INTRODUCTION

In this chapter, you will learn to assign various materials and maps to the objects in a scene to make it more realistic. Materials are used to describe the reflection or transmission of light of an object. Maps are used to simulate texture, and apply designs, reflection, refraction, and other effects. To assign materials and maps, you need to use the **Material Editor** tool from the **Main Toolbar**, which is discussed next.

MATERIAL EDITOR

Menu bar: Rendering > Material Editor > Compact/Slate Material Editor
Main Toolbar: Material Editor flyout > Compact/Slate Material Editor
Keyboard: M

In 3ds Max, there are two types of material editors, Slate Material Editor and Compact Material Editor. You can use any of these material editors to create new materials and maps, modify the existing materials, apply these new materials and maps to the models in the scene, and create a new environment for the scene. The Slate Material Editor uses nodes and wiring to graphically display the design of the materials created by you. The Compact Material Editor is easy and stripped down version of Slate Material Editor.

To create a new material, press the M key; the **Slate Material Editor** dialog box will be displayed, as shown in Figure 7-1. Next, if you choose **Modes > Compact Material Editor** from the material editor menu bar, the **Material Editor** dialog box will be displayed, as shown in Figure 7-2. The title bar of the **Material Editor** dialog box displays the name and number of the current material, which gets changed depending on the material that you select. The **Material Editor** dialog box is divided into various areas, refer to Figure 7-2. These areas are discussed next.

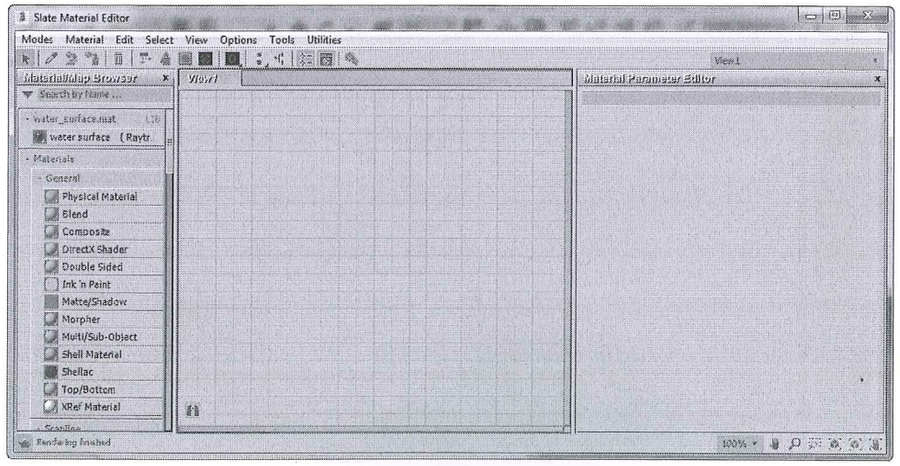

***Figure 7-1** The **Slate Material Editor** dialog box*

Note

*When you press the M key, the material editor that you opened last in 3ds Max will be displayed. However, if you press the M key for the first time in 3ds Max, then the **Slate Material Editor** will be displayed.*

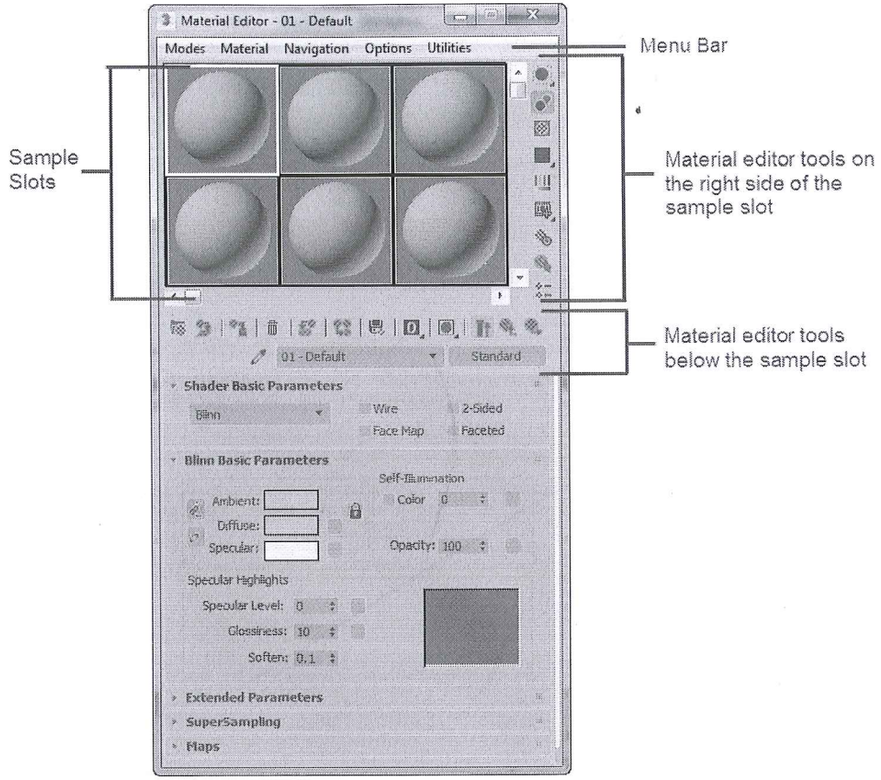

***Figure 7-2** The **Material Editor** dialog box*

Menu Bar

The menu bar is located at the top of the **Material Editor** dialog box. It consists of various pull-down menus such as **Material**, **Navigation**, and so on. The options in these pull-down menus are used to choose various tools. These tools can also be invoked using the options available below as well as on the right side of the sample slots in the **Material Editor** dialog box, refer to Figure 7-2.

Sample Slots

The sample slots in the **Material Editor** dialog box are used to preview the material or the maps that are assigned to the objects in the viewport. By default, there are 6 slots which can be extended to 24 slots and each sample slot represents a single material or map. To view other sample slots, move the scroll bar available on the right, and just below the sample slots. You can also increase the number of visible sample slots. To do so, select one of the sample slots; it will be surrounded by a white colored boundary and will get activated. Next, right-click on the active sample slot; a shortcut menu will be displayed, as shown in Figure 7-3. By default, the **3x2 Sample Windows** option is chosen in the shortcut menu. Next, choose the required option; the number of visible sample slots will be increased accordingly, refer to Figures 7-4 and 7-5.

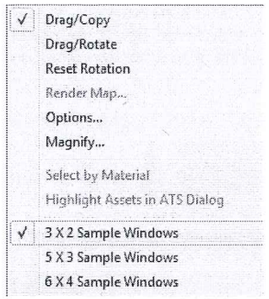

Figure 7-3 *The shortcut menu displayed*

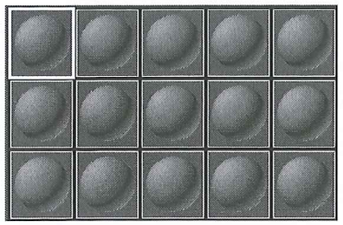

Figure 7-4 *The sample slots after choosing the* ***5x3 Sample Windows*** *option*

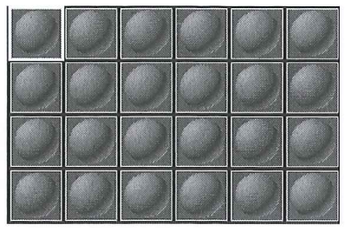

Figure 7-5 *The sample slots after choosing the* ***6x4 Sample Windows*** *option*

In the shortcut menu, the **Drag/Copy** option is chosen by default. It is used to copy the material or the map from one sample slot to another. Select the sample slot, whose material or map you want to copy. Next, press and hold the left mouse button on it, drag it to another sample slot, and then release the left mouse button; the same material or the map will be copied to the other sample slot, as shown in Figures 7-6 and 7-7.

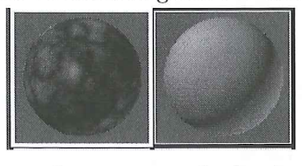

Figure 7-6 *Two sample slots in the* ***Material Editor*** *dialog box*

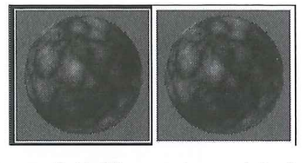

Figure 7-7 *The map/material of one sample slot copied to the other*

On choosing the **Drag/Rotate** option in the shortcut menu, the shape of the cursor will change. Now, you can view the material map on the sample slot by rotating it. The **Reset Rotation** option in the shortcut menu is used to reset the sample slot to its default orientation. By default, the **Render Map** option in the shortcut menu is not activated. It will be activated on assigning a map to the sample slot. This option is used to render the map in the selected sample slot by creating a bitmap or an *avi* file (if the map is animated). When you choose the **Options** option, the **Material Editor Options** dialog box will be displayed. The options in this dialog box are used to modify the sample slots.

Choose the **Magnify** option; the selected sample slot will be displayed in an enlarged window, as shown in Figure 7-8. Alternatively, double-click on the selected sample slot to display it in an enlarged window. To resize the window, move the cursor at the bottom of the window; the cursor will change to a double-headed arrow. Now, drag the cursor to resize the window.

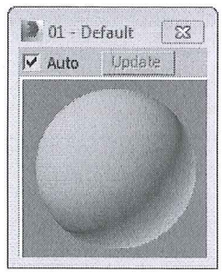

Figure 7-8 *The sample slot displayed in a separate window*

Material Editor Tools

The material editor tools are used to modify the default settings of the selected sample slot, and apply the materials or the maps to the objects. These tools are available below as well as on the right

side of the sample slots in the **Material Editor** dialog box. The most commonly used tools are discussed next.

Get Material

Material Editor Menu:	Material > Get Material
Material Toolbar:	Get Material
Keyboard:	G

The **Get Material** tool is used to get a material or a map for the selected sample slot. Materials affect the color, opacity, glossiness, and other physical properties of objects.

To get a material, select one of the sample slots to activate it. Choose the **Get Material** tool available below the sample slots; the **Material/Map Browser** dialog box with a list of materials and maps will be displayed, as shown in Figure 7-9.

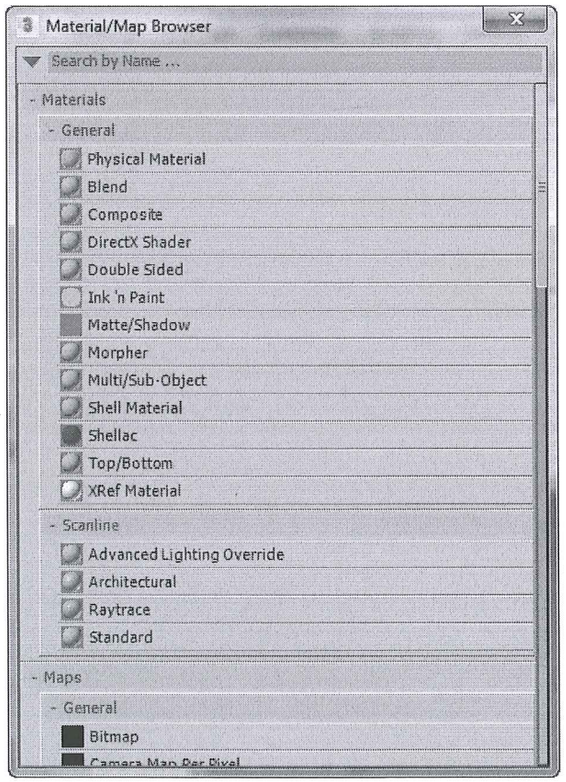

Figure 7-9 *Partial view of the rollouts in the* ***Material/Map Browser*** *dialog box*

You can collapse and expand this list as required. Now, double-click on one of the materials or maps from the list; the default material will be replaced by the new material or map. Also, the new material will be displayed on the sample slot in the **Sample Slots** rollout of the **Material/Map Browser** dialog box. The **Material/Map Browser** dialog box is discussed next.

Note

*The shortcut key G mentioned above will work only if the **Keyboard Shortcut Override Toggle** tool in the **Main Toolbar** is activated and the **Material Editor** dialog box is displayed.*

Material/Map Browser

The **Material/Map Browser** dialog box is used to select different types of materials and maps from the lists displayed in it. Various options in this dialog box are discussed next.

Search by Name: The **Search by Name** text box is located on the top of this dialog box. It is used to search and select the name of the materials or the maps. For example, enter the alphabet **d** in this text box; a drop-down list of all the materials and maps starting with the alphabet d will be displayed, as shown in Figure 7-10. You can double-click on the required material or map; it will be displayed on the selected sample slot. Now, choose the **Clear Results** button on the right side of the text box; the drop-down list will be cleared.

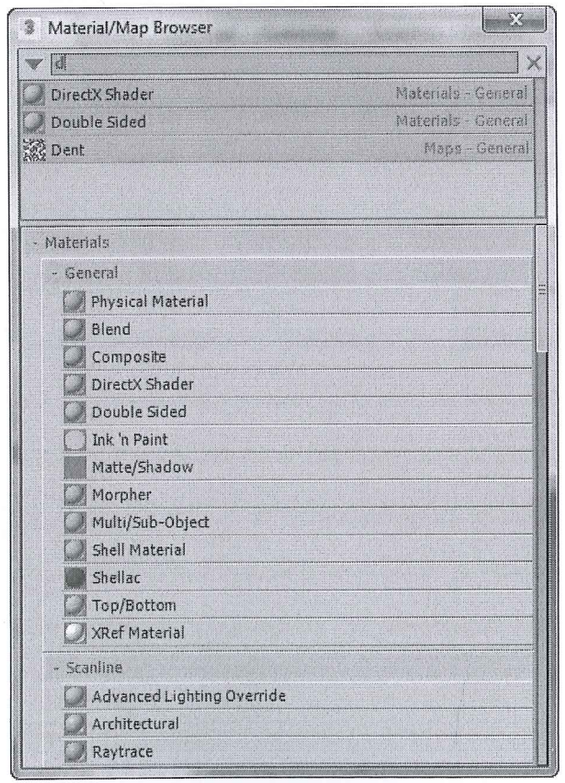

***Figure 7-10** The drop-down list displayed after entering the alphabet **d** in the text box*

Material/Map Browser Options: The **Material/Map Browser Options** button is located on the left of the **Search by Name** text box. Choose the **Material/Map Browser Options** button; a flyout with various options will be displayed, as shown in Figure 7-11. The options in this

flyout are used to manage the **Material/Map Browser** dialog box based on the requirement. Also, these options will help you to create new material library, manage Autodesk material library, and so on. These options are discussed next.

The **New Group** option is used to create a new group and add it to the **Material/Map Browser** dialog box. Choose the **New Group** option from the flyout; the **Create New Group** dialog box will be displayed, as shown in Figure 7-12. Type a name of your choice in the text box and then choose the **OK** button; a new group with the specified name will be displayed in the **Material/Map Browser** dialog box. You can expand and collapse the group as required.

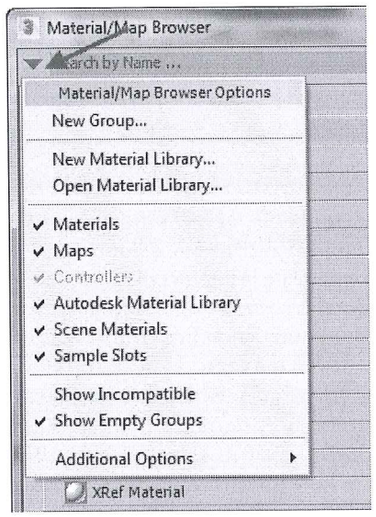

***Figure 7-11** The flyout displayed after choosing the **Material/Map Browser Options** button*

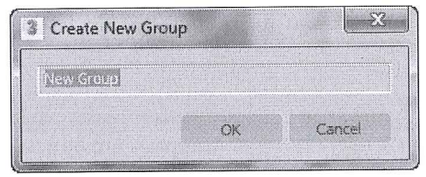

***Figure 7-12** The **Create New Group** dialog box*

When you install 3ds Max, the material libraries will automatically get installed in your system in the *.mat* format. To select the material library of your choice, choose the **Open Material Library** option from the shortcut menu; the **Import Material Library** dialog box will be displayed. Navigate to the location C:*Program Files\Autodesk\3ds Max 2017\materiallibraries*; the material libraries will be displayed in the **Import Material Library** dialog box, as shown in Figure 7-13. Next, select the required material library and choose the **Open** button; all materials of the selected material library will be displayed in the **Material/Map Browser** dialog box, refer to Figure 7-14.

You can also create a new library to put all materials and maps defined in the sample slots of the current file. To create a new library, choose the **New Material Library** option from the shortcut menu; the **Create New Material Library** dialog box will be displayed, as shown in Figure 7-15. Type a name in the text box and choose the **Save** button; a new library with the specified name will be displayed in the **Material/Map Browser** dialog box. Next, you can put the materials defined in the sample slots to the new library using the **Put To Library** tool in the **Material Editor** dialog box.

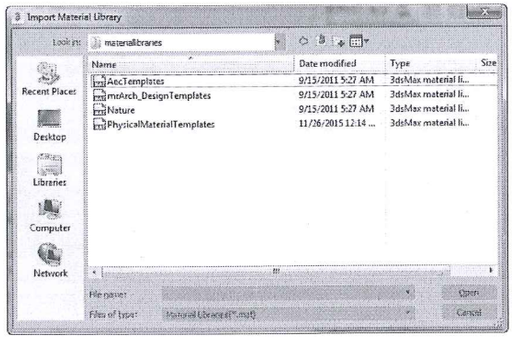

Figure 7-13 *The* ***Import Material Library*** *dialog box*

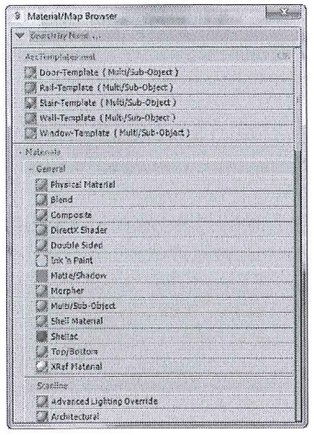

Figure 7-14 *The materials of the selected library displayed in the* ***Material/Map Browser*** *dialog box*

When you create a new material library or open an existing material library, the library will have a name and location assigned to it. To modify the name and location, right-click on the title bar of the new library in the **Material/Map Browser** dialog box; a shortcut menu will be displayed, as shown in Figure 7-16. Now, choose the **Save As** option from the shortcut menu; the **Export Material Library** dialog box will be displayed. Next, navigate to the location where you want to save the new library. Also, type a new name in the **File name** text box and make sure that the **Material Libraries (*.mat)** option is selected in the **Save as type** drop-down list. Now, choose the **Save** button; the new library will be saved at the specified location. You can use the newly created library in another scene. Alternatively, you can use the **Rename Group** option from the shortcut menu to change the name of the library.

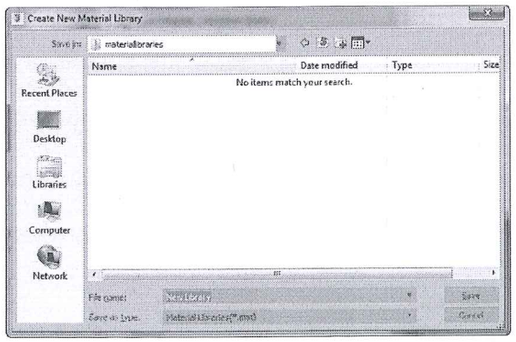

Figure 7-15 *The* ***Create New Material Library*** *dialog box*

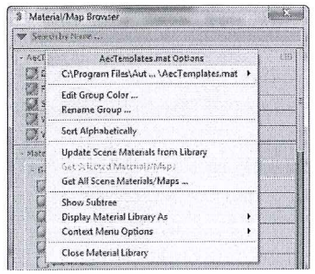

Figure 7-16 *The shortcut menu displayed*

There are various rollouts such as **Materials**, **Maps**, **Scene Materials**, and **Sample Slots** in the **Material/Map Browser** dialog box. You can toggle the display of these groups by choosing the respective option from the shortcut menu.

You can also reset the **Material/Map Browser** dialog box to its default appearance. Choose the **Additional Options** option from the flyout; a cascading menu will be displayed. Now, choose the **Reset Material/Map Browser** option; the **Reset Material/Map Browser** message box will be displayed. Choose the **Yes** button from this message box; the **Material/Map Browser** dialog box will be reset to its default appearance.

Note

When you right-click on a material or map in the ***Material/Map Browser*** *dialog box, a shortcut menu will be displayed. On choosing the* ***Copy to*** *option from this shortcut menu, a cascading menu will be displayed. You can copy the material or map to a temporary material library or to a new material library using the options available in this cascading menu.*

Assign Material to Selection

Material Editor Menu: Material > Assign to Selection
Toolbar: Assign Material to Selection

The **Assign Material to Selection** button is used to assign the material or map from the active sample slot to the selected object in the viewport. On choosing the **Assign Material to Selection** button, the active sample slot will be surrounded by four triangles at corners, as shown in Figure 7-17.

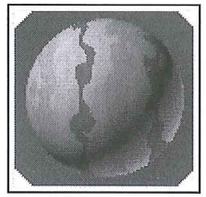

Figure 7-17 *The triangles displayed on a sample slot*

For assigning a material to the selected object in the viewport, select the sample slot and then select the object on which you need to assign the material in the viewport. Next, choose the **Assign Material to Selection** button in the **Material Editor** dialog box to assign the material to the selected object in the scene. You can also select more than one object to assign the same material to all of them. Alternatively, you can drag the material from the sample slot to the selected objects in the viewport to assign materials to them. You need to choose the **Show Shaded Material in Viewport** button in the **Material Editor** dialog box to view the assigned material in the viewport. You will learn more about this tool later in the chapter.

Reset Map/Mtl to Default Settings

Toolbar: Reset Map/Mtl to Default Settings

The **Reset Map/Mtl to Default Settings** tool is used to reset the values that were assigned to the map or material in the active sample slot using various rollouts displayed in the **Material Editor** dialog box.

Put to Library

Material Editor Menu: Material > Put to Library
Toolbar: Put to Library

The **Put to Library** tool is used to add the selected material to the temporary library or the library created. To do so, select the sample slot that has the material that you want to add to the library. Next, choose the **Put to Library** tool. If you have created a new library, a flyout is displayed, refer to Figure 7-18a. Choose the desired option from the flyout;

the **Put to Library** dialog box will be displayed, as shown in Figure 7-18b. If a new library is not created then the **Put to Library** dialog box will be displayed directly. In the **Name** text box, enter a new name for the material and then choose the **OK** button; the material will be saved in the specified library.

Figure 7-18a *The flyout displayed*

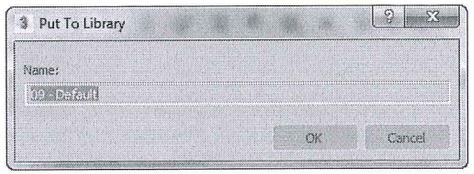

Figure 7-18b *The* ***Put to Library*** *dialog box*

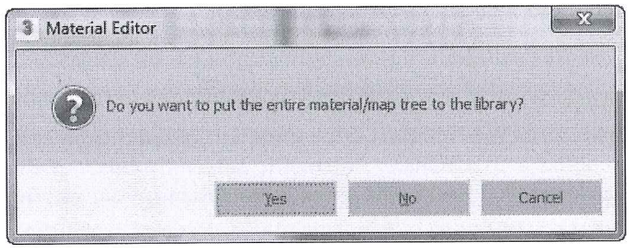

Figure 7-19 *The* ***Material Editor*** *message box*

If you are in the sub-level of the material and you invoke the **Put to Library** tool, the **Material Editor** message box will be displayed, as shown in Figure 7-19. In this message box, you will be prompted to specify if you want to put the entire material/map tree to the library. Choose the **Yes** option from the message box; the **Put to Library** dialog box will be displayed. As described earlier, in the **Name** text box, enter a new name of the material and choose the **OK** button; the material will be saved in the temporary library. Also, the material will be displayed in the **Temporary Library** rollout of the **Material/Map Browser** dialog box.

Show Shaded Material in Viewport

Toolbar: Show Shaded Material in Viewport

The **Show Shaded Material in Viewport** button is used to display the material or map assigned to the selected object in the viewport. To do so, select the object in the viewport and assign a material to it and then choose the **Show Shaded Material in Viewport** button; the material will be displayed on the selected object in the viewport.

Go to Parent

Material Editor Menu: Navigation > Go to Parent
Toolbar: Go to Parent

The **Go to Parent** tool is used to go one level up in the current material.

Go Forward to Sibling

Material Editor Menu: Navigation > Go Forward to Sibling
Toolbar: Go Forward to Sibling

The **Go Forward to Sibling** tool is used to go to the next map or material at the same level for the current material. This tool is active in compound materials such as **Composite** material, **Blend** material, and so on. These materials are discussed later in the chapter.

Sample Type

Toolbar: Sample Type

On choosing the **Sample Type** tool, a flyout will be displayed. This flyout consists of three options: sphere, cylinder, and cube. These options are used to choose the geometry type to be displayed in the active sample slot. By default, the material will be displayed on a spherical sample slot.

Backlight

Material Editor Menu: Options > Backlight
Toolbar: Backlight
Keyboard: L

The **Backlight** tool is chosen by default. It is used to add the backside light to the active sample slot, refer to Figures 7-20 and 7-21.

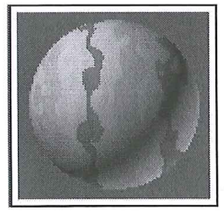

Figure 7-20 *The effect of the* ***Backlight*** *tool in the sample slot*

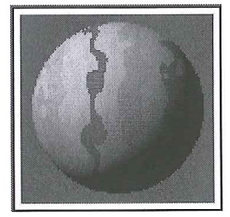

Figure 7-21 *The sample slot without the backlight effect*

Background

Material Editor Menu: Options > Background
Toolbar: Background
Keyboard: B

The **Background** tool is used to add a multicolored background to the active sample slot, refer to Figures 7-22 and 7-23. The multicolored background is useful for transparent materials.

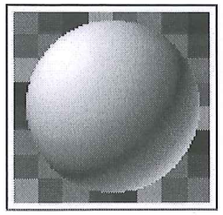

Figure 7-22 *The sample slot with the* ***Background*** *tool invoked*

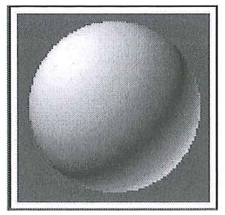

Figure 7-23 *The sample slot without invoking the* ***Background*** *tool*

Sample UV Tiling

Toolbar: Sample UV Tiling

On choosing the **Sample UV Tiling** tool, a flyout will be displayed. This flyout has four options: 1x1, 2x2, 3x3, and 4x4. On selecting any of these tiling patterns, the object in the viewport will not be affected. The selected tiling pattern will be displayed only in the active sample slot, refer to Figures 7-24, 7-25, and 7-26.

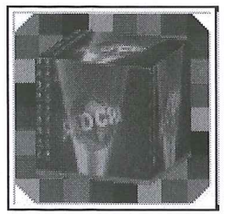

Figure 7-24 *The 1x1 sample UV tiling in a cube sample slot*

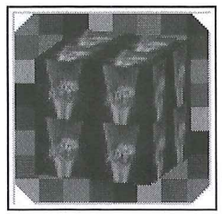

Figure 7-25 *The 2x2 sample UV tiling in a cube sample slot*

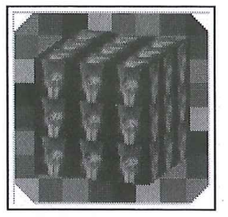

Figure 7-26 *The 3x3 sample UV tiling in a cube sample slot*

Pick Material From Object

The **Pick Material From Object** tool is used to pick the material from the object in the viewport and apply it to the active sample slot. To do so, select the sample slot to activate it and choose the **Pick Material From Object** tool; the shape of the cursor will be changed to the shape of an eye dropper. Now, move the cursor over the object in the viewport from which you want to pick the material and click on it; the selected sample slot will display the same material.

You can change the name of the material of each sample slot by entering a new name in the **Material Name** drop-down list on the right of the **Pick Material From Object** tool. The **Material Type** button on the right of the **Material Name** drop-down list displays the name of the material that is selected from the **Material/Map Browser** dialog box, refer to Figure 7-27.

MATERIALS

In this section, you will learn about the **Material Editor** tool that helps you to create materials and assign them to the objects to make them more realistic. The materials assigned to the objects give the best results with lights, about which you will learn in the later chapters. In 3ds Max, you can create and assign various materials to the objects using the **Material Editor** tool from the **Main Toolbar**.

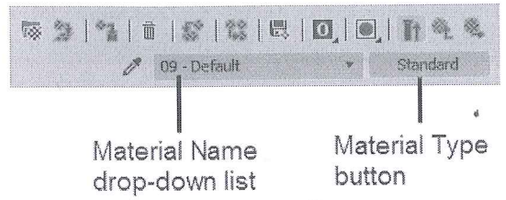

Figure 7-27 *The* ***Material Name*** *drop-down list and the* ***Material Type*** *button*

Choose the **Material Editor** tool from the **Main Toolbar**; the **Material Editor** dialog box will be displayed. Now, choose the **Material Type** button on the right side of the **Material Name** drop-down list, refer to Figure 7-27; the **Material/Map Browser** dialog box will be displayed. Next, expand the **Materials > General** rollout, if it is not already expanded. In this list, there are some materials that can combine other materials in them. These are known as Compound materials. The Compound materials in this list are **Blend**, **Composite**, **Double-Sided**, **Morpher**, **Multi/Sub-Object**, **Shellac**, and **Top/Bottom**. Select the material as per your requirement from the list and then choose the **OK** button; the name of the selected material will be displayed on the **Material Type** button in the **Material Editor** dialog box. Also, the rollouts related to that material will be displayed in the **Material Editor** dialog box. The material can be modified by using the parameters available in these rollouts. The most commonly used materials are discussed next.

Note

You can also get the default materials using the ***Get Material*** *tool in the* ***Material Editor*** *dialog box, as discussed earlier in this chapter.*

Standard Material

By default, the **Standard** material is selected in the **Material Editor** dialog box. Various rollouts are also displayed below the **Material Type** button to create new materials or modify the properties of the current material. The most commonly used rollouts are discussed next.

Shader Basic Parameters Rollout

The options in this rollout are used to specify the shading types and other properties for the material, refer to Figure 7-28.

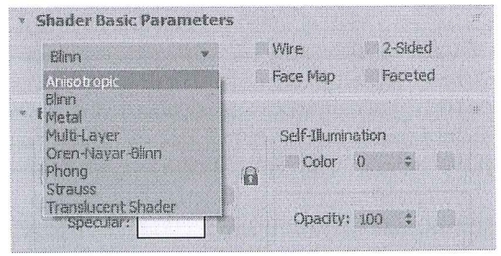

Figure 7-28 *The* ***Shader Basic Parameters*** *rollout with eight shaders displayed in the drop-down list*

Select the **Wire** check box in this rollout to render the material as wireframe, as shown in Figure 7-29. Select the **2-Sided** check box to apply the material to both sides of the selected faces. Select the **Face Map** check box to apply the maps or images to each face of the object, as shown in Figure 7-30. Select the **Faceted** check box to create a faceted object, as shown in Figure 7-31. In this case, each face of the surface will be rendered as flat face.

