

# A short introduction: Information visualizations in teaching & research

**Isabel Meirelles | [meirelles.isabel@gmail.com](mailto:meirelles.isabel@gmail.com)**

Associate Professor, Graphic Design, CAMD

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Information design

Infographics

Information visualization

Data visualization

# Information design

## Infographics

**Graphical representations that aim at communicating information with the purpose to reveal patterns and relationships not known or not easily deduced without the aid of the visual presentation of information.**

# Information visualization

## Data visualization

**“the use of computer-supported, interactive, visual representations of abstract data to amplify cognition”** Card et al. : *Readings in Information Visualization: Using Vision to Think*

# Information

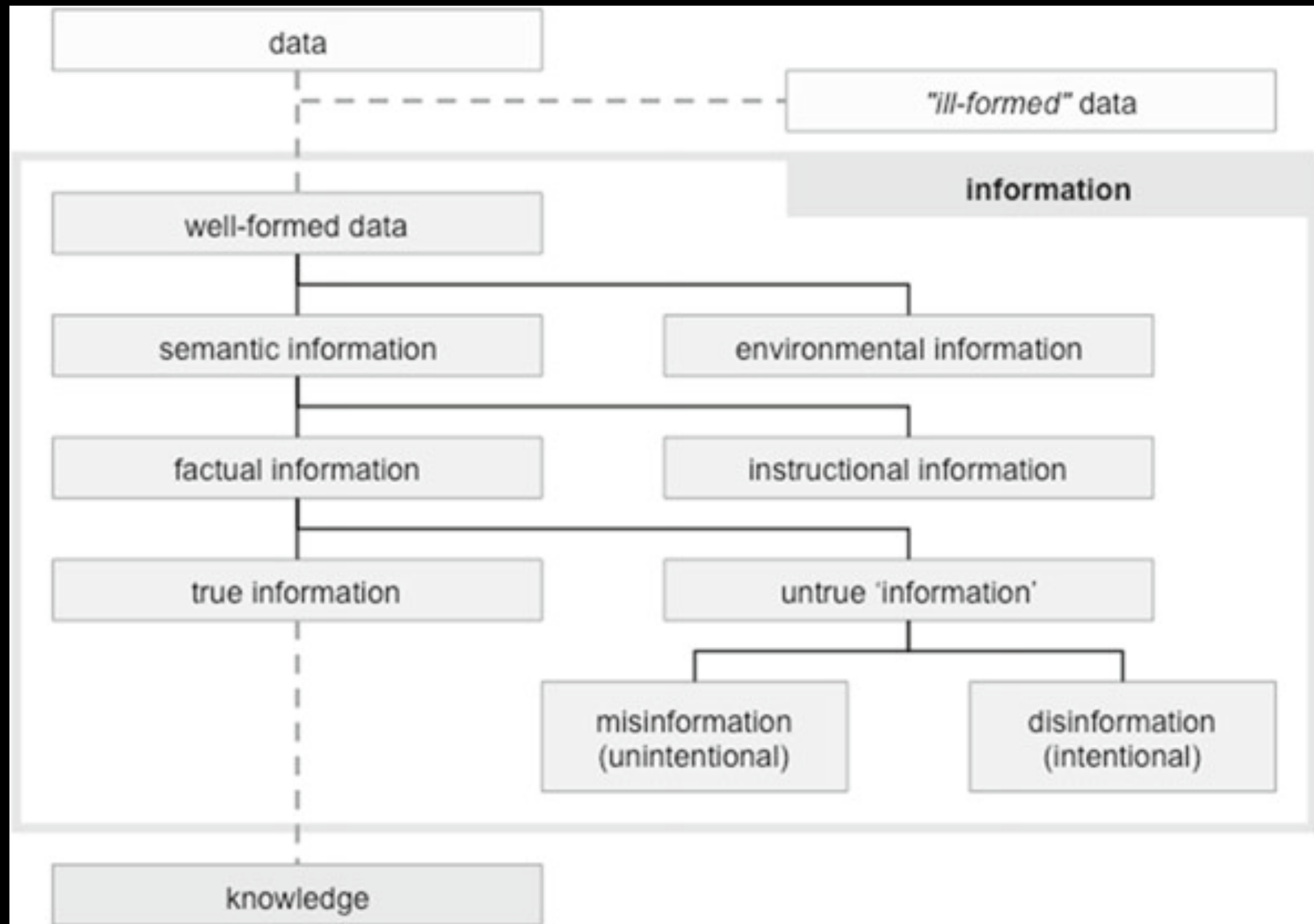
*From Latin **informare** to give form or shape to, from in into + **formare** to form, from forma a form or shape + **-ation** indicating a process or condition*

# Information

*Definition\**      *Definition*  
*information*      = *well-formed and*  
*meaningful data*

*\*Weak definition. The strong definition includes the further condition of truthfulness.*

