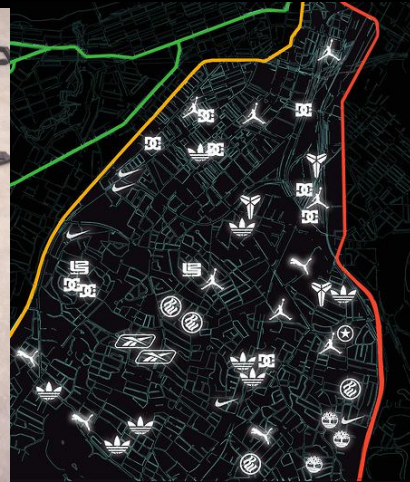
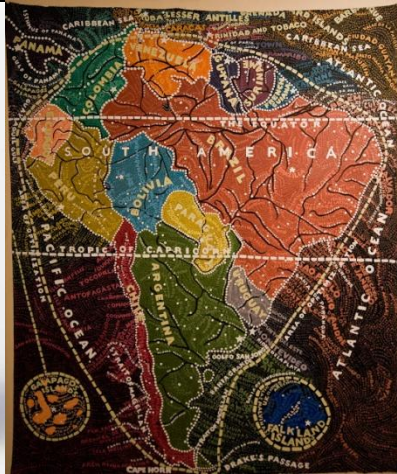


Cartography and Communication: *Telling the story with maps*

Juliana Maantay, M.U.P., Ph.D., F.R.G.S.

*Fulbright Distinguished Chair, Glasgow Urban Lab, Mackintosh School of Architecture ; and
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*In conjunction with the exhibit "Contemporary Cartographies," at the Lehman College Gallery
April 23rd, 2013, 5:30 PM*



Why do we use maps? To communicate information.



Why do we use maps? To communicate information.

Previous slide:

On the left: a montage of antique and vintage reference maps, whose primary purpose is to show us the world or some part of the world as it was known at that time.

On the top right: an example of a U.K. Ordnance Survey (OS) map. These maps are relatively large-scale maps, many as large as 6 inches to the mile, and they cover the entire United Kingdom in great detail. The beginnings of the OS mapping project dates from the early 18th century, largely in response to the Scottish uprisings, and the attempts of the English to put down rebellion in the Scottish Highlands. Since these areas were poorly known and hardly mapped at all, the English were at a severe disadvantage in combating the guerilla-style warfare conducted by the Scottish Highlanders in their mountain fastnesses. Mapping the Highlands was seen as the answer. Coastal mapping of all of Britain followed, also for defensive purposes. Although the OS maps were originally created primarily for military purposes, they are now used by everyone from hikers to urban dwellers, owing to their high level of accuracy and detail, and their attractiveness.

On the bottom right: the U.S. equivalent of the Ordnance Survey maps – the United States Geological Survey (USGS) maps, which are also drawn to a fairly large-scale, showing the landscape in great detail, including most roads and buildings. The impetus for the USGS maps was also at least partially military, but also stems from the exploration of then-unknown parts of the continent and the need to map the territory in order to claim it. The discovery and locating of natural resources was another reason for a comprehensive nation-wide mapping effort.

Both the OS and the USGS maps are widely acknowledged as some of the best reference maps in the world. Nevertheless, despite the high accuracy of these maps, they are not entirely without subjectivity in the cartographers' decisions about what to put in and what to leave out.

Uses of Maps:

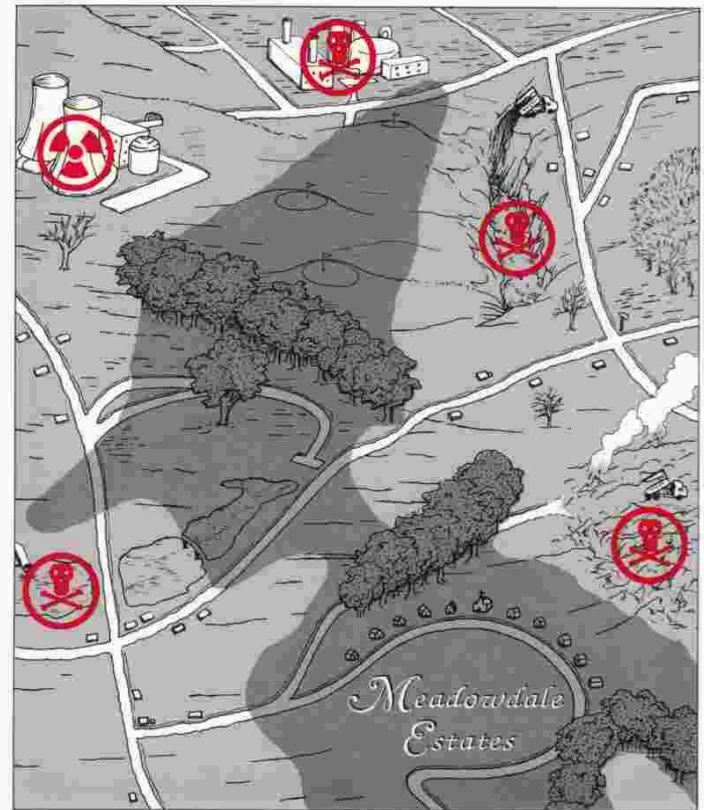
- To show the way
- To demonstrate power
- To understand the world
- To make decisions
- To persuade/convince of a point of view
- To propagandize
- To explain connections
- To figure stuff out
- To advertise
- To predict
- To proselytize
- To justify a viewpoint
- To alarm/frighten
- To show complexity
- To amuse
- To provoke/be provocative
- To educate/enlighten
- To share experiences
- To mislead
- To idealize
- To advocate
- To tell a story
- To make us question our biases
- MAPS AS ART: personal iconography

All maps lie – all maps are subjective – all present their information through the cartographer's eyes, and represent a certain viewpoint.

All maps contain distortions, and the more “scientific” and “objective” the map looks, the more easily we are fooled/seduced into thinking that it shows the Truth about some aspect of Reality.

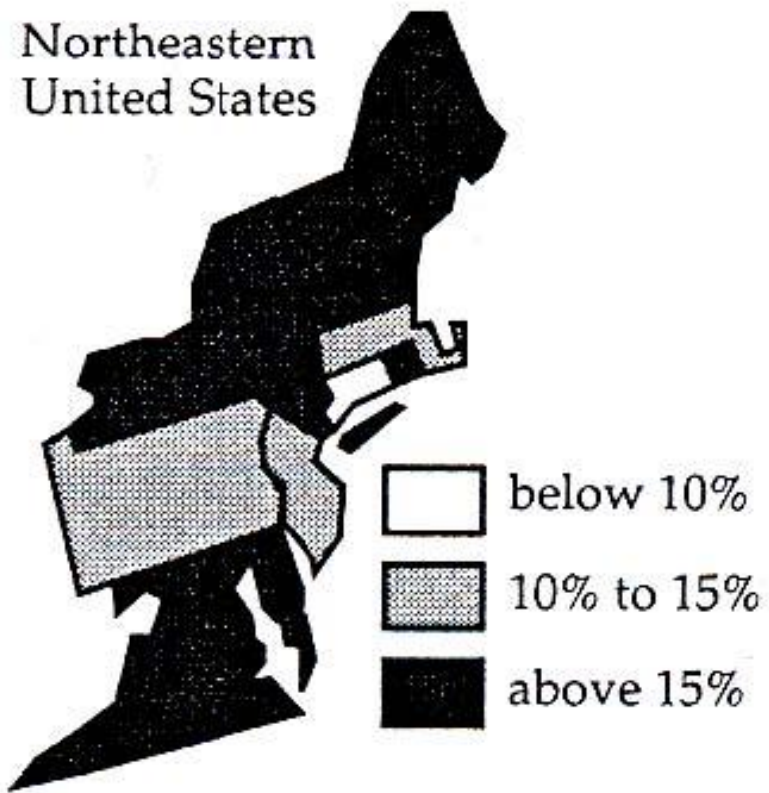
HOW *to* LIE *with* MAPS

MARK MONMONIER



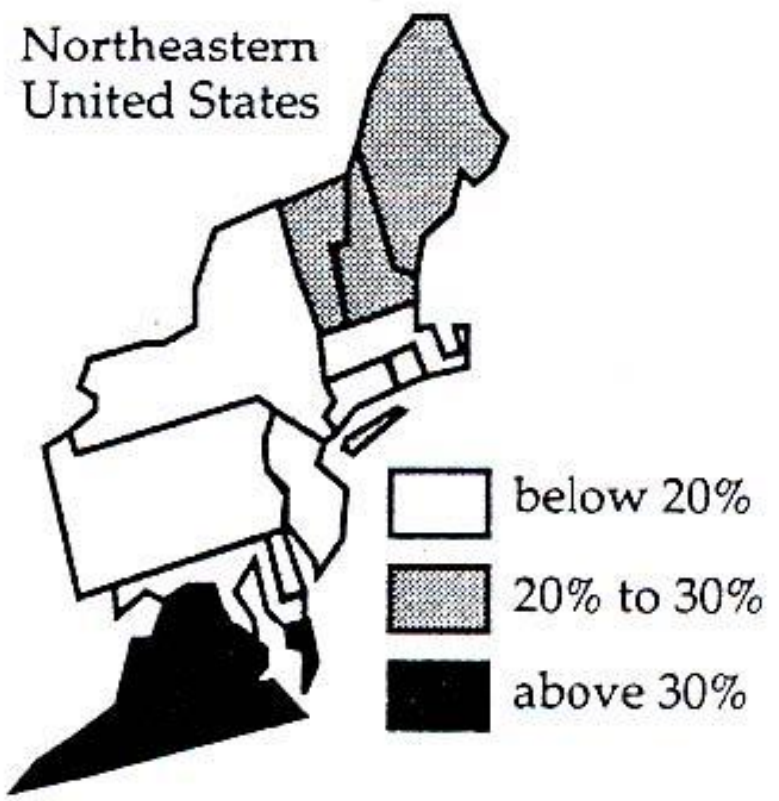
Occupied Housing Units Lacking a Telephone, 1960

Northeastern United States



Occupied Housing Units Lacking a Telephone, 1960

Northeastern United States



The exact same data presented in two different ways, the only difference being where the cartographer has chosen to put the class breaks in the legend. The story being told is markedly different in each version, and although neither is more “correct” than the other, the map to be used would depend upon the audience and the purpose of the map. Figure from: *How to Lie with Maps*, by Mark Monmonier, 1996

America's Largest 3G Network.

Want 5 times more 3G coverage than AT&T? **There's a map for that.***
Browse the web and download music and apps at 3G speed.



*COMPARISON BASED ON SQUARE MILES COVERED WITH 3G. VOICE AND DATA SERVICES AVAILABLE OUTSIDE 3G COVERAGE AREA.

This misleading map resulted in a lawsuit when AT&T sued Verizon. AT&T assumed (probably correctly!) that potential customers would see the map and figure AT&T had spotty cell phone Internet coverage. There are 2 things misleading about this map – the coverage is based on square miles and not population, and it only includes 3G coverage, not 2G coverage - most of the blank space on the AT&T map.

There's a misrepresentation for that

Verizon's ads suggest that AT&T has no data coverage in much of the country by comparing only AT&T's newer, faster 3.2 Mbit 3G network against its own 1.4 Mbit 3G EVDO while excluding any mention of AT&T's slower but functional EDGE service, as well as its free WiFi access points.



Verizon's advertised 3G maps



AT&T's own data coverage map

A comparison of US population density explains why AT&T hasn't focused its 3G deployment on Nevada and rural areas of the Mountain Time Zone.



Actual US population map

DEMAND that Enbridge pulls their misleading ad

Enbridge deleted islands from its public safety videos to convince the public its pipeline route is safer than it really is

In reality, there are over 1,000 km² of rocky islands that oil supertankers would have to weave through



Enbridge's version of Douglas Channel



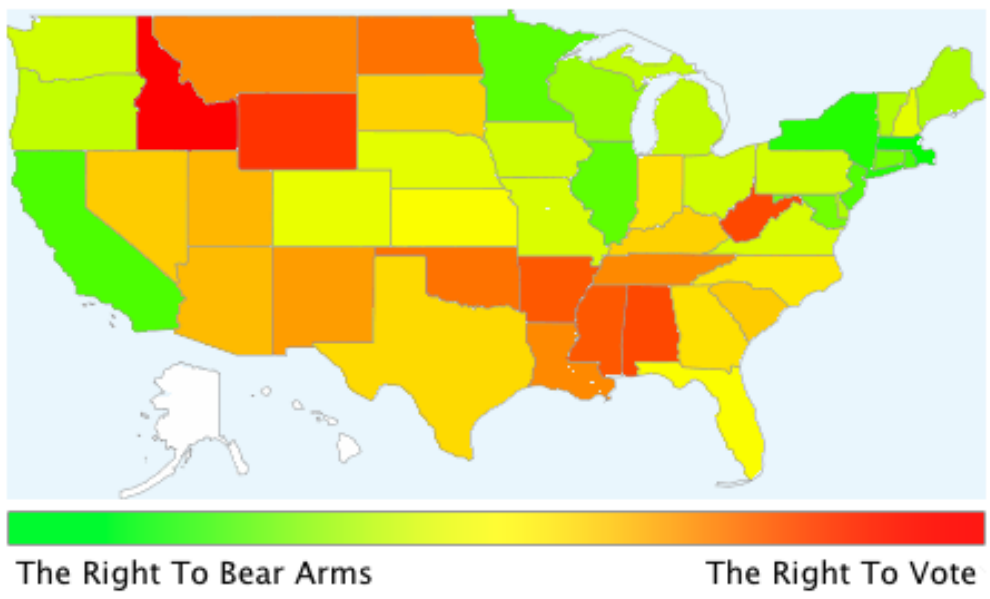
A scientist's map of Douglas Channel

Tell Enbridge to stop misleading the public about the risks of oil tanker spills.

Enbridge, the corporation behind the Northern Gateway pipeline in British Columbia, Canada, shows the map on the left in their promotional material, to persuade Canadian governmental officials and the public that the channel to the oil depot the end of the pipeline is perfectly straightforward and safe. Douglas Channel is said to be the fourth most dangerous waterway in the world, with many twists and turns to navigate around rocky islands in the channel. These islands are not shown on the Enbridge map. There's a high probability of oil tankers experiencing problems and a resultant risk of potential oils spills in a pristine marine environment. The corrected map on the right shows a more realistic depiction of the actual conditions. If you go to Google Earth and zoom into Douglas Channel, you can see all the obstacles for yourself. The government is now having second thoughts about the pipeline. From "Clearing the PR Pollution that Clouds Climate Science "

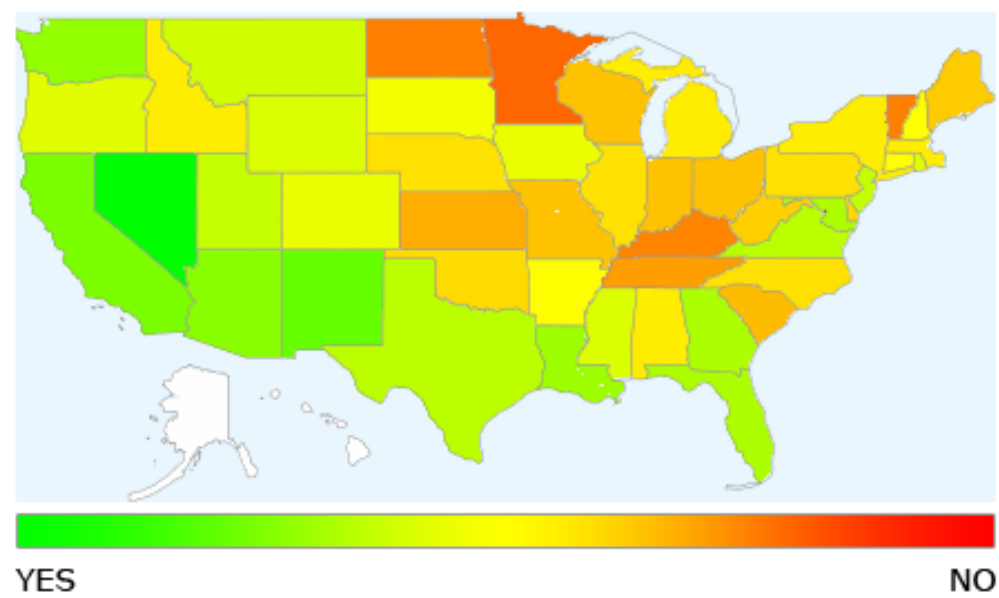
How to Lie with Maps – Intentionally Misleading or just a “Bad Map”?

Which would you rather lose?



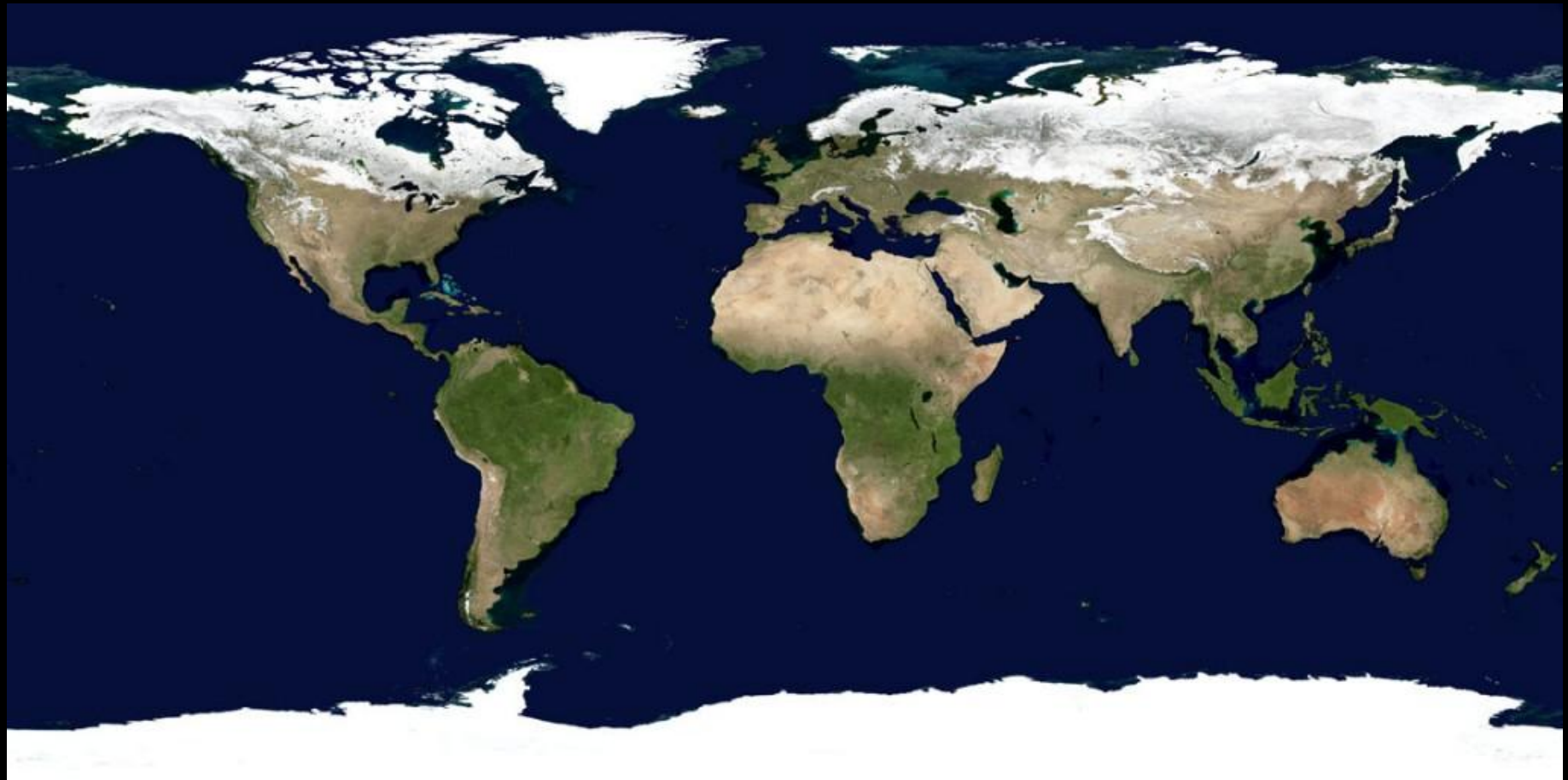
This map series is possibly unintentionally misleading. The map viewer might assume that a high percentage of people in each state voted one way or the other, either yes or no, but in reality, the divergent color ramp represents states at each extreme of the data values. The greenest state and the reddest state might actually be only a few percentage points away from each other. Therefore, in the bottom map, Nevada responders (the greenest state, and therefore presumably the state with the most intense “YES” to the question) might in reality have had only 5% of its responders answering Yes, while Minnesota, the reddest state, might have had only 3% of its responders answering Yes.

Are some human lives worth more than others?



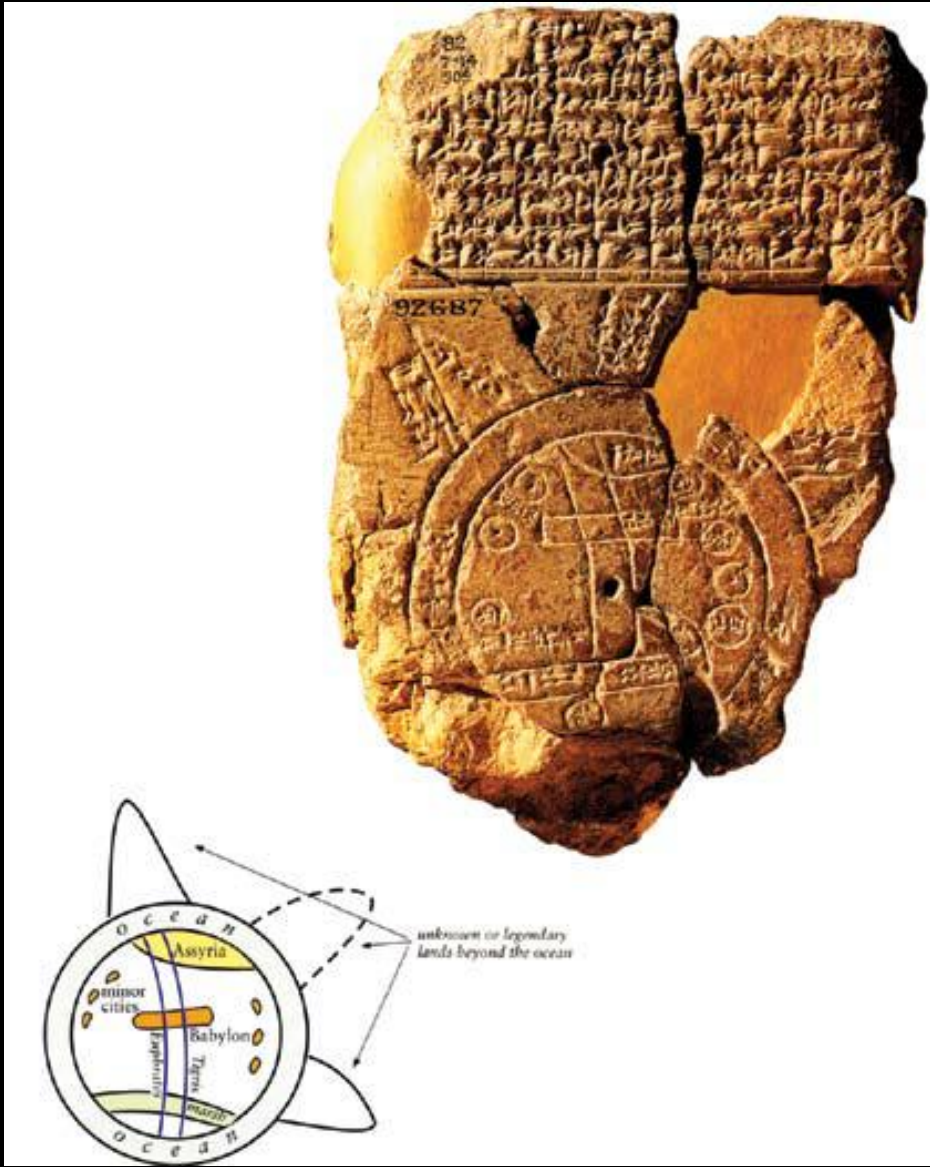
YES NO

This “satellite image” of the Earth from space is not real!