Figure 7-29 *The sphere geometry with the* ***Wire*** *check box selected*

Figure 7-30 *The sphere geometry with the* ***Face Map*** *check box selected*

Figure 7-31 *The sphere geometry with the* ***Faceted*** *check box selected*

Note

1. To view the effect of the selection of the ***Face Map*** *or* ***Faceted*** *check box on an object, you need to assign an image or a map to the object. You will learn more about assigning an image or a map to the object later in this chapter.*

2. You can see the effect of the selection of the ***Faceted*** *check box only after rendering.*

There are eight types of shaders in the drop-down list located on the top of this rollout, refer to Figure 7-28. These shaders provide different effects to the material after rendering. By default, the **Blinn** shader is selected in this drop-down list. Various shaders and their rollouts are discussed next.

Anisotropic Shader

The **Anisotropic** shader is used to create elliptical highlights, refer to Figure 7-32. This shader is suitable for creating glasses, brushed metals, and so on. To assign this shader to the material, select the **Anisotropic** option from the drop-down list in the **Shader Basic Parameters** rollout. On doing so, the **Anisotropic Basic Parameters** rollout will be displayed below the **Shader Basic Parameters** rollout, as shown in Figure 7-33. This rollout is discussed next.

Note

To view the effects of shaders, you need to set the parameters in the ***Basic Parameters*** *rollout of the corresponding shader.*

Anisotropic Basic Parameters Rollout: The options in the **Anisotropic Basic Parameters** rollout are used to set the colors, transparency, shine, and so on of the material.

The **Ambient**, **Diffuse**, and **Specular** color swatches are used to set the colors of the material. The **Ambient** color swatch is used to specify the color of an object in shadow. The **Diffuse** color swatch is used to specify the color of an object in direct light. It is the primary color of the material. The **Specular** color swatch is used to specify the color of the highlighted or the shiny part of the material, refer to Figure 7-34.

Figure 7-32 *The sphere geometry with* ***Anisotropic*** *shader*

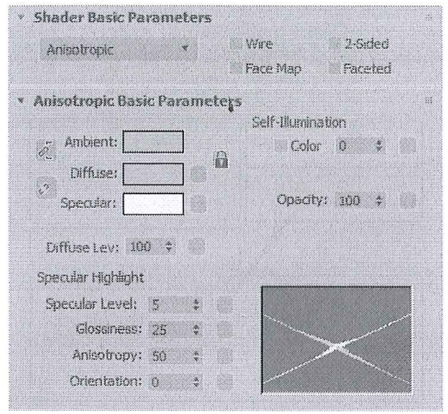

Figure 7-33 *The* ***Anisotropic Basic Parameters*** *rollout*

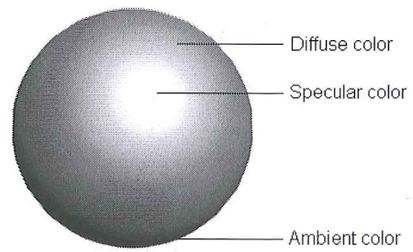

Figure 7-34 *The ambient, diffuse, and specular colors in a sphere*

To set the color of the material, select one of the color swatches; the **Color Selector** dialog box will be displayed along with the name of the color swatch that you have selected. Select a color and choose the **OK** button; the selected color will be displayed in the color swatch and the active sample slot.

Self-Illumination Area: The options in the **Self-Illumination** area are used to create incandescence effect by replacing shadows on the surface with color specified using the **Diffuse** color swatch. It creates an illusion of light being generated from the material. The value of the spinner in the **Self-Illumination** area specifies the percentage of shadow replaced with the color. To set the illumination of the object, select the **Color** check box in this area; the spinner on its right will be replaced by a color swatch.

You can change the intensity as well as the color for the self-illumination using the color swatch. Choose the color swatch in the **Self-Illumination** area; the **Color Selector: Self-Illum Color** dialog box will be displayed. As you increase the value in the **Value** spinner, the intensity of the incandescence effect also increases, refer to Figures 7-35 and 7-36.

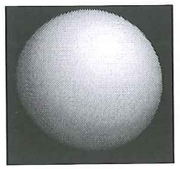

Figure 7-35 *A sphere geometry without self-illumination*

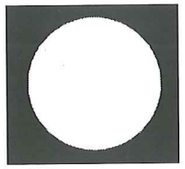

Figure 7-36 *A sphere geometry with self-illumination*

The value in the **Opacity** spinner is used to control the transparency of the material. By default, the value in the spinner is 100, which makes a material opaque. As you decrease the value, the transparency will increase, refer to Figure 7-37.

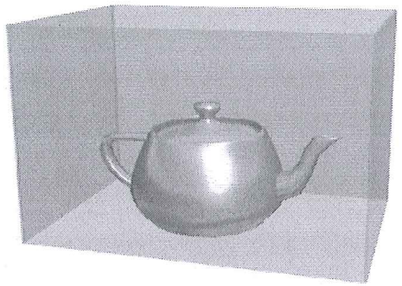

Figure 7-37 *A teapot geometry within a transparent box*

The value in the **Diffuse Lev** spinner is used to control the brightness of the diffuse color in the material, refer to Figures 7-38 and 7-39. By default, the value in this spinner is 100.

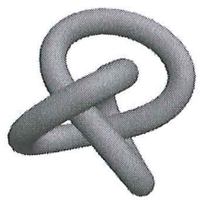

Figure 7-38 *The torus knot geometry with the default value in the* ***Diffuse Lev*** *spinner*

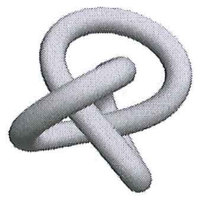

Figure 7-39 *The torus knot geometry with the value* ***150*** *in the* ***Diffuse Lev*** *spinner*

Specular Highlight Area: The options in the **Specular Highlight** area are used to set the shape, appearance, strength, and orientation of the specular highlight or the shiny part of the material.

The value in the **Specular Level** spinner is used to set the brightness or intensity of the specular highlight of the material. As you increase the value in the spinner, the brightness of the specular highlight will also increase, refer to Figures 7-40 and 7-41.

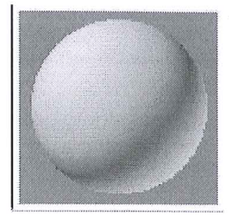

Figure 7-40 *The sphere geometry with the value* ***0*** *in the* ***Specular Level*** *spinner*

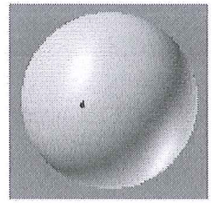

Figure 7-41 *The sphere geometry with the value* ***66*** *in the* ***Specular Level*** *spinner*

The value in the **Glossiness** spinner is used to set the size of the specular highlight of the material. However, if you increase the value in the **Glossiness** spinner, the size of the specular highlight will decrease, refer to Figures 7-42 and 7-43.

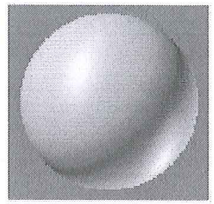

Figure 7-42 *The sphere geometry with less value in the* ***Glossiness*** *spinner*

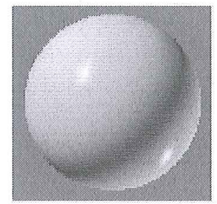

Figure 7-43 *The sphere geometry with more value in the* ***Glossiness*** *spinner*

The value in the **Anisotropy** spinner is used to set the shape of the specular highlight of the material. As you increase the value in the **Anisotropy** spinner, the shape of the specular highlight will reduce, refer to Figures 7-44 and 7-45.

Figure 7-44 *The teapot geometry with less value in the* ***Anisotropy*** *spinner*

Figure 7-45 *The teapot geometry with more value in the* ***Anisotropy*** *spinner*

The value in the **Orientation** spinner is used to change the orientation of the specular highlight of the material in degrees. By default, its value is 0. By changing the value in the **Orientation** spinner, you can change the orientation of the specular highlight of the material, as shown in Figures 7-46 and 7-47.

Note

In the ***Specular Highlights*** *area, there is a graph on the right that graphically represents the changes in all spinners.*

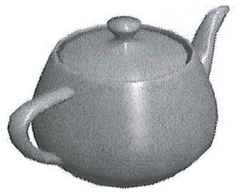

Figure 7-46 *The teapot geometry with the value* ***0*** *in the* ***Orientation*** *spinner*

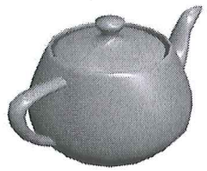

Figure 7-47 *The teapot geometry with the value* ***45*** *in the* ***Orientation*** *spinner*

Blinn Shader

The **Blinn** shader is used to create round and soft highlights, refer to Figure 7-48. To assign this shader to the material, select the **Blinn** option from the drop-down list available in the **Shader Basic Parameters** rollout; the **Blinn Basic Parameters** rollout will be displayed below the **Shader Basic Parameters** rollout. The **Ambient**, **Diffuse**, and **Specular** color swatches, the **Self-Illumination** area, and the **Opacity** spinner in this rollout are the same as those discussed in the **Anisotropic Basic Parameters** rollout.

In the **Specular Highlights** area, the **Specular Level** and **Glossiness** spinners are the same as those discussed in the **Anisotropic Shader**. The value in the **Soften** spinner is used to soften the effect of the specular highlight. By default, its value is 0.1.

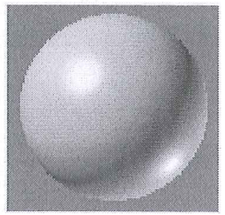

Figure 7-48 *The sphere geometry with the* ***Blinn*** *shader*

Metal Shader

The **Metal** shader is used to give a metallic effect to objects, refer to Figure 7-49. To assign this shader to the material, select the **Metal** shader from the drop-down list available in the **Shader Basic Parameters** rollout; the **Metal Basic Parameters** rollout will be displayed below the **Shader Basic Parameters** rollout. The options in this rollout are the same as discussed in the **Anisotropic Basic Parameters** rollout.

Figure 7-49 *The teapot geometry with the* ***Metal*** *shader*

Multi-Layer Shader

The **Multi-Layer** shader is similar to the **Anisotropic** shader with the only difference that the **Multi-Layer** shader has two specular highlight controls. To assign this shader to the material, select the **Multi-Layer** shader from the drop-down list available in the **Shader Basic Parameters** rollout; the **Multi-Layer Basic Parameters** rollout will be displayed. In this rollout, the **Ambient** and **Diffuse** color swatches are same as those discussed in the **Anisotropic Basic Parameters** rollout. Also, the **Self-Illumination** area, the **Opacity** spinner, and the **Diffuse Level** spinner are same as those discussed in the **Anisotropic Basic Parameters** rollout.

The **Roughness** spinner is used to set the transition from diffuse color to the ambient color. By default, its value is 0 and it ranges from 0 to 100. When you increase the value in the **Roughness** spinner, the material becomes less shiny, refer to Figures 7-50 and 7-51.

Figure 7-50 *The teapot with less value in the* ***Roughness*** *spinner*

Figure 7-51 *The teapot with more value in the* ***Roughness*** *spinner*

In the **Multi-Layer Basic Parameters** rollout, there are two specular highlight areas, **First Specular Layer** and **Second Specular Layer**. You can use both highlights independently to produce complex and blend shadings in the material. The options in the **First Specular Layer** and the **Second Specular Layer** areas are same. However, you can use different settings to produce the blend shadings in the material, refer to Figure 7-52. These options are discussed next.

Figure 7-52 *The teapot with the* ***Multi-Layer*** *shader*

Choose the **Color** color swatch to change the specular color of the first and the second highlights in the respective areas. The **Level** spinner is used to set the brightness or the intensity of the specular highlight of the material. By default, its value is 0. As you increase the value in the spinner, the brightness of the specular highlight will also increase. The **Glossiness**, **Anisotropy**, and **Orientation** options are the same as those discussed in the **Anisotropic** shader.

Oren-Nayar-Blinn Shader

The **Oren-Nayar-Blinn** shader is a variant of the **Blinn** shader and is used to create dull or matte highlights, as shown in Figure 7-53. This shader can be used for rubber, clay, clothes, and so on. To assign this shader to the material, select the **Oren-Nayar-Blinn** shader from

Figure 7-53 *The teapot geometry with the* ***Oren-Nayer-Blinn*** *shader*

the drop-down list available in the **Shader Basic Parameters** rollout; the **Oren-Nayar-Blinn Basic Parameters** rollout will be displayed. The **Ambient**, **Diffuse**, and **Specular** color swatches, the **Self-Illumination** area, and the **Opacity** spinner in this rollout are the same as discussed in the **Anisotropic Basic Parameters** rollout. In the **Advanced Diffuse** area, the **Diffuse Level** and **Roughness** spinners are the same as discussed in the **Multi-Layer** shader.

In the **Specular Highlights** area, the **Specular Level**, **Glossiness**, and **Soften** spinners are the same as discussed in the **Blinn** shader.

Phong Shader

The **Phong** shader is very similar to the **Blinn** shader. The only difference is that the highlights produced by the **Phong** shader are stronger than those produced by the **Blinn** shader, refer to Figure 7-54. To assign this shader to the material, select the **Phong** shader from the drop-down list available in the **Shader Basic Parameters** rollout; the **Phong Basic Parameters** rollout will be displayed. The **Ambient**, **Diffuse**, and **Specular** color swatches, the **Self-Illumination** area, and the **Opacity** spinner in this rollout are the same as described in the **Anisotropic Basic Parameters** rollout. In the **Specular Highlights** area, the **Specular Level**, **Glossiness**, and **Soften** spinners are the same as those discussed in the **Blinn** shader.

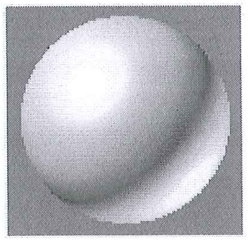

Figure 7-54 *The sphere geometry with the* ***Phong*** *shader*

Strauss Shader

The **Strauss** shader is used to create the metallic and non-metallic surfaces, refer to Figure 7-55. To assign this shader to the material, select the **Strauss** shader from the drop-down list; the **Strauss Basic Parameters** rollout will be displayed. This rollout is discussed next.

Figure 7-55 *The teapot geometry with the* ***Strauss*** *shader*

Strauss Basic Parameters Rollout: The **Strauss** shader does not have the **Ambient**, **Diffuse**, and **Specular** color swatches. Choose the **Color** swatch to change the color of the material. The value in the **Glossiness** spinner is used to set the size and the intensity of the specular highlight of

the material. The value in the **Metalness** spinner is used to set the metallic effect in the material. The value in the **Opacity** spinner is used to set the transparency of the material.

Translucent Shader

The **Translucent** shader is used to create translucent materials. In such materials, the light gets scattered as it passes through them, refer to Figure 7-56. It is very similar to the **Blinn** shader. Additionally, it defines the translucency of the material. To assign this shader to the material, you need to select the **Translucent Shader** from the drop-down list in the **Shader Basic Parameters** rollout; the **Translucent Basic Parameters** rollout will be displayed. This rollout is discussed next.

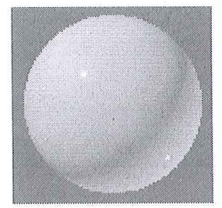

Figure 7-56 *The sphere geometry with the* ***Translucent*** *shader*

Translucent Basic Parameters Rollout: Most of the options in this rollout are the same as discussed earlier. By default, the **Backside specular** check box is selected in this rollout. As a result, the specular highlight is displayed on both sides of the material.

Note

Select the ***Backside specular*** *check box in the* ***Specular Highlights*** *area in the* ***Translucent Basic Parameters*** *rollout to create materials such as plastic or smooth glass. Clear the* ***Backside specular*** *check box to create the frosted or rough material.*

In the **Translucency** area, the **Translucent Clr** swatch is used to define the color of the light that will be scattered inside the material. The **Filter Color** swatch is used to define the color of the light that will be transmitted by the material.

Architectural Material

The **Architectural** material is used to provide a highly realistic view of an object when rendered with photometric lights and radiosity, about which you will learn in the later chapters. To apply the **Architectural** material, choose the **Material Type** button on the right side of the **Material Name** drop-down list; the **Material/Map Browser** dialog box will be displayed. Choose the **Architectural** material from the **Material/Map Browser** dialog box; the **Architectural** label will be displayed on the **Material Type** button. Also, various rollouts such as **Physical Qualities**, **Special Effects**, and so on will be displayed below the **Architectural** button. You can use these rollouts to create new materials and modify the physical properties of those materials. The most commonly used rollouts are discussed next.

Templates Rollout

The drop-down list in the **Templates** rollout consists of a number of preset materials such as **Water**, **Glass-Clear**, **Metal**, **Paper**, and so on, as shown in Figure 7-57. On selecting one of the preset materials from the drop-down list, you will get a template in the selected sample slot for the type of material you have selected. After selecting the material, you can set the parameters in other rollouts to get a realistic view of the material, refer to Figure 7-58.

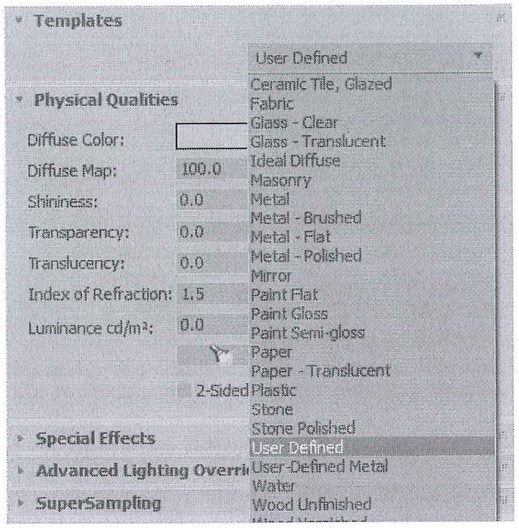

Figure 7-57 *The preset materials in the drop-down list in the* ***Templates*** *rollouts*

Figure 7-58 *The teapot geometry with the* ***Masonary*** *preset material applied*

Physical Qualities Rollout

The **Diffuse Color** swatch is used to specify the color of an object in direct light. It is the main color of the material. Choose the **Diffuse Color** swatch to define the color of the material. The **Diffuse Map** option is used to assign a map or an image to the material. To do so, choose the **Diffuse Map** button labeled as **None** on the right side of the **Diffuse Map** spinner; the **Material/ Map Browser** dialog box will be displayed. Select one of the maps from the **Maps > General** rollout and double-click on it to assign it. The basic parameters rollouts of the selected map will be displayed. Set the parameters as per your requirement and then choose the **Go To Parent** button to go back to the previous level; the **None** label will be replaced by the name of the selected map. The spinner on the right side of the **Diffuse Map** option is used to set the amount of visibility of the map in the material in percentage. By default, its value is 100. On decreasing the value in this spinner, the visibility of the map in the material will be decreased. Note that by default, the check boxes located in between the spinners and the buttons in the **Physical Qualities** rollout are selected. As a result, the selected map will be displayed on the material.

The **Set color to texture average** button, available next to the **Diffuse Color** color swatch, will be activated only if you assign a diffuse map to the material using the **Diffuse Map** button. This button is used to set the diffuse color according to the map that you have assigned to the material using the **Diffuse Map** button. The **Shininess**, **Transparency**, and **Translucency** options in the **Physical Qualities** rollout are used to define the shine, transparency, and the translucency of the material. Also, you can assign a map or an image to these options as you did for the **Diffuse Map** option. The **Index of Refraction** spinner is used to set the amount of refraction of the light transmitted by the material. The **Luminance cd/m²** spinner is used to give the glow effect to the material. The luminance is measured in candelas per meter square. The **Set luminance from light** button uses the scene light to obtain the materials luminance. Select the **2-Sided** check box to assign the material on both sides of the selected faces.

Note

The ***Architectural*** *material gives a realistic result only with photometric lights.*

Raytrace Material

The **Raytrace** material creates highly refractive and reflective surfaces. When this material is assigned to an object in the scene, the materials/maps of other objects in the scene get reflected on it, as shown in Figure 7-59. It is an advance material and is used to provide realistic raytraced images. It also creates raytraced reflections and refractions, and takes a longer time to render. On selecting the **Raytrace** material, various rollouts will also be displayed below the **Material Type** button to create new materials and modify the properties of those materials. The **Raytrace Basic Parameters** rollout is the most commonly used rollout. This rollout is discussed next.

Raytrace Basic Parameters Rollout

The basic parameters in this rollout are similar to those used in the **Standard** material but the color swatches in this rollout act differently, refer to Figure 7-60. These color controls are discussed next.

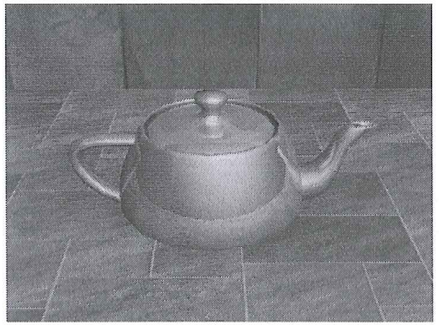

Figure 7-59 *The teapot geometry with the* ***Raytrace*** *material applied*

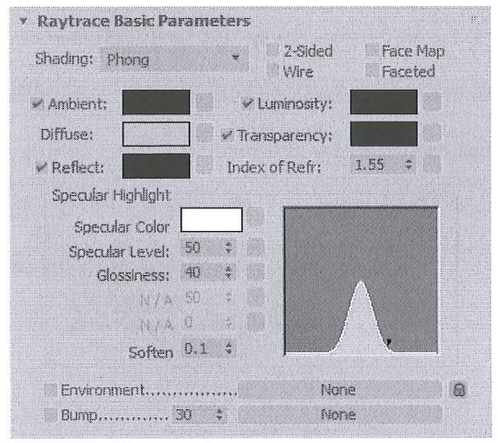

Figure 7-60 *The* ***Raytrace Basic Parameters*** *rollout*

By default, the check box on the left side of the **Ambient** color swatch is selected, which is used to specify the amount of absorption of the ambient light by the material. By default, the black color is selected in this color swatch and it specifies the maximum absorption of the ambient light by the material. On setting a lighter color in the **Ambient** color swatch, the ambient light will be reflected. If you clear the check box, the color swatch will be replaced by a spinner. The value in the spinner specifies the grayscale value.

The **Diffuse** color swatch specifies the color of the object without the specular highlight. The **Reflect** color swatch is used to specify the specular reflection color. By default, the color in this color swatch is black and the object does not reflect. If you change the color to white, then the object will reflect everything and will be visible. If you clear the check box, the color swatch will be replaced by a spinner. If you set the value in the **Reflect** spinner to 100, then the diffuse color

will not be visible on the object. The value in the spinner specifies the grayscale value. If you select this check box again, the spinner will be replaced by the **Fresnel** option. This option adds the fresnel effect to the reflecting object resulting in a bit of extra reflection in the reflecting object.

The **Luminosity** color swatch is very similar to the **Self-Illumination** area in the **Standard** material. By default, the check box on the right of the **Luminosity** option is selected. If you clear the check box, the **Luminosity** label will be replaced by **Self-Illum** and the color swatch will be replaced by a spinner. The value in the spinner specifies the grayscale value.

The **Transparency** color swatch is used to define the transparency of the object. By default, the check box on the right of the **Transparency** option is selected. If you clear this check box, the **Transparency** color swatch is replaced by a spinner. The value in the spinner also defines the transparency of the object.

Blend Material

The **Blend** material is a compound material and is used to mix two different materials, as shown in Figure 7-61. You can assign this mixed or blend material as a single material. When you select the **Blend** material from the **Material/Map Browser** dialog box, the **Replace Material** message box will be displayed, as shown in Figure 7-62. Select the **Discard old material?** radio button to remove the current material of the selected sample slot. Select the **Keep old material as sub-material?** radio button to keep the material of the selected sample slot as a sub-material in the **Blend** material. Choose the **OK** button; the **Blend** material will be displayed in the **Material Type** button with a number of rollouts. The most commonly used rollout is discussed next.

*Figure 7-61 The sphere geometry with the **Blend** material applied*

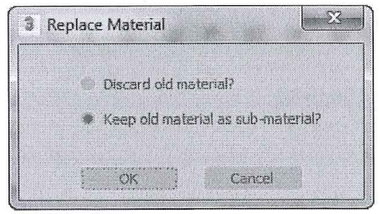

*Figure 7-62 The **Replace Material** message box*

Blend Basic Parameters Rollout

On the top of this rollout, there are two buttons, **Material 1** and **Material 2**, refer to Figure 7-63. These buttons are labeled with the name of the default materials and are used to select two different materials to blend. By default, the **Standard** material is displayed as the sub-material. Choose these buttons to assign desired materials. Next, choose the **Go To Parent** tool to go back to the **Blend** material.

The **Mask** button is used to insert an image or a map as a mask. The amount of blending of the two materials depends on the mask image. The lighter area of the mask image will show more of **Material 1** and the darker area of the mask image will show more of **Material 2**.

By default, the check boxes on the right side of the **Material 1**, **Material 2**, and **Mask** buttons are selected, which specify that the concerned material or the mask will be displayed on the object.

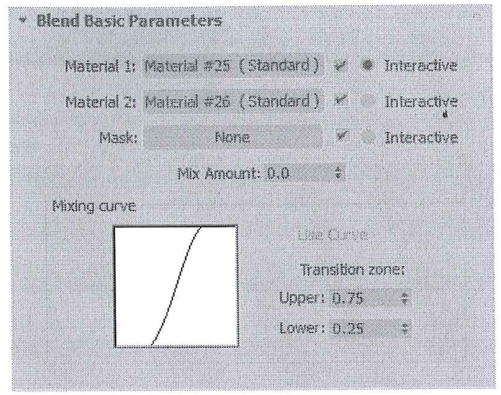

*Figure 7-63 The **Blend Basic Parameters** rollout*

If you clear any of the check boxes, the corresponding material or mask will not be displayed. Select the two **Interactive** radio buttons on the right side of the check boxes to specify the materials that will be displayed on the object in the shaded viewports. The value in the **Mix Amount** spinner is used to set the blending amount of the materials in percentage. When you insert a map using the **Mask** button, the **Mix Amount** spinner will become inactive.

The **Mixing curve** area is used to define the transition between two colors being blended. It affects the transition only when the mask map is applied to the **Mask** button. Select the **Use Curve** check box to apply the curve settings to the blending. This check box will be active only if you have assigned the mask map. In the **Transition zone** group, the values in the **Upper** and **Lower** spinners set the transition of the materials. The values in these spinners vary from 0 to 1.0.

Note

*The blending of maps can be animated over time using the **Mix Amount** spinner.*

Composite Material

The **Composite** material is similar to the **Blend** material and is used to mix ten different materials. You can assign this mixed material as a single material. On choosing the **Material Type** button, the **Material/Map Browser** dialog box will be displayed. Select the **Composite** material and choose the **OK** button; the **Replace Material** message box will be displayed. Select the **Discard old material?** radio button to remove the material of the selected sample slot. Else, select the **Keep old material as sub-material?** radio button to retain the material of the selected sample slot as a sub-material in the **Composite** material. Choose the **OK** button; the **Composite** material will be displayed in the **Material Type** button with a number of rollouts. The most commonly used rollout is **Composite Basic Parameters** rollout, which is discussed next.

Composite Basic Parameters Rollout

On the top of this rollout, there is the **Base Material** button which is labeled with the name of the material on it, refer to Figure 7-64. It is used to define the base material of the object. By default, the **Standard** material is displayed on it. Choose this button and set the parameters for the base material as required. Next, choose the **Go to Parent** tool to go back to the parent level.

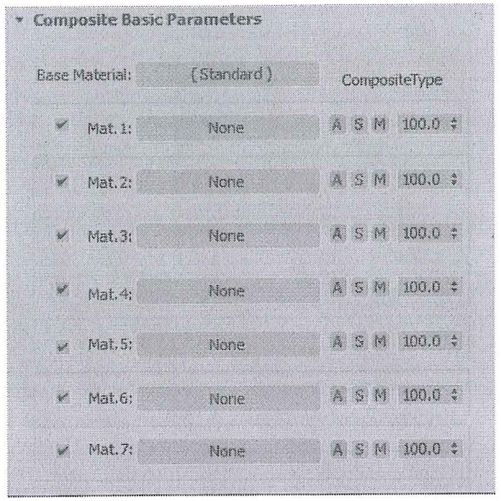

Figure 7-64 *The* ***Composite Basic Parameters*** *rollout*

There are nine buttons below the **Base Material** button, from **Mat.1** to **Mat.9**, labeled with **None**. These buttons are used to composite nine materials. Choose these buttons one by one to assign different materials; the **None** labels will be replaced by the names of the materials that will be assigned to them. The check boxes on the left side of these buttons are selected to display the corresponding materials in the objects. If you do not want to display any of the materials, then clear the respective check boxes.

The **A**, **S**, and **M** buttons are used to specify the composition of the materials. Choose the **A** button to use the additive color to compose the materials. It specifies that the color of the base material will be added to the color of the composed material. Choose the **S** button to use the subtractive color to compose. It specifies that the color of the composed material will be subtracted from the color of the base material. Choose the **M** button to blend the materials as discussed in the Blend Material section with the only difference that the option for masking is not available in this case. For each material, the spinner on the right of the **A**, **S**, and **M** buttons determines the amount of mixing of the respective material with the **Base Material**. When the **A** and **S** buttons are active, the value in the spinner ranges from 0 to 200. Whereas, when the **M** button is active, the value in the spinner ranges from 0 to 100.

Double Sided Material

The **Double Sided** material is used to assign two different materials to the front and back faces of an object, refer to Figures 7-65 and 7-66. Choose the **Double Sided** material from the **Material/Map Browser** dialog box; the **Replace Material** message box will be displayed. Select the **Discard old material?** radio button from this dialog box to remove the material of the selected sample slot. Else, select the **Keep old material as sub-material?** radio button to retain the material of the selected sample slot as the sub-material in the **Double Sided** material. Choose the **OK** button;the **Double Sided** material will be displayed in the **Material Type** button with a number of rollouts. The **Double Sided Basic Parameters** rollout is discussed next.

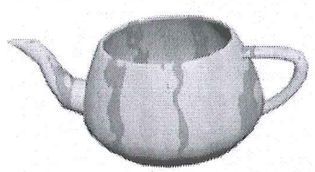

Figure 7-65 *The object with the* ***Standard*** *material*

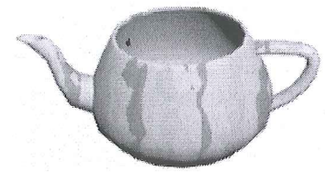

Figure 7-66 *The object with the* ***Double Sided*** *material*

Double Sided Basic Parameters Rollout

The **Translucency** spinner at the top of this rollout specifies the amount of blending of **Facing Material** and **Back Material**, refer to Figure 7-67. The value in this spinner varies from 0 to 100.0. If you set the value **100** in the **Translucency** spinner, the back material will completely cover the face material. Choose the buttons next to the **Facing Material** and **Back Material** options to select the material for the front and back sides of the object, respectively.

