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Projectors



Projectors are still images, animations, or even video.

They can either be black and white or color. Only one may be applied to a given light source.

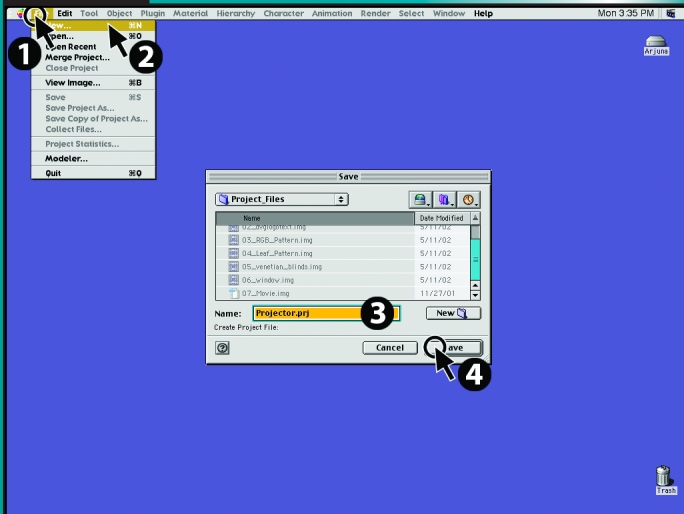
There are endless reasons why one would use projectors. They can simplify complex scenes by creating illusions of objects, or provide other really cool effects in weird unthinkable ways...

Let's find out how these work...



Lighting Tutorial: Projector





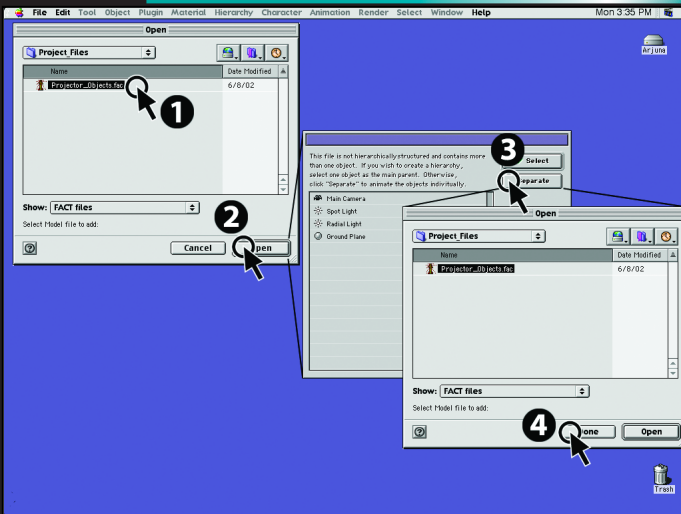
Launch Electric Image Animator.

Press **[CMD/CTRL+N]** to start a new project.

When Electric Image prompts you to name and save this new project, name it "Projector.prj" file, then navigate to the Projector_Tutorial folder and save it in there.

Note: Macintosh keyboard commands are indicated in **red**. Windows keyboard commands are indicated in **blue**. Some files may need to be manually located while loading.





After saving, you will be prompted to load your FACT files into this new project.

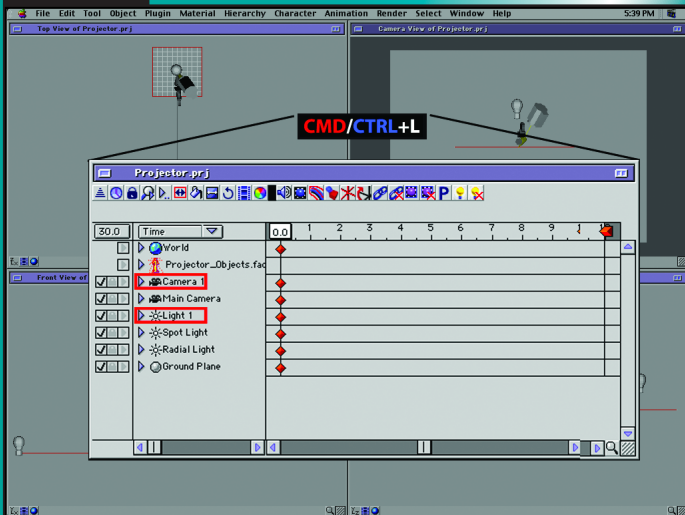
Locate the Projector_Objects.fac file and **[CLK]** Open.

You will then be asked to create a hierarchy of the objects contained in this FACT file. Since we want them separate, **[CLK]** the Separate button.

If there were any more models to add, you could continue adding them into the project, but for this exercise, there aren't, so **[CLK]** the Done button



Removing Unecesary Objects



Animator then generates the scene loosely based on the size of the FACT file we loaded.

Before we proceed, we need to remove two unwanted elements, a Camera and a Light.

Open the Project window [**CMD/CTRL+L**].

