

LETTERS TO THE EDITOR

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SUPPRESSION OF HIGH FREQUENCIES IN THE PRODUCTION OF JOSHI EFFECT

A REVIEW of the now considerable literature on this phenomenon shows, (1) the presence in the discharge current of numerous frequencies much higher than that of the exciting field;¹ (2) exposure of the discharge tube to light causes a current decrease, $-\Delta i$ (the negative Joshi Effect), and (3) which predominates in the H.F.'s.^{3,5,6,8} No satisfactory explanation is forthcoming for (3). The mechanism of Klemenc, *et al.*² for H.F. production in the ozoniser discharge cannot explain Joshi Effect, since it does not anticipate the occurrence of the positive effect, negative temperature coefficient, the influence of the nature of the gas and of 'ageing'.⁹ The boundary complex theory

(*vide infra*) gives a more detailed mechanism of the working of the boundary layer, postulated by Joshi⁹ as the chief seat of the effect, and is not inconsistent with the findings of Klemenc, Hintenberger and Hoffer.² It is suggested that (4) the formation of a single-bonded^{10,11,12} polarised wall complex, $W^{+\frac{1}{2}}.(XY)^{-\frac{1}{2}}$ is a primary step, where W denotes the wall molecule and XY the gas molecule from the discharge space which can accept normally or under excitation an electron donated by W; (5) under the applied fields the complex ionises: $W^{+\frac{1}{2}}.(XY)^{-\frac{1}{2}} \rightarrow (W.XY)^+ + e(-)$; (6) light dissociates it into neutral particles (a) $W+XY$, (b) $WX+Y$ or/and particles (a) $W+XY$, (b) $WX+Y$ or/and negative ions, (c) W^++XY^- , (d) WX^++Y^- instead of electrons in (5); the latter causes a