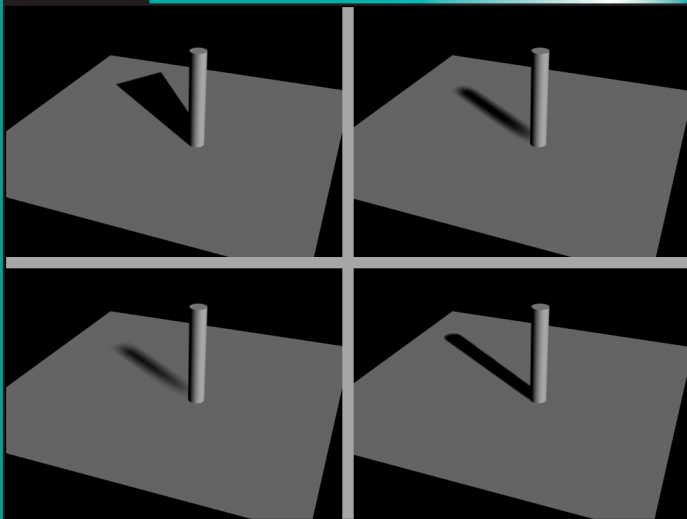


# 1

## Parallel Lights

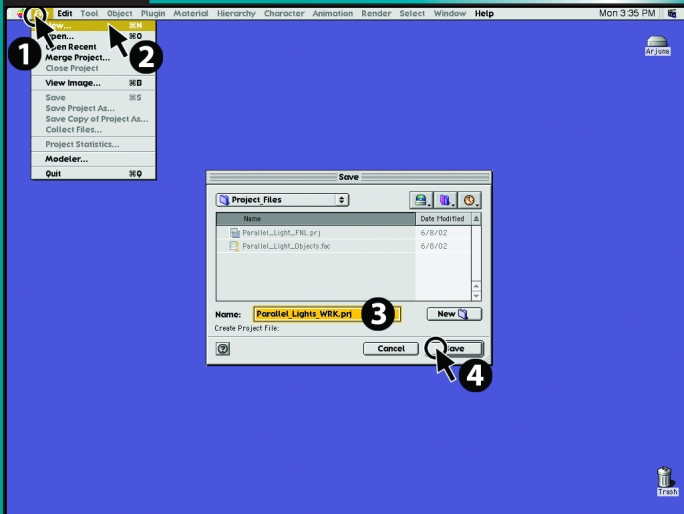


Parallel Lights are unique kinds of lighting instruments in 3D.

No matter how close or how far away the light is from the scene, the light illuminates the entire scene with the same given intensity. Distance has no effect on the illumination factor of the Parallel Light. However, the shadow it casts is another story.

In this exercise, we will demonstrate the distance effect of the Parallel Light, but we will also tune you in to the shadow detail. And we will see how the Shadow Buffer size comes into play with this light source.



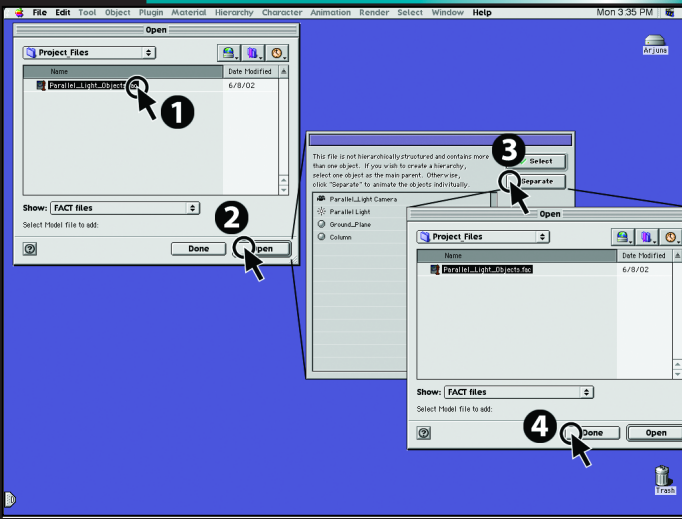


Launch Animator.

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

When Animator prompts you to name and save this new project, name it "Parallel\_Lights\_WRK.prj" file, then navigate to the Parallel\_Lights\_Tutorial folder and save it in there.





