**The Oxford Outremer Map: The Possibilities of Digital Restoration
Omeka Mapping Tutorials**

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I. About the Tutorials

The Oxford Outremer Map project created a website with an annotated interactive map, to showcase an unusual 13th century map drawn by Matthew Paris. The website was created using Neatline, a mapping plugin used with Omeka, an open source web design and content management system. The purpose of this guide is to help people planning similar digital mapping projects decide whether these platforms are suitable for their purposes, and if so, to help them implement them.

A mapping project like the Oxford Outremer map requires dedicated server space, which can be prohibitively time-consuming and expensive to set up for people who have not gone beyond basic curiosity in a digital system, and a desire to assess the system's capabilities. Therefore, after an introduction speaking generally about Omeka and Neatline there are two sections:

II. Tutorial One: Getting Familiar with Omeka. This tutorial is designed to help cultivate a basic understanding of Omeka using only free tools and server space.

III. Tutorial Two: Creating an Annotated Historical Map Using Omeka Neatline. This tutorial is intended to walk users through the steps required to create an interactive map like the one available at http://frenchofoutremer.com/omeka/exhibits/show/oxford-outremer-map/interactive-map , assuming available servers.

Since the two sections are designed to be useful independently, they contain some redundant information.

A final option for familiarizing yourself with Omeka is to go through one of our Omeka-based websites (http://frenchofoutremer.com/omeka/exhibits/show/oxford-outremer-map, or http://frenchofoutremer.com/omeka/exhibits/show/french-texts-in-italy). Neither of our websites comes near to exhausting the possibilities of Omeka, but they lay out some possibilities. You can also examine a range of Omeka-based sites available at https://omeka.org/codex/Sites_Using_Omeka, which will demonstrate other possible applications.

Whether to Use Omeka and Neatline

Omeka, like all content management systems (CMS's), is intended to make it possible to make and edit websites with little direct engagement with the underlying code. Many other such platforms exist, and it can be difficult to decide which platform is most appropriate for a given project. In light of this, it is important to consider the intended purpose of the software – in attempting to make web design easier, all such systems wind up making assumptions about what those users will want. Accomplishing goals outside a CMS's assumptions is often still possible, but it will be infinitely more frustrating.

Omeka is intended primarily for **cataloging** and **archiving**. The underlying structure is based on "items," which are intended to contain information about or computer files (picture, recordings, videos, or text) pertaining to sub-categories within a broader collection (of books, art objects, oral history recordings, etc). It is quite possible to make Omeka websites without using the item system – the center for medieval studies is in the process of making such a website for the project "Exploring Place in the French of Italy," (not yet live). In our case, we made the decision to use Omeka for this project because many of the people working on the new project were already familiar with that platform, and because maintaining the same system allowed close conformity between the new project and older ones, to which Omeka was more obviously suitable. In the absence of such outside considerations, however, projects which do not conform well to an item-based system could be made just as effectively with other software.

Neatline, made by the Scholar's Lab at the University of Virginia, is an optional plugin for Omeka, designed to allow for the display of information (including maps, images, and annotations) in a geographic context. It is important to note that it is primarily a display tool, not a tool intended for analysis. It contains a much more limited set of options for the manipulation of data than geographic information software (GIS) like Arc or Quantum, or even from simpler but still database-oriented tools like CartoDB. On the other hand, it is more web-oriented and easier to use as a way of creating geographic displays than GIS systems, and is more flexible than CartoDB. It also has an unusually robust timeline tool, which can be useful as a way of organizing items chronologically, or displaying changing trends.

In summary, if you wish to display relatively detailed information about particular items in a geographic context online, Omeka Neatline is likely an appropriate tool.

If you are interested in **producing maps for print editions,** or analyzing geographic data based on co-location in ways more sophisticated than visual clustering, you would be better served by a program like ArcGis or Quantum GIS.

If you are looking for a tool to **quickly display geographic information** for a number of points which are all similar to one another, or which have only a small number of relevant attributes that you wish to display, you would be better served by CartoDB, Google Maps, or a similar platform.

Software and Servers

If you wish, you can conduct a digital map annotation project like the Oxford Outremer Map almost entirely using free and open-source software. During our project, we did not do so, instead using proprietary software periodically, either because it was easier, or because we were already using the proprietary platforms for other projects: examples include our use of PhotoShop and ArcGIS to clean the image and convert it to a usable form (rather than, for instance, the free programs with similar capabilities, Gimp and Quantum GIS). A more unavoidable cost is server space.