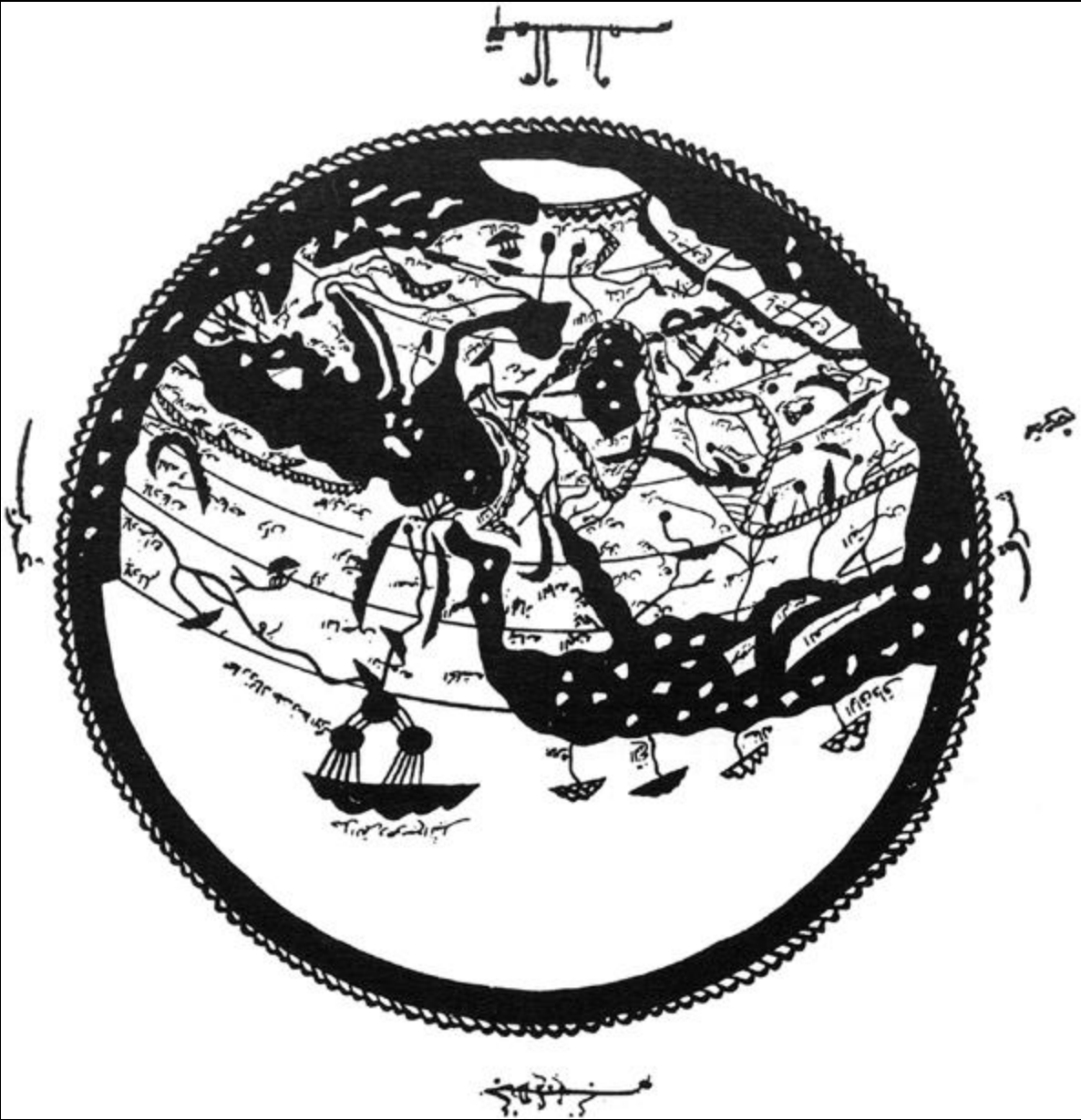
Ten years ago, thousands of photos snapped by NASA’s Terra satellite were stitched together with 3-D software to create a composite of the entire planet. At no point would the Earth ever really look like this, with no cloud cover, every place in daytime at once, and all in the same season. Yet it is presented as a realistic view of Earth from space, and when we see it, we believe it represents reality. And it was produced by NASA satellites, so it must be correct!

Early Cartography - in the Service of Power



Some scholars consider this the oldest map of the world we have found. It shows the homeland of its creators, the Babylonians, as the center of the world.

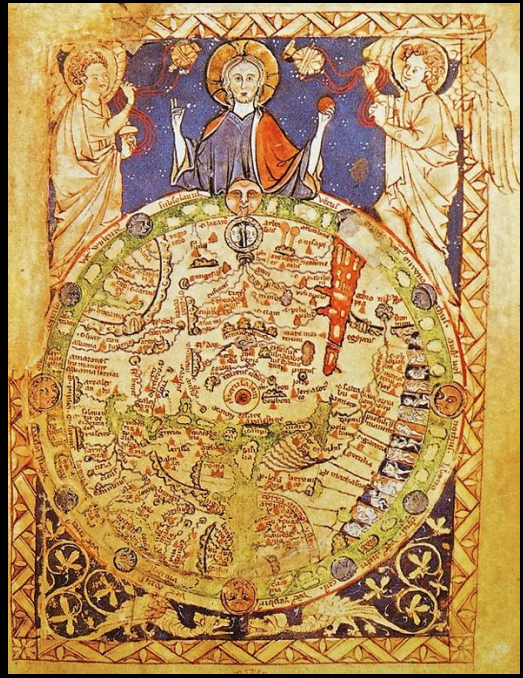
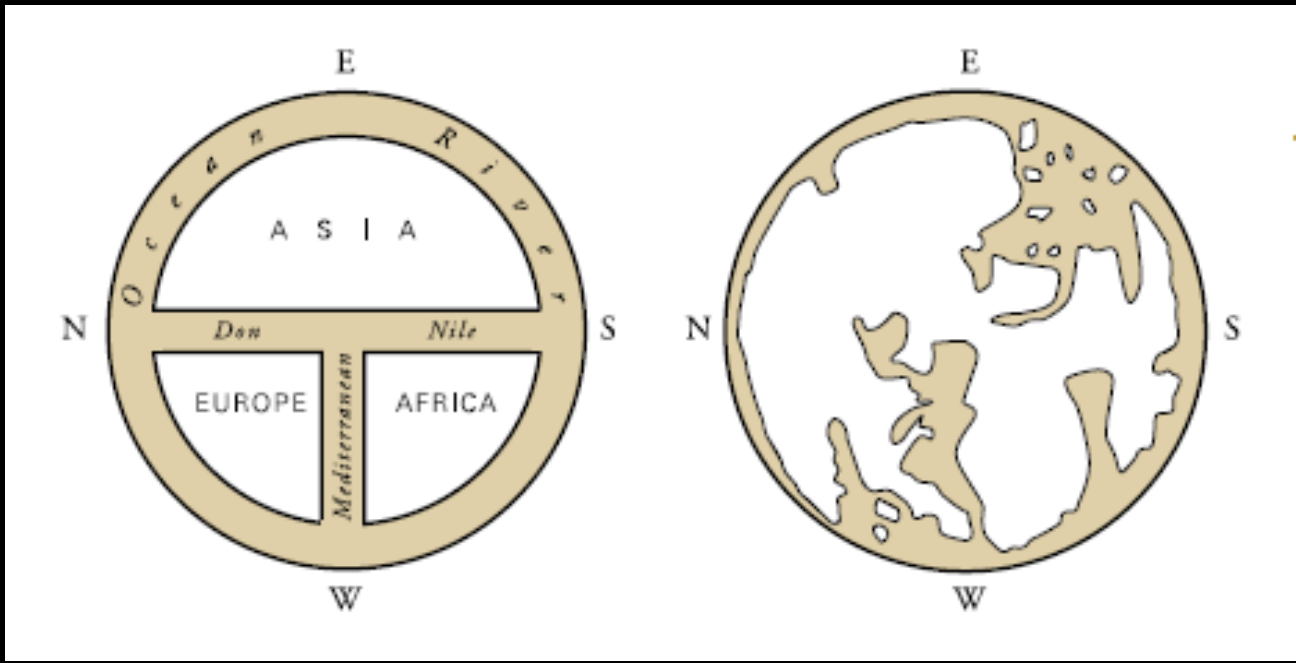
© 1998. From *New Found Lands: Maps in the History of Exploration*, by Peter Whitfield. Reproduced by permission of Routledge/Taylor & Francis Books, Inc.



Islamic cartographer Al Idrisi created this map in 1154. He placed Mecca, the holy city of Islam, at the center.

From Seeing Through Maps: The Power of Images to Shape Our World View (2001) page 96, by W. Kaiser and D. Wood. Reproduced by permission of ODT Publishers.

Early Cartography - in the Service of Religion



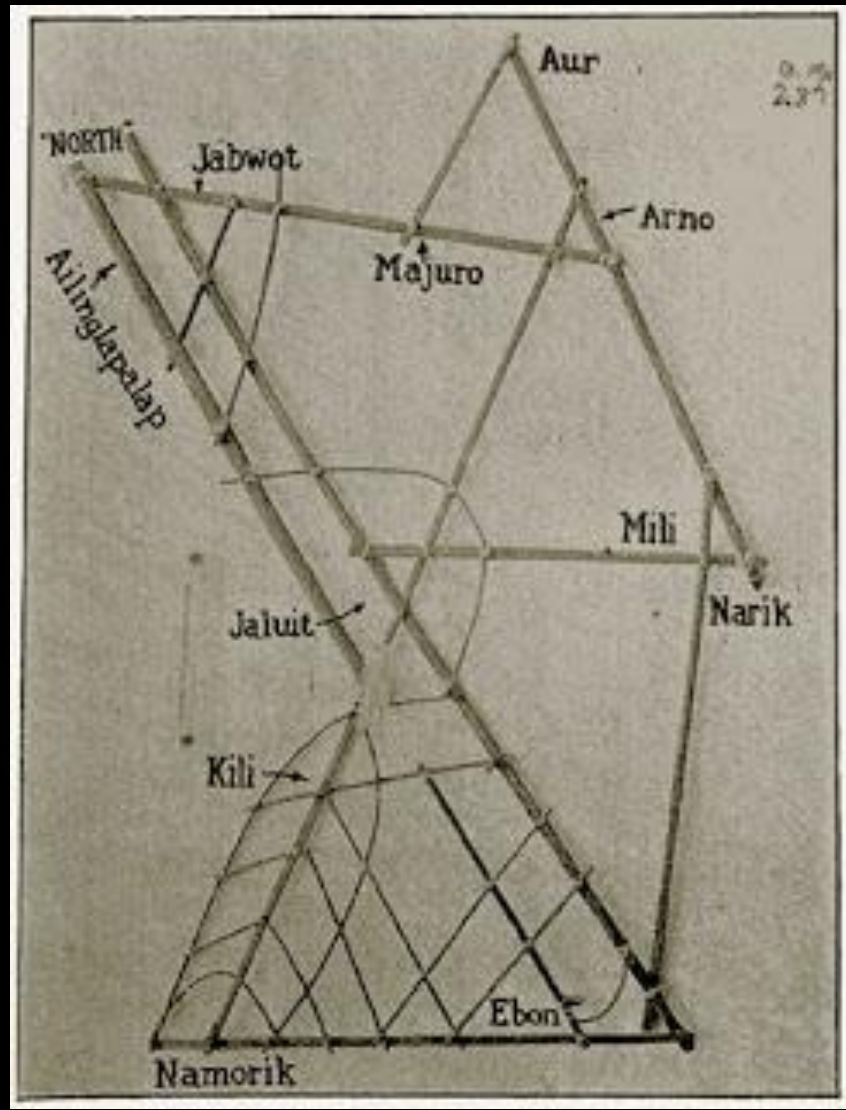
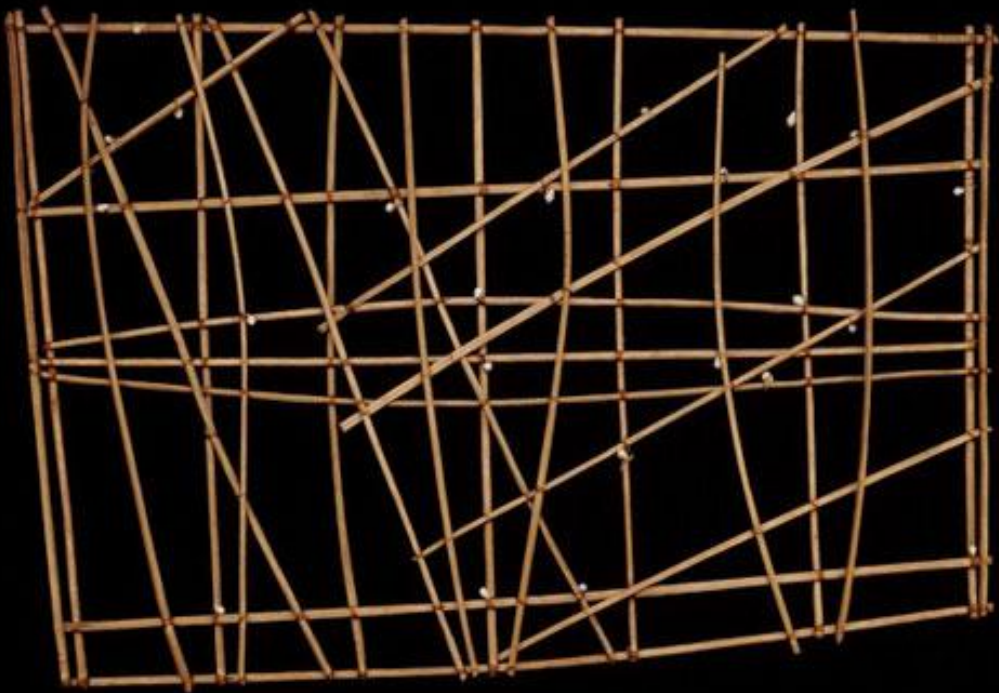
T-in-O map, so-called because of the distinct shape formed by the major rivers and the encircling ocean. *Mappae mundi* typically depicted the world known to medieval Europeans, a Tri-part world, with the Garden of Eden at the top (east) of the map and north at the left of the map. Jerusalem, the spiritual center of the Christian world, would be located in the center of the map. These maps were often very elaborate and intricately detailed, and sometimes Christ's head and feet were shown at the cardinal directions, encompassing the known extent of the world.

Mapping Sacred Spaces – Buddhist Cosmological Maps



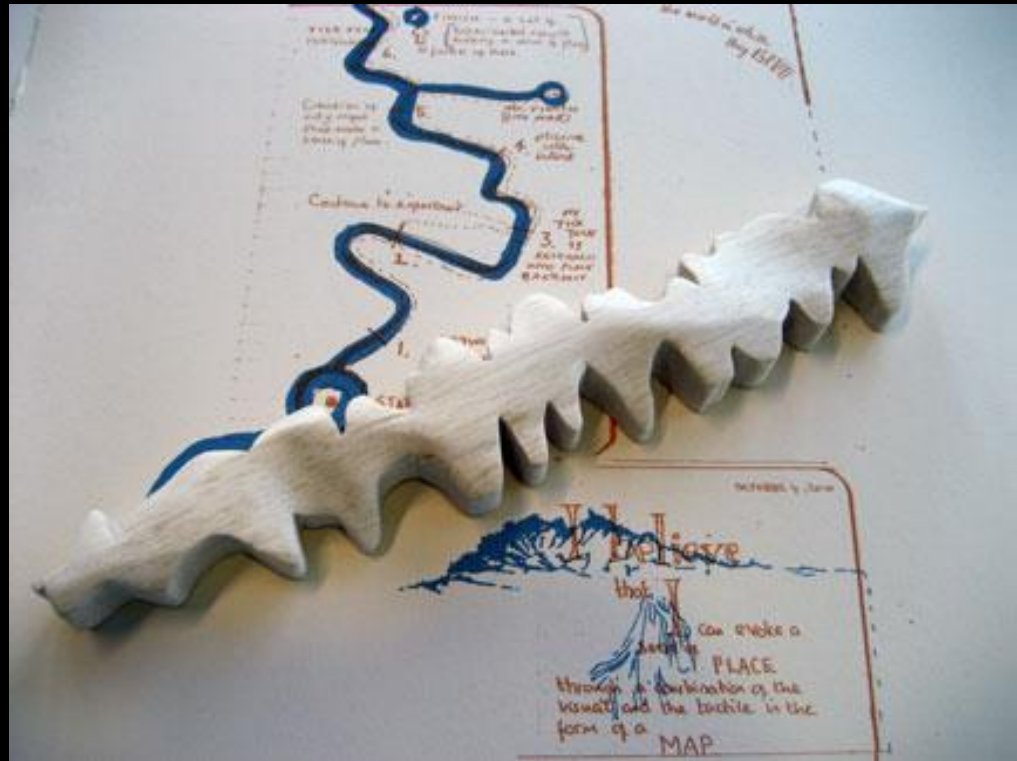
Buddhist Cosmological Maps describe the arrangement of the various worlds within the universe, the shape of the universe. Spatial cosmology can be divided into two branches: the vertical cosmology describes the arrangement of worlds in a vertical pattern, some being higher and some lower. The horizontal cosmology describes the grouping of these vertical worlds into sets of thousands, millions, or billions.

Tactile Maps – Polynesian Navigational Stick Charts



Polynesian navigation device showing directions and patterns of winds, waves, and islands, using sticks and shells.

Tactile Maps – Inuit Sensory Coastal Maps

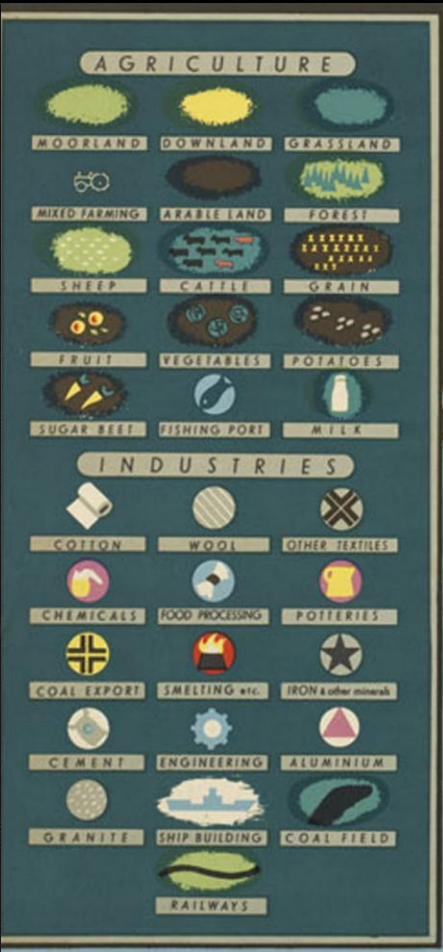


Inuit sensory maps, made of wood or bone, with exaggerated contours to depict the shape of the coastline or other landform features, and meant to be read with the hands. They were often kept within mittens, to be referred to whilst sailing.



Early map of Virginia, by John White, 1585, with Sir Walter Raleigh's coat of arms displayed prominently, a stamp of English possession imposed on the existing indigenous population. (They also Anglized most of the native place names.)

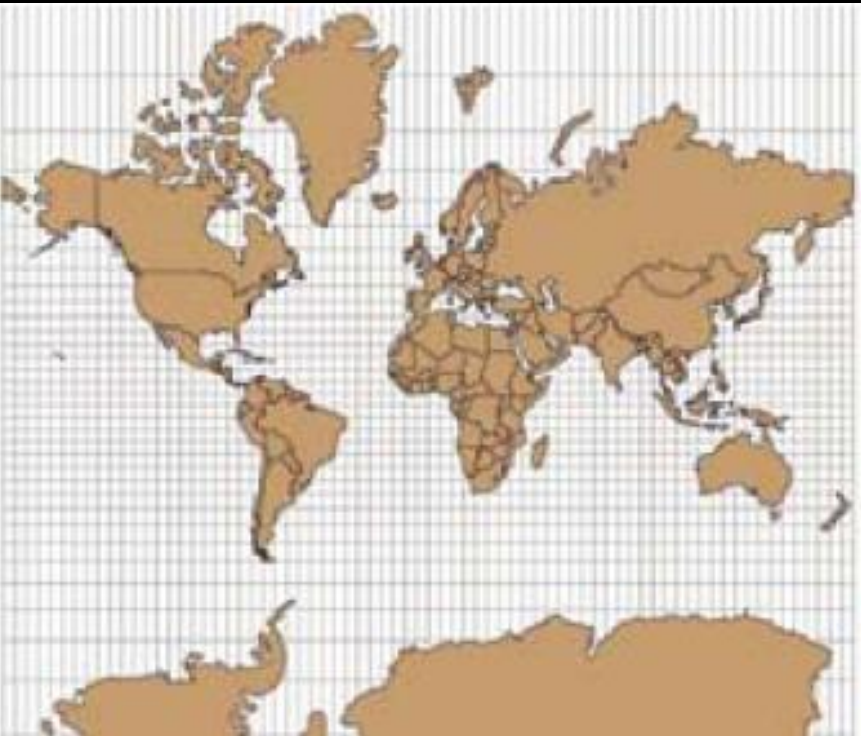
Maps to Glorify the Nation / Extol Her Peoples' Industriousness / Celebrate Her Richness



This is an attractive early infographic, created and published in New York City, and distributed by the British Information Services, an agency of the British Government, in about 1939.

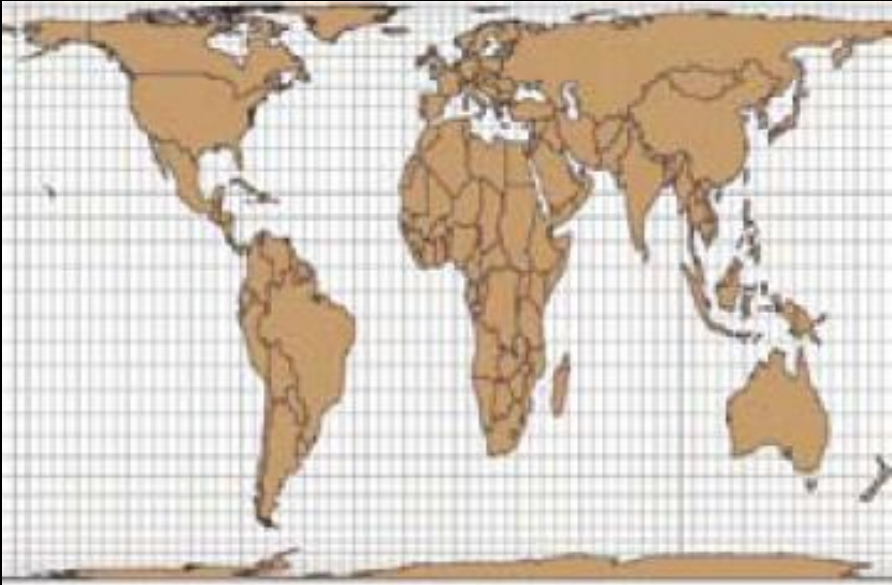


Even Map Projections can have a political agenda – All flat maps have distortions



Mercator Projection – Correct Shape and Direction is preserved , but Area is distorted. This 16th century projection was excellent for navigation, but has been accused of fostering a racist and imperialist agenda since Europe and North America are dominant and unrealistically large, while Africa and South America are diminished in size. This is the projection that appeared in most European and American classrooms until the 1970's.

Gall-Peters Projection – Correct Area is preserved, Shape is distorted. The “politically correct” projection, often used by the United Nations and other global organizations for their thematic mapping, since areal units are shown more correctly.



Maps to Bust Assumptions – The True Size of Africa

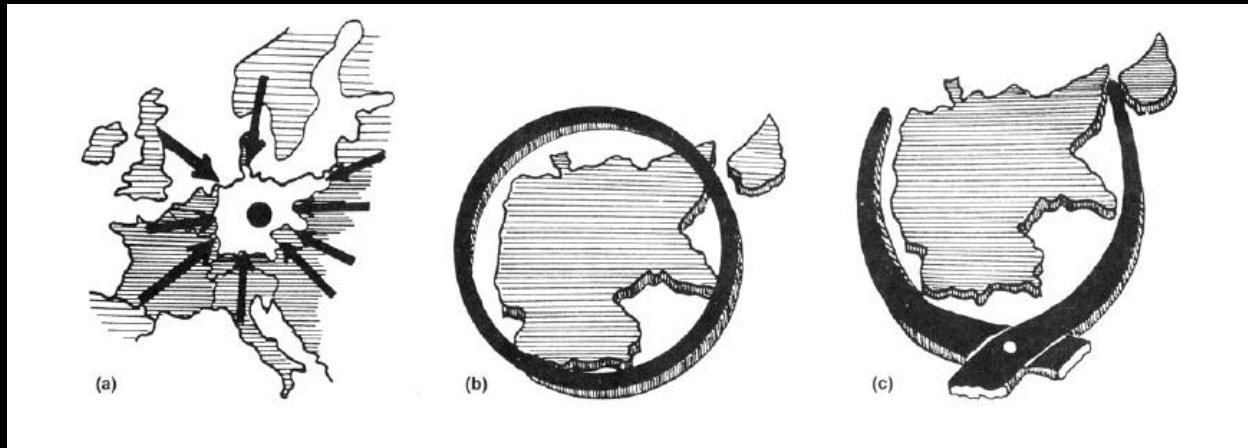


Maps to Bust Assumptions and Challenge our Perspective – Why is North Always on Top?



In this map, where north is at the bottom, Australia is no longer “Down Under.” After all, Earth is a geoid hurtling through space, and in space there is no “up” or “down.”

