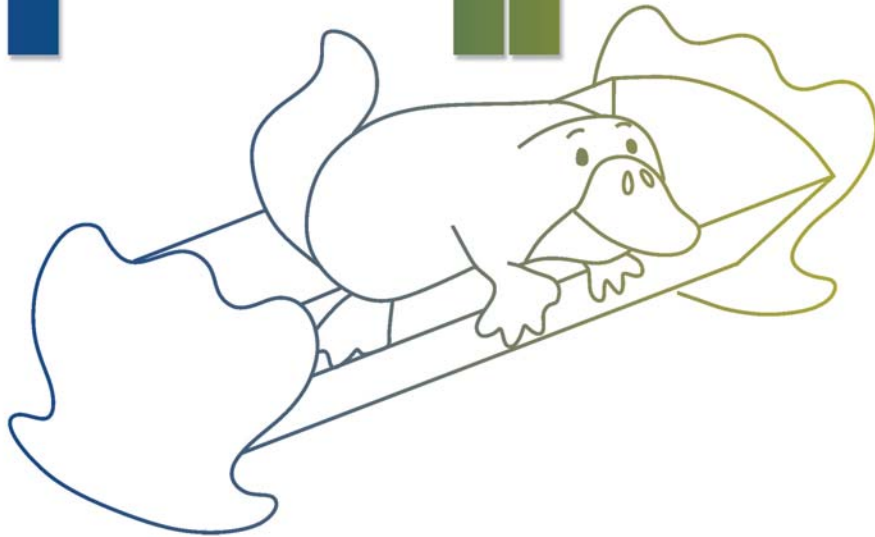


platypus



ABOUT THIS GUIDE

This User Guide is a reference for Platypus. You can read from start to finish or jump around as you please. This guide is available in Acrobat PDF format.

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Attribution

Platypus was created as a collaborative effort by Rujie Yin, David Dunson and Ingrid Daubechies of Duke University; Bruno Cornelis of the Free University Brussels; Bill Brown and Noelle Ocon of the North Carolina Museum of Art; Digital Film Tools.

INSTALLATION

- 1** Download Platypus from the Platypus project website at: <http://www.project-platypus.net/temporary/main/>
- 2** Double-click on the file that was downloaded and run through the installation process.
- 3** Start Photoshop and load a grayscale image.
- 4** Select Platypus from Photoshop Filter menu.

The Platypus user interface opens.

UNINSTALLING

Windows

From the Windows Start Menu, select Programs > Platypus > Uninstall Platypus.

Macintosh

Go to Applications/Platypus and double-click on Uninstall Platypus.

PLATYPUS

Description

Platypus removes the deleterious effect of cradling on X-ray images of paintings on wooden panels. The algorithm consists of a three stage procedure. First, the cradled regions are located automatically. The second step consists of separating the X-ray image into a textural and image component. In the last step, the algorithm distinguishes between the texture caused by the wooden cradle and the texture belonging to the original painted wooden panel and removes only the wood grain texture which cannot be done manually in Adobe Photoshop™.

Before



After



Background

Between the 12th to the 17th century, paintings in Europe were mostly created on wooden panels consisting of solid wooden boards. Until about 1950, cradling was a common restoration technique used by conservators to remediate or prevent structural or insect damage. In the process, the panels were first thinned, and then strengthened by permanently attaching to their backs hardwood lattices called cradles.

Although invisible when a cradled panel painting is on display, the cradles show up in X-ray images, which are intensively studied by art experts and museum conservators to learn artist technique, painting fabrication, and the physical

condition of the painting. To remove these cradle artifacts from X-ray images, experienced museum conservators do it manually Adobe Photoshop™. As a labor intensive task, this is done only on a small portion of the whole collection of museums' panel paintings. Therefore, a semi-automated algorithm is welcomed by museum conservators which can save their time and effort on removing the cradle image from X-ray images.

Features

- **Automatic detection of cradle region location**
- **Separation of the X-ray image into textural and image components**
- **Black, Gamma and White point adjustments of the removed cradle sections**
- **Removal of the cradle's wood grain texture**
- **Ability to manually override automatic features**

