

Representing Place in World Historical Gazetteer



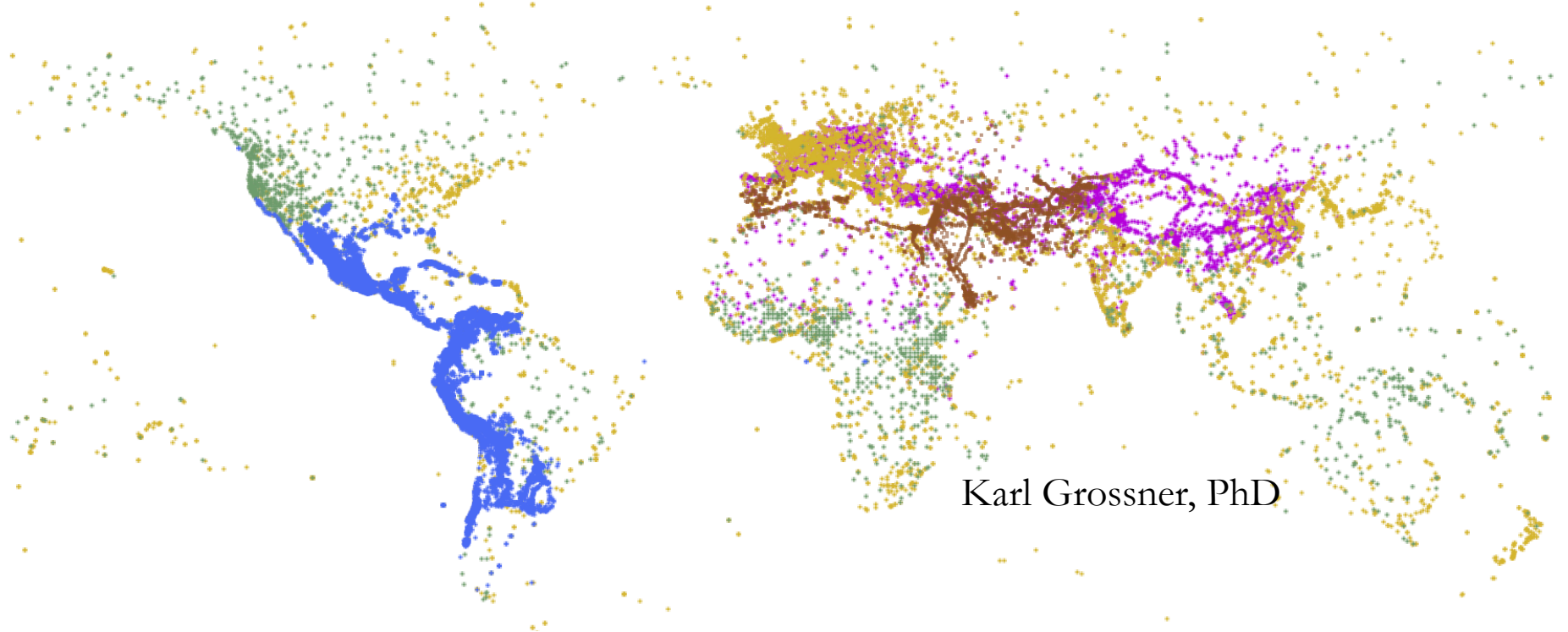
I'm very pleased to be back at UCSB and the Spatial Center, my almae maters. This talk is about representing knowledge of places in the new World Historical Gazetteer platform, and about my now 10-year engagement with Digital Humanities.

Karl Grossner, PhD

Pitt
World History
Center

spatial@ucsb
27 Oct 2020

Computing Place with World Historical Gazetteer



Karl Grossner, PhD

One day I hope to give a talk with this title. My personal research agenda can be summed up by the phrase “computing place.” I see this platform as supporting, among other things, my own research on computation of historical cultural landscapes. Quality of analysis depends in part on quality of description.

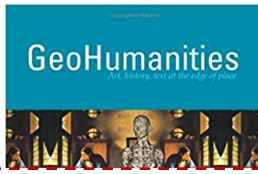
Outline

- Some Context
- Place
- World Historical Gazetteer
- Linked Places
- Next

Context

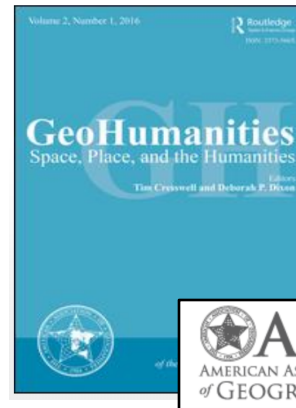
Geo-, Spatial-, Geospatial Humanities

A research trajectory



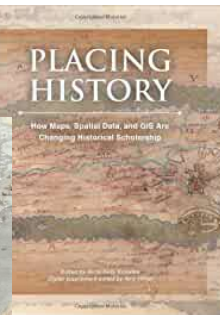
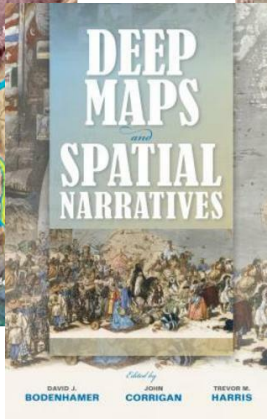
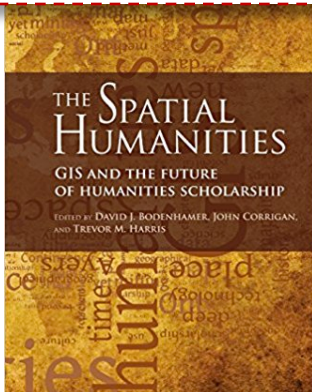
Geography and GIS/GIScience have been connecting with the humanities in several ways over the last couple of decades.

Disciplinary perspectives vary. Anyone who attends the AAG conference will know that cultural geography is well represented, and digital methods are rare. In the AAG journal GeoHumanities, qualitative methods predominate. Historians and geographers have engaged in developing Historical GISes. Historians are generally not keen on including the terms “geo” or “geography” with “history” – claim to want only spatiality.



GeoHumanities

Spatial Humanities/History



Stanford University

Spatial History Project

UNIVERSITY OF VIRGINIA LIBRARY

SCHOLARS' LAB

Spatial Humanities

TEXTS, GIS & PLACES

Univ of Lancaster

Historical
GIS



Summer 2019, UCGIS hosted a meeting on Geospatial Humanities, and produced a special issue of the International Journal of Humanities and Arts Computing, Volume 14 (1-2), 2020

GeoHumanities Spatial Humanities Geospatial Humanities



University Consortium for
GEOGRAPHIC INFORMATION SCIENCE

The Geospatial Humanities:
Transdisciplinary Opportunities for the
for GIScience Community
June, 2019 Washington DC

“While humanities scholars have increasingly shown interest in GIS and GIScience, the reciprocal interest is not often as expressed...”

“...a possible methodological path to the **geospatial humanities...**”

Whether or not a new term is needed (or would ever be adopted) advancing the connections between GISci and the Humanities is desirable



Alberto Giordano, Shih-Lung Shaw and Diana Sinton

The Geospatial Humanities: Transdisciplinary Opportunities

International journal of humanities and arts computing,
2020, Vol.14(1/2)

[https://www.eupublishing.com/toc/ijhac/14/1-2](https://www.euppublishing.com/toc/ijhac/14/1-2)

2013



Literary Studies, History, Philology, Linguistics, Archaeology, Arts

“...a venue for pooling knowledge and best practices for relevant existing **digital tools and methods**, to foster the collaborative development of **shared resources and new tools and extensions to geospatial software**, and to keep humanist scholars at large informed about the possibilities and inherent pitfalls in their use.”

I entered this meeting ground between history and geography via ECAI at Berkeley, then HGIS and the Social Science History Association. As you probably know, historical research is carried out in most of the social sciences, but many historians do not consider themselves scientists at all. In time I made my way to Digital Humanities, and 2013 co-founded one of the first special interest groups in the Alliance of Digital Humanities Organizations – ADHO. My goal was to make clear to that community that GIScience is NOT static, and if there are deficiencies in geospatial methods and software, these could be addresses, IF the two domains met. In 2015, AAG launched a GeoHumanities journal dominated by qualitative methods and critical theory. Appropriation!!

2015



Bible Geography
Black Geographies
Cultural Geography
Ethnic Geography
Feminist Geographies

...

Spatial Humanities

A Project of the Institute for Enabling Geospatial Scholarship

Spatial Turn

Stan Bu Stan

Projects & Groups

Resources

About

Contribute

What is the Spatial Turn?

What is the Spatial Turn?

by Jo Guldi

What is a turn? Humanities scholars speak of a quantitative turn in history in the linguistic and cultural turn of the 1980s in history and literature, and even more recently an animal turn. Beyond the academy, to turn implies retrospection, a process of slowing in the road and glancing backwards at the way by which one has come.

*May the weary traveler turn from life's dusty road and in the w
shade, out of this clear, cool fountain drink, and rest*

R. E. Speer, "Robert Burns," Nassau Literary Magazine 43 (1888): 469.

"Landscape turns" and "spatial turns" are referred to throughout the academic discourse often with reference to GIS and the neogeography revolution that puts mapping v

What is the Spatial Turn?

