the film, and by shifting it quickly, we get the direct image and mirror image alternately, so that, by those motion, the judgement of the coincidence of the two images are made very easy.

(ii) We made two images of the end points or any distinctive points of the tracks coincide at a point on the white paper, which is freely movable along the x, y, z-axes. Then x, y, z, coordinates of the point were read with the vernier, and from these values the ranges and the spacial arrangements of tracks were determined.

We found these methods were very convenient and accurate.

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44. On the Property of the Proportional Counter.

Masateru Sonoda.

The counting property of a CH_4, CH_4–Ar, C_2H_5OH, and C_2H_5OH–Ar proportional counter was investigated under the intense γ-ray background and the followings were found.

(1) The plateau was 150V~200V with the rise of about 10 %.

(2) The γ-ray background became sensitive on the plateau for the higher value of the total pressure. The relatively small pressure (7~10 cm Hg) was found to be most suitable for counting α-particle or proton under such intense γ-ray background.

(3) The increase of Ar decreases the operating voltage of the counter so for as the amount of CH_4 or C_2H_5OH is kept greater than a certain lower limit (about 3 cm Hg).

The counter of the CH_4 flow type was also investigated and found to be used satisfactorily both for α-particle and β or γ-rays. The plateau was about 200V for the α-particle and 100V for the β-particle, with the slope flatter than for the former type in both cases.

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45. The Efficiency of the G-M Counter for High Energy γ-quanta.

Masateru Sonoda.

The efficiency of the lead counter was calculated theoretically for the γ-ray of high energy such as emitted by (Li-p) or (F-p) reaction, taking into account the effect of the multiple scattering and the radiation loss of the secondary electrons. The contribution due to the secondary radiation produced by the brems-

trahlung effect of the secondary electrons was also considered, and found to be small.

The final results obtained were as follows. The inner diameter of the counter was 2 cm.

wall thickness in cm	energy of γ-ray quantum 12	20	25	30	34 (mc^2)
0.65	3.2 %	8.5 %	13.3 %	18.1 %	21.3 %
0.60	3.3	8.7	13.6	18.7	22.1
0.50	3.6	9.3	14.3	19.8	23.4
0.40	3.8	9.9	14.9	20.4	23.7
0.30	4.0	10.4	15.2	20.2	23.0
0.20	4.0	10.2	14.6	18.0	20.1

46. Observation of Cosmic-rays with Photographic Emulsion. (I)

Kiichi Kimura, Senzo Tokunaga, Kazunori Yuasa and *Ryutaro Ishiwari.*

A preliminary report on the observation of cosmic-rays with photographic emulsion was described. Eight sheets of Type N. T. B. plate presented by the Eastman Kodak Co., were exposed to cosmic-rays at the meteorological observatory of Mt. Norikura (2840 m) during 47 days this summer.

Though up to now only 1⅓ plates have been scanned, 261 cosmic-ray stars and several meson and many proton tracks have been observed. The distribution of the number of prongs per star is compared with the results of Cortini et al.[1] on Testa Grigia (3500 m) and Lattes et al.[2] on Pic du Midi (2800 m) as shown in the table.

Number of prong		2	3	4	5	6	7	8	9	≧5	Total
Stars/cc/day	Norikura	10.9	16.4	15.6	9.3	2.1	0.21	0.21	0.21	12.0	55.1
	Testa Grigia		5.04	4.11	1.91						14.22
	Pic du Midi									10.5	

1) G. Cortini and A. Manfredini; Nature **163**, 991 (1949).

2) C. M. G. Lattes, G. P. C. Occhialini and C. F. Powell; Nature **160**, 453 (1947).

47. Study on Pulse Shapes of Alpha-ray Counter with Ionization Chamber and Linear Amplifier.

Yoshiaki Uemura, Ryutaro Ishiwari and *Kazunori Yuasa.*

The pulse shapes of alpha-ray counter with ionization chamber and linear