LETTERS TO THE EDITORS

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War-time Growth of Schoolboys

THE rationing and restriction of many of our common foodstuffs has prevented the free choice of food to which we were all of us accustomed before the War, but it has handicapped some of the community much more than others. The public schools have had a difficult time because boys of 14–18 require more total food than the average holder of a ration book, yet the schools have no means of obtaining meals for their boys outside the ordinary rations. The question therefore has arisen as to whether this has made any difference to the boys' rate of growth. Are public school boys now as tall and heavy as they were before the War? The pre-war and war-time weight and height records of boys at two public schools have been submitted to statistical analysis. Both schools take a serious interest in the way their boys are fed.

GROUP *A* (BOYS AGED 14–15 YEARS).

Year	Average weight in January of each year. (lb.)	Average increment during the year. (lb.)	Average height in January of each year. (in.)	Average increment during the year. (in.)
1939	115·5	12·9	64·9	2·4
1940	113·9	12·0	64·4	2·5
1941	116·9	12·8	65·2	2·4
1942	116·4	12·8	65·3	2·1
1943	113·8		64·0	

GROUP *B* (BOYS AGED 15–16 YEARS).

Year	Average weight in January of each year. (lb.)	Average increment during the year. (lb.)	Average height in January of each year. (in.)	Average increment during the year. (in.)
1939	123·8	11·6	66·8	2·0
1940	125·6	10·3	67·1	1·7
1941	126·5	10·3	67·1	1·9
1942	128·0	10·0	67·5	1·7
1943	129·2		67·4	

The rate of growth during the year January 1939–40 has been compared with the rates of growth during the three following years. The boys were divided into two age-groups, *A* and *B*. Group *A* comprised all boys who became fifteen during the course of each year of investigation, and group *B* all boys who became sixteen during each year.

Very similar results were obtained at both schools and average results for one school are shown in the accompanying tables. At this school there were about a hundred boys in each age-group in each of the years 1939–43. There has been no significant decrease in the height and weight of these boys during the past three years; the 15–16 year-old boys are in fact taller and heavier now than were boys of a corresponding age before any food restrictions were imposed. Hence we may conclude that, given reasonably good catering and management, the rationing system should not have interfered with schoolboys' growth. This speaks well for the system of rationing, or the brains behind it; but it may be pointed out that if no outside sources of food are available, the catering must be good to make the present rations the basis of an adequate diet for a group of healthy young men or boys.

E. M. BILLINGTON.
R. A. McCANCE.
E. M. WIDDOWSON.

Department of Medicine,
University of Cambridge.
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Radioactivity and the Completion of the Periodic System

IN connexion with the article by Prof. F. A. Paneth[1] in NATURE of May 23, 1942, I would like to direct attention to the fact that the systematics of isotopes acquires a more simple and logical form if, besides the usual formation of nuclei by addition of a neutron (^1_0n) and a proton (^1_1p), we assume the possibility of the formation of new nuclei by addition of a hypothetical particle ($^{\ 1}_{-1}a$) of unit mass and charge equal to $-e$, which may be called the aproton-type formation of nuclei.

In a recent paper[2] I have shown that, if all isotopes are plotted on the graph (Z, A), some regularities in the position of stable nuclei may be noticed. These regularities may be considered as a consequence of the existence of the following scheme in the sequence of addition of elementary particles in the process of formation of new nuclei:

$$\left.\begin{array}{l}(1)\ \text{From hydrogen to oxygen } n \to p \to n \to p \to \ldots \\ (2)\ \text{From oxygen to titanium } 2n \to 2p \to 2n \to \ldots \\ (3)\ \text{From titanium to uranium } (2n \text{ or } 4n) \to \\ \qquad \to (2p(a) \text{ or } 4p(a)) \ldots \end{array}\right\} \quad (1)$$

where n, $2n$, $4n$ . . . denote the addition of one, two, four . . . neutrons one after another without interruption; p denotes the addition of a proton; $2p(a)$, $4p(a)$ the addition of two or four protons one after another, the last of which may or may not be replaced by an aproton.

Fig. 1 shows a part of the graph (Z, A), namely, from $Z = 78$ to $Z = 94$. Stable isotopes are denoted by crosses, β-active isotopes by circles, and stable isotopes not yet found, but expected according to the above scheme (1), by dots. As this graph shows, all known stable isotopes in this range, without exception, agree with the scheme. On the other

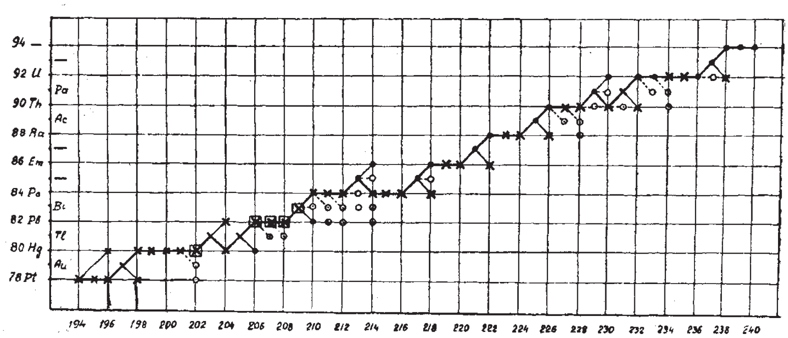

Fig. 1. SYSTEMATICS OF ISOTOPES.
X known stable and α-active isotopes.
● expected stable and α-active isotopes.
O unstable, β-active isotopes.

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