



# Light Effects with Dungeon Designer 3

An article by Joachim de Ravenbel<sup>1</sup>

## Conventions

Throughout this article, I will use a color coding to clearly identify all the keywords:

Sheet names will always appear in **Green**,

Layer names will always appear in **Blue**,

Keyboard commands or keys will always appear in **Red**,

CC3 menu commands and icons will always appear in *Italic Orange*.

A **Black** name followed by an arrow pointing right → and, at least at the end, an *Italic Orange* name indicates a CC3 menu drop-down list leading to a command. **Black** names also represent buttons or sheet effects.

It is particularly important to understand the difference between sheets and layers.

Sheets are like real transparent paper sheets piled one above the other. Whatever you do with commands like *Bring to Front* or *Send to Back*, entities present on a sheet **SHEET1** above **SHEET2** will always be in front of every entity on **SHEET2**.

Layers are convenient memory drawers to keep entities organized, regardless of the sheet containing them. Except for the hide/show features, layers have no graphic effect.

For example, you might have a lot of chairs and tables on the **SYMBOLS** sheet. If you just want to move a chair, you can easier select and move the chair if it's on the **CHAIRS** layer and the tables are on the **TABLES** layer with the **TABLES** layer hidden or frozen.

The sheets and layers denominations may be confusing because some graphic softwares use layers that work like CC3's sheets.

## Introduction

Light effects were first described in the 19<sup>th</sup> issue of The Cartographer Annual (July issue of Annual #2 or 2008) which introduced the **Light** menu, light effects, and new symbols with included light sources.

If you read the [Chapel tutorial](#), you may already be familiar with some of the features of this article. Lights effects will however be more detailed here, especially:

- ◆ How light effects work
- ◆ What “side effects” can occur and how to prevent or circumvent them
- ◆ How to simulate light effects by another way

**Note:** this is *not* a tutorial. The purpose of this article is to make you better understand how the light effects are applied within DD3, not a step by step map creation. The way the sample map is created follows an academic purpose and is probably not the best way to draw a battle-map.


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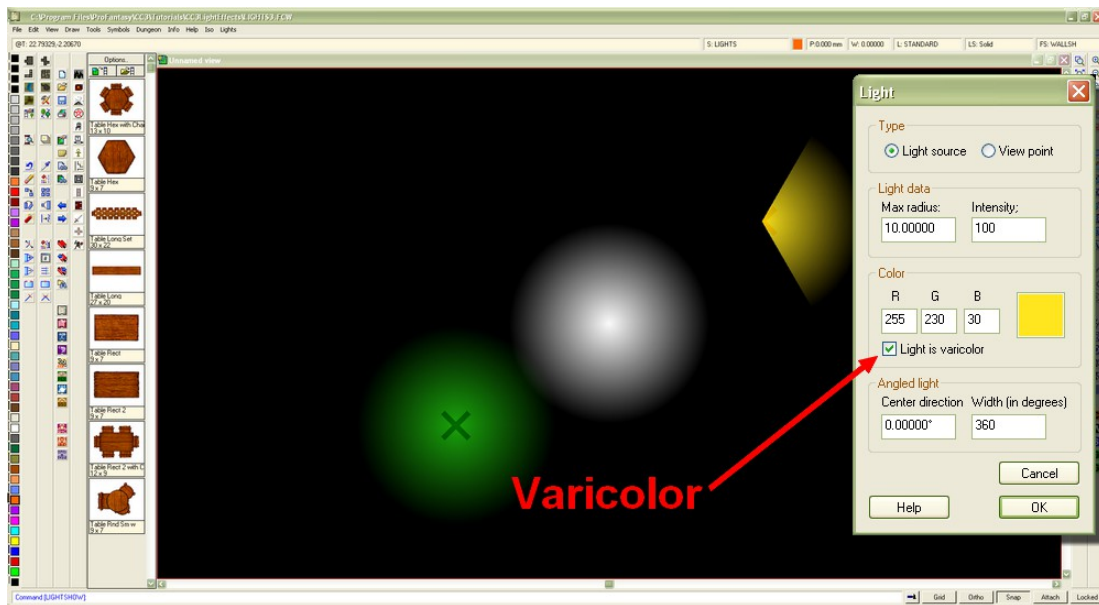
<sup>1</sup> Many thanks to Bill Roach, aka Terraformer Author, for the nice font used for the title. You can find it [here](#).




# How light effects work

To simulate a light source Dungeon Designer 3 creates a *shadow* mask. This mask is an infinite plane (like a rectangle always filling the whole map regardless of the zoom level) with circular (or wedge like) holes centered on the light sources. The infinite black area gradually fades away from the edges to the centers of the holes.