Though the Omeka software itself is free, implementing it as a website requires a server. If you have access to institutional servers, and if you or someone willing to work with you can manipulate these servers, the best solution is simply to upload Omeka software onto one of them. There are many companies that will rent you server space: some possible options are listed at: https://omeka.org/codex/Hosting_Suggestions.

Omeka itself also rents server space, and provides a very limited version of Omeka on its own servers for free – see https://www.omeka.net/signup. Implementation through Omeka's own servers is somewhat easier, but can be limiting. The free version especially imposes sharp limits the total amount of data, the number of sites which can be produced, and the plugins and visual themes which can be used. Neatline, for example, is not supported in the free version. Nevertheless, even the free version provides some significant functionality, and even if it is insufficient for your final project, it can provide you with a good chance to become familiar with Omeka in general terms. The first tutorial, below, is designed to help build basic familiarity with the Omeka platform using this version.

Running Neatline and uploading map images will also require server space running GeoServer, a sophisticated server system for holding geographical data for other systems to access. This platform will store your map data, which will be accessed by the Neatline plugin, and displayed on your Omeka-powered site.

Our own project currently runs both Omeka and GeoServer on server space rented from AcuGIS, though we hope at some point to migrate our data onto Fordham University's own servers. We chose AcuGIS because it could support both Omeka and Geoserver on a single platform.

II. Tutorial One: Getting Familiar with Omeka

It is possible to set up a basic account off of Omeka's own servers for free. These accounts are fairly sharply limited – they allow only a small selection of plugins and themes (which govern the functionality and appearance of Omeka websites) and only 500 mb of total space. While as a platform for setting up project websites, a free Omeka.net site is often insufficient, it is nevertheless a good way to get familiar with the Omeka platform. The following tutorial will walk you through a few basic features of Omeka, and help you decide whether this platform would be appropriate for your digital project.

1. Set up an Omeka Account

Go to https://www.omeka.net/signup, and select the "Free Basic Account," option on the bottom left of the page. Enter account information, and Omeka will forward to your email address a link to continue setting up your account. Follow the prompts to set up your account, and a new website.

2. Choose a URL for Your Website

For free Omeka sites, you will be restricted to the format "….omeka.net."

3. Access the Omeka Dashboard

Select "manage site," to access the Omeka dashboard
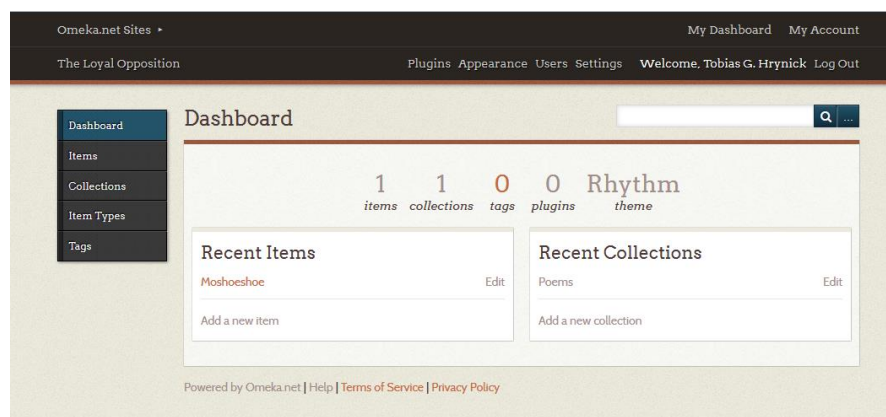
The dashboard is the screen from which you can edit Omeka-based websites. In general, the top navigation ("Plugins, Appearance, Users, Settings") adjusts settings across the whole site, while the left-hand navigation ("Dashboard, Items, Collections, Item Types, Tags") lets you adjust things which refer to a specific Omeka tool or modify specific elements of content.

4. The Top Navigation Bar

Click on each of the items along the top navigation bar in turn, and scroll down. The options available through the Omeka dashboard are limited enough that it is useful to scan through them all, since this is likely to save you time later, when you need to find particular functions.

