

Methyl-Violet as a Red-Sensitiser of the Photographic Plate.

By

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Nearly one year ago, when the writer was developing, under the illumination of a red light, a photographic plate which had been accidentally stained by a trace of methyl-violet, the plate was found to be fogged at the neighbourhood of the stained portion of the plate. As the same phenomenon did not occur when the process was carried on in the darkness, the question naturally arose whether this fogging might be due to a red-sensitising action of the methyl-violet. In the present experiment this was tested and the result came out positive.

50 ccs of ethyl alcohol were mixed with the same volume of water, and 5 ccs of ammonia were added. This solution was cooled by melting ice. Next 1 gr. of methyl-violet was dissolved in 1000 ccs of cold absolute alcohol, and 5 ccs of this were added to the former. The solution thus prepared was well stirred, and cooled by melting ice. The best result was obtained with this solution so far as the writer has tried. The photographic plate to be sensitised was soaked in this solution for 5 minutes or more, and then was rinsed in alcohol and dried. This sensitising process was carried on, of course, in the darkness.

For the sensitising methyl-violet, Grüber's 5B was used throughout the present experiment, but Grüber's 6B and the methyl-violet made by Merck may be used equally well.

For testing the plate, the spectrum emitted by a Nernst lamp was photographed with the aid of a small quartz spectrograph, for

the sake of convenience, though quartz is not needed for the present purpose.

The photographs represented in Fig. 1 were taken with Seed's dry plate 27. The time of exposure was varied, step by step, from 24 second to a few tenths of a second. From 24 sec. to 3 sec. each duration of the exposure was reduced by 3 sec. from that of the preceding longer one; and then followed 1 sec. exposure, and then a momentaneous one. Corresponding to each step of the exposure, the position of the photographic plate was displaced a little in the direction perpendicular to the spectral band, so that a system of the spectra as shown in the annexed photographs was obtained. For the comparison spectrum, the writer employed a cadmium spark. The photographs indicated by Fig. 1, 2, 3 and 4 were obtained in the same experimental condition, and were developed in the same bath of a metol developer with an equal time of development.

Fig. 2 was obtained with a Seed's dry plate 27, sensitised in the manner described above; Fig. 3 with an orthochrome plate, non-filter, of Lion; and Fig. 4 with the same orthochrome plate sensitised by the methyl-violet.

Curves 1, 2, 3 and 4 represent curves of equal density, each one corresponding to the same numbered figure.

In Eder's *Handbuch der Photographie*¹ it is stated that methyl-violet sensitises silver bromide strongly for the yellow region in the neighbourhood of the D line. But as is clearly seen from the curves 2 and 4, the portion of the spectrum to which the plate was most strongly sensitised is in the neighbourhood of $640 \mu\mu$. Thus the photographic plate was rendered sensitive to the light of the shorter wave-lengths in the red.

With regard to the sensitiveness to the red light both in the intensity and the limit of the wave-length the plate thus sensitised is never superior to the panchromatic plate of Wratten and Wainwright; it was, however, ascertained that the plate thus sensitised was more sensitive to the light of shorter wave-lengths than the latter.

When the orthochrome plate mentioned above was sensitised by the methyl-violet, a new maximum of sensitiveness at $640 \mu\mu$ was found in addition to the original maximum at $560-570 \mu\mu$; and the spectrum region to which the plate was made sensitive extended to about $650 \mu\mu$.

¹ Eder; *Ausführliches Handbuch der photographie*, II 3, p. 466.

as shown in Fig. 4 and Curve 4. Though the sensitiveness of the plate thus sensitised to the red was a little reduced at the green and yellow region, it could be used as a rapid plate sensitive to the light of nearly all wave-lengths except those of extreme red.

In conclusion, the writer's sincere thanks are due to Profs. T. Mizuno and M. Kimura for their interest in the work.

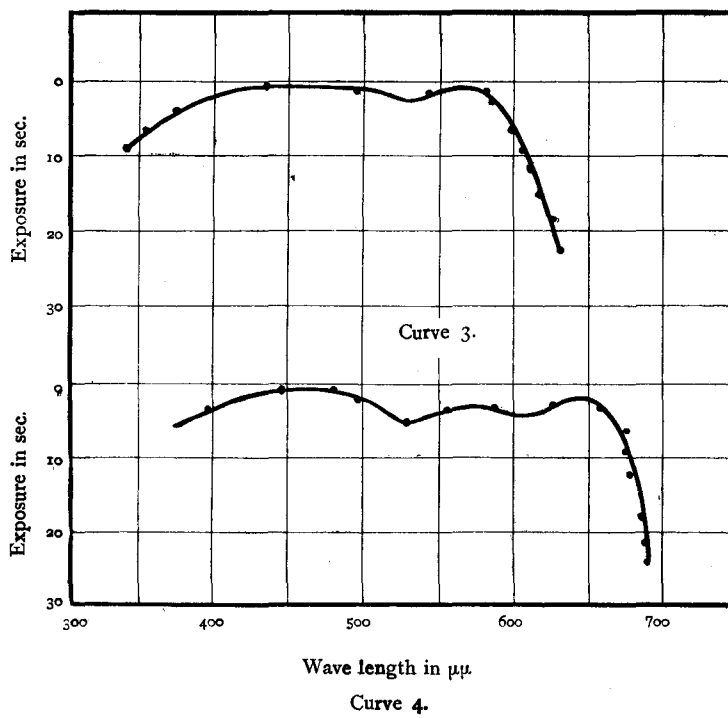
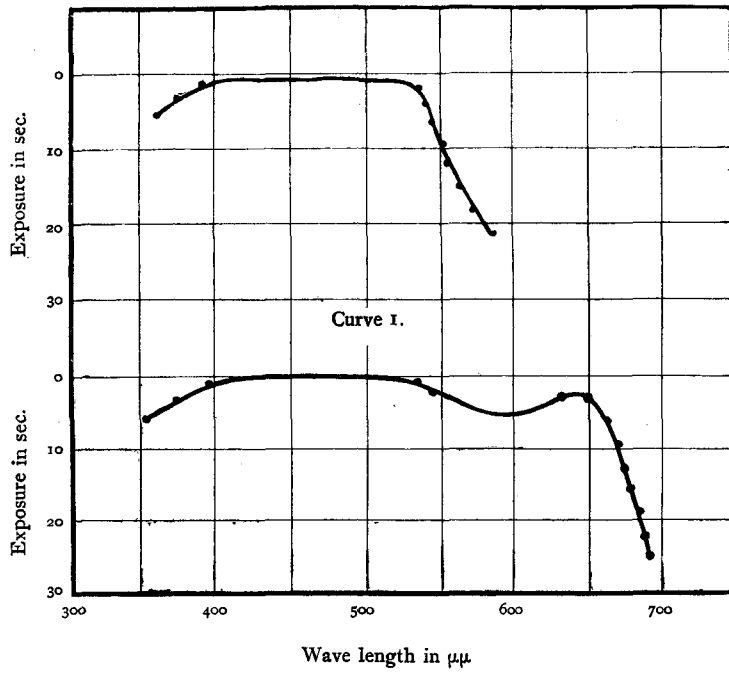




Fig. 1.

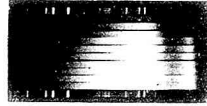


Fig. 2.



Fig. 3.



Fig. 4.