DxO Optics Pro Review
by Nikonian Team Member Neil van Niekerk

What DxO Labs say the software does:

"**DxO Optics Pro** automatically enhances images produced by Digital-SLR, advanced Digicams, and their lenses with revolutionary optics, noise and lighting corrections packed in an all-new, easy-to-use feature rich application."

DxO Optics Pro runs on both Mac and Windows platforms, and works on raw or jpg image. This review is based on version 3.5

MY VERDICT ON THIS PROGRAM

DxO Optics is a truly impressive piece of software in how it was designed precisely for specific camera and lens combinations, to correct for specific optical errors.

The designers automated the use of various features to a high degree. DxO Optics Pro allows you to get the optimum image quality from a variety of lenses with the minimum of fuss in the Automatic Mode. But it also allows you precise control in the Key Control and Expert Control modes, to get exactly what you want.

Over the next few pages I'll touch on various aspects which impressed me, and show examples of how DxO Optics enhances and corrects images.

There was only one area where the software performed slightly under what I anticipated - and that was in Noise Reduction. I believe that a program which specializes in noise reduction will generally give better results.

Certain other functions are better handled by programs such Adobe Camera Raw or Capture One if you are doing raw workflow in any kind of volume. Even though DxO Optics Pro can process multiple images, I don't believe it was intended to compete with the likes of ACR and Capture One.
DxO Optics Pro fills another niche - and beautifully so.

Even where some corrections are available in Photoshop, such as correction of chromatic aberration - you'd still have to manually do it by checking the image. DxO Optics Pro does it **automatically** for you depending on various factors such as the specific lens, the focal length it was zoomed to, and the focusing distance. The wizards at DxO Labs did your homework for you.

Overall, I would highly recommend this program to anyone who wants to get optimum quality from their lenses, with the least amount of fuss. There certainly isn't anything else like it on the market.

GENERAL OVERVIEW OF DxO Optics Pro 3.5

There are three modes of operation:

- fully automatic
- key controls
- expert controls

Fully Automatic is self-explanatory.

Expert Control is at the other end of the spectrum, offering an expanded palette of controls. This allows you fine control over of all adjustments that DxO Optics Pro makes to an image.

Key Controls is a mode that lies somewhere in between, allowing you to adjust the most important aspects of DxO Optics Pro. This mode offers a limited palette of controls.

Having three modes of operation like that is an excellent idea, offering the user a choice of whether to get your hands dirty with the actual work of manipulating an image - or allowing the software to make the choices.

For the major part of testing the software for this review, I had the software in Expert Control mode, but it always seemed as if the default settings the software chose (ie, the Auto settings), were the best choice. This would seem to underline the motivation behind the software's design - to seamlessly offer the user optimal adjustment and correction of the image with the least amount of effort. But, with the option of allowing you full control if you wish. This is a big plus.

DxO doesn't write to the actual raw files, so there is no chance of DxO corrupting them. Instead, DxO, similar to ACR, writes side-car files. C1 uses a similar way to store info about the raw files.

You can save DxO corrections as DNG file, to make sure that DxO's corrections and enhancements are available for further editing in Photoshop.

Expert Mode offers numerous adjustments under these eight tabs:

- <u>DxO Optics Engine</u> (which corrects Distortion, Chromatic Aberration, Vignetting.)
- <u>DxO Lighting Engine</u>
- <u>DxO Noise Engine</u>
- Colour & Exposure (which contains WB / exposure / Curves / Hue / Saturation / Lightness controls)
- Image Information (which shows the Exif Data)
- Output Settings (which controls output file format and colour space)
- Sharpening
- Histogram

The first three are specific to the DxO software, but the other settings should be familiar to anyone who uses photo editing software. Even then, there are some specific enhancements that DxO brings to the other settings. I'll discuss the DxO-specific tabs on the following pages.

WORKSPACE & SETTINGS

For me it is important that an imaging program be intuitive enough that you can get the gist of it by just playing around with it.

Obviously a lot of the functionality of a complex program is discovered by going through the manual or help files - but I still feel that since photography is a visual medium, the programs that we use in digital photography should by definition be easy to grasp visually.

FIRST IMPRESSIONS

The menu layout seems simple enough, and has the usual user interface w/ drop-down menus and tooltips. The buttons and menus are clearly marked and labeled. No surprises here, and it all seems like design and function was thoroughly considered. The manual too is thorough, and written in an easy-to-follow style.

Here is what the workspace looks like. This is **the main screen**, and from which you will control the function of DxO Optics software. The Controls palette is movable, and I expanded it there just for illustration.
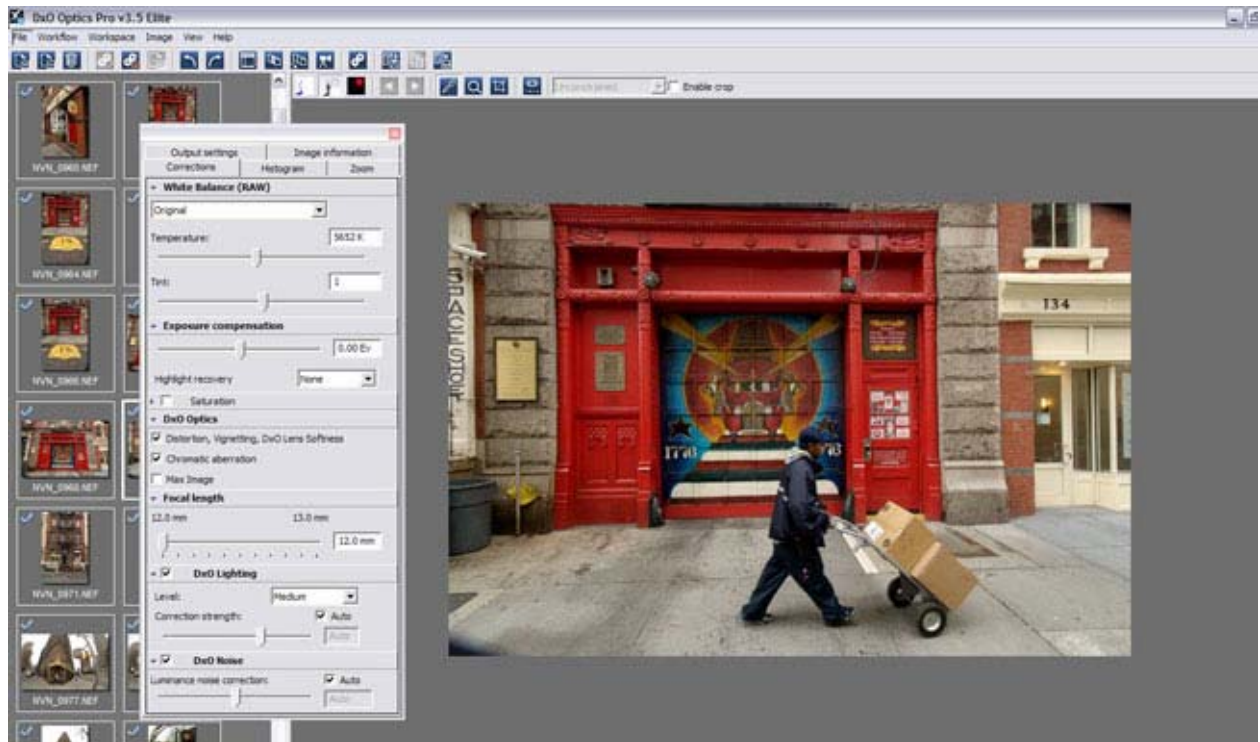

