attributed to the photo-multiplier crystal combination, it may possibly represent a lack of exact linearity in the crystal light output-energy relationship for low energies.

In Fig. 2(*D*) is shown the 29-kev x-ray of Xe, obtained with a somewhat larger gain setting of the linear amplifier. From the resolution of this low energy line (50 percent), and other considerations, it has been possible to reconstruct approximately the pulse-height scale in terms of the numbers of electrons collected from the cathode. It is interesting to note that the noise level rises rapidly only below pulse heights corresponding to 3 or 4 electrons collected by the first dynode (or approximately 5 kev on the calibration curve[5]).

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The Gamma-Radiation of Ba^{131}

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FOR determination of the energies of gamma-rays less abundant than the 496-kev gamma-ray of Ba^{131} barium nitrate was activated with the highest neutron flux available at the Oak Ridge National Laboratory. The gamma-radiation intensity of Ba^{131} received was about twice that of the previous activation. The barium was chemically purified and after disintegration of Ba^{133} was studied with a thin-lens spectrometer. A broad increase in the counting rate of photo-electrons was observed in the range corresponding to 180 to 220 kev indicating the presence of several gamma-rays. Only two peaks were sufficiently strong to define clearly the photo-electron energies. These peaks are shown in Fig. 1. The separation of peaks indicates that they are *K* and *L* peaks of a single gamma-ray of 213.5±2 kev. The energy values of this gamma-ray were calculated on the basis of averages, of several runs, for the *K* peak of 213.2±1 kev and for the *L* peak of 213.8±2 kev. The probable error was determined from the uncertainty in estimating exact peak positions. The 213.5-kev gamma-ray determined by the spectrometer probably corresponds to the previously reported gamma-ray of energy 220±10 kev found by absorption measurements.[1]

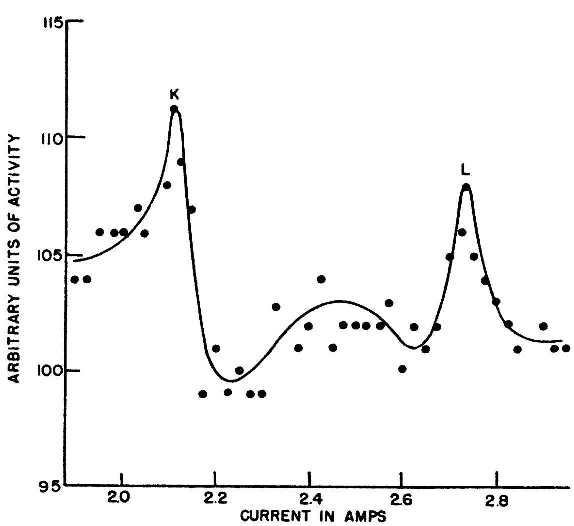

FIG. 1. Barium 131—*K* and *L* photo-electron peaks of 213.5±2-kev gamma-rays—lead radiator.

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A Method for Measuring Paramagnetic Absorption on Small Samples

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WE have found it possible to make absorption measurements on very small samples of paramagnetic material.

In our apparatus, the two side arms of a magic tee are each terminated by a cavity. The cavity containing the sample is rectangular in shape and operates on the TE_{011} mode; the other one is a cylindrical TE_{011} resonator with means provided to vary its *Q*-factor within large limits, making it possible to set the resonance amplitude at the same value in both cavities. By tuning them to slightly different frequencies, and using a frequency sweep on the Klystron, we get the two resonance curves side by side on the oscilloscope. With a suitable vertical gain, amplitude comparison can thus be made quite accurately.

Using this apparatus, we found for the absorption of $MnSO_4 \cdot 4H_2O$ a value somewhat different from that given by Cummerow *et al.*[1] The shape of our curve (Fig. 1) seems to be closer to the theoretical curve of Frenkel; the normal paramagnetic susceptibility, χ, obtained from the integrated surface under the curve (0.25×10^{-25} cm^3/ion) also fits better with direct measurement.

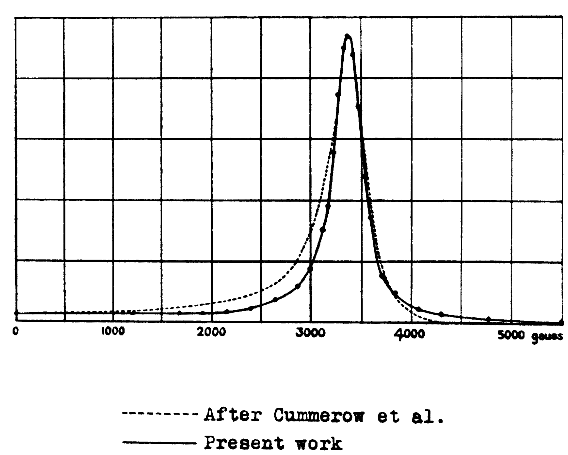

FIG. 1. Absorption curve of $MnSO_4 \cdot 4H_2O$.

We would suggest as a possible explanation for this discrepancy that the resonant rotation of the polarization plane[2] in the cavity when it is filled with a paramagnetic salt will tend to change the *Q*-factor. Our method seems to be free from this objection, as we used only thin samples in the vicinity of the walls.

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