GET1030

Computers and the humanities

Lecture 9
Visualizing geographical data

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Objectives

Define basic concepts for geospatial data

Describe geospatial visualizations

Consider an overview of digital humanities projects that use geospatial data

Map projections

Mercator = Wright		Cylindrical	Conformal	Gerardus Mercator	1569	Lines of constant bearing (rhumb lines) are straight, aiding navigation. Areas inflate with latitude, becoming so extreme that the map cannot show the poles.
Web Mercator		Cylindrical	Compromise	Google	2005	Variant of Mercator that ignores Earth's ellipticity for fast calculation, and clips latitudes to ~85.05° for square presentation. De facto standard for Web mapping applications.
Gauss–Krüger = Gauss conformal = (ellipsoidal) transverse Mercator		Cylindrical	Conformal	Carl Friedrich Gauss Johann Heinrich Louis Krüger	1822	This transverse, ellipsoidal form of the Mercator is finite, unlike the equatorial Mercator. Forms the basis of the Universal Transverse Mercator coordinate system.

https://en.wikipedia.org/wiki/List_of_map_projections

Coordinate reference systems (CRS)
https://docs.qgis.org/3.16/en/docs/gentle_gis_introduction/coordinate_reference_systems.html
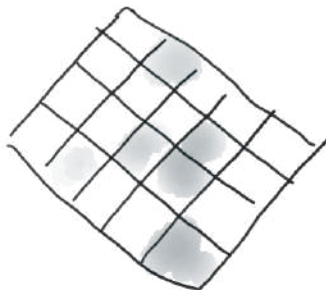
Rasters and vectors

Vectors are defined in x and y coordinates:

Point, lines, polygons

Rasters are matrices or grids

Elevation, temperature, soil pH, etc. that vary continuously from location to location

Vector elements

Point

Lyne

Polygon

Math geometry can be used to calculate simple quantitative features (distance, area, etc).

Quantitative data

Descriptive statistics for points, lines and polygons

- Measures of central tendency
- Dispersion

More complex measurements

- Proximity analysis
- Points within the radius of another element
- Clustering
- Spatial autocorrelation

Maps as networks

Places are nodes

Edges as:

- Communication lines
- Similarity on a quantitative measurement (number of writers)
- Movement from one place to another (directed networks)

Geocoding

Obtaining coordinates from a text string

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Part 2: Types of geospatial visualizations

Thick Mapping

- "Mapping is not a one-time thing, and maps are not stable objects that reference, reflect, or correspond to an external reality... Maps are visual arguments and stories; they make claims and harbor ideals, hopes, desires, biases, prejudices, and violences. They are always relational, in dialogue or in contact with someone or something" (Presner et al.)
- **Thick mapping:** collecting, aggregating, and visualizing ever more layers of geographic or place-specific data (Presner et al.)
- Thickness connotes a kind of cultural analysis trained on the political, economic, linguistic, social, and other realities in which human beings act and create (Presner et al.).

Presner, T., et al., *HyperCities: Thick Mapping in the Digital Humanities* (Cambridge: Harvard University Press, 2014).
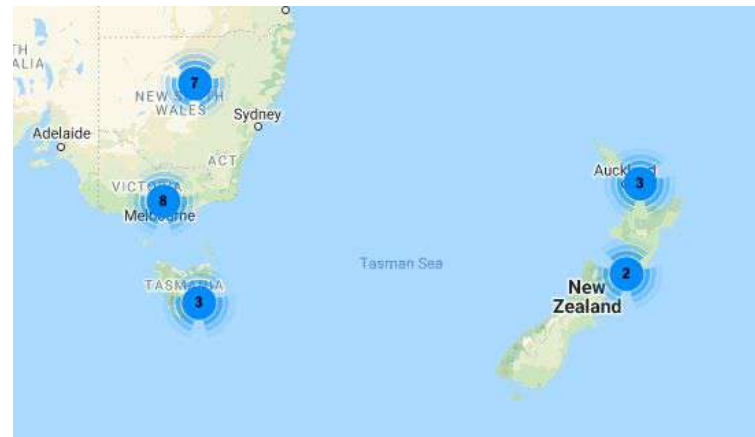
See Presner speak at
https://www.youtube.com/watch?v=qtGdfiwrJSQ

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Markers and marker clusters

Markers
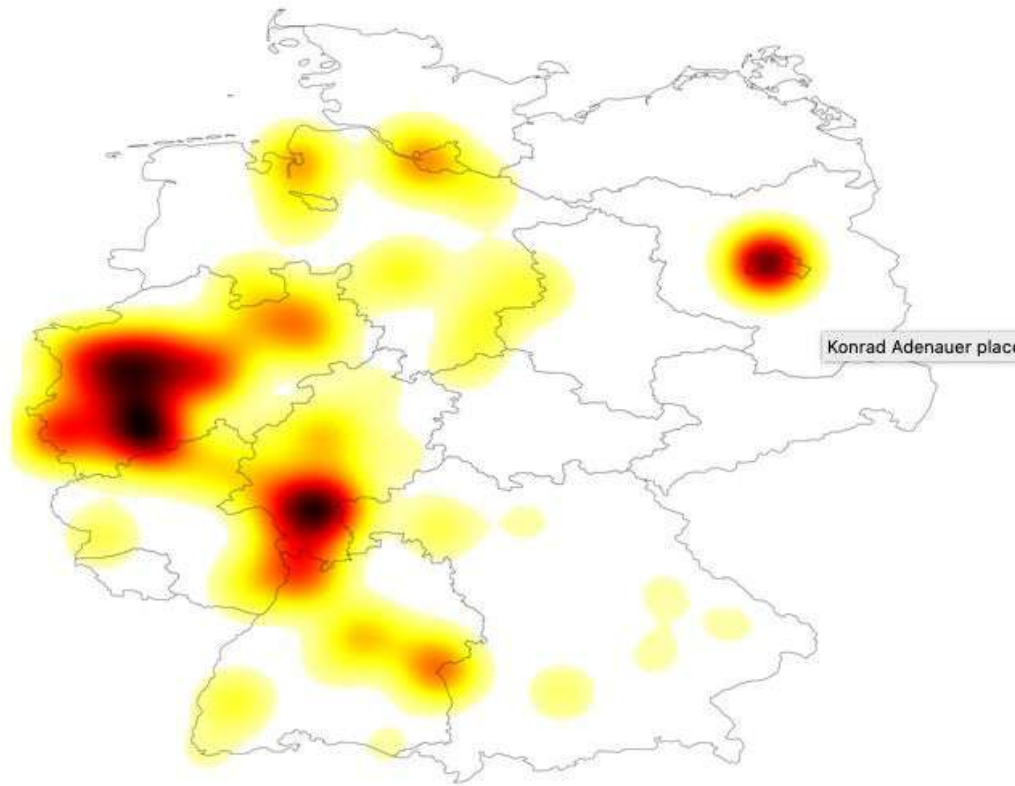
(symbols, colors, size)

