Additional Information to the book "Photoshop Restoration & Retouching, 2nd edition" by Katrin Eismann for QUE July 2003.
For additional information, please visit http://www.digitalretouch.org

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Correcting Red Eye the Way Mother Nature Wanted It

Problem:

Figures 1 and 2 overleaf show the problem we will fix: Maxwell's oversized "maroon" pupils.

Objectives:

Once the image is scanned, we wish to fix the scanned image without affecting the original file until the corrections are "final".

We wish to correct the eyes as easily as possible so that they look "natural".

We must preserve highlights; otherwise the eyes will look "dead".

What we need to know about the subject:

Most pupils are black, but there are "shades of black", and some pupils can be grayish.

For light-eyed people, the iris tends to be lighter toward the pupil, darkening toward the outer edge.

More of the pupil is uncovered in darker lighting conditions, which is when we use flash; but the flash duration is too short to give the iris enough time to re-close over the pupil. Perhaps this is one reason why in photos the pupils can appear over-sized relative to the ambient light created by the flash and frozen in the photo. Red-eye results from the reflection through the pupils of direct photoflash off of red blood cells at the back of the eye. If all this red were simply turned black, the resulting size of the pupil in the image may be larger than it should appear relative to the ambient lighting conditions portrayed in the photo, giving the eyes an unnatural "wide-eyed" appearance.

If we think our subjects may emerge red-eyed, at the time we take the pictures we should retain a mental note of the shade of the pupils for corrective work afterwards.

Correction Procedure:

This procedure is tested for a 35 mm color negative scanned as a 2400 ppi "tif" image and corrected using Adobe Photoshop 6. It may also work for other types of scans and other imaging software, but has not been tested for them.
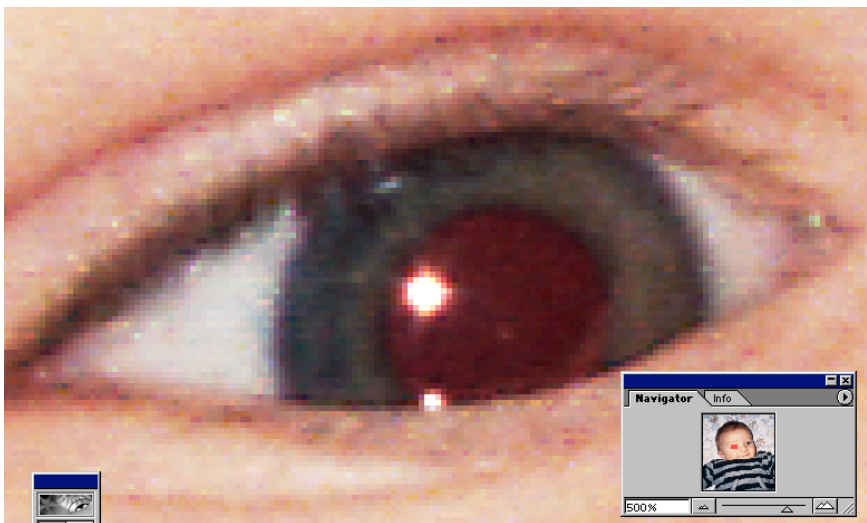
**Figures 1 and 2: Maxwell with red eyes**
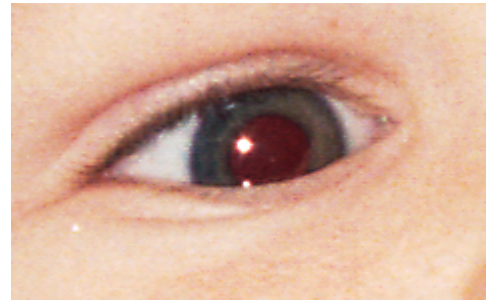
Step 1:

Maximize the image and zoom it enough for the eye to fill most of the screen. (I use 500%.) Find the eye using the navigator. The result will resemble Figure 3.

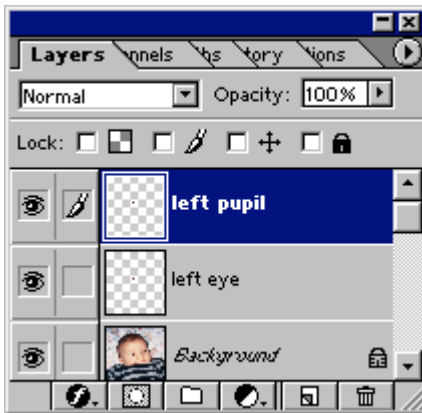**Figure 3. Zoomed eye ready for surgery**

Step 2:

Use the rectangular marquee to select enough of the eye so that the iris is contained in the selection (figure 4). Do "Ctrl +J" to make a new <layer via copy> of the selection. Name it "left eye". The "Left Eye" layer now contains the selection of the left eye.