The hollow area are also filled by a transparent color chosen when you add the light. By checking the **Varicolor** check box, you ensure that you can change the color easily after adding the light source by right-clicking the **Change Properties** icon  and choosing **Change Color**.



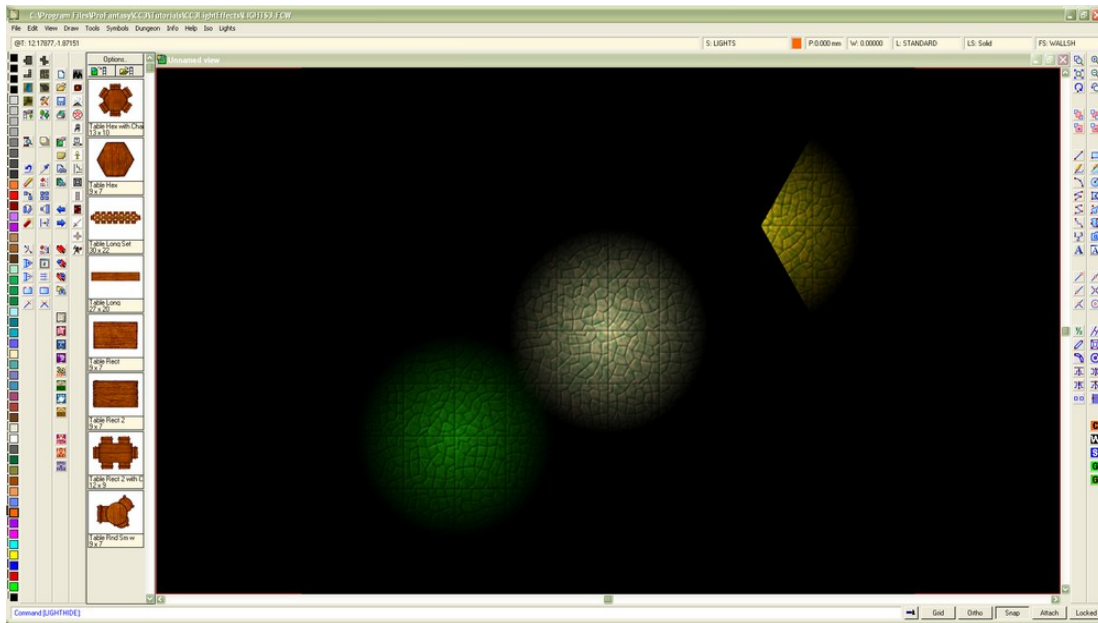
This sample map has been done with only a **WALLS** sheet affected by a **Wall Shadow, Point Light Setup** effect and a **LIGHTS** sheet with three light sources. It looks like you really have lights on your screen but it's the contrast between the black area and the "lit" areas that makes it so, enhanced by the fading of the black color.

**IMPORTANT:** in the following and all other tables in this article, sheets will be listed as you can see it by clicking the **Sheet Indicator** (a white text box above the main screen with a text starting by "S:") on or the **Sheet and Effects** icon . This is the **reverse** of the visual order: the topmost entry in the list is visually the lower sheet and the bottommost entry is visually above all the other sheets.

Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	-
<b>LIGHTS</b>	-	-	Lights sources



If you add a **FLOOR** sheet with a bitmap fill style, you'll see the transparency of the "lit" areas:

