the observation that 70 percent of the closely spaced double pulses are followed by a third pulse interpretable as a μ-decay while only 30 percent of all the sweeps show a second pulse.

(d) By extrapolation of the decay curve of Fig. 2 back to zero time, we conclude that about 1.5 π^+-mesons were stopped in each gram of crystal per hour. A Kodak NTB nuclear emulsion placed near the crystal indicated that about 1.2 π^+-mesons were stopped in each gram of emulsion per hour.

The circled points in Fig. 2 show the number of delayed pulses corrected for accidentals. By fitting an exponential curve to these points[1] one finds for the mean life of π^+-mesons the value $\tau=(1.65\pm 0.33)\times 10^{-8}$ sec. Within the rather large statistical errors involved, this value of the mean life agrees with the value $\left(1.97{+0.14 \atop -0.17}\right)\times 10^{-8}$ sec. obtained by Martinelli and Panofsky[2] on the decay of π^+-mesons in flight, and with the value $\left(1.11{+0.31 \atop -0.22}\right)\times 10^{-8}$ sec. obtained by Richardson[3] on the decay of π^--mesons in flight.

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1 R. Peierls, Proc. Roy. Soc. **A149**, 467 (1935).
2 E. A. Martinelli and W. K. H. Panofsky, Phys. Rev. **77**, 465 (1950).
3 J. R. Richardson, Phys. Rev. **74**, 1720 (1948).

Superconductivity of Isotopes of Mercury*

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THE superconducting transition temperatures of natural lead and the lead isotope obtained from the decay of uranium have been determined from resistance measurements by Kamerlingh Onnes and Tuyn[1] and by Justi.[2] In both instances, no detectable change in transition temperature between the natural element and the isotope was found.

In the measurements to be described, critical field *vs.* temperature curves for mercury samples enriched in various isotopes were determined by susceptibility measurements. The samples were obtained from the U. S. Atomic Energy Commission, and were prepared by electromagnetic separation. The average mass numbers for the enriched samples (samples 1, 2, 4) are shown in Table I; sample 3 is natural mercury.

The samples varying in mass from 50 to 100 mg, were sealed under helium in capillaries about 0.5 mm i.d., giving samples about 3 cm long. A coil of No. 41 copper wire was wound around each capillary. The samples were placed in a Dewar vessel of liquid helium, and formed the secondary of a mutual inductance with a solenoid placed outside the shield Dewar. The solenoid was excited by a 1000 c/sec. oscillator, and produced a magnetic field at the sample of less than 0.1 oersted. The signal picked up by the sample coil was amplified and detected. The signal was balanced out with the sample superconducting, and then the detected signal

TABLE I. Transition temperatures.

Sample	Average mass number	T_0(°K)
1	203.4	4.126
2	202.0	4.143
3	200.7	4.150
4	199.7	4.161

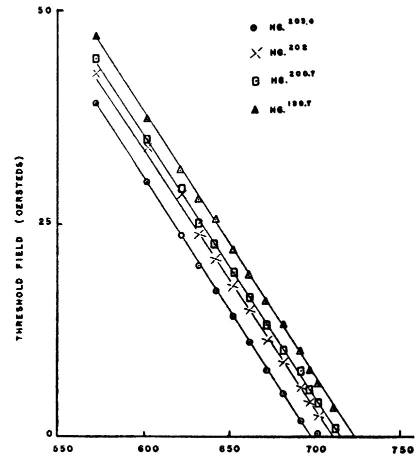

FIG. 1. The critical magnetic field as a function of the absolute temperature.

was observed as a function of the magnetic field of a large Helmholtz coil surrounding the Dewars. The earth's magnetic field was canceled to 0.3 percent. When the magnetic field reached the neighborhood of the critical value at any temperature, there was a rapid increase in detected signal. The critical field was taken to be the average value in the transition interval. Figure 1 shows the critical field curves for the four samples. It is to be noted that there is a *systematic decrease of transition temperature with increasing mass*. The transition temperatures (in zero magnetic field), T_0, of the samples are given in Table I. The slopes of these curves at zero field agree within 1.0 percent; the magnitude of the slope is -204 ± 2 oersteds/°K.

Figure 2 is a plot of transition temperature *vs.* average mass

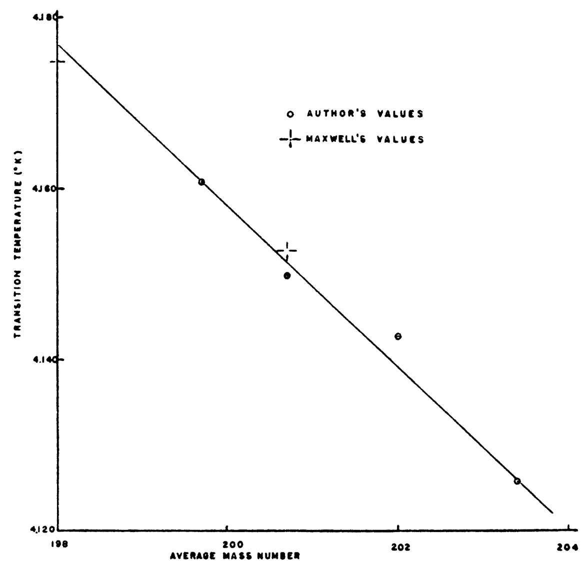

FIG. 2. The transition temperature *vs.* the average mass numbers of the isotopic mixtures.

number. The values obtained by Maxwell[3] for Hg^{198} and natural Hg are included. The slope of the line in Fig. 2 is 0.009 °K/(mass number).

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1 H. Kamerlingh Onnes and W. Tuyn, Leiden Comm. No. 160b (1922).
2 E. Justi, Physik. Zeits. **42**, 325 (1941).
3 E. Maxwell, Phys. Rev. **78**, 477 (1950).