# Project EYEris
Shader Documentation

The purpose of this document is to provide users of the EYEris Shader with a better understanding of it's specific features. It will be assumed that the user has some experience with shader editing in general, and won't go over properties most commonly available in other shaders (DAZ Default – UberSurface). Those of you who would mainly just like to use to Project EYEris material presets should do fine without this information.

Default State

When first loading the base shader you will find yourself with something very familiar, it renders quite the same as the DAZ Default with it's base settings.
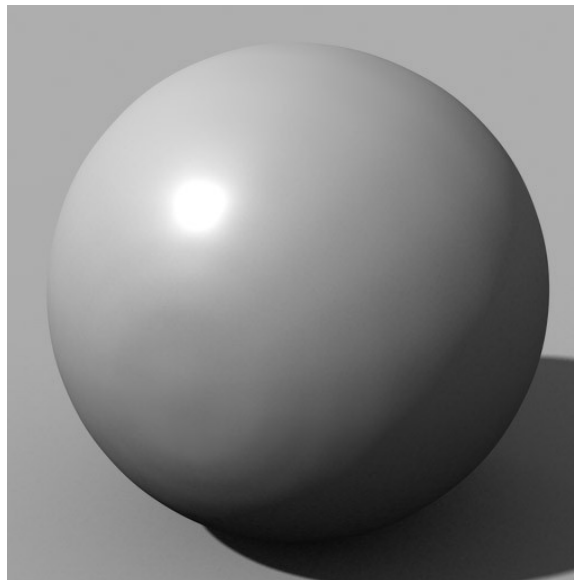

This makes things such as testing textures easier as it provides a common default. Dial your textures in here just as you would any shader before moving on to the new features.
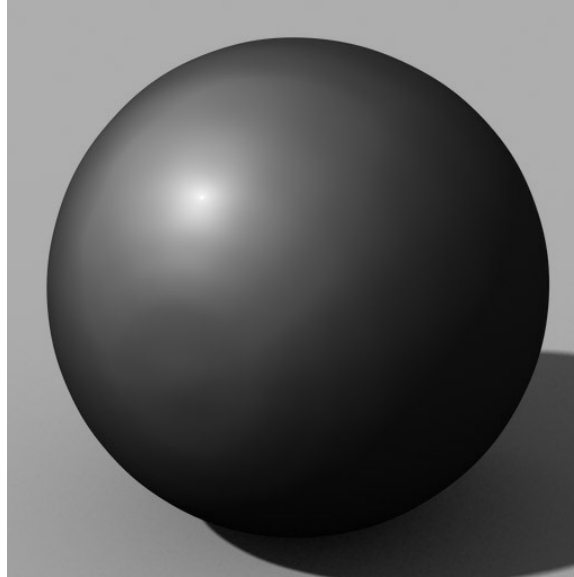
Specularity

