

LETTERS TO THE EDITOR

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A SELF-STABILISED HIGH VOLTAGE SOURCE FOR GEIGER COUNTERS

SEVERAL methods* of obtaining stabilised high voltages have been described. In all of them, a separate rectifier and a separate stabiliser, bias batteries, etc., have been used. A self-stabilised high voltage source is being developed and its circuit is shown in Fig. 1.

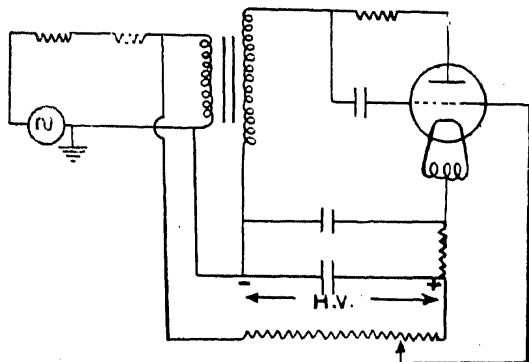


FIG. 1

The circuit is self-explanatory. By introducing an air gap in the central leg of the high voltage transformer, some degree of stability is obtained. By adjusting the bias to the grid of the rectifier, the stability is increased. Feeding back the D.C. output current to the primary further improves the stability of the output voltage. The coupling between the plate and grid by a condenser reduces the ripple to an unnoticeable extent and also improves the stability. The primary circuit contains lamp resistances which reduce surges and regulate the output voltage.

In such a circuit, it is found that a mains voltage variation of 60 volts in a 230 volt supply produces a variation in the output voltage of less than 10 volts. An output current change of ten micro-amperes produces no perceptible change in the output voltage. In this circuit, a power tube of the receiving type is used and as such cannot be operated with a high current drain at voltages above 1,000 volts. Consequently the polarisation of the core by D.C. flow has to be reduced considerably at such voltages. Even if this is done, the worst instability obtained corresponds to one volt in the output per one volt change of the mains

voltage. A complete description of its operation will be published in due course.

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August 16, 1943.

* Webster, *Proc. Camb. Phil. Soc.*, 1931, 28, 121. Street and Johnson, *J. Frankl. Inst.*, 1932, 214, 155. Richards, *Rev. Sc. Inst.*, 1933, 4, 479. Evans, *Ibid.*, 1934, 5, 371. Ginrich, *Ibid.*, 1936, 7, 207. Ashworth and Muzon, *Ibid.*, 1937, 8, 127. Neher and Pickering, *Ibid.*, 1939, 10, 53. Hartman, *Electronics*, 1932, 6, 43.

THE TEA POLYPHENOL OXIDASE—ITS MATERIAL NATURE

IN previous studies¹ the tea oxidising enzyme was characterised as a polyphenol oxidase, mainly by reason of its substrate specificity. The question then arose whether tea oxidase was also analogous in its material and chemical nature to such other polyphenol oxidases^{2,3} which are known to be copper-protein compounds.

Copper has been detected in all preparations of tea enzyme. But the crude preparations were found also to contain manganese and iron, both associated with other types of oxidising enzymes.^{4,5} On purification, however, iron and manganese were completely eliminated from the enzyme while the preparations got enriched in their copper content.

The purification of enzyme was effected as follows:—The acetone preparation of the enzyme was extracted with Sorenson's glycine buffer at pH 10.1, and after adjusting the pH of extract to 6.0 the enzyme was precipitated by a fractional saturation with Am_2SO_4 . The precipitate obtained between half and full saturation was collected, dispersed in water and dialysed. Further purification consisted in an adsorption on freshly prepared calcium orthophosphate gel and subsequent elution. By this method tea oxidase has been purified to a concentration of at least 800 times that present in fresh leaf.

Some typical results for the activities and the copper contents of the preparations during the different stages of purification are given