

## Step 3 - Add NYC Space/Time Basemap

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Technically we now have a map (by Leaflet's standards). Cartographers, however, might take issue with our "map" because there's no map data!

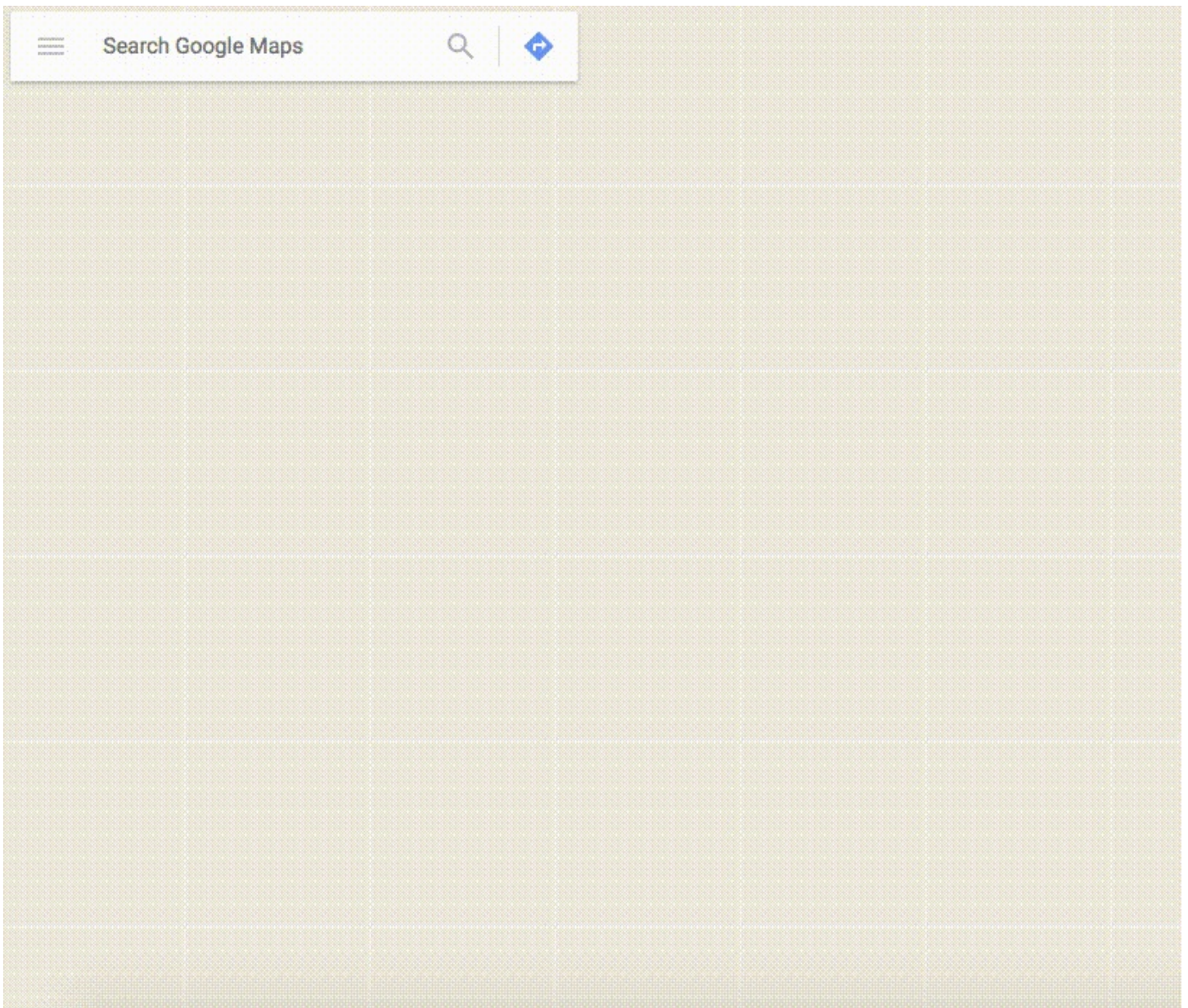
Let's make our map more interesting by adding a basemap from NYPL's digital map collection.

First, let's learn how to add a basemap to our Leaflet map. Then we'll find an appropriate one from the NYPL's digital collections.

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**Note about basemaps:** A challenge in web mapping is how to load all the data that is required to show maps at different parts of the world and at different scales (zoom levels). It's impossible to send all the data to the browser at once. We also don't know how a user will use the map. We don't want to send them data for an area or zoom that they never even try to look at.

The solution for this problem of web mapping is to cut data into **tiles**. You may see this in action if you've tried to view a map with slow internet connection.



When we are panning or zooming on a map, the map client (Leaflet, OpenLayers, Google Maps) is constantly sending requests to a **tile server** to tell it which data we want to look at. The tile server responds with all the tiles that we need to view the data.