A screen-capture of the menu and toolbars of the **workspace**:
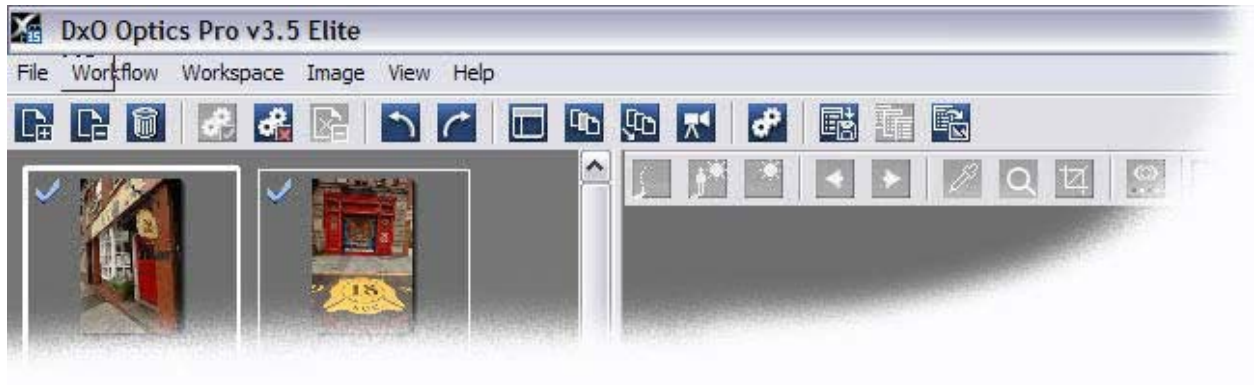
When you click on "Add Images" icon, or click on File >> "Add Images" in the menu, then a separate browser screen opens up. It makes the workspace less cluttered with the browser separate from the main function of the DxO Optics software.

The **workspace** has a preview window & preview window toolbar. The **browser window** has two re-sizable panes, with the left-hand pane showing the folder structure. The right-hand pane shows file listing or thumbnails.

The screen capture of the **browser window** shows the clarity of the menu and toolbars.
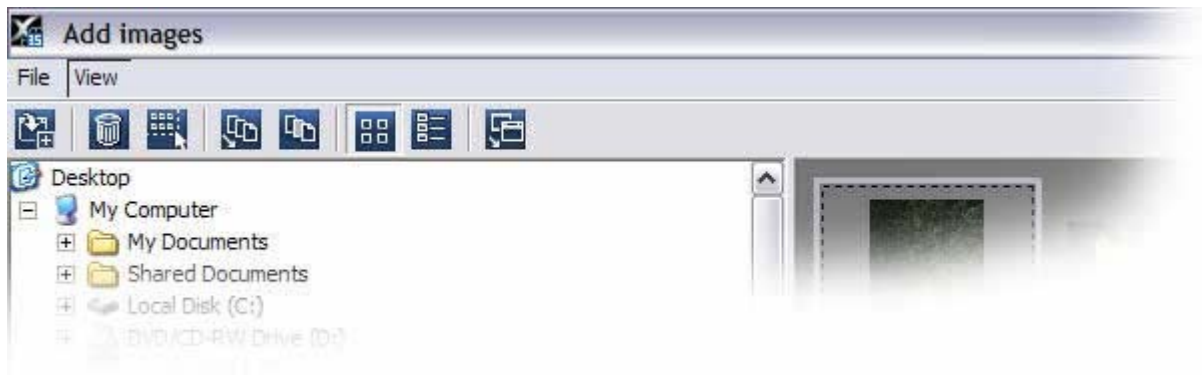
When you have images open in the workspace, there are 'filters' available with which you dictate which images should be processed, and which not. You can also remove images from the workspace to help clear up the clutter on the light-box. 'Remove images' just removes images from the workspace, and doesn't delete them.

With the images loaded into the main window, clicking on any image opens up a pane with all possible corrections - as can be seen in the top image on this page.

The status bar at bottom will tell you which camera & lens combination.
(DxO Optics Pro adjusts and corrects each image according to algorithms for specific lenses at specific focal lengths and focus distances.)

There are buttons in the workspace window to show highlight and shadow clipping, which are useful tools in making a decision about exposure correction and the dynamic range in the image.

Cropping of the raw file is also possible whether unconstrained, or to any number of aspect ratios.

However, you can only crop individual images. It isn't possible to crop multiple files like you can with ACR or Capture One.
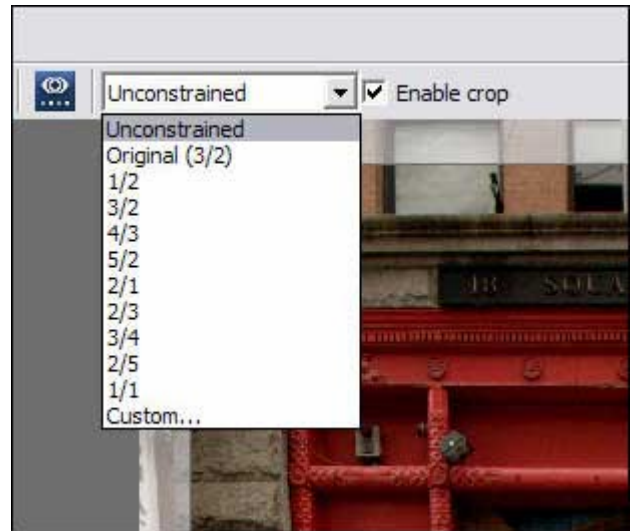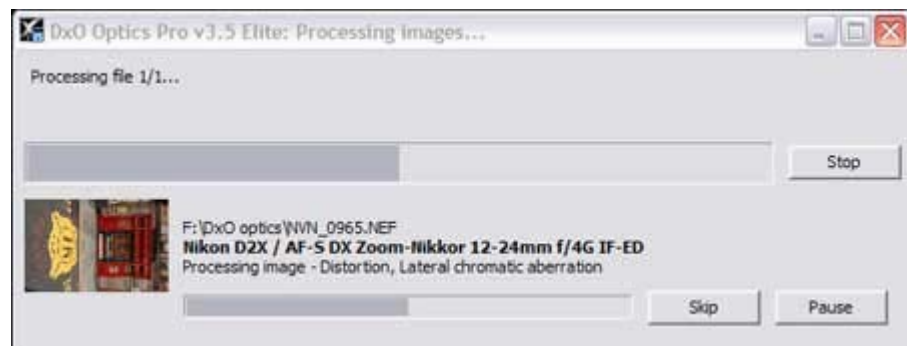
There are some quirks to DxO Optics that need a little bit of getting used to:
Batch processing disables the main program. i.e., you can only run one batch at a time. When DxO batches, the entire workspace window disappears, to be replaced by a status window.

Figure shows the dialogue window opens during processing.

batch that

If you're used to how Adobe Camera Raw processes raw files in the background, this is going to seem like an interruption to you with the main screen (the workspace) disappearing. More annoyingly, the screen jumps in position on the task bar, in between editing and batch processing. If you are using multiple windows, the tab position on your task bar changes position.

But that is the only unlikable aspect I could find in the layout and controls of DxO Optics Pro - and it is a minor one. For the rest, I have to restate again that it is obvious that the program designers took great care in making this program user-friendly.

GENERAL CONTROLS

Even though DxO Optics Pro brings its own flavour to the following controls, they should be familiar to anyone who has used photo editing software.

- Exposure
- White balance picker
- Curves
- Hue / Saturation / Lightness control
- Histogram
- Image Information / Exif Data
- Output Settings (output file format & colour space)
- Sharpening

(The DxO specific tabs - Optics, Lighting and Noise, will be discussed on following pages.)

By double clicking on an image in the thumbnail pane of the DxO Workspace, a preview will open up. A collection of tabs should also open up, with controls that will be used to adjust and enhance the image. If the tabs don't show, they can be called up via the menu. Workspace >> Show Controls.

I'm not going to go over all the controls, since they are self-explanatory to any digital photographer.
There are no surprises in how DxO Optics Pro presents these, since their menus and control tabs are clearly marked and has a logical layout to them. This of course is a huge positive for this program, since the learning curve is not as steep if you are already accustomed to image editing programs.