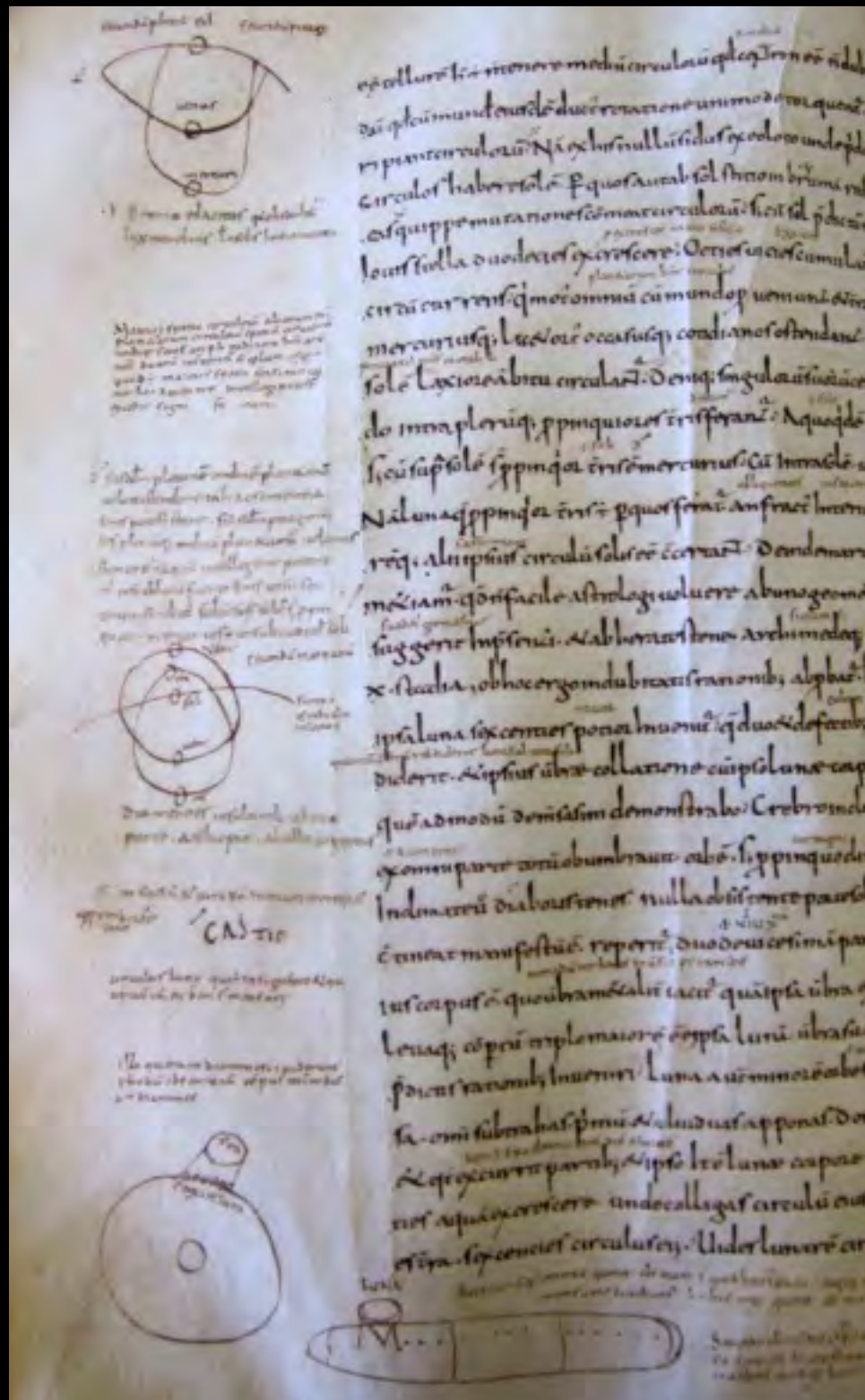
# Information taxonomy by Floridi



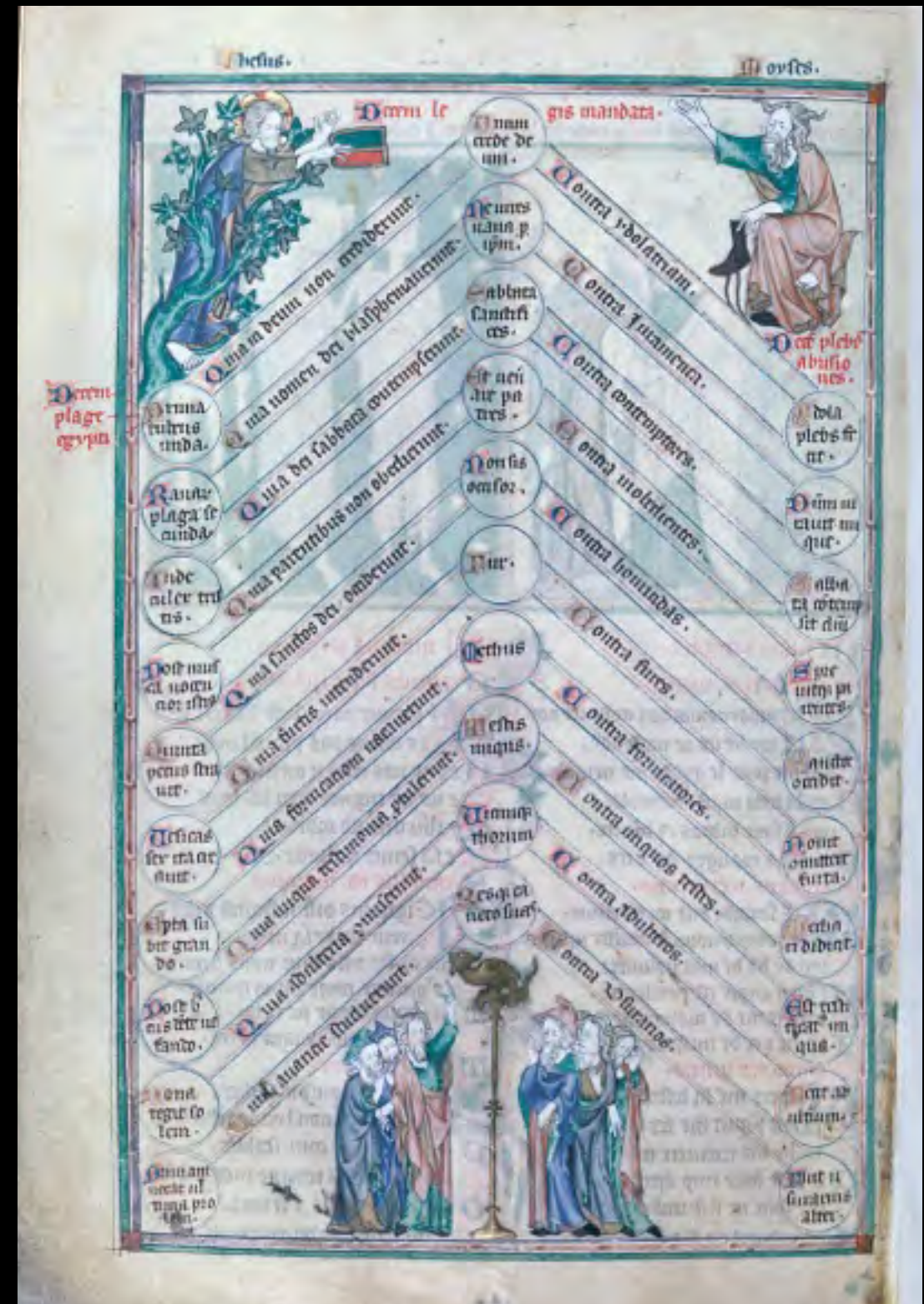
(historical)  
**intermezzo**



# Visual/diagrammatic representations over history



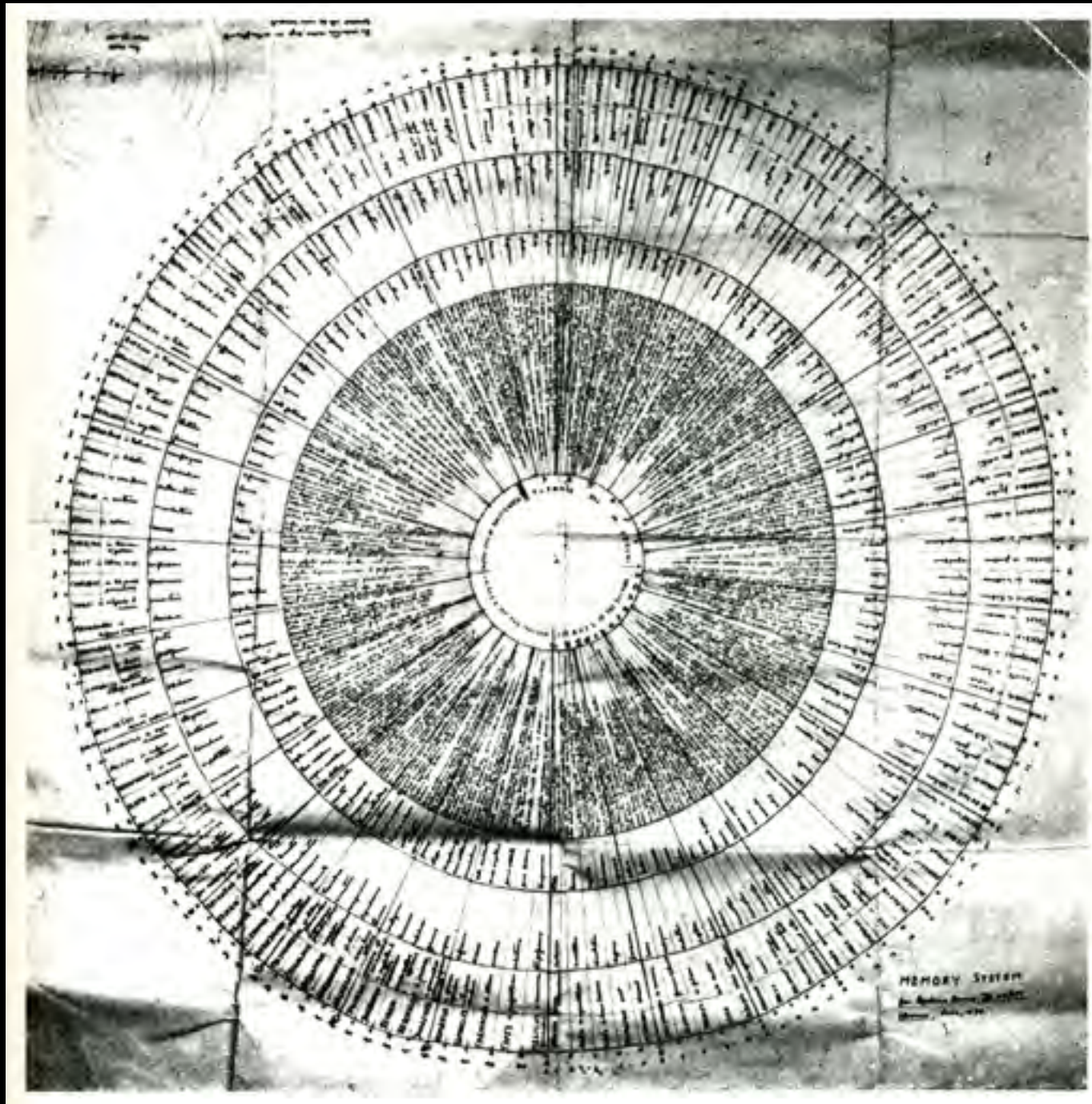
9th-ct., France: M. Capella, *De nuptiis*,  
Planetary diagrams



c. 1310, England: Table of the Ten Commandments  
from the *De Lisle Psalter*



# To increase working memory



1582: Giordano Bruno Memory system



c. 1460, England: T. Walsingham's treatise on mensural music.



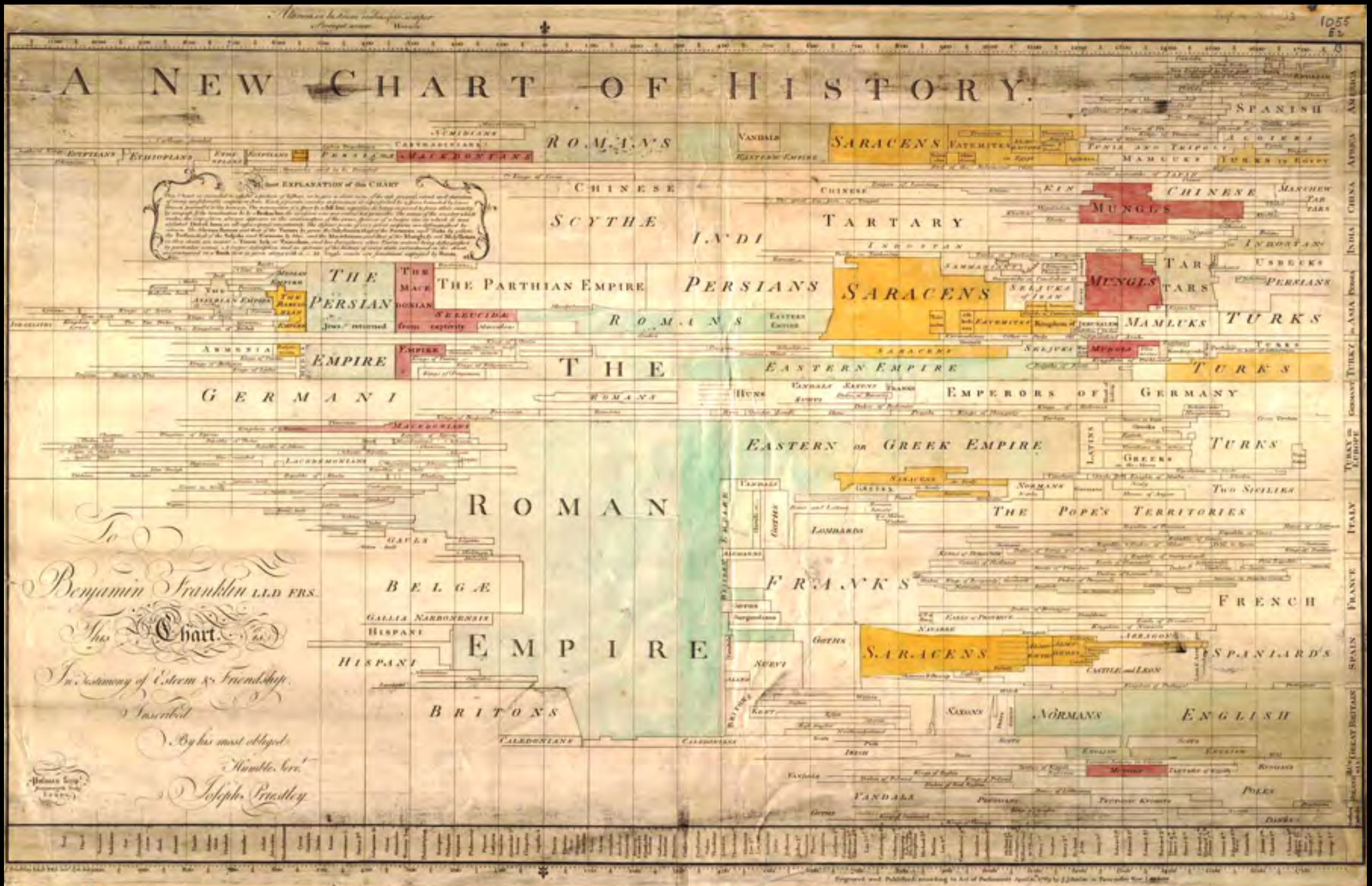
# To increase working memory + to facilitate search & discovery