The Spatial Turn in Anthropology

The Spatial Turn in Psychology

The Spatial Turn in Architecture

The Spatial Turn and Religion

The Spatial Turn in Literature

The Spatial Turn in Art History

The Spatial Turn in Sociology

The Spatial Turn in History

Jo Guldi, Associate Professor of History, SMU

<http://spatial.scholarslab.org/spatial-turn/what-is-the-spatial-turn/>

Representing historical knowledge in geographic information systems (Grossner 2010)

- **digital historical atlases**
- spatial-temporal RDBMS
- “story/deep” maps
- web maps generally
- desktop GIS (esri ArcMap, QGIS)

gazetteers

~~triple stores~~

My background: a 2010 dissertation at UCSB. In my work, “geographic information system” is a generic term, not at all limited to desktop GIS software. Gazetteers are certainly geographic information systems, but I did not consider them in that work. I worked with relational databases queried with SQL, and not triple stores queried with SPARQL.

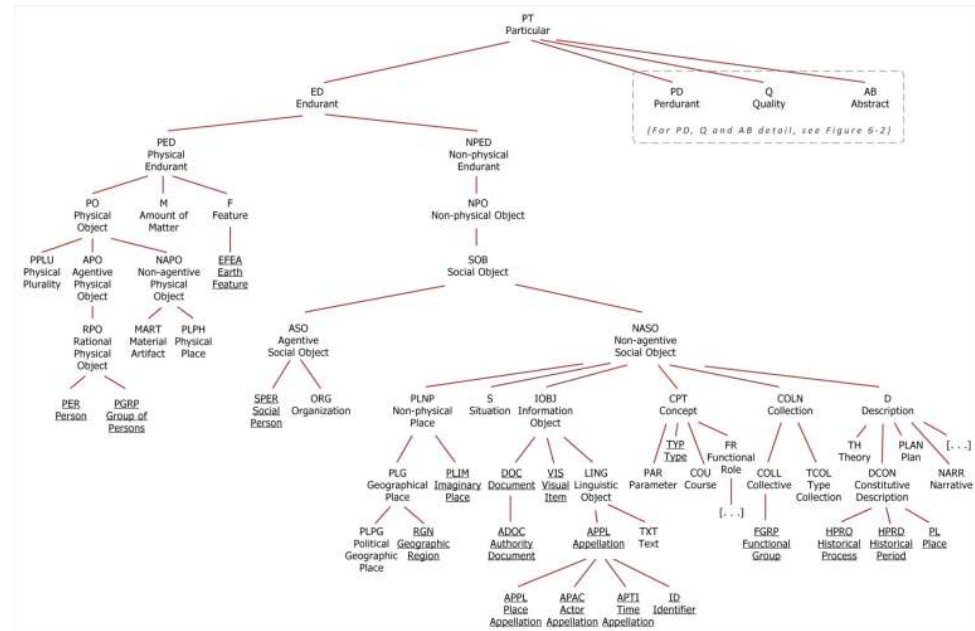
The work did delve into geo-semantics and their formalization, and I relied on work from the Muenster group at the time – with whom UCSB had a strong connection.

Committee: M. Goodchild, H. Couclelis, K. Clarke, M. Raubal, R. Mostern
Muenster allies: W. Kuhn, K. Janowicz, C. Keßler

Spatial History Ontology (SHO)

“...the introduction of logical formalisms to historical knowledge representation in GIS should be attempted incrementally.

Fortunately for those who want to make maps right away, a **useful level of reasoning** can be accomplished in a relational model...”



One product of my dissertation work was a Spatial History Ontology, which I instantiated in a relational database, PostgreSQL. I aimed for what I called “a useful level of reasoning,” and “sufficient logic.”

Extending DOLCE

(and adopting its First Order Logic notation)

I studied historical atlases extensively, and delved into historiography, knowledge representation, and cognitive science. I ended up extending DOLCE, and defining entities, relations, and axioms in first order logic, as DOLCE does.

“...all Achievements x are either directly constituted (DK) by some Activity y for some time t during the interval bounding the Achievement, or specifically generically constituted (SK) by some Activity throughout that interval (sho11).”

$$\forall x(ACH(x)) \exists y ((DK(x, y, t) \vee SK(x, y)) \wedge A(y)) \quad (\text{sho11})$$

In English:

Events, and occurrents generally, are composed of one or more activity, or “temporal substance” – much as material objects are composed of physical substances in some combination.

“sufficient logic”

I discovered I could express the ontology in the RDBMS, and achieve most of the logical constructs and reasoning I was after.

Table 6-1. Logical capabilities compared

RDF/S or OWL capability	Achieved in RDBMS
<u>Schema definitions</u> , e.g. PoliticalEvent hasType rdfs:Class hasParticipant hasType rdf:Property	Tables for Class and Relation ('property'); all instance records have foreign key to Class and/or Relation
<u>Class and property propagation</u> (is-a; sub-relation) <u>Property intersection</u> (A <i>subproperty-of</i> B; A <i>subproperty-of</i> C → if x A y, then x B y, x C y)	Hierarchy established with parent_id value for each; recursive queries using SQL's WITH, WITH RECURSIVE and UNION
<u>Class definitions</u>	Table columns incl. custom data types (ENUM); check constraints incl. NOT NULL; DEFAULT
<u>Property definitions</u> - Domain and range - Cardinality	Check constraints
<u>Transitivity</u> of parthood, and is-a relations	Recursion, using SQL's WITH, WITH RECURSIVE and UNION
<u>Complex classes</u> , e.g. NewClass \triangleq intersectionOf [ConditionA, ConditionB,...]	Materialized views
<u>Differentiating individuals</u> , e.g. owl:distinctMembers, owl:allDifferent	UNIQUE constraints, including primary keys
<u>Instance checking</u>	SQL: SELECT...WHERE...
<u>Graph query patterns</u>	SQL: SELECT...WHERE...AND...AND...FROM...JOIN
<u>Reification</u> ; blank nodes	Association classes
<u>Unions and intersections</u>	SQL: UNION and INTERSECT

"representing information
about the world in a form
that a computer system
can utilize"

KR meets DH

- maps w/time
- networks of
weighted relations
- linked data discovery
- uncertainty

KR: $\forall x(ACH(x)) \exists y ((DK(x, y, t) \vee SK(x, y)) \wedge A(y))$

"events are composed of activities for some period"

DH: "huh?"

or

"so what?"

or

"my data doesn't look like that; what is cost/benefit?"

I left UCSB and went to Stanford Libraries to work as a Digital Humanities Research Developer. My ideas, for example of event-entered data systems did not get a great reception with my DH colleagues. DHers wanted visualizations of quantified relations between people, objects, concepts, and places. They wanted to represent uncertainty and the absence of data, and my advocacy of event-centered data fell flat.



Topotime v0.1 gallery & sandbox

A pragmatic data model, D3 layout, and Python functions
for representing complex and/or uncertain periods and events. [*in progress*]

The D3 Javascript track

There are several examples demonstrating a new timeline layout built upon [D3.js](#):

All timespan types (singular, multi-part, cyclical, durations, etc.); *part-of* and *participates* relations.

Lifespans of 50 US states linked to a map.

Stacked layout displays timespans as geometric figures; temporal density band and profile.

Simple example rendering Topotime data written as CSV.



The Python-ic track

Our Python functions generate "temporal geometry" with the help of [Shapely](#).



These are rendered to a browser with D3 in [this sandbox web page](#), providing some basic query capability.

While at Stanford, Elijah Meeks I began developing Topotime, in our "spare time," to model uncertain and complex temporal extents. It was well received, but we couldn't implement the data model, visualizations and computational libraries for lack of time. My takeaway from the 5 years at Stanford was that in DH, development of new models had to be coupled with development of specific software applications that test and demonstrate their utility in a compelling way so they might get some uptake and maybe find widespread adoption.



Figure 1 – A timespan with uncertain start and end

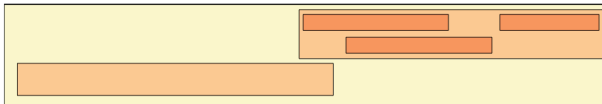


Figure 2 – A composite event rendered as its timespan with two levels of sub-event parts.

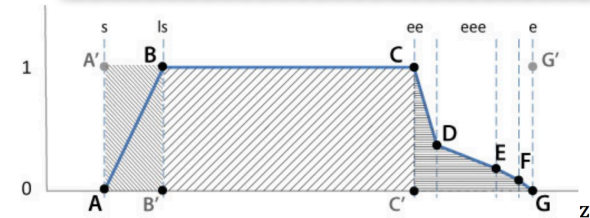
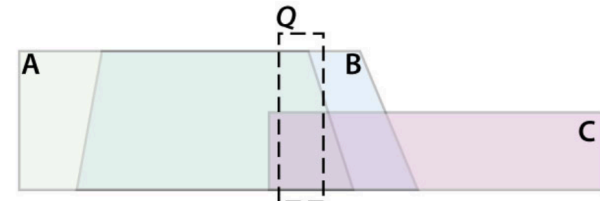


Figure 5 – Percentages of "potential certainty"



KR meets DH

KR: $(\text{PLG}(x) \vee \text{GOBJ}(x)) \wedge \exists y(\text{APPL}(y) \wedge \text{identifies}(y, x) \rightarrow \exists t(\text{T}(t) \wedge \text{identifies}(y, x, t))$ (sho38)
If a Place referent has a name, that name is valid at some time

DH: “huh?”
or
“so what?”