Specularity is much the same as the DAZ Default, it only looks slightly different and uses "Roughness" rather than gloss which some people may be more familiar with. The default specularity settings can be seen here, I've lowered the "Diffuse Strength" to make the effects more obvious.
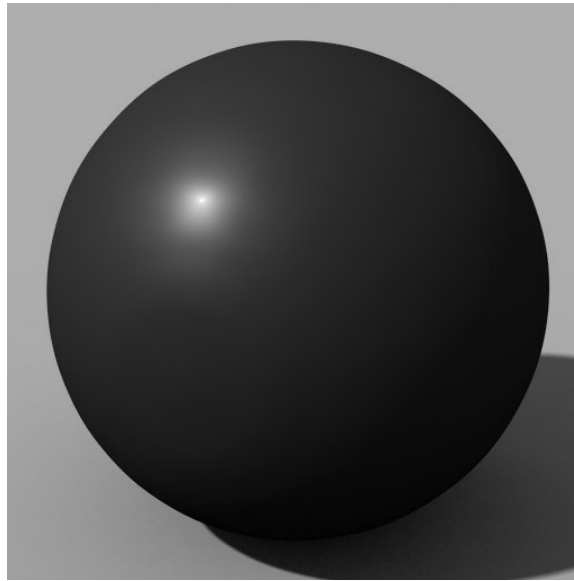
When lowering the roughness you'll notice your highlight getting sharper. This is because by removing roughness we are essentially adding gloss, and making the surface more shiny.
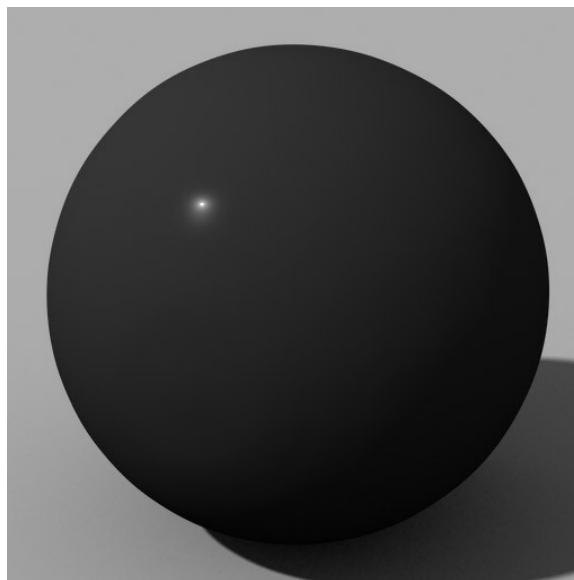
Adversely, if we are adding roughness then we are removing gloss and the surface becomes less shiny. For eyes we would generally want very low roughness so the default is set accordingly, but the shader can also produce very rough highlights as seen here.
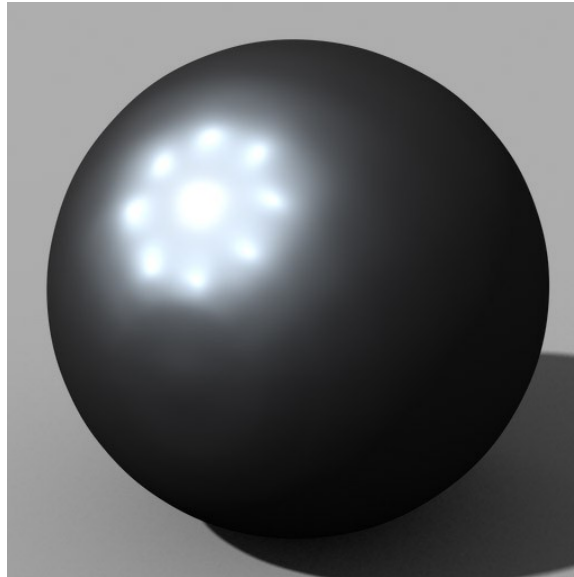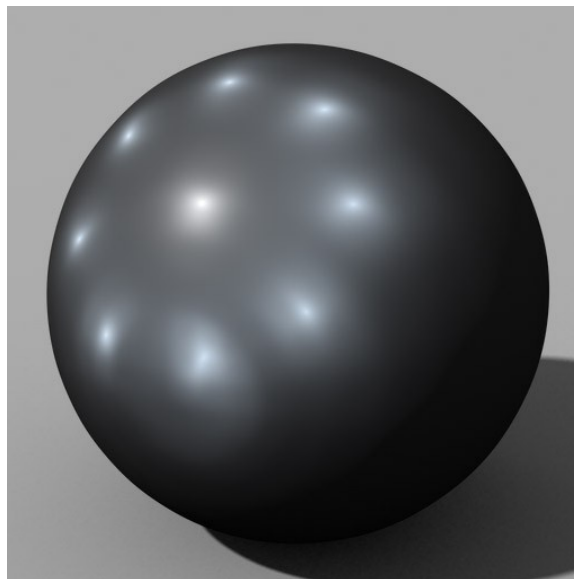

