in the medium with the above-mentioned dose of nicotinic acid. Smaller doses (1 γ) proved insufficient and gave inconstant results.

Thus the development of the newly hatched *Galleria* larvæ can serve as a most sensitive biological test for detecting minute quantities of nicotinic acid.

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Moscow. May 13.

[1] Trager and Subbarow have recently reported the necessity of the vitamin B_1 for the development of the mosquito larvæ (*Biol. Bull.*, **75**, No. 1; 1938).

Radiations from Radiomanganese

THE radiations from radiomanganese, ^{56}Mn, have been investigated by various experimenters and, as a result, it has been concluded that a γ-ray of energy 1·7 Mev. is present, together with a complex spectrum of negative electrons. This spectrum has been analysed into partial spectra with maximum energies 1·2 and 2·9 Mev. respectively.

I have made, recently, single counter absorption measurements[2] of the β-particles from this body and coincidence experiments utilizing β-γ [1] and γ-γ [3] coincidences in turn. The β-absorption measurements confirm the upper energy limit deduced by previous authors, and are consistent with a β-particle spectrum composed of the above two partial spectra in the ratio of 0·40 : 0·60.

The β-γ coincidence experiments show a correlation of all β-particles with γ-rays. In Fig. 1 are plotted, logarithmically, the β-γ coincidence rate per quantum detected by the γ-counter (curve *a*), and the β-absorption curve (*b*). The curves are closely parallel beyond an absorption thickness of 240 mgm. per sq. cm., and the former has been scaled so as to be superimposed on the latter in this region. The coincidence rates are explicable in terms of a γ-ray of 600 kev. (± 50 kev.) following the β-particles in the harder partial spectrum and a γ-ray of 2·5 Mev. following those of the softer spectrum. These coincidence experiments yield, directly, an upper limit of 1·1 Mev. for the softer β-partial spectrum.

The γ-γ coincidence experiments, on the other hand, demonstrate the successive emission of two γ-rays by some of the excited ^{56}Mn nuclei. The γ-γ coincidence rate obtained can be explained *quantitatively* by the assumption that the softer β-particle spectrum is associated with two γ-rays of energy 1·7 Mev. and 600 kev., emitted in cascade, this assignment of energies being chosen, in preference to any other pair giving the same γ-γ coincidence rate, since the efficiency of detection of a 1·7 Mev. γ-ray together with that for a 600 kev. ray is equivalent to that for a γ-ray of 2·5 Mev.[1], and the β-γ-coincidence rate is thereby uniquely explained.

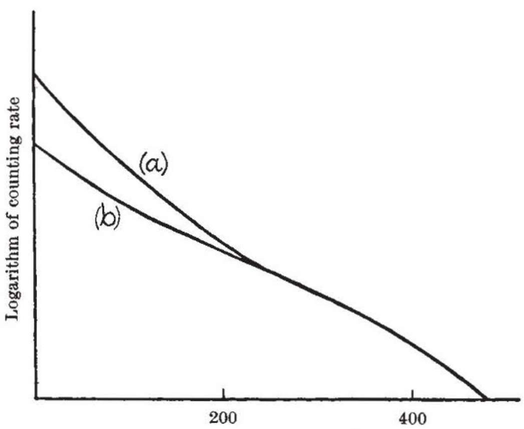

Fig. 1.

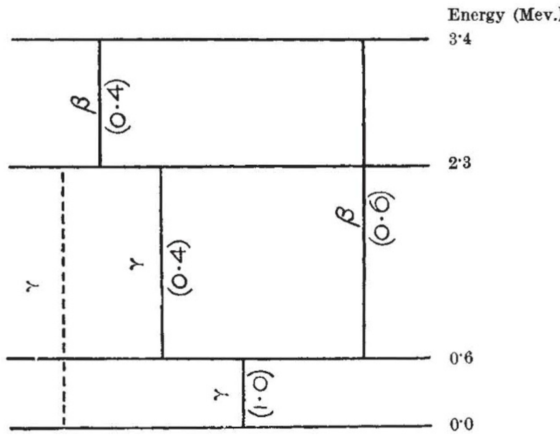

Fig. 2.

LEVEL SCHEME FOR DISINTEGRATION OF RADIOMANGANESE

Figures in brackets represent intensity of radiations per disintegration

The level scheme shown in Fig. 2 is therefore obtained. It predicts a γ-ray of energy 600 kev. of 2·5 times the intensity of the harder γ-ray. The presence of this γ-ray (of 600 kev.) has been confirmed by Ward (of this Laboratory) using a pressure ionization chamber. At the same time, it has been shown that there is no appreciable intensity of the γ-ray transition shown dotted in Fig. 2.

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Cavendish Laboratory,
Cambridge. May 17.

[1] Dunworth, in the press.
[2] Feather, *Proc. Camb. Phil. Soc.*, **34**, 599–611 (1938).
[3] Feather and Dunworth, *Proc. Roy. Soc.*, A, **168**, 566–585 (1938).

Apparent Existence of a Very Penetrating Radiation from Radium and (Radium + Beryllium)

A FEW years ago, one of us[1] observed a very penetrating radiation emitted by a strong source of radium, having an absorption coefficient in lead of about $\mu = 0{\cdot}03$ cm.$^{-1}$. We have recently reinvestigated this phenomenon, as there were grounds for supposing that the radiation might consist of mesotrons. The arguments in favour of this view may be summarized as follows:

Mesotrons may be formed, according to Heitler[2], in processes such as:

$$h\nu + {}^1_1\mathrm{H} \rightleftarrows M_+ + {}^1_0n,$$
$$h\nu + {}^1_0n \rightleftarrows M_- + {}^1_1\mathrm{H},$$

provided that $h\nu$ is greater than 10^8 ev. It is now known that energies greater than 10^8 ev. are liberated during the 'fission' of heavy nuclei. The absorption coefficient of mesotrons in lead is $\mu = 0{\cdot}03$ cm.$^{-1}$, which is similar to that of the unknown radiation referred to above.