

DIY Cartography: Networks: Nodes, Links, Relationships

ADN592/ARC590: DIY Cartography
March 02, 2016

“The change in focus from **attribute data** to **relational data** dramatically affects how data are collected, represented and analyzed.”



Graphic Diagrams showing the relative Mortality and the mean temperature in each week of the 11 Years 1840-50. The distance between each circle represents either 100 deaths from 100. Besides these circles which serve for a scale there are two others. The one running outside the yellow colour and inside the black; the other outside

the blue and inside the red colour) represent respectively the average weekly deaths of the ten Years 1840-49 corrected for increase of Population and the mean temperature of the ten Years 1840-49. The inner irregular line the Mean temperature in each week of the year. The black colour denotes the extent by which the weekly

deaths exceed the average (Excessive Mortality), and the yellow colour denotes the extent by which the weekly deaths are below the average (Deficiency). The red colour denotes the extent by which the mean weekly temperature is above the mean temperature of the 10-year Mean. In the year 1846 the number of deaths registered in the 25th week was 365, the

average weekly number for the 10 years was 1020 the deaths were therefore 212 below the average, which difference is shown by the width of the yellow colour. The mean temperature for the same week was 69° 5, while the average mean for the 10 years was only 48° 4, so that the mean temperature of that week was 21° above the average mean, which excess is shown by the width of the red colour.

William Farr, Report on the Mortality of Cholera in England, 1848-49 (1852)

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Relevée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 23 Octobre. Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilow et un régiment vers Orscha et Witebsk, avaient toujours marché avec l'armée.

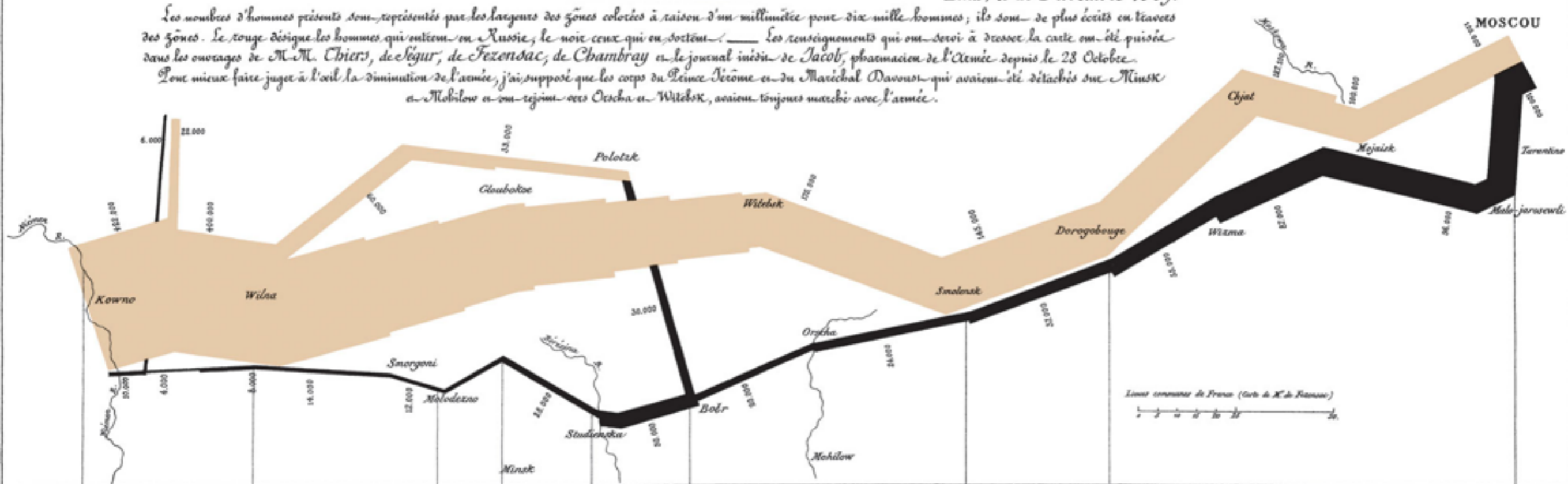
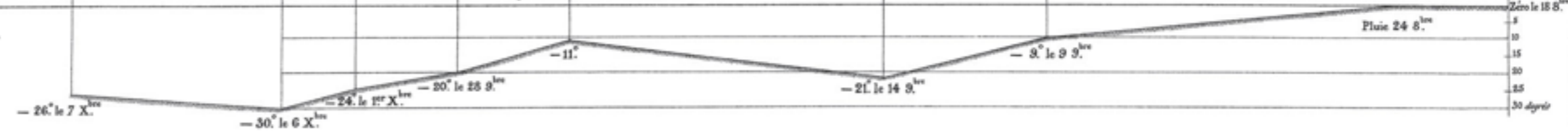


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niemen gelé.

Antiq. par Regnier, 1. Par. 5^e Marie St O^{me} à Paris.

Imp. Lith. Regnier et Desvres.

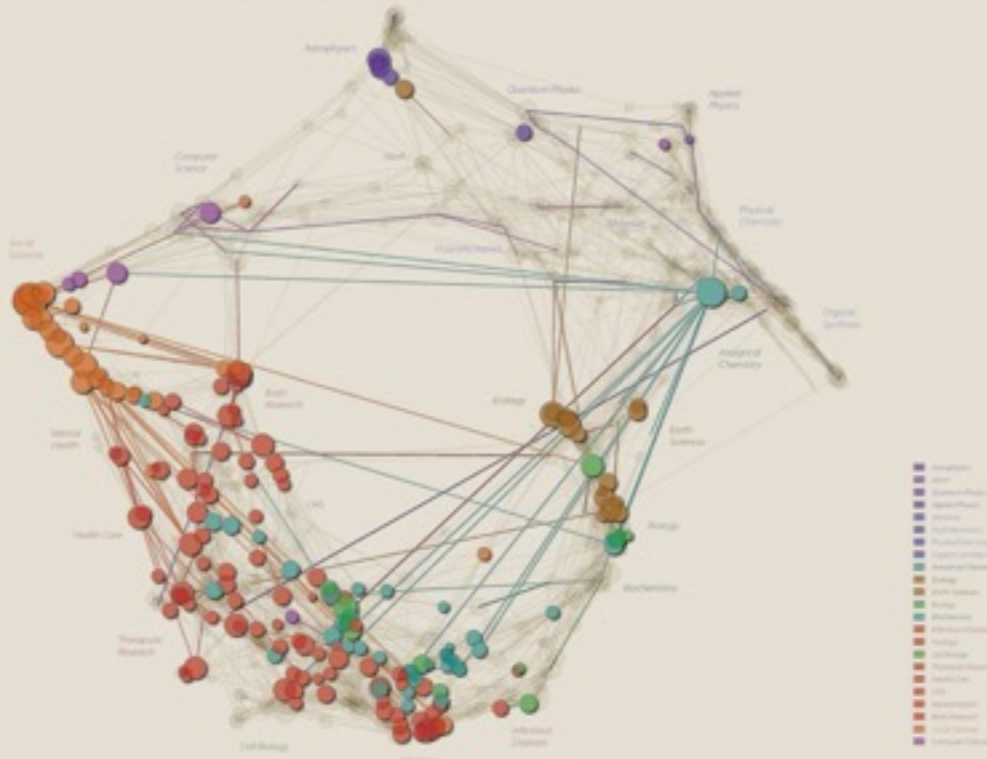
THE STRENGTHS OF NATIONS

This network diagram represents areas of science comparing colored overlays can help us understand how different nations emphasize different topics. Each circular node represents scientific publications exploring a particular topic, more accurately called a paradigm. There are 776 high-level paradigms distributed in a single five-dimensional space, including those that concern physics (or approximately 100), Chemistry (200), Biology (the term for the interdisciplinary of Organic Chemistry and Biochemistry), Earth Sciences and Biology (100), an interesting span of Interdisciplinary (from 400 to 600), linking Chemistry to Medicine from 500 to 600, the Social Sciences (100) and Applied Math (including Computer Science, at 1000). Edges linking nodes represent scientific publications that explore more than one topic.

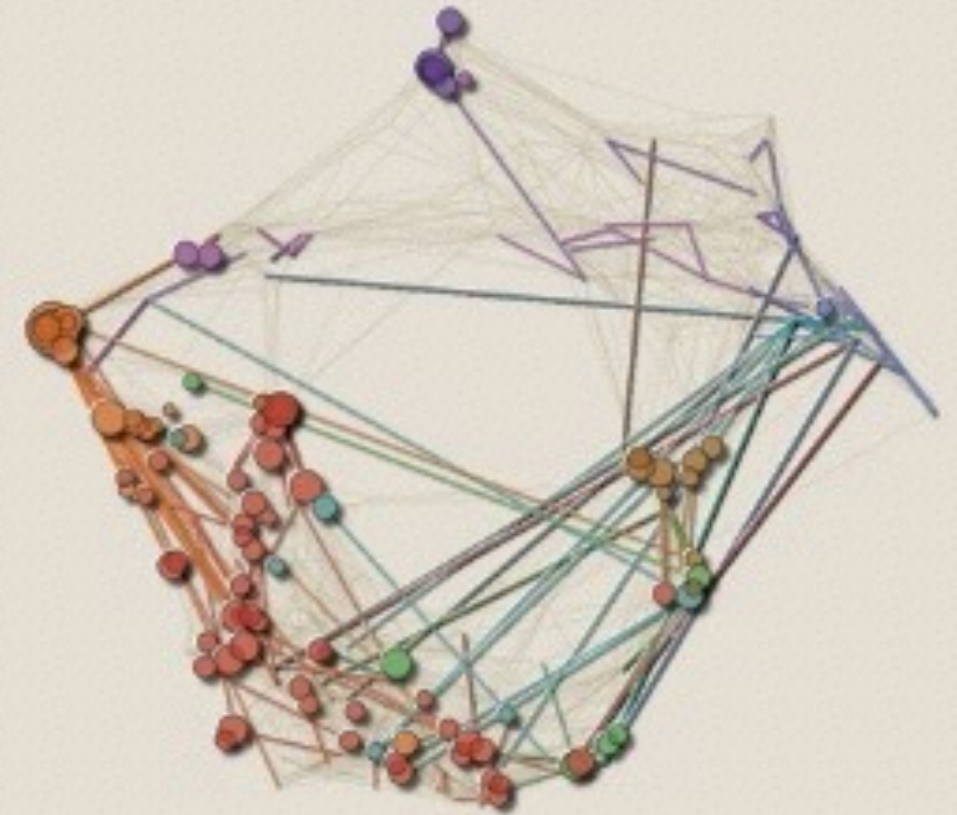
A nation's emphasis in specific areas of science is represented by the highlighted nodes and edges. Nodes and edges are only highlighted if a nation publishes significantly more in the area than expected. For example, the United States tends to publish significant numbers of papers in the social sciences and the medical sciences from 400 to 600 and in areas of agricultural science (the band of nodes around 400). There is also an exceptionally strong node on the far right (in chemistry, colored light red because its main concern is biochemistry) which represents papers dealing with work that interests basic research in chemistry for use in the more applied areas of medicine.

Nations that emphasize interdisciplinary work will have more weight on long edges linking topics that are more distant from one another. The diagram below suggests that the large biochemistry node is a center of interdisciplinary research. This node contains papers that discuss many of the recent methods for drug development, e.g., genomics and stem cells. Chemistry, the U.S. does not show an exceptional level of interdisciplinary research there is a noticeable lack of interdisciplinary research in math, engineering and the physical sciences. Interestingly, there is an equally noticeable tendency for interdisciplinary research between medicine and the social sciences—especially dealing with issues of mental health.

