an arc myself, it was found that with exposures of the order of one or two seconds, the 2212 band appeared with marked intensity.

(2) With a high-frequency (valve) circuit and external electrodes applied to a tube containing cadmium vapour at pressures ranging from 10 mm. to 40 mm. or higher, the narrow isolated band at 2212 was not obtained. In agreement with Cram's results, it was found that the continuous emission on the short wave-length side of the resonance line 2288 extended as far as a sharp edge in the neighbourhood of 2212. In two or three spectrograms, however, an increased intensity near 2212 gave the appearance of a narrow band at that place.

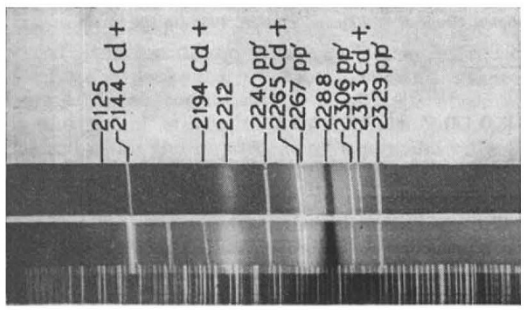

FIG. 1. Arc spectra of cadmium, with copper arc superimposed on the lower spectrum.

(3) In the case of zinc vapour excited with the same high-frequency arrangement, an emission band at 2000 was obtained without difficulty at pressures of the order of 10–12 mm., as is clearly shown in Fig. 2. This fact is not irrelevant to the origin of the 2212 cadmium band, because zinc and cadmium have corresponding absorption bands—at approximately 2064 and 2002 for zinc; 2212 and 2125 for cadmium. In a note in the *Physical Review*, Winans[3] has stated that the 2212 cadmium and the 2064 zinc bands, both present in absorption, are both *absent* in emission.

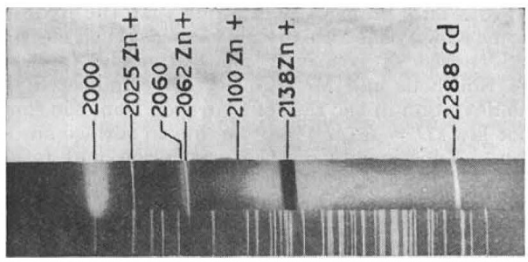

FIG. 2. Spectrum of zinc vapour when excited by high-frequency discharge, with external electrodes. Copper arc superimposed.

Although my observations as given in paragraph (2) might readily be used in support of Cram's view that the 2212 band is an impurity, it seems to me that the weight of the evidence is in favour of its being a true cadmium band. In support of this position, I submit the following arguments.

(*a*) The undoubted presence of 2212 as an emission band in the arc makes it less probable that its appearance, under certain conditions, in an excited tube, is due to an impurity. It is not without significance that in both the arc and the early electrodeless discharge showing this band, *pp'* lines are present with considerable intensity. These do not occur in Cram's spectra (nor in my recent high-frequency discharges), and it may be that the presence of a narrow band at 2212 is associated with the excitation of this group of lines.

(*b*) The undoubted presence of a band in both emission and absorption, in the related element zinc, strongly suggests the probability that the corresponding band in cadmium should also be present in emission, as well as in absorption.

(*c*) Since there is without question an absorption 2212 cadmium band, it is not a matter of surprise that there should be an emission band also. Of course, this does not necessarily follow, but the presence of an absorption band does help to make it less likely that an emission band, found in the same place, is due to an impurity.

The origin of certain diffuse bands which occur in the spectra of metallic vapours is, however, not always easy to settle. It is only through the co-operation and continued experiment of different workers, using different conditions, that certainty can finally be reached.

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Dec. 11.

[1] Cram, *Phys. Rev.*, **46**, 205; 1934.
[2] Robertson, *Phil. Mag.*, **14**, 795; 1932.
[3] Winans, *Phys. Rev.*, **37**, 902; 1931.

Structure of Br III

THE spark spectrum of bromine, excited under different conditions, has been photographed over the wave-length range λ450–7000, using various instruments, and lines belonging to the doubly ionised atom have been identified.

These experiments have made possible the detection of the structure of Br III, which is found in all its characteristic features to be analogous to that of Se II, classified recently by us[1]. The intervals of the fundamental term $5s\ ^4P$ are 2587 and 2253 cm.$^{-1}$; and those of $5p\ ^4D$ are 2413, 2070 and 658 units. This scheme is, however, at variance with the one published by Deb[2], which, we consider, is improbable in many important respects. A complete report of the new classifications will be published shortly.

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[1] *Proc. Roy. Soc.* (in press).
[2] *ibid.*, A, **127**, 204; 1930.

Large Sunspot Group of February 1935

ALTHOUGH the sunspot group referred to in NATURE of February 16 (p. 260) was not specially large, it was of interest because of its very rapid growth. Spectroheliograms in $K_{2,3,2}$ light were secured through thin cloud at the Solar Physics Observatory, Cambridge, on February 5, 6 and 7. On February 5 the group is shown on a plate exposed from $12^h\ 25^m\ 18^s$ to $12^h\ 26^m\ 51^s$, and as the formation was near the centre of the disc, it must have been recorded very near $12^h\ 26^m\ 5^s$. As no spot was shown on the Greenwich photograph