Propaganda Maps – to Inflame and Incite

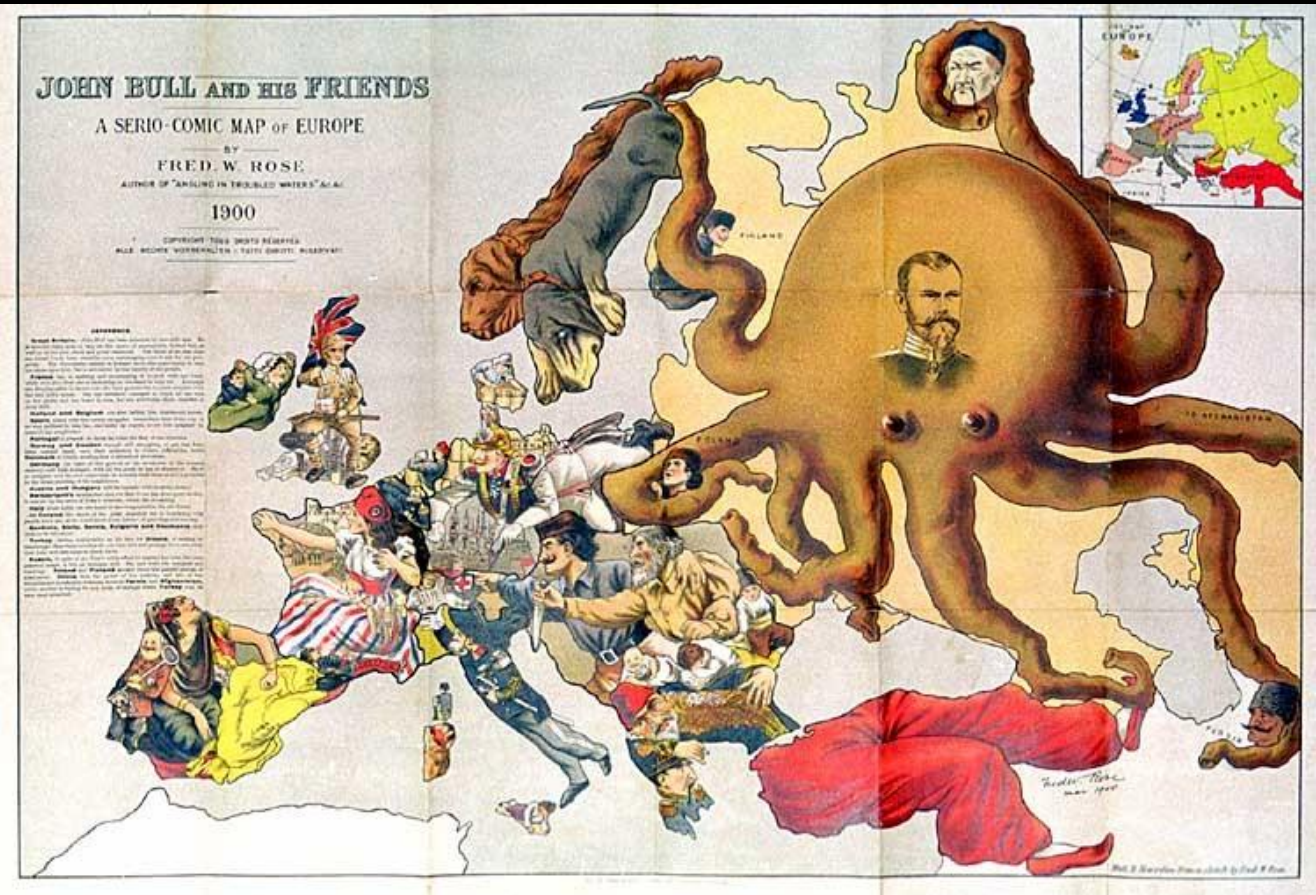


Typical propaganda map symbols: (a) arrows represent pressure on Germany from all sides; (b) circle signifies the encirclement of Germany before and after WWI; (c) pincers personify the pressure against Germany from France and Poland from the west and east.



A poster displayed by the Army of the Pure, a militant organization based in Pakistan, shows missiles juxtaposed against a map of India and Pakistan, and suggests that the map of the subcontinent be changed to include “more Pakistans.”

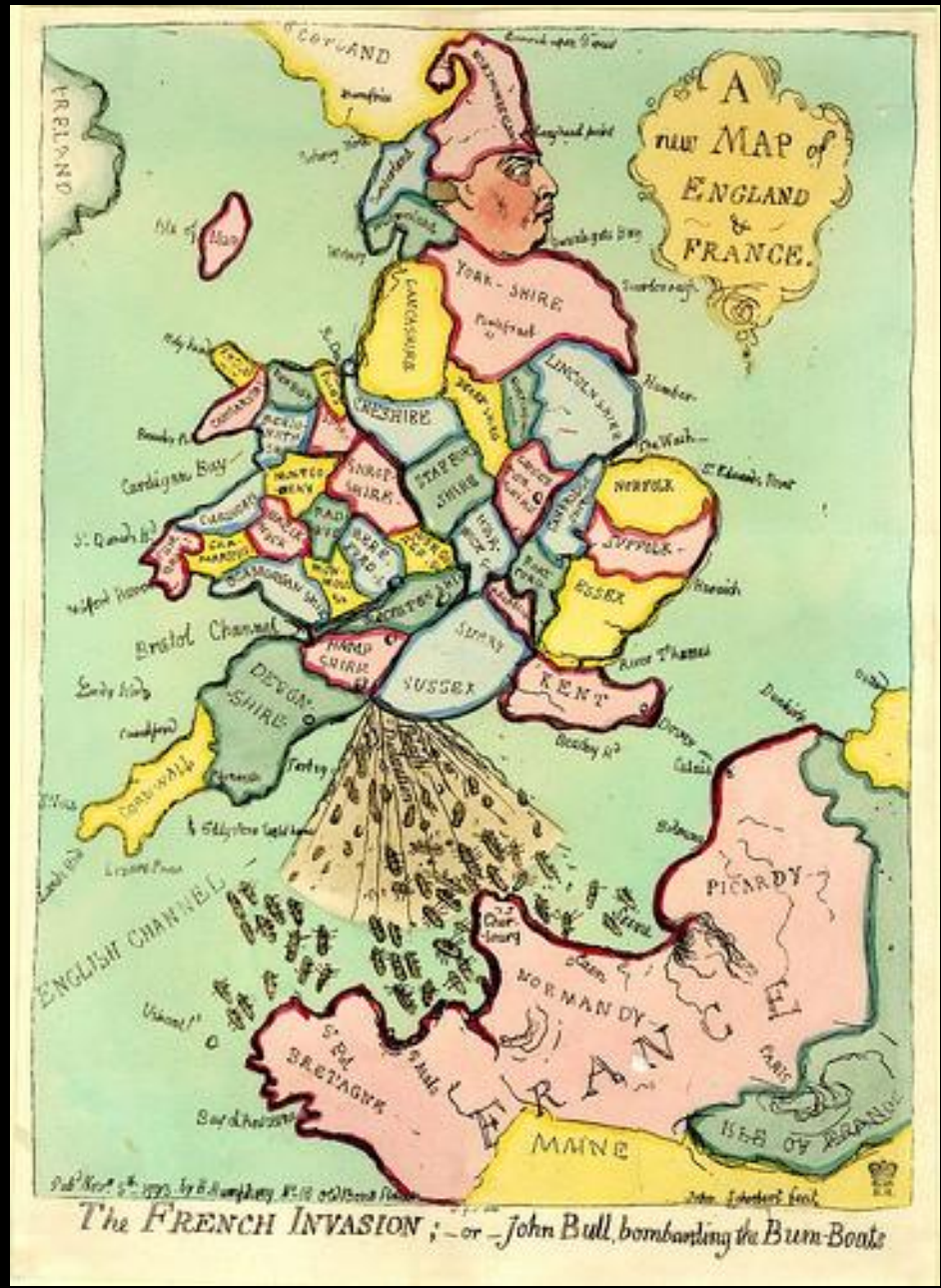
Satirical Maps / Political Commentary (One Step Above a Propaganda Map)



Political caricature map of the countries of Europe, known as the Octopus Map from the brooding presence of the Russian Empire depicted as a massive octopus, whose tentacles stretch out towards Europe. China is shown in the grasp of Russia, as is Persia and Poland. France and Spain are attractive women, while Germany, Italy and England are military commanders. It uses an outline of Europe as the framework for presenting its political comment, assuming that its readers will recognize the shapes and identify the countries within. Variations on the Octopus Map were popular, including use by Japanese propagandists to win European support against Russia during the Russo-Japanese War.

Satirical Maps (One Step Above a Propaganda Map)

This caricature...deals with the then very acute British fear of a French invasion. At that moment in time, (late 18th century) France was raging with a revolutionary fervour, and threatened the surrounding established regimes. One could call this caricature a fine example of scatological cartography, since George III [John Bull] “craps vigourously on the coast of France, dispersing a number of tiny gunboats (...) The image is gross, but the King’s evacuations are heroic, patriotic and contemptuous, expressing the feelings of the brutish but uncensored John Bull, whom he here embodies.”



Maps that Stereotype / Insult / Provoke / Make us Question our Biases

New Yorker's Map of America

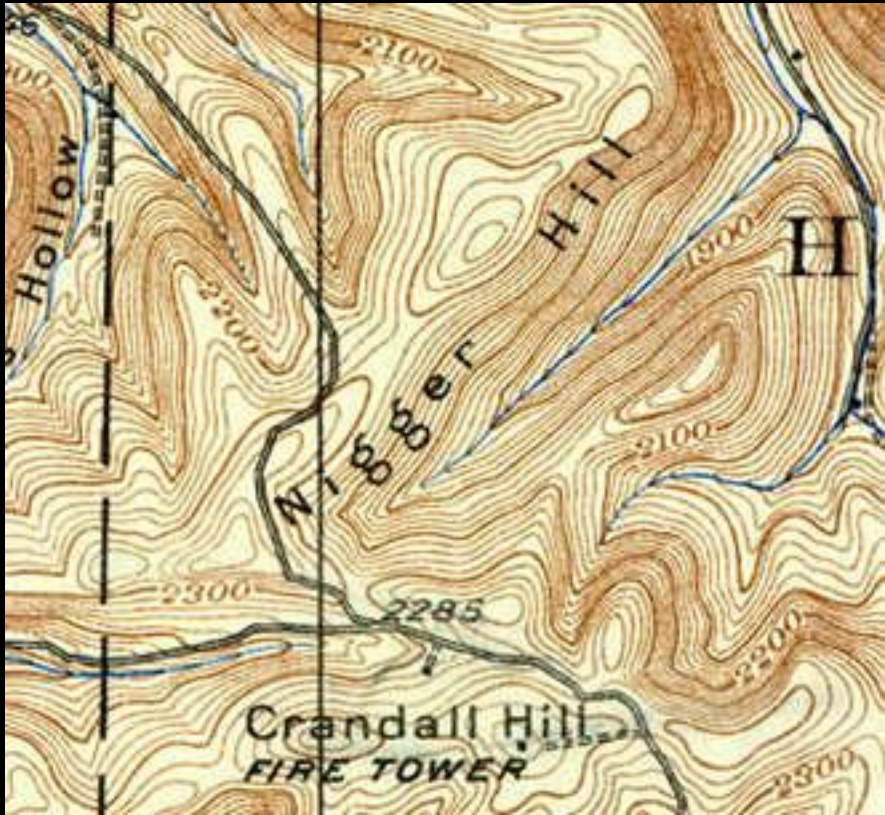


- New York, greatest place in the world
- Guidos
- Cheese-Steaks
- Fucking Red Sox fans
- Hippies
- Rednecks, hillbillies, yokels, sister-fuckers



Top left: New Yorker's View of the U.S.;
Top right: American's View of the World;
Bottom right: Detail of American's View of the World (from Alphadesigner).
Offensive or amusing? You be the judge.
If offensive, is it more offensive (or derogatory) to the people being stereotyped, or to the people supposedly doing the stereotyping?

Maps that Denigrate – Geographical Bigotry – The Amazing Racism! Derogatory Toponyms



“In the early twentieth century, it was common for towns and geographical features to have salacious, bawdy, and even derogatory names....Place names are far more than simple markers of location; they are social constructions which create, define and validate the particular reality desired by the namers,” Mark Monmonier, *“From Squaw Tit to Whorehouse Meadow: How Maps Name, Claim, and Inflammate,”* University of Chicago Press, 2007.

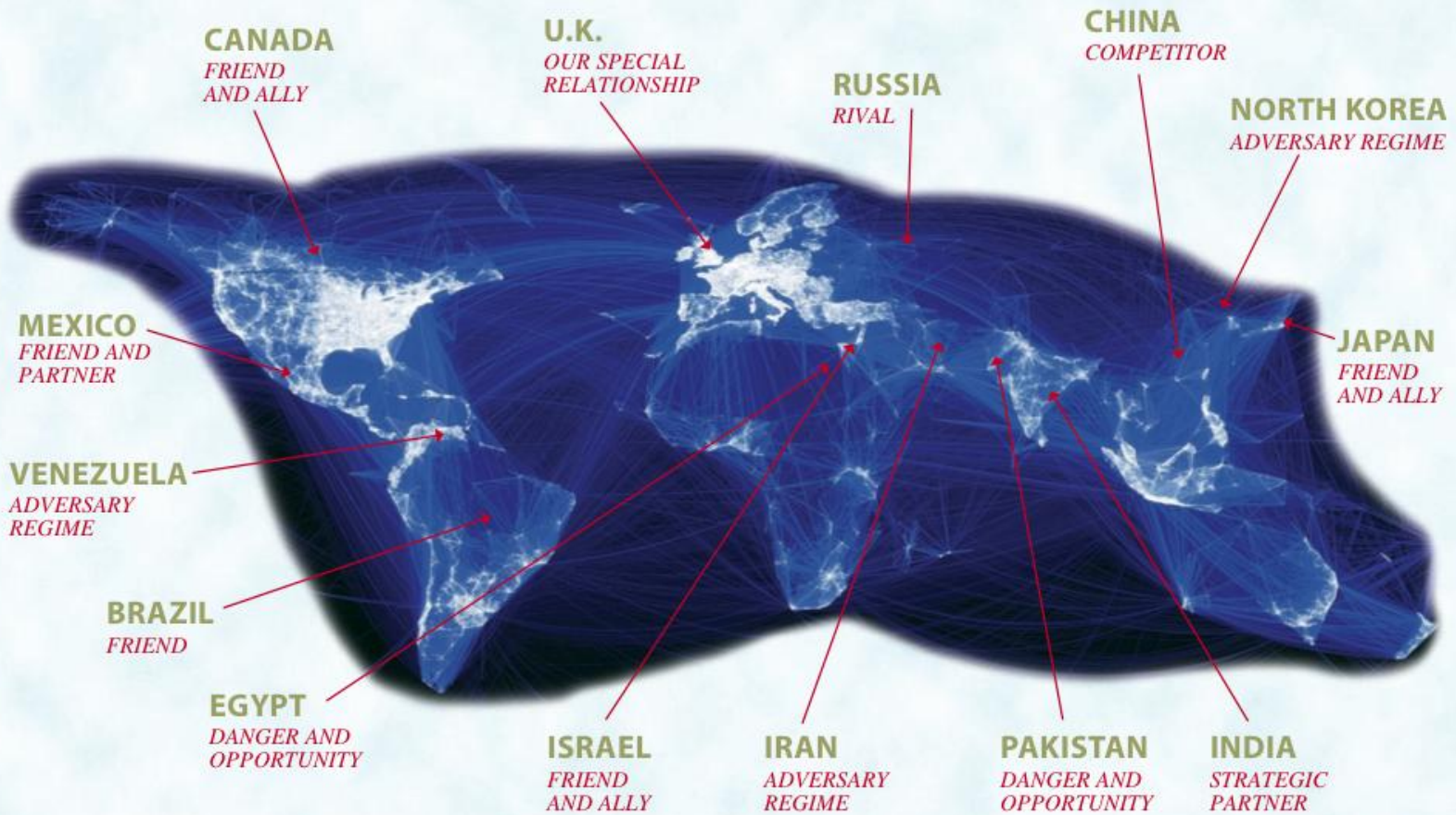
Remember the brouhaha over Texas governor Rick Perry’s unfortunately named boulder on his ranch? Amazingly, there are still many derogatory place names in the U.S. Some states have made an effort to change these.



Excerpt from the Commodore, PA 7.5-minute USGS quadrangle map (1993)

MY ASSESSMENT OF OUR KEY COUNTRY RELATIONS

I will clearly distinguish between our friends and our adversaries – and make it known that we will stand by our friends.



This map shows the density of Facebook connections around the world. It illustrates how entrepreneurship and freedom can light up the world with friendship.

This 2012 map is from the website of the ill-fated Republican Presidential candidate, Herman Cain, and displays sweeping generalizations and mysterious and dubious categorizations of various nations.

Maps to Advertise



A beautiful example of a product map, showing the extensive route map of the Flying Clippers, as well as (some rather simplistic) symbols of the points of interest in each continent that the traveler will undoubtedly wish to visit. It definitely give the impression of the global reach of the Pan American Airlines.

This type of map was used successfully by many companies to demonstrate the global or national reach of their product, which was seen as impressive and a positive selling point.

Maps to Advertise



IMPERIAL FEDERATION - MAP OF THE WORLD SHOWING THE EXTENT OF THE BRITISH EMPIRE IN 1866.

STATISTICAL INFORMATION FURNISHED BY CAPTAIN J. C. R. COLONEL W. F. H. R. S. L. BRITISH TERRITORIES COLOURED RED.

WILSON & JONES PRINTING CO. LONDON.

This map is not trying to sell a product, per se, but rather a brand – the “Rule Britannia” brand. Showing the extent of the British Empire in 1866 (the sun never did set on the British Empire in those days!), it embellishes the map’s margins with “exotic” subject peoples in native garb.

UTOPIAE INSVLAE FIGVRA



UTOPIENSIVM ALPHABETVM.
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 Θ Φ Ω Γ Δ Ι Λ Γ Π Ε Ψ Ε Ε Ε

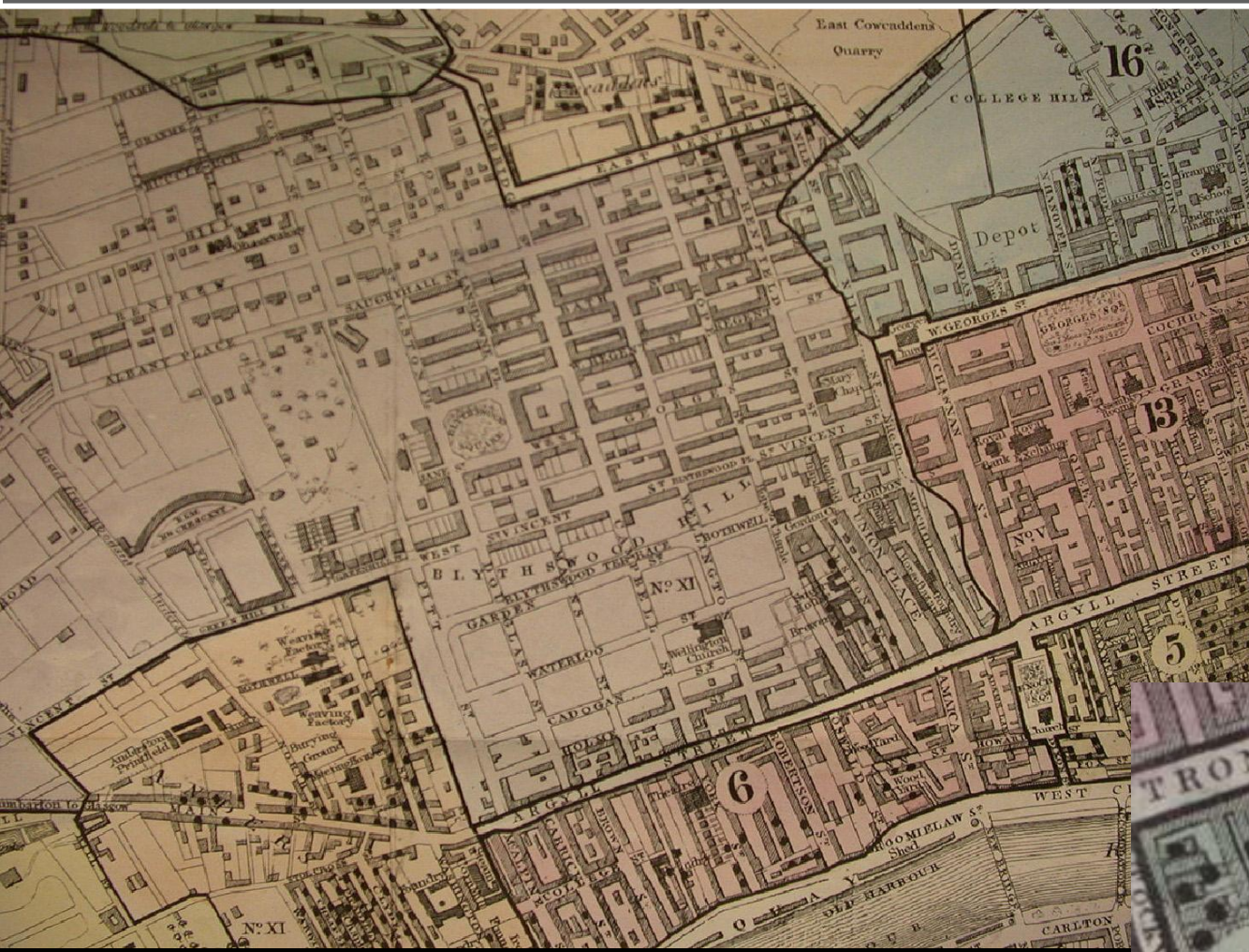
Tetraſtichon vernacula Vtopienſium lingua.

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|-------------|-------------|--------------|--------|----|
| Vtopos | ha | Boccas | petu | la |
| ΘΠΛΓΛΕCΘ | ΘΛΦΘΘΒ | ΓΘΕΙΞΘ | | |
| chama | polta | chamaan | | |
| ΦΘΔΘ | ΓΛΞΠΘ | ΦΘΔΘΘΙ | | |
| Bargol | he | maglomi | baccan | |
| ΘΘΠΛΞ | CE | ΔΘΥΞΛΔΘ | ΘΘΦΘΘΙ | |
| soma | gymno | ſophæon | | |
| ΕΙΛΔΘ | ΘΒΔΙΛ | ΕΙΛΓCΘΙΛ | | |
| Agrama | gymnoſophon | labarembacha | | |
| ΘΠΘΔΘ | ΘΒΔΙΛΒΙΓΙΛ | ΞΘΔΘΓΘΔΘΘCΘ | | |
| | bodamilomin | | | |
| ΘΛΘΘΔCΞΛΔC | | | | |
| Voluala | barchin | heman | la | |
| ΕΙΛΞΕΘΞΘ | ΘΘΠΦCΘΙ | CΘΔΘΙ | ΞΘ | |
| Iauoluola | dramme | pagloni | | |
| ΞΘΒΙΛΞΕΙΛΞΘ | ΘΠΘΔΔΘ | ΓΘΘΞΙΛC | | |

Horum verſum ꝑd verbum hæc eſt ſententia,
 Vtopus me dux ex non inſula fecit inſulam
 Vna ego terrarum omnium ꝑbſqꝑ philoſophia
 Civitatem philoſophicam expreſſi mortalibus
 Libèter impartio mea, nõ grauatim accipio meliora.

