

A Guide to the GIMP Image Editor for Photographers

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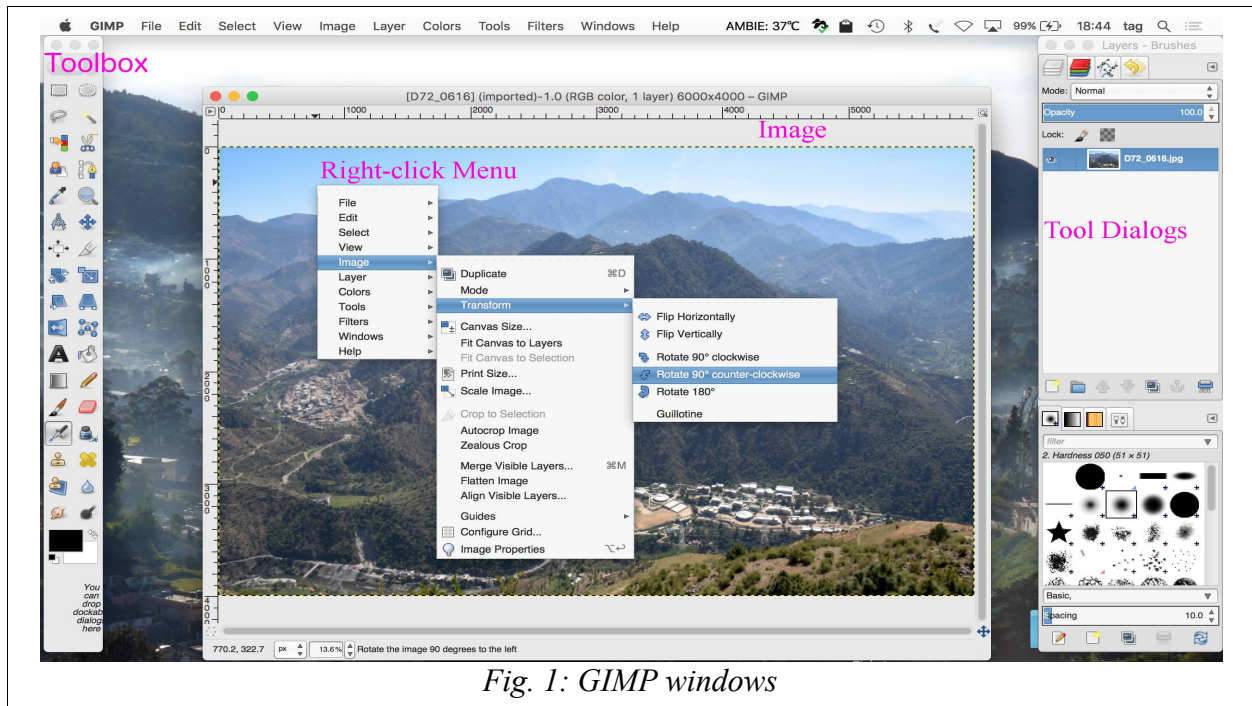


Fig. 1: GIMP windows

1 Preamble

The GIMP is a very powerful tool for image editing and manipulation. It is useful for digital art, photography and a variety of other purposes. It has a bewildering array of features, which can result in a steep learning curve. GIMP is free, open-source software. You can download it on Linux, Windows or Mac OS X and use it for any purposes at zero cost.

This Guide is intended to give a quick introduction to GIMP for common tasks that today's digital photographer needs to do. The Guide starts with a "Quick Start" to familiarise you with basics of the GIMP user-interface. This is followed by a "How to" section that gives step-by-step solutions to common needs of a photographer. Subsequent sections delve into some of the depths of GIMP, to entice you to become an expert in GIMP.

2 Quick Start

A GIMP image consists of 1 or more Layers on a Canvas. Each Layer can be edited independently, made (in)visible, various degrees of transparency, etc. The final image is produced by flattening the layers.

