This shows that during β-decay a half α-particle is formed from two neutrons, $2pe \longrightarrow p_2e + e$; inasmuch as two β-decays follow each other in rapid succession, the net result for the nucleus is the formation of an α-particle, $2p_ee \longrightarrow p_4e_2$.

Artificial disintegration could then be explained by the expulsion of neutrons and this would be possible only with Li^7, Be^9, B^{11}, C^{13}, O^{17} and O^{18}, etc., but not with $Li,^6$ $Be,^8$ $B,^{10}$ etc.

CHEMICAL LABORATORY, SCHOOL OF DENTISTRY
COLLEGE OF PHYSICIANS AND SURGEONS
SAN FRANCISCO, CALIFORNIA
INGO W. D. HACKH

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THE ATOMIC WEIGHTS OF SELENIUM AND OF TELLURIUM

Sir:

The chemically determined values for the atomic weights of selenium and of tellurium have recently been questioned by Aston[1] on the basis of improved measurements with the mass spectrograph.

With the advantage of increased precision in the measurements of relative amounts of the isotopic constituents, Aston reports the following relative percentages: for tellurium, Te_{125} (6.6%), Te_{126} (20.9%), Te_{128} (36.1%) and Te_{130} (36.4%); and for selenium, Se_{74} (0.9%), Se_{76} (9.5%), Se_{77} (8.3%), Se_{78} (24.0%), Se_{80} (48.0%) and Se_{82} (9.3%). Corrected for packing effects and converted to the chemical oxygen scale these figures lead to respective atomic weights 128.03 ± 0.1 and 78.96 ± 0.04. The limits of error are those assigned by Aston. The atomic weights determined by chemical means are, respectively, 127.5 and 79.2.[2] These latter values have stood for over twenty years although subjected to frequent careful redeterminations by different workers.[3] Tellurium, in particular, has received more than usual attention due to its anomalous position with respect to iodine in the older arrangements of the Periodic Table.

Te_{125} is a new discovery. Its discovery, together with the discoveries of Ba_{136} and Sr_{87} also reported by Aston,[1] constitutes confirmation of

[1] Aston, *Proc. Roy. Soc.* (London), A**132**, 487 (1931).

[2] Table of International Atomic Weights, Report of the Committee on Atomic Weights of the International Union of Chemistry, THIS JOURNAL, **53**, 1627 (1931).

[3] Baker and Bennett, *J. Chem. Soc.*, **91**, 1849 (1907); Harcourt and Baker, *ibid.*, **99**, 1311 (1911); Marckwald and Foizik, *Ber.*, **43**, 1710 (1910); Flint, THIS JOURNAL, **34**, 1325 (1912); Dudley and Bowers, *ibid.*, **35**, 875 (1913); Dennis and Anderson, *ibid.*, **36**, 882 (1914); Staehler and Tisch, *Z. anorg. allgem. Chem.*, **98**, 1 (1916); Bruylants and Desmet, *Bull. soc. chim. Belg.*, **28**, 264 (1919); Bruylants and Michielson, *Bull. sci. acad. roy. Belg.*, [V] **5**, 119 (1919); Bruylants and Bytebier, *Bull. Belg. acad.*, 856 (1912); Kusma and Kruhlik, *Trans. Bohemian acad. of Emperor Francis Joseph*, **19**, No. 13 (1910); Jannek and J. Meyer, *Z. Electrochem.*, **19**, 833 (1913); *ibid.*, **83**, 51 (1913); Bruylants and Dondeyne, *Bull. sci. acad. roy. Belg.*, [V] **8**, 387 (1922); Bruylants, La Fortuen and Verbruggen, *Bull. soc. chim. Belg.*, **33**, 587 (1924 .

definite predictions which were recently made by the writer.[4] The further discoveries by Aston of Ba_{135} and Ba_{137} are also concordant with these predictions. Further predictions of isotopes whose discoveries have not yet been reported include three additional tellurium isotopes, Te_{120}, Te_{122} and Te_{124}, with the possibility of Te_{123} as well, and two additional selenium isotopes, Se_{79} and Se_{81}. It is significant that allowance for these additional isotopes will change Aston's computed values in the directions of the chemical atomic weights, both for selenium and for tellurium.

Small uncertainties which, of course, do exist in the chemical atomic weights preclude the possibility of an exact estimate of the proportions in which these additional isotopes exist. However, we expect that these uncertainties are small compared with the divergences between the chemical and the mass spectrograph values. Hence we can make predictions as to the approximate percentages of these isotopes. These predictions lead to about 8% of Te_{120}, Te_{122}, Te_{124} (and possibly Te_{123}), taken collectively, and to about 9% of Se_{81}. No estimate for the amount of Se_{79} is possible. Failure heretofore to observe the 8% mixture of tellurium isotopes is reasonable since the 6% of Te_{125} alone remained, until now, undiscovered. Proximity to the very abundant Se_{80} (48%) may account for failure to observe both Se_{81} and Se_{79}.

The writer's predictions of these isotopes, as of Te_{125}, Ba_{136} and Sr_{87}, were based on the positions of missing atoms in a "Periodic Table" of atomic nuclei.[4] Independently, Professor H. C. Urey[5] made similar predictions, including isotopes of selenium and of tellurium. The predictions of further missing isotopes can now be extended to include Ce_{141}, Ce_{144}, and Nd_{148}. As a convenient aid in using the "Periodic Table" of isotopes it is useful to observe that the positions at which the various isotopes of a given element may occur occupy a pattern similar to successive knight moves on a chess board.

[4] Johnston, This Journal, **53**, 2866 (1931).

[5] Urey, This Journal, **53**, 2872 (1931).

Department of Chemistry
The Ohio State University
Columbus, Ohio

Herrick L. Johnston

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PREPARATION OF PINACOLONE

Sir:

Because of the need of large amounts of pinacolone for investigations in progress in this Laboratory, methods for its preparation have been studied. The usual method ["Organic Syntheses," Vol. I, pp. 87, 91] is time consuming.

We find that the addition of a dilute ether solution of tertiary-butyl-