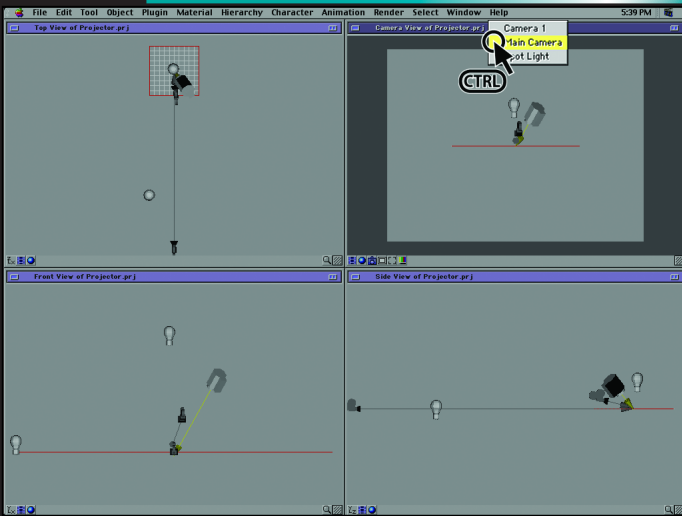
Animator defaults to adding a Light and a Camera into every new Project file. Since our FACT file contained a prebuilt Camera and Light, we do not need the default Camera and Light in our scene.

But before we delete the Camera, we need to switch our viewing angle from the default Camera to the Main Camera...



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Switching the Camera View



In the Camera View window, **[CTRL/RIGHT+CLK]** on the Camera View window header bar.

In the pop-up menu, select Main Camera.

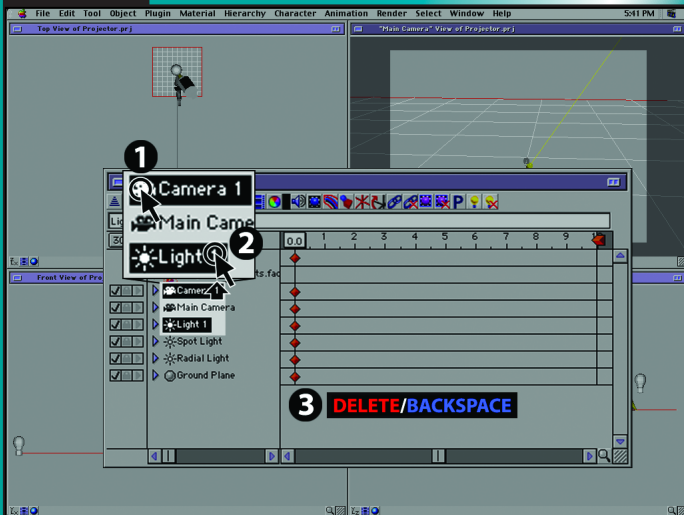
The Camera View window should now be looking at the set from a higher elevation.

Now we can delete the default Camera and Light....



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Deleting the Default Camera and Light



So, in the Project window, **[CLK]** on Camera 1 and **[SHIFT+CLK]** on Light 1, then press the **[DELETE/BACKSPACE]** button.

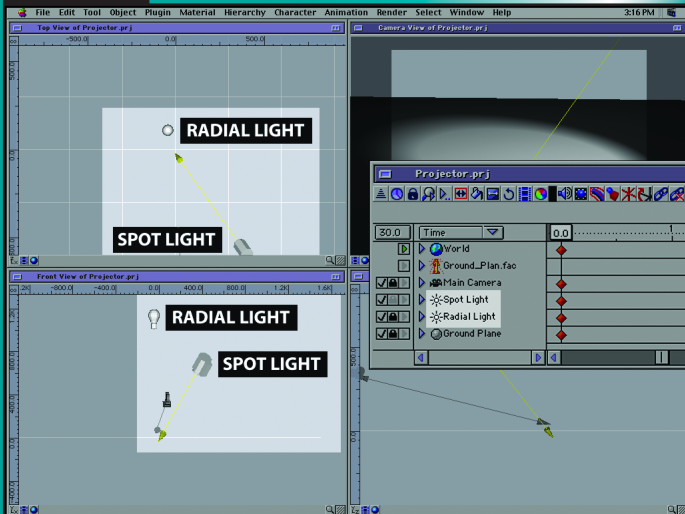
You should only see the following in the Project window : World, Projector_Objects.fac, Main Camera, Spot Light, Radial Light, and Ground Plane. Now, before we proceed, let's zoom in on each window, and remove the Grid.

To remove the Grid, go to the Main menu and select Window > Hide Grid.

To zoom in on each Top, Front, and Side view, **[OPT/ALT+CLK]** on the magnifying glass in the lower right corner of each window.

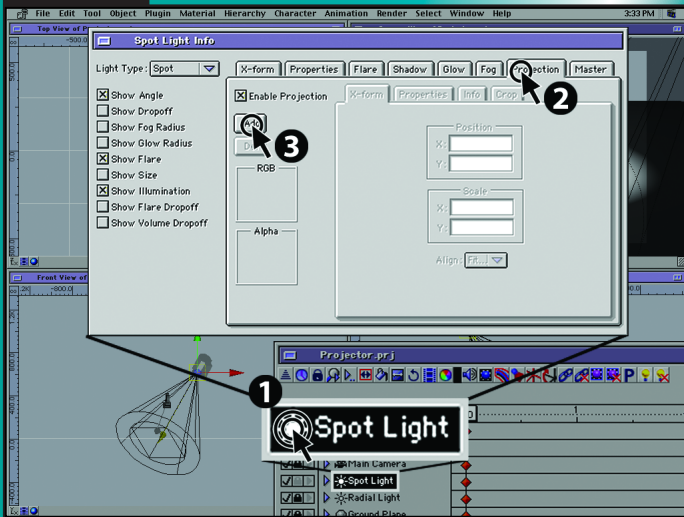
Now on to the exercise....