The United States of America



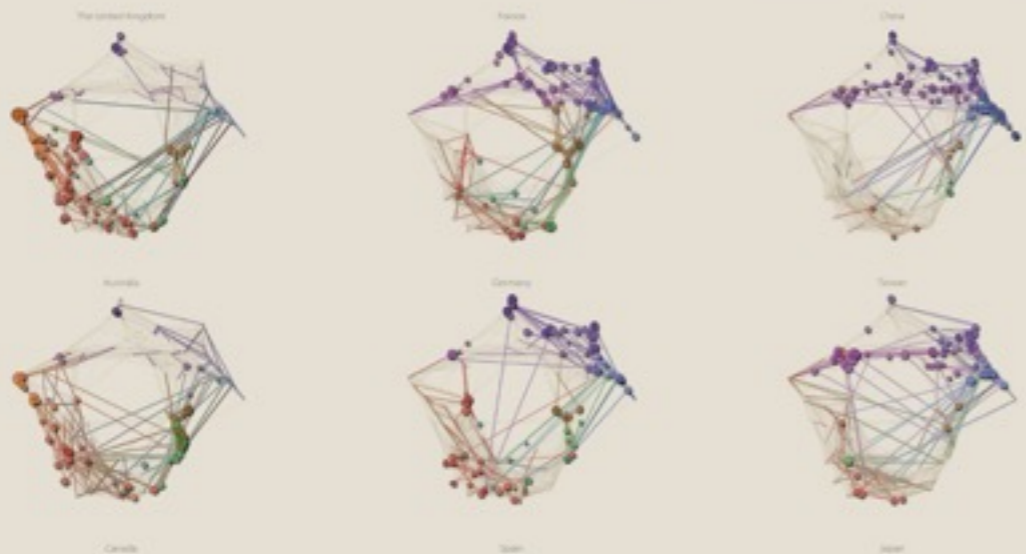
The United Kingdom



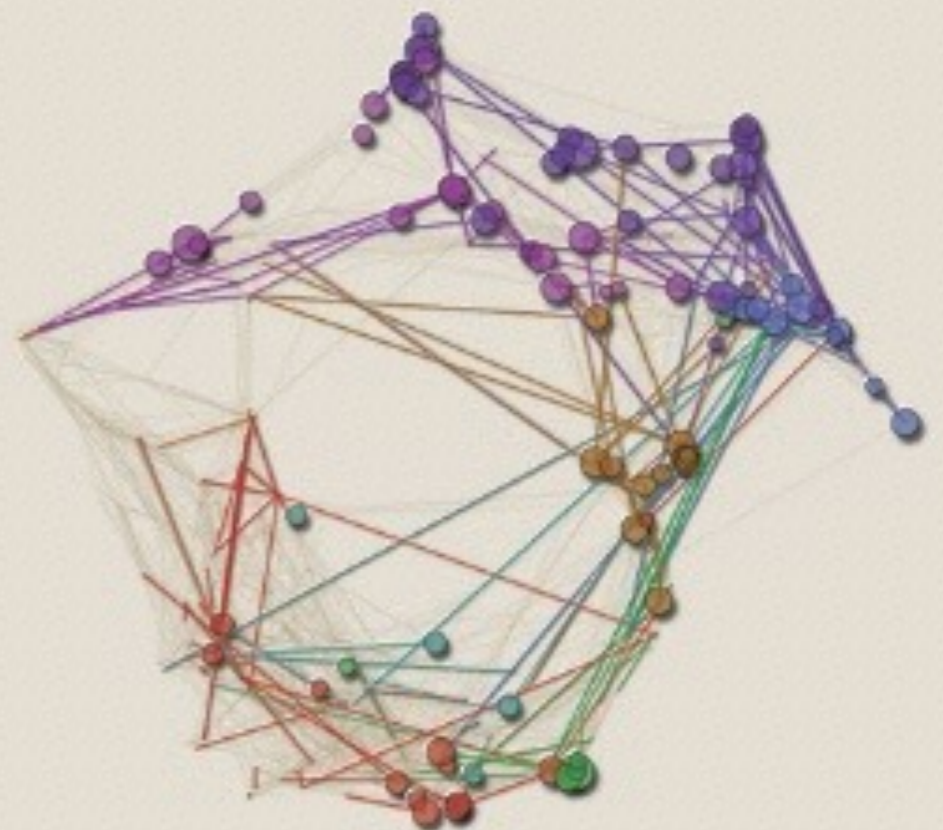
The nations most similar to the United States are The United Kingdom, Australia and Canada. There are differences, though. The UK has an even greater emphasis on the network spanning social sciences and mental health. Australia has more emphasis on biology, and Canada is relatively distant from all these with its research primary pattern and strength in computer science.

The two European nations with the most scientific publications France and Germany lead in genetics and chemistry. French network emphasizes engineering applications (the band of nodes that are close to the center of the diagram). Germany emphasizes the more theoretical aspects of chemistry and physics (the nodes that tend to be further from the center). Spain, on the other hand, focuses on science that links to agriculture (the band of nodes from 500 to 600). Each European nation has distinct profiles that represent their unique scientific strengths.

The two Pacific rim nations with the most scientific profiles are China and Taiwan. Both strongly address applied mathematics from computer sciences on the left towards engineering and applied physics on the right. Japan explores the middle of area (lower left) and physical chemistry (the band of nodes on the upper right). There is a great deal of interdisciplinary work within these two broad areas, but relatively few edges spanning these areas—the very area that the U.S. works to be together.



France



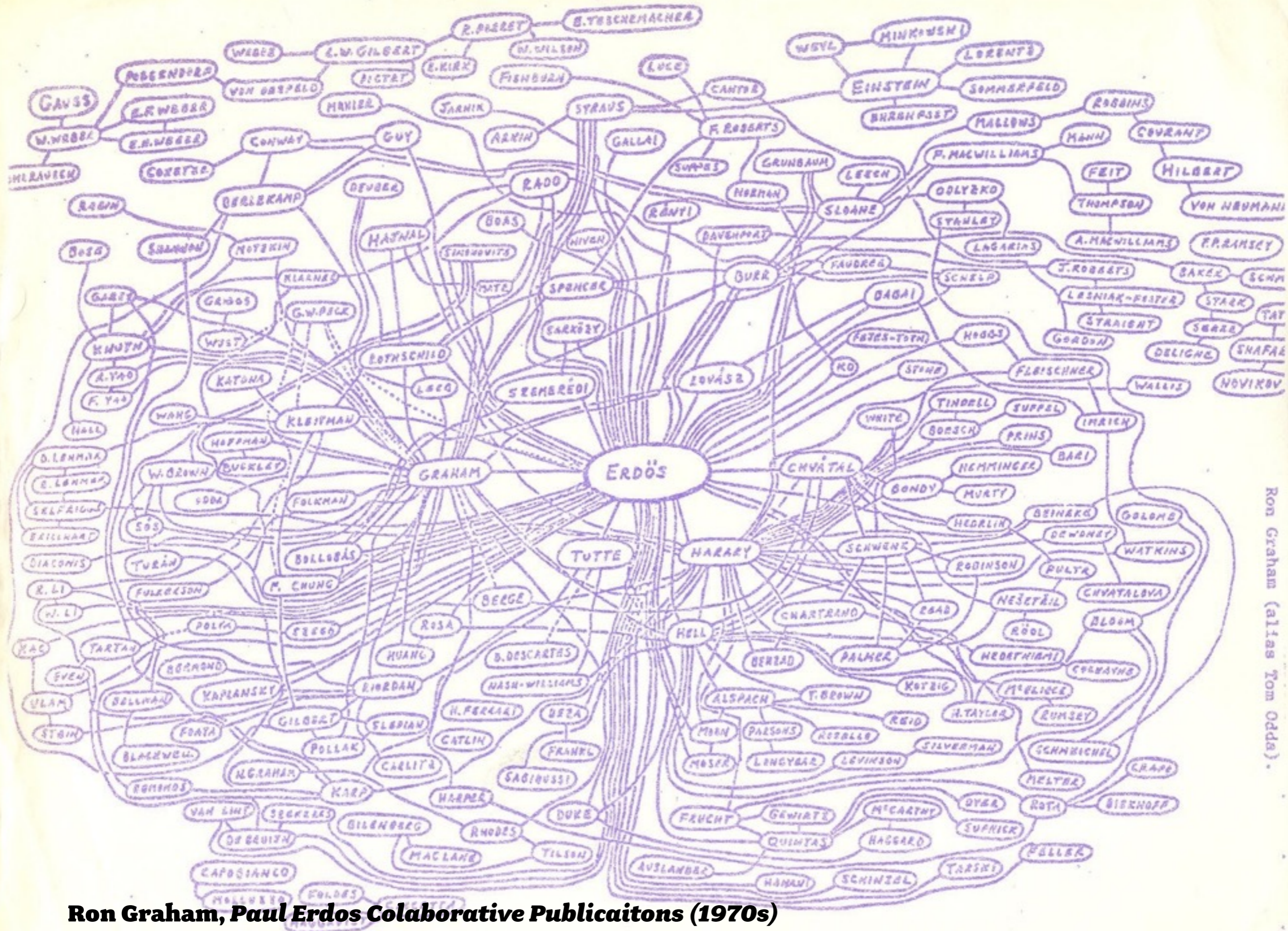
Kevin Boyack, Dick Klavans, W. Bradford Paley
Strength of Nations (2006)

Networks are made up of:

—**Nodes:** Uni-Modal or Multi-Modal

Affiliation Network (p49): Connecting across sets but not within them.

—**Links:** Undirected or Directed;
Weighted and unweighted.

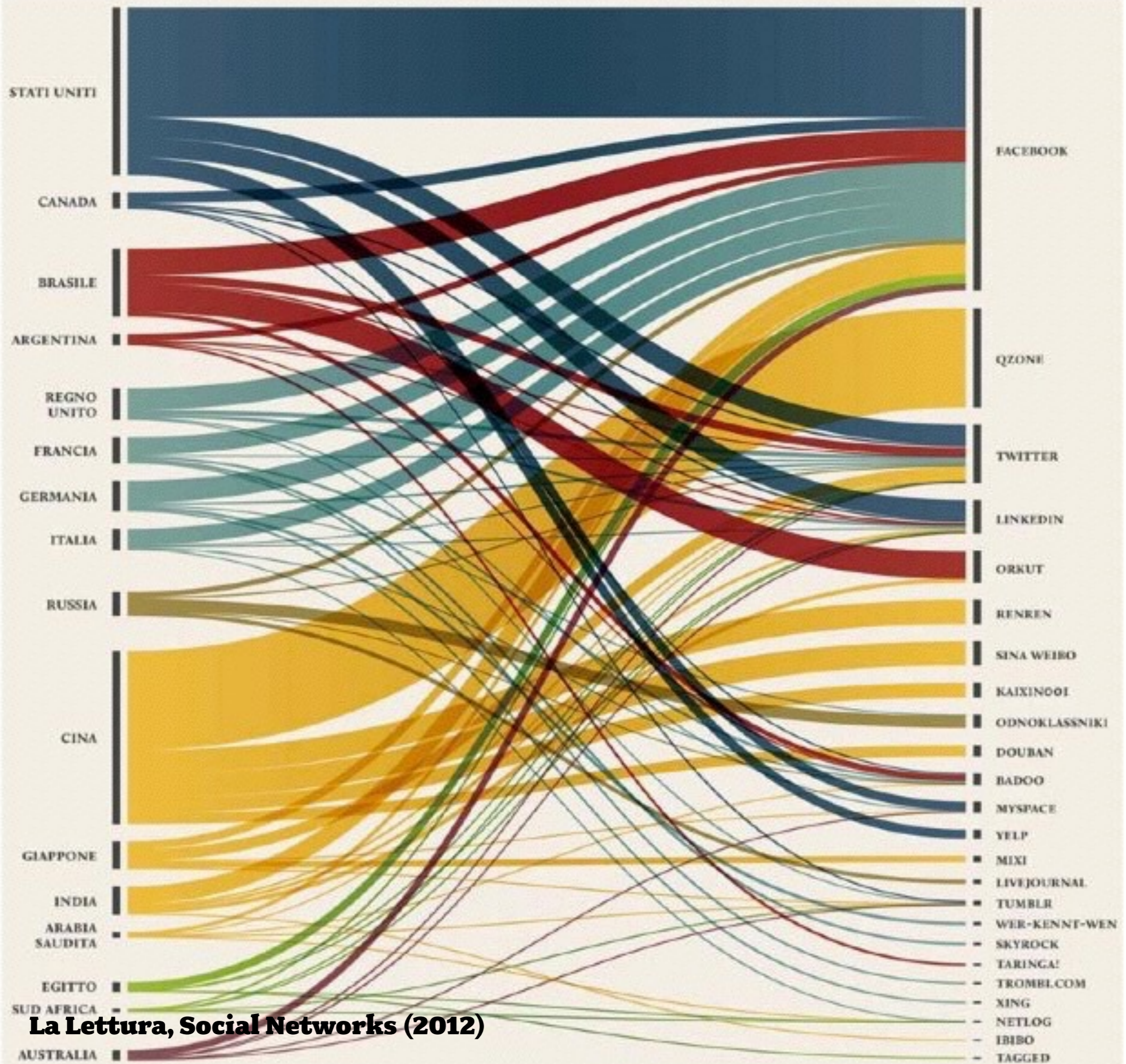


Ron Graham (Atlas Tom Odde).