- **Plugins**: Plugins are pre-fabricated pieces of code which allow you to use Omeka for more functions. The software for these plugins has to be placed on the same server which runs your site as a whole, and then installed through this "Plugins" tab. The server-space associated with your free Omeka.net account comes with a pre-set number of plugins (unfortunately not including Neatline) and does not allow you to add others. When you install these available plugins from this tab, new buttons will appear on the left-hand navigation, which will allow you to use the associated tools. Once you have installed plugins, you can also uninstall them from this tab.

- **Appearance**: This tab governs how your site looks, in ways broader than particular images or other "content," elements. Like WordPress and many similar CMS's, Omeka organizes broad changes of appearance into "themes." Themes are managed much like plugins – they can be created and made available by individuals with coding experience, and must then be placed on the server from which you are running Omeka, at which point they can be put into use from the "Appearance" tab. Again like plugins, their use is quite restricted when you are using free Omeka.net server space. You do, however, have four themes from which you can choose (all pre-loaded onto the Omeka.net server-space), and some basic modifications which can be made within any given theme (using the blue "Configure Theme," button). Feel free to click this now and see what your choices are for configuration– nothing will change unless you press the green "save changes," button. Changing *which* of them you are using by clicking the "use this theme," button will make the changes instantaneously, but feel free to do this too – it is easily reversible, and you can view how the appearance of your site changes by using the clicking on the name of your site beneath the "Omeka.net Sites," button in the far upper left.

- **Users**. This tab allows you to make multiple user profiles with varying levels of privileges to make changes to your site. Because we have worked with a relatively small group of people who were more or less equally equipped to make site-wide changes, we never made more than a single user profile for the Oxford Outremer project – whether or not this constitutes absolute best practice is open to debate, and in any larger project, or in a class-room setting, this model would not be sustainable.

- **Settings**. The settings tab is the most miscellaneous of the tabs in its contents. You will also probably need to make changes with this tab least frequently.

Nevertheless, it may be useful to examine its contents. "Item Type Updates," and "Element Sets," both allow you to adjust meta-date settings: meta-data is a structure which allows you to provide information about the kind of information contained in particular elements (much as a library catalogue card contains information about the information within a particular book) – Omeka's standard meta-data structure is "Dublin Core," about which you may find more information, along with descriptions of the function of metadata at http://dublincore.org/documents/dces/.

5. The Left-Hand Navigation Panel.

Browse through each item in the left-hand navigation panel. This panel is divided into the following sections:

- **Dashboard**. This allows you to access the Dashboard homepage, on which there will be links to items and collections which you have manipulated recently.

- **Items**. Items are the basic element around which most Omeka sites are organized. In origin, the items were intended to represent distinct archive items, in a range of possible formats. However, items are quite flexible, and it is possible to manage a wide variety of content using them. One might, for example, regard individual labels on a larger map as items.

- **Collections**. Collections are web-pages which display groups of items, in one of a number of pre-selected ways. Click "Add a Collection," and browse the options – no changes will be made until you click another green "Add a Collection," page which will appear to the right of meta-data options for a new collection.

- **Item Types**. This allows you to create new types of item for your site to display. In practice the range of options initially available is broad enough that this is rarely necessary to add new types, but you may find it useful to adjust how different types of item will be displayed. Click "Edit," for a few item types (the option will appear orange text in the "Type Name," column) and observe your options *without* clicking "Save Changes," or "Delete," unless you are already confident of the changes you will need to make.

- **Tags**. Tags allow you to cluster items by relevance to particular topics, by assigning key-words to them. Once you have made and tagged a few items, the different tags you have used will appear here, and you will be able to view groups of items based on your tagging system.