Specular Flare

One of the new features you'll find in the shader is something I call "Specular Flaring", this is not a real life effect but it can help you get highlights where you want or add unique style to your renders. By raising "Specular Flare Presence" you will enable the effect, at first you will just notice it as a bigger and brighter highlight...
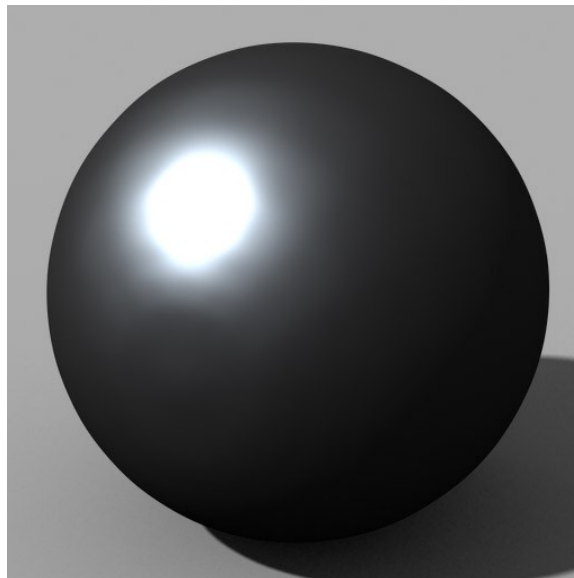
This is because the "Flaring Amount" is set to 0, by turning this up you will start to see what's really going on.

The specular flare effect is actually adding 8 more highlights per light source to your surface, spread out in a star-burst pattern. "Flaring Amount" modifies how spread out the extra highlights are, we can see that here by raising the value more.


(How far you spread the flare is limited in the shader, as going too far places specular effects where they don't make much sense. You can however disable these values and use them unlimited at your own discretion)

Coming back to the "Flare Amount" we had before, there are some other things to be noted. "Flare Roughness" which does the same thing as mentioned in the Specularity section, only localized to the flare highlights.
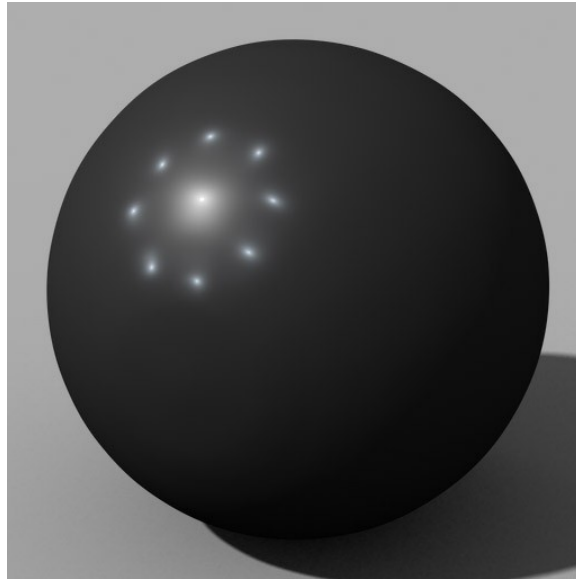

