

Networks in Early Modern Science

{ An exploration of historiographic hypotheses
using network analysis

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SLIS Doctoral Research Forum 2012 | Saturday, October 5th

Wells Library, E174 | Bloomington, Indiana | 10:45 a.m.

Outline

- The Republic of Letters
 - Scientific Revolution
 - Key Players
 - Historian's Take
- The Network
 - Data
 - General Characteristics
 - Hypothesis Matching
 - New Directions
- Methodological Difficulties
 - Data Availability
 - Historical Evidence
 - Network Sampling
 - Question of Structure

The Republic of Letters

{ Context and historical research

The Republic of Letters

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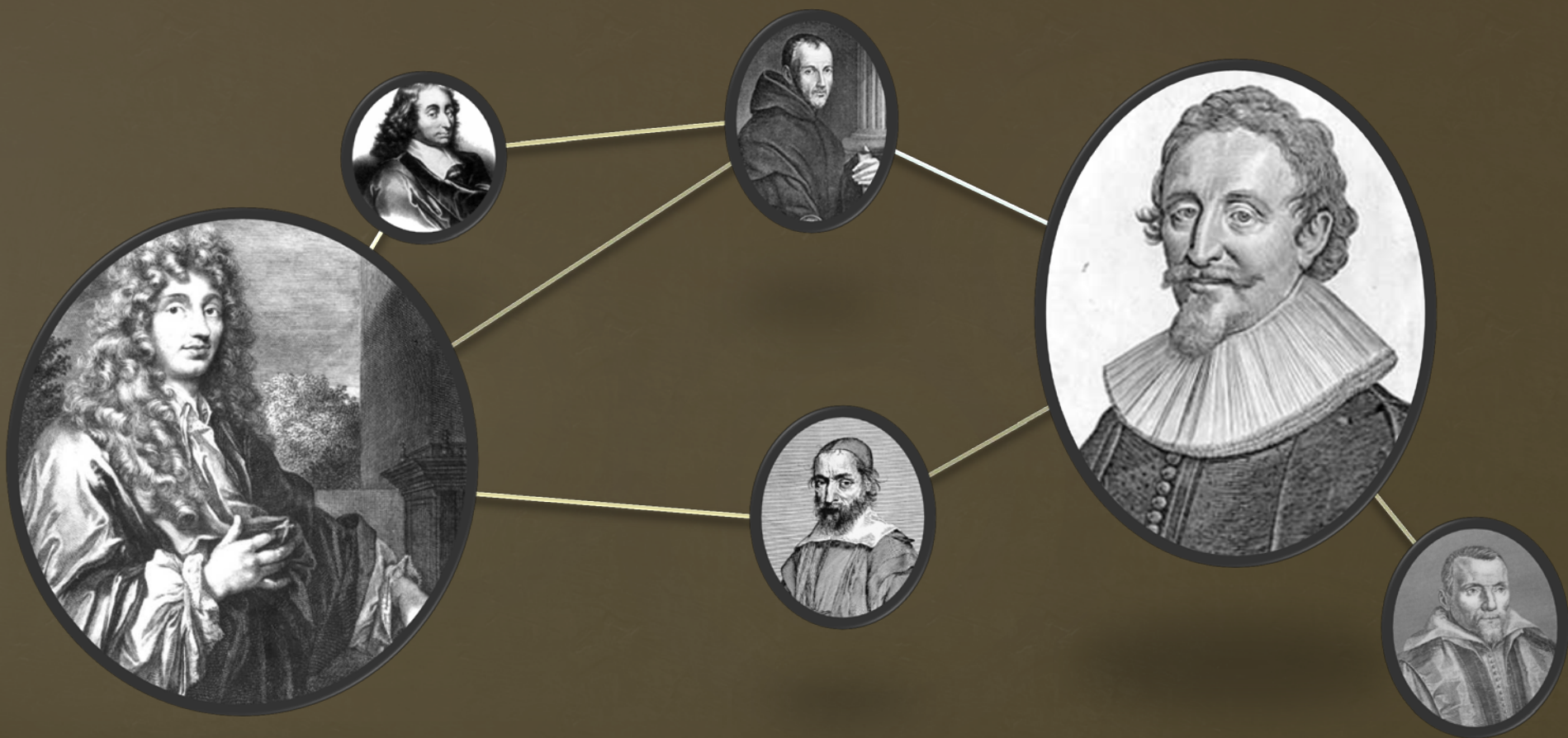


PHILOSOPHICAL TRANSACTIONS.