Back in my SHO, I expressed the temporal scoping of place names this way...something I needed, but not interesting to Dhers or directly useful to them.

Place

Defining Place

- experienced space (paraphrasing Yi-Fu Tuan)
- “a meeting up of histories” – Doreen Massey
- a function of events and activity that *have happened* there, and *can happen* there – K. Grossner
 - buildings, monuments, streets, squares, parks built
 - lives led, works created, performances
 - commerce, conflict, meetings, dominion
- places are dynamic, they change over time
- the answer to “where?”

My interest in describing places led me to humanistic geographers' conceptions of Place, which led me first to event-centered models and formats

CIDOC-CRM

Of course that led to investigating CIDOC-CRM, which is a popular “ontology” within the digital humanities, at least within the GLAM domain (for which it was developed). It’s definition of Place does not correspond with broad requirements within DH. Scope notes for `place_is_defined_by` were recently amended to account for “phenomenal places,” which are not differentiated formally in CRM

E53 Place

This class comprises **extents in space**, in particular on the surface of the earth, **in the pure sense of physics: independent from temporal phenomena and matter.**

P168 place_is_defined_by

“phenomenal places”

Note that it is possible for a place to be defined by phenomena causal to it or other forms of identification rather than by an instance of E94 Space Primitive.

E93 Space Primitive

This property associates an instance of E53 Place with an instance of E94 Space Primitive that defines it.

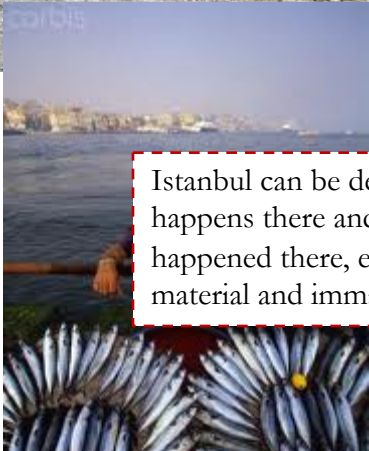


Fort Duquesne, Fort Pitt,
Fort Trent, The Manor of Pittsburgh
Pitts-Bourg, Pittsburgh, ...

Place is not Location, and places
are not defined by their location.
The red markers indicate a
representative location for the
cities of Pittsburgh and Istanbul,
and that is all they represent.



Byzantion, Byzantium, Constantinople,
Constantinopoli, Constantinopolis,
Costantinopoli, Estambul, Istamboul, Istambul,
Istanbul, Konstantinopel, Konstantinoupolis,
Kustantiniyah, Mikligard, New Rome, Stamboul,
Stambul, Tsargrad, Tsarigrad, İstanbul, ...



Istanbul can be defined by what happens there and what has happened there, evidenced in material and immaterial culture.



Pécs, Hungary



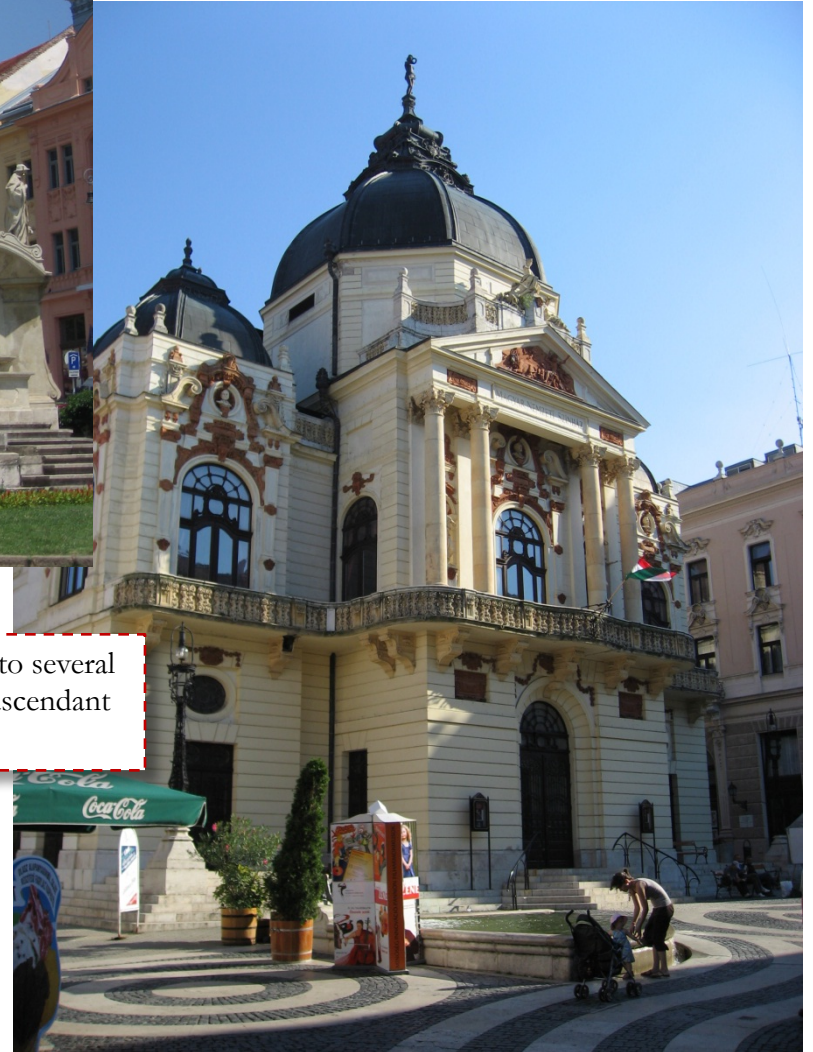
Pécs always was a multicultural city where many cultural layers are encrusted melting different values of the history of two thousand years. Hungarians, Croats and Swabians still live in peace together in economic and cultural polarity.

The same goes for Pecs, Hungary, which is typical of all places in a way – what is there is evidence of what has happened there and what happens there now.





The structure important to several religions – dominant or ascendant at different times





Cultural practice of performance,
costumes



(Some) of what happens there now...

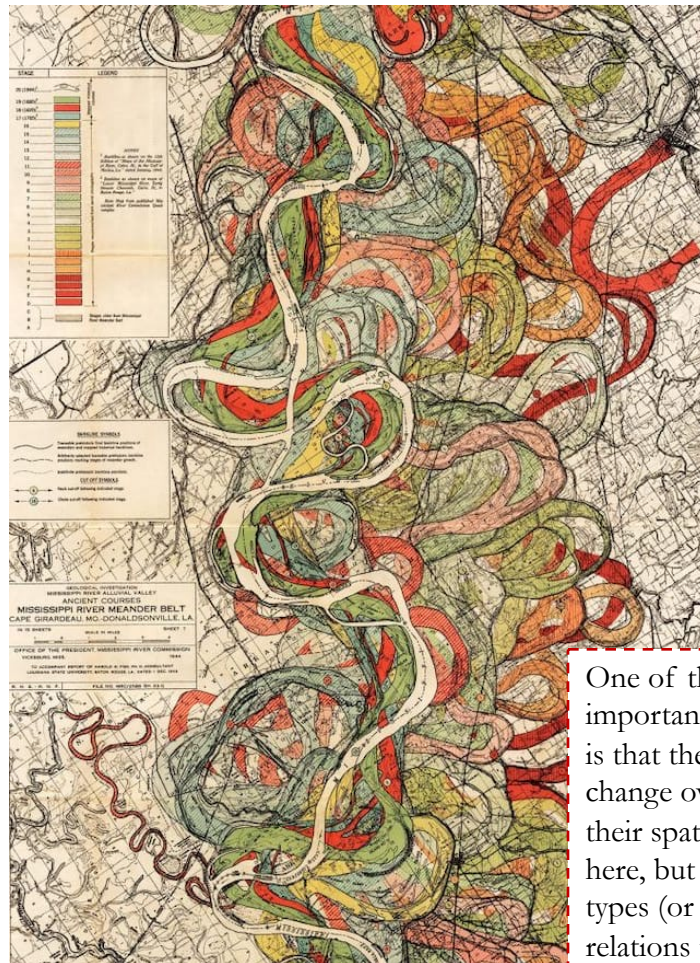
Purves, R. S., Winter, S., & Kuhn, W. (2019). **Places in information science.** *Journal of the Association for Information Science and Technology*, 70(11), 1173-1182.

"A **place** is an object resulting from a **shared identification of a location.** As an object, it may become a part of a network and participate in events."

"An **object** is a uniquely **identifiable entity existing in space and time** and having well-defined properties as well as relations with other objects."

I very much like this recent paper on 'Places in information science.' I particularly like its pragmatic approach, relating the difficult term 'place' with information systems – each of which have particular requirements.

"...we can productively work with many existing definitions about places and move toward **a shared understanding of the general properties expected from information systems dealing with place.**"



Mississippi River



“Poland”

One of the very most important attributes of places is that they are dynamic – they change over time. Not only their spatial extents, as shown here, but their names, their types (or functions), and their relations to other places – their membership in networks and their parthood in regions and territories.