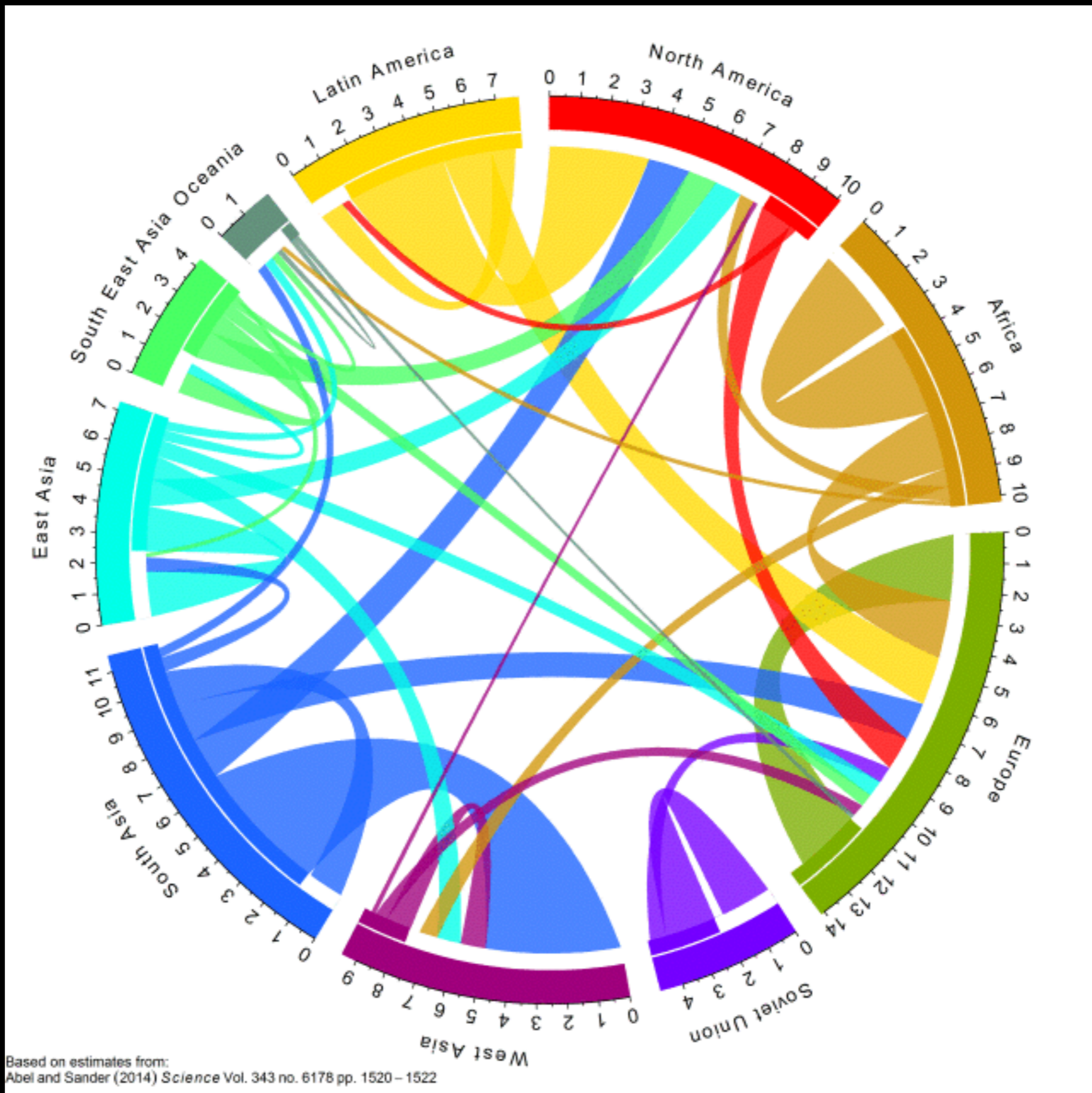
Ron Graham, Paul Erdos Colaborative Publicaitons (1970s)



Figure 1
 To appear in Topics in Graph Theory (F. Harary, ed.) New York Academy of Sciences (1979).



La Lettura, Social Networks (2012)



Based on estimates from:
 Abel and Sander (2014) *Science* Vol. 343 no. 6178 pp. 1520–1522

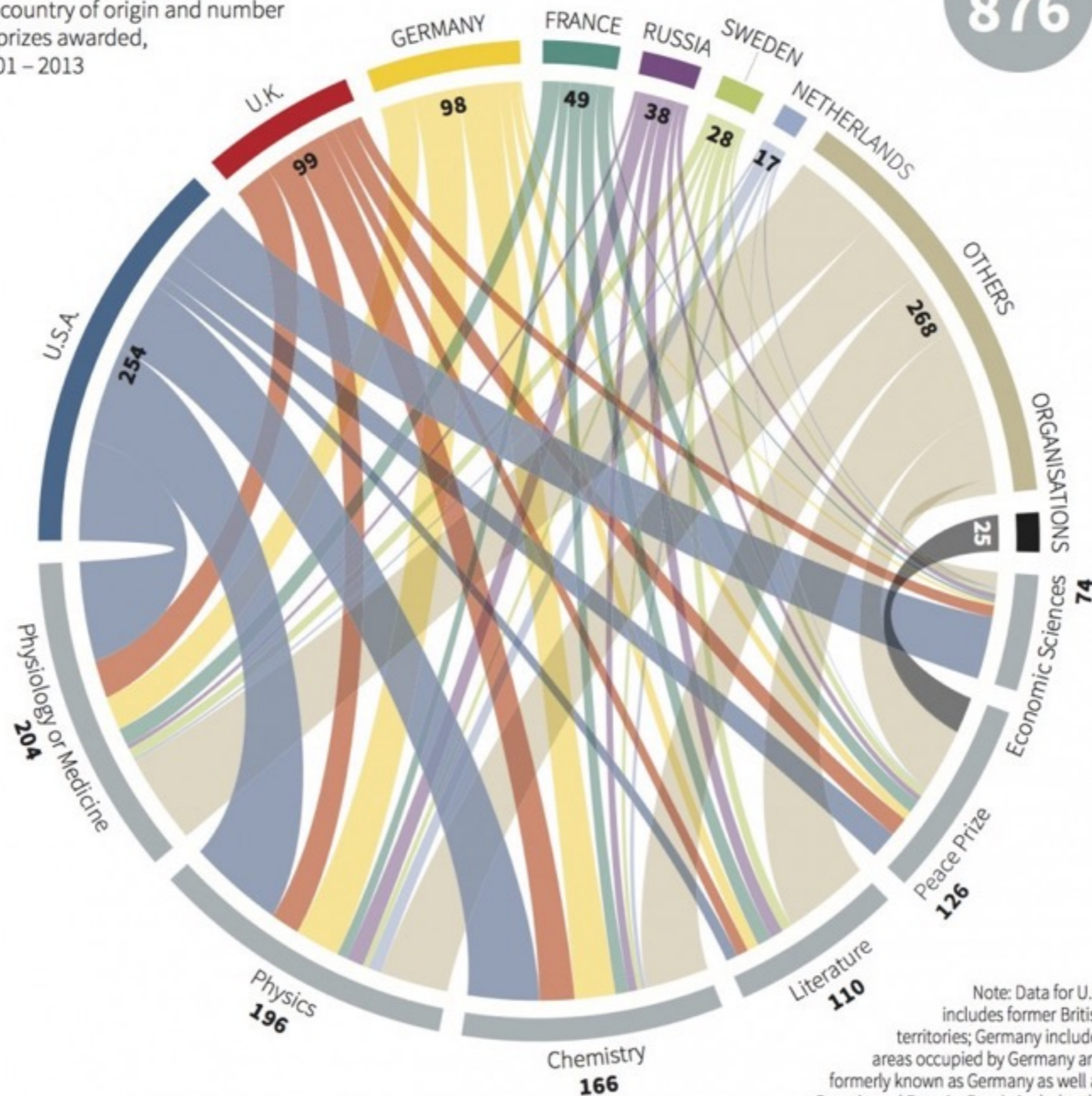
Guy Abel, Net Global Immigration

Nobel Prize

NOBEL LAUREATES

By country of origin and number of prizes awarded, 1901 - 2013

TOTAL
876



Note: Data for U.K. includes former British territories; Germany includes areas occupied by Germany and formerly known as Germany as well as Bavaria and Prussia; Russia includes the former Russian Empire and U.S.S.R.

Source: Nobel Foundation

W. Foo, 03/10/2014

REUTERS

Paths and Connectivity:

A path is any sequence of nodes given that each consecutive pair of nodes is connected by a link. The path length provides the number of links in the route between a pair of nodes.

Three representation strategies

- Lists
- Matrices
- Node-Link Diagrams

Lists



Matrices

HIGHBROW

Giuliani says he might run for president again.

The *New Yorker's* cartoon editor admits he has no idea what a joke about Ohio in last week's issue was supposed to mean.

Stephen Sondheim's sixties TV musical *Evening Primrose* is now out on DVD.

The great **DOC NYC festival** at IFC Center and NYU, including new films from Werner Herzog and Errol Morris.

Rodarte's \$500 socks.

Sleeveless trench coats abound.

The editor-at-large of *Vogue Japan* rents an entire apartment just for her clothes.

Francis Ford Coppola is reportedly shooting a thriller that stars Val Kilmer on his Napa estate.

Georgia Engel's sunny librarian in Will Eno's otherwise bleaker-than-bleak *Middletown* at the Vineyard Theatre.

Irrfan Khan's quietly mesmerizing patient on *In Treatment*.

The **Lazy Self-Indulgent Book Reviews** site. (Though the writing is not actually lazy. Liars!)

Gross: Certain women's hormone creams have starting causing spayed/neutered pets to develop swollen genitals and bloody discharge.

Justin Bond's goofily pretentious hippie mythology show at the Kitchen.

Levi's Photo Workshop, in the old Ditch Projects Soho space, offers free public access to top-quality photography equipment.

The new Chanel makeup counter at Lord & Taylor use state-of-the-art technology to show you how you look in different kinds of light.

DESPICABLE

Baristas who interpret "room for milk" as "Let me cheat you out of half your coffee, mrahaha."

The trailer for MTV's adaptation of BBC cult hit *Skins* does little to alleviate fears that the show will be dumbed down for Americans.

Air New Zealand is going to offer "Cuddle Class" seats for couples on some flights. Awww!

The delightfully insane "Letters to the Editors of Women's Magazines" column on the Hairpin.

Alex Blagg's internet-guru satire site **bajillionhits.biz**.

The beautifully renovated, historic, huge-screened **Lafayette Theater** in Suffern, N.Y.

Stores that stock Christmas merchandise before Halloween.

How I Met Your Mother's string of cheery episodes about emotional growth.

Archie Panjabi, already TV's finest perpetually booted actress, just gets better on *The Good Wife*.

Bill Hader's recurring "Weekend Update" character **Stefon** on SNL.

A *Marie Claire* writer on plus-size sitcom *Mike & Molly*: "I'd be grossed out if I had to watch two characters with rolls and rolls of fat kissing each other."

Did you know **Hannah Montana** is still on? Keep **Newly Oversexualized Miley Cyrus** away from the children!

Duelling-sax-and-drums band **Moon Hoach**, killing it on a subway platform near you.

The magical-seeming **Eatwhat-ever mints**.

David Anquette gives a second TMI interview to Howard Stern.

Converse's adrenaline-pumping "Join the Procession" ad featuring Dr. J and God Shammgod (®).

