
Bringing Historical Maps into GIS

Erica Hayes & Mia Partlow

Setup: Bringing Historical Maps into GIS

Sign in:

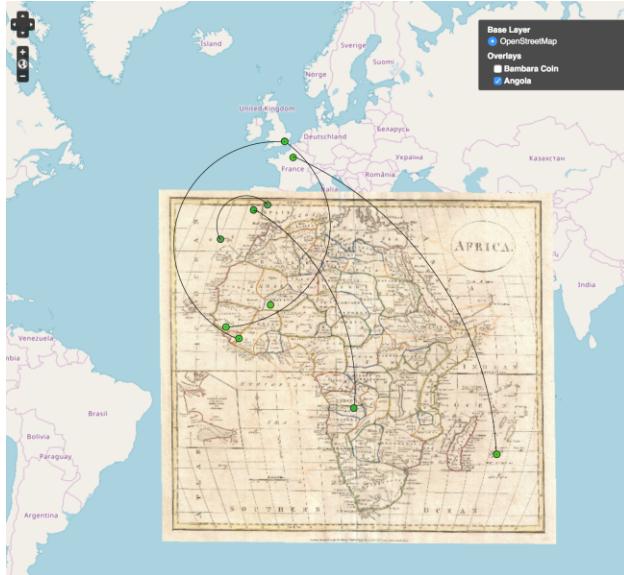
[ArcGIS.com](#)
[Mapbox.com](#)

Download Workshop Materials:

[go.ncsu.edu/georeference18](#)

Georeferencing

The process of defining the location of a map that does not have geographic coordinates attached. Includes assigning the geographic coordinates as well as the coordinate system for the map.



Mapping the African Coins in Sarah Sophia Banks's Numismatic Collection

Madeira Coin



Authority: Vicente d'oliviera & Co.

Place of Issue: Iberian Peninsula

Madeira, a Portuguese colony established in the 15th century, was a commercial and trading hub for sugar, then, beginning in the 17th century, wine. While Catherine Eagleton points out that Sarah Sophia did not record a coin in this section of the catalogue, we know that Mr. Higginson gave her an old coin from Madeira. Notably, it was Mr. Harris's bit and K bit coins from Madeira in February 1902.⁴¹ From this, then, we begin to see Sarah Sophia's unique cataloguing method take shape: the coins, rather than appearing under Madeira in her catalogue, appear among Spanish coins "with notes of their names in use in Madeira recorded there."⁴² This categorical move exemplifies Sarah Sophia's strategy of cataloguing the Madeira coin according to the authority behind its issue, rather than the geographical location of its use.

Sample projects

David Rumsey Map Collection
CARTOGRAPHY ASSOCIATES

Anonymous Log In Register

COLLECTIONS EXPLORE CREATE SHARE EMBED PRINT HELP

REFINE X

Browse All

1-50 of 88,245 1 2 3 >

WHAT

- Atlas Map (48375)
- World Atlas (32521)
- Text Page (13749)
- National Atlas (12552)
- View (8659)
- More ▾

