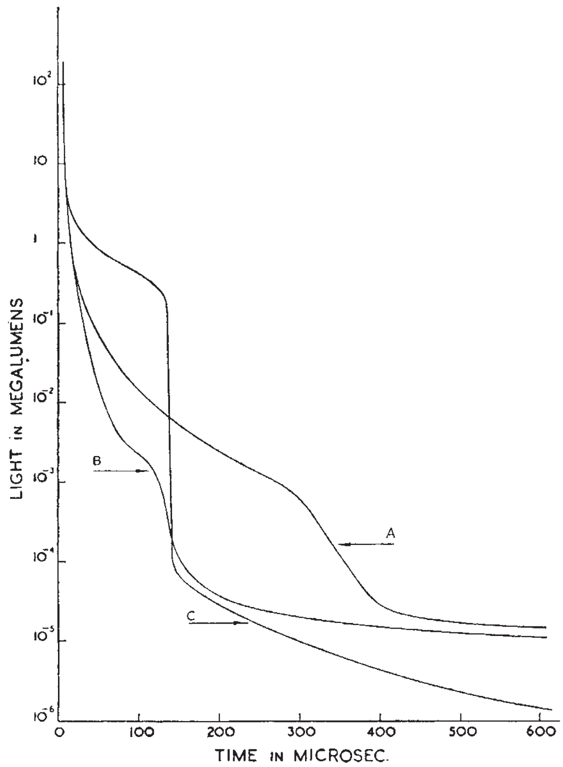

Decay of light from pulse discharges, 6,000 amp. peak and 6 μsec. duration: (*A*) in air, (*B*) in a rapid air stream, and (*C*) in water at 60 atm. pressure

tension of the cell and by the use of optical filters, the range of light output that could be measured was greater than 10^8 to 1, and the recovery time of the system from saturation due to the peak light was only about 20 μsec.

The types of decay curves obtained under various conditions are shown in the accompanying graph. Curve *A* is for a 6,000-amp. discharge between steel electrodes in air. The light decays very rapidly to about 10^{-4} of peak in the first 100 μsec. The rate of decay afterwards is much slower until a level of about 10^{-7} of peak is reached at 400 μsec., and this level is then maintained nearly constant to at least 600 μsec. This persistence of light at a low level is not due, apparently, to excited atoms remaining in the gap, as when the gap is swept by a powerful air blast only the initial rate of decay is changed, as shown in curve *B*. A similar curve is also obtained when possible direct radiation from the electrodes is screened off from the cell.

It was also found that the shape of the light decay curve is not significantly affected by the value of the peak current over the range investigated, but a slightly slower decay-rate is obtained when the pulse length is increased from 2 to 9 μsec. Slower initial decay-rates are obtained when the more volatile metals, such as aluminium, are used for the electrodes. Results similar to the air spark are obtained from discharges in photographic flash tubes, designed for a flash of a few microseconds duration, and in trigatrons.

Similar effects have also been observed with discharges in water; but in this case the initial rate of decay showed a marked increase when the water was subjected to considerable pressure, presumably due to the quicker collapse of the vapour bubble formed by the discharge. This effect is shown by curve *C* for a pressure of 60 atmospheres.

In all cases tried, light is still being emitted at a level of 10^{-7}–10^{-8} of peak some 600 μsec. after the current pulse, and this is not materially influenced by the conditions of the discharge. It is possible that ionization produced by continued electron emission from the cathode may account for this effect, and further study may yield new information on the processes involved. It is hoped to publish more detailed results in due course.

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Rotational Analysis of the Columbium Oxide Bands

THE bands of columbium oxide have been photographed on a 21-ft. concave grating with 30,000 lines per inch. The rotational analysis of three of these bands, λ 4,510 (1,0), λ 4,689 (0,0) and λ 4,915 (0,1) has been carried out. The rotational structure is found to resemble very closely that of vanadium oxide. Two *R* and two *P* branches have been identified in each band. The following constants have been determined for the ground and excited states:

$B_e' = 0{\cdot}5395$ cm.$^{-1}$	$B_e'' = 0{\cdot}6557$ cm.$^{-1}$
$B_0' = 0{\cdot}5325$ cm.$^{-1}$	$B_0'' = 0{\cdot}6553$ cm.$^{-1}$
$B_1' = 0{\cdot}5185$ cm.$^{-1}$	$B_1'' = 0{\cdot}6545$ cm.$^{-1}$
$\alpha' = 0{\cdot}0140$ cm.$^{-1}$	$\alpha'' = 0{\cdot}0008$ cm.$^{-1}$
$I_e' = 50{\cdot}32 \times 10^{-40}$ gm.cm.^{2}	$I_e'' = 42{\cdot}18 \times 10^{-40}$ gm.cm.^{2}
$r_e' = 2{\cdot}237 \times 10^{-8}$ cm.	$r_e'' = 1{\cdot}874 \times 10^{-8}$ cm.

The *D* values for the two states are of the order of 10^{-6} cm.$^{-1}$. Details of this work will be published elsewhere.

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Eye Rotations with Change of Accommodation

THE apparatus, previously described[1], for studying eye movements of subjects in the sitting position, has been expanded so that side-to-side and up-and-down movements of the right eye can be recorded simultaneously. Rotations of this eye, occurring when accommodation is changed, have been studied with the apparatus. In these experiments, two fixation targets were used; both lay on the visual axis of the right eye when this eye was looking straight ahead. The farther target, which was viewed through a glass plate, was a bright pin-hole, angular diameter 1′, distant 5½ ft. from the subject. The nearer target was the mid-point between two virtual images, formed by reflexion at the front and rear surfaces