Total word count: 11231

"From the Cabinets of mere vertuosi into the busy world": Thomas Pennant's Natural Philosophical Networks and the Creation of *British Zoology*, 1752–1766

Philip Beeley, Ffion Mair Jones, and Yann Ryan

1. Introduction

Writing in 1781, upon the appearance in print of the second edition of his *History of Quadrupeds*, the Welsh naturalist and traveller Thomas Pennant (1726-98) was in no doubt of the value of his vast circle of friends and acquaintances for his scientific endeavours. It was after all largely through their many contributions of specimens, illustrations, and written descriptions that this major work had more than doubled in size since its first appearance, ten years before. But with good reason Pennant singled out one man for particular praise and gratitude in his preface to the work.[1] The Prussian naturalist Peter Simon Pallas (1741-1811) had not only in his travels reached almost all parts of the Russia of Catherine the Great (1729-96) and given 'the most ample account of the regions he has visited', but also 'by a rare facility of communication, continues to inform and instruct by correspondence, in every matter in which his friends are desirous of information'.[2] Through his generosity, Pallas had proved himself worthy of the trust Pennant had placed in him during their first and only meeting in The Hague, in 1765 Pennant had at the time encouraged Pallas to write a systematic book on the quadrupeds himself, thereby helping to launch the scientific career of that 'very ingenious young man'.[3]

This praise to Pallas is exceptional in its warmth, but one finds similar expressions of gratitude in the prefaces to Pennant's other publications. They encapsulate the importance he and

[1] Thomas Pennant, *History of Quadrupeds*, 2 vols. (London, 1781). This work evolved from the earlier *Synopsis of Quadrupeds* (Chester, 1771).

[2] Pennant, *History of Quadrupeds*, vol. I, p. ix.

[3] On the abortive plan for a book of quadrupeds authored by Pallas, and its subsequent appropriation by Pennant, see Thomas Pennant, *The Literary Life of the late Thomas Pennant, esq., by himself* (London, 1793), p. 7; and R. Paul Evans, 'The life and work of Thomas Pennant (1726-1798)' (unpublished PhD thesis, University of Wales, Swansea, 1994), pp. 163-5.

contemporary naturalists attached to scientific communication and collaboration in furthering their work, processes which went far beyond anything found in the fields of mathematical or physical enquiry. While scholars in other disciplines likewise valued the exchange of news of publications and discoveries, for naturalists epistolary commerce played an essential role in extending the reach of investigations otherwise limited by material and financial circumstances. Put simply, Pennant and his contemporaries through their networks were able to access an almost unlimited supply of natural curiosities from near and far: not just descriptions and drawings, although these were often received avidly, but also specimens of rare birds, quadrupeds, plants, shells, or ores that could duly be added to their own cabinets or collections.

It was Pennant's thirst for knowledge of the natural world which drove the substantial correspondence in which he engaged with contemporaries across the British Isles, the European continent, and North America from 1750 up to his death in 1798. Some two thousand letters are known to be extant; their geographic diffusion is reflected in present day holdings in archives across the world. The main collection is at Warwickshire County Record Office, with two other substantial collections at the National Library of Scotland and the National Library of Wales. Smaller collections are held at various archives across the UK, as well as in Europe (including at Uppsala University Library, in reflection of Pennant's relationship with the Swedish naturalist Carl Linnaeus (1707-78), the United States, Australia and New Zealand. Individual correspondences from the entire corpus have been published from Pennant's own days to the present, and feature Gilbert White, Peter Simon Pallas and, in digital format, James Edward Smith, the print collector Richard Bull, and a host of Scottish and Welsh figures.[4] The topics covered in Pennant's letters foreshadow his published works, ranging from early works on natural history from 1763 onwards, when the first section of *British Zoology* appeared in print, to narratives of his travels through Scotland, published from 1771 onwards, and through Wales, from 1778. His interest in natural history was never wholly suppressed by competing interests or

[4] The smaller collections include those housed at the Bodleian Library, Oxford; the British Library; the Linnean Society; the Morrab Library, Cornwall; Uppsala University Library; Erlangen-Nürnberg University Library; Houghton Library, Harvard University; New York Public Library; and Pennsylvania State University Libraries. Published and online collections include Gilbert White, *The Natural History of Selborne*, ed. Anne Secord (Oxford, 2013); Carol Urness (ed.), *A Naturalist in Russia: Letters from Peter Simon Pallas to Thomas Pennant* (Minneapolis, 1967); *The Correspondence of Sir James Edward Smith* at <http://linnean-online.org/smith_correspondence.html>; and, most recently, the selections of material edited by the *Curious Travellers*: *Thomas Pennant and the Welsh and Scottish Tour (1760-1820)* project at <https://editions.curioustravellers.ac.uk/letters>. See further Alex Deans and Ffion Mair Jones, 'The Letters: General Introduction', ibid.

a change of focus, and he continued to produce studies of the animal kingdom as late as the 1790s, when his *Introduction to the Arctic Zoology* (1792) appeared.

Natural history is most prominent in the early correspondence and is the focal point of this article. Pennant's stature among his contemporaries is reflected through his productive dialogue with figures such as Pallas, the French naturalists Mathurin Jacques Brisson (1723-1806) and George-Louis Leclerc, Comte de Buffon (1707-88), the Dutch ichthyologist Laurens Theodorus Gronovius (1730-77), and the towering figure of the Swedish naturalist and explorer Carl Linnaeus. At the same time, Pennant also maintained a significant network within Britain and Ireland encompassing men and women such as the botanist and author Benjamin Stillingfleet (1702-71), the naturalist Anna Blackburne (*bap*. 1726, d. 1793), and the Cornish antiquary William Borlase (1696-1772). In total, metadata for 1,521 letters either by or to Pennant have been catalogued in a single dataset, gathered from a range of sources in archives located in Britain, Europe, Australia, New Zealand and the USA, currently a work-in-progress.[5] For the period of study here, 1752-66, we harmonized the names used and extracted enhanced metadata for 512 letters, resulting in a network consisting of 108 author-recipient connections (edges) and 105 unique authors (nodes). As with many real-world networks, the connections are skewed—a small number of the correspondents in Pennant's letters are responsible for the majority of connections including Emanuel Mendes da Costa (152), Linnaeus (38), and Gronovius (23). Focusing primarily on the aforementioned period, and combining the close reading of Pennant's correspondence with the methods of network analysis, this article seeks to deliver new insights into three key aspects of his scientific career and scholarly practice: the impact of his European tour on his development as a naturalist; the methods and facilitators of specimen exchange; and the role played by women within a male-dominated field.

One key form a network can take in formal network analysis is known as an 'ego network'.[6] This generally consists of all the connections to and from a single individual (or node) and, crucially, the connections *between* that individual's connections, known as 'alters'. However, the vast majority of correspondence datasets do not generally contain this additional

[5] Adam Coward, 'Superlist of Thomas Pennant's correspondence' (unpublished), produced as part of *Curious Travellers* at <https://curioustravellers.ac.uk/en/>.
[6] Mark Newman, *Networks* (Oxford, 2018), p. 55.

information. In this article, we seek to supplement the kind of quantitative analysis carried out on a single correspondence (one without these connections-between-connections) through a number of methods: first, by analysing a secondary category of metadata found in the correspondence—the people mentioned—and second, by concluding with an initial attempt to situate Pennant's correspondence network within the broader context of the developing reconstruction of the eighteenth-century Republic of Letters in the Oxford-based epistolary database Early Modern Letters Online (EMLO).

Understanding key parts of this article first requires some background information. In February 1765, the year before the fourth part of his *British Zoology* was published, Pennant embarked upon a short tour of the continent, his route taking him first to Paris, where he enjoyed the rich visual culture of the city before proceeding south to Dijon and Lyon, visiting Buffon along the way. In Switzerland he met Voltaire (1694-1778) but also the naturalist Johann Rudolf Valltravers (1723-1815) and the ornithologist Daniel Sprüngli (1721-1801).[7] On the return journey he visited a number of German towns including Nuremberg, famed for its artists and engravers, before entering the Low Countries where he met Pallas and Gronovius. Using metadata from Pennant's correspondence, we investigate the impact of this tour on his network and show not only how it contributed to its expansion but also - and not unconnected with this - how it served to strengthen and increase his standing outside the British Isles. While figures such as Gronovius and Valltravers were known to him already as correspondents, a far greater number of those he met were new contacts, among them the Nuremberg polymath Christoph Gottlieb von Murr (1733-1811) and the Swiss naturalist Albrecht von Haller (1708-77). Indeed, the 1766 publication proudly lists over a dozen foreign subscribers of which not a few had become personally acquainted with Pennant during his tour.[8]

We also seek to bring into sharper focus the roles played by scores of lesser-known figures in promoting or enabling the exchange of ideas, knowledge, and material specimens, factors which drove the enormous development of natural history during the course of the eighteenth century. The conveyance of letters, packages, and trunks would not have been possible without the contributing actions and support of merchants, seafarers, agents, and

[7] See Thomas Pennant, *Tour on the Continent 1765*, ed. G. R. de Beer (London, 1948).
[8] Evans, 'The life and work of Thomas Pennant (1726-1798)', p. 149.

diplomats along the way. Safe passage of intellectual and material goods was never guaranteed and the most reliable conveyors are often referred to by name. While naturalists would occasionally themselves collect specimens, especially when on tour, much of the work would be done by unnamed men and women such as fishermen, miners, or beachcombers, who remain completely in the shadows of history. In this case, anonymity prevents network analysis from bringing the figures in question fully to the foreground, but close reading of the texts makes it possible to acknowledge their contribution. Likewise, there are remarkable women in Pennant's network, who feature not just as relatives, but who are active participants in specimen collection and scientific investigation. We also seek to make them more visible here.

Pennant's grand tour of 1765 was fundamental in establishing and maintaining many of the connections on which he relied for the practical aspects of specimen collection throughout his career.[9] In order to ascertain the impact of the tour on his correspondence network, we viewed this network through the medium of enriched metadata. The information given for each separate letter entry includes the dates of writing, the names of the correspondents, the location of the author and recipient, and the manuscript and printed sources. Material up to and including 1766 was extracted and further enriched by adding the names of people mentioned and books named in each letter, and by subsequently seeking additional biographical and bibliographic information.