Gottfried Hensel, 1741: maps depicting the use of languages in geographic space



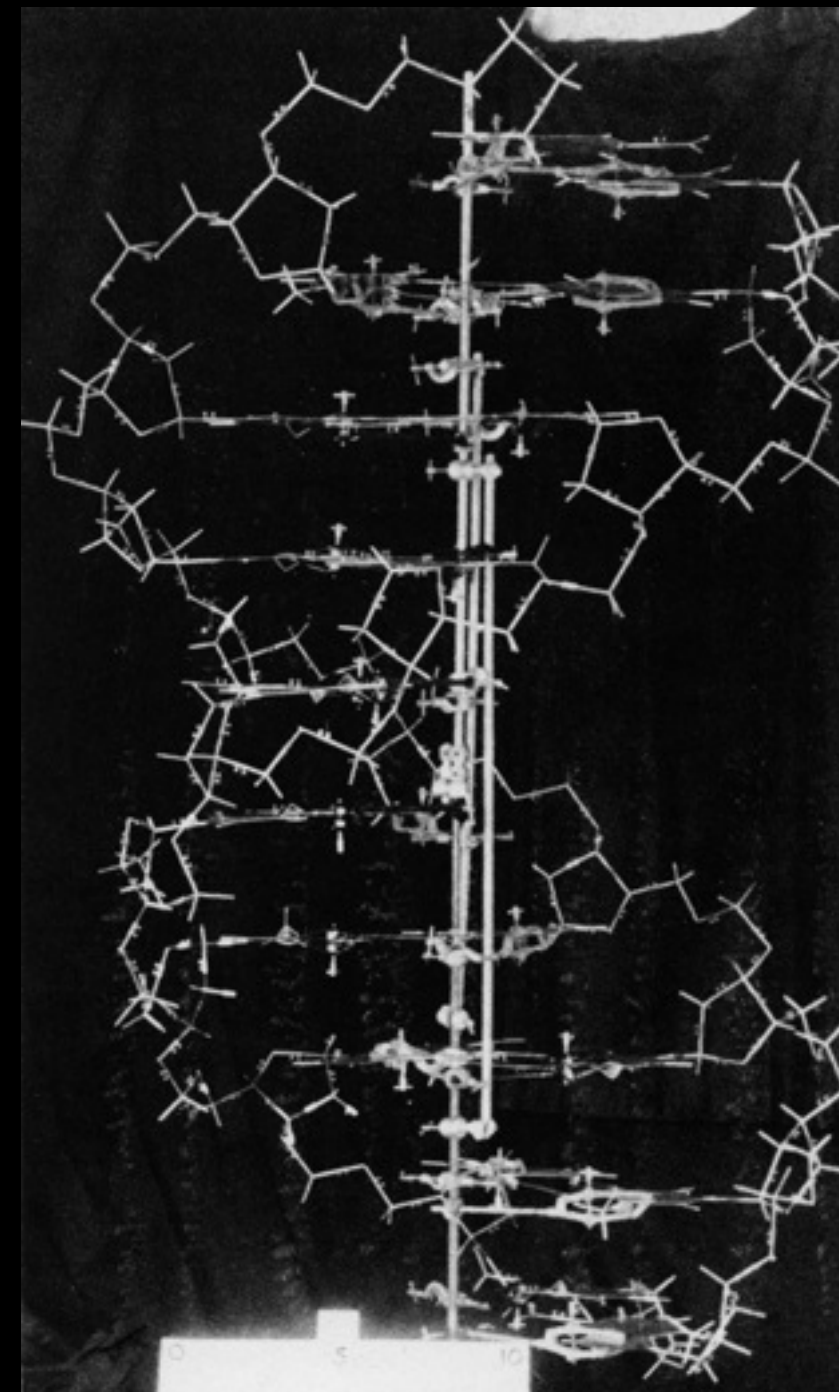
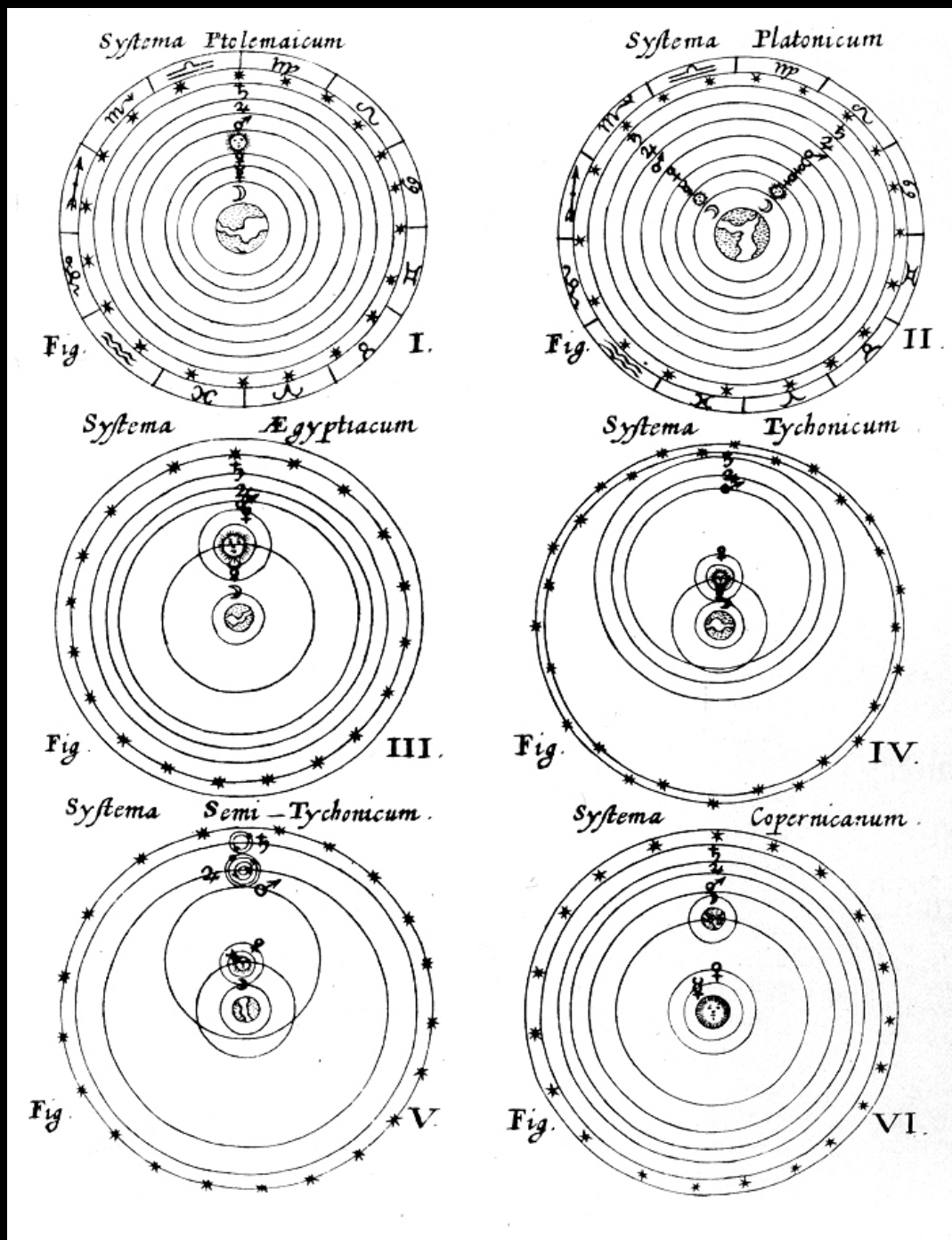
To increase working memory + to facilitate search  
& discovery + to support perceptual inference



### Joseph Priestley, 1769: A New Chart of History (this version is from 1777)



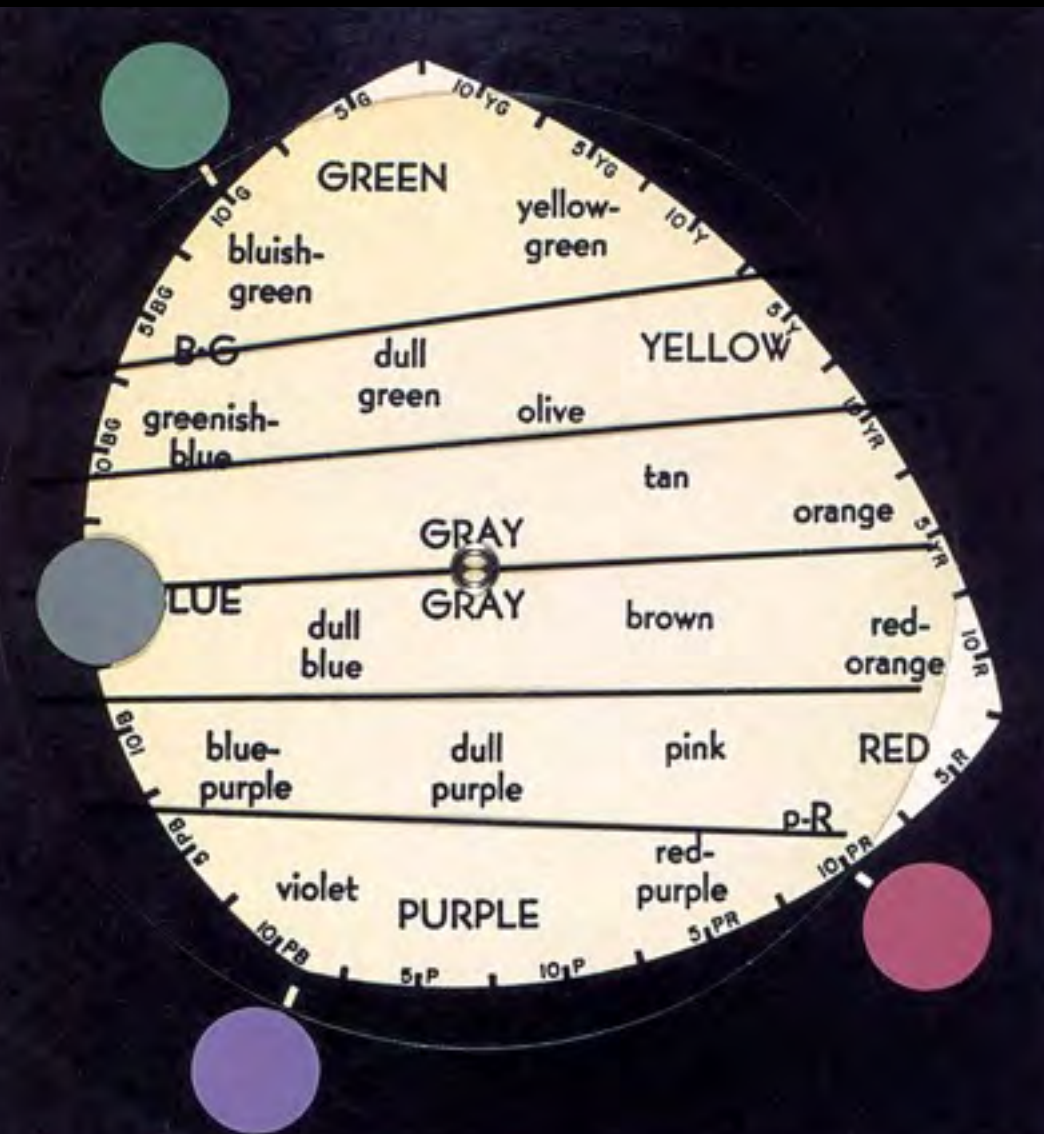
To increase working memory + to facilitate search  
& discovery + to support perceptual inference + to  
provide models



17th-ct.: comparative cosmologies

Watson & Crick, 1953: model of DNA molecular structure

To increase working memory + to facilitate search  
& discovery + to support perceptual inference + to  
provide models + to support data manipulation