6. Make a Collection
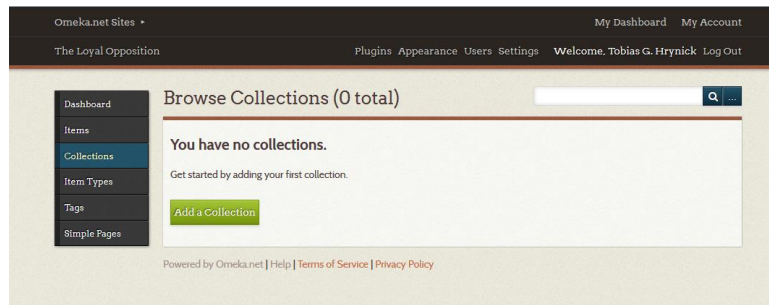
Click "Collections," on the left-hand navigation panel, and then click the green "Add a Collection," button.
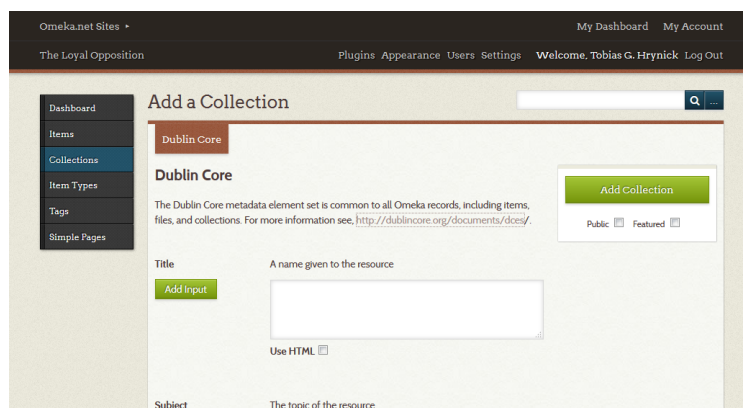
Omeka will prompt you to enter metadata using the Dublin Core. Enter some text. Feel free to enter nonsense text for the moment, just to try out the system. On the right there are two check-boxes, one marked "Public," which will cause the new exhibit to be viewable by users online, and "Featured," which will cause it to be displayed prominently on the home-page. Check both, and click the green "Add Collection," button.

7. Create Items

Go to the "Items," button on the left-hand navigation. Click on "Create a New Item."

Across the top of the screen, you will see a series of tabs, labeled "Dublin Core," "Item Type Metadata," "Files," and "Tags."

- **Dublin Core:** a metadata structure which lets you provide information about the nature of the item you input in a structured and consistent way.

- **Item Type Metadata**: can be initially confusing, because both it and "Dublin Core," refer to types of metadata. Item Type Metadata refers specifically to information indicating what kind of item you are using the item to display (text, image, video, etc.)

- **Files:** allows files to be uploaded from your computer to be associated with items

- **Tags:** allows you to associate key-words with items, by which items can be organized or searched.

For now, feel free to insert nonsense into the Dublin Core metadata fields, or else to try inserting information for an item which you might make in an eventual display.

Under "Item Type Metadata," select "Text," and note that a text-window appears for you to enter text, if you do not wish to upload it as a file. Enter some text here.

Under Tags, enter a few terms by which you might wish to search for your item later, separating them from one another with commas.
On the far right-hand side, notice the two check-boxes labeled "Public," and "Featured," – the function is the same as that of the similar boxes in the "Collections," section. Check

both. In the scroll-down list of collections below, select the name of your collection, and then click the green "Add Item," button, above.

Repeat this process a few times, until you have a few items to work with, adding each item to your collection as you make them.