TUTORIALS

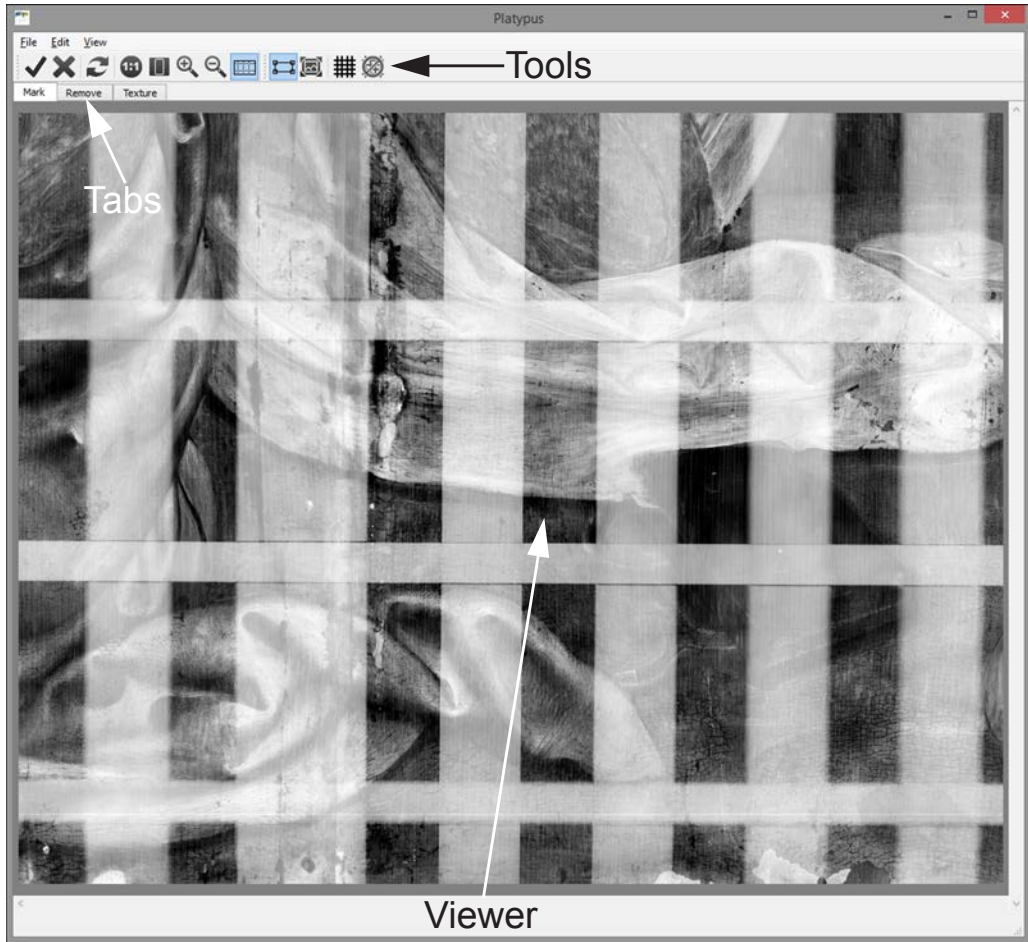
- 1 **Start Photoshop.**
- 2 **Load the *cradle.jpg* image located at:**
 - **Macintosh:** /Applications/Platypus/images
 - **Windows:** C:/Program Files/Platypus/images

Note: Platypus only works with grayscale images. If you are using a color image, select the Image > Mode > Grayscale Photoshop menu item.

- 3 **Select Layer > Duplicate Layer.**

This creates a duplicate layer that Platypus can be applied to.
- 4 **Apply Platypus from the Filters menu.**

The Platypus user interface consists of tools, tabs and a viewer.

