able, it seems that these disintegrations are not of this type.

Taken together, (A) and (B) seem to indicate that these disintegrations actually occur by capture, and that non-capture disintegrations are absent.

The evidence is extremely weak for non-capture disintegration by α-particles or by protons and is shown above to be invalid for neutrons, the only projectile for which the evidence had apparent strength, due to a neglect of the mechanics involved. Thus there seems to be no basis for the idea that any nucleus whatever has been disintegrated by a process in which the projectile was not captured. Obviously this does not prove that such disintegrations cannot be discovered in the future.

UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS
WILLIAM D. HARKINS
DAVID M. GANS

RECEIVED MARCH 26, 1934

PREPARATION OF CYSTINEHYDANTOIN

Sir:

Using the method advocated by Dakin [*J. Biol. Chem.*, **8**, 25 (1910)] for the preparation of tyrosinehydantoin, cystinehydantoin has been prepared in practically quantitative yields and of a high order of purity. Two grams of cystine is suspended in 10 cc. of boiling water and 1.5 g. of potassium cyanate is added. The solution is then acidified with 25 cc. of 10% hydrochloric acid and heated with a reflux condenser for thirty minutes. The cystinehydantoin separates in diamond-shaped plates; yield 2.2 g., 91%. *Anal.* Calcd. for $C_8H_{10}N_4S_2O_4$: N, 19.17; S, 22.09. Found: N, 19.30; S, 21.96. It begins to decompose at 310° and has no definite melting point. It is insoluble in ordinary organic solvents, insoluble cold and slightly soluble in hot water. Alkalies dissolve the hydantoin with decomposition. Using the loosely bound sulfur procedure of Sullivan and Smith [*U. S. Pub. Health Repts.*, **43**, 1334 (1928)] it forms lead sulfide in twenty seconds.

Cystinehydantoin gives a negative Sullivan cystine reaction. The nitroprusside reaction for a disulfide, using sodium cyanide as the reducing agent, is positive. The Okuda [*J. Biochem.* (*Tokyo*), **5**, 201 (1925)] method gives the theoretical cystine equivalent. The Folin–Marenzi [*J. Biol. Chem.*, **83**, 103 (1929)] cystine method gives the same amount of color with the hydantoin as the equivalent weight of cystine. As in the case of cystine [Folin–Looney, *ibid.*, **51**, 421 (1922)] sodium cyanide will inhibit the color production. In all the colorimetric work a solution containing 24.2 mg. of the hydantoin in 100 cc. of a 0.1 N hydrochloric acid equivalent to a 200 parts per million cystine solution was used.

CHEMO-MEDICAL RESEARCH INSTITUTE
GEORGETOWN UNIVERSITY,
WASHINGTON, D. C.
WALTER C. HESS

RECEIVED MARCH 26, 1934

OPTICAL ROTATION AND ATOMIC DIMENSION

Sir:

It has been established in the writer's previous investigations on this subject [fifth article, THIS JOURNAL, **47**, 1285 (1925), and the ninth article, *Bureau of Standards Journal of Research*, **7**, 573 (1931)] that certain halogen derivatives may be divided into two classes. Those compounds which constitute the first class have the halogen directly attached to an asymmetric carbon atom and differ only in having one halogen replaced by another. For these substances the *specific rotations* have the ratio 41:17:21, which agrees closely with the ratio 41:16:21 for the differences in atomic diameter of the respective neutral atoms. Those in the other class have the halogens attached indirectly (by a chain of atoms) to the asymmetric carbon. For these substances the *molecular rotations* have a ratio which likewise agrees with the ratio of the diameters of the respective neutral atoms. All the investigated compounds were carbohydrate derivatives which contain several asymmetric carbon atoms, so it was found desirable to prepare the halogen derivatives of two active amyl alcohols, 2-methylbutanol (1) and methylpropylcarbinol, for testing the above regularities, as these compounds are simple in structure and contain only one asymmetric carbon atom. The halogen derivatives of one of these alcohols, the negative rotating 2-methylbutanol (1) (in which the halogen is indirectly attached to the asymmetric carbon), have now been prepared in pure condition. The rotational values obtained are:

	$[\alpha]^{20}_D$ Specific rotation	$[M]^{20}_D$ Molecular rotation
1-Fluoro-2-methylbutane	−8.87	− 799.1
1-Chloro-2-methylbutane	+1.68	+ 179.0
1-Bromo-2-methylbutane	+4.04	+ 610.1
1-Iodo-2-methylbutane	+5.68	+1124.7