

Letters to the Editor should be addressed to the Editor,  
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### Bleached Holograms

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Phase holograms have recently attracted the interest of several authors,<sup>1-5</sup> owing to the higher obtainable brightness of the reconstructed images.

This letter is concerned with both a useful variation of the tanning bleach bath already used by Altman<sup>5</sup> to obtain pure relief images and with a different bleaching system which offers a good compromise between the resolving power and the brightness of the image.

The brightness of the image, reconstructed from a hologram processed with Altman's method, is much better than that obtained from a hologram bleached with a usual bath. However, as already observed by the same author, the resolving power turns out to be much worse.

In order to avoid this limitation, we carried out a set of tests by reducing the percentage of the salted solution contained in the Kodak KR-10 bath.

For the benefit of the reader we recall the formula for the Kodak Bleach Bath R-10 as used by Altman

1 part solution A  
1 part solution B  
10 parts of water

solution A:

Distilled water	500 ml
Ammonium bichromate	20 g
Concentrate sulfuric acid	14 ml
Distilled water to make	1 liter

solution B:

Sodium chloride	45 g
Distilled water to make	1 liter

We modified this formula to: 1 part solution A,  $\frac{1}{10}$  part solution B, 10 parts water. The Kodak 649F plates were treated with this bath, still following the procedure indicated in Ref. 5. We obtained a resolving power of 1200 lines/mm (against 750 lines/mm), still having an enhanced relief image.

However, the best results were obtained with a different bleaching procedure although using the same tanning bleach; precisely the plates were bleached after the complete photographic process, including fixing and drying.

A number of checks have been carried out on portions of the same plate, for different percentages of the salted solution. For each percentage, two different chemical processes were performed by bleaching before and after the fixing and drying. The resolving power turned out to be definitely improved in the second case. In some particular cases the plate bleached before fixing did not give any image while good images were reconstructed if the bleach was performed after fixing and drying.

This effect could be due to the fact that in a plate already fixed and dried, the profile of the gelatin remains most probably unchanged by bleaching, thus obtaining the resolving power of the usually bleached holograms along with an increased brightness of the image.

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