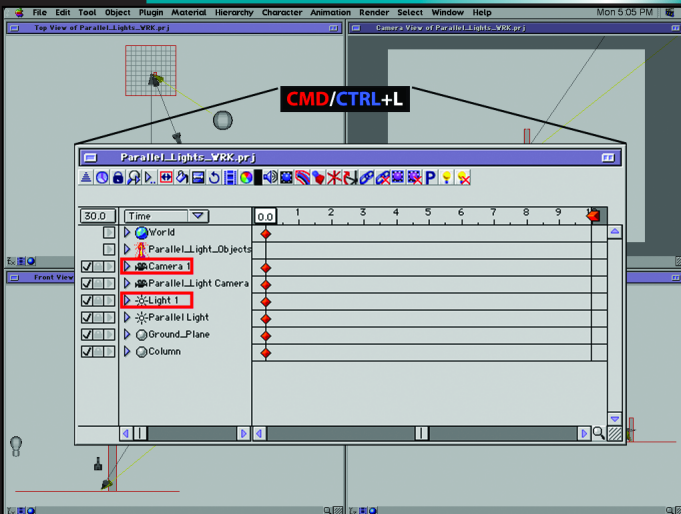
After saving, you will be prompted to load your FACT files into this new project.

Locate the `Parallel_Light_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 are no more models to add, so **[CLK]** the Done button.





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

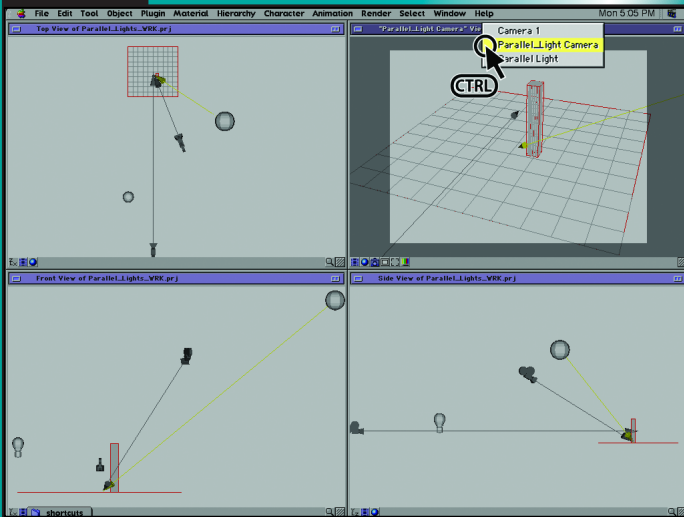
But before we delete the Camera, we need to switch our viewing angle from the default Camera to the Parallel\_Light Camera...





## 5

## Switching the Camera View



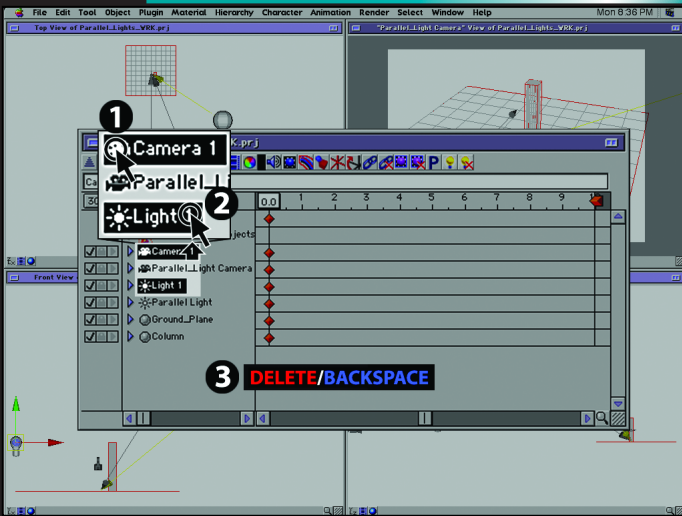
In the Camera View window, **[CTRL/RIGHT+CLK]** on the Camera View window header bar.

In the pop-up menu, select **Parallel\_Light Camera**.

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

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





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

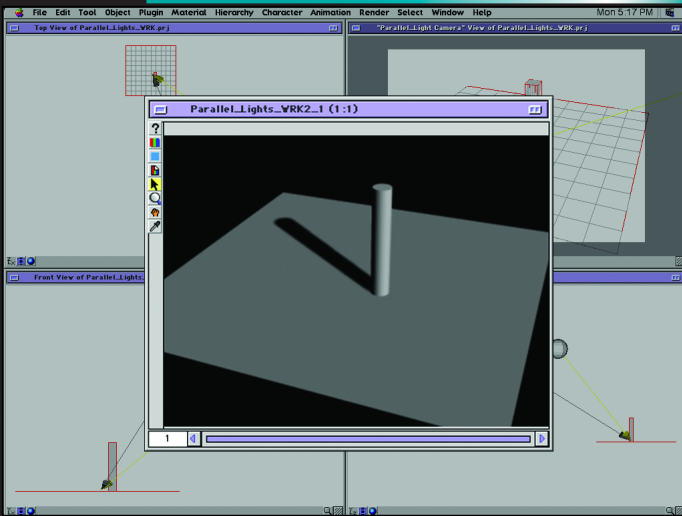
You should only see the following in the Project window : World, Parallel\_Light\_Objects.fac, Parallel\_Light Camera, Parallel Light, Ground\_Plane, and the Column.