BRILLIANT

LOWBROW

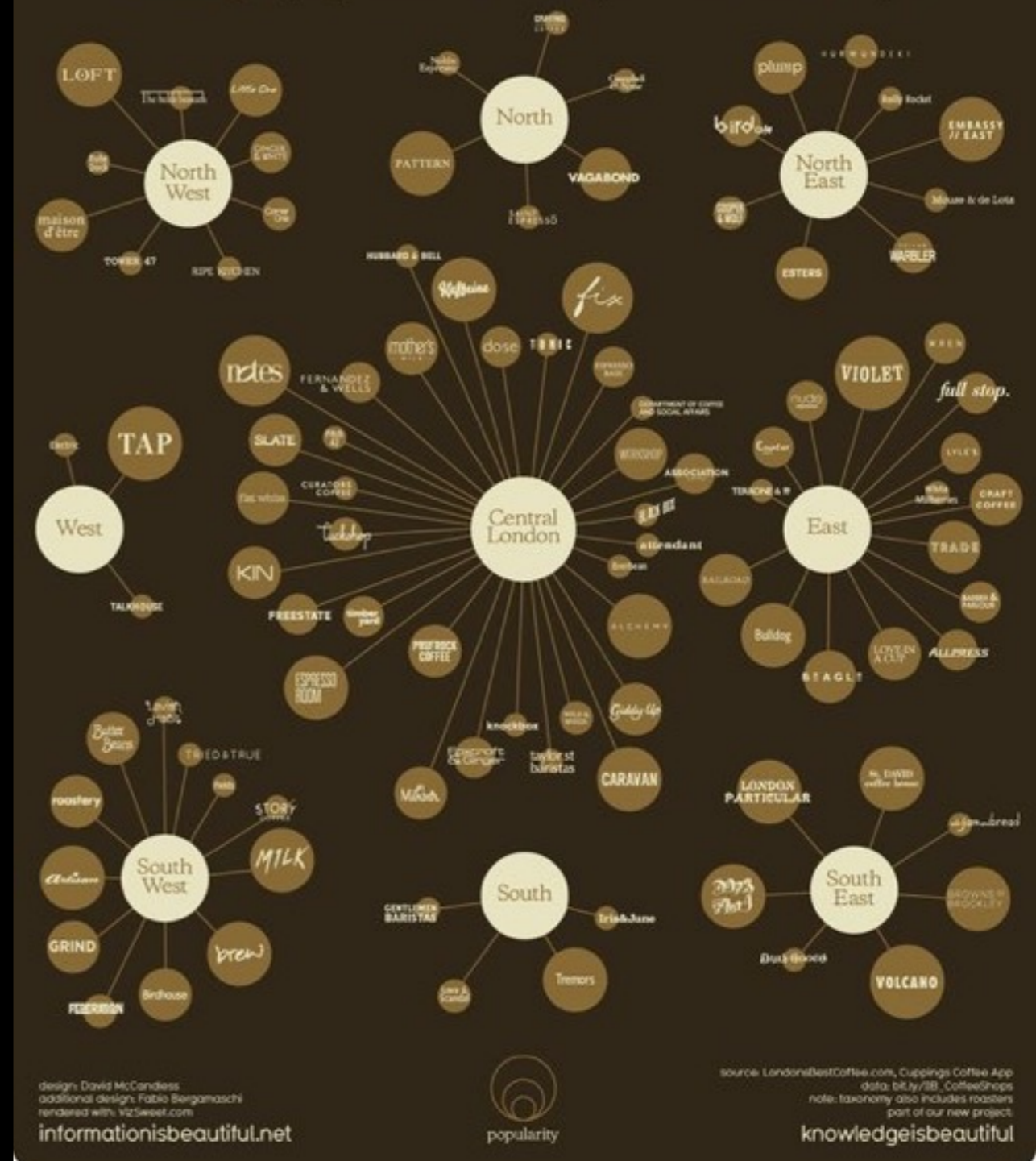
**New Yorker Magazine,
High Brow, Low Brow,
Despicable, Brilliant**

Nodes and Links

A Taxonomy of London Hipster Coffee-Shop Names



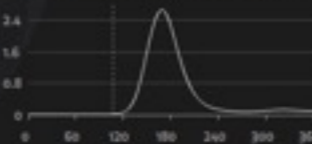
A Geography of London's Hipster Coffee-Shops



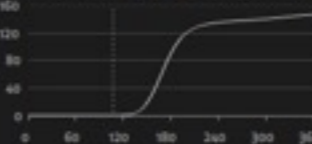


REGION - WESTERN EUROPE -

NEW INDIVIDUALS (PER 1000) / DAY



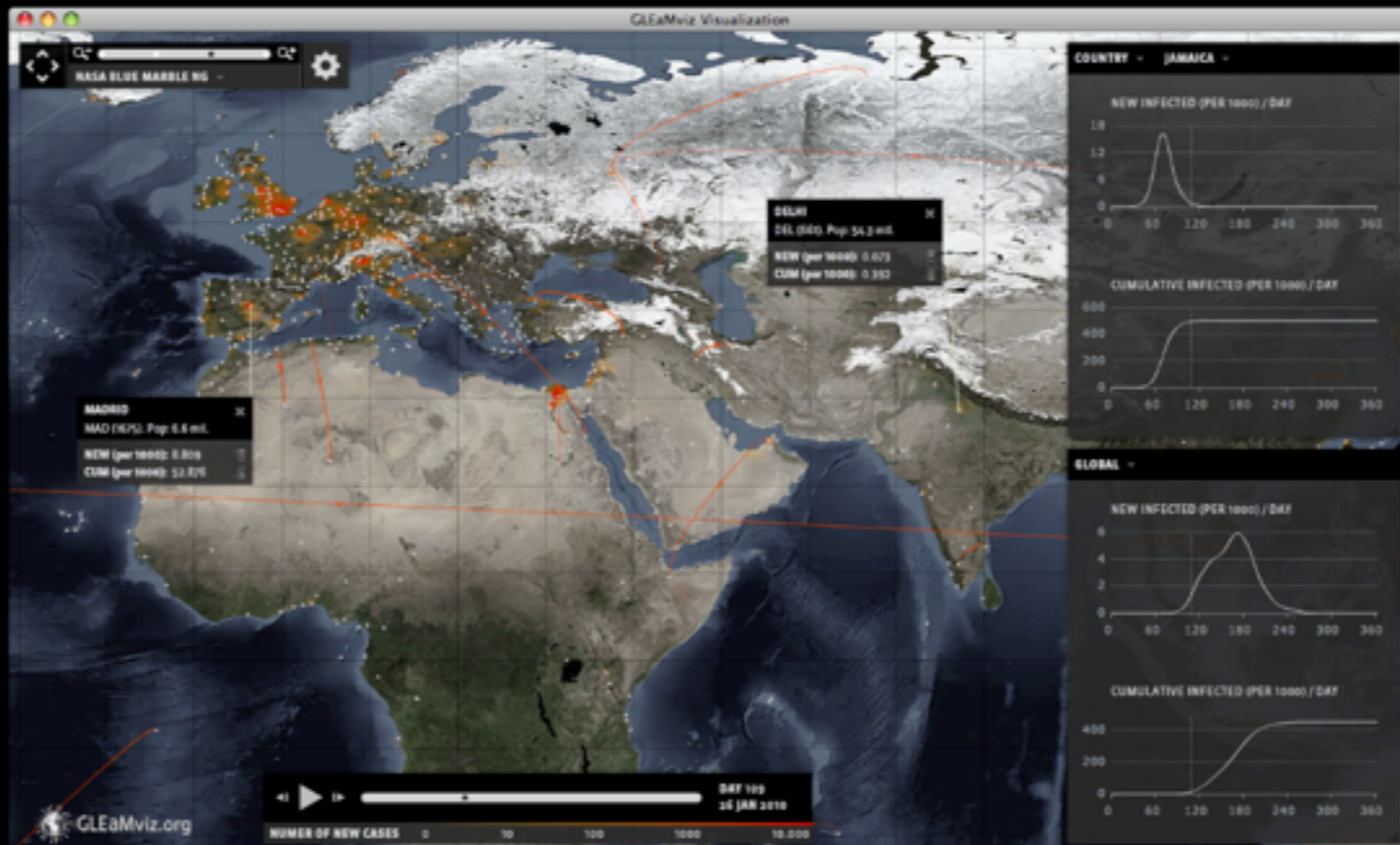
CUMULATIVE NEW IND. (PER 1000) / DAY



GLEAMviz.org

DAY 108 11/25/2008

NEW INDIV. / 1000 0.01 0.1 1 10





HANOI [HAN] ▾

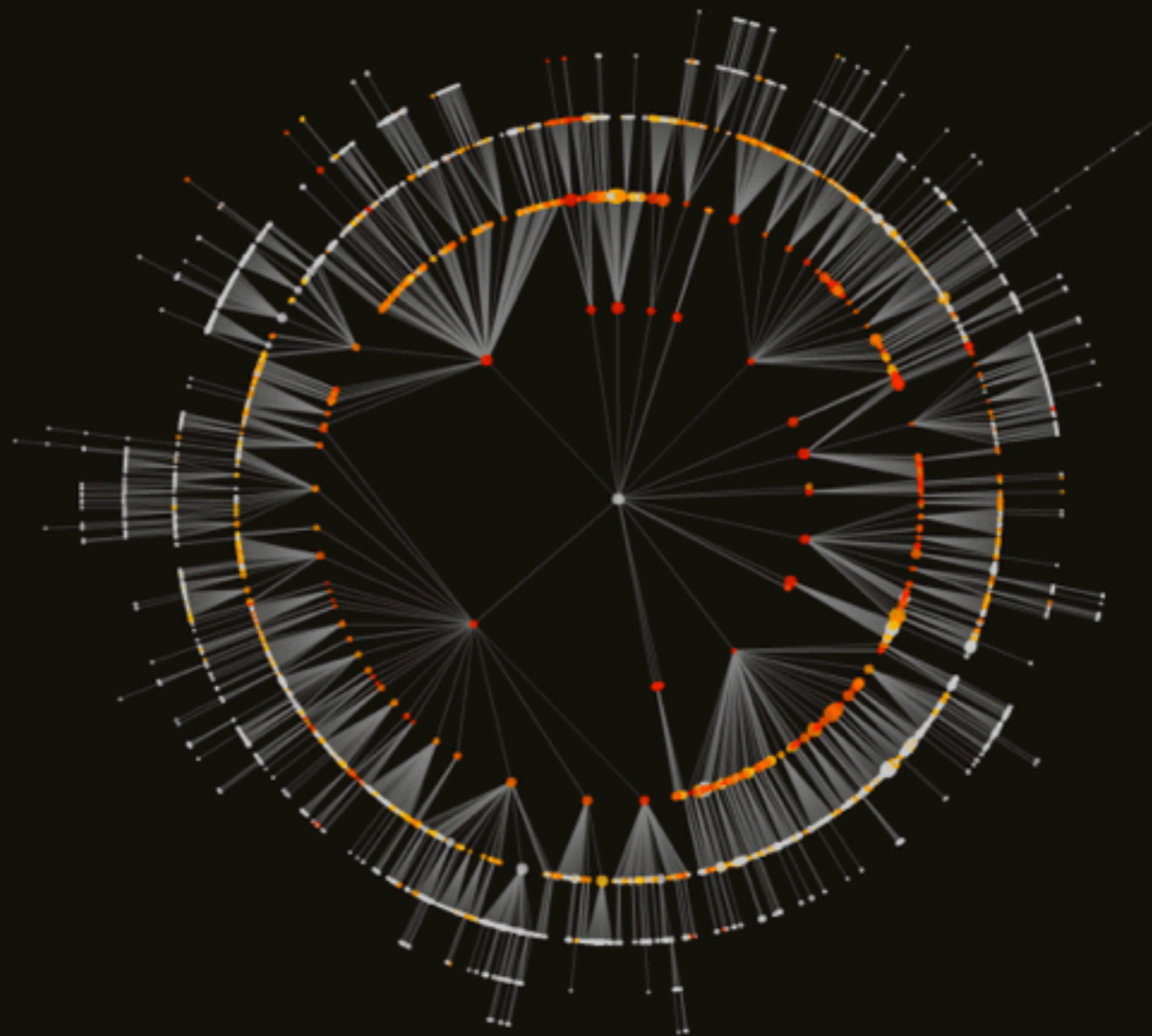
CONCENTRIC LOG ▾

1 SELECTED COMPARTMENT ▾

ADD PANEL

ABOUT

SETTINGS ⚙



Relational maps might suggest causation, but do not explicitly indicate it. That is where narratives can help.

Mapping the World's Friendships

Learn which countries share the closest friendship connections on Facebook.

