Staffan Müller-Wille:
“Plant Affinities”

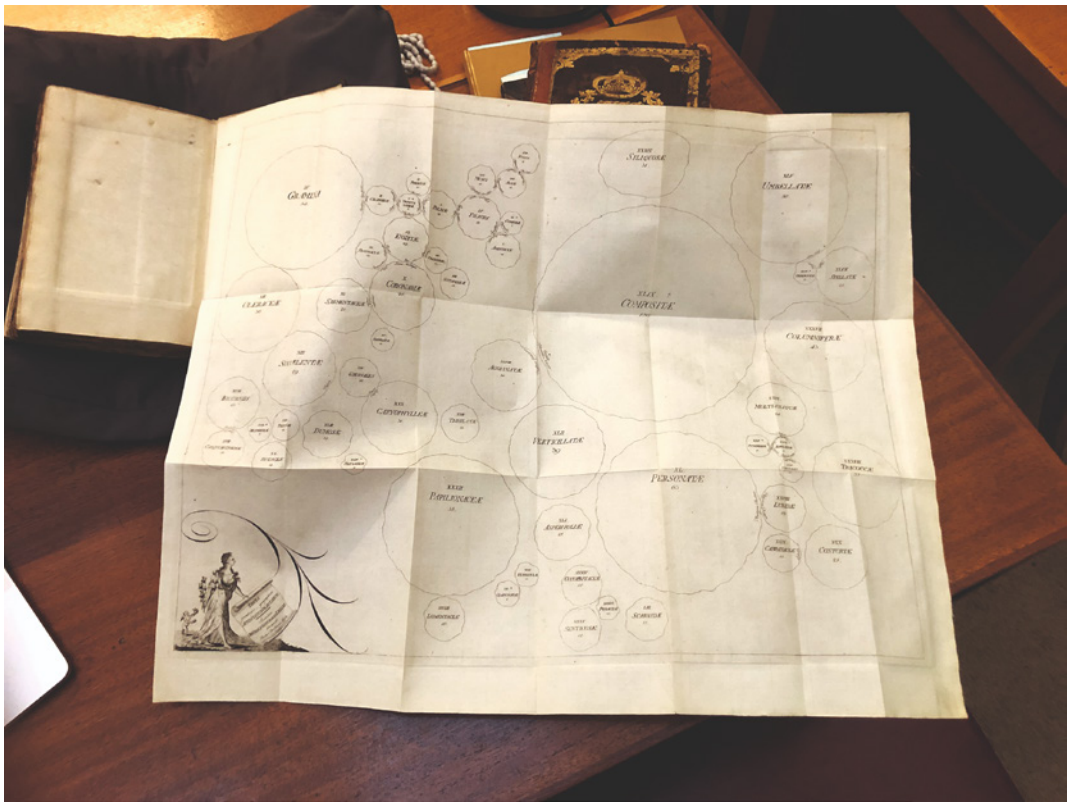
in: Eric Hounshell, Ruth Amstutz (eds.):

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SHADOW OF THE TREE

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PLANT AFFINITIES Genealogy and Geography



Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edidit Paulus Diet. Giseke,* Hamburg: Impensis Benj. Gottl. Hoffmanni (1792). With kind permission by the Linnean Society of London, www.linnean.org.

Paul Dietrich Giseke's "Tabula genealogico-geographica affinitatum plantarum," published in 1792 as a foldout table accompanying his edition of lectures by the Swedish botanist Carl Linnaeus. Copper engraving, 49 x 62 cm.

In 1792, Paul Dietrich Giseke (1741–1796) published an edition of lectures on the "natural orders" of plants given by Carl Linnaeus (1707–1778). The edition was based on notes that he himself and the naturalist Johan Christian Fabricius (1745–1808) had taken while attending Linnaeus's lectures during visits to Sweden in 1767 and 1771.[1] The volume contained a large foldout table, entitled "Genealogical-Geographical Table of Plant Affinities" *(Tabula genealogico-geographica affinitatum plantarum)* that today is remembered as a milestone in the history of graphical representations of biodiversity. Building on Linnaeus's famous aphorism that "all plants show mutual affinities, like a territory in a geographic map," it depicted plant diversity not in a linear series, as the ancient tradition of a *scala naturae* had it, but spread out in two dimensions.[2]