But the following items might be of specific interest:

The Control tabs can be unlinked (i.e., split up), making it easier to see certain factors at the same time. In this example, the zoom tab was moved away from the tab group. Certain changes need to be seen at 100% or larger, to see the effect. Example, noise reduction and sharpening.

In this screen grab, the zoom tab is separate from the group for a detailed view.
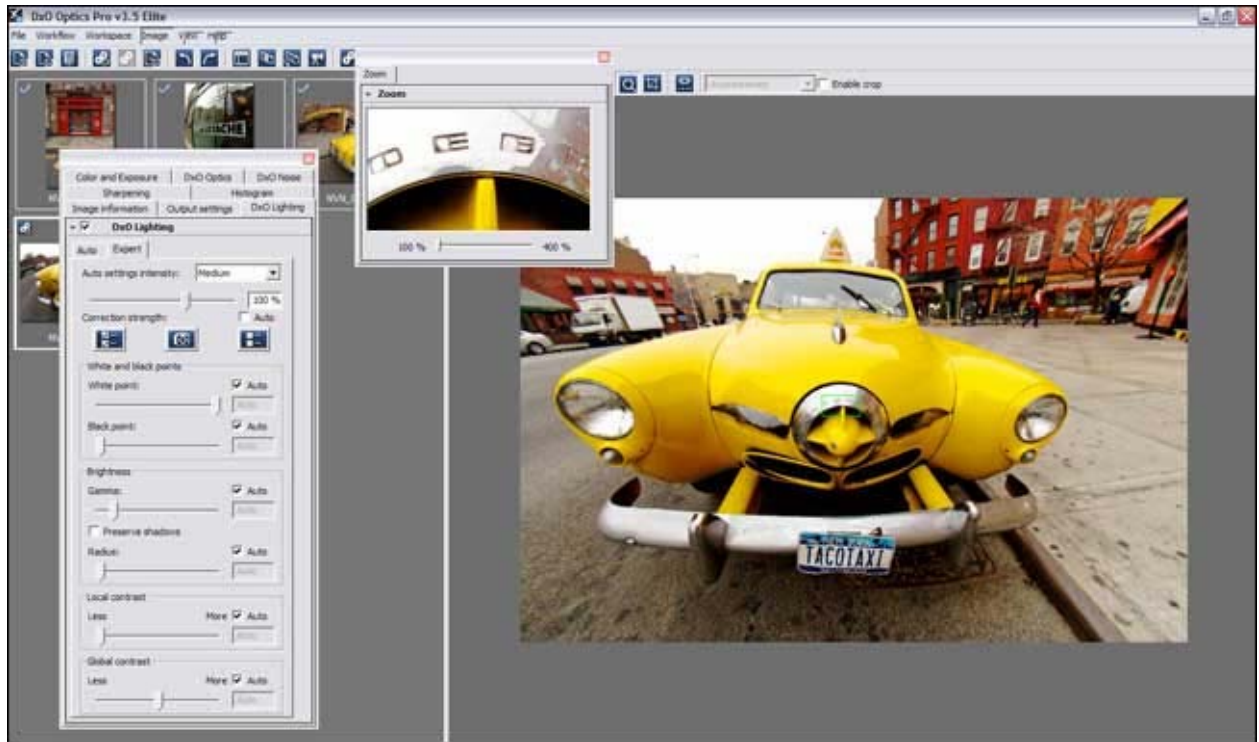

The Zoom tab is a necessity in that you can only see the effects of sharpening and noise reduction while zoomed into the actual pixel level. Although preview image is an excellent way of judging global changes to the image, certain changes need to be seen in detail. The Zoom button shows selection of image, with ALL the processing applied.

The WB clicker (which is available under the 'Color and Exposure' tab, works like any other WB pick.

Under the zoom tab, you can see a before and after preview of what the white balance would be if the area under the eye-dropper tool was clicked on. This helps in giving a better idea of whether the intended area will be a good point to pick a neutral white balance from.

If you don't want to click between the tabs, it is simple enough to disconnect the tabs from the main group.
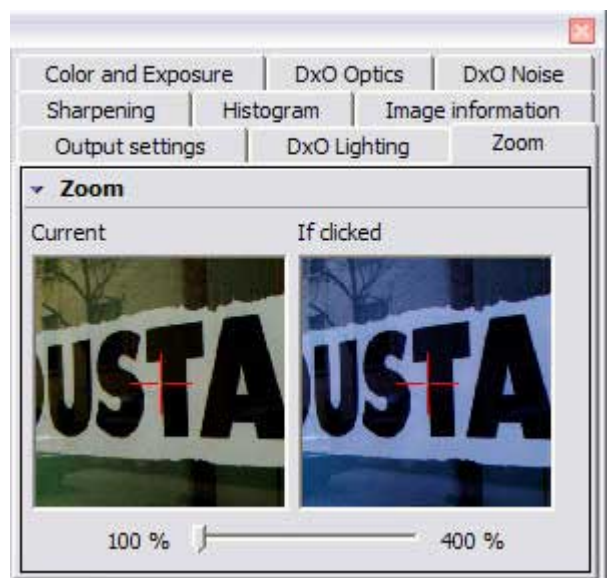
The Exif Editor is useful for adding copyright info to any images.

To save the same info to multiple images, it is easy enough to create a new preset to do just this.

Save this as a preset, and disable all other settings, and enable only the Exif editor. This will keep all other edits the same, and just add copyright info.

Color and Exposure	DxO Optics	DxO Lighting
DxO Noise	Sharpening	Histogram
Zoom	Image information	Output settings

▾ **EXIF**

Aperture: f/10.0
Shutter speed: 1/80 s
Focal length: 12.0 mm (!)
ISO setting: 800
Date/time: 2006:01:11 14:52:11