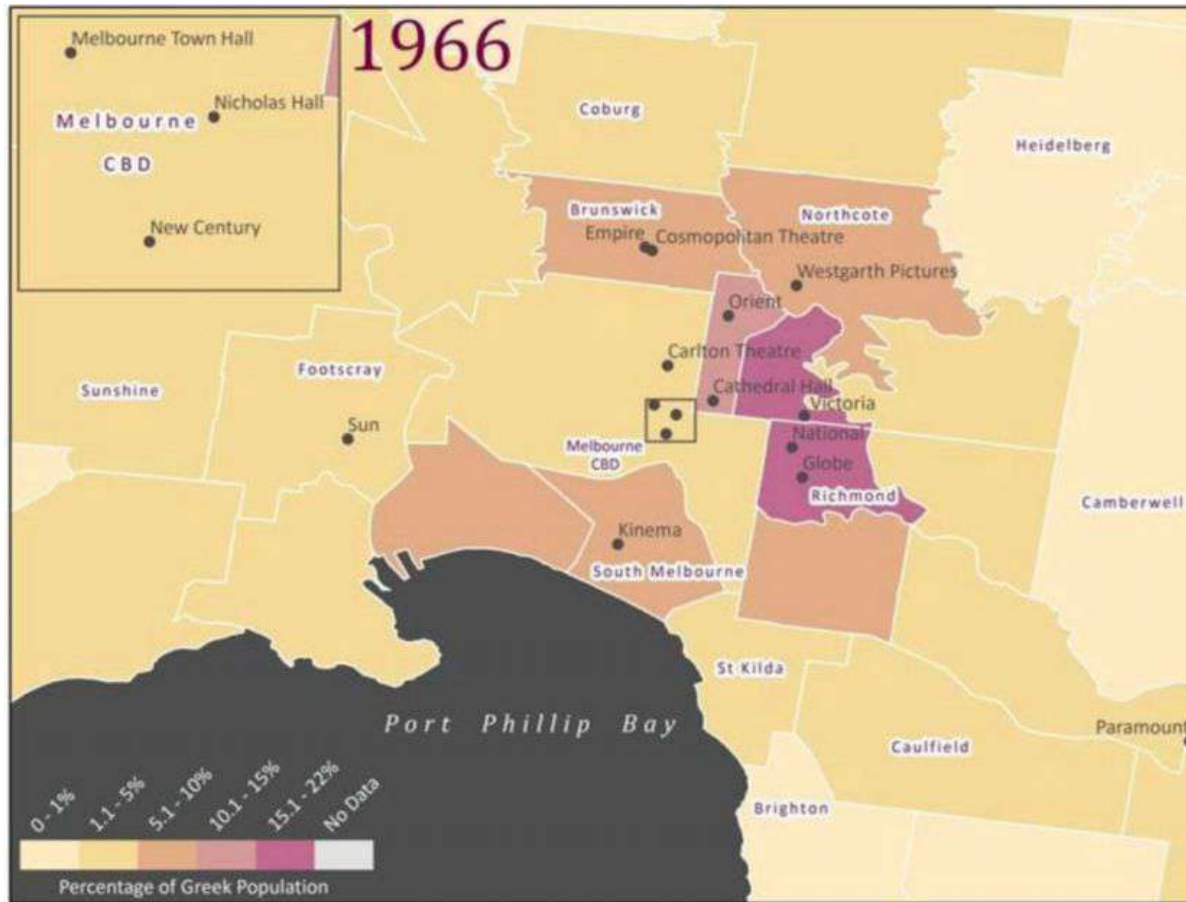## Marker clusters

Heatmaps (isopleth)

Location of the 375 places
named after Konrad Adenauer

Konrad Adenauer place

Konrad Adenauer (1876 – 1967)
was a German statesman who
served as the first Chancellor of the
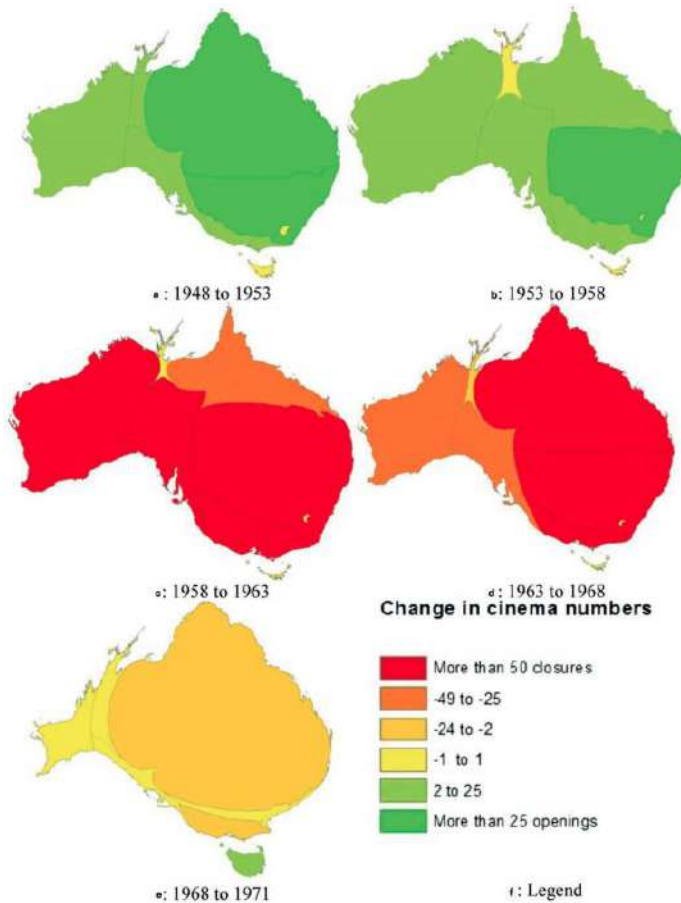Federal Republic of Germany
(West Germany) from 1949 to 1963

https://rikunert.com/heat_map

Choropleths

Greek film venues in Australia

Choropleth: a geographical heatmap.

Arrowsmith, Verhoeven and Davidson (2014).

Cartograms

a : 1948 to 1953   b: 1953 to 1958

c: 1958 to 1963   d: 1963 to 1968

Change in cinema numbers

🟥	More than 50 closures
🟧	-49 to -25
🟨	-24 to -2
⬜	-1 to 1
🟩	2 to 25
🟩	More than 25 openings

e: 1968 to 1971   f: Legend

A **cartogram** of greek film venues in Australia.

Cartograms distort maps according data.

Arrowsmith, Verhoeven and Davidson (2014).