Of course, you can also change the color of your flare separately from your other highlight, using the "Flare Color" value. This can be done either with the solid color or using an image map.
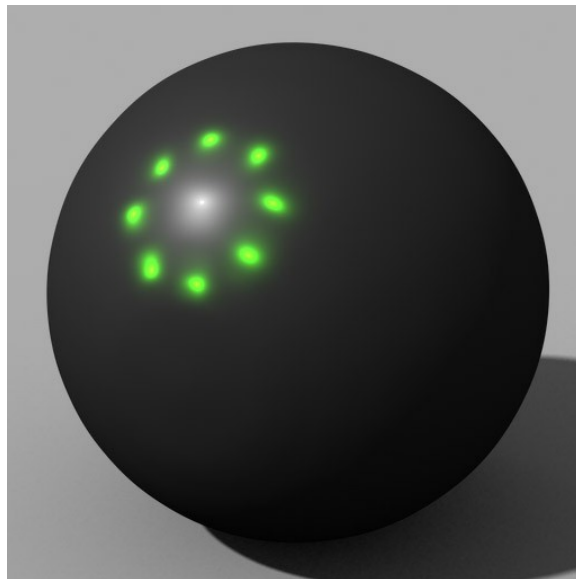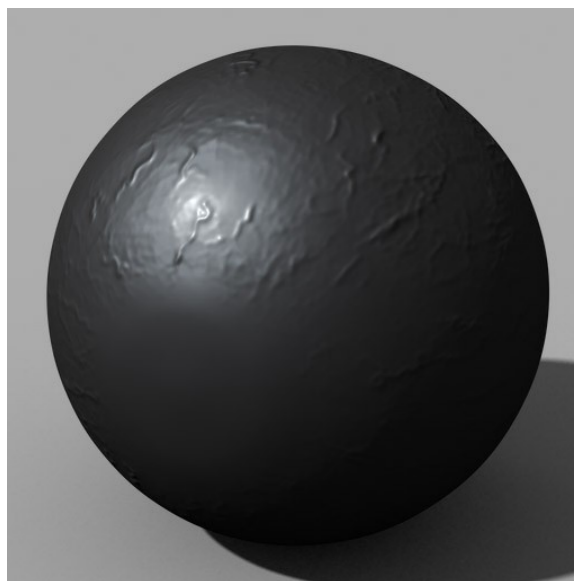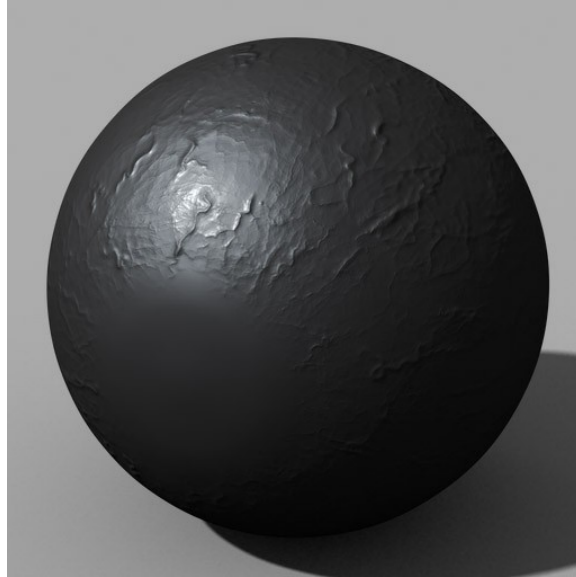
Displacement – Bump

Displacement and bump mapping (like Specularity) are both something that were handled a bit differently in this shader. Here they are essentially the same effect, using the same strength values and maps. This is to reduce complication and simplify the shader, but it also enables useful effects. This is the non-displaced surface that I'll be working with for your reference...
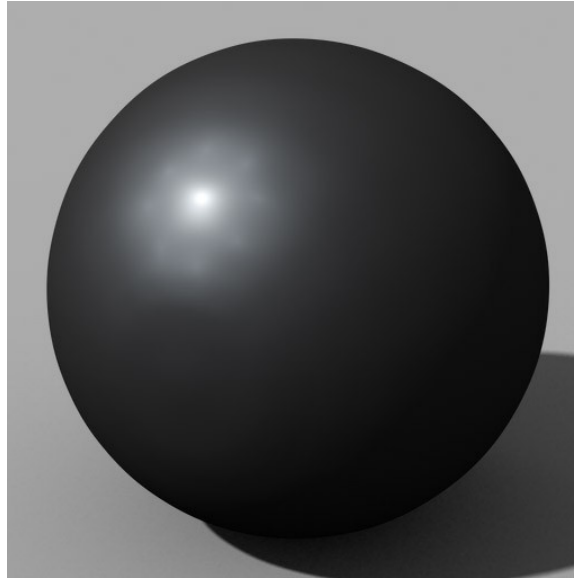

Now I will load my textures, you'll notice two different map slots labeled "Hi-Detail" and "Lo-Detail". This is where things get nice because I can blend between two maps. For now I'll load my displacement texture (slightly blurred 16-bit TIFF) under "Lo-Detail" and raise my displacement strength.