February 19. 16⁷¹₇₂.

The CONTENTS.

A Letter of Mr. Isaac Newton, Mathematick Professor in the University of Cambridge; containing his New Theory about Light and Colors: Where Light is declared to be not Similar or Homogeneal, but consisting of difform rays, some of which are more refrangible than others: And Colors are affirm'd to be not Qualifications of Light, deriv'd from Refractions of natural Bodies, (as 'tis generally believed;) but Original and Connate properties, which in divers rays are divers: Where several Observations and Experiments are alledged to prove the said Theory. An Accompt of some Books: I. A Description of the EAST-INDIAN COASTS, MALABAR, COROMANDEL, CEYLON, &c. in Dutch, by Phil. Baldæus. II. Antonii le Grand INSTITUTIO PHILOSOPHIÆ, secundum principia Renati Des-Cartes; novâ methodo adornata & explicata. III. An Essay to the Advancement of MUSIC by Thomas Salmon M.A.



The early modern Republic of Letters



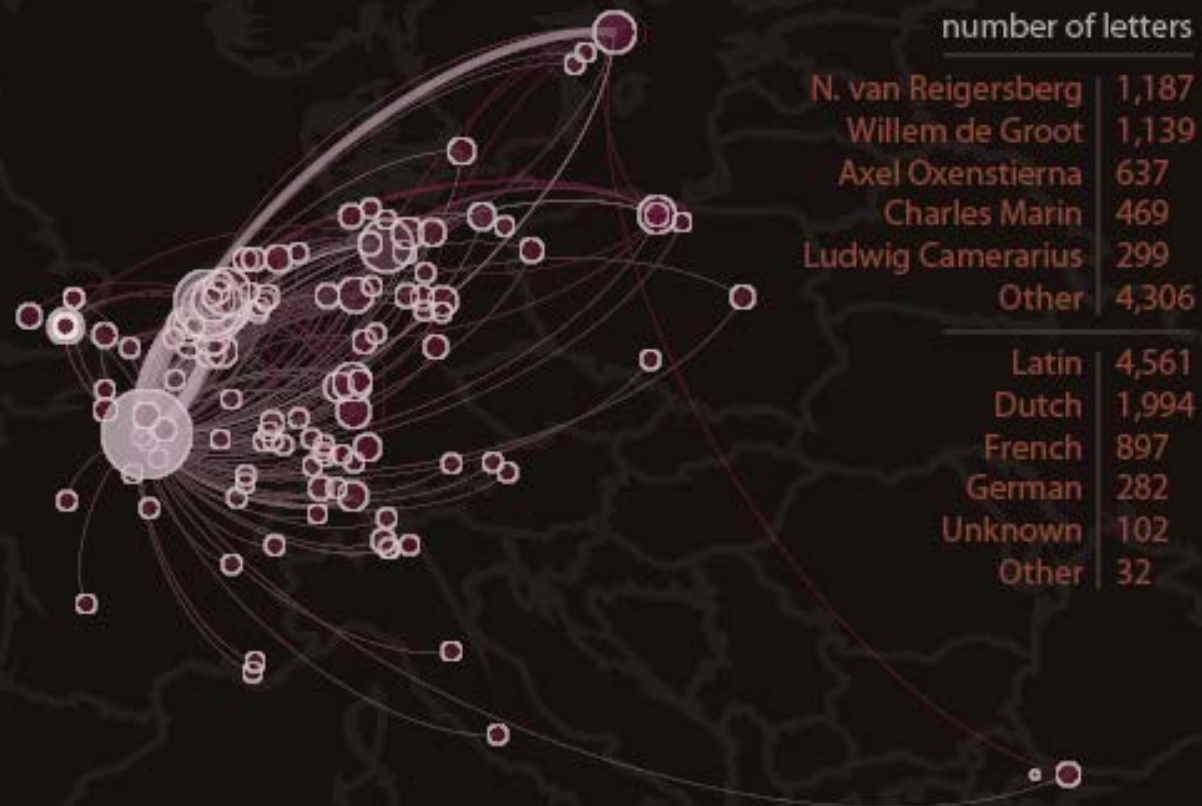
Peiresc (http://en.wikipedia.org/wiki/File:Nicholas-Claude_Fabri_de_Peiresc.jpg) & Oldenburg (http://en.wikipedia.org/wiki/File:Henry_Oldenburg.jpg)