WHERE

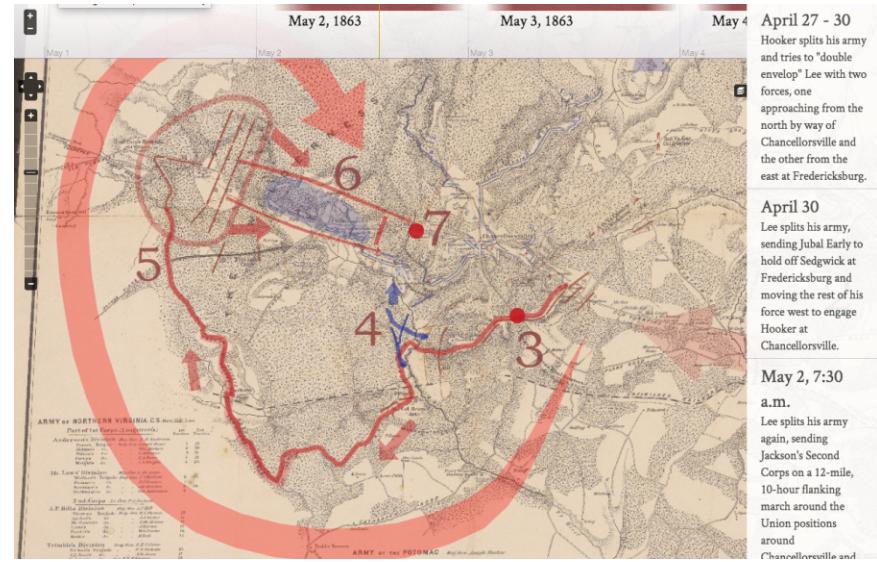
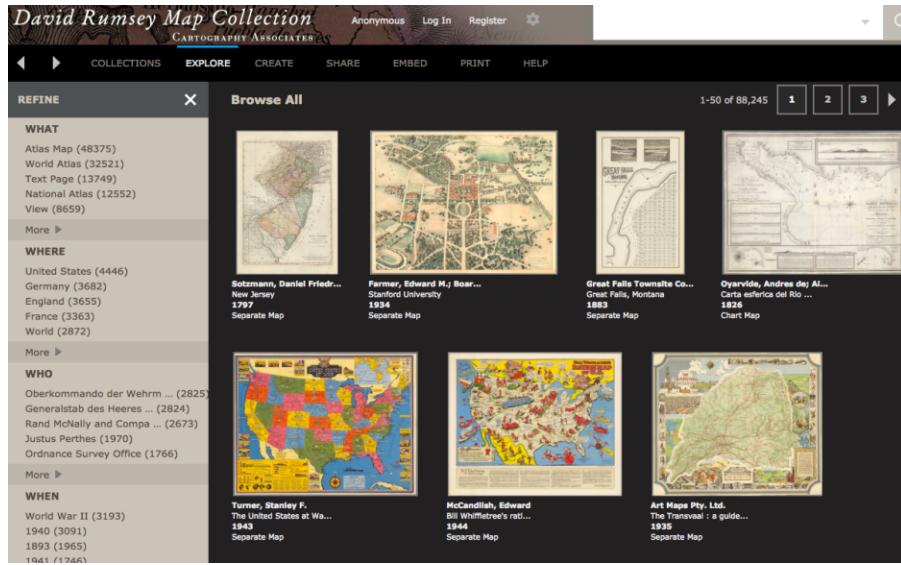
- United States (4446)
- Germany (3682)
- England (3655)
- France (3363)
- World (2872)
- More ▾

WHO

- Oberkommando der Wehrm... (2825)
- Generalstab des Heeres ... (2824)
- Rand McNally and Compa ... (2673)
- Justus Perthes (1970)
- Ordnance Survey Office (1766)
- More ▾

WHEN

- Turner, Stanley F. The United States at Wa... 1940 (3091)
1893 (1965)
1941 (1746)
- McCandlish, Edward Bill Whittlesey's atl... 1946 Separate Map
- Art Maps Pty. Ltd. The Transvaal : a guide... 1938 Separate Map



Sample projects

A Digital and Naturalistic Landscape of Thomas Hardy's Wessex: Tess of the D'Urbervilles

By Erica Y. Hayes

Wessex Location: Shafton
England Location: Shaftesbury

Chapter 1:

An evening in the latter part of May a middle-aged man was walking homeward from the village of Shaston, in the adjoining Vale of Bluestone, or Blumoor.

The pair of legs that carried him were rickety, and there was a bias in his gait which inclined him somewhat to the left of a straight line; but he did not mind a nod, as if in confirmation of some opinion, though he was not thinking of anything in particular at the moment. He was leaning upon his arm, the nap of his hat was ruffed, a patch being quite worn away at its brim where it had rubbed against a stone.

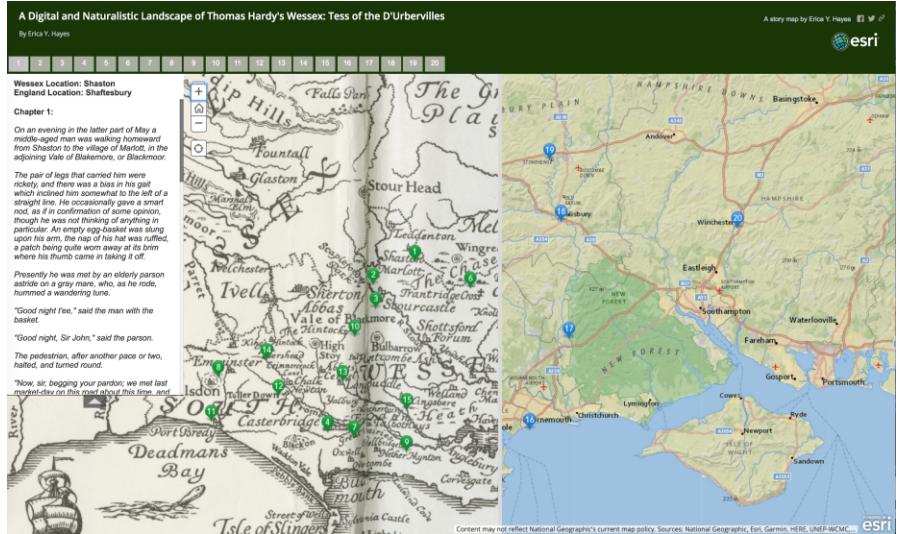
Presently he was met by an elderly person afoot on a gray mule, who, as he rode, hummed a wandering tune.