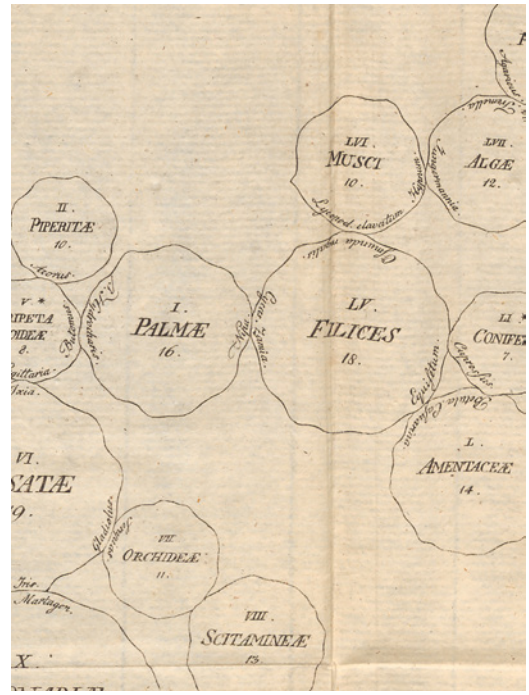
Helpfully, Giseke provided his readers with a detailed "commentary" that explained how to read his *tabula*. The circles represent natural orders as "provinces" *(provinciæ).* Their "width" *(amplitudo)* represents the number of genera they contain. And their relative positions express "affinities" measured in terms morphological similarity. Thus some provinces are

"adjoined" *(finitimus),* others are "neighbouring" *(vicinus),* and some set apart as "islands" *(insulae).* The *Siliquosæ*, for example, are depicted at the top edge since "none of the islands is more distant from all the provinces and islands" than this one.[3] With the help of Giseke's *tabula*, even the uninitiated reader can gain an intuitive grasp of plant affinities by literally reading it like a map.



Detail from "Tabula genealogico-geographica affinitatum plantarum", in: Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edidit Paulus Diet. Giseke*, Hamburg: Impensis Benj. Gottl. Hoffmanni (1792). Online: https://www.e-rara.ch/zut/content/zoom/5812789.

Flora, chased by Cupid, both with roses in their hands, displays the title of the copper engraving.



Detail from "Tabula genealogico-geographica affinitatum plantarum", in: Paul Dietrich Giseke (ed.): *Caroli a Linne ... Praelectiones in ordines naturales plantarum. E proprio et Jo. Chr. Fabricii ... edidit Paulus Diet. Giseke*, Hamburg: Impensis Benj. Gottl. Hoffmanni (1792). Online: https://www.e-rara.ch/zut/content/zoom/5812789.

Each circle symbolizes a "natural order" *(ordo naturalis)* of plants. At the center of each, the following information is displayed: a Roman numeral designating the position of the order in the linear succession of chapters of the book; the name of the order; and the number of genera it contains. Genera inscribed in their margins connect "neighboring" orders in terms of mutual "affinity." Thus, the two natural orders at the center of this image, i.e. the order of "palms" (*Palmae,* treated in the fifty-fifth chapter and containing sixteen genera) and the "ferns" (*Filices,* treated in the first chapter and containing eighteen genera), are connected by the mangrove palm *(Nipa;* today spelled *Nypa)* and two cycad or fern palm genera *(Cycas* and *Zamia).*

PLANT AFFINITIES Wahlverwandtschaften

"[S]uch natures as, when they come in contact, at once lay hold of each other, and mutually affect each other, we speak of as having an affinity one for the other."

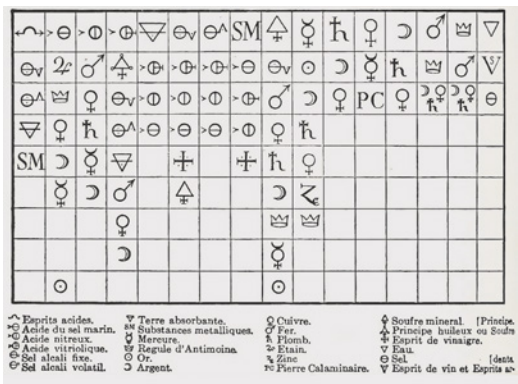
Johan Wolfgang von Goethe: *Die Wahlverwandtschaften. Ein Roman,* Tübingen: J. B. Cotta (1809), vol. 1, p. 82. Translation quoted from Johan Wolfgang von Goethe: *Elective Affinities. A Novel,* New York: Henry Holt (1872), p. 39.