# Google books Ngram Viewer

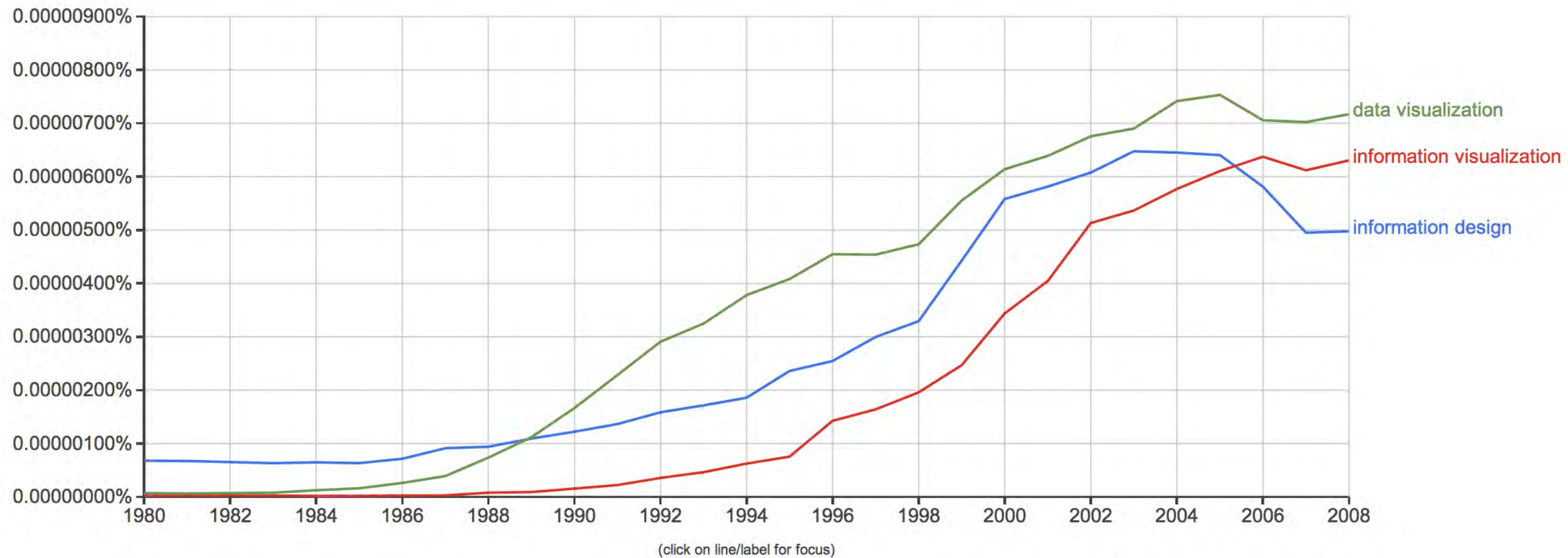
Graph these comma-separated phrases:

information design,information visualization,data visualization

☐ case-insensitive

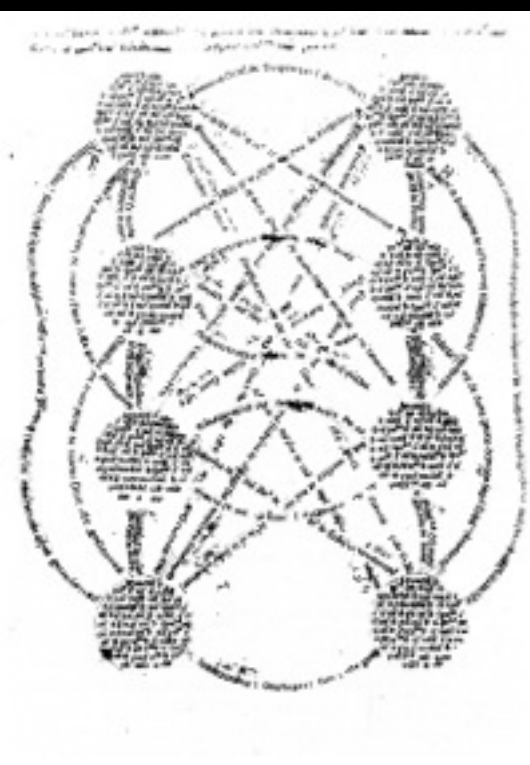
between 1980 and 2008 from the corpus English with smoothing of 3.

[Search lots of books](#)



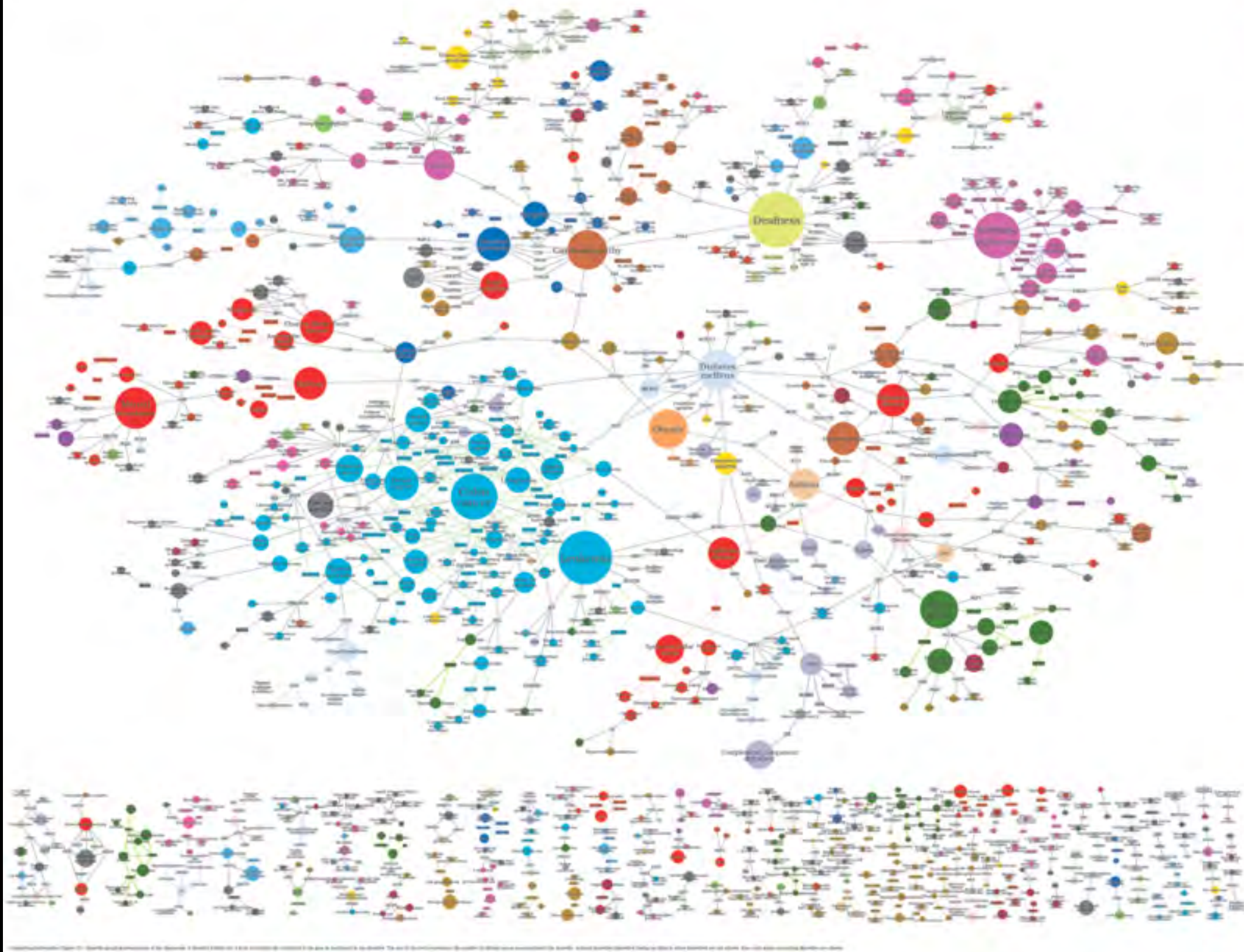
a **very** small  
sample





## The human disease network

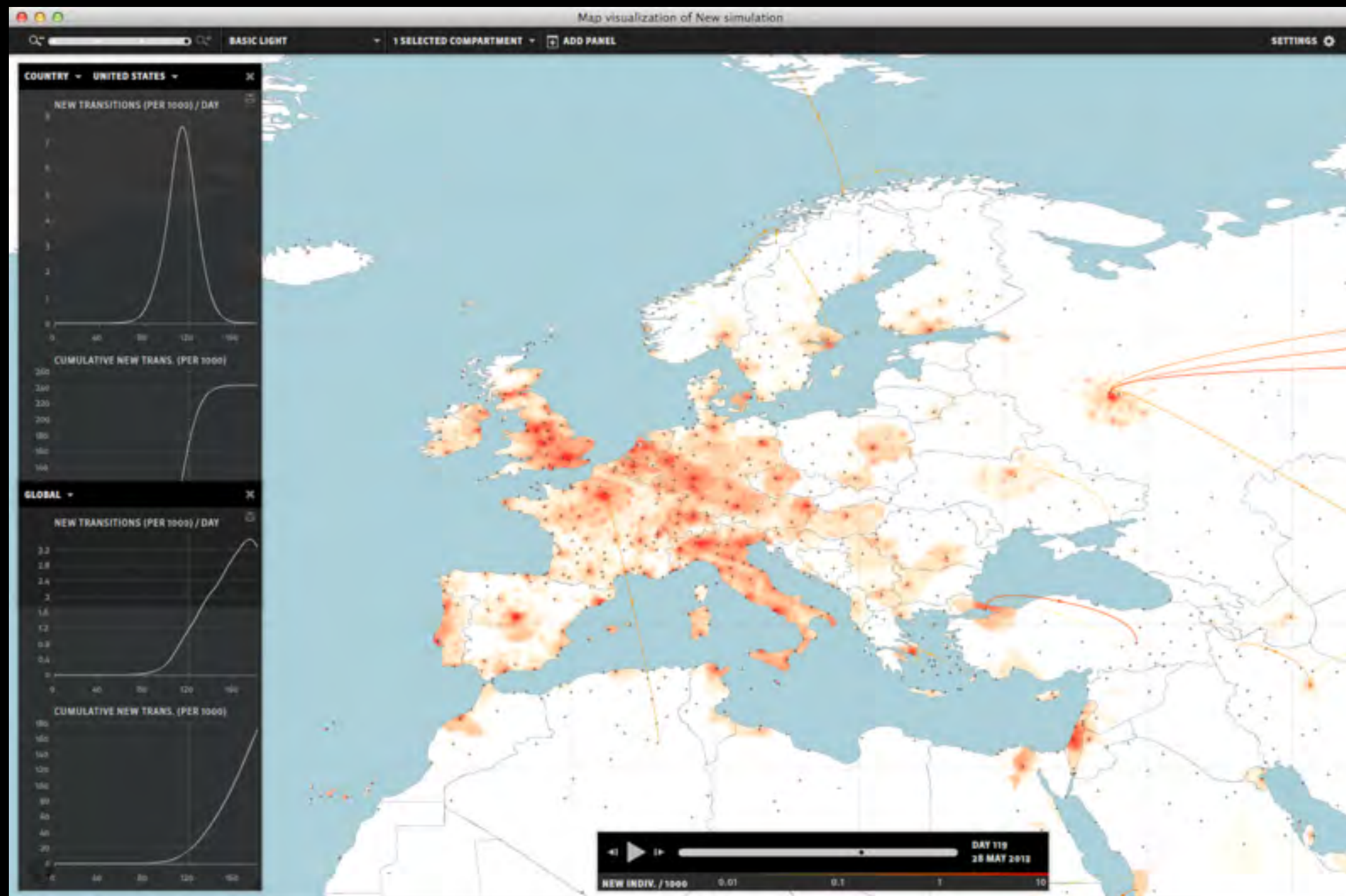
Goh K-I, Cusick ME, Valle D, Childs B, Vidal M, Barabási A-L (2007) *Proc Natl Acad Sci USA* 104:8685-8690



