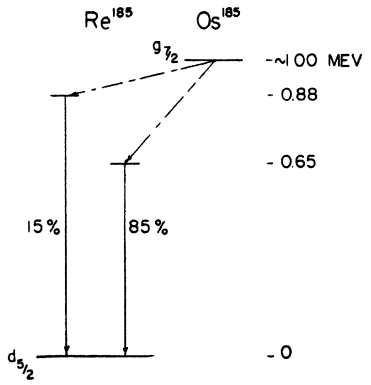

FIG. 2. Disintegration scheme of Os^{185}.

and the disintegration scheme are correct, the atomic mass difference between Os^{185} and Re^{185} may be estimated. This turns out to be about 1.0 Mev if the transition to the 0.88-Mev level is assumed to be first-forbidden, and slightly lower for an allowed transition.

The fraction of the total K capture to the ground state has been reported[8] to be no greater than 0.10. The amount of L capture feeding the excited states could not be estimated at that time and hence was not considered. The presence of L capture changes this value to 0.20, but does not essentially alter the interpretation of this transition as first-forbidden, in agreement with the shell model.

* This work was assisted by the joint program of the ONR and AEC.
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The Radiations of Tl^{199} and Tl^{200}

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THE internal conversion electron spectrum of $Hg^{199,200}$ resulting from the orbital electron decay of $Tl^{199,200}$ has been studied with a small 180° shaped field spectrometer. The thallium isotopes were produced by alpha-particle bombardment of gold in the Indiana University cyclotron, and were separated from the target material by standard chemical procedure. Carrier-free sources were obtained by electrodeposition of the thallium from a solution containing no gold or mercury. With a plating current of 150 ma, the major part of the activity was deposited on the platinum electrode within one to two hours. The deposit was removed from the electrode with nitric acid and laid down by evaporation on a thin zapon film.

A survey of the negatron spectrum showed the presence of twenty-five internal conversion lines, all of which decayed in intensity with either the 7-hour half-life of Tl^{199} or the 27-hour half-life of Tl^{200}. An analysis of the conversion lines of Tl^{199} shows that they arise from nine gamma-rays of energies 49, 78, 103, 157, 206, 245, 332, 454, and 490 kev. For Tl^{200} the observed conversion lines correspond to six gamma-rays of energies 365, 577, 622, 829, 1210, and 1360 kev. The figures quoted are accurate to within one percent.

In the case of Tl^{199} the results are in agreement with those of Hole,[1] who has found gamma-rays at 155 and 360 kev associated with an isomeric 43-minute activity in Hg, which has been assigned[2] to Hg^{199}. Scintillation spectrometer studies offer further evidence that these gamma-rays are coupled. It is found that the 157- and 332-kev gamma-rays are of about the same intensity and are probably in cascade. The 490-kev gamma-ray may be interpreted as the cross-over for these transitions. Similarly, the 245- and 206-kev gamma-rays are about equal in intensity and may be regarded as a cascade pair, with the 454-kev gamma-ray resulting from the alternative cross-over transition.

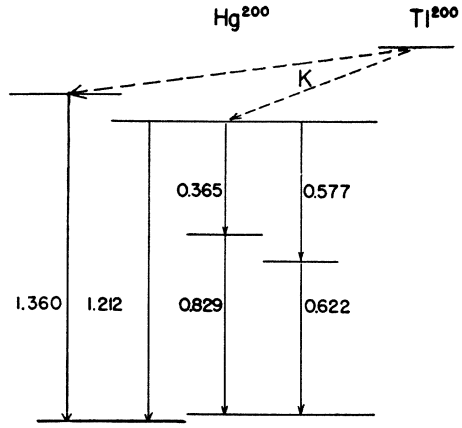

FIG. 1. A possible disintegration scheme for Tl^{200}. It is to be noted that the 1.212-Mev gamma-ray is not the cross-over for the cascade gamma-rays. The assignment of the 15-kev discrepancy as shown is arbitrary.

The first five gamma-rays of Tl^{199} listed above have essentially the same energies as those reported in a study[3] of the beta-decay of Au^{199} to Hg^{199}. It therefore appears that the decay scheme proposed by Beach *et al.* should be altered to take into account the higher levels which are evident in the K-capture process. Further work on this matter is in progress.

The energies of the gamma-rays of Tl^{200} are consistent with the tentative decay scheme shown in Fig. 1. While the absorption work of Cuffey[4] in this laboratory supports this picture, further study of the conversion electron spectrum in the low energy region and a complete study of the photoelectron spectrum are necessary before this scheme can be considered as certain.

No positrons were found in the case of either Tl^{199} or Tl^{200}.

* This work was assisted by the joint program of the ONR and AEC.
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Electron Mobilities in Liquid Argon*

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THE work of Gerritsen,[1] of Davidson and Larsh,[2] and of Hutchinson[3] has shown that conductivity pulses due to ionizing radiation may be observed in liquid argon. Using a parallel plate chamber immersed in liquid argon, we have measured the mobility of electrons resulting from the ionization of liquid argon by the alpha-particles of ThC and ThC′.

The chamber was similar to that described by Davidson and Larsh,[2] with the plates $\frac{5}{8}$ inch in diameter and separated by various sizes of spacers made of Teflon. The source ThB was collected on the bottom plate by recoil. Commercial tank argon, supplied by Linde, and stated to be 99.91 percent pure, was liquefied by means of a small heat exchanger immersed in liquid air. Further purification was not undertaken.