GIMP features can generally be accessed in any of several ways (Fig. 1). These include:

- The Menu bar at the top
- The Toolbox, usually at the left
- The Tool Dialogs, usually at the right
- <Right-click> context menu inside an image
- <Right-click> context menu inside a Dialog
- Keyboard shortcuts *Note: Use <Ctrl> on Linux and Windows, <Cmd> on MacOS X.*

We now outline a few of the common menus and tools. This list does not include many advanced features.

Undo History

GIMP saves all edits in the *History*. This is a powerful feature that allows you to freely experiment without worrying that you may do lasting damage to an important image.

You can undo the last edit with <Ctrl-z> or *Edit*→*Undo*. You can directly select any previous edit from the History Dialog. <Ctrl-y> or *Edit*→*Redo* moves forward in the edit History. Thus you can go back and forth between edits freely, until you overwrite the image with *File*→*Save*.

Note: the History is lost when you exit from GIMP.

View Menu

Zoom in with + out with -

Zoom→*Fit Image in Window* makes the whole image visible

Zoom→*1:1(100%)* shows every pixel, useful for very fine editing

Image <Right-click> Context Menu

View Exif: camera and exposure information

Image Properties: canvas size in pixels, file type, number of layers, etc.

Transform: Rotate, Flip

Tools:

Toolbox <Ctrl-b>: selection, editing and other tools for quick access. Hover the mouse over a tool to see its name.

Dialogs: A set of tabs such as Layers, Channels, Brushes, etc . Each tab with options, lists, etc.

Click and drag a tab outside the Dialog to undock it.

Click on the <left-arrow> icon at the right, then <Add Tab> to add a tab.

To get docked toolboxes: <Right-click>→*Windows*→*Dockable Dialogs*

<TAB> in image window: hide/show all docks

<Double-click> on a tool icon to open the **tool options** dialog tab

Manage Toolbox: You can customise the toolbox by adding/removing tools from it using Drag-and-drop. Or use menu *Preferences*→*Toolbox*

Presets: Many tools allow settings to be saved as presets and applied later. To apply a preset, click on the <Preset> listbox at the top of the tool dialog. To save the current settings as a new preset, click on the <+> icon.

Tip: If you have just used one of the *Color* tools, clicking on the image will reopen the Dialog for that tool.

Selection

GIMP has a variety of ways of selecting part of an image. This *selection* is used by many tools. Tools for selection include constrained rectangular and elliptical regions, as well as freehand drawing. The edges of the selection can be feathered to take care of fuzzy borders of an object.

Rectangle, ellipse, lasso (freehand), *colour* (magic wand). *Intelligent scissors* is very useful for selecting irregular shapes.

<Shift-click> to add to current selection

<Ctrl-click> to subtract from current selection

<Shift-Ctrl-click> for intersection

Rectangle, ellipse: if has resize handles, resize or move selection outline

Without handles, move or copy the selected area

Quick Mask <Shift-q>: makes only current selection visible, useful for fine tuning the selection. Add or subtract from selection with any paint tool: Black subtracts, White adds. Press <Shift-q> when done.

Copy selection: <Shift-Opt click-drag> on MacOS X to copy the selected area of the image. Note that a new “floating selection layer” is created. Move or edit the floating layer. When satisfied, click on the image to merge (anchor) the floating layer to the image, or press <Ctrl-h>.

Key combination may vary on other systems, try <Ctrl-Alt>, <Shift-Ctrl>, etc.

Move selection: <Shift-Opt-Cmd click-drag> on MacOS X to move the selected area of the image. Note that a new “floating selection layer” is created.

Key combination may vary on other systems, try <Shift-Ctrl-Alt>, <Shift-Alt>, etc.

Copy/Move – alternate method: Sometimes the key-combinations above do not work. Copy/Move the selection using:

1. Copy/Cut the selection <Ctrl-c>/<Ctrl-x>
2. Clear the selection *Select→None*
3. Paste the selection <Ctrl-v>. This creates a floating layer.
4. Use the Move tool to move the selection to the desired position.
5. Anchor the selection using <Ctrl-h> or *Layer→Anchor Layer*

2.1 Useful Tips

This section contains tips that apply across many tools and features of GIMP. They will help you become a more efficient and effective GIMPer.

