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LUMINESCENT INTENSIFICATION

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UNEDITED ROUGH DRAFT TRANSLATION

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In the works of the author there have been shown (1, 2) the great possibilities of the method of reinforcing weak photographic images by the photographing luminous images on a dark background. In these writings it was explained that the basic factor which limits the realistic possibilities of the method is the illumination of the background - a silvery and ficticious fog.

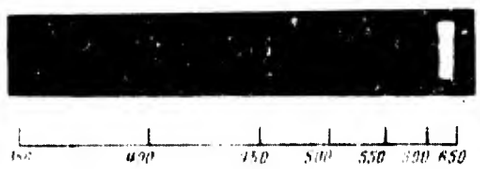
In all the descriptions of the method of reinforcing by photographing in a dark field the illumination of an image to be reinforced is attained by lateral radiation, and the illumination is photographed which is caused by the scattering of the light by the grains of the image (4-8). If by the selection of photographic material and rational treatment it is possible to remove almost fully the silvery fog, still the illumination of the background brought about by different causes (murkiness of the gelatine, mechanical damage to the emulsion layer and base, occlusions which cause optical nonuniformity occurring in the emulsion layer and base, colloid

sulfur, etc.) it is practical impossible to eliminate.

The lowering of the brightness and the interferences of the background is possible if the illumination of the image is effected not by light scattering but by luminescence. In the literature there are hints about luminescence from silver halides (8). However the conditions of excitation (deep cooling) and the wide spectral band of luminescence makes the use of this luminescence difficult and little feasible.

The conversion of the silver photographic image into a luminescent one offers practical interest.

The luminescent intersection should satisfy the following requirements.



Spectrum of fluorescence of a silver photographic image toned by thiosalicylic acid.

1. The spectral band of the luminescence of the toned image should lie in the orange, red, or infrared area of the spectrum, removed from the zone of the luminescent base and the emulsion layer which has the maximum in the area of the blue-violet part of the spectrum, and from the zone of luminescence of the toning solution.

2. The band of luminescence of the toned image should be as narrow as possible for the maximum reduction of the interferences and brightness of the background by selective light filters in the photographing.

The indicated requirements satisfy the images bleached in a solution of mercuric chloride illuminated by orange light and images of thiosalicylate of silver (3). The solutions of thiosalicylic acid and the emulsion layers

impregnated with it under UV radiation give a bright blue luminescence and silver thiosalicylate which produces a toned image illuminates with a bright-blue light in a narrow band of 610 to 640 mu (see drawing).

Because of the ready oxidation of thiosalicylic acid and its salts the process is done in two stages. At first the silver of the image in the bleaching solution (5- to 20-percent acqueous solution of ferricyanide of potassium or a 5-percent solution of $K_3(Fe(CN)_6)$ with the addition of KCl (or NaCl) 20 g/l) is oxidized and converted into nonsoluble ferrocyanide or silver chloride, and then after flushing out the print is immersed for one to three minutes in a two-percent water-alcohol solution (3:7) of thiosalicylic acid.

After toning the image is washed for some minutes in running water.

The light-yellow image obtained is very stable either for long preservation or for illumination with visible or ultraviolet light. Such images can be used strengthening in a dark field, both as light-scattering and as luminescent.

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