8. View Your New Collection

Click on Collections on the left-hand navigation, then click the title of your collection.
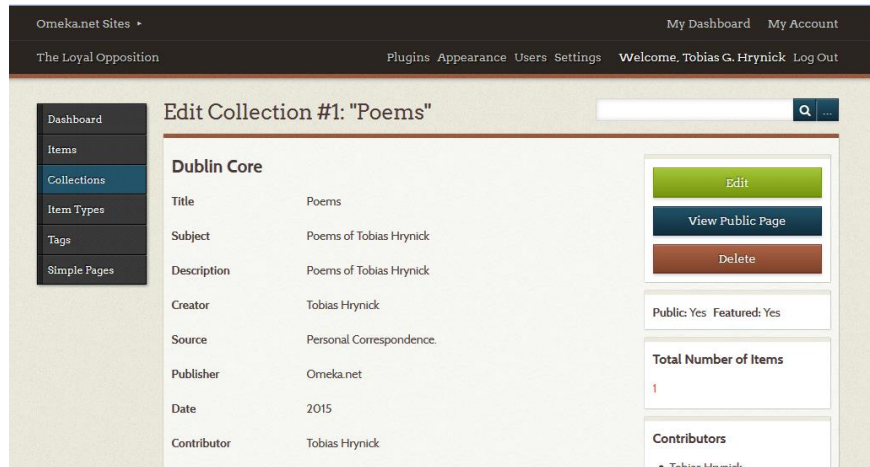
Click "View Public Page." This will bring you to the collection, as it would be viewable by your site users. Note that depending on what changes you made earlier to your themes, the result may look quite different.
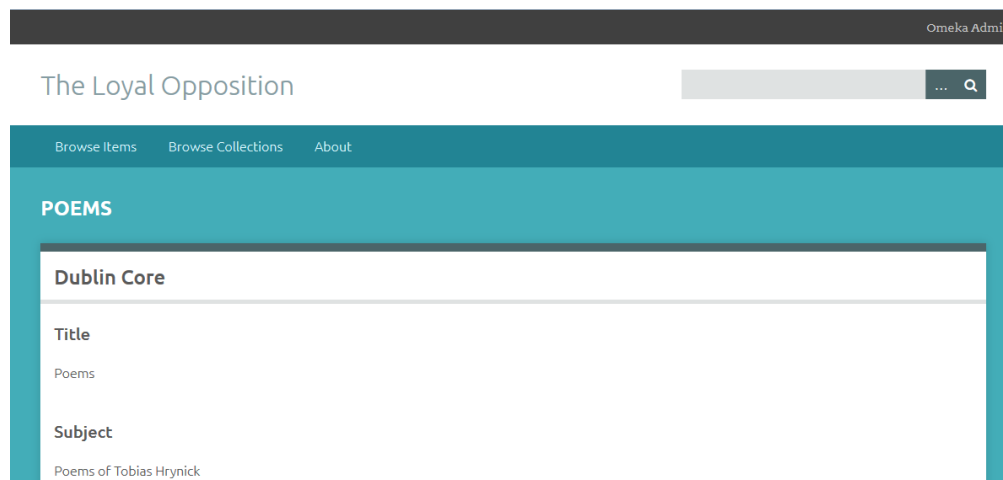
9. Moving Forward…

You now have done enough with the Omeka dashboard that you would be able to make a basic website, either by repeating steps you have done, or by extrapolating from what you have done in relatively simple ways. If you would like to cement your understanding of the Dashboard, and explore a few other possibilities, try completing the following:

- Add items to your current collection which contain pictures rather than text.
- Create a new Collection, which is not visible to the public.
- Install the "Simple Pages," Plugin, and experiment with the new "Simple Pages," option which will appear on the left-hand navigation (this is a good way to make simple web-pages containing only text or text and images, rather than Omeka items).
- Change your site's visual theme, and view the public page to see the result.

If at any point you have difficulty with any of Omeka's features, the two most reliable resources are http://omeka.org/codex/Documentation, and the very active forum http://omeka.org/forums/. You will undoubtedly have questions and run into problems, but the Omeka community as a whole is both welcoming and helpful, and the learning curve overall is quite shallow.

III. Tutorial Two: Creating an Annotated Historical Map Using Omeka Neatline

What follows is a walk-through, which should guide you in making an interactive map like the one visible at http://frenchofoutremer.com/omeka/exhibits/show/oxford-outremer-map/interactive-map.

The walk-through does not exactly follow our own process, since we frequently made bad decisions, and had to extricate ourselves from dead-ends; instead, it gives the process in somewhat idealized form. The walk-through is also necessarily incomplete: you will have to make choices about which platforms and options suit your project best, and the range of possibilities is too wide to be described in any single guide. Instead, we hope to provide you the tools you will need to seek out outside information, make informed decisions, and to extricate yourself when you come into difficulties.

System Requirements

To create an annotated historical map using Neatline, you will at first need to have Geoserver and Omeka installed on a server. Exactly how to install these two pieces of software will vary according to your choice of server (see: Software and Servers), so it is not possible to provide precise directions. Note, however, that many servers are designed to facilitate easy installation of both platforms, and though the exact method of installation, and its degree of difficulty, will vary depending on the type of hosting you choose, it need not be daunting. See also https://omeka.org/codex/Installation for general information on the installation process, and see the discussion of servers in the introduction for some possible options.