World Historical Gazetteer

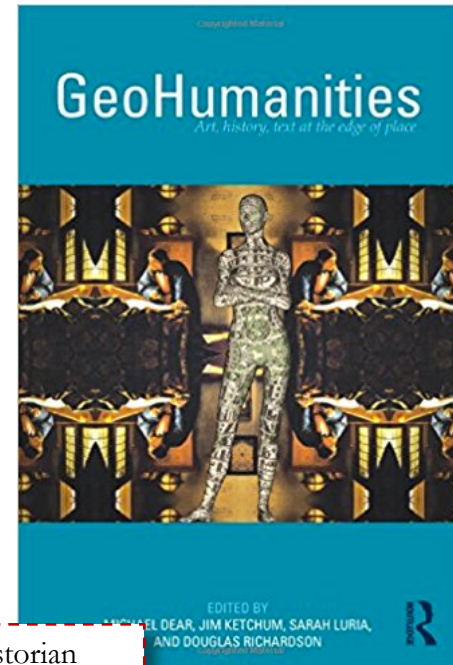
“What do humanists want?
What do humanists need?
What might humanists get?”

Peter K. Bol (2011)

In Dear, M. et al (Eds.) *GeoHumanities: Art, history, text at the edge of place*.

- a. Maps and some spatial analysis
- b. A world-historical gazetteer
- c. ??? (“we’ll see”)

In 2011, Harvard historian Peter Bol asked these questions in a chapter with that name. His answers follow.



World-Historical Gazetteer



The University of Pittsburgh

World History Center



University of Pittsburgh



NATIONAL ENDOWMENT FOR THE

Humanities

LINKED OPEN DATA

Version 1 was launched in July, 2020

NEH-funded project at the
University of Pittsburgh's
World History Center (WHC)
(2017-2020)

Ruth Mostern (WHC Director)
Principal Investigator

Karl Grossner
Technical Director & Lead Developer

Susan Grunewald
WHC post-doctoral fellow

Patrick Manning (WHC Founder)
Project consultant

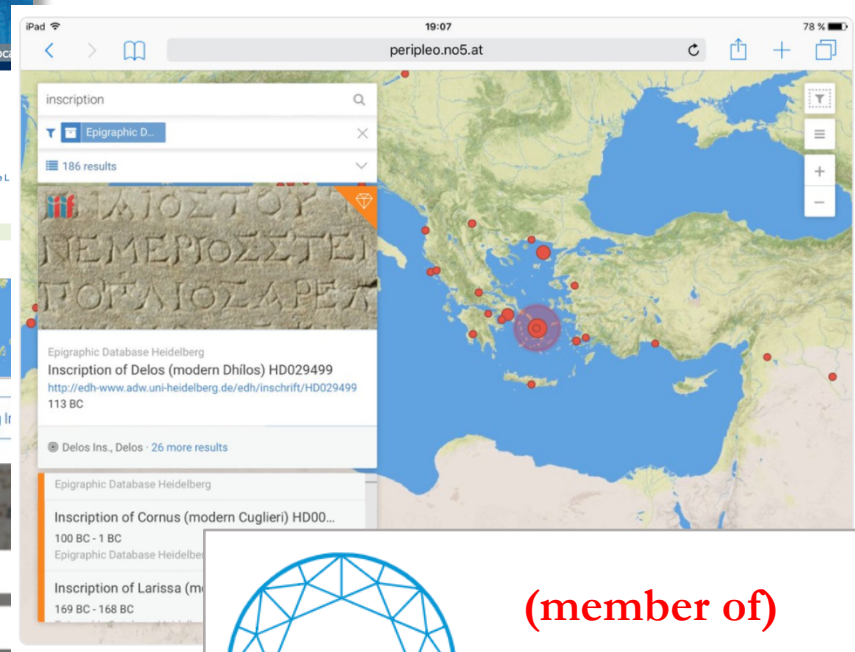
<http://whgazetteer.org>

Following on from Pelagios' **Peripleo**, which was seeded by the **Pleiades** gazetteer



<http://pleiades.stoa.org>

<http://peripleo.pelagios.org>



Recogito | AN INITIATIVE OF Pelagios

Tutorial About Log In

Semantic Annotation
without the pointy brackets

Work on texts and images. Identify and mark named entities. Use your data in other tools or connect to other data on the Web. Without the need to learn code.

<http://recogito.pelagios.org>

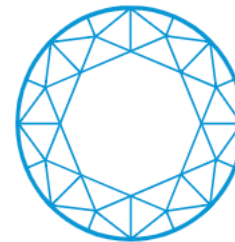
Pick a username

Your email address

Create a password

Register for Recogito

☐ Agree to our Terms and Conditions of Use and the storage of your E-Mail address.



(member of)

Pelagios
network

Aggregating contributed **place** and **trace** data

I don't go into what we mean by **traces** further here, but there is further explanation in the WHG site guide.

Place records

Records of references to place (toponyms, ethnonyms) from historical sources:

- texts of all kinds
- tabular records
- print gazetteers
- old maps



Linked Places format

Trace annotations

Records of historical entities of any kind for which setting (location at time) is of interest, annotated with IDs for relevant places @ time

- people
- events
- works



Linked Traces annotation format

settlements, administrative areas, regions, natural features, peoples, routes



World Historical Gazetteer

v1.0

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☒ Places ☐ Traces

abydos

[filters](#) ▾

SEARCH RESULTS (4)

[filter by type](#) ▾

[Abydos](#) (inhabited places) [AU] 🌐

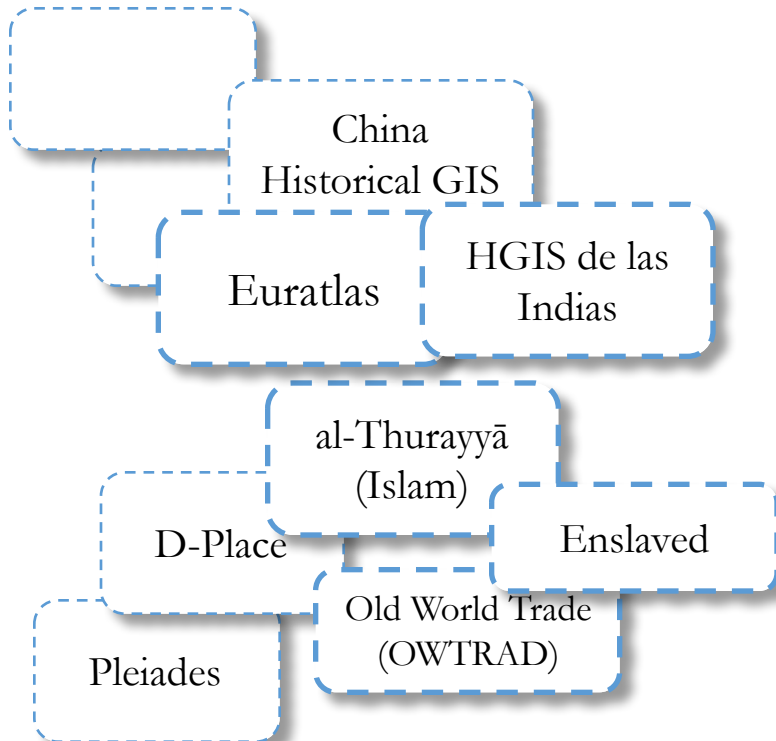
[Çanakkale](#) (deserted settlements, inhabited places, archaeological sites) [TR] 🌐
var: *Abydos; Abydos; Abydus; Abydus Asiae; Chanak; Chanaq; Dardanelles; Kale-Sultanie; ...*

[Ma'bad Abīdūs](#) (deserted settlements, cities, inhabited places, ruins, archaeological sites) [EG] 🌐
var: *Abdju; Abdou; Abedju; Abydos; Abydos; Abydus; Abydus Aegyptiae; Abīdūs; Ma'bad; ...*

[Al 'Arābā al Madfūnah](#) (ancient sites, towns, inhabited places) [EG] 🌐
var: *Al 'Arābah al Madfūnah; Araba al-Madfuna; Arabat El Madune; Arabet Abydos; El Araba El Madfuna; El 'Arāba el Madfūna; El-'Arāba el-Madfūna; العربية المدفونة; ...*



filtered search, API, private workspace, reconciliation services, contributions



Registered users with place data (individuals or project members) can upload datasets to a private “workspace,” where they are stored in a relational database.