▾ **EXIF editor**

Artist   Neil van Niekerk

Copyright   © One Perfect Moment

Another display that you should be familiar with, is the histogram.
A nice feature of DxO Optics Pro is that the histogram is calculated on the cropped display. This helps in eliminating non-relevant highlights in judging your exposure via the histogram, and will help in a detailed analysis of the image.
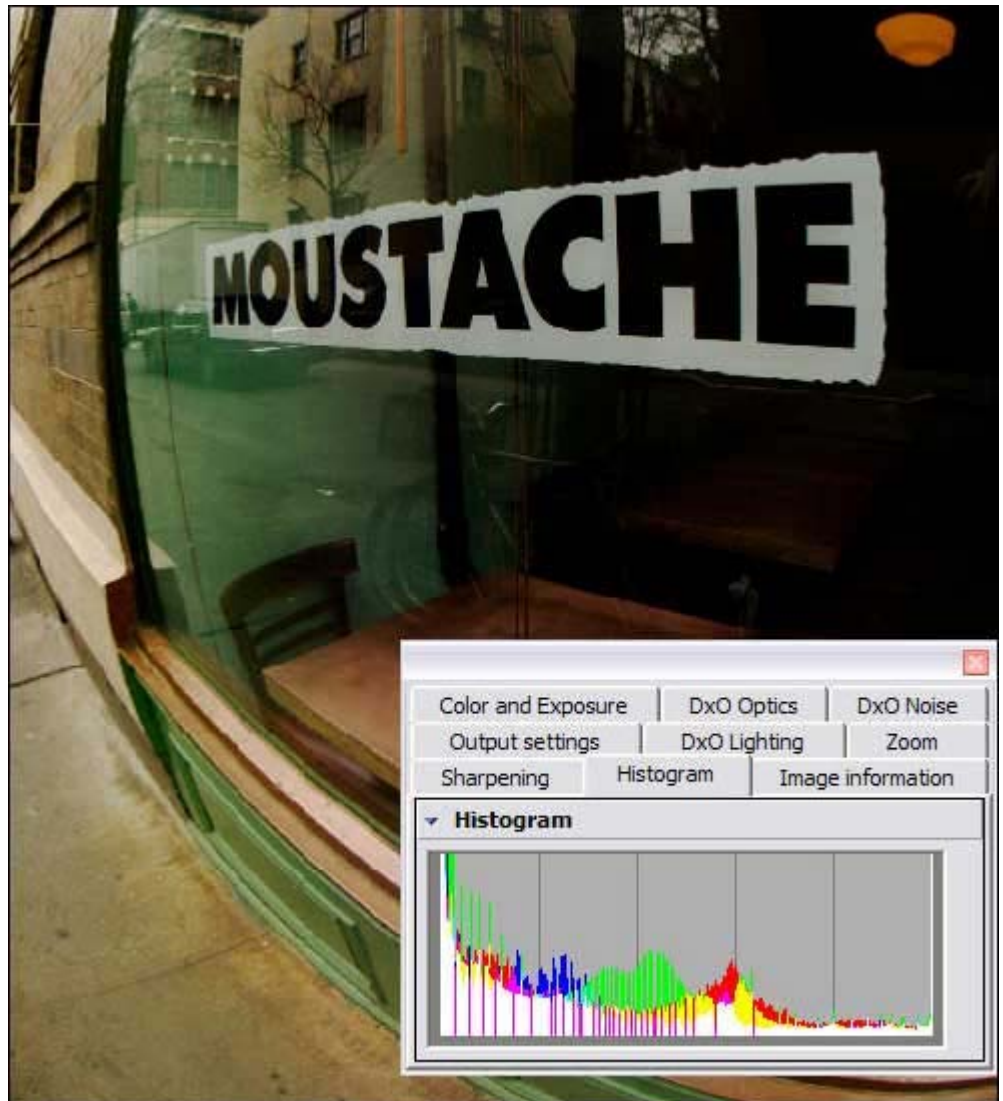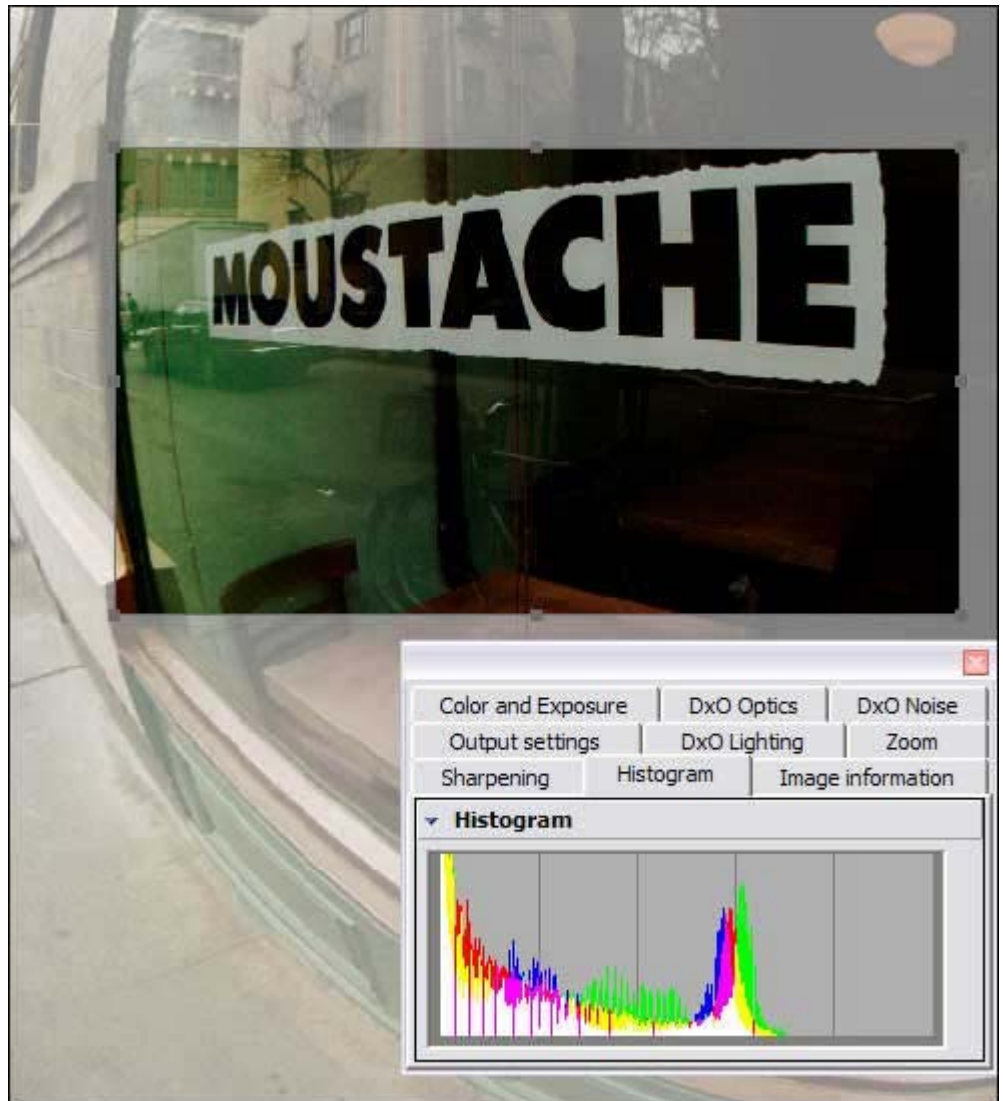
Under the Sharpening Tab, there are two settings:

- USM, the already well-known method of sharpening.
- DxO Lens Softness.

DxO Lens softness corrects for inherent optical softness, and is dependent on lens & body combination, just like all the other DxO controls. Obviously it can't correct for camera shake or subject movement or mis-focusing.

As can be expected from the design philosophy behind DxO Optics Pro, image sharpness is calibrated for the specific lens used. Therefore the sharpness that is applied via DxO Lens Softness can vary across the frame. It is recommended that most sharpening is done with the DxO Lens Softness control, and then some USM added as required.

Output settings:

DxO previews are in sRGB mode, even if output is in Adobe RGB.

DxO Optics Pro can save in DNG format, and do so at the same time as saving to Jpg or Tiff. Saving in DNG allows you to save the unique features of DxO Optics and still maintain an Adobe Camera Raw (ACR) workflow.

DXO OPTICS ENGINE

Even the most expensive lenses show a certain amount of image degradation, whether distortion, vignetting, chromatic aberration or blur.

And these are the defects in specific lenses that the DxO Optics Engine was designed to "reverse out". Automatically.

The DxO literature describes the DxO Optics Engine as:

The software was designed to compensate for the residual defects of a lens' design. The DxO Optics Engine works on the principle of creating a detailed model of lens performance by taking thousands of images with each lens for which a DxO Lens Module is created.

The DxO Lens Module is then used by the DxO Optics Engine algorithms to "reverse out" all the defects. This way of working means the optical corrections are based on the "real-world" defects of the lens, rather than on estimates, and can be fully automated.

The current DxO Optics Engine correction is fairly exhaustive - chromatic, geometric, axial and field-dependent aberrations can be corrected simultaneously, and if desired, automatically. This is done in accordance with taking conditions such as focal length and aperture.

Now to be honest, that is more optical physics than most photographers ever want to touch - but the problems do affect us as photographers. As an example, an optical problem such as chromatic aberration, is fairly easy for any photographer to see when it rears its ugly head.

Sure, you can fix chromatic aberration with Photoshop - but this is the beauty of DxO Optics Pro - the corrections are applied automatically, with the option of full manual control. And it is done taking into consideration the specific lens design and focal length and focus distance.

I tried this on numerous images, and the results were always spot-on. In Auto Mode.

In this image for example, you can see the chromatic aberration corrected when you look at the 100% crop of the top left hand corner.