This scene has a Spot Light and a Radial Light already set up for you. The Radial Light is set to illuminate the ground plane. The Spot Light will be the centerpiece of this exercise. We will focus on the Spot Light Info window and the Camera View window.



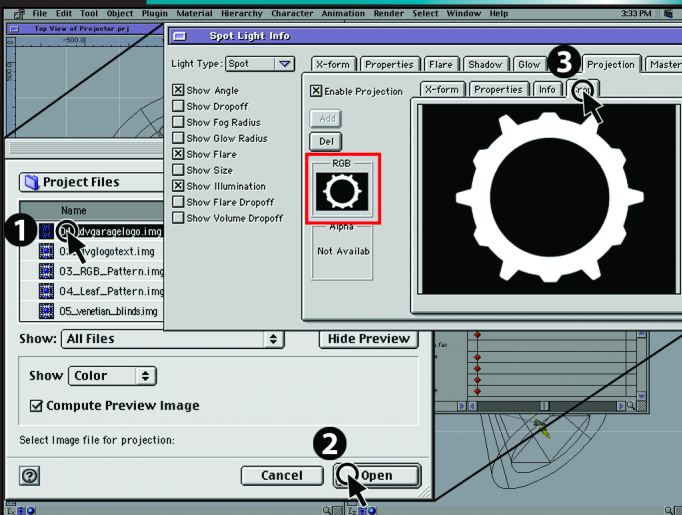


In the Project window, **[DBL+CLK]** on the Spot Light.

In the Spot Light Info window, **[CLK]** on the Projection tab, then **[CLK]** on the Add button.

Note: The Projection tab is where we add the images or movies to our lights.

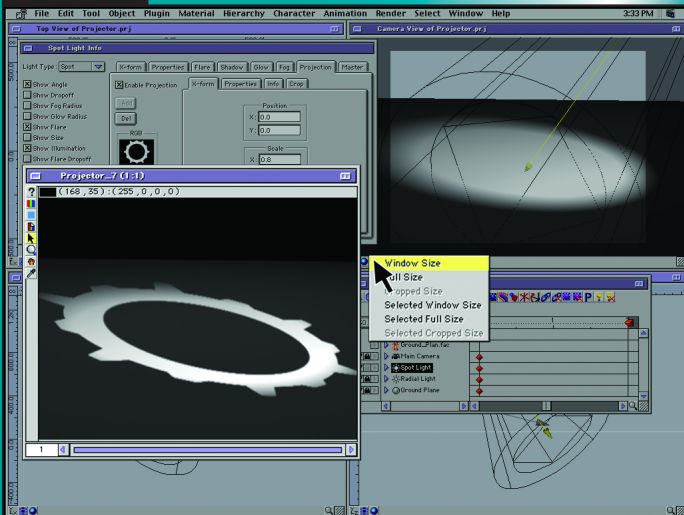




Select the 01_dvgaragelogo.img and **[CLK]** Open.

Note: You can see a little preview of the image in the RGB window. You can also see a preview in the Crop sub-tab. The Crop sub-tab is used when you only want a portion of the image to be projected.



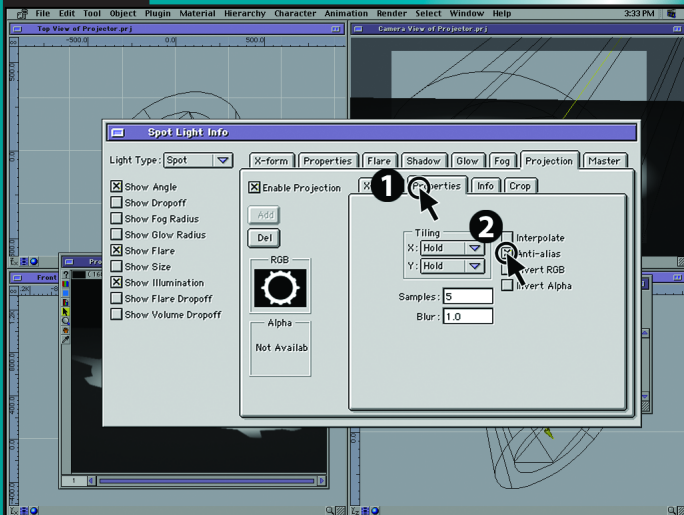


Since we will be referring to the Spot Light Info window constantly, position this window on top of the Top View window.

In the lower left of the Camera View window, **[CLK]** on the Snapshot button and select Window Size.

As you can see, the logo is being projected from the light. You can also see that the logo is very jaggy. To correct this we need to change a few settings. So....



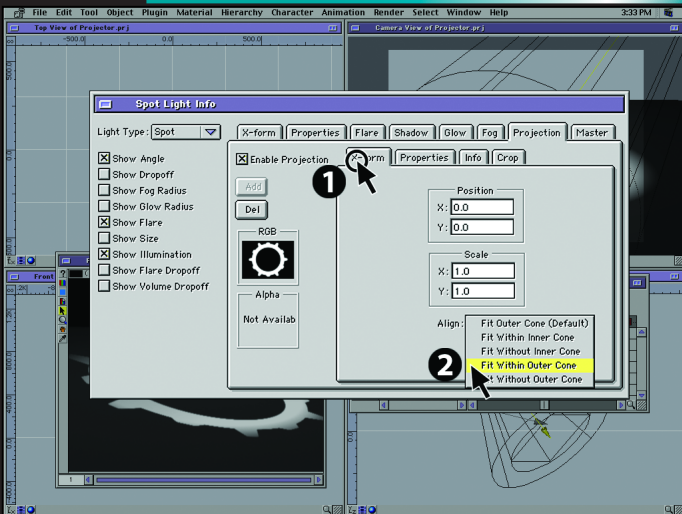


Within the Spot Light Info window, go to the Projection tab and **[CLK]** on the Properties sub-tab.