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Bubblemaps

https://theconversation.com/coronavirus-outbreak-a-new-mapping-tool-that-lets-you-scroll-through-timeline-131422
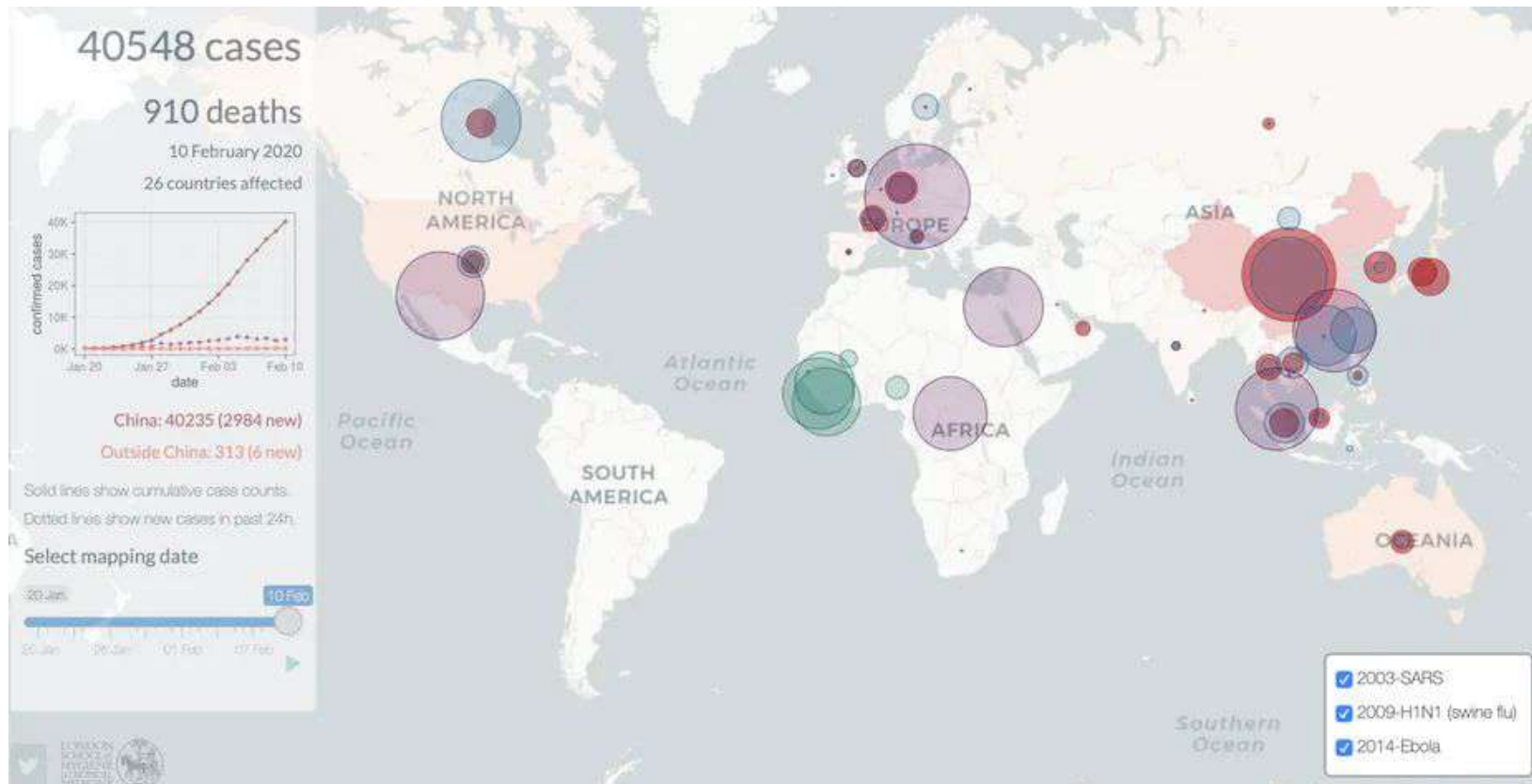
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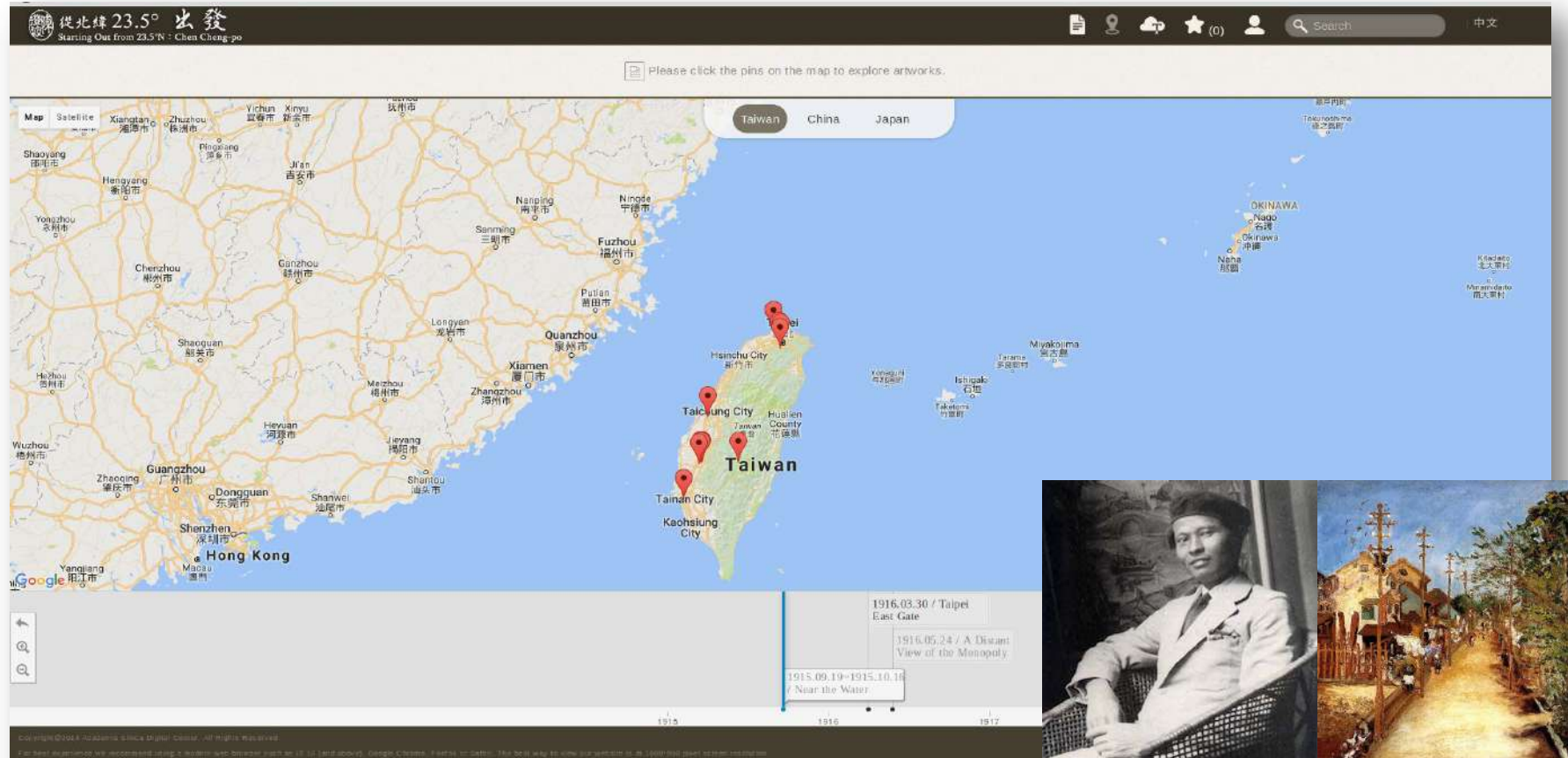Part 3: Overview of projects