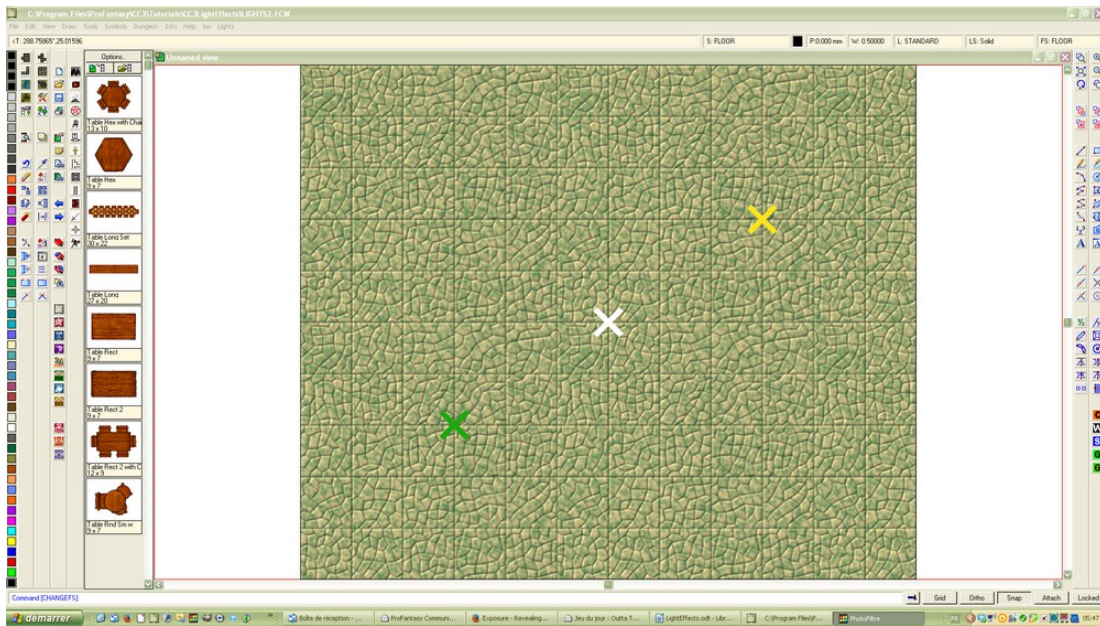


Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	-
<b>LIGHTS</b>	-	-	Lights sources
<b>FLOOR</b>	-	-	Filled rectangle (box)

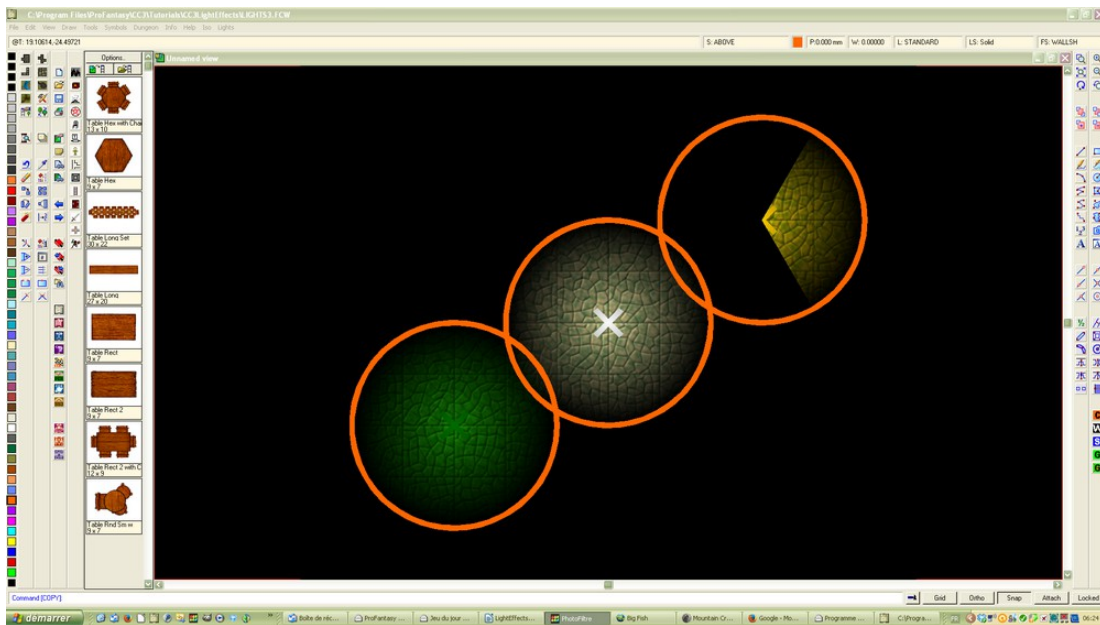
**Notes:**

- ◆ Light sources are visualized by an X cross (particularly showing in the green area, first picture previous page). These crosses responds to line width and fill styles so it's interesting to set the line width to something tangible and the fill style to **solid** to better localize your light sources.
- ◆ Light sources do not follow sheet organization... Up to a certain point. When you create a new sheet, it is added to the bottom of the list and is thus above all the other. The **FLOOR** sheet is for now above the **LIGHTS** sheet but the shadow **mask** is still applied to the **FLOOR** sheet. Because it's always recommended to organize your sheets logically the **FLOOR** sheet will be moved to its rightful place: just below the **WALL** sheet.
- ◆ To stop the shadows affecting sheets you need to add a **Wall Shadow, Point Light Finalize** effect to a sheet and all subsequent sheets won't be modified.





The sample map so far, effects off. The colored crosses show the lights sources and their colors and are easy to localize because a line width of 0.5 units and a solid fill style have been applied (the floor is a 60×50 units rectangle).