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[+ add new](#)

My Datasets

id	name	label	created (utc)	# rows	status
725	croniken 20	croniken20_g7	21 Sep 2020, 16:19	20	reconciling
726				20	uploaded
727				20	uploaded

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Create dataset

Title

Label [?](#)

Description

Creator(s)

URI base [?](#)

Web page

Public? [?](#) ☐

initial file


File No file chosen

Format

License [CC BY 4.0](#)

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PostgreSQL


World Historical Gazetteer
v1.0
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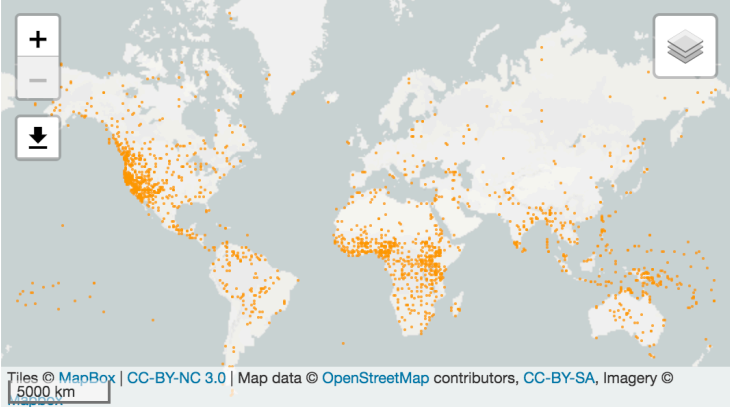
Delete dataset

count
added

Records
Unreviewed hits
Name variants
Links
Geometries

ID / label
2 / dplace
Title
D-PLACE (webpage)
URI base
https://d-place.org/society/
Description
D-PLACE (the Database of Places, Language, Culture, and Environment) contains cultural, linguistic, environmental and geographic information for over 1400 human 'societies'. A 'society' in D-PLACE represents a group of people in a particular locality, who often share a language and cultural identity. All cultural descriptions are tagged with the date to which

Public?
Dataset status
Creator
Current data file
Revision
File
File status
Uploaded
Data type
Format
License



Tiles © MapBox | CC-BY-NC 3.0 | Map data © OpenStreetMap contributors, CC-BY-SA, Imagery © Mapbox

Title: **!Kung**
Variants: Was Nyae; Kung Bushmen; !Kung (Was Nyae); !Kung;
Types: society; [cultural group](#)
Linked records: [closeMatch](#); [dbp:!Kung_people](#)

Description: The !Kung, also spelled !Xun, are a San people living in the Kalahari Desert in Namibia, Botswana and in Angola. They speak the !Kung language, noted for its extensive use of click consonants. The "K" in the name "Kung" is a click that sounds something like a cork pulled from a bottle. However, th ...

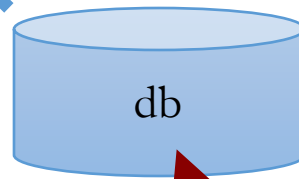
Show
10
entries
Search:

pid	src_id	title	ccodes	geom?
124653	Aa1	!Kung	BW,NA	
124654	Ab1	Herero	NA	
124655	Ad31	Duruma	KE	
124656	B296	Kuskowagmut	US	
124657	B322	Syilx	CA,US	
124658	B335	Round Lake Ojibwa	CA	
124659	B339	North Albany Ojibwa	CA	
124660	B340	Waswanipi Cree	CA	
124661	B341	Wegamon Ojibwa	CA	
124662	B350	Mountain Dene	CA	

Showing 1 to 10 of 1,428 entries
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Next

They can view and manage their datasets... which principally involves reconciling their data against the Getty TGN, Wikidata, and ultimately the WHG index itself...

Getty TGN



Wikidata

DBpedia

GeoNames

You reconcile to augment your data with geometry and concordances – identifiers from TGN and in the case of Wikidata, several other “authorities”

yes → +links +geometry

skos:closeMatch?

Augmenting by Reconciliation

World Historical Gazetteer

Reconciliation Review: mydataset01 > tgn

Undo last save Save < first previous Record 9 of 9

Villa San Carlos

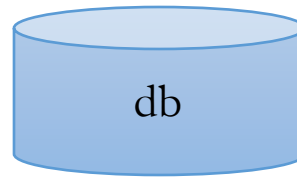
WHG place id: 6503539
Source id: 9000720
Name variants: Villa de San Carlos; San Carlos;
Modern countries: Argentina (Argentina);
Place type(s): Poblacion (village);

Titles/Preferred: San Carlos
TGN ID: 1019985
Variants: San Carlos
Types: l'inhabited
Parents: Salta > Argentina > South America > World

Titles/Preferred: San Carlos
TGN ID: 1136458
Variants: San Carlos;
Types: l'inhabited places (aat:3000083477)
Parents: Corrientes > Argentina > South America > World

Titles/Preferred: San Carlos
TGN ID: 1136459
Variants: San Carlos;
Types: l'inhabited places (aat:3000083477)
Parents: Mendoza > Argentina > South America > World

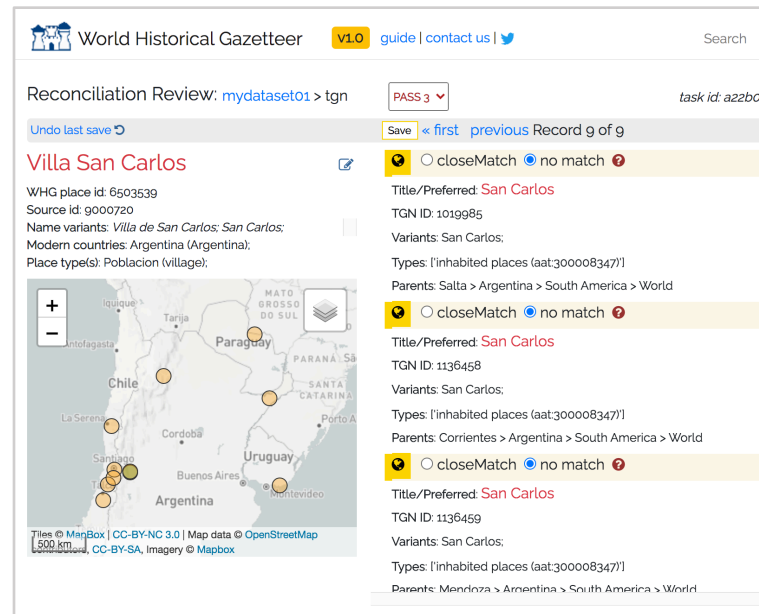
The accessioning step involves adding data to the WHG index (now rich with as much geometry and as many authority ID matches as possible)



yes → child

no → new record

skos:closeMatch?



Accessioning
to
WHG index



Istanbul

Attestations

Istanbul [pid: [227537](#); dataset: [gn500](#)]



Variants: *Bizanc*; *Bizânc*; *Byzantion*; *Byzantium*; *Byzanz*; *Constantinoble*; *Constantinopla*; *Constantinople*; *Constantinopolen*; *Constantinopoli*; *Constantinopolis*; *Costantinopoli*; *Estambul*; *IST*; *Istamboul*;

Types: *populated place*

Links: *none* [loc:n79034985](#) [tgn:7002473](#) [viaf:135931454](#) [tgn:7002473](#)
[wd:Q406](#)

İstanbul [pid: [5991423](#); dataset: [tgn_filtered_01](#)]



Variants: *Byzantion*; *Byzantium*; *Constantinople*; *Constantinopoli*; *Constantinopolis*; *Costantinopoli*; *Estambul*; *Istamboul*; *Istambul*; *Istanbul*; *Konstantinopel*; *Konstantinoupolis*; *Kustantiniyah*; *Mikligard*; *New Rome*;

Types: *inhabited place*; *port*; *city*; *religious center*

Links: *none*

Related: *Within Istanbul, Türkiye, Asia, World*

Istanbul [pid: [85196](#); dataset: [black](#)]



Variants: *Byzantium*; *Istanbul*

Types: *settlement*

Links: [dbp:Istanbul](#) [gn:745042](#) [gn:745044](#) [loc:n79034985](#) [tgn:7002473](#)
[viaf:135931454](#) [wd:Q406](#)

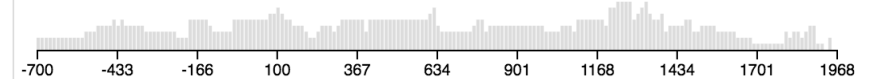
Temporal: [1947, 1968] | [1945, 1952] | [1914, 1918] | [1939, 1942] | [1942, 1945]

Constantinople [pid: [83140](#); dataset: [black](#)]



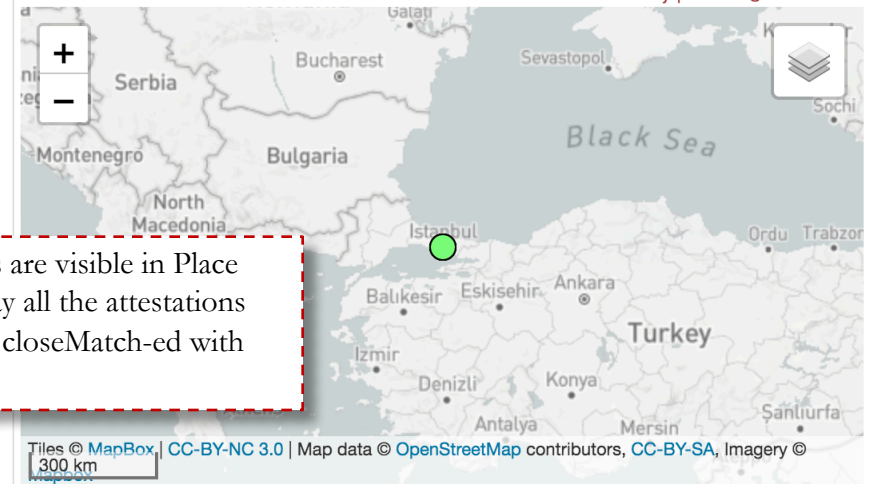
The results of these steps are visible in Place Portal pages, which display all the attestations of a place that have been closeMatch-ed with each other.