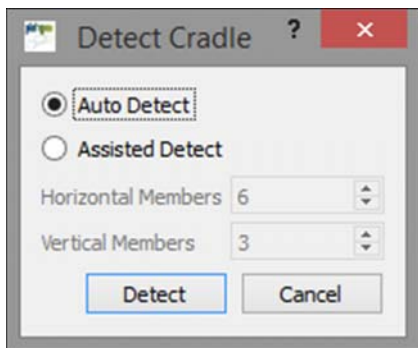


Automatic Cradle Detection

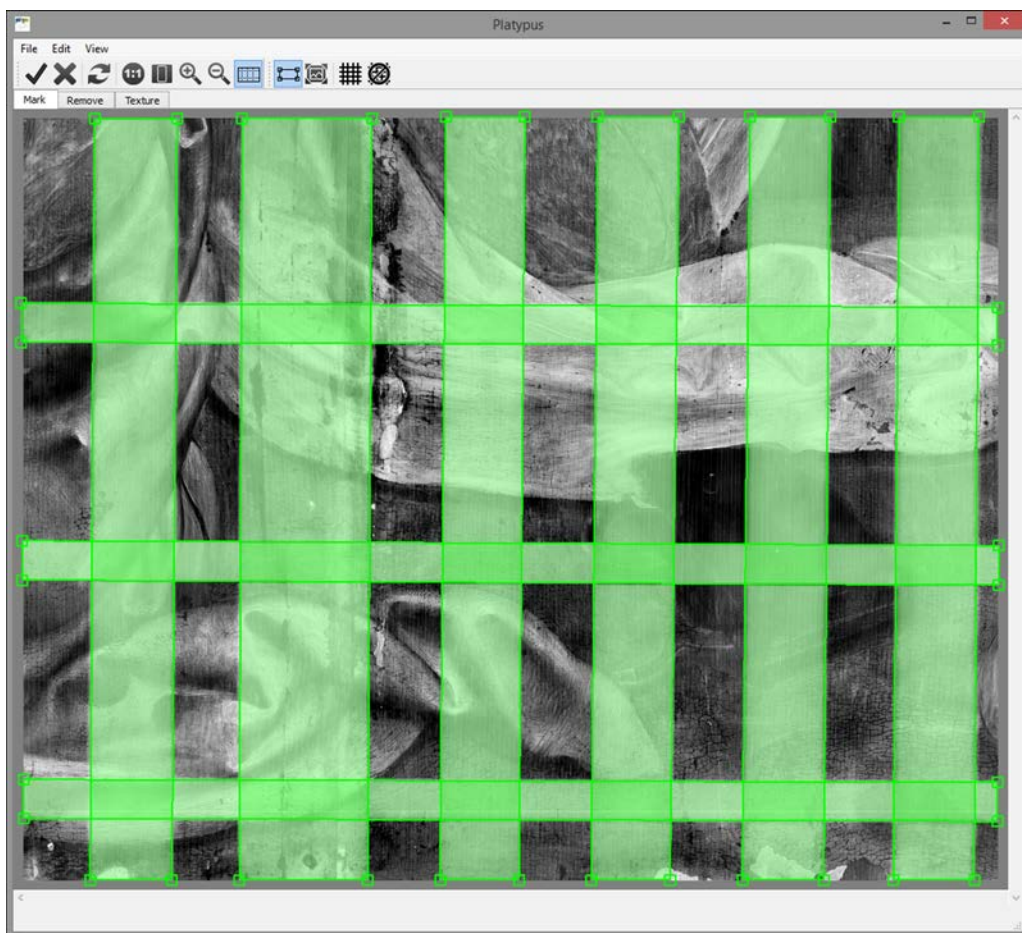
- 1 Click the Detect Cradle icon.



- 2 In the Detect Cradle windows that opens, click Auto Detect.



The cradle detection algorithm runs and display the detected cradle sections as an overlay.



- 3 If the result of the cradle detection needs to be fine tuned, edit the points as needed.**

Go to the [Polygon Editing Keyboard Shortcuts](#) to see the different ways to edit polygons.

- 4 If the cradle detection is not successful with the image you are using, click the Detect Cradle icon again, select Assisted Detect and enter the number of horizontal and vertical members.**

Assisted Detect helps the automatic cradle detection by entering the number of horizontal and vertical members.

See [Assisted Detect](#) for more information.

If the cradle detection is still not successful, you will need to manually draw the cradle sections. To do this, you can use the Polygons tool.