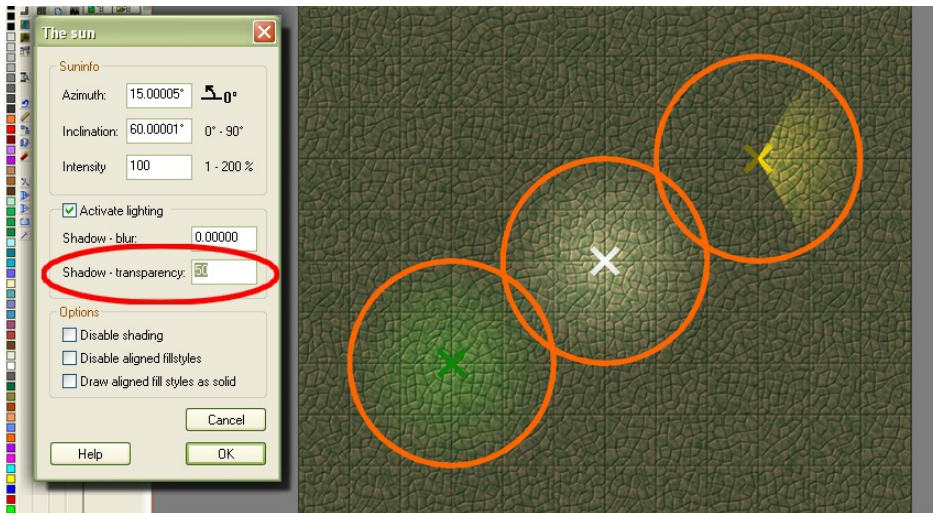
Effects turned on with orange circles on a new **CIRCLES** sheet above the **LIGHTS** sheet now affected by a **Wall Shadow, Point Light Finalize** effect. These circles are temporary, to illustrate the effect. Furthermore, the radius of the circles is the radius of the light sources which also shows that this value means the distance were shadows are again at their maximum.

Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	-
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>CIRCLES</b>	-	-	Orange circles



Now if you have a fast computer and few light sources, it's quite possible to use such a map while moving the light sources during a game. If however this is not an option for you, you might feel that creating a map that is partly full black would be a waste of time and ink if you want to print it.

The solution is to make the shadows partially transparent. To achieve this, you right click on the **Sheets and Effects** icon  and choose **Global Sun** or use the keyboard command: **SUNINFO** (↵ means carriage return). In the center of the pop-up you can see the shadow transparency value, originally set to 0% which means total opacity. Changing this value to anything greater than 0 will make the black shadow mask somewhat transparent:



The sample map and the Global Sun dialog with shadow transparency set to 50%.

## SUMMARY

- ◆ Light effects produce a dark mask extending to the infinite in all directions with “holes” corresponding to the light sources.
- ◆ Light sources are represented by an X cross you can alter like any other entity so make them wide and solid filled. **Note:** you can only select the light source by clicking on the intersection point of the two lines from the cross, not on a single line.
- ◆ If you make the light varicolor, you can alter the color of the glow by changing the color of the entity.
- ◆ The radius of a light source is the distance where the shadow is at its maximum.
- ◆ Lights affect all sheets visually below the sheet containing the **Wall Shadow, Point Light Finalize** effect. All the sheets above this sheet are unaffected.
- ◆ Shadows can be partially transparent by adjusting the **Shadow – transparency** parameter of the Global Sun settings.