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....





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

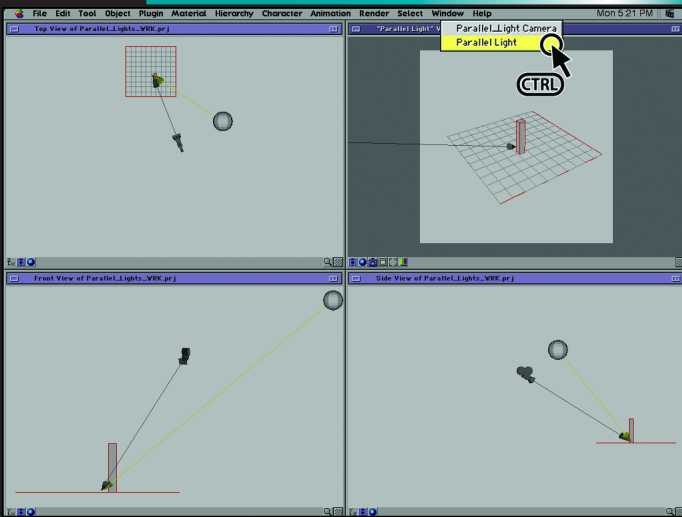
In this simple scene, there is a ground plane with a single column on it and one light source, a Parallel Light, that is illuminating the scene. The Shadow casting ability for this light has been turned on and the values are left at the default settings.

Position this rendered window on top of the Side View window. We will compare future renders to this render.



## 8

# Change the Camera View to the Light's POV

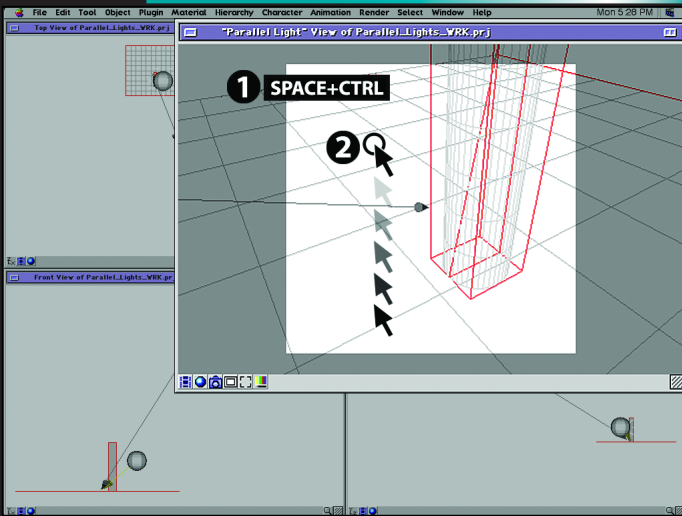


In the Camera View window, **[CTRL/RIGHT+CLK]** on the Camera View window header bar.

In the pop-up menu, select Parallel Light.

We are now looking at the scene through the light source (which is very handy when aiming lights). Besides seeing what the light source is illuminating, we can observe how the shadow buffer is interacting with the scene.



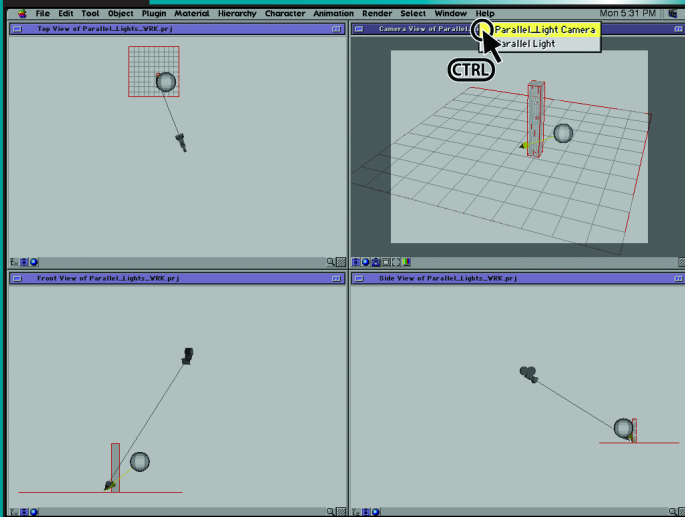


We are going to move the light up close and personal to the column.

In the Parallel Light View window, press and hold the **[CTRL/SHIFT+SPACE]** keys to access the shortcut for Dolly (the standard cursor should change to a **forward/rear** looking arrow, or a **left/right** pointing arrow).