As well as biographical information, we extracted the geographic locations of authors and recipients within the correspondence. Geographic metadata can reveal general patterns within the correspondence and how they changed over time. Useful here is Pennant's own account of his travels, his *Tour of the Continent*, edited by De Beer, and published in 1948. The wealth of information contained in what is, to a large extent, an on-the-ground diary of the tour has never been fully explored. We extracted detailed information on the itinerary, and used georeferencing techniques to create a map of the journey, providing details of the dates spent at each location together with further metadata regarding the people met and mentioned (figure 1). In the online resource, this rich source of information is accessible by clicking on the individual places

[9] Pennant, Tour on the Continent 1765; and for a later account of the tour, Pennant, The Literary Life of the late Thomas Pennant, esq., pp. 4-8.

mapped, allowing us to understand how this journey related to and strengthened his continental correspondence links.[10]

2. Pennant in Europe: the impact of the continental tour on his scholarly network

Pennant's correspondence data helps us to understand how the tour affected the geography and practicalities of his correspondence network. Although he had some important trans-continental correspondents before 1765, his network was more concentrated in Britain and Ireland up to then. Plotting the origins of letters before and after the Continental tour (Figure 1) shows a striking difference: Pennant's continental contacts expanded above all into Germany. In the months and years following the tour, Pennant was sent letters by the wine merchant Johann Peter Gogel (1728-82) in Frankfurt am Main, Caspar Gottlieb Merkel (1715-83) in Nuremberg, and the paleontologist Guillaume Antoine Deluc (1729-1812) in Geneva.[11] All these were places Pennant visited and the letters often concerned the facilitation of fossil and specimen exchange, or some other aspects relating to the practicalities of doing natural history. As was usual, he carried letters of introduction to those he wished to meet along the route of his journey such as the eminent Nuremberg botanist Christoph Jacob Trew (1695-1769). In this case, the London botanist Peter Collinson (1694-1768) obliged, his letter pointedly indicating the focus of Pennant's work:

> The Bearer Thomas Pennant Esquire a gentleman of Rank & Fortune and very learned & curious in the Study of Zoology. I recommend him to the favour & Friendship of my Dear Friend Doctor Trew. He is the Principal Author of an Elegant Work now publishing, Intituled the British Zoology of which He will shew you some specimens. He has not applied himself much to Botany but has made the Study of animals his Chief Amusement.[12]

[10] The interactive resource is available at https://networkingarchives.github.io/thomas-pennant-tour

[11] See John Peter Gogel to Thomas Pennant, 13 December 1768; and Peter and Noah Gogel to Thomas Pennant, 19 May 1767, at WCRO, CR 2017/TP237 and 238; Caspar Gottlieb Merkel to Thomas Pennant, 5 July 1765, 20 September 1765, at ibid., CR 2017/TP302/1 and 2; Guillaume Antoine Deluc to Thomas Pennant, 21 September 1768, at ibid., CR 2017/TP292.

[12] Peter Collinson for Christoph Jacob Trew, 10 February 1765, Universitätsbibliothek Erlangen-Nürnberg, H62/TREWBR/Collinson Petrus/41.

Another letter of introduction was for the physician and mineral collector Gottfried Wilhelm Müller (1709-99) in Frankfurt, although there is no record of a meeting taking place.[13] He met Pallas in The Hague and the first extant letter between them was addressed from there, while all their later correspondence found him in St Petersburg.[14]

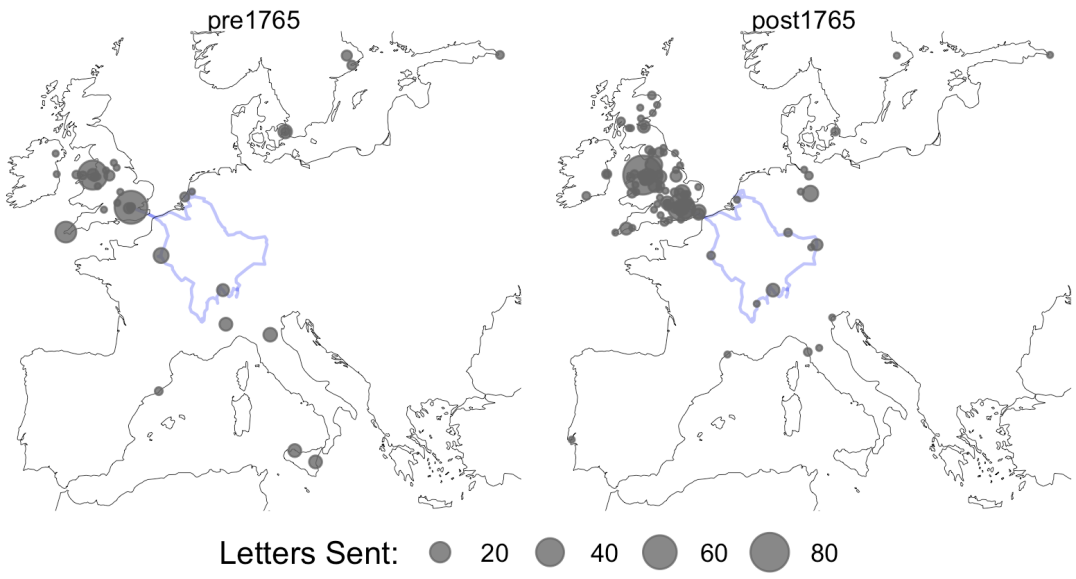


Figure 1: the impact of Pennant's continental tour on his correspondence network. These maps visualise Pennant's incoming correspondence before and after his continental tour, with the route he took on the tour highlighted. While Pennant had established some key continental links before his tour, mapping the geography of his correspondence shows its expansion afterwards. As will be shown below, Pennant used the tour to establish important relationships with those who could supply him with material for his work on natural history.

Pennant's correspondence shows the multiple fronts on which these links were fostered in the years following the continental tour. Letters from Christoph Gottlieb von Murr in the early 1770s display a continuing conversation about developments in Pennant's work, and the supporting role played by Murr and other contacts from the 1765 tour. What is preserved of the exchange between the two men shows that Murr was busily involved with Pennant's *British Zoology,* his earliest publication of note. In a letter of March 1770, he mentions that he has written to Pennant's publisher, Benjamin White (*c.*1725–94)), asking for a copy of the latest volume on

[13] D. Ferdinand Jacob Baier to Gottfried Wilhelm Müller (introducing Thomas Pennant), 5 July 1765, at WCRO, CR 2017/TP276.
[14] Urness (ed.), *A Naturalist in Russia: Letters from Peter Simon Pallas to Thomas Pennant*, pp. 9, 14, 21, and *passim*.

fish,[15] and that he is also preparing a parallel German/Latin translation of the first volume on quadrupeds.[16] Pennant's remarks about the natural history cabinet and vast library of Christoph Jacob Trew during his visit to Nuremberg confirm their meeting and indicate also that he recognized the value of Murr's having access to these resources in preparing his translation.[17] Pennant gave Trew a small present as a token of his esteem and showed him as planned completed parts of *British Zoology*.[18] But he knew that on his return to Wales a more fitting gift would be required, and while waiting in Calais for the packet-boat to Dover he sent a letter to Nuremberg asking the unknown recipient to convey his

> Respect & Compliments to the worthy Doctor Trew, & let him know that in a few Weeks I shall beg his acceptance of a few ores & minerals as a Mark of my gratitude for his Civilities.[19]

Murr acted as an intermediary in discussions with the Augsburg printer Johann Jakob Haid (1704-67), a correspondent of Trew's, whom Pennant had also met during his tour.[20] As in earlier correspondences, the 1770s letters also reflect the appearance of new works on the continent. Pennant would have been interested in the appearance of the *Icones Plantarum* the physician and botanist Casimir Christoph Schmeidel (1718-92).[21] He had met Schmeidel, who 'lives by dem goldnen Schild', during his visit to Nuremberg in 1765, when he found him busily involved with another work of Trew's, the *Plantae rariores*.[22]

Exploring the identities of the contacts in the locations found in Figure 1 is a useful starting-point for understanding the mercantile roots of Pennant's network. Unsurprisingly, perhaps, scientific exchange with men Pennant had met during his tour was dominated by a mercantile understanding of equivalent value. When Pallas wrote his first letter to Pennant, he

---

[15] Thomas Pennant, *British Zoology. Class III. Reptiles. IV. Fish* (London, 1769).

[16] Christoph Gottlieb von Murr to Thomas Pennant, 30 March 1770, in NLW 15424E, no fol. nos; Thomas Pennant, *British Zoology. Class I. Quadrupeds. II. Birds* (London, 1768).

[17] Pennant, *Tour on the Continent 1765*, p. 131.

[18] Thomas Pennant for Christoph Jacob Trew, 1765, Universitätsbibliothek Erlangen-Nürnberg, H62/TREWBR/Pennant Thomas/2: 'Mr Pennant begs the favor of Doctor Trew to accept this trifle as a token of his esteem'.

[19] Thomas Pennant to?, 18 August 1765, Universitätsbibliothek Erlangen-Nürnberg, H62/TREWBR/Pennant Thomas/1.

[20] Ibid., p. 126.

[21] Christoph Gottlieb von Murr to Thomas Pennant, 1 August 1771, in NLW 15424E.

[22] Pennant, *Tour on the Continent 1765*, p. 130.

informed him of the successful procurement of items he had ordered from Dutch suppliers, an antelope skull with horns and the horns of a southern Asian white-spotted deer.[23] Because of the support received for his naturalist endeavours, Pallas only requested in return that Pennant, then in London, provide a detailed account of 'what scarce Animals there are now publickly shewn at the Tower and other publick places, and collect what Zoological remarks and Anecdotes you can'.[24] By the time of his second letter, eleven years later, Pallas had gained a professorial chair at the St Petersburg Academy of Sciences, become a favourite of the Empress, and was now quite explicit in his expectation that specimens exchanged should be of commensurate value. He partly justified his demand, by noting that his recent journey bringing specimens back from Siberia had been arduous, although their collection and preparation had no doubt been carried out by others.

To avoid misunderstandings, he proceeded to suggest that in future Pennant or his friends should send lists of what they could offer in return, wisely adding the proviso that 'they be in perfect condition'.[25] Such lists of desiderata were a common practice among naturalists at the time, because they increased the chances of the other party being able to fulfil some of one's requirements. It was always expected that generosity be reciprocated in due course, taking into account the vagaries of the weather and difficulties of passage. On one occasion, Pallas tactfully combined a request from Pennant for 'Seaweeds & Corallines [...] from the Coast of Wales or Cornwall' with reminders that Anna Blackburne and the Scottish aristocrat Archbald Hope (1735-94), needed to repay him for services rendered:

> Perhaps you could join them in the Parcell Mrs. Blackburne may intend for me next Summer. If you should happen to write to Lord Hope, I would begg of you to remind me to his Lordship & to tell him, that I have not received any of the Lead ores of His Lordship's mines, which he was pleased to promise me during his stay at Petersburgh in the year 1777.[26]

---

[23] Peter Simon Pallas to Thomas Pennant, 18 January 1766, in Urness (ed.), *A Naturalist in Russia: Letters from Peter Simon Pallas to Thomas Pennant*, pp. 12-13.
[24] Ibid., p. 11.
[25] Ibid.
[26] Peter Simon Pallas to Thomas Pennant, 27 December 1778, in ibid., pp. 46-7.