1. Many tools operate on the current selection if it exists. If there is no selection, the tool operates on the active layer. This can be confusing. You may be able to control this behaviour using check boxes in the *Tool Options*. Or, remove the selection using *Select→None* or <Shift-Ctrl-a>.
2. The *Move* tool operates on the active layer, or on some other layer if it is outside the image on the active layer. The cursor has a hand pointer in addition to the

move symbol if it is over a non-active layer. You can control this using check boxes in the *Tool Options*: “*Pick a layer or guide*” OR “*Move the active layer*”.

3 Common Tasks – How To

3.1 Crop an Image

Use the *Rectangle Select* tool to select the area for cropping. Adjust the selected area using the handles in the corners. Move the selected area by clicking in its middle. Press <Enter> to confirm the selection. In the Selection Dialog, you can fix the aspect ratio, the width, the height, or the size.. Or make other fine adjustments (see “ Selection” in Section 1).

When you are satisfied, click *Image→Crop to Selection*. Note that the canvas gets resized to fit the cropped image.

The *Ellipse* selection tool is useful to get a photo frame effect.

3.2 Scale or resize an image

Digital cameras nowadays with 20-25 megapixel sensors produce large images, such as 6,000 x 4,000. For a webpage or a document, you may want to scale the image to say 1,200 x 800. This is easy in GIMP:

1. *File→Open* the image
2. *Image→Scale Image* to bring up a dialog. Be sure that the chain to the right is continuous to preserve the aspect ratio. Enter the desired width or height. You can select the units of size as pixels or percent. Eg above, specify the width as 1,200 pixels, or as 20%. If the aspect ratio link is on, the height will be set automatically.

OR

Pick the *Scale* tool and click on the image, then use the handle in a corner to scale the image (or scale the selection). As above, use the dialog to preserve aspect ratio..

An image out of the camera may occupy 5-15 MB. For webpages and email, it is necessary that the file size be reduced to a few 100 KB. This can be controlled via a combination of scaling and reduced JPG quality.

1. Scale the image as above
2. Save the file with *File→Export As* and select file type such as JPG or PNG.
3. When saving as JPG, move the Quality slider to lower values to get smaller file sizes:
 - a. 100: best quality, largest file, say F MB
 - b. 90: almost best quality, file about F/3 MB
 - c. 65-85: good quality, file about F/6 MB
 - d. 40-60: acceptable quality, file about F/8 MB

Note: reduction in file size is dependant on the contents of the image.

3.3 Automatic exposure and colour

For quick adjustments, try the auto colour tools, *Equalise*, *White Balance*, *Color Enhance*, *Normalize*, *Stretch Contrast*, and *Stretch HSV* (Fig. 2).

These scale the histograms of the 3 primary colours in various ways. The effect of each tool depends on the image. Try them all to achieve the desired effect.

If these are not satisfactory, see Sub-sections 3.4 and 3.5 below for manual methods that give you more control.

3.4 Correct the exposure of an image

3.4.1 Quick Method

Use *Colors*→*Brightness-Contrast*.

In the pop-up dialog, adjust the sliders. Applies to the current selection even if it is in an inactive layer. If no selection, applies to the active layer.

For visual operation, click and drag mouse from the centre of the image to operate the sliders: up/down ==> +/- brightness, left/right ==> +/- contrast.

3.4.2 Fine control by colour

Use *Colors*→*Levels*.

Automatic level setting: Click <Auto>

Manual setting:

1. Select *Channel: Value* for intensity of all colours. Or select one of the Channels *Red*, *Green* or *Blue*
2. In “*Input Levels*”
 - move the left slider to the black point (all pixels less intense than this will appear pure black)
 - move the right slider to the white point (all pixels more intense than this will appear pure white)
 - move the centre slider to the middle-grey value. Moving to the left brightens shadows.