The Network

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The Correspondence of Hugo Grotius



map by [Scott Weingart](#)
data from [Huygens ING](#) (The Hague)
built using [The Sci2 Tool](#) and [Gephi](#)

600

letters per year

300

1597

1621

1645

600

300

Sancroft, William

Charlett, Arthur (DD) (Reverend)

Hearne, Thomas

Noble, Mark (Reverend)

Malone, Edmund (junior)

Vossius, Gerardus Joannes

Wharton, Philip

Lenthall, William (the Honorable)

Hartlib, Samuel

Hibbert, Admiral (1635-1680)

Pole, John (1591-1641)

Curtis, John

Shedden, Gilbert

Aubrey, John

Lister, Martin

Wood, Anthony

Lhwyd, Edward Edward

Lister, Martin

Smith, Thomas

Steuartson, Richard (Dr)

Unknown addresssee

Brett, Thomas (junior)

Unknown addresssee ('Addresses not named')

Pegge, Samuel

D'Orville, Jacques Philippe

Leigh, Richard

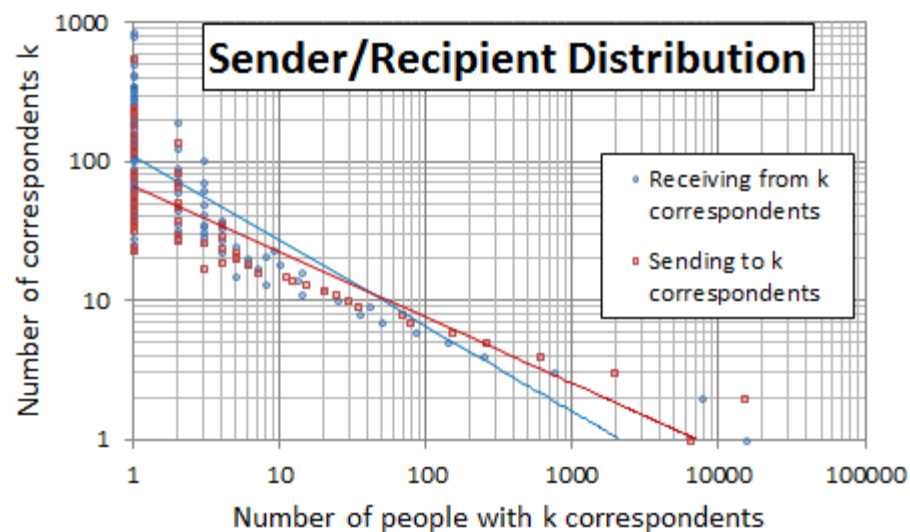
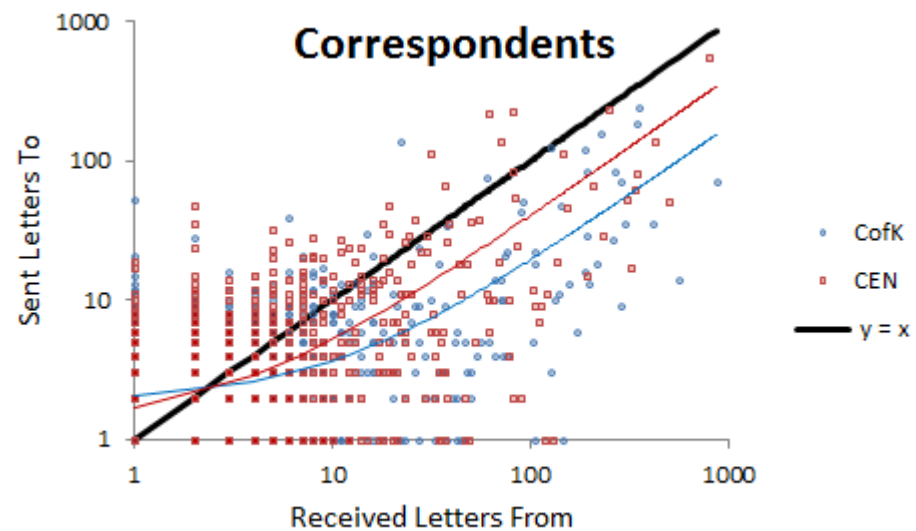
