COMPARATIVE EFFICIENCIES OF FLUORESCING MEDIA AT 1215 A.

Substance	Relative response
Apiezon oil *B*	100
Apiezon grease *L*	100
Zinc silicate on *L* grease	100
Calcium tungstate on *L* grease	50
Magnesium α-tungstate on *L* grease	50
Calcium tungstate alone	10
'Clean' cathode	10

It would appear that calcium tungstate and magnesium α-tungstate are of little use with the 5060 tube, the maximum response of which is at 4800 A.; zinc silicate, which Tomboulian and Pell[2] found useless, is, in our case, as efficient as oil or grease. The response with a 'clean' cathode is presumably due to fluorescence excited in the 'Pyrex' glass, as a line spectrum is seen and the scattered light background (shown in Fig. 1) is negligible.

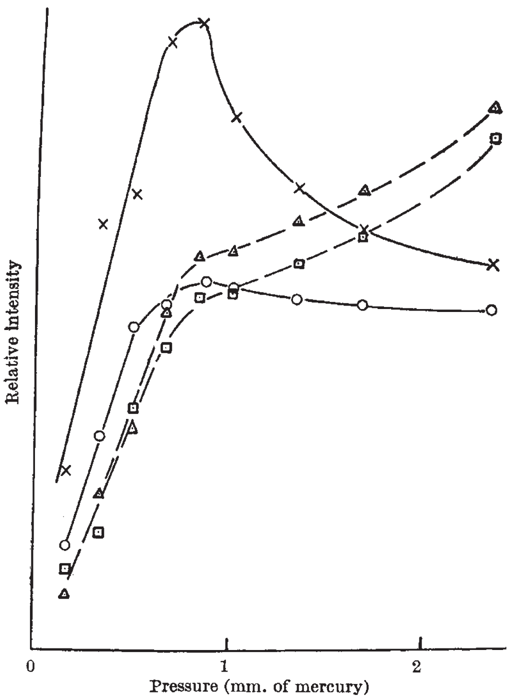

Fig. 2. Changes in intensities of atomic and molecular lines as discharge pressure is varied:

H, ———, × , λ 1025. × 1; ○, λ 1215. × 0·05
H_2, - - - -, □, λ 1160. × 1; △, λ 1221. × 0·5

As an example of the type of observations the photomultiplier makes possible, the intensity variations of the first two Lyman series lines and of two molecular lines are shown in Fig. 2, for different discharge pressures. These measurements were made in less than an hour. The different behaviour of the atomic and molecular lines is very marked, and, in fact, was used to identify λ 1025 as $L\beta$ and later to decide that $L\gamma$ did not appear among lines at 972 A.

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[1] Price, W. C., "Rep. on Prog. in Physics", **14**, 10 (1951).
[2] Tomboulian, D., and Pell, E. M., *J. App. Phys.*, **20**, 263 (1949).

A Stroboscopic Mercury Vapour Light Source

Beeson and Webb[1] have recently described a xenon discharge lamp for optical systems which is capable of either continuous or flash operation.

A very simple mercury vapour lamp for use as a stroboscopic light source in a photoelastic polariscope has been developed in this Laboratory. The lamp is also capable of giving single flashes of 10 microsec. duration or less, which are of sufficient intensity for photographs to be taken.

It is a simple U-tube of 1½ mm. internal diameter except for a length of about 1 cm. in the centre of the horizontal portion of the U, where the diameter is 2½ mm. Tungsten electrodes are brought into the U through the open ends and carry the current into the mercury. The flashes occur across a vapour gap of about 5 mm. length formed by the action of a small heater coil (about 30 watts) wound on the horizontal part of the tube. The electrodes carry small glass beads which partially close the tube, thereby damping out pulsations of the mercury and steadying the position of the gap; the open ends of the U are enlarged to act as reservoirs of mercury. The voltage across the lamp and an ignitron which acts as a switch is 4·7 kV. With very clean mercury the lamp fires well, though at repetition frequencies exceeding about 20 per sec. it may miss occasionally.

The lamp now in use has been developed by S. L. Harris, and is a simplified and improved version of a lamp devised by C. H. Wan. The development of this lamp has been part of a project carried out with the financial support of the Department of Scientific and Industrial Research.

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[1] Beeson, E. J. G., and Webb, A. A., *Nature*, **168**, 1038 (1951).

Relation of Volume of Bubble to the Diameter of the Orifice at which it is Formed

THE theoretical value of the ratio of the volume of a bubble to the diameter of the orifice at which it is formed is 0·231 cm. for air–water at 20° C., if the plane of the orifice is horizontal.

Datta, Napier and Newitt[1] have carried out a very thorough series of investigations in which they found a value for this ratio centring about 0·33 cm. at slow rates of formation. They used orifices constructed by grinding square the ends of glass capillary tubing of several internal diameters between 0·022 and 0·519 cm. The volume of bubbles formed at a given size of orifice decreased with increasing rate of formation to a minimum value and then increased, until a random size distribution set in.

By blowing bubbles at a very slow rate, we have been able to observe a further variation in this ratio at very slow speeds. Our orifices were constructed of glass capillary tubing with diameters from 0·0131 to 0·4744 cm. We obtained a value of the ratio