On the Infra-Red Emission Spectrum of the Mercury Arc.

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I. INTRODUCTION.

At the present time, when efforts are being directed towards the establishment of relationships between the atomic structure of an element and special features of its spectra, it is desirable to ascertain as fully as possible the frequencies which are associated with the atoms of the element in definite and determinate physical states. The frequencies associated with mercury atoms in the neutral, or supposed neutral state, have been carefully investigated by R. W. Wood[1], McLennan and Edwards[2] and others in the region between $\lambda = 6{,}000$ A°.U. and $\lambda = 1{,}800$ A°.U. In the experiments in which this was done, it has been found that if light of wave-lengths lying within the limits mentioned be passed through non-luminous mercury vapour there is a strong symmetrical absorption band at $\lambda = 1{,}849$ A°.U., a moderately strong non-symmetrical one at $\lambda = 2{,}536{\cdot}72$ A°.U. and one still less marked and consisting of three narrow bands at $\lambda = 2{,}338$ A°.U.

From this it has been concluded that within the limits mentioned there are three groups of frequencies which characterise the atoms or groups of atoms present in the vapour of mercury in the non-luminous state. It is desirable, however, that a wider range of frequencies should be investigated, especially on the side of the infra-red, where but little work on absorption appears to have been done as yet.

With a view to proceeding in this direction some preliminary work has been done by the writers in that region on the emission lines in the spectrum of the mercury arc. It is evident that a knowledge of the lines which characterise this spectrum in the infra-red region as well as of their exact wave-lengths would be of great assistance in deciding where to look for absorption by mercury vapour.

It was found on examining the work of those who have already investigated the emission spectrum of the mercury arc in the infra-red

[1]R. W. Wood. Physical Optics, p. 431.

[2]McLennan and Edwards, Proc. Roy. Soc. of Canada, 1915.