You can set the 3 levels by entering numeric values in the range 0-255. Black, grey and white points can be selected from the image using the eye-droppers.

To view the **histogram** of the image, use *Colors*→*Info*→*Histogram*. Select “*Value*”, “*Red*”, “*Blue*” or “*Green*”.

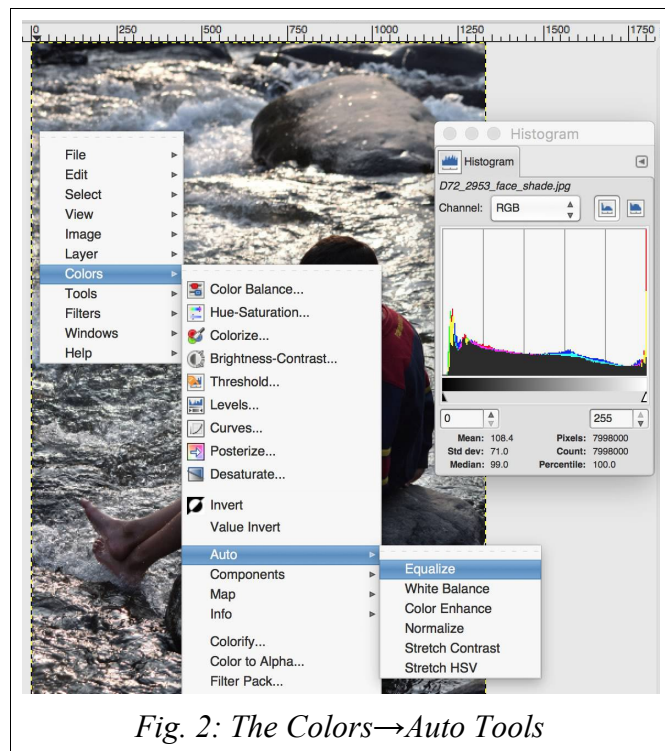


Fig. 2: The *Colors*→*Auto* Tools

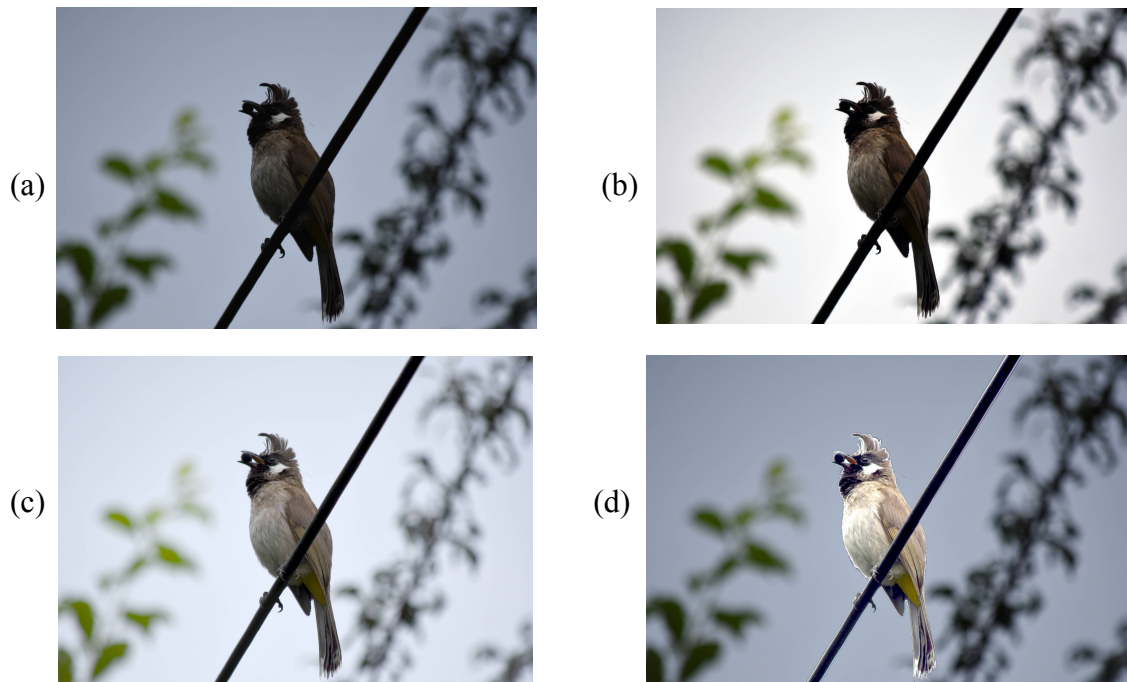


Fig. 3: The bright morning sky was behind the bulbul. (a) Camera exposure (b) GIMP Levels auto (c) Levels with manual adjustment (d) Levels with manual adjustment restricted to the bulbul.

3.4.3 Backlit subject

When you take photos of people outdoors with bright sunlight from the back, the camera sets the exposure for the whole scene, and subjects' faces in shadow are underexposed. If you increase the exposure of the whole image so that the faces are properly exposed, the rest of the scene gets overexposed.

Use GIMP to increase the exposure of only the shadows in the image.

1. Use *Colors*→*Levels*. Notice in the histogram that there is a zero level segment at the left and right ends.
2. Select *Channel: Value*
3. In *Input Levels*, move the left (black level) and right (white level) sliders inwards until the zero level segments are excluded
4. Move the centre (grey level) slider towards the left to increase the exposure of the shadows.

This method also increases the brightness of the overall scene. In case you wish to leave the scene as-is and only enhance the shaded object:

1. Select the shaded object (see “Selection” in Section 1).
2. Now, use *Colors*→*Levels* as above. The sliders will only affect the selection.

The bulbul in Fig. 3 was shot facing towards the bright early morning sky. The camera exposed for the sky, so the bird is too dark (a). The image in (b) is auto enhanced with Levels. The details of the bird are still obscured. In (c), with manual adjustment of levels, the de-

tails of the bulbul's eye and feather colours are visible. Image (d) is similar to (c) except that the level adjustments were applied only to the selected bird. Hence, it stands out from the background sky more clearly.

