MAP BORDERS IN GIMP

A Cartography Guild Tutorial by Arsheesh

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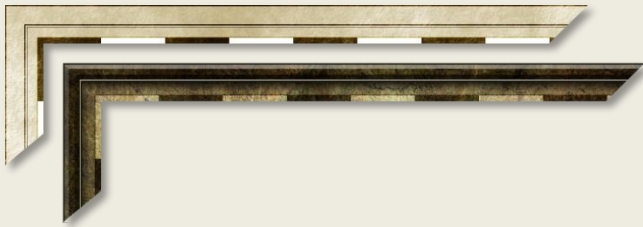
INTRODUCTION

In a recent GIMP related map I spent a fair amount of time trying to figure out the best way of making borders to frame the piece. I'm not at all confident that I landed upon the "best way" of achieving what I sought, but I did at least discover "a" way of getting the job done. After posting the finished map, there was some interest from other GIMP users on how I made my borders. So I thought I'd share the techniques I used with the Guild.

How to Use this Tutorial

This tutorial is written for both the beginner and the experienced GIMP user. For the beginner I have included quite a bit of explanatory text as well as screenshot figures illustrating the tools and settings that we will be using, and the progression of our map borders. I have divided the tutorial into two sections; the first dealing with traditional borders (for parchment maps) and the second dealing with ornate borders (for artistic and photo-realistic maps). Where overlap occurs in the second section, I refer the reader to the explanatory details of the first section.

For those of you with more experience, I'll be highlighting the key commands used so that you can skip over the explanatory text (in this I've taken my cue from Tear). Here's an example of what the highlights will look like:

Image > Canvas Size > Lock Aspect Ration > 100px > Center > Resize

In addition to explanatory text, figures and key commands, I've also included some "Mapping Tips" windows (just look for the icon) that serve to highlight information I deem important, as well as to offer tips and tricks I've learned related to GIMP and fantasy cartography.

What You Will Need

I will be using version 2.6.10 of GIMP for this tutorial. In addition, I will be making use of a custom Script called "Layer Effects" that is not a part of the standard GIMP download package. Basically this script attempts to emulate some of the layer styles available within Photoshop. You can find this script at the GIMP Plug-in Registry, at this address: http://registry.gimp.org/node/186. Finally, I will be using a tiled pattern for the photo-realistic map border. You can find an uploaded copy of this pattern on the tutorial page where this pdf is posted, or just use your own.

Terminology

Just a Quick note regarding terms. Despite the name of this tutorial, the "border" of the map is only one element of what people typically think of as a map border. Other common elements include neat lines, border lines, margins, and frames. While some variance in the usage of these terms exists, roughly they may be characterized as follows (See also Figure 1):

A **neat line** is a boundary line which encloses and defines the geographical data of a map. This is frequently displayed as a grid or graticule, but can also be a single line, a double line or a more complex border design.

A **borderline** is the outermost line of a border.

A **border** is the area of the map that includes the neat line, the border line(s), and all that lies between.

A **margin** is the area of the map that is between the borderline and the frame.

A **frame** (sometimes called chart border line) is the outermost line or border pattern surrounding the entire map.

Figure 1: Elements of a Map Border

Neatline
Borderline
Border
Margin
Frame
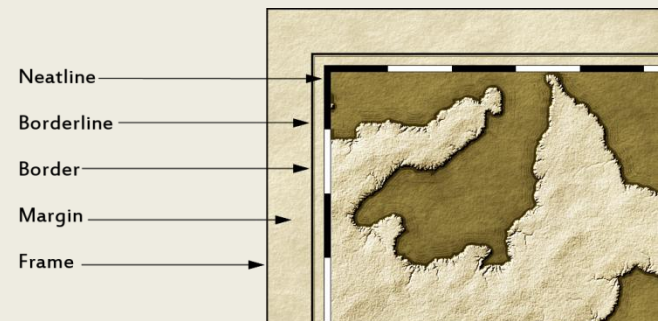
Traditional Borders

This section shows how to create a border suitable for old style, parchment maps, such as the one shown in Figure 13. For this demonstration I will be using a cropped section of one of my existing maps. However the initial screenshots will all be in black and white since I will not create the parchment background until after I have finished resizing the canvas of the map.