You can see that I have my largest veins making bumps now, but I'd like more detail. So I will now add my higher detail displacement map (non-blurred full resolution JPG "bump map") under "Hi-Detail". I'll also start to raise my "Displacement Detail" value, this tells the shader how much of this detail to use...


The higher you crank the "Displacement Detail" the more pronounced your small features will be. These high details are ADDED to the low details, so even with your "Hi-Detail" map full blast you'll still get the big vein displacement from your "Lo-Detail" map...
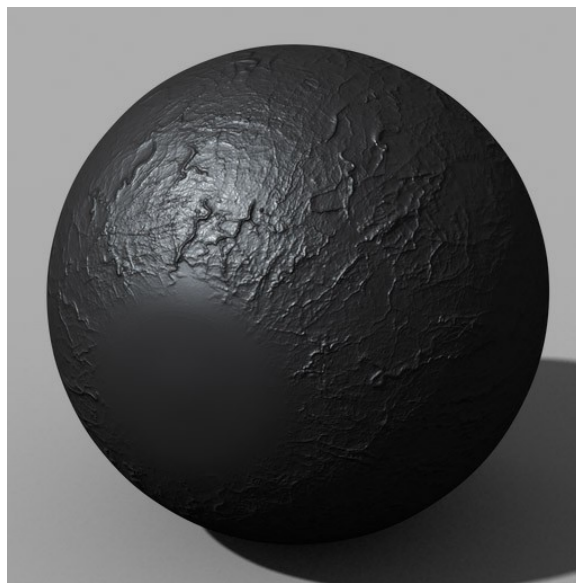
The setting labeled "Bump-Displacement Switch" will change the shader from it's default mode of bump mapping and use displacement instead. Difference being that displacement mode will modify geometry while bump will not. Here is the surface with displacement enabled (notice the edge of the surface and shadows cast showing bumps).
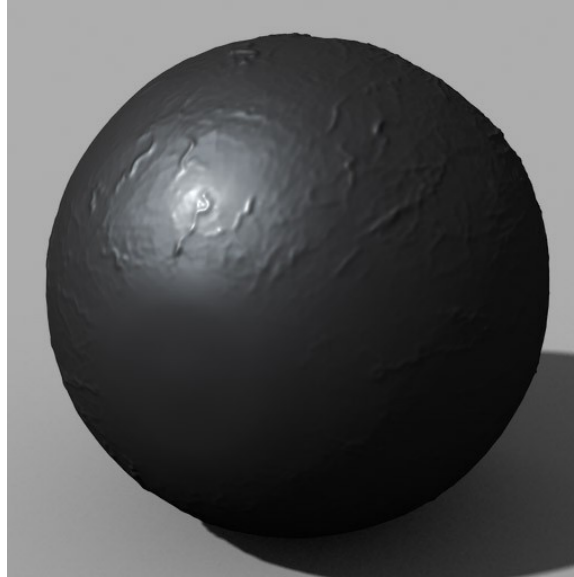