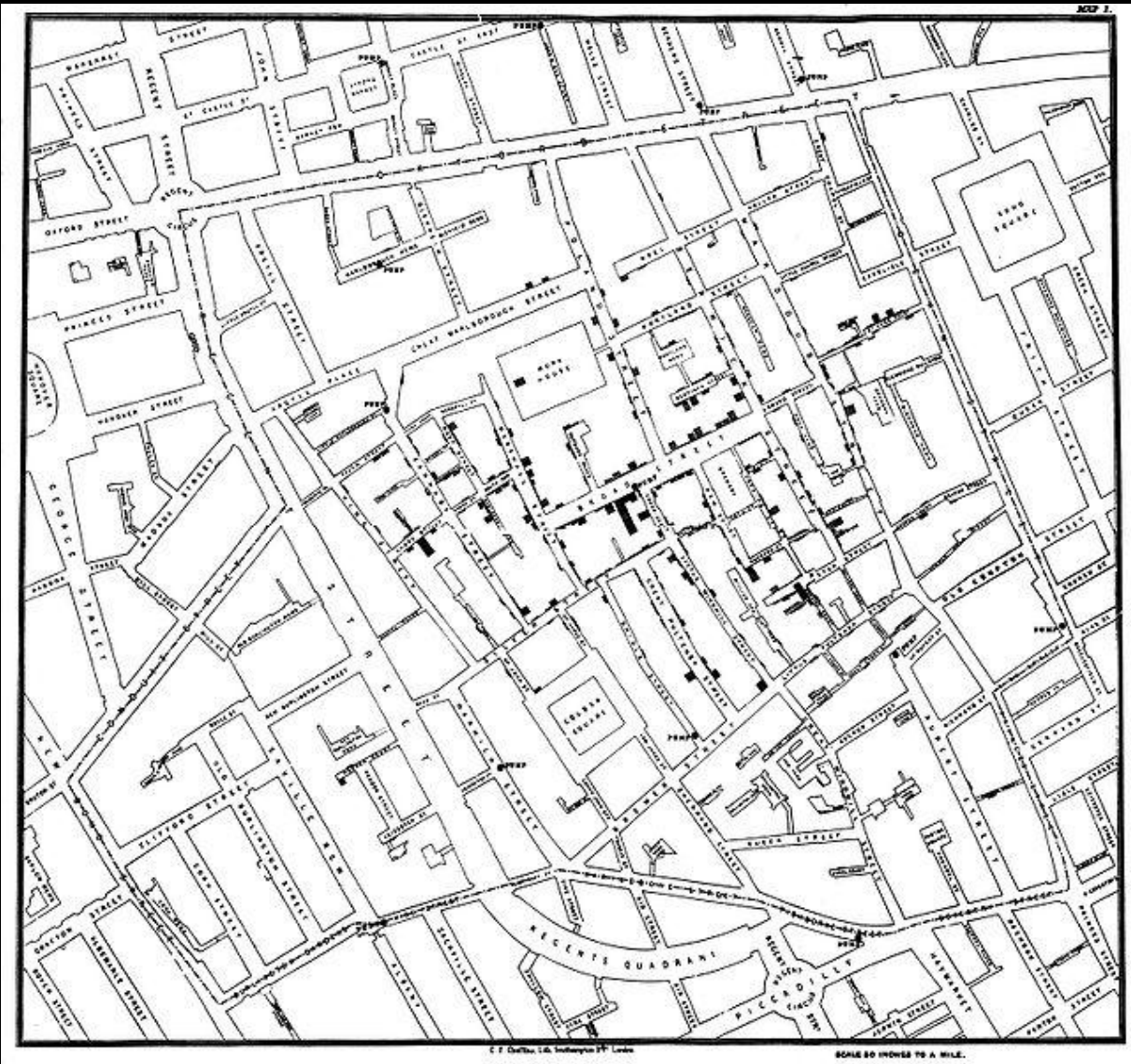
A map of an ideal (imaginary) environment in Sir Thomas More’s 1516 book “Utopia,” which was a word he coined. Urban planners and designers still today make maps of ideal environments.

Maps to Inform and Advocate for Change

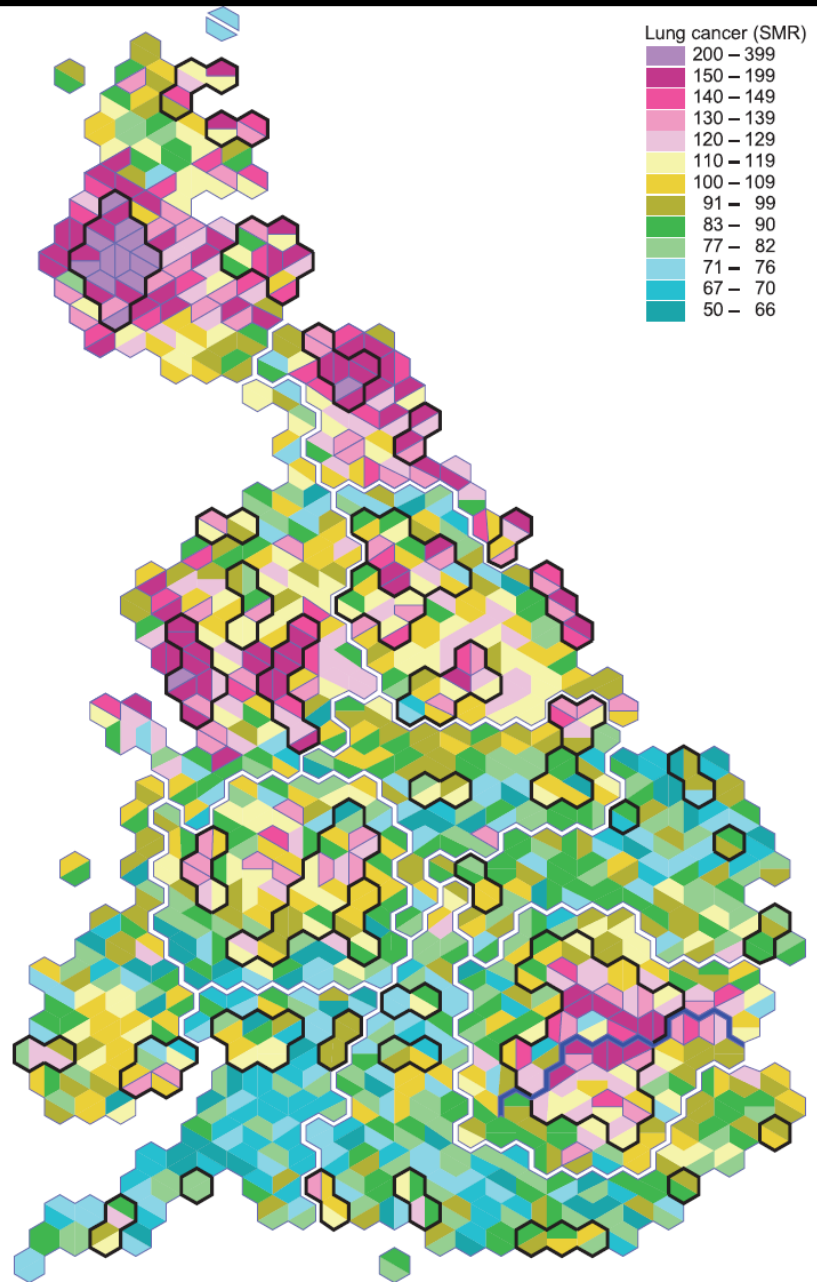


This 1844 study relates to the fever epidemic which struck Glasgow in the previous year. Written by Robert Perry of the Glasgow Royal Infirmary, it uses local medical reports, statistical tables, and a color-coded map of the city to highlight the link between poor sanitation, poverty, and poor health.

Maps for Discovery and Reform

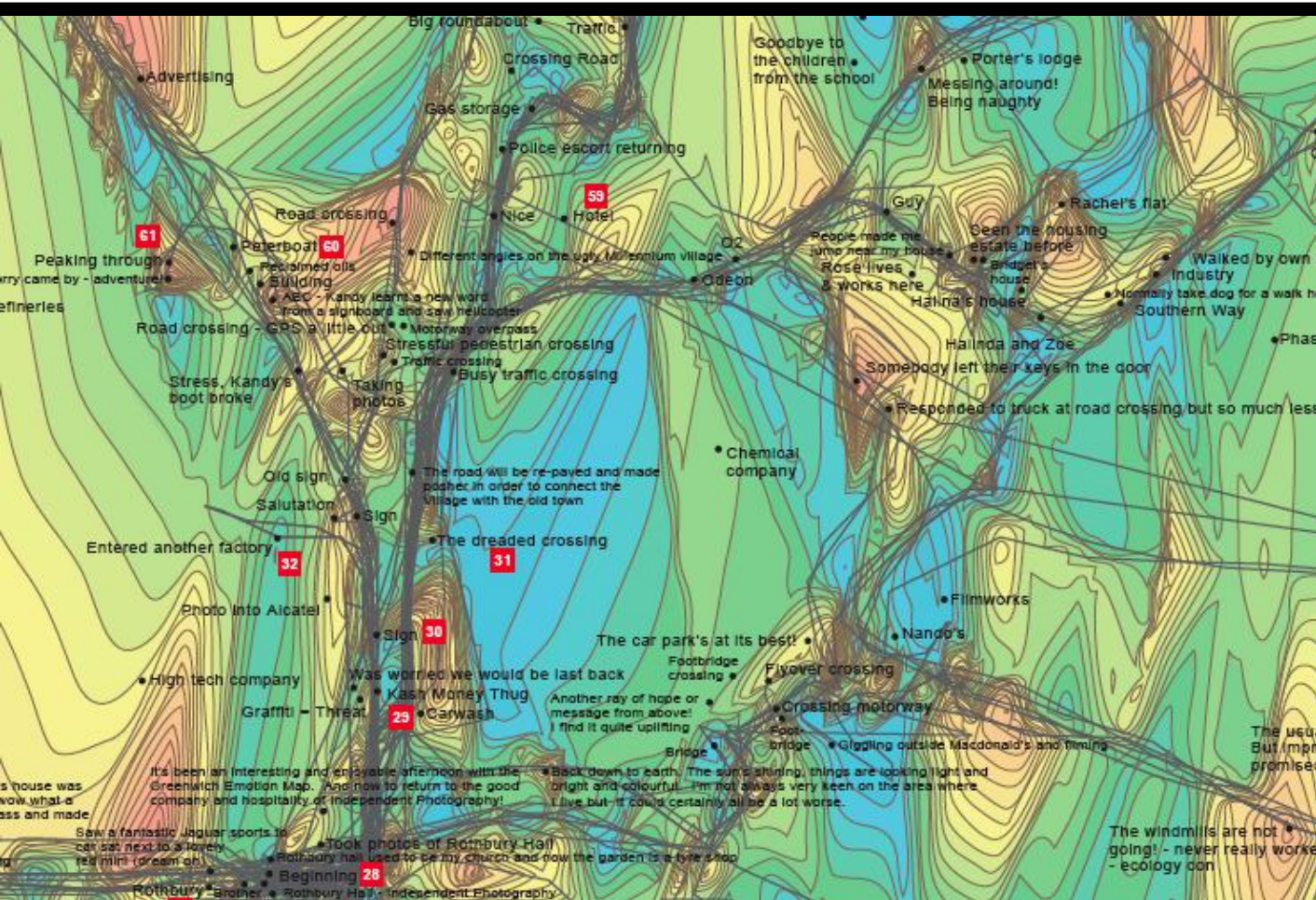


Dr. John Snow's seminal map on the location of cholera victims in relationship to water sources in mid-19th century Soho, London. Up until this time, the causes of cholera were unknown, and suspected to be due mainly to unhealthy "miasmas." Dr. Snow's map demonstrated that in fact cholera was a water-borne disease, caused by drinking water contaminated with the bacteria.



Standardized Mortality Rates for Lung Cancer in Britain. “Smoking is strongly linked to deprivation. The map shows a north–south gradient with lower rates in the south. Scotland, and particularly Glasgow, has the highest rates; Scotland also has the highest smoking rates. Clusters are found in Liverpool and Manchester, in Tyneside and along the north east coast, and in central London. Within central London, the neighbourhoods covering the more affluent areas have lower rates than their neighbours. From *“The Grim Reaper’s Road Map: An Atlas of Mortality in Britain.”* (Shaw, Thomas, Smith, and Dorling, 2008).

Emotion Mapping - Psychogeography



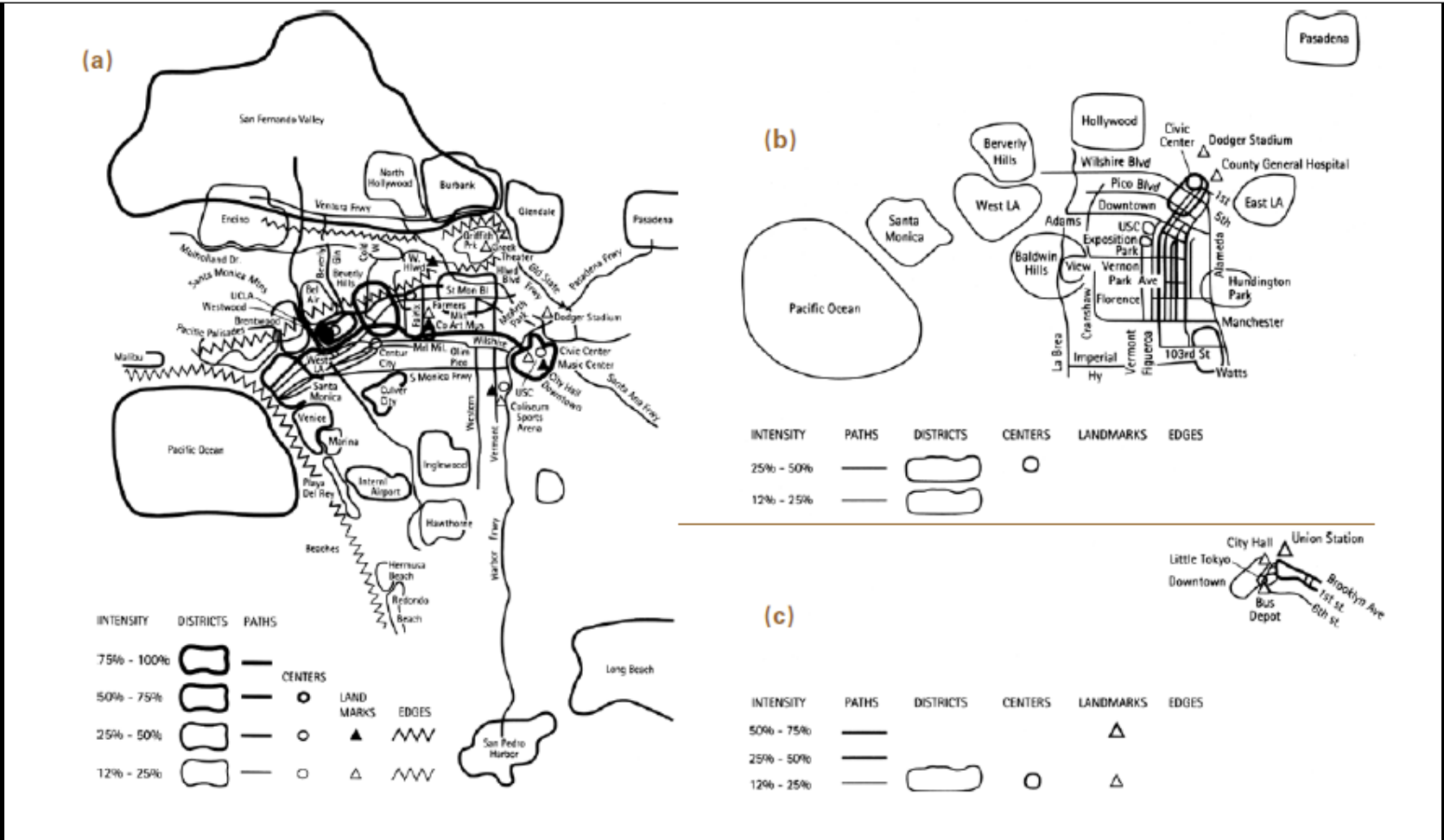
Key

- Participant's track
- Arousal contour
- Location of participant's photograph
- Participant's annotation
- Communal arousal gradient

| |
|--------------|
| High Arousal |
| Low Arousal |

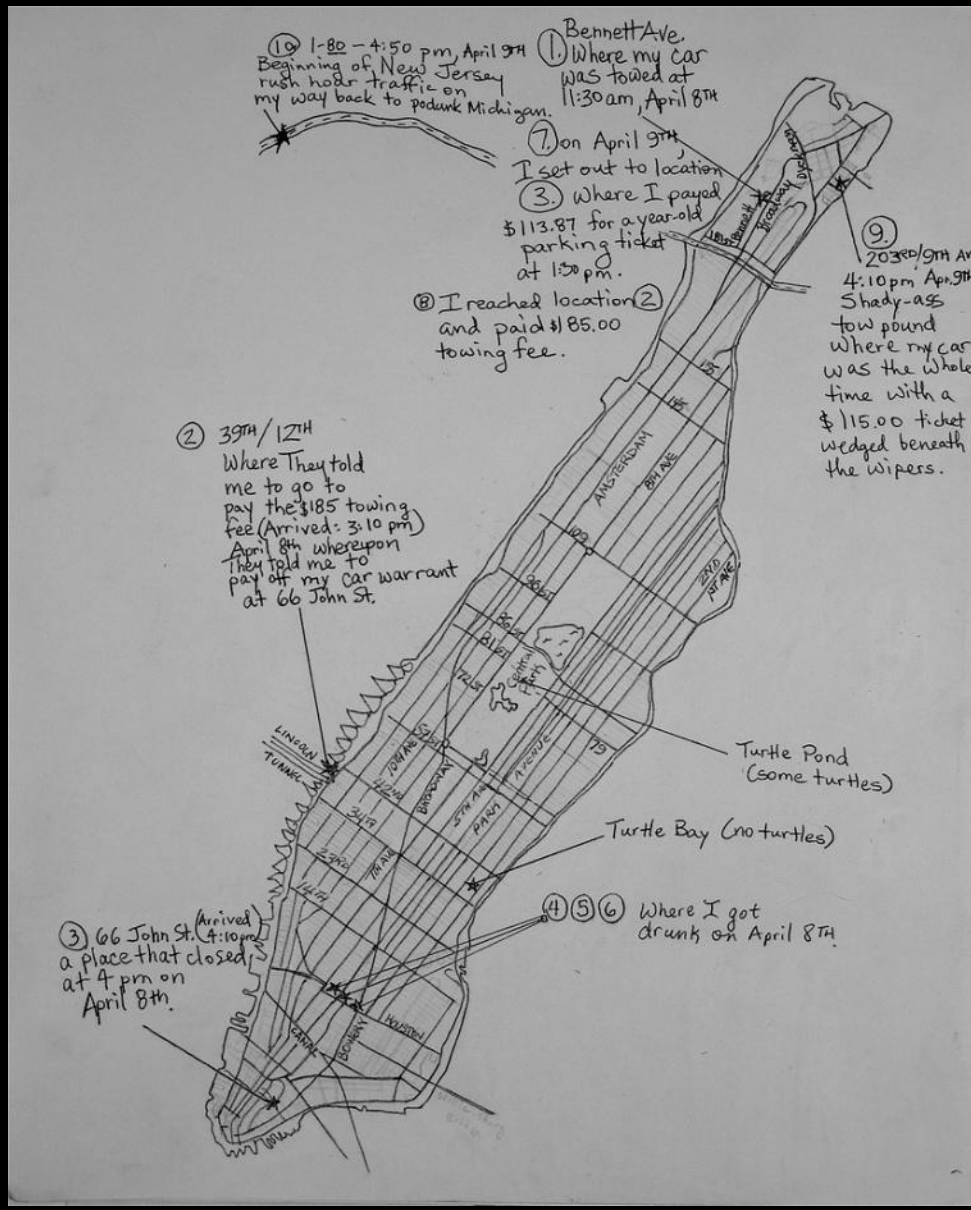
“[Emotion Mapping] is revolutionary methodology and tool for visualising people's reactions to the external world. Participants re-explore their local area with the use of a unique device which records the wearer's Galvanic Skin Response (GSR), a simple indicator of emotional arousal in conjunction with their geographical location. A map is created which visualises points of high and low arousal, highlighting the issues that people feel strongly about.” Christopher Nold

Mental Mapping – How we perceive our world and what that says about us



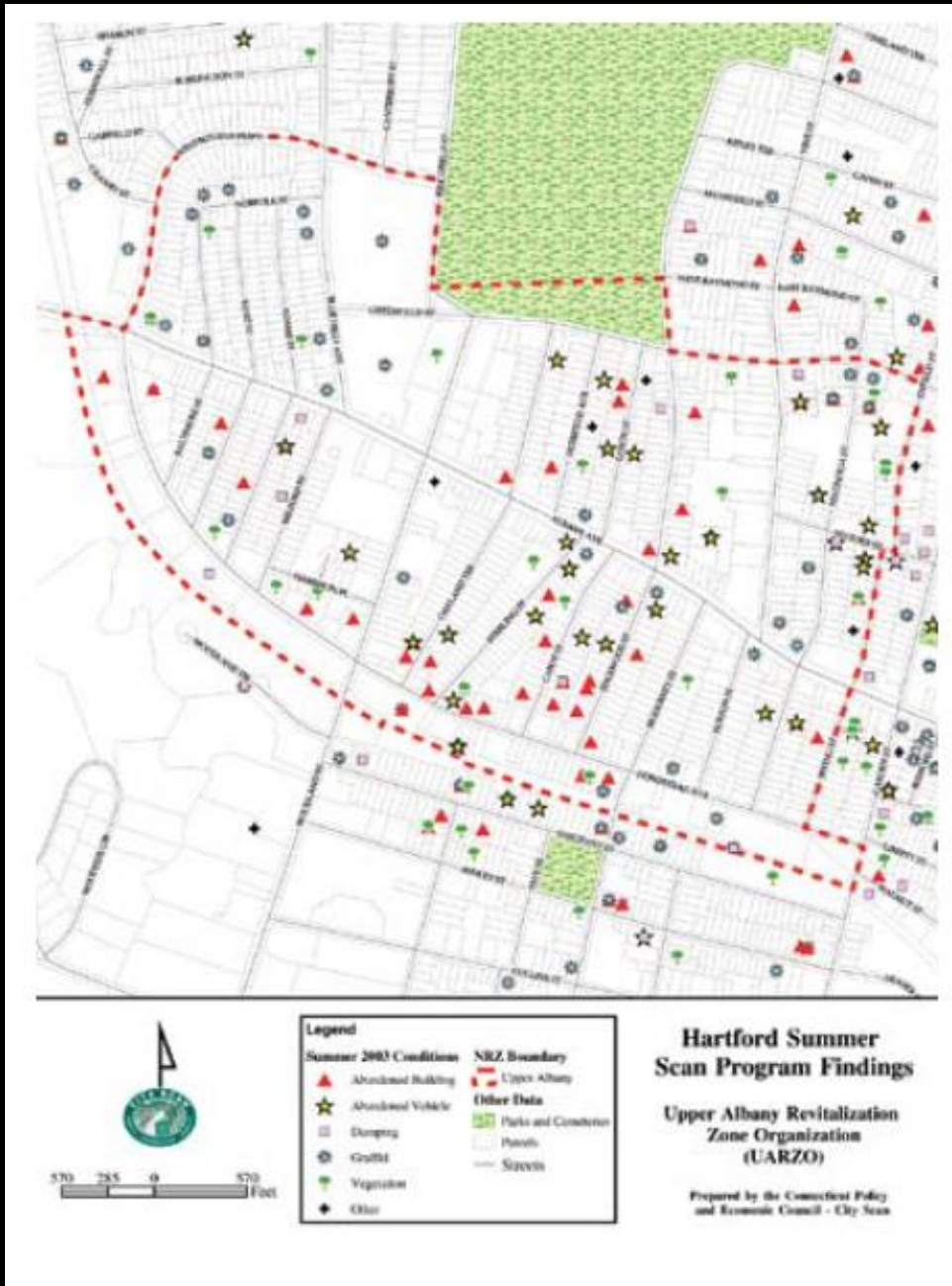
How we experience our surroundings depends on who we are: our cultural background, education, income level, gender, age, and physical abilities. Map (a) is a composite of mental maps of Los Angeles compiled by white residents in a predominantly white community. Map (b) is by black residents living in a black community. Map (c) is by Hispanic residents in a community where they predominate. From *“Mapping: Ways of Representing the World”*

Mental Mapping – How we perceive our world and what that says about us



A visitor to New York City had his car towed, and this map represents the saga of his experiences, geographical journeys, and timeline in reclaiming his car from the pound. For a simple sketch map, it is sophisticated, contains a lot of complex information, and tells a complete story.