Check the Anti-alias checkbox to turn on the anti-aliasing settings.

We have now taken care of the jaggies.





There are 5 alignment styles for a projection map...all have to deal with how the map is projected in relation to the shadow cone of the light source. Selecting one of these styles will slightly alter the way the map is projected from the light source.

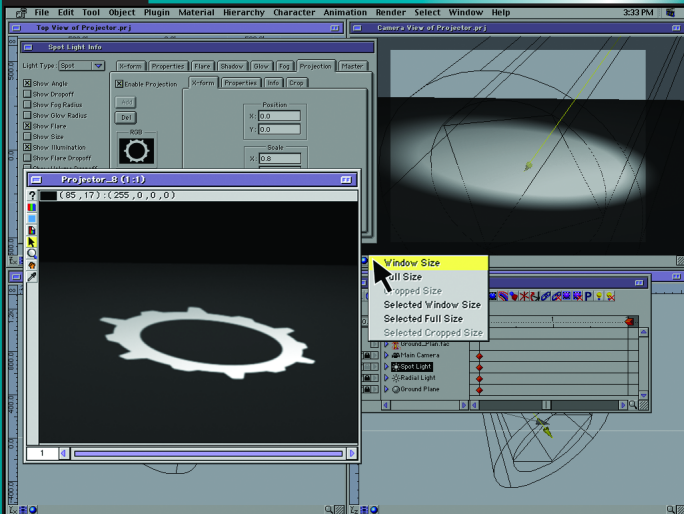
[CLK] on the X-form sub-tab located within the Projection tab.

Locate the Align option, then **[CLK+HOLD]** on the dropdown menu.

For now, select Fit within Outer Cone.

Please feel free to experiment with each setting and render out snapshots to see what they do.

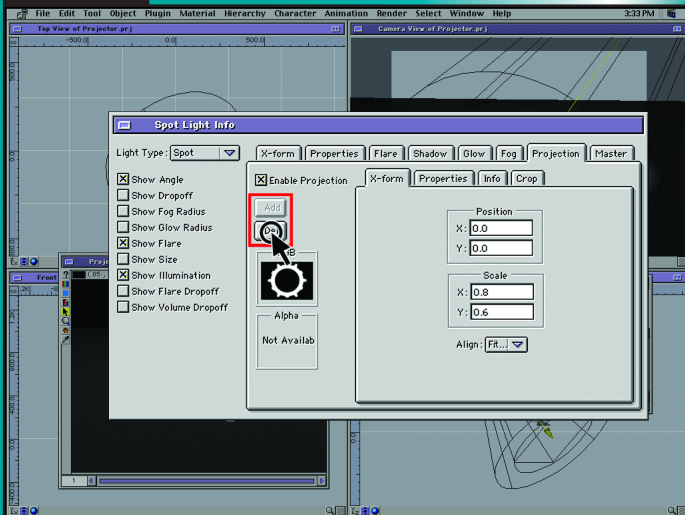




In the lower left of the Camera View window, **[CLK]** on the Snapshot button and select Window Size.

The logo is now smoother and smaller than the previous render. Checking the Anti-aliasing option smoothed out the projection and selecting the Fit within Outer Cone directs the map to project inside the Outer Cone of the Spot Light.





An image that contains text can also be projected. To demonstrate this, we need to change images. Since we can only project one image at a time, we need to remove the one we already have placed.

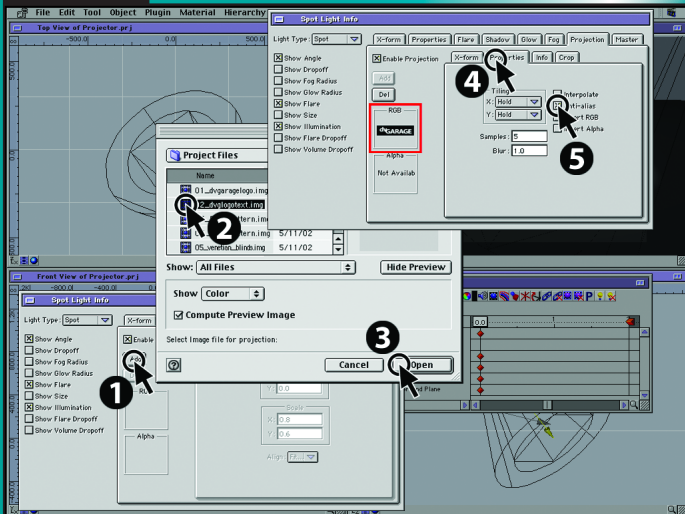
In the Spot Light Info window, notice that the Add button is grayed out (that is because this light has a projection map assigned to it). Notice, however, that the Del button below it is active. Besides seeing a thumbnail image, this is another way of knowing that a light has a projection map attached to it.

