linearity of the curve within 150 kev of the end point is in accordance with theoretical expectations. The "fillet" near the end point can be accounted for by the angular window of the spectrograph. The extrapolated end point of this spectrum was used along with Q_2 to calculate Q_2'.

The curves obtained from reaction (3) are shown in the insert in Fig. 1. Both the doubly ionized He^4 and He^3 ions were detected and both groups were used in the energy determination. The reaction was studied at 742- and 1237-kev bombarding energy.

In the calculations, the midpoint of the front edge of the peaks was taken as corresponding to particles leaving the front surfaces of the target at the mean entrance angle of the spectrograph. Small corrections for relativity and surface layers have been made in each case. The errors were calculated by compounding the estimated systematic errors with the observed statistical errors which were very small. The probable systematic errors assumed were 0.3° in the angle of observation, 0.3 percent in observed energy, and 0.2 percent in the bombarding energy.

Q_1 is found to be 2.121 ± 0.012 Mev, Q_2 is 0.558 ± 0.003 Mev, while Q_3 is 4.017 ± 0.022. These are both somewhat higher than the measurements of Rosario,[5] and Perlow.[6] Q'_2 is 89 ± 5 kev, which is to be compared with Hemmendinger's value of 102 ± 10 after his value is corrected for the gamma-ray recoil.[7] A combination of the above Q values with those of $D(dp)H^3$ and $D(dn)He^3$, which have Q-values of 4.036 ± 0.022 Mev and 3.265 ± 0.018 Mev, respectively,[8] and the binding energy of the deuteron, 2.237 ± 0.007 Mev[9] makes it possible to calculate the energy release in the reactions $Li^6(nH^3)He^4$ and $Be^9(\gamma n)Be^8$. We find for the first reaction $Q=4.788\pm0.023$ Mev and for the second, $Q=-1.679\pm0.008$ Mev. The ratio of the Q-value of $H^2(\gamma n)H^1$ to that of $Be^9(\gamma n)Be^8$ is 1.332 ± 0.010, which is in agreement with the measurement of Waldman and Miller[10] who find 1.338 ± 0.004. The recently determined ranges of the particles in the Li^6 reaction[11] give the following two points on the range energy relations: 0.912-Mev protons have a range of 2.00 ± 0.02 cm and 2.058-Mev alpha-particles have a range 1.04 ± 0.02 cm in air at N.T.P.

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* Fluxmeter readings are proportional to the (charge)/(momentum) of the observed particles.

** The particles and residual nuclei produced in a reaction at a given angle have approximately the same momentum. Hence, the ions of the two products with the same charge overlap in a momentum analysis made by a magnetic field. This is quite different than in an analysis by range measurements.

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A Revaluation of the Gamma-Radiations from Co^{60} and Zn^{65}

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IN a recent paper[1] we described briefly the construction of an iron-free magnetic lens spectrometer and discussed the character of the corrections to be applied to gamma-ray measurements made with an instrument of that type. Energy values for the gamma-radiations from Co^{60} and Zn^{65}, obtained by measurement of photoelectric conversion lines, were reported. Calibration of the spectrometer was effected through the use of photoelectrons produced by annihilation radiation and of conversion electrons from ThB (F-line).

It has since become possible for us to obtain sources which would permit comparative measurements of the internal conversion line corresponding to the 2.62 Mev gamma-ray of ThC″ and the F-line from ThB. Such a comparison was considered desirable, since it would afford a definitive check of the presumed proportionality between the focused momenta and the currents in the spectrometer. Upon learning from Dr. T. Lauritsen that spectrometer work[2] at the California Institute of Technology indicated energies for the Co^{60} gamma-radiations approximately 15 kev higher than those cited by us,[1] we undertook to perform this check of our instrument *in conjunction with* a remeasurement of the photoelectric conversion lines from Co^{60}. This work has confirmed the linearity of the instrument but has led to a revised value of the spectrometer constant which is almost one percent greater than that found in our earlier work.

Based on momentum values of 1385 and 10,000 gauss-cm for the internal conversion electrons from ThB and ThC″, respectively,[3] and with the corrections for the photoelectric radiator made in the manner previously described,[1] our recent measurements lead to energies of 1.16_9 and 1.33_1 Mev for the gamma-radiations from Co^{60}. It is believed that these new values are more reliable than those given by us previously, as the stability of the spectrometer has been improved since the earlier data were obtained. These revised values are consistent with those determined by Hornyak *et al.*,[2] and with the precision wave-length measurements which have now been reported by Lind, Brown, and DuMond.[4] The values we have now obtained, when used in conjunction with previously reported[5] data obtained from a *composite* source in which *both* Co^{60} and Zn^{65} activities were present, leads to a revised value of 1.11_8 Mev for the Zn^{65} gamma-ray.

It should be mentioned that our corrections for the energy loss experienced by the electrons in the photoelectric converter are based[1] on the *average* energy loss by collision and, in the energy range with which we are concerned here, disregard complicating scattering effects. It is understood that the results of a more elaborate analysis have been used in the work of Hornyak *et al.*,[2] and lead to corrections appreciably smaller than those which we have been led to apply.

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Ferro-electric Properties of WO_3

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WE have recently grown single crystals of WO_3 and have found that these crystals appear to show ferro-electric behavior. The crystal structure of WO_3 may be looked at as being similar to a perovskite structure with the omission of the cations at the cube corners of the unit cell. That is, we may view WO_3 as derived from $BaTiO_3$ by the complete omission of the Ba-ions and the substitution of W for Ti. The ionic radius[1] of W^{+6} is 0.62 A and we therefore see that the WO_6 octahedra obey the empirical rule for the occurrence of ferro-electricity in perovskite-type structures