Film theatres in Liverpool
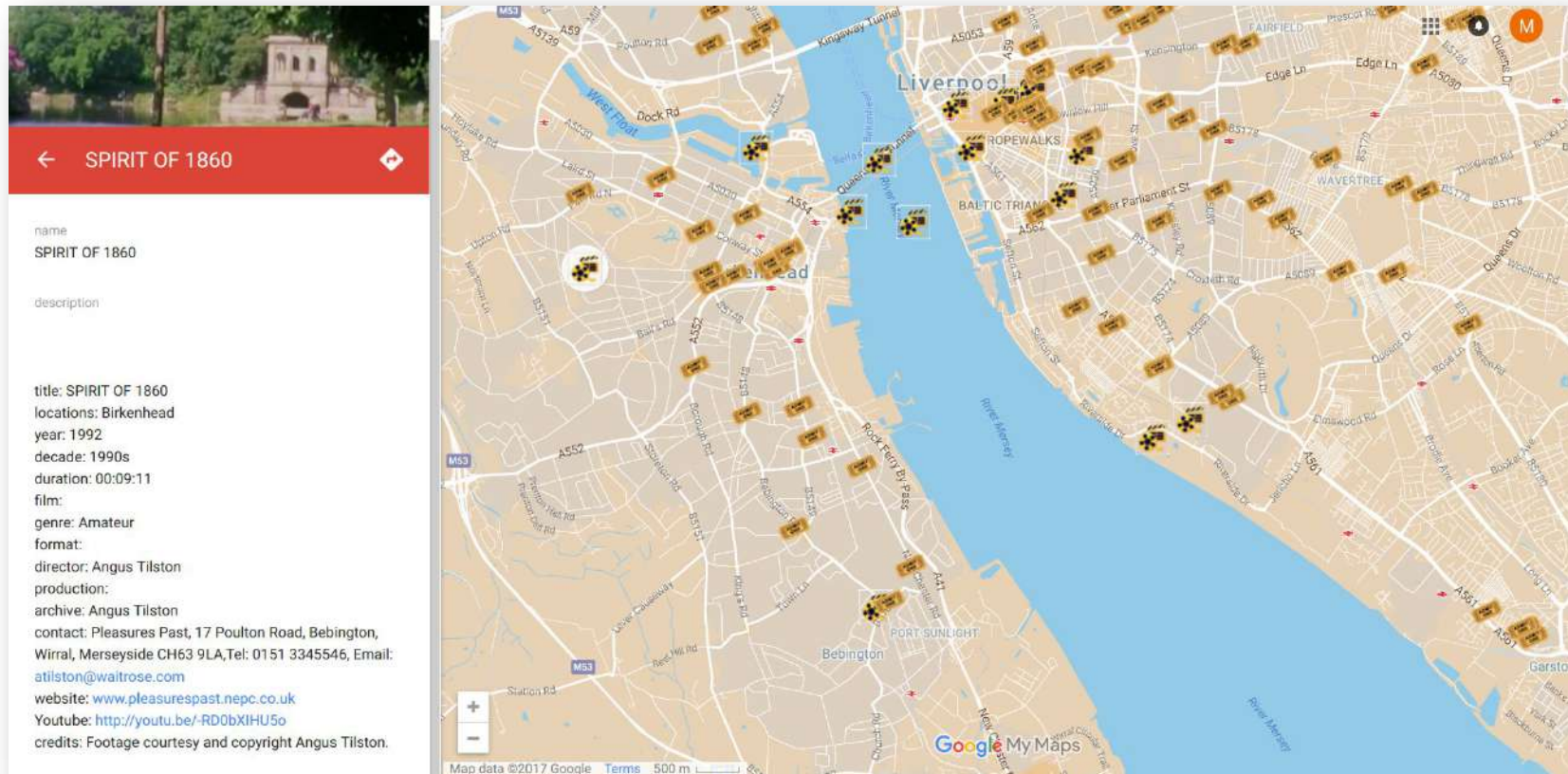
Liverpool - City in Film map features location data relating to 176 former cinema sites across Merseyside,
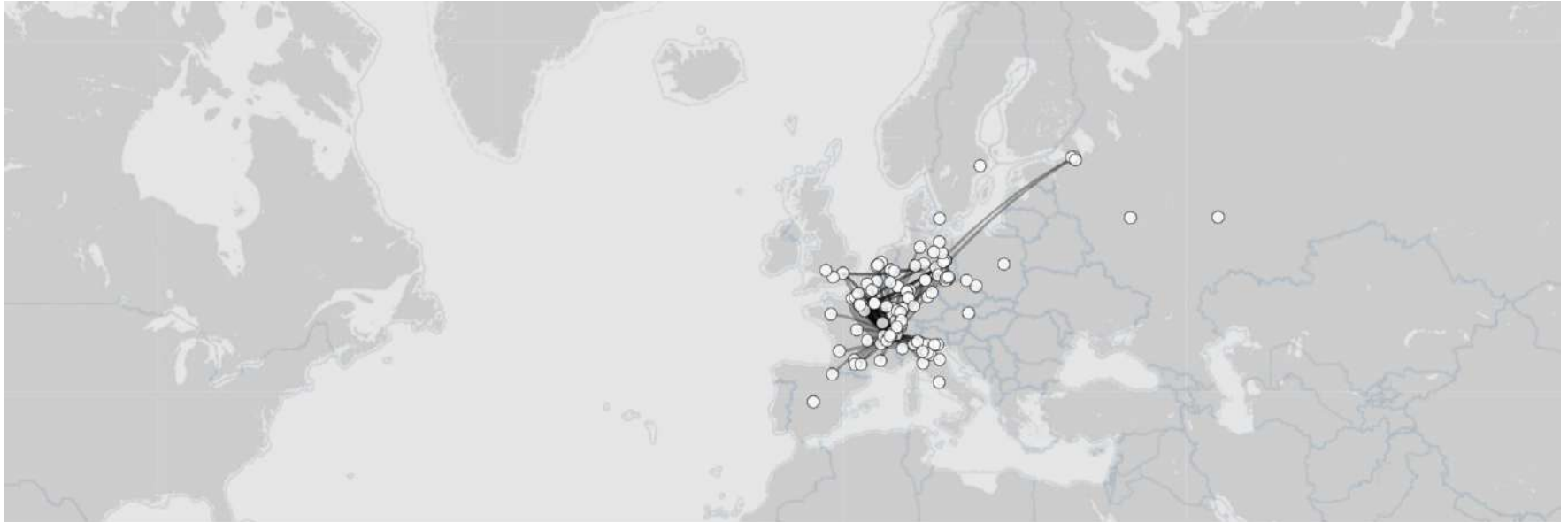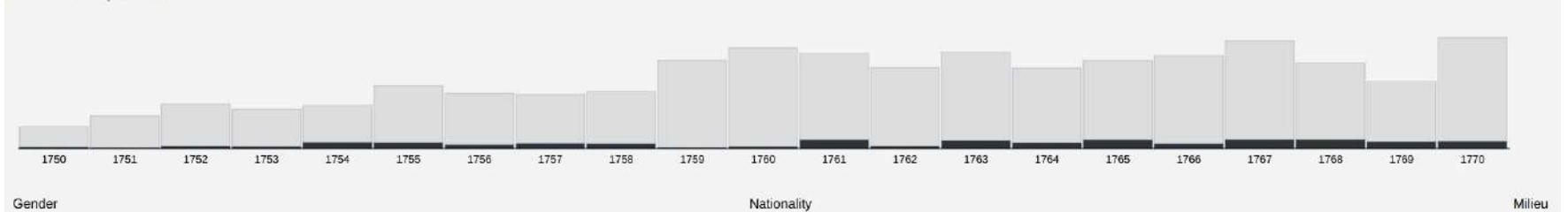https://www.liverpool.ac.uk/architecture/research/cava/cityfilm/map/