## Add a Basemap

Leaflet makes it easy for us to add a tile layer to our map with its `tileLayer` method.

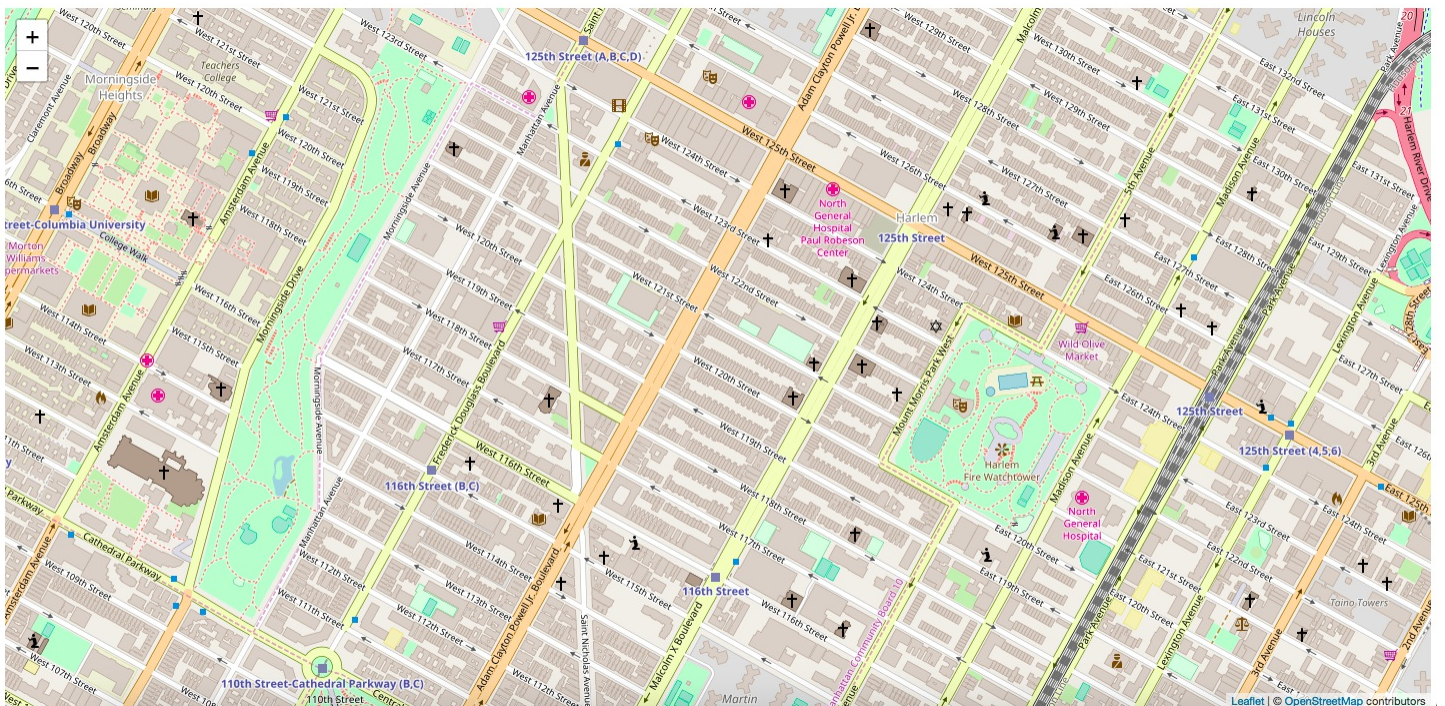


Add the following at the bottom of your JavaScript to add a tile layer using [OpenStreetMap's](#) tile server:

```
/** public/map.js */  
  
// Add a tile layer from OpenStreetMaps tile server  
// Pass a configuration object {} for attribution  
L.tileLayer('http://{s}.tile.osm.org/{z}/{x}/{y}.png', {  
  attribution: '&copy; <a href="http://osm.org/copyright">OpenStreetMap contributors',  
}).addTo(map); // this .addTo() syntax is called "method chain."
```



If you save `map.js` and refresh your webpage you should see this:



## Navigating the NYC Space/Time Directory

To browse NYPL's digital map collections head over to [Map Warper](#). Map Warper is a:

"...tool for digitally aligning ("rectifying") historical maps from the NYPL's collections to match today's precise maps. Visitors can browse already rectified maps or assist the NYPL by aligning a map. "

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NYPL Map Warper

HomeBrowse All MapsBrowse Rectified MapsFind Maps by LocationBrowse All LayersFind Layers by Location

Logged in as: BRANDYN FRIEDLYMY MAPSMY ACTIVITYSETTINGSLOG OUT

### How to use this tool

NYPL Map Warper Tutorial



The NYPL Map Warper is a tool for digitally aligning ("rectifying") historical maps from the NYPL's collections to match today's precise maps. Visitors can browse already rectified maps or assist the NYPL by aligning a map. Play the video above to tour the site and learn how to rectify a map yourself. Everyone is welcome to participate!