"One can almost fancy, said Charlotte, that in these simple forms one sees people one is acquainted with; one has met with just such things in the societies amongst which one has lived."

Johan Wolfgang von Goethe: *Die Wahlverwandtschaften: Ein Roman,* Tübingen: J. B. Cotta (1809), vol. 1, p. 80. Translation quoted from Johan Wolfgang von Goethe: *Elective Affinities: A Novel,* New York: Henry Holt (1872), p. 39.

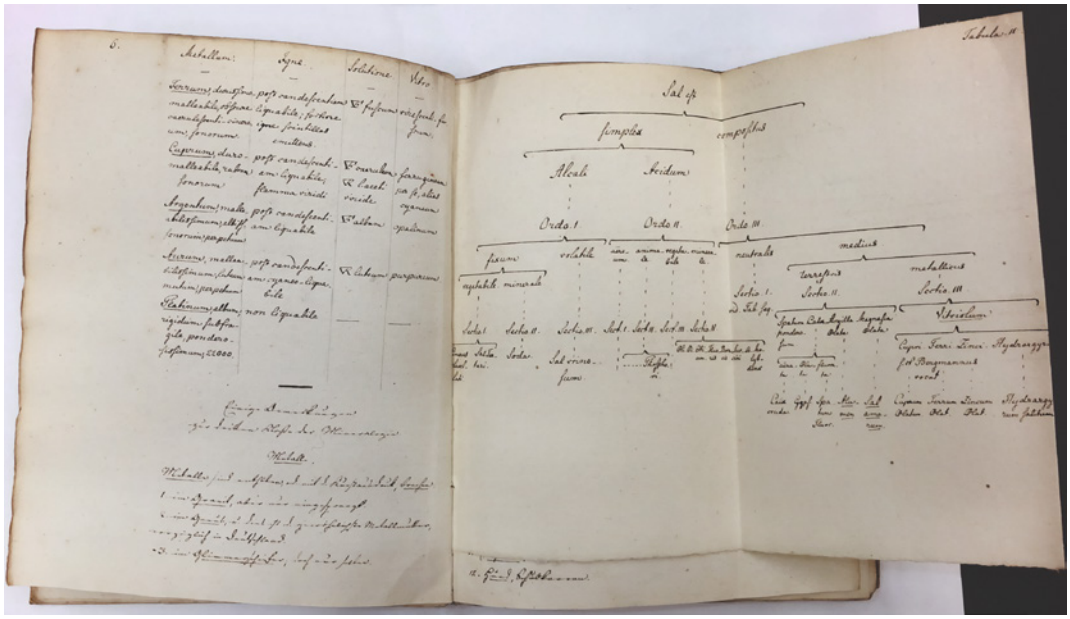
Historians of biology have been adamant that, prior to Darwin, genealogical metaphors in natural history cannot be taken literally. And indeed, Giseke stated explicitly that, by calling his table of plant affinities "genealogical," he did not want to imply that "one could trace [plant affinities] from grandfather to grandchildren." However, in a surprising *volte-face*, he added that the table might rather be read in the sense in which "cousins and in-laws are placed together so that the bonds by which they are connected are laid open."[4] Diachronic descent was not what was captured by the table, but affinity in the sense of synchronic relations of kinship was.

Affinity in this sense was a buzzword in eighteenth-century sciences, as reflected in the title by Johann Wolfgang Goethe's (1749–1832) novel *Elective Affinities (Die Wahlverwandtschaften,* 1809). Most prominently, it played a foundational role in chemistry. "Affinity tables" classified chemical substances according to their capacity to displace other substances from compounds. As a teacher in "physics and poetry" at the Academic Gymnasium in Hamburg from 1771 to 1784, Giseke was well versed in this literature. He taught on the subject and possessed the latest literature, including Torbern Bergman's (1735–1784) essay on "Elective Attractions."[5]



Étienne François Geoffroy: "Table des different rapports observes en chimie entre differentes substances", in: *Histoire de l'Academie Royale des Sciences. Avec des Memoires de Mathematique & de Physique pour la même Année* (1718), pp. 202–12. Online: https://commons.wikimedia.org/wiki/File:Affinity-table.jpg.