[CLK] on the Del (Delete) button to remove the current map.



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Adding the Text Image



Now that we have removed the previous map, we can add a new one....

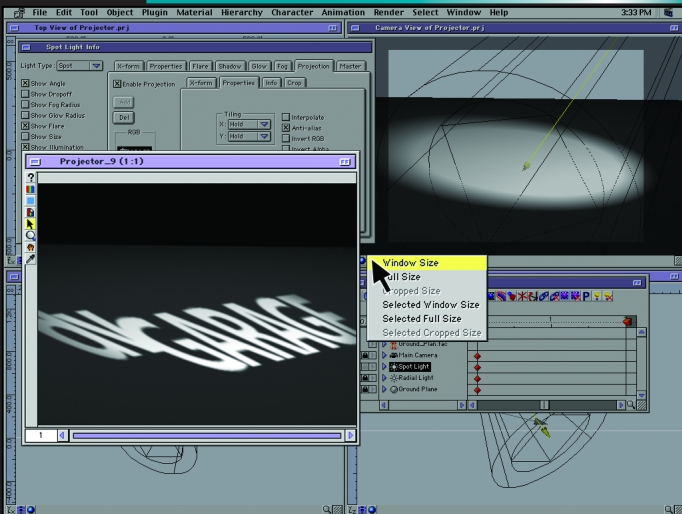
[CLK] on the Add button.

Select the 02_dvglogotext.img and **[CLK]** Open.

Again notice the thumbnail image being displayed. Also notice that the values are reset with each image.

In the Properties tab, turn on the Anti-alias option.



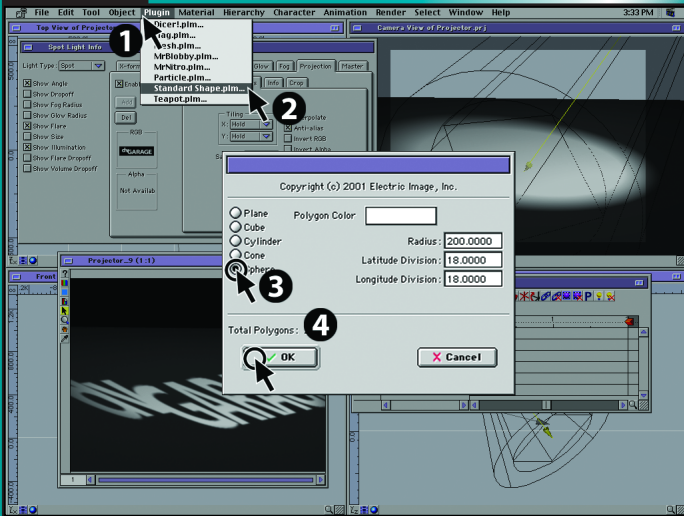


In the lower left of the Camera View window, **[CLK]** on the Snapshot button and select Window Size .

See, text!

You know what? This is kind of dull... let's add an object to the scene and see how a projection map interacts with it...





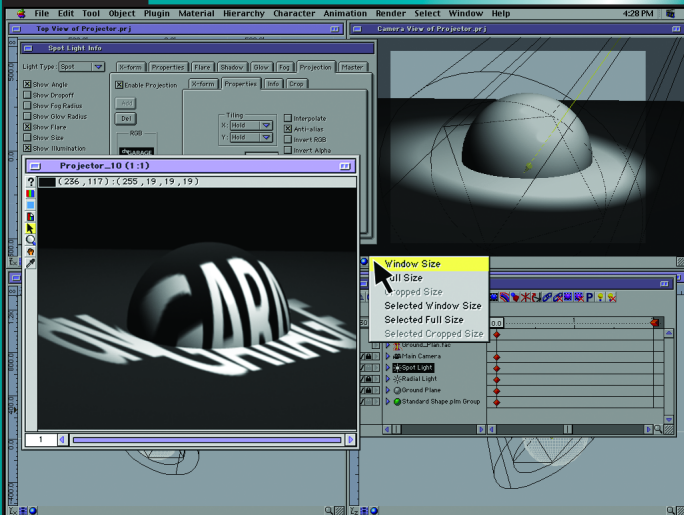
Let's add a sphere to the scene.

In the Main menu, select Plugin > Standard Shape.plm.

[CLK] on the Sphere radio button.

[CLK] OK.



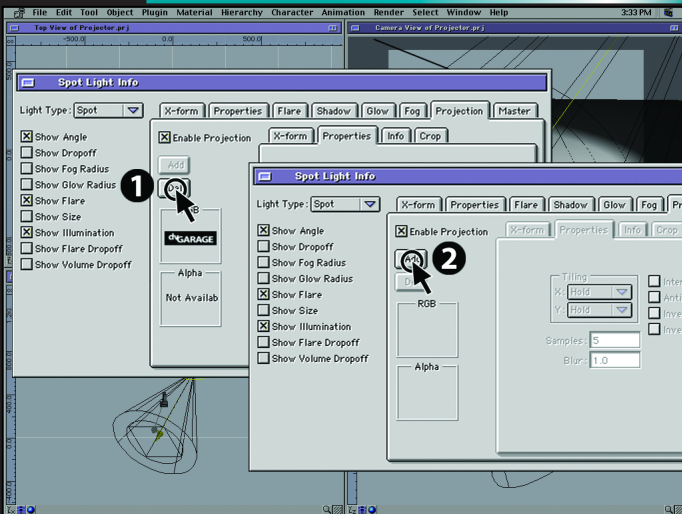


In the the lower left of Camera View Window, **[CLK]** on the Snapshot button and select Window Size.