Mapping a Community – The “Unofficial” View – Mapping Quality-of-Life Issues

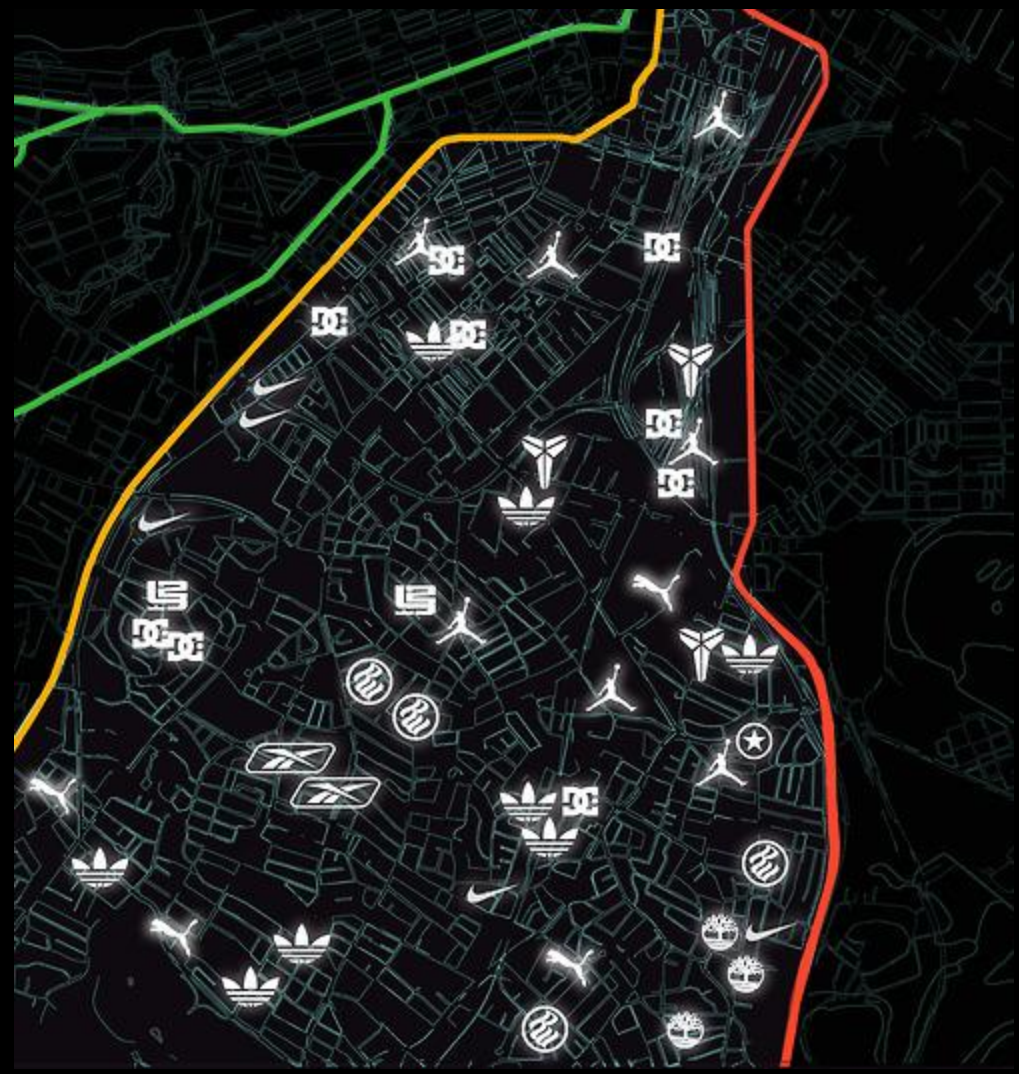


Mapping quality of life issues—street level conditions. In the CitiScan Project, neighborhood volunteers and high school students with GPS, handheld computers, and digital cameras recorded data about physical conditions in their neighborhoods. The data was then entered into a GIS and mapped for use in resource allocation and prioritization.

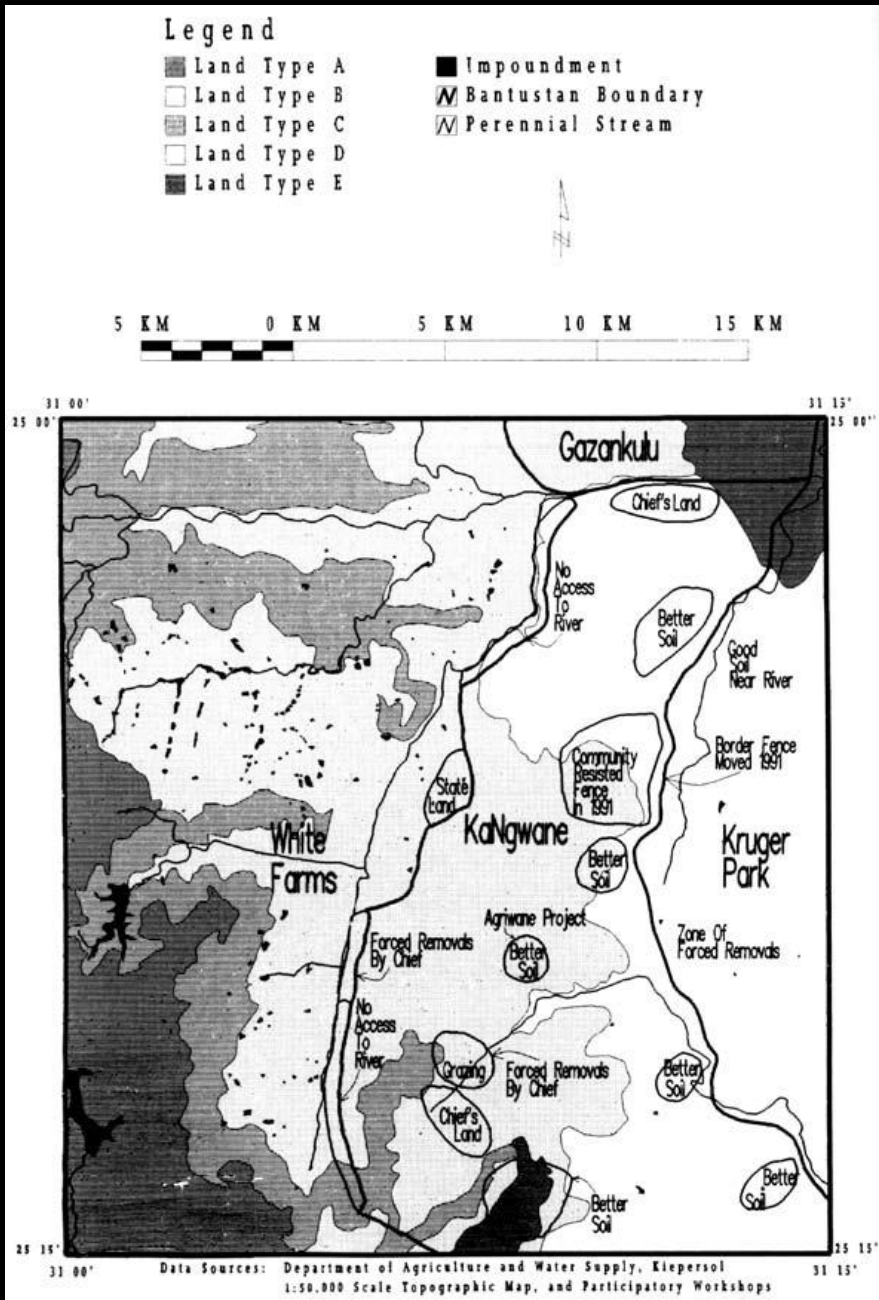
This map shows features that would never appear on an official USGS map of the area, such as illegal dumping areas, abandoned cars, derelict buildings, and graffiti. These things are not mapped by USGS because they are thought to be temporary and not permanent features of the landscape, even though many of these things could be there for years.

Connecticut Policy and Economic Council, (CPEC)
www.city-scan.com.

"The Street Wear Map," a mapping of the various brands of sneakers hanging from power lines between the Orange and the Red line subway alignments in greater Boston, using ArcGIS, Google Street View, Illustrator, and Photoshop, by David Buckley Borden



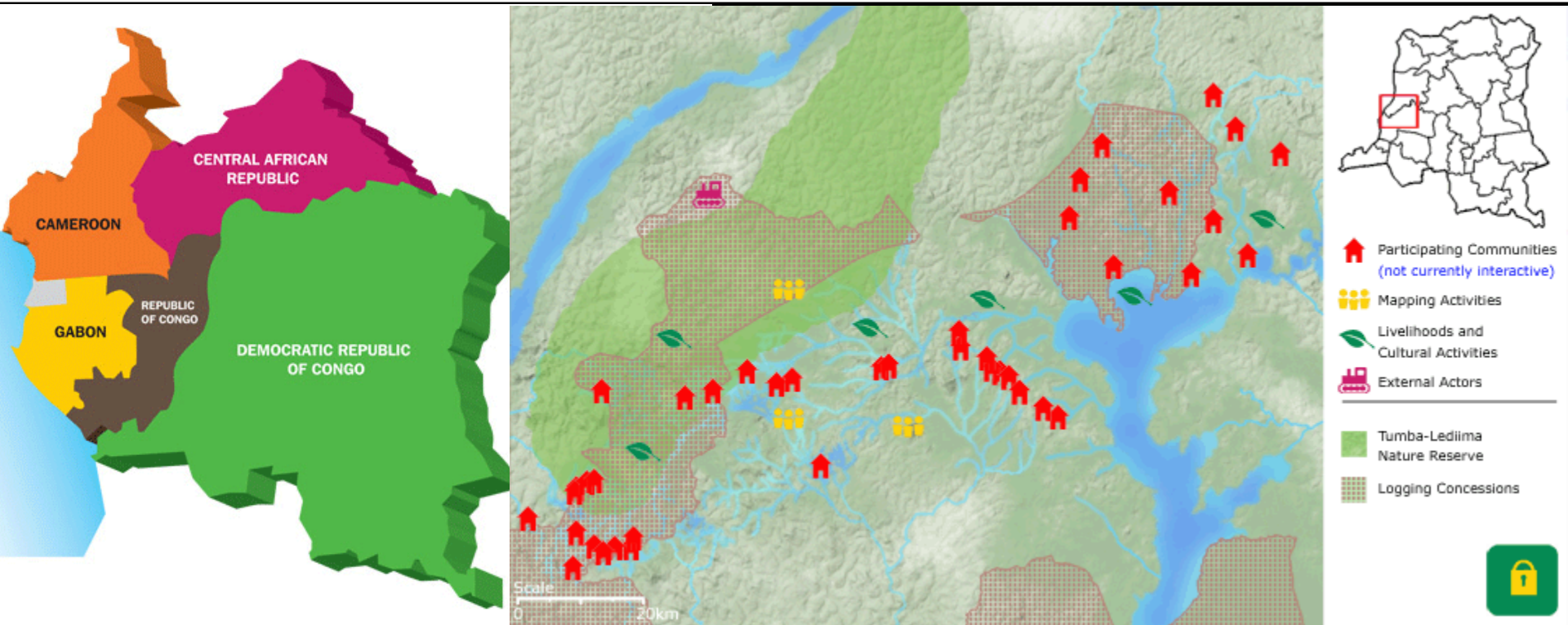
Participatory Mapping – Maps for Empowerment – Mapping for Rights



Map of land types and composite mental map of Kiepersol, Eastern Transvaal, South Africa. Maps were developed based on participatory GIS projects for equitable post-apartheid land reform and land redistribution, and show areas of good soil for agriculture.

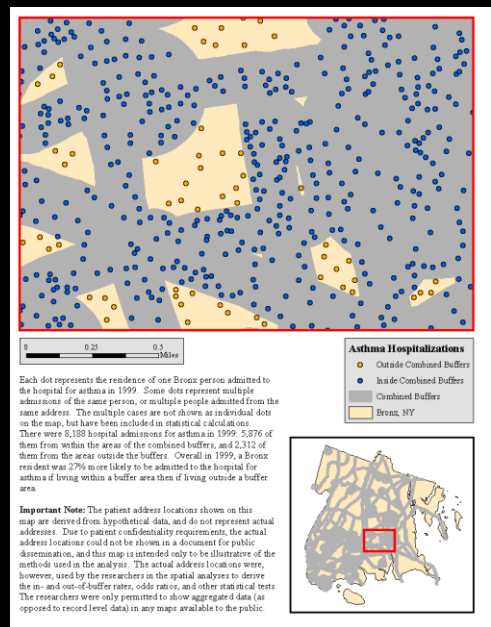
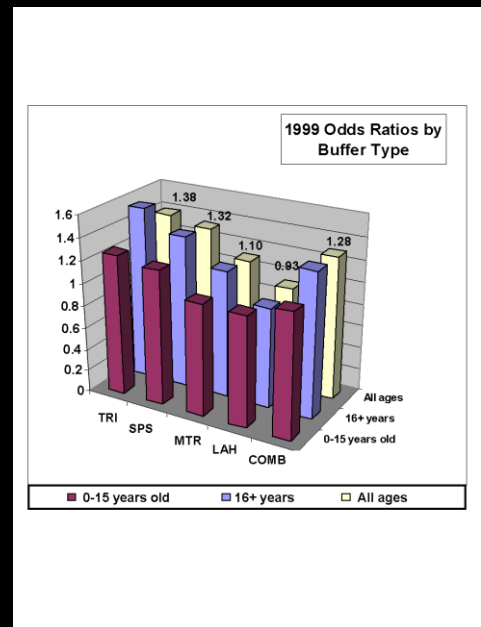
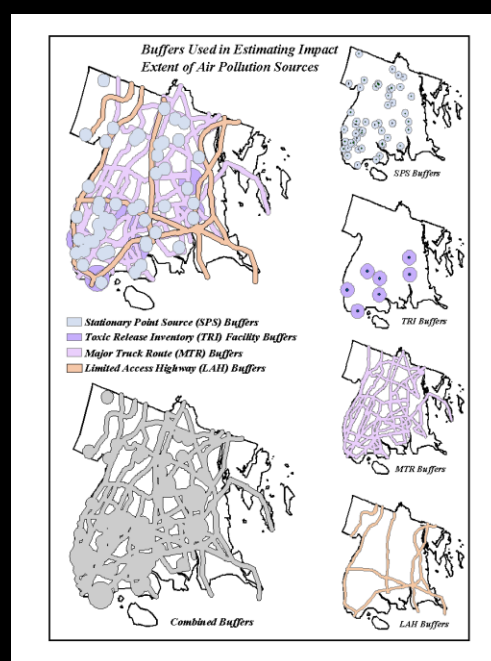
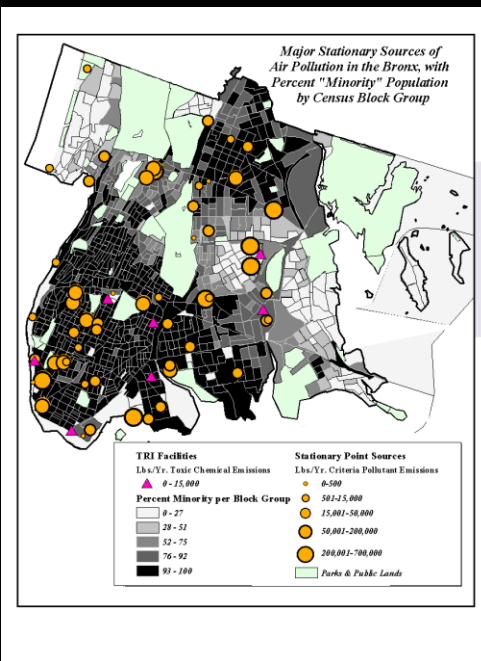
From *Pursuing Social Goals Through Participatory GIS: Redressing South Africa's Historical Political Ecology*, by Harris, et al. in *Ground Truth: The Social Implications of GIS*, John Pickles, ed. Reprinted by permission. The Guilford Press, © 1995.

Maps to Empower – Mapping for Rights – Participatory Mapping



“Counter-Mapping” creates spatial information about a place that will challenge the “official” view of the area, and offer an alternative perspective, based on the lived experience of the people who inhabit the geography. Participatory mapping frequently has the objective of obtaining or codifying the rights of people to fully use and own their traditional land and the resources on it without interference from outsiders looking to profit from the land and evict the original inhabitants, and therefore generally focuses on tribal peoples in relatively remote or rural areas, especially those areas that are rich in the resources valued by governments and corporations. It’s also been used in urban areas in an environmental health justice context.

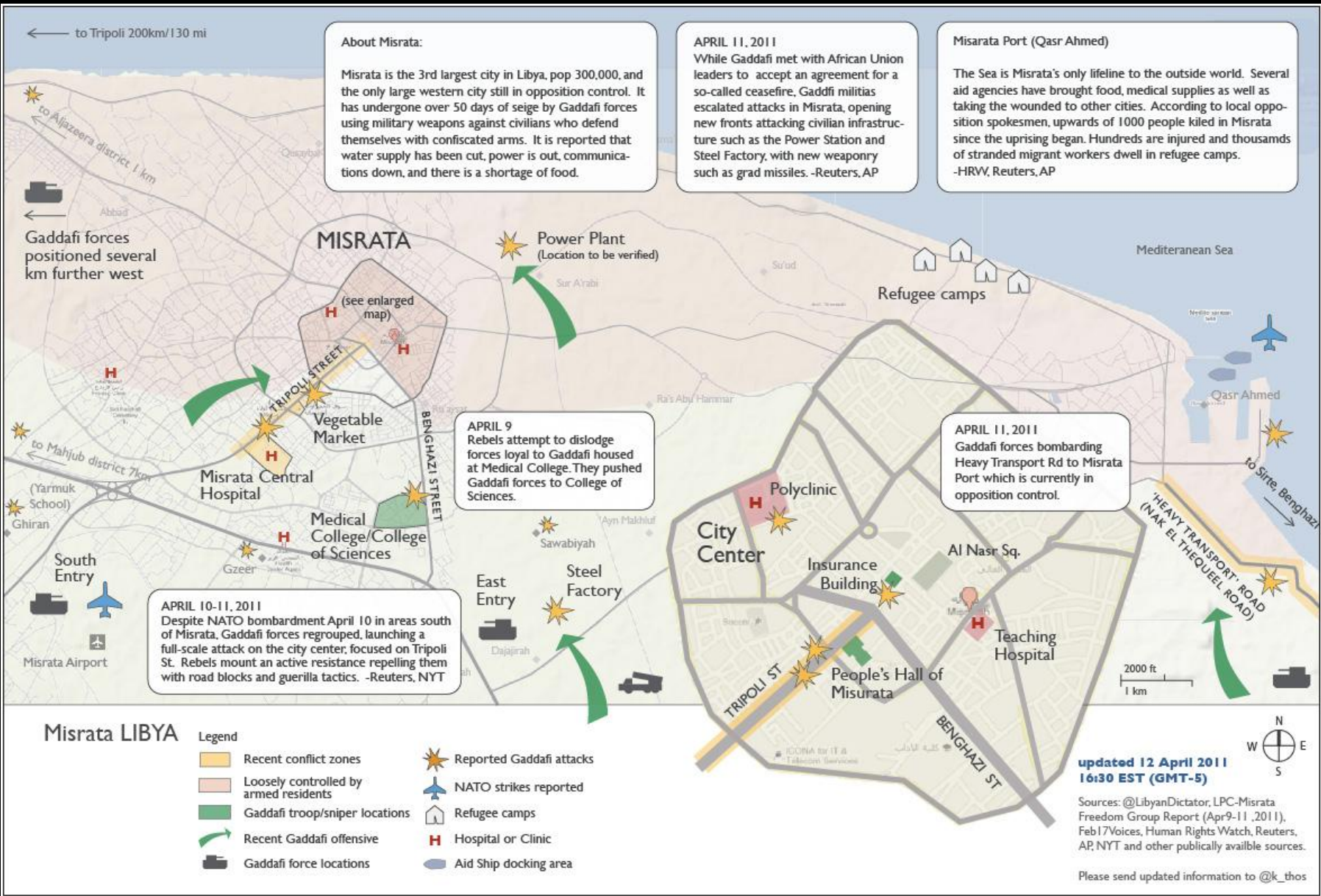
Advocacy Mapping – Environmental Health Justice



Study of the relationship amongst air pollution sources, high asthma rates, and communities of color and the less affluent. Those living in close proximity to a polluting facility were up to 60% more likely to be hospitalized for asthma, and these areas were predominantly poor and minority.

Source: Maantay, J.A. Asthma and air pollution in the Bronx: Methodological and data considerations in using GIS for environmental justice and health research. *Health and Place*, 2007.

Maps to Show a Timeline of Current Events



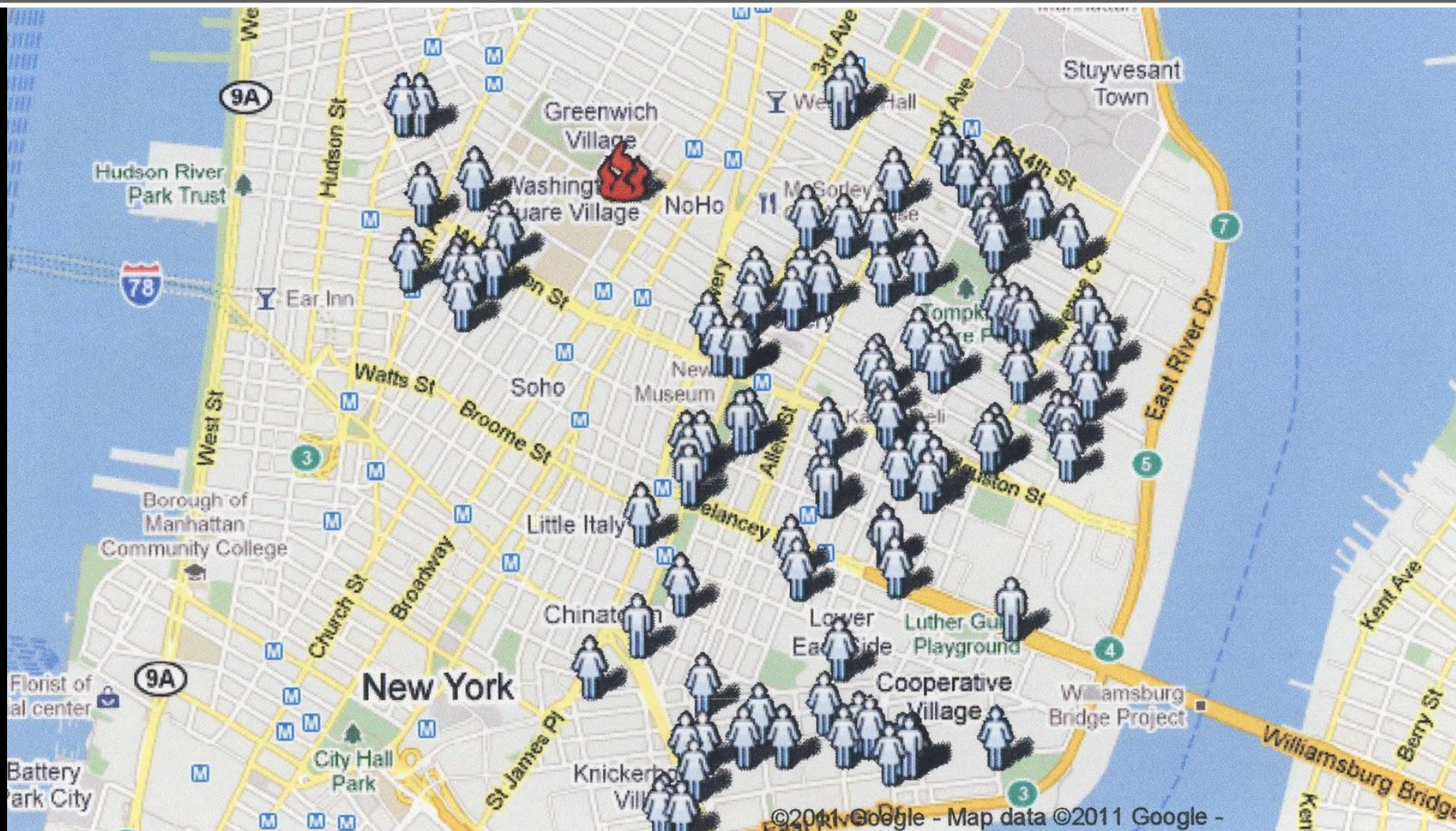
Maps to Share Experiences – Real Time Data



London Riots, August 2011. Location of incidents, updated by ordinary people on-line.



Maps to Share Experiences – Links with History



The map indicates the names and ages of all the known victims of the tragic and preventable 1911 Triangle Fire, most of whom were teenaged women immigrants. It was created for the project CHALK, based on the list provided by David von Drehle in "Triangle: The Fire that Changed America," and updated based on the original research of Michael Hirsch and comments by family members. On the CHALK project website, the map is clickable on each person symbol for name, age, and address. Every year, the CHALK project participants go to each address and chalk the name and age of each victim, an ephemeral memorial.

HARBINGERS of VIOLENCE Predicting Armed Conflict

One correlation is established between a set of predictors and the occurrence of armed conflict. Studies at CUNY's Lehman College, in the Bronx, New York, examined the period during the Cold War years of 1945-1990. The researchers were surprised to see the correlation as well as to provide a clear means of illustrating the predicted results.

Conditions creating domestic violence include: 1970-1980 and 1990-2004 time periods. A limited number of variables were chosen based on order of variable importance regarding the conditions followed by order of significance in the occurrence of armed conflict.

Conflict was defined according to a descriptive model of conflict which was developed through a series of studies by the United Nations Conflict Prevention Program and the International Peace Research Institute in Oslo. Observed Armed Conflict (OAC) refers to any armed conflict between states.

Class of studies of armed conflict: www.csis.org/ICG/ICG_2004_2004



Produced by Billie Morgan, Andrew Marshall, Stephen Frenkel, Daniel Brumberg, James Anderson. Very special thank you to Professor James Brumberg.

With special thanks to: David Brumberg, CIA, Washington, DC; JICP & IPIA, US S&T, C.R. Dames, Cambridge of War, SAO, World Alliance.



The prediction of armed conflict was derived by the application of a model constructed and tested between 1945 and 2004. This is a predictive model exclusive to the time period 2005 and 2014.

