As the mean life τ of the state M is much longer than that of the level F, the phosphorescence is quenched appreciably more than fluorescence. This follows from the formula $I = \dfrac{I_0}{1 + k\tau}$, where k is the probability of a quenching act, I the observed intensity of photoluminescence.

The absorption band $N-M$ (inverse transition) must also appear if the transition $M-N$ take place, notwithstanding its small probability. However, it will have a very small intensity as compared with band $N-F$.

Under the influence of disturbing fields, for example of the surrounding molecules of the solvent, the probability of transition $N-M$ can become appreciably greater than that of the isolated molecule.

In solutions, practically all the molecules which have reached the level M in any possible way will be quenched. Therefore the absorption band $N-M$ must be completely inactive.

Such inactive bands, overlapping on the longer wave-length side the active absorption bands ($N-F$), can cause the falling off of efficiency as observed in fluoresceine solutions[3,4,5]. It is to be noted in this connexion, that in the region of abrupt falling off of yield, the values of absorption coefficients of fluoresceine solutions reach only from 0·2 to 2 per cent of the maximal value.

In the above considerations I have supposed for the sake of simplicity that the levels for absorption and emission acts are identical. I have dealt elsewhere with the relative displacements of emission and absorption bands.[6]

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Interaction between Radio-Waves?

THE coming into operation of the Luxembourg high-power broadcasting-station on a wave-length of 1190 m. has caused the following remarkable phenomenon. For the first time on April 10 of this year it was observed at Eindhoven, Holland, that when a radio-receiver was tuned to Beromünster (460 m.), the modulation of the Luxembourg station could be heard on the background to such an intensity that during the weak passages of the programme of Beromünster the programme of Luxembourg was heard with an annoying strength. Since the field-strength of Luxembourg at Eindhoven has the quite normal value of about 10 mv./m. (the distance from Luxembourg to Eindhoven is somewhat more than 200 km.) and the same phenomenon was observed with different types of receivers, this cannot be due to cross-modulation in the receivers. It was also observed with a battery set away from the electric distribution system of the town, so that any disturbing influences from these sources were eliminated. Hence it seems that the phenomenon has its origin somewhere in the transmission between Beromünster and Eindhoven. It may be remarked that Luxembourg is situated nearly on the line joining Beromünster and Eindhoven.

Since the first observation the same phenomenon has been observed at Eindhoven with different intensities on Radio Paris (1725 m.), Budapest (550 m.), Munich (533 m.), Lyons la Doua (466 m.), Sottens (404 m.), Muhlacker (361 m.), Strasbourg (345 m.), Milan (332 m.), Poste Parisien (328 m.) and Frankfurt (259 m.), which all lie somewhat in the direction from Eindhoven to Luxembourg and at a greater distance from Eindhoven than Luxembourg. It has also been observed on Beromünster at Rotterdam, near Arnhem and at Dusseldorf. It was always the modulation of Luxembourg which could be heard on the background. This modulation has not been observed on Langenberg (472 m.) and Brussels (509 m., 338 m.), or on a British station.

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Kinetics of the Iodine-Oxalate Reaction

SINCE 1916, when one of us[1] reported that this reaction is very sensitive to light and that the dark reaction has a high temperature coefficient, a large amount of work has been carried out on this chemical change by several chemists[2].

The majority of workers believe that the velocity of this reaction in light is not directly proportional to the light intensity but varies as the square root of the intensity of the incident radiation, although Bhattacharya and Dhar[3] have observed that by using an aqueous solution of iodine in the absence of potassium iodide, the relation between velocity and light intensity for this reaction approaches unity in radiations of mean wave-lengths 5650 A. and 7304 A.

We have carried out further experiments on this reaction using normal potassium oxalate and $N/850$ aqueous solution of iodine without the addition of potassium iodide, and some of the results are as follows :

	Dark 8750 A.	8500 A.	3340 A.	3512 A.	3452 A.	3125 A.	3536A.
$k_{25^\circ}/k_{15^\circ}$	4·64	3·92	3·54	2·02	2·25	2·38	2·38	2·44

When potassium iodide ($N/277$) was added to the reaction mixture, the velocity was greatly diminished and $k_{32^\circ}/k_{22^\circ}$ assumed the high value 8·84 in the dark.

In the absence of potassium iodide and with normal oxalate and $N/850$ iodine, the following results were obtained for the relation between light intensity and velocity :

Wave-length in A.	Observed ratios of velocities	Ratio of light intensity
3500	1·32	4
3340	1·79	4
3536	3·25	6·25
8500	3·97	4·34
8750	2·71	2·44

It appears that the relation between the velocity and light intensity varies from 1/3 to 5/4 approximately. Several other photochemical reactions taking place in aqueous solutions behave in a similar manner. It is now well known that the photochemical reactions between chlorine and hydrogen and bromine and hydrogen in the gaseous state are proportional to the square root of the light intensity under certain conditions and are directly proportional to the light intensity under other conditions. We have shown experimentally and theoretically that the relation