The correspondence from Von Murr, with its concern about producing a translation of Pennant's *British Zoology*, exemplifies the desired end point of the process of studying natural history. Our view of Pallas's letters shows clearly the processes of collection and exchange which lay beneath printed books, particularly his and Pennant's contemporary work on quadrupeds.[27] Turning now to our focus period, the years leading to the continental tour and the publication in full of Pennant's first study of natural history, the 1766 edition of *British Zoology*, we explore further what the correspondence tells us about years of specimen collection, cataloguing, and exchange between Pennant and his contacts in Britain and continental Europe.

3. Scientific Ambition and Specimen Exchange: the 'Network of the Busy World'

Specimen exchange for Pennant begins in his earliest correspondence, with the fossilist Emanuel Mendes da Costa (1717-91). Mendes da Costa was a member of a Sephardic Jewish family, which had emigrated to London from Portugal in the 1690s. His father, Abraham, traded in precious stones (diamonds and corals) and the young da Costa was himself involved in this trade: 'I am engaged in the Mercantile way which takes up most of my time', he wrote to Pennant in June 1752.[28] Mendes da Costa's interest in fossils appears to have evolved in parallel with the family business which, with its extensive European contacts, provided him with a model and a basis for scientific exchange. These mercantile roots to Pennant's first significant entry to the world of scientific specimen-exchange inform our reading of his network later on. Pennant himself describes his early scientific interests in terms of mercantile or commercial ventures, envisaging exchanges with his first continental contact, the Turin physician and botanist Carlo Allioni (1728–1804), as 'fossil commerce'.[29] But Pennant clearly had a strong scientific bent from early on, and was untypical, described as having 'some knowledge of Fossils, and much more curiosity than those gentry commonly have'.[30] Indeed, we find Pennant crawling on hands and knees into caves, ordering colliers to bring him specimens from underground, and reporting

[27] Peter Simon Pallas, *Novae species Quadrupedum e Glirium ordine*, Erlangen 1778; Thomas Pennant, *Synopsis of Quadrupeds*, Chester 1771; 2nd edition, *History of Quadrupeds*, London 1781.

[28] Geoffrey Cantor, 'The Rise and Fall of Emanuel Mendes da Costa: A Severe Case of "The Philosophical Dropsy"?', *English Historical Review*, vol. 116, no. 457 (2001), pp. 584-603, here at pp. 585-6; Emanuel Mendes da Costa to Thomas Pennant, 27 June 1752, at WCRO, CR 2017/ TP408/11.

[29] Thomas Pennant to Henry Baker, 23 June 1753, in Manchester University Library, English MS 19, vol . V, no. 288.

[30] James Ducarel to Emanuel Mendes da Costa, 29 February 1752, in John Nichols, *Illustrations of the Literary History of the Eighteenth Century*, 8 vols., vol. 4 (London, 1822), p. 604.

on and cataloguing his findings in vivid detail.[31] Da Costa, for his part , was clearly impressed with this young man's inquisitiveness and meticulousness: 'I really cannot enough Admire your Curiosity & Accuracy in Your researches'.[32]

Just how important scientific communication and specimen exchange was to the fulfilment of Pennant's scholarly ambitions is revealed through his correspondence with Linnaeus. In October 1756, he mentions to the Swedish naturalist that he has discovered an anomalous shell on the lower branch of one of a collection of marine plants he recently received from Norway and encloses a description and drawing of it in the letter.[33] Linnaeus's reply, sent just over a month later, is exuberant with praise of Pennant's discovery, noting that the shell was one 'which no human being has ever seen before and which has ignited the brightest flame in natural history to shine on previously lost genera of shells'.[34] No doubt this exuberance was intended to fulfil a purpose, for Linnaeus combines it with an invitation to Pennant to become a member of the Royal Swedish Academy of Sciences in Uppsala. Pennant subsequently suggested that his luck in making the discovery was outstripped by his luck in finding Linnaeus, 'the foremost of philosophers', to promulgate his discovery.[35] He now revealed that the plant had been a gift from Erik Pontoppidan (1698-1764) and that it was depicted in the Danish historian's *Natural History of Norway*, which had been published in London the year before. Going one better than his previous letter to Linaeus, Pennant now sent him a dried branch of the plant so that he could show it to fishermen or other people who collected plants. Thereby, Pennant again reflects the close ties between scientific and artisanal practice: Linnaeus could presumably ask local fishermen to look out for similar plants when bringing in their catches.

As the case of the anomalous shell exemplifies, collaboration in natural history could help promote one's own work in ways which were quite unique among contemporary scientific endeavours. Such promotion was of tremendous importance, of course, because of the considerable cost involved in producing publications which had to be richly illustrated to make

[31] Thomas Pennant to Emanuel Mendes da Costa, 26 April 1752, in WCRO, CR 2017/TP408/3, 3A.
[32] Emanuel Mendes Da Costa to Thomas Pennant, 27 June 1752.
[33] Thomas Pennant to Carl Linnaeus, 22 October 1756, in London, Linnean Society, Linnaean Correspondence XI, pp. 416-17.
[34] Carl Linnaeus to Thomas Pennant, 3 December 1756, in private possession; Uppsala University Library, urn:nbn:se:alvin:portal:record-226506.
[35] Thomas Pennant to Carl Linnaeus, 31 December 1756, in London, Linnean Society, Linnaean Correspondence XI, pp. 418-19.

an impression and which often needed to be updated in the light of later discoveries or revisions in classification. In the early 1760s, in what could be seen as an effort to promote his own work and British natural history more generally, Pennant sent Linnaeus extensive sets of citations from *British Zoology*, giving British equivalents to Latin bird names with the intention that Linnaeus include these in a future new edition of his widely read *Systema naturae.*[36]

Through other sources we learn more about how the specimens that entered cabinets and collections of naturalists were procured. For example, Hans Sloane (1660–1753) employed a transatlantic procurement chain that saw the collection, preservation, description, and drawing of specimens in Jamaica before they were subjected to further research back in London.[37] The employment of slaves by English colonizers is known to have been an integral part of that chain.[38] Some of Pennant's correspondents had high expectations of acquiring specimens through a British contact's colonial links, although it is not clear whether Pennant was able to oblige them.[39] On a local level he certainly made use of lowly figures. Thus, although he describes entering caverns in Shropshire in search of fossils during the earliest days of his scientific career, he also sent his servant into caves and profited from his close connection with the coal mining industry in his native Flintshire (his father was among the major owners of mines in the county).[40] The recommendation made to William Borlase in October 1753 that beachcombing and mine refuses were good sources of specimens may or may not suggest a closer involvement in the actual process of collection;[41] whereas a letter of 1762 clearly shows Borlase making use of someone who lives near the beach to go and find a specific bird specimen desired by Pennant.[42] Once specimens were appropriated by collectors, they became their property for exchange, a process designed to improve their own collections and, in the case of the more curious among them, to advance their knowledge of the natural world. Pennant's correspondence is littered with references to the exchange of fossils, marine and plant specimens.

---

[36] See for example Thomas Pennant to Carl Linnaeus, 31 October 1772, London, Linnaean Society, Linnaean Correspondence XI, p. 437

[37] James Delbourgo, *Collecting the World: The Life and Curiosity of Hans Sloane* (Cambridge, Mass. 2017), p. 96.

[38] Ibid., pp. 97-8, 229.

[39] See for example Ferdinando Bassi to Thomas Pennant, 8 March 1759, in CR 2017/TP171/4; Arnout Vosmaer to Thomas Pennant, 1760, in ibid., CR 2017/TP382/1.

[40] Thomas Pennant to Emanuel Mendes da Costa, 26 April 1752; 12 April 1752, in WCRO, CR 2017/TP408/4.

[41] Thomas Pennant to William Borlase, 25 October 1753, in Morrab Library, MOR/BOR/2D, 15a.

[42] William Borlase to Thomas Pennant, 6 September 1762, in WCRO, CR 2017/TP181/6.

Scientific and mercantile interests soon became amalgamated. The preface to Pennant's first major scientific publication, *British Zoology*, extols British natural resources in evident response to Linnaeus's plea to his own countrymen 'to apply themselves to the study of nature'.[43] In a competitive urge he boasts of British minerals, 'as great in quantity, as rich in quality' as anything in Sweden and speaks of the tin mined in Cornwall, the 'inexhaustible veins of copper' in northern Britain, the lead mines of Derbyshire, Cardiganshire and Flintshire.[44] Similarly, he suggests that 'few countries receive more advantages from their natural breed of quadrupeds than Britain and that 'few can boast a greater variety of birds, whether local, or migratory'.[45] Furthermore, Pennant's preface echoes the plea of his friend Benjamin Stillingfleet, both in his multi authored *Calendar of Flora* (1761) and in personal correspondence, to allow the discipline of natural history to be drawn 'from the cabinets of mere vertuosi into the busy world among physicians farmers and mechanics where it ought to be, and where it cannot be wanted without great loss to many of the useful acts of life'.[46] Pennant's reference to 'our rivals the French' in the preface confirms his (and Stillingfleet's) concern to promote national interests underlying more internationally collaborative practices.[47]

Turning to what might be termed the 'network of the busy world', we find that many of the peripheral figures which enabled the promotion of natural history within and across nations are invisible within a standard correspondence network analysis but with additional techniques they can be brought to the forefront. As mentioned above, the network drawn from the data for Pennant's correspondence can be described in a most simple sense as an *ego network.* By itself, the analysis one can perform on an ego network is limited: from a *network analysis* point of view, there is not much to be gained from listing all of the authors to Thomas Pennant, apart from learning some basic information about the volume of letters sent from each. An ego network of this kind is silent about all the other important connections in an individual's social sphere-- those with whom contact was face to face, peripheral figures mentioned in

[43] Pennant, *British Zoology,* vol. I (1768), p. ii.
[44] Ibid, pp. iii–iv.
[45] Ibid., p. v.
[46] Benjamin Stillingfleet to Thomas Pennant, 12 November 1761, in WCRO, CR 2017/TP367/2; Benjamin Stillingfleet (author and ed.), *The calendar of flora, Swedish and English. Made in the year 1755: The calendar of flora / by Theophrastus* (London, 1761), esp. p. 42; and Pennant, *British Zoology*, vol. I (1768), p. xi.
[47] Ibid., p. xi.

conversations, those met in person and talked about while travelling, secondary contacts (those 'friends of friends' who also in some way may have exerted an influence in one's network), etc.

