proportionality of the ionization-energy relation for α-particles in air should be much better than declared by Bethe and Jesse *et al.*

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3. γ-Spectrum of Co^{60}

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A thin double magnetic lens β-ray spectrometer has been employed with a source of Co^{60} of 2 mc sealed in a glass capsul. Its design admited about 1/500 of 4π in solid angle of β-rays from the source into the counter. The spectrometer, with a thin Pb radiator foil (diameter 7 mm) on one end and a mica end-window type G–M counter on the other and with thick Pb between them to avoid the direct γ, is equipped with the thin double magnetic lens at the middle part of the brass cylindrical tube, as explained eleswhere in detail. (M. Deutch *et al.*, R.S.I. **15** 198 (1944), E.A. Quade *et al.*, Phys. Rev. **72**, 234 (1947)). The γ-ray energies were determined by the study of the spectrum of photo-electrons produced in Pb radiator foils. In addition to the photoelectric conversion lines generated in the lead by γ, a broad distribution of compton electrons was obtained. To permit an accurate determination of the photo-electrons from the radiator, attention was given to the effect of the radiator thickness and to the influence of the earth's magnetic field. The momentum p of the focused electrons will be proportional to the strength of the field and the field is proportional to the coil current. Therefore, may write for this relation $p=k\cdot I$, where I is the current in the coil and k is a factor dependent upon the shape of the field. (k is 1.216×10^3 gauss cm/Amp in this case.)

The current required to focus 1.1 Mev conversion line was found to change 16 mA when the current was reversed, so the correction for the earth's magnetic field has been taken as ±8 mA. The photo-electrons ejected from a radiator for a particular γ-energy will have energies depend upon the depth of the point from which they originate. The coil current which converged the 1.1 Mev photo-conversion electrons was determined by the use of seven Pb foils 21.5 mg/cm^2 to 83.0 mg/cm^2 and its resolution was found to be 3.4%. Two peak values of photo-conversion lines correspond to $I_1=4.175$ Amp and $I_2=4.755$ Amp, respectively, with earth magnetic field correction. So we can estimate the rate of two γ-ray energies as 4.175/4.755. This value corresponds to that give by Linde *et al.* (Phys. Rev. **76**, 1838 (1949)) and Jenzen *et al.* (Phys. Rev. **75**, 458 (1949)).