3.5 Correct the white-balance of an image

Basic corrections: Use *Colors→Levels*.

1. Select *Channel*: “Red”, “Blue” or “Green” to correct a specific colour.
2. In “*Input Levels*”
 - move the left slider to the black point (all pixels less intense than this will appear black)
 - move the right slider to the white point (all pixels less intense than this will appear white)
 - move the centre slider to the middle-grey value

You can set the 3 levels by entering numeric values in the range 0-255. Black, grey and white points can be selected from the image using the eye-droppers.

Fine-tuning: Use *Colors→Color Balance*

1. Select *Range* “Shadows”, “Midtones” or “Highlights” to adjust
2. Adjust the 3 sliders to correct the colour cast

Note: Check “*Preserve luminosity*” to preserve the average image intensity.

For very fine adjustments, try *Colors→Curves*

3.6 Convert to black-and-white

Use *Colors→Colorize*

Set “*Saturation*” to 0 for greyscale image

For a colour tone, eg. sepia, set “*Saturation*” to a mid-value and choose the colour using the “*Hue*” 360-degree colour wheel.

Alternatively, use *Colors→Desaturate*. You can select grey levels dependant on the lightness, luminosity, or an average of both.

3.7 Combine 2 or more images side-by-side

1. *File→New* In the dialog, set canvas of sufficient size to hold the combined images. Use *Image→Image Properties* to find out the size of each image
2. *File→Open as layers* — select all the images in the file dialog. Each is opened in a new layer.
3. Select a layer, then use the Move tool to move the image to its desired position. Scale the layer image using *Layer→Scale Layer* if needed.
4. Repeat Step 3 with each layer.
5. Once all images are scaled and positioned as desired, draw a rectangular selection box that exactly includes all images, then *Image→Fit Canvas to Selection*.
6. Save the image as .xcf for future editing, and export as .jpg

Caution: *Image→Crop to Selection* and *Image→Scale* crops/scales **all** layers.

