DETAILED INSTRUCTIONS FOR USING THE LEIDEN UNIVERSITY LIBRARIES GEOREFERENCER TOOL

1. By clicking on the orange button (Fig. 1), you will be taken to the Leiden Georeferencer tool and assigned a random map from our Special Collections. Click the ''**This map**'' tab to view the map's title, date, and other publication information.

Figure 1: *Link to the Georeferencer application*

2. In order to save and submit your georeferencing efforts you will need to register. An account with Georeferencer is free and only requires your e-mail address; this can be established by following the "**Sign up**" link. A password will then be provided to you by email.

   Alternately, you may login using an existing account with Facebook, Google, or Twitter (this may happen automatically if you are already signed-in to one of these services). See Fig. 2.

Figure 2: *Sign-in screen*

3.   After having logged in, you will be presented with two map boxes in the Georeference tab; the scanned old map will appear on the left, with a modern map on the right (Fig. 3).
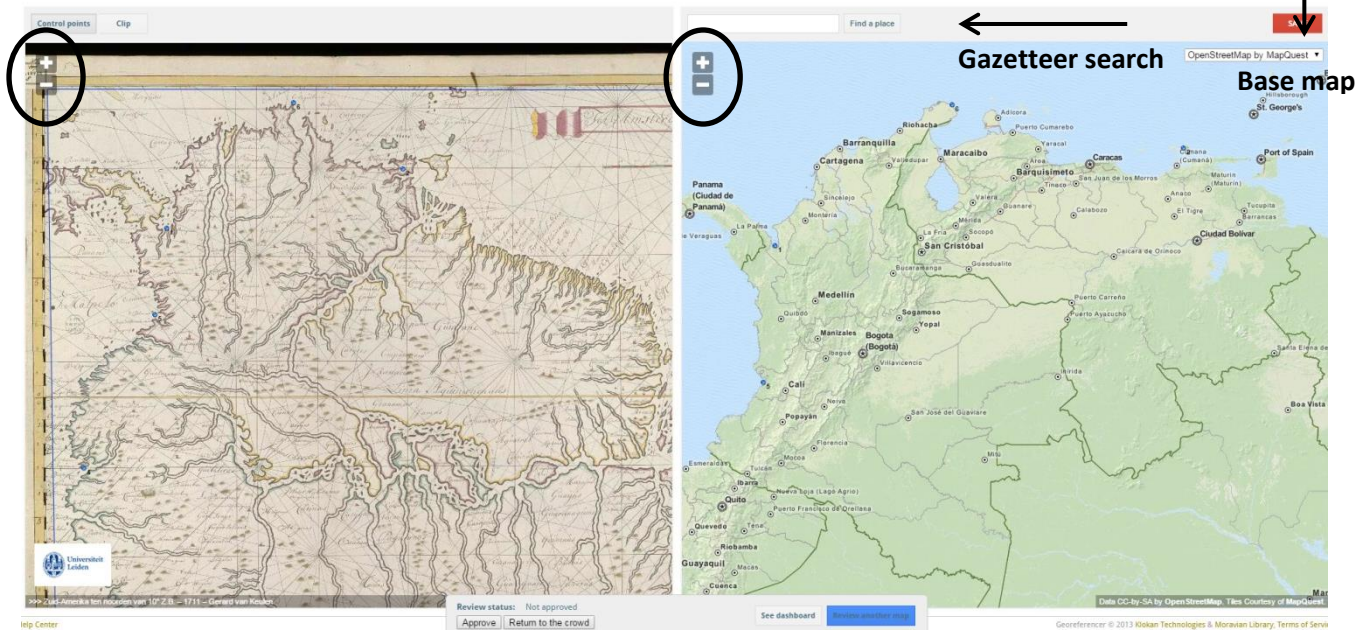

Figure 3: *Screenshot of the Leiden Georeferencer tool, with zoom-pan controls of the two maps circled, and labeled arrows pointing to the Gazetteer search and the Base map selection.*

The modern map, by default, will be OpenStreetMap online mapping. This may be changed to one of several other medium-scaled, modern "base maps" (Google Streets, Google Satellite, and others; each with its own (dis)advantages) using the dropdown box on the right-hand side of the screen (Fig. 3).

4.   Zoom in on the old map - enough to read it - using the controls in the upper left of the map box. (Fig. 3) The modern map has the same controls in its map box for zooming and panning.

Use the gazetteer search box that appears above the modern map (Fig. 2) to locate the place depicted on the historic map. Search for a prominent settlement name or landmark; if it is still unascertainable, click on the ''**This map**'' tab to view the map's title and description, and search for the place names noted there. Once text is entered in the box, several possibilities will be offered and the correct location should be selected.

When using the gazetteer, remember that place names as they appear on old maps may not be found in modern gazetteers for a number of reasons, including different spellings, name changes or word form.

5.   Examine the maps carefully, looking to identify spatial relationships. When a corresponding location between the two maps can be identified, click on that point on one map, followed by the other.

If you wish to delete a set of points, finish assigning the pair, then select the point and press the "Delete" button on your keyboard.

6.   Assign as many points as you can over the entire map. The minimum number is five, but more points, spread evenly over the map and extending to the map margins, will be more accurate and therefore much more valuable.