Look for the green / purple fringing around the balustrade in the left hand image which is uncorrected. The image on the right has the chromatic aberration automatically corrected in DxO Optics. This immediately makes the image detail crisper.

Here are other examples of how the DxO Optics Engine corrects an image:
(Rockefeller Center, Manhattan, NYC
Nikon D2x; Nikon 12-24mm f4; @ 12mm; 1/50th @ f4 @ 800 ISO.)

A comparison with the DxO Optics Engine disabled, against when the image has been corrected for Distortion and Vignetting.

And in this comparison, we get to see what the image looks like with and without correcting Vignetting.

Notice how barrel distortion was corrected, and the lines of the building straightened out.

In this image, Chromatic Aberration was also corrected, but won't be noticeable on such a small image.

The DxO Optics Engine tab has four sections.

In the first, you can adjust the **focal length** if you feel you want to fine-tune the results even further.

In this example I used the Nikon 12-24mm f4 lens, and the focal length can be incrementally changed between 12mm and 13mm.

If the **focusing distance** isn't available in the EXIF data, then the screen allows you to enter the distance manually, since this information is used to correct for these aberrations

Distortion corrects for barrel and pincushion distortion, and other aberrations

Chromatic Aberration also holds a check mark for correction of **purple fringing** / birefringence. This is where you see purple edges around high-contrast areas with over-exposed highlights.

Vignetting is also corrected for specific lenses, and for the specific focal length used.
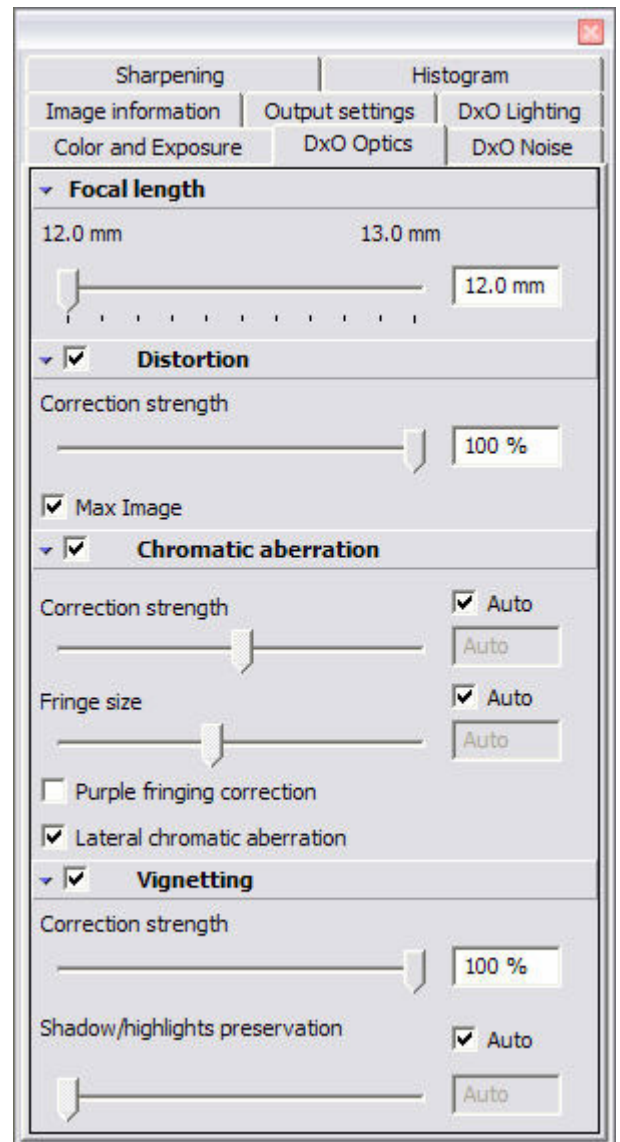
An interesting side-effect of the distortion control of DxO, is that you have the same kind of 'de-fishing' effect if you use the Nikon 10.5mm f2.8 DX lens with Nikon Capture.

With setting the check in DxO Optics tab for distortion control, your fish-eye image becomes a rectilinear image.

Obviously there will be some smearing towards the edges (just like with Nikon Capture), as the software tries to interpolate data which isn't there.

There is one aspect of how DxO Optics control the rectilinear version of the fish-eye image, that Nikon Capture doesn't have - **Max Frame**.

Because DxO creates a rectilinear image from the fish-eye image, there is an area that extends outside the normal 2:3 frame. By selecting 'Max Frame' you get in essence a panoramic shot.

This might be easier to understand visually.
You'll have to excuse the sloping horizon in this image - it is tough to get the image perfectly horizontal when the horizon is curved. 😕

Firstly, the image with default (auto) settings in DxO Pro, with distortion control disabled:

The same image but with distortion control enabled in DxO Optics, which gives us that wacky ultra-wide rectilinear perspective:

Just for comparison as to how the Nikon Capture version looks: (Now to be fair here in judgment, keep in mind that the Nikon Capture version has had no adjustments done to it, whereas the DxO version automatically adjusts the image.)

But back to the DxO Optics version: I like the 'Saturated Reversal Film' setting in DxO Optics - it gives me that saturated Fuji slide film look that I loved. So here is the version with that setting enabled, just to give us punchier colours (with the ease of click of a button.)

But now, with 'Max frame' enabled, the image extends from the normal 2:3 image, to a panoramic image which has nearly a 1:2 aspect ratio.

Now that is eye-catching! And the beauty of it is in how simple it was to get to this point.

To my eye, the de-fished version looks very good, and if you concentrate on compositions which are very strongly central, then the edges of the frame are less important in terms of sharpness.

This really is an option in extending the possibilities of the 10.5mm f2.8 DX fish-eye lens.

As to how sharp the edges are of the image which has been 'de-fished' to the rectilinear version - as I said, there will obviously be smearing towards the edges.

Here are 100% crops of the fish-eye version, and the stretched rectilinear version: (both are DxO versions.)

… and the 100% crops of the same area from the Nikon Capture versions:

DXO LIGHTING ENGINE

According to DxO Labs, **DxO Lighting** is a unique local exposure and dynamic range optimizer. It also automatically replicates the analog film techniques 'dodging and burning', to bring out shadow detail while preserving highlights, textures, colours and a natural look.

The control tab for DxO Lighting shows the expected adjustments, such as white point, black point, contrast and brightness. There is another adjustment - Local Contrast - which affects the image dramatically. This will be discussed on the next page.

DxO Lighting was an aspect of DxO Optics Pro software proved to be a surprise to me. I anticipated the DxO software to automatically correct for optical aberrations and errors, like they advertise - but DxO Lighting offers image enhancement which is impressive. Even more so since it is automatic, but with complete manual override if you wish.

Automatic image enhancement with DxO Lighting

Here are two versions of the same image. With one, I enabled all the automatic controls in the DxO software, (including DxO Lighting), but for the comparison, there is another version with DxO Lighting disabled.

DxO Lighting brings into play adjustments which gives any image more punch.

I suspect that the major change to the image is done via the **Local Contrast** adjustment.

The DxO literature describes Local Contrast as altering contrast in a spatially-determined way, and that its effect is similar to dodging and burning.

This dramatic change was done with default settings, simply by clicking the Process button.

What attracts me here is the simplicity of it - if you so wish. You run the image through DxO Optics at its default settings, and it just pops! If you do want to fiddle with it further, then the options are there.

And to top it all, the highlights were retained. That's a headache that wedding photographers constantly have to deal with.

The Distortion adjustment in DxO Optics corrected for the optical flaws in the Nikkor 12-24mm f/4G lens, as used at 12mm. Even though the optical aberrations are of less concern to a wedding photographer than someone who photographs architecture, the kind of adjustment shown here should interest any photographer.

Another interesting control offered are the presets that mimic film types, such saturated reversal film.