Before You Begin

Working with a checkers patterned set of neat lines can be tricky at first, and if one is not careful, one could easily make one of the following mistakes:

Inconsistent
Checkered Pattern

Mismatched
Corners

What you want to end up with rather, is something along the lines of this:

Consistent, Matching
Checkered Pattern

Achieving a set of consistent checkered neat lines with matching corners is a function of having the right canvas size to begin with. In the first example, I used a canvas size that was not easily divisible (e.g. 1087x1087px), and set the area size of the checkered boxes at 200px each. This resulted in cut off (see how only about half of the bottom left corner is showing?). So try to avoid a canvas size that is not easily divisible.

In the second example I set the canvas to 1200x1200px, and the area size of each checkered box to 200px. The result is somewhat better (at least the checkered pattern is consistent), but those mismatched border corners are a bit awkward. So try to avoid a canvas size that is only easily divisible by an even number of boxes.

In the final example I set the canvas to 1000x1000px, and the area size of each box to 200px. This resulted in a 5x5 checkered box pattern (rather than the 6x6 pattern of the previous example) that was consistent and had nice matching corners. The take away lesson here is that once you know roughly how large you want your map to be, be sure to determine a canvas size conducive to an odd number of checkered neat lines. Also, note that the starting canvas size of your map will need to be smaller than the canvas size of its neat lines. In this tutorial for example, I'm beginning with a canvas size of 1080x1080px (which will then be expanded to 1100x1100px) and I'll be setting the area size of each checkered box to 100px. This will result in a checkered neat line pattern of 11x11.

Neat Lines: Checkered Patterns

Alright, let's begin. If you haven't already started work on a map, go ahead and create your new document now. Set the Height and Width to the desired px size, however bear in mind the lessons of "Before You Begin". As mentioned, I'll be using an image with a starting canvas size of 1080x1080px (which will then be expanded to 1100x1100px), but if you are working with a regional or world map you will probably want to use a much larger starting canvas size (e.g. 2080x2080px or larger), otherwise your map will likely end up being too small.

Figure 2: Original Canvas Size 1080x1080px
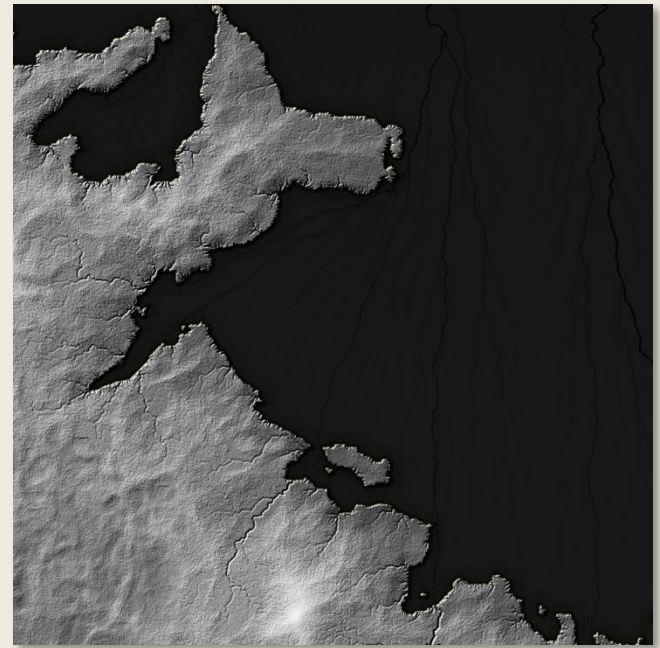
To create a new document in GIMP, click on the file menu and select "New". In the "Create New Image" pop-up window that emerges, set the Height and Width (make sure that this se to "pixels"). Then, click on the "Advanced Options" drop-down menu and set the X and Y resolution to 300.