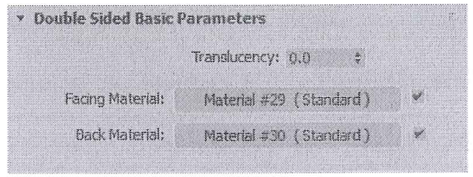

Figure 7-67 *The* ***Double Sided Basic Parameters*** *rollout*

Multi/Sub-Object Material

The **Multi/Sub-Object** material is used to assign different materials to an object at the sub-object level, as shown in Figure 7-68. Select the object to which the **Multi/Sub-Object** material is to be assigned. Convert the object to editable poly and then select the **Polygon** sub-object level. Next, select the group of polygons in the viewport, refer to Figure 7-69. Now, expand the **Polygon Material IDs** rollout and enter the value **1** in the **Set ID** spinner and press ENTER. Then, invert the selection and enter the value **2** in the **Set ID** spinner. Next, press ENTER; refer to Figure 7-70.

Figure 7-68 *The object with the* ***Multi/Sub-Object*** *material*

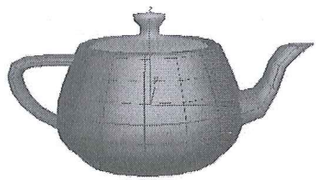

Figure 7-69 *The object with group of polygons selected*

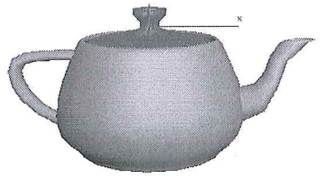

Figure 7-70 *The object with remaining polygons selected*

Note that multiple numbers of IDs can be assigned to an object depending on the number of materials to be assigned to it. Once IDs are set to different parts of the object, choose the **Multi/Sub-Object** material from the **Material/Map Browser** dialog box; the **Replace Material** message

box will be displayed. Select the **Discard old material?** radio button from it and choose the **OK** button; the **Multi/Sub-object** material will be displayed in the **Material Type** button. Also, the **Multi/Sub-Object Basic Parameters** rollout will be displayed, refer to Figure 7-71. This rollout is discussed next.

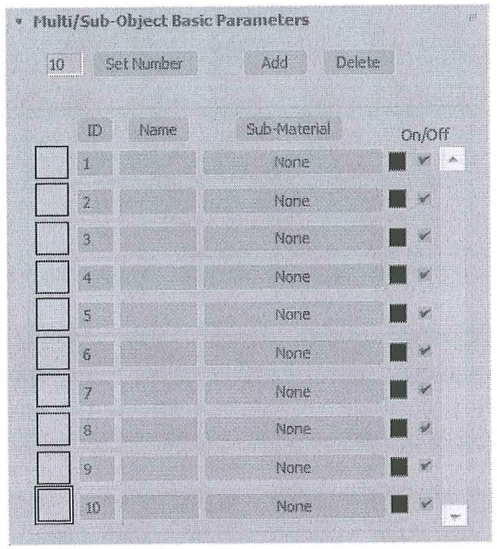

***Figure 7-71** The **Multi/Sub-Object** Basic Parameters rollout*

Multi/Sub-Object Basic Parameters Rollout

Choose the **Set Number** button in this rollout; the **Set Number of Materials** dialog box will be displayed. Enter **2** in the **Number of Materials** spinner and choose the **OK** button; the **Multi/Sub-Object Basic Parameters** rollout will display two entries instead of ten entries. Note that the value entered in the **Number of Materials** spinner should be equal to the number of IDs created for the object which in turn is equal to the entries in this rollout. Now, choose the **None** button for each of the IDs to assign the required sub-material. Also, you can enter the name of the sub-material in the **Name** text box. Next, assign the material to the object to see the effect of the **Multi-Sub-Object** material.

Note

*If you want to change only the color of the sub-material without assigning any map to it, then the color swatch next to it will be inactive. It will be activated only when you assign **Standard** material to it.*

Top/Bottom Material

The **Top/Bottom** material is used to assign two different materials on the top and bottom portions of the object, as shown in Figure 7-72. To do so, choose the **Top/Bottom** material from the **Material/Map Browser** dialog box; the **Replace Material** message box will be displayed. Select the **Discard old material?** radio button from this message box to remove the material of the selected sample slot. Else, select the **Keep old material as sub-material?** radio button to retain the material of the selected sample slot as the sub-material in the **Top/Bottom** material.

Choose the **OK** button; the **Top/Bottom** material will be displayed in the **Material Type** button with a number of rollouts. The **Top/Bottom Basic Parameters** rollout is discussed next.

Top/Bottom Basic Parameters Rollout

Choose the buttons next to **Top Material** and **Bottom** to select the material for the top and bottom portions of the object, respectively, refer to Figure 7-73. Choose the **Swap** button to exchange the material of the **Top Material** and **Bottom** buttons.

***Figure 7-72** The object with the **Top/Bottom** material applied*

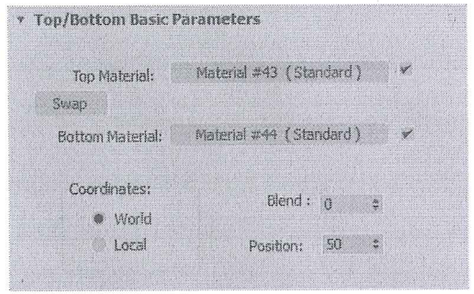

***Figure 7-73** The **Top/Bottom Basic Parameters** rollout*

The options in the **Coordinates** area are used to set the boundary between the top and bottom of the object. By default, the **World** radio button is selected and the faces will point up or down according to the world coordinates of the scene. In this case, if you transform the object, then the boundary remains constant at its place. If you select the **Local** radio button, then the faces will point up or down according to the local coordinates of the object. In this case, if you transform the object, the material will also get transformed. The **Blend** spinner is used to blend the edges of the top and bottom materials. The **Position** spinner is used to specify the position of the top and bottom materials on the object. By default, the value in both the spinners ranges from 0 to 100.0.

Physical Material

New

The **Physical Material** is a modern layered based material that is suitable for physically-based workflow. This material is compatible with both the mental ray and ART renderers. It also preserves the energy and ensures that the sum of various shading components does not exceed 100%. The light energy is only scattered or absorbed but not created. This material comes with many presets that you can access from the **Presets** rollout of the **Material Editor** dialog box, refer to Figure 7-74. Presets provide you the starting point to create various materials.

MAPS

In 3ds Max, maps are the default images assigned to a material. They are used to create texture for the objects to make them appear more realistic. In this section, you will learn about assigning the maps to the objects. When maps are assigned to the objects, the objects demonstrate best effects on applying lights.

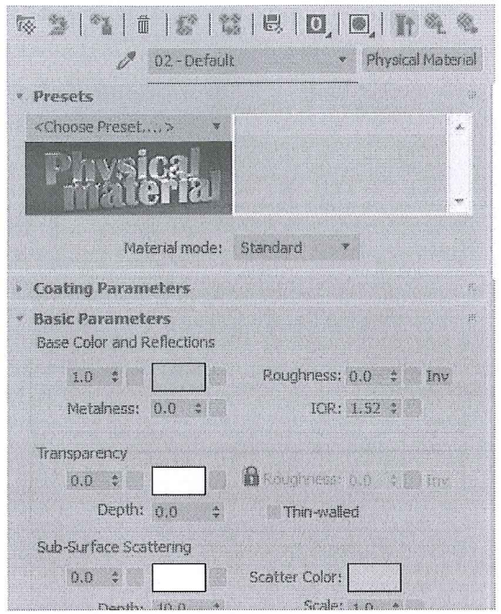

***Figure 7-74** The **Presets** rollout*

To assign a map to the material, choose **Modes > Compact Material Editor** from the material editor menu bar; the **Material Editor** dialog box will be displayed. Select one of the sample slots in the **Material Editor** dialog box to activate it. Now, in the basic parameters rollout of the selected material, choose the small square buttons on the right of the parameters available, refer to Figure 7-75; the **Material/Map Browser** dialog box will be displayed with a list of default maps available in 3ds Max. Next, select the required map from the **Maps > General** or **Maps > Scanline** rollouts and then choose the **OK** button; the name of the selected map will be displayed on the **Material Type** button and the rollouts related to that map will also be displayed. Set the parameters for the map in various rollouts displayed. Next, choose the **Go to Parent** tool to go back to the previous level; the small square button will be labeled as **M**. Also, when you move the cursor over the **M** button, it will display the name of the map that you have assigned to it.

Various types of maps available in the **Material/Map Browser** dialog box are discussed next.

Note

*You can also assign maps using different options such as **Ambient Color**, **Diffuse Color**, **Specular Color**, and so on to a material using the **Maps** rollout in the **Material Editor** dialog box. You need to choose the buttons on the right side of the options that are labeled as **None**, refer to Figure 7-75.*

Types of Map

In 3ds Max, the maps are categorized as bitmaps and procedural maps. The bitmaps are 2D images and they get pixelated when zoomed on them. The procedural maps are Noise, Tiles, Marble, Gradient, and so on and they do not get pixelated when zoomed on them. The maps can be categorized into 2D maps, 3D maps, Compositors, Color Mods, and so on. These maps are discussed next.

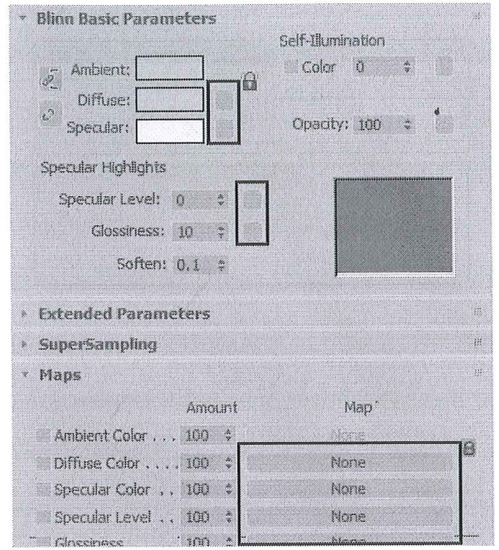

***Figure 7-75** The square buttons highlighted for inserting maps*

2D Maps

The 2D maps are two-dimensional images that can be assigned to geometric objects and are used to create an environment for the scene. The most commonly used two-dimensional maps such as **Bitmap**, **Checker**, **Combustion**, **Gradient**, **Gradient Ramp**, **Swirl**, and **Tiles** are discussed next.

Bitmap

The bitmaps are the simplest 2D images. To apply this map on an object, select the **Bitmap** map in the **Material/Map Browser** dialog box; the **Select Bitmap Image File** dialog box will be displayed. In this dialog box, navigate to a folder and select the image that you want to insert and choose the **Open** button; the image will be displayed in the selected sample slot. Also, various rollouts to modify the image map will be displayed in the **Material Editor** dialog box. Now, when the material is assigned to the object in the viewport, the object will be displayed with the assigned bitmap, as shown in Figure 7-76. You can select all the still or animated files that 3ds Max supports.

Checker

The **Checker** map is a combination of two colors, as shown in Figure 7-77. You can change or replace the colors with the images using the **Checker Parameters** rollout in the **Material Editor** dialog box.

Gradient

The **Gradient** map is used to create a ramp of three colors, as shown in Figure 7-78. You can modify or replace colors with images using the **Gradient Parameters** rollout of the **Material Editor** dialog box.

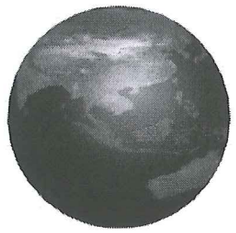

Figure 7-76 *A sphere with the* ***Bitmap*** *map applied*

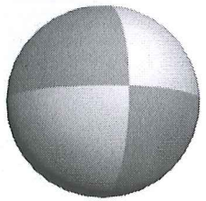

Figure 7-77 *A sphere with the* ***Checker*** *map applied*

Figure 7-78 *An object with the* ***Gradient*** *map applied*

Gradient Ramp

The **Gradient Ramp** map is a 2D map similar to the **Gradient** map, as shown in Figure 7-79. However, in this map, you can use any numbers of colors and maps for creating the gradient. You can get the best effect using the **Gradient Ramp Parameters** rollout in the **Material Editor** dialog box.

Swirl

The **Swirl** map is a procedural map and is used to produce whirl effect in materials, as shown in Figure 7-80. You can modify the colors or replace the colors with the images using the **Swirl Parameters** rollout in the **Material Editor** dialog box.

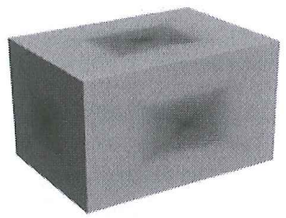

Figure 7-79 *A box with the* ***Gradient Ramp*** *map applied*

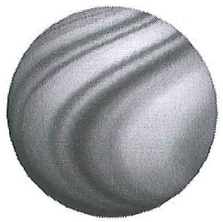

Figure 7-80 *A sphere with the* ***Swirl*** *map applied*

Tiles

The **Tiles** map is a procedural map and is used to create bricks or tiles effect using different colors and maps, as shown in Figure 7-81. The better effect of this map can be acquired using different rollouts displayed in the **Material Editor** dialog box.

Figure 7-81 *A sphere with the* ***Tiles*** *map applied*

Substance Map and Map Output Selector Map

The **Substance** map is a collection of 2D textures. To use a texture from the **Substance** map, choose any of the desired map buttons from the **Material Editor** dialog box and select the **Map Output Selector** map from the **Maps** rollout in the **Material/Map Browser** dialog box. On doing so, the **Map Output Selector** map will be displayed in the **Material Type** button. Also, the **Parameters** rollout will be displayed, as shown in Figure 7-82. Next, choose the **None** button on the right of the **Source Map**

parameter from the **Parameters** rollout and then select **Substance** from the **Material/Map Browser** dialog box; various rollouts such as **Global Substance Settings**, **Substance Package Browser**, **Coordinates**, and so on will be displayed in the **Material Editor** dialog box, as shown in Figure 7-83.

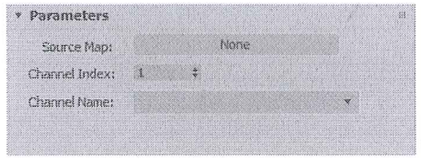

Figure 7-82 *The* ***Parameters*** *rollout of the* ***Map Output Selector*** *map*

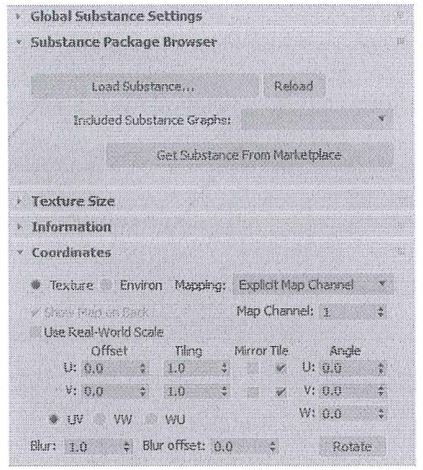

Figure 7-83 *The rollouts displayed on selecting the* ***Substance*** *map*

Now, choose the **Load Substance** button from the **Substance Package Browser** rollout; the **Browse from Substances** dialog box will be displayed. In this dialog box, select the desired texture and choose the **Open** button; the **Load Substance** button will be replaced by the texture you have selected. Also, the rollout for the respective texture parameters will be added at the bottom in the **Material Editor** dialog box. In this rollout, different parameters can be changed to get the desired result. Choose the **Get Substance From Marketplace** button to buy textures online. Next, choose the **Go to Parent** tool and select the desired channel name from the **Channel Name** drop-down list.

Vector Displacement Map

The **Vector Displacement** map is a procedural map and is used to displace the meshes in three dimensions. This map uses a range of colors to display its effect.

Vector Map

The **Vector Map** map is used to apply the vector-based graphics to objects. The image it generates is independent of display resolution. The **Vector Map** map supports a variety of industry-standard vector-graphic formats such as AutoCAD PAT Hatch, AI (Adobe Illustrator), SVG, PDF, and SVGZ.

Multi Tile Map

This map allows you to load multiple texture titles into the UV editor simultaneously. This map is useful for opening and displaying high resolution textures from the 3D painting applications such as ZBrush, Mudbox, and Mari.

Shape Map

You can use this map to create graphical textures in the in a 3ds Max scene that can be animated. It is useful in creating decals and logos directly in the scene without using an external image editor. All adjustments that you make to the shape are animatable.

To create a texture from the shape. Open the **Material Editor**, select a sample slot and then choose a material. Apply **Shape Map** to the **Diffuse** slot of the material. Apply the material to an object. 3ds Max displays the default shape logo in the viewport, as shown in Figure 7-84.

Now, create a shape such as circle, or line in the viewport. On the **Material Editor > Shape Parameters** rollout, choose the **None** button corresponding to the **Shape Object** parameter and then click on the shape you created in a viewport; the spline will be used as a texture, as shown in Figure 7-85.

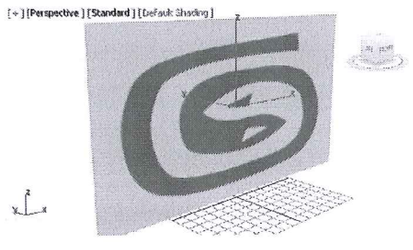

Figure 7-84 *The default shape displayed in the viewport*

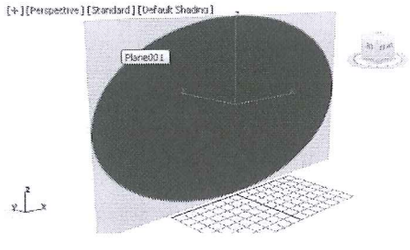

Figure 7-85 *The spline texture shown in the viewport*

To change the fill color and line color of the shape, use the **Fill Color** and **Line Color** swatches. You can also control the extent of the shape by using controls available in the **Map Boundary** area.

Text Map

This map is similar to the Shape Map with the difference that with this map a **TextPlus** object.

3D Maps

The 3D Maps are three-dimensional images that can be assigned to geometric objects. These are also known as procedural maps. The most commonly used three-dimensional maps such as **Cellular**, **Falloff**, **Noise**, and so on are discussed next.

Dent

The **Dent** map is used to produce material with 3D bumps on its surface. It is basically used as the **Bump** map available in the **Maps** rollout, refer to Figure 7-86. The effects of this map can be modified at an advanced level by using the **Dent Parameters** rollout in the **Material Editor** dialog box.

Cellular

The **Cellular** map is a 3D procedural map. It is used to produce materials such as sand, pebbled surfaces, and so on, as shown in Figure 7-87. The effects of this map can be modified at an advanced level using the **Cellular Parameters** rollout in the **Material Editor** dialog box.

Noise

The **Noise** map is used to create disturbance on the surface of an object by combining two colors or materials in different ways, as shown in Figure 7-88. The effects of this map can be modified at an advanced level using the **Noise Parameters** rollout in the **Material Editor** dialog box.

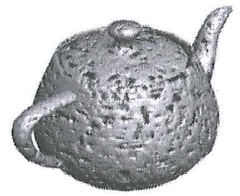

Figure 7-86 *A teapot with the **Dent** map applied*

Figure 7-87 *An object with the **Cellular** map applied*

Figure 7-88 *A sphere with the **Noise** map applied*

Smoke

The **Smoke** map is used to produce textures such as smoke from the fire, cloudy effect, or the beam of lights on the surface of an object, as shown in Figure 7-89. The effects of this map can be modified at an advanced level using the **Smoke Parameters** rollout of the **Material Editor** dialog box.

Speckle

The **Speckle** map is used to produce the texture of the patterned surfaces, as shown in Figure 7-90. The effects of this map can be modified at an advanced level using the **Speckle Parameters** rollout in the **Material Editor** dialog box.

Splat

The **Splat** map is used to produce texture such as splattered paint on the surface of an object, as shown in Figure 7-91. The effects of this map can be modified at an advanced level using the **Splat Parameters** rollout of the **Material Editor** dialog box.

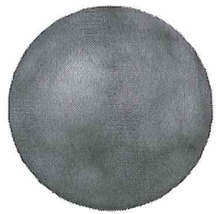

Figure 7-89 *A sphere with the **Smoke** map applied*

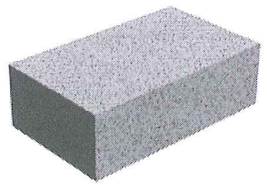

Figure 7-90 *A box with the **Speckle** map applied*

Figure 7-91 *A box with the **Splat** map applied*

Stucco

The **Stucco** map is used to produce the textures such as plaster or cement on the surface of an object. You need to assign a **Bump** map using the **Maps** rollout to get its best effect,

refer to Figure 7-92. The effects of this map can be modified at an advanced level using the **Stucco Parameters** rollout in the **Material Editor** dialog box.

Waves

The **Waves** map is used to create a wavy surface, as shown in Figure 7-93. The effects of this map can be modified at an advanced level using the **Waves Parameters** rollout in the **Material Editor** dialog box.

Wood

The **Wood** map is used to create the 3D wood texture on the surface of the object, refer to Figure 7-94. The effects of this map can be modified at an advanced level using the **Wood Parameters** rollout in the **Material Editor** dialog box.

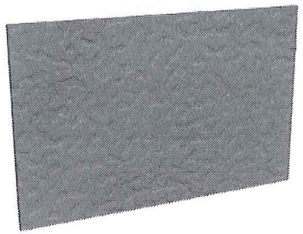

Figure 7-92 *A wall with the **Stucco** map applied*

Figure 7-93 *A plane with the **Waves** map applied*

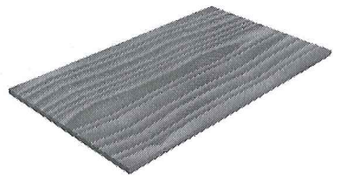

Figure 7-94 *A box with the **Wood** map applied*

Compositors Maps

The **Compositors** maps are used to combine the colors or the maps together. Various maps in this category are: **Composite**, **Mask**, **Mix**, and **RGB Multiply**.

Color Mods Maps

The **Color Mods** maps are used to modify or change the color of pixels in a material. Various maps in this category are: **Output**, **RGB Tint**, and **Vertex Color**.

Other Maps

There are some other types of maps such as **Raytrace**, **Flat Mirror**, and so on, which are used in a different way. These maps are discussed next.

Flat Mirror

The **Flat Mirror** map is used to create a material that generates reflection of other objects in the scene when assigned to the flat surfaces. You can get the best effect of this map using the **Flat Mirror Parameters** rollout in the **Material Editor** dialog box.

Raytrace

The **Raytrace** map is used to create the raytraced reflections and refractions on the surface of the objects. You can get the best effect of this map using the **Raytrace Parameters** rollout in the **Material Editor** dialog box.

Reflect/Refract

The **Reflect/Refract** map is used to produce the reflection and the refraction based on the objects in the scene. You can modify the effects using the **Reflect/Refract Parameters** rollout in the **Material Editor** dialog box.

Once you assign any of the above maps on the square button in the **Material Editor** dialog box, M will be displayed on it. If you right-click on this button, a shortcut menu will be displayed, as shown in Figure 7-95. Using the options in the shortcut menu, you can cut or copy the map and paste it at the desired place. You can also clear the unwanted map using the **Clear** option.

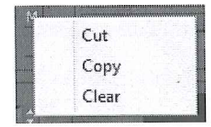

Figure 7-95 *The shortcut menu displayed on right-clicking on the **M** button*

TUTORIALS

Before starting the tutorials, you need to download the *c07_3dsmax_2017_tut.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

Extract the contents of the zip file and save them in the *Documents* folder.

Tutorial 1

In this tutorial, you will assign a map to the LCD monitor, as shown in Figure 7-96.

(Expected time: 15 min)

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Assign the map to the LCD screen.
d. Assign material to support, back portion, speaker, and buttons.
e. Assign material to the front part.
f. Save and render the scene.

Creating the Project Folder

Create a new project folder with the name *c07_tut1* at *\Documents\3dsmax2017* and then save the file with the name *c07tut1*, as discussed in Tutorial 1 of Chapter 2.

Figure 7-96 *The model of LCD monitor*

Opening the File

In this section, you will open the file.

1. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c07_3dsmax_2017_tut* and select the *c07_tut1_start.max* file in it. Choose the **Open** button to open the file, refer to Figure 7-97.

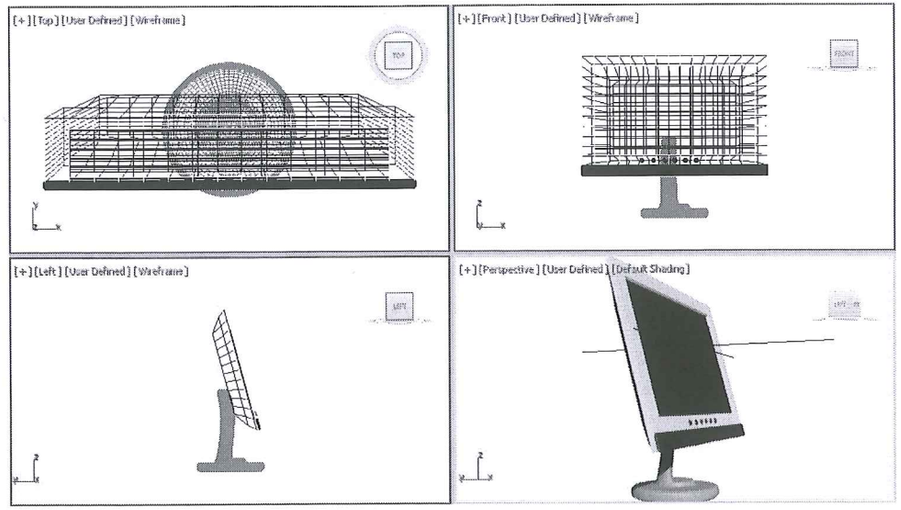

Figure 7-97 *The LCD computer in viewports*

2. Choose **Save As** from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c07_tut1\scenes*. Save the file with the name *c07tut1.max* at this location.

Assigning the Map to the LCD Screen

In this section, you will apply an image to the LCD screen of the computer.

1. Display the image on your computer screen and press the PRT SCR keys. Next, open the **Paint** software and press the CTRL+V keys to paste the image. Now, save the file with the name *desktop_screen* in the *jpg* format at the following location: *\Documents\3dsmax2017\c07_tut1\sceneassets\images*.

2. Select *LCD monitor* from the Scene Explorer and then choose **Group > Open** from the menubar. Similarly, open the *monitor* group and then open the *front part* group. Select *screen* from the Scene Explorer and then choose the **Compact Material Editor** tool from the **Main Toolbar**; the **Material Editor** dialog box is displayed.

3. Select one of the sample slots from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **desktop background** and press the ENTER key. By default, the **Standard** material is displayed on the **Material Type** button. Make sure that the **Blinn** shader is selected in the **Shader Basic Parameters** rollout. You will use the same material for assigning the map.

   Next, you need to assign the *desktop_screen.jpg* image to the **Diffuse** map button.

4. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the file **desktop_screen.jpg** and then choose the **Open** button; the image is displayed in the selected sample slot.

5. Choose the **Go to Parent** tool.

6. In the **Specular Highlights** area, set the values as follows:

   Specular Level: **40** Glossiness: **16**

   Next, you need to apply the map to *screen*.

7. Make sure that *screen* is selected in the viewport and the *desktop background* material is selected in the **Material Editor** dialog box. Next, choose the **Assign Material to Selection** button; the *desktop background* material is assigned to *screen* of LCD computer in the viewport.

8. Now, choose the **Show Shaded Material in Viewport** button, if it is not already chosen; the *desktop background* material is displayed on *screen* in the Perspective viewport.

Assigning Material to Support, Back Portion, Speaker, and Buttons

In this section, you will assign material to *support*, *back portion,* and *speaker* by changing the parameters in the **Blinn Basic Parameters** rollout.

1. Select next unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **blackmat** and press the ENTER key. By default, the **Standard** material is displayed on the **Material Type** button. Make sure that the **Blinn** shader is selected in the **Shader Basic Parameters** rollout.

2. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** color swatch to change the color of the material; the **Color Selector: Diffuse Color** dialog box is displayed. Set the values as follows:

   Red: **8** Green: **8** Blue: **8**

   Now, choose the **OK** button to close this dialog box.

3. Choose the **Specular** color swatch to change the color of specular highlights; the **Color Selector: Specular Color** dialog box is displayed. Set the values as follows:

   Red: **146** Green: **146** Blue: **146**

   Now, choose the **OK** button to close this dialog box.

4. In the **Specular Highlights** area, set the values as follows:

   Specular Level: **58** Glossiness: **54**

5. Select *support*, *back portion*, *speaker* and *buttons* from the Scene Explorer. Make sure *blackmat* material is selected in the Material Editor. Next, choose the **Assign Material to Selection** and **Show Shaded Material in Viewport** buttons; *blackmat* material is assigned to the selected objects.

Assigning Material to the Front Part

In this section, you will assign modified *blackmat* material to *front part*.

1. Make sure *blackmat* material is selected in the Material Editor. Next, drag it to next sample slot.

2. In the **Material Name** drop-down list, change the material name to **whitemat**.

3. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** color swatch to change the color of the material; the **Color Selector: Diffuse Color** dialog box is displayed. Set the values as follows:

   Red: **254** Green: **249** Blue: **240**

   Now, choose the **OK** button to close this dialog box.

4. Assign the *whitemat* material to *front portion*, as discussed earlier.

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the file *c07_3dsmax_2017_rndr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Change the background color of the scene to white, as discussed in Tutorial 1 of Chapter 2.

2. Choose **Save** from the **Application** menu.

3. Activate the Perspective viewport. Next, choose the **Render Production** tool from the **Main Toolbar**; the **Rendered Frame** window is displayed. This window shows the final output of the scene, refer to Figures 7-98 and 7-99.

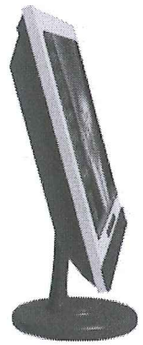

Figure 7-98 *The final output after rendering (view 1)*

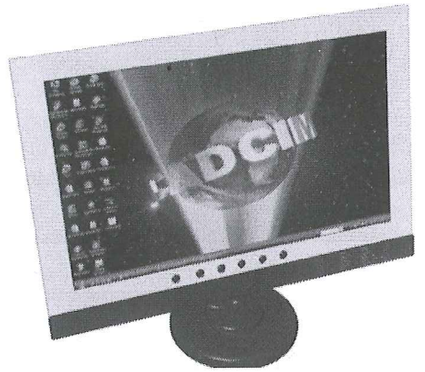

Figure 7-99 *The final output after rendering (view 2)*

Tutorial 2

In this tutorial, you will create and assign material to the objects in the scene, refer to Figure 7-100. **(Expected time: 30 min)**

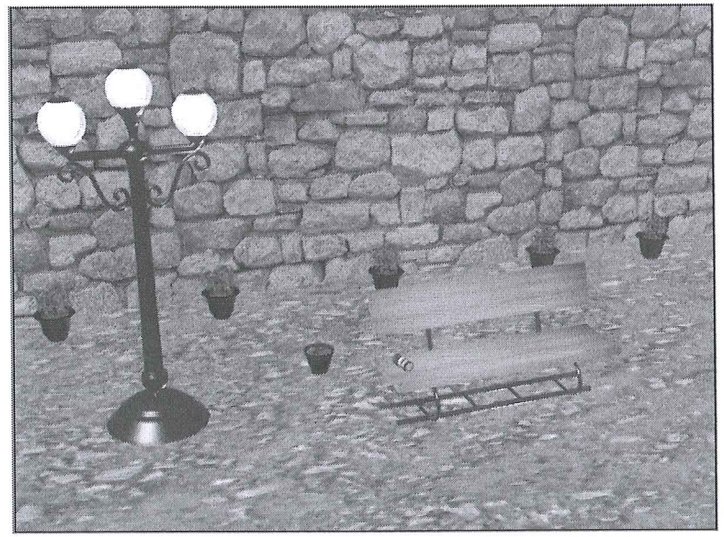

Figure 7-100 *The textured scene*

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.

c. Create material for bench.
d. Create material for street lamp.
e. Create material for dustbin.
f. Create material for pots and plants.
g. Save and render the scene.

