Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 475.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Radioactivity of some Rarer Elements produced by Neutron Bombardment

EXPERIMENTS on the Fermi effect with some rarer elements have given the results summarised below. The neutrons were obtained from sources of radon, in quantities up to 100 millicuries, sealed in small glass tubes with powdered beryllium, and the radioactivity produced was measured with a Geiger-Müller counter which had been carefully calibrated with weighed amounts of uranium oxide. To utilise the enhanced activity produced by surrounding source and specimen with hydrogen compounds[1] most of the irradiations were carried out in a cavity in the middle of a large block of paraffin wax. The main results obtained are collected in the following table.

Element	Half-life	Relative intensity
Silver	2·33 min.*	1
Iodine	25 min.*	0·7
Europium	9·2 hr. ± 0·1	19
Terbium	3·9 hr. ± 0·1	0·5
Erbium	2·9 hr. ± 0·1	3
Ytterbium (? Lutecium)	2·5 hr.	0·6
Germanium	c.2 hr.	0·1

* Quoted from reference 2.

The relative intensities give a rough comparison of the activities produced per gram-atom when irradiated in the wax block in a fixed position for a time long compared with the half-life. Measurements on silver (2·33 min. activity) and iodine were also made to serve as standards.

Europium, terbium and gadolinium were kindly supplied as very pure oxides by Dr. J. K. Marsh. Europium shows a remarkably high activity compared with that of silver. Since the 20-sec. period of silver gives an intensity about four times that of the longer period, europium gives about four times the total activity of both periods of silver. The 'water effect' for europium was roughly determined and the activity was found to be increased forty times by irradiating the specimen in the wax block. The β-ray spectrum is now under investigation in the Physics Department of this College; the maximum energy is approximately $2{\cdot}0 \times 10^6$ e.v. In addition, γ-rays have been detected which are little absorbed by 4 mm. of lead.

A specimen of pure white gadolinium oxide (Gd_2O_3) which had been freed from europium and terbium[3] gave no detectable activity with the sources used. The activity with a half-life of 8 hours reported by Fermi and his co-workers[2] may possibly be due to the presence of a small amount of europium, which is not easily separated except by the method of electrolytic reduction. The terbia used in these experiments had been carefully purified for atomic weight determinations[3].

Specimens of erbia and ytterbia originally supplied by Merck were kindly lent by Prof. J. F. Spencer. In addition to the strong activity with a half-life of 2·9 hours, erbia gave a much weaker activity with a period of *c.* 30 hours. As, however, the specimen used may contain other rare earths, this period cannot definitely be ascribed to erbium. The ytterbia contained lutecium, so that the activity observed may be due to this element. It is hoped shortly to settle this point by examining specimens of these elements which have been separated by electrolytic reduction.

A specimen of pure scandia from Messrs. Adam Hilger, Ltd., which had been tested spectroscopically and was at least 99 per cent pure, gave no detectable activity when irradiated for 15 hours with 100 millicuries. Another specimen kindly lent by Prof. G. T. Morgan also gave no activity. The activity with a period of 16 hours reported by Hevesy[4] must presumably have been obtained with much stronger sources of neutrons.

I am much indebted to Prof. P. M. S. Blackett for his encouragement and advice whilst this work was in progress.

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[1] Fermi et al., *Ric. Scient.*, V, **2**, 7–8; 1934.
[2] Fermi, D'Agostino, Amaldi, Pontecorvo and Segrè, *ibid.*, Jan. 1935.
[3] Marsh, *J. Chem. Soc.*, 1972; 1934.
[4] Hevesy, NATURE, **135**, 96, Jan. 19, 1935.

Curare

IN 1931 Hartridge and West[1] noted a rigidity-removing ('lissive') action of curare in experimental parathyroid tetany in dogs. The application of the drug to diseases involving muscular rigidity in man was undertaken by West in a wide series of cases[2]. As it was observed quite early in the investigations that the 'lissive' action was apparently only present in certain samples of curare and might be due to some constituent other than the 'curarines' to which the classical action of curare is due, a broad chemical survey of the much neglected field of the curares was undertaken by the writer in close co-operation on the pharmacological side with Dr. Ranyard West.

Through the valuable co-operation of the Curator of Forests, British Guiana, we have been able to examine a number of *Strychnos* species, kindly identified botanically by the Kew authorities, for pharmacologically active alkaloids. The species examined, their numbers in the Forest Department Records[3], and their approximate relative total alkaloidal contents are shown in the following table.

Species.	Rec. No.	Alkaloid Content.
Strychnos Erichsonii	2284	++++
,, *toxifera*	2278; 2285	+++
,, *Melinoniana*	2260; 2279; 2286; 2303	+±
,, *diaboli*	2295	++
,, *diaboli ?*	2270	+
,, *Mitscherlichii*	2261	0
Guettarda acreana	2317	++++

Of these *Strychnos* species one only, *St. toxifera*, contains an amorphous quaternary alkaloid, to the extent of 0·2 per cent, indistinguishable chemically and pharmacologically from the paralysing principle curarine isolated from calabash or gourd curare from