Search Text for Year 1544 2001 SEARCH

All maps Rectified maps only



New: Find Rectified Maps by Location

### My Maps

MAP	TITLE	YEAR	LAST MODIFIED	STATUS
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See all of My Maps

### Most Recently Rectified Maps

MAP	TITLE	YEAR	LAST MODIFIED	STATUS
	<b><u>Queens land use policy</u></b> <i>From The Borough (In 3 layers) Depicts: 1969</i> <a href="#">View Map</a>   <a href="#">Rectify Map</a>   <a href="#">Save to My Maps</a>   <a href="#">Download KML</a> Bibliographic records: <a href="#">Digital Collections</a>	1969	about 6 hours ago.	5 control points.
	<b><u>Rail road map of New England, Canada, &amp; eastern N.Y. / by J.H. Goldthwait.</u></b> <i>From Parts (In 4 layers) Depicts: 1850</i> <a href="#">View Map</a>   <a href="#">Rectify Map</a>   <a href="#">Save to My Maps</a>   <a href="#">Download KML</a>	1850	about 12 hours ago.	4 control points.

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With Map Warper, we can browse all maps or ones that volunteers have already georeferenced for us. We can also search the collections by *Layers* , maps from the same atlas stitched together. Let's "Find Layers by Location" for our basemap.



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NYPL Map Warper

Home Browse All Maps Browse Rectified Maps Find Maps by Location Browse All Layers Find Layers by Location

Home > Layers

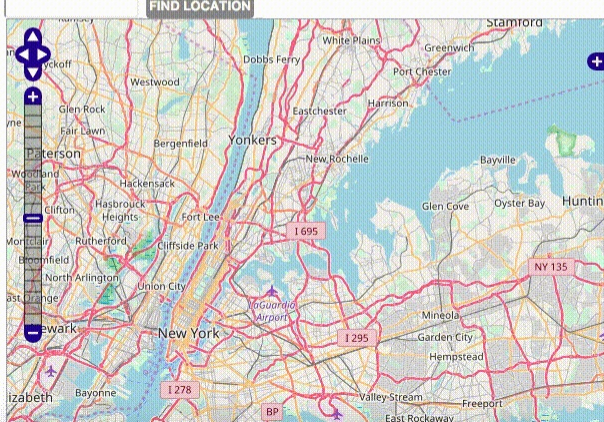
### Find Layers by Location

Move or zoom map - both the map and list will be updated with found layers.  
Layers are shown if they have one or more rectified maps within them, and are visible (not a meta collection/layer).

Year 1544 2001

Found 416 Layers. Showing 1 - 20

- Mitchell's new general atlas, containing maps of the various countries of the world, plans of cities, etc., embraced in fifty-three quarto maps, forming a series of eighty four maps and plans, together with valuable statistical tables.  
1860  
Open layer
- Cyclists' road map of the Hudson River District, New York.  
1897  
Open layer
- A new system of the mathematics: containing I. Arithmetick, as well natural and decimal, as in species, or the principles of algebra. II. Practical geometry, together with the first six books of Euclid's Elements, as also the eleventh and twelfth, symbolo  
1681  
Open layer
- The history of the British plantations in America. With a chronological account of the most remarkable things, which happen'd to the first adventurers in their several discoveries of that new world. Part I. Containing The history of Virginia; with remarks  
1738  
Open layer
- America: being the latest, and most accurate description of the New world: containing the original of the



After clicking "Open Layer" on a layer of your choice, we are greeted with a few powerful tools. We can browse the map, digitize features, and view detailed information about the atlas.


To use this layer in our custom application, we're interested in the *Export* panel. Among the many options for using this layer, one in particular is helpful for our Leaflet map:

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NYPL Map Warper

Home Browse All Maps Browse Rectified Maps Find Maps by Location Browse All Layers Find Layers by Location

Home > Maps > Layers > Layer 862



**Atlas of the borough of Manhattan, city of New York.**  
Depicts : 1916  
194 maps (191 maps rectified 98%)  
[View on Digital Collections](#) | [Download KML](#)  
[Export](#)

Show Digitize Export Metadata Comments (0)

### Layer

WMS: [WMS Capabilities URL](#)  
WMS link suitable for [JOSM OpenStreetMap Editor](#)  
Tiles (Google/OSM scheme): <http://maps.nypl.org/warper/layers/tile/862/{z}/{x}/{y}.png>  
KML: [Download KML](#)  
Bibliographic: [Digital Collections](#)

That URL should look familiar. Try replacing the OSM URL in `map.js` with the tiles URL in Map Warper. Also Refresh your map to see Harlem in 1916.





We just made a web map with an atlas from 1916 in 9 lines of code. Thank you Leaflet and NYPL!

See `3-add-nyp1-basemap-SOLUTION` for the changes we made to `map.js`.