15-ct Square of oppositions

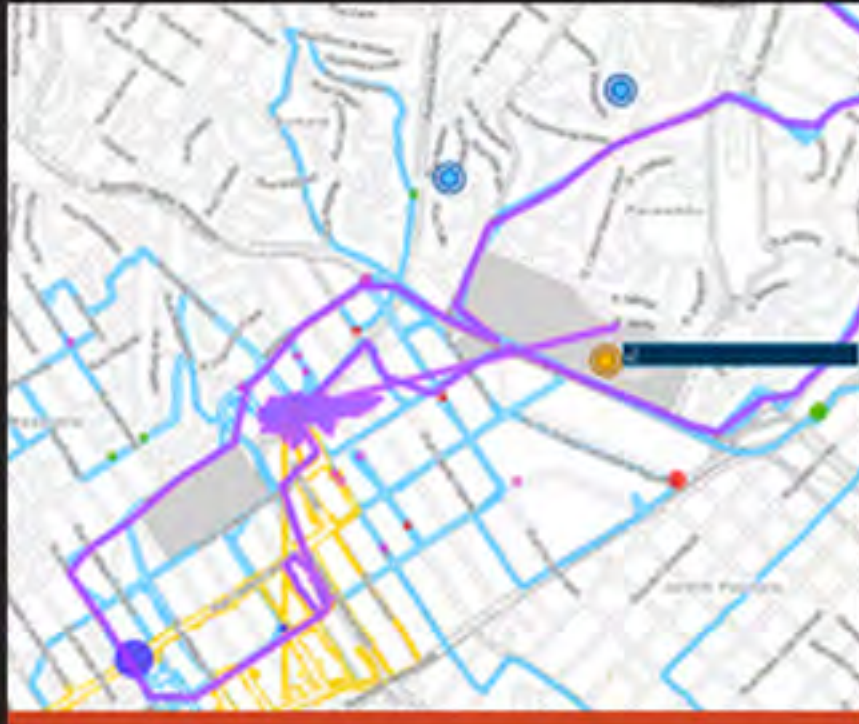
The Human Disease Network, PNAS 104:21, 8685 (2007)





J. Snow, 1854: London Cholera Epidemic

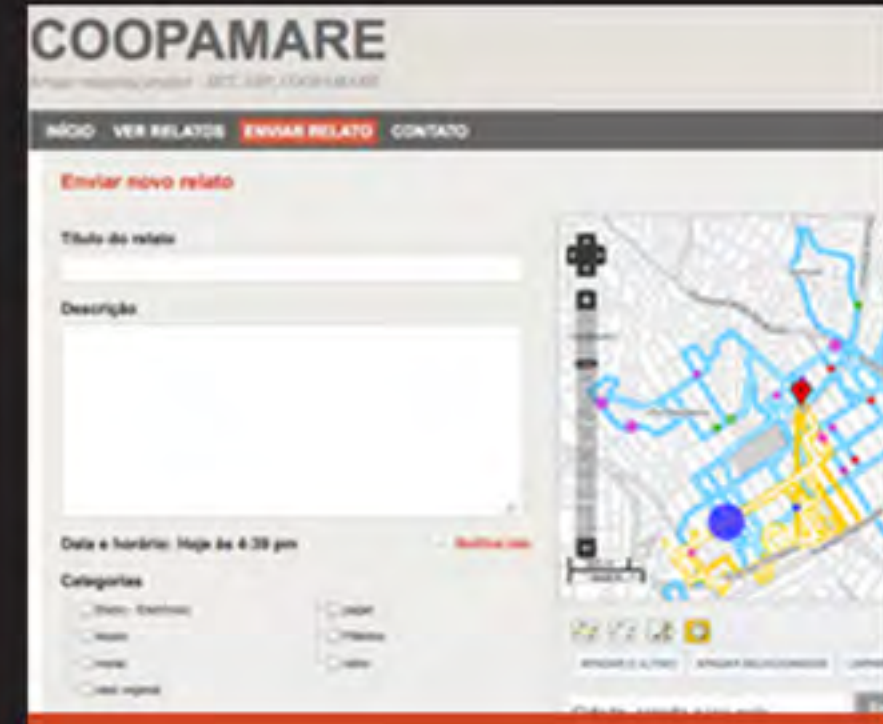
A. Vespignani and colleagues: GLEAMviz



*Interview tool for audio-synchronous annotation of GPS traces*

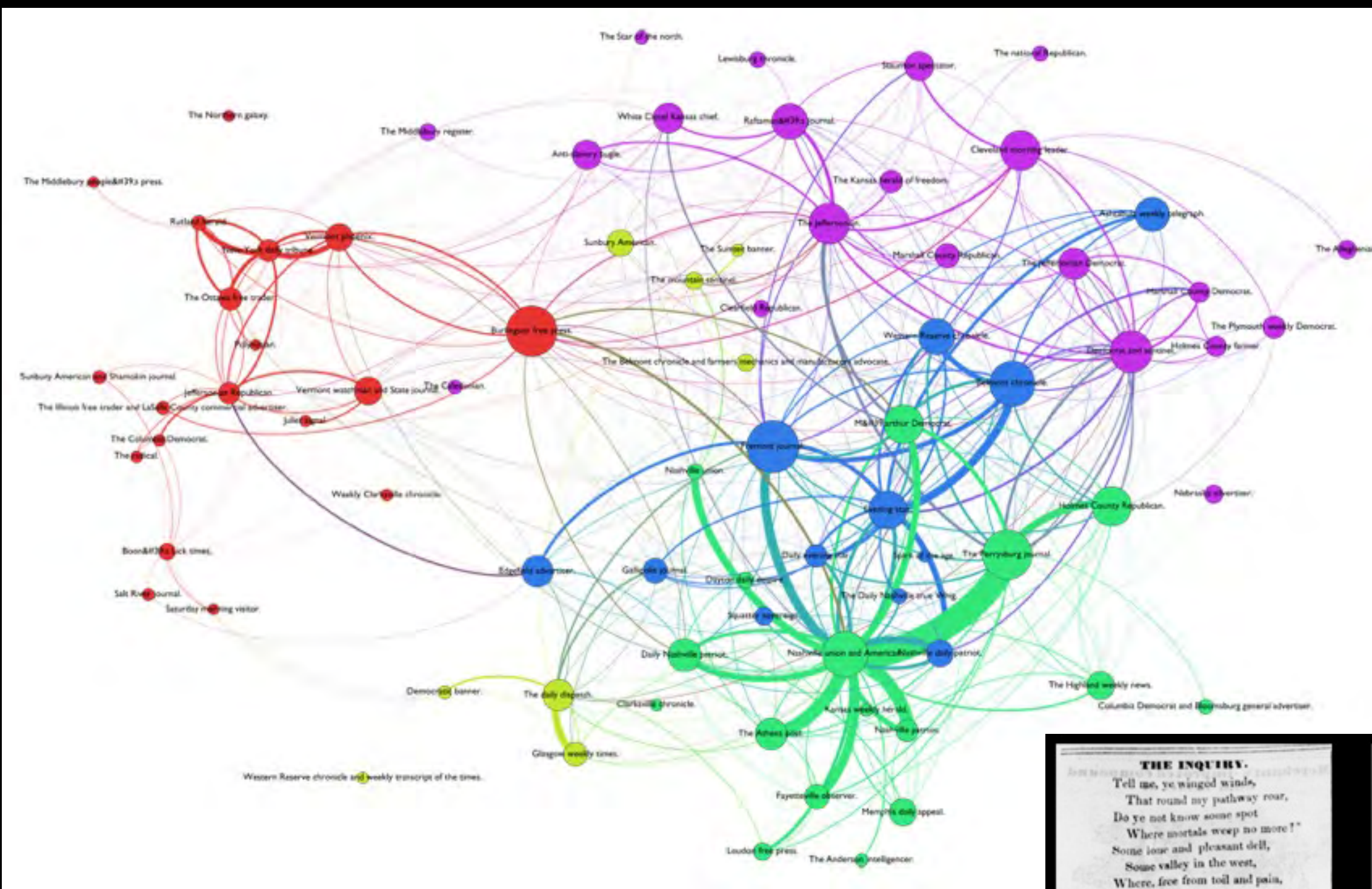


*Smartphone app for requesting recycling pick-ups*



*Data & Request management based on Ushahidi*





**THE INQUIRY.**  
Tell me, ye winged winds,  
That round my pathway rear,  
Do ye not know some spot  
Where mortals weep no more?  
Some lone and pleasant dell,  
Some valley in the west,  
Where, free from toil and pain,  
The weary soul may rest!  
The loud wind dwindled to a whisper low,  
And sighed for pity as it whispered "No!"

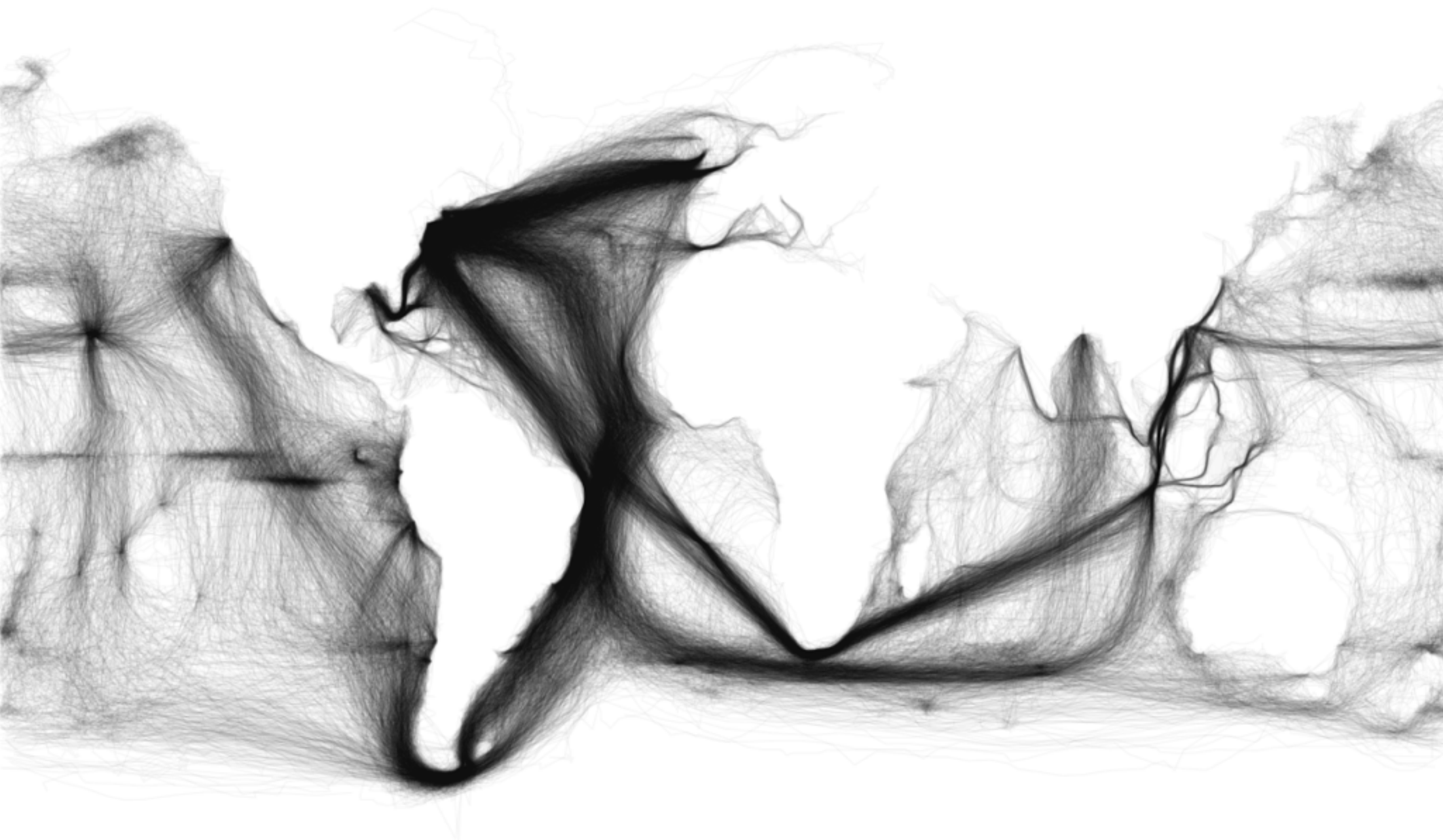
Tell me, thou mighty deep,  
Whose billows round me play,  
Know'st thou some favored spot,  
Some island far away,  
Where weary man may find  
The bliss for which he sighs,  
Where sorrow never lives,  
And friendship never dies?  
The loud waves rolling in perpetual flow,  
Stopped for awhile, and sighed, to answer "No!"

