cell disappeared rather rapidly, probably as a result of the adsorption of atomic oxygen on the cell walls. I was aware of this possible source of error. However, my source was a largely 'atomic' hydrogen discharge, with very low intensity in the spectral region responsible for oxygen dissociation. In addition, observation of the pressure in the absorpton cell during a prolonged run showed that it did not perceptibly decrease. It is therefore felt that no considerable error could have arisen from dissociation, and that the lower value for the absorption coefficient of oxygen, which is in agreement with previous estimates[6], is the more reliable.

It should be pointed out that a law of absorption $\log I_0/I = \mu x + C$ (where I_0/I is the ratio of incident to transmitted intensity, μ the absorption coefficient, x the equivalent path length at N.T.P., and C a constant found by Williams to have a negative value) can scarcely be called 'usual', as stated by Williams. It presumably predicts zero absorption for the range $0<\mu x<|C|$, and I can find no record of the actual observance of such a phenomenon. Williams refers to Shalow and Steiner[6] as having described a case in which the *absorption coefficient* μ (attributed to O_2–O_2 molecules) varies with the *square* of the pressure p. Reference to their article indicates that they found that $\log I_0/I = ap^2$ (where a is a constant). The usual law of absorption, which can be written as $\log I_0/I = \frac{\mu l p}{76}$ (where μ is the coefficient of absorption, l the *actual* path length, and p the pressure in cm.), then shows that μ is directly proportional to p, not to p^2. They found no evidence of zero absorption over a finite pressure range.

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Rotational Analysis of the Band Spectrum of Boron Monobromide

THE $^1\pi \rightarrow {}^1\Sigma$ spectrum of the molecule BBr[1] has been photographed in the second order of a 6·5 m. concave grating. The light source was an uncondensed discharge through BBr_3-vapour in a pyrex H-type tube fitted with quartz window and nickel electrodes. The rotational structure of the (0,0)-band at 2950 A. is partially resolved into lines. Measurements in the P-, Q- and R-branches, where lines up to $J \sim 90$ can be observed, make a complete analysis of this band possible. The constants of the BBr-molecule are found to be:

$^1\Sigma^+$:		$^1\pi$:	
$B_0'' = 0{\cdot}487$	cm.$^{-1}$	$B_0' = 0{\cdot}496$	cm.$^{-1}$
$D_0'' = -0{\cdot}90\times10^{-6}$	,,	$D_0' = -1{\cdot}25\times10^{-6}$	,,
$r_0'' = 1{\cdot}890$ A.		$r_0' = 1{\cdot}875$ A.	

Owing to the small difference of the constants B' and B'', the constants D' and D'' determine the form of the branches, which are rather unusual, the Q-branch forming two heads, one at the zero line, the other at $J \sim 100$. The value $B'' = 0{\cdot}487$ of the ground state together with the ground frequency $\omega e'' = 684{\cdot}0$ cm.$^{-1}$ gives for Mecke's bounding constant $k = \omega^2/4B$ the value 240,000 cm.$^{-1}$, confirming very strikingly the value calculated formerly from AlCl data for the group of halides of metals of the third group in the periodic system.

The full paper will appear shortly in *Helv. phys. Acta*.

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A Photographic Method of Studying β-Ray Absorption by $^{32}_{15}P$

IN a previous communication[1], I pointed out the photographic action of artificial radio-elements; as an application of this, it has been possible to study the β-ray absorption of radiophosphorus through aluminium. Radiophosphorus was prepared by irradiating carbon disulphide by means of the neutrons emitted from 900 mgm. radium plus beryllium; its concentration was effected by means of an electric field[2]. The solutions containing $^{32}_{15}P$ (20–200 × 10^3 kicks per minute) were evaporated to dryness on a water-bath in leaden vessels 1·5 cm. × 12 cm. × 0·3 cm. In order to establish the absorption curve, a series of aluminium absorption screens of increasing thickness (0·1–1·06 mm. and every 0·1 mm. up to 1 mm.) were placed between a Kodak X-ray film and each of these vessels. The photographs obtained were checked by means of a Zeiss microphotometer.

According to Bothe[3], who studied the blackening of a photographic plate as a function of the β-ray intensity, the photographic density D is proportional to the number of impinging electrons up to $D = 1$. The mass absorption coefficient can be deduced from the logarithmic absorption curve.

On the other hand, the results of measurements with a Geiger-Müller counter show, from 1·5 mm. aluminium onward, an incurvation of the logarithmic absorption curve toward the thickness axis. However, the curve is linear between 0 and 1 mm. aluminium, and it is possible to calculate the mass absorption coefficient μ/ρ.

Microphotometer deductions yield $\mu/\rho = 9{\cdot}27 \pm 0{\cdot}11$, whereas Geiger-Müller counter and electrometer methods give $\mu/\rho = 8{\cdot}55 \pm 0{\cdot}20$ and $\mu/\rho = 8{\cdot}51 \pm 0{\cdot}02$ respectively.

Thus the intensity of β-rays emitted from an artificial radioelement can be determined by a photographic method.

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