Creating the Project Folder

Create a new project folder with the name *c07_tut2* at *\Documents\3dsmax2017* and save the file with the name *c07tut2*, as discussed in Tutorial 1 of Chapter 2.

Opening the File

In this section, you will open the file.

1. Open Windows Explorer and then browse to the *c07_3dsmax_2017_tut* folder and copy all jpeg files from this folder to *\Documents\3dsmax2017\c07_tut2\sceneassets\images*.

2. Choose the **Open** button from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to *\Documents\c07_3dsmax_2017_tut* and then select the **c07_tut2_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 7-101.

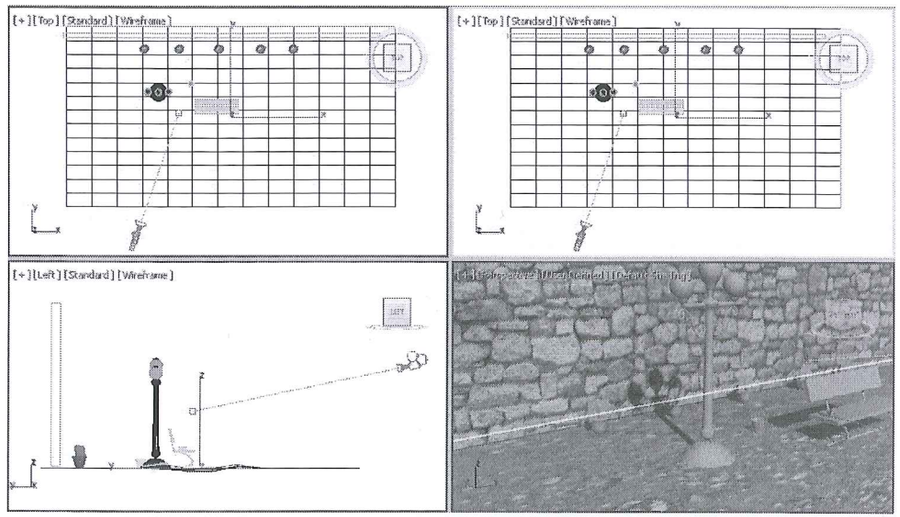

Figure 7-101 *The file displayed*

3. Choose the **Save As** button from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c07_tut2\scenes*. Save the file with the name *c07tut2.max* at this location.

Creating Material for Bench

In this section, you will create material for bench using the **Standard** and **Architectural** materials.

1. Select *bench* from the Scene Explorer. Next, choose **Group > Open** from the menu bar; the *bench* group is opened.

2. Press the M key; the **Material Editor** dialog box is displayed. Select unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **wood**.

3. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button located next to the **Diffuse** button; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **wood.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

4. Select *back* from the *bench* group. Next, choose the **Assign Material to Selection** and **Show Shaded Material in Viewport** buttons from the **Material Editor** dialog box; the *wood* material is assigned to *back*, as shown in Figure 7-102.

   You will notice that the *wood* material is not displayed properly on *back*. To properly display this material, you need to follow the steps given next.

5. Make sure *back* is selected. Next, select the **UVW Map** modifier from the **Modifier List** drop-down list of the **Command Panel**; the modifier is displayed in the modifier stack and rollouts are displayed below the modifier stack.

6. In the **Parameters** rollout, select the **Box** radio button from the **Mapping** area. Next, select the **X** radio button and then choose the **Fit** button from the **Alignment** area; the texture is properly applied on *back*, as shown in Figure 7-103.

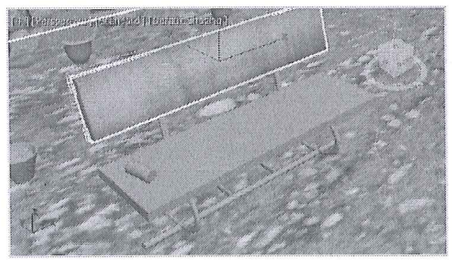

Figure 7-102 *The wood material assigned to back*

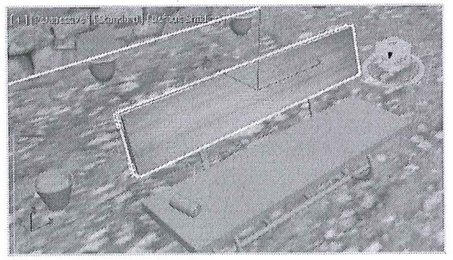

Figure 7-103 *The wood material displayed after using the* ***UVW Map*** *modifier*

7. Select *seat* from the Scene Explorer. In the **Material Editor** dialog box, make sure that *wood* material is selected. Next, choose the **Assign Material to Selection** button from the **Material Editor** dialog box; the material is assigned to *seat*.

8. Repeat the procedure in steps 5 and 6 to apply the **UVW Map** modifier to *seat*. Figure 7-104 shows the *wood* material assigned after using the **UVW Map** modifier.

9. Select all backsupports and supports of the *bench* group from the Scene Explorer. Next, select unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **black metal**.

10. Choose the **Standard** button on the right of the **Material Name** drop-down list; the **Material/ Map Browser** dialog box is displayed. Select the **Architectural** material from the **Materials > General** rollout and choose **OK**; the **Standard** material changes to **Architectural** material in the **Material Editor** dialog box.

11. In the **Material Editor** dialog box, select **Metal - Flat** from the drop-down list in the **Templates** rollout.

12. In the **Physical Qualities** rollout, choose the **Diffuse Color** color swatch; the **Color Selector: Diffuse** dialog box is displayed. In this dialog box, set the black color and choose **OK**.

13. Choose the **Assign Material to Selection** and **Show Shaded Material in Viewport** buttons from the **Material Editor** dialog box; the *black metal* material is assigned to all supports in the *bench* group.

14. Render the Perspective viewport; the rendered image is displayed, refer to Figure 7-105.

Figure 7-104 *The wood material displayed after using the* ***UVW Map*** *modifier*

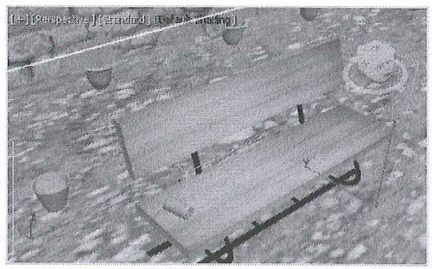

Figure 7-105 *The rendered image*

15. Select *bench* from the Scene Explorer. Next, choose **Group > Close** from the menu bar to close the *bench* group.

Creating Material for Street Lamp

In this section, you will create material for street lamp using the **Standard** and **Architectural** materials.

1. Select *street lamp* from the Scene Explorer. Next, choose **Group > Open** from the menu bar; the *street lamp* group is opened.

2. Select the *black metal* material from the **Material Editor** dialog box and drag it to unused sample slot. Next, change the name in the **Material Name** drop-down list to **green metal**.

3. In the **Physical Qualities** rollout, choose the **Diffuse Color** color swatch; the **Color Selector: Diffuse** dialog box is displayed. In this dialog box, set the values as follows and choose **OK**.

Red: **16** Green: **28** Blue: **7**

4. Select all parts of *street lamp* except *dome01, dome02*, and *dome03*. Next, choose the **Assign Material to Selection** and **Show Shaded Material in Viewport** buttons from the **Material Editor** dialog box; the *green metal* material is assigned to selected parts of the *street lamp* group.

Next, you will create material for domes.

5. Select next unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **dome**.

6. In the **Blinn Basic Parameters** rollout, select the check box in the **Self-Illumination** area; the **Color** spinner is changed to the **Color** color swatch. Choose the **Color** color swatch; the **Self-Illum Color** dialog box is displayed. Enter **198** in the **Red**, **Green**, and **Blue** spinners and choose **OK**.

7. Enter **75** in the **Opacity** spinner located below the **Self-Illumination** area.

8. Select *dome01*, *dome02,* and *dome03* from the Scene Explorer. Next, choose the **Assign Material to Selection** and **Show Shaded Material in Viewport** buttons from the **Material Editor** dialog box; the *dome* material is assigned to *dome01*, *dome02,* and *dome03*.

9. Render the Perspective viewport; the rendered image is displayed, refer to Figure 7-106.

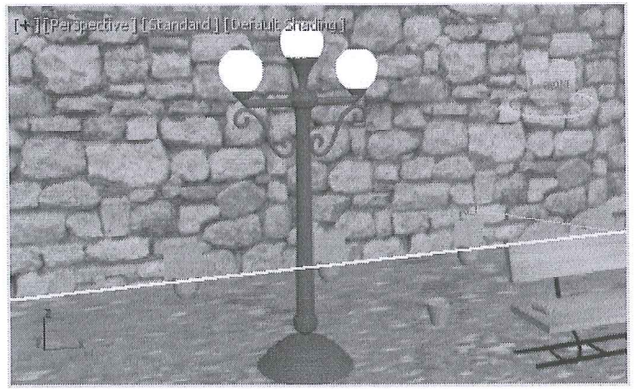

Figure 7-106 *The rendered image*

10. Select *street lamp* from the Scene Explorer. Next, choose **Group > Close** from the menu bar to close the *street lamp* group.

Creating Material for Can

In this section, you will create material for *can* using the **Multi/Sub-Object** material. You will also change the default scanline renderer to mental ray renderer to use the material from the **Autodesk Material Library**.

1. Choose the **Render Setup** tool from the **Main Toolbar**; the **Render Setup: Scanline Renderer** dialog box is displayed.

2. In this dialog box, select **NVIDIA mental ray** from the **Renderer** drop-down list; the **Scanline Renderer** is changed to **NVIDIA mental ray** renderer.

3. Select next unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **canmat**.

4. Choose the **Standard** button on the right of the **Material Name** drop-down list; the **Material/Map Browser** dialog box is displayed. Select the **Multi/Sub-Object** material from the **Materials > General** rollout and choose **OK**; the **Replace Material** dialog box is displayed. In this dialog box, select the **Discard old material?** radio button and choose **OK**. The **Standard** material is replaced by the **Multi/Sub-Object** material in the **Material Editor** dialog box.

5. In the **Multi/Sub-Object Basic Parameters** rollout, choose the **Set Number** button; the **Set Number of Materials** dialog box is displayed. In this dialog box, enter **2** in the **Number of Materials** spinner and choose **OK**; sub-materials in the **Multi/Sub-Object Basic Parameters** rollout are reduced to 2.

6. Enter **body** in the **Name** text box of first sub-material and choose the **None** button at the right of this text box; the **Material/Map Browser** dialog box is displayed. In this dialog box, select the **Standard** material from the **Materials > Scanline** rollout and choose **OK**.

7. Select **Metal** from the drop-down list in the **Shader basic Parameters** rollout.

8. Choose the **Diffuse** map button from the **Metal Basic Parameters** rollout of the **Material Editor** dialog box; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **pepsi.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

9. Choose the **Go to Parent** tool. Next, enter **74** and **56** in the **Specular Level** and **Glossinesss** spinner of the **Specular Highlights** area, respectively. Next, choose the **Show Shaded Material in Viewport** button.

10. Choose the **Go to Parent** tool again. Next, enter **cap** in the **Name** text box of second sub-material and choose the **None** button at the right of this text box; the **Material/Map Browser** dialog box is displayed. In this dialog box, select **Aluminium - Polished** from the **Autodesk Material Library > Metal > Aluminium** rollout and choose **OK**; the **Autodesk Metal** material is displayed in the **Material Editor** dialog box.

11. In the **Material Editor** dialog box, select **Semi-polished** from the **Finish** drop-down list of the **Metal** rollout. Next, choose the **Go to Parent** tool to return to parent level. Next, choose the **Show Shaded Material in Viewport** button.

12. Select *can* from the **Scene Explorer** and choose the **Modify** tab from the **Command Panel**. Next, click on the arrow sign on the left of the **Editable Poly** in the modifier stack.

13. Select the **Polygon** sub-object level; it gets activated and turns yellow.

Note
*The **Editable Poly** objects and their sub-objects levels are discussed in detail in Chapter 8.*

14. Click on the cap of *can*; a polygon is selected, as shown in Figure 7-107. Next, enter **2** in the **Set ID** spinner of the **Polygon: Material IDs** area, if not already set.

15. Click on the cap of *can* again and then press CTRL+i; rest of the polygons of *can* are selected, as shown in Figure 7-108. Next, enter **1** in the **Set ID** spinner in the **Polygon: Material IDs** area, if not already set.

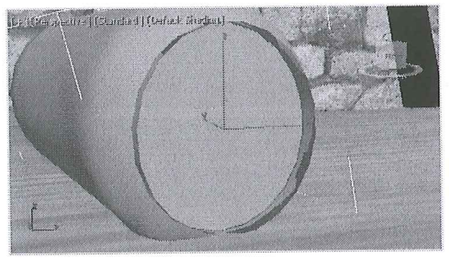

Figure 7-107 *Selected polygon of can*

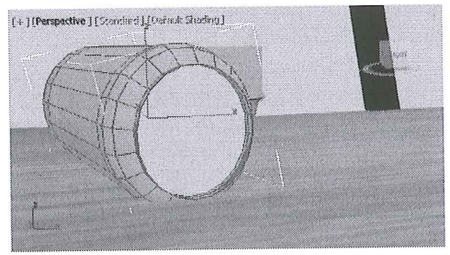

Figure 7-108 *Rest of the polygons selected*

16. In the modifier stack, select the **Polygon** sub-object level again to deactivate it.

17. Make sure *can* is selected. Next, choose the **Assign Material to Selection** button from the **Material Editor** dialog box; the *canmat* material is assigned to *can,* refer to Figure 7-109.

Creating Material for Dustbin

In this section, you will create material for *dustbin* using the **Standard** material.

1. Select unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **dustbinmat**.

2. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button located next to the **Diffuse** color swatch; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **dustbin.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.
3. Choose the **Go to Parent** tool. Next, enter **35** and **25** in the **Specular Level** and **Glossinesss**

spinners of the **Specular Highlights** area, respectively.

4. Select *dustbin* from the Scene Explorer. Next, assign the *dustbinmat* material to it, as discussed earlier, refer to Figure 7-110.

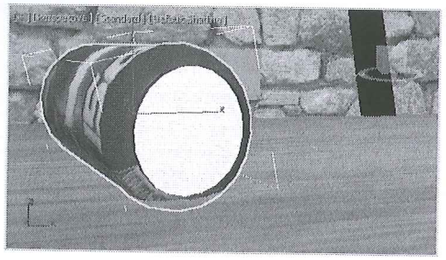

Figure 7-109 *The canmat material displayed*

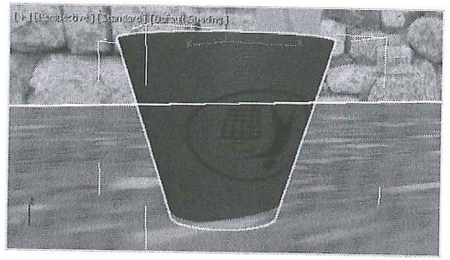

Figure 7-110 *The dustbinmat material displayed*

Next, you will create material for *garbage*.

5. Select the unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **garbagemat**.

6. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button located next to the **Diffuse** color swatch; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **garbage.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

7. Assign the *garbagemat* material to *garbage*, as discussed earlier, refer to Figure 7-111.

Creating Material for Pots and Plants

In this section, you will assign material to pots and plants using the **Standard** material. You will use the **Opacity** map to assign texture to plants.

1. Select *pot_plants* from the Scene Explorer. Next, choose **Group > Open** from the menu bar; the *pot_plants* group is opened.

2. Select the unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **potmat**.

3. Choose the **Standard** button on the right of the **Material Name** drop-down list; the **Material/Map Browser** dialog box is displayed. In this dialog box, select **Plaster - Ventetian Rough** from the **Autodesk Material Library > Stucco** rollout and choose **OK**; the **Autodesk Generic** material is displayed in the **Material Editor** dialog box.

4. Choose the color swatch from the **Generic** rollout of the **Material Editor** dialog box; the **Color Selector: Generic_Color** dialog box is displayed. In this dialog box, set the values as follows:
Red: **0.161** Green: **0.043** Blue: **0**

Choose **OK** to close the dialog box.

5. Make sure *pot* is selected. Next, select the **UVW Map** modifier from the **Modifier List** drop-down list of the **Command Panel**; the **UVW Map** modifier is displayed in the modifier stack and rollouts are displayed below the modifier stack.

6. In the **Parameters** rollout, select the **Cylindrical** radio button from the **Mapping** area. Next, select the **X** radio button and choose the **Fit** button from the **Alignment** area.

7. Make sure *pot* is selected. Next, assign the *potmat* material to it, as discussed earlier.

Next, you will create material for *plant1* and *plant2*.

8. Select the unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **plant**.

9. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button located next to the **Diffuse** color swatch; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **plant_diff.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

10. Choose the **Go to Parent** tool. Next, choose the **Opacity** map button on the right of the **Opacity** spinner; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **plant_op.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

11. Choose the **Go to Parent** tool. Next, assign the *plant* material to *plant1* and *plant2*, as discussed earlier, refer to Figure 7-112.

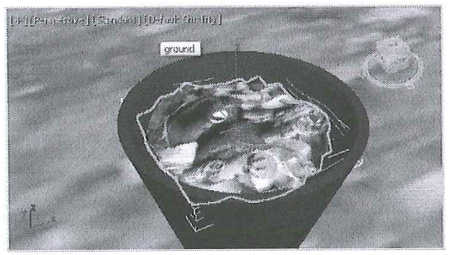

Figure 7-111 *The garbagemat material applied*

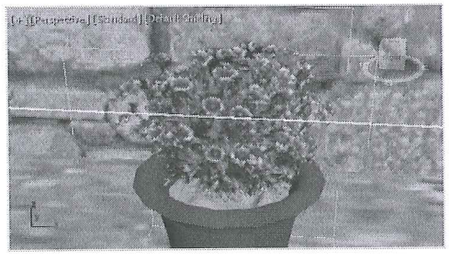

Figure 7-112 *The plant material applied*

Note

*You can also insert the **Diffuse** and **Opacity** maps using the **Maps** rollout.*

Next, you will apply material to *soil*.

12. Select the unused sample slot from the **Material Editor** dialog box. In the **Material Name** drop-down list, enter **clay**.

13. In the **Blinn Basic Parameters** rollout, choose the **Diffuse** map button located next to the **Diffuse** color swatch; the **Material/Map Browser** dialog box is displayed. Choose the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **clay.jpg** file and then choose the **Open** button; the image is displayed in the selected sample slot.

14. Choose the **Go to Parent** tool. Next, assign the *clay* material to *soil,* as discussed earlier, refer to Figure 7-113.

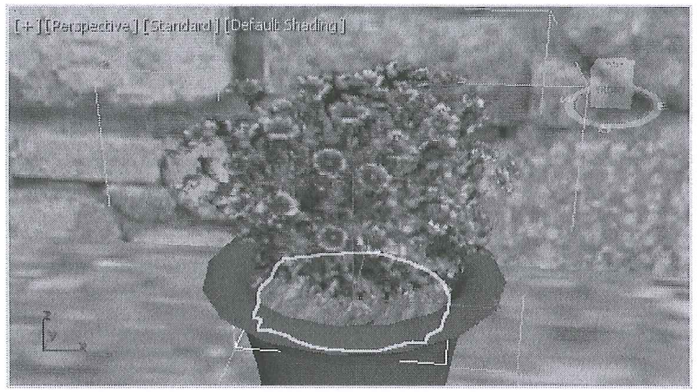

Figure 7-113 *The* ***clay*** *material applied to soil*

15. Select *pot_plants* from the Scene Explorer. Next, choose **Group > Close** from the menu bar to close the *pot_plants* group.

16. Similarly, open groups *pot_plants001, pot_plants002, pot_plants003,* and *pot_plants004*. Next, apply the **UVW Map** modifier to *pot001, pot002, pot003,* and *pot004*.

17. Assign *pot, plant,* and *clay* material to corresponding objects in these groups and then close the groups.

18. Close the **Material Editor** dialog box.

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the *c07_3dsmax_2017_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu.
2. Activate the Perspective viewport. Next, choose the **Render Production** tool from the **Main Toolbar**; the **Rendered Frame** window is displayed. This window shows the final output of the scene, refer to Figure 7-114.

Figure 7-114 *The final output of the scene*

Tutorial 3

In this tutorial, you will create brass material and assign it to a flower pot, as shown in Figure 7-115. **(Expected time: 15 min)**

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Create brass material for the flower pot.
d. Save and render the scene.

Figure 7-115 *The model of a flower pot*

Creating the Project Folder

Create a new project folder with the name *c07_tut3* at *\Documents\3dsmax2017* and then save the file with the name *c07tut3*, as discussed in Tutorial 1 of Chapter 2.

Opening the File

In this section, you will open the file.

1. Open the Windows Explorer and then browse to the *c07_3dsmax_2017_tut* folder and copy the

Lakerem2.jpg file from this folder to the location *\Documents\3dsmax2017\c07_tut3\sceneassets\images*.

2. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c07_3dsmax_2017_tut* and select the *c07_tut3_start.max* file in it. Choose the **Open** button to open the file, refer to Figure 7-116.

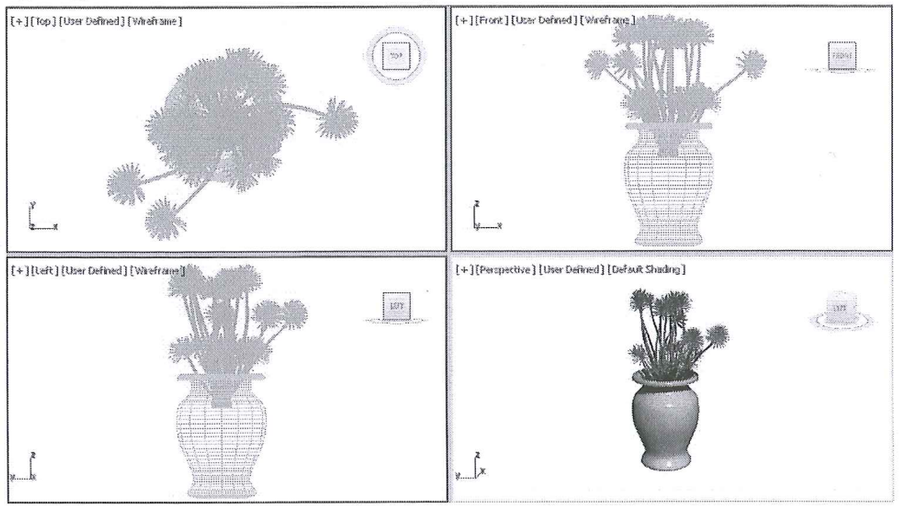

Figure 7-116 *The flower pot geometry with a plant*

3. Choose **Save As** from the **Application menu**; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c07_tut3\scenes*. Save the file with the name *c07tut3.max* at this location.

Creating Brass Material for the Flower Pot

In this section, you will create the brass material for the flower pot by using the **Compact Material Editor** tool.

1. Select *flower pot* in a viewport and choose the **Material Editor** tool from the **Main Toolbar**; the **Material Editor** dialog box is displayed.

2. Select one of the empty sample slots in the **Material Editor** dialog box. In the **Material Name** drop-down list of this dialog box, enter **brass**.

3. By default, the **Standard** material is displayed on the **Material Type** button and you need to use the same for creating the *brass* material.

   Next, you need to set parameters for the **Standard** material.

4. In the **Shader Basic Parameters** rollout, select the **Metal** shader option from the drop-down list; the **Metal Basic Parameters** rollout is displayed. Select the **2-Sided** check box.
5. In the **Metal Basic Parameters** rollout, choose the **Diffuse** color swatch to change the color

of the material; the **Color Selector** dialog box is displayed. Set the values as follows:

Red: **253** Green: **159** Blue: **37**

Now, choose the **OK** button to close this dialog box.

6. In the **Specular Highlights** area, set the values as follows:

   Specular Level: **80** Glossiness: **75**

   Next, you need to assign the **Reflection** map from the **Maps** rollout to get a realistic effect.

7. Expand the **Maps** rollout in the **Material Editor** dialog box; a list of maps is displayed.

8. Select the **Reflection** check box to make it active. Choose the **Reflection** map button that is labeled as **None** on the right of the **Reflection** spinner; the **Material/Map Browser** dialog box is displayed. Select the **Bitmap** map from the **Maps > General** rollout and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed.

   As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box.

9. Select the file *Lakerem2.jpg* from this dialog box and choose the **Open** button; the image is displayed in the selected sample slot, as shown in Figure 7-117.

10. Choose the **Go to Parent** tool from the **Material Editor** dialog box. In the **Maps** rollout, set the value **50** in the **Reflection** spinner.

11. Make sure that *flower pot* is selected in the viewport and the *brass* material is selected in the **Material Editor** dialog box.

12. Choose the **Assign Material to Selection** button; the *brass* material is assigned to *flower pot*.

13. Choose the **Show Shaded Material in Viewport** button; the **brass** material is displayed on *flower pot* in the Perspective viewport.

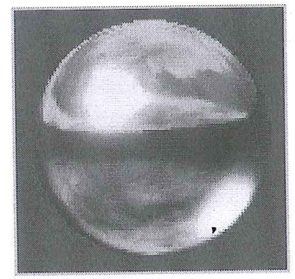

Figure 7-117 *The brass material displayed in the sample slot*

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the *c07_3dsmax_2017_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu.

INTRODUCTION

In 3ds Max, lights are used to illuminate a scene to make it realistic. They are also used to create the sources of illumination such as street lights, flashlights, and so on. The two main categories of lights available in 3ds max are: **Standard** and **Photometric**. In these categories, different types of lights are available. You need to select one or more lights based on the requirement of a scene. The Photometric lights provide more realistic lighting effects but they are more complex than the Standard lights.

Figure 13-1 *The tools to create standard lights in the* ***Object Type*** *rollout*

STANDARD LIGHTS

In 3ds Max, the Standard lights are objects that simulate lights. You can create eight types of Standard lights in 3ds Max. To create a light in a scene, choose **Create > Lights** in the **Command Panel**. By default, the **Photometric** option will be displayed in the drop-down list below the **Lights** button. Select the **Standard** option from the drop-down list. You can choose one of the tools available in the **Object Type** rollout to create different types of lights in the viewport, refer to Figure 13-1. When you choose a tool from the **Object Type** rollout, various rollouts will be displayed. These rollouts are used to modify the parameters of lights. The tools in the **Object Type** rollout are discussed next.

Omni

Menu bar:	Create > Lights > Standard Lights > Omni
Command Panel:	Create > Lights > Standard > Object Type rollout > Omni

The **Omni** tool is used to create an omni light in the viewport. An omni light is a single point in space that projects the rays uniformly in all directions. To create an omni light, choose the **Omni** tool; the **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Advanced Effects**, **Shadow Parameters**, and **Shadow Map Params** rollouts will be displayed in the Modify panel. Move the cursor in the viewport; the shape of the cursor will change. Click in the viewport to place the light. You can continue clicking in the viewport to add more than one light. Next, right-click in the viewport to exit the command. To modify the parameters of a light, select the light and choose the **Modify** tab in the **Command Panel**; various rollouts will be displayed. These rollouts are used to modify the parameters of the selected light. The most commonly used rollouts are discussed next.

Name and Color Rollout

This rollout is used to modify the name of the selected light by entering the new name in the text box. You can also modify the color of the selected light using the color swatch. But, this will only change the color of the icon of the light in the viewport and will not affect the color of the light being emitted.

General Parameters Rollout

The options in this rollout are used to set the parameters of the selected light, refer to Figure 13-2. In the **Light Type** area of this rollout, the **On** check box is selected by default. As a result, the

light will illuminate the scene, refer to Figures 13-3 and 13-4. If you clear the **On** check box, then the light will not illuminate the scene. The drop-down list on the right side of the **On** check box is used to define the type of light. By default, the **Omni** option is selected in this drop-down list. You can also select the **Directional** or the **Spot** option to convert the omni light into directional or spot light.

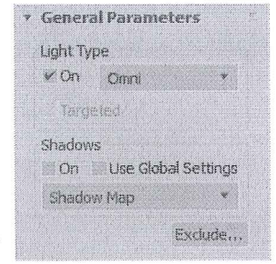

Figure 13-2 *The* ***General Parameters*** *rollout*

The **Targeted** check box is activated only if the **Directional** or **Spot Light** option is selected from the drop-down list. On selecting any of these options, a spinner will be displayed next to the **Targeted** check box. The value in the spinner is used to specify the distance of the target from the light. You will learn about the spot and directional lights later in this chapter.

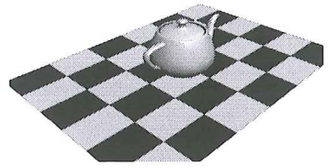

Figure 13-3 *The scene without any light*

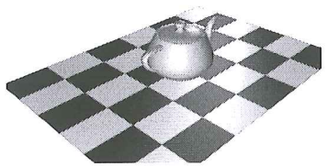

Figure 13-4 *The scene with the omni lights applied*

Note

1. By default, the ***Standard*** *shading mode is selected in the viewport, refer to the Figure 13-5. Click on the* ***Standard*** *label, a flyout will be displayed. Next, choose* ***Lights and Shadows > Shadows*** *from the flyout to display the shadows in the viewport, refer to Figure 13-6.*

2. If you want to see high quality lights and shadows in the viewport, select the ***High Quality*** *shading mode. Alternatively, you can press Shift+F3.*

In the **Shadows** area, select the **On** check box. As a result, the light will cast shadows of the object on rendering. Alternatively, when you place a light in the viewport, select it and right-click on it; a quad menu will be displayed, as shown in Figure 13-7. Choose the **Cast Shadows** option; the shadows of the object will be displayed on rendering.

If a scene consists of more than one light, you can use the **Light Lister** tool to display and change the settings of lights in a single window. To do so, choose **Tools > Light Lister** from the menu bar; the **Light Lister** window will be displayed, as shown in Figure 13-8. This window will display the information of all lights used in the scene. Now, select the check box(es) in the **Shadows** column; the shadows of the light corresponding to the selected check box(es) will be displayed on rendering.