To understand more about this wider network the content of the letters themselves can also be analyzed - moving beyond the basic metadata to encompass a richer field of view. Thus, we extracted and analyzed the people *mentioned* in letters written by correspondents in Pennant's ego network. This data can be used in a number of ways: first, in simple counts of those mentioned by authors to Pennant give a good sense of other important players within his extended circle and second, the information can be used to form a 'co-citation network'. In the latter, connections between individuals are drawn if they are mentioned in the same letter: working on the premise that if individuals are often mentioned together this can be used to infer some kind of connection, whether that be real (a social connection not recorded in correspondence) or symbolic (individuals mentioned together may share some abstract similarity). This is the premise behind, for example, Evan Bourke's work on co-citation networks which has brought out the role of women in intellectual circles; and it is the underlying method behind the digital project 'Six Degrees of Francis Bacon', which used co-citation in *Oxford Dictionary of National Biography* articles as the basis for inferring early modern social connections.[48] These methods enable us to highlight sidelined voices not involved in the direct correspondence, and offer the additional benefit of foregrounding the important role of women, merchants, and authors of natural histories to Pennant's world of scientific progress.

To construct the co-citation network, we took the data systematically collected on people mentioned in Pennant's correspondence up to 1765, and then used a computer script written in R, which draws a connection between two people if they are mentioned in the same letter. This information can then be visualised as a network diagram: one where people are represented as points and their co-mentions as lines connecting them. The resulting diagram highlights a number of aspects of the network: it provides an overview of those most 'central' to the citation network and helps us to understand distinct communities within the citations

Unlike a network of correspondence, a network of co-mentions can bring out figures who were involved in a network but who were not necessarily the writers of letters themselves. In

[48] Evan Bourke, "Female Involvement, Membership, and Centrality: A Social Network Analysis of the Hartlib Circle," *Literature Compass* 14, no. 4 (April 2017): 1–17, doi:10.1111/lic3.12388, and also his chapter in this volume; Christopher N. Warren et al., 'Six Degrees of Francis Bacon: A Statistical Method for Reconstructing Large Historical Social Networks', *Digital Humanities Quarterly*, 10, no. 3 (12 July 2016).

Figure 2 below, we have highlighted lesser-known individuals within the mention network who our research identified as facilitators of the correspondence network. This formed the basis for a close reading of the texts featuring these figures, to understand more about their influence on Pennant's system of specimen exchange. Many of them were merchants, but others were diplomats, factory owners, publishers, etc.

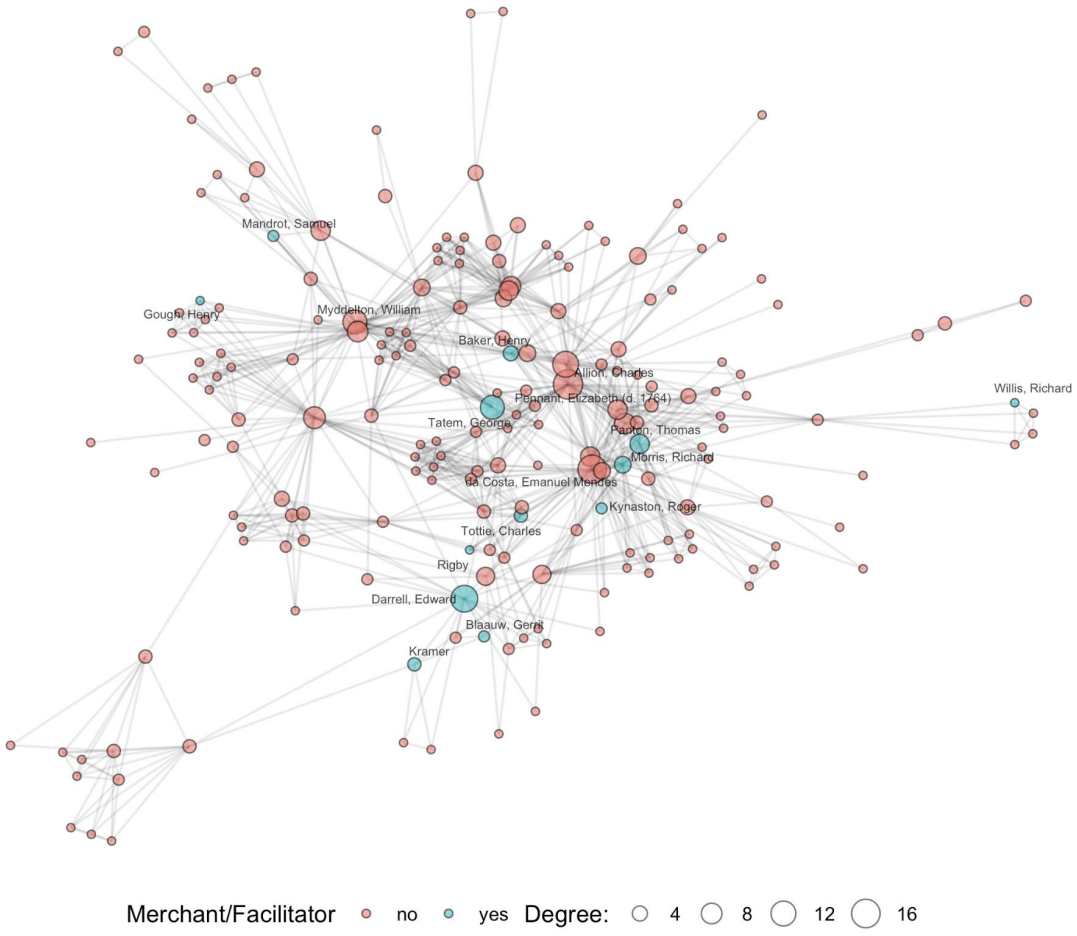


Figure 2: Co-citation network of Pennant correspondence up until 1765, with key 'facilitators' highlighted. Those at the centre tend to be mentioned alongside many others in letters. As well as those involved in direct scientific exchange, this method highlights the importance of a group who acted as facilitators or intermediaries in the network, as well as the many women who were central but themselves do not have correspondence in the network.

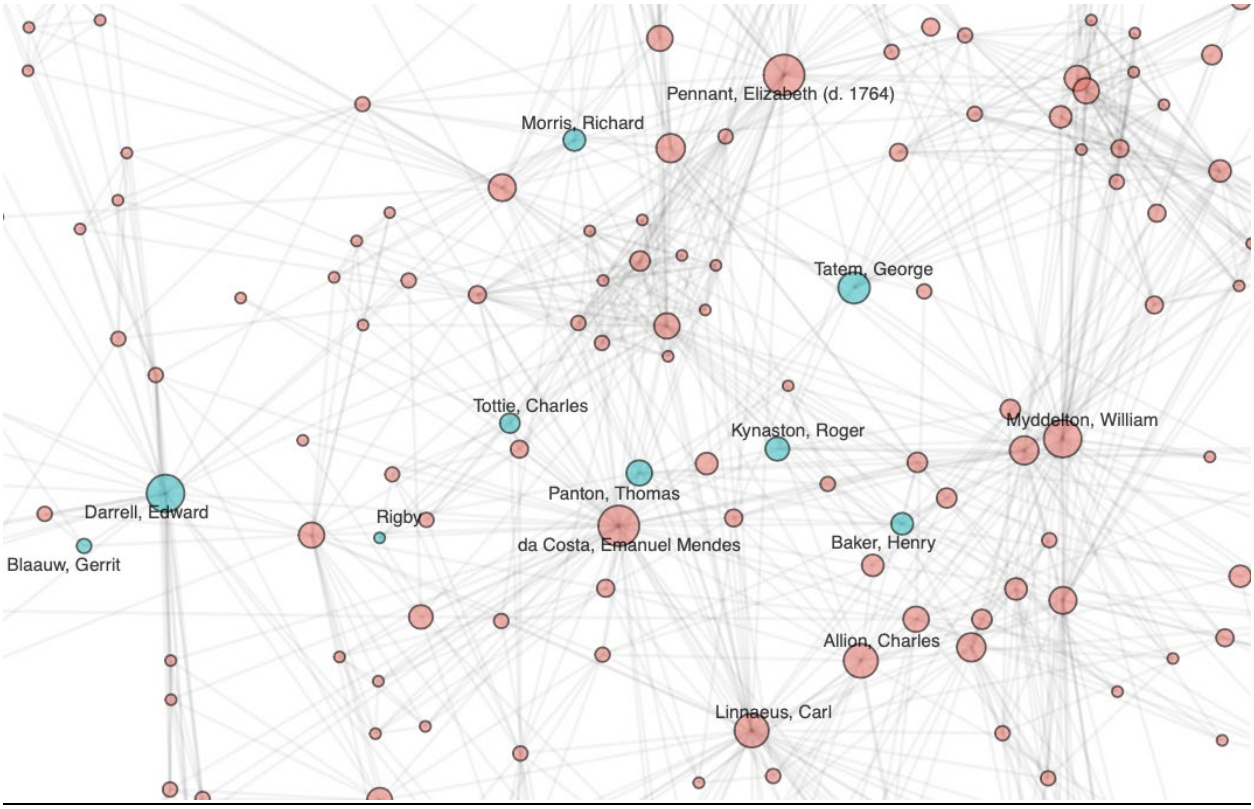


Figure 3: close-up of the figure above, showing in more detail those at the centre of the co-citation network.