This behaves the same for both the "Hi-Detail" and "Lo-Detail" maps, so be careful not to use too much displacement when using a lot of detail. Results can come up as unfavorable geometry spikes from detail in your images.
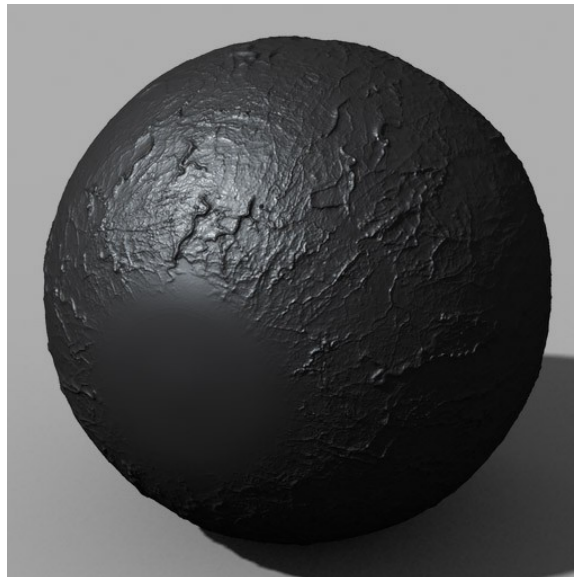
Reflection Curve

Most of what makes this shader nice for eye surfaces comes from the Reflection Curve feature. This essentially applies a tone curve (modifies the contrast) of the reflections on the surface. Here is an un-curved surface using a reflection dome with HDRI to create raytraced reflections (similar to the Ref-Dome in my HDR Prosets – Monterey set).
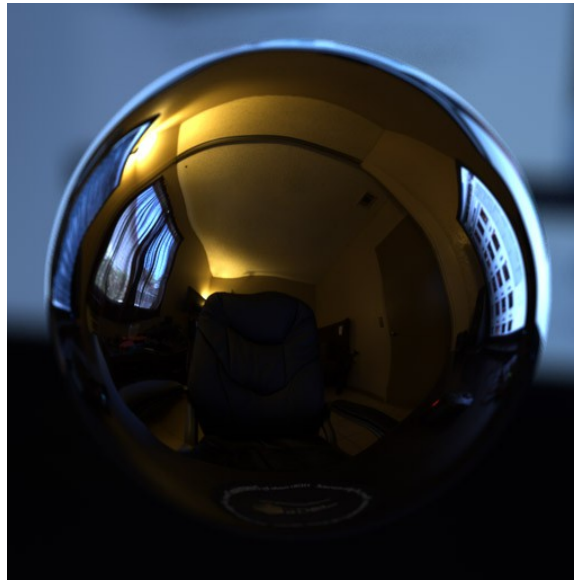
Here I have added a value of 1 to "REF-Curve P2", "REF-Curve End" and "REF-Curve Presence". This tells the shader to use the reflection curve, while using "P2" and "End" as our points for brightness (1 on both happens to equal the same as default). You'll notice the reflections are the same brightness, only in black and white now...

Now that we're ready to modify, we're going to change that "REF-Curve P2" number. That value is essentially the "Mid Range" of our reflection, it influences all the grays while leaving the blacks and whites alone. So, lowering that value will make our grays darker while leaving the highlights relatively the same.

At this point I'm going to lower the P2 value even more, as well as raising my "Reflection Strength" to actually brighten the reflections overall (you'll generally want to raise "Reflection Strength" to offset the brightness loss in curving). Here you will start to see some clipping in the highlights, this is essentially the effect we're going for.

Now that we have our reflection curve figured out, we can start rolling back on our "REF-Curve Presence" until we achieve the desired result. This will mix our curve in with the original reflection, bringing in some brightness and returning some color.
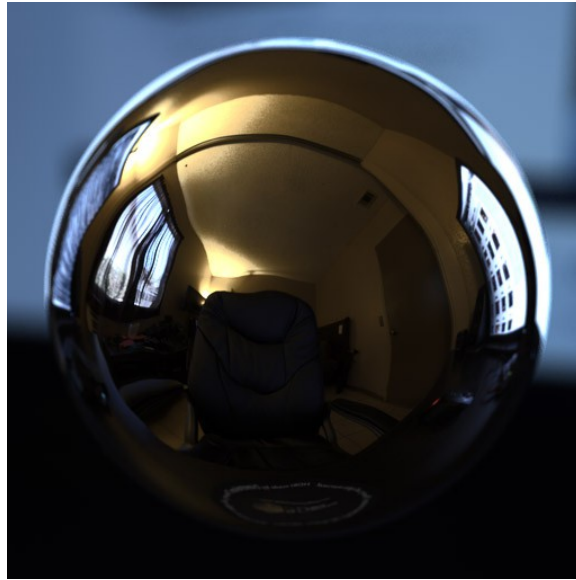

