444 — Show that the Maxwell-Boltzmann law for the distribution of the energy, E, of an assembly of N identical, weakly-interacting systems can be expressed by the equation

$$a_l = \exp(-\lambda - \mu\varepsilon_l)$$

in the usual notation. Explain how the constants λ and μ can be determined.

Discuss the significance of the quantity ε_l when this law is applied (1) to classical statistics and (2) to quantum statistics.

SECTION B.

445 — Give an account of experiments carried out prior to 1915 on the scattering of α-particles by matter, and explain the interpretation of these experiments as given by Rutherford.

An aluminium foil intercepts a beam of α-particles of 6 Mev energy. Calculate the closest distance of approach of the α-particles to the nuclei of aluminium atoms.

(For aluminium, Z = 13, A = 27. $e = 4.8 \times 10^{-10}$ e s.u.)

446 — Give an account of the Stern-Gerlach experiment.

Explain the significance of the results of this experiment at the time when it was performed, and trace its influence in the subsequent development of atomic theory.

447 — Write a short essay on present knowledge regarding the distribution of negative in heavy atoms.

448 — Give an account of representative experiments on the inelastic scattering of electrons by matter. To what extent is comparison of experiment with theory of value in this field of study?

Noticiário

Doutor Manuel Valadares

É com o maior prazer que noticiamos que o Doutor Manuel José Nogueira Valadares, ausente de Portugal desde 1947, foi recentemente nomeado «Directeur de Recherches», devido às suas altas qualidades de Investigador.

O Doutor Manuel Valadares, desde que se ausentou do País, tem-se dedicado à Investigação Científica no Laboratório Curie (Paris) e no Laboratório de «l'Aimant Permanent» (Bellevue).

Parece-nos interessante para o leitor, incluir nesta notícia uma lista dos trabalhos publicados por este Físico desde a sua permanência em França e que amplamente justificam a elevada honra com que o nosso compatriota acaba de ser distinguido.

— «Influence de la tension d'excitation sur les satellites des raies $L\alpha$ de l'or» — par M. Valadares et F. Mendes — C. R. t. 226, p. 1185-1187, 12 Avril 1948.

— «Structure fine du spectre magnétique des rayons α de l'ionium» — par S. Rosenblum, M. Valadares et Melle J. Vial — C. R. t. 227, p. 1088-1090, 22 Novembre 1948.

— «Le spectre du rayonnement alpha émis par *R Th* + *Th X*» — par S. Rosenblum, M. Valadares et Melle Perey — C. R. t. 228, p. 385-387, 31 Janvier 1949.

— «Les spectres *L* et gamma émis dans la trasmutation *Ra D* → *Ra E*» — par L. Salgueiro et M. Valadares — Portugaliae Physica, 3, p. 21-28, 31 Mai 1949.

— «Structure fine du spectre alpha du *Th X*» — par S. Rosenblum, M. Valadares, M. Perey et J. Vial — C. R. t. 229, p. 1009-1011, 14 Novembre 1949.

— «Nouvelle détermination de quelques *rayons* des noyaux radioactifs lourds» — par S. Rosenblum et M. Valadares — C. R. t. 230, p. 384-386, 23 Janvier 1950.

— «Structure fine du spectre magnétique alpha du plutonium 239» — par S. Rosenblum, M. Valadares et B. Goldschmidt — C. R. t. 230, p. 638-640, 13 Février 1950.

— «Spectrographie par diffraction cristalline du rayonnement électromagnétique