The prevalence of merchants and other facilitators in a co-citation network is determined by the number of times they are mentioned in connection with others; thus, their ubiquitousness does not reflect their intellectual contribution to the network but rather their supporting role as receivers or transporters of packages on behalf of the intellectual drivers of the network. A man named Rigby in Liverpool was the recipient of material to and from Scandinavian ports sent by the merchants William and Charles Tottie in Stockholm.[49] When Pennant writes to Linnaeus in February 1760, and indicates that he would consider himself amply repaid for the large collection of minerals he had sent him through a present of books by Linnaeus's disciples printed in Sweden, he requests explicitly that the present be sent to Rigby.[50] Likewise, John Ulrich Passavant, a naturalized immigrant to England, facilitated the delivery of material from Pennant's Swiss correspondent Friedrich Samuel Schmidt in 1756;[51] Schmidt was also served together with

[49] Charles and William Tottie to Thomas Pennant, 13 March 1764, in WCRO, CR 2017/TP375/1; Thomas Pennant to Carl Linnaeus, 28 February 1760, in London, Linnean Society, Linnaean Correspondence XI, pp. 424-5.
[50] Thomas Pennant to Carl Linnaeus, 16 February 1760, in London, Linnean Society, Linnaean Correspondence XI, pp. 460-1.f
[51] Friedrich Samuel Schmidt to Thomas Pennant, 24 October 1756, in WCRO, CR 2017/TP354/1.

his compatriot, the geologist and cartographer Gottlieb Sigmund Gruner (1717–78), by Samuel Mandrot (d. 1794) and his company, who carried packages of specimens to Pennant and an unnamed Englishman in 1758 during an annual visit to Britain.[52] Finally, Gerrit Blaauw (1708-75), 'a rich merchant' to whom Pennant was recommended by Edward Darrell (*fl*. 1761-81) deserves to be mentioned.[53] Pennant visited him during his stay in Amsterdam in July 1765 and he facilitated the transportation of material from Gronovius in Leiden to Pennant in Flintshire either directly or via Darrell in London.[54] Rarely are we given more than a passing glimpse of these people, while the contents of the boxes or trunks they conveyed are often described in great detail. Gronovius mentions in May 1762 that the boxes transported by his carrier contained items such as woodworms, marine insects, and minerals.[55] In December 1763, he reports sending a box containing a bird from his friend the metallurgist Johann Andreas Cramer (1710-77), and from himself another small bird and a stork.[56]

Other merchants had a more proactive role in the network due to their apparent interest in the material exchanged and surface as correspondents in their own right. William and Charles Tottie, who clearly met Pennant during time spent in England, were Scottish merchants based in Stockholm and involved in the export of iron, tar and timber to England. As recipients of material bound to and from the ports of London and Liverpool on behalf of Pennant and his correspondents, they also displayed an interest in the intellectual conversation at the heart of the network, relaying news about Linnaeus's publication plans in March 1764, and possibly receiving a copy for their own benefit of a part of *British Zoology* in October the same year, as well as passing one on to the entomologist Charles de Geer (1728-78).[57] Thomas Panton (b. *c*.1730) of Livorno was an important link in chains emanating from northern Italy (Turin and Bologna). Like the Totties, he became a direct correspondent of Pennant's; two letters, dated 17 October 1768 and 1 December 1769, demonstrate his undertaking of a role which merges that of merchant and contact-maker.[58] The letters provide an insight into the kind of service which one

[52] Friedrich Samuel Schmidt to Thomas Pennant, 4 January 1758, in ibid, CR 2017/TP354/4; 15 April 1758, in ibid. /5.
[53] Pennant, *Tour on the Continent 1765*, p. 153.
[54] Laurens Theodorus Gronovius to Thomas Pennant, 26 May 1762; 26 August 1762; 6 December 1763; 7 February 1764; 3 May 1764, in NLW 22195C, ff. 1-2, ff. 5-6, ff. 11-12, ff. 13-14; ff. 15-16.
[55] Laurens Theodorus Gronovius to Thomas Pennant, 26 May 1762.
[56] Laurens Theodorus Gronovius to Thomas Pennant, 6 December 1763.
[57] Charles and William Tottie to Thomas Pennant, 13 March 1764; 9 October 1764, in WCRO, CR 2017/TP375/2.
[58] Thomas Panton to Thomas Pennant, 17 October 1768; 1 December 1769, in WCRO, CR 2017/TP323/1 and 2.

might expect to see being offered by 'merchant' figures for learned correspondents - Panton mentions looking for a direct conveyance for Liverpool or alternatively sending material through a contact, his 'good friend Mr: Thos: Hinchliff - Mercht: In London'.[59] But he also searches for a copy of Salvani's history of fish for Pennant, and undertakes to buy it if it 'can be procured here at the price you mention'. And he is himself an admiring recipient of Pennant's 'Elegant History of Birds' (presumably a copy of the second volume of *British Zoology,* 1768).[60] Furthermore, Panton is an active searcher for specimens: in December 1769, he regrets that Pennant's last letter arrived too late in the season to enable him to procure birds for him, but promises to get him 'a Copious quantity' the following year; he hopes also to send a sea turtle, fish, crabs and insect which inhabit the sea; and he has been able to find through a friend at Florence a Doctor Manetti as 'a proper Correspondent in the way of a Naturalist', according to his letter of October 1768. Thomas Panton, thus, becomes a polyvalent figure within the network, whose contribution far surpasses expectations.

4. Women in Pennant's Correspondence Network

This co-citation method also highlights other groups whose importance to Pennant's network of correspondence would otherwise be invisible or diminished. In the context of natural history discourse in the eighteenth century, women's voices are apt to be lost. Pennant's correspondence during this period features only three women: one of his two twin sisters, Catherine Pennant (1729-94), his 'venerable aunt', Elizabeth Pennant (d. 1775), and a mysterious admirer who signs herself as 'Lucy'. Catherine Pennant wrote the briefest of notes to Emanuel Mendes Da Costa with an enclosure from her brother in 1752; Elizabeth Pennant is the recipient of lively letters from Pennant sent during his tour of Ireland in the summer of 1754; and Lucy conjures up visions of joint involvement with the youthful Pennant in scenes of social conviviality.[61] As well as being a nephew and a brother, Pennant was twice married, but no correspondence has been discovered to or from either wife. This may well raise questions about the family's attitude towards the preservation of female correspondence, whether during Pennant's lifetime or as his

[59] Thomas Panton to Thomas Pennant, 1 December 1769.

[60] Thomas Pennant, *British Zoology. Class II. Genus XVIII, &c.} Birds. With an appendix, an essay on birds of passage and an index* (London: Benjamin White, 1768); Thomas Panton to Thomas Pennant, 17 October 1768.

[61] Catherine Pennant to Emanuel Mendes da Costa, 6 October 1752, in WCRO, CR 2017/TP408/22; Thomas Pennant to Elizabeth Pennant, 16 July 1754; 24 August 1754; 28 September 1754; 8 October 1754, at WCRO, CR 2017/TP125/1-4; Lucy to Hibernus, 29 October 1754; Lucy to Tommy, 12 May 1756, at WCRO, CR 2017/TP293/1–2.

papers were passed down via his elder son, David (entrusted by his father with orchestrating his legacy), and his grand-daughter, Louisa Pennant (d. 1853), eventually reaching the hands of the Warwickshire family of Newnham Paddox.[62] Women whose scientific interests brought them into contact with Pennant are so far not numerous; and female involvement in the activities exercised by members of the Royal Society, that bastion of scientific enquiry and discovery, appears to have been kept undercover.[63] This suggests a prevailing marginalization of women in a context which, even as late as the eighteenth century, privileged the use of Latin for learned expression (an issue which Anna Blackburne addresses in her correspondence with Linnaeus). This, alongside the priorities of archival practice means that, at first sight, women are offered limited agency within the extant correspondence. An analysis which considers the people mentioned within the network, however, allows us to gauge with greater precision the extent of their contribution to it. By highlighting the most important people mentioned overall in the network, we not only bring to the foreground the names of female figures involved in the network, but also find that women feature prominently alongside the men (figure 4). This marks out this particular method within network analysis as another tool in the armoury of archival recovery central to approaches to correspondence and to the study of gender in the early modern period.[64]

[62] Evans, 'The life and work of Thomas Pennant (1726–1798)', pp. 90–3. Evans maintains that David 'was responsible for destroying the letters of several of his father's correspondents', ibid., p. 259. ee also James Daybell, 'Gendered Archival Practices and the Future Lives of Letters', in *idem* and Andrew Gordon (eds.), *Cultures of Correspondence in Early Modern Britain* (Philadelphia: University of Pennsylvania Press, 2016), pp. 210–36, quoted at p. 234.

[63] See Lynette Hunter, 'Sisters of the Royal Society', in *eadem* and Sarah Hutton (eds.), *Women, Science and Medicine, 1500–1700: Mothers and Sisters of the Royal Society* (1997), pp. 178–97.

[64] See James Daybell and Andrew Gordon (eds.), *Women and Epistolary Agency in Early Modern Culture, 1450–1690* (London: Routledge, 2016), pp. 7–8; Kim McLean-Fiander and James Daybell, 'New directions in early modern women's letters: *WEMLO*'s challenges and possibilities', in ibid., pp. 223-38; and Women's Early Modern Letters Online, <http://emlo-portal.bodleian.ox.ac.uk/collections/?page_id=2595>.

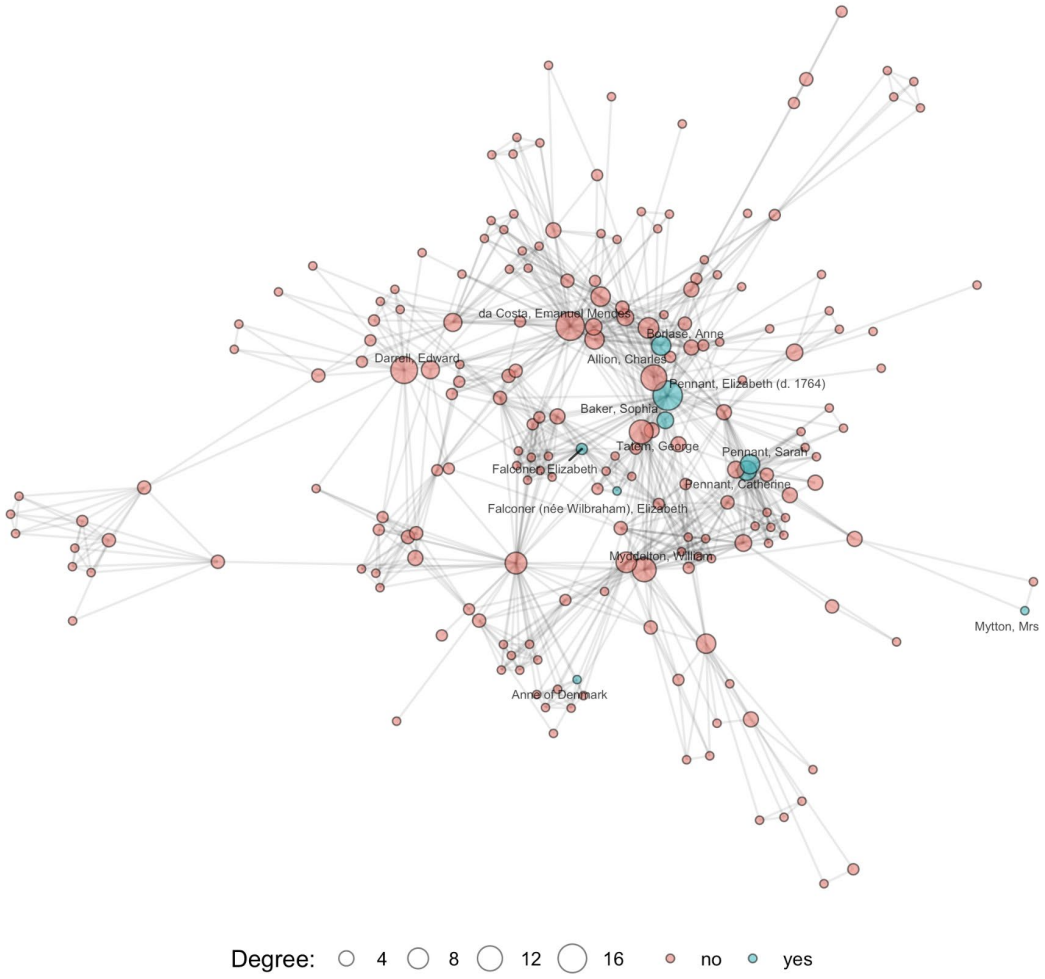


Figure 4: Co-citation network built from metadata on people mentioned in the dataset of Thomas Pennant's correspondence, with women highlighted. A number of women, who otherwise are invisible in the network, are highlighted in this way, most notably Elizabeth Pennant (d. 1764) and Anne Borlase (d. 1769).