"Good night! I see," said the man with the basket.

"Good night, Sir John," said the person.

The pedestrian, after another pace or two, halted, and turned round.

"How air boggin your pardin; we met last market-day on this road about this time, and



The World in 1812 and 2013

A story map by Erica Y. Hayes

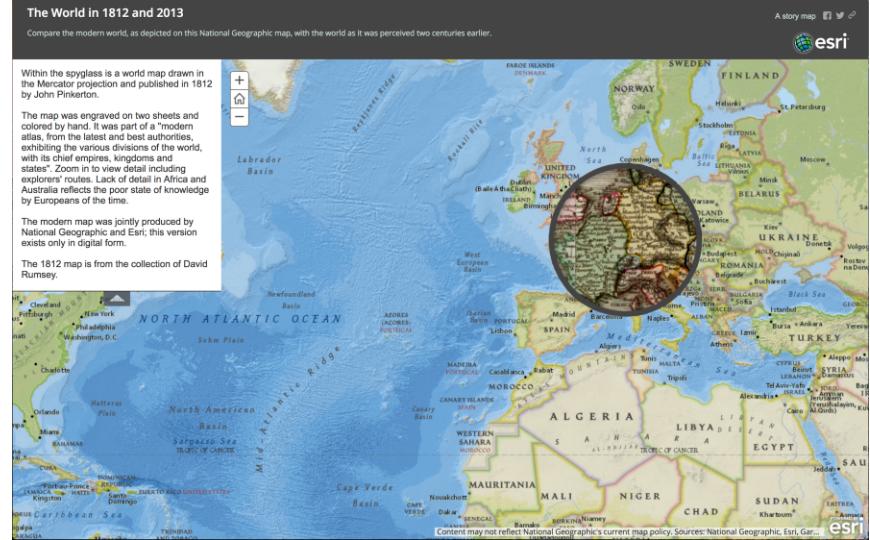
Compare the modern world, as depicted on this National Geographic map, with the world as it was perceived two centuries earlier.

Within the eyepiece is a world map drawn in the Mercator projection and published in 1812 by John Pinkerton.

This map was engraved on two sheets and colored by hand. It was part of a "modern atlas, from the latest and best authorities, exhibiting the various divisions of the world, with its chief empires, kingdoms and states". Zoom in to see detail including expanded outlines of land in Africa and Australia reflects the poor state of knowledge by Europeans of the time.

The modern map was jointly produced by National Geographic and Esri; this version exists only in digital form.

The 1812 map is from the collection of David Rumsey.



Sample projects

Connecticut's Coast: Then and Now

UCONN CLEAR

The Project

To compare historic aerial photos from 1934 with images captured recently, it is critical that the images line up. [Here are the details.](#)

The close alignment is obvious when toggling between 1934 and current imagery, such as Bluff Point (Groton) [today](#) and in [1934](#) or Merwin Point (Milford) [today](#) and in the [1934](#). Even though there are differences in tidal level, features that haven't changed, like rocks (flagged), match up.

An example of ground control points (GCPs) for one image tile.

The 1934 and present day images can look different for several reasons.

- The 1934 camera was black and white and today's sensors are color.

Finally, keep an eye out for the green text. It signals a link that will open a new map, photo, web page and more!

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BOUNDARIES of NATURE

Sixty years of landscape change in the Igapó National Park, Brazil

1953

1980

2014

2014: In the 1980s, with the recovering of the vegetation in the areas inside the park cleared in the 1960s and 1970s, the difference between park and non-park landscape is accentuated. While the park is now mostly covered by forest, the area outside it is completely dominated by farmland. The few stretches of forest that existed outside the park in 1980 have shrunk considerably.

Frederico Freitas, Peter Salazar, and Eli Berg

Spatial History Project, CESTA, Stanford University and Instituto de Terras e Cartografia, Paraná, Brazil

Considerations

What are your goals?

