Map Warping 101

or... Doing more with maps

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1. Basics
2. Digitize

http://libguides.csufresno.edu/historicaldocuments
3. Georeference/georectify
Georeference/georectify

“To georeference means to associate something with locations in physical space. The term is commonly used in the geographic information systems field to describe the process of associating a physical map or raster image of a map with spatial locations.”
http://en.wikipedia.org/wiki/Georeference

“Image rectification in GIS converts images to a standard map coordinate system. This is done by matching ground control points (GCP) in the mapping system to points in the image.”
Tools for warping maps

Desktop applications
• ArcGIS (esri.com)
• QGIS (Open source, qgis.org)
• Many more: help.oldmapsonline.org/georeference

Online services
• georeferencer.org (in development)
• mapwarper.net (Open source)
Map Warper

Double-click on both maps, then click Add Control Point. Do this for at least three points.
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## Control Panel

<table>
<thead>
<tr>
<th>Control Points</th>
<th>Image X</th>
<th>Image Y</th>
<th>Lon</th>
<th>Lat</th>
<th>Error(0.00)</th>
<th>delete</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3413.6624999983</td>
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<td></td>
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<tr>
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<tr>
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<td>36.7796177415</td>
<td>14.53</td>
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<td></td>
</tr>
</tbody>
</table>

Add Control Point Manually
Map Warper

Map

- GeoTiff: Download rectified GeoTiff
- PNG: Download rectified PNG (and associated .aux.xml file)
- KML: Download KML file (View KML in Google Maps)
- WMS: WMS base URL (for JOSM OpenStreetMap Editor)
- Tiles (Google/OSM scheme): Tiles base URL

Bibliographic:
- Bibliographic
Why geo{reference,rectify}?

• Enable spatial search
• Enable your patrons
4. Do even more

- Tilemill and Mbtiles
  - or -

- Web Map Service (WMS)

- Openlayers
  - or -

- Leaflet
Questions or comments?

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• “C. Fresno.” Thos. H. Thompson, 1891. From The David Rumsey Historical Map Collection. Used under Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License. http://www.davidrumsey.com/luna/servlet/s/ov0csc