The Life of Cheng Chen-Po [陳澄波]

http://chenchengpo.asdc.sinica.edu.tw/map_en [unavailable]

Mapping the Republic of Letters

http://republicofletters.stanford.edu/casestudies/voltaire.html
http://ink.designhumanities.org/voltaire/ [unavailable]

Telling stories with maps

The digital Literary Atlas of Ireland
http://cehresearch.org/DLAI/

Singapore Historical GIS

Spatial Distribution of Chinese Temples

http://shgis.nus.edu.sg/index.php/chinese-temples/
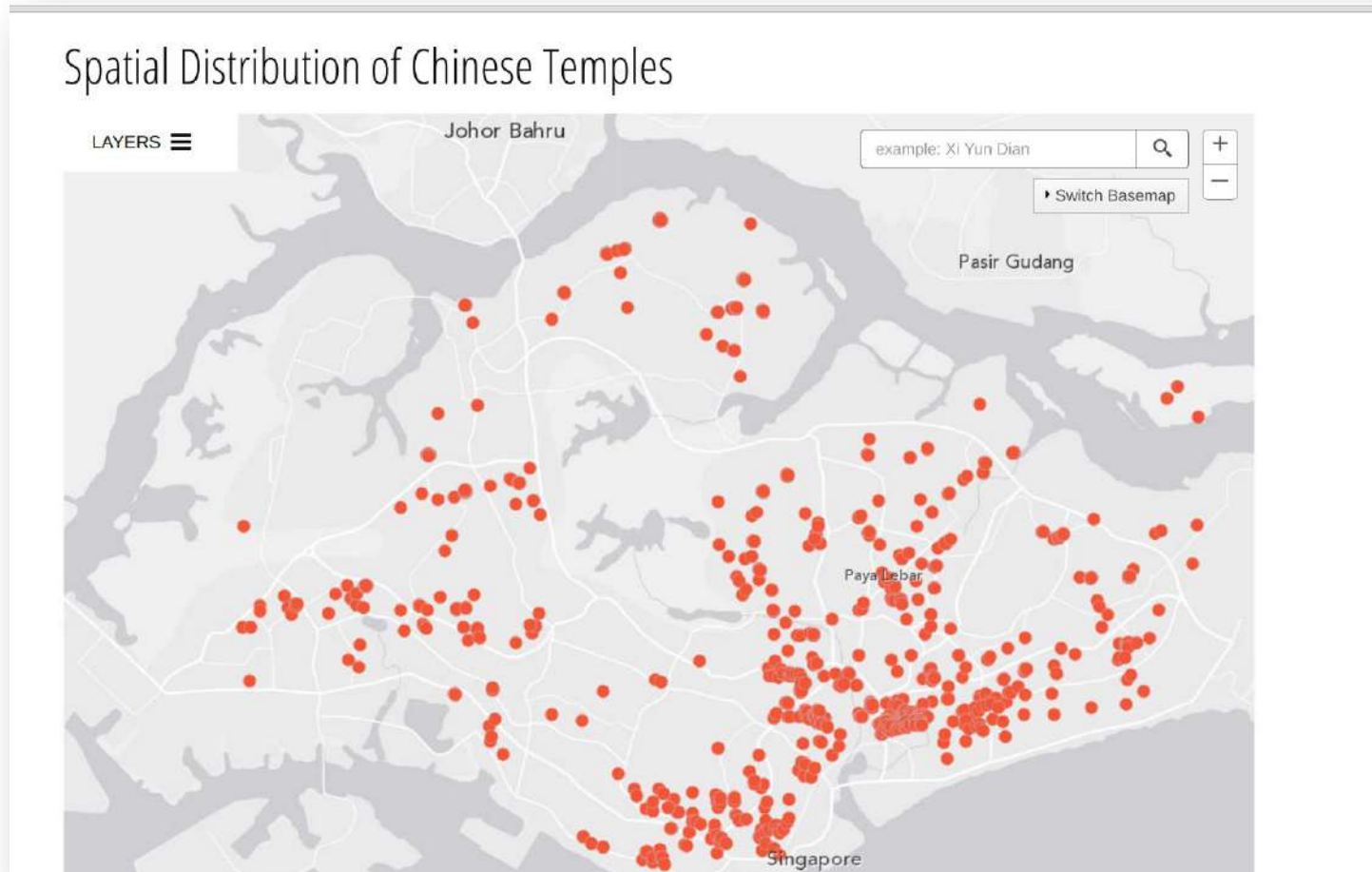
Mapping Twitter in Real Time
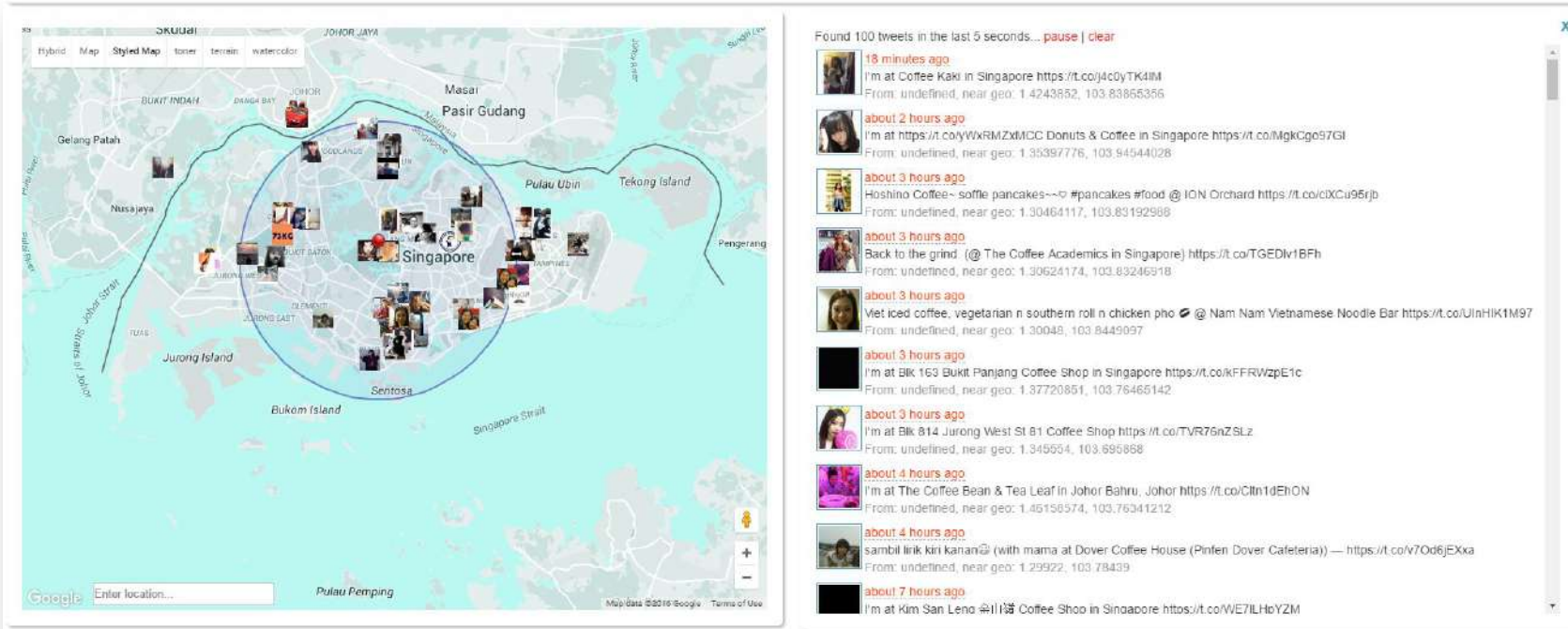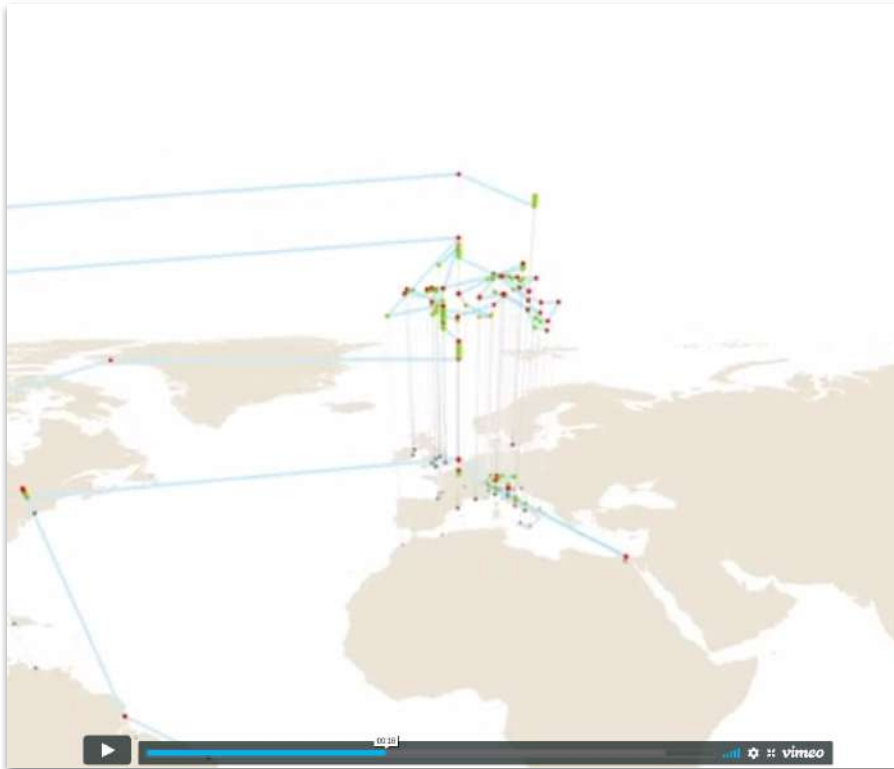