3.7.1 Make a collage

Combine several images as above. Create a background layer at the bottom of the layer stack and fill it with a suitable colour or pattern using the *Bucket Fill* tool or *Blend* tool. Images in different layers can overlap one another as desired. Use the *Rotate* tool to position an image at an angle. Change the order of images in the layer stack to get the desired effect.

3.8 Blend 2 images

You have two images. One has a well-defined object that you want to appear in the middle of or to one side of the other image. For instance, you have a picture of a person and another picture of a scenic river. You want the person to appear by the side of the river. You have a picture of a building and another of a mountain range. You want the building to appear at the base of the mountains.

1. Open both images in layers, move the object image lower in the stack (Section 3.7)
2. In the top image, select the region in which the object from the other image is to appear. If necessary, scale the lower image using the *Scale* tool (see Subsection 3.2).
3. *Select*→*Invert*. For blurred edges, *Select*→*Feather*, choose say 50 pixels
4. *Layer*→*Add Layer Mask*: check *Selection*. The other image appears in the selection window.
5. Edit the layer mask to adjust the window.

Alternate method to get a more gradual transition between the images:

1. Open both images in layers, move the object image lower in the stack (Section 3.7)
2. Select the layer with the top image and click *Layer*→*Add Layer Mask*: check *White(full opacity)*
3. Using the *Rectangle* or *Ellipse* tool, select the area on the mask where you want the other image to appear (see “Selection” in Section 1).
4. <Double-click> the *Blend* tool. In the Tools Options, select *Gradient* “FG to transparent”, select *Shape* “Square” or “Radial” to match the selection shape.
5. Make sure that *FG/BG* colours in the Toolbox are *Black/white*.
6. Drag the *Blend* tool from the centre of the selection outwards. Short drag => small transparent region in centre with quick transition to opacity; long drag => more of the selection is transparent with a gentle gradient to full opacity.

A quick method, though less flexible, is to cut the object from one image and paste it on the other image. The pasted object is in a floating layer and can be moved, scaled, flipped, etc. After pasting is done, the object become a part of the base image and cannot be separated.

1. Select the object from one image (see “Selection” in Section 1).
2. Select the layer with the base image, clear the selection *Select*→*None*, and *Edit*→*Paste*.
3. A floating layer is created with the pasted object. You can edit and move this until satisfied.
4. Click on the base image to merge the floating layer into the base image. Or, use *Layer*→*Anchor Layer*.

3.9 Correct perspective of tall buildings

When you take a picture of a tall building from close by, you have to tilt the camera upwards. In the picture, the building appears to lean backwards. With GIMP it is easy to correct the perspective. See Fig. 4 for example.

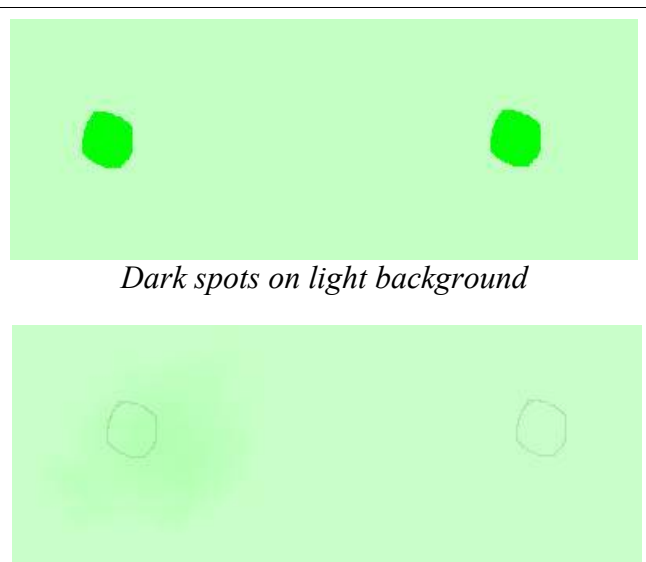
1. Open the image
2. Select the *Perspective Tool*. In the *Tool Options*, if the building is leaning backwards, check “*Corrective (backwards)*”. Select *Clipping* “*Crop to Result*”. Select *Guides* to get a reasonable number of grid lines.
3. Click in the image. The grid appears and also the *Transform* dialog. Move the dialog off the image.
4. Use the 4 corner handles to adjust the image until the vertical lines of the building are almost parallel to the guidelines. Similarly, correct any horizontal perspective.
Note: Leave a little perspective so that the building does not look unnatural.
5. Press <Enter> to Transform the image.
6. If the image appears distorted, correct the aspect ratio, using the *Scale Tool*.



