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.

---

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

The Production of Radioactive Manganese by Irradiation of Neutrons

Kiichi Kimura, Ryutaro Ishiwari, Masakatsu Sakisaka, Isao Kumabe, Sukeaki Yamashita and *Kōzō Miyake*

(K. Kimura Laboratory)

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.

---

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

Toshio Azuma, Kunihiko Tsumori and *Kiichi Kimura*

(K. Kimura Laboratory)

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 further observed by using Aluminum as a radiator of the secondary electrons. The geometrical arrangement of apparatus was the same as those described in the previous report. The experimental results obtained are shown in the following table. The photo-electrons disappeared in the case of Al-radiator.

Table I. Energy Spectrum of Gamma-Rays from Co^{60}

Energy (Hρ)	Counts/Min.	
	Pb-Radiator (39 mg/cm^2. 14mmϕ)	Al-Radiator (1 mm thick. 14 mmϕ)
557	212	214
1113	254	305
1670	505	814
2226	1082	1652
2783	2138	2804
3339	3406	4312
3896	4655	6156
4173	4846-(Compton-peak)	6424-(Compton-peak)
4452	4712	6174
4730	4008	5004
4898	3282	4272
5009	3636	3316
5120	3816-(Photo-peak)	2422
5231	2298	1524
5342	2292	1212
5565	1414	416
5676	1636	322
5787	1805-(Photo-peak)	306
5898	1354	292
6010	1066	284
6122	622	264

We found that the method of Richardson-Kurie (Phys. Rev. **50**, 999 (1936)) was also applicable to the analysis of the energy distribution of the Compton electrons which was detected by the lens coil spectrometer. The Compton electrons suffered both the angular distribution determined by the Klein-Nishina formula and the energy straggling calculated by the White-Millington formula (Proc. Roy. Soc. Lond. **120**A, 701 (1928)). The results of the numerial evaluations were shown in table II, taking the peak value of 1.17 Mev.

Table II. Counting Ratio near the Compton Peak.

Energy (Hρ)	4000	4100	4200	4300	4400	4500	4550
Counting Rate	915	1095	1270	1050	905	695	350

---

6. On the Backscattering of the β-Rays of P^{32}

Toshio Azuma, Hiroshi Nakamura, Isao Kumabe, Kunihiko Tsumori, and *Sakae Shimizu*

(K. Kimura Laboratory)

The amounts of the backscattering of the β-rays of P^{32} were reported in