https://sandbox.idre.ucla.edu/maptwitter/ (unavailable)

Dunham Data

Dunham Data
A study of the works of choreographer Katherine Dunham (1909-2006)
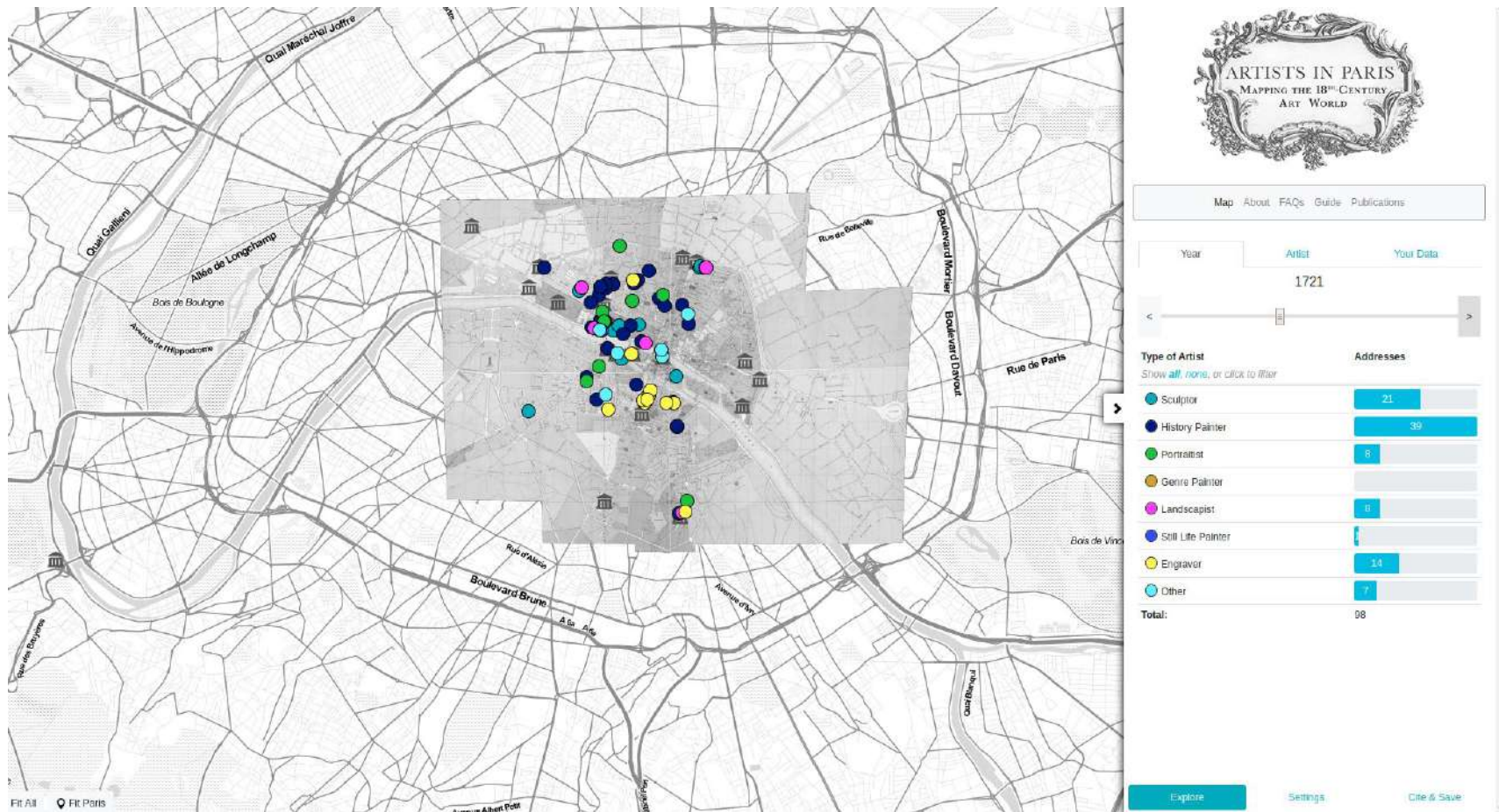https://www.dunhamsdata.org/blog/tracking-dunhams-everyday-1950-53