**THE LYRE.**

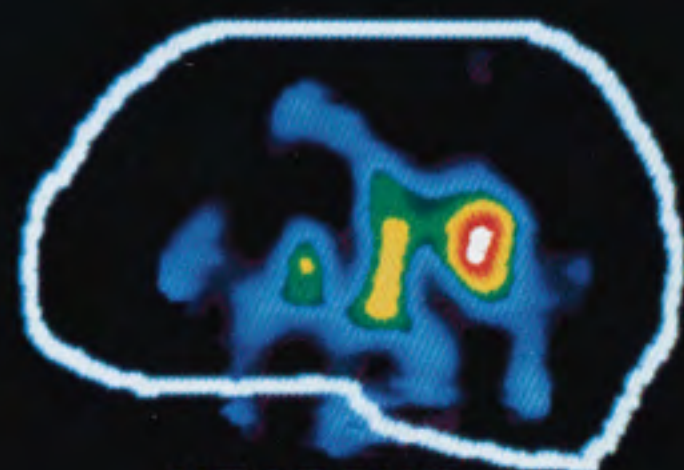


"He touched his harp, and nations heard, entranced."

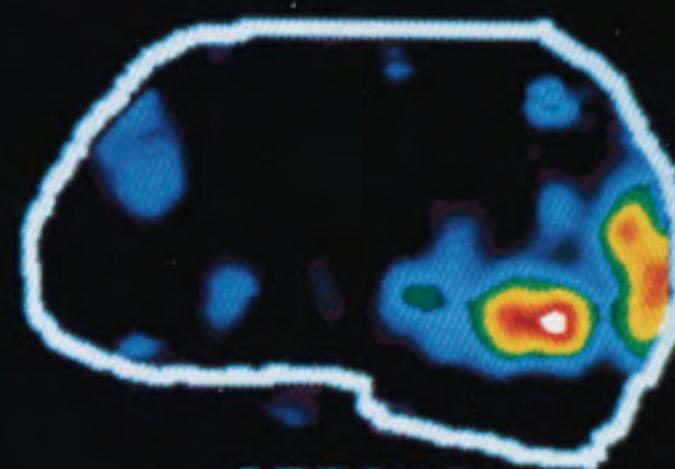
**THE INQUIRY.**  
Tell me ye winding winds,  
That round my pathway rear,  
Do ye not know some spot  
Where mortals weep no more—  
Some lone and pleasant dell,  
Some valley in the west,  
Where, free from toil and pain,  
The weary soul may rest!  
The loud wind dwindled to a whisper low,  
And sighed for pity, as it answered, "No!"