Fig. 4: The picture on the left of the Basilica in Goa was taken with a 10mm wide-angle lens. On the right is the perspective-corrected picture, with a little vertical perspective retained to give an impression of the height.

3.10 Clean sensor or lens dirt

A speck of dust or a fingerprint on the lens, or dirt on the sensor results in a blurred spot on the image. If this spot appears in a plane area such as the sky, it may be quite noticeable. Such spots can be removed with GIMP's *Smudge Tool* (the pointing index finger icon in the Toolbox). Rub the spot repeatedly with the *Smudge Tool*. This blends the colours in the pixels that are smudged. Smudging is akin to rubbing a watercolour painting with a wet finger. It reduces the intensity of the spot, but does not entirely eliminate it. This tool is easy to use and the image is not obviously edited.



Dark spots on light background

Fig. 5: Spots removed using smudge tool (left) and clone tool (right)

Note: You can select the brush size and various effects in the *Tool Options*. However, the brush colour setting has no effect.

A more powerful alternative is the *Clone Tool*. With this, you first select a part of the sky without the spot, then apply this selection over the spot. The spot is completely replaced. However, unless used skilfully, the *Clone Tool* is likely to leave visible edges.

See Fig. 5 for use of the smudge and clone tools on a green image with dark green spots. Smudging leaves slight traces of the dark spot, while cloning completely removes the spot.

4 Layers

A GIMP image consists of a stack of semi-transparent sheets or layers placed onto of a canvas. You view the image by looking through the stack of layers from the top layer to the bottom layer (top to bottom order in the Layer Dialog). What you see is a merged view, depending on the visibility and transparency of each layer.

You can change transparency of each layer, change the order of layers, make a layer temporarily invisible. Edits on one layer do not affect other layers in any way, except that the image on one layer may partially or wholly obscure lower layers.

Use of new layers ensures that the original image is unaffected. This enables you to freely experiment until you have achieved the desired effect. If you make a mistake, simply delete the new layers! Any editing except for very trivial changes is best done by use of layers. It is common to have many layers in your image during editing.

If you wish to draw boxes, ovals, etc on top of an image, create a separate layer for your drawings. To annotate an image with text, create a separate text layer. To change the opacity of a layer, select the layer in the Layer Dialog and adjust the Opacity slider between 0% (fully transparent) to 100% (fully opaque) at the top of the dialog.

When you **save the image**, say DSC1234 . jpg, GIMP saves the image with all layers separately in the file DSC1234 .xcf. The special format .xcf is not useable by most photo viewers, browsers, etc. When you are done editing and want to use the image elsewhere, export to JPG or other standard image format. Exporting flattens all the layers into one.

The *Layers* menu, or <Right-Click>→*Layer* in the image, or <Right-Click> in the Layer Dialog pops up a menu with assorted functions such as create/delete a layer, transform the layer by rotation/flipping, merge 2 layers, set transparency, etc.