TEMPORAL ATTESTATIONS



GEOGRAPHY

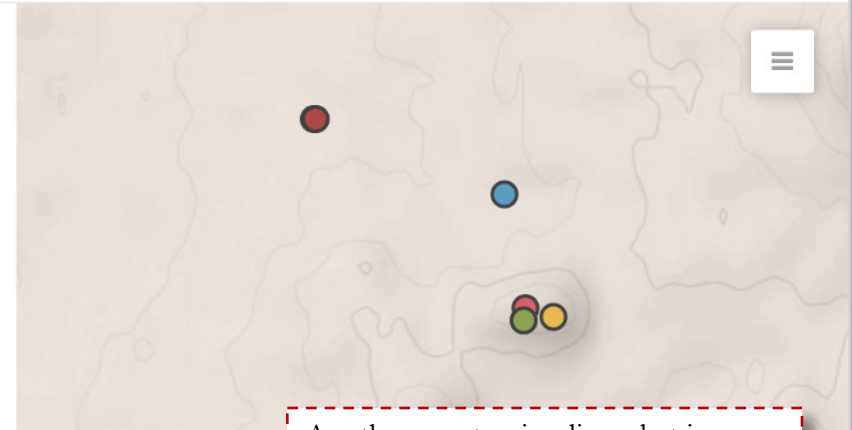
nearby places (300 max) ☐



TRACES (related persons, events, works, objects)

- person ['deathplace_of (0565-11-14)']:
[Justinian](#)
- event ['waypoint (1147/1149)']:
[show trace places](#)
[Second Crusade \(Louis VII of France\)](#)

X



<http://nomisma.org/id/athens>

This visualization is from Peripleo, the architecture of which is almost the same as WHG

spatial@ucsb, 27 Oct 2020

archaeology

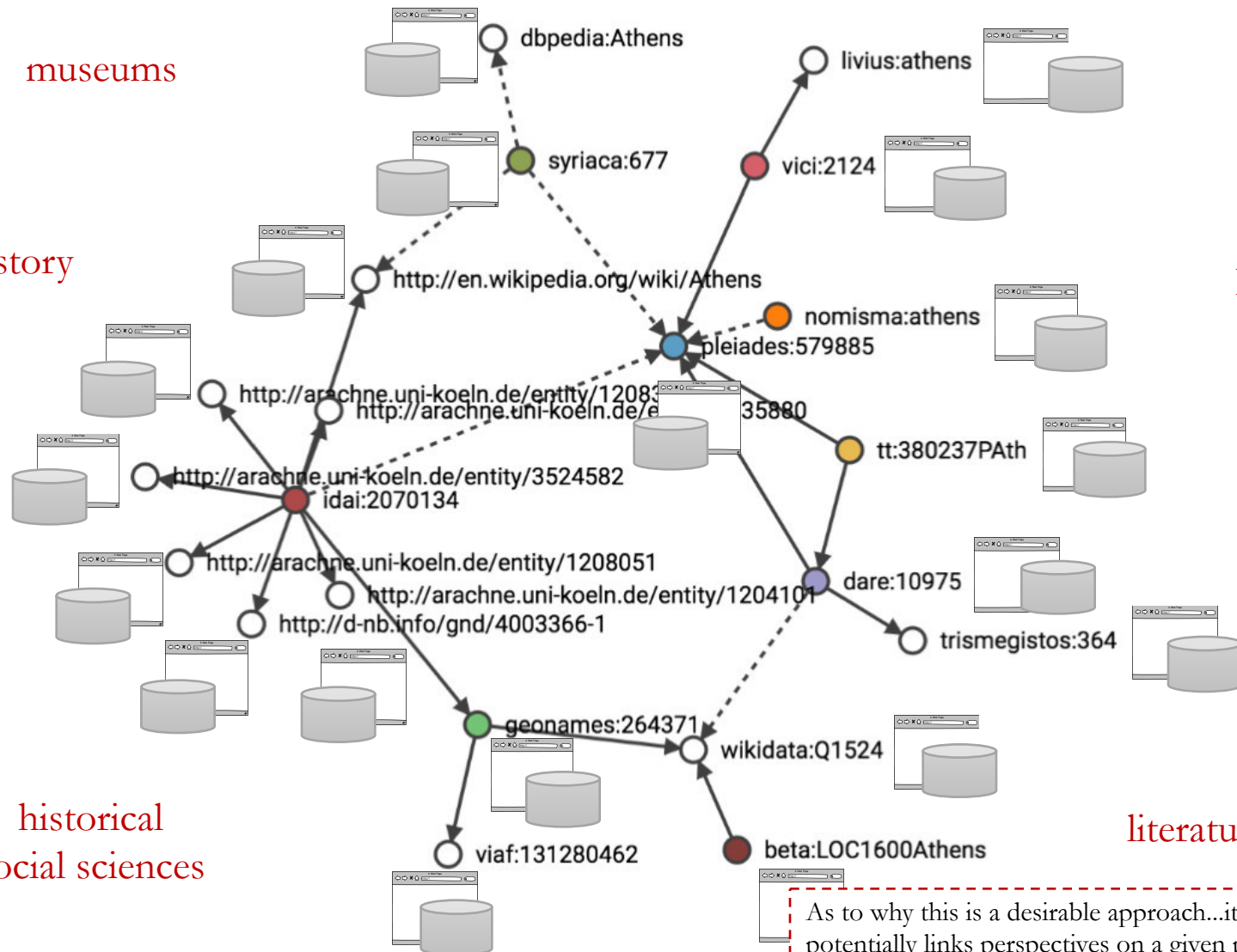
museums

art history

history

historical
social sciences

literature



As to why this is a desirable approach...it potentially links perspectives on a given place from many fields

Linked Places

A model and a format

The properties of place derived from existing data exemplars. name(s), type(s), when, and location(s) serve to uniquely identify a place, AS ASSERTED BY A HUMAN!

Immediate concern was, what format for ingest?