- Explore historical data as part of your research
- Publish online
- Share screenshots in a paper

What information does your map contain?

- Latitude and longitude lines
- Identifiable (legible) geographic features

Working with historic maps

- How warped is too warped for your needs?
- Sometimes you have to guess (using your expertise)



Image from: <https://www.leventhalmap.org/event/back-future-2/>

Online Georeferencing Tools

- Mapwarper

- *Pros:*

- Free and easy to use
 - You only need an internet browser to use it

- *Cons:*

- It can be buggy
 - The maps you upload are automatically published online

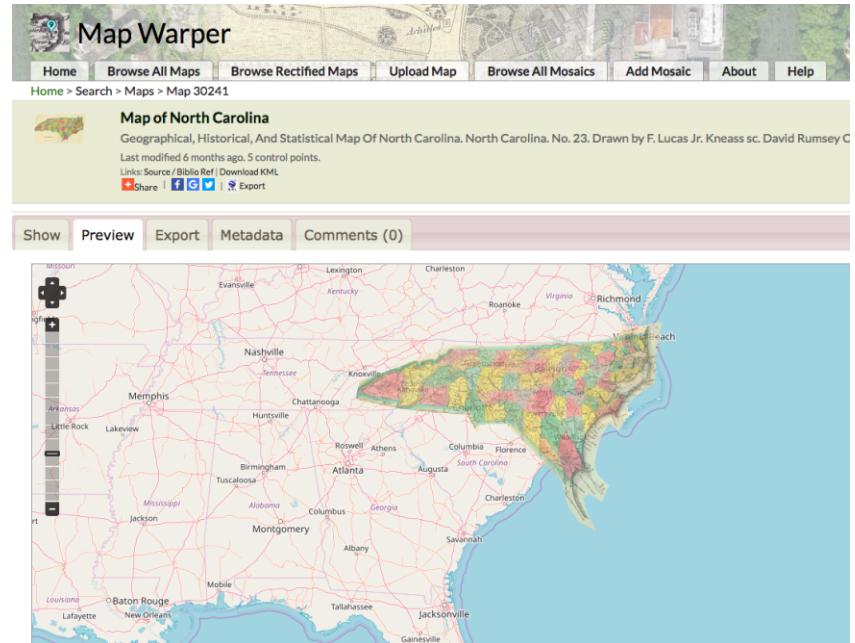
- Georeferencer

- *Pros:*

- Easy to use
 - You only need an internet browser to use it

- *Cons:*

- Monthly subscription fee



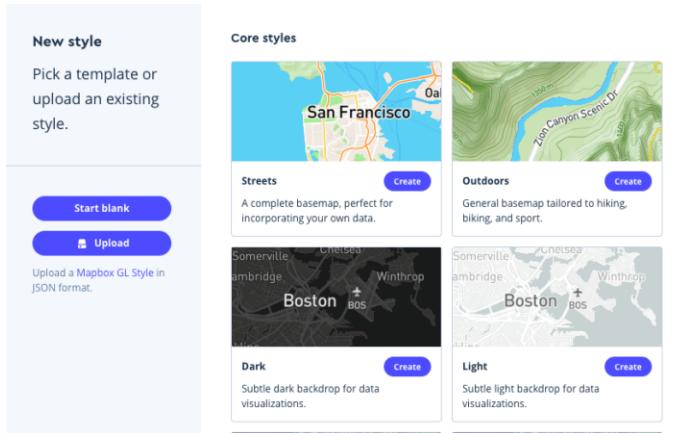
Desktop Georeferencing Tools

- QGIS
 - *Pros:*
 - many tutorials online and strong user community
 - your maps will stay private
 - *Cons:*
 - not as easy as online tools
 - need to have understanding of map projections
 - relies on a plugin
- ArcMap/ArcGIS Pro
 - *Pros:*
 - more reliable than QGIS
 - training and tutorials designed by the company
 - your maps will stay private
 - *Cons:*
 - the process is complex
 - need to have understanding of map projections

Other Useful Mapping Tools

Mapbox

An application for managing geospatial data and designing custom map styles. Customize colors, fonts, add or remove data, and publish for use online.



ArcGIS Online

Esri's cloud-based platform for online GIS mapping and analysis, developing web apps, and finding data. Excellent for presenting information online and doing some spatial analysis, though you are limited to 1,000 rows of data.