4.1 Example use of layers

Suppose you wish to edit one feature in an image, say make change the colour of a cloud:

1. Select the part of the image that you wish to edit
2. Copy to the Clipboard with <Ctrl-v> or *Edit*→*Copy*
3. Make a new layer from the selection using *Edit*→*Paste as*→*New Layer*
4. Select the new layer in the Layers Dialog. Drag it to the top of the stack.
5. You can now move the selection, edit it, crop it, etc. For clarity, you may make a layer invisible by clicking on the <Eye> icon in the Layers Dialog. <Shift-Eye> makes all other layers invisible.

6. When you are satisfied, save the image using *File*→*Export*. The visible layers are flattened and saved in the desired format, such as .jpg, .png, etc.

4.2 Layer mask

Each layer can have a **mask** to set the transparency of the layer. Unlike the opacity slider which applies uniformly to the entire layer, the layer mask can be used for selective transparency. The *degree of transparency* is set by the colour of the mask which can range from white through shades of grey to black.

- If an area of the mask is white, the layer is fully opaque. The lower layers are fully obscured. The area can range from 1 pixel to the whole image.
- If an area is black, the layer is fully transparent. The lower layers are fully visible and the current layer is not visible.
- If an area is grey, the layer is partially transparent. The transparency and intensity of the current layer is reduced in inverse proportion to the greyness.

Use items in the <*Right-Click*>→*Layer*→*Mask* menu to:

Add a mask: Initialise the mask to white (full opacity), black (full transparency), the current selection, etc. A layer can have only 1 mask.

Edit the mask: First click on *Show Mask* to make it visible for editing. Then edit using any paint tool with brush colour set to black, shades of grey or white. Use the *Blend Tool* to get a graduated transparency across the image. When you are done editing, uncheck *Edit Mask* and *Show Mask* so that you can edit the image on the layer.

Disable the mask: temporarily disable the mask without deleting it.

5 Delving Deeper

This tutorial has covered some of the commonly used features and essential aspects of GIMP. You should be able to do many tasks with GIMP now.

GIMP is a very powerful image editor. Each of the features described in the preceding sections has many more bells and whistles. GIMP has numerous other features and capabilities. Read the GIMP Manual (available under the *Help* menu or by pressing <*F1*>) and experiment to become an expert with GIMP.

In this Section, we touch on a few other capabilities of GIMP. These include filters, channels, paths, batch processing, and scripting to automate tasks.

5.1 Special effects

GIMP has many filters to achieve special effects, in the *Filter* menu. *Color*→*Posterize* reduces the number of colours in an image to make it look like a map.

5.2 Channels

There are two types of channels: Colour Channels and Selection Masks.

5.2.1 Colour Channels

There are 3 colour channels: Red, Green and Blue. A colour channel includes all pixels of the specified colour in the entire images, across all layers. The Alpha channel is a colour channel for advanced usage. In the Channels Dialog, if you make Green and Blue invisible, you will see your image as shades of red. With Red and Green visible, the image appears in different shades of yellow.

5.2.2 Selection Masks

<<< to be added >>>

5.3 Paths

<<< to be added >>>

5.4 Batch processing

You have taken a bunch of pictures of a function held in a pandal. All the images have a similar colour cast due to the colour of the tent. You laboriously correct the colour balance of one image (see Section 3.5).

You have a large number of images taken with a 25 MP digital camera, each of file size 8-15 MB. You want to resize each image to about 200-500 KB for posting on a website. You know how to manually resize each image (see Section 3.2).

BIMP, a batch processing plugin for GIMP, allows you to quickly repeat the same corrections on all the images in such cases.

5.5 Scripting

If the builtin features do not meet your needs, GIMP is extensible via several scripting languages. These include Script-Fu (a variant of Scheme) and Python-Fu. By writing a script, you can add a new editing feature, or combine a series of editing steps into one. For those who are not programmers, the plugin repository at <http://registry.gimp.org/glossary/a> contains a number of useful scripts.

5.6 Customising GIMP

GIMP can be customised to your taste. You can tailor many *Preferences*, *Keyboard Shortcuts*, *Modules*, and measurement *Units*. These can be accessed via the main menu, or via the <Right-click>→*Edit* image context menu.