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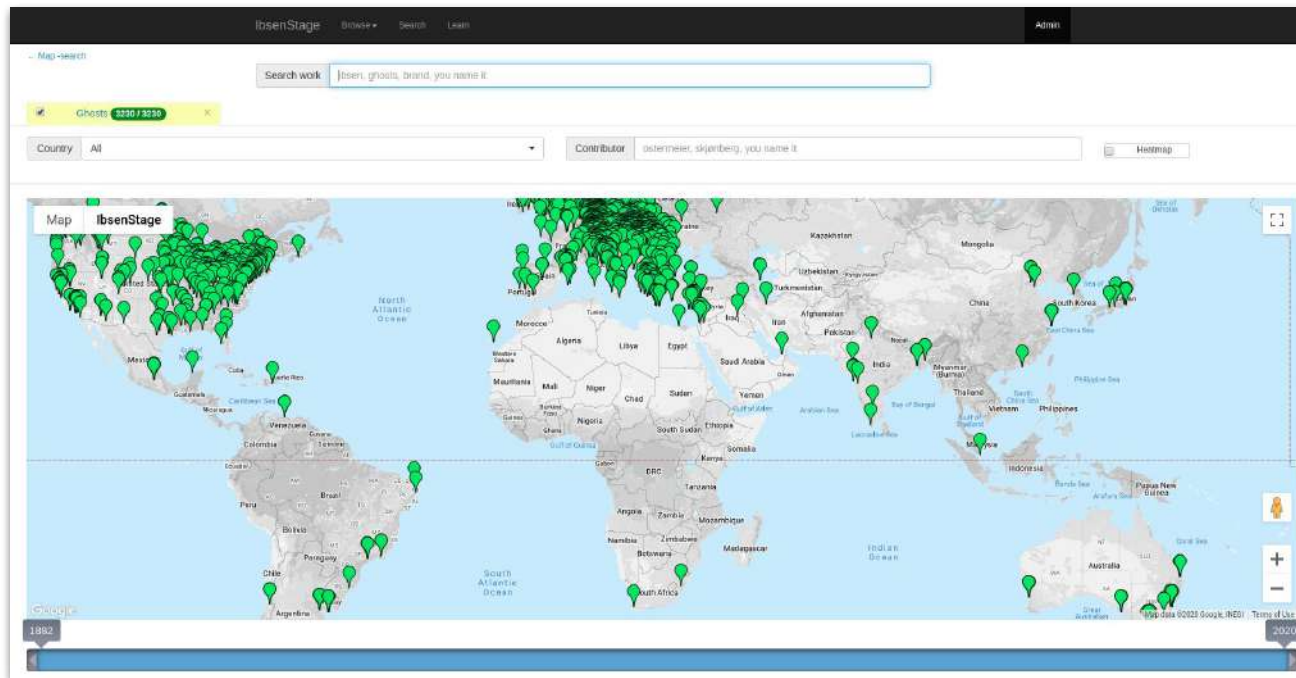
Ibsen Stage

Ibsen Stage
A database of performances of the works of Henrik Ibsen (1828-1906)
https://ibsenstage.hf.uio.no/pages/browse/map/work