The two most often co-cited are Elizabeth Pennant (d. 1764), Thomas Pennant's first wife, whom he married in April 1759; and Anne Borlase (d. 1769), wife to the Cornish antiquarian and natural historian William Borlas. In spite of the frequency with which Elizabeth Pennant is mentioned, she is a distant, almost ghostly figure - everywhere present in valedictions and good wishes, yet palpably absent, a fact accentuated by her early death, only five years after the marriage. Pennant's correspondence network enables us to see Elizabeth in the context of the expectations regarding women's lives after marriage, but also, specifically, in that of her husband's interest in natural history. As Thomas Pennant embraced marriage, his predilection for

shells and fossils would at last be placed in subservience to the duties of a husband to father children, referring at the same time to his bride, simply, as 'charming & Beautifull'.[65] Other correspondents suggested how Elizabeth might partake in her husband's scientific interests: Ferdinando Bassi (1710-74), writing from Bologna in November 1759, congratulated Pennant on his recent marriage and hoped that his wife had 'a taste for Botany';[66] William Borlase observed how Pennant and his wife would know how to 'season [their] domestick happyness by the sweet interchanges of Philosophy', a reference, perhaps, to the marital model ensconced by himself and his wife.[67] Pennant's own observations on his wife's interests in scientific endeavour appear to be confined to one brief but possibly significant comment in a letter to Linnaeus in June 1760, more than a year after the marriage: he had married a woman who harboured a love for natural history.[68]

The glimpses given in the correspondence of William Borlase provide a clearer picture of how a woman might relate to a naturalist husband's interests. In October 1763, thanking Pennant for his copy of the *British Zoology*, Borlase wrote that his wife had examined with pleasure the Cornish chough, featured in that publication, and was planning to work it and other birds in silk as a present for a young lady; she had compared it to a bird known to her for fourteen years and would add certain colours to her representation of it.[69] This suggests that she was a discerning naturalist, with a long-standing interest in observing a bird local to her area and an eye for detail to enable her to choose adequate colours for representing it in what might be termed the traditionally female occupation of silk-work. Anne also had an interest in both fossils and gardening: the naturalist John Ellis writes of Mrs Borlase's 'curious fucus' in a letter of December 1758, and in March 1764, her husband mentions her receipt of a box of flower roots from his Dutch naturalist correspondent Gronovius.[70] Anne Borlase thus features as an active natural historian alongside her husband although hidden from the record since there is no stage on which she could demonstrate and signpost her interest.

---

[65] Ellis Price to Thomas Pennant, [1759], in WCRO, CR 2017/TP341/1.

[66] Ferdinando Bassi to Thomas Pennant, 6 November 1759, in WCRO, CR 2017/TP171/5.

[67] William Borlase to Thomas Pennant, 29 June 1761, in WCRO, CR 2017/TP181/2.

[68] Thomas Pennant to Carl Linnaeus, 6 June 1760, in Linnean Society, XI, 426-428; Uppsala Univ. Library

[69] William Borlase to Thomas Pennant, 5 October 1763, in WCRO, CR 2017/TP181/10.

[70] John Ellis to William Borlase, 7 December 1758, at Morrab Library, MOR/BOR/2D, pp. 242-3; William Borlase to Thomas Pennant, 28 March 1764, at WCRO, CR 2017/TP181/11.

Other women surface merely as names, but are clearly as involved as Anne Borlase. An unnamed daughter of Taylor White (1701–1772), fellow of the Royal Society and a notable collector of natural history watercolours, was praised by Borlase as 'remarkably ingenious for preserving Birds in their natural dress';[71] and the 'Dudley fossils' of a Miss Ford were forwarded to Pennant by a contact at Coalbrookdale, Shropshire, in 1755.[72] Ford, who remains unidentified, was clearly at the forefront of discoveries in her local area: trilobite fossils discovered at Dudley and named after that locality are a point of discussion among male natural historians in the Royal Society's *Philosophical Transactions* in 1750, and it is possible that she acquired her collection (or that it became of interest to male natural historians) reasonably soon after this discovery.[73] The surfacing of a daughter of Taylor White and Miss Dudley is made possible through the use of a co-citation network model of analysis, demonstrating the critical importance of this technique in expanding understanding of the involvement of underrepresented groups. Further sharing of the metadata on online platforms such as EMLO leading to a high degree of accessibility for the data might lead to the identification of additional sources in which they feature.

The importance of the family in fostering curiosity regarding natural history among women is suggested by the involvement of White's daughter in the preservation of avian specimens. Anna Blackburne was likewise led towards natural history by the interests of her father, horticulturist John Blackburne (*bap*. 1694, d. 1786). Her stature within this predominantly male sphere is suggested early on by the inclusion in a letter to Pennant of the name 'Miss Blackburne' as subscriber to the *British Zoology*: it is her name rather than her father's which is given for a copy of the book in a letter from her cousin Ashton Lever to Pennant in February 1762.[74] She went on to foster a direct relationship with Pennant, greatly benefiting him by providing him with American specimens forwarded from New York by her brother Ashton

---

[71] William Borlase to Thomas Pennant, 28 October 1766, in WCRO, CR 2017/TP181/12. On White see <https://en.wikipedia.org/wiki/Taylor_White>; and for his art collection <https://archivalcollections.library.mcgill.ca/index.php/taylor-white-collection>.

[72] George Perry to Thomas Pennant, 15 August 1755, in WCRO, CR 2017/TP331/2.

[73] Charles Lyttelton and Martin Folkes, 'A letter from the Rev. Charles Lyttelton LL. D. and F.R.S. Dean of Exeter to the President, concerning a non-descript petrified insect', in *Philosophical Transactions of the Royal Society of London*, vol. 46, issue 496, at <https://doi.org/10.1098/rstl.1749.0112>; and 'Some further account of the before-mention'd Dudley fossil, by the editor of these transactions', ibid., at <https://doi.org/10.1098/rstl.1749.0113>. See also Donald G. Mikulic and Joanne Kluessendorf, 'Legacy of the Locust – Dudley and its famous trilobite *Calymene Blumenbachii*', at <https://uwosh.edu/weis/wp-content/uploads/sites/147/2019/08/Dudley-Locust.pdf>.

[74] Ashton Lever to Thomas Pennant, 21 February 1762, in WCRO, CR 2017/TP280/1.

Blackburne.[75] She further established herself as a natural historian through relations with Johann Reinhold Forster (1729-98), sometime tutor at the Warrington Academy, Linnaeus, and Peter Simon Pallas.[76] Anna's involvement with substantial names in the world of natural history is particularly evinced in Linnaeus's 1771 letter, which records a story heard by him of how she and two other females held their own against a male botanist at an Oxford garden in 1769. Her reply diminishes the honour suggested by Linnaeus, noting that the male botanist was merely the gardener, 'who was a great dunce'.[77] Yet, she only partially succeeds in demystifying the participation of women in science: although she notes that 'There are many Ladies in this country that are very fond of plants, one only of my acquaintance[...] knows them scientifically which is Lady Ann Monson', a woman whose assiduity as a collector and sharer of botanical specimens would have been known to Linnaeus.[78] She proceeds to note the substantial pains which she took to gain access to the scientific world, not least on account of her lack of knowledge of Latin.

Another woman whose name surfaces in Pennant's pre-1765 continental tour correspondence is likewise an aristocrat, Margaret Bentinck, Duchess of Portland (1715–85), proprietor of a large garden in Buckinghamshire and an impassioned collector of rare seeds. Mentioned to Linnaeus in the correspondences of both Daniel Solander (who apparently intended to infiltrate a cargo of insects destined for her from Jamaica in November 1761)[79] and Peter Collinson (who reported on Solander's survey of her museum in 1765),[80] she was also known by reputation to Erik Pontoppidan. Pontoppidan described her to Pennant as very knowledgeable and noted he had received letters from her.[81] Like Blackburne, Bentinck was a correspondent of

[75] See 'A catalogue of things sent from New York June 21st 1770 by Mr Ashton Blackburne to his sister Mrs A. Blackburne of Orford Hall', in WCRO, CR 2017/TP46.

[76] See V. P. Wystrach, 'Anna Blackburne (1726–1793) – a neglected patroness of natural history', in *Journal of the Society for the Bibliography of Natural History*, 8 (2) (1977), 148–68.

[77] Anna Blackburne to Linnaeus, 14 October 1771, in Wystrach, *op. cit.*, 154; and <http://linnean-online.org/77777323/>.

[78] Ibid. Anne Monson ordered the nurseryman James Lee to send plants to Linnaeus during 1767. See John Ellis to Carl Linnaeus, 3 July 1767, at <http://urn.kb.se/resolve?urn=urn:nbn:se:alvin:portal:record-232389>. For a (?draft) letter by Linneaus to Anne Monson, see Wilfrid Blunt, *Linnaeus: The Compleat Naturalist*, with an introduction by William T Stearn (Princeton, 2001), p. 225. Further on Anne Monson (*c.*1727–76), see *ODNB* <https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-57839?rskey=KrnzG4&result=1>. Note that Anne Monson's involvement in James Lee's translation of Linnaeus's *Philosophia botanica* into English was not acknowledged, thus silencing the female voice within the historical record.