Understanding the Omeka Dashboard

Once Omeka is installed on a server, you will be able to begin creating and editing web-pages. Logging onto your Omeka account will bring you to Omeka's "Dashboard," from which pages can be created, deleted, and edited, and from which more general adjustments can be made to your site's settings. Along the top of the dashboard, you will see the options, "Plugins," "Apearence," "Users," and "Settings."
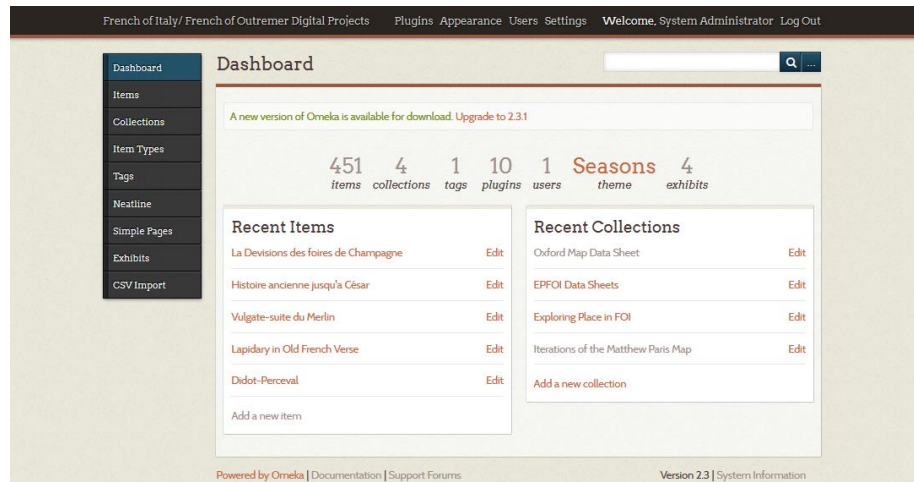
Plugins gives you access to set fragments of code which can be implemented on your site to do certain things, ranging from the very simple (create a page of text) to the quite complex (like the Neatline tool).

Appearance allows you to adjust the overall visual design of your site through the implementation of pre-established themes.

Users allows you to set up access for multiple people, with varying levels of power to make changes.

Settings is a more miscellaneous category, containing a wide variety of basic choices – in the course of our Omeka projects, we have very rarely had to adjust underlying settings.

Along the left, you will see another series of options – whereas the buttons on the top of the screen allow you to make site-wide changes, these allow you to make changes on a more local level, or to access the particular plugins, once they have been installed. More detailed information on manipulating some of these features is included in the first tutorial.

Installing Plugins

The plugins which we used to make the Oxford Outremer Map website are the following:

- Neatline
- Neatline Widget – Neatline Simile Timeline
- Exhibit Builder
- SimplePages
- CSV Import
- Social Bookmarking
- Simple Contact Form.

Many of these plugins we used are designed to manage peripheral parts of our project; the "CSV Import" plugin, for example, allowed us to upload files as spreadsheets for others to download.

In the interest of space, I will only discuss the Neatline plugin, which is required for the annotated map itself – you should install this now; it will be possible to extrapolate from these instructions to add other plugins later.

Plugins are installed in a two-step process:

First: the files for the plugins (which can be downloaded from http://omeka.org/add-ons/plugins/) must be positioned on the server in the place where Omeka can access it. The exact directory structure of your server will vary, but within the folder labeled "omeka," will be another labeled "plugins." Upload the unzipped folder containing the plugin files to the "plugins," folder.

Second: once the software is uploaded, go to the Omeka dashboard, click "plugins," on the top navigation bar, scroll down until you find the name of the plugin whose files you uploaded, and click on the button labeled "install." New options will appear on the left-hand navigation on the front-page of the dashboard, from which you can access the functionalities of new plugins.
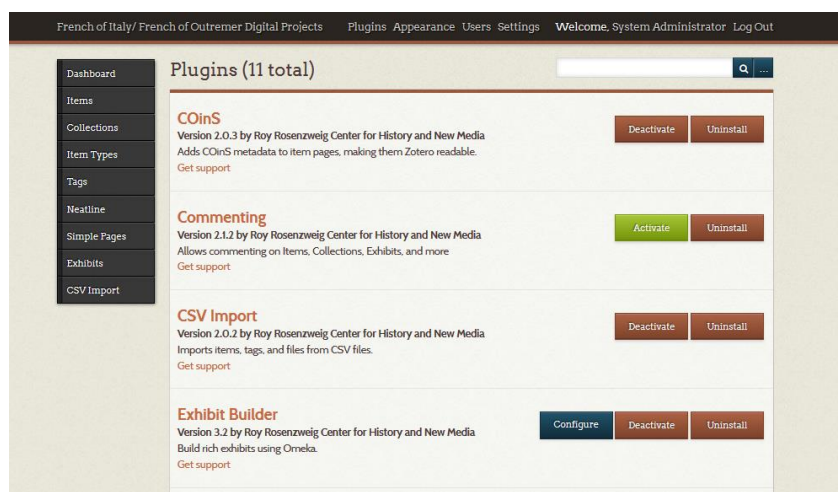
Making a Neatline Map Exhibit

Once Omeka and Geoserver are installed, and the Neatline plugin is uploaded to your server and installed, follow these steps to create your first Neatline map exhibit.