**[CLK]** in the Light View window and drag the cursor **down/right** to zoom into the column. Stop when the base fills three-quarters to half the view.



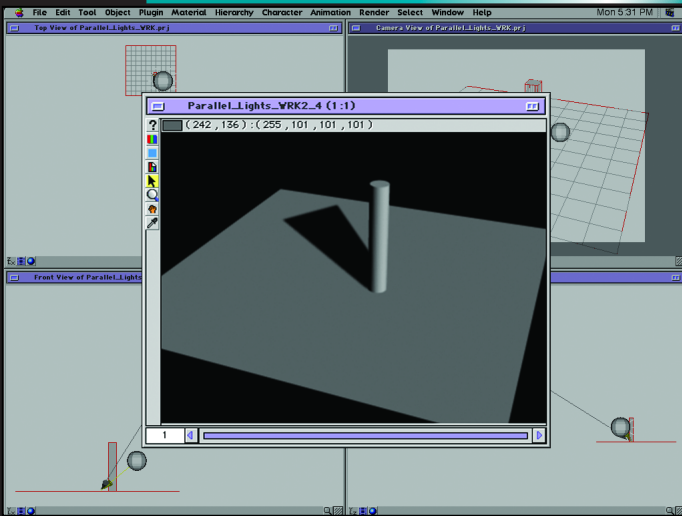


To render the scene, the View window must be in the Camera View mode.

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

In the pop-up menu, select Parallel\_Light Camera (you'll become familiar with this, as we will be doing it quite often).





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

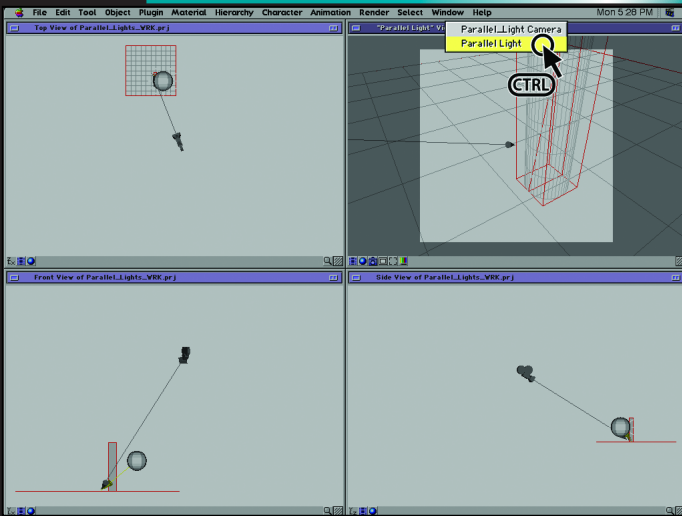
Compare this render with our first render.

As you can see, the light level on the ground plane and the column have not changed. Drag the cursor around and look at the RGB values... Then do the same on the other render in the same areas... No change.

But look at the shadow - it should be quite intense and flared out. While a parallel light calculates the illumination from an infinite source, shadows and specular highlights still use the light position.

Now what happens if we zoom the light source way out? Let's give that a try (again, keep these renders handy for comparison)...





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

In the pop-up menu, select Parallel Light.