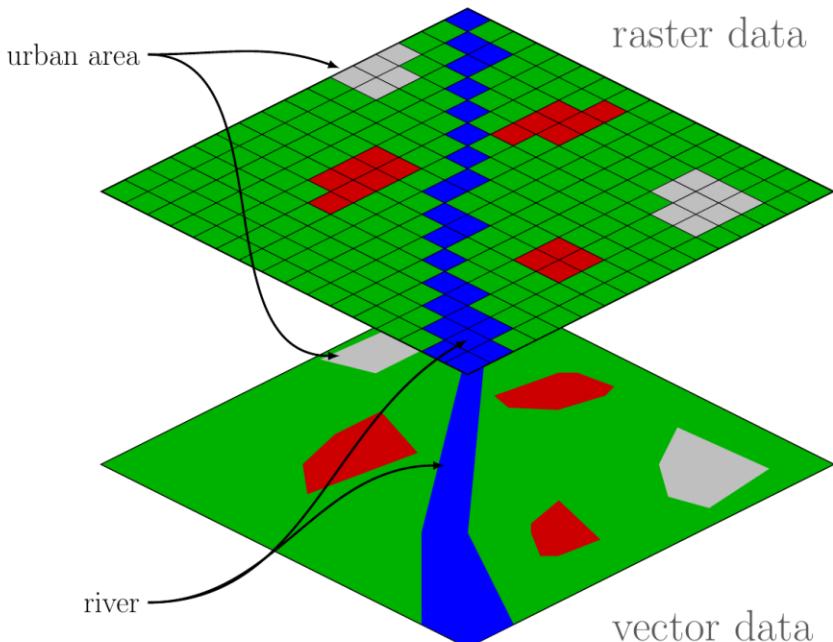
Data formats & types

JPG and TIFF: image formats. tiff files are large and good for editing and preservation.

Geotiff: a tiff file with geographic information embedded

Raster data: pixels with color values. Example:
Scanned maps, aerial photographs.

Vector data: points and the lines/geometry that connect them



Coordinates & Projections

Geographic coordinates:

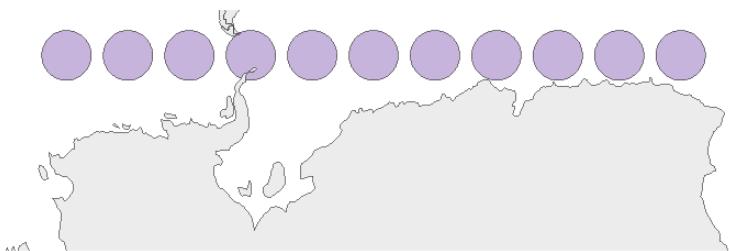
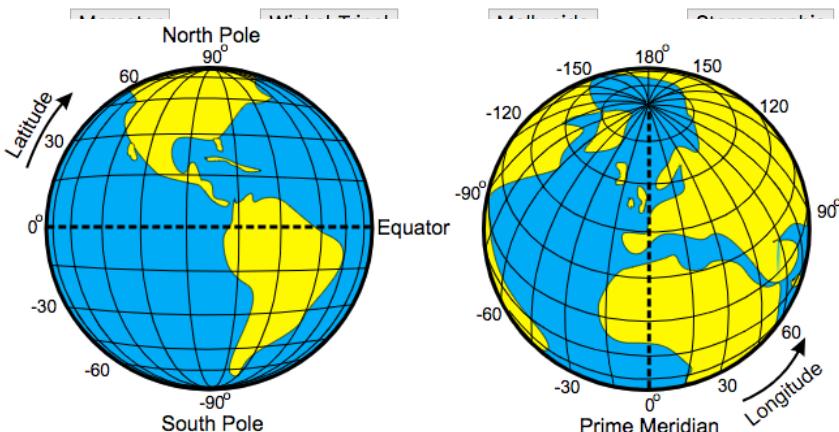
Degrees minutes and seconds:

35°47'87" N latitude, 78°38'32" W longitude

Decimal degrees: 35.7877, -78.644

Map Projections & coordinate systems: mathematical models that transform points on a globe to x and y coordinates on a flat surface.

Takeaway: your georeferenced map and your basemap need to have the same projection/coordinate reference system



Today's Activity

Go to:

go.ncsu.edu/georeference18

Login to:

- [MapWarper.net](#)
- [ArcGISOnline.com](#)

Get help



Erica Hayes, NCSU Libraries Fellow
Copyright & Digital Scholarship Center
Digital Scholarship Specialist
eyhayes@ncsu.edu



Mia Partlow, NCSU Libraries Fellow
Data & Visualization Department
mpduffy@ncsu.edu