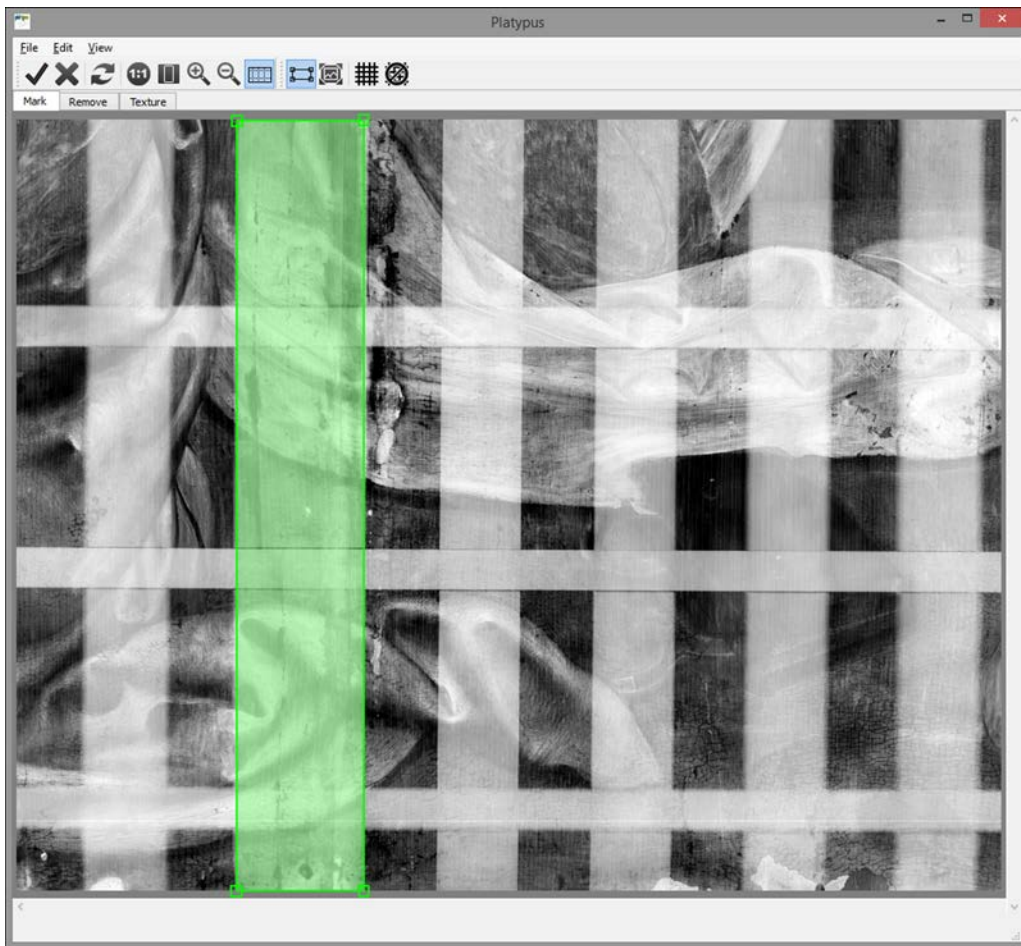
- 5 Press Ctrl(Win)/Cmd(Mac)-Z to undo the cradle detection.**

Manual Cradle Creation

- 1 Click the Polygons icon to select it or press E.**

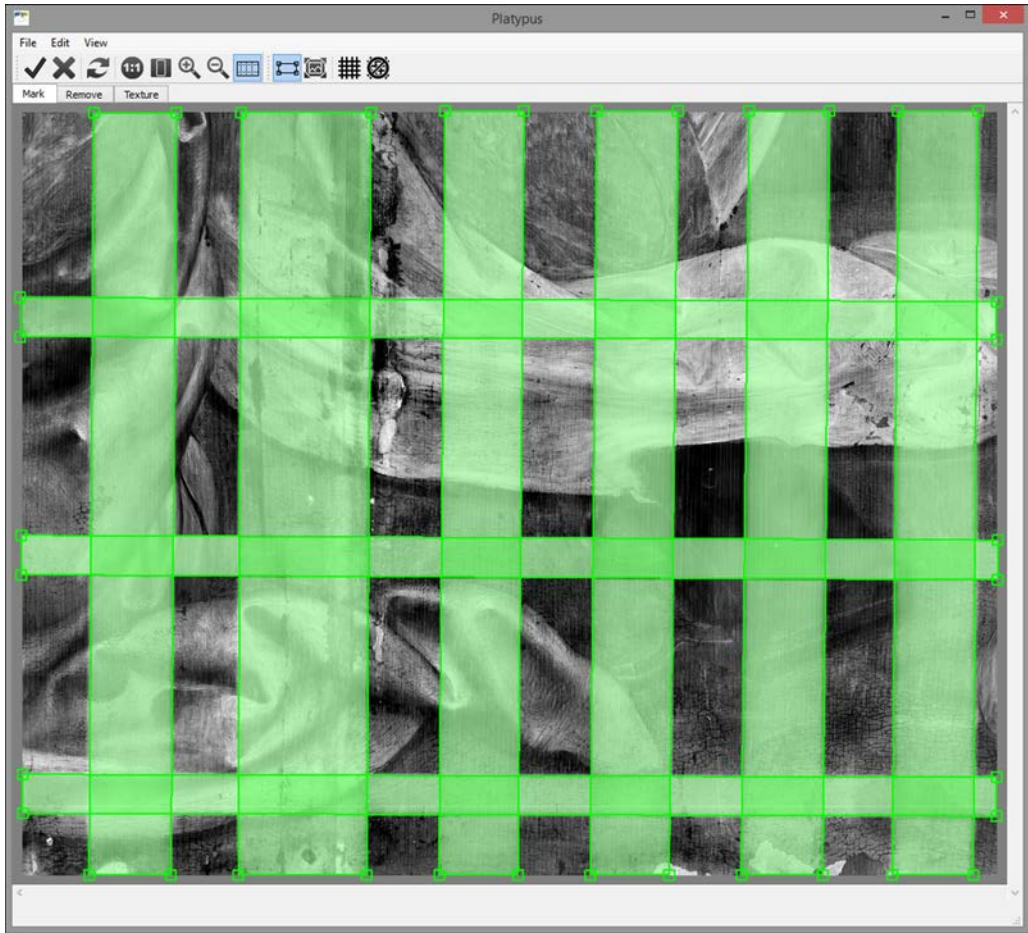


- 2** To create a polygon, click and drag over a cradle section to create a shape.



