berkelium isotopes in a windowless gas proportional counter showed the 4.6-hour Bk^{243} previously reported[3] and a considerably longer-lived decay period corresponding to a 4.95±0.1-day half-life. Some of this same radioactivity was examined in a differential alpha-pulse analyzer,[4] which revealed alpha-particles of the following energies and abundances: 6.33±0.05 Mev (18 percent), 6.15±0.05 Mev (48 percent), and 5.90±0.05 Mev (34 percent). All three alpha-particle groups were observed to decay with a 4.95-day half-life. Initially the three alpha-particle groups belonging to the 4.6-hour Bk^{243} were also present. Consideration of the systematics of alpha-radioactivity[5] suggests that the new 4.95-day isotope is most likely Bk^{245}. The new berkelium isotope must be of mass greater than 244 or it would have been observed in bombardments of Am^{241} with alpha-particles. Furthermore, much longer half-lives than 4.95 days were predicted for Bk^{246} and Bk^{247} using methods of estimation which have been described previously.[6] Comparison of the counting rate of the 4.95-day radioactivity in the windowless counter to that in the alpha-pulse analyzer allows calculation of ~0.1 percent alpha-branching, which corresponds to a 15-year partial alpha-half-life. The alpha-particle decay of this isotope appears to be hindered by a factor of ~100 (using the conventions of reference 5) and resembles the decay of the isotope Bk^{243} in this respect.

Following the decay of the berkelium isotopes, the curium daughters resulting from electron capture decay were examined in the alpha-pulse analyzer and the characteristic alpha-particles of Cm^{243} produced by the decay of 4.6-hour Bk^{243} were observed. The amount of alpha-activity of energies expected for Cm^{245}, namely, that in the range 5.4–5.8 Mev, was such that the half-life of the latter isotope must be at least 500 years if the energy is as indicated by the alpha-decay systematics.[5] This tentative conclusion is, of course, also based on the assumption that the mass assignment of the 4.95-day berkelium isotope is correct.

Examination of the californium fraction in the alpha-pulse analyzer soon after irradiation showed only 6.75-Mev alpha-particles decaying with a 35-hour half-life (tentatively assigned previously to Cf^{246}).[7] The growth of alpha-particles of 6.08-Mev energy was observed and the amount corresponded to a half-life of approximately 160 days. This daughter is undoubtedly Cm^{242} produced by the decay of Cf^{246}, and the assignment to Cf^{246} is now regarded as certain. The decay of the Cf^{246}, followed through a decay factor of approximately 50, gave a half-life of 35.7±0.5 hours in agreement with previous measurements. The ratio of the counting rate in the windowless proportional counter to the alpha-counting rate corresponded closely to that observed for a number of "pure" alpha-emitters previously examined under similar conditions, so that Cf^{246} appears to be beta-stable as expected. No radioactivity other than Cf^{246} and its daughter Cm^{242} was observed in the californium fraction. This result is somewhat surprising since it might have been expected that Cf^{247} and possibly Cf^{245} would have half-lives long enough to allow their observation.

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The Magnetic Moment of As^{75}*

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NUCLEAR magnetic resonances of As^{75} with a natural line width at half-maxima of about eight gauss have been observed in a solution of 2 molar Na_2HAsO_4 in 3 molar NaOH in which the compound Na_3AsO_4 is presumably formed. The resonant frequency was compared to that of Na^{23} present in the above solution with the result

$$\nu(As^{75})/\nu(Na^{23}) = 0.64745 \pm 0.00015. \quad (1)$$

Using the fact that the spin of As^{75} is $\frac{3}{2}$,[1] and calculating the moment of Na^{23} by taking $\mu(H') = 2.79268 \pm 0.00006$ nuclear magnetons,[2] and $\nu(Na^{23})/\nu(H') = 0.26450 \pm 0.00003$,[3] the sign and value of the magnetic moment was found to be

$$\mu(As^{75}) = +1.4347 \pm 0.0003. \quad (2)$$

The earlier determination of $\mu(As^{75}) = 1.5 \pm 0.3$ nm by Schüler and Marketu[4] is in agreement with the more precise value of Eq. (2).

In order to avoid excessive line broadening due to the large quadrupole moment ($+0.3 \times 10^{-24}$ cm^2)[4] of arsenic, it is necessary to place the nucleus in a symmetrical molecular configuration. The solutions of the above proportions were chosen on the assumption that AsO_4^{-3} ions of tetrahedral symmetry are formed.

Arsenic signals were detected in both liquid and solid phases of the above sample with a shift of about $1/10^4$ towards higher fields for the solid state. Nuclear resonances of As^{75} were not observed in other arsenic compounds (e.g., Na_2HAsO_4). This was probably due to the fact that the line widths, resulting from quadrupole effects, were too large.

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The Electrical Conductivity of Liquid Germanium*

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OBSERVATIONS of the melting of germanium have shown that the fusion process for this metal is very unusual. The entropy of fusion is 5.9 cal/deg,[1,2] about three times the value for most metals, and there is a considerable volume contraction on melting.[3] Solid germanium crystallizes in the diamond lattice, while the x-ray experiments of Hendus[4] show that the atomic arrangement in liquid germanium corresponds to a more nearly close-packed structure. These facts indicate that the binding forces of liquid germanium are of more metallic character than those of the solid, and lend interest to a measurement of the electrical conductivity of the liquid.

The difficulty of finding electrodes suitable for use with germanium at the high temperature required for this experiment necessitated measuring the effect of currents induced in a germanium core on the impedance of a surrounding coil. Unfortunately, the effects of temperature on the coil severely limit the accuracy of this technique.

The germanium was obtained from the Eagle-Picher Company and was stated to be of purity in excess of 99.9 percent. The sample container was made of quartz, and the experiment was performed in an argon atmosphere. Measurements were made at frequencies around 20 kilocycles and around 2 megacycles.