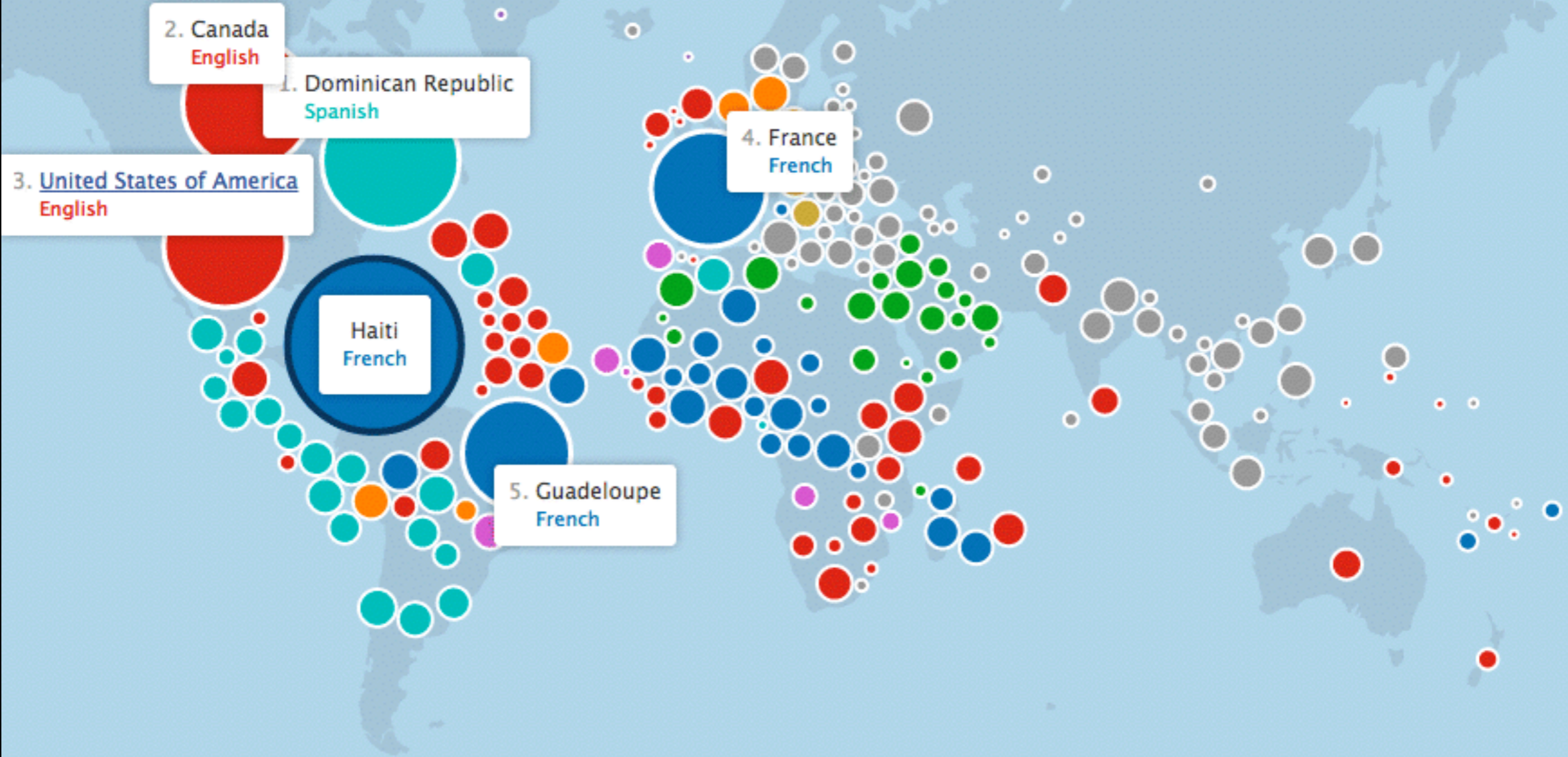
[Methodology](#)

Show

Language



Search



A Closer Look: Dominican Republic & Haiti

Though the Dominican Republic shares an island with its western neighbor, Haiti, the two countries share a tense relationship due to different languages and a large wealth disparity. Many Haitians seeking economic opportunity and fleeing earthquake damage have relocated to the Dominican Republic, though they often face discrimination and increasing deportation rates. [Source](#)

Mapping the World's Friendships

Learn which countries share the closest friendship connections on Facebook.

[Methodology](#)

Show

1. United States of America

4. Guam

5. Philippines

Marshall Islands

2. Federated States of Micronesia

3. Fiji

A Closer Look: Marshall Islands & the United States

The U.S. occupied the Marshall Islands from 1944 until 1986, and 10 percent of the islands' residents hail from the U.S. The top destination for Marshallese immigrants is the United States, where they mostly reside in Hawaii, Oregon, California and Arkansas [Source](#)

Mapping the World's Friendships

Learn which countries share the closest friendships on Facebook.

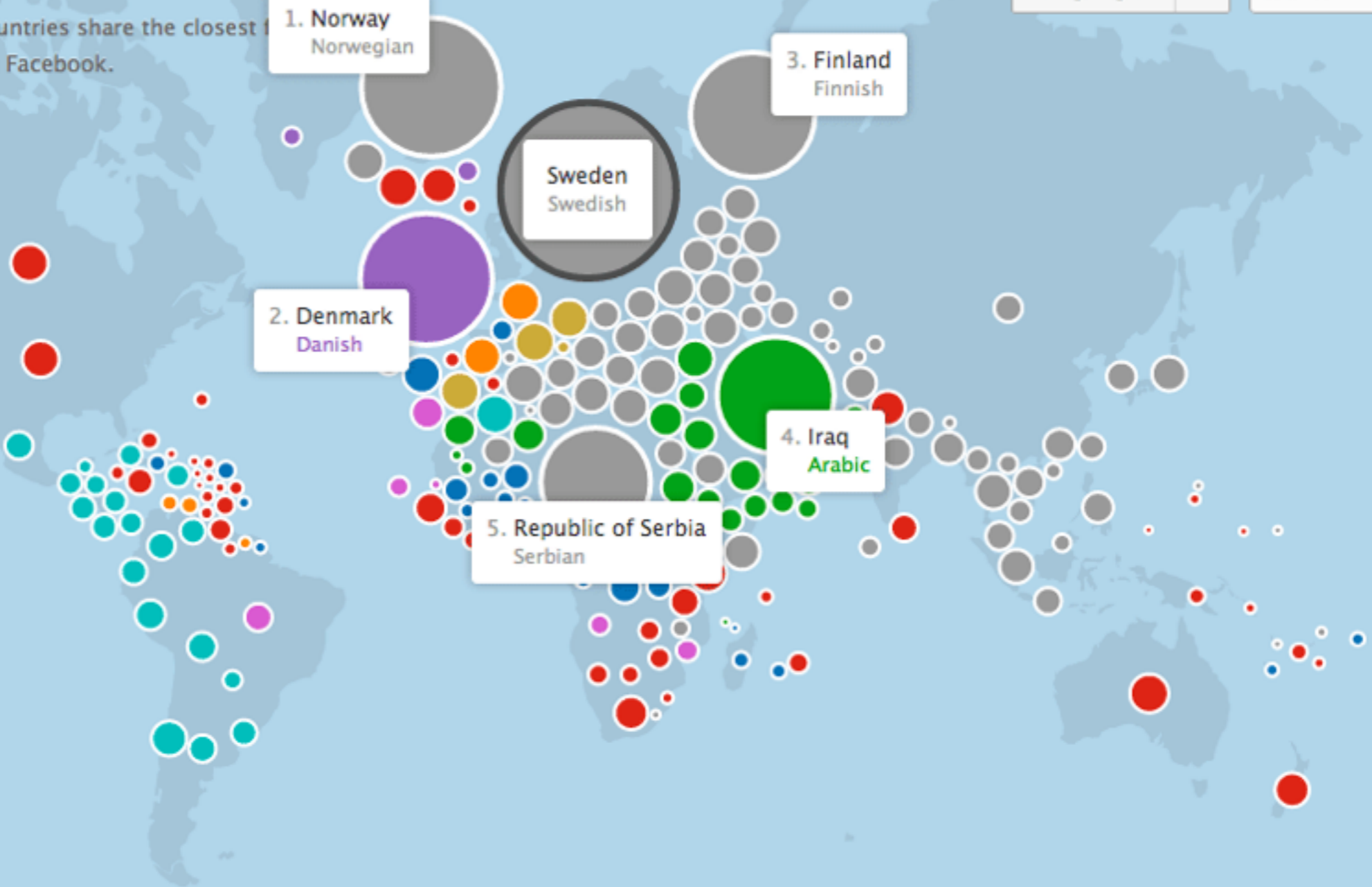
[Methodology](#)

Show

Language



Search

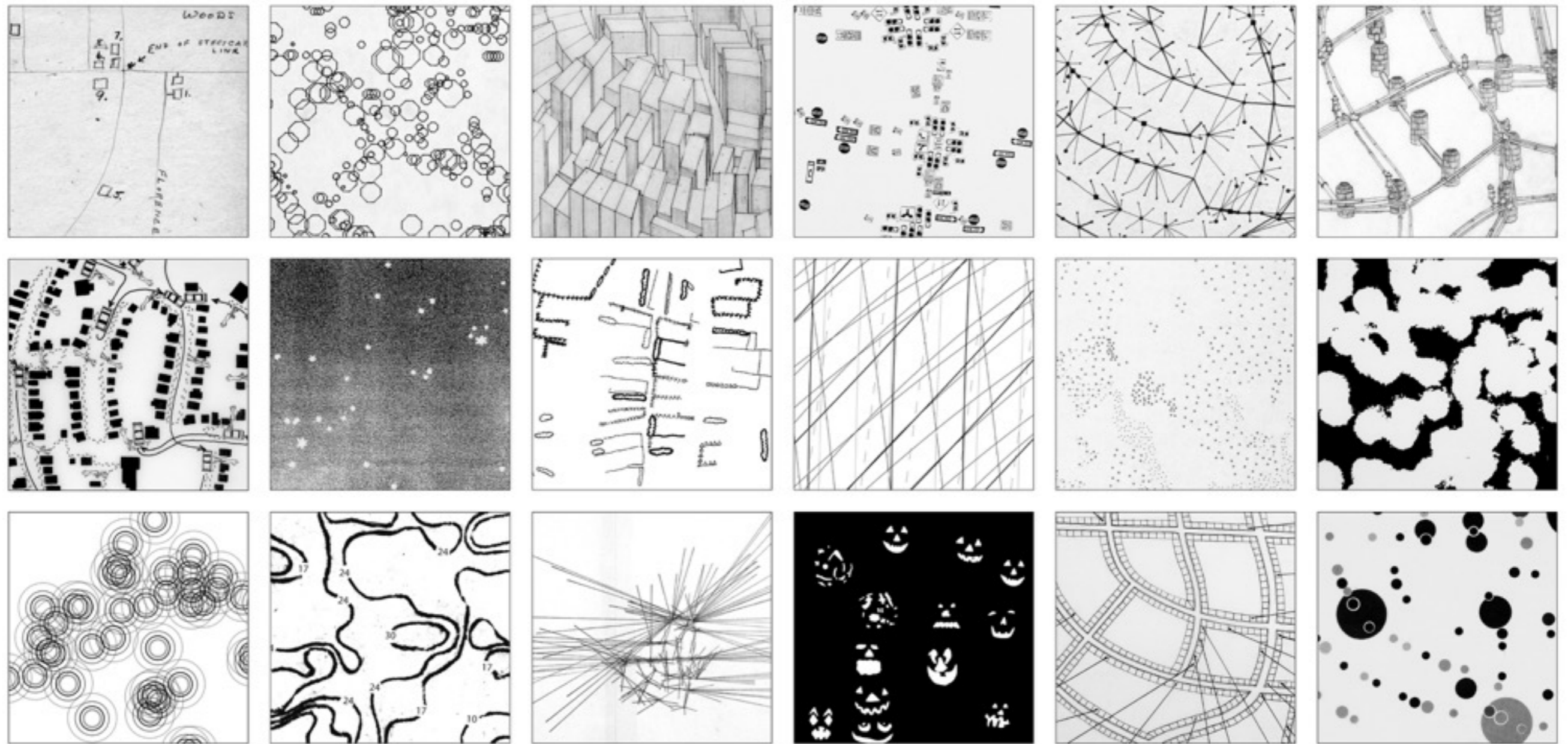


A Closer Look: Sweden & Iraq

Sweden has taken in more Iraqi refugees than the United States. One town alone, Södertälje, dubbed "Little Baghdad", has accepted 6,000 Iraqis since 2003. [Source](#)



Paul Butler, *Map Visualizing Friendships in Facebook around the Globe* (2010).