Artists in Paris in the 18th Century

https://www.artistsinparis.org

Maps of Historical Segregation

http://dsps.lib.uiowa.edu/placingsegregation/washington/
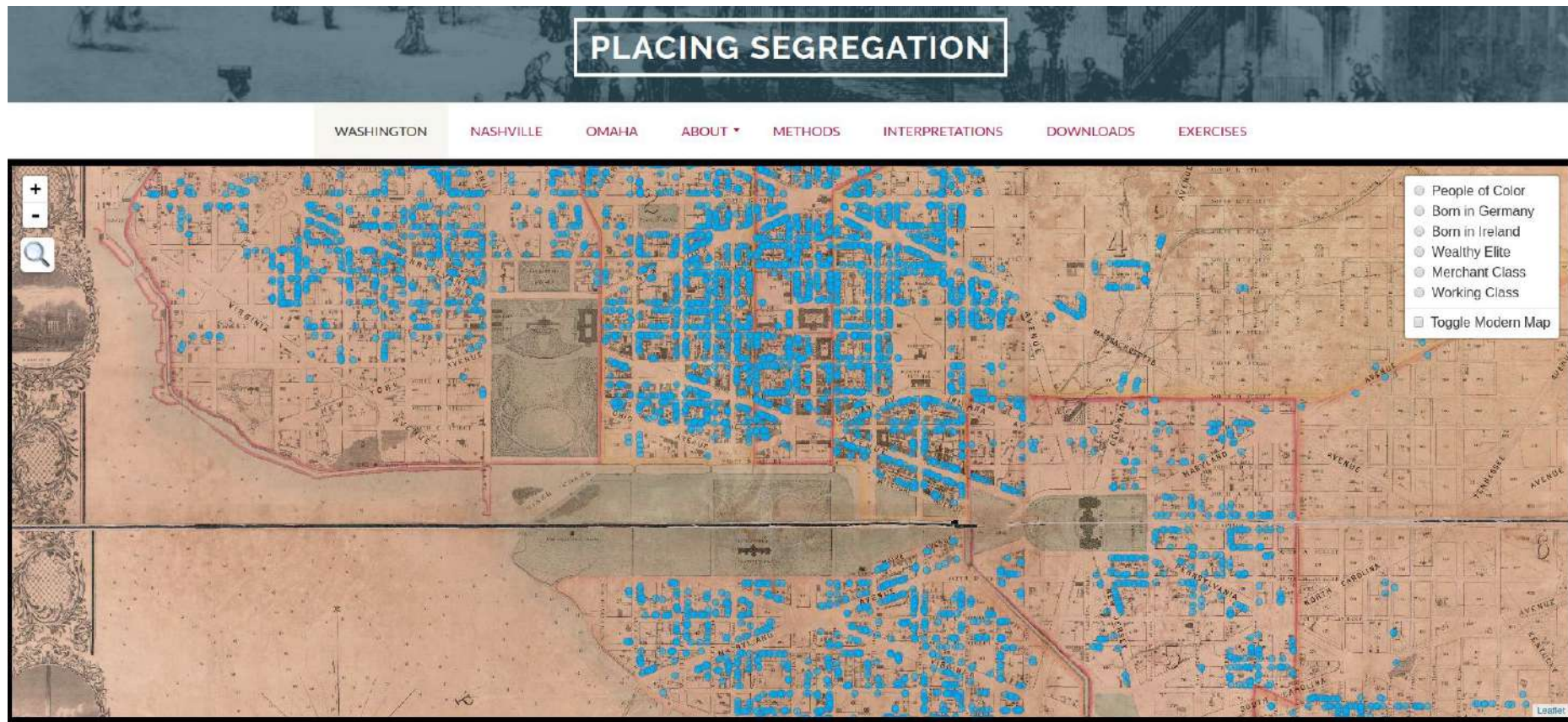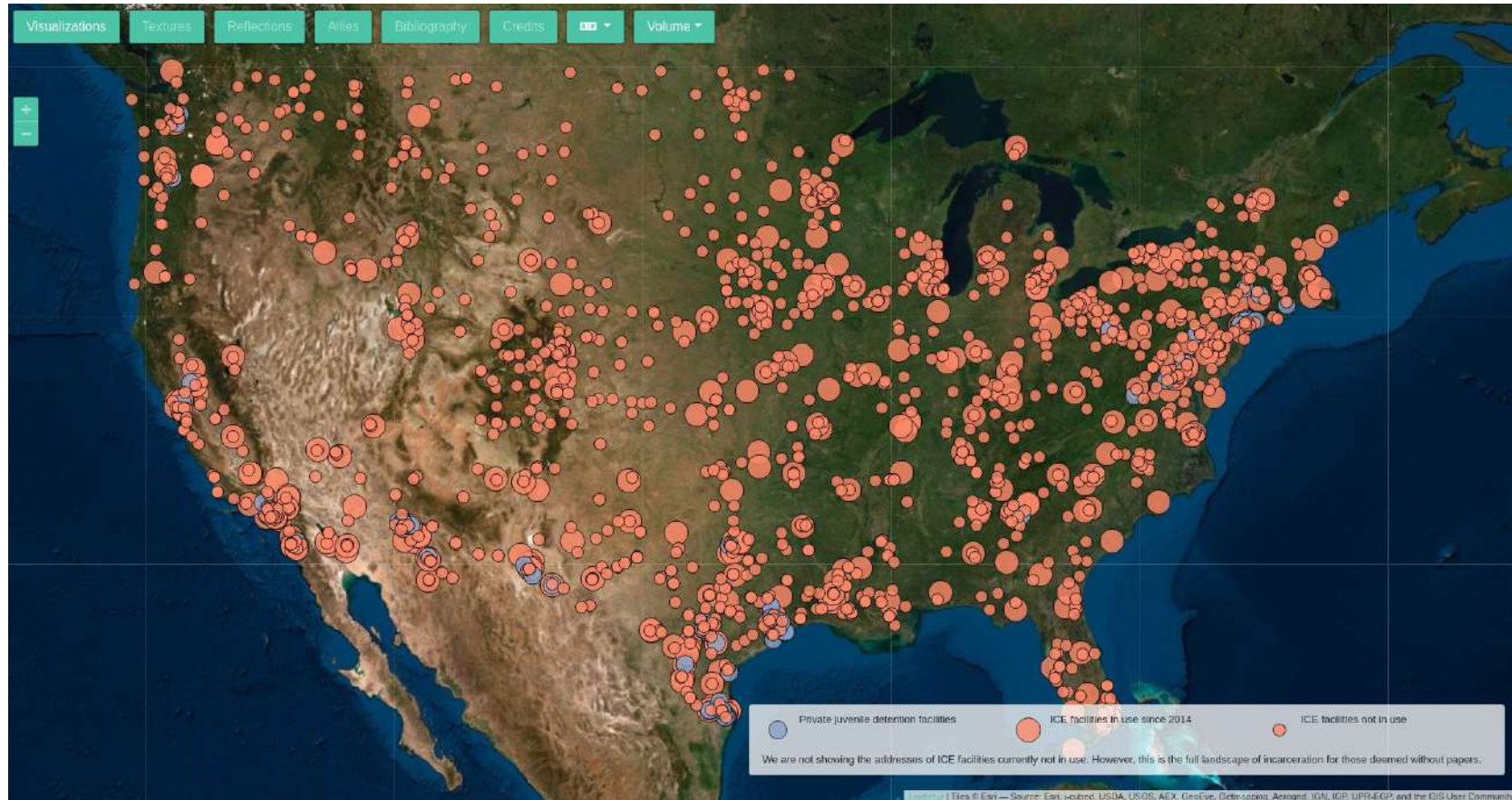
Torn apart / separados

by Manan Ahmed, Alex Gil, Moacir P. de Sá Pereira, Roopika Risam, Maira E. Álvarez, Sylvia A. Fernández, Linda Rodriguez, and Merisa Martinez - June 26, 2018
https://xpmethod.plaintext.in/torn-apart/volume/1/

Maps of fictional worlds

The Lord of the Rings project
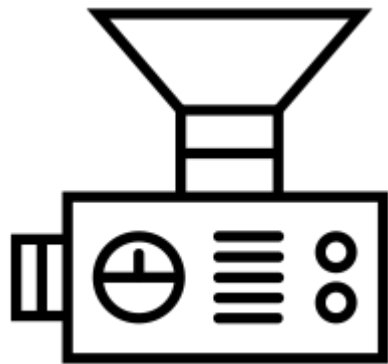http://lotrproject.com/map/

Sustainability

- Many projects depend on Google Maps.
  - What happens if they change their terms of service?
  - Other approaches are possible, such as the OpenStreet map.
- Link attrition.
- A general problem of DH projects.

Layers of sustainability

Machines → Software → Data

Making projects sustainable

- LOCKSS. Lots of copies keeps stuff safe.
- Open data. People can download and reuse the data.
- Open formats. Rather than proprietary formats.
- Open source. Programmers can rewrite and extend the code for projects.

See *The Endings Project:* https://projectendings.github.io/

"Make sure your entire project can run out of a usb drive"
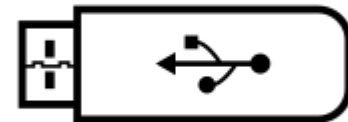
References

Arrowsmith, Colin, Deb Verhoeven, and Alwyn Davidson. "Exhibiting the Exhibitors: Spatial Visualization for Heterogeneous

Cinema Venue Data." *The Cartographic Journal* 51, no. 4 (November 1, 2014): 301–12.

https://doi.org/10.1179/1743277414Y.0000000096.

Geertz, Clifford. 1973. *The Interpretation of Cultures: Selected Essays*. New York: Basic Books.

Presner, Todd Samuel, David Shepard, and Yoh Kawano. *HyperCities*. MetaLABprojects. Cambridge: Harvard University Press,

2014.

A Doll's House:

Ibsen, Henrik. 1992 [1879]. *A Doll's House*. Dover Thrift Editions. Dover Publications, Incorporated.

http://ebookcentral.proquest.com/lib/nus/detail.action?docID=1889903