File > New > Height (select) > Width (select) > Resolution 300

After you have created your new document (or opened an existing map document), we are going to make a selection of the entire canvas. To do this, click on the "Select" menu and select "Select all". You should now see "marching ants" surrounding the entire image. Next we are going to save this selection as a path. Click on the "Select" menu again, but this time select "To Path". The selection will now be traced along a path located in your Paths dialogue (which should be the third dialogue of your "Layers, Channels, Paths" Doc (see Figure 3):

Figure 3: Layers Dialogue
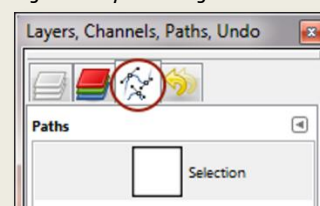
Click on the Paths dialogue. You should see a single path named "Selection" (this is the default name for all paths). Double click on this word to select it, then rename this path "Neat Line Bottom".

Saving a selection to a path allows you to later re-select the original area, and to paint along that selection. We will be using these features momentarily. But for now, go ahead and turn off the selection by going to "Select" and clicking "Select None".

Next we are going to expand the canvas size of the image. The expanded area will be the space wherein we place our Neat Lines. To expand the canvas size, click on the "Image" menu and select "Canvas Size". In the pop-up window that emerges, change the Width and the Height from 1080px to 1100px (or if you are working with a different scaled map, to whatever the equivalent would be). Once you've entered the new canvas size you should notice that the map in the preview window is aligned to the top left of the new canvas size. To center the image, just go ahead and click on the "Center" button and then simply hit the "Resize" button.

You're image should now look something like Figure 4 below:

Figure 4: Base Map Resized to 1100x1100px
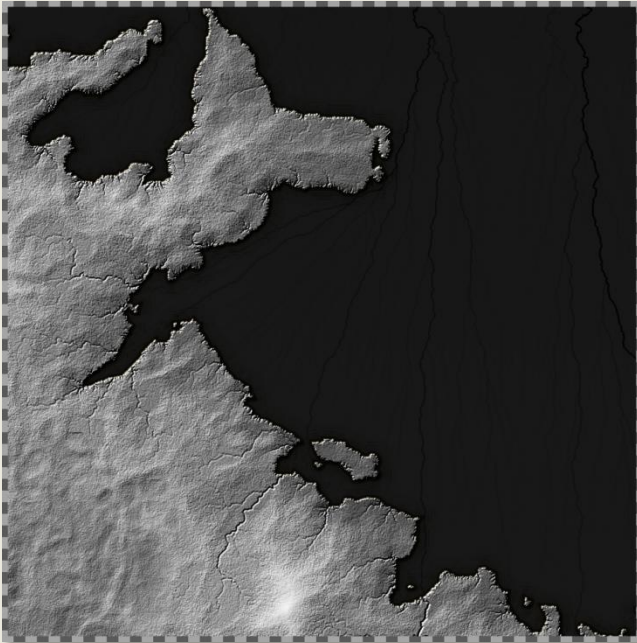
OK, we are ready to apply our checkered Neat Line pattern. I have found at least two effective ways of achieving this effect, but here's the simpler of the two methods. Create a new transparent layer above your map and name it "Neat Lines".
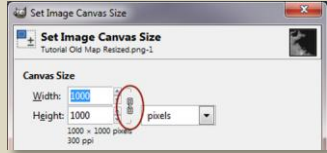
Before we proceed, make sure that your foreground color is set to black (or whatever you want your darker border color to be), and that your background color is set to white (or whatever you want your lighter color to be. If you are not sure how to do this, take a look at your Toolbox Dock. Inside the toolbox you'll see a

RECTANGULAR MAPS

If you are working with a map whose width is different than its height then before you attempt to rescale the image you will need to "unlock" the aspect ratio of the canvas size. When the aspect ratio is locked, GIMP will preserve the original shape of the canvas so that when you enter in a new set of measurements into one field, GIMP automatically recalculates the measurement of the other. This however will result in a map who's Horizontal and Vertical borders are each of a different width.

Figure 5: Unlocking the Aspect Ratio

In order to unlock the aspect ratio, simply click on the "Lock" icon just to the right of the Width and Height fields. This will allow you to enter in new measurements for each field separately.

Figure 6: Foreground / Background Tool

couple of solid, sheet-like colors stacked on top of each other (see Figure 6). The topmost color is your foreground color, and the bottom is your background. Clicking on either color brings up a pop-up window with several built in options for changing the color. However, if you just want to change the foreground color to black and the background color to white, just click on the small foreground background reset icon just to the bottom left of the foreground background tool.