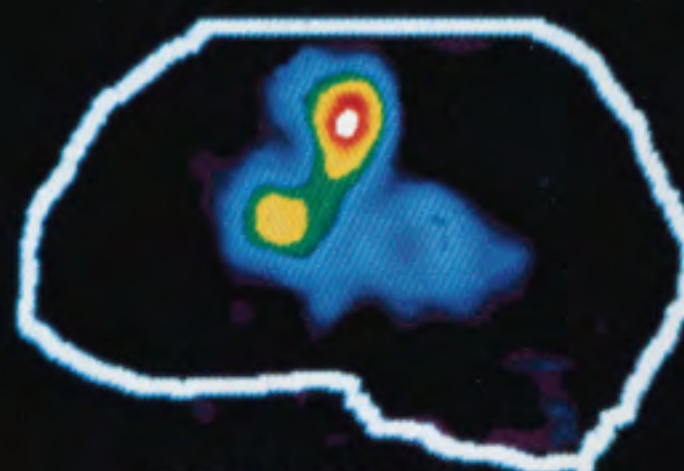




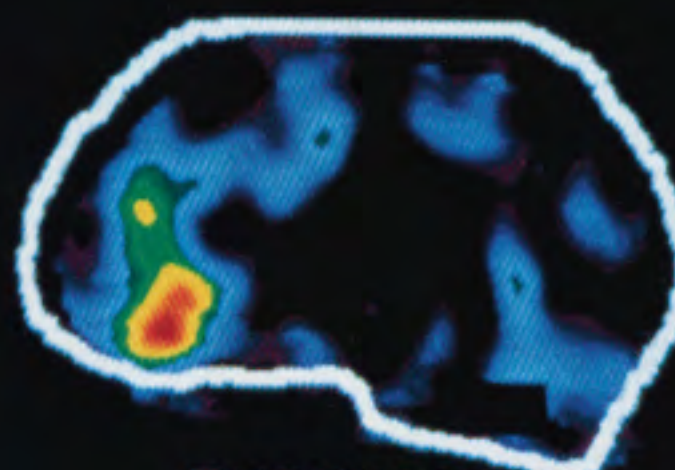
HEARING



SEEING



SPEAKING



THINKING



# PATHLINE

PATHWAY

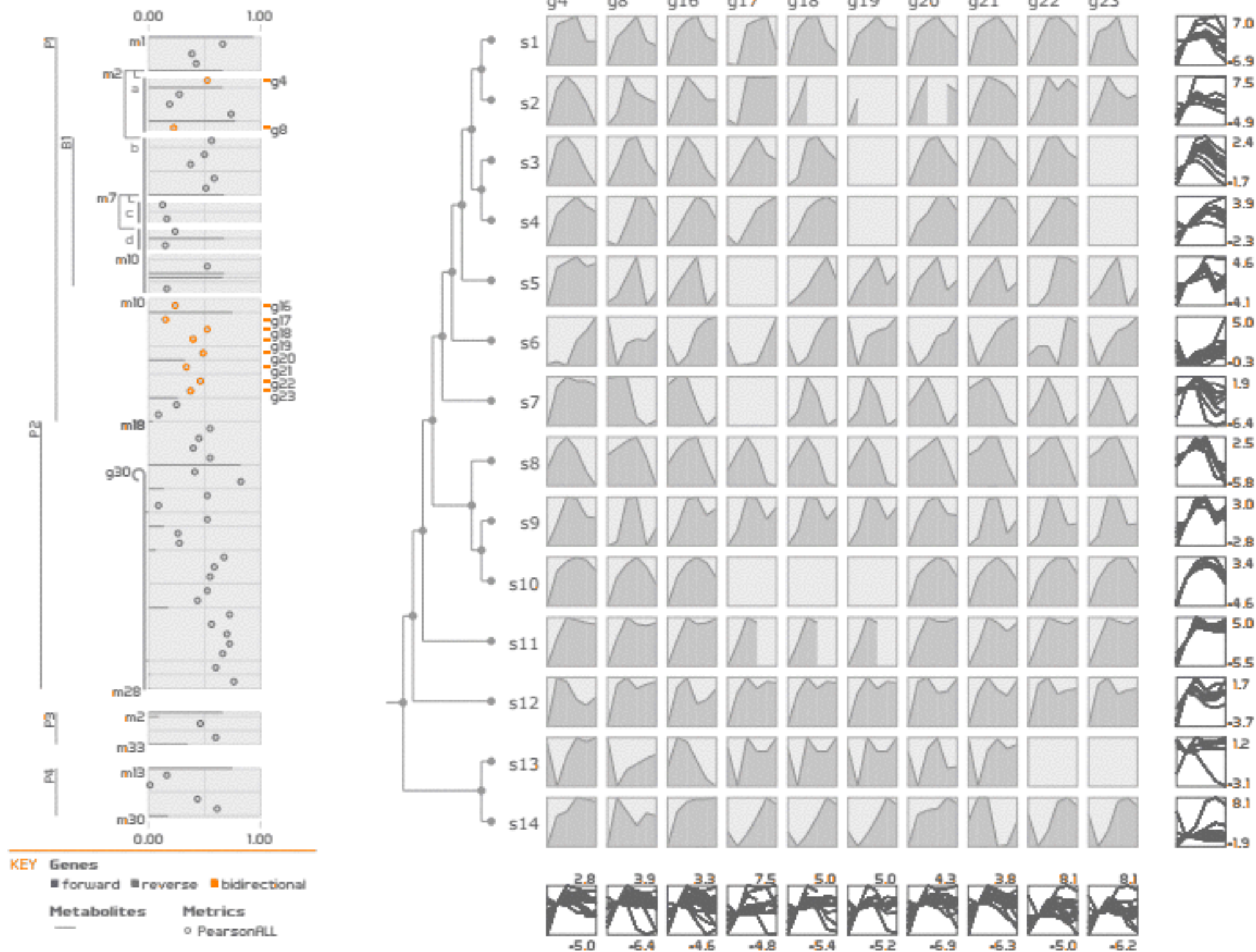
METRIC OVERVIEW

SPECIES

CURVEMAP

A TOOL FOR COMPARATIVE FUNCTIONAL GENOMICS

OVERLAYS







Google Search on 08/26/14: data visualization



from **wow!**

to **why?**

take away 1

**visualizations**

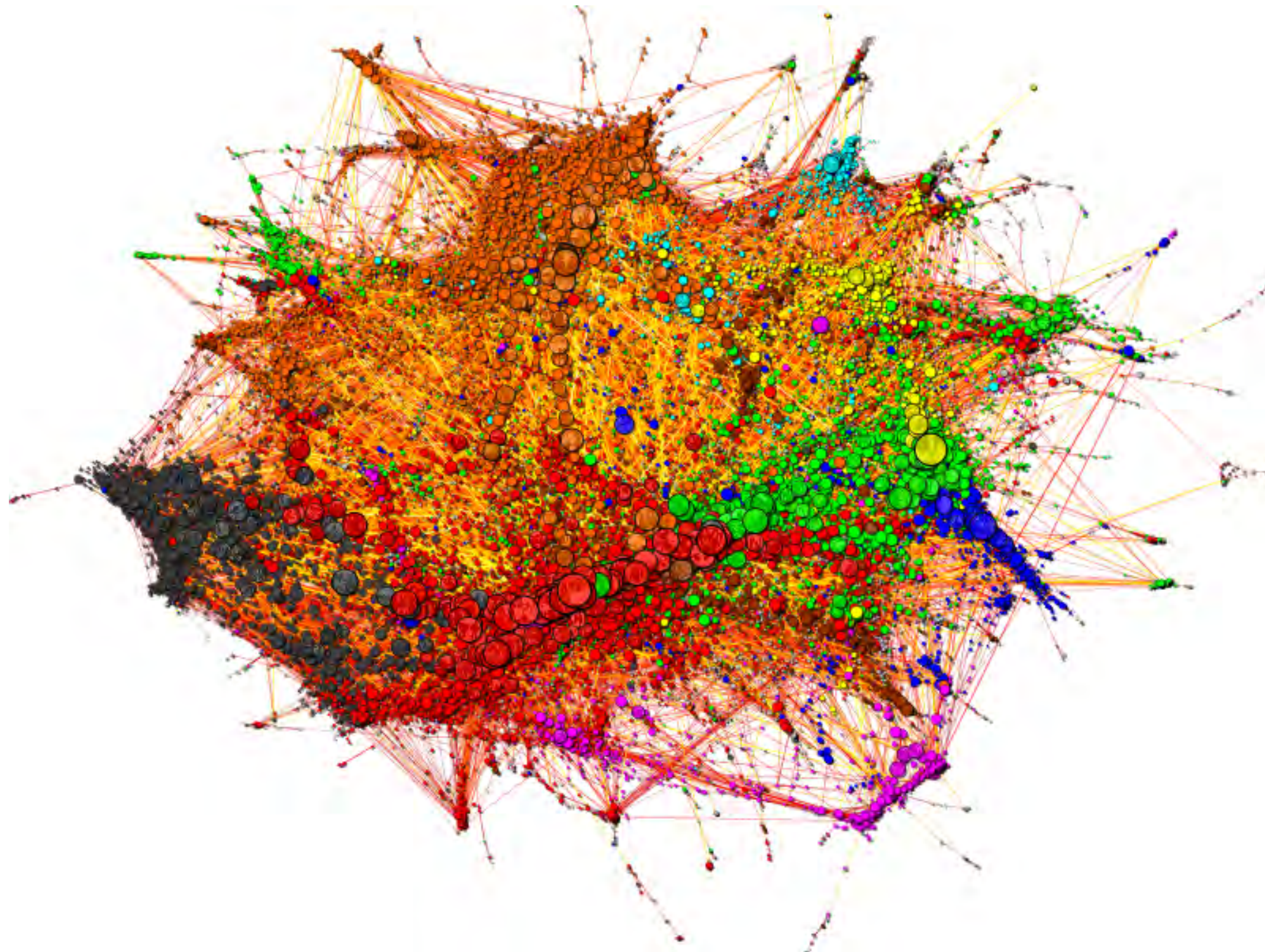
**entail**

**compromise**



18	Epic Movie	Independent	2	38	Comedy	Comedy	2801	6644	28.74	47.13	86.87	20.00	434.33%	18.8
19	Evan Almighty	Universal	23	56	Comedy	Comedy	3604	8654	100.48	72.89	173.39	175.00	99.08%	31.2
20	Fantastic Four: Rise of the	Fox	35	55	Monster Force	Action	3959	14683	131.92	157.11	289.05	130.00	222.34%	58
21	Ghost Rider	Sony	28	56	Monster Force	Action	3619	12541	115.80	112.39	228.74	110.00	207.94%	45.3
22	Good Luck Chuck	Lionsgate	3	61	Love	Comedy	2612	5226	36.03	34.17	59.19	25.00	236.77%	13.7
23	Grindhouse	The Weinstein	82	86	pursuit	Action	2624	4419	25.04	25.15	50.19	33.00	94.71%	11.6
24	Hairspray	Warner Bros.	92	84	Underdog	Musical	3121	8603	118.67	63.68	202.56	75.00	270.06%	27.5
25	Halloween	The Weinstein	26	64	Pursuit	Horror	3472	7592	58.27	30.20	78.47	39.00	392.35%	26.4
26	Happily N'Ever After	Lionsgate	4	43	Maturation	Animation	2381	2775	15.59	23.50	38.08	47.00	81.03%	6.6
27	Harry Potter and the Order of	Warner Bros.	78	82	Quest	Adventure	4285	17998	202	647.88	939.88	150	628.59%	77.1
28	Hitman	Fox	15	61	Quest	Action	2458	5362	30.88	60.28	99.98	17.50	571.22%	13.2
29	Hostel: Part II	Lionsgate	44	45	Escape	Horror	2350	3490	17.21	16.01	35.62	70.00	356.20%	8.2
30	I Am Legend	Warner Bros.	69	69	Quest	Thriller	3606	21411	386.39	107.28	584.16	150.00	389.44%	77.2
31	I Now Pronounce You Chuck	Universal	13	73	Comedy	Comedy	3495	9795	120.09	65.95	186.06	95.00	218.69%	34.2
32	In the Land of Women	Warner Bros.	43	72	Transformation	Comedy	2155	2186	17.35	6.51	17.56	10.00	175.62%	4.7
33	Into the Wild	Paramount	62	90	quest	Drama	658	3249	18.95	37.28	55.83	15.00	370.90%	2.1
34	Juno	Fox	94	89	Maturation	Comedy	1019	10436	143.50	67.69	231.18	7.50	3082.46%	10.6
35	Knocked Up	Universal	91	83	Love	Comedy	2871	10690	149.77	70.23	219.00	23.00	663.64%	30.7
36	License to Wed	Warner Bros.	8	55	Love	Comedy	2604	4002	43.80	25.51	69.31	35.00	198.02%	10.4
37	Lions for Lambs	Independent	27	48	Quest	Drama	2215	3025	15.00	43.27	63.21	35.00	180.60%	6.7
38	Live Free or Die Hard	Fox	79	86	Rescue	Action	3408	9791	154.53	248.00	383.53	110.00	348.66%	33.4
39	Meet the Robinsons	Disney	66	75	Quest	Animation	3413	7361	87.82	71.51	169.33	100.00	169.33%	25.1
40	Michael Clayton	Independent	90	72	Transformation	Thriller	2511	4131	48.02	43.96	92.99	25.00	371.97%	10.4
41	Mr. Brooks	MGM	56	75	Temptation	Thriller	2453	4083	28.85	19.59	48.12	20.00	240.61%	10
42	Mr. Magorium's Wonder	Independent	36	56	Transformation	Fantasy	3164	3043	30.08	34.29	68.95	25.00	275.79%	9.63
43	Music and Lyrics	Warner Bros.	63	70	Love	Romance			50.57	95.32	145.90	40.00	364.74%	13.6
44	Nancy Drew	Independent	49	61	The Riddle	Thriller	2612	2615	25.61	5.05	30.67	29.00	153.33%	6.9
45	National Treasure: Book of	Disney	31	72	The Riddle	Thriller	3832	11686	218.98	257.40	457.36	150.00	351.82%	44.8
46	Next	Paramount	29	59	Pursuit	Thriller	2725	2617	18.21	58.03	73.54	70.00	105.06%	7.1
47	No Country for Old Men	Paramount	95	84	Pursuit	Drama	860	9042	74.28	86.72	161.00	25.00	644.00%	7.8
48	No Reservations		39	64	Love	Comedy	2425	4828	43.11	49.46	92.60	25.00	330.72%	11.7
49	Norbit	Paramount	9	56	Comedy	Comedy	3136	10904	35.87	62.64	159.31	60.00	265.52%	34.2
50	Ocean's 13	Warner Bros.	70	74	Revenge	Thriller	3565	10135	112.16	194.16	311.31	85.00	366.25%	36.1
51	P.S. I Love You	Independent	21	82	Love	Romance	2454	2641	51.70	80.40	153.09	90.00	510.31%	6.5
52	Pathfinder: Legend of the		11	41	Rescue	Action	1720	2907	10.23	20.56	30.82	25.00	118.55%	5
53	Pirates of the Caribbean: At	Disney	45	74	Rescue	Action	4362	26302	209.42	451.58	961.00	500.00	320.33%	114.7
54	Premonition	Sony	8	55	The Riddle	Drama	2831	6202	47.85	36.14	84.00	20.00	419.98%	17.6
55	Ratatouille	Disney	97	84	Transformation	Animation	3940	11935	206.45	414.08	621.42	150.00	414.28%	47
56	Rush Hour 3	Warner Bros.	20	68	Rescue	Action	3778	12996	140.10	171.30	258.02	140.00	184.30%	49.1
57	Saw IV	Independent	18	70	Escape	Horror	3183	9976	63.50	75.95	139.35	10.00	1393.53%	31.7
58	Shoot 'Em Up	Warner Bros.	67	66	Pursuit	Action	2108	2711	12.81	14.20	26.81	25.00	68.74%	5.7
59	Shooter	Paramount	47	82	Pursuit	Action	2806	5175	47.00	43.89	95.70	61.00	156.88%	14.5
60	Shrek the Third	Paramount	42	57	Quest	Animation	4122	29507	232.72	475.24	798.96	160.00	499.35%	121.6
61	Sicko	The Weinstein	93	87	quest	Documentary	702	5128	24.34	11.23	35.77	20.00	397.42%	3.6
62	Smokin' Aces	Universal	27	64	Pursuit	Action	2218	6599	35.79	21.32	57.10	17.00	335.91%	14.6
63	Spider-Man 3	Sony	61	54	Metamorphosis	Action	4252	35540	336.53	554.34	890.87	250.00	345.30%	151.1
64	Stardust	Paramount	76	86	Quest	Adventure	2540	3610	38.62	86.32	135.56	70	193.66%	9.16
65	Stomp the Yard	Independent	27	83	Maturation	Musical	2051	10645	81.36	14.15	75.51	14.00	539.37%	21.9
66	Superbad	Sony	88	87	Comedy	Comedy	2948	11211	121.46	42.17	169.87	30.00	849.36%	33
67	Surf's Up	Sony	78	64	Discovery	Animation	3528	5000	58.87	90.13	149.04	35.00	175.35%	17.8
68	Sweeney Todd: The Demon	Warner Bros.	86	81	Revenge	Musical	1249	7446	52.90	98.63	152.52	30.00	305.05%	9.3
69	The Bourne Ultimatum	Universal	93	91	Pursuit	Thriller	3660	18929	327.47	215.38	442.82	110.00	402.57%	69.3
70	The Brave One		43	65	Rivalry	Action	2755	4889	38.79	32.98	69.79	70.00	99.70%	13.5
71	The Bucket List	Warner Bros.	41	81	discovery	Drama	2911	6661	93.47	20.84	174.31	45.00	387.36%	19.4
72	The Darjeeling Limited	Fox	67	79	Journey and	Drama	698	2523	11.00	23.02	34.92	11.50	199.53%	1.8
73	The Game Plan	Disney	27	75	Discovery	Comedy	3103	7396	80.64	57.23	147.87	32.00	672.13%	22.9
74	The Golden Compass	Warner Bros.	42	55	Rescue	Action	3528	7308	70.11	302.43	372.23	190.00	206.80%	25.7
75	The Heartbreak Kid	Paramount	30	41	Love	Comedy	3229	4342	38.79	30.98	127.77	60.00	212.94%	14
76	The Hills Have Eyes 2	Independent	11	50	Monster Force	Horror	2447	3958	20.80	16.66	37.47	15.00	249.77%	9.7
77	The Invasion	Warner Bros.	19	43	Monster Force	Sci-Fi	2776	2143	15.07	25.10	40.17	30.00	50.21%	5.6
78	The Kingdom		52	78	Quest	Action	2793	6135	47.54	39.07	86.81	30.00	108.26%	17.1
79	The Kite Runner	Paramount	66	85	Maturation	Drama	715	2243	15.80	67.38	73.19	20.00	365.97%	1.6
80	The Mist	The Weinstein	72	64	Monster Force	Horror	2423	3686	25.89	31.24	56.83	18.00	315.72%	8.9
81	The Nanny Diaries	The Weinstein	33	52	Discovery	Comedy	2629	2845	25.62	21.67	47.00	20.00	235.00%	7.5
82	The Reaping		9	53	Quest	Horror	2603	3851	25.13	31.54	62.77	40.00	156.93%	10
83	The Simpsons Movie	Fox	90	78	Maturation	Comedy	3922	18877	162.14	303.83	527.07	75.00	702.76%	74
84	There Will Be Blood	Paramount	91	84	Wretched Excess	Drama	885	5502	40.23	35.96	76.18	25.00	304.73%	4.9
85	TMNT		33	63	Monster Force	Action	3110	7799	54.15	40.89	95.01	35.00	271.46%	24.3
86	Transformers	Paramount	57	89	Monster Force	Action	4011	17577	319.25	588.83	708.27	150.00	472.18%	70.5
87	Tyler Perry's Why Did I get	Independent	46	47	Love	Romance	2011	10618	96.20	3.88	55.86	15.00	372.42%	21.4
88	Vacancy	Sony	55	46	Pursuit	Comedy	2551	2980	70.36	15.94	35.30	19.00	185.79%	7.6
89	Waitress	Independent	89	67	Love	Romance	605	3327	19.07	3.10	22.18	2.00	1108.97%	2
90	Walk Hard: The Dewey Cox	Sony	75	55	Comedy	Comedy	2650	1575	78.93	2.26	20.58	30.00	58.79%	4.1
91	We Own the Night	Sony	55	63	Sacrifice	Drama	2362	4583	28.56	26.26	54.83	21.00	261.08%	10.8
92	Wild Hogs	Disney	14	72	Transformation	Comedy	3287	12077	168.27	65.35	253.63	30.00	281.81%	39.7
93	Zodiac	Paramount	89	73	Pursuit	Thriller	2362	5671	33.08	61.71	84.79	65.00	130.44%	13.4