This image should show the vibrancy that results from this. All still with the click of a button or two. Simplicity itself.

You can edit any of the settings and save new presets. This will help tremendously in speeding up a workflow where certain corrections are repeatedly made. You can also edit any of the given presets.


In this next image taken inside St Patrick's Cathedral in Manhattan, NYC you can clearly see how DxO Lighting opens up the image. What was a dark contrasty image suddenly has some 'space' to it.

The DxO Optics control also corrected for some optical aberrations You'll notice the barrel distortion on the pews on the right hand bottom corner, has been corrected in the DxO version. Automatically.

(Nikon D2x; 12-24mm f4 DX, used at 12mm; 1/6th sec @ f5.6 @ 1600 ISO)

And for a direct comparison, here's how DxO Lighting enhances the image, against a basic conversion in Adobe Camera Raw.

ACR - basic conversion

DxO - all settings enabled (auto)
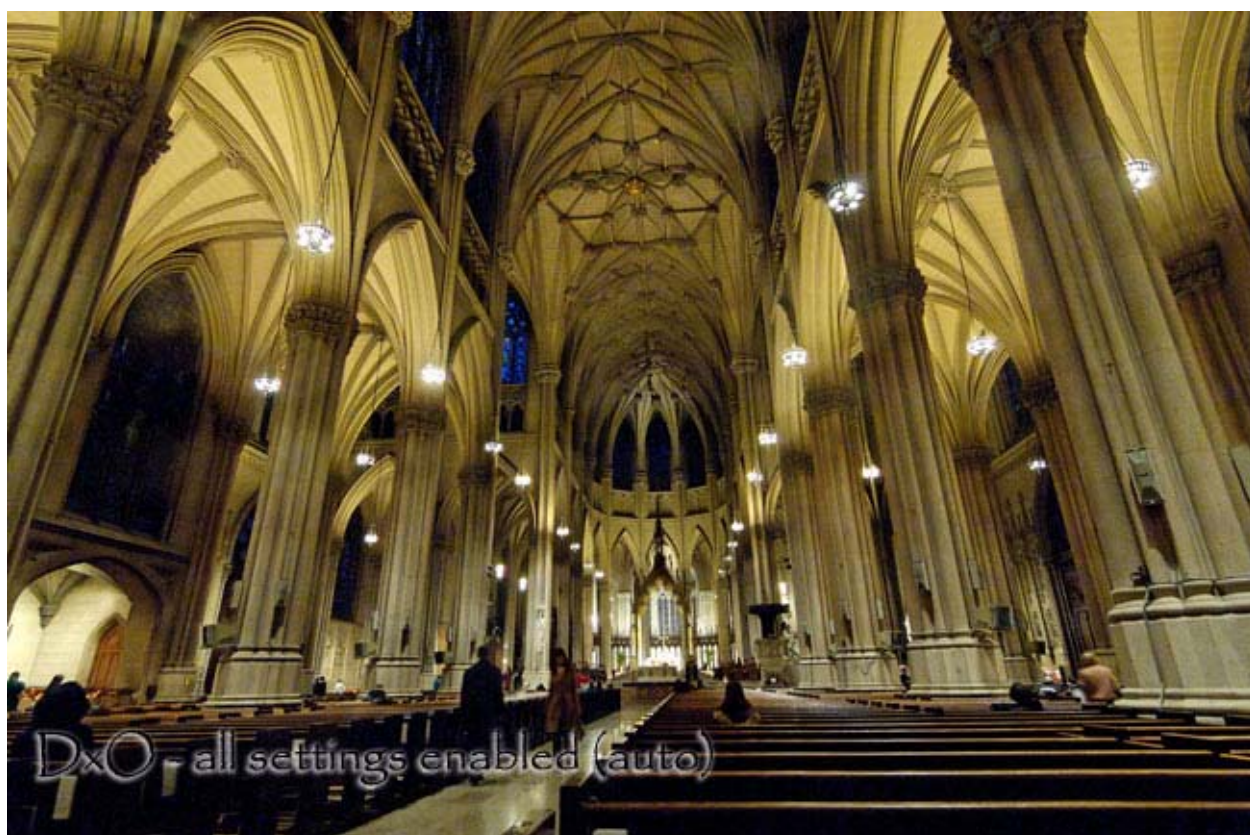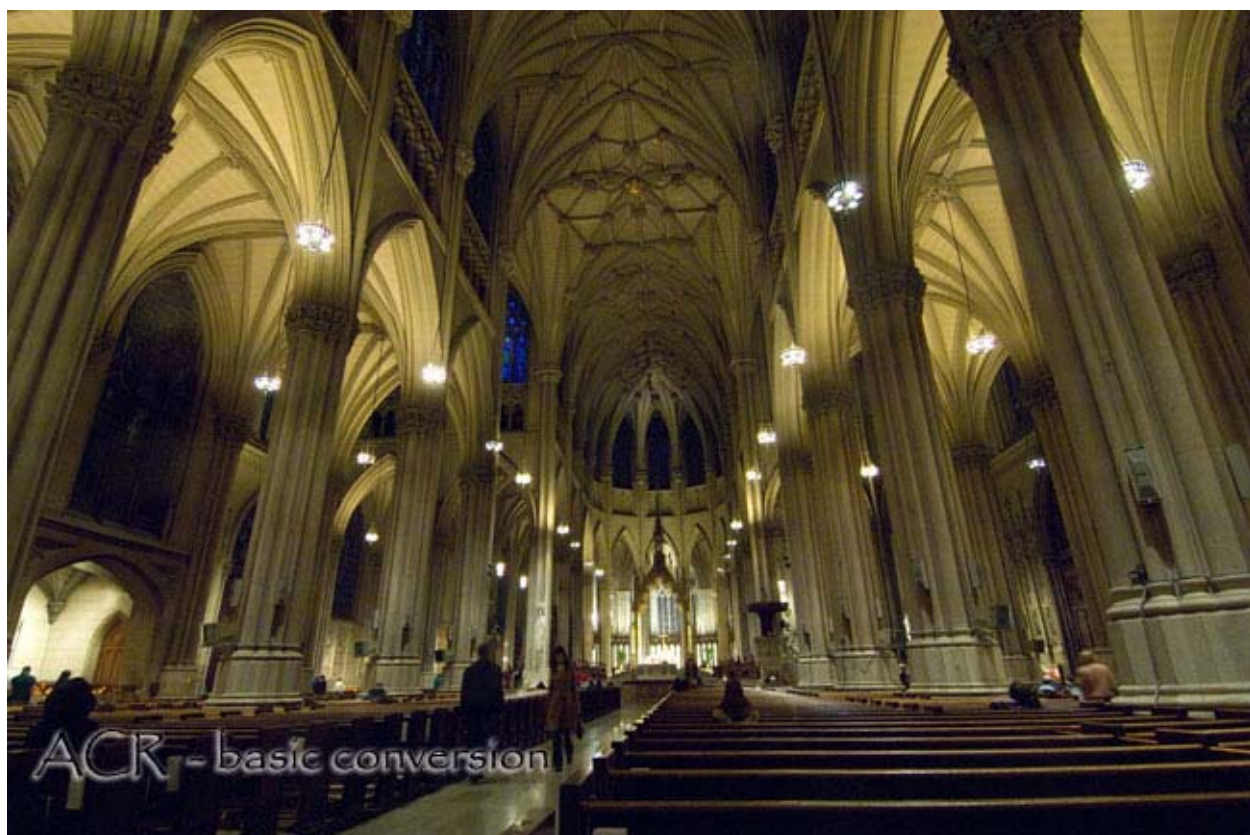
DXO LIGHTING ENGINE: Local Contrast

Under the DxO Lighting Tab, one of the controls that has a lot of potential for adjusting images in ways that other programs don't, is the **Local Contrast** setting.