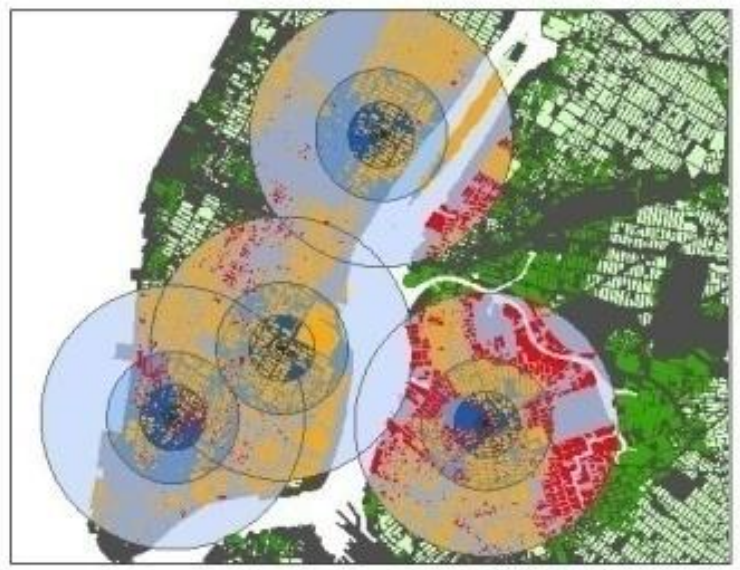
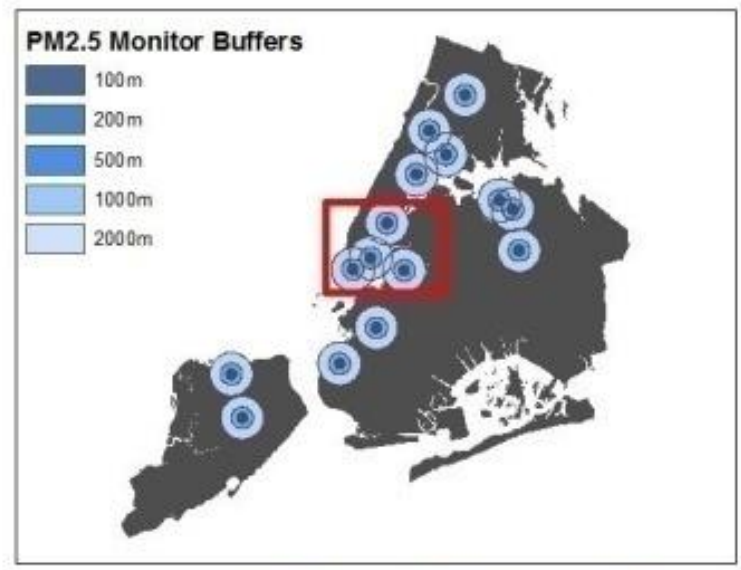
| Year | High Risk | Medium Risk | Low Risk |
|------|-----------|-------------|----------|
| 2005 | 15 | 25 | 60 |
| 2006 | 18 | 22 | 60 |
| 2007 | 20 | 20 | 60 |
| 2008 | 22 | 18 | 60 |
| 2009 | 25 | 15 | 60 |
| 2010 | 28 | 12 | 60 |
| 2011 | 30 | 10 | 60 |
| 2012 | 32 | 8 | 60 |
| 2013 | 35 | 5 | 60 |
| 2014 | 38 | 2 | 60 |

Analysis of results revealed that the single largest indicator of armed conflict for a given decade is the occurrence of armed conflict in the preceding decade. This index factors into eleven to three to three, but significant findings on conflict taking place the twenty year of a country, and the mean political duration of the country's presidency.



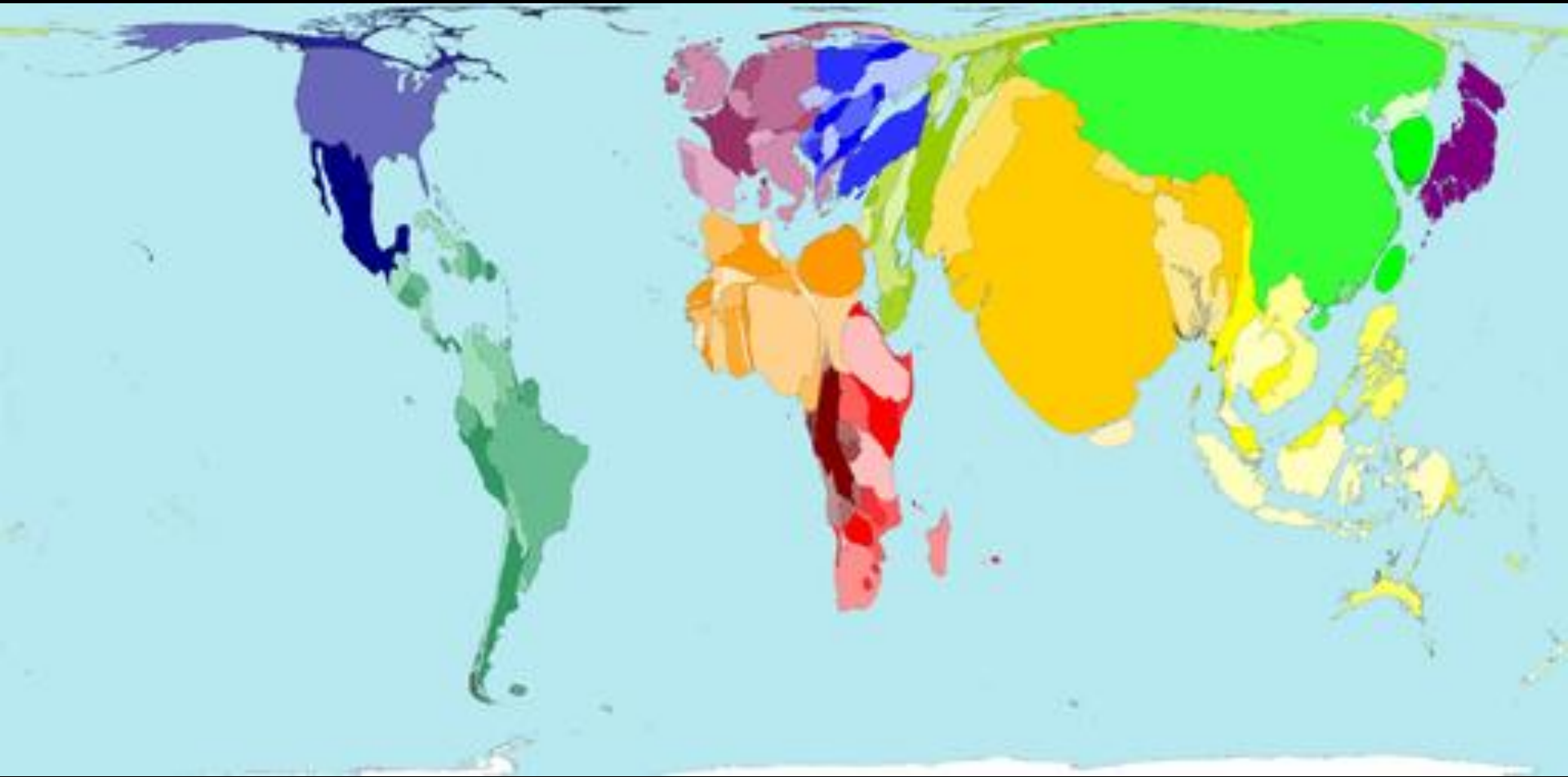
A GISc student team project to develop a model that could predict the likely places of armed conflict in the next decade. The students used global data sets, such as country literacy rates, the rights of women and children, freedom of the press and of religion, type of government, etc., to create a composite conflict index.

Maps to Predict Unknown Conditions in the Present – GeoStatistical Techniques



Spatial Analysis to interpolate air pollution concentrations in New York City, based on regressing existing land use against a few sample points of air monitoring. (A.Maroko)

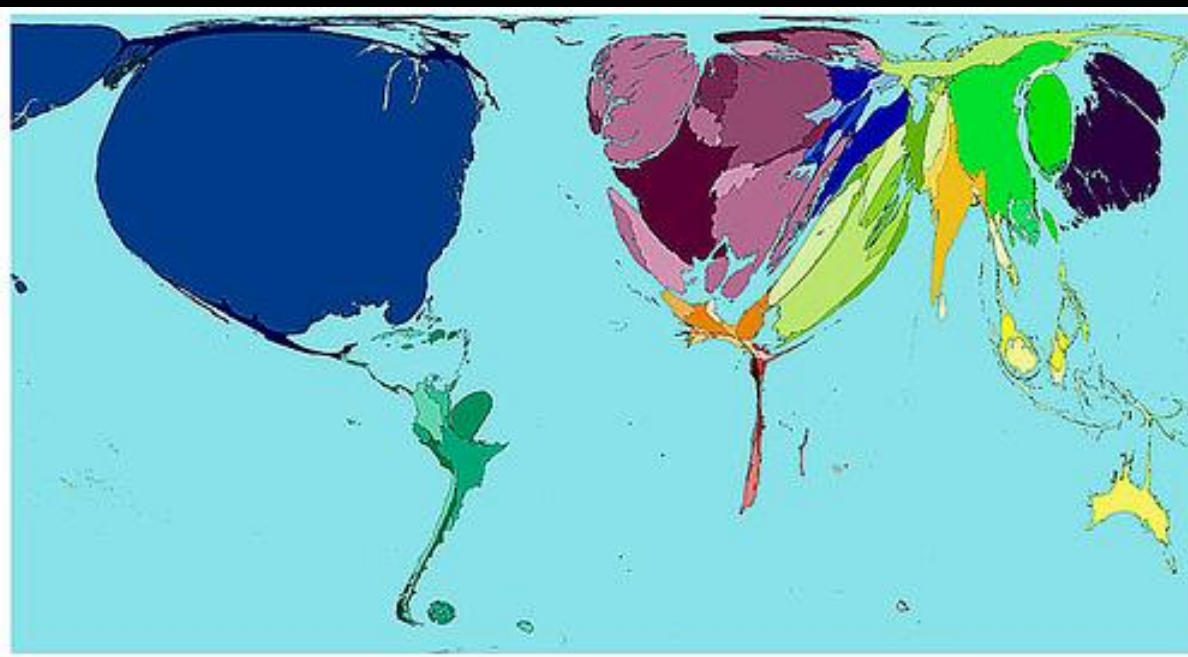
Maps to Visualize Data - Cartograms



Cartograms – a different way of presenting data. In this map, the countries are sized according to their populations, not their areal extents. In this map, Japan, India, China and other places of high populations are shown much larger than their geographic areas, while Canada, Australia, and Russia are shown much smaller than their true area. Other variables can also be mapped, such as disease rates, carbon footprints, energy usage, water supplies, greenhouse gas emissions, and poverty.

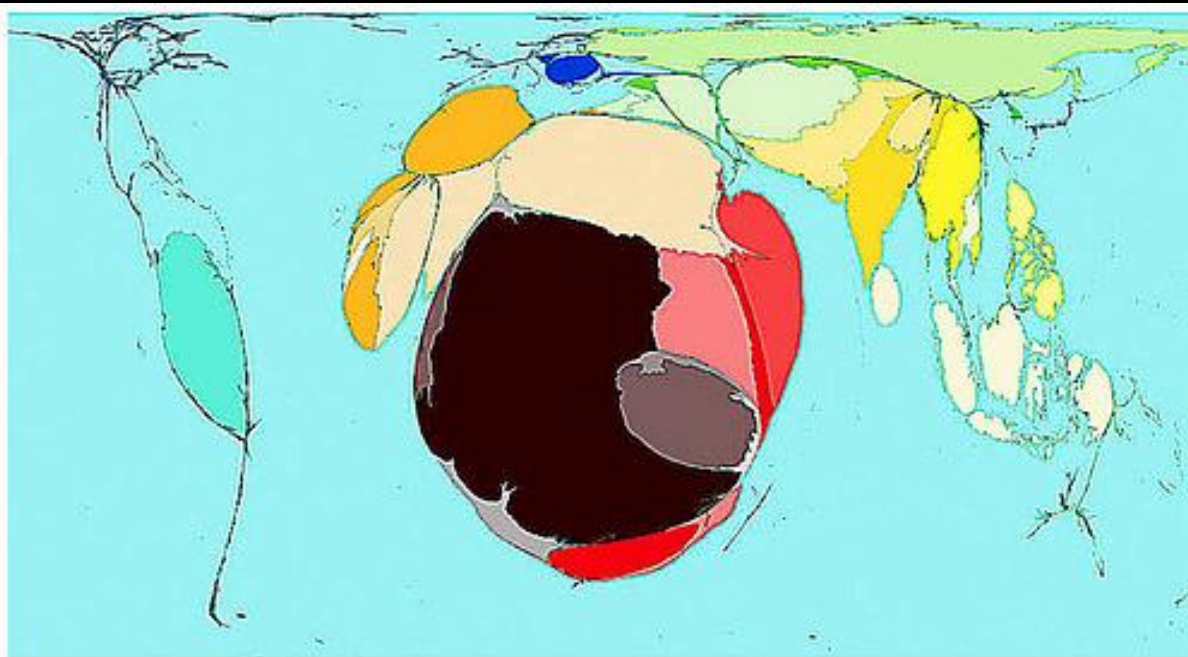
From *“Atlas of the Real World: Mapping the Way We Live,”* by Dorling, Newman, and Barford, 2011.

Maps to Bust Assumptions – Cartograms

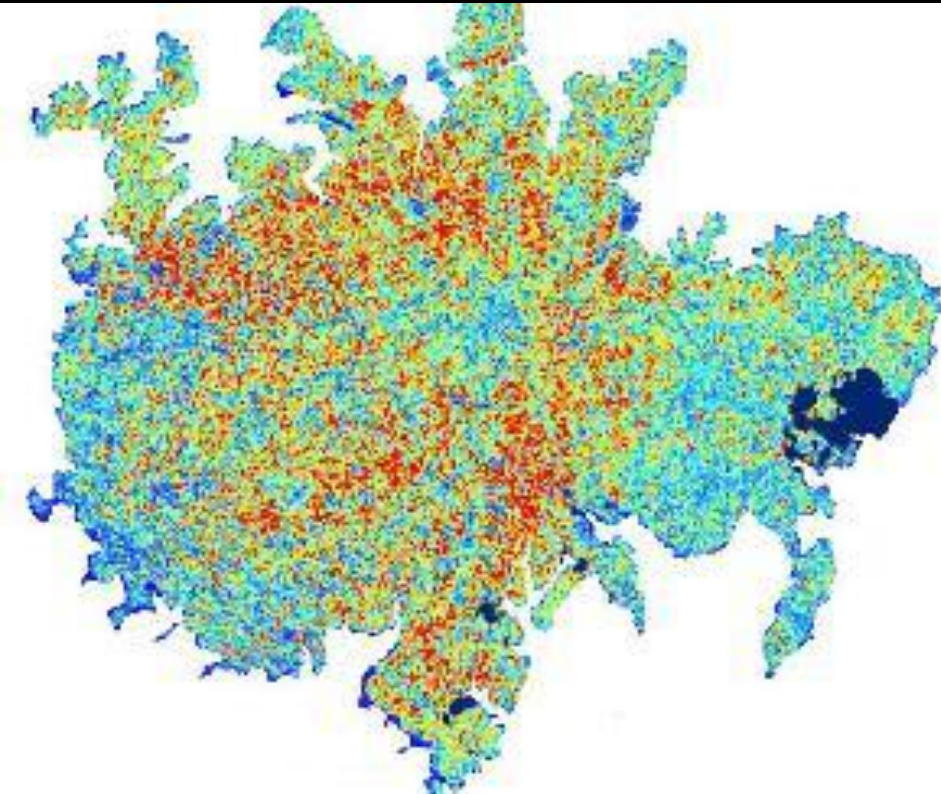


Cartograms showing military spending per country (top) and deaths from war (bottom)

(From Danny Dorling's World Mapper project and *Atlas of the Real World*)

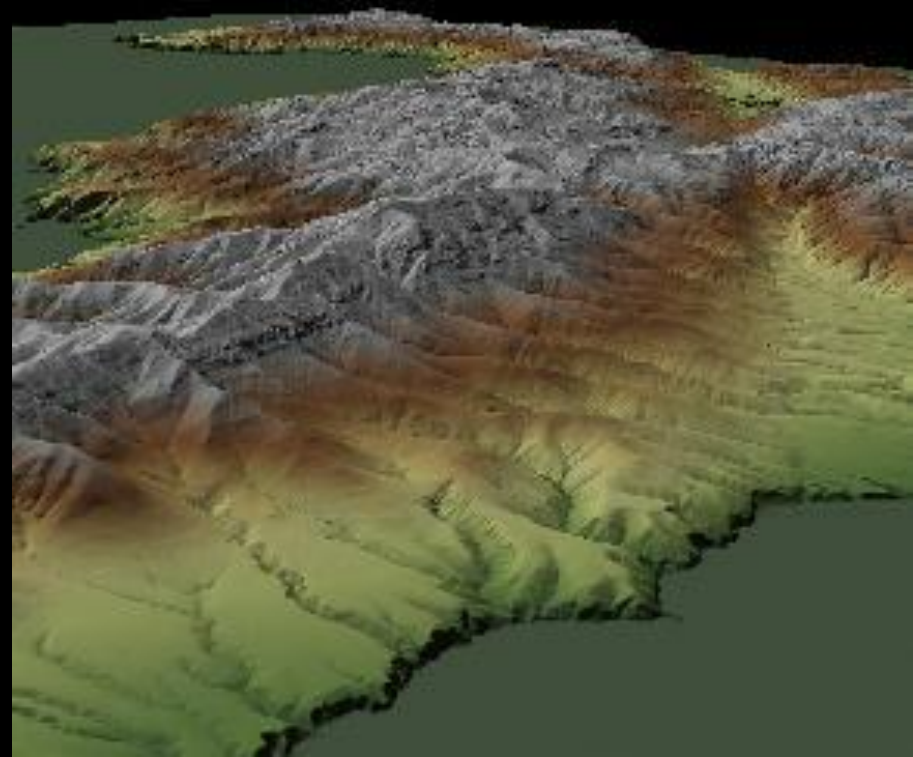


Maps to Visualize Data – New Technologies - LiDAR



Carnegie Airborne Observatory (CAO) map of forest carbon stocks (high values in red, low values in light blue, dark blue areas are clouds) in Panama.

California Floristic Province



LiDAR (Light Detection and Ranging) technology, used in conducting flyovers of the Amazon basin to map various attributes of the forest, including measures of biodiversity, carbon stocks, and evidence of deforestation due to mining and other human activities. They have created baseline data which is being used to assess current conditions and monitor future changes in deforestation and degradation.

Maps to Visualize Data – Arcs of Connectivity

COMMUNITIES

Calling patterns reveal communities that don't necessarily correspond to geographic borders. Some follow state lines and others split states in half or combine them.

COMMUNICATION

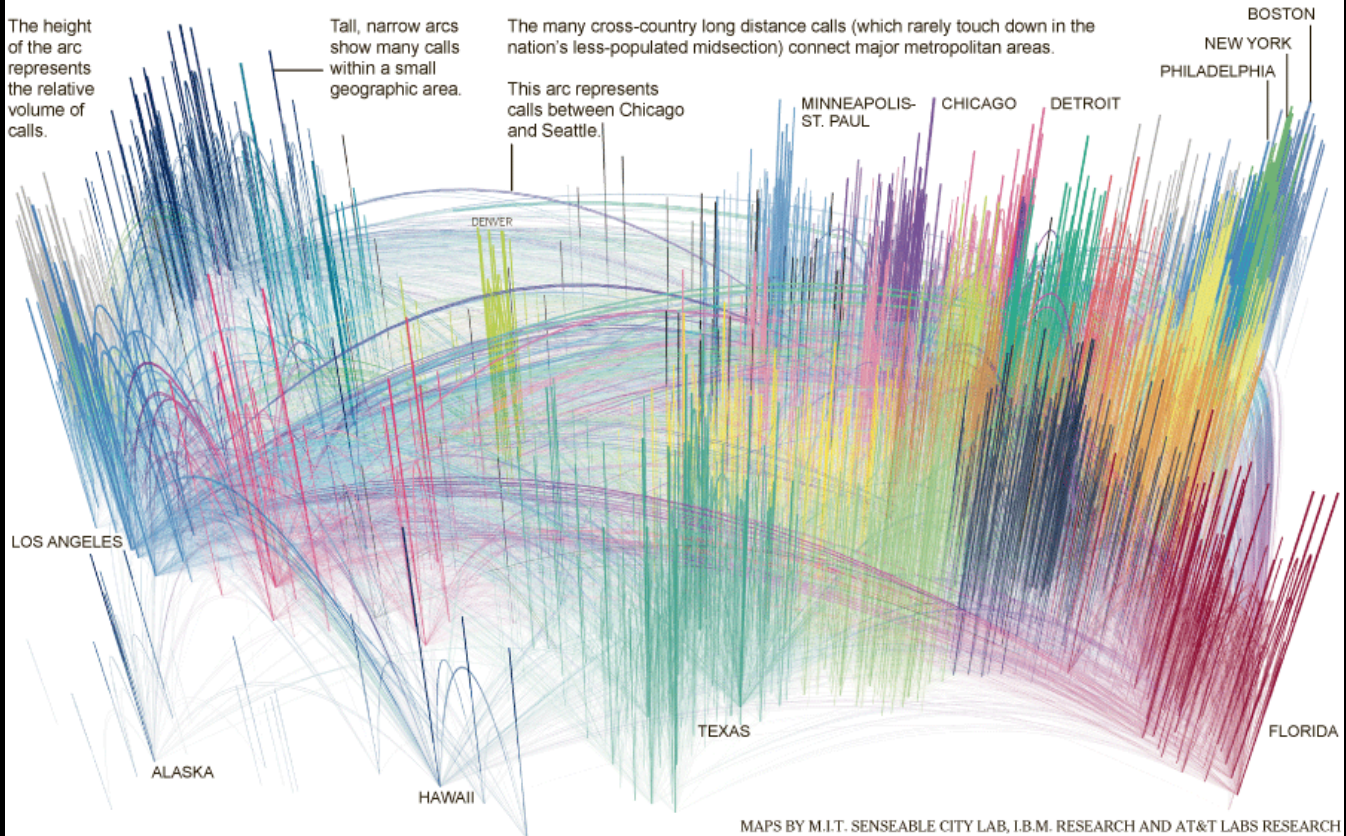
The map below shows the mobile connections between people, with each arc representing thousands of phone calls. The color of each arc is a mix between the colors of the communities on either end of the calls, corresponding to the map above.

The height of the arc represents the relative volume of calls.

Tall, narrow arcs show many calls within a small geographic area.

The many cross-country long distance calls (which rarely touch down in the nation's less-populated midsection) connect major metropolitan areas.

This arc represents calls between Chicago and Seattle.



MAPS BY M.I.T. SENSEABLE CITY LAB, I.B.M. RESEARCH AND AT&T LABS RESEARCH

Connectivity through telephone calling patterns within the US.

Calling patterns as shown on the map reveal communities that do not conform to state boundaries.

The height of the arc represents the relative volume of calls. The narrow arcs show many calls within a small geographic area.

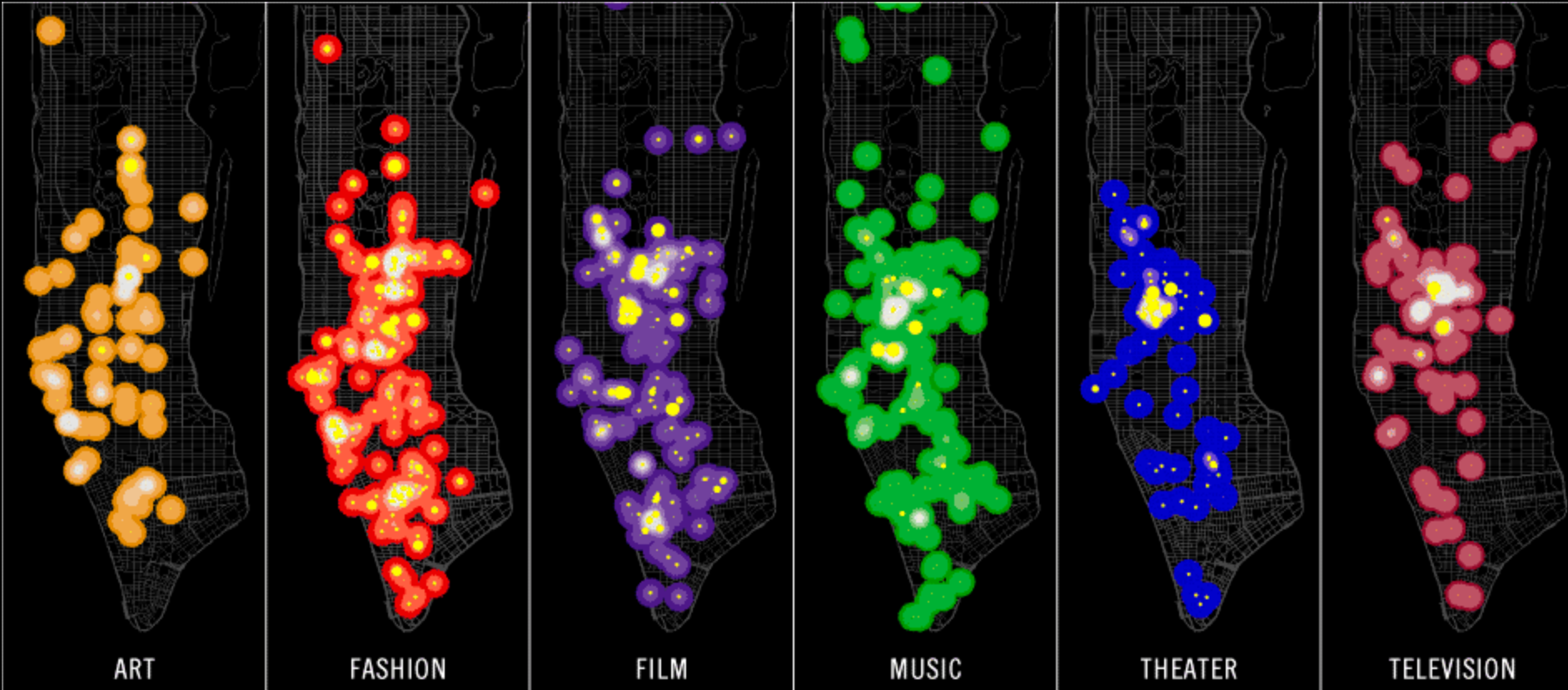
Maps to Visualize Data – Heatmap Technology



The Rich Guy Map, concentrations of rich, single men in New York City.