The drop-down list next to the **Shadows** check box in the **Light Lister** window is used to select the types of shadow that the light will cast.

The **Use Global Settings** check box is located next to the **On** check box. This check box is used to cast shadows of the light as per the global settings. The drop-down list below the check boxes

is used to specify the shadow map that the renderer will use while generating the shadows of the light. By default, the **Shadow Map** is selected in this drop-down list. It specifies the map which the renderer will use, while generating the shadows of the light.

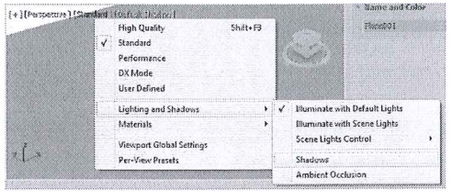

Figure 13-5 *The cascading menu displayed in the viewport*

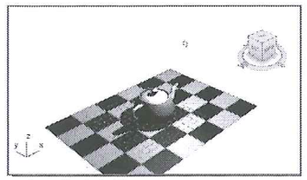

Figure 13-6 *The shadows displayed in the viewport*

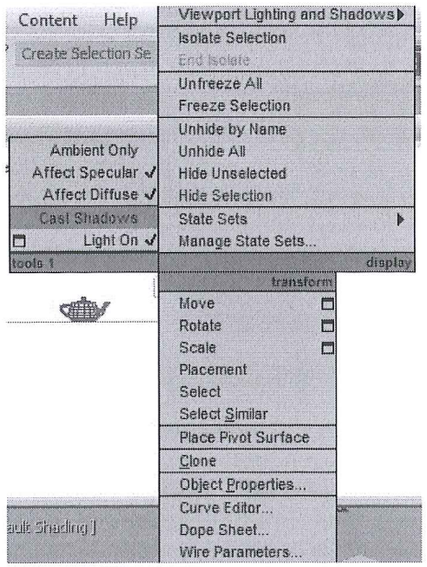

Figure 13-7 *The quad menu displayed in the viewport*

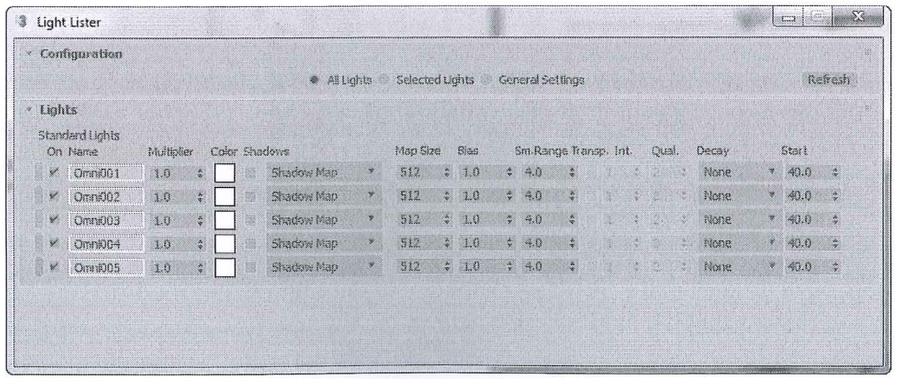

Figure 13-8 *The* ***Light Lister*** *window*

The **Exclude** button is used to select the objects in the scene that you do not want to get affected by the light at rendering. By default, the light affects all objects in the scene. To exclude or include an object from the effect of the light, choose the **Exclude** button; the **Exclude/Include** dialog box will be displayed, as shown in Figure 13-9.

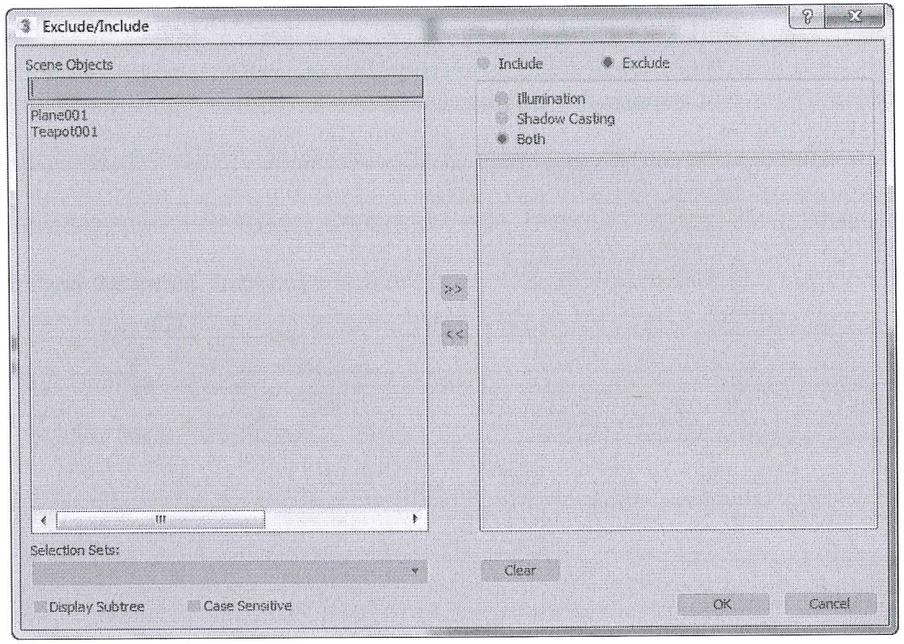

Figure 13-9 *The* ***Exclude/Include*** *dialog box*

The **Scene Objects** area on the left side of this dialog box displays the list of all objects in the current scene. On the top right of this dialog box, there are two radio buttons namely, **Include** and **Exclude**. By default, the **Exclude** radio button is selected. As a result, the objects will be excluded from the effect of light. To do so, select the objects that you want to exclude from the list displayed in the **Scene Objects** area. Then, choose the right arrow button; the selected objects will be excluded from the selected light. Also, they will be displayed in the area on the right side of this dialog box. Similarly, to include the excluded objects again, select the excluded objects from the area on the right side, and choose the left arrow button; the selected objects will be included. Next, choose the **OK** button.

Intensity/Color/Attenuation Rollout

The options in this rollout are used to set the color, intensity, and attenuation of the light, refer to Figure 13-10. The decrease in the intensity of light with distance is called attenuation. The **Multiplier** spinner in this rollout is used to set the intensity of the light. By default, the value in this spinner is 1.0. You can increase or decrease the value to increase or decrease the brightness of the light. Choose the color swatch on the right side of the **Multiplier** spinner; the **Color Selector: Light Color** dialog box will be displayed. Select the color of the light and choose the **OK** button to assign a new color to the light. The areas in the **Intensity/Color/Attenuation** rollout are discussed next.

Note
*If you increase the value in the **Multiplier** spinner to a very high extent, the scene will burned out. So, it is recommended that you increase the value gradually as required for the scene.*

Decay Area

The options in this area are used to reduce the intensity of the light over the distance. The **Type** drop-down list is used to define the type of decay that will be used for the selected light. By default, the **None** option is selected and therefore no decay is applied to the light, refer to Figure 13-11.

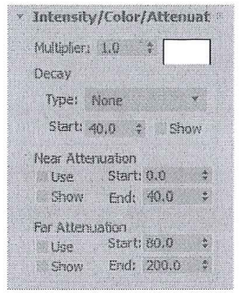

***Figure 13-10** The **Intensity/Color/Attenuation** rollout*

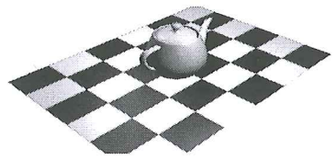

***Figure 13-11** The effect of light on selecting the **None** option*

In this case, if you use the options in the **Far Attenuation** area, then the decay will be applied to the light according to the values in the **Start** and **End** spinners. Select the **Inverse** option in the **Type** drop-down list to apply the light with intensity varying inversely with respect to distance, as shown in Figure 13-12. Select the **Inverse Square** option to apply the light intensity that varies with square inverse proportion with respect to distance, as shown in Figure 13-13.

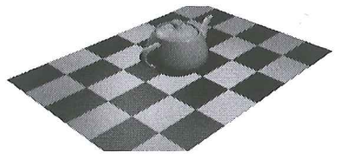

***Figure 13-12** The effect of light on selecting the **Inverse** option*

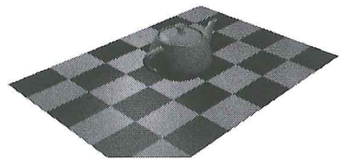

***Figure 13-13** The effect of light on selecting the **Inverse Square** option*

The **Inverse** and **Inverse Square** options use some mathematical equations to apply the decay effect on the light. When you select the **Inverse** or the **Inverse Square** option, the gizmo will be displayed in the viewport for the selected light to define the distance from where the decay starts. Set the value in the **Start** spinner of the **Decay** area to specify the distance from where the decay starts. On selecting the **Show** check box, a gizmo will be displayed even if the light is not selected.

Near Attenuation Area

The **Near Attenuation** area is used to set the distance at which the light begins to fade in. Select the **Use** check box to enable the near attenuation for the selected light; a gizmo will

be displayed in the viewport to define the near attenuation. Select the **Show** check box to display the gizmo in the viewport even if the light is not selected. Set the value in the **Start** spinner to define the distance at which the light begins to fade in. Set the value in the **End** spinner to define the distance at which the light reaches its maximum value that is 100%.

Far Attenuation Area

The **Far Attenuation** area is used to set the distance at which the light begins to fade out. Select the **Use** check box to enable the far attenuation for the selected light; a gizmo will be displayed in the viewport to define the far attenuation. Select the **Show** check box to display the gizmo in the viewport even if the light is not selected. Set the value in the **Start** spinner to define the distance at which the light begins to fade out. Set the value in the **End** spinner to define the distance at which the light reaches its minimum value that is zero.

Advanced Effects Rollout

The options in this rollout are used to set the effects of light on surfaces, refer to Figure 13-14. This rollout is also used to provide settings for the projector lights. The areas in this rollout are discussed next.

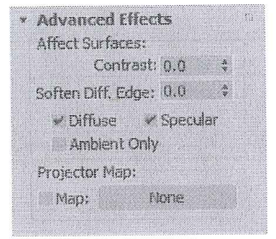

***Figure 13-14** The **Advanced Effects** rollout*

Affect Surfaces Area

The **Contrast** spinner in this area is used to adjust the contrast between different areas of the object that are affected by the diffuse and ambient lights. By default, the value in this spinner is 0, which provides the normal contrast. Set the value in the **Soften Diff. Edge** spinner to soften the transition between the ambient and the diffuse areas. The **Diffuse** and **Specular** check boxes are selected by default and are used to affect the diffuse and specular light areas, respectively. If you clear the **Diffuse** or **Specular** check box, the light will not affect the diffuse or specular property of the surface. On selecting the **Ambient Only** check box, the light will affect only the ambient area of the illumination.

Projector Map Area

This area is used to make a light act as a projector. To do so, select the light in the viewport and choose the **Modify** tab in the **Command Panel**. Now, in the **Projector Map** area of the **Advanced Effects** rollout, select the **Map** check box to enable the projector effect. Next, choose the **None** button; the **Material/Map Browser** dialog box will be displayed. Choose the map type from the **Material/Map Browser** dialog box; the name of the material will be displayed on the **None** button and the selected map will be projected in the scene at rendering.

Note
*You can adjust the settings of the projector map in the **Material Editor** dialog box.*

Shadow Parameters Rollout

The options in this rollout are used to control the properties of the shadow, refer to Figure 13-15. Choose the color swatch from the **Object Shadows** area to modify the color of the shadow. The **Dens.** spinner is used to adjust the density of the shadow. By default, the value in this spinner is 1.0. On increasing the value, the shadow will become denser or darker. Select the **Map** check

box to assign a map to the shadow. To do so, choose the map button labeled as **None** and assign a map as discussed earlier; the selected map will be displayed in the shadow, as shown in Figure 13-16. Select the **Light Affects Shadow Color** check box to blend the color of the light with the shadow.

The **Atmosphere Shadows** area in the **Shadow Parameters** rollout is used to enable the different atmospheric effects, such as volume fog, to cast shadows in a scene. The **On** check box is used to cast the shadow by using the atmospheric effect, when the light passes through them. The **Opacity** spinner is used to control the opacity of the shadows cast by the atmospheric effect. The **Color Amount** spinner is used to adjust the blending of the atmosphere's color and the shadow color.

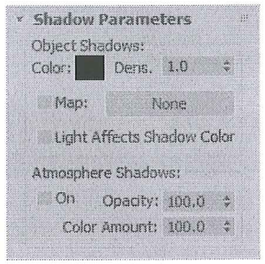

***Figure 13-15** The **Shadow Parameters** rollout*

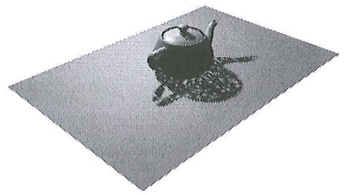

***Figure 13-16** A dent map used as a shadow map*

Atmospheres & Effects Rollout

The options in this rollout are used to assign special effects such as fog, lighting effects, and so on to the environment on rendering, refer to Figures 13-17 and 13-18. To assign a special effect to the scene, select the light in the viewport and expand the **Atmospheres & Effects** rollout. Now, choose the **Add** button; the **Add Atmosphere or Effect** dialog box will be displayed, as shown in Figure 13-19. Select the effect from this dialog box to add it to the light selected in the viewport and choose the **OK** button; the selected effect will be displayed in the **Atmospheres & Effects** rollout. Next, select the effect from the **Atmospheres & Effects** rollout and choose the **Setup** button; the **Environment and Effects** dialog box will be displayed, refer to Figure 13-20. You can set the parameters of the selected effect using the corresponding rollout in this dialog box. If you want to delete an effect from the scene, select the effect in the **Atmospheres & Effects** rollout and choose the **Delete** button.

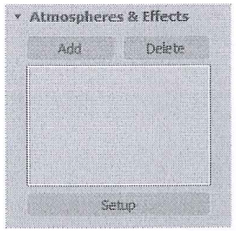

***Figure 13-17** The **Atmospheres & Effects** rollout*

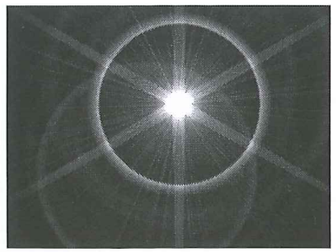

***Figure 13-18** The lens effect applied to the omni light*

Note

*To view the hidden rollouts of the selected effect in the **Environment and Effects** dialog box, hover the cursor over the dialog box until the shape of the cursor changes to the hand icon. Next, drag the cursor up or down to see the hidden rollouts.*

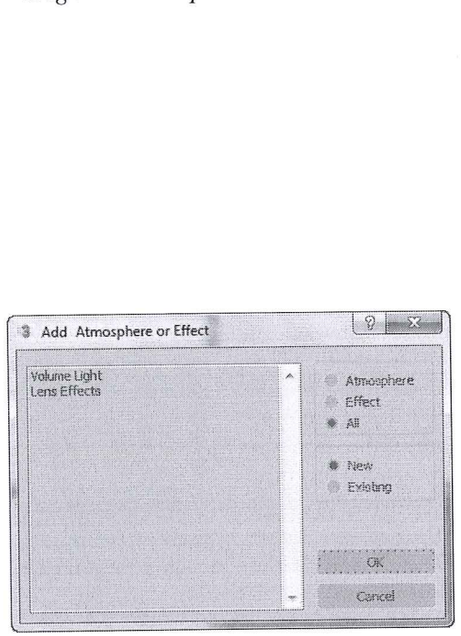

***Figure 13-19** The **Add Atmosphere or Effect** dialog box*

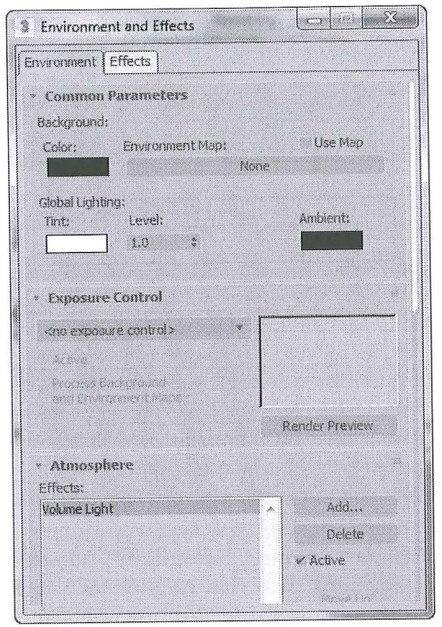

***Figure 13-20** The **Environment and Effects** dialog box*

Target Spot

Menu bar:	Create > Lights > Standard Lights > Target Spotlight
Command Panel:	Create > Lights > Standard > Object Type rollout > Target Spot

The **Target Spot** tool is used to create the spot lights. A spot light projects the rays in a particular direction from a source, refer to Figure 13-21. The target spot light also has a target spot to locate the target, refer to Figure 13-22. To create a target spot light, choose the **Target Spot** tool; the **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Spotlight Parameters**, **Advanced Effects**, **Shadow Parameters**, and **Shadow Map Params** rollouts will be displayed. Now, move the cursor over the viewport; the shape of the cursor will change. Press and hold the left mouse button to specify the starting point of the light and drag the cursor to locate the target of the light. Release the left mouse button; a target spot light will be created. Next, you can modify the parameters of the light using various rollouts displayed in the **Command Panel**. To exit the light command, right-click in the viewport.

Note

*The **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Advanced Effects**, **Shadow Parameters**, and **Atmospheric Effects** rollouts are same for all types of lights as discussed in the omni light.*

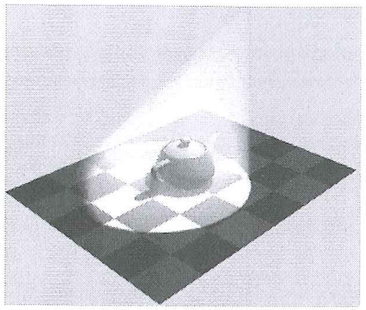

*Figure 13-21 The effect of the target spot light with the **Volume Light** effect*

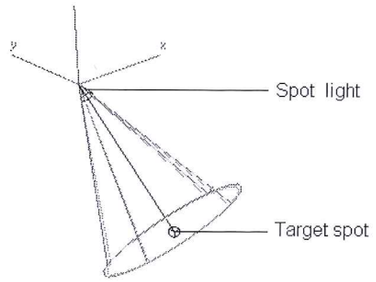

Figure 13-22 The target spot light

Spotlight Parameters Rollout

The options in the **Light Cone** area of this rollout are used to set the effects of the target spotlight, refer to Figure 13-23. Select the **Show Cone** check box to view the cone in the viewport even if the light is not selected. Select the **Overshoot** check box to project the light in all directions, but the shadows of the light will fall within the distance specified in the **Falloff/Field** spinner. When you select the **Overshoot** check box, the **Hotspot/Beam** spinner will be deactivated. The **Hotspot/Beam** spinner is used to set the angle of the cone of the target spot light in degrees. The hotspot is the part of the light cone that provides the most acute illumination. Set the value in the **Falloff/Field** spinner to adjust the angle of the falloff of the light. The falloff is the area at which the light intensity falls to zero.

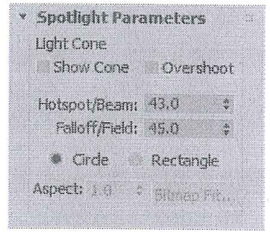

*Figure 13-23 The **Spotlight Parameters** rollout*

By default, the **Circle** radio button is selected. It provides a circular shape to the hotspot and falloff areas. Select the **Rectangle** radio button to provide a rectangular shape to the hotspot and falloff areas. On selecting the **Rectangle** radio button, the **Aspect** spinner and **Bitmap Fit** button get activated. Set the value in the **Aspect** spinner to adjust the aspect ratio. The aspect ratio is the ratio of the width to the height. You need to set the aspect ratio to match a particular bitmap. Choose the **Bitmap Fit** button; the **Select Image File to Fit** dialog box will be displayed. Select the bitmap image and choose the **Open** button; 3ds Max will adjust the aspect ratio in the **Aspect** spinner according to the image selected in the **Select Image File to Fit** dialog box.

Free Spot

Menu bar:	Create > Lights > Standard Lights > Free Spotlight
Command Panel:	Create > Lights > Standard > Object Type rollout > Free Spot

The **Free Spot** tool is similar to the **Target Spot** tool but a free spot light does not have any target, refer to Figure 13-24. All the rollouts used to adjust the free spot light are the same as those discussed in the target spot light.

Figure 13-24 The free spot light

Target Direct

Menu bar:	Create > Lights > Standard Lights > Target Direct
Command Panel:	Create > Lights > Standard > Object Type rollout > Target Direct

The **Target Direct** tool is used to create direct lights. A direct light projects the rays in a particular direction from a source. But it projects the parallel rays instead of a cone, refer to Figures 13-25 and 13-26. The target direct light simulates the sunlight.

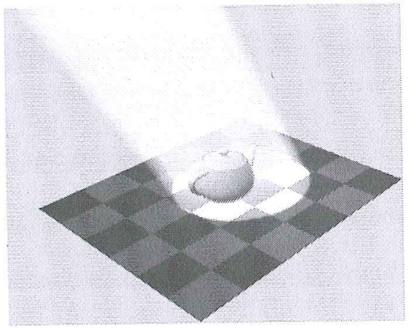

Figure 13-25 The effect of the target direct light

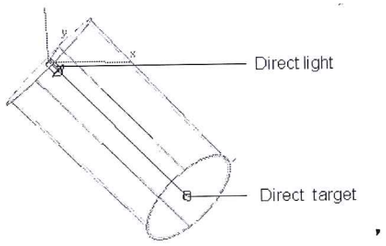

Figure 13-26 The target direct light

To create a target direct light, choose the **Target Direct** tool; the **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Directional Parameters**, **Advanced Effects**, **Shadow Parameters**, and **Shadow Map Params** rollouts will be displayed. Move the cursor over the viewport; the shape of the cursor will change. Next, press and hold the left mouse button to specify the starting point of the light and drag the mouse to specify the target of the light. Release the left mouse button; the target direct light will be displayed in viewports. Next, you can modify the parameters of the light using various rollouts in the **Command Panel**. Most of the rollouts are same as discussed earlier in this chapter, except the **Directional Parameters** rollout. The options in the **Directional Parameters** rollout are same as those discussed in the **Spotlight** Parameters rollout of the target spot light, refer to Figure 13-27.

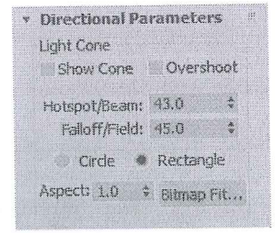

*Figure 13-27 The **Directional Parameters** rollout*

Free Direct

Menu bar:	Create > Lights > Standard Lights > Free Direct
Command Panel:	Create > Lights > Standard > Object Type rollout > Free Direct

The **Free Direct** tool is also used to create the direct light but unlike the target direct light, this light does not have a target, refer to Figure 13-28. All the rollouts to adjust the free direct light are same as those discussed in the target spot light.

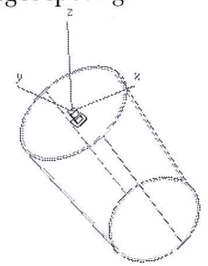

Figure 13-28 The free direct light

Skylight

Menu bar:	Create > Lights > Standard Lights > Skylight
Command Panel:	Create > Lights > Standard > Object Type rollout > Skylight

The **Skylight** tool is used to create daylights. The best effect of the skylight comes when you use it with the **Light Tracer**. To create a skylight, choose the **Skylight** tool; the **Name and Color** and **Skylight Parameters** rollouts will be displayed. Now, move the cursor over the viewport; the shape of the cursor will change. Click in the viewport; the light will be displayed in the viewport. Figure 13-29 shows the skylight displayed in the Perspective viewport. Now, choose **Rendering > Light Tracer** from the menu bar; the **Render Setup: Default Scanline Renderer** dialog box will be displayed. In the **Advanced Lighting** tab of this dialog box, set the parameters as required and then choose the **Render** button; the effect of the light will be displayed, refer to Figure 13-30. The **Name and Color** rollout is similar to other tools, as discussed earlier. The **Skylight Parameters** rollout is discussed next.

Figure 13-29 The skylight

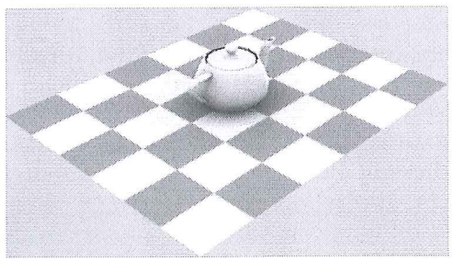

Figure 13-30 The effect of the skylight

Skylight Parameters Rollout

The **On** check box is selected by default in this rollout, which enables the skylight to be used in the scene, refer to Figure 13-31. Set the value in the **Multiplier** spinner to define the intensity of the light. The areas in this rollout are discussed next.

Sky Color Area

By default, the **Sky Color** radio button is selected. Choose the color swatch on the right side of the **Sky Color** radio button to select the color for the skylight. The **Map** check box is selected by default. It is used to insert a map along with the light that affects the skylight. By default, the value in the spinner on the right side of the **Map** check box is 100.0. If you decrease the value, the color of the map will be mixed with the sky color. Choose the **Map** button labeled as **None**; the **Material/Map Browser** dialog box will be displayed. Select the desired map and choose the **OK** button to display the map along with the light.

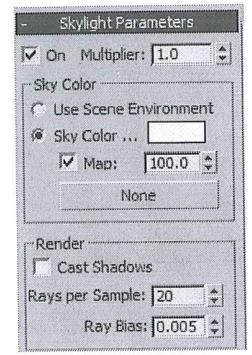

*Figure 13-31 The **Skylight Parameters** rollout*

Select the **Use Scene Environment** radio button to use the color that you have set in the **Environment and Effects** dialog box for the skylight.

Render Area

The parameters in this area are deactivated if the **Light Tracer** or **Radiosity** plugin is used. Select the **Cast Shadows** check box to project a shadow with the light. Set the value in the **Rays per Sample** spinner to define the number of rays in the skylight projecting in the scene. Set the value in the **Ray Bias** spinner to define the closest distance at which an object can project the shadows in the scene.

mr Area Omni

Menu bar:	Create > Lights > mental ray > mr Area Omni
Command Panel:	Create > Lights > Standard > Object Type rollout > mr Area Omni

The **mr Area Omni** tool is used with the mental ray renderer. It is used to create an area omni light, refer to Figure 13-32. If you use the area omni light and render the scene using the default scanline renderer, then its effects will be similar to the standard omni light. To view the best effect of the mr area omni light, you need to change the renderer.

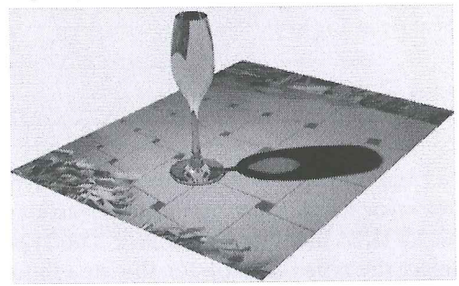

Figure 13-32 The effect of the area omni light

To render the scene with the **NVIDIA mental ray** renderer, choose the **Render Setup** tool from the **Main Toolbar**; the **Render Setup: Default Scanline Renderer** dialog box will be displayed. Next, select the **NVIDIA mental ray** option from the **Renderer**

drop-down list and choose the **Render** button. Now, the scene will be rendered using the mental ray renderer. Alternatively, expand the **Assign Renderer** rollout in the **Common** tab. Next, choose the **Choose Renderer** button on the right side of the **Production** label, as shown in Figure 13-33; the **Choose Renderer** dialog box will be displayed, refer to Figure 13-34. Select the **NVIDIA mental ray** option and choose the **OK** button; the **Default Scanline Renderer** text will be replaced with the **NVIDIA mental ray** text in the **Production** text box and close the **Render Setup** dialog box.

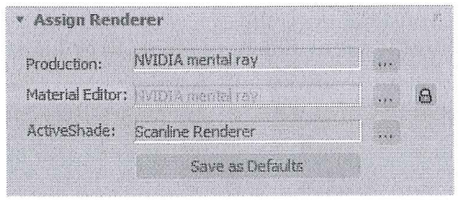

*Figure 13-33 The **Choose Renderer** button highlighted in the **Assign Renderer** rollout*

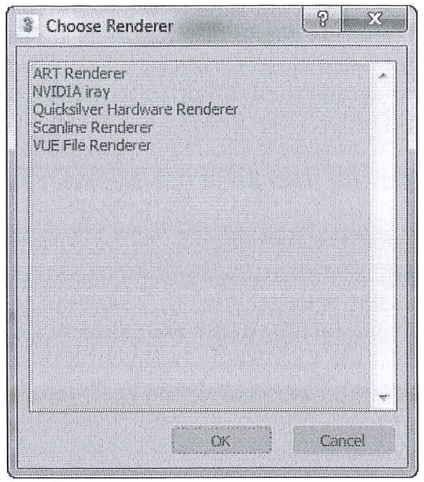

*Figure 13-34 The **Choose Renderer** dialog box*

To create a mental ray area omni light, choose the **mr Area Omni** tool; the **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Advanced Effects**, **Shadow Parameters**, **Ray Traced Shadow Params**, and **Area Light Parameters** rollouts will be displayed in the **Command Panel**. Now, move the cursor over the viewport; the shape of the cursor will change. Click in the viewport; the light will be displayed in the viewport. Next, you can modify the parameters of the light using various rollouts in the **Command Panel**. Most of the rollouts are same as discussed earlier in the omni light. The **Area Light Parameters** rollout is discussed next.

Area Light Parameters Rollout

In this rollout, the **On** check box is selected by default, refer to Figure 13-35. As a result, the light illuminates all objects in the scene. Select the **Show Icon in Renderer** check box to display a shape at the location of the area light on rendering. To view the shape on rendering, you need to render the scene using the **NVIDIA mental ray** renderer. The **Type** drop-down list is used to select the type of shape for the area light. By default, the **Sphere** option is selected. Select the **Cylinder** option to display a cylindrical shape. Set the value in the **Radius** spinner to set the radius of the shape displayed. Note that when you select **Cylinder** from the **Type** drop-down list, the **Height** spinner is also activated. Set the value in this spinner to define the height of the cylindrical shape displayed. The **Samples** area in this rollout is discussed next.