[79] Daniel Solander to Carl Linnaeus, 16 November 1761, at <http://www.alvin-portal.org/alvin/imageViewer.jsf?dsId=ATTACHMENT-0001&pid=alvin-record%3A231349&dswid=-3841>.

[80] Peter Collinson to Carl Linnaeus, 1 May 1765, at <http://linnean-online.org/777773930/>.

[81] Erich Ludvigsen Pontoppidan to Thomas Pennant, 24 March 1764, at WCRO, CR 2017/TP338/8.

Pennant's by the early 1770s, her letters showing evidence of specimen transmission and reception.[82]

When Pennant travelled to the Continent in 1765, he became acquainted with female naturalists and painters newly involved in the representation of natural history. Among these was the Parisian Madame Baudeville, whose cabinet made an impression on Pennant as much for its design as the 'crystals and concave crystalline balls' which it contained;[83] or a Frau Schmidt, widow of a physician at Augsburg, who asked 8,000 florins for a cabinet.[84] Furthermore, the tour was an opportunity for Pennant to encounter work by female artists involved in the illustration of natural history. In Paris, he viewed examples of work by contemporary female artists such as Madame [Madeleine Françoise] Basseporte (1701–80), whose fine drawings of grapes he saw in the cabinet of Henri Louis Duhamel Du Monceau (1700-82) and, later, alongside works by two former male teachers of hers, Paul-Ponce-Antoine Robert (known as Robert de Sery; 1686–1733) and Claude Aubriet (1665–1742), whom she succeeded to the post of official painter to Louis XV's botanical gardens in 1741.[85] These latter drawings were held within the 'numerous volumes of drawings on vellum, mostly of plants', kept at the Bibliothèque du Roi.[86] Madame [Marie] Vien (née Reboul, 1728-1805), whose watercolour drawings of animals, seen at the Louvre, he described as 'Fine but extravagantly dear'.[87] A contact made at Nuremberg proved to be more felicitous. During a visit to the Dietszch family, whose members numbered two sisters, Barbara Regina Dietzsch (1706-83) and Margaretha Barbara Dietzsch (1726-95), both natural history painters, Pennant was impressed by the 'utmost elegance' with which Mrs Dietzsch drew plants and insects, and noted their prices, 'from 6 to 12 Florins each piece'.[88] His correspondence shows that Pennant commissioned work from either the elder or the younger sister. In a letter which caught him at Calais as he awaited a fair wind to carry him back home across the channel, Casper Gottlieb Merkel explains how Mademoiselle Dietsch and Mons. Karell (Johann Careel,

---

[82] Margaret Bentinck to Thomas Pennant, 1774, 1778, and n.d., at WCRO CR2017/TP172/1–3; Anna Blackburne to Thomas Pennant, n.d., including 'A Catalogue of things sent from New York June 21 1770 by Mr. Ashton Blackburne to his sister Mrs. A. Blackburne of Orford Hall', at WCRO, CR 2017/T46/1; and Anna Blackburne to Thomas Pennant, 11 January 1778 and 18 April 1778, at WCRO, CR 2017/TP177/1–2.

[83] Pennant, *Tour on the Continent 1765*, p. 21.

[84] Ibid., p. 127.

[85] Ibid., pp. 11, 23. See also anon., 'Royalists to Romantics: Spotlight on Madeleine Françoise Basseporte', at <https://nmwa.org/blog/royalists-to-romantics-spotlight-on-madeleine-francoise-basseporte/>.

[86] Pennant, *Tour on the Continent 1765*, p. 23.

[87] Ibid., p. 12.

[88] Ibid., p. 130.

fl. 1760-80) wished to be paid for work ordered by Pennant before delivering it.[89] Whereas it cannot be certain which of the two Dietzsch sisters was involved here (the 'Mademoiselle' appellation may suggest the younger), there is no doubt that Pennant, in his involvement with the continental art world, valued the work of female artists alongside their male counterparts.

As an exercise in projecting influence onto the future, the 1765 tour does not, on the whole, suggest strong currents of female influence on Pennant's network. However, incrementally, the names, although they appear as isolated nodes in any network visualization, bring a sense of an accumulative female presence into the network, with activities relating to natural history and art featuring prominently and contributing to a restorative exercise in unleashing the female voice, in which the experience of continental Europe played a significant part.

5. Thomas Pennant in the context of Early Modern Letters Online

Looking beyond Pennant's 1765 continental tour and the publication of *British Zoology* the following year, questions arise about Pennant's entire correspondence and its placement within a larger frame of reference. If some or all of the connections *between* Pennant's own connections are included (see Figure 5 (a)), the utility of the dataset in terms of network analysis begins to increase: each additional connection added to an individual within the ego network allows us to map a new world beyond Pennant's immediate surroundings, and to understand more about the context within which his own ego network was situated. This is also a key part of the agenda of the Networking Archives project from which this volume arose - joining individual catalogues on a much bigger scale. EMLO itself is very partial, particularly so in the eighteenth century, and so this linkage only lets us see a fraction of the epistolary world informing Pennant's oeuvre, and its role in this case should be thought of as suggesting possible interesting links, and providing hints at Pennant's wider network, through contextualisation with EMLO - and demonstrating the potential were more of these individual correspondences to be linked up.

We merged the Pennant ego network to the larger dataset, connecting the points within the Pennant ego network to a wider network (Figure 5 (b)). Through this it was possible to understand more about Pennant's network, highlight individuals who were particularly central to this wider circle, and even suggest individuals who stand out within this wider network who

[89] Casper Gottlieb Merkel to Thomas Pennant, 20 September, at WCRO, CR 2017/TP302/2.

would not have otherwise. Using software developed by the EMLO project, *Recon*,[90] we were able to find 42 people who wrote to Pennant and who also have records themselves in EMLO.

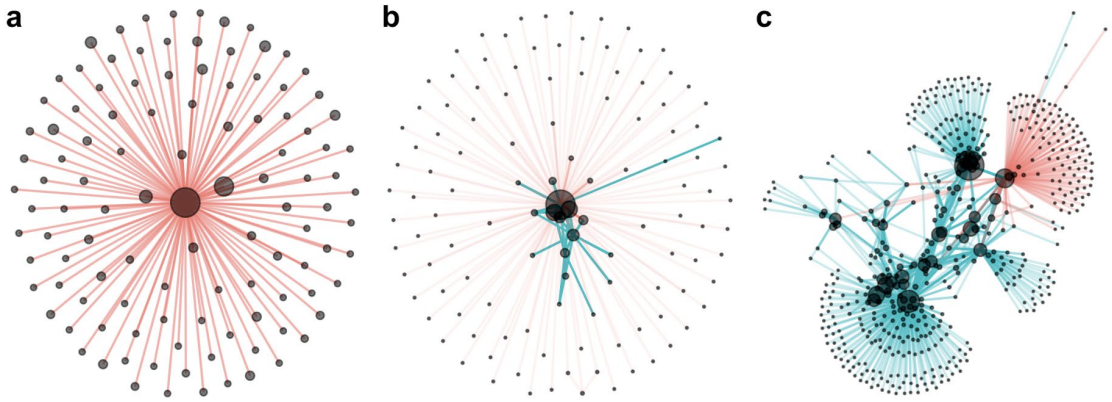
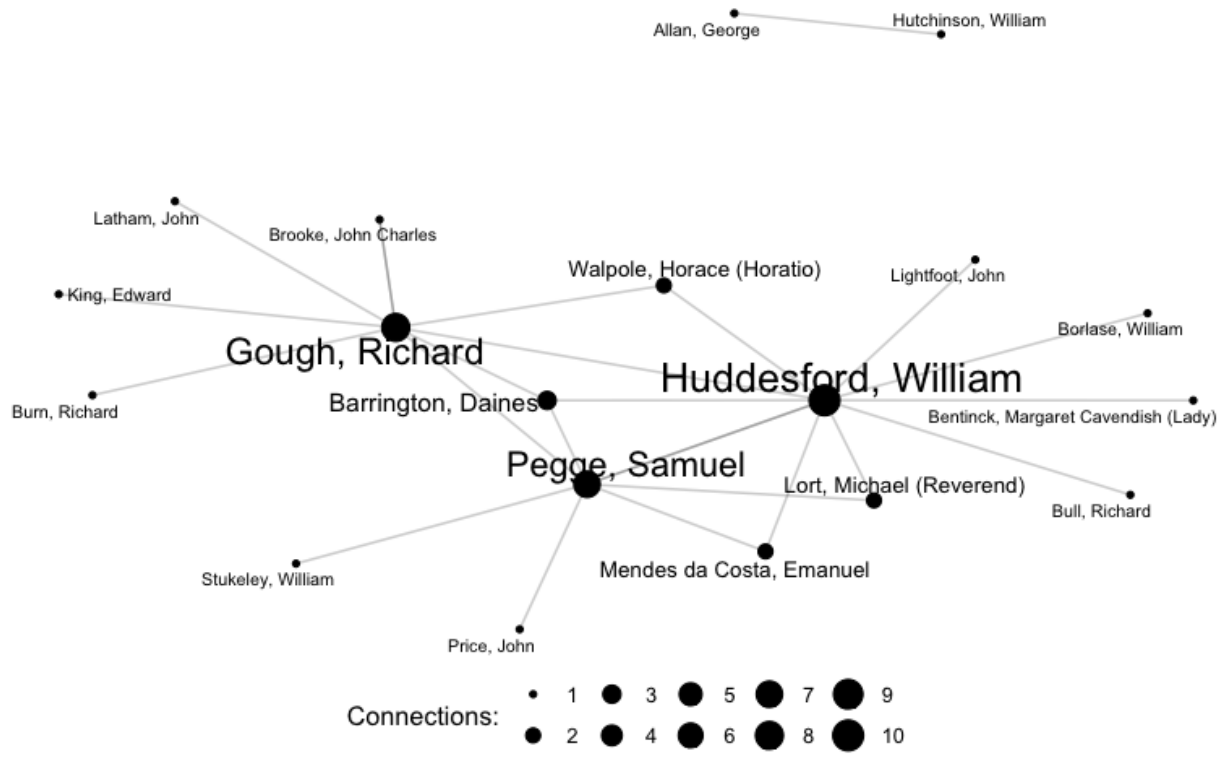


Figure 5: Moving from the Ego to EMLO: Linking people records in the Pennant data allows us to embed it within a wider network. Nodes are sized by their total connections.The first 'star' formation (a) is simply a representation of Pennant (the dot at the centre) and his direct connections (those who he either wrote or received a letter from). (b) is Pennant's ego network including all links between his connections, only possible with the addition of EMLO data. Links from EMLO are highlighted in green. (c) is Pennant's ego network situated in the context of an even wider EMLO network: all Pennant's direct connections, plus all their direct connections, as found in EMLO. Links from Pennant are highlighted in red, and links found in the wider EMLO data in green.