- 3** Click and drag the points to fine tune the shape.

- 4 Draw additional polygons over the remaining cradle sections or copy and paste an existing polygon using Ctrl(Win)/Cmd(Mac)-C to copy and Ctrl(Win)/Cmd(Mac)-V to paste and then edit the points as needed.



Go to the [Polygon Editing Keyboard Shortcuts](#) to see the different ways to edit polygons.

If there are areas of the image that you would like to exclude from processing, use the Mask tool to draw a shape over the area. The masked area will then be excluded from any further cradle detection, removal and texture replacement.



See [Mask](#) for more information.

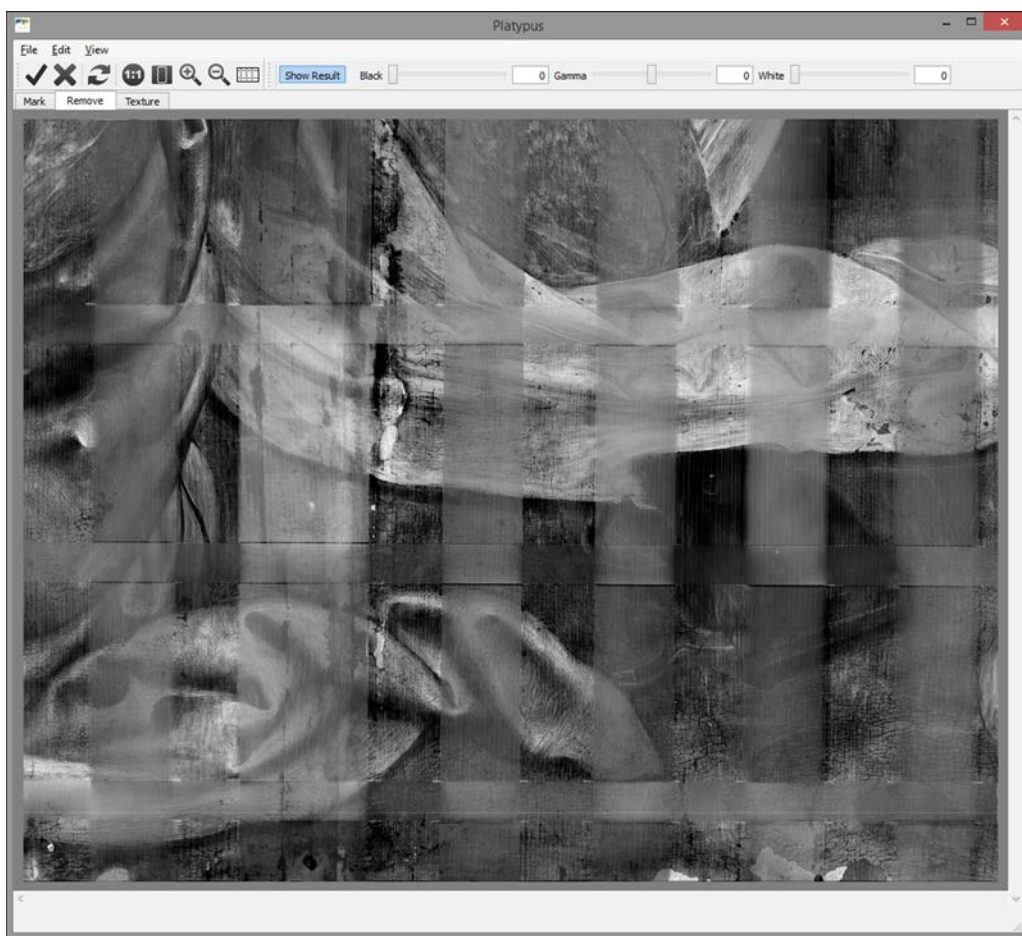
Removing the Cradles

- 1 Press the Remove Cradle icon.



The cradle removal algorithm runs, removes the cradle sections and switches to the Remove tab.

- 2 Select the Toggle Overlay icon or press Q to remove the cradle overlay from the image.



- 3 Toggle the Show Result button to see the difference between the original image and the cradle removal.



- 4 If you would like to save cradle for later use, select File > Save Cradle. Some of the cradle sections may need their Black, Gamma or White point adjusted.

- 5 Toggle the Overlay icon or press Q to turn the cradle overlay back on.