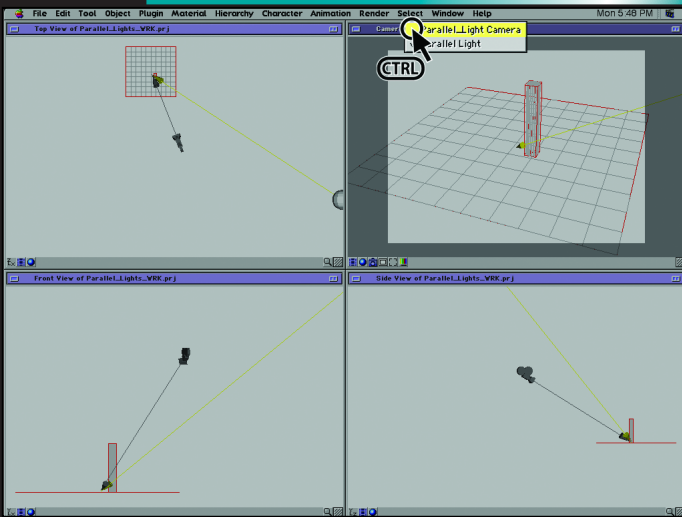




## Move the Light Away From the Column

# 14

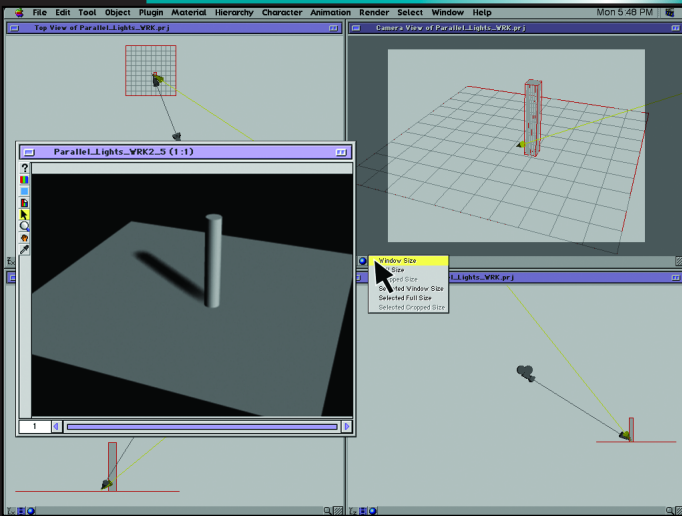
## Change the View Back to Camera



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

In the pop-up menu, select Parallel\_Light Camera.





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

Compare this render with our previous two renders.

Notice, again, that the light illumination did not change... take RGB readings and compare them to each render.

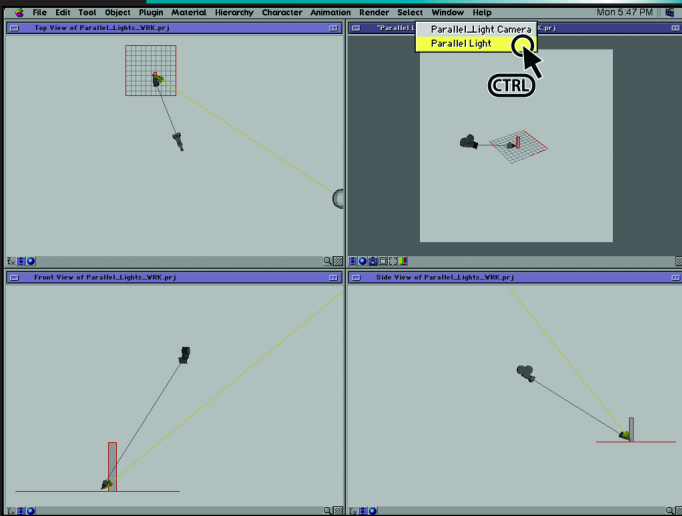
Now look at the shadow - it has changed again. With the increase in distance of the Parallel Light, the shadow has become more fuzzy and is starting to dissipate.

Now, let's try something else (again, keep these renders handy for comparison)...



# 16

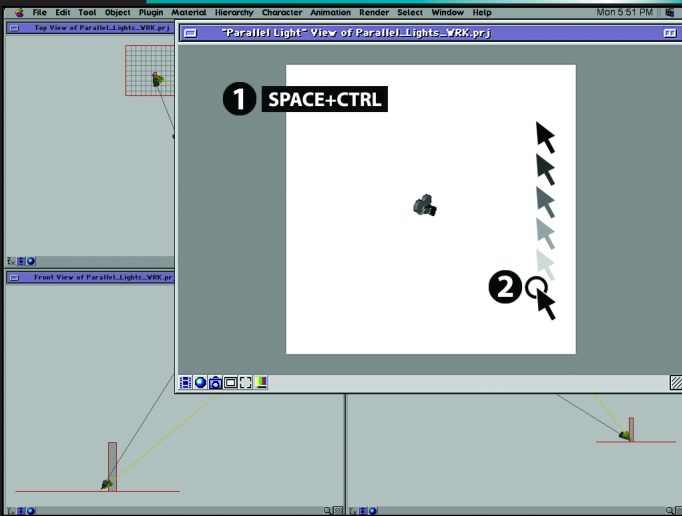
## Change the View to the Light's View



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

In the pop-up menu, select Parallel Light.





We are going to move the light extremely far away from the column.

In the Parallel Light View window, press and hold the **[CTRL/SHIFT+SPACE]** keys.