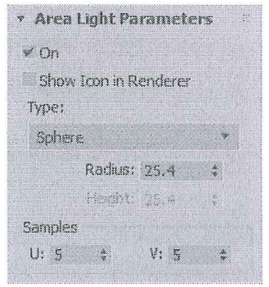

*Figure 13-35 The **Area Light Parameters** rollout*

Samples Area

The options in this area are used to set the quality of the shadow projected by the area omni light. Set the value in the **U** spinner to specify the number of subdivisions along the radius, or the height of the sphere or cylinder. Set the value in the **V** spinner to specify the number of angular subdivisions in the shape.

mr Area Spot

Menu bar:	Create > Lights > mental ray > mr Area Spot
Command Panel:	Create > Lights > Standard > Object Type rollout > mr Area Spot

The mental ray area spot light emits light from a rectangular or disc shaped area rather than from a fixed point, refer to Figure 13-36. To create mental ray area spot light, choose the **mr Area Spot** tool; the **Name and Color**, **General Parameters**, **Intensity/Color/Attenuation**, **Spotlight Parameters**, **Advanced Effects**, **Shadow Parameters**, **Ray Traced Shadow Params**, and **Area Light Parameters** rollouts will be displayed. Move the cursor over the viewport; the shape of the cursor will change. Now, press and hold the left mouse button to specify the location of the light, drag the cursor to locate the target of the light, and release the left mouse button; the light will be displayed in the viewports. You can modify the parameters of the light using various rollouts displayed in the **Command Panel**. Most of the rollouts have already been discussed. The **Area Light Parameters** rollout for the area spot light is discussed next.

Area Light Parameters Rollout

The options in this rollout are same as discussed for the **mr Area Omni** tool, refer to Figure 13-37. In the **Type** drop-down list, the **Rectangle** shape is selected by default. It is used to display the area spot light in a rectangular shape. Specify the height and width in the **Height** and **Width** spinners, respectively. Select the **Disc** shape in the **Type** drop-down list to display the light in circular shape; the **Radius** spinner will get activated. Set the value in this spinner to specify the radius of the shape.

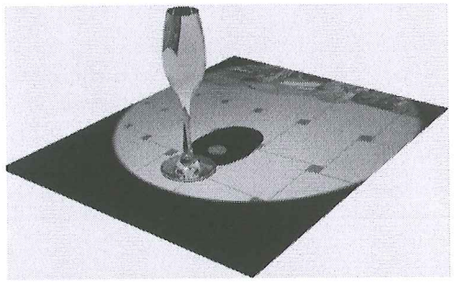

Figure 13-36 The effect of the area spot light

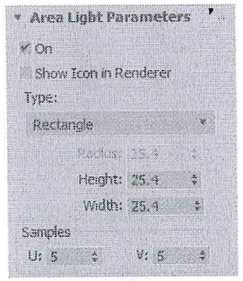

*Figure 13-37 The **Area Light Parameters** rollout*

PHOTOMETRIC LIGHTS

The photometric lights are used to add realistic light effects to the scenes. The photometric lights use the light energy values to calculate the lights accurately as they are in the real world.

To create a photometric light in a scene, choose **Create > Lights** in the **Command Panel**; the **Photometric** light will be displayed by default in the drop-down list below the **Lights** button. Also, various tools to create photometric lights will be displayed in the **Object Type** rollout. These tools are **Target Light**, **Free Light**, **mr Sky Portal**, and **Sun Positioner**, refer to Figure 13-38. Choose one of these tools and create the light in the viewport. If you choose the **Target Light** or **Free Light** tool and if you are using the **Default Scanline Renderer**, the **Photometric Light Creation** message box will be displayed, asking if you want to use the Logarithmic Exposure Control, refer to Figure 13-39. Choose the **Yes** button in this message box. When you choose a tool from the **Object Type** rollout, various rollouts will be displayed to modify the parameters of the corresponding light. Note that if you choose the **Target Light** tool or **Free Light** tool and are using the **NVIDIA mental ray Renderer**, the **Photometric Light Creation** message box will be displayed, asking if you want to use the mr Photographic Exposure Control, refer to Figure 13-40.

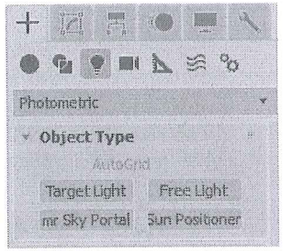

Figure 13-38 *Various tools to create* ***Photometric*** *lights*

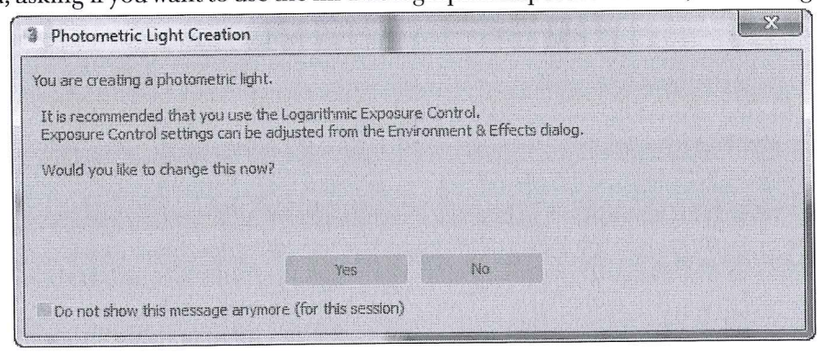

Figure 13-39 *The* ***Photometric Light Creation*** *message box*

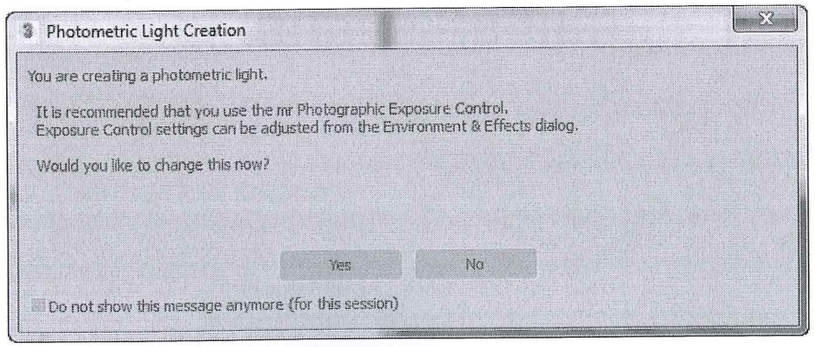

Figure 13-40 *The* ***Photometric Light Creation*** *message box*

The **Name and Color**, **General Parameters**, **Shadow Parameters**, **Advanced Effects**, and **Atmospheres & Effects** rollouts for photometric lights are same as discussed in the standard lights. The **Intensity/Color/Attenuation**, **Templates**, and **Shape/Area Shadows** rollouts for the target light and the free light are discussed next.

Templates Rollout

The options in this rollout are used to specify preset light types such as 40W bulb, Street 400W lamp, and so on, refer to Figure 13-41. To do so, select a light in the viewport and click on the down arrow at the bottom of the **Templates** rollout; a drop-down list will be displayed, as shown in Figure 13-41. Select the required light type from the drop-down list. You will notice a change in the light effect in the viewport. Also, the description of the selected light will be displayed in the text area just above the drop-down list.

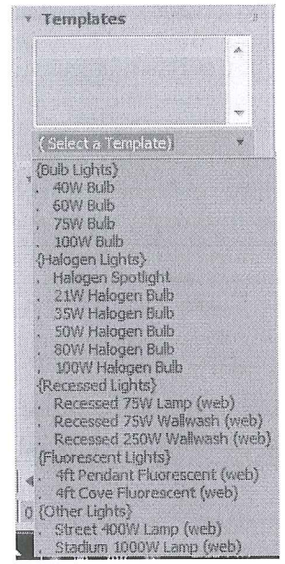

Figure 13-41 *The* ***Templates*** *rollout and the drop-down list displayed to select the type of light*

Intensity/Color/Attenuation Rollout

The options in this rollout are used to set the intensity, color, dimness, and attenuation of the light, refer to Figure 13-42. The areas in this rollout are discussed next.

Color Area

The drop-down list on the top of this area displays different common lamp specifications. By default, the **D65 Illuminant (Reference White)** option is selected in the drop-down list. Select the other options; the color in the color swatch on the right side of the **Kelvin** radio button will change according to the selection in this drop-down list. Select the **Kelvin** radio button to specify the color of the light by setting the color temperature in the spinner on the right of this radio button. The value in this spinner is in kelvin unit. As you change the value (temperature) of this spinner, the color in the color swatch will change accordingly. Choose the **Filter Color** color swatch to specify the color of the color filter.

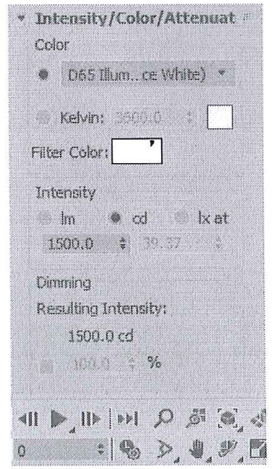

Figure 13-42 *The* ***Intensity/Color/Attenuation*** *rollout*

Intensity Area

The options in this area specify the intensity of the light. By default, the **cd** radio button is selected that measures the intensity of the light in candela unit. Select the **lm** radio button to measure the intensity of the light in lumen unit. Select the **lx at** radio button to measure the intensity in lux unit. Set the values in the spinners below these radio buttons to specify the intensity of the light.

Dimming Area

The options in this area are used to set the intensity by dimming the light. The resulting intensity is set by the value specified in the **Resulting Intensity** spinner. By default, this spinner is not active. Select the **Resulting Intensity** check box. Next, enter a value in the spinner. A value of 100 indicates that the light will be displayed with its full intensity. Select the **Incandescent lamp color shift when dimming** check box to simulate an incandescent light as the light gets dimmed.

Shape/Area Shadows Rollout

The options in this rollout are used to specify a light shape that generates the shadows, refer to Figure 13-43. The controls in this rollout work with the **NVIDIA mental ray** renderer. The areas in this rollout are discussed next.

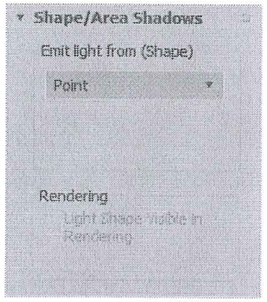

Figure 13-43 *The* ***Shape/Area Shadows*** *rollout*

Emit light from (Shape) Area

The drop-down list on the top in this area is used to select the shape for generating the shadows. On selecting an option from the drop-down list (except the **Point** option), the dimension controls related to the selected option will be displayed at the bottom of this area. You can set the dimensions in the respective spinners to modify the shape. Also, the **Shadows Samples** drop-down list will be displayed in the **Rendering** area.

Note

If you choose the ***Point*** *shape from the drop-down list in the* ***Emit Light from (Shape)*** *area, then the* ***Shadows Samples*** *drop-down list will not be available in the* ***Rendering*** *area.*

Rendering Area

Select the **Light Shape Visible in Rendering** check box to view the light shape at rendering. The different options in the **Shadows Samples** drop-down list are used to set the quality of the shadows of the light.

Sunlight Positioner

New

The Sunlight Positioner is the alternative to the Daylight System. The new Sun Positioner and Physical Sky system in 3ds Max is used with the modern renderer for physically-accurate workflow. Like other Sunlight and Daylight systems in 3ds Max, Sunlight Positioner also follows the geographically correct angle and movement of the sun over a given location on earth. Most of the controls for Sunlight Positioner are similar to that of the Daylight system discussed in Chapter 15.

PLACE HIGHLIGHT TOOL

Menu bar:	Tools > Align > Place Highlight
Main Toolbar:	Align flyout > Place Highlight
Keyboard:	CTRL + H

The **Place Highlight** tool is used to align a light with an object to position its highlight accurately. Before performing the alignment, make sure that the object with highlight is visible in the viewport. Now, select the light in the viewport and choose the **Place Highlight** tool; the shape of the cursor will change. Next, move the cursor over the object on which you want to place the highlight; a selection cursor will be displayed, as shown in Figure 13-44. Click on it; the light will be aligned accordingly and the highlight will be repositioned, refer to Figure 13-45.

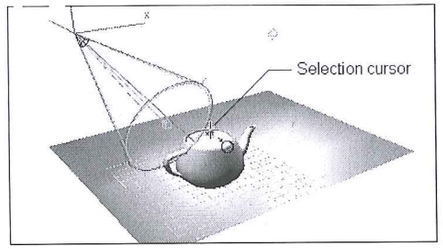

Figure 13-44 *The selection cursor displayed after invoking the* ***Place Highlight*** *tool*

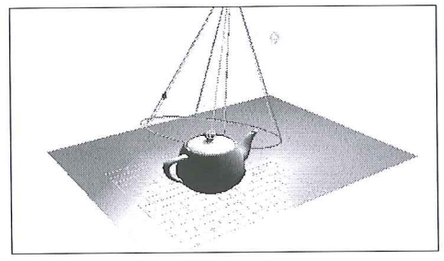

Figure 13-45 *The light aligned as per the selection of the face of the object*

CAMERAS

In 3ds Max, the cameras are used to adjust a particular view in a scene. These cameras act as the still image or video cameras in the real world. There are three types of cameras in 3ds Max 2017, namely Target, Free and Physical. The target camera has two parts, the target camera and a target object, as shown in Figure 13-46. It displays the view according to the position of the target object. You can move the target object and the target camera independently. The free camera does not have any target object, as shown in Figure 13-47. It displays the view in the direction of the camera. You can use the free camera to perform the walkthrough animation. The physical camera uses exposure control and produces photorealistic renderings.

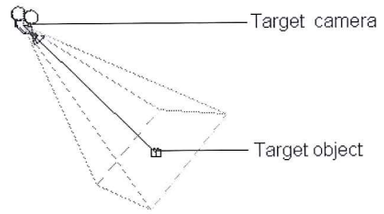

Figure 13-46 *The target camera*

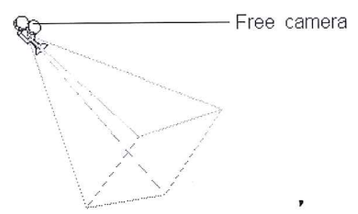

Figure 13-47 *The free camera*

Creating a Target Camera

Menu bar:	Create > Cameras > Target Camera
Command Panel:	Create > Cameras > Standard > Object Type rollout > Target

To create a target camera, choose **Create > Cameras** in the **Command Panel**; the **Standard** option will be displayed in the drop-down list below the **Cameras** button. You can use the tools in the **Object Type** rollout to create cameras, refer to Figure 13-48. Choose the **Target** tool; the **Name and Color**, **Parameters**, and **Depth of Field Parameters** rollouts will be displayed in the **Command Panel**. Next, move the cursor over the viewport; the shape of cursor will change. Press and hold the left mouse button to specify the location of the camera, drag the cursor to specify the target of the camera, and release the left mouse button; the target camera will be displayed in the viewports. You can modify the parameters of the camera using

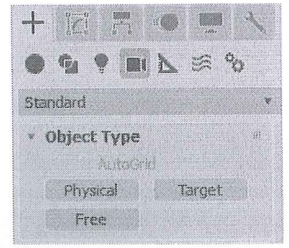

Figure 13-48 *The Object Type rollout with tools to create cameras*

the rollouts displayed in the **Command Panel**. Next, right-click in the viewport to exit the command.

To display the camera view in the viewport, move the cursor over the POV viewport label and click on it; a flyout will be displayed. Choose the **Cameras** option; a cascading menu will be displayed, as shown in Figure 13-49. Choose the **Camera001** option; the current viewport label will be replaced by the Camera001 label. Alternatively, you can press the C key to display the camera view. The **Parameters** rollout is used to modify the parameters of the camera and is discussed next.

Parameters Rollout

To modify the parameters of the camera, make sure that the camera is selected in the viewport. Next, choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed, as shown in Figure 13-50.

The **Lens** spinner in this rollout is used to specify the focal length of the camera in millimeters. The focal length is the distance between the camera lens and its focus. Set the value in the **FOV** spinner to specify the field of view of the camera in degrees. The field of view (FOV) determines the area that the camera can view in the viewport. The **Stock Lenses** area in this rollout is discussed next.

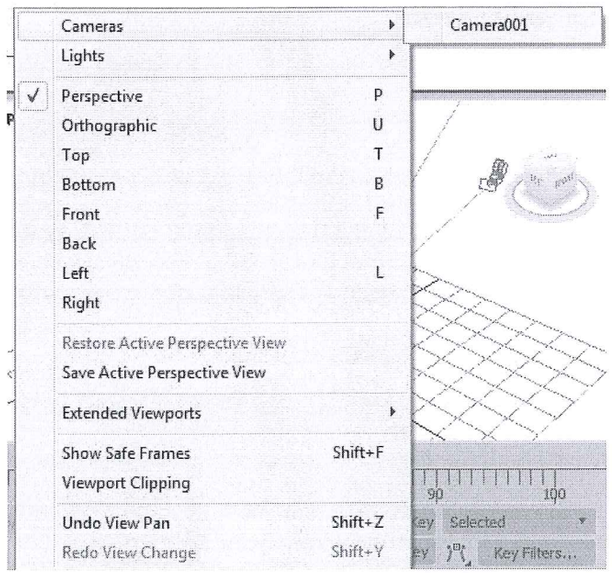

***Figure 13-49** The cascading menu displayed on choosing the **Cameras** option*

***Figure 13-50** Partial view of the **Parameters** rollout*

Stock Lenses Area

Choose one of the buttons in this area to set the focal length of the camera in millimeters. On choosing a button in this area, the value in the **Lens** and **FOV** spinners will also change automatically.

The **Type** drop-down list is used to set the type of camera in the viewport. The **Target Camera** is selected by default in this drop-down list. Select the **Free Camera** option to use the free camera. Select the **Show Cone** check box to view the FOV cone in all viewports, even if the camera is not selected. Select the **Show Horizon** check box to view the horizon line displayed in dark gray color in the Camera viewport.

Creating a Free Camera

Menu bar:	Create > Cameras > Free Camera
Command Panel:	Create > Cameras > Standard > Object Type rollout > Free

To create a free camera, choose **Create > Cameras** in the **Command Panel**; the **Standard** option will be displayed in the drop-down list. Choose the **Free** tool from the **Object Type** rollout; the **Name and Color**, **Parameters**, and **Depth of Field Parameters** rollouts will be displayed. Move the cursor over the viewport; the shape of the cursor will change. Now, click in the viewport; the camera will be displayed in the viewports. You can modify the parameters of the camera using the rollouts displayed in the **Command Panel**. The options in these rollouts are the same as those discussed in the target camera.

Creating a Physical Camera

Menu bar:	Create > Cameras > Create Physical Camera From View
Command Panel:	Create > Cameras > Standard > Object Type rollout > Physical

This camera is used to create photorealistic, physically based renderings. To create a physical camera, choose **Create > Cameras** in the **Command Panel**; the **Standard** option will be displayed in the drop-down list below the **Cameras** button. Choose the **Physical** tool; the **Name and Color**, **Basic**, **Physical Camera**, **Exposure**, **Bokeh(Depth of Field)**, **Perspective Control**, **Lens Distortion**, and **Miscellaneous** rollouts will be displayed in the **Command Panel**, refer to Figure 13-51. Next, move the cursor over the viewport; the shape of cursor will change. Press and hold the left mouse button to specify the placement of the camera, drag the cursor to specify the target of the camera, and release the left mouse button; the physical camera will be displayed in the viewports. You can modify the parameters of the camera using the rollouts displayed in the **Command Panel**. Next, right-click in the viewport to exit the command.

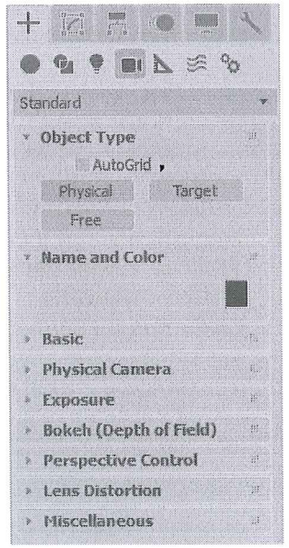

***Figure 13-51** Various rollouts to create a physical camera*

To display the camera view in the viewport, move the cursor over the POV viewport label and click on it; a flyout will be displayed. Choose the **Cameras** option; a cascading menu will be displayed. Choose the **PhysCamera001** option; the current viewport label will be replaced by the PhysCamera001 label. Alternatively, you can press the C key to display the camera view. The commonly used rollouts are discussed next.

Basic Rollout

The options in the **Basic** rollout are discussed next.

Targeted

The **Targeted** check box is selected by default. It is used to specify that the camera has a target.

Target Distance

The **Target Distance** spinner is used to specify the distance of a target with focal plane.

Viewport Display Area

The options in the **Show Cone** drop-down list of this area are used to specify whether the camera cone will be displayed always, never, or on selection. The **Show Horizon Line** check box is used to display the horizontal line in the Camera viewport.

Physical Camera Rollout

The options in the **Physical Camera** rollout are discussed next.

Film/Sensor Area

The options in the **Preset** drop-down list are used to specify the film sensor of a physical camera. The **Width** spinner allows you to specify a custom film sensor width. If you enter a custom width in this spinner, the **preset** drop-down list will change to **Custom**.

Lens Area

The **Focal Length** spinner is used to specify the focal length of lens. If you select the check box located below it, the **Specify FOV** spinner will be activated. You can set the value in this spinner to specify the field of view in degrees. Similarly, set the value in the **Zoom** spinner to adjust the zoom level of camera. The **Aperture** spinner allows you to set the aperture as an f-number or f-step. This spinner allows you to zoom the camera without changing its position.

Focus Area

The **Use Target Distance** radio button is used to set the focal distance same as the target distance. If you want the focal distance to be different than the target distance, select the **Custom** radio button; the **Focus Distance** spinner will be activated. Next, set the value in this spinner to change the focal distance. The **Lens Breathing** spinner is used to move the lens toward the focal distance or away from it to adjust the field of view. The **Enable Depth of Field** check box is clear by default. If selected, the camera generates the depth of field (blur offset) based on the aperture settings. The blurring occurs at a distance which is not equal to the focal distance.

Shutter Area

The options in the **Type** drop-down list are used to specify the unit of shutter speed. The **Duration** spinner is used to set the shutter speed. Note that the shutter speed depends on the type of unit specified in the **Type** drop-down list. Select the check box below the **Duration** spinner; the **Offset** spinner will be activated. The **Offset** spinner allows you to control the timing of the opening of the shutter related to the start of each frame. The timing is dependent on the option that you select from the **Type** drop-down list.

The **Enable Motion Blur** spinner is used to generate the motion blur.

Exposure Rollout

The options in the **Exposure** rollout are discussed next.

Exposure Control Installed

If the exposure control is already activated for the physical camera, the **Exposure Control Installed** button in this rollout is deactivated and the label of the button reads "**Exposure Control Installed**". Also, the **Physical Camera Exposure Control** option selected in the drop-down list of the **Exposure Control** rollout in the **Environment and Effects** dialog box changes to **Physical Camera Exposure Control**. If you select the option other than the **Physical Camera Exposure Control** option in this drop-down list, the **Exposure Control Installed** button changes to the **Install Exposure Control** button and the other parameters in the **Exposure** rollout are deactivated. Choose the **Install Exposure Control** button; the **Physical Camera Exposure Control** message box will be displayed. Choose the **OK** button in this message box; the **Install Exposure Control** button will be replaced by the **Exposure Control Installed** button and the **Physical Camera Exposure Control** option will be selected in the drop-down list of the **Exposure Control** rollout in the **Environment and Effects** dialog box.

Exposure Gain Area

When you select the **Manual** radio button, the spinner next to it will be activated. You can use the value in this spinner to set exposure gain via an ISO value. Exposure value is directly proportional to the value in this spinner. The **Target** radio button is selected by default. The more the value in the spinner, the lesser will be the exposure value.

White Balance Area

The **Illuminant** radio button is selected by default. As a result, the drop-down list below it will be activated. The options in this drop-down list consist of various standard light sources. The color swatch next to it changes based on the option selected in the drop-down list and sets the color balance. If you select the **Temperature** radio button, the spinner below it will be activated. The color swatch next to it changes depending on the value set in the spinner and is used to set the color balance. If you select the **Custom** radio button, the color swatch below it will be activated. You can set the color in this color swatch to set the color balance.

Enable Vignetting

If you select the **Enable Vignetting** check box, the **Amount** spinner will be activated. More the value in the **Amount** spinner, more will be the vignetting effect. This effect results in darkness at the edges of the film plane at rendering.

Bokeh (Depth of Field) Rollout

When the **Enable Depth of Field** check box is selected in the **Physical Camera** rollout, a pattern is created in the areas of the image that are out of focus. This is known as Bokeh effect. The options in the **Bokeh (Depth of Field)** rollout are discussed next.

Aperture Shape Area

This area defines the pattern shape. By default, the **Circular** radio button is selected. As a result, circular shaped pattern is created. If you select the **Bladed** radio button, the sharp edge shaped pattern is created in which the number of edges in the shape depend on the value in the **Blades** spinner. The **Rotation** spinner is used to specify the angle of rotation for all shapes in the pattern. If you select the **Custom Texture** radio button, the **None** radio button is activated. Choose the **None** button to select a map. This map replaces the shape in a pattern.

Center Bias (Ring Effect) Area

If you move the slider toward right or enter a positive value in the spinner next to it, the amount of blurriness is more in the out of focus parts of the image and vice-versa.

Optical Vignetting (Cat Eye) Area

This option vignettes the rendered frame for simulating the cat's eye effect. The highlights appear to be elliptical instead of round.

Anisotropy (Anamorphic Lens) Area

This slider lets you stretch the aperture vertically (negative value) or horizontally (positive value). This stretching simulates anamorphic lens effect.

Perspective Control Rollout

The options in the **Perspective Control** rollout are discussed next.

Lens Shift Area

The spinners in this area are used to move the camera view horizontally or vertically without changing its position or orientation.

Tilt Correction Area

The spinners in this area are used to tilt the camera horizontally or vertically and to correct the perspective. The **Auto Vertical Tilt Correction** check box is used to auto correct the tilt correction along the Z axis.

Lens Distortion Rollout

The options in the **Lens Distortion** rollout are discussed next.

Distortion Type Area

The **None** radio button is selected by default. As a result, there is no distortion applied. Select the **Cubic** radio button; the **Amount** spinner will be activated. The positive value in this spinner results in pincushion distortion whereas negative value in this spinner results in barrel distortion. If you select the **Texture** radio button, the **None** button will be activated. Choose the **None** button to select a map. The distortion of the image depends on the colors in the image.

Miscellaneous Rollout

The options in the **Miscellaneous** rollout are discussed next.

Clipping Planes Area

Select the **Enable** check box to add near and far clipping planes. Specify the distance of the near clipping plane from the camera in the **Near** spinner and the distance of the far clipping plane from the camera in the **Far** spinner. Note that the objects in between the camera and the near clipping plane and the objects which are outside the far clipping plane will not be visible in renderings.

Environment Ranges Area

The values in the **Near Range** and **Far Range** spinners specify the near and far range limits, respectively for the atmospheric effects added in the scene.

ALIGN CAMERA TOOL

Menu bar: Tools > Align > Align Camera
Main Toolbar: Align flyout > Align Camera

The **Align Camera** tool is used to align a camera normal to a selected surface. To align a camera, select it in the viewport and then choose the **Align Camera** tool; the shape of the cursor will change. Next, move the cursor over the surface of the object; a selection cursor will be displayed, as shown in Figure 13-52. Select the face; the camera will be aligned accordingly, refer to Figures 13-53, 13-54, and 13-55.

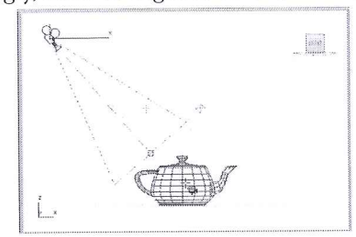

Figure 13-52 *The cursor displayed on the object to get the proper alignment*

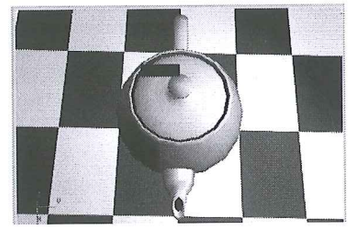

Figure 13-53 *The Camera viewport before alignment*

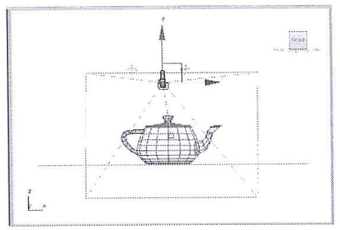

Figure 13-54 *The new position of the camera after using the* ***Align Camera*** *tool*

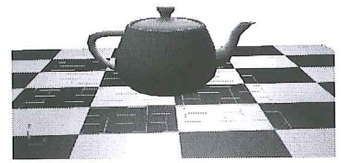

Figure 13-55 *The Camera viewport after using the* ***Align Camera*** *tool*

TUTORIALS

Before starting the tutorials, you need to download the *c13_3dsmax_2017_tut.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A comprehensive Guide*

Extract the contents of the zipped file and save them in the *Documents* folder.

Tutorial 1

In this tutorial, you will create a scene, as shown in Figure 13-56, by using the lights, materials and maps. **(Expected time: 30 min)**

Figure 13-56 *The scene to be created*

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Create lights.
d. Save and render the scene.

Creating the Project Folder

1. Create a new project folder with the name *c13_tut1* at *\Documents\3dsmax2017* and then save the file with the name *c13tut1*, as discussed in Tutorial 1 of Chapter 2.

2. Open the Windows Explorer and then browse to the *c13_3dsmax_2017_tut* folder and copy the *sky_1.jpg* file from this folder to *\Documents\3dsmax2017\c13_tut1\sceneassets\images*.

Opening the File

1. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c13_3dsmax_2017_tut* and select the **c13_tut1_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 13-57.

2. Choose **Save As** from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c13_tut1\scenes*. Save the file with the name *c13tut1.max* at this location.

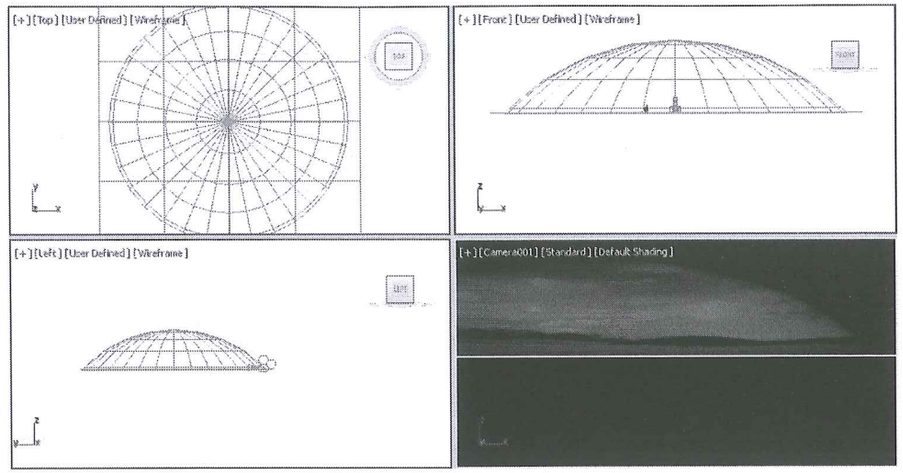

Figure 13-57 *The c13_tut1_start.max file*

Creating Lights

In this section, you will create lights by using the **Omni** tool.