1. Convert a Map Image to Geo-Referenced .tiff

A .tiff file is kind of image file, to which information can been added to indicate to a machine reading the file which portion of the globe the file is intended to portray. There are a number of ways in which this can be done. If you have access to Arc GIS software, it is probably your best choice – a good tutorial on how to geo-reference historical maps using Arc GIS for use on Neatline has been made available by the University of Virginia's Scholar's Lab: http://scholarslab.org/geospatial-and-temporal/using-neatline-with-historical-maps-georeferencing/.

Unfortunately Arc GIS, while it remains the industry standard, is relatively expensive, and if you *only* want to geo-reference one or a hand-full of maps to use on Neatline, it is probably not worth it.

Quantum GIS is a free and open-source platform which is roughly equivalent (and has been making steady gains on Arc GIS in recent years). It can be accessed at http://www.qgis.org/en/site/.

There have also been efforts to make tools specifically designed to geo-reference files – both of the above programs have much wider applications. We have only ever attempted geo-rectification with full GIS suites, so I am not able to endorse any of these tools particularly, but they are worth considering if you find full GIS suites daunting.

Note that if your map does not correspond well to real geography, you are under no obligation to geo-rectify your map correctly – it is entirely possible to simply place your map image over some convenient portion of the globe.

2. Upload .tiff file to GeoServer.

Again, the exact process will vary based on the way in which you are hosting GeoServer. The file path of location in which the files should be stored will probably end with "…/geoserver/data/MyGeoTiffs."

3. Create Neatline Exhibit.

From the Omeka dashboard, select "Neatline," from the left-hand navigation, and choose "new exhibit."

4. Import .tiff file from Geo-Server to Neatline Exhibit.

Open your new Neatline exhibit, and click "New Record."

Most Neatline records will be files which are stored within Omeka itself; however Neatline can also treat as some externally stored files as records.

Under "style," scroll down, and you will see two entries: WMS Address, and WMS Layers. WMS stands for Web Map Service.

For a general guide to this protocol, see https://developers.arcgis.com/ios/objective-c/guide/wms-layer.htm. The WMS Address is a URL giving the location of the server folder in which your .tiff file is stored – the form will vary based on how your server is set up, but it will generally relate logically to your server's file structure, and you can consult with your server provider (or with institutional IT) if it is not clear.

For our project, the WMS Address is http://frenchofoutremer.com/geoserver/sf/wms. Under "WMS Layer," enter the name of the level above "wms," in your url and server file structure (in our case "sf,") followed by a colon and the name of layer you wish to import. Multiple .tif files can be uploaded simultaneously if the names are separated with commas (i.e. "pf:name1,name2").

Relatively few of the other sections which can be filled are likely to be relevant to an underlying map layer. These other sections are described in more detail in: What do all the Fields on Neatline Records Mean?– you can always come back and add additional information to the record representing your underlying map later. For now, click the blue "Save," button, and your historical map will be added to the Neatline exhibit (though you may have to click and drag the underlying map to get to the point to which you geo-rectified it).

5. Create Records with Desired Annotations.

It is possible either to create annotations on Neatline itself by using the "New Record," button, and filling out the offered fields. It is also possible to import Omeka "Items," as Neatline "Records," but if you are only interested in annotating the map, this is only a more complicated way of achieving the same thing. Click "New Record," and fill out information for your new annotation.