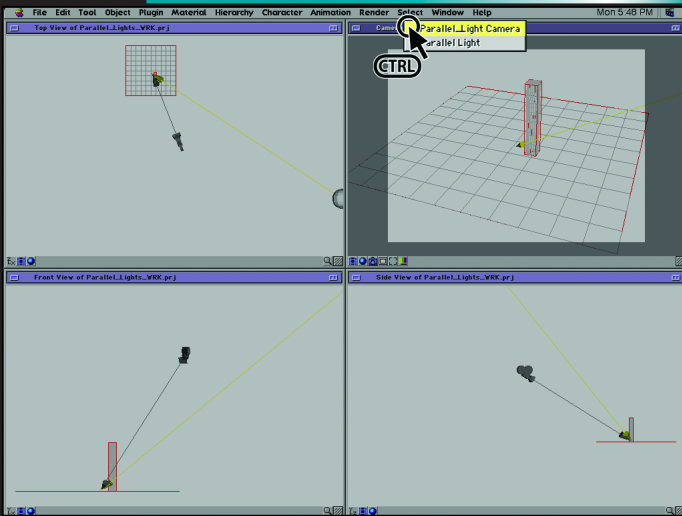
**[CLK]** in the Light View window and drag the cursor **upward/left** to zoom away from the column. You may need to **[CLK]** and drag up a few times.

Stop when you see the Camera overlap and consume the scene (so that you can only see the camera and not the scene).



# 18

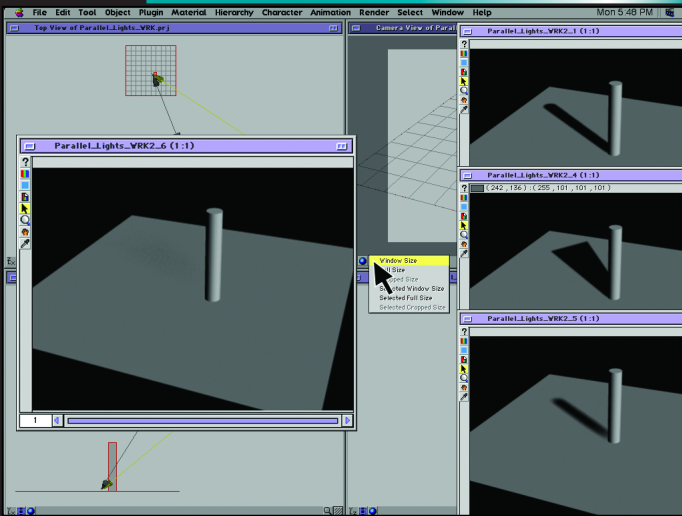
## Change the View Back to Camera



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

In the pop-up menu, select Parallel\_Light Camera.





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

Compare this render with our previous three renders.

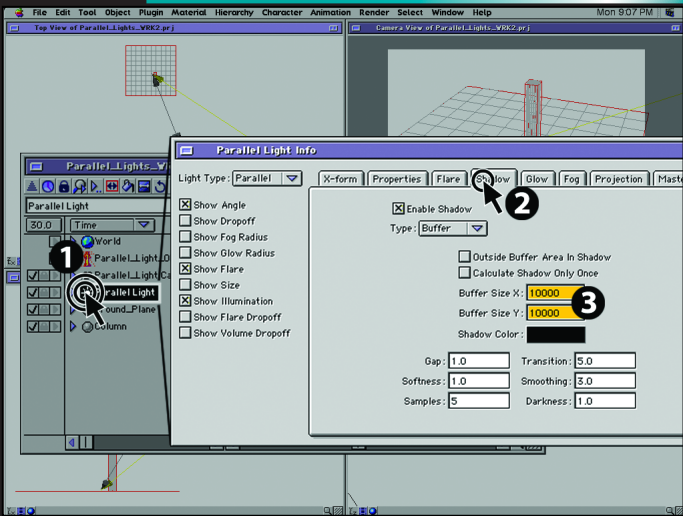
Again, same illumination, but now there is no shadow whatsoever.

This, once again, is because the Shadow Buffer is calculated as in any other light.

There is something that can bring back the shadow, even at the great distance of the light from the scene - the Shadow Buffer Size setting.

Again, as a reminder, leave this window open along with the others so that we can compare them.





What we are going to do is increase the Shadow Buffer size for our Parallel Light source.

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

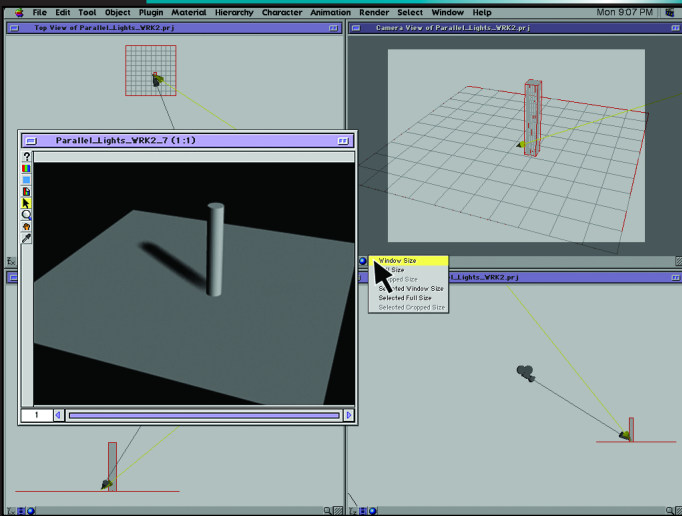
In the Parallel Light Info window, **[CLK]** on the Shadow tab.