Next, (making sure that the "Neat Lines" layer is selected) click on the "Filters" menu and select "Render" in the submenu select "Patterns" and in that submenu select "Checkerboard". In the pop-up window that appears set the size to 100px (or whatever size you wish) and hit "OK".

You should end up with a checkerboard pattern that looks similar to similar to Figure 7. I prefer to have black border corners so I went to the "Colors" menu and selected "Invert".

Figure 7: Checkerboard Patterns

Original Checkerboard

Inverted Checkerboard

Figure 8: Path to Selection

Obviously we don't want the checkerboard to cover over our map so let's go ahead and delete this area. Click on your path's dialogue and select the "Neatline Bottom Path". On the bottom of the Path's dialogue you'll see some command options. The Pink box icon (See Figure 8) creates a selection from the path. Click on this icon, and, making sure that the "Neat Lines" layer in our Layers Dialogue is selected, hit delete. This should remove the portion of the checkerboard pattern obscuring our map.
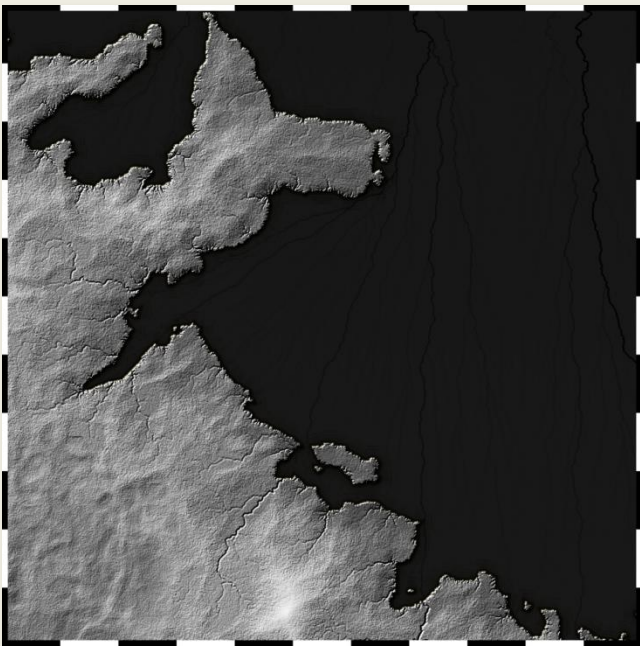
Paths > Select "Neatline Bottom Path" > Path to Selection > Delete

Now go back to the "Select" menu and hit "Select None">

Select > Select None

Your Neat Lines should now look something like Figure 9.

Figure 9: Checkered Neat Lines

Neat Lines: Top and Bottom

The neat lines are nearly finished; the last thing that remains to do is to add a set of inner and outer lines to them. Next we are going to create another selection to path, using the "Neat Lines" layer as our selection. The steps are the same as previously noted. Name the new path "Neat Lines Top."

Select > Select All > To Path (Name Path "Neat Line Top")

Now, with "Select All" still turned on, click on the "Paint Along Path" command located at the bottom of your Paths Dialogue. In the pop-up window that appears, under "Stroke Line" set the line width to 2px and then click on "Stroke".

Paths > "Neat Line Top" > Paint Along Path > Line Width 2px > Stroke

Figure 10: Paint Along Path

Next, we are going paint the inner line. Select the "Neat Lines Bottom" path and repeat the same set of steps just outlined to add a thin line along the bottom of the Neat Lines. When you are finished, go to the "Select" menu and "Select None". That's it for the Neat Lines.

Paths > "Neat Line Bottom" > Path to Selection

Paths > "Neat Line Bottom" > Paint Along Path > Line Width 2px > Stroke

Select > Select None

Borderlines & Frame

The final steps should flow fairly quickly since they mostly deal with techniques we've already covered. Next we are going to expand the canvas size one last time. In this map, I am going to expand the height and width from 1100px to 1200px.

Image > Canvas Size > Height (select) > Width (select) > Center > Resize

Next, create a new transparent layer above the "Neat Lines" layer, and name it "Borderlines & Frame".

Layers > New Layer > Transparent (Name "Borderline & Frame")

On the "Borderline & Frame" layer, go to the "Select" menu, select all, and save the selection as a path, named "Frame".