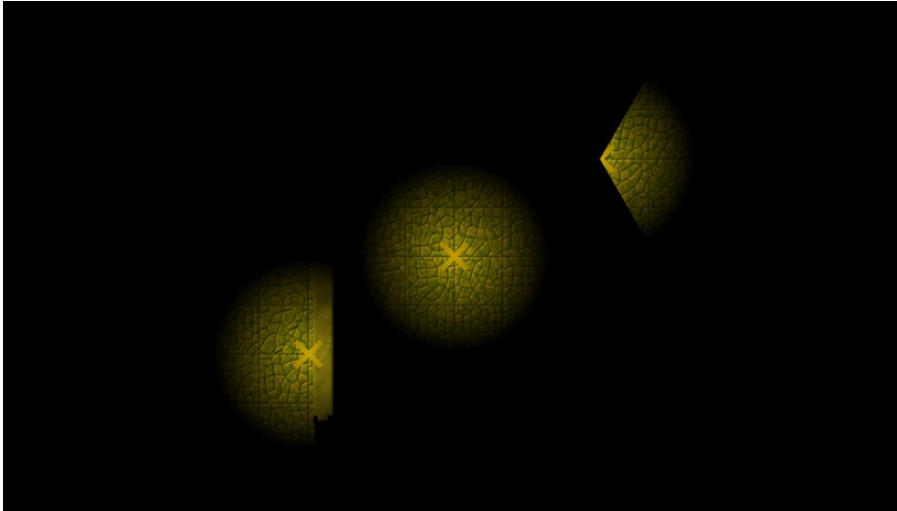




# Side Effects

## 1. Walls

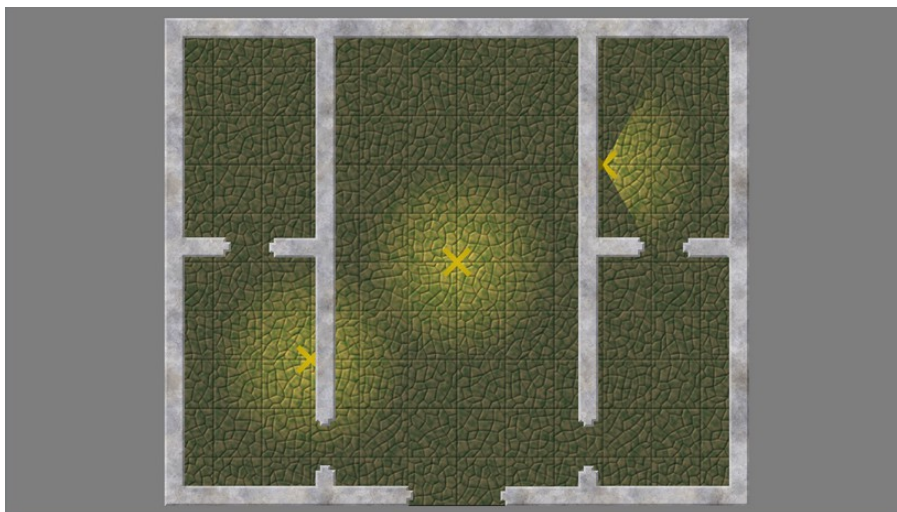
When placed in a lighted area, 3-dimensional objects tend to cast shadows (flat, horizontal objects don't unless they are at some height). Walls, particularly, cast long shadows, considered infinite if a ceiling is supposed to join the walls which means that a light source on one side of a wall doesn't light any area on the opposite side. Because infinite is not really a number, it is coded by "0" in the **Wall Shadow, Point Light Setup** (if you really want a shadow length of 0 you just don't add an effect).



All light colors have been turned to yellow (color 135) and walls have been added. You can see that the top of the walls are also affected by the shadows. To enhance this fact, shadow transparency has been turned off. The wall prevents the left light source to illuminate its right side.

Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	Polygons
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources

It means that if you want to see the top of the walls, you need to place the **WALLS** sheet above the **LIGHTS** sheet that has the **Wall Shadow, Point Light Finalize** effect:




Now the left light shines through the wall!

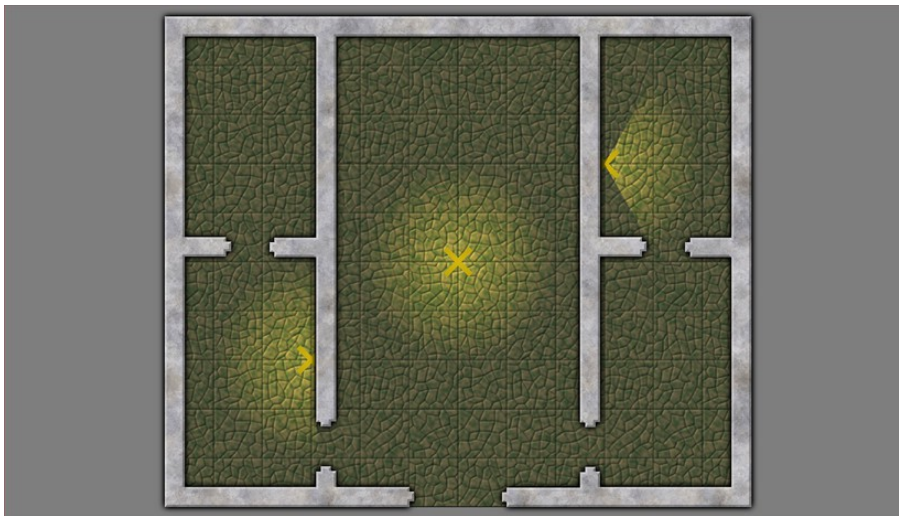


### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	Polygons

In order to affect lights and cast shadows, an object must be placed on a sheet below the sheet with the Wall Shadow, Point Light Finalize effect, but that means that the light will also shine on the object.

**SOLUTION:** Use two sheets: **WALLS** for the shadows through the **Wall Shadow, Point Light Setup** effect, and **WALLS TOP** for all the other effects (ie **Bevel, Glow**) you want for the top of the walls. Each sheet contains the same entities: you need to copy from one sheet to the other by right-clicking the **Copy** icon  and choosing the **Copy to Sheet** command.



The result using the solution above. The top of the walls are visible with no shadow and the left light is stopped by the wall.

### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	Polygons
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>WALLS TOP</b>	<b>Bevel Glow</b>	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet



## 2. Other objects

Unless an object (or even a creature) extends from floor to ceiling, its shadow will be proportional to its height. A given sheet can only cast shadows of a single length. Consider the following map:



More light sources have been added and the diameters have been increased. The shadow transparency is set to 75%. Note how the shadows cast by the two statues (very high), the treasure bags (mid height), the five central bowls (very low height) and the rugs (negligible height) are casting roughly the same length of shadows. This happens because they are all on the same **SYMBOLS** sheet, the default sheet for many symbols.

Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	Polygons
<b>SYMBOLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 5	Symbols
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>WALLS TOP</b>	<b>Bevel Glow</b>	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

**All the entities placed on the same sheet with a Wall Shadow, Point Light Setup effect will cast the same length of shadows only modulated by their distances to the light sources.**

**SOLUTION 1:** You need to create separate sheets for all the diverse object heights. In fact, the default sheet for most of the symbols is labelled **SYMBOLS\***. The "\*" character, also called **wildcard** has a very specific meaning: as long as the current sheet name starts with the text preceding the wildcard, the sheet where the symbols appear won't change. Thus it is recommended to start all the new sheets by **"SYMBOLS"**. For example you could use **SYMBOLS FLAT** for the rugs, **SYMBOLS LOW** for the bowls, **SYMBOLS MID** for the treasure bags and **SYMBOLS HIGH** for the statues. Each sheet will have a different shadow length according to its nature: no effect for the flat symbols, a short length for the low symbols and so on. Experiment with the values until you get a satisfying result.





A more realistic repartition of shadow lengths. There is still a problem with the loose treasure gems and coins top right that are part of the larger treasure symbols.

### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	Wall Shadow, Point Light Setup	Shadow length infinite (0)	Polygons
<b>SYMBOLS FLAT</b>	-	-	Rugs
<b>SYMBOLS LOW</b>	Wall Shadow, Point Light Setup	Shadow length 2	Bowls
<b>SYMBOLS MID</b>	Wall Shadow, Point Light Setup	Shadow length 4	Treasures, bags
<b>SYMBOLS HIGH</b>	Wall Shadow, Point Light Setup	Shadow length 10	Statues
<b>LIGHTS</b>	Wall Shadow, Point Light Finalize	N/A	Lights sources
<b>WALLS TOP</b>	Bevel Glow	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

**SOLUTION 2:** Rotate, move... symbols relatively to the lights sources, or pile them up to hide offending parts.



The right treasure room symbols have been re-organized so the small individual parts are either in the darkest areas or hidden by more symbols.



### 3. Light sources and irregular symbols

If you own **Cartographer's Annual 2008** you should have a **CA19 Light Sources.FCS** symbol catalog in your **DD3 Color** symbols sub-folder (CC3\Symbols\Dungeons\DD3\DD3 Color\ usually). All these symbols place the picture of the object emitting the light **and** the light entity (X-cross). Otherwise, you'll have to perform two actions, placing the symbol and the light entity (the order of the actions is not important).



On the sample map, it's obvious that the magic circle should go on the **SYMBOLS FLAT** sheet but has been placed on the **SYMBOLS MID** sheet for academic purpose. The sconces should cast some minor shadows toward the walls so they were also placed on the **SYMBOLS MID** sheet. On both close-ups, you can see what can happen with raster (or bitmap) symbols. These symbols use a picture file (usually a .png file) that generally has what

is called an alpha channel: each pixel has a transparency value. The distribution of pixels is not always very accurate and a single non transparent pixel will yield a "shadow ray".

**Raster symbols may have "loose" pixels creating unrealistic "shadow rays".**

**SOLUTION 1:** If the object should not cast shadows – like the magic circle – or if the shadows are limited and negligible – like the sconces – just place the symbols on the **SYMBOLS FLAT** sheet.



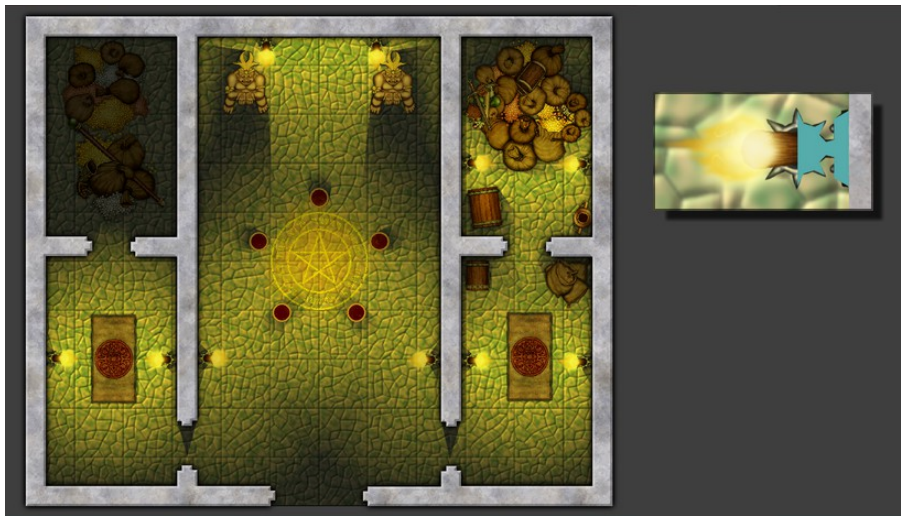
The magic circle and the sconces placed on the **SYMBOLS FLAT** sheet.