Notice how the projection interacts with the sphere.
Kinda cool, huh?

Note: When finished viewing, delete the sphere. Go to the Project Window, select the Standard Shape.plm Group and press the **[DELETE/BACKSPACE]** key -or- just press **[CMD/CTRL+Z]** to undo the addition of the Sphere.



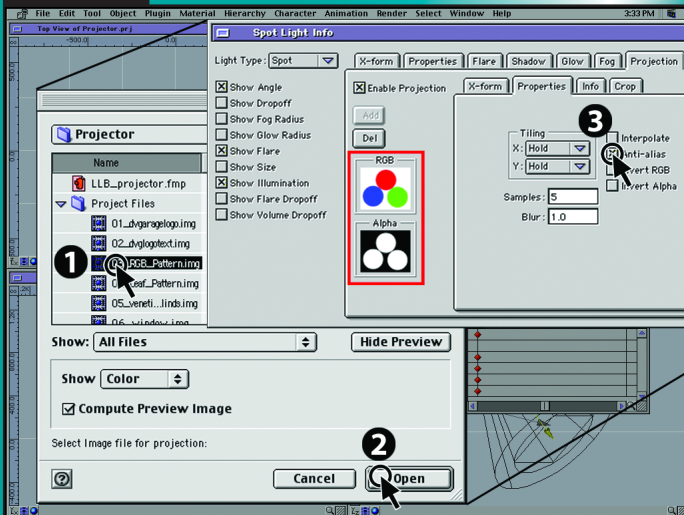


Black and white images are not the only images that can be projected. Color images can be projected, too.

In the Light Info window, go to the Projection tab, **[CLK]** on the Del button to Delete the current projected image.

Then press the Add button.





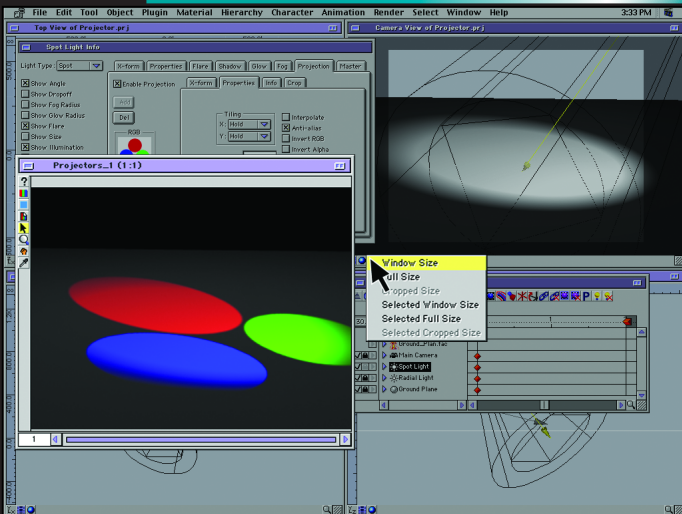
Locate and select the 03_RGB_Pattern.img file. **[CLK]** Open to add it.

Notice on the thumbnail preview that below the RGB thumbnail, there is an Alpha channel thumbnail, too.

This image has an Alpha channel. The Alpha channel masks out the light source, permitting only the red, green, and blue circles to be projected. A mask that covers a light source and permits only the pattern cut into the mask to be projected is called a "gobo". This is a standard lighting term that means "GOes Before Optics"

Turn on the Anti-alias option in the Properties sub-tab of the Projection tab.



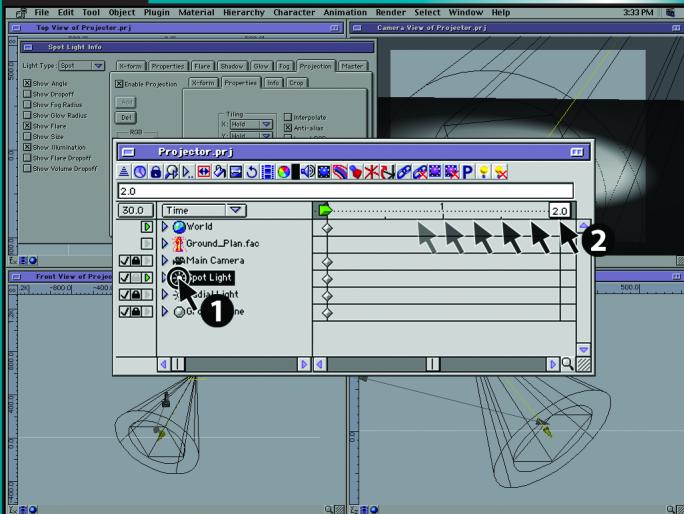


In the lower left of the Camera View window, **[CLK]** on the Snapshot button and select Window Size.

Not bad.

Let's add a little zest to this.