Figure 4: Selection of left eye.   **Figure 5: Selection of pupil**
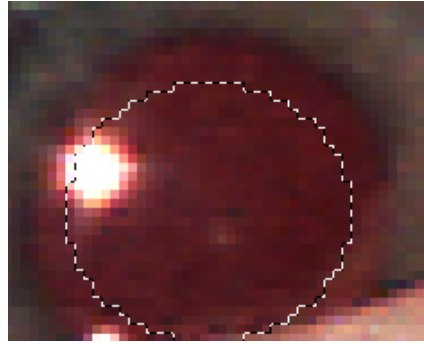
Step 3:

In the Left Eye layer, use the elliptical marquee to create a selection of the pupil that has the size, shape and position considered correct for this subject and ambient lighting (Figure 5). The positioning must be centered in the iris, (in this image taking into account that the bottom part of the iris is hidden). Create a new layer via copy and name it "Left Pupil" The image will now have a background and two layers structured as shown in Figure 6.

Figure 6: Layer Structure   **Figure 7:   Cloning the iris**
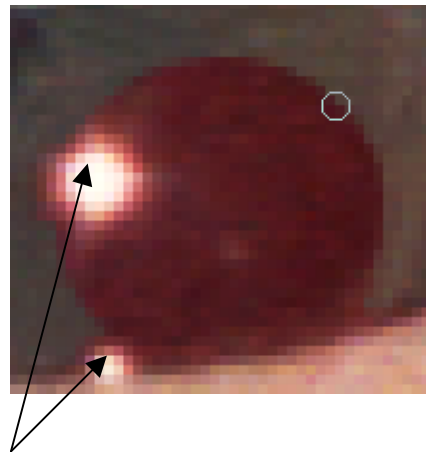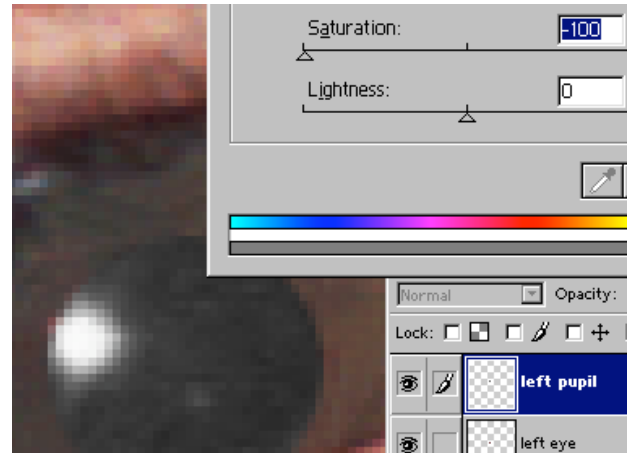

highlights

Step 4:

Select the "Left Eye" layer. From the portion of the iris close to the pupil, clone the iris into the pupil all around, watching that the selection of cloned iris remains appropriate. Re-select iris material and re-clone it into the pupil as often as necessary to maintain a natural-looking iris around the remaining pupil. Do not clone away any highlight in this layer, but do clone away all pupil that converts to iris. The "Left Pupil" layer preserves the pupil material we will retain. When this procedure is completed, the remaining pupil will be that in the Left Pupil layer (Figures 7 and 8).

Figure 8. Cloned Iris, correct pupil size   **Figure 9. De-saturate the pupil**

Step 5

Select the Left Pupil layer. Do "Ctrl+U" to open the "Hue/Saturation" palette. De-saturate the layer completely. The pupil will now be gray. The highlight will still show. (Figure 9).
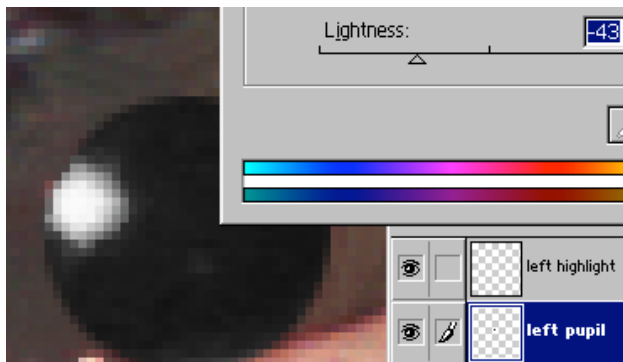
Figure 10. Darkened pupil   **Figure 11. Left eye corrected**

Step 6

Use the magic wand to select the highlight in the pupil, create a new layer via copy called "Left Highlight". Go back to the Left Pupil layer, do "Ctrl U' and slide the lightness slider to the left (darkening) until the pupil is as black as seems appropriate for the subject. The highlight will remain intact because it is a separate uppermost layer (Figure 10).

Step 7:

Select the blur tool, normal mode, 100% pressure. In the "Left Pupil" layer, carefully blur the circumference of the pupil so the smoothened outer edge of the pupil gradually fades into the iris.

Save the image. In the "View" menu, select "Fit on Screen" to see the result in normal picture viewing mode (Figure 11). If any further adjustments are needed they can be made on each layer corresponding with the portion of the eye needing further correction. Once satisfied with the result, save the image again and repeat the same process on the right eye, making sure that the treatment is similar (i.e. pupil size, positioning, shade of black). Once both eyes are completed and require no further adjustment, flatten the image to reduce the file size and save it.

Concluding Comment

Other shorter techniques for correcting red eye are described in the Photoshop literature. The procedure described above, while it requires seven steps and three layers per eye, involves no complex techniques, can be done quite rapidly with a bit of experience and requires little manual dexterity. It has the advantage of allowing total control over the various aspects of the correction sometimes needed to insure that the results look natural, without incurring the risk of damaging the background scan in case of errors.

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