1. Activate the Top viewport. Choose **Create > Lights** in the **Command Panel**; the **Photometric** option is displayed in the drop-down list below the **Lights** button. Choose the **Standard** option from the drop-down list.

2. Choose the **Omni** tool from the **Object Type** rollout in the **Command Panel** and click in the Top viewport; the omni light is displayed in the viewports. It is automatically named as *Omni001*.

3. Choose the **Select and Move** tool and align *Omni001* in the viewports, as shown in Figure 13-58.

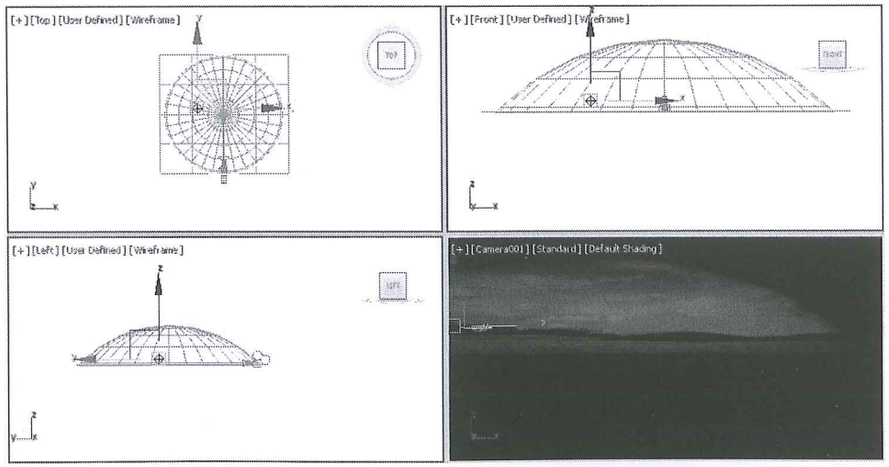

Figure 13-58 *Alignment of Omni001 in the viewports*

4. Create one more omni light at the center of *background* in the Top viewport. It is automatically named as *Omni002*. Now, align *Omni002* in all viewports, as shown in Figure 13-59.

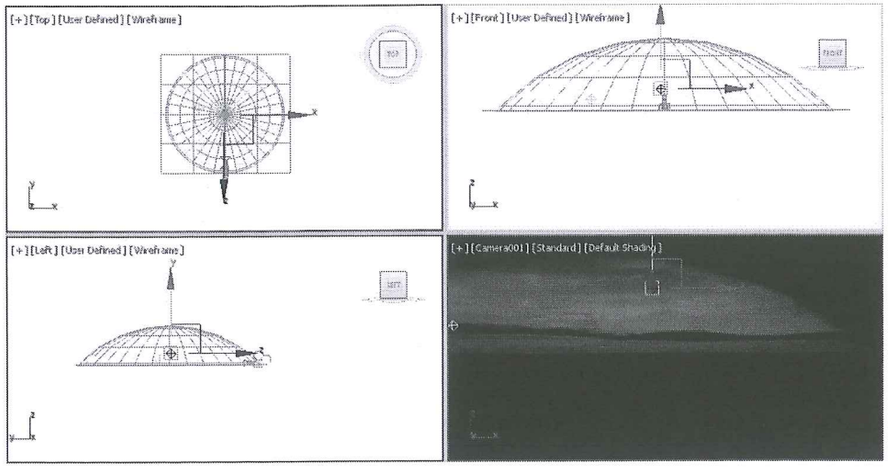

Figure 13-59 *Alignment of Omni002 in the viewports*

Next, you need to modify *Omni002* light to create the sun effect.

5. Make sure that *Omni002* light is selected and then choose the **Modify** tab in the **Command Panel**; the rollouts to modify the light are displayed in the modify panel.

6. Expand the **Atmospheres & Effects** rollout and choose the **Add** button; the **Add Atmosphere or Effect** dialog box is displayed. Select the **Lens Effects** option and then choose the **OK** button; the **Lens Effects** option is displayed in the text area of the **Atmospheres & Effects** rollout. Next, you need to modify the parameters of **Lens Effects**.

7. Select **Lens Effects** in the **Atmospheres & Effects** rollout and choose the **Setup** button; the **Environment and Effects** dialog box is displayed. By default, the **Effects** tab is chosen in the **Environment and Effects** dialog box.

8. In the **Effects** rollout, make sure the **Lens Effects** option is selected under the **Effects** area. Now, select the **Glow** effect and choose the right arrow button in the **Lens Effects Parameters** rollout; the **Glow** effect is displayed in the list available on the right side, as shown in Figure 13-60. Also, the **Glow Element** rollout is displayed at the bottom of the **Environment and Effects** dialog box to modify the parameters of the **Glow** effect.

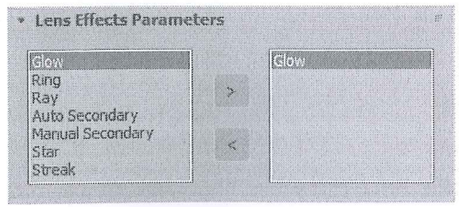

Figure 13-60 *The* ***Lens Effects Parameters*** *rollout*

Note

1. To view all rollouts, you need to scroll inside the dialog box.
2. You can view the effects of the ***Lens Effects*** *option only after rendering.*

9. In the **Glow Element** rollout, set the value **20.0** in the **Size** spinner. Use the default values for other options. In the **Lens Effects Parameters** rollout, select the **Ray** effect and choose the right arrow button; the **Ray** effect is displayed in the text area available on the right side. Also, the **Ray Element** rollout is displayed at the bottom of the **Environment and Effects** dialog box to modify the parameters of the **Ray** effect.

10. In the **Ray Element** rollout, set the values in the spinners as follows and close the **Environment and Effects** dialog box.

Size: **50.0** Num: **20**

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the file *c13_3dsmax_2017_rndr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu. Next, activate the Camera001 viewport.

2. Choose the **Render Production** tool; the **Rendered Frame** window is displayed showing the final output of the scene at one frame, as shown in Figure 13-61.

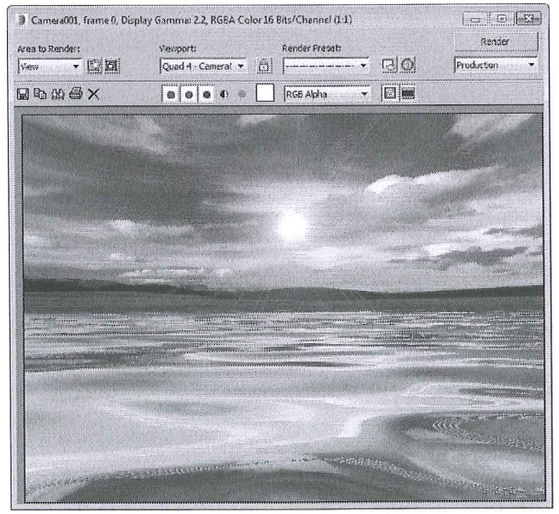

Figure 13-61 *The final output of the scene*

3. Close the **Rendered Frame** window.

Tutorial 2

In this tutorial, you will illuminate a room by using the **Omni** and **Target Direct** tools, as shown in Figure 13-62. **(Expected time: 30 min)**

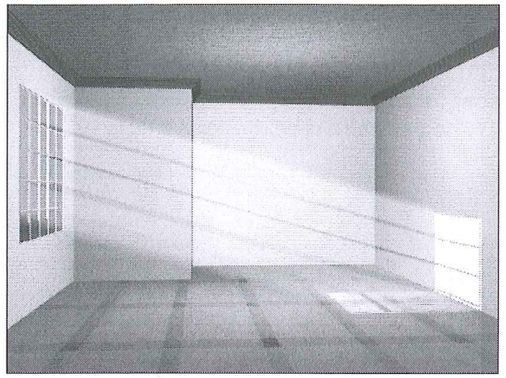

Figure 13-62 *The illuminated room*

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Create lights.
d. Create the background.
e. Save and render the scene.

Creating the Project Folder

Create a new project folder with the name *c13_tut2* at *\Documents\3dsmax2017* and then save the file with the name *c13tut2*, as discussed in Tutorial 1 of Chapter 2. Now, copy *Finishes.Masonry Flooring.Marble.Beige-Grid.jpg* and *CLOUDS4.jpeg* files to *\Documents\3dsmax2017\c13_tut2\sceneassets\images*.

Opening the File

1. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c13_3dsmax_2017_tut* and select the **c13_tut2_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 13-63.

2. Choose **Save As** from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c13_tut2\scenes*. Save the file with the name *c13tut2.max* at this location.

Creating Lights

In this section, you will create lights by using the **Omni** and **Target Direct** tools.

1. Activate the Top viewport. Choose **Create > Lights** in the **Command Panel** and select the **Standard** option from the drop-down list. Next, choose the **Omni** tool from the **Object Type**

rollout. Next, click in the Top viewport; the omni light is displayed in the viewport and it is automatically named as *Omni001*.

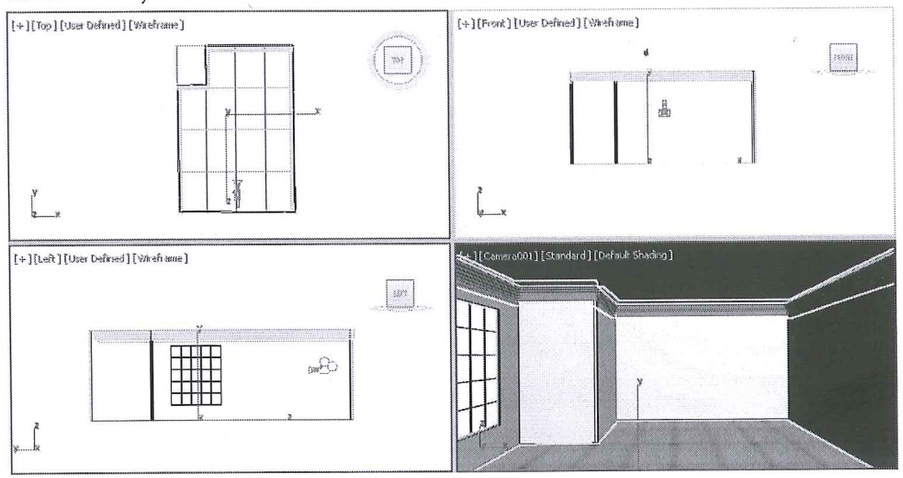

Figure 13-63 *The c13_tut2_start.max file*

2. In the **Modify** tab, set the following parameters:

General Parameters rollout
Select the **On** check box in the **Shadows** area

Intensity/Color/Attenuation rollout
Set the value **0.6** in the **Multiplier** spinner

3. Select the **Multiplier** color swatch and modify the colors by setting the following parameters:

Red: **255** Green: **219** Red: **181**

4. Align *Omni001* in viewports, as shown in Figure 13-64.

Next, you need to create the target direct light in the scene to give the shadow effect.

5. Activate the Front viewport, choose the **Zoom** tool, and zoom out until the objects are displayed about half of their original size.

6. Choose the **Target Direct** tool from **Create > Lights > Standard > Object Type** rollout in the **Command Panel**. Move the cursor on the left side of the Front viewport; the shape of the cursor changes. Next, press and hold the left mouse button to specify the location of the light and drag the cursor near the front portion of *wall001* to specify the target of the light. Release the left mouse button; the light is displayed in all viewports and it is automatically named as *Direct001*.

7. Choose the **Modify** tab in the **Command Panel**; various rollouts are displayed to modify the target direct light.

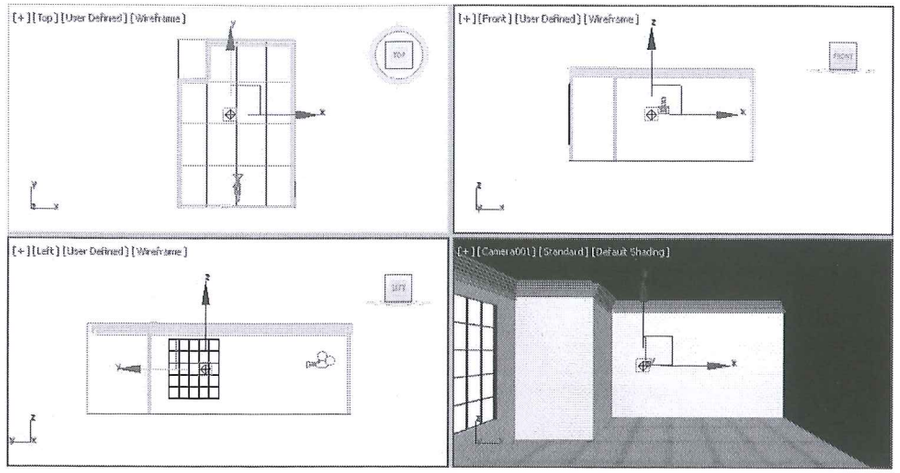

Figure 13-64 *The Omni001 light in viewports*

8. Expand the **General Parameters** rollout and select the **On** check box in the **Shadows** area.

9. In the **Directional Parameters** rollout, select the **Rectangle** radio button and set the values in the respective spinners as given below.

   Hotspot/Beam: **84.0** Falloff/Field: **86.0**

10. Expand the **Atmospheres & Effects** rollout and choose the **Add** button; the **Add Atmosphere or Effect** dialog box is displayed. Select the **Volume Light** option and choose the **OK** button; the **Volume Light** option is displayed in the text area of the **Atmospheres & Effects** rollout.

    Next, you need to modify the parameters of the **Volume Light**.

11. Select the **Volume Light** option in the **Atmospheres & Effects** rollout and choose the **Setup** button; the **Environment and Effects** dialog box is displayed. The **Environment** tab is chosen by default in the **Environment and Effects** dialog box.

12. In the **Atmosphere** rollout, make sure the **Volume Light** option is selected in the **Effects** area. Set the value **1.5** in the **Density** spinner of the **Volume** area in the **Volume Light Parameters** rollout. Use the default values for other options and close the **Environment and Effects** dialog box.

Note
You can also use different settings in the ***Volume Light Parameters*** *rollout to give different effects in the scene.*

13. Align *Direct001* light in the viewports to cover window, as shown in Figure 13-65.

Note
You can adjust the position of the Camera001 to view the scene with desired light effects.

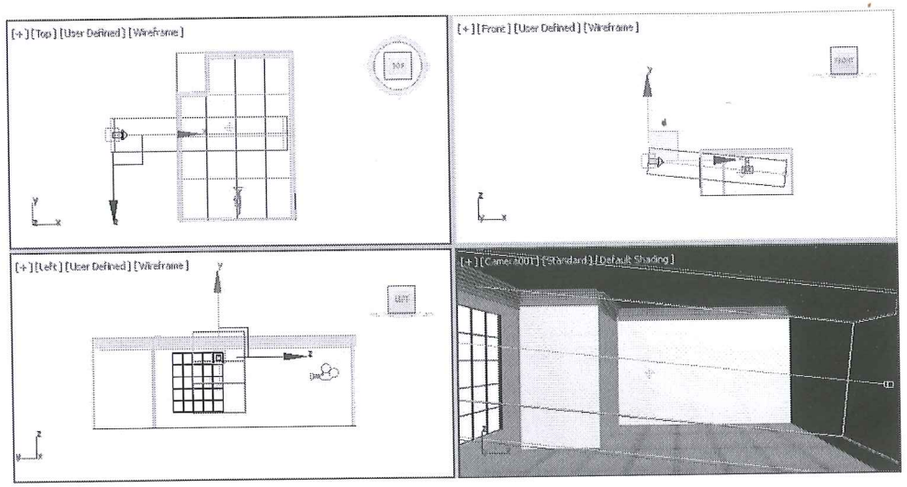

Figure 13-65 *Alignment of the Direct001 light in viewports*

Creating Background

In this section, you will create a background for the scene across the window.

1. Choose **Rendering > Environment** from the menu bar; the **Environment and Effects** dialog box is displayed.

2. The **Environment** tab is chosen by default in the **Environment and Effects** dialog box. In the **Background** area of the **Common Parameters** rollout, choose the **Environment Map** button that is currently labeled as **None**; the **Material/Map Browser** dialog box is displayed.

3. Select the **Bitmap** map and choose the **OK** button; the **Select Bitmap Image File** dialog box is displayed. As the project folder is already set, the *images* folder is displayed in the **Look in** drop-down list of this dialog box. Select the **CLOUDS4.jpg** file and choose the **Open** button; the selected image is displayed in the background after rendering. Close the **Environment and Effects** dialog box.

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the file *c13_3dsmax_2017_rndr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu. Activate the Camera001 viewport.

2. Choose the **Render Production** tool in the **Main Toolbar**; the **Rendered Frame** window is displayed, showing the final output of the scene, as shown in Figure 13-66.

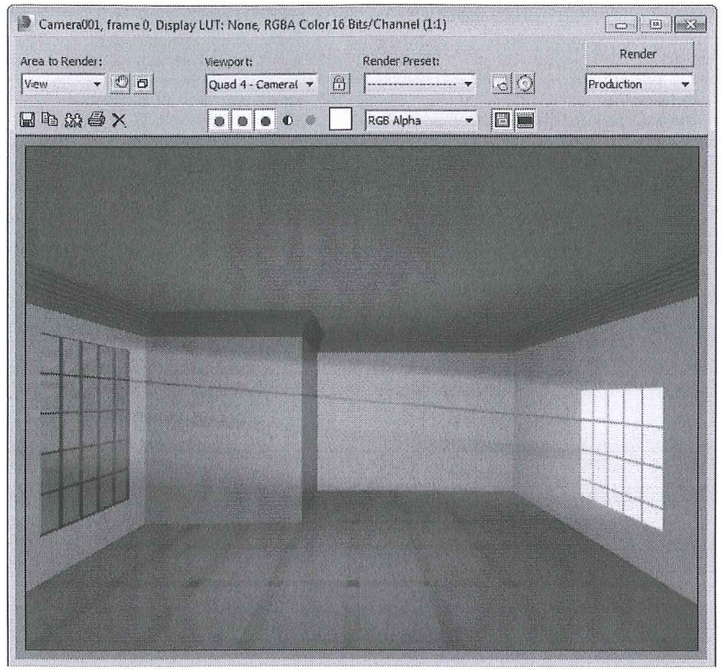

Figure 13-66 *The final output after rendering*

3. Close this window.

Tutorial 3

In this tutorial, you will illuminate a night scene of a room using photometric lights, refer to Figure 13-67. **(Expected time: 30 min)**

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Create the roof light.
d. Create wall lights.
e. Save and render the scene.

Creating the Project Folder

1. Create a project folder with the name *c13_tut3* in the *3dsmax2017* folder, as discussed in Tutorial 1 of Chapter 2.

2. Open Windows Explorer and then browse to *\Documents\c13_3dsmax_2017_tut*. Next, copy all jpeg files to *\Documents\3dsmax2017\c13_tut3\sceneassets\images*. Also, copy *1.IES* file to *\Documents\3dsmax2017\c13_tut3\sceneassets\photometric*.

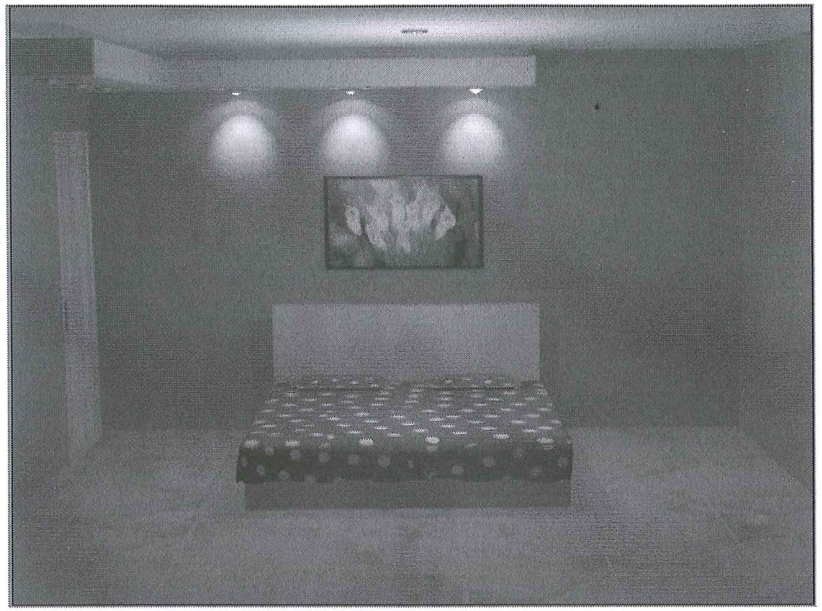

Figure 13-67 *The illuminated night scene of a room*

Opening the File

1. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c13_3dsmax_2017_tut* and select the **c13_tut3_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 13-68.

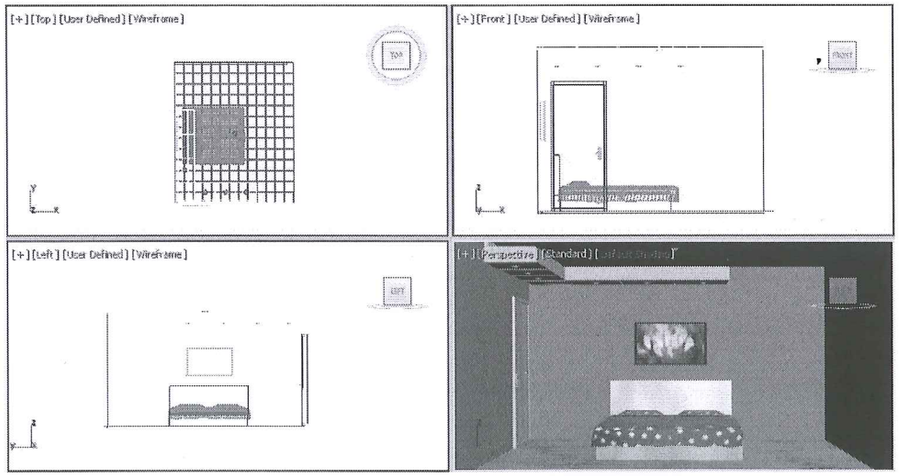

Figure 13-68 *The c13_tut3_start.max file*

2. Choose **Save As** from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c13_tut3\scenes*. Save the file with the name *c13tut3.max* at this location.

Creating the Roof Light

In this section, you will create the roof light by using the **Free Light** tool. You will also change the renderer from scanline renderer to mental ray renderer.

1. Choose the **Render Setup** tool from the **Main Toolbar**; the **Render Setup: Default Scanline Renderer** dialog box is displayed.

2. In this dialog box, click on the **Renderer** drop-down list and select **NVIDIA mental ray**; the **Default Scanline Renderer** is changed to **NVIDIA mental ray** renderer.

3. Choose the **Maximize Viewport Toggle** tool to view all the viewports and activate the Top viewport. Choose **Create > Lights** from the **Command Panel**. By default, the **Photometric** option is displayed in the drop-down list below the **Lights** button.

4. Choose the **Free Light** tool from the **Object Type** rollout; the **Photometric Light Creation** message box is displayed, refer to Figure 13-69. Next, choose **Yes** from this message box. Also, various rollouts are displayed in the **Command Panel**.

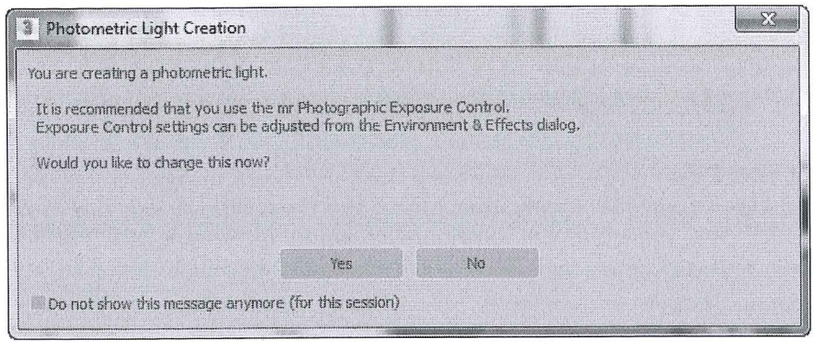

Figure 13-69 *The* ***Photometric Light Creation*** *message box*

5. Click at the center of the room; the free light is created with the name *PhotometricLight001*. Enter **rooflight1** in the **Name and Color** rollout.

6. Choose the **Select and Move** tool and align *rooflight1* in the viewports, as shown in Figure 13-70.

   Next, you will modify the shape of *rooflight1*.

7. Choose the **Modify** tab in the **Command Panel.** Next, in the **Templates** area, select **40W Bulb** from the drop-down list.

8. In the **Emit light from (Shape)** area of the **Shape/Area Shadows** rollout, make sure the **Point** option is selected in the drop-down list.

   Next, you will modify the parameters of *rooflight1* to lit the room with proper intensity, colors, and shadows.

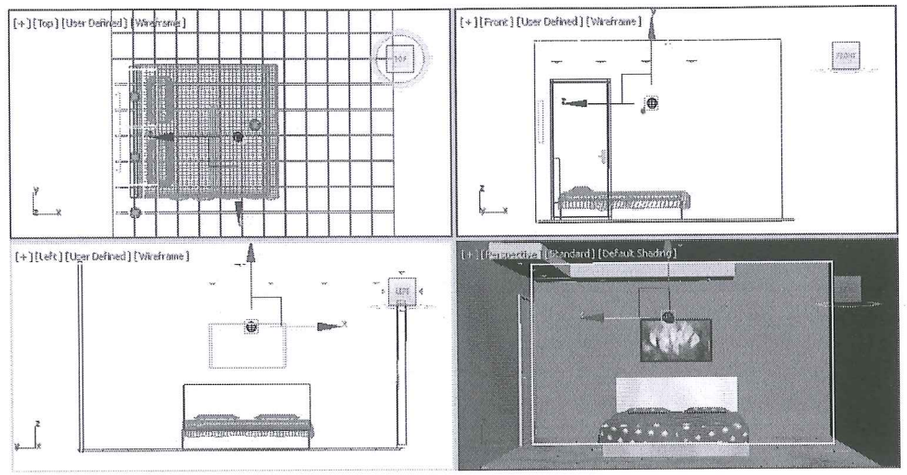

Figure 13-70 *The rooflight1 aligned in the viewports*

9. In the **General Parameters** rollout, make sure the **On** check box is selected in the **Shadows** area. Next, select **Ray Traced Shadows** in the drop-down list below this check box.

10. In the **Shadow Parameters** rollout, enter **0.7** in the **Dens.** spinner. Next, choose the **Color** color swatch; the **Color Selector: Shadow Color** dialog box is displayed. In this dialog box, enter **15** in the **Red**, **Green**, and **Blue** spinners and then choose the **OK** button to close the dialog box.

11. Make sure the **Uniform Spherical** option is selected in the drop-down list located in the **Light Distribution (Type)** area.
    The **Uniform Spherical** option is used to spread light in all directions.

12. Make sure the **Kelvin** radio button is selected.

13. Set the value **6500** in the **Kelvin** spinner; the color swatch located next to the **Kelvin** spinner is changed to white. Next, choose the **Filter Color** color swatch located below it; the **Color Selector: Filter Color** dialog box is displayed. In this dialog box, make sure the value in the **Red**, **Green**, and **Blue** spinners is set to **255** and then choose the **OK** button to close the dialog box.

Note

The value in the ***Kelvin*** *spinner and the color in the* ***Filter Color*** *color swatch together define the color shade of the light being created. You can use different combinations of the spinner value and color shade in the color swatch to achieve a variety of light color shades.*

Next, you will set the intensity of *rooflight1*.

14. In the **Intensity** area of the **Intensity/Color/Attenuation** rollout, select the **lm** radio button; the value in the first spinner located below the **lm** radio button changes and displays the intensity of the light in Lumen. Next, set the value **40** in this spinner; the intensity of the light is changed.

15. Choose **Rendering > Environment** from the menu bar; the **Environment and Effects** dialog box is displayed. In this dialog box, Make sure **mr Photographic Exposure Control** is selected in the drop-down list of the **Exposure Control** rollout. Next, click on the **Render Preview** button to see the render preview in the window available in this rollout.

16. In the **mr Photographic Exposure Control** area, select **Physically Based Lighting, Indoor Nighttime** in the **Preset** drop-down list. Next, select the **Exposure Value (EV)** radio button, if not already selected and then enter **0.6** in the **Exposure Value (EV)** spinner; the preview of the render is updated in the **Exposure Control** rollout.

17. In the **Image Control** area, set the values as given next:

    Highlights (Burn): **0.5** Midtones: **1.25** Shadows: **0.1**

    Now, you will render the scene to view the effect of modifying *rooflight1* parameters in the scene.

18. Activate the perspective viewport. Next, choose the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 13-71.

Figure 13-71 *The rendered image*

Creating Wall Lights

In this section, you will create wall lights by using the **Target Light** tool. You will also use IES file to achieve a specific light pattern.

1. Switch from the Left viewport to the Right viewport. Now, activate the Front viewport. Choose **Create > Lights** from the **Command Panel**. Next, choose the **Target Light** tool from the **Object Type** rollout; various rollouts are displayed in the **Command Panel**.

2. Click at a point and drag the cursor downward. Next, release the left mouse button; a target light is created. In the **Name and Color** rollout, enter **spot light1**. Next, choose the **Select and Move** tool and then select *spot light1* and *spot light1.Target*. Now, align them in the viewports, as shown in Figure 13-72.

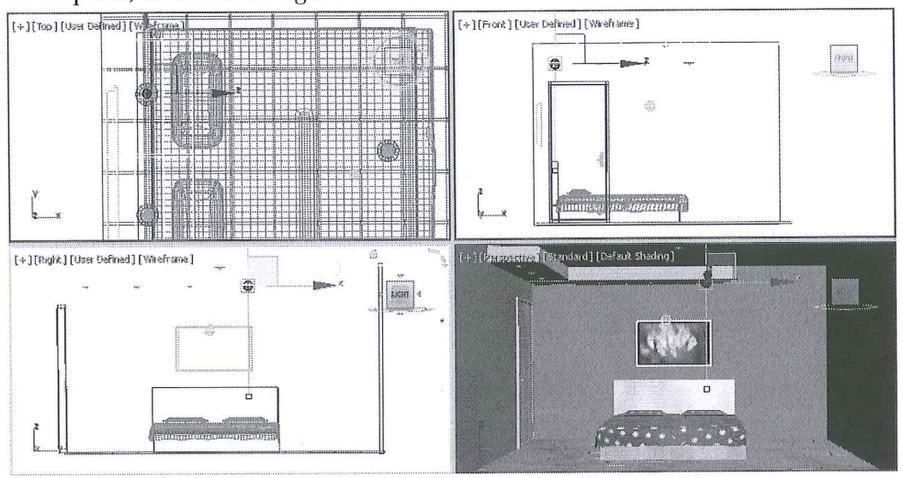

Figure 13-72 *The spot light1 and spot light1.Target aligned in the viewports*

Next, you need to modify the parameters of *spot light1*.

3. Select *spot light1* and then choose the **Modify** tab in the **Command Panel**. In the **General Parameters** rollout, select the **Photometric Web** option in the drop-down list from the **Light Distribution (Type)** area; a **Distribution (Photometric Web)** rollout is displayed in the **Command Panel**.