Select > Select All > To Path (Name "Frame")

Next, make sure your foreground color is set to black and then stroke the path at a 4px line with.

Path > "Frame" > Paint Along Path > Line Width 4px > Stroke

Onto the Borderlines. Now go to the "Select" menu and click on "Shrink". Make sure that "Shrink from Image Border" is selected and set the "Shrink Selection By" field to 30px.

Select > Shrink Selection > Shrink from Image Border (On) > 30px

Next, save this selection as a path named "Borderline Top", and then go ahead and stroke the path with a line width of 4px.

Select > To Path (Name "Borderline Top") > Paint Along Path > 4px

Now shrink the selection again, this time by 10px, and save that selection as a path named (you guessed it) "Borderline Bottom".

Select > Shrink Selection > Shrink from Image Border (On) > 10px

Alright, I bet you know what comes next. Go ahead and stroke the selection, only this time set the line width to 1px.

Select > To Path (Name "Borderline Bottom") > Paint Along Path > 1px

OK, we are pretty much done with our selection at this point, so go ahead and click "Select None" in the "Select" menu.

Now if you are happy with where things are at, you could just stop here. However, for this map I decided I wanted the lines and checkered pattern of my frame and border to better match the parchment tan and brown hue of the map, so I decided to play around with Layer modes a bit. Here's a quick before and after look at what I came up with.

Figure 11: The Progression of Our Borders

Figure 12: Layer Mode & Duplicate Layer
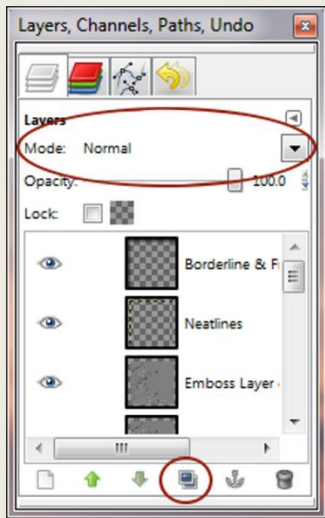
What I did here (in the last pic of Figure 11) was to set the "Layer Mode" of both the "Neat Lines" and the "Frame & Borders" layers to "Overlay" and then duplicate each layer twice (See Figure 12 for an illustration of these features).

Well, that about wraps up the first section of this tutorial. You can see the finished map below. In the second section we will build on the methods shown in this section to make an ornate border.

What, no Parchment?

If you've been following along so far you may be wondering just how I got from the black & white image in Figure 9 to the brown and tan parchment image shown in Figure 13. I mention briefly that I created a Parchment Layer but don't explain how I did this, nor for that matter how I mapped my existing B&W image onto it. There are two good reasons for this.

First, this is not a tutorial about how to make Parchment, neither is it a map tutorial. This is a tutorial about how to make map "*borders*", and I simply use the map here for illustrative purposes.

Second, there already exist tutorials on both of these topics at the Cartographer's Guild. In fact, for this map I made use of RobA's Parchment Tutorial. Thus, rather than try to recreate the wheel here, I'll just refer you to his wonderful little walk-through (just do a word search for it in the Tutorials section of the Guild).

Figure 13: The Final Cut

Ornate Borders

This section shows how to create a border suitable for artistic or photo-realistic maps, such as the one shown in Figure 14. Many of the techniques here are the same as those discussed in the previous section. Where overlap occurs I'll offer the highlighted keystroke commands but not the accompanying text or figures. I'll be working with the same size canvas as before.

**Figure 14: Original Canvas Size 1080x1080px**

Neat Lines & Margin

As before, we are going to make a set of Neat Lines for our map. The technique here is identical to that discussed in the previous section, so please refer back to it for instructions.

Next we are going to expand the Map canvas by 100px. Right now your map ought to look something like that of Figure 15.