**SOLUTION 2:** If you need to keep the symbol on a shadow casting sheet, you can try to edit a **copy** of the .png file with a powerful picture editor like Photoshop or The Gimp in order to erase all the offending pixels. Place a solid colored background layer behind the transparent picture and zoom. This might be lengthy and may require trial and error.





**SOLUTION 3:** Place the symbol on a new **SYMBOLS TOP** sheet with no effect and make sure this sheet is above all the other **SYMBOLS\*** sheets than create a solid filled shape looking like the symbol on the relevant (regarding shadow length) sheet.



The part of the sconce that should cast shadows has been roughly traced to create a solid filled polygon. To hide this polygon, the **SYMBOLS TOP** sheet must be placed over the **SYMBOLS MID** sheet were the polygon was created. The insert, top right, shows the polygon when the **SYMBOLS TOP** sheet still under the **SYMBOLS MID** sheet, for tracing purpose.

### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite (0)	Polygons
<b>SYMBOLS LOW</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 2	Bowls
<b>SYMBOLS MID</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 4	Treasures, bags, sconce "polygons"
<b>SYMBOLS HIGH</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 10	Statues
<b>SYMBOLS FLAT</b>	-	-	Rugs, magic circle
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>SYMBOLS TOP</b>	-	-	sconce symbols
<b>WALLS TOP</b>	<b>Bevel Glow</b>	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

**SOLUTION 4:** Seek another symbol in another catalog or in the many free or commercial sources on the web.





## 4. Outside scenery

In some cases, you'll want to add an area outside the walls. The usual way to do this with DD3 is to add a background rectangle filling all the map area:



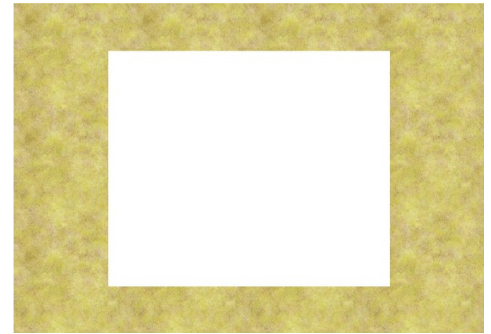
Unless you want a night scene (and waste a lot of ink if printing), the background, being a very low sheet, is affected by the shadow mask.

Sheet organization			
Sheet	Effects	Effect Parameters	Content
<b>BACKGROUND</b>	-	-	Filled rectangle (box)
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite	Polygons
<b>SYMBOLS FLAT</b>	-	-	Rugs, magic circle, sconces
<b>SYMBOLS LOW</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 2	Bowls
<b>SYMBOLS MID</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 4	Treasures, bags
<b>SYMBOLS HIGH</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 10	Statues
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>WALLS TOP</b>	<b>Bevel Glow</b>	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

Background sheets, placed behind the rest of the map, are affected by the shadow mask and create a night scene.



**SOLUTION 1:** The “background” sheet must be placed **above** the sheet containing the **Wall Shadow, Point Light Finalize** effect. Obviously, a filled rectangle will hide all the rest of the map so you’ll need to create a more elaborate polygon or even a multipoly. It’s the method described in part 6 of the [Chapel tutorial](#).



The grass box has been multipolyed with another box outlining the building. Multipoly-ing overlapping entities will create a hollow where they meet.

### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length infinite	Polygons
<b>SYMBOLS FLAT</b>	-	-	Rugs, magic circles, sconces
<b>SYMBOLS LOW</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 2	Bowls
<b>SYMBOLS MID</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 4	Treasures, bags
<b>SYMBOLS HIGH</b>	<b>Wall Shadow, Point Light Setup</b>	Shadow length 10	Statues
<b>LIGHTS</b>	<b>Wall Shadow, Point Light Finalize</b>	N/A	Lights sources
<b>BACKGROUND</b>	-	-	Filled multipoly
<b>WALLS TOP</b>	<b>Bevel Glow</b>	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

**SOLUTION 2:** You can also create the inner part in a DD3 file, than export it as a .png picture file to insert in a second DD3 file. It’s the method described in the [Map Bits tutorial](#).