[90] See Eetu Mäkelä, 'Jiemakel/Recon', <https://github.com/jiemakel/recon> (accessed 28 February 2021).

Figure 6: A network of connections between Pennant's contacts, known as the alters in an ego network, made by merging Pennant's correspondence with the full metadata from Early Modern Letters Online. Pennant himself has been removed from the network so that the alters's own connections can be seen more clearly. Corresponds to diagram (**b)** above.

A primary utility of merging Pennant's ego network within EMLO is the addition of ties between the alters which otherwise are unseen in our analysis. These have then been visualised as their own network (Figure 6). In this figure we can see three competing - but connected - figures dominate the network (Gough, Huddesford, Pegge), representing the primary disciplines in which Pennant, like many of his contemporaries among the landed gentry and clerical classes, were involved. William Huddesford (*bap.* 1732, *d.* 1772), who succeeded his father as keeper of the Ashmolean Museum in 1755, concentrated his endeavours at the museum on putting to order the natural history collections left in disarray by his predecessors. Requesting the advice of influential contemporaries, including Emanuel Mendes da Costa and William Borlase, who both feature in this network visualization, he sought to compile catalogues and classify the material anew. John Lightfoot (1735–88), Michael Lort (1725–1790) and Margaret Cavendish Bentinck, who connects with Huddesford here, were other prominent naturalists who may be supposed to have aided him in this work. The link which brings together Huddesford and Samuel Pegge (1704–1796), another dominant figure, points to an interest in the antiquarian material held both at the Ashmolean and at the Bodleian Library in Oxford, with which Huddesford was called upon by Pegge to aid him in his researches. Huddesford's other links comprise Horace Walpole (1717–97), whose wide-ranging interests and circle of acquaintances embraced the antiquarian world; and Daines Barrington (1727/28–1800), who had a dual interest in these fields.

Antiquarianism may be at the heart of the strong nodal representation of both Pegge and Richard Gough (1735–1809), the latter director of the Society of Antiquaries by 1771, his papers left to the Bodleian Library. A slightly smaller node represents Barrington, who like Walpole and Pegge also had links with Huddesford. The prime holders of the antiquarian branch of the network, Pegge and Gough, both have contacts unique to themselves. Pegge's feature the Bodleian librarian John Price (1735–1813); and the antiquarian and natural philosopher William Stukeley (1687–1765), whose manuscript history of the Antiquarian Society, of which he was a founder member when it was re-established in 1718, was later used by Gough, although no direct

link between the two men is noted here.[91] Gough corresponded with the Somerset Herald John Charles Brooke (1748–94); the legal writer Richard Burn (1709-85); the antiquarian Edward King (1735?–1807); and the ornithologist John Latham (1740–1837), who was also elected a Fellow of the Society of Antiquaries in 1793, during Gough's directorship.

The network is partly conditioned by EMLO having started out as a database derived from the Bodleian Library card catalogue, with figures such as Gough, who left his papers to the Library, or John Price and William Huddesford with their strong Bodleian / Ashmolean links featuring prominently by virtue of their geographical and historical placement within Oxford. It speaks to aspects of Thomas Pennant's career, but is silent on others: the dissociated north of England figures George Allan (1736–1800) and William Hutchinson (1732–1814), antiquary and topographer respectively, seen at the top of the visualization, are indicative of further lacunæ, in particular Pennant's Scottish contacts from the date of his first tour of Scotland in 1769, and, with the exception of the Denbighshire-born John Price and Michael Lort, a native of Pembrokeshire, his entire Welsh network of friends, acquaintances and family members.

A second mode of analysis is suggested by Figure 5 (c). This network is built by merging with EMLO and extracting not only the connections between Pennant's contacts, but also all of *their* contacts, or 'overlaps'. The overlaps method lists all the contacts of an individual, *A*, and each of the contacts that *A* in turns shares with *B*, *C*, *D*, and so forth. It furthermore also allows an exploration of shared indirect contacts, namely *A* and *C* have *B* in common, even though *A* and *C* did not correspond directly. This approach is thus key in understanding direct and indirect links, but also in establishing the proximity of other individuals and networks. By focusing on Pennant, we are with the overlaps method to find direct and indirect connections within EMLO.

[91] ODNB, s.n. William Stukeley.

Table 1: of the most connected who do not have a connection directly to Pennant. These are the largest-sized nodes as seen in diagram **(c)** above.

Name	**Connections to those in Pennant's network**	**Information on titles and roles as taken from EMLO**
Noble, Mark (Reverend)	27	English clergyman; biographer and antiquary
Rawlinson, Richard (Dr)	19	Topographer and antiquarian; bishop of the nonjuring Church of England; brother of Thomas Rawlinson (1681–1725)
Nichols, John	16	printer, writer and antiquarian; printer and editor of 'The Gentleman's Magazine'; head of Nichols family printers and publishers; father of John Bowyer Nichols (1779-1863)
Ballard, George	14	Antiquary
Ducarel, Andrew Coltée	13	librarian and antiquary
Brett, Thomas	12	bishop of the nonjuring Church of England; theologian; LLD, Queens' College, Cambridge, 1698
Gray, Thomas	10	Poet; Literary Scholar
Richardson, Richard	8	Physician; botanist; FRS
Wise, Francis	7	librarian and antiquary; keeper of the archives, Oxford University; first librarian of the Radcliffe Library, Oxford; fellow of the Society of Antiquaries
Percy, Thomas (Reverend)	7	writer; Church of Ireland bishop of Dromore
Jurin, James	6	Physician; natural philosopher; FRS; FRCP
Ames, Joseph	6	bibliographer; antiquary; ironmonger
Lyttelton, Charles	6	Bishop of Carlisle, 1762; antiquary
Willis, Browne	5	antiquary; eldest son of Thomas Willis (1658-99); M.P. for Buckingham
Mortimer, Cromwell	5	physician; antiquary
West, James	5	politician and antiquary
Loveday, John	5	antiquary and traveller; father of John Loveday the younger (1742-1809)
Owen, Humphrey	5	Bodley's librarian; principal of Jesus College
Malone, Edmond	5	literary scholar and biographer; son of Edmund Malone (1704-1774)

Finally, if we take a glance at the persons who feature in EMLO with the most connections to Pennant's correspondents, but who have no direct contact with Pennant himself, the same geographical prioritization of mostly southern England contacts is seen. However, the range of occupations and interests are broader, giving alongside antiquaries and librarians a range of men involved in the church at various level - from a clergyman to several bishops - together with physicians, writers, literary scholars, and poets, and, in the figure of John Nichols (1745–1826), a printer and editor. This method puts the antiquary Mark Noble at the top of Pennant's list:

although it is not clear whether they knew each other; Pennant is listed as a subscriber in Noble's work *Two Dissertations Upon the Mint and Coins of the Episcopal-Palatines of Durham*.[92] Some of the names seem so integral to Pennant's contacts' lives and to his own activities that it is hard to imagine that he had no direct contact with them. Nichols is a case in point: Pennant was actively involved with London printers throughout his career; his close acquaintance Gough went on excursions alongside Nichols. Similarly, Andrew Coltée Ducarel (1713–85) was a correspondent of Da Costa's, through whom the latter gained access to Ducarel's brother James and Pennant's relation Roger Kynaston (1710-88) in Shrewsbury;[93] and it was to Ducarel that Charles Lyttelton (1714–68), bishop of Carlisle, communicated in 1768 his belief that the manuscript travels of Richard Pococke (1704–65) in Scotland had been lost - falling into the hands of no less a figure than Thomas Pennant himself, it has been suggested.[94] Seeing the proximity of these figures to each other within a network in which Pennant is also placed conveys almost uncanny, yet unproven, social ties, connections which lie just beyond our reach through the extant historical record but which techniques of network analysis can reinstate within our field of vision.

6. Conclusion

From early on, Pennant sought to establish a correspondence network across the British Isles, continental Europe, and beyond. For naturalists the value of such an epistolary commerce was enormous, as this study has shown. Letters served to convey news of ongoing work, discoveries or publications, but they provided channels for so much more besides. Through letters a complex system of the exchange and occasional sale of specimens was supported, enabling Pennant and his contemporaries to access rare specimens of animals, plants, or minerals with which to enrich their own collections and publications. There was a mutual dependency here, which existed against the backdrop of competing interests. By subscribing to each others' books, naturalists were able to sustain a market where costs on account of the many illustrations needed to impress

[92] Mark Noble, *Two dissertations, upon the mint and coins of the Episcopal-Palatines of Durham* (Birmingham: Pearson and Rollason, 1780), p. vi.
[93] Emanuel Mendes da Costa to Andrew Coltée Ducarel, 12 August 1751, in John Nichols, *Illustrations of the Literary History of the Eighteenth Century*, vol. 4, p. 602.
[94] Charles Lyttelton to [?Andrew Coltée Ducarel], 31 July 1768, in Daniel William Kemp (ed.), *Tours in Scotland 1747, 1750, 1760 by Richard Pococke Bishop of Meath* (Edinburgh, 1887), pp. lxix, lxx.

were notoriously high. In this way they facilitated not only their own work, but were also dependent on many others: collectors, conveyors, merchants, seafarers, agents, and the like.

Through this article we have sought to capture the complexity of the networks of knowledge and exchange by layering up methods: first, by capturing different types of metadata such as people mentioned, and, second, through merging with larger datasets of letters. Both of these methods serve to highlight otherwise silent or marginalised figures: in this case, a parallel network of merchants and facilitators has been drawn out through the letter mentions, as has the importance of women to Thomas Pennant's correspondence network and work. Merging and reconciling Pennant's correspondence with EMLO, though only broadly sketched out above, and working with incomplete eighteenth-century data, clearly demonstrates the potential of record linkage. Future correspondence projects could gain enormously by linking to EMLO and other correspondence datasets, including those yet to be uncovered in international archives, through authority identifiers such as VIAF or Wikidata: what we hope to have shown is not only that this record linkage helps with identification, but also that by enabling the possibility of merging with a larger network, new ties can be discovered or inferred, and the simplest ego network can be contextualised within a wider social sphere. Mirroring Pennant's wide-ranging and highly prized international network, the possibilities to scholars through closer cooperation with archives in Europe and beyond for accessing enhanced records are truly enormous.