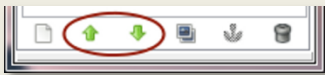Image > Canvas Size > Height (select) > Width (select) > Center > Resize

Figure 15: Map with Neat Lines Resized to 1200x1200px
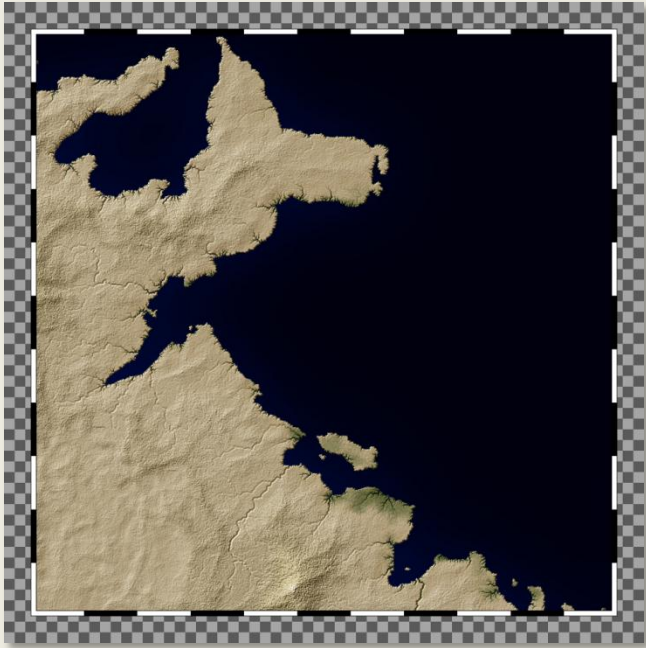
OK, here's where things are going to diverge a bit from the first section. Create a new layer named "Margin".

Layers > New Layer > Transparent (Name "Margin")
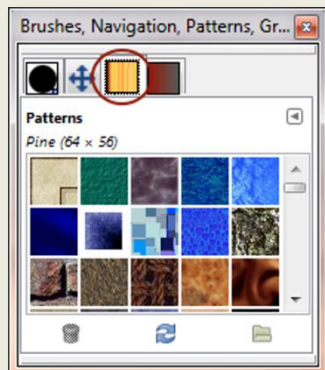
Figure 16: Raise and Lower Layer Commands

Lower the margin layer to the bottom of you layers stack. You can raise and lower individual layers by using the raise and lower commands located at the bottom of your layers dialogue.

Layers > "Margin" > Lower Layer (To Bottom of Layers Stack)

Figure 17: Patterns Dialogue

Next we are going to fill this layer with our Slate Pattern (or your own pattern of choice). To do this, simply go to your "Patterns" dialogue, select the "Slate" pattern, and then, keeping your left mouse key depressed, drag this pattern from the dialogue to the image. The layer should now be filled with your pattern.

Toolbox > Bucket Fill > Pattern Fill > Slate Pattern > Fill

Figure 18: Layer Mode
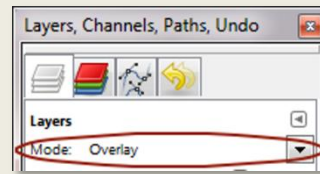
The black and white checkered neat lines don't quite match the slate margin. Let's remedy that now shall we. Click back on the "Neat Lines" layer to select it. Now set the layer mode of the "Neat Lines" layer to "Overlay" (See Figure 18). Awe, now that more like it.

Layers > "Neat Lines" > Layer Mode (Overlay)

Figure 19: Map with Slate Pattern Fill

Ornate Frame

Now we are going to create an outer frame for our map, using the same slate pattern as before. Click back on the "Margin" layer to select it. Now, go to the "Select" menu, hit select all and save the selection as a Path named "Frame Top" (instructions for how to do this are given in the first section).

Layers > "Margin" > Select > Select All > To Path (Name "Frame Top")

Next, shrink the selection by 28px and save the newly reduced selection as a path named "Frame Bottom".

Select > Shrink > Shrink from Image Border (On) > 28px

Select > To Path (Name "Frame Bottom")

Next, create a new layer above the "Neat Lines Edit" layer and name it "Frame".

Layers > Create New Top Layer (Name: "Frame")

Go to the "Select" menu and select "Invert Selection".

Select > Invert Selection

Go to your "Patterns" dialogue and drag and drop the "Slate" pattern onto the "Frame" layer. You won't notice it but you've just added a thin strip of the slate pattern to the layer (the inverted selection insures that the pattern is only applied to the area above the "Frame Bottom" path selection).