Built Shader Example

Here I'm going through the same process with a texture applied as reference. First starting with the default untextured shader and applying my basic diffuse and opacity maps then setting up my lighting (UberEnv and single direct light).
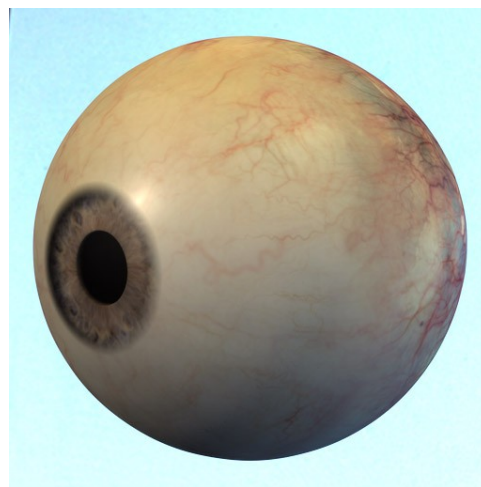
The next steps are adding in my Specular Flare (keeping that Multiply Through Opacity option in mind) and applying my Displacement textures.
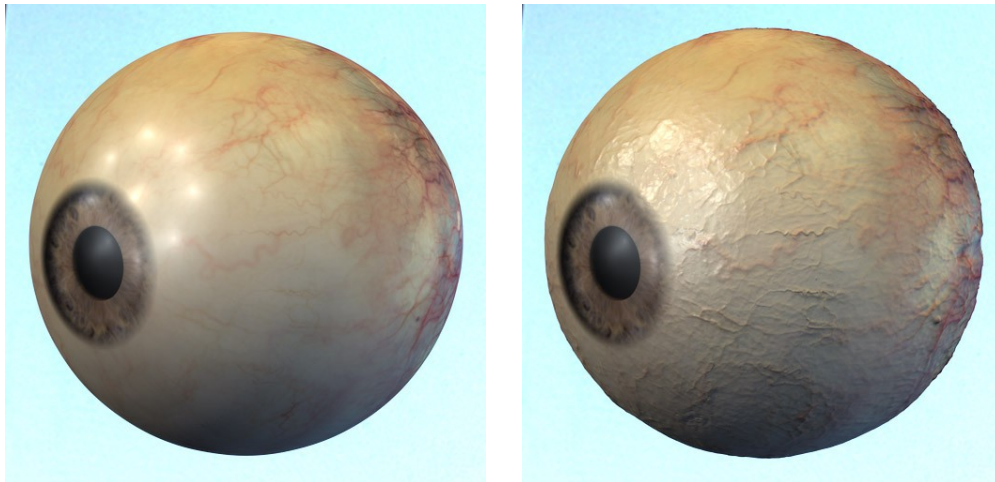
The last thing we did was add in our tone curved reflections.
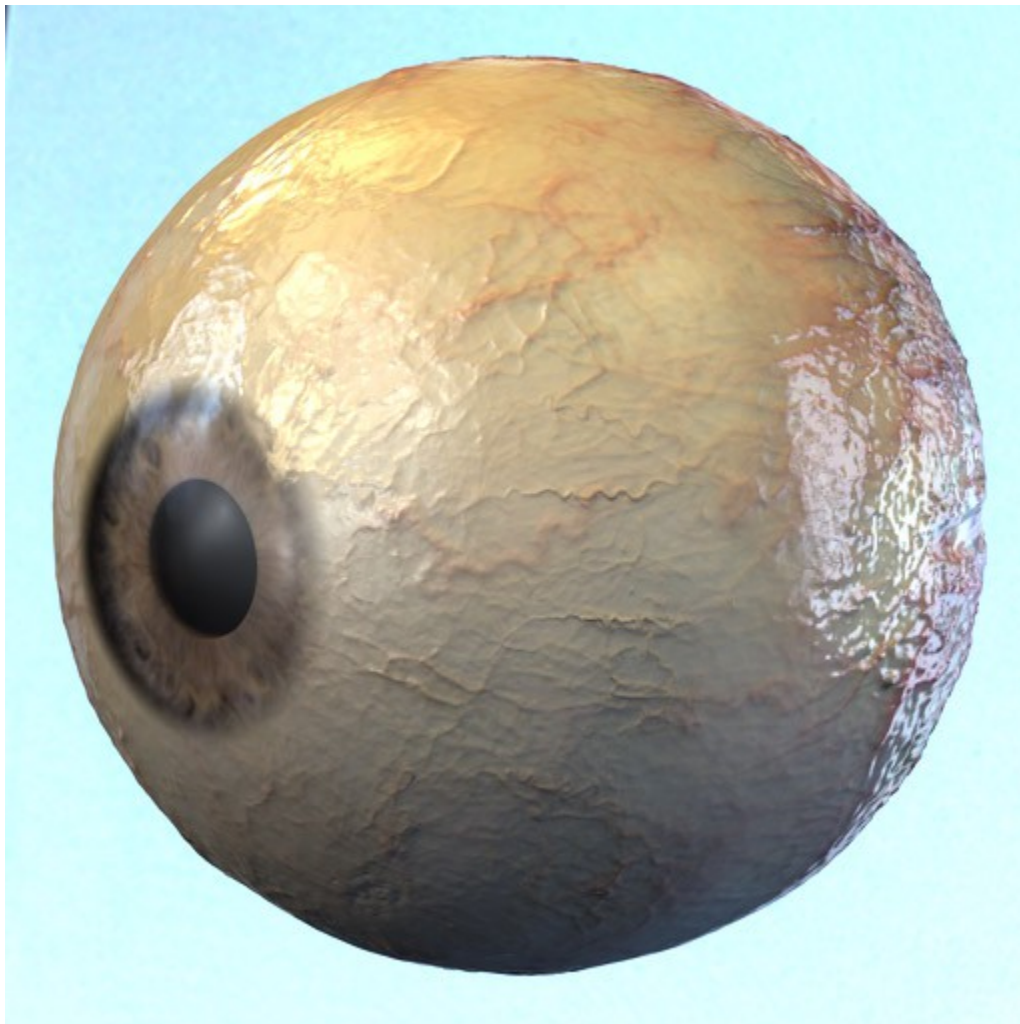
Shader Reference

UV Set
Default UVs

Smooth
On

Angle   89.90

Displacement Strength   0.0%

Minimum Displacement   -0.10

Maximum Displacement   0.10

Displacement Detail   0.00

Lo-Detail Displacement Map
255   255   255

Hi-Detail Displacement Map
255   255   255

Bump-Displacement Switch   0.00

Diffuse Strength   100.0%

Ambient Strength   0.0%

Diffuse Color
200   200   200

Ambient Color
255   255   255

Multiply Specular Through Opacity
On

Specular Flare Presence   0.00

Specular Color
255   255   255

Specular Roughness   0.10

Flaring Amount   0.00

Flare Color
207   231   255

(8): Flare Roughness   0.10

Opacity Strength
255   255   255

Reflection Ray Depth   1.00

Reflection Color
255   255   255

Reflection Strength   0.0%

Reflection Blur   0.00

Reflection Samples   1

Reflection Bias   10.00

REF-Curve Type
catmull-rom

REF-Curve Start   0.00

REF-Curve P1   0.00

REF-Curve P2   0.00

REF-Curve End   0.00

REF-Curve Presence   0.00