“Heatmap” technology displays information using futuristic gradient shading.

Maps to Visualize Data – Mapping Photographs



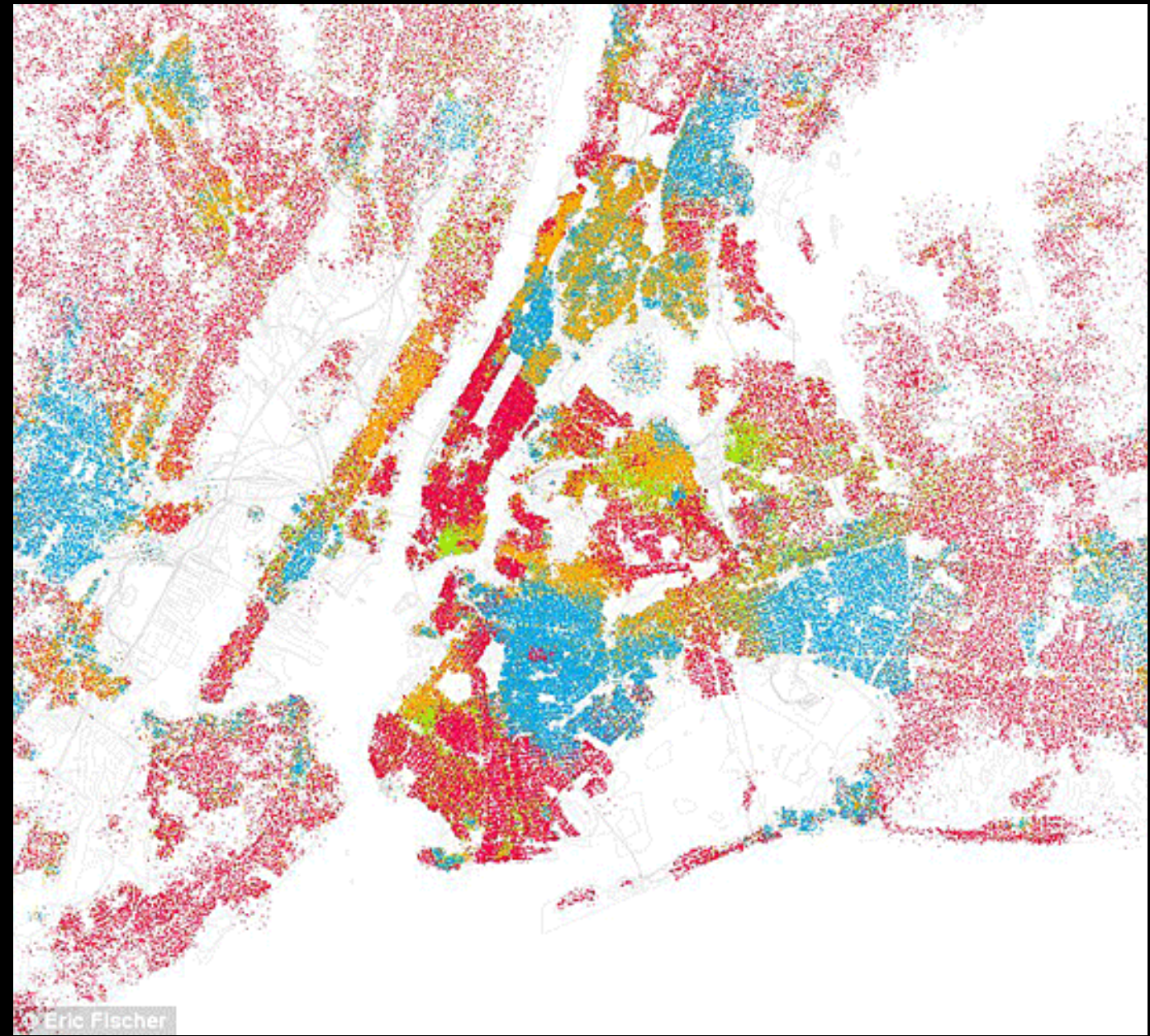
The Geography of Buzz. Mining thousands of photographs from Getty Images that chronicled flashy parties and smaller affairs for a year, these maps show the density of different types of cultural events in New York.

Flow of Transnational Organized Crime



Click each category to see the flow of goods.

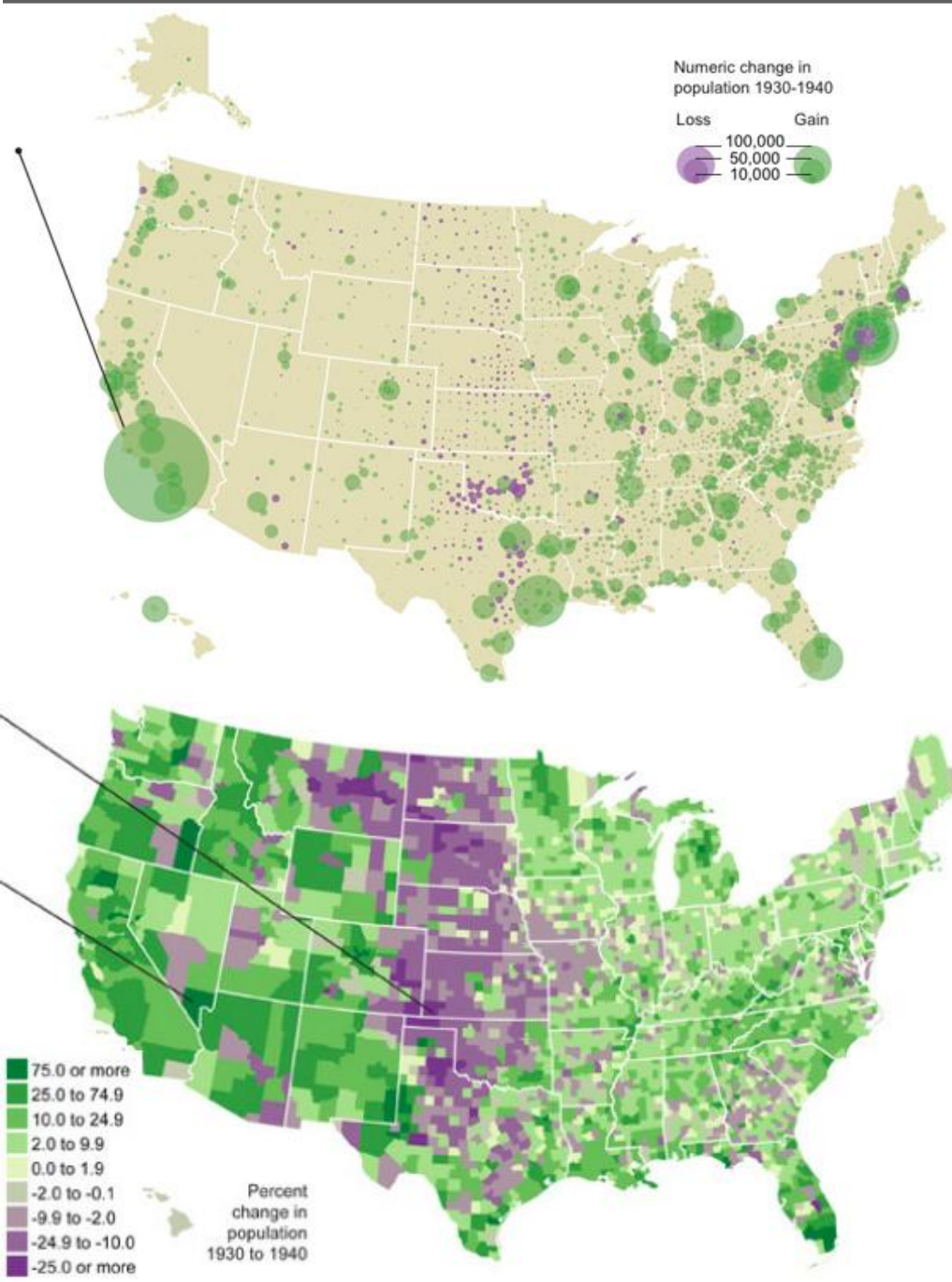
-  FEMALE TRAFFICKING
- COUNTERFEIT GOODS
- HEROIN
- WILDLIFE
- GOLD
- PIRACY
- FIREARMS
- COCAINE
- MIGRANT SMUGGLING



Race maps of NYC
New York City is still an extremely segregated city, as is vividly demonstrated in this dot density map.

Bill Rankin, at Radical Cartography, developed this particular format of dot density mapping the various racial and ethnic groups, to show urban transitions. Each race/ethnicity is shown by a different colored dot.

Maps to Visualize Data – Proportional Symbol Maps versus Choropleth Maps



Population Change during the Great Depression, 1930-1940.

The Proportional Symbol map (top) shows absolute numbers of change in population (green reflecting population increases, and purple designating population losses).

The Choropleth map (bottom) shows percentage change (colors indicating same direction of change as above). The maps depict the same basic information, but look very different, and might be open to different interpretation.

Using both maps together reveals a more complete picture of the information.

Maps to Visualize Data – Topographical Technique used to Represent Population Distribution

The population of the United States is not distributed evenly. Instead, we tend to bunch up in communities, leaving the spaces in between more sparsely inhabited. Most Americans live in or near cities; today 53 percent live in the 20 largest cities. 75 percent of all Americans live in metropolitan areas.

This map shows population density. The relative height of each major city reflects its population in 1990.

Source: U.S. Census Bureau

Go West. Nevada is the fastest growing state, followed by Arizona, Idaho, Colorado, and Utah.

Wyoming has the lowest population density of all states in the lower 48 with an average of five people per square mile.

What happens in the empty spaces? Some of it is farming country. More than one quarter of America's crop land is used to grow corn. One third of what is produced is exported to other countries.

Chicago, the country's third largest city, has a population of about three million people. There are 21 states with populations smaller than this city.

Largest metropolitan area includes New York City and portions of New Jersey and Long Island with a total population of 20 million.

Population Distribution

*Where do we live?
Where don't we live?*

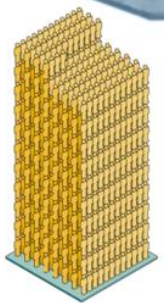


Population density is highest in New York City, where there are 23,000 people per square mile.

Wet. Some states are full of water. For example, Louisiana includes more than 8,000 square miles of lakes and wetlands. That's an area bigger than Connecticut and Rhode Island combined.

Coastal areas are home to more than half the U.S. population.

Approximately one in nine Americans lives in the nation's most populous state—California. More than 15 million people live in the Los Angeles, Riverside, and Orange County metropolitan area.



Distributing our population evenly would put an average of 76 people per square mile.

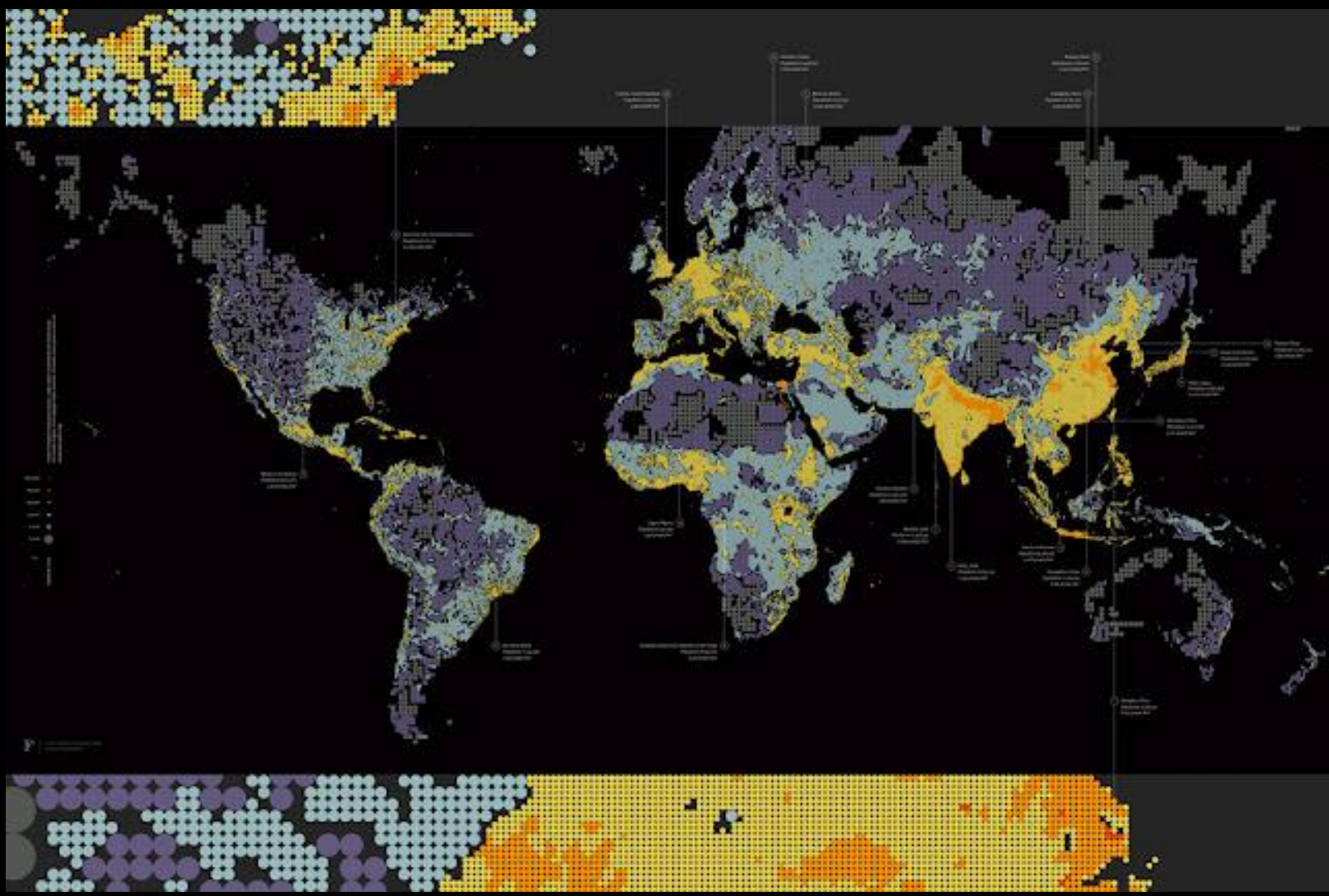
New Jersey is the most densely populated state with an average of more than 1,000 people per square mile.



Alaska is a sparsely populated state with an average of one person per square mile.

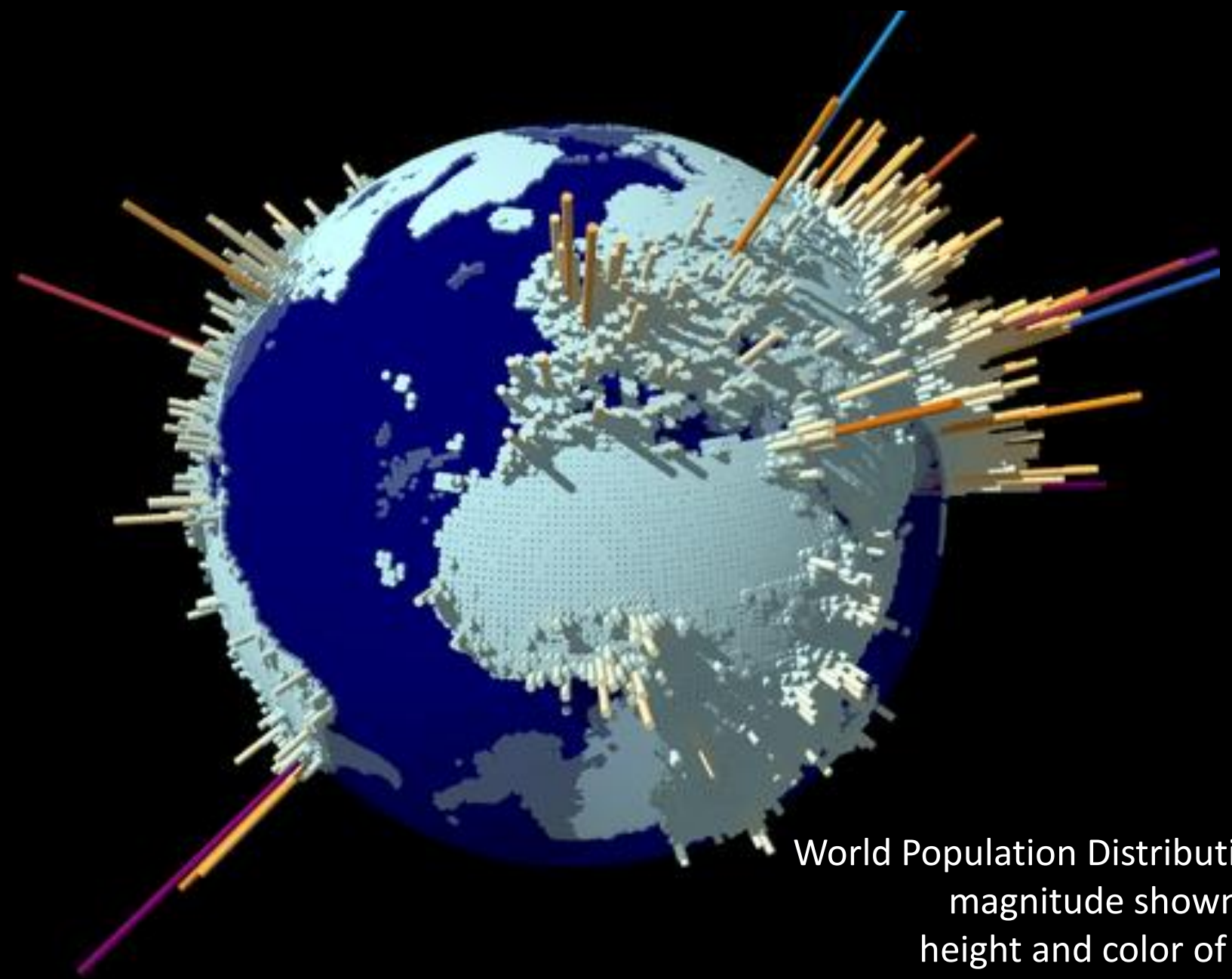
A quasi-3-D topographical technique to depict population distribution (absolute numbers). This shows the extremes in the high and low density areas of the country - the peaks and the flatlands.

Maps to Visualize Data – New “Dencity” Method



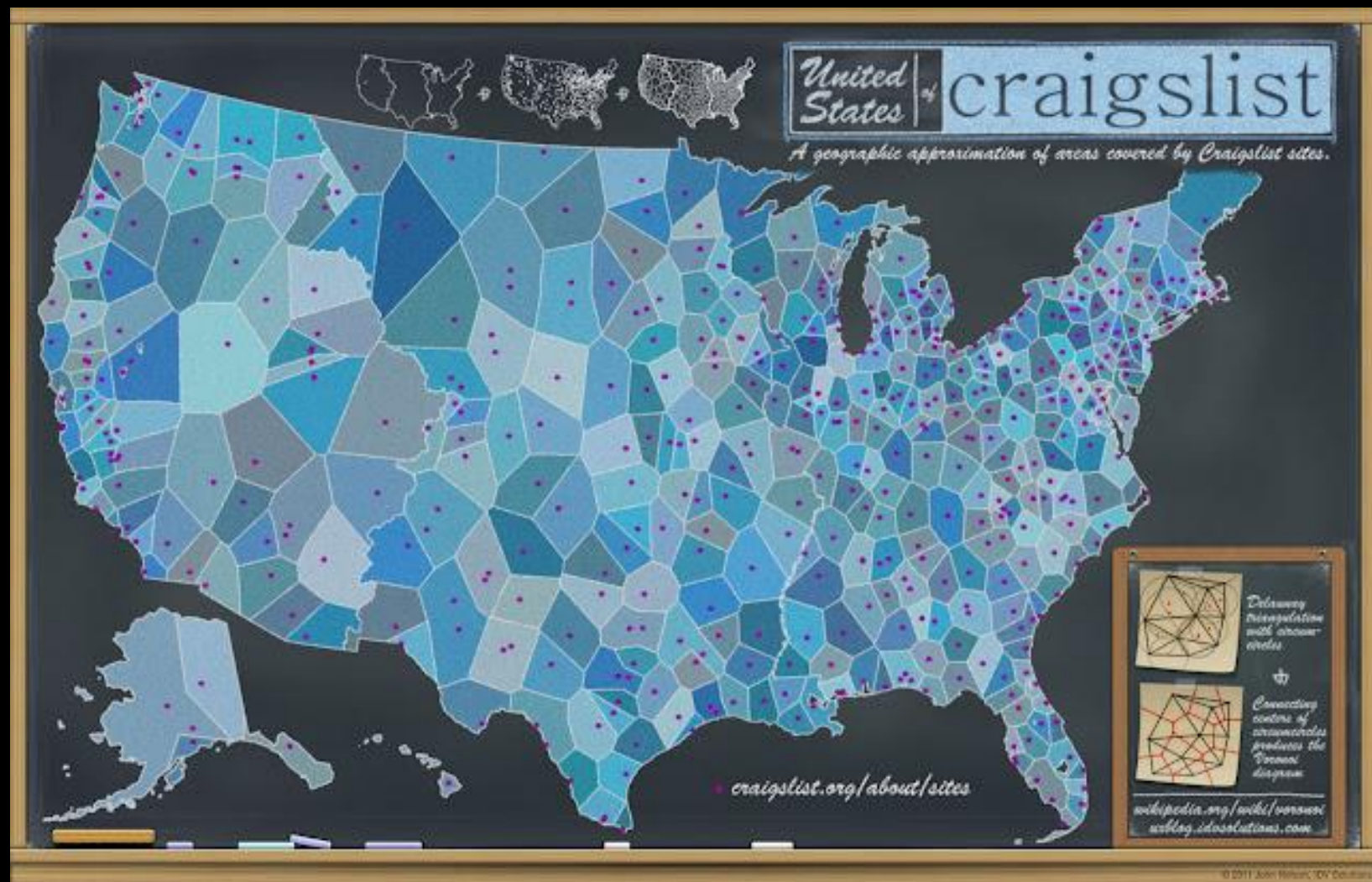
Density maps population density using circles of various size and hue. Larger, darker circles show areas with fewer people, while smaller, brighter circles highlight crowded cities. Representing denser areas with smaller circles results in additional geographic detail where there are more people, while sparsely populated areas are more vaguely defined.

