

Digitizing the Fall of Roman Empire and Medieval Europe

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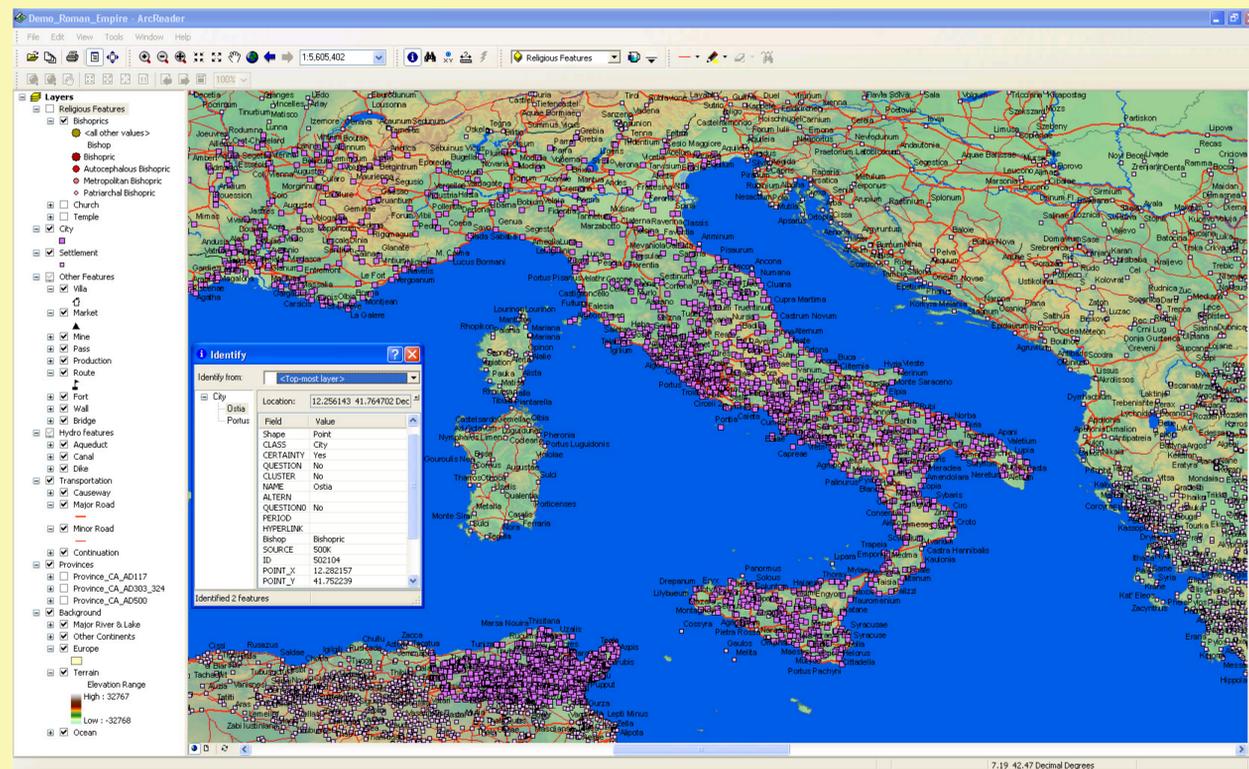
Michael McCormick, Department of History, Harvard University

Introduction

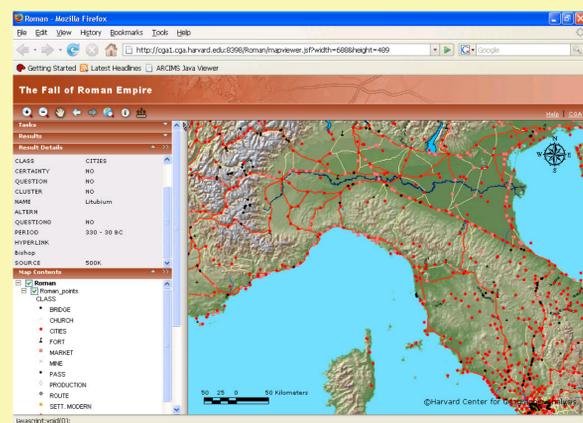
Today's students are more visually oriented than yesterday's, and more digitally aware in general. For a history course, it is essential to the teaching mission of the staff that the students be able to visualize the places, monuments, excavations, relief and vegetation of the late Roman empire, even as they hear over the website the sounds of a reconstructed late Roman circus organ or the chant of churches of the imperial capitals. One of the approaches to make this possible is to move from the era of inert wall maps to interactive and infinitely adaptable digital maps. With each map, students will be able to zoom in, click on a site and see all related information about this place, and even listen to instructor's tour of the monument, site, or excavation, as well as see all digital resources, esp. photos. The Center for Geographic Analysis has been working with Professor McCormick at Department of History to apply digital maps to his two undergraduate courses: "History 1111: The fall of Roman Empire" and "History 1101: Medieval Europe".