Denis Wood Everything Sings: Maps for a Narrative Atlas (2010)

Call Types (by number)

1	general	14	disturbance	27	robbery
2	talk with officer	15	traffic	28	motor vehicle theft
3	stray dog	16	vehicle blocking passage	29	stalking
4	barking dog	17	motor vehicle accident	30	assault
5	pick up animal	18	request services	31	protest
6	other animal	19	assist persons	32	fight
7	animal injury	20	injured person	33	drugs
8	animal bite	21	man down	34	forgery
9	investigate person	22	ambulance and EMS	35	rare
10	investigate vehicle	23	public drunk	36	missing persons
11	open door	24	property damage	37	attempted suicide
12	security check	25	larceny	38	fire
13	burglar alarm	26	burglary		

Call Frequency (by size)

8 one call

13 seven calls

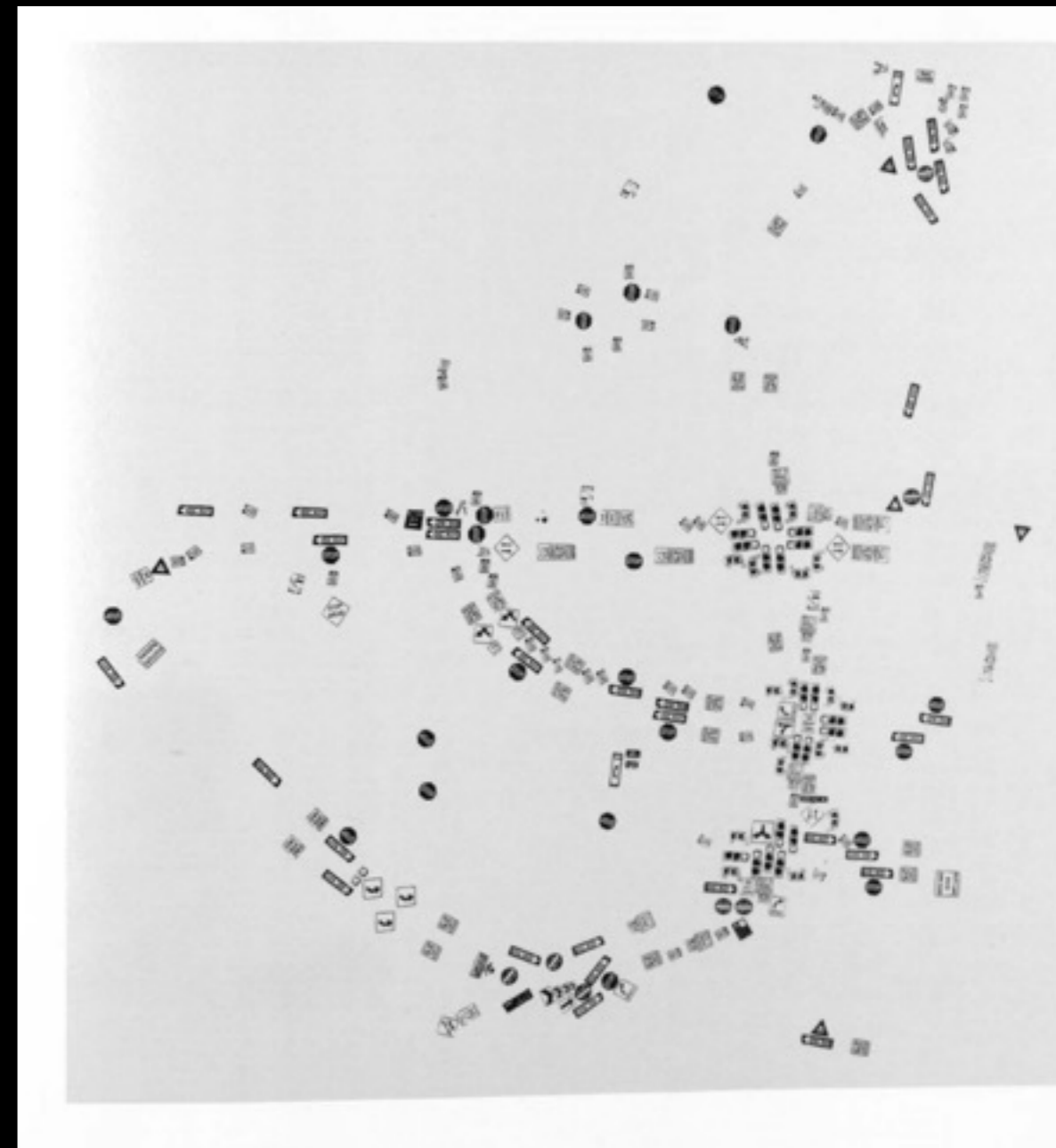
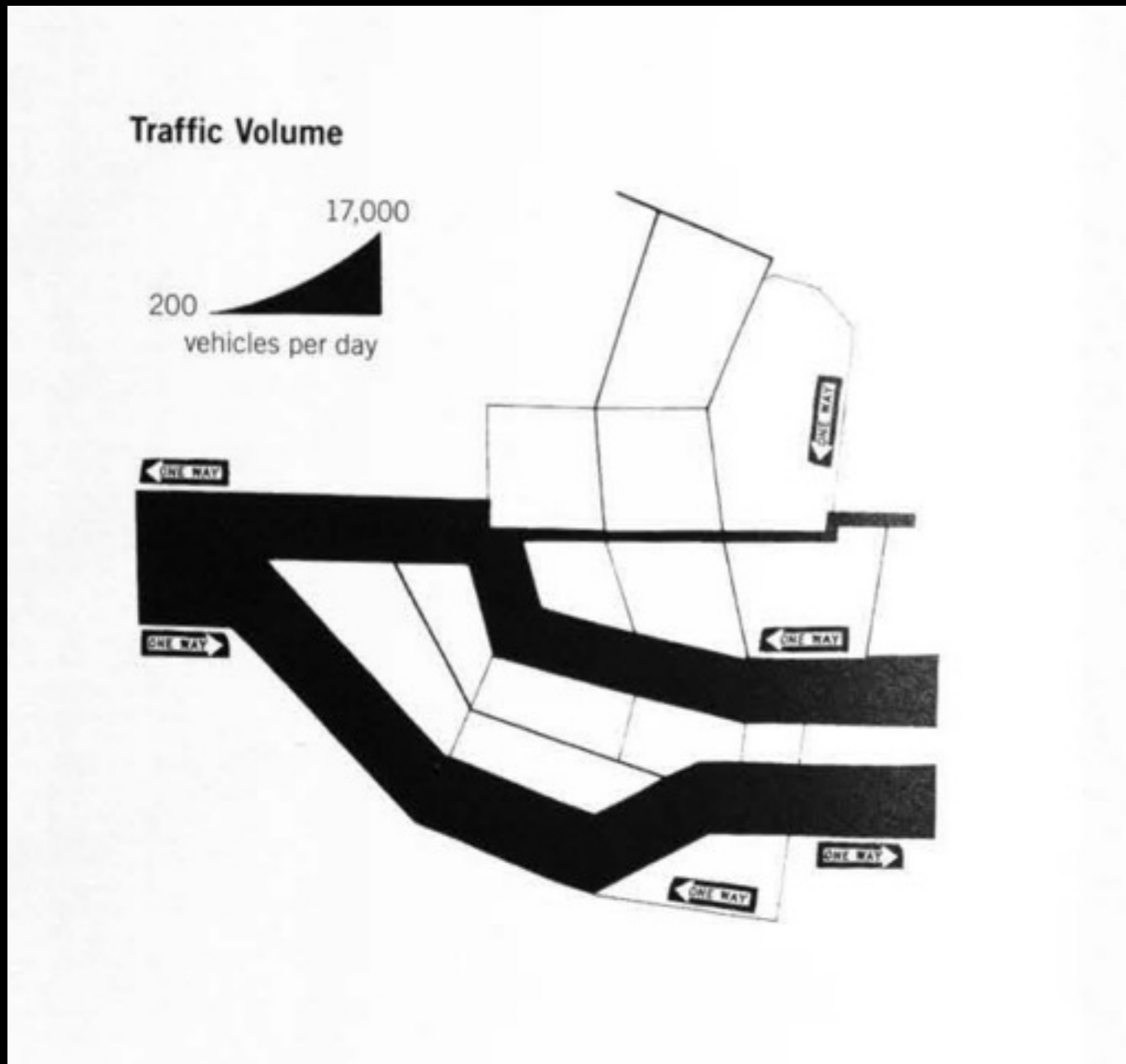
16

fourteen calls

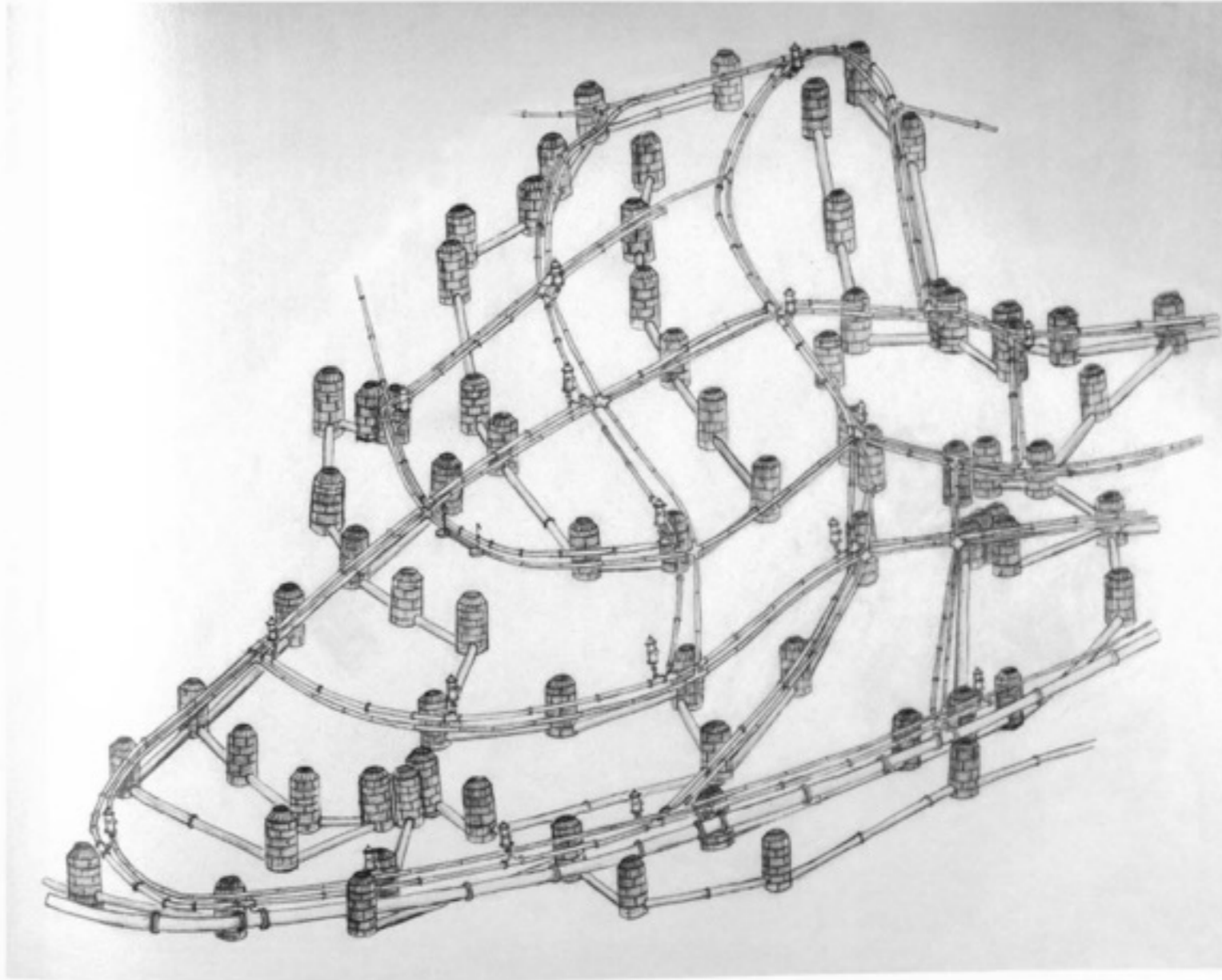
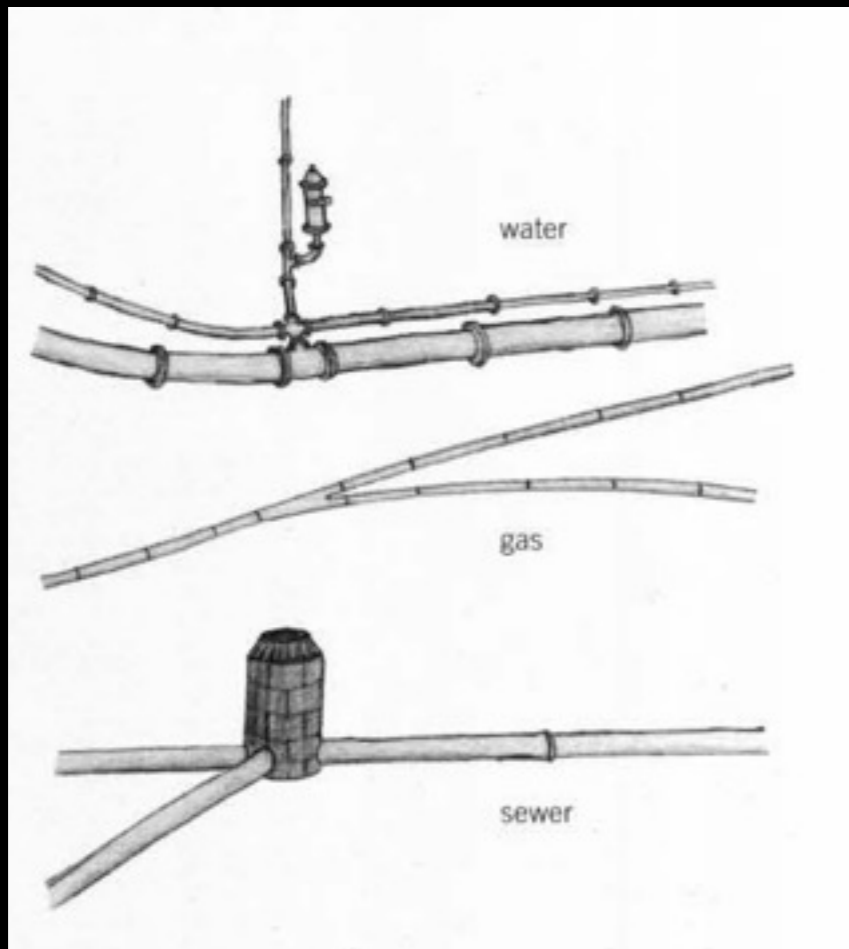