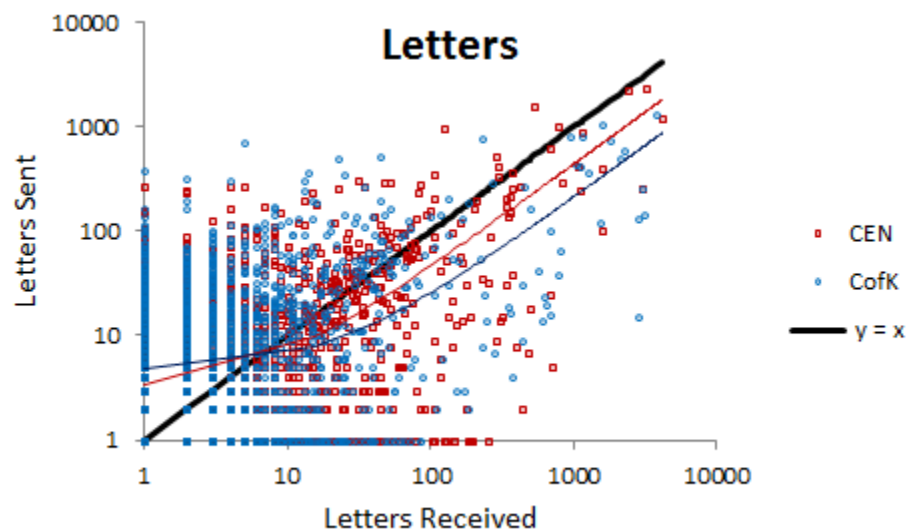
Thomson, Mary (Lach)

Noble, George (Mrs.) (1645-1680-1681)

James, J.D.

James, J.D.

Metric	CofK	CEN
# of nodes	11,072	13,548
# of edges	14,487	15,671
Max edge weight	618	675
Mean edge weight	3.943	3.661
Max degree	935	1,345
Mean degree	1.258	1.157
Max weighted degree	5,141	5,593
Mean weighted degree	4.965	4.236
Diameter	17	15
Average path length	5.609	4.799
Avg. letters per year	178.06	286.96
Density	0.0001	0.0001
Largest SCC	1,085	860
Largest WCC (Giant component)	9,840	10,333
Giant component % of whole	88.873%	76.269%
# of WCCs	550	1,339
Reciprocity	0.079	0.061
% of edges involved in reciprocity	14.49%	11.55%
Transitivity (directed)	0.01	0.0058
Clustering coefficient (undirected/weighted)	0.045	0.026





Methodological Difficulties

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Thank You.
-Scott Weingart



Sailing Ships (c. 1886-1890) Constantinos Volanakis