These two courses emphasize archaeology, primary written sources in translation, web-based resources, and the application of new natural scientific methods to historical and archaeological problems across the entire Roman world and Medieval Europe. We use geodatabase as the central container to host all the spatially enabled historical information, then build applications to serve the information out to the students.

In the end, this project will create the first high quality digital maps of the Roman Empire and Medieval Europe which are suitable for continuous improvement and adaptation in teaching and research worldwide.



The final product is a geodatabase of all the features about the Roman Empire and Medieval Europe. We use ArcGIS Server to serve out data. Students can use freeware like ESRI's ArcReader to navigate and query the digital maps we pre-customized.



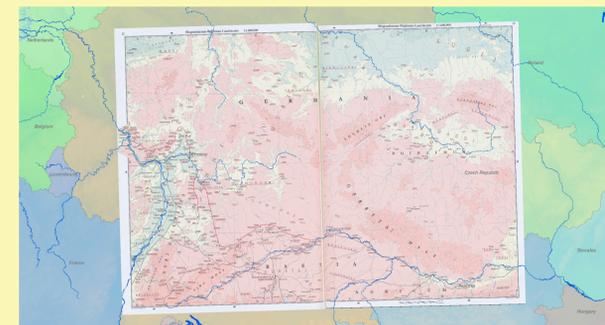
A web-based digital map viewer is being planned to give students easy access to the geodatabase. This image is showing the beta version of the web-based viewer.

Technical Procedures

Georeferencing technology is widely used in this project. It plays an important role by bring all kinds of information into GIS layer. Technical solutions vary from georeferencing scanned map sheets, geocoding place-names, to turning tabular data into GIS layers.

• Georeference Scanned Paper Maps

In the first stage, the CGA helps to georeference and convert existing paper maps into a GIS databases. We use the georeferencing tools available on ArcGIS to give each scanned historical map its physical location on the earth by identifying matching natural features, like the river junctions. Many map sheets from different atlas, including "The Barrington Atlas of the Greek and Roman World", were scanned and georeferenced.



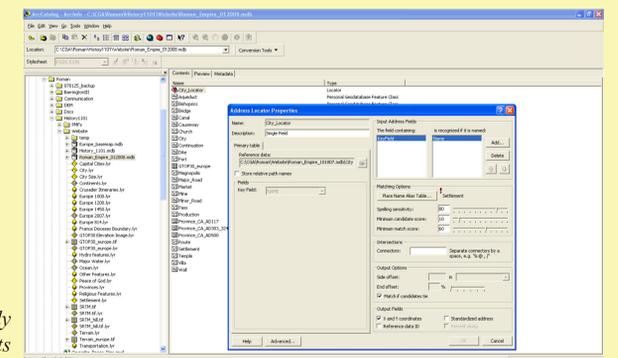
Georeferencing scanned historical maps by identifying matching natural features



Overlay of maps at different scales after being georeferenced
All the features on the maps were digitized

• Geocode Historical Placenames

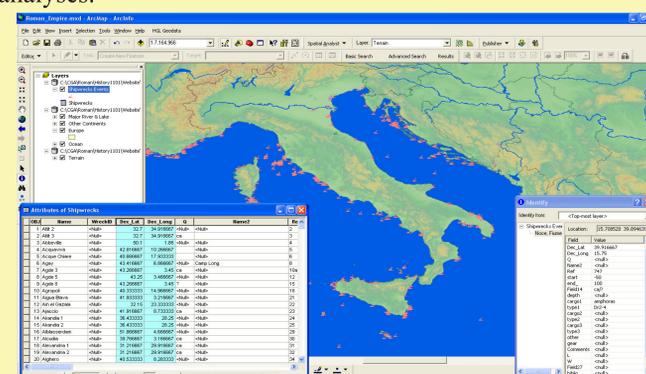
After the first stage, all the digitized cities and settlements were imported into a historical gazetteer database. This database later serves as a reference to geocode other types of datasets by using a placename locator. The locator even helps to geocode some places with slightly different spelling in the names because of different languages. Datasets geocoded in this way include monasteries, bishoprics and so on.



A locator is created in ArcGIS to take advantage of already digitized features to geocode other datasets

• Map Tabular Data

Some other datasets were introduced into geodatabase from tabular datasets. An example is the shipwrecks dataset which was originally collected from many literatures on archeology. Many shipwrecks have X,Y coordinates from GPS readings documented to help people locate them. By mapping these shipwrecks, we can visually see the distribution of them and link information from tabular data, such as cargo, to other spatially enabled datasets and perform analyses.



Shipwrecks were mapped by turning tabular data into GIS layer