      Look carefully if the right, corresponding, control points are linked. You can check that by selecting a point on the old map. The linked point on the modern map will then be highlighted .

7.   Additionally, define the content area of the map by "clipping" the borders in the ''**Clip**'' tab displayed on the left side of the screen, just above the zooming button (see detailed video instructions). Clip carefully along the borders of the map image. The framework of the map, as well as inset maps should be excluded, but parts of the sea are part of the map image (see Fig. 4) Symbols on the map (compass rose, cartouches, scale bars etc.) should not be excluded as they are surrounded by parts of the map image!
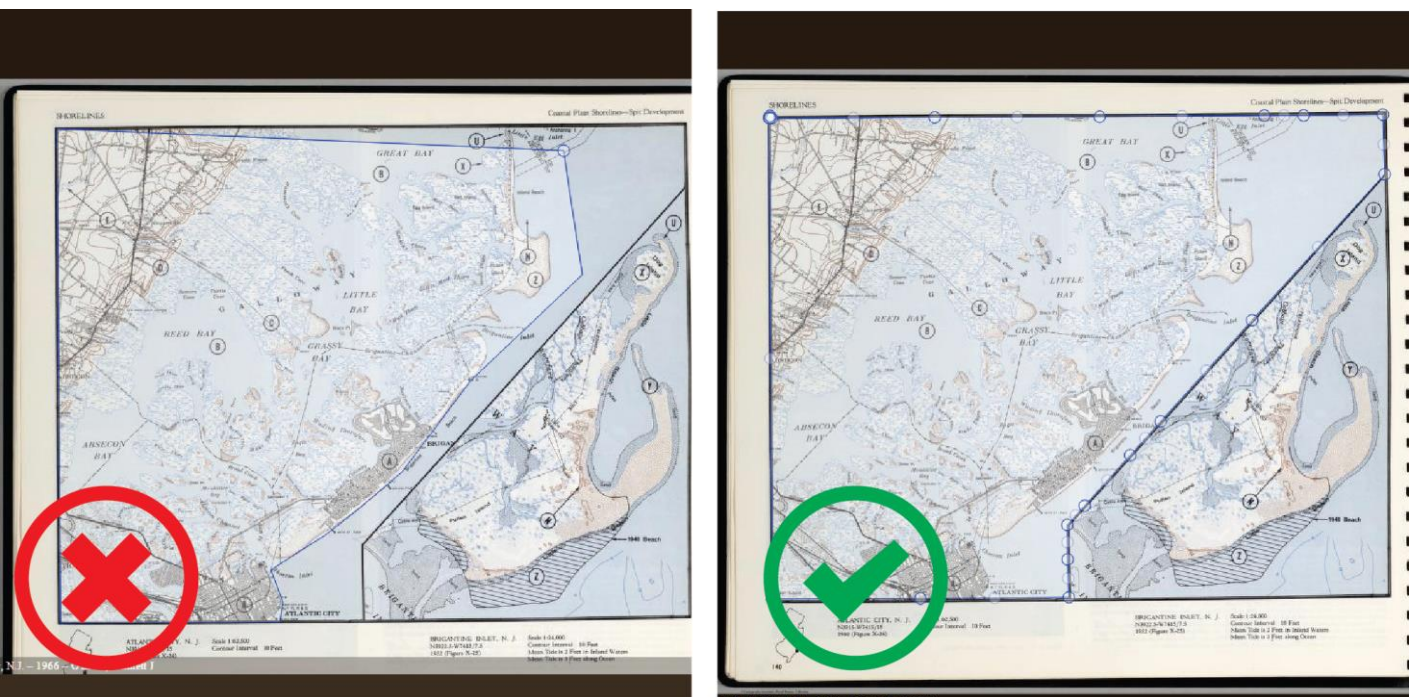

Figure 4: *Screenshot of the Leiden Georeferencer tool, with an example of a correct and an incorrect usage of the clipping tool.*

8.   When you are finished, click the red "Save" button. Once your work is saved, you are automatically taken to the ''**Visualise**'' tab, showing the historic map overlaid on Google Maps. You can open the georeferenced KML-file as well in Google Earth by clicking on "Open KML in Google Earth. You will need to have Google Earth plug-in (http://earth.google.com/plugin/)

installed in order for this to function.If the map looks overly stretched or warped, there could be a stray point that is throwing off the calculations. In this case, go back to the Georeference tab to review the placement of points. The Accuracy tab will indicate problem areas with red circles.

To be assigned another map to georeference, click the blue button at the top, "**Try another map**".

The ''**Accuracy**'' tab uses a tool called MapAnalyst to compute and illustrate the "accuracy" of the georeferencing. A mathematical comparison between the original, old map and the actual distances and placement on the ground is made.

This will vary over the map, and can be a valuable tool for map historians to quickly ascertain how spatial representation differs between areas on a map. For more information on how this works, see http://mapanalyst.org/.

For questions/remarks please contact the project managers Patrick Gouw (p.gouw@library.leidenuniv.nl) and Martijn Storms (m.storms@library.leidenuniv.nl). To connect with other users of this technology and participate in discussions, join the User Group of Klokan Technologies at http://help.georeferencer.com/user-group.

[*This document is based upon the manual 'Detailed instructions for georeferencing historic maps using the British Library Georeferencer', courtesy of the British Library - www.bl.uk/maps*]