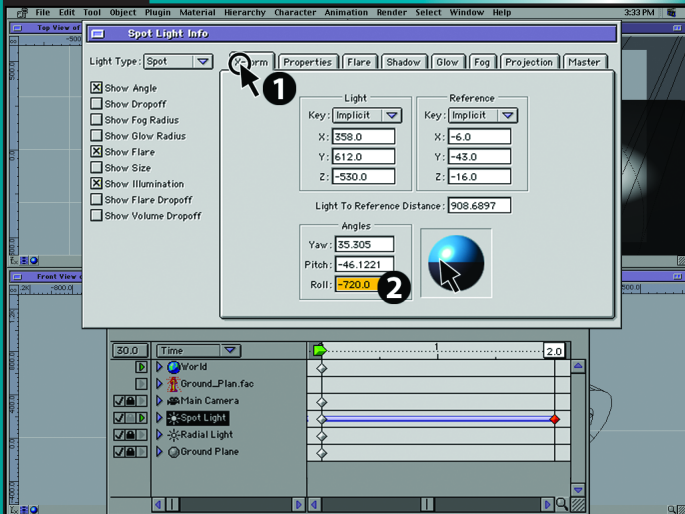




In the Project window, **[CLK]** on the green animation triangle for the Spot Light.

Move the Time Marker to the 2 second mark (which will be the designated end of the animation - where the red marker now is.)

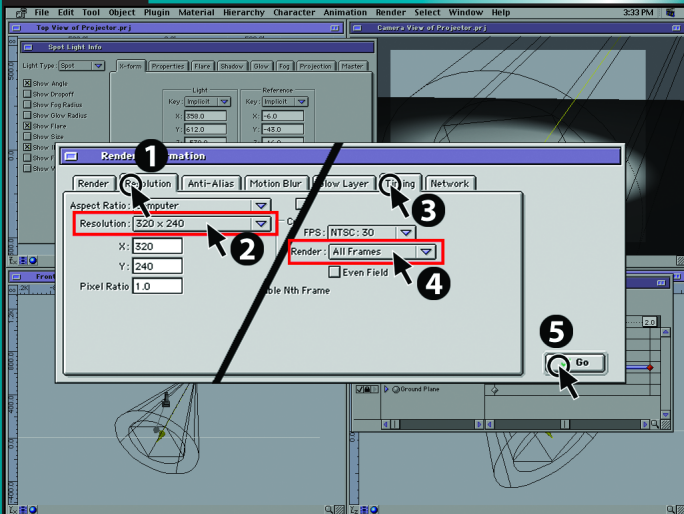




In the Spot Light Info window, **[CLK]** on the topmost X-form tab (not the X-form sub-tab in the Projection tab).

Under the Angles property box, locate the Roll numeric input box and enter -720.0 (or you can grab the black and blue sphere and rotate it counterclockwise twice).





Press **[CMD/CTRL+R]** to pull up the Render Info window.

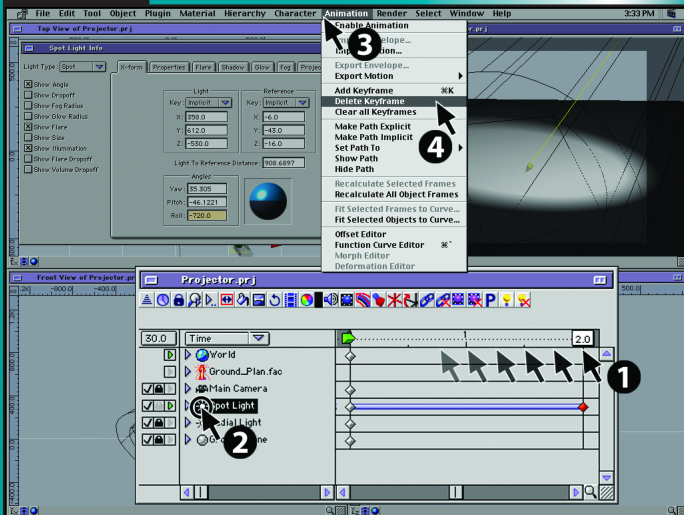
In the Resolution tab, set the Resolution to 320 x 240.

In the Timing tab, make sure that Render is set to All Frames.

[CLK] Go. Name this movie Lights_RGB.img.

NOTE: When this is done rendering, in order to view this movie, locate the Projector application program (drag it off the Lighting Lab CD) and drag this movie on top of that application program. It will ask you to save another "FAST" version of it, tell it to do so, and watch the movie play. It will go slow at first, but then it will go into realtime after the frames have been cached into memory.





So far we have been dealing with still images. Let's add a movie as a projection map and see what that looks like.

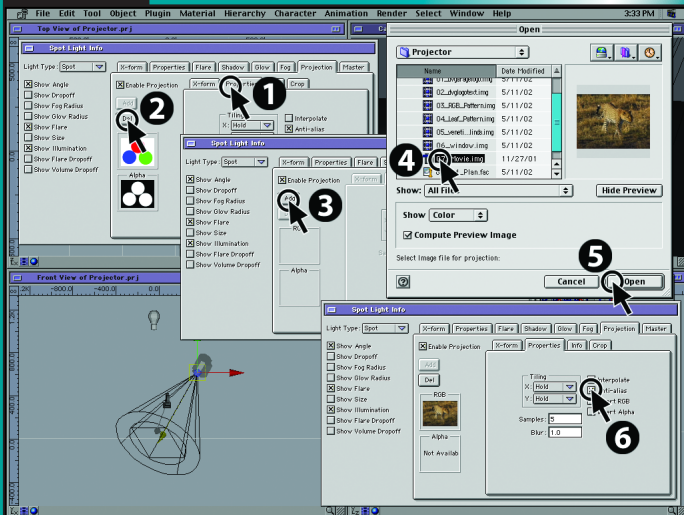
Relaunch Electric Image Animator and reopen your Project file.

