interested to learn that this effect was due to "the well-known influence of polarised light." I do not feel, however, that an argument of the form—"certain effects are produced by light on crossing a snowfield—some of this light is polarised—therefore the effects are due to the polarised light"—will withstand logical analysis.

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The Occurrence of Dwi-Manganese (At. No. 75) in Manganese Salts.

As the present writer is responsible for the polarographic investigations of solutions containing dwi-manganese (see letter by Dolejšek and Heyrovský, NATURE, 116, p. 782), he alone replies to the criticism of the above letter by Mr. A. N. Campbell (NATURE, 116, p. 866). This criticism shows a misunderstanding of what the polarographic-electro-analysis with the dropping mercury cathode really means. First of all, the present author's potentials refer, as expressly stated, to the calomel—not absolute—zero, and thus, of course, do not agree with those obtained by Mr. Campbell, since the present author's special electrolytic method is based on an almost currentless reversible electrolysis which differs widely from ordinary electrolytic methods (see, for example, *Tran. Far. Soc.*, 19, p. 692, 1924; *Rec. Trav. Ch. Pays-Bas*, 44, p. 488, 1925). The over-voltage on the pure mercury cathode beads is so large that hydrogen begins to be deposited from a deci-normal hydrionic concentration at $-1{\cdot}20$ v. from the calomel electrode (*Rec. Trav. Ch. Pays-Bas.*, 44, p. 503, 1925), and at the acidity of the solutions used in the dwi-manganese investigations, at $-1{\cdot}3$ v. to $-1{\cdot}4$ v., *i.e.* far behind the point of deposition of element 75. Variation of hydrion concentration from 0·1 n. to neutral solution produced no effect upon the "75" hump, neither was its shape or position affected by polarising the sulphate or the chloride. Solutions of manganese sulphate which were freed from the two impurities by means of the electro-chemical deposition described in the first letter showed no hump whatever before the deposition potential of manganese at $-1{\cdot}35$ v.

Solutions were further obtained by subliming volatile chlorides from a fraction rich in "75," and these showed on polarograms the corresponding humps without any manganese in solution. The formation of manganese tetrachloride at the large mercury anode used in this method is out of the question, and it is equally impossible to superpose an alternating current with this delicate arrangement.

Polarograms of sodium sulphate have been frequently studied (*Rec. l.c.*, p. 493, 600), and show the same flat curve as those for sodium chloride, bromide and hydroxide.

Altogether about 400 polarograms were obtained, by the author and five collaborators working on three different pieces of apparatus in the dwi-manganese research, and checked by polarising solutions containing additions of different metallic salts to ensure that the new hump was due to a metal not hitherto identified. Whenever this hump is very prominent, the *L* lines of element 75 invariably appear in the X-ray spectra obtained by V. Dolejšek, and the combination of the two methods is now used as a guide in the analytical enriching of the solutions in element 75. Finally, the "75" hump agrees well with the deposition potentials at the dropping mercury cathode expected for the triad 25, 43, and 75, since in all analogous examples the deposition potentials of the metals in a triad become more positive by 0·1 v. to 0·2 v. with increasing atomic weight.

For a better understanding of the above explanations Mr. Campbell is referred to the seventeen papers dealing with this special electrolysis already published in English, and particularly to the Brauner jubilee number of the *Rec. Trav. Ch. Pays-Bas*, 44, pp. 488-600.

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December 15.

MR. A. N. CAMPBELL in his letter to NATURE (Dec. 12) questions the validity of Dolejšek and Heyrovský's conclusions (NATURE, Nov. 28) that the second "hump" in their manganese deposition curve is due to the presence of small amounts of dwi-manganese.

In his letter Mr. Campbell assumes that the Czech authors used a platinum cathode, whereas it was Heyrovský's "dropping mercury cathode." As Mr. Campbell does not appear to be acquainted with Prof. Heyrovský's apparatus, I should like to direct his attention to an account of it in the Brauner jubilee number of the *Recueil des Travaux Chimiques des Pays-Bas* (May 1925). In his general introduction to a series of researches with this apparatus, Prof. Heyrovský pointed out, with examples, that the method he used was capable of detecting impurities down to concentrations of 10^{-6} gram-equivalents per litre. This has not been controverted.

Dolejšek and Heyrovský's interpretation that the "hump" in their manganese deposition curves was due to traces of dwi-manganese in "pure" manganese sulphate is supported by the isolation of the oxide of the new element from manganese sulphate and chloride by Mr. F. H. Loring and myself (*Chem. News*, Oct. 30, Nov. 27). By an entirely independent method we have been able to obtain about a gram of what we believe is fairly pure higher oxide of dwi-manganese.

Prof. Heyrovský's "dropping mercury cathode" does not appear to have received in Great Britain the attention it merits, although the writer of the section on general and physical chemistry in the Chemical Society's "Annual Report," 1924, mentions in connexion with it (p. 21) that there is no indication of a surface film being formed on it. This would invalidate Mr. Campbell's contention.

GERALD DRUCE.

December 14.

The Plant as a Measure of the Habitat.

IN NATURE of October 31, p. 656, appears a note concerning the plant as a measure of the habitat, wherein reference to "The Phytometer Method in Ecology," by Clements and Goldsmith, is made.

The subject of the complexity of the individual plant as a recorder is correctly touched upon, and opinion is expressed that probably it will be long ere physical instruments can be dispensed with in plumbing the possibilities of the environment.

As workers in phytometry have been comparatively few, and are almost entirely American, it may be worth while to record very briefly indications as to the utility of the phytometer, obtained by me as the result of independent work.

South African native tree seedlings (*e.g.* those of *Ocotea bullata, Olinia cymosa, Olea laurifolia, Platylophus trifoliatus, Cunonia capensis*) are being tested as phytometers, the growth and transpiration re-