particles by neutral radiation are not detectable, or, in any case, their amount is less than ~1 percent.

A fuller discussion of these experiments will be found elsewhere.[3]

We wish to emphasize that our negative conclusion about generation in paraffin of penetrating particles by neutral radiation refers only to experiments performed at sea level. In higher stations, the generation of penetrating particles in low atomic number materials seems to have been found by several experimenters.[4]

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Energy Levels of O^{17} Obtained from $O^{16}(d, p)O^{17}$ and $N^{14}(\alpha, p)O^{17}$

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THE measurement of nuclear energy change (Q) values in transmutation experiments enables the positions of deep nuclear levels to be observed. These levels are not yet explained and there is some question as to whether they are characteristic of the reaction process or of the product nucleus. In any event, the observation of the same levels in different reactions is of interest.

The nucleus O^{17} can be formed in the $O^{16}(d, p)O^{17}$, $F^{19}(d, \alpha)O^{17}$, and $N^{14}(\alpha, p)O^{17}$ reactions. The first has been studied by Cockcroft and Lewis, and Guggenheimer, Heitler, and Powell,[1] the second by Burcham and Smith,[2] and the third by Haxel.[3] A well-defined group occurs for the ground state (Q_0) value for the first two reactions and the first excited state (Q_1) is clearly found at about 0.85-Mev excitation in both cases. The third reaction does not show the presence of an excited state at 0.85 Mev in previous work. Since the geometry of natural source work is rather poor, we have studied the $N^{14}(\alpha, p)$ reaction using cyclotron alpha-particles and good geometry. In order to remove systematic errors, we have also studied the $O^{16}(d, p)O^{17}$ reaction using the same absorption cell.

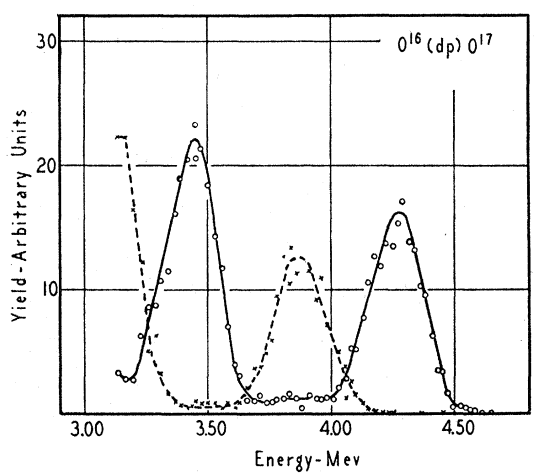

FIG. 1. Yield of protons plotted against energy from $O^{16}(d, p)O^{17}$, using a high counter bias to give differentiation. Two groups are present. The dotted curve is for a reduced bombarding energy. The same groups appear, but with a different relative yield.

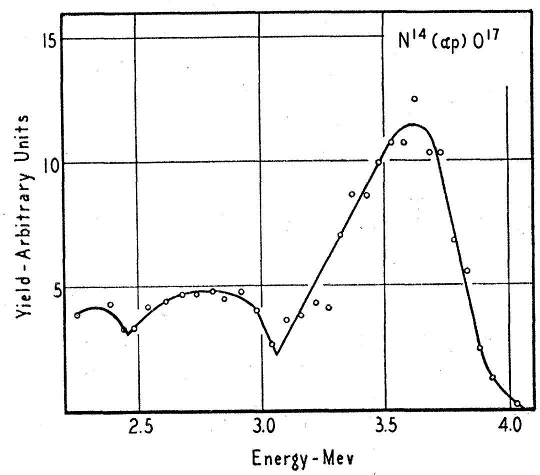

FIG. 2. Yield of protons plotted against energy from $N^{14}(\alpha, p)O^{17}$. Two groups appear corresponding to the same excitation level as found in the reaction of Fig. 1.

The results of the bombardment of oxygen by deuterons of two energies are shown in Fig. 1. It can be seen that the two proton groups are clearly resolved. The ratio of the yields changes as the bombarding energy changes, there being less relative yield in the excited state as the bombarding energy increases. Table I shows the ratio at four energies, the highest being taken from the paper of Guggenheimer, Heitler, and Powell, the lowest, Cockcroft and Lewis, and the other two from our new data. The ratios found by Burcham and Lewis for the (d, α) reaction and our own figures for the (α, p) reaction are included.

TABLE I.

Beam energy	0.575	2.9	3.3	6.2	(d, α)	(α, p)
Ratio yield of Q_1 to Q_0	2.28	1.87	1.43	0.94	1.00	0.3

The alpha-particle bombardment of nitrogen gave the results of Fig. 2. The target was urea. The beam homogeneity is rather worse for alpha-particles, and the yield is less. Nevertheless, two groups of energy 3.93 and 3.15 are present, corresponding to Q-values of -1.31 Mev and -2.12 Mev. The ratio of yields is about 0.3.

We find for the reaction $O^{16}(d, p)O^{17}$, $Q_0=1.75$, $Q_1=0.89$, difference 0.86 Mev, for $N^{14}(\alpha, p)O^{17}$, $Q_0=-1.31$, $Q_1=-2.12$ Mev, difference 0.81 Mev. The two are identical within the experimental error.

The reaction process clearly influences the relative yield as the excited-state group in the (α, p) reaction is one-third as prolific as in the (d, p) or (d, α) reaction. Bombardment by alpha-particles seems to be similar to high energy deuteron bombardment.

A third group of $Q-2.90$ Mev appears in the (α, p) reaction. This perhaps may be due to a second excited state in O^{17}, but other explanations, notably scattered deuterons or $N^{14}(\alpha, d)O^{16}$, are possible.

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A Note on the Paper "Second Quantization and Representation Theory"[1]

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April 10, 1947

In a recent number of this journal[1] Dr. E. M. Corson published a paper with the above title. On examination this paper turns out to bear a striking resemblance to a paper of mine[2] entitled "Konfigurationsraum und Zweite Quantelung," which was published in 1932. Without exception, all of the results which Dr. Corson finds are contained in my paper. There is a close parallelism not only between the formulas, but also between the texts of the two papers.

Through the courtesy of the editor I have had the opportunity of seeing a copy of the letter by Dr. Corson which follows this one, in which he explains that his paper was intended to be expository in nature. It is singularly unfortunate that he neglected to state this in his paper, and also that he neglected to state the source of the material used. My paper was quoted by Dr. Corson, but only in connection with a trivial identity, and no indication was given of the dependence of his paper on my reasoning and on my results.

In a recent communication from Professor Fock, which has been brought to my attention, Professor Fock points out that my recent article on second quantization is similar in content to his paper in *Zeits. f. Physik* **75**, 622 (1932).

I should like to explain that my paper was intended to be expository in nature. I regret that this aim was not brought out clearly, because of insufficient reference to earlier publications on second quantization. In particular, inadequate acknowledgment was made of the debt to Professor Fock's article, whose general plan my exposition followed, and from which several examples were adapted.

The author sincerely hopes that his work, far from detracting from the credit which is due Fock, will rather serve to direct attention to the very important contribution Fock has made in this field.

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June 26, 1947

[1] E. M. Corson, Phys. Rev. **70**, 728 (1946).
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