Increase the Buffer Size for X and Y to 10000 each.

Close the Light Info window.







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

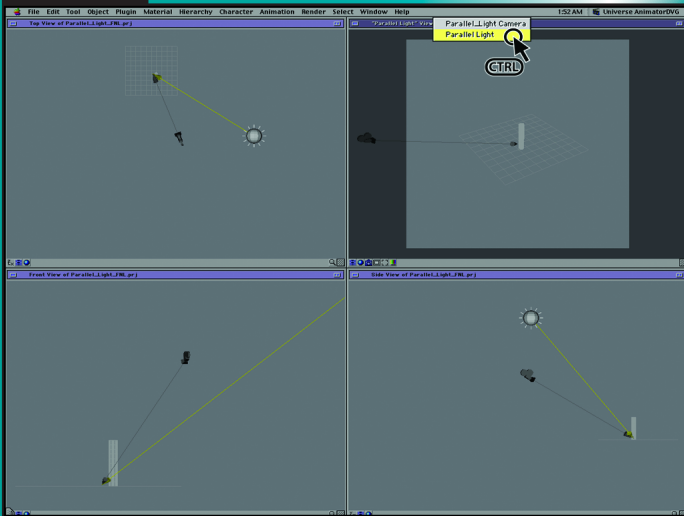
This may take a little while; in fact, pay close attention to how long it takes to render this, and write that time down.

As we had learned in the Shadow Buffer exercise, the Shadow Buffer controls the resolution of the Shadow texture map.

When it's done rendering, compare this render with our previous four renders.

Again, same illumination (we did not change any setting to affect that), but notice... once more, we have a shadow... Now how is that possible?



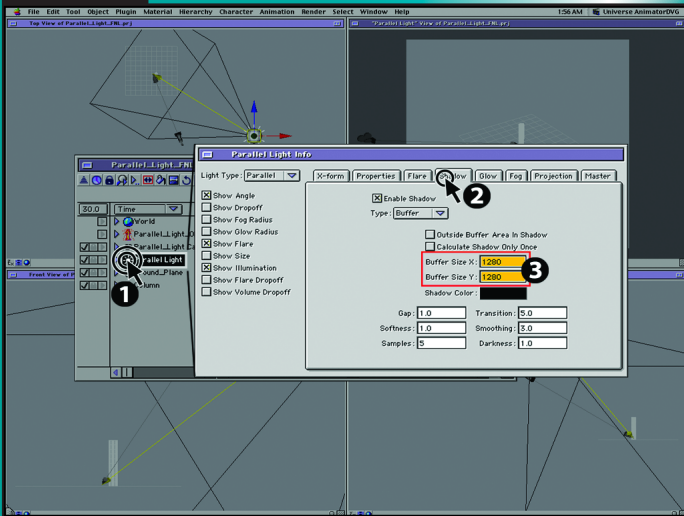


We are now going to reduce the Shadow Buffer back to its standard setting, then alter the Shadow Cone to achieve the same effect.

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

In the pop-up menu, select Parallel\_Light.



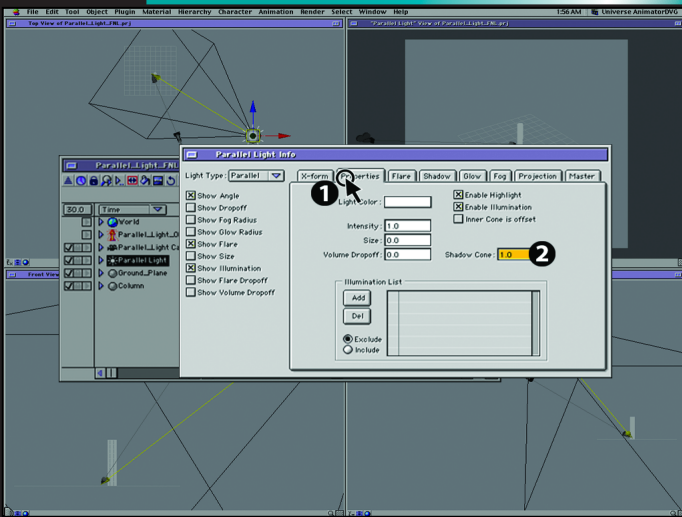


In the Project window, **[DBL+CLK]** on the Parallel Light.

In the Parallel Light Info window, **[CLK]** on the Shadow tab.

Decrease the Buffer Size for X and Y back to 1280 each.