- 6 Click on a cradle section to select it. Adjust the Black, Gamma and White sliders as needed.

While you adjust the sliders, the overlay disappears.

- 7 If you Alt-click on another cradle section, the Black, Gamma and White adjustments from the first section are applied to the new section.

Note: Cradle sections can be selected and adjusted, even though you can't see the selection. Just click on the cradle section to select it and then adjust it using the sliders.

Cradle Texture Replacement

- 1 Select the Remove tab.

In the Remove tab, there is a Remove Texture option. When selected, the cradle algorithm distinguishes between the texture caused by the wooden cradle and the texture belonging to the original painted wooden panel and removes only the wood grain texture.

Warning: The Remove Texture phase is time/memory intensive and takes a long time to render.

- 2 Click Remove Texture.

A progress bar appears at the bottom left of the Platypus user interface and displays the result when it is finished.



- 3 Click the Done button to apply the filter to your image.



The resulting image from Platypus is transferred to Photoshop.

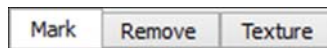
PLATYPUS USER INTERFACE

The Platypus user interface consists of tools, tabs and a viewer.



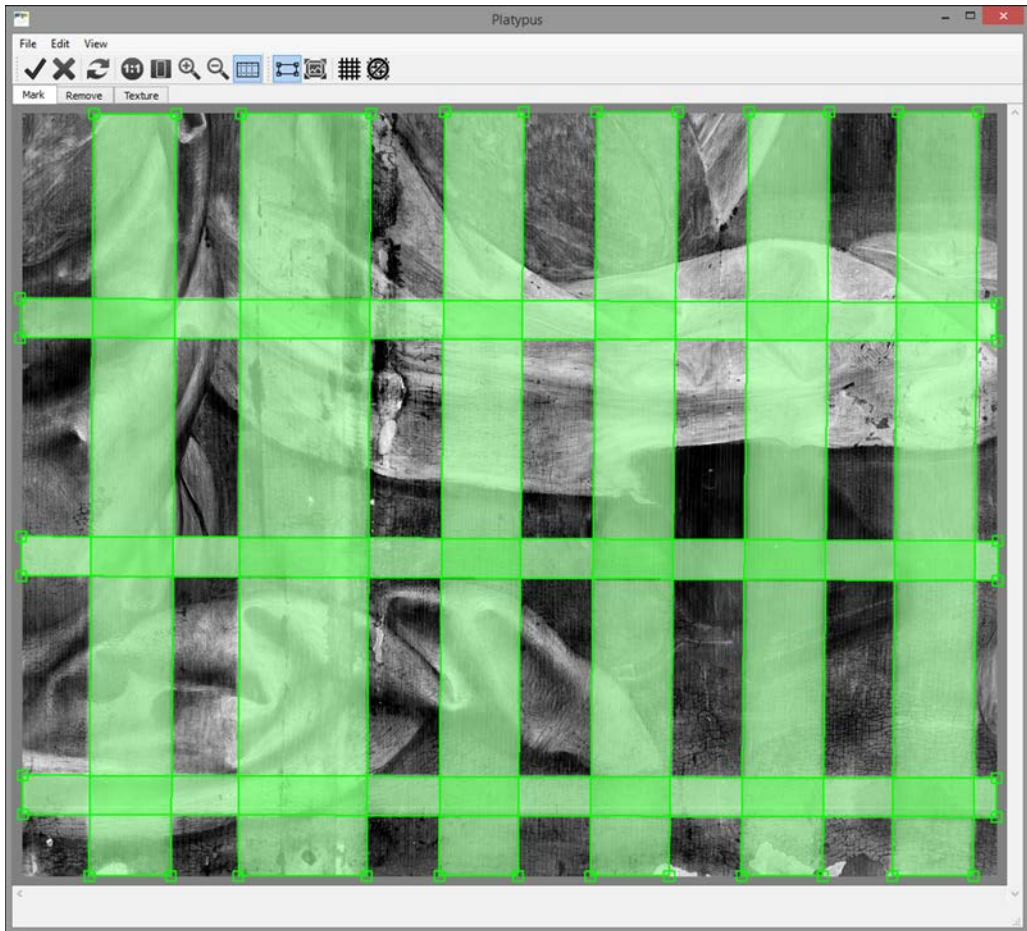
Platypus Controls

The Platypus controls are organized using tabs. There are Mark, Remove and Texture tabs. Within each tab are associated tools.



