the temperature variation of amplitude, (*b*) from the shape of the envelope at a single temperature, and (*c*) from various comparisons between curves for different ψ at the same temperature. As in zinc and bismuth, the various estimates do not agree very well, and the discrepancy is in the sense that the temperature variation is not so rapid as the theory predicts. The various estimates of m_1 and the corresponding estimates of T_0 are collected in the table, together with figures for zinc (based on the work of Mackinnon[7]) for comparison; for bismuth more parameters are required to interpret the data, and no simple quantitative comparison is possible.

	m_1/m_0			T_0 ° K.		
	(*a*)	(*b*)	(*c*)	(*a*)	(*b*)	(*c*)
Gallium	0·06	0·16	0·17	700	270	250
Tin	0·1	0·3	0·6	2500	800	400
Zinc	0·008	0·015	0·012	250	130	160

(*b* and *c* at 4·24° K.)

From an experimental point of view, the measurements are complicated, particularly with tin, by the very short period of the oscillations and by the heavy eddy-current damping of any motion of the metal in the magnetic field; in view of this, and since it is not certain that the gallium specimen was entirely a single crystal, the results illustrated and the conclusions drawn from them must be regarded as illustrating only the general nature of the phenomena, until more thorough measurements have been completed. It should be noted, too, that negative results must be regarded with caution, since the apparent absence of field-dependence may be due to slight inhomogeneity of the field or the specimen (for example, variations of crystal orientation or fluctuations of impurity concentration), which might smooth out oscillations of very short period.

Note added in proof. The de Haas – van Alphen effect has just been found also along the hexagonal axis of a graphite crystal; the characteristic features are intermediate between those of zinc and gallium.

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Absence of Delayed γ—γ Coincidences in the Decay of Hafnium-181

β-EMISSION by hafnium-181 leads to a 20-microsecond metastable state of tantalum-181 [1]. This has been studied by observing delayed coincidences between the β-rays from hafnium-181 and the radiation emitted in the decay of the metastable state. The delayed radiation consists of cascade γ-rays of 0·13 and 0·47 MeV. and the corresponding conversion electrons[2,3,4]. Beneš *et al.*[4] have reported that sources of hafnium-181 give rise also to delayed γ—γ coincidences and have proposed a decay scheme showing a 0·34-MeV. γ-transition preceding the metastable state of tantalum-181. The other workers[1,2,3] have not reported delayed γ—γ coincidences, and this implies a decay scheme in which β-emission by hafnium-181 leads directly to the metastable state. We have carried out recently a re-examination of hafnium-181 for delayed γ—γ coincidences with a negative result.

In our test for delayed coincidences, we used the integral recorder described earlier[2,3]. The hafnium source was placed between two Geiger counters. From one counter (counter *A*) a pulse 38 microseconds in length passed to the coincidence stage, while the pulse from the other counter (counter *B*) was 0·3 microsecond in length. An anti-coincidence circuit of 2 microseconds resolving time, actuated from counter *A*, was used to suppress instantaneous coincidences. The two counters used each had copper cathodes 5 cm. long and 2·5 cm. in diameter (active anode length, 3 cm.) with end windows of aluminium 7 mgm./cm.^{2} thick. Both windows were covered with 360 mgm./cm.^{2} lead sheet, and the two counters were mounted with the lead sheets facing each other 3 mm. apart. The source between the lead sheets was stuck to a 2·3 mgm./cm.^{2} aluminium foil. The net efficiencies of the counters for recording individually the γ-transitions known to be present (including the allowance for internal conversion and solid angle) were estimated to be as follows: 0·47 MeV., 0·25 per cent; 0·34 MeV., 0·15 per cent; 0·13 MeV., 0·03 per cent. (The relative net efficiencies were estimated from the construction of the counters, the approximate absolute values of the net efficiencies being then inferred from the counting-rates with and without the lead sheets in position.)

To be detected, a genuine delayed coincidence-rate must exceed the errors in both the total recorded coincidence-rate and the computed random coincidence-rate. If no genuine delayed coincidence-rate is observed, it means that less than a certain fraction of the counts recorded in counter *A* can be followed by delayed rays detectable in counter *B*. The counting-rates of the individual counters in our delayed coincidence experiment were about 50 per sec., and a counting time of 40 hr. gave approximately equal errors in the total recorded coincidence-rate and the computed random-rate. Analysis of the results following a procedure similar to that used in ref. 3 showed that not more than about 0·7 per cent of the counts recorded in counter *A* could be followed by γ-rays, which were detected in counter *B* with a combined net efficiency of 0·3 per cent and delayed with a half-life of 20 microseconds. From this, and the net efficiencies given in the preceding paragraph, it follows that not more than 2 or 3 per cent of the disintegrations of hafnium-181 can take place according to the decay scheme proposed by Beneš *et al.*[4]

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Modified Ionization Chamber for Study of Angular Distribution of Ionizing Particles

A NEW method of studying the angular distribution of ionizing particles with ionization chambers has been developed here and then applied to the study of the angular distribution of uranium fission fragments produced by fast neutron bombardment. Fig. 1 shows the principle involved. *A* and *B* are the positive and negative plates respectively of a plane parallel-plate ion chamber filled with pure argon gas, in which the negative ion mobility is very much greater than