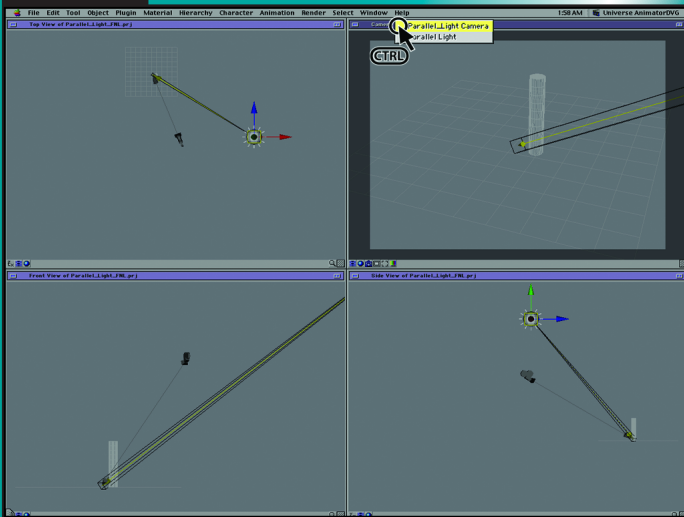
Still in the Parallel Light Info window, **[CLK]** on the Properties tab.

Now, pay close attention to the Camera View window as you do this next step...

Change the Shadow Cone Angle setting to 1.0.

Note: You should now see the set again in the Camera View window. What we did was narrow the focus of the Shadow to such a small angle that it now will only focus on our set.

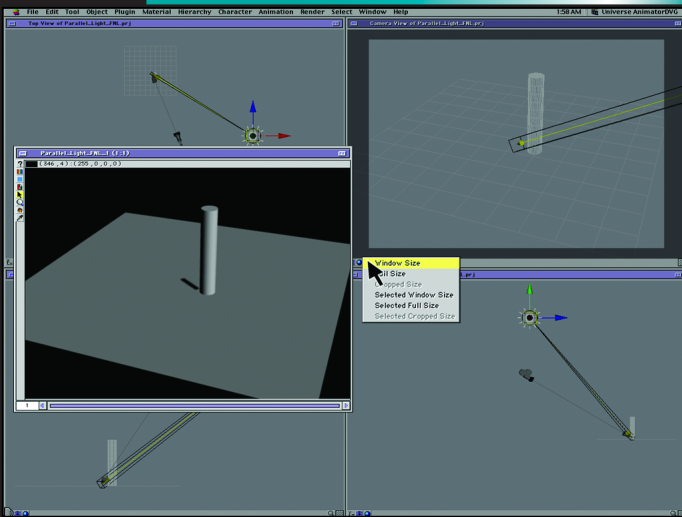




In the Camera View window, [**CTRL/RIGHT+CLK**] on the Camera View window header bar.

In the pop-up menu, select Parallel\_Light Camera.





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

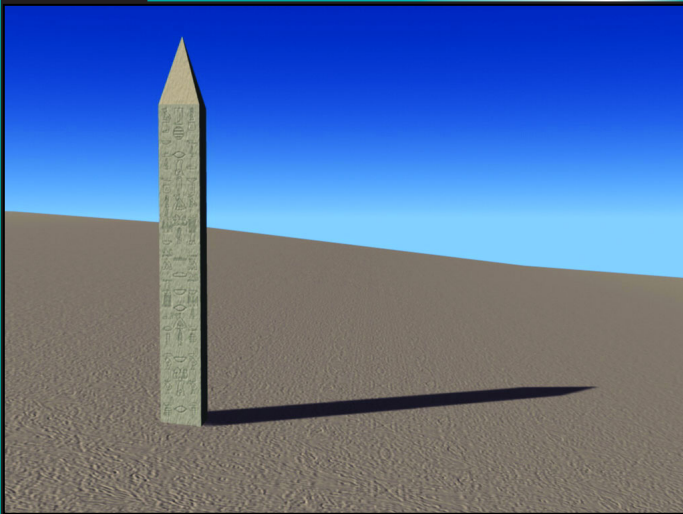
Now watch how fast the scene renders... Compare the render time of this scene to the previous render. A lot faster this time, isn't it?

And we still have a shadow...

When you place a Parallel Light far away from your scene, and you need shadows, always consider reducing the Shadow Cone angle instead of ramping up the Shadow Buffer setting.

10,000x10,000 shadow buffer setting has to render 61 times more pixels than a setting of 1280x1280. Remember that productivity and efficiency are key goals.





Parallel lights are great for illuminating outdoor scenes where shadows are generated locally for technical reasons...

Even though they act like the sun, it doesn't usually mean that you need to keep them that far away.

