Narrow Continuous Band of Potassium in the Extreme Red

ALTHOUGH the absorption bands which appeared, as reported by Kuhn[1] and Datta[2], near the principal series lines of potassium at high vapour pressures were interpreted on the assumption of polarisation of the molecule, the bands which may have appeared near the resonance lines λλ7699, 7665 were not observed.

FIG. 1.

FIG. 2.

With the view of searching for these bands, the extreme red absorption spectrum of potassium vapour was investigated. By heating the potassium metal in a steel tube filled with hydrogen to a pressure of about 10 cm. mercury, spectral photographs of the potassium vapour were taken at the first order region of the 1·5 m. concave grating. When the continuous light from a carbon arc passed through the vapour, keeping the temperature sufficiently high, a remarkable broadening of the resonance lines, as shown in Fig. 1, was observed. At higher temperatures a narrow continuous band appeared at about λ7220 (Fig. 2), while Fig. 3 shows its photometer curve. In the absence of hydrogen this band was also observed, but with difficulty.

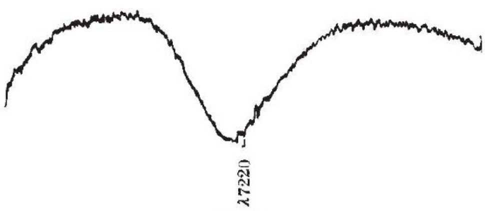

FIG. 3.

Wurm[3] reported a narrow band of sodium appearing on the shorter wave-length side of the *D*-lines, explaining it by assuming polarization of the molecule. Hamada[4] observed the fluctuation of a continuous band in the same region, considering its origin as the sodium quasi-molecule. The potassium λ7220 band may be interpreted in the same manner.

Though the longer wave-length side of the potassium resonance lines was also photographed, the absorption of the $A^1\Sigma \rightarrow B^1\Sigma$ band was so strong that any narrow continuous band was difficult to observe.

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Japan. May 12.

[1] H. Kuhn, *Z. Phys.*, **76**, 782 (1932).
[2] S. Datta and B. H. Chakrovarty, *Ind. J. Phys.*, **7**, 273 (1932).
[3] W. Wurm, *Z. Phys.*, **79**, 736 (1932).
[4] H. Hamada, *Phil. Mag.*, **15**, 574 (1933).

Liquids of High Refractive Index

IN a previous letter to NATURE[1] under this title, we gave values for the refractive index of phenyldi-iodoarsine as measured by us. Our attention has now been directed to the fact that the properties of this compound had already been accurately measured and published in a valuable paper on "The Optical Properties of Arsenic" by Gryszkiewitz-Trochimowski and Sikorski[2] which had appeared six years previously. We had unfortunately overlooked this paper owing to the fact that in none of the abstracts or collective indexes which we consulted as a guide to the relevant literature was there any mention of the above compound in connexion with these authors. The figures for phenyldi-iodoarsine given by the Polish workers ($n_D^{14\cdot5}$ 1·8527 ; $d_4^{14\cdot5}$ 2·6264) are higher than those we communicated, but agree closely with those we have recently obtained with the purer samples now commercially available.

We take this opportunity to add a warning note. Though we occasionally use phenyldi-iodoarsine when refractometer readings of high index are required, the action of this liquid on the soft glass hemisphere of the instrument is distinctly deleterious. The chief usefulness of this remarkable compound will thus probably be as an immersion medium.

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[1] NATURE, **133**, 66 (1934).
[2] Gryszkiewitz-Trochimowski and Sikorski, *Roczniki Chemji*, **8**, 405 (1928).

Structure of Bromine III

IN a previous letter[1] it was reported that the structure of Br III was detected, the intervals of the fundamental term $5s\ ^4P$ being 2589 cm.$^{-1}$ and 2253 cm.$^{-1}$. A further comprehensive investigation, carried out particularly to distinguish between the lines of Br II and Br III, has led to a considerable extension of the scheme, which consists of doublets and quartets of the $4p$, $5p$, $5s$, $4d$ and $5d$ configurations. On account of the large intervals of the $4d$ and $5d$ configurations, it is difficult to assign the L-values to these terms. Assuming an arbitrary value of 300,000 cm.$^{-1}$ for $4p\ ^4S_{1\frac{1}{2}}$, some of the chief term values are :

$5p\ ^4D_{\frac{1}{2}}$	126823	$5p\ ^4P_{1\frac{1}{2}}$	121875
$5p\ ^4D_{1\frac{1}{2}}$	126165	$5p\ ^4P_{2\frac{1}{2}}$	119751
$5p\ ^4D_{2\frac{1}{2}}$	124095	$5s\ ^4P_{\frac{1}{2}}$	154588
$5p\ ^4P_{\frac{1}{2}}$	123335		

The intervals of $4p\ ^2D$ and ^2P are found to be 1259 cm.$^{-1}$. and 1665 cm.$^{-1}$ respectively. About 200 lines of Br III have been classified altogether.

The complete analysis is being communicated to the Royal Society of London.

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May 27.

[1] NATURE, **135**, 309 (1935).