greatest number of cases, even a little below the solidification temperature cracks were formed in the disk, thus falsifying the measurements and causing an illusory increase of resistance. In the luckiest cases the resistance at the temperature of the liquid air was found to be almost equal to that of the solid just below the solidification point.

There was still the possibility that the solid resistance was much lower than the one measured with this method, because of the resistances in the contacts. Therefore measurements with a potentiometer method were carried out. The resistance of the solid also was always found with this method and so in all our experiments the phenomenon of superconductivity was absent. On the other hand, the fact which we demonstrated, that the sudden decrease of resistance occurs just at the solidification point, induces us to think rather of a phenomenon depending just on the change of state, than of a phenomenon of superconductivity.

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Relative Abundance of the Copper Isotopes and the Suitability of the Photometric Method for Detecting Small Variations in Isotopic Abundance

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USING a Dempster double-focusing mass spectrograph,[1] the abundance ratio of the two copper isotopes was determined photometrically with a view to ascertaining the value of the method in detecting small variations in isotopic abundances. Following the general method of Mattauch and Ewald,[2,3] the blackening curve of Ilford Q11 plates was obtained by using as standards the isotopes of zinc, which have been accurately measured by Nier.[4] A brass rod served as one of the electrodes in a Dempster spark source[5] and provided both zinc and copper ions. The intensities of the mass spectrum lines were measured with a microphotometer, and a blackening curve was drawn for each photographic plate. On most plates there were more than one exposure and, in these cases, the blackening curve was drawn with considerable certainty.

The values of the ratio Cu^{63}/Cu^{65} obtained by measurement of twenty-one mass spectra are listed below:

2.258	2.335	2.242	2.284	2.135
2.292	2.433	2.160	2.342	2.400
2.296	2.215	2.010	2.425	2.392
2.145	2.370	2.342	2.362	2.230
		2.142		

These data lead to a mean value of the ratio $Cu^{63}/Cu^{65}=2.277\pm0.017$, the probable error being based on the internal consistency of the experimental results. The manner in which the present blackening curves were obtained, namely, in most cases by use of two or more zinc spectra of varying intensity, tended to cancel out small errors in the presumed abundance of the zinc standard. Consequently the isotopic constitution of copper is $Cu^{63}=69.48\pm0.16$ percent and $Cu^{65}=30.52\pm0.16$ percent. Flugge and Mattauch[6] give a value for the packing fraction of $Cu^{63}=-8.13\pm0.10\times10^{-4}$, while Duckworth[7] gives $\langle f\rangle_{Av}$ for Cu^{63} and Cu^{65} to be $-7.92\pm0.25\times10^{-4}$. Assigning a value of $f=-8.03\pm0.10\times10^{-4}$ to both copper isotopes, and using the ratio given above, namely, 2.277 ± 0.017, one obtains a chemical atomic weight of 63.542 ± 0.006. This is not in very good agreement with the accepted chemical atomic weight[8] of 63.57 but does agree splendidly with the recent value of 63.542 obtained by Hönigschmid and Johannsen.[9] Ewald's latest value[3] for the Cu^{63}/Cu^{65} ratio is 2.330 ± 0.032.

Some remarks should be made regarding the efficacy of the method for detecting small variations from the natural abundance. If enough of the sample material is available to make, say, ten determinations of the type described above, the probable error in the ratio would be of the order of 0.020. Since there is associated with the natural ratio a probable error of 0.017, variations would "probably" (used in the probable error sense) be real if they exceeded $0.037/2.277=0.016$ of the natural ratio. As the measured ratios diverged still further from the natural value, the certainty of the variation being a real one would increase in the statistical manner. With the present accuracy the method would not be useful for variations from the natural abundance of less than about one-half percent.

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Angular Distribution of the $Li^7(p, \alpha)\alpha$ Reaction

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MEASUREMENTS of the angular distribution of the 8-cm alpha-particles produced in the reaction

$$Li^7+H^1\rightarrow 2\ He^4,$$

have been made for the range of proton energy from 400 to 1400 kev. Approximate agreement with previous work[1,2] up to 900 kev is observed, but there is only a gradual decrease in the asymmetry from 800 to 1400 kev.

The apparatus used was a scattering camera,[3] similar in principle to that described by Chadwick, *et al.*,[4] using photographic detection of the emitted alpha-particles. Figure 1 shows the apparatus schematically. The $2''\times4''$