Toolbox > Bucket Fill > Pattern Fill > Slate Pattern > Fill

Create a new layer above the Frame layer named "Frame Edit".

Layers > Create New Top Layer (Name: "Frame Edit")

On the "Frame Edit" layer, use the "Bucket Fill" tool to fill the inverted selection with black (or simply drag and drop the black foreground color to the layer).

Toolbox > Bucket Fill > FG Color Fill (Black) > Fill

Next, set the Layer Mode of the "Frame Edit" Layer to "Overlay". Right Click on this layer and select "Merge Down".

Layers > "Frame Edit" > Set Layer Mode (Overlay) > Merge Down

Next, simply turn off your selection.

Select > Select None

You should now be able to see the Frame outline, which appears as a darker version of the slate pattern.
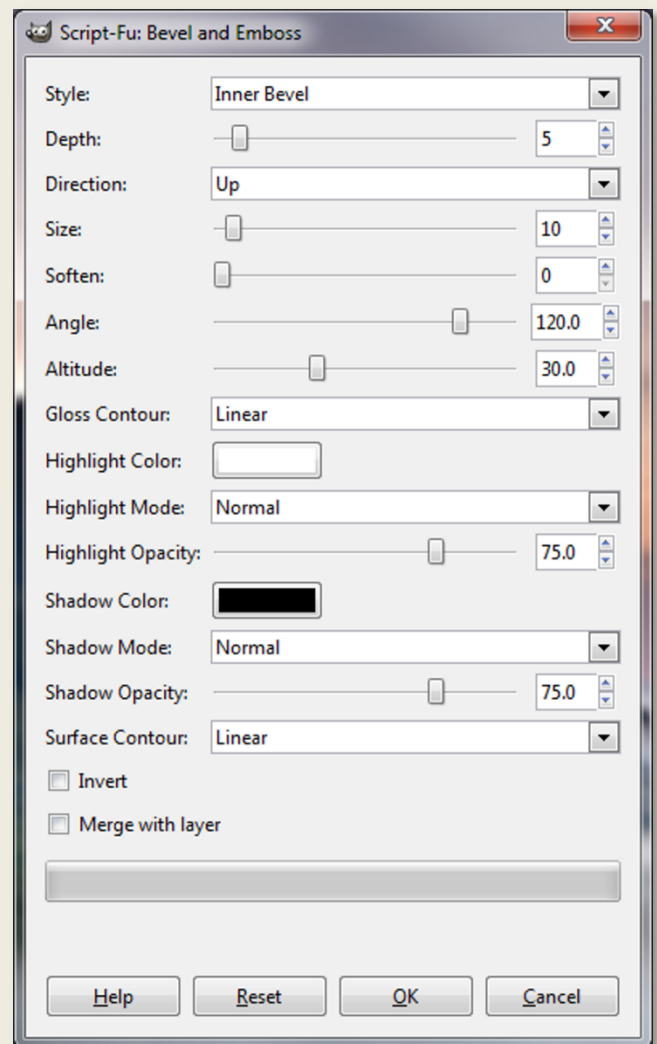
Figure 20: Map with Frame Outline

With the "Frame" layer selected, go to the "Script-Fu" menu and select "Bevel and Emboss". This will bring up a pop-up menu with several different options to select from. Use the settings shown in Figure 21 (Size may vary depending on map size):

Script-Fu > Bevel & Emboss (See Figure 21 for settings)

Your frame should now look something like Figure 22.

Figure 22: Map with Inner Bevel & Emboss Applied to Frame

Next let's add some gold borderlines to the frame. Create a new layer above the Frame Highlight and Frame Shadow layers. Name it "Gold Border Top".

> Layers > Create New Top Layer (Name: "Gold Top")

Now change your Foreground color from Black to Gold (I'm using HTML #887d52; you can copy and paste this into the HTML notation field of your "Change Foreground Color" window).

> Toolbox > Change Foreground Color > HTML Notation 887d52

Next, with the "Gold Top" selected, go to your Paths dialogue and click on the "Frame Top" path to select it. Then click on the "Paint Along Path" Icon. Set the line width to 4px and then click on "Stroke".