The next section provides guidance on the available fields within any given record, and how they should be filled out when you are making a map annotation.
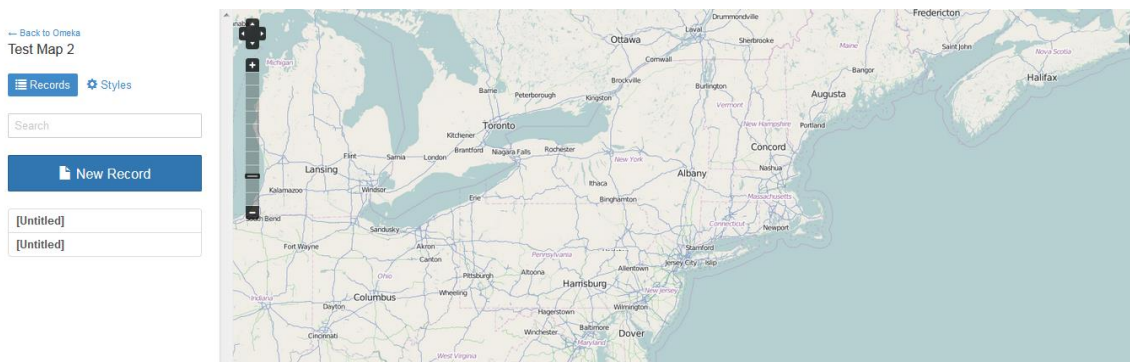
What do all the Fields on Neatline Records Mean?
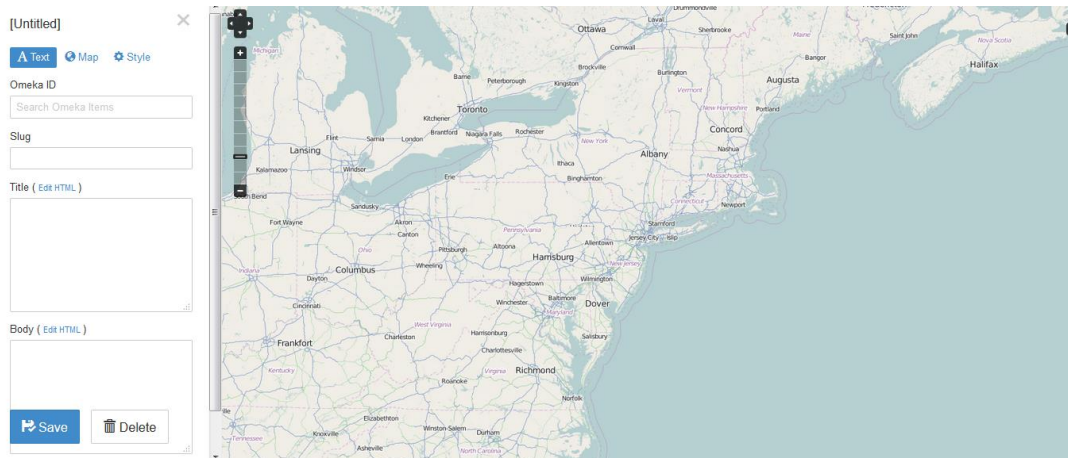
1. The Text Tab

> **Omeka ID**: If you are constructing the entry on Neatline, leave this space blank. It is important only if you are importing Omeka items as Neatline records. If you do decide to import Omeka items, and later want to change the record through Neatline, you will have to delete the Omeka ID in this field, to break the link between the Neatline Record and the Omeka item, to make them separately editable.

> **Slug**: Again, generally leave blank. The slug is the last portion of a URL, but if you only want the Omeka exhibit to be viewable as a whole, slugs for individual annotations are not necessary.

> **Title**: Here give the desired title for your annotation.

> **Text**: Here, type out your desired annotation.

2. The Map Tab

Here, you have the ability to place your annotation somewhere on the map. In order to do this on our project, we used the polygon tool to draw a polygon on the map – the user will be abler to bring up the annotation by clicking anywhere on the polygon.

3. The Style Tab

A large number of tools are available, allowing you to vary the appearance of the annotations, and shapes drawn on the maps. It is not practical to discuss every item listed on this tab, but particularly important is the option at the bottom to "use current viewpoint as default." This is useful because it allows you to set a position which the map will adjust when a particular item is selected, which can be useful to ensure that the portion on the map is visible at the same time as the annotation.

Conclusion

Unfortunately, in the above directions, we have often been able to provide only bare guide-lines. In general, however, this is not because the things which we are describing are terribly difficult – only that there are so many different ways of achieving the goal that the time required to fully explore every alternative is prohibitive.

The best general tools for solving problems you might encounter with Omeka and Neatline are http://omeka.org/codex/Documentation, and the very active forum http://omeka.org/forums/.

In general, the Omeka community is both helpful and welcoming, and with the preceding tutorial, you should at least have the tools to frame questions, and understand the answers. If you skipped the first tutorial, consider reading it through as well – it may be helpful as a guide to broader uses of Omeka, through which you can develop a wider website on which to house your mapping project.