cular to the axis of a counter, we counted β-particles ejected from the same sample of P^{32} which were collimated by the very narrow and long hole (1 mm in diameter).

As the results, the part of the center was found to be rather inefficient. It was considered to be due to the existence of a glass bead and a center wire. While the efficiency of the part near the cathode wall decreased so sharply that it could not be only attributed to ordioary recombination of ions. Moreover, it was found to be not due to diffusion of a beam of the β-rays by some experiments.

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4. The Improved Counting Rate Meter

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(K. Kimura Laboratory)

This circuit consists of an uniform pulse generator, an integrator and a vacuum tube voltmeter. The uniform pulse generator consists of two univibrators and a differential circuits, so that the average rate of arrival of the periodic or random pulses can be indicated by the outputmeter and the reading of the meter never depend on the shape of pulses. Also the first univibrator can act the role of the discriminator. The range of the counts can be easily changed by changing only the bias of the integrator tube. In the integrator circuit no condenser is used, except in the tank circuit, and the vacuum tube voltmeter is of the type of the cathode follower, so that the reading of the outputmeter is linear to the average rate of the input pulses. The voltmeter, forming an electrical bridge, is stable to the fluctuation of the supply voltage.

With this meter, we could read the counting rate, from 10 to 300,000 periodic pulses per minute, or from 71 to 23,100 random pulses per minute, within the error of 5%.

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5. The Absorption of γ-Rays from Co^{60} in Several Elements

Sakae Shimizu, *Tetsuya Hanai* and *Sunao Okamoto*

(K. Kimura Laboratory)

The γ-ray absorption coefficients of twelve elements for Co^{60} γ-rays (1.17 Mev and 1.33 Mev) were measured.

The value of absorption coefficient generally depends to some extent upon the experimental geometry used. In the present experiment, therefore, in order to exclude the effects of scattered or stray radiation as far as possible, we adopted the experimental arrangement essentially the same as that used by Uemura in the similar measurements for 17 Mev and 6.1 Mev γ-rays (this bulletin, **22** (1950), 18).

The source of γ-rays used was $CoCl_3$ of about 2 mC, which was enclosed in a small glass tube. As a radiation detector we used an end-window type G-M counter with a lead plate 1.2 mm thick placed before the window. The distance between the γ-ray source and the counter was about 80 cm, and the distance between an absorber and the counter was about 30 cm. A set of the canalizing lead slit and plug was placed upon the counter. Then the difference between the counts wiђh the lead plug and that without for each absorber was taken to be the true counts due to the γ-rays, which passed through both absorber and canal.

By these procedures we obtained the absorption coefficients (cm^{-1}) for twelve elements as follows:

$_{12}$Mg, 0.099_4; $_{13}$Al, 0.14_3; $_{26}$Fe, 0.40_8; $_{28}$Ni, 0.48_8; $_{29}$Cu, 0.46_4; $_{30}$Zn, 0.36_6;
$_{48}$Cd, 0.43_8; $_{50}$Sn, 0.36_2; $_{51}$Sb, 0.33_5; $_{80}$Hg, 0.74_9; $_{82}$Pb, 0.64_3; $_{83}$Bi, 0.56_6.

Further meafurements for other elements and the analysis of the expetimental data obtained are now in progress.

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6. On the Scintillation Counter

Sakae Shimizu, Hidekuni Takekoshi and *Eiko Nishimura*

(K. Kimura Laboratory)

The scintillation counter has been used for measuring γ-ray energy and intensity.

For this purpose, transparent NaI (Tl) and anthracene crystals were made in our laboratory by slow cooling method. The scintillations excited by individual γ-ray quanta in the crystal was detected by the photo-multiplier (RCA 931A). The output of photo-multiplier was amplified about 500 times, and pulse hight distribution was observed by the set of discriminator and scaler. Several microcuries of $Co^{60}Cl_3$,were put in front of the NaI (Tl) crystal (about $1\times1\times1$ cm^3). We found relatively sharp four lines in the differential pulse hight distribution curve. The sharpness of these lines was affected by the intensity of radioactive source, the thickness of the crystal, the collimation of γ-rays, and many other factors, but the position of these lines was not altered. Comparing these lines with the pair line (2.6 Mev) of Th-C'', γ-rays, it is concluded that these lines correspond to two compton lines and two photo-electric lines for two γ-ray components (1.13 Mev and 1.17 Mev).

But when the anthracene crystal was used, these lines were much broadened. This was caused probably by poor fluorescent characteristics of anthracene.

To avoid fluctuation in the counting, high voltage supply for the photo-multiplier was stabilized to about 0.01% and the amplifier gain was stabilized as far as possible.