Mark

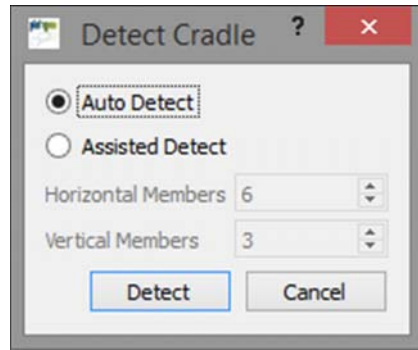
The Mark tab includes tools for automatically or manually defining the cradle pieces and triggering the cradle removal.



Automatic Tools

Detect Cradle

Opens the Detect Cradle window.



Auto Detect

Automatically detects cradle sections and draws them as an overlay on the image.

Assisted Detect

When enabled, the cradle detection algorithm uses the numeric values entered for Horizontal and Vertical members and draws them as an overlay on the image.

Horizontal Members

Defines the number of horizontal cradle members.

Vertical Members

Defines the number of vertical cradle members.

Remove Cradle

Automatically removes the cradle. Once clicked, the Remove tab is automatically selected.



Manual Tools

Polygons (e)

Creates a square or rectangular polygon.



To create a polygon, click and drag to create a shape.

Polygon Editing Keyboard Shortcuts

<u>Shortcut</u>	<u>Action</u>
Click-drag over image	Creates a polygon
Click-drag a point	Moves a polygon point
Alt-drag selected polygon edge	Moves two corner points simultaneously
Alt-drag over open space on image	Rotates the selected polygon
Ctrl(Win)/Cmd(Mac)-click polygon	Toggles the polygon selection
Shift-drag over polygons	Selects multiple polygons
Arrow Keys	Moves selected shapes
Arrow Keys+Hover over point	Moves point

Mask (m)

Draws a bézier shape that is used to define areas to be excluded from the cradle detection, removal and texture replacement.

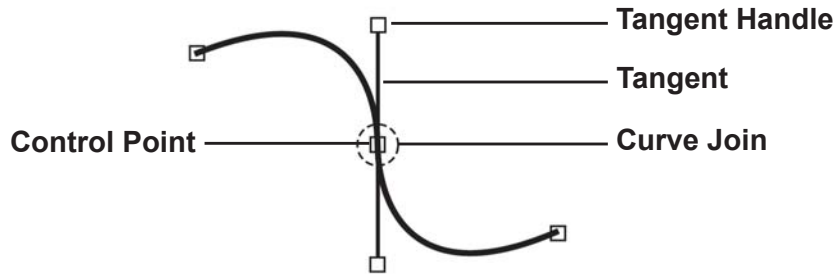


Invert Mask (i)

Inverts the mask.



Alt-click on one of the shape boundaries to add a point. The added point will have a control point and tangent handle that can define the form of the curve.



Mask Keyboard Shortcuts

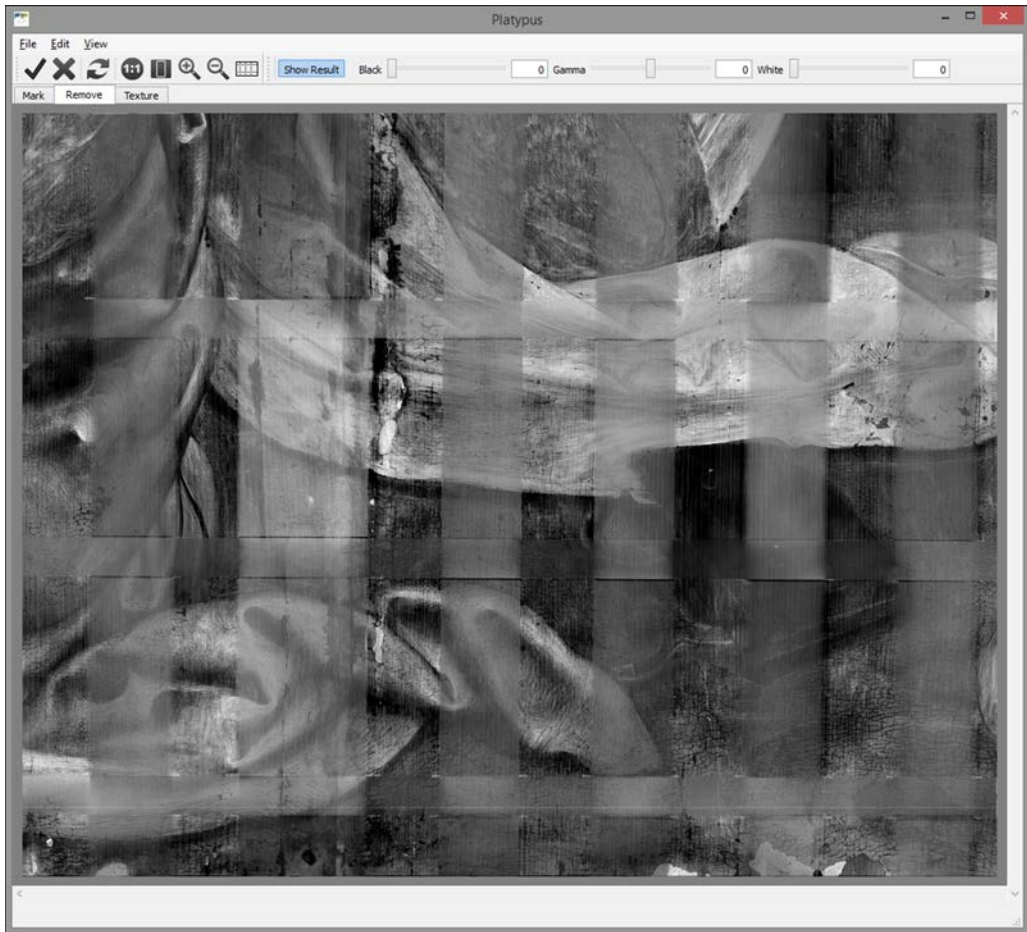
<u>Shortcut</u>	<u>Action</u>
Click -drag over image	Creates a mask
Click -drag a point	Moves a mask point
Alt -drag a point	Turn a corner point into a smooth point
Ctrl (Win)/ Cmd (Mac)-drag a tangent	Adjust both tangents simultaneously and equally
Alt -drag over open space on image	Rotates the selected mask
Ctrl (Win)/ Cmd (Mac)-click polygon	Toggles the mask selection
Shift -drag over polygons	Selects multiple mask
Arrow Keys	Moves selected shapes
Arrow Keys+Hover over point	Moves point