The DxO literature describes Local Contrast as altering contrast in a spatially-determined way, and that its effect is similar to dodging and burning.

Local Contrast is described as in effect applying a varying tone curve across the image - unlike global contrast.

Once again, it might be easier to grasp the possibilities here while looking at how it affects an image.

The photo here is one I took of a mime in Covent Garden, London.
I used the D2x and the Nikkor 85mm f/1.4 optic at f/1.4

For comparison, here are five versions of the same image:
- the first is with the entire DxO Lighting tab deselected. ie, no adjustments.
- then there are three variations of the local contrast, 0%, Auto (28%), and 100%.
- the final version is where I used a blunt adjustment to the curves to lift the shadow areas, but trying to keep the highlights the same.
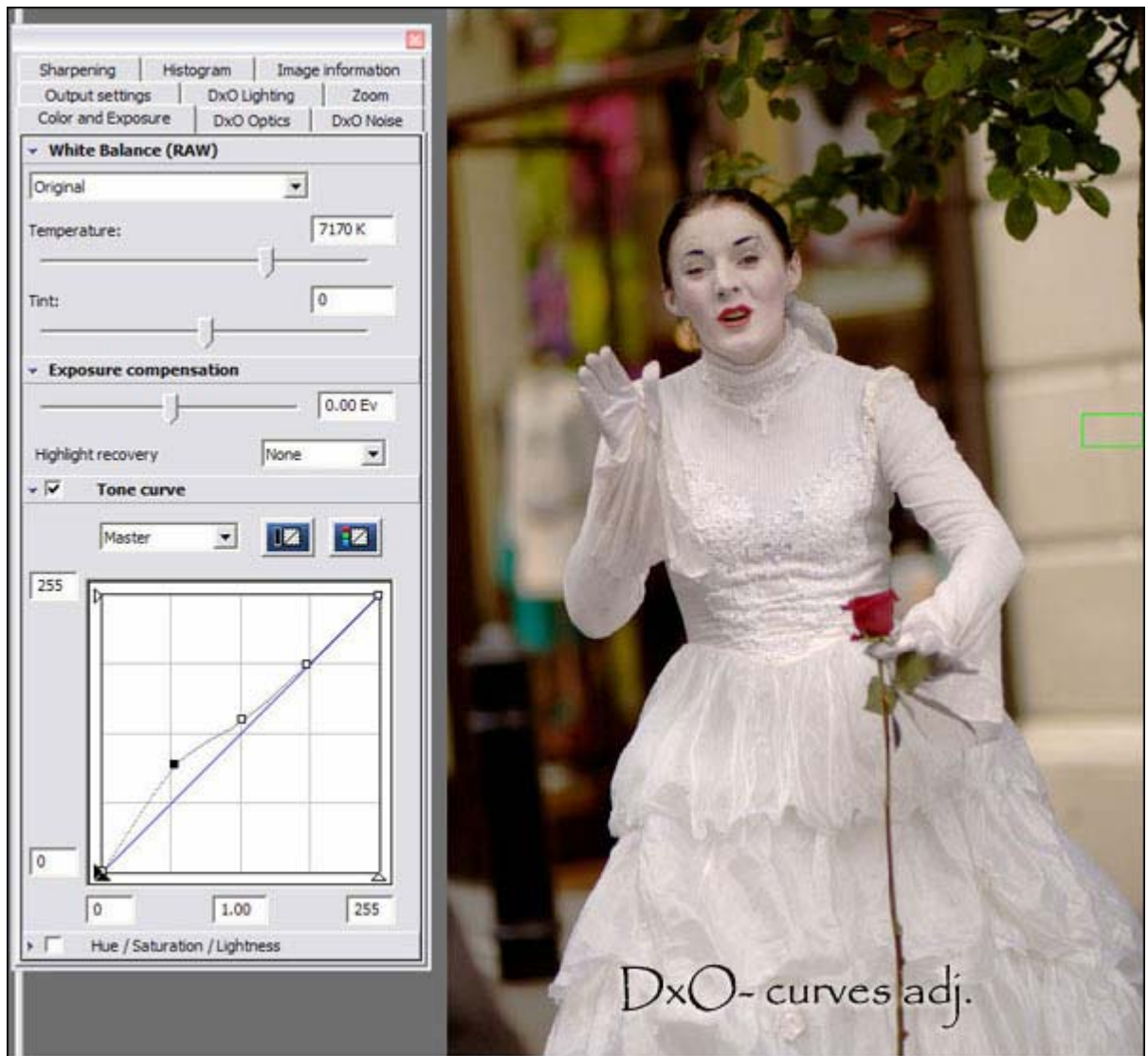
In these images, you'll notice that the white of the dress and the mime's white painted face is largely unaffected by local contrast when set to auto (which turned out to be 28% for this particular image.) Only the darker background area is affected and the colours punchier and brighter.

In racking the global contrast between 0% and 100%, you can see the white areas are brighter. However, it looks different than the S-shaped curve of a global contrast adjustment would've. Global contrast would've crushed the white areas, and made the brighter areas look more flat. In comparison, the image where I crudely adjusted the curves in imitation of lifting the shadow areas, don't look nearly as good as any of these other versions.

DxO- no adjustment

DxO- auto local contrast (28%)

DxO- curves adj.

DxO- local contrast 0%

DxO- auto local contrast (28%)

DxO- local contrast 100%

DxO- curves adj.

This is one of the features of DxO Optics with which I was really impressed. However they do it, the results look great. Even more so for the simplicity of the adjustment.

Even making extreme changes from 0% to 100% gave versions which are equally acceptable to me.

DXO NOISE ENGINE

DxO Optic Pro's literature states that DxO Noise is a hard-ware model based correction. They specifically tailored by DxO Labs for each camera, and so this correction will only be performed for images from cameras that have been calibrated by DxO.

DxO labs claim a 2-stop improvement in the noise level, and the software has been designed to retain maximum detail in the image.

The DxO Noise palette, allows you to control the following aspects of digital noise:

- Luminance Noise Correction
- Fine Detail Preservation
- Chrominance Noise Correction
- Impulse Noise Correction
- Gray Equalizer

Fine Detail Preservation will preserve a greater amount of fine detail in the photo, (at the expense of some residual noise), to avoid that plastic look of over-processed images.

Impulse Noise Correction is randomly occurring noise. It is however not corrected for on raw images, and will be grayed out when processing raw images.

The Grey Equalizer tab cleans up unwanted coloured noise from the mid-tones - at the expense of slightly desaturating the mid-tones.

In testing the noise reduction capabilities of this software, I found that it is difficult making a direct comparison to how other programs handle noise, since DxO Optics Pro brings into play other corrections and adjustments. Especially the changes made by the DxO Lighting palette itself, causes the image to look substantially different in that it automatically brings out a lot more shadow detail.

Please note: This isn't a quantitative test - but just an indication of how DxO stacks up when you look at the details.

These sequences of images are all 100% crops of a portrait I did of my daughter, using available light. The image was repeated for 800 ISO, 1600 ISO and 3200 ISO. Nikon D2x and 70-200mm f/2.8G AF-S VR.

The first shows the difference between using DxO and the image with no noise reduction at all. The slight change to the image is due to the optical correction that DxO applies. (Keep in mind that we're looking at 100% crops and that the differences might be marginal with small enlargements.)

1600 ISO a: Nikon Capture with no noise reduction. b: DxO Optics Pro, with all settings enabled and on auto.

NC noise off

DxO

The DxO image does look noticeably cleaner, but the sharpening applied introduces some slight artifacts, especially if you look at the eyelashes.

For the next series of images, I compare DxO with all settings enabled, against the version from Neat Image (on a jpg converted via ACR.) This will give us a more precise idea of how DxO Optics Pro compares to excellent noise reduction software such as Neat Image.