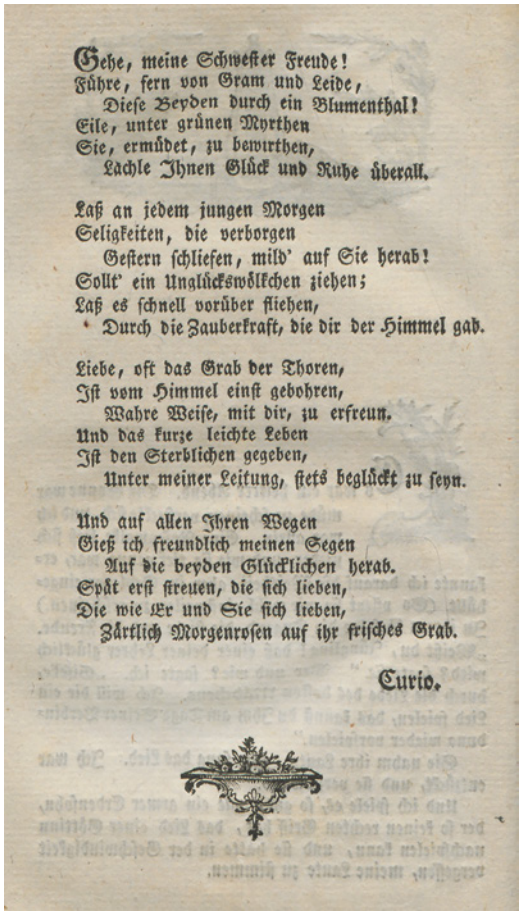
"Table of affinities" *(table de rapports)* published by Étienne François Geoffroy in 1718. Chemical substances are designated by symbols. The closer a substance is to the substance at the top of a column, the stronger its "affinity" to unite with this top substance and oust the substances below from such unions. At the beginning of his essay, Geoffroy declared: "These affinities have their degrees and their laws" *(Ces rapports ont leur degrès & leurs lois).*



Johann Wilhelm Schütze: "Tabulae et adnotationes ad mineralogiam pertinentes, ex dictatis viri experimentissimi doctissimi Paul Dieter. Giseke Phys. Pr. Publ. descriptae", in: Nachlass Paul Diedrich Giseke, 1 Bd, Staats- und Universitätsbibliothek Hamburg, call no. 18: NPDG NL Giseke (Alte Signatur: Cod. hans.: IV: 43). With kind permission by the Staats- und Universitätsbibliothek Hamburg.

Johann Wilhelm Schütze's notes from lectures on mineralogy that Giseke gave at the Academic Gymnasium in Hamburg in 1791. The diagram follows the Ramist tradition of dividing up contents taught by applying a series of distinguishing criteria, but the reference to "Bergmannus [sic]" under "Cupri. Ferri. Zinci." on the right-hand side shows that Giseke was teaching mineralogy on the basis of the work of the Swedish chemist and mineralogist Tobern Bergman, known for his work on chemical "affinities."

Closer to home, one can note that Giseke's mercantile milieu has been identified as "kinship-hot," or obsessed with developing and tracing extensive networks of kindred.[6] Giseke was a very active citizen as well, engaged in the foundation and leadership of Hamburg's Society of Physicians *(Ärztlicher Verein)* and other associations. The language of "affinities" may have appealed to Giseke for these reasons, and some of his students went on to become prominent proponents of republicanism in Hamburg.



Gehe, meine Schwester Freude!
Führe, fern von Gram und Leide,
Diese Beyden durch ein Blumenthal!
Eile, unter grünen Myrthen
Sie, ermüdet, zu bewirthen,
Lachle Ihnen Glück und Ruhe überall.

Laß an jedem jungen Morgen
Seligkeiten, die verborgen
Gestern schliefen, mild' auf Sie herab!
Sollt' ein Unglückswölkchen ziehen;
Laß es schnell vorüber fliehen,
Durch die Zauberkraft, die dir der Himmel gab.

Liebe, oft das Grab der Thoren,
Ist vom Himmel einst gebohren,
Wahre Weise, mit dir, zu erfreun.
Und das kurze leichte Leben
Ist den Sterblichen gegeben,
Unter meiner Leitung, stets beglückt zu seyn.