Tamas Nepusz (2008): Visualization of the relationships among artists in the last.fm database > <http://sixdegrees.hu/>

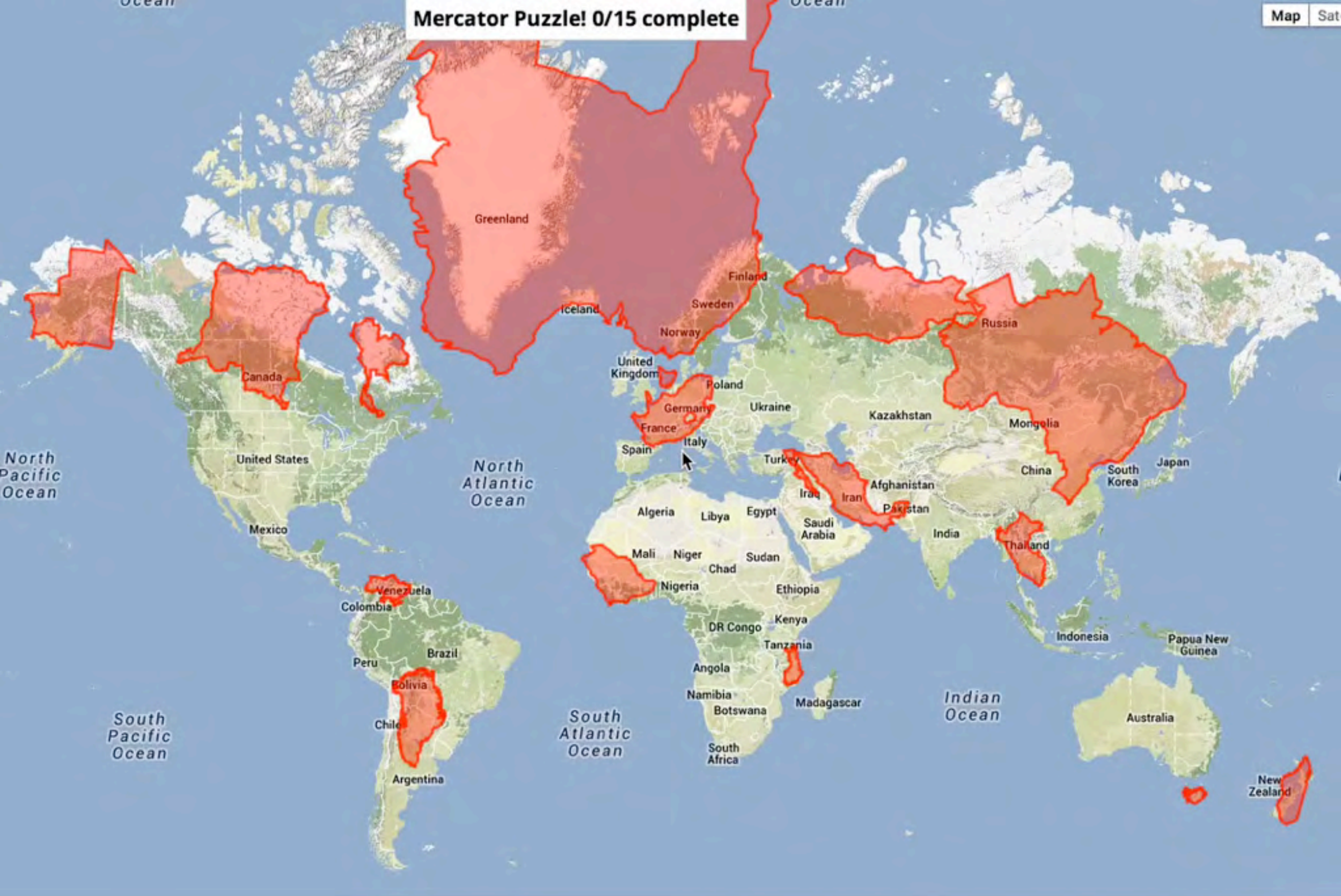
take away 2

**human-centered  
artifacts**



Mercator Puzzle! 0/15 complete

Map Sat

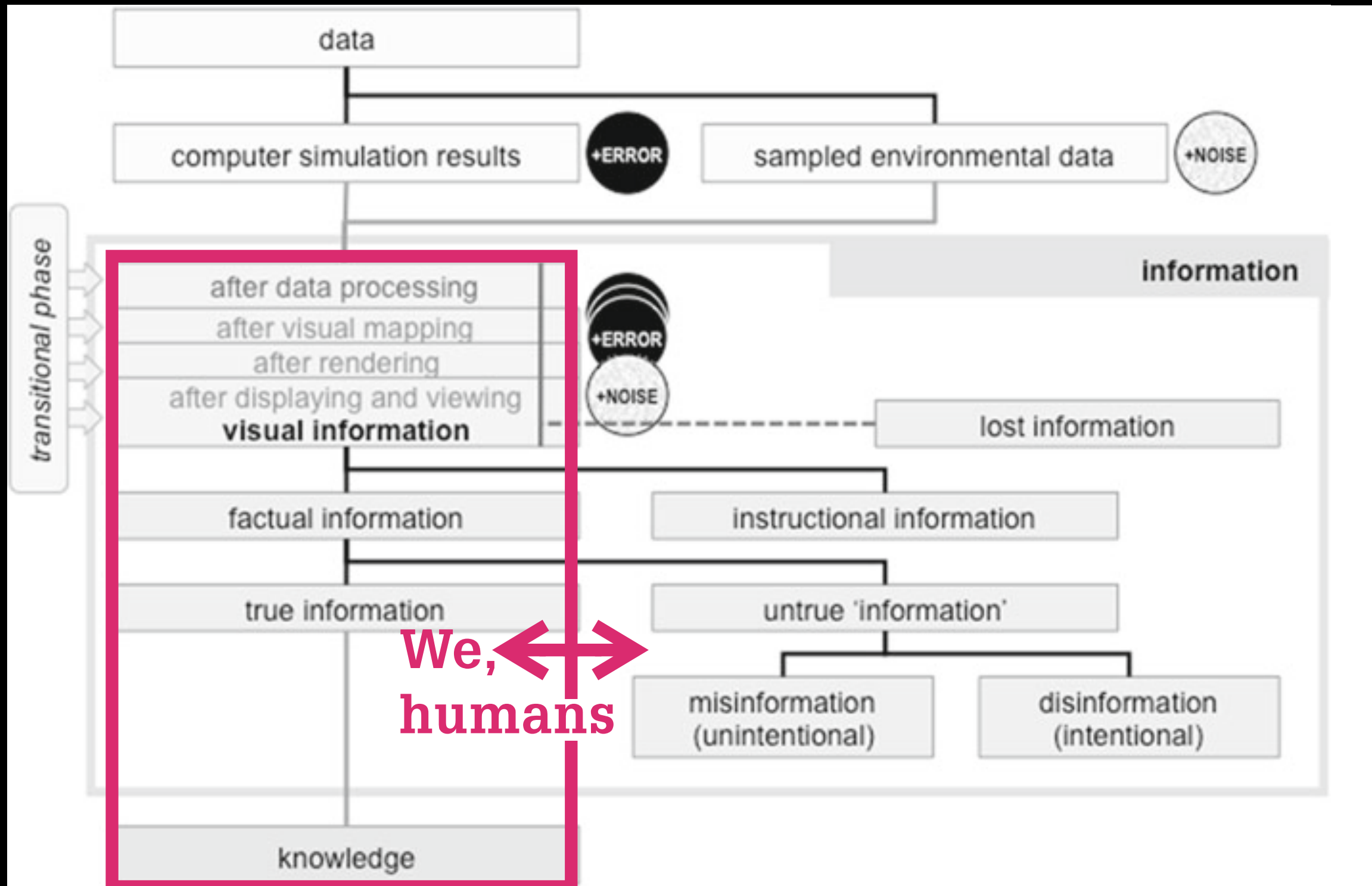


take away 3

**literacies**

**visual & numerical**

# Information map for visualisation by Chen & Floridi





# thanks!

[meirelles.isabel@gmail.com](mailto:meirelles.isabel@gmail.com)

[www.isabelmeirelles.com](http://www.isabelmeirelles.com)