Remove

Show Result

Displays the result of the cradle removal. Disabling Show Result displays the original image.

Show Result



Black

Adjusts the black point of the selected cradle sections.

Gamma

Adjusts the midtones of the selected cradle sections.

White

Adjusts the white point of the selected cradle sections.

Note: Cradle sections can be selected and adjusted, even with the Overlay being hidden. Just click on the cradle section to select it and then adjust it using the sliders.

Remove Keyboard Shortcuts

<u>Shortcut</u>	<u>Action</u>
Left/Right Arrow keys while hovering over Black, Gamma or White sliders	Adjusts the slider in fine increments.
Alt -click a new cradle section	The Black, Gamma and White settings from the selected cradle section are transferred to the newly clicked cradle

Texture

Remove Texture

The cradle algorithm distinguishes between the texture caused by the wooden cradle and the texture belonging to the original painted wooden panel and removes only the wood grain texture.



Warning: The Remove Texture phase is time/memory intensive and takes a long time to render.

Viewer

The Viewer controls manipulate how images are viewed and edited.

Zoom 1:1 (h)

Sets the Viewer to a 1:1 zoom ratio and shows the actual pixels of the image.



Zoom to Fit (f)

Fits the entire image inside the Viewer.



Zoom In (i)

Zooms the image in.



Zoom Out (o)

Zooms the image out.



Toggle Overlay (q)

Toggles the display of the cradle marking overlay on and off.



Viewer Keyboard Shortcuts

<u>Shortcut</u>	<u>Action</u>
Space Bar -drag	Pans the image
I Key	Zooms the image in
O Key	Zooms the image out
Scroll wheel over image	Zooms the image in and out
Middle-mouse double click	Fits the image to the window
F	Fits the image to the window
H	Sets the image to a 1:1 pixel ratio

Done, Reset, Cancel

Done

The image created in the Platypus user interface is transferred to Photoshop.



Reset All

Resets Platypus back to it's default settings.



Cancel

Closes the Platypus user interface without making any changes.



PULL-DOWN MENUS

File

Open Cradle

Opens a previously saved cradle so that you can pick up editing where you left off.

Save Cradle

Saves the current cradle setup which can be reloaded at a later time.

Save Cradle As

Saves the currently saved cradle as a new file.

Edit

Undo/Redo

Undo or redo operations.

Cut

Cuts the selected objects.

Copy

Copies the selected objects.

Paste

Pastes the selected objects.

Delete

Deletes the selected objects.

View

Zoom to Fit (f)

Zoom the image to fit the window.

Zoom to 1:1 (h)

Zooms the image to a 1:1 pixel ratio.

Zoom In (i)

Zooms the image in.

Zoom Out (o)

Zooms the image out.

Help

User Guide

Opens the Platypus User Guide.

Help Shortcuts

<u>Shortcut</u>	<u>Action</u>
F1	Opens the Platypus User Guide

About

Shows the Platypus version.