Police Calls

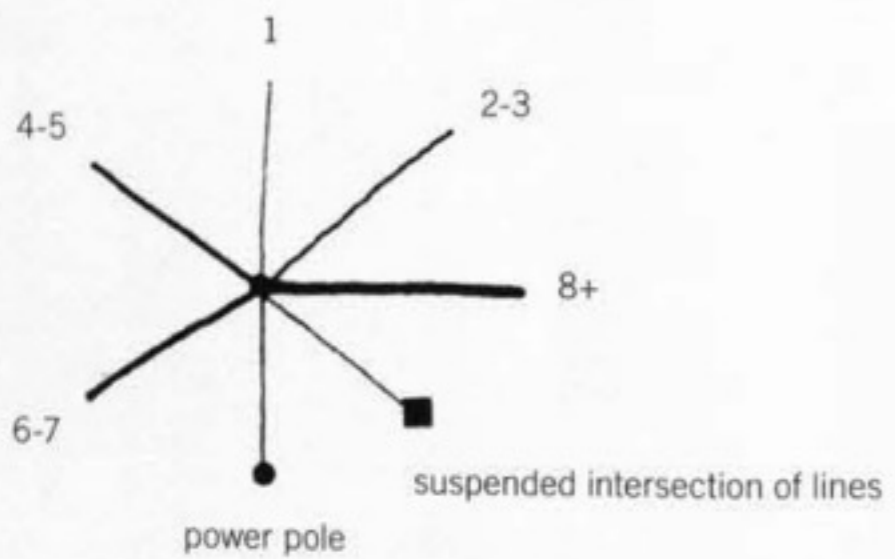
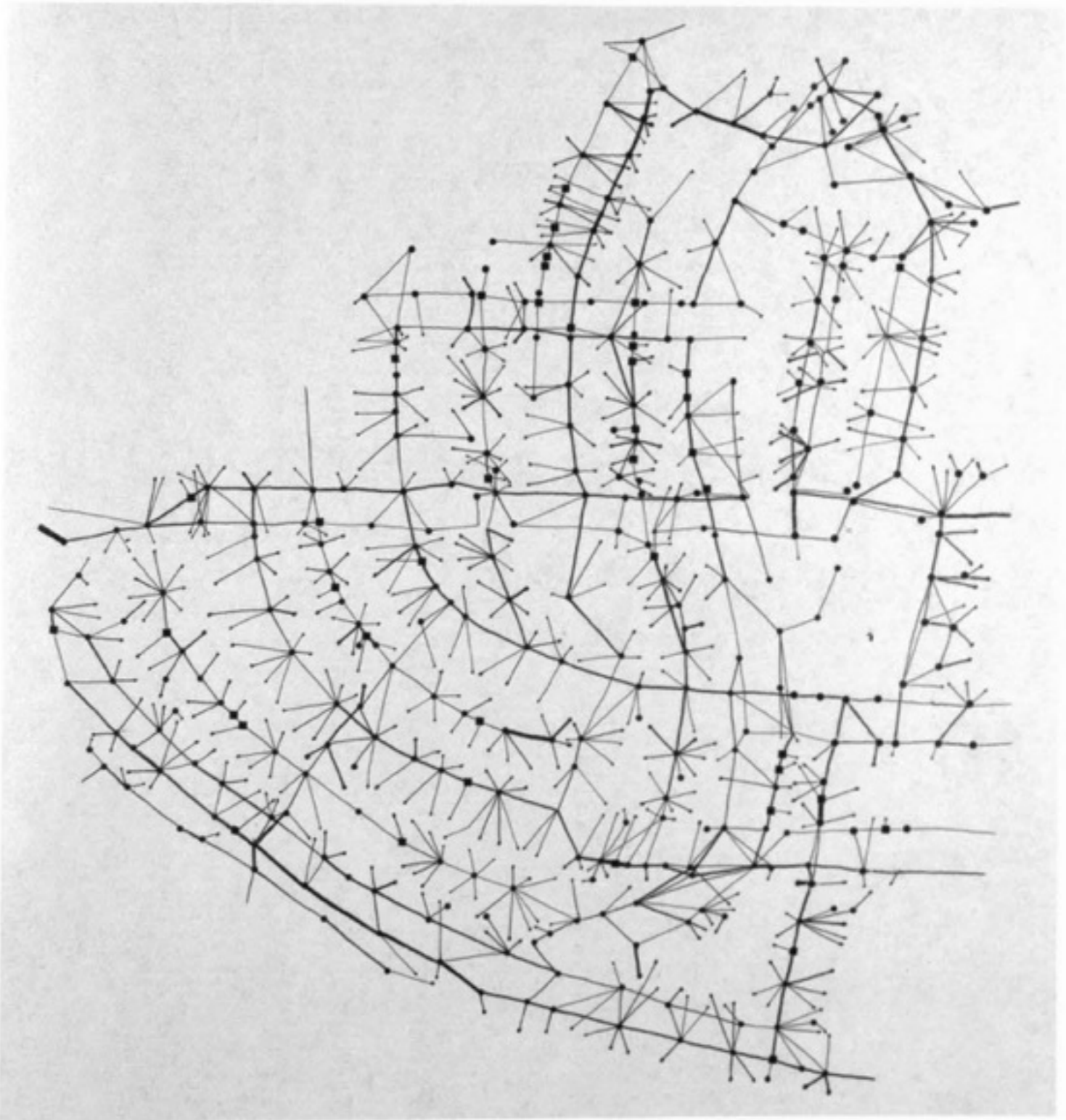
Denis Wood Everything Sings: Maps for a Narrative Atlas (2010)



Signs for Strangers
Denis Wood Everything Sings: Maps for a Narrative Atlas (2010)

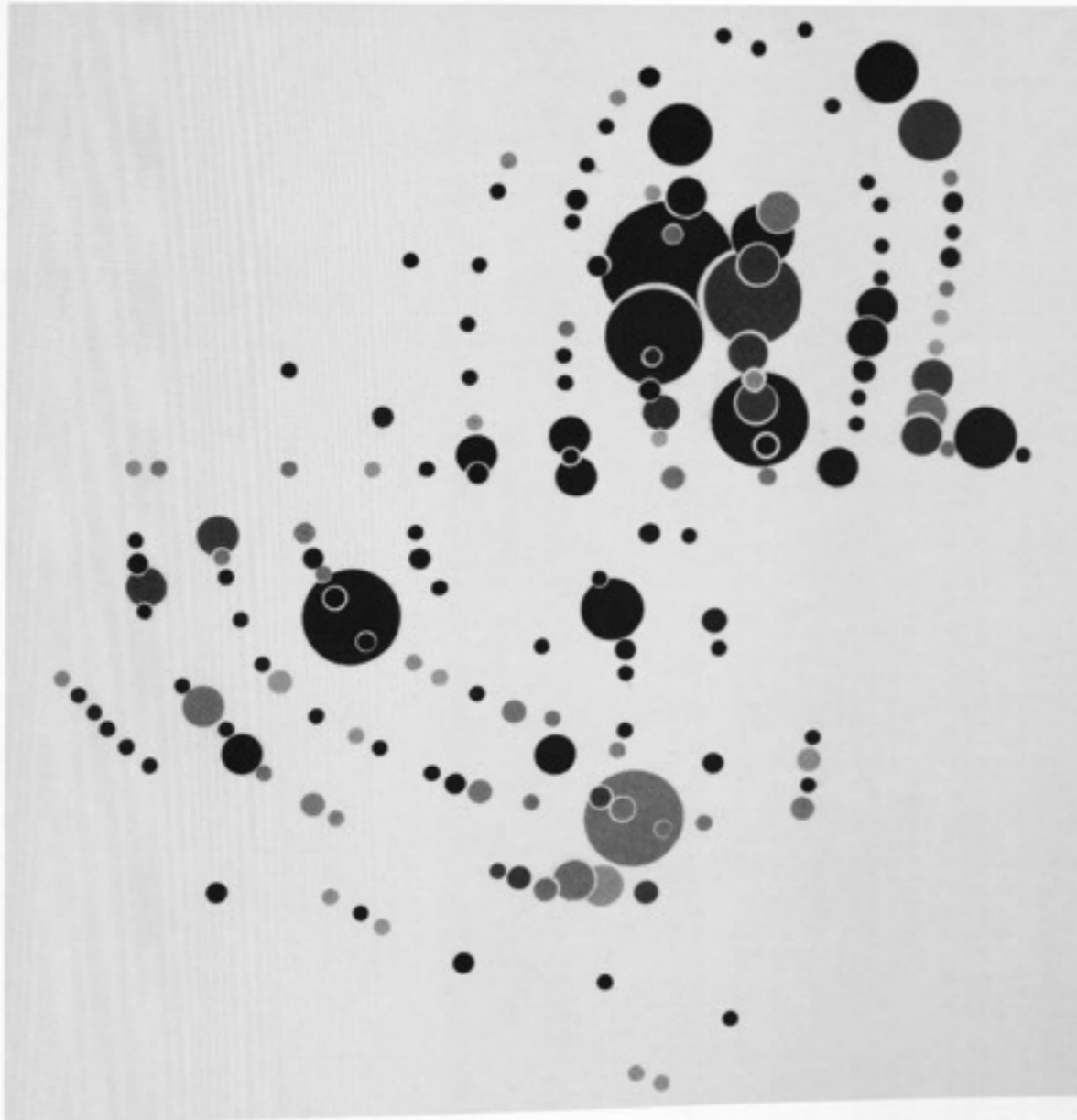


Intrusions Under Hill
Denis Wood Everything Sings: Maps for a Narrative Atlas (2010)

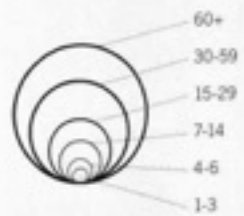


Squirrel Highways

Denis Wood *Everything Sings: Maps for a Narrative Atlas* (2010)



