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The reaction system of luminescence in Mnemiopsis.

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In dark adapted *Mnemiopsis* luminescence occurs upon stimulation such as gentle agitation of the vessel containing the animal. If agitation is continued the light keeps up for a few seconds and then ceases. After a few minutes' rest the reaction may be obtained again. If rested animals are exposed to light of sufficient intensity and duration they cease to luminesce when stimulated. Hence the luminescence reaction may be represented by the following scheme:

$$D \underset{\text{dark}}{\overset{2\ \text{illumination}}{\rightleftarrows}} A \underset{\text{rest}}{\overset{1\ \text{stimulation}}{\rightleftarrows}} L$$

In which A represents the luminescent substance in the resting, dark adapted state, L the light-giving compound, and D the decomposition product of A caused by illumination. The "rest" reaction of 1 proceeds during illumination and the "dark" reaction of 2 is facilitated by stimulation. The relation of light intensity to the time of exposure required to suppress luminescence is given by the equation $I \times t = K$ where I is the intensity in candle meters, t is time in minutes and K is a constant.

Luminescent paper may be prepared from *Mnemiopsis* in the fashion described by Heymans and Moore for *Pelagia*. Such papers glow in isosmotic solutions of KCl, K_2SO_4, $CaCl_2$, $MgSO_4$ but do not glow in solutions of $MgCl_2$, NaCl, and Na_3 citrate. Variations in pH value of the solutions between 6.0 and 8.0 do not appreciably affect the reaction. Illumination of the indicator paper causes no deterioration in its luminescent properties. Therefore in suppressing luminescence in the animal, illumination acts not on the luminescent substance directly but upon some other structure of the organism, presumably a sense organ. No glow is elicitable from the paper by cytolytic agents such as solutions of alcohol, ether, or butyric acid in sea water, or sea water warmed to 40° C., and hence luminescence in this case does not depend upon cytolysis.