

The curious case of blue green X-ray images from Fitzsimons Army Medical Center: Interview with Robert Shanebrook, December 14 & 15, 2007.

Robert Shanebrook writes:

I have looked at the [X-ray] images. There is quite a range of color in the images including neutral, blue and blue-green (cyan) color.

I was working on designing new x-ray films in the 1970's so I am very familiar with x-ray films from this time period. X-ray films from all popular manufacturers have a support¹ that is dyed blue. I am assuming the original images are 14 x 36 inch duplitized² silver in gelatin images.

If these films are illuminated by a typical X-ray light box with a florescent light source and photographed using a Type B film i.e. Kodak High Speed Ektachrome Film, Type B (EHB) images will have a blue/green-cast.³

The green comes from the mercury spike in the light source output. The human visual system adapts so it sees the fluorescent lamps as being neutral.

The blue comes from the film base color plus the type B film is designed to yield a neutral image when used with 3200K light sources. If Type B film is used in typical sunlight illumination the images will have a heavy blue cast. Ektachrome X Film is balanced for use with daylight illumination. With florescent light sources the Ektachrome-X film will produce images with a greenish cast.

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¹ The "support" is the sheet that the light sensitive materials are coated on. For x-ray it is PET (same as Coke bottles). For Ektachrome it is cellulose acetate.

² Duplitized means there is a light sensitive coating and subsequently an image on BOTH sides of the film support. The film is made of the support and a light sensitive coating on each side of the support. Nearly all x-ray film is the same on both sides. The light sensitive coating consists of silver bromide in a gelatin vehicle (gelatin as in Jell-o. It is not accidental that Jell-o was invented near Kodak. The gel used in film is far better than that used in food).

³ EKTACHROME films available in 1976 were certainly capable of accurately reproducing the images. However, the light sources are not very good. The degree of variation exceeds what I would expect from the films. Perhaps the images were made on different light boxes. There may be some color shifting caused by aging of the EKTACHROME images. I did notice on one image that the color changes across the image. Photographing x-rays on the light box is a common practice. There is no color film that is perfect for this purpose. The best way to do this is to use DAYLIGHT balanced film i.e. EKTACHROME X Film with a 30 Magenta filter in order to remove the green cast caused by the Hg [Mercury] line.