In the Project window, move the Time Marker to the end of the animation and single **[CLK]** on the Spot Light to highlight it.

In the Main menu, select Animation > Delete Keyframe.

We don't need our light source spinning anymore.



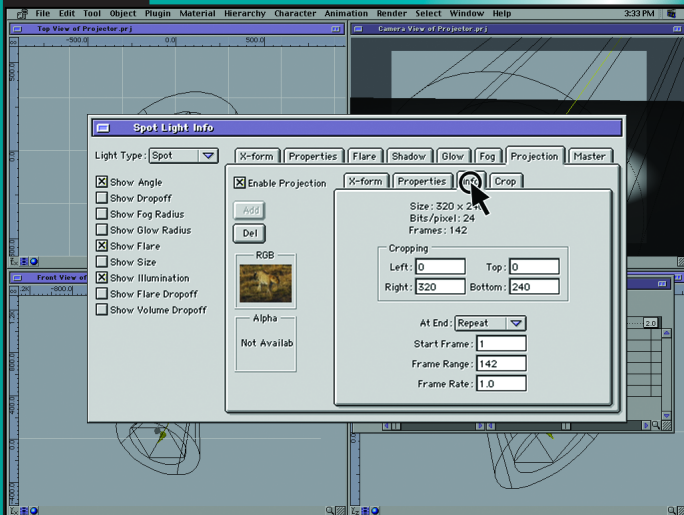


In the Spot Light Info window, **[CLK]** on the Projection tab, then press the Del button to remove the 03_RGB_Pattern.img file.

[CLK] the Add button and locate and select the 07_Movie.img file.

[CLK] the Anti-alias option.



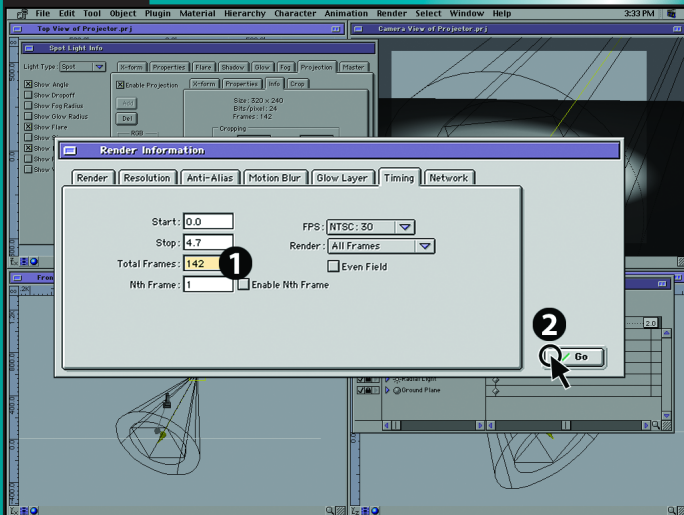


In the Projection tab, [CLK] on the Info sub-tab.

Notice that we have some editing capabilities with regards to this movie. Besides cropping it, which is the same as if it were a still image, we can change where the beginning of the movie occurs with the Start Frame. We can also tell this movie to either Repeat itself at the end of the movie's animation, Oscillate, or Hold on the last frame. We can also alter the Range of Frames and even the Frame Rate.

Leave everything as is, and let's render this movie out.





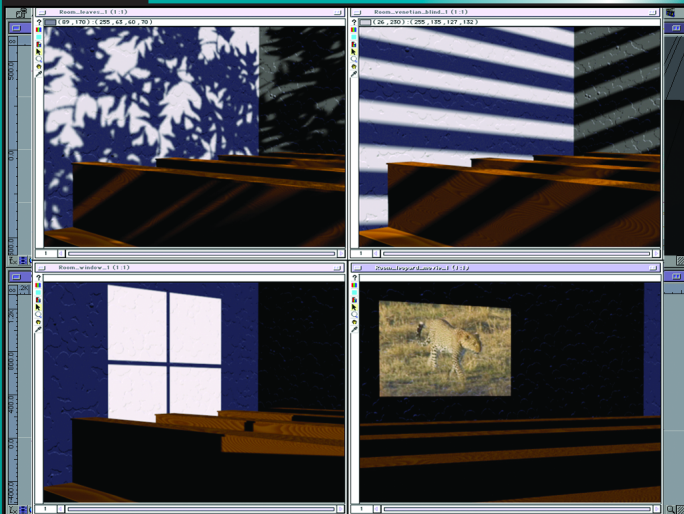
Press **[CMD/CTRL+R]**. The Info sub-tab in the Projection tab tells us that the movie we added is 142 frames long, yet our animation is currently only set for 61 frames. See the Total Frames box.

Let's change that. In the Total Frames numeric box, enter 142.

Everything is still saved from before, so let's just go ahead and render this out.

[CLK] Go. Name this Projection_Movie.img.





As you can see, there are a variety of options for Projection Maps on Lights..

Light may be blocked from an object or part of a scene. Shadows can be controlled and created. Color and pattern can be thrown by the light.

In real world lighting we use flags, gels, and gobos to create this effect lighting, but you can experiment now in being creative with light in your own 3D world. We've included several more images for you (in the project folder) to play with to get an idea of the potential of Projection maps.