Maps to Visualize Data – 3-D Views



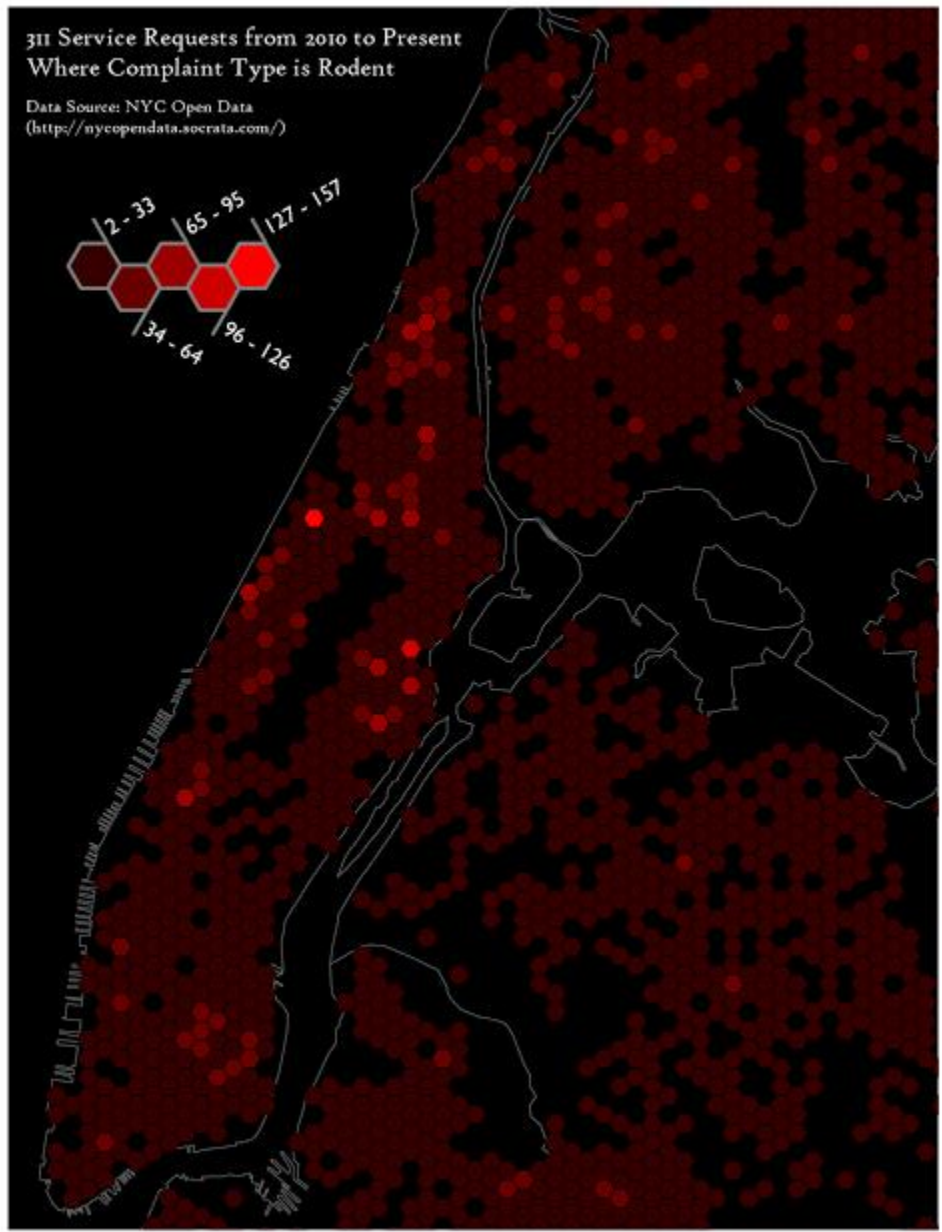
World Population Distribution,
magnitude shown by
height and color of bar

Maps to Visualize Data – Voronoi Tesselations

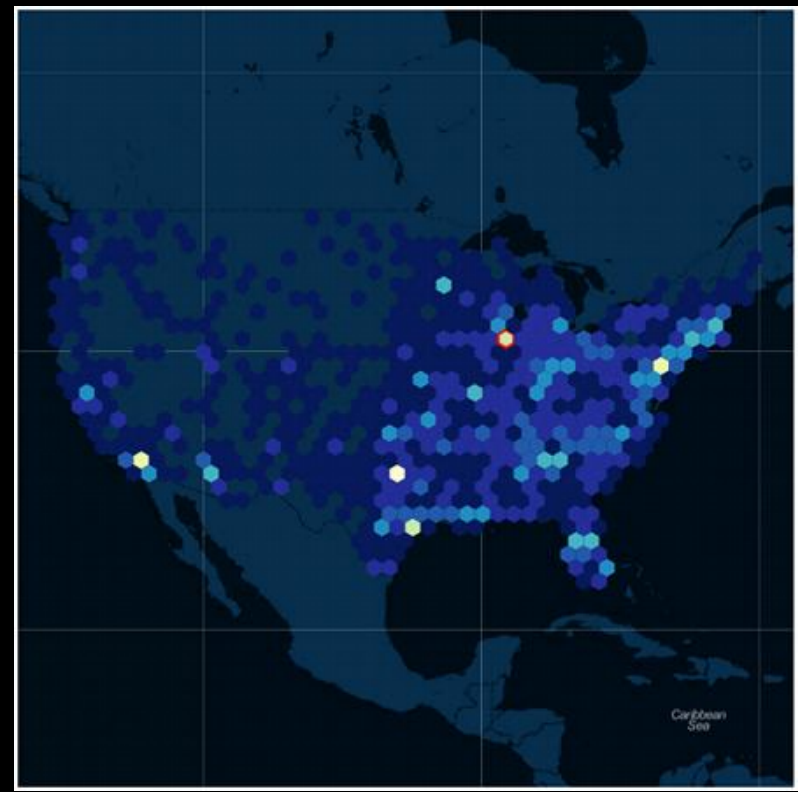


Map showing Craigslist market territories, or Craigs-sheds. A Voronoi diagram of a set of “sites” (points) is a collection of regions that divide up the plane. Each region corresponds to one of the sites, and all the points in one region are closer to the corresponding site than to any other site. It has applications in fields from anthropology to zoology, and just about everything in between. This type of maps has been used to show geographic extents of sports team fans, newspaper readerships, and urban influences.

Maps to Visualize Data – Hexbins!



Hexbinning is a type of bivariate histogram and consists of laying a hexagonal grid or lattice atop a 2-dimensional field of data and determining data point counts for each hexagon. Left: Rodent Complaints, by G. Culp; Below: Walmarts, by Z. Johnson



Maps to Visualize Data – Color-Coded Dot Density

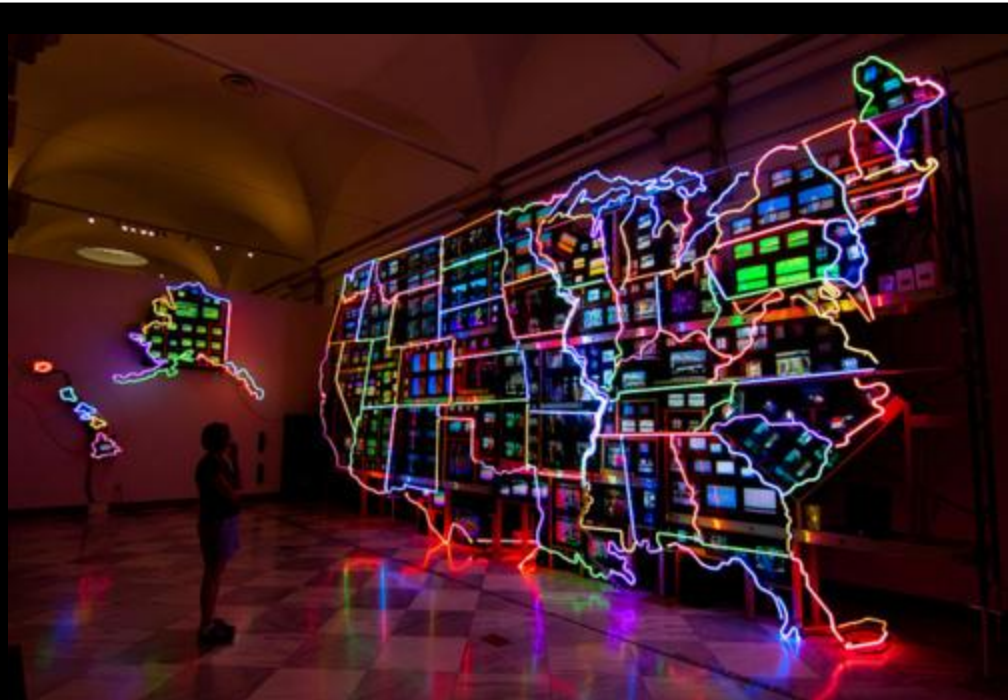
Chain Stores in New York – each store shown by a dot, and color-coded by the number within a 10-minute walk.



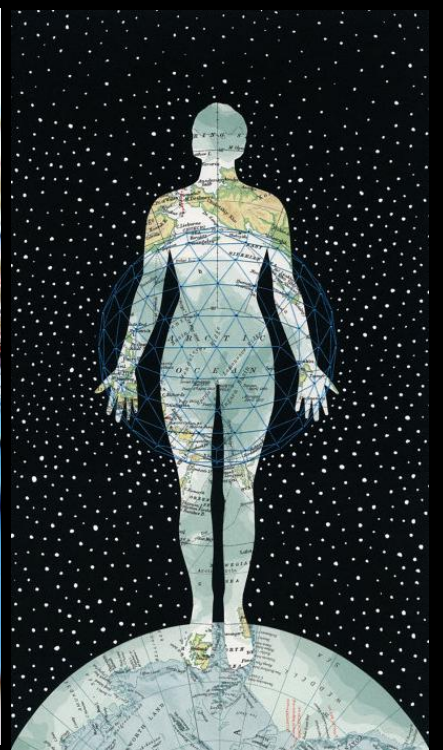
“We are accustomed to looking at maps in attempts to find direction, our relationship to a physical interpretation of the land. But that land can be more than a city or country, it can help us to navigate our bodies, to understand our environment beyond its physicality into the realm of cultural space, and to grasp an understanding though the visceral. Cartographers can tell us more than just the routes from one point to another, they can map terrains of landscape or psychological space, that amorphous state that adds up to a sense of a place beyond mere cataloging.”

Maddy Rosenberg, curator of “Mapping the Surface” at Central Booking Gallery, Brooklyn, 2011

Maps as ART – Views of the USA – Nam June Paik; Bill Will; Jasper Johns; Paula Scher



“In search of finding connections between geography, anatomy, and botany, I combine the visual elements of maps, anatomical illustrations, and natural forms to explore themes of travel, healing, and time....These new geographies explore notions of place, perception and experience, suggesting the potential for a broader landscape and inviting viewers to examine their relationships with each other and the world we share.” Shannon Rankin, aka selfless



Maps as ART “You are Here: Mapping the Psychogeography of New York City”



“Some Heavy Influences,” by Dahlia Elsayed

This show intends to “map the emotional terrain of the world’s most famous and influential urban center, New York City, and explore the effect of the city’s powerful moods on those who live and work here.” The show included Nicola Twilley’s Scratch ‘N Sniff NYC, Nina Katchadourian’s New York Soundtrack, Daniela Kostova and Olivia Robertson’s Anxiety Map, and Ingrid Burrington’s Loneliness Map.

Maps as ART "You are Here: Mapping the Psychogeography of New York City"



Artist Liz Hickok and several work-study students worked morning til late-evening for 10 days to build "Fugitive Topography: Jelly NYC, View From the Staten Island Ferry."

Maps as ART “Uneven Geographies”



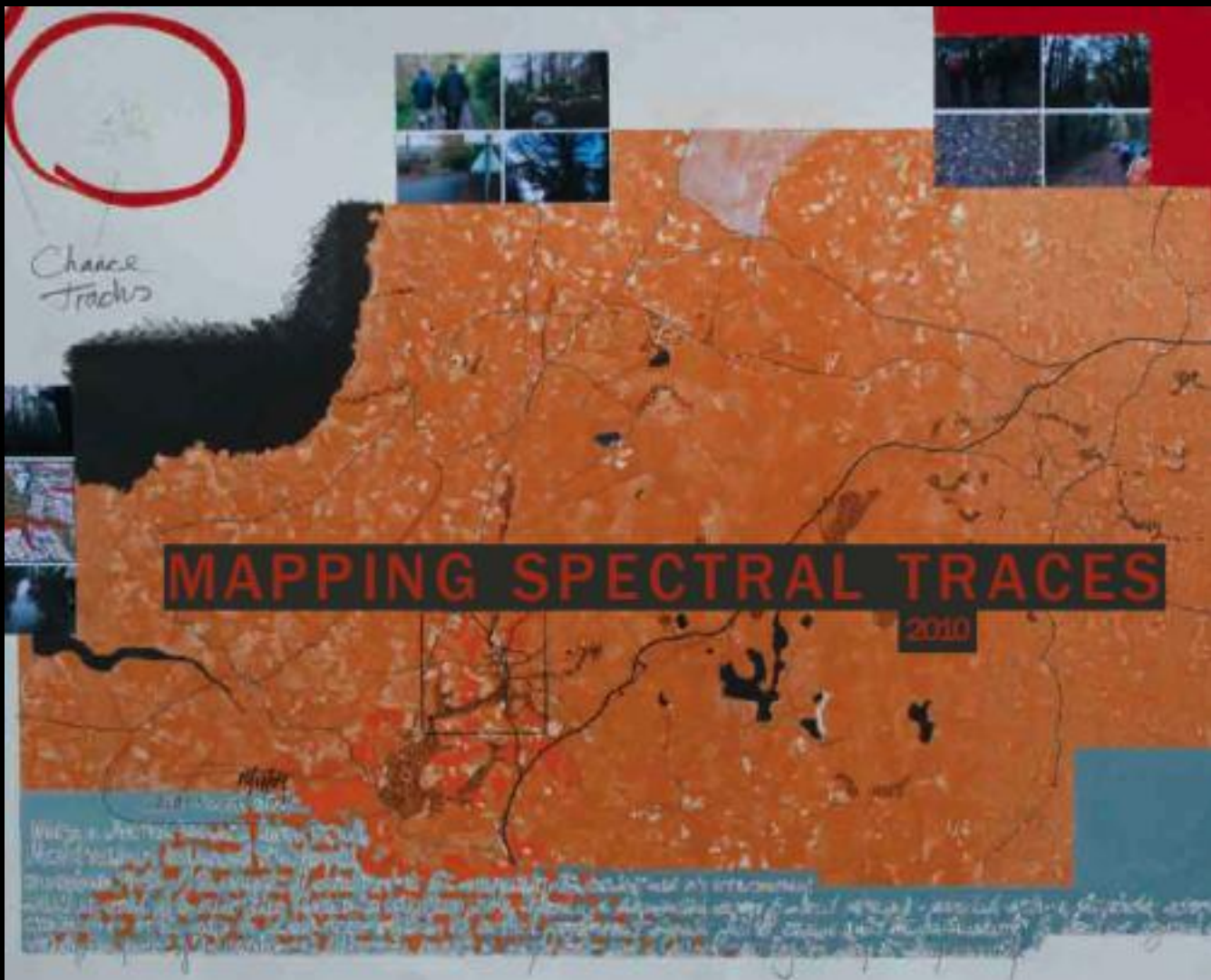
“**Uneven Geographies** considers ways contemporary art responds to the politics of globalization through the work of fourteen artists and artist-collectives from twelve countries and five continents.”

Maps as ART “Uneven Geographies”



*Eduardo Abaroa. “Proposal: We Just Need a Larger World,” 2008 (detail)
Construction wire, papier maché, world map cutouts and steel pins
From the “Uneven Geographies” Show at Nottingham Contemporary ,2010.*

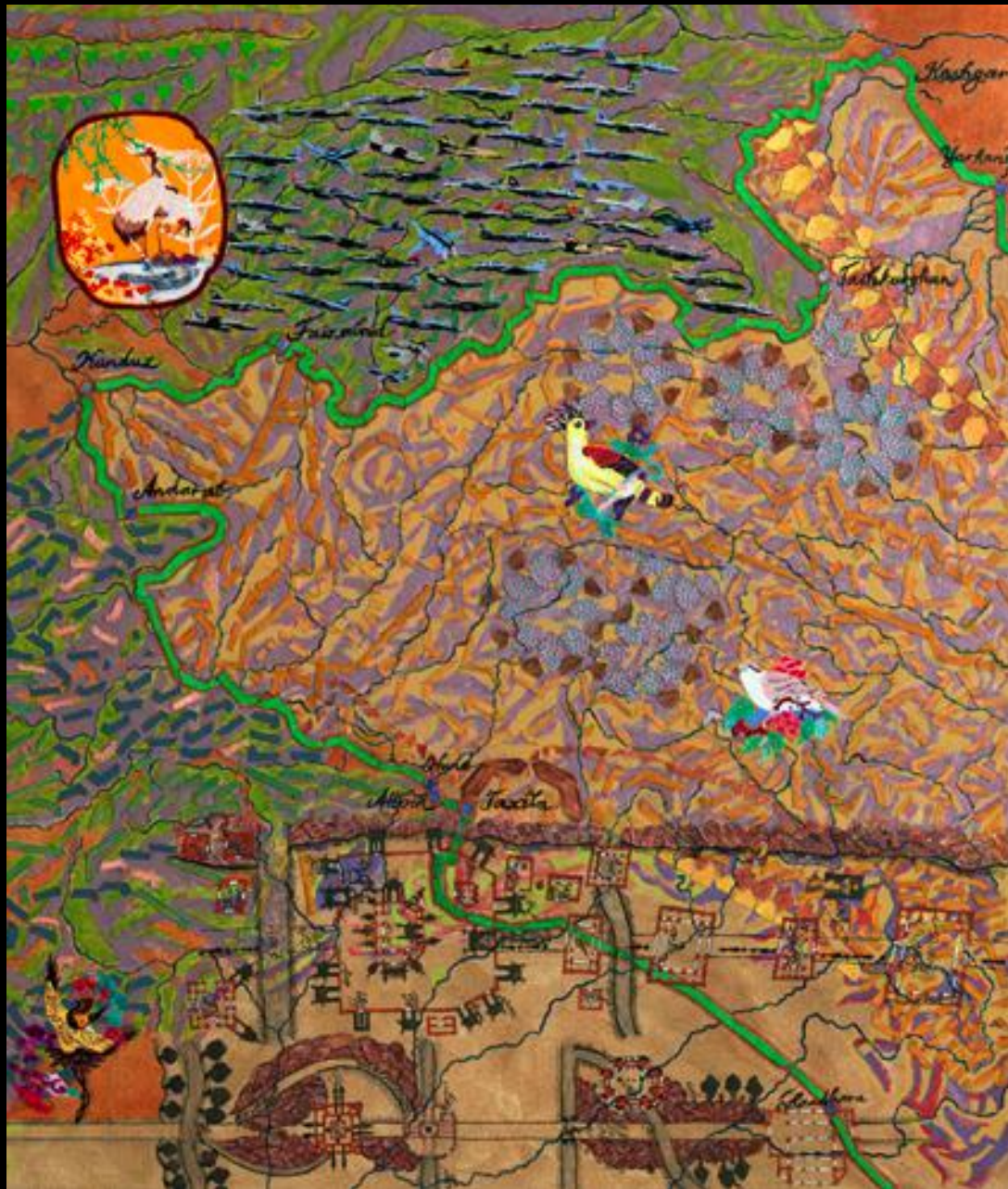
Maps as ART "Mapping Spectral Spaces"



"Mapping Spectral Spaces" Virginia Tech College of Architecture and Urban Studies, Blacksburg, VA, 2010.

"How have residual marks [including maps] been created, left, and remembered? How might we conceptualize these afterlives and effects of experiences, perceptions, processes, and events?"

Maps as ART “Navigational Triangles”



Joyce Kozloff: “**Navigational Triangles,**” 2010

“Long before Google Maps or GPS, seafarers used navigational triangles to pinpoint their location and to chart their course in relation to celestial bodies and the earth’s poles. This exhibition comprises paintings and mixed media works that expand upon this concept and continue the artist’s longstanding engagement with cross-cultural issues.”

s

Maps as ART “Mapping: Memory and Motion in Contemporary Art”



“Mapping: Memory and Motion in Contemporary Art,” Katonah Museum of Art, Katonah (NY), 2010-2011.

“In an era of global culture, artists are increasingly exploring maps as both image and cipher. Mapping: Memory and Motion in Contemporary Art features paintings, works on paper, sculptures, videos, a sound installation, and a live web terminal to address such themes as borders and boundaries, identity and colonialism, journeys – both real and imagined, memory and nostalgia, and tourism and travel.”

Maps as ART "Mapping Joy and Pain"

"Mapping Joy and Pain," 2010-2011

Rebecca Krinke's public map art project consists of a large laser-cut map of Minneapolis and St. Paul (and elsewhere) on which people are encouraged to locate their personal places of joy and pain.





Lauren Rosenthal, The
Monmouth Museum, NJ,
2011

Rosenthal uses maps – here
hand-cut paper maps of
rivers and river basins – to
reorient people’s thinking
about rivers and our
interconnectedness.

Maps as ART “The Art of Mapping”



“The Art of Mapping,” TAG Fine Arts, London, 2011, “celebrates cartography’s potential as an art form, rather than a science.”

Maps – Is it ART or is it Cartography?

Map of the Island of Thule, (spelled “Tile” on this map) in Scotland, by Olaus Magnus, 1539. This is a detail of his much larger Carta Marina – a map of the ocean showing the Northern Lands. For many years, it was commonly thought that Thule was one of the Hebrides Islands in Scotland. Ultima Thule was thought by the ancients to be the ends of the earth. Notice the whales (Balena, Orca) in the foreground. The Orkneys are possibly derived from “Orca,” and whales are still prevalent there.



The use of sea monsters and other fanciful creatures has long been thought of as a device to fill in unknown areas on maps. The current school of thought is that cartographers used these creatures as a way of expressing themselves creatively, as the artists they truly were.

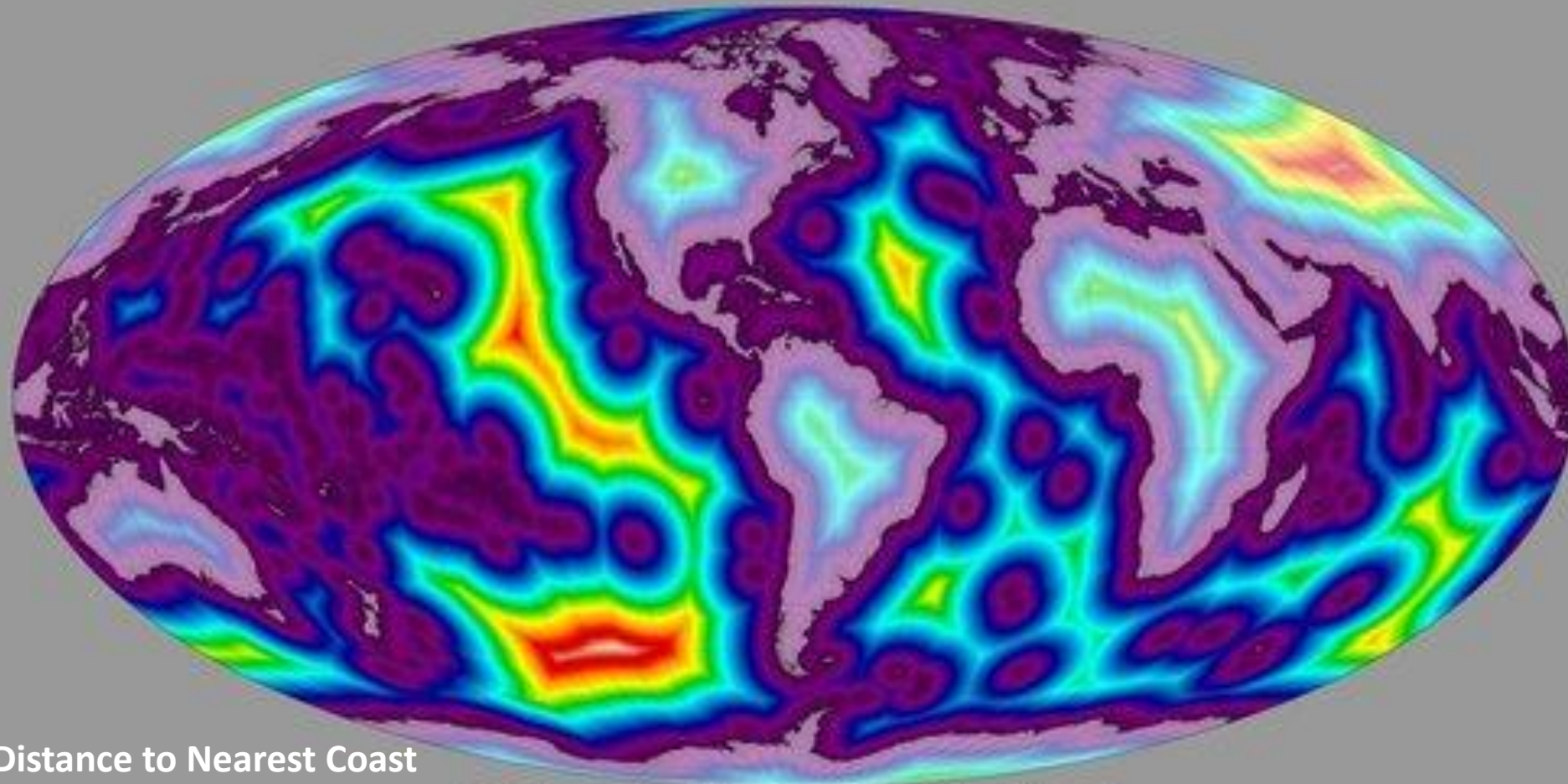
Contact Info for GISc Program at Lehman College, CUNY

Contact e-mail: Juliana.Maantay@lehman.cuny.edu

Geographic Information Science (GISc) Program:

<http://www.lehman.edu/academics/eggs/geographic-information-science.php>

Map blog: <http://geographer-at-large.blogspot.com/>



Distance to Nearest Coast