1600 ISO - DxO Optics Pro - Neat Image

**3200 ISO - DxO Optics Pro - Neat Image**

My personal preference here is for the DxO version of the 1600 ISO image. But with the 3200 ISO image, I prefer the softer look of Neat Image since the noise reduction of DxO creates noticeable artifacts which doesn't look pleasing.

Extreme test:

Back to this image shown on a previous page - we'll be able to see how DxO's noise reduction handles the dark interior. Since the darker areas will be enhanced with DxO Lighting, the noise reduction applied will look different than it would to an image with less contrast. (Nikon D2x; 12-24mm f4 DX, used at 12mm; 1/6th sec @ f5.6 @ 1600 ISO)

Here's how DxO changes the image from a basic conversion in Adobe Camera Raw:
(ACR settings: 0% luminance smoothing, 25% chrominance noise reduction)
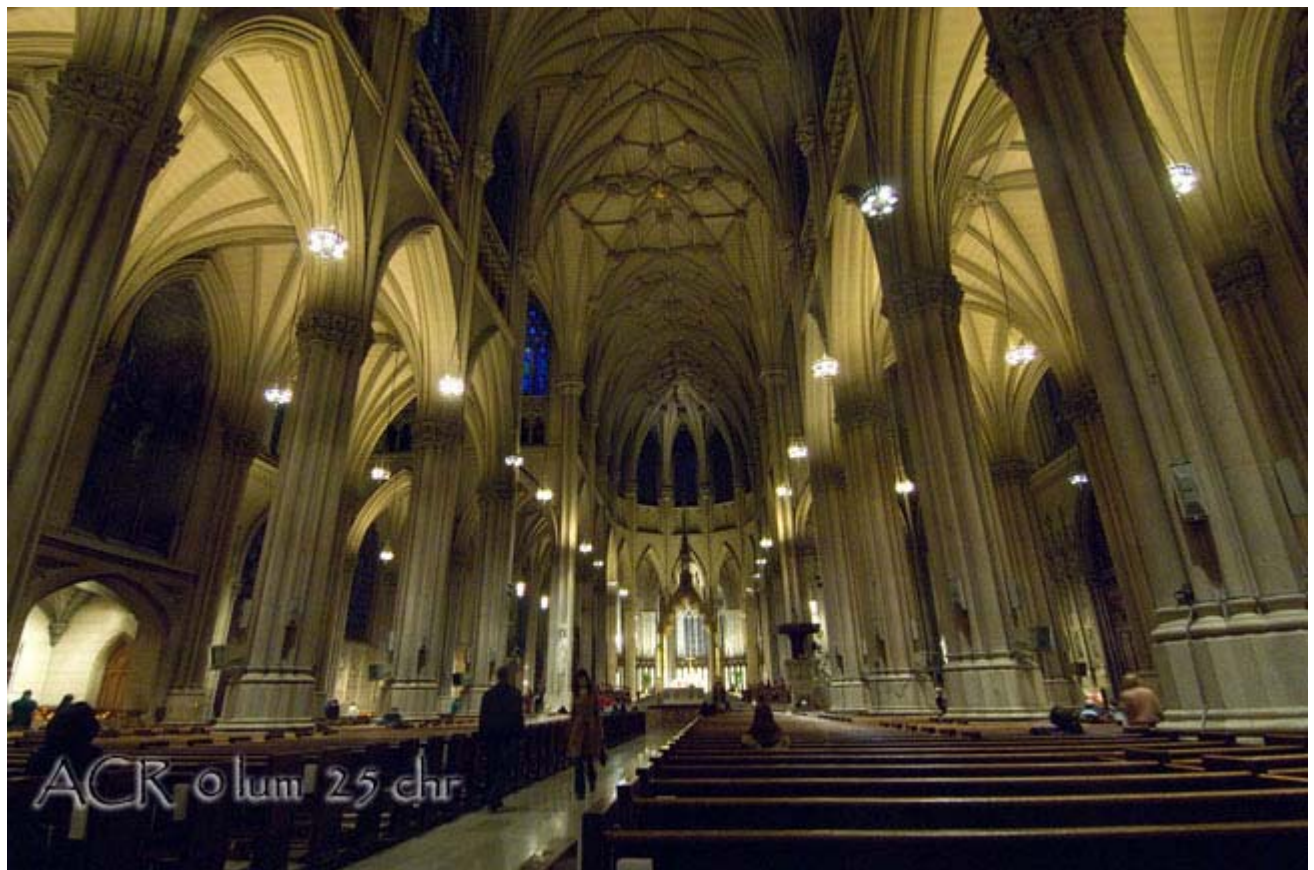
It is impressive in how DxO opens up the image, but we'll have to look at the detail at 100% (or more) to see the actual effect of noise reduction.

The left hand image here is a 100% crop of the DxO converted raw file, but with all the settings enabled (on auto). The next image is of the DxO converted file without DxO lighting enabled, since this boosts the shadow areas, and will affect how the noise reduction works.
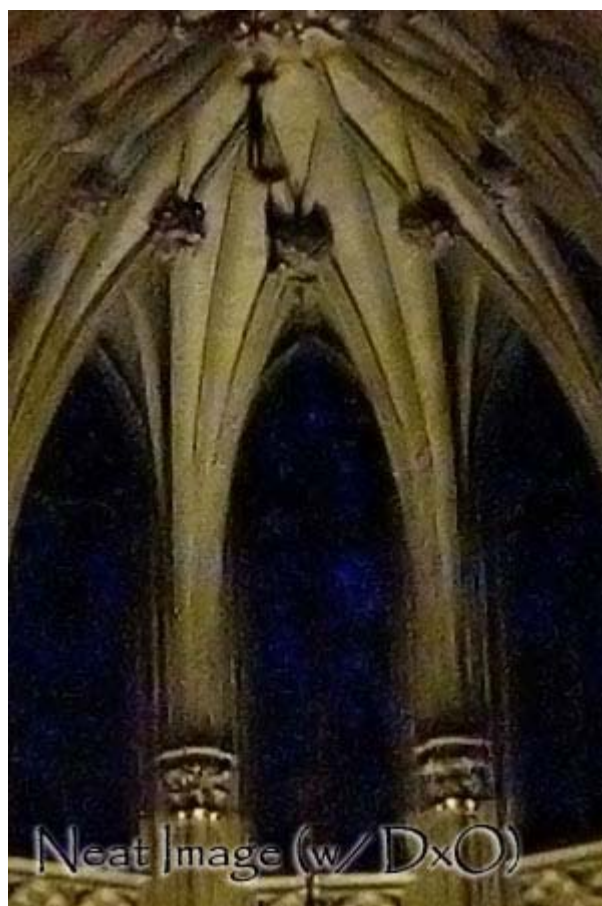
The final two images are with Neat Image doing the noise reduction - firstly on a JPG converted from the raw file via ACR. And the following image is of the DxO converted JPG (with DxO Noise off) and then processed in Neat Image.

Conclusion of extreme example results:

The DxO Optics controls do boost the shadow areas considerably, and this will give a brighter and more eye-catching image - but at the cost of making the noisier areas more pronounced. There's a distinct trade-off here. In running the jpgs through Neat Image, a cleaner result was possible, but at the cost of detail which is smoothed out.

What I take from this is that if you are working on an image taken at a high ISO, and with lots of shadow areas, it might be better to turn off the auto settings and nudge the image to where you want. It is more work, but the results might be better. As it is, DxO Optics enhanced the dark image really well, and I like the results - but if the image were to be enlarged considerably, then the artifacts might show, and an image with less aggressive manipulation might be better to work with.

To my eye the best results were achieved with the DxO enhanced image with noise reduction off, and then processed through Neat Image.

This extreme example is the only type of image where the automatic adjustment and enhancement of DxO Optics Pro fell down slightly.

So overall, the software is still a remarkable tool for the digital photographer. For the rest of my conclusion, return to the intro page.