   Now, you will use a standard photometric IES file to create a specific lighting pattern.

   These IES files are standard files provided by light manufacturers and are available on the internet for free download.

4. In the **Emit light from (Shape)** area of the **Shape/Area Shadows** rollout, make sure the **Point** option is selected in the drop-down list.

5. Choose the **< Choose Photometric File >** button from the **Distribution (Photometric Web)** rollout; the **Open a Photometric Web File** dialog box is displayed. As the project folder is already set, the *photometric* folder of this project is displayed in the **Look in** drop-down list. Next, select the **1.ies** file from this dialog box and then choose the **Open** button; the label of the button is replaced by the name of the selected file. Also, the lighting pattern is displayed in the window located above this button. Next, set the value in the **Y Rotation** spinner to rotate *spot light1*, as shown in Figure 13-73.

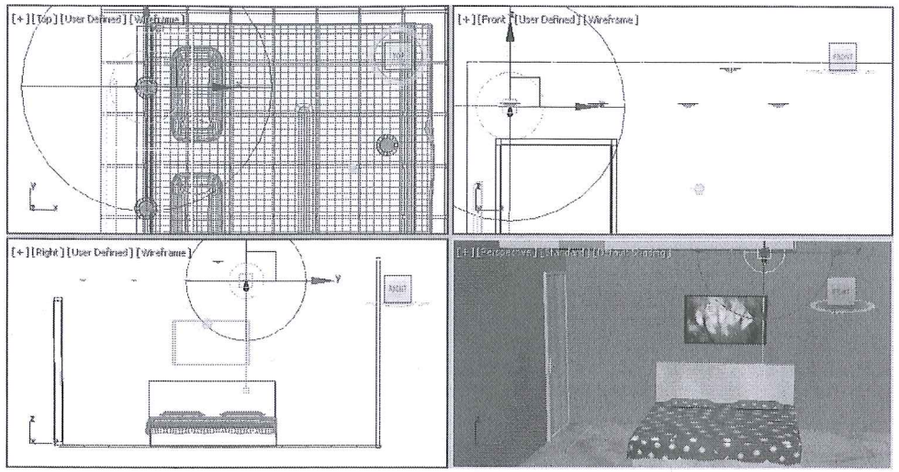

Figure 13-73 *The spot light1 rotated*

Next, you need to set the intensity and color of *spot light1*.

6. Select the radio button located near the **Kelvin** Spinner; the **Kelvin** spinner is activated.

7. Choose the **Filter Color** color swatch located below it; the **Color Selector: Filter Color** dialog box is displayed. In this dialog box, set the value in the **Red**, **Green**, and **Blue** spinners as given next:

   Red: **164** Green: **165** Blue: **112**

   Choose the **OK** button to close the dialog box; the color in the **Filter Color** color swatch is changed.

8. In the **Intensity** area of the **Intensity/Color/Attenuation** rollout, select the **lm** radio button; the value in the first spinner located below this radio button changes and displays the intensity of the light in Lumen. Next, set the value **4** in this spinner.

9. In the **Far Attenuation** area of the **Intensity/Color/Attenuation** rollout, select the **Use** and **Show** check boxes. Next, set **10** and **34** in the **Start** and **End** spinners, respectively.

10. Activate the Perspective viewport. Next, choose the **Render Production** tool from the **Main Toolbar** to view the render.

    Next, you will add glow to the source of *spot light1*.

11. Choose **Rendering > Material Editor > Compact Material Editor** from the menu bar; the **Material Editor** dialog box is displayed. In this dialog box, choose **Utilities > Reset Material Editor Slots** from the Material Editor menu bar; all slots in the **Material Editor** dialog box are empty. Now, select any empty slot in it and modify its name in the **Material Name** text box to *lamp dome material*.

12. Select the **Color** check box in the **Self-Illumination** area of the **Blinn Basic Parameters** rollout. Next, choose the **Color** color swatch and change its color to white.

13. Choose the **Diffuse** and **Specular** color swatches from the **Blinn Basic Parameters** rollout and change its color to white.

15. Set the value **81** in the **Specular Level** spinner and **51** in the **Glossiness** spinner of the **Blinn Basic Parameters** rollout.

16. Select *lamp holder dome* from the Scene Explorer. Next, choose the **Assign Material to Selection** button from the **Material Editor** dialog box; the self illuminating material is applied to *lamp holder dome*.

17. Choose the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, as shown in Figure 13-74. You will notice glow at the source of *spot light1*.

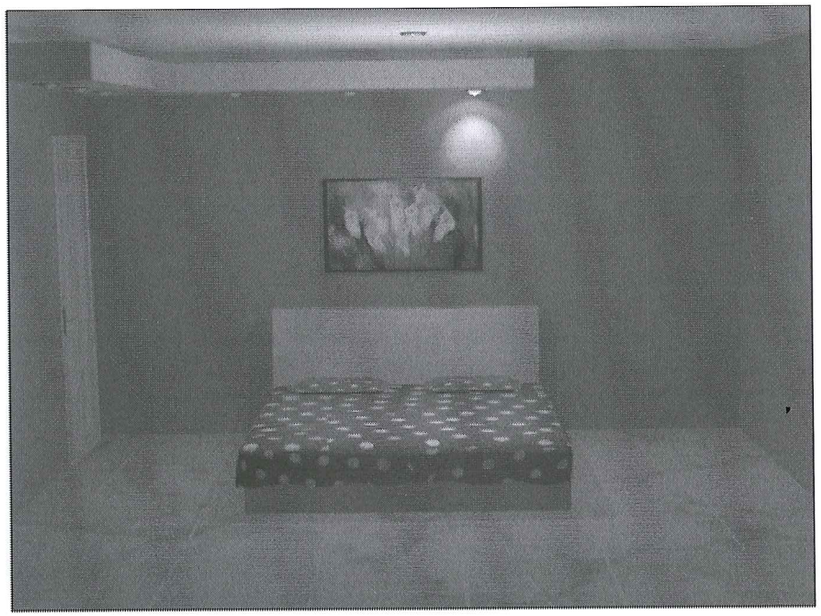

Figure 13-74 *The rendered image*

18. Activate the Right viewport and select *spot light1* and *spot light1.Target*. Next, press and hold the SHIFT key and drag the cursor to the adjacent lamp holder located at the left of *spot light1*. Release the left mouse button; the **Clone Options** dialog box is displayed. In this dialog box, select the **Copy** radio button. Set the value **2** in the **Number of Copies** spinner and choose the **OK** button; two copies of *spot light1* and *spot light1.Target* are created in the viewports. Next, choose the **Select and Move** tool and align these lights in the viewports, as shown in Figure 13-75.

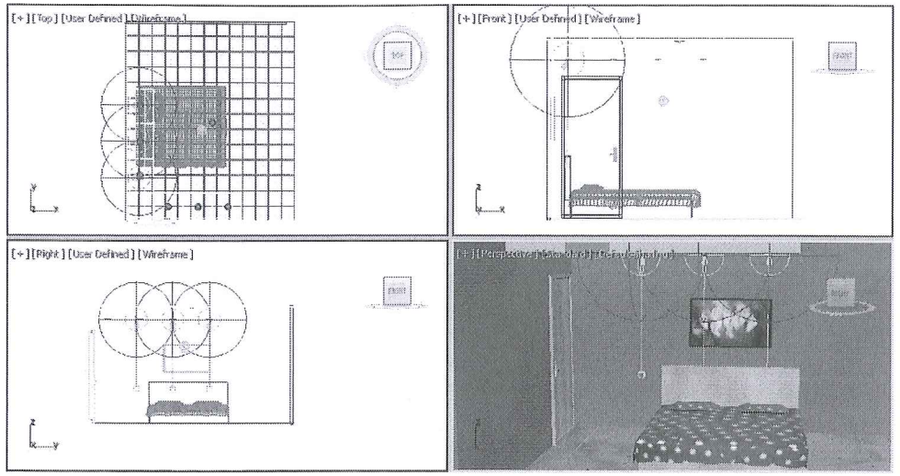

Figure 13-75 *Copies of spot light1 and spot light1.Target aligned in the viewports*

19. Assign the *lamp dome material* to *lamp holder dome 001, lamp holder dome 002* and *lamp holder dome 006* to add glow at the source of lights in the scene.

Note

You can create copies of spot light1 and spot light1.Target and place them at the remaining spot lights of the false ceiling. You need to assign the lamp dome material to remaining lamp holder domes.

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this model by downloading the file *c13_3dsmax_2017_rndr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu.

2. Activate the Perspective viewport. Next, choose the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 13-76.

   You can improve the rendered output further by performing the following steps:

3. Drag the rendered frame window upward to see the parameters available below it. Next, move the slider below the **Final Gather Precision** text box toward right so that **Low** is displayed in that text box.

4. In the **Trace/Bounces Limits** area, enter **2** in the **FG Bounces** spinner. Next, render the output. You will notice the change in the rendered output.

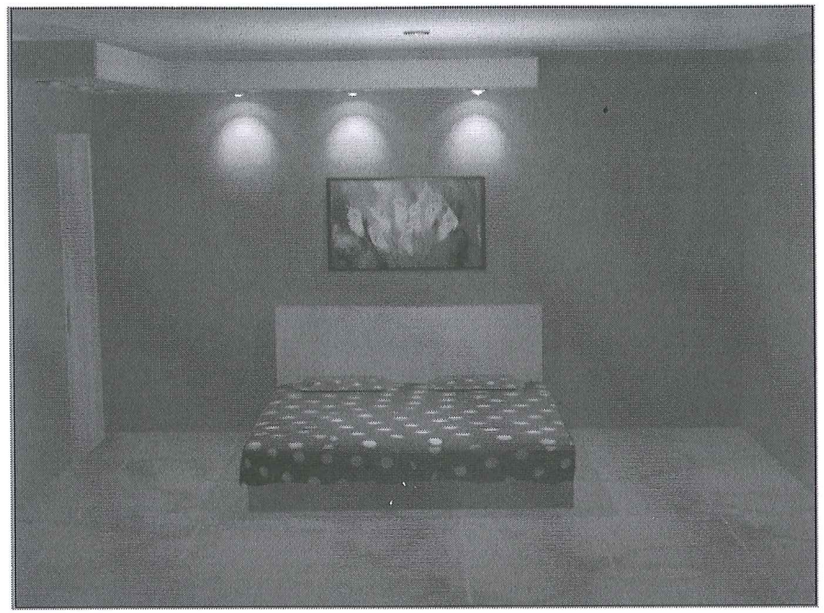

Figure 13-76 *The rendered image*

Tutorial 4

In this tutorial, you will set up a daylight exterior scene, refer to Figures 13-77.

(Expected time: 30 min)

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Open the file.
c. Set up physical camera settings.
d. Set up the skylight.
e. Set up the daylight system.
f. Save and render the scene.

Creating the Project Folder

1. Create a project folder with the name *c13_tut4* in the *3dsmax2017* folder, as discussed in Tutorial 1 of Chapter 2.

2. Open Windows Explorer and then browse to *\Documents\c13_3dsmax_2017_tut*. Next, copy all jpeg files to *\Documents\3dsmax2017\c13_tut4\sceneassets\images*.

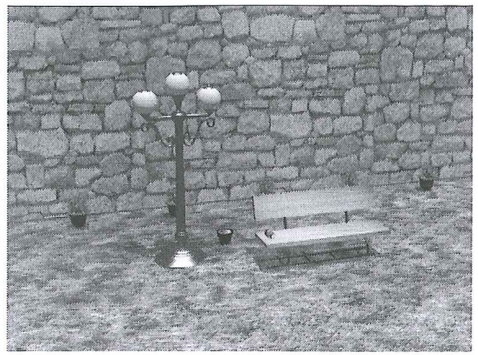

Figure 13-77 *The daylight exterior scene*

Opening the File

1. Choose **Open** from the **Application** menu; the **Open File** dialog box is displayed. In this dialog box, browse to the location *\Documents\c13_3dsmax_2017_tut* and select the **c13_tut4_start.max** file from it. Choose the **Open** button to open the file, refer to Figure 13-78.

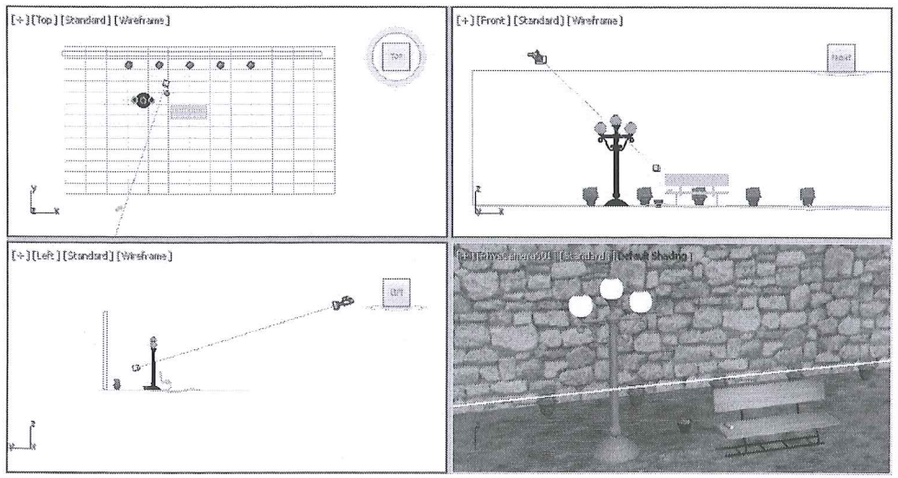

Figure 13-78 *The c13_tut4_start.max file*

2. Choose **Save As** from the **Application** menu; the **Save File As** dialog box is displayed. Browse to the location *\Documents\3dsmax2017\c13_tut4\scenes*. Save the file with the name *c13tut4.max* at this location.

Setting Up Physical Camera Settings

1. Choose **Rendering > Environment** from menu bar; the **Environment and Effects** dialog box is displayed.

2. Select **Physical Camera Exposure Control** from the drop-down list in the **Exposure Control** rollout, if not already selected; the **Physical Camera Exposure Control** rollout is added in the **Environment and Effects** dialog box.

3. In this rollout, enter **8** in the **Exposure Value** spinner of the **Global Exposure** area.

4. Choose the **Render Preview** button from the **Exposure Control** rollout; the render preview is displayed in the window of this rollout, as shown in Figure 13-79. Minimize the **Environment and Effects** dialog box.

5. Render the PhysCamera001 viewport; the rendered image is displayed, as shown in Figure 13-80.

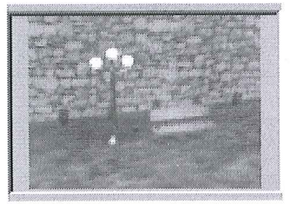

Figure 13-79 *The render preview displayed*

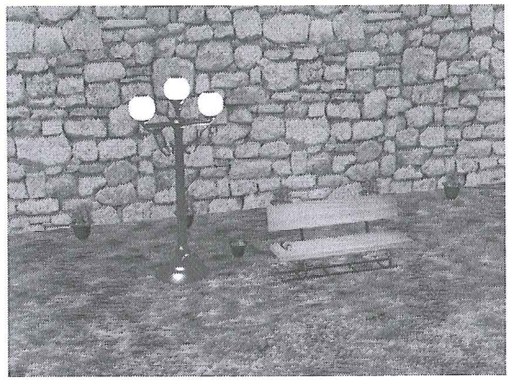

Figure 13-80 *The rendered image*

Setting up the Skylight

1. Activate the Top viewport. Choose **Create > Lights** in the **Command Panel** and select the **Standard** option from the drop-down list. Next, choose the **skylight** tool from the **Object Type** rollout. Next, click in the Top viewport; the skylight is displayed in the viewport and it is automatically named as *Sky001*.

2. Choose the **Modify** tab from the **Command Panel**. In the **Skylight Parameters** area, enter **0.3** in the **Multiplier** spinner. Next, choose the color swatch located next to the **Sky Color** radio button; the **Color Selector: Color** dialog box is displayed. Enter the following values in this dialog box.

   Red: **236** Green: **223** Blue:**173**

   Choose the **OK** button to close the **Color Selector: Color** dialog box.

3. Select the **Cast Shadows** check box from the **Render** area. Also, enter **5** in the **Rays per Sample** spinner.

4. Render the PhysCamera001 viewport; the rendered image is displayed, refer to Figure 13-81.

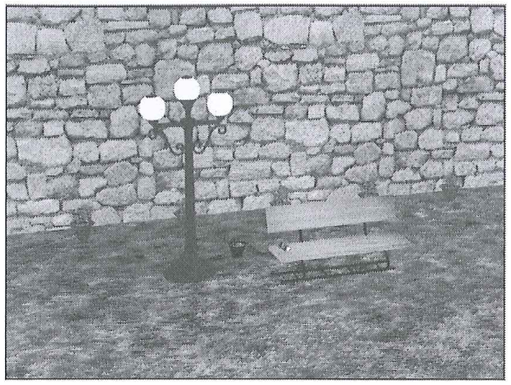

Figure 13-81 *The rendered image*

Setting Up the Daylight System

1. Activate the Top viewport. Choose **Create > Systems** from the **Command Panel** and make sure the **Standard** option is selected in the drop-down list. Next, choose the **Daylight** tool from the **Object Type** rollout.

Note
You will learn the Daylight System in detail in Chapter 15.

2. Click at a point in the Top viewport. Next, drag the cursor to create a compass and then release the left mouse button. Now, drag the cursor to specify the height and click again; the daylight system is added in the scene and automatically named as *Daylight001*.

3. Choose the **Modify** tab from the **Command Panel**. You will notice that **Skylight** is selected in the **Skylight** drop-down list.

4. Select the **Show Cone** check box in the **Directional Parameters** rollout to see the cone in the viewport. Also, make sure that the **Circle** radio button is selected in this rollout.

5. Adjust the value in the **Falloff/Field** spinner so that the scene is covered inside the cone, refer to Figure 13-82.

6. In the **Shadows** area of the **General Parameters** rollout, select **Area Shadows** from the drop-down list.

7. In the **Shadow Parameters** rollout, enter **0.7** in the **Dens.** spinner.

8. Choose the **Setup** button from the **Position** area of the **Daylight Parameters** rollout; the **Assign Controller** and **Control Parameters** rollouts are displayed in the **Command Panel**.

9. In the **Time** area of the **Control Parameters** rollout, enter **9** in the **Hours** spinner.

10. In the **Location** area of the **Control Parameters** rollout, enter **96** in the **North Direction** spinner.

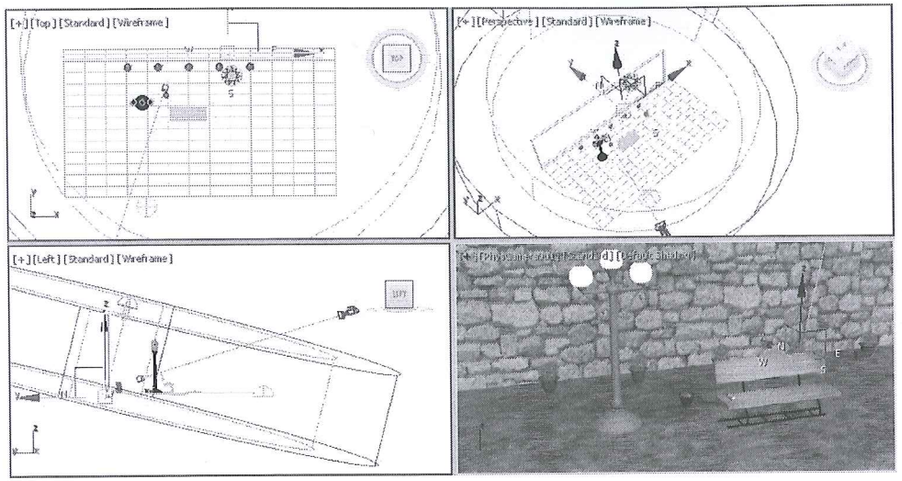

Figure 13-82 *The Daylight cone adjusted*

11. In the **Site** area of the **Control Parameters** rollout, enter **614** in the **Orbit Scale** spinner. Figure 13-83 shows the position of *Daylight001* in the viewports.

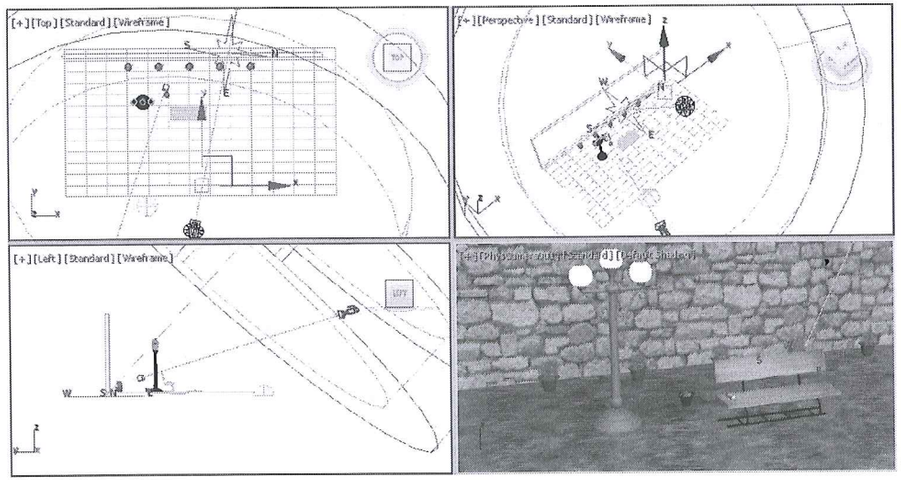

Figure 13-83 *The Daylight cone adjusted*

Next, you will see the render preview in the **Environment and Effects** dialog box.

12. Choose the **Render Preview** button from the **Exposure Control** rollout of the **Environment and Effects** dialog box. You will notice that the scene appears burned in the preview displayed in the window of this rollout.

13. Enter **13** in the **Exposure for all Cameras/Views** spinner; the preview in the window is changed. Close the **Environment and Effects** dialog box.

14. Render the PhysCamera001 viewport; the rendered image is displayed, as shown in Figure 13-84.

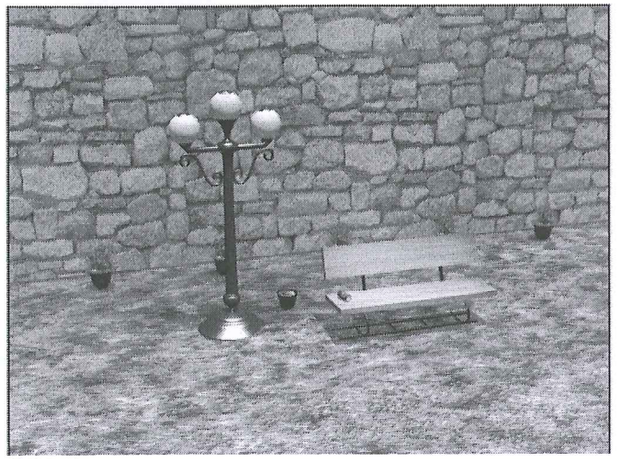

Figure 13-84 *The rendered image*

Next, you will use the advanced lighting parameters in the **Render Setup** dialog box to improve the overall illumination.

15. Choose **Render Setup** tool from the **Main Toolbar**; the **Render Setup: Default Scanline Renderer** dialog box is displayed.

16. Choose the **Advanced Lighting** tab from this dialog box. In the **Select Advanced Lighting** rollout, select **Light Tracer** from the drop-down list. Next, enter **0.5** in the **Global Multiplier** spinner, **350** in the **Rays/Sample** spinner, and **1** in the **Bounces** spinner. Next, close the dialog box.

Saving and Rendering the Scene

In this section, you will save the scene and then render it. You can also view the final rendered image of this scene by downloading the file *c13_3dsmax_2017_rndr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

1. Choose **Save** from the **Application** menu.

2. Activate the PhysCamera viewport. Next, choose the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 13-85.

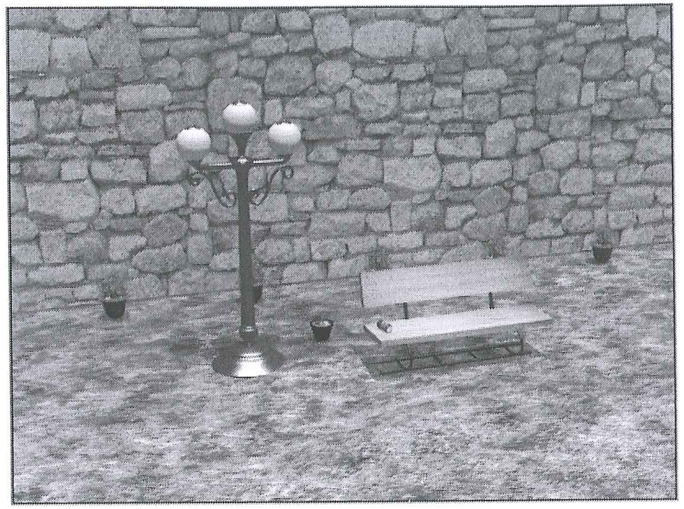

Figure 13-85 *The final output*

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following tools is used to create the photometric lights?

(a) **Target Light** (b) **Free Light**
(c) **mr Sky Portal** (d) All of these

2. Which of the following spinners is used to define the intensity of the light in the **Intensity/Color/Attenuation** rollout?

(a) **Color Amount** (b) **Start**
(c) **Multiplier** (d) None of these

3. Which of the following tools is used to create the area omni light?

(a) **Target spot** (b) **mr Area Omni**
(c) **Free Direct** (d) None of these

4. To assign special effects to the environment such as fog and glow, you need to use the _____ rollout in the **Modify** tab of the **Command Panel**.

5. To view the shadow of an object, you need to select the _____ check box in the _____ area of the **General Parameters** rollout.

6. The options in the _____ rollout are used to control the properties of the shadow.

7. The **Target Spot** tool is the only tool used to create a spot light. (T/F)

8. The standard lights use the light energy values to create realistic scenes. (T/F)

9. The **Exclude** button is used to define the number of objects in a scene that will be affected by the light on rendering. (T/F)

10. The decrease in the intensity of light with distance is called attenuation. (T/F)

Review Questions

Answer the following questions:

1. Which of the following tools is used to align light with an object for positioning its highlight accurately?

(a) **Place Highlight** (b) **Align**
(c) **Align Camera** (d) None of these

2. Which of the following rollouts is not used with the photometric lights?

(a) **Intensity/Color/Attenuation** (b) **Atmospheres & Effects**
(c) **Shadow Parameters** (d) All of these

3. Which of the following is a type of camera used in Autodesk 3ds Max?

(a) Target camera (b) Free camera
(c) Physical (d) All of the above

4. In the **Parameters** rollout of the target camera, set the value in the _____ spinner to specify the field of view for the camera in degrees.

5. To display the camera view in the viewport, you need to press the _____ key.

6. The _____ tool in the **Main Toolbar** is used to align a camera with a selected face normal of an object.

7. In the **Name and Color** rollout of the lights, you can use the color swatch to modify the color of the light. (T/F)

8. The distance between the camera lens and its focus is called the focal length of the lens. (T/F)

EXERCISES

The rendered output of the models used in the following exercises can be accessed by downloading the *c13_3dsmax_2017_exr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2017: A Comprehensive Guide*

Exercise 1

Create a scene using the standard primitives and target spot lights, as shown in Figure 13-86. **(Expected time: 15 min)**

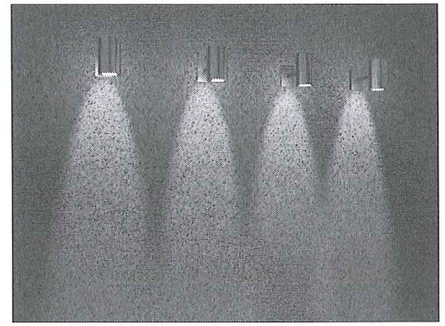

Figure 13-86 *The target spot lights illuminating the wall*

Exercise 2

Create a scene using the standard primitives and target spot lights, as shown in Figure 13-87. **(Expected time: 30 min)**

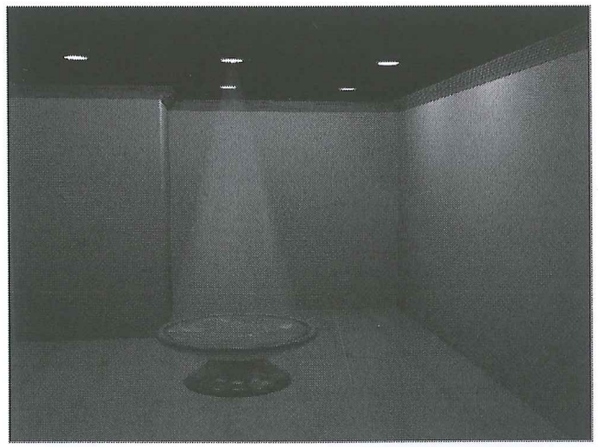

Figure 13-87 *Various lights illuminating the room*

Hints:

1. Create the hollow effect on the roof using the **ProBoolean** compound object and use the **Free Point** photometric light.

2. Create a **Target Spot** standard light for highlighting the object. You need to add the **Volume** effect using the **Atmospheres & Effects** rollout for the projector effect. Also, apply the projector map using the **Advanced Effects** rollout to get a realistic effect.

Exercise 3

Create a scene using the standard primitives and target spot lights, as shown in Figure 13-88. **(Expected time: 15 min)**

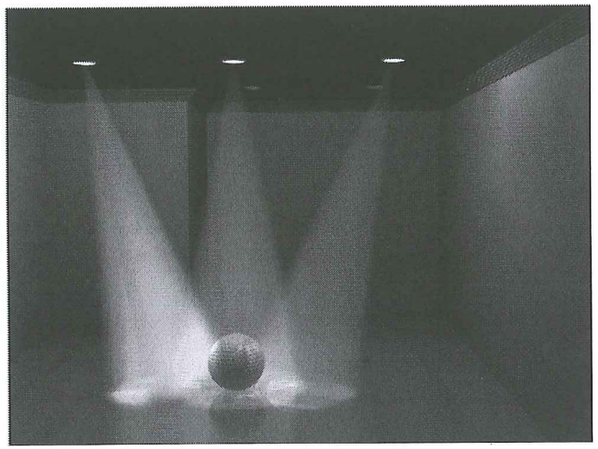

Figure 13-88 *The scene illuminated by the spot lights*

Hint:

1. Create three target spot lights and adjust their positions in all viewports. Choose separate colors for all three lights using the color swatch in the **Intensity/Color/Attenuation** rollout.

Answers to Self-Evaluation Test

1. d, **2.** c, **3.** b, **4. Atmospheres & Effects**, **5. On**, **Shadows**, **6. Shadow Parameters**, **7.** F, **8.** F, **9.** T, **10.** T

14

Animation Basics

Learning Objectives

After completing this chapter, you will be able to:

- *Work with the time slider*
- *Use animation playback controls*
- *Use animation and time controls*
- *Morph compound object*
- *Render and preview an animation*
- *Apply various rendering effects to a scene*