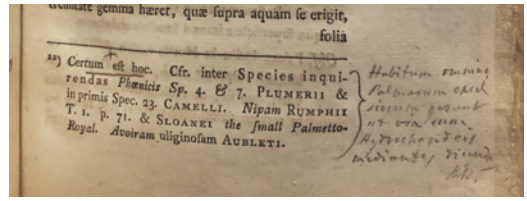
Und auf allen Ihren Wegen
Gieß ich freundlich meinen Segen
Auf die beyden Glücklichen herab.
Spät erst streuen, die sich lieben,
Die wie Er und Sie sich lieben,
Zärtlich Morgenrosen auf ihr frisches Grab.

Curio.

Johann Karl Daniel Curio: *Dem Herrn Doctor Giseke gewidmet,* Hamburg: Joh. Phil. Christ. Reuß (1774), p. 2. Staats- und Universitätsbibliothek Hamburg, Online: https://resolver.sub.uni-hamburg.de/kitodo/PPN867661461.

A poem published by Johann Carl Daniel Curio (1754–1815) on occasion of Giseke's marriage with Charlotta Wilhelmina Fixsen on September 20, 1774. Curio was a student of Giseke and would later found the first German teacher's association *(Gesellschaft der Freunde des vaterländischen Schul- und Erziehungswesen,* 1805). He is known for his republican views and allegedly stated: "We have no nobility, no patricians, no slaves, no, not even subjects. All real Hamburgers know and have only one class, the class of citizens. Citizens we are, nothing more and nothing less." *(Wir haben keinen Adel, keine Patrizier, keine Sklaven, ja nicht einmal Untertanen. Alle wirklichen Hamburger haben nur einen einzigen Stand, den Stand eines Bürgers. Bürger sind wir alle, nicht mehr und nicht weniger.)*

Quoted from Peter Rietbergen: *Europe: A Cultural History,* London: Routledge (1998), p. 333. Translation slightly altered.



gemma hæret, quæ supra aquam se erigit,
folia

[22]) Certum est hoc. Cfr. inter Species inquirendas Phœnicis Sp. 4. & 7. Plumerii & in primis Spec. 23. Camelli. Nipam Rumphii T. 1. p. 71. & Sloanei the small Palmetto-Royal. Avoiram uliginosam Aubleti.

Habitum [illegible]
Palmarum esse
[illegible]
ut [illegible]
[illegible]
[illegible]

Paul Dietrich Giseke (ed.): *Caroli a Linne ... Prælectiones in ordines naturales plantarum,* Hamburg: Benj. Gottl. Hoffmann (1792), Linnean Society of London, Library and Archives, call no. L XVI 792, p. 31. With kind permission by the Linnean Society of London, www.linnean.org.

Annotation by Robert Brown ("RB") in the copy of Giseke's *Prælectiones in ordines naturales plantarum* belonging to the Linnean Society of London. Brown is commenting on the "habitus" as a distinctive characteristic of palms. Giseke had sent this copy to James Edward Smith, the president of the Linnean Society, as is evident from a note he placed on the flyleaf *(Ex dono auctoris).* Brown was working as Smith's librarian for a while.

While Giseke's *tabula* can thus be seen to resonate with some important elements of eighteenth-century science and culture, it did not immediately create a new visual genre. Alexander von Humboldt (1769–1859) reviewed the volume, and while appreciating that it gave access to Linnaeus's "philosophical ideas about affinity" *(philosophischen Ideen über Pflanzenverwandtschaft),* he did not even mention the *tabula.*[7] Botanists promoting the so-called

"natural system" in the early nineteenth century, such as Robert Brown in London, read it attentively, though, and in the long run, the peculiar structure of this system should become one of the chief phenomena evolutionary theories of the nineteenth century tried to explain.

