proportionately, more atoms than ions in the beam, $(E_- - E_+)/E_+$ will also increase. When $(E_- - E_+)/E_+$ is plotted against A/E_+ (as abscissa) straight lines are obtained. The intercept of the line with the ordinate is the value of k_+, and the slope is k_0. Argon, nitrogen, and helium were investigated, and the values of k_+ and k_0 are shown in Fig. 1.

Since the current A is a measure of the number of neutralizing collisions occurring, it is possible with the same arrangement to measure the cross section for neutralization of each ion in its own gas for various ion energies. The cross section as a function of the ion energy is shown in Fig. 2.

* This work was supported in part by the Office of Naval Research under Contract N6Onr-248 T.O.I.

[1] Kallmann and Rosen, Zeits. f. Physik **61**, 61 (1930).

[2] Rostagni, Zeits. f. Physik **88**, 55 (1934).

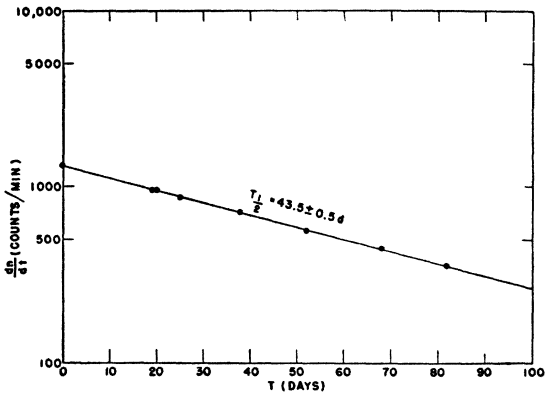

FIG. 1.

The Beta-Spectrum of $Hg^{(203)}_{(205)}$

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August 19, 1948

THE 180° β-spectrometer has been used to measure the long-lived $Hg^{(203)}_{(205)}$ activity. In their final work, G. Friedlander and C. S. Wu[1] found 51.5±1.5 days for the half-file, 460 kev for the β-end point by absorption in Al, and a γ-ray of 300 kev by absorption in Pb. L. C. Miller and L. F. Curtiss,[2] using a thin lens spectrometer, obtained the β-end point as <0.3 Mev and the γ-energy as 0.28 Mev.

The sample, in the form of the oxide, was irradiated in the Argonne heavy-water pile. After allowing a month for the shorter activities to decay, the half-life measurements were started; at present they indicate a single activity of 43.5±0.5 days (see Fig. 1). The sample is still being followed to see if a longer-lived tail exists, possibly explaining the large difference between the present value and that of Friedlander and Wu.

The source for the spectrometer was of thickness ~2.4 mg/cm², mounted on Nylon backing of 0.54 mg/cm². The resolution $\Delta H\rho/H\rho$ finally used was 2 percent; a previous source used at 1 percent proved to be too weak.

In Fig. 2 the spectrum shape is shown for two values of window thickness—the first 0.05 mg/cm², the second ~0.2 mg/cm², both of Nylon. It is clear that the true β-end point is hidden in the K and L conversion lines of the γ-ray. The previous β-end-point measurements included these lines and are, accordingly, much too high. In that of Miller and Curtiss, the source was quite thick, 20 mg/cm² mounted on 3-mg/cm² backing, with the counter window 2.36 mg/cm². This means that, essentially, the continuous β-spectrum was not counted in their measurement.

To get the true end point, and a comparison for spectrum shape, the Kurie plot of the Fermi theory is shown in Fig. 3. Below the K line the plot is linear back to 40 kev, then falls rapidly as a result of window absorption. Extrapolating the linear portion through the base of the K line, the end point is obtained as 205±10 kev. Using this end point, with the half-life of 43.5 days, the ft value was computed at 2.6×10^6. This places the activity in the first forbidden empirical classification. However, from the linearity of the Kurie plot, the spectrum shape, where visible, is allowed. Thus the total forbidden correction factor is constant with energy, the theory giving this for $\Delta J=0, \pm1$, with any of the interactions for heavy elements.[3]

From the K and L conversion lines, the energy of the γ-ray is 286±5 kev, correction for the resolution having been made. This agrees well with the value of Miller and Curtiss.

The present result assumes the γ-ray after the simple β-transition to $Tl^{(203)}_{(205)}$, checked by the decay of the conversion lines with the Hg period.

The conversion coefficients are as follows:

$E(\gamma)$	K	L	M	K/L	L/M
286	18%	6%	≤0.5%	3	≥12

Assuming the radiation to be electric multipole, and extrapolating the theoretical ratio[4] for K/L to high Z, it is found that the γ-ray has $\Delta l=2$.

Friedlander and Wu produced the Hg activity with both fast and slow neutrons, and thus suggested the mass assignment of 203. No check on this was made with the

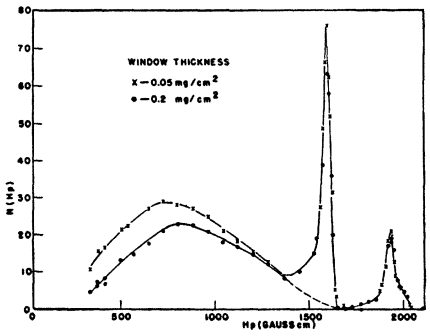

FIG. 2.

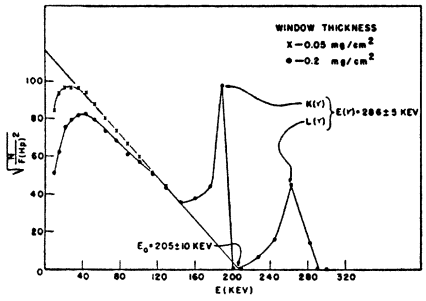

FIG. 3.

present sample, the irradiation being made essentially with slow neutrons. However, the recent analysis of the Hg isotopes by Inghram, Hess, and Hayden[5] makes almost certain the 203 mass assignment.

The author wishes to thank W. Woelf for help in taking the spectrometer data.

[1] G. Friedlander and C. S. Wu, Phys. Rev. **63**, 227 (1943).
[2] L. C. Miller and L. F. Curtiss, Phys. Rev. **70**, 983 (1946).
[3] E. J. Konopinski and S. E. Uhlenbeck, Phys. Rev. **60**, 308 (1941).
[4] M. H. Hebb and E. Nelson, Phys. Rev. **58**, 486 (1940).
[5] M. S. Inghram, D. C. Hess, Jr., and R. J. Hayden, Phys. Rev. **71**, 561 (1947).

Erratum: A Rapid Method for the Determination of the Maximum Energies of β-Emitters with Simple Spectra

[Phys. Rev. **73**, 1400 (1948)]

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June 18, 1948

Line 5 should read "50 micrograms/cm^2," *not* "50 milligrams/cm^2."

Erratum: An Example of the Beta-Decay of the Light Meson

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Lyman Laboratory of Physics, Harvard University,
Cambridge, Massachusetts

[Phys. Rev. **74**, 101 (1948)]

THE photograph of Fig. 1 on page 101 has been inverted. The separate views of the cloud chamber were mounted as a single photograph so that the proper orientation can be obtained by rotating the figure through 180°.