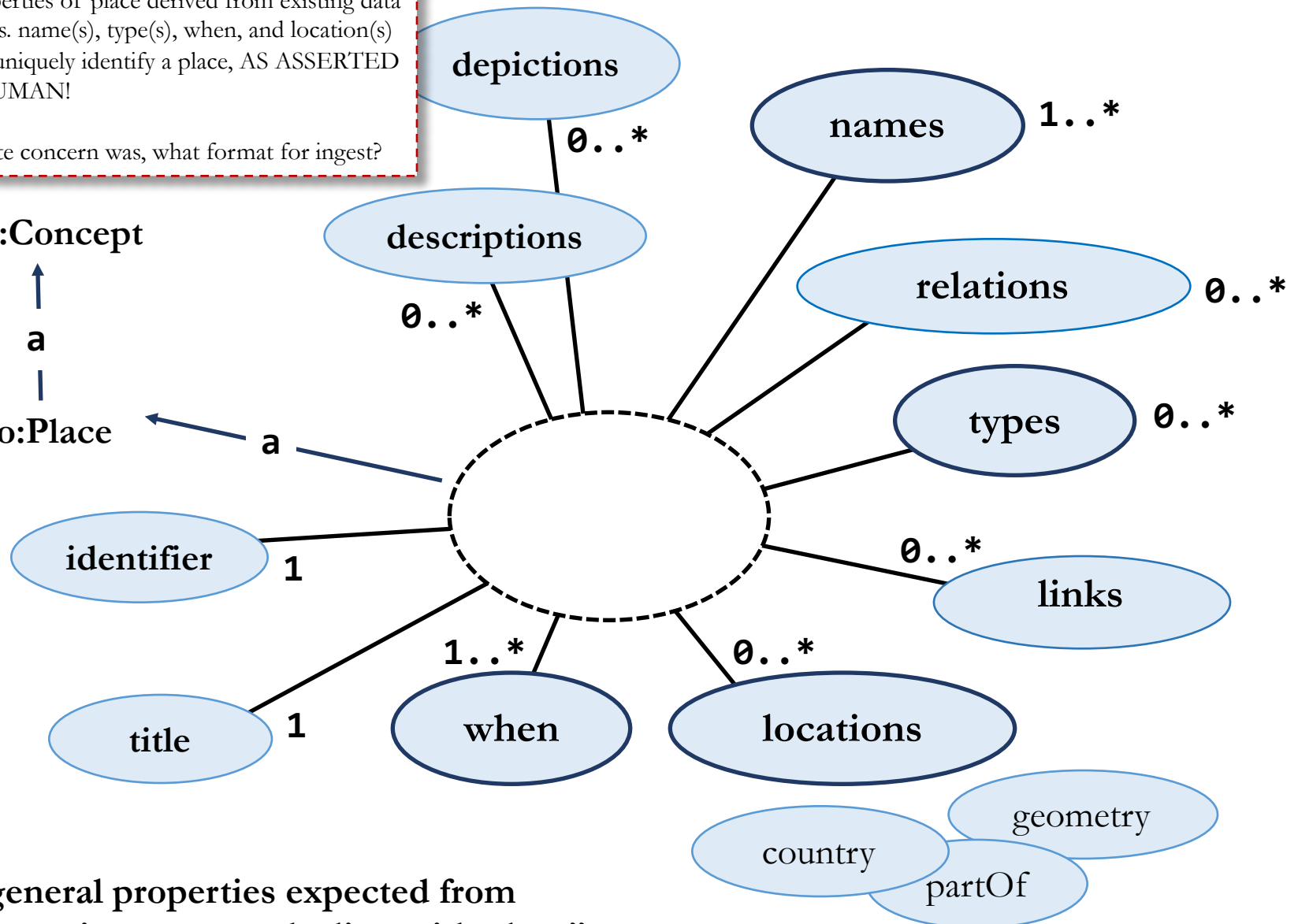
skos:Concept



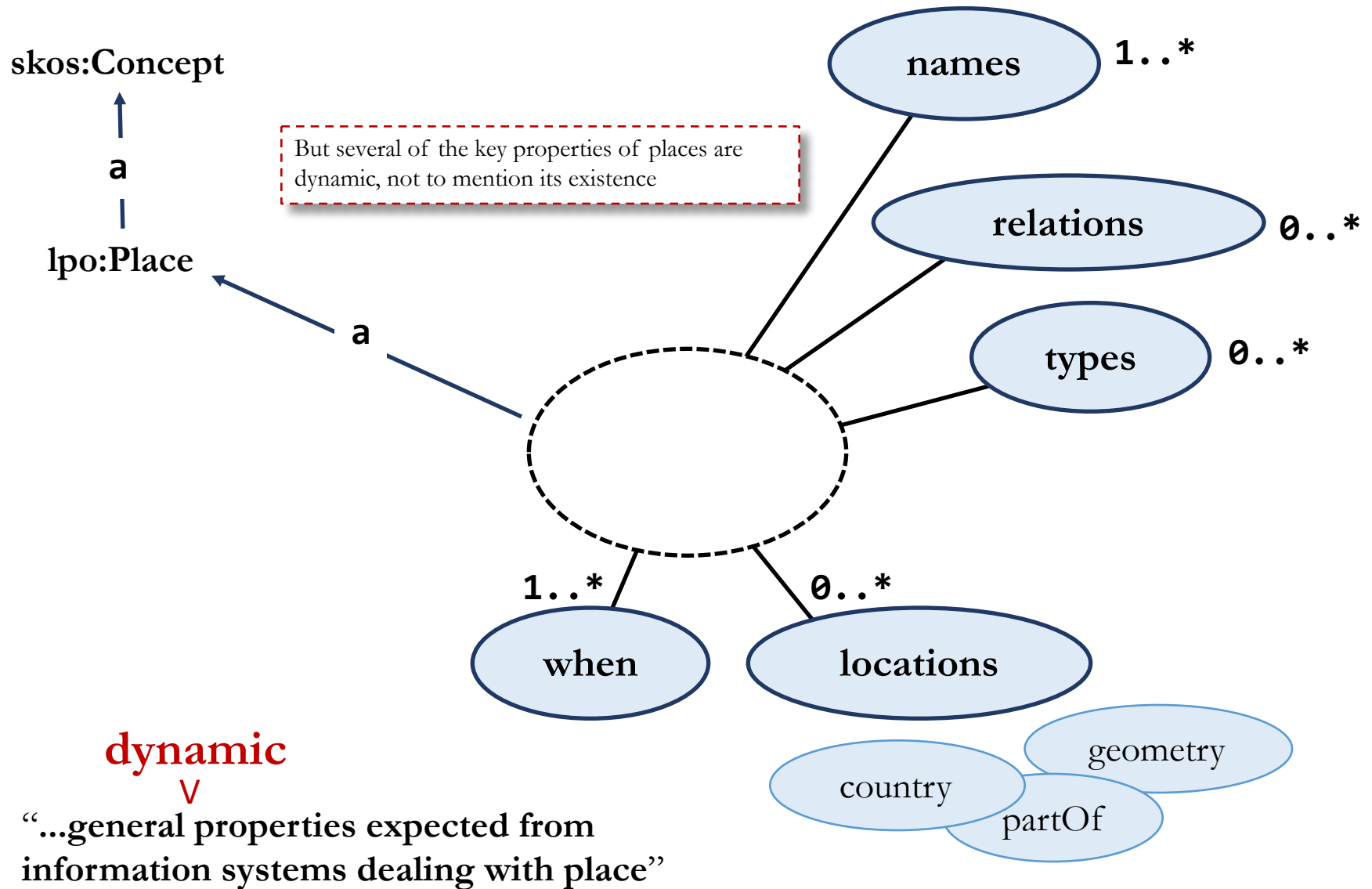
a

lpo:Place

a

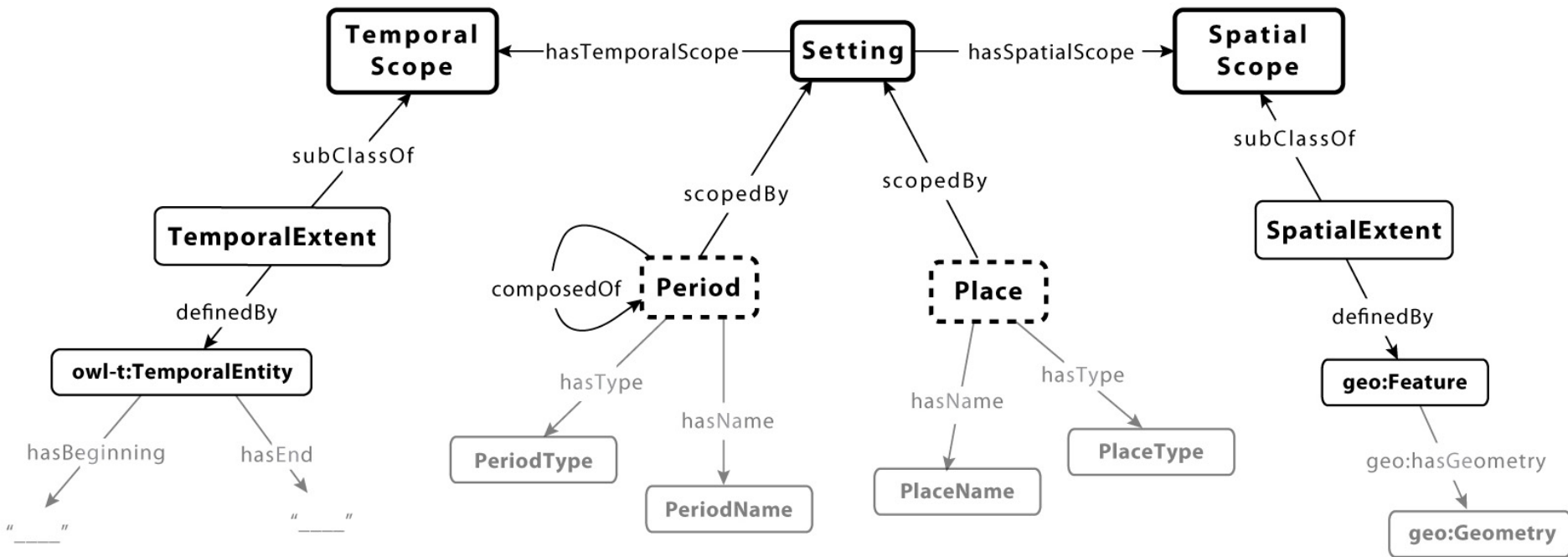


“...general properties expected from information systems dealing with place”



Setting pattern

A few years before the WHG project began, I did some work with Krzysztof Janowicz and Carsten Keßler, developing an ontology design pattern for setting, reflecting the fact that both places and historical periods have spatial and temporal scopes and extents. Trying to model the way that the answer to where is often “here, then” and the answer to when can be “then, here”



K. Grossner, K. Janowicz & C. Keßler (2014)

Place, Period and Setting for Linked Data Gazetteers

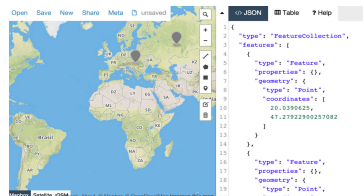
in Berman, Southall, Mostern (Eds.) *Placing Names*

GEOJSON

<https://geojson.org/>

I needed a data format to join space and time – why start from scratch? GeoJSON is very widely used for web mapping applications.

“GeoJSON is a format for encoding a variety of geographic data structures.



geojson.io



```
{ "type": "FeatureCollection",  
  "features": [  
    {  
      "type": "Feature",  
      "properties": { },  
      "geometry": { },  
    },  
    ...  
  ]  
}
```

GeoJSON models Features in FeatureCollections, with only three required properties: type, geometry, and properties. Properties is free-form, intentionally. Geometry is further specified. New elements can be added, with some restrictions, called “foreign members.”

GeoJSON


```
{ "type": "FeatureCollection",  
  "features": [  
    {  
      "type": "Feature",  
      "properties": {  
        "when": {  
          "geometry": {  
            },  
          },  
        },  
      },  
    ],  
  }  
}
```

So why not add “when” – at the level of the entire feature. In 2017 I began drafting a GeoJSON-T spec. It is still draft and provisional, though it has been getting more attention and traction recently.

GeoJSON-T

```

{ "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": { },
      "when": { },
      "geometry": {
        "type": "GeometryCollection",
        "geometries": [{
          "type": "MultiPolygon",
          "properties": { },
          "coordinates": [ ],
          "when": { }
        }]
      }, ... ]
    }
  ]
}

```

And if the geometry is itself a collection of geometries, why not allow a “when” for each?

