the emission of a (virtual) γ-quantum by the electron, the absorption of this quantum by a nucleon, and the subsequent emission of a meson. Hence, we have $a = 2$, $b = 1$, and

$$\sigma_B = \pi\lambda_t^2\ (e^2/hc)^2\ (g^2/hc)\ \varepsilon^{7/2}. \qquad (3B)$$

(C) In the final case, where we have the photomesic effect, we get for c the value 5/2. (The volume in momentum space reduces to $\int dp_n'\ dp_n$.) Since the reaction consists of the absorption of the photon and the emission of a meson, we have $a = b = 1$, and

$$\sigma_C = \pi\lambda_t^2\ (e^2/hc)\ (g^2/hc)\ \varepsilon^{5/2}. \qquad (3C)$$

We may remark here that the exponent of ε is different from that obtained by Nordheim and Nordheim or Yukawa (*Phys. Rev.*, 1938, **54**, 254; *Proc. phys. math. Soc. Japan*, 1938, **20**, 720; cf. also P. Urban. *Acta Phys. Austr.*, 1947, **1**, 167). This is due to the fact that these authors did not take into account the momentum of the nucleon in the Fermi gas.

In order to get an idea as to the absolute value of the cross sections for bombarding energies well above the threshold, we can calculate the cross sections for $\varepsilon = 1$. Using $g^2/hc = 1/6$, we get:

$$\sigma_A = 2.10^{-4} \text{ barns}, \sigma_B = 4.10^{-7} \text{ barns}, \sigma_C = 6.10^{-5} \text{ barns}.$$

We must remind the reader here that if nuclei of atomic weight A are bombarded, the cross sections have to be multiplied by A.

Comparing equations (1) and (2), it seems that one may expect an optimum energy for the creation of mesons to exist somewhere in the neighborhood of 300 Mev ($2\,\mu c^2$).

We may refer to McMillan and Teller's paper for a discussion of the various effects which they and we neglected. It should be remarked here that in cases B and C it is always possible to satisfy the law of conservation of momentum.

I should like to express my thanks to H. M. James and J. A. Wheeler for clarifying discussions on the subject of this note.

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The Use of Chemicals to Prevent Molding of Herbarium Specimens

Recently Fosberg (*Science*, September 12, 1947, pp. 250–251) discussed the use of formaldehyde to prevent molding of herbarium specimens. Johnson (*Science*, March 19, p. 294) found that this type of chemical treatment is without value in preparation of specimens of *Tsuga* and *Picea*. It is of interest to note that certain chemicals were used effectively by a botanist as early as 1854 to inhibit mold.

In a recent book (*A scientist with Perry in Japan*. Chapel Hill: Univ. of North Carolina Press, 1947), James Morrow recounts in his diary the difficulties experienced in preserving herbarium material collected mostly in Japan. On page 212 there is a statement that Morrow found some of the specimens beginning to mold, and also signs of insects working among them. He therefore painted the dried plants and flowers with a preparation of corrosive sublimate, strong spirits of wine, and camphor.

In a memorial presented to Congress after the return of the Perry expedition it is stated on page 264 that Morrow collected plants at different ports and that by painting with a chemical preparation he was so fortunate as to bring them to the U. S. without injury to a single plant.

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The Robert H. Goddard Rocket Project

The Robert H. Goddard Memorial exhibit sponsored by the Daniel and Florence Guggenheim Foundation, which was opened at the American Museum of Natural History on the afternoon of April 21 (*Science*, April 23, p. 420), is an admirable expression of appreciation of the late Dr. Goddard's scientific work. This exhibit is to be shown in other cities and later placed in some public institution for permanent display.

All who have been associated with the rocket project feel a deep sense of appreciation for the generous support which the Guggenheim Foundation has given to this scientific work during its later years and for the kind words regarding Dr. Goddard, expressed by Harry F. Guggenheim and Lt. Gen. James H. Doolittle at the exercises associated with the formal opening of the exhibit.

The conception of a rocket to be flown at terrific speed by jet propulsion and the earlier stages in this great adventure of a remarkable scientist, when much of the creative thinking was done, were not adequately covered in the addresses made at the Museum. Many institutions and individuals have contributed to this enterprise.

In his biographical sketch, Gen. Doolittle stated that Dr. Goddard was born in Worcester and graduated with a B.S. degree from the Worcester Polytechnic Institute in 1908. That is correct. No mention was made of the fact that Dr. Goddard transferred to Clark University for his graduate studies in physics and from that institution received his Master's degree in 1910 and his Ph.D. in 1911. He received the D.Sc. degree, *honoris causa*, from Clark University in May of 1945.

For a brief period (1912–13) Dr. Goddard was at Princeton, where he held a Research Fellowship. While there, he worked on the mathematical theory of rocket propulsion. He returned to Clark in 1914 as a member of the faculty and continued as a member of that staff until 1943, when he voluntarily resigned his professorship in physics to accept full-time employment in the laboratories of the U. S. Navy at Annapolis.

From the time Dr. Goddard joined the faculty of Clark University he gave most of his research time to the laboratory problems associated with jet propulsion and rocket flight. In this he was supported by the Uni-