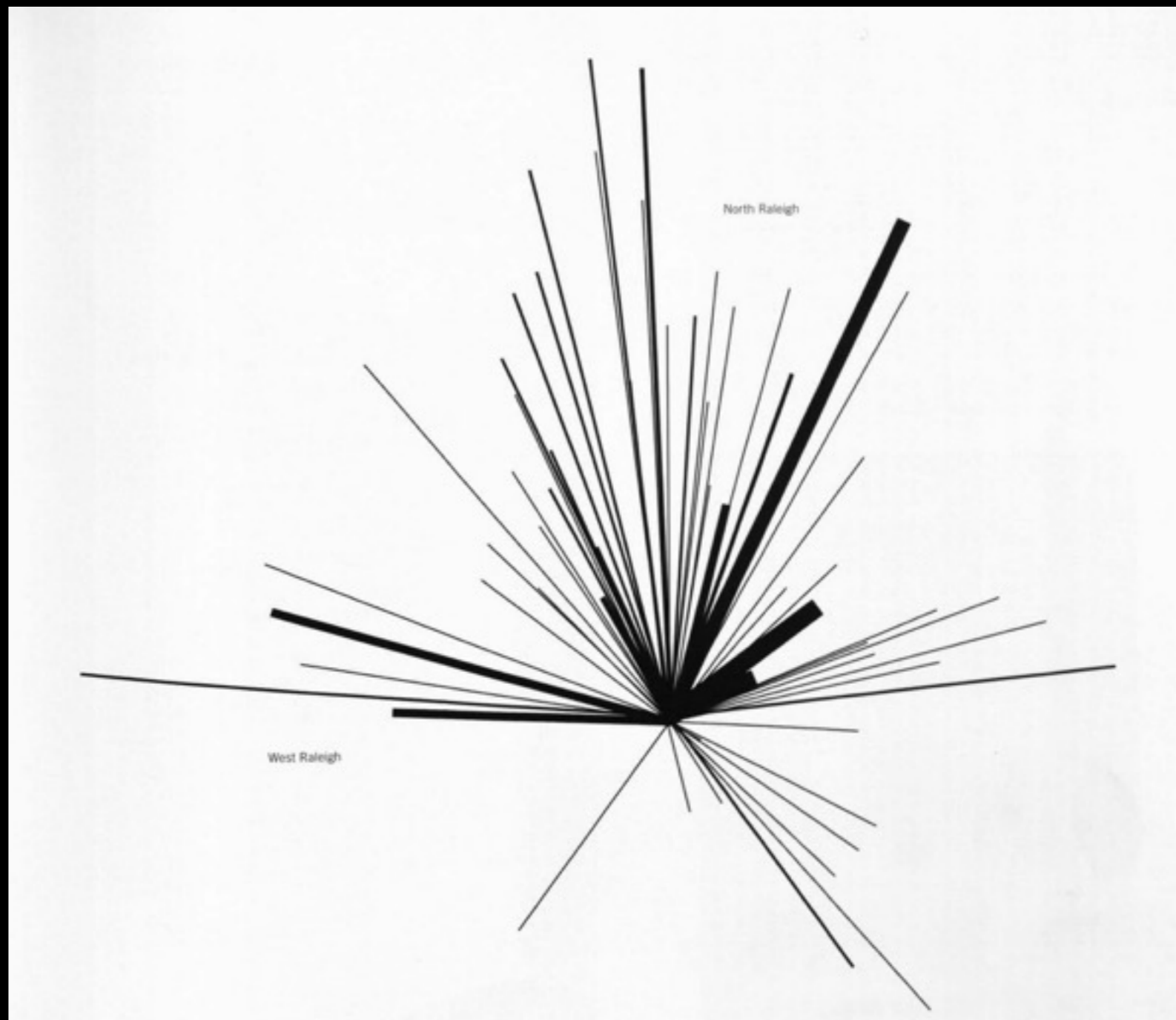
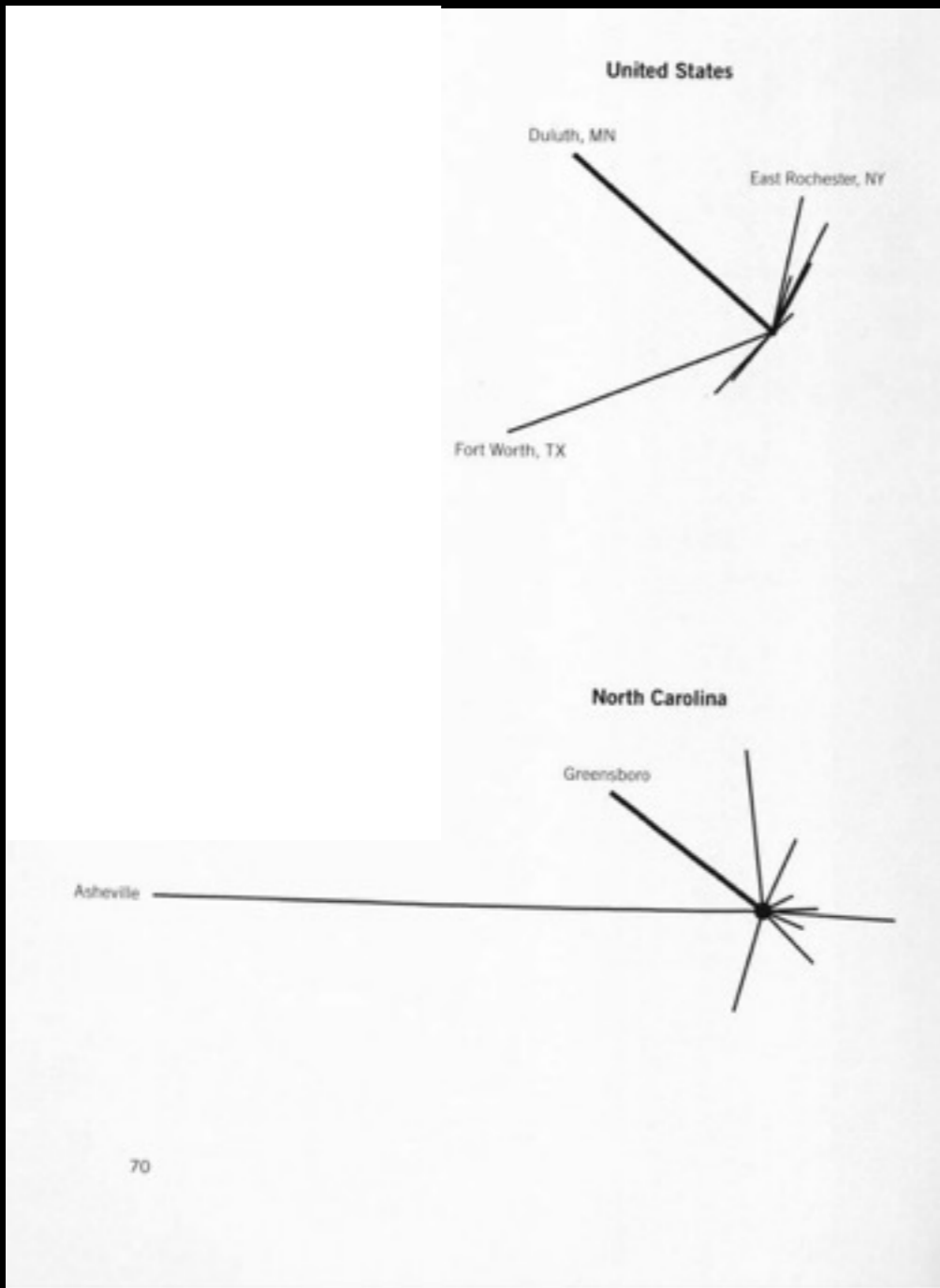
Mentions in the Newsletter



The LIGHTER the color, the more personal the nature of the reference.

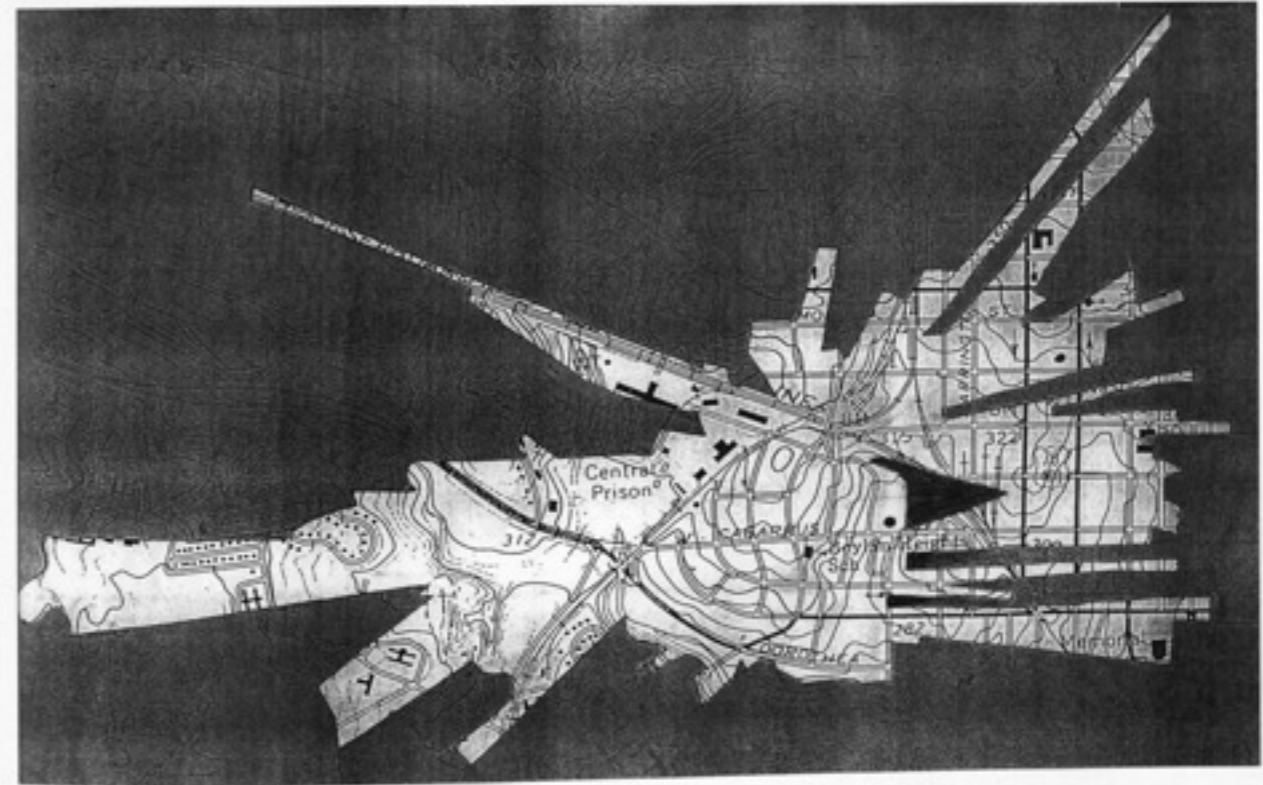
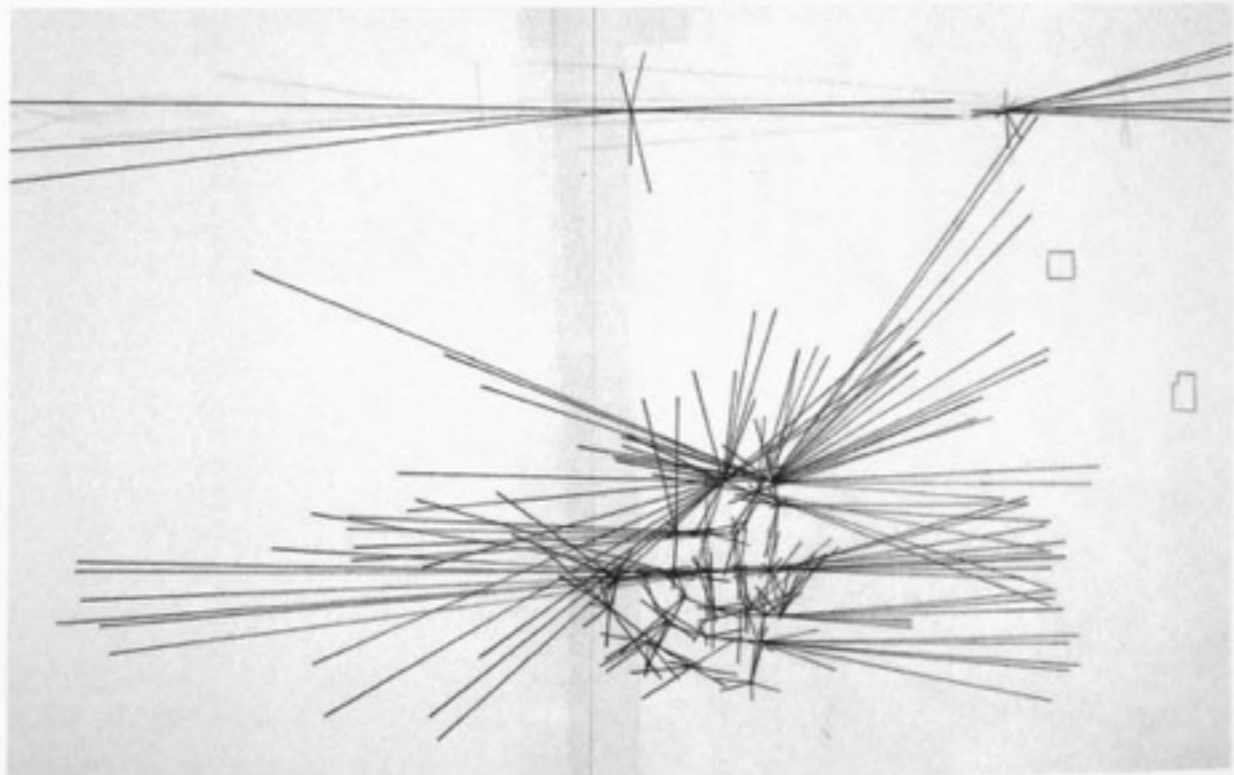
The DARKER the color, the more the reference pertains to neigh-

Newsletter Prominence and Jack-O-Lanterns



Absentee Landlords

Denis Wood *Everything Sings: Maps for a Narrative Atlas* (2010)



View Sheds

Denis Wood Everything Sings: Maps for a Narrative Atlas (2010)