> Path > "Frame Top" > Paint Along Path > Line Width 4px > Stroke

Now we are going to apply a Pillow Emboss layer effect to this top gold borderline. Go to the "Script-Fu" menu and select "Bevel & Emboss". Use the settings shown in Figure 23.

> Script-Fu > Bevel & Emboss (See Figure 24 for settings)

Figure 23: Gold Border Pillow Emboss Settings
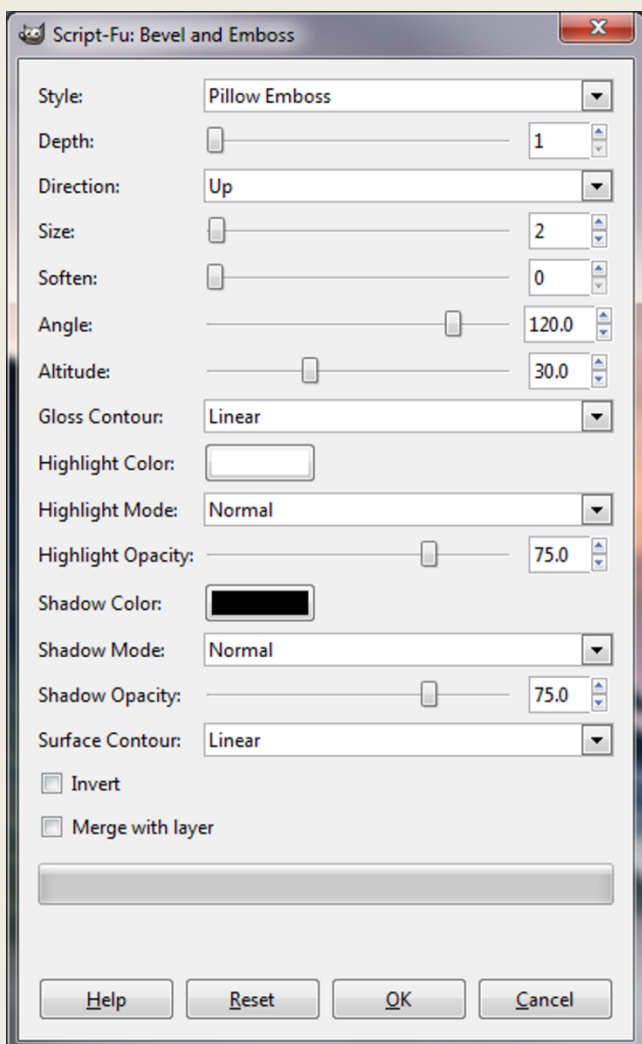
Now let's add a black stroke around the edges of the Gold Borderline to help better define it. Click on the "Gold Top" layer again to select it. Now go to the "Script-Fu" menu and click on "Stroke". In the pop-up window that emerges change the Color to black and the Position to 100. Hit "OK".

> Layers > "Gold Top" > Script-Fu > Stroke > Color (Black) > Position (100)

And now for the bottom gold borderline. Create a new layer above the Gold Top Highlights and Shadows layers. Name it "Gold Bottom".

> Layers > Create New Top Layer (Name: "Gold Bottom"

Once again go to your paths dialogue and select the "Frame Bottom" path. Click on the "Paint Along Path" Icon. However this time only set the line width to 2px (it will end up being the same size as the top).

> Path > "Frame Bottom" > Paint Along Path > Line Width 2px > Stroke

Next, add a Pillow Emboss Layer effect to this bottom gold borderline. Use the same settings as before (i.e. as in Figure 24).

> Script-Fu > Bevel & Emboss (See Figure 24 for settings)

As before, now add a stroke to the Gold Bottom layer. Go to "Script-Fu" and change Color to black and the position to 100.

> Layer > "Gold Bottom" > Script-Fu > Stroke > Color (Black) > Position (100)

Almost finished. The last detail to be added is a drop shadow effect. In your layers stack click on the "Frame" layer, then go to the "Script-Fu" menu and select "Drop Shadow". In the pop-up window that appears, keep all of the default settings as is, except for Size and Offset Distance. Change the Size to 15px, and the Offset Distance to 10px. Now click "OK". The End!

> Layers > "Frame" > Script-Fu > Drop Shadow > Size (15px) > Offset (10px)

Figure 24: The Final Cut