Notes

1 Paul Dietrich Giseke (ed.): *Caroli a Linne … Prælectiones in ordines naturales plantarum,* Hamburg: Benj. Gottl. Hoffmann (1792), p. xiv. (Translations, if not stated otherwise, are my own.)
2 Carl Linnaeus: *Philosophia botanica in qua explicantur fundamenta botanica cum definitionibus partium, exemplis terminorum, observationibus rariorum,* Stockholm: Kiesewetter (1751), aph. 77, p. 27. The aphorism is quoted in Fabricius's lecture notes; see Paul Dietrich Giseke (ed.): *Caroli a Linne … Prælectiones in ordines naturales plantarum,* Hamburg: Benj. Gottl. Hoffmann (1792), p. 4, note a).
3 Paul Dietrich Giseke (ed.): *Caroli a Linne … Prælectiones in ordines naturales plantarum,* Hamburg: Benj. Gottl. Hoffmann (1792), p. 625: "Sed nulla Insularum magis remota est ab omnibus tum provinciis tum aliis insulis, quam ordo XXXIX."
4 Paul Dietrich Giseke (ed.): *Caroli a Linne … Prælectiones in ordines naturales plantarum*, Hamburg: Benj. Gottl. Hoffmann (1792), p. 623: "Dixi am genealogicam, quia vox Affinitatis de families adhiberi solet partier se utrumque Plantis, sed non ita, ut ab Avo ad nepotes deduci possit; potius eo sensu, quod patrueles & affines collocentur ita, ut vincula, quibus inter se nectantur, pateant."
5 *Catalogus librorum viri celeberrimi Pauli Diderici Giseke M.D. Physices & Poëseos Prof. Bibliothecarii Primarii &c. : Quorum publica fiet auctio Hamburgi in æde vulgo dicta (Eimbecksche Haus) inde a die V Februar & seqq. DCCLXXXXVIII.* Hamburg: Wœrmer (1798), no. 2391. Online: https://resolver.sub.uni-hamburg.de/kitodo/PPN857335502.
6 David Warren Sabean, Simon Teuscher: "Kinship in Europe: A New Approach to Long Term Development", in: David Warren Sabean, Simon Teuscher, Jon Mathieu (eds.): *Kinship in Europe: Approaches to Long-Term Development (1300–1900),* New York: Berghahn (2013), p. 3.
7 Alexander von Humboldt: "[Review of] Car. a Linnaei … Praelectiones in Ordines Naturales Plantarum 1791", in: *Annalen der Botanick* 1/1 (1791), pp. 172–74.

Further Readings

Giulio Barsanti: *La scala, la mappa, l'albero: Immagini e classificazioni della natura fra sei e ottocento,* Firenze: Sansoni (1992).

Johannes Endres: "Evolution und Erbe: Zur Problemgeschichte der 'Wahlverwandtschaften' bei Goethe und Darwin", in: *KulturPoetik* 9 (2009), pp. 45–66.

Ursula Klein: *Verbindung und Affinität: Die Grundlegung der neuzeitlichen Chemie an der Wende vom 17. zum 18. Jahrhundert,* Basel: Birkhäuser (1994).

Staffan Müller-Wille: "Names and Numbers: 'Data' in Classical Natural History, 1758–1859", in: *Osiris* 32 (2017), pp. 109–28.

Kees van Putten: "Three Eighteenth-Century Attempts to Map the Natural Order: Johann Herrmann – Georg Christoph Würtz – Paul Dietrich Giseke", in: *Early Science and Medicine* 24 (2019), pp. 33–89.

Hans-Jörg Rheinberger: "Aspekte des Bedeutungswandels im Begriff organismischer Ähnlichkeit vom 18. zum 19. Jahrhundert", in: *History and Philosophy of the Life Sciences* 8 (1986), pp. 237–50.

Olivier Rieppel: "The Series, the Network, and the Tree: Changing Metaphors of Order in Nature", in: *Biology and Philosophy* 25 (2010), pp. 475–96.

David Warren Sabean: "From Clan to Kindred: Kinship and the Circulation of Property in Premodern and Modern Europe", in: Staffan Müller-Wille, Hans-Jörg Rheinberger (eds.): *Heredity Produced: At the Crossroad of Biology, Politics and Culture, 1500–1870,* Cambridge, Mass.: MIT Press (2007), pp. 37–59.

David Warren Sabean, Simon Teuscher: "Kinship in Europe: A New Approach to Long Term Development", in: David Warren Sabean, Simon Teuscher, Jon Mathieu (eds.): *Kinship in Europe: Approaches to Long-Term Development (1300–1900),* New York: Berghahn Books (2013), pp. 1–32.

Mary P. Winsor: "Considering Affinity: An Ethereal Conversation, Part I–III", in: *Endeavour* 39 (2015): pp. 69–79, 116–126, 179–187.