GeoJSON-T

```
"when": {  
  "timespans": [  
    {  
      "start": { "in": "nnnn-nn" },  
      "end": {  
        "earliest": "-nnnn",  
        "latest": "nnnn-nn-nn"  
      },  
    }  
  ],  
  "periods": [  
    {  
      "name": "Hellenistic Period",  
      "uri": "http://n2t.net/ark:/99152/p0mn2ndq6bv"  
    }  
  ],  
  "duration": "P100Y",  
  "follows": "http://mygaz.org/p_00123",  
  "label": "for a century in the Hellenistic period"  
}
```

I then proposed some standard properties of “when” objects: timespans, named periods, duration, follows for sequences, and a label

<https://github.com/kgeographer/geojson-t>

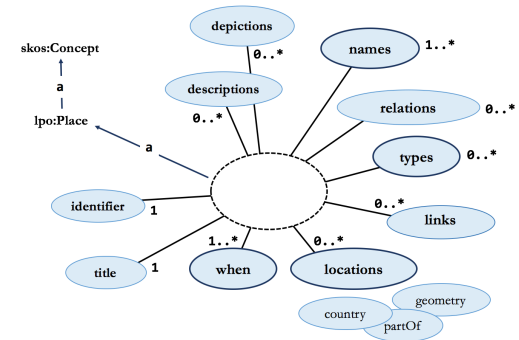
GeoJSON-T

```

{
  "type": "FeatureCollection"
  "@context": http://linkedpasts.org/lp-context.jsonld,
  "features": [
    {
      "type": "Feature",
      "properties": { "id": " ", "title": " " },
      "geometry": { ..., "when": { } },
      "when": { },
      "names": [{ ..., "when": { } }],
      "types": [{ ..., "when": { } }],
      "relations": [{ ..., "when": { } }],
      "links": [{ }],
      "descriptions": [{ }],
      "depictions": [{ }],
    }, ...
  ]
}





```




When it came time to develop a standard contribution data format for WHG, I extended GeoJSON-T, and threw in JSON-LD compatability to make it RDF. You can see *optional* “when” objects can be used to temporally scope an entire feature, singleton geometries or collections, names, types, and relations with other places.


















Linked Places


<https://github.com/LinkedPasts/linked-places>

 Search or jump to...  Pull requests Issues Marketplace Explore  + 

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<> Code  Issues 16  Pull requests  Actions  Projects  Wiki  Security  Insights ...

 master  1 branch  0 tags  Go to file  Add file  Code  About 

README.md 

The Linked Places format (LPF)

v1.1, 9 May 2019

NOTES (14 Jul 2019)

- An **alternative TSV-format** will be supported by World-Historical Gazetteer, appropriate for relatively simple place records, e.g. those without temporally scoped names, geometries, etc., and without multiple name variants including citations.
- LPF v1.1 is implemented in current versions of World-Historical Gazetteer and Pelagios projects, including Recogito. There is a need to make improvements in a Version 2 and to develop/write the underlying ontology. Please consider joining a small working group in that effort.

Linked Places format is in use for WHG and for Pelagios projects, and is specified in a github repo README file

"@context": <http://linkedpasts.org/lp-context.jsonld>,

```
{
  "@context": {
    "id": "@id",
    "type": "@type",
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",

    "lpo": "http://linkedpasts.org/ontology/lpo_latest.ttl#",
    "lawd": "http://lawd.info/ontology/",
    "gvp": "http://vocab.getty.edu/ontology#",
    "aat": "http://vocab.getty.edu/aat/",
    "tgn": "http://vocab.getty.edu/tgn/",
    "crm": "http://erlangen-crm.org/current/",
```

```
    "features": {
      "@id": "lpo:hasFeature",
      "@type": "geojson:Feature",
      "@container": "@set"
    },
    "properties": "geojson:properties",

    "geometry": "geojson-t:geometry",
    "geometries": {
      "@id": "lpo:setting",
      "@type": "lpo:Setting",
      "@container": "@set"
    },
    "geo_wkt": "http://www.opengis.net/ont/geosparql#asWKT",
    "periodo": "http://n2t.net/ark:/99152/#",
    "ccode": { "@id": "gn:countryCode" },

    "when": { "@id": "lpo:when" },
    "timespans": {
      "@id": "lpo:timespan",
```

"lpo": "http://linkedpasts.org/lpo_latest.ttl"

There is a draft context file, which refers to a Linked Pasts Ontology (lpo:)...

lpo: <http://linkedpasts.org/ontology#>

```
## LPO version 1.1. Richard Light, started 13 March 2020
```

```
@prefix lpo: <http://linkedpasts.org/ontology#>.
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>.
@prefix owl: <http://www.w3.org/2002/07/owl#>.
@prefix skos: <http://www.w3.org/2004/02/skos/core#>.
@prefix time: <http://www.w3.org/2006/time#>.
@prefix xml: <http://www.w3.org/XML/1998/namespace>.
@prefix xsd: <http://www.w3.org/2001/XMLSchema#>.
```

```
lpo:when a owl:FunctionalProperty ;
  rdfs:range lpo:Timespan ;
  rdfs:comment "Relates an instance of an entity or
for a period of time it existed or was valid. For
association with a particular name, its spatial lo
place. That TemporalScope could be metric (a time:
defining a named historical period (e.g. a Period0
```

```
lpo:timespan a owl:ObjectProperty ;
  rdfs:range lpo:Timespan .
```

```
lpo:has_start a owl:ObjectProperty ;
  rdfs:subPropertyOf time:intervalStartedBy ;
  rdfs:domain lpo:Timespan ;
  rdfs:range time:ProperInterval ;
  rdfs:comment "" .
```

The Linked Pasts Ontology is essentially aspirational at this point. I realized as this process went along that the order of development was unusual, or unorthodox, or both. There is a format in use to describe places, which has an underlying formal model that has not yet been committed to valid RDF. I'm not sure what to make of that – except that the model works, and that the ontology will eventually be recorded properly. We (Rainer Simon and I) know what we mean by the terms we've adopted, but haven't yet formalized their semantics.

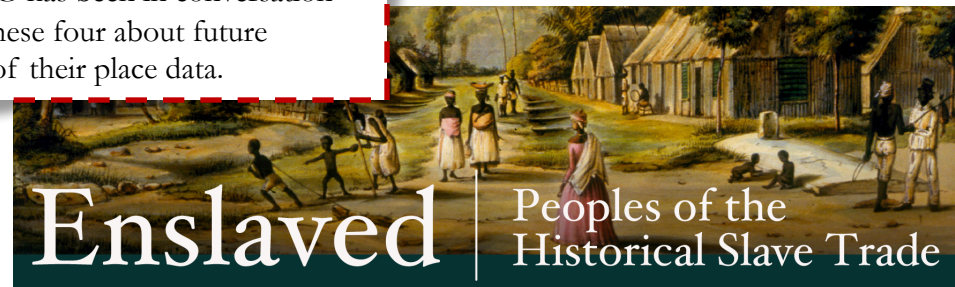
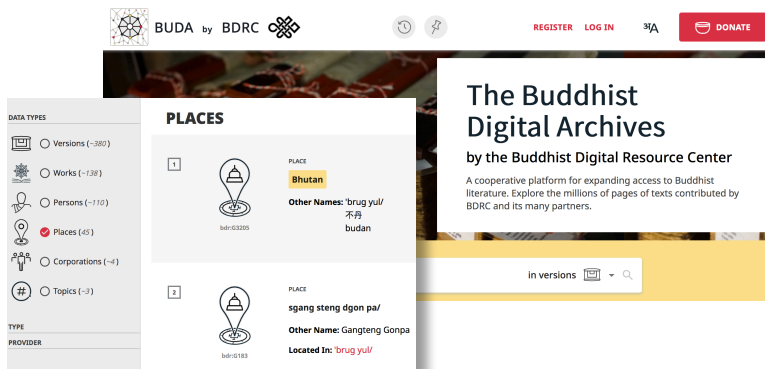


A world map visualization showing the distribution of historical gazetteer data. The map is covered with numerous small, colored dots (yellow, green, blue, purple, brown) representing individual places. Overlaid on the map are several thick, colored lines (blue, purple, brown) that trace paths across the continents, likely representing major trade routes or historical migration patterns. The word "Next" is written in a large, black, serif font on the left side of the map.

Next



There are several aggregators of historical data devoted to particular domains. These data include places, but also typically people and texts. WHG has been in conversation with each of these four about future contributions of their place data.



- Biographies of the Enslaved (Henry Louis Gates and Steven Niven) [View project data](#)
- Free Black Database (Brian Mitchell) [View project data](#) | [View this journal data article](#)
- Legacies of British Slave-ownership (Keith McClelland) [View project data](#)
- Louisiana Slave Database (Gwendolyn Midlo-Hall) [View project data](#) | [View this journal data article](#)
- Maranhão Inventories Slave Database (Walter Hawthorne) [View project data](#) | [View this journal data article](#)
- Voyages: The Trans-Atlantic Slave Trade Database (David Eltis) [View project data](#)

A Emerging Linked Pasts Network

One place that groups like these meet is the Linked Pasts symposium, now in its sixth year.

Linked Pasts I London

Linked Pasts II Madrid

Linked Pasts III Stanford, CA

Linked Pasts IV Mainz

Linked Pasts V Bordeaux

Linked Pasts VI: London (virtual 2-16 Dec 2020)

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<https://ics.sas.ac.uk/events/event/22792>



Start a huge, foolish project
Like Noah

– Rumi

A poet's directive I have always taken to heart.

Note that not all huge projects are foolish!

<http://whgazetteer.org>

<https://github.com/LinkedPasts/linked-places>

<https://github.com/kgeographer/geojson-t>

@WHGazetteer

@kgeographer



karl@kgeographer.org