**SOLUTION 3:** Add a lot of white light sources outdoors.



The X-crosses marking the light sources have been turned visible again (**Light**→**Show light symbols** or **LIGHTSHOW**↓). As you can see, a lot of lights are needed to simulate the outdoor sun light, but the **Background** sheet stays behind all other sheets (page 12 sheet organization). You could even arrange the position to create realistic outside shadows. This solution is heavy on the system but if your computer can cope it's worth a try.

## Simulating light effects

### 1. Shadows

Because shadows consist in a black mask with a given amount of transparency, it is easy to create your own shadows by placing black polygons or multipolys on a **SHADOW** sheet with a **blur** and a **transparency** effect.



The two levels of the dais have been simulated by two black crescents on the **SHADOW** sheet:



You get such crescents by multipoly-ing a half-circle arc with an elliptical arc.

**Note:** using black shapes to create realistic shadows is more detailed in part 9 of the [Chapel Tutorial](#).



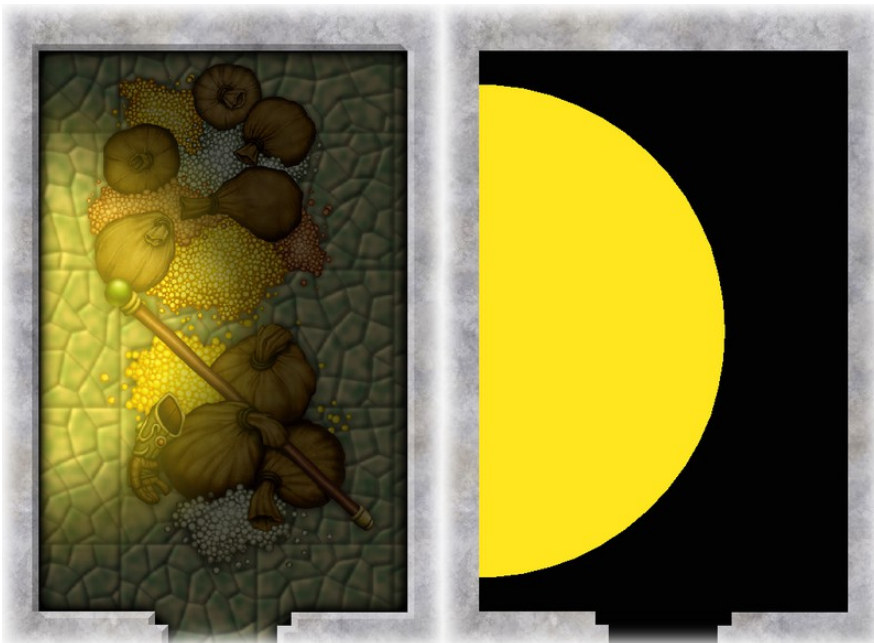


### Sheet organization

Sheet	Effects	Effect Parameters	Content
<b>FLOOR</b>	-	-	Filled rectangle (box)
<b>WALLS</b>	Wall Shadow, Point Light Setup	Shadow length infinite	Polygons
<b>SYMBOLS FLAT</b>	-	-	Rugs, magic circles, sconces
<b>SYMBOLS LOW</b>	Wall Shadow, Point Light Setup	Shadow length 2	Bowls
<b>SYMBOLS MID</b>	Wall Shadow, Point Light Setup	Shadow length 4	Treasures, bags
<b>SYMBOLS HIGH</b>	Wall Shadow, Point Light Setup	Shadow length 10	Statues
<b>LIGHTS</b>	Wall Shadow, Point Light Finalize	N/A	Lights sources
<b>BACKGROUND</b>	-	-	Filled multipoly
<b>SHADOW</b>	Blur Transparency	Radius 0.5 Opacity 67%	Crescents
<b>WALLS TOP</b>	Bevel Glow	0.5/30/0/0 Outside/Black/1/1	Copied polygons from the <b>WALLS</b> sheet

## 2. Lights and shadows

It might be a bit far fetched, but in some situations, you can create yourself what the effect does: add a black mask and transparent glowing areas in the holes:



Left: effects on, right: effects off. The black multipoly is on the **SHADOW** sheet with **transparency**, **blur** and **edge fade, inner** effects. The yellow circle (full circle to center the light source) is on a **FALSE LIGHT** sheet with **transparency** and **edge fade, inner** effects. The two shapes overlap a distance equal to both the **edge width** values.

Sometimes you can just use the yellow circle with **transparency** and **edge fade, inner** (or **glow**) effects and place, for example, a candle on it.



## Conclusion

This article has hopefully clarified many ways to illuminate your dungeon maps:

- ◆ By understanding how the embedded light effects work
- ◆ By giving solutions to frequent unwanted side effects
- ◆ By giving an alternative way